

Building and Painting the **Sd.Kfz 251** in 1/48 Scale



Armor Modeling How To
by **Kevin Townsend**

Contents

CHAPTER	SUBJECT	CHAPTER	SUBJECT
	<u>Introduction</u>	17	<u>Sd.Kfz 251/11 Ausf C</u>
1	<u>Schutzenpanzerwagen (SPW)</u>	18	<u>Sd.Kfz 251/16 Ausf D</u>
2	<u>The Kits</u>	19	<u>2cm Flak 38 Auf SPW (Sd.Kfz 251)</u>
3	<u>Construction, Detailing</u>	20	<u>Sd.Kfz 251/17 Ausf D</u>
4	<u>Painting and Weathering</u>	21	<u>Sd.Kfz 251/20 with Panther G</u>
5	<u>Creating and Painting Figures</u>	22	<u>Sd.Kfz 251/21 Ausf D</u>
6	<u>The Ten Commandments of Effective Composition</u>	23	<u>Sd.Kfz 251/22 Ausf D with Flakvierling 38</u>
7	<u>Sd.Kfz 251/1 Ausf D</u>	24	<u>Sd.Kfz 251/1 Ausf D Holzgasantrieb (Field Modification)</u>
8	<u>Sd.Kfz 251/1 Ausf D mit Wurfrahmen 40 "Stuka Zu Fuss"</u>		<u>References</u>
9	<u>Sd.Kfz 251/2 Ausf D</u>		
10	<u>Sd.Kfz 251/3 Ausf D with Panther G</u>		
11	<u>Sd.Kfz 251/4 Ausf C with 7.5cm Infantry Gun</u>		
12	<u>Sd.Kfz 251/6 Ausf B with Kubelwagen</u>		
13	<u>Sd.Kfz 251/7 Ausf D</u>		
14	<u>Sd.Kfz 251/8 Ausf C</u>		
15	<u>Sd.Kfz 251/9 Ausf D (Early)</u>		
16	<u>Sd.Kfz 251/10 Ausf C (Field Modification)</u>		

"PROJECT 251"

Modeling the Sd.Kfz 251



INTRODUCTION

By Kevin Townsend



INTRODUCTION

As we grow, we are shaped by various life-changing events.

One of mine happened in the summer of 1974. I was 13 years old. The models I had previously built were used as toys. But then I saw that wonderful diorama—"Red Sniper Hunt"—by Shep Paine in "Military Modeler" Magazine. There in full color was something unlike anything I had ever seen. "Red Sniper Hunt" featured two Sd.Kfz 251 halftracks. One, with rocket launchers, was pinned down by sniper fire while another roared to the rescue with infantry dismounting over the sides. I bought the Tamiya 1/35th scale 251/1 kit and Panzergrenadier set and made my own version of grenadiers dismounting from a halftrack. Construction was shoddy. Painting? The vehicle was left in grey plastic and the figures in their molded field grey color. Flesh areas were sloppily painted a cream color; weapons, boots and most gear were black. Canteens and bread bags were brown. It was beautiful...to me.

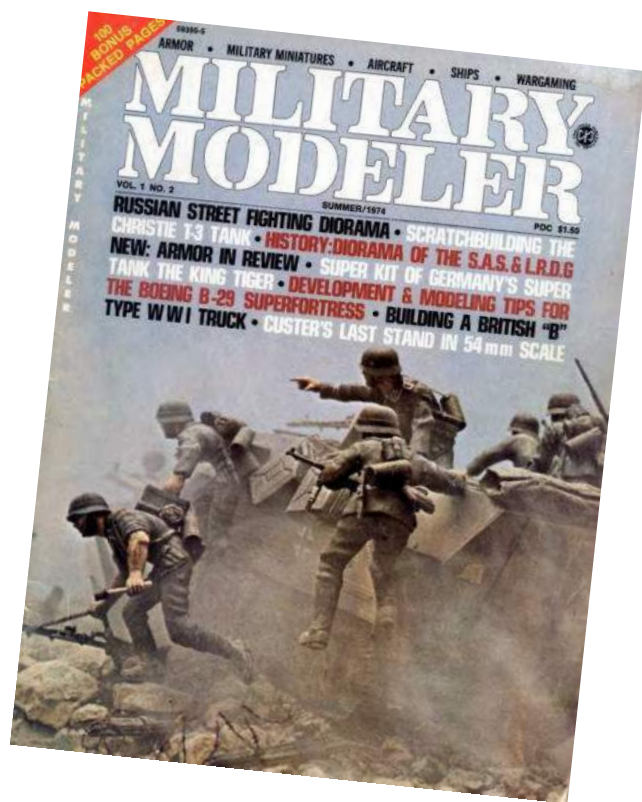
That was my introduction to "adult" modeling. My love affair with the Sd.Kfz 251 started with that same magazine article, and it has remained one of my favorite military vehicles. Although serving an evil cause, WWII German vehicles and uniforms have long been favorites of armor and figure modelers. It's not hard to see why. The quality, technical complexity, effectiveness, multitude of types and variants, and attractiveness make German armor a fascinating study. Add in the variety of camouflage colors, patterns, designs, and the plethora of uniform types and the modeler has a nearly endless subject matter. The Sd.Kfz 251 is a case in point - it's complex suspension and angular sloped armor give it interesting and attractive lines. It was also a ubiquitous vehicle—where the tanks and panzergrenadiers were, so too was it. The numerous variants—both official and unofficial—means a modeler could almost spend his or her entire modeling career on this one vehicle!

As I matured in the hobby during my middle and high school years, I built half a dozen Sd.Kfz 251s; mostly in 1/35th scale, but I also built one of Bandai's 1/48th scale kits. I liked the halftrack design, and wanted a whole set of them. At graduation, I still had three - a decent Tamiya 251/1 with credible figures deploying over the side; another Tamiya kit featuring rocket frames from the Nitto kit, and a third mounting Tamiya's 37mm gun. This last kit was the nicest model I had built to that point—it could hold its own even today. I had no idea how inaccurate Tamiya's kit was, or how many variants of the vehicle existed. College, family, nearly 23 years in the military, and many moves were hard on the few models I had kept. None survived. Nor, unfortunately, do I have photos—only fond memories.

For 16 years after high school, I was not active in the hobby—life demanded my time and attention. I returned in 1995 as a fig-

ure modeler, but my interest in the 251 remained. I studied it, and still dreamed of a whole set. I saw most variants released in 1/35th scale, but in that scale, the project would have been too expensive, too complex, too time-consuming, and too big.

Then in 2013 I discovered 1/48 scale was still around—I thought it had died when Bandai stopped producing their little gems decades ago. While there were few options, I saw my opportunity. Conversion and scratch-building would be needed, but my skills had matured to the point that was no obstacle. Aftermarket conversion sets existed for some of the variants. Tamiya also marketed several figure sets—not perfect, but useable, plentiful, and inexpensive. I had the needed funds from the sale of some finished figures and kit masters made for a figure company. Through 2014 I collected kits, parts, and references. In late January 2015, I started work. The image of panzergrenadiers deploying over the sides of the halftrack is one that always stayed with me, so my project began there. I was 53—40 years had passed since I first tried my hand at “adult” modeling, and I had come full circle—recreating what was, in effect, the first serious model I had ever built. Over the next few years, more halftracks in more variants followed. We all have our dream modeling project—our “holy grail”. This is mine. I am very pleased with the result and hope you are as well.



The Diorama “Red Sniper Hunt” by Shep Paine, appearing on the cover of the Summer, 1974 edition of Military Modeler Magazine, was one of the key catalysts in my transition from a kid who built kits to play with into a serious modeler. It remains to this day my favorite diorama of all time. It was also the inspiration for my version of the 251/1 halftrack. Shep is regarded by many as the father of our hobby. He is arguably the best known modeler in the world, and was the inspiration for an entire generation of armor, aircraft, and figure modelers. Shep’s book, “How to Build Dioramas” is still—rightly—considered the “Bible” by many in the hobby. Other books by Shep include “Building and Painting Scale Figures”, “Modeling Tanks and Military Vehicles”, and “Photographing Scale Models”. Shep is also famous for the fantastic “Tips on Building Dioramas” pamphlets that appeared in Monogram models back in the 70s—I still have many of these amazing little documents. It was through his books and pamphlets that I learned my craft. Those familiar with his methods will see much they recognize in these pages. Shep was a master modeler in the days before the large aftermarket and vast kit selection we see today, and had to rely largely on detailing and scratch-building skills. Although the hobby has advanced beyond the methods he introduced, it was, in part, his pioneering work that made all that possible. His work still holds its own beside the modeling superstars of today. I consider myself blessed to have met him on several occasions and to have had the opportunity to attend some of his seminars. Thanks, Shep! This project is dedicated to your memory.

Opposite Top: My rendition of Panzergrenadiers deploying from a Sd.Kfz 251/1 Ausf D. Shep’s influence is clearly visible.

This work documents my journey to create a collection of 251s. It includes far more than just halftrack models. For me, figures are vital—they provide an immediately recognizable sense of scale and add life to the models. Groundwork provides setting and context. They way all these elements interact—the composition of a diorama or vignette—tell stories. These stories are what provides interest and attract viewers—just as Shep’s magical dioramas did for me all those years ago. It is my hope I can give some of that same inspiration and education I received from Shep to newcomers of the hobby today.

This work describes the methods I use to create models, figures, and groundwork in quarter scale (one quarter inch to the foot or 1/48 scale). They are certainly not the only methods. Nor are they necessarily the best methods. They are simply the methods that work for me. They are not exclusive to 1/48th scale—they will work in both larger and smaller sizes. Part of the fun of this hobby is experimenting and finding the techniques that work best for you. My methods are not secret or proprietary. In fact, few are my own creations – most I picked up from others and adapted through trial and error to fit my way of working. My methods also evolve, and in some cases change, over time. So in these pages, you will sometimes find more than one way to approach a particular modeling task.

In this work, we will begin by looking at the Sd.Kfz 251 itself. There are a great number of references available. The Panzer Tracts works are, by far, the best and most accurate. The others, while some are quite good, all have some errors. Many present

contradictory information or repeat mistakes made by other authors. After over three years studying the vehicle, I have presented what I believe is the most accurate information as I have been able to determine it. I leave it to you to judge the accuracy of my work. After this, we will look at the available kits. Next we will discuss basic assembly. More specialized conversion and scratch-building methods will be studied in the chapters on the individual variants. We will also examine my painting, figure making and compositional ideas before continuing to the specific builds. Ground work, while certainly as critical as these other elements, will be looked at in chapters on the models themselves. We will start in early chapters with simple, basic ground-work and create more advanced settings as we progress.

If you are new to the hobby, welcome. Much of this work is written with you in mind. I have tried to keep things simple enough for the novice to follow even when describing advanced methods. I hope this work will be useful for many projects as you grow in our hobby. I hope, too, that the “grizzled veteran” will also find things of interest and maybe pick up a couple tips. None of us has mastered everything - we can all learn from one another regardless of whether we build primarily armor, figures, aircraft, ships, cars, buildings, dollhouses, trains, or whatever else we may create.

If you are new, start simple. Don't try to sprint immediately - learn to crawl and then to walk before you begin running. Many are those who tried to tackle a project beyond their ability and ended up frustrated and discouraged. Many quarter scale kits - most notably those by Tamiya - are relatively simple, ideal for novices. While their detail can be improved upon, they make fine kits straight from the box. While quarter scale is not as heavily populated as the smaller 1/72nd scale or the more bloated 1/35th scale, there is enough available for you to create a wide variety of models, vignettes, and dioramas by making only stock straight from the box models, figures, and groundwork items. It's a great scale for beginners - the kits are generally somewhat simpler than larger kits while being easier to handle and work with than smaller ones.

Buy only the materials you need for your first kit, and let your stock of tools, paints, and materials grow as you grow. Throughout this work I offer advice on tools, paints, and other supplies. Much of this is directed toward the beginner and focuses on getting value for the money. Quality does not necessarily mean expensive or complex. You may be perfectly content to stick with stock, straight from the box kits, but you can also, as you grow in experience and ability, detail or convert kits. Resin kits and conversion sets open up more possibilities. Even building from scratch is not as difficult as you might think as we shall see in later chapters. I enjoy adding figures and creating vignettes and dioramas. To me the most memorable pieces are the unique and imaginative ones, even if they are “technically” not the best. None of this is as hard as it seems. The choice is entirely up to you.

I sincerely hope this work can assist you, be you novice or pro. Take this hobby as far as you wish. Go to model shows, study the work of others, ask questions - but most importantly make friends and have fun. All of us, from the rookie to the leading pro, gain from this interaction. Join a club if you have access to one that shares your interest. Participate in on-line forums if you wish. Don't be disappointed if your first works aren't masterpieces. Don't be upset if you make a mistake - we all do—it's a mandatory part of the process. As long as you give each project your best effort, you can be justly proud of the result. But don't rest on your laurels - use any flaws as motivation to improve with your next effort. Develop your own style, and build whatever YOU like however YOU wish. There are no rules - give your imagination and your talent free reign. Anyone who tells you you're wrong is...wrong. If you gain anything useful from this work, then I have met my goal. Good modeling and God Bless!



While there is certainly nothing wrong with building a model straight from the box and proudly placing it on your shelf, I prefer to place my models in a vignette or diorama with appropriate ground-work and figures. Not only do I enjoy these aspects of the hobby, the figures and groundwork provide context and tells a story. I also like to weather my models, but there is nothing wrong with building factory-fresh kits if that is what your prefer. Seen here is a detail from my Sd.Kfz 251/3 diorama.

1

"Project 251" Modeling the Sd.Kfz 251



Schützenpanzerwagen (SPW)

By Kevin Townsend



SCHUTZENPANZERWAGEN (SPW)

Sonderkraftfahrzeug (Sd.Kfz) 251

In the years between the World Wars, as Germany was developing the military doctrine the world would come to know as “Blitzkrieg”, a new type of armored vehicle was developed to allow the infantry to keep pace with the tanks. The ubiquitous “Hanomag” became synonymous with the panzergrenadier. Where the tanks were, so too were the SPWs.

Derived from the unarmored Sd.Kfz 11 prime mover, the Sd.Kfz 251 halftrack was designed to transport a squad of mechanized infantry into battle. Development started in 1937, and the first vehicles—designated *mittlere gepanzerte Mannschaftstransportwagen Sd. Kfz. 251* (medium armored personnel carrier) - reached the troops in 1939. Beginning in 1941, it was redesignated as the *mittlerer Schützenpanzerwagen Sd.Kfz 251* (medium rifleman’s armored vehicle). These vehicles, often referred to as “Hanomags” by historians after the primary design company, were the most widely produced German half-tracks of the war, with at least 15,252 vehicles of all models and variants being produced (note there is no evidence the troops ever referred to them as “Hanomags”). The halftrack chassis and armored body allowed the panzergrenadiers to accompany the tanks and provide infantry support as required. It was an efficient vehicle, although its complex track and suspension made heavy demands on maintenance personnel. Its halftrack design allowed it to go where trucks could not, and it had the performance needed to keep up with the tanks. When the panzergrenadiers dismounted, the vehicle usually stayed close to provide fire support with its machineguns. The vehicle was made in four models, the Ausf A-D. In addition to the standard infantry carrier, numerous variants were designed to support the infantry, tanks, and other support units.

Due to cost and slow production, the number of vehicles available was initially low. Only a portion of the 1st Panzer Division was equipped for the Polish Campaign. The vehicle was still relatively rare during the French campaign. Production was stepped up in 1940 and the vehicle saw increased employment in the Balkans, Greece, and especially Russia. The vehicle also saw service in North Africa, but only in limited numbers. The complex design of the armored body was simplified with the introduction of the final model, the Ausf D, in 1943, and more of these were produced than the A-C combined, making the vehicle a very common sight on the battlefields of Russian, Western Europe, and Italy. Still, in practice, there were never enough to go around, and normally only one battalion of a Panzergrenadier regiment was equipped, the remainder moving in trucks.



Above: The image of the Sd.Kfz 251 is linked to the Panzergrenadiers. Their image, in turn, is linked to the Panzers. Here we see an Sd.Kfz 251/9 operating with Panther Tanks

Title Page: Troops deploy from a 251/1 Ausf B (Bundesarchiv)

Opposite: My depiction of the Sd.Kfz 251/9.

In addition to the information in this chapter, additional historical data on many variants can be found in the dedicated chapter. Most of the photos in this chapter are from the Bundesarchiv. Some are from the National Archives. Others are from various sites on the internet (see the appendix on references and resources). Due to the passage of time, all should now be in the public domain.

accumulated mud and snow could freeze solid between the wheels, immobilizing the vehicle. The front wheels were unpowered and served only to support the weight of the vehicle's nose and to provide steering during slight turns of less than 15 degrees. For sharper turns, the inside track was slowed and increased power supplied to the outside track. The vehicle had four forward gears and one reverse. A two-speed transfer case thus gave the halftrack 8 forward and two reserve speeds.

The armored body was usually made from welded plate. However, one factory producing the Ausf C did not initially have the capability to weld armor resulting in some early Ausf Cs featuring riveted hulls. The body was made in two sections, bolted together behind the front seats. Armor ranged from 14.5mm on the nose to 6mm on the belly offering some protection against small arms, fragmentation, and mines. The open top design offered good situational awareness and allowed the passengers to fight from the vehicle, but it was also vulnerable to plunging fire and fire coming from higher elevations. The armor was sloped, increasing its effectiveness. Armored glass was fitted under armored visors, providing protected vision for the crew. Both the armored cover and the armored glass could be raised, provided better visibility when the additional protection was not needed.

In 1940, the decision was made to use the 251 as the basis for as many of the armored formations' special-purpose vehicles as possible. The Ausf A and B models came from the factory only as personnel carriers (and were further modified in the field). The first eight variants (251/1 to 251/8) were officially created in November of 1940. The next six (251/10 to 251/15) were authorized in August of 1942. Some were already in service by this time and others still in development. With the increasing production throughout the life of the C and D, the pace of variant development picked-up. By the end of the war, 23 variants and numerous sub-variants had been authorized (but not all were actually produced). This, combined with field-modified vehicles, resulted in a bewildering variety of types.

The Sd.Kfz 251 consisted of an armored body and belly plate bolted to the chassis of the Sd.Kfz 11. The Sd.Kfz 11 chassis was little changed – the radiator was altered to fit inside the armored body, an angled steering wheel was used, the exhaust redesigned and repositioned, and the gas tank was redesigned. The suspension was unchanged – each side had a three quarter length track run supported by interleaved road wheels and driven by a drive wheel equipped with complex rollers rather than the more common sprocket teeth. While the interleaved road wheels provided good weight distribution and a smoother ride, they were difficult to maintain. In the winter

The Sd.Kfz 251 Compared to the U.S. M3 Halftrack:

Both were successful, attractive, versatile vehicles, made in numerous variants. But how do they compare?

The M3 had a simpler, more reliable suspension and track. The unpowered front axle beams on the 251 were not as robust as their powered M3 counterparts. The 251's lack of a powered front axle reduced cross-country ability, but was somewhat made-up for by the 3/4 length track run giving it superior crossing ability over ditches, streams, and banks. The M3 had better climbing ability, but the 251, with its long track run, was less likely to get stuck on a crest. The M3 was superior on roads and in flat or gently rolling country with the 251 being better in rough country.

Neither was heavily armored, but the sloped armor of the 251 provided it relatively more protection, but at the cost of reduced interior space.

The simpler M3 was less expensive and faster to produce than the more complex German halftrack.

In short, both were effective vehicles and were clearly the forerunners of today's Infantry Fighting Vehicles.

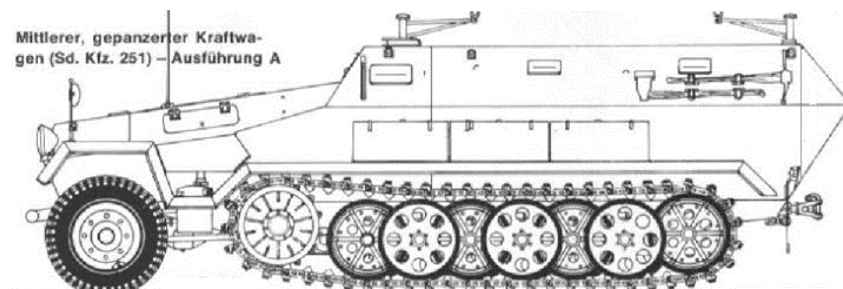
The Ausf A entered service in 1939. Due to a lack of armor production capability, 305 Ausf A's were unarmored. Vehicles were issued without regard as to whether or not they were armored. The Ausf B appeared in early 1940. The only difference from the A was the deletion of the vision ports on the fighting compartment sides. The A/B featured two crane-mounts for machineguns, one at the front and one at the rear. The nose was made of two plates. The radiator air intake was located on the top front of the engine deck. In addition to the double engine access hatches on the engine deck, access/cooling hatches were located one on each side and a third in the lower nose plate. On the inside, there were two bench seats on each side. Stowed under the seats in floor brackets were ammunition cans for the machineguns. There were no seat backs, but a small shelf ran the length of the fighting compartment behind the seats on which were placed the soldiers' packs. Brackets for spare barrel holders, rifle racks, and other were attached directly to the hull armor. In radio-equipped vehicles, the radio was located on the right side wall above and behind the co-driver's seat.

Based on combat experience, many changes were made to the Ausf C, introduced in 1941. Externally, the most obvious difference was the vehicle's nose. The two nose plates were replaced by a single plate. The air intake was moved to the hull underside, and the side access hatches were replaced by vents protected by armored covers. The front of the rear fenders was raised to increase clearance over the drive sprocket. Fender stowage boxes were moved rearward and tool stowage altered. The rear doors were formed from a single plate with welded hinges in place of the earlier two overlapping plates and bolted hinges. The front MG mount was changed to fixed pivot and gun shield, giving better accuracy and protection. This was interchangeable with the rear crane mount based on the tactical situation. The mount and shield were often retrofitted to earlier vehicles. The interior of the Ausf C and D was redesigned. Brackets/mounts were attached to a sheet metal liner fitted inside the hull rather than attached directly to the hull. Bench seats were placed on top of floor-mounted stowage bins. Seatbacks were provided behind which were located rifle racks (front) and a stowage bin for packs (rear). The radio was relocated to the front of the co-driver's seat.

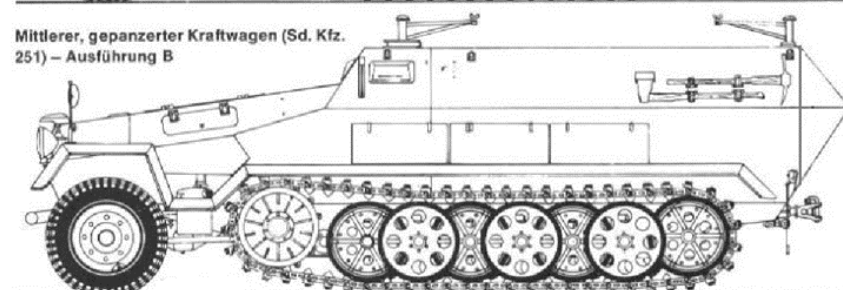
The Ausf D was simplified. The body was redesigned, reducing the number of armor plates from 19 to 9. The complex rear end, door and hinge arrangement was replaced with a straight sloping single-piece rear with two straight hinged doors. External stowage bins were replaced by boxes built into the straight sides of the vehicle. The vent box covers were replaced by straight plates on the engine deck sides. The side vision ports were replaced by slits. External stowage was simplified: most items were stowed in the side boxes. Internal arrangements remained the same. Additional detail changes were implemented late in production to further simplify production. This was not done simultaneously or universally - vehicles with different combinations of features existed. The "D" profile vision block covers were replaced with flat covers. The two-piece side-opening engine hatch covers were replaced by a single rear-opening hatch. The radiator fill cover was removed - the entire armor plate over the radiator was hinged to open to the right allowing access. The padded seats on the rear benches were replaced by wooden slat park bench seats.

SD.Kfz 251 QUICK REFERENCE

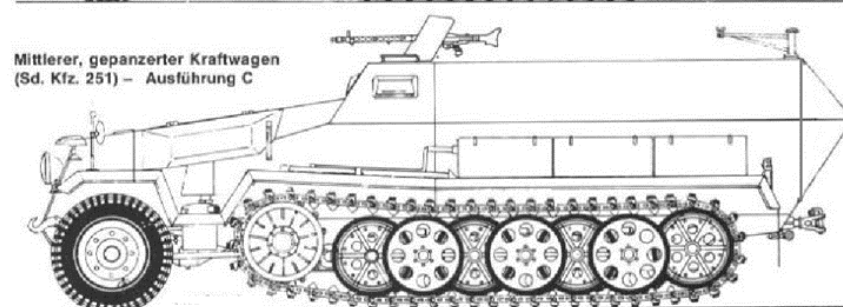
Compiled by Kevin Townsend



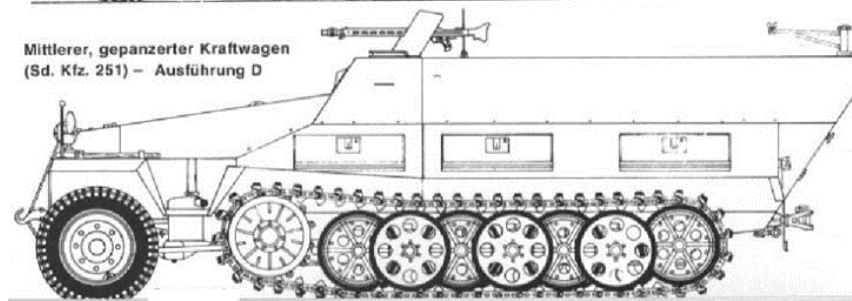
Mittlerer, gepanzerter Kraftwagen (Sd. Kfz. 251) – Ausführung A



Mittlerer, gepanzerter Kraftwagen (Sd. Kfz. 251) – Ausführung B










































Mittlerer, gepanzerter Kraftwagen (Sd. Kfz. 251) – Ausführung C





















Mittlerer, gepanzerter Kraftwagen (Sd. Kfz. 251) – Ausführung D

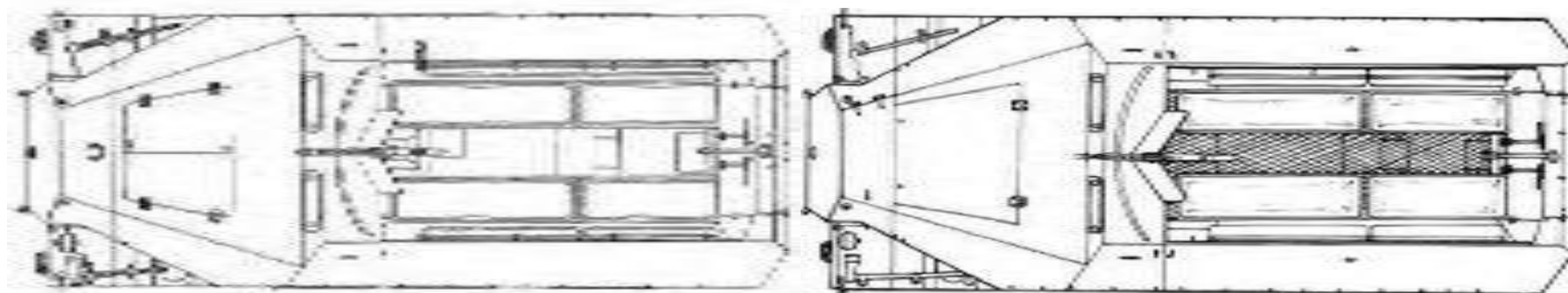
NOTE: The drawings on this page, by Hilary Doyle, show the major external differences between the Ausfs of the 251. These are old drawings from the 1970s, and the originals contain inaccuracies in the rear hull shape of the Ausf A-C. I have taken the liberty of correcting them here. Doyle's correct never drawings can be found in Panzer Tracts 15-2 and 15-3. I have found "Panzer Tracts" to be very accurate and reliable - more so than other references on the Sd.Kfz 251, most of which contain numerous errors. I highly recommend the Panzer Tracts publications for researching German armor.

Number Produced by Year (Approximate)	1939: 530 (Ausf A)	1940: 340 (Ausf A-B)	1941: 420 (Ausf B-C)	1942: 1200 (Ausf C)	1943: 4280 (Ausf C-D)	1944: 7780 (Ausf D)	1945: 1000 (Ausf D)	Total Production (All Ausfs and Variants): 15,252
Data	Designer: Hanomag		Manufacturers: Hanomag, Horch, Skoda, Borgwald		Type/Suspension: Halftrack (front wheels not powered). 55 links left, 56 links right. Front sprocket drive		Engine: Mayback HL 42 6-cylinder petrol engine producing 100 HP with a power/weight ratio of 12.8 HP to the ton	Cost: 22,560 Reich marks
Specifications	Length: 5.8 m		Width: 1. m Ausf A-C 2. m Ausf D		Height: 1.75 m not including gun shield/mount		Combat Load Weight: 8.5 metric tons	Armor: Front: 14.5mm Sides and Rear: 6-8mm Bottom: 6mm
	Wheel Base: 1.65 m		Track Base: 1.6 m		Track Contact: 1.8 m		Ground Clearance: 32 cm	Fuel Capacity: 160 liters
Performance	Speed: 52.5 km/hr max 30 km/hr road 10 km/hr cross country		Range: 300 km road 150 km cross country		Maximum Grade: 24 Degrees		Trench Crossing: 2 m	Vertical Obstacle: 30 cm
	Ford Depth: 50 cm		Turning Radius: 11 m Ausf C 12.5 m Ausf D		Towed Load: 2.7 metric tons Ausf C 3 metric tons Ausf D			
Crew, Armament, Communications	Crew and main armament determined by variant. Most variants carried a secondary armament of one MG 34 (later MG 42) machinegun. Vehicle was open-topped, allowing crew and passengers to use small arms from inside the vehicle. Most variants (including the ambulance) carried one or two MP 38/40 for the crew. The vehicle did not initially carry a radio (except by special variants) Radios became standard beginning in 1942.							
Variant	Avators show factory base color. Vehicles destined for North Africa would have been painted in tropical colors. Many vehicles may have received three-color camouflage paint at the factory after September 1944. Amount of factory compliance with official pattern is unknown				Produced	Weapons	Crew	Notes
	Ausf A	Ausf B	Ausf C	Ausf D				
251/1 Infantry Carrier					Jun 1939-Mar 1945	2 x MG 34/42	12 incl. infantry squad	Most produced variant making up 30% or more of total production
251/1 Heavy MG					1940-1944	2 x MG 34/42	12 incl. infantry squad	Front MG mount replaced with a heavy sustained-fire mount. Vehicle did not mount the front gun shield.
251/1 Wurfrahmen 40					Mar 41 - ?	2 x MG 34/42	4?	Carried 6 side-mounted frames for 280mm or 320mm rockets

251/1 Infrared (Falke)					Late 1944	2 x MG 34/42	12 incl. infantry squad	Infrared light/scope provided for both driver and gunner. Likely never used operationally
251/1 with Map Table Unofficial Field-Modification					1940?	Probably same as 251/1. May not have had front MG mount.	Unk	Unofficial Field-Modified Variant made in unknown numbers. For Commanders at company level and above. Sometimes mistakenly referred to as a 251/18 in references. Photos show use in France and during invasion of Russia
251/2 Mortar Carrier					Nov 1940- Mar 1945	8 cm Gr. W. MG 34/42	8	Mortar could be fired from inside the vehicle or dismounted for outside use.
251/3 Gun Tractor					Nov 1940- Early 1943	MG 34	Based on gun	Originally an ammo carrier until redesignated a radio vehicle in early 1943.
251/3 Radio/Command Vehicle					Early 1943- Mar 1945	MG 34/42	7	Redesignated early 1943. Replaced the 251/6. Sub-variants carried a variety of different radio equipment. Issued all the way down to company commander level. Second most produced variant
251/4 Gun/Ammo Tractor					Nov 1940- 1944	MG 34/42	Based on Gun	After 251/3 redesignated as a radio vehicle, the /4 took over gun-towing duties in addition
251/5 Pioneer Vehicle					Nov 1940- Nov 1944	MG 34/42	8 incl. pioneer	Only difference from the 251/1 was internal stowage configuration. Gradually supplanted by the 251/7. Crew smaller than 251/1 due to amount of stores carried internally
251/6 Command Vehicle					Nov 1940- Mid 1943	MG 34	8	Sub-variants carried different radio equipment. Issued to senior commanders/ communications units. Replaced by the 251/3 from early 1943
251/7 Pioneer Vehicle					1942-Mar 1945	2 x MG 34/42	7-8	Carried two 8-ton assault bridge ramps. Gradually replaced 251/5. Third most produced variant
251/8 Ambulance					Nov 1940- Mar 45	-	2	Normally configured for 2 litters and 4 walking wounded. Made in small numbers. Authorized units issued only one or two
251/9 7.5 cm Low Mount (Early)					Late 1942- 1944	7.5 cm K37 L/24 MG 34	3	Portion of upper hull over co-driver cut away to fit gun. Approx. 630 produced.

251/9 7.5 cm High Mount (Late)					1944	7.5 cm K37 L/24 MG 42	3	Bolt-on conversion did not require modification of the hull. Gun fitted on top of upper hull. As many as 1100 produced.
251/10 3.7cm Full Shield Field Modification					1940-1942	3.7 cm Pak L/45 MG 34	Unk	All vehicles mounting the full gun shield for the PaK are likely field modifications. Seen in the invasion of France, Russian, and in Africa.
251/10 3.7 cm Low Shield					Jul 1941-Oct 1943	3.7 cm Pak L/45 MG 34/42	6	The low/partial shield is the factory standard - was often installed in the field using factory-provided conversion kits. Issued to platoon leaders for fire support.
251/11 Telephone Cable Laying					Aug 1942-Feb 1945	MG 34/42	5	Some references state this variant was built on Ausf C only, but production continued until near war's end, making use of Ausf D likely.
251/12 – 251/15 Artillery Support				Variants authorized, but there is no evidence they were ever produced	N/A			
251/16 Flamethrower					Jan 1943-Feb 1945	2 x Flamm-enwerfer MG 42	3	Early 16s also had a hand-held flamethrower for use outside the vehicle. The fuel tank was in the vehicle and a hose connected to the flamethrower
2 cm Flak 38 Auf SPW					1942	2 cm Kw.K 38	Unk	12 were made – 10 with guns and two command/control versions. Sides of hull folded down to allow gun to engage ground as well as air targets. They belonged to the Luftwaffe and were assigned to the Hermann Goering Division. Often mistakenly referred to as a 251/17 Ausf C (it never carried that designation). Vehicles most likely lost in Tunisia in 1943
251/17 Schwerebelafette (Standard)					Fall 1944-Mar 1945	2 cm Kw.K 38 MG 42	Unk	Replaced 251/16. Often referred to as anti-aircraft variant. It could engage aircraft, but was meant for use against ground targets. One source puts one at 11, but there is only seating for only 6-7. 140-200 produced
251/18 Observation Vehicle					Oct 1944-Mar 1945	MG 42	Unk	Probably less than 50 produced
251/19 Telephone Exchange Vehicle				Variant authorized, but there is no evidence it was produced. Possibly made via field mod	N/A			Vehicle would have carried a telephone switchboard, phones, and wire to establish/control phone communications net

251/20 "Ub" Infrared Observation Vehicle			Oct 1944 – Feb 1945	3WG 42	Unk maybe 4	60cm IR searchlight provided illumination for IR-equipped Panther tanks. Infrared also provided for vehicle driver. 61 produced.
251/21 "Drilling"			Fall 1944- Mar 1945	Triple mount MG 151/15 or MG- 151/20	Unk maybe 5-6	Often described as an anti-aircraft variant, but was primarily intended for use against ground targets. In addition to "official" versions, it is possible a very few Drilling mounts (without gun shield) were field-mounted at Ausf. Ds.
251/22 "Pakwagen" 7.5cm			Dec 1944- Mar 1945	7.5 cm Pak 40 L/46	Unk maybe 3-4	Both factory-built and field modified using factory-provided conversion kits. Many were converted from 251/5s.
251/23 Turreted KwK 2cm		Variant authorized, but no evidence it was ever produced.	N/A			Vehicle would have been enclosed and carried same turret as Sd.Kfz. 222



These drawings, from blueprints.com, show the major differences between the standard and final production Ausf. Ds. What I will refer to as the "Standard Production" model is shown at left. This is the version depicted by the Tamiya kits. What we shall call the "Final Production" model is shown at right. Major changes deal with the top of the engine compartment. The double side-opening engine hatches were replaced with a single large hatch opening to the rear. The radiator fill cover was removed, and this entire piece of armor was hinged to open to the right. The armor covers over the view ports were also simplified—the early "D" profile covers were replaced by flat covers. Finally, the padded leather seats were replaced by wooden-slat park-bench style seats. Interestingly, these are included along with the early seats in the AFV Club kit, indicating the company had planned at some point to release an Ausf. D. It's a shame they never did.

Service History	The vehicle, used by both the German Army and SS, normally equipping the Division of Panzergraffiers in Panzer Divisions and some Panzergraffier Divisions . The Luftwaffe's Bombardier division also used the vehicle. Following the Second World War, some were used by the Czech Army. A final Czech version, the OT 80, had an air-cooled diesel engine and an enclosed fighting compartment. 1100 were produced by 1942, remaining in active service until the 1960s – at reserve status until 1965. Today, most vehicles used by reenactors and on the movie screen are converted OT-80s.
NOTES: References are often contradictory and/or incomplete. Where references contradict, my default position has been to follow Jentz and Doyle's "Panzer Tracts." Where this did not provide a satisfactory answer, I have went that direction(s) that appeared most reliable or seemed most likely. Where information is not available (or unreliable), I have made my best guess based on other, known, facts. Dates, unless both year and month are listed, should be approximate estimates only. Likewise, production figures are usually approximate. Note that although production on a particular variant may have stopped, the vehicles would likely remain in use as long as they were serviceable. Photos show Ausf. Ds in use as late as the Germany campaign (equipped in appropriate 3-color camouflage). In addition to these standard variants, numerous field-modified vehicles existed. While I believe this information is fairly accurate, the reader is encouraged to do his/her own research and make their own determinations.	

Sd.Kfz 251 Standard Weapons Comparison Chart¹

Weapon/ Variant	MG 34 All	MG 42 All	MG 151/15 251/21 Early	MG 151/20 251/21	2cm KwK 38 251/17	3.7cm Pak 36 251/10	7.5cm KwK 37 251/9	7.5cm L46 Pak 40 251/22	Wurfrahmen 40
Length/Weight	48 in 26.7 lbs	48 in 25.51 lbs	75.4 in 84 lbs	69.5 in 94.2 lob	13 ft 5 in 926 lbs	65in ² 721 lbs	69.5 ³ 1,080 lbs	136in ⁴ 3,142 lbs	11-13 in diameter 174-181 lbs
Feed System	Belt	Belt	Belt	Belt	20 rd Magazine	Single shot	Single shot	Single shot	Fired from packing crates
Max Rate of Fire	800-1200 rpm	900-1500 rpm	740 rpm	750 rpm	220 rpm	13 rpm	12-15 rpm	14 rpm	1 at a time in a 10 second ripple
Effective Range ⁵	1000 meters (m)	1000 m	1000 m	800 m	1200m vs ground target	300m	1,000m	1,800m	1,925-2,200m
Ammunition ⁶	Military Ball	Military Ball	HE or AP	HE, AP, Incendiary	HE, AP, Incendiary	AP and HE	AP, HE, Smoke	AP and HE	HE, Incendiary
Armor Penetration ⁷	N/A ⁸	N/A ⁸	Not Available	3-15mm Max	100m – 23mm 500m – 14m	100m – 34mm 500m – 29mm 1000m – 22mm 1500m – 20mm	100m – 41mm 500m – 38mm 1000m – 35mm 1500m – 32mm 2000m – 30mm	100m – 126mm 500m – 108mm 1000m – 87mm 1500m – 72mm 2000m – 63mm	Not available
Accuracy ¹⁰					200m – 100% 400m – 95% 600m – 76% 800m – 55% 1000m – 37% 1200m – 24%	200m – 100% ¹¹ 400m – 97% 600m – 88% 800m – 66% 1000m – 47% 1200m – 28%	200m – 100% 400m – 100% 600m – 90% 800m – 75% 1000m – 56% 1200m – 38% 1500m – 21%	200m – 100% 400m – 100% 600m – 97% 800m – 84% 1000m – 66% 1200m – 51% 1500m – 33% 2000m – 16%	Area effect. Rockets fairly inaccurate. Precise figures not available.

¹ Refer to the chapters on each variant for more detailed information on each weapon. Information listed herein is compiled from several sources that are not always in agreement. Some figures have been extrapolated from various sources. Distances are given in meters.

² Length given for this weapon is barrel length only. Weight is combat weight of AT gun, including carriage. Gun weight on the 251 would be substantially less.

³ Length given is barrel length.

⁴ Same as "1" above.

⁵ Maximum combat range at which targets could be reliably engaged. For MGs, this is the normal vehicle mount – sustained-fire mount/ telescoping sight would double range. For guns, the effective range of HE (and indirect fire) is farther than the listed direct-fire armor-piercing range. The maximum range the projectile could travel is much farther.

⁶ Most common types of ammunition. Other types were sometimes available, but only in limited numbers.

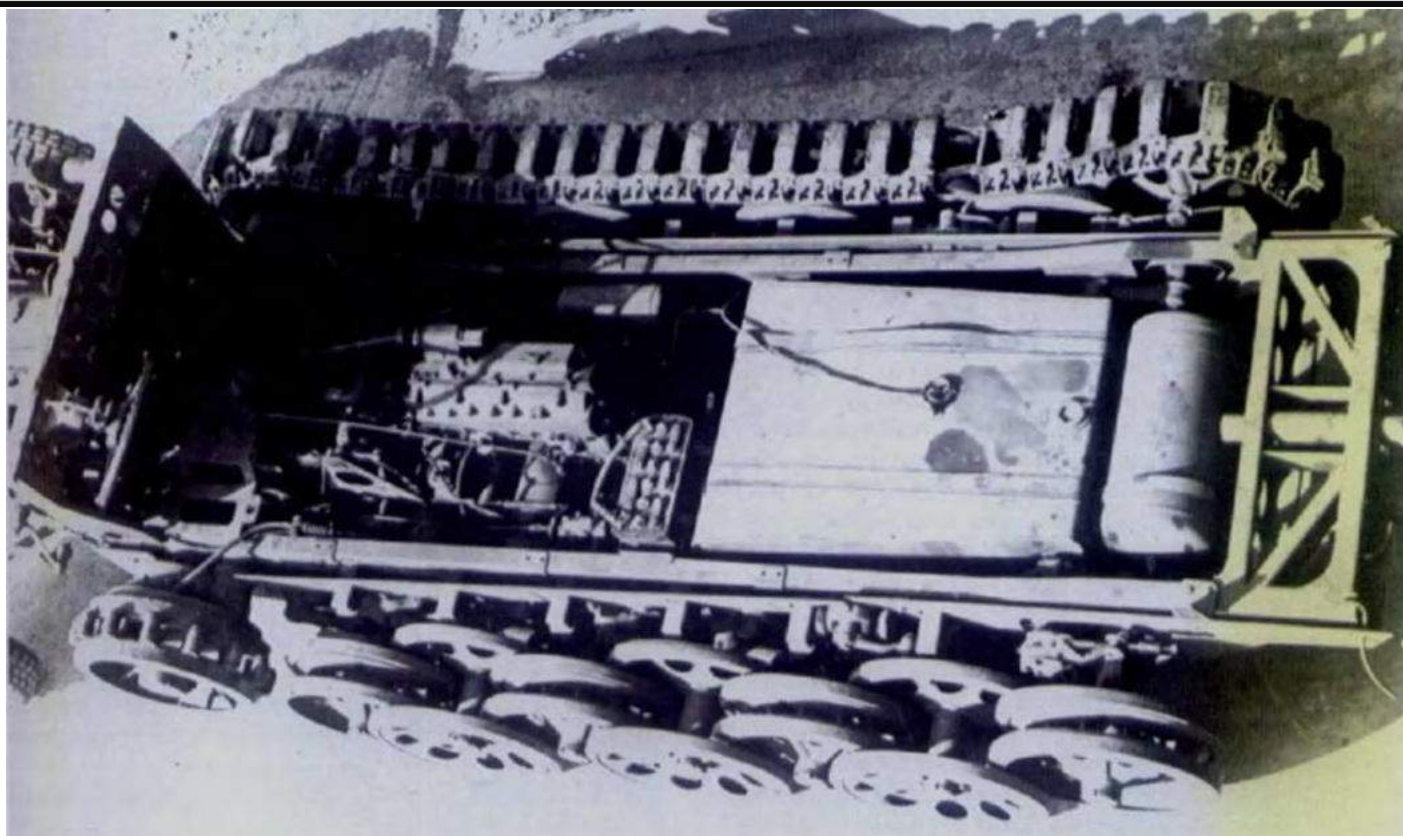
⁷ Assumes most common type of AP ammunition striking target surface at a 60 degree angle (simulating both sloping armor and the rarity of perfect alignment in combat).

⁸ There was an AP round, but due to a shortage of tungsten, production ceased early in the war. It could penetrate 13mm of armor at 100 meters range/7.5mm at 500 meters.

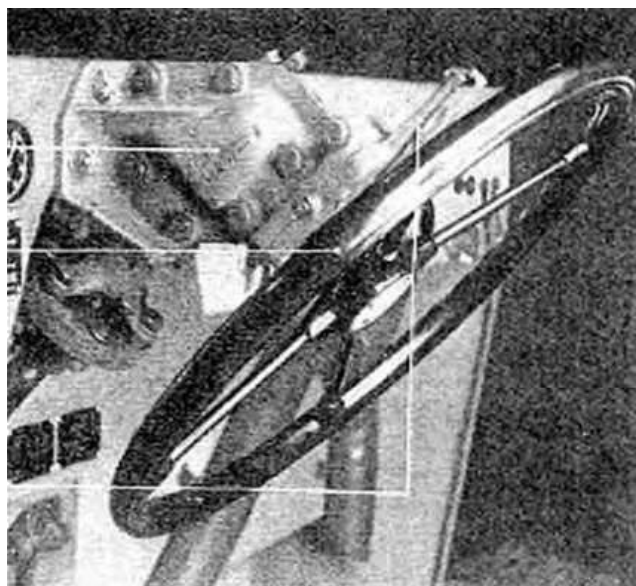
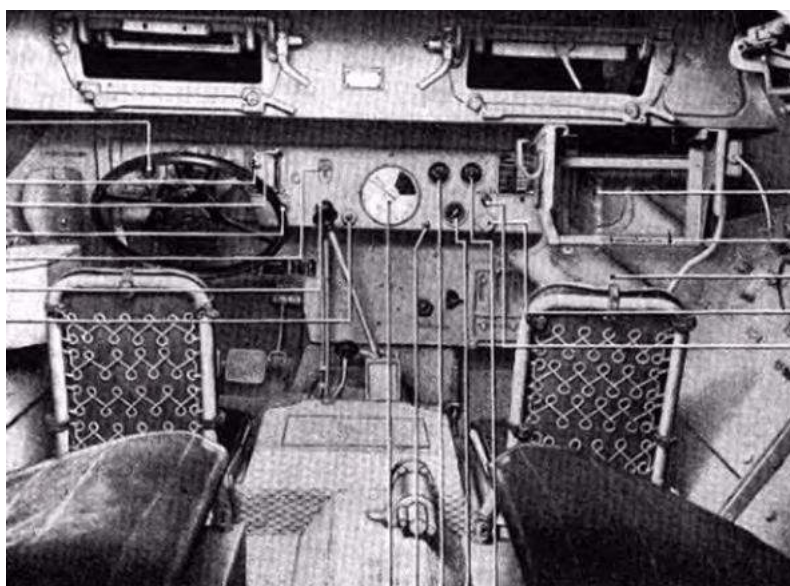
⁹ Same as "2" above.

¹⁰ Expected accuracy vs a 2 x 2.5 meter target (similar to the front of a tank) during practice firing assuming correct range estimation. Combat accuracy would be much lower, especially on the first shot. A "calm" gunner might approach these figures after ranging on the target.

¹¹ My source chart did not include data for this weapon. Figures extrapolated from other similar charts and information – i.e. best guess.



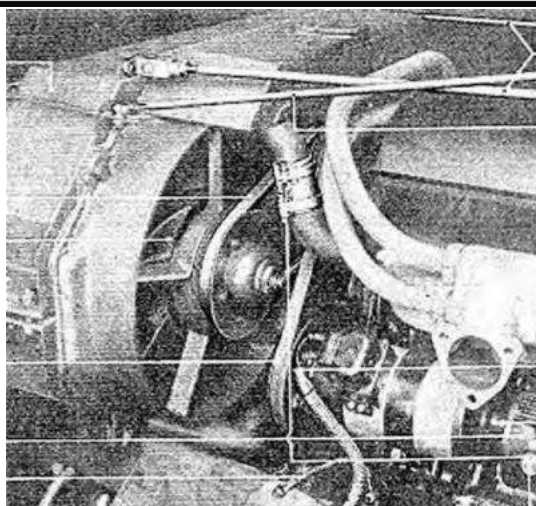
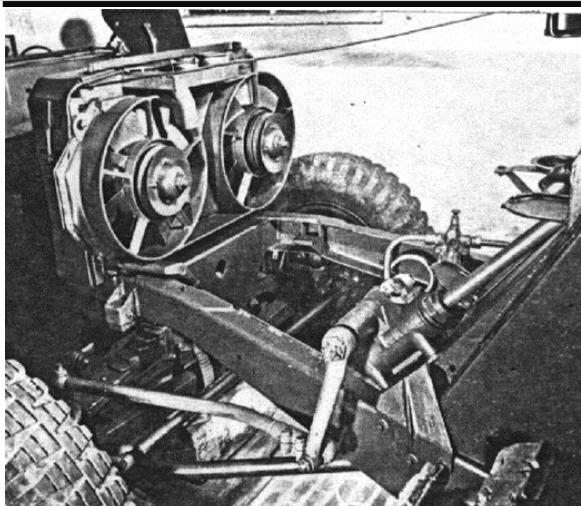
Above: The track, rollers on the drive sprocket, interleaved road wheels, and the angled steering wheel are clearly seen, as are the floor plates, the transmission, gas tank, and other fittings are clearly visible.



Above: The driver's compartment of the Ausf C. The radio rack is mounted forward of the co-driver. One of the changes required to the Sd.Kfz 11 chassis was to angle the steering wheel as clearly seen above right.

Opposite Top: Another change to the Sd.Kfz 11 chassis was a new radiator equipped with two fans instead of one. At left we have a good view of the radiator. At right we see the radiator with the engine in place.

Opposite Middle: At left we see the firewall between the engine and driver's compartments. The steering linkage to the front wheels is clearly visible. At right is a photo of the engine.



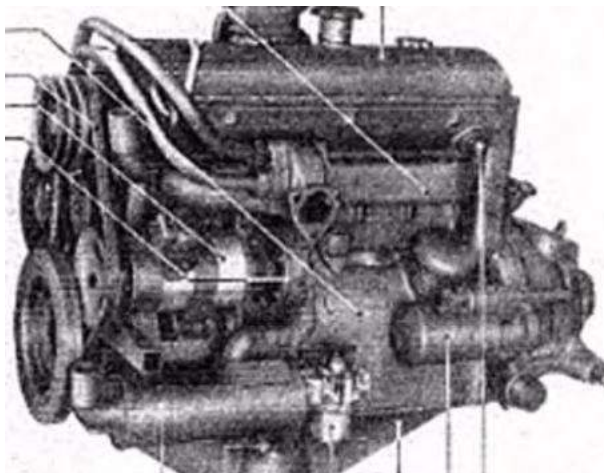
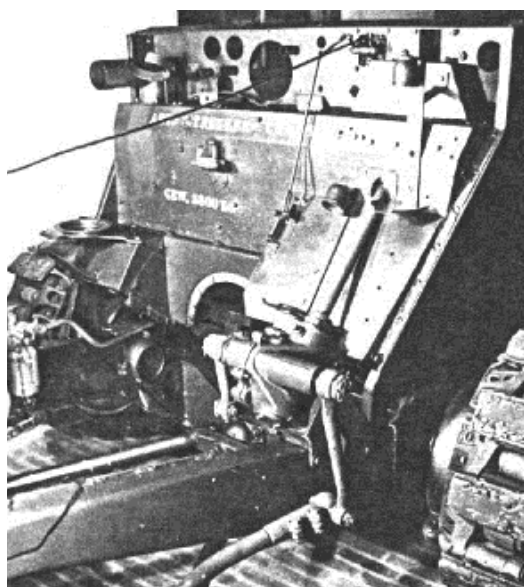
INTERLEAVED ROAD WHEELS:

Many German vehicles, including the 251 family, the Tiger I, and the Panther, had interleaved road wheels. Interleaved road wheels were a dead-end design. Developed in the early 1930, they were used only by Germany and disappeared after WWII.

There were advantages to the system. By overlapping/interleaving the wheels, more wheels and torsion bars could be used resulting in a smoother ride over difficult terrain. The system allowed multiple large wheels to distribute the vehicle's weight evenly on a larger area of track. This resulted in lower ground pressure, improved performance, and better fuel economy. It may also have extended the life of the wheels and track. Mobility with some wheels missing was also improved.

As good as all this sounds, there were significant disadvantages, too. Mud and ice could collect between the wheels and freeze, sometimes immobilizing the vehicle. The complex design is also more difficult to build and maintain—to get to an inner wheel, several outer wheels also had to be removed. To work on the torsion bars themselves, wheels on both sides often had to be removed. The design is also heavier.

The design has not been repeated, so it is safe to assume the disadvantages offset the advantages.



Above: This photo of 251 AusfDs on the production line clearly shows the two part hull. The front and rear portions were joined together directly behind the driver and co-driver's seat.

COLORS & CAMO

German Armored Vehicle Camouflage:

We see and identify things because of contrasts with the background in color, shape, shadow, texture, shine, and/or movement. Even the shape of a shadow can give an object away. To have effective camouflage, these differences with the background must be disguised or removed. Breaking up outlines with foliage and netting, taking advantage of shadows and other concealment, covering tracks, preventing shine and reflection, etc., are all important aspects. A technique practiced by many nations in WWII was camouflage paint. Camouflage paint helps not by making the vehicle invisible, but by making it harder to identify and to reduce visibility by attracting attention to individual shapes rather than the vehicle as a whole. In WWII there were a couple schools of thought. Some nations, with the idea that vehicles would become encrusted with mud or covered with dirt anyway, opted for a single, matt color. Others opted for a two or three (or more) color pattern applied in irregular blotches to mimic the environment they operated in.

Camouflage paint applied in a contrasting color(s) over the base color helps break up a recognizable outline. Because the textured surface of the ground looks darker from the air, colors used were often darker than the terrain. To prevent a vehicle from being identified by its shadow, countershading was often used. This technique involved placing dark colors on reflecting surfaces, and light colors in shadow. The result was to "flatten" lights and darks into one uniform appearing surface. The basic principles of camouflage paint are that regular outlines, regular spacing, and symmetrical shapes should be avoided. The exact colors and actual shape of the patterns varied from army to army (and even vehicle to vehicle in the German Army).

I have attempted in this project to illustrate these principles. Compare the colors and shapes of the camouflage on my models to the terrain they operate in. In many instances, these are very similar.

The following is a basic introduction to German camouflage and markings. This is very complex subject and the data here is, by necessity, incomplete. For those planning to model German armor, further research is recommended.

Initially, German AFVs were painted overall Panzer Grey with soft-edge brown spots covering about 1/3rd of the vehicle. Some early 251/1 Ausf As may have been painted in this pattern. Non-combat vehicles were overall Panzer Grey. Beginning in June 1940, everything was painted Panzer Grey. Existing vehicles were only repainted as needed.

Starting in February 1943, vehicles left the factory in an overall Dark yellow. Red-Brown and Olive-Green paints were supplied in paste form to be added in the field, allowing units to match patterns to terrain. Some were elaborate and professionally applied, others were slopped on. Vehicles already in Panzer Grey were sometimes repainted, sometimes left in grey, and sometimes a new pattern was applied over the grey. If modeling a generic vehicle, this is a good period—the possibilities are almost endless.

In order to achieve more standardization, camouflage was applied at the factory beginning in August 1944. The army provided patterns for each vehicle to the various factories. Only one of these patterns survive (or has been located). Photographic evidence is our best resource. In December, 1944, the order was given, to begin by March, 1945, to use an olive green base-color with the pattern applied over that. It is unknown, at least in the case of the Sd.Kfz 251, if this was ever implemented. In fact, it is questionable how much these later patterns were adopted for the SPW—photographic evidence appears to show dark yellow used as a base color until the end of the war, in many cases with no camouflage at all over the base.

As for the halftracks' interiors, the earliest 251s may have been painted an ivory color forward of the bulkhead behind the driver. This was soon dropped, and the entire interior was painted in the vehicle base color since the vehicle was open topped. The engine compartment was normally left in red oxide primer.

Afrika Korps (DAK) Vehicle Colors:

Initially, vehicles sent to Africa were dark grey and were often camouflaged with dust or mud. Starting in March, 1941, vehicles destined for Africa were to be painted in overall yellow brown with grey green camouflage. These colors were fairly low contrast. Many of the surviving grey vehicles were eventually repainted. There were many variations. Vehicles in a single color were common, or the camouflage colors were applied over the grey, covering only part of the original finish. In March of 42, these colors were replaced by a darker sand color with dark grey camouflage that was rarely applied - most vehicles being overall sand brown. Due to the situation in Russia, it was not uncommon to see vehicles painted in tropical colors serving in that theater. In addition to standard colors, borrowed Luftwaffe or Italian colors were sometimes used (but not often) as were captured British paints. Conditions were harsh on paint, with bleaching, fading, chalking, cracking, peeling, and blistering being common. As supply became more difficult, paint had a low priority. Thus, a great variety of colors in various stages of deterioration were seen. By the spring of 1943, shipments of vehicles to Tunisia were painted in the standard dark yellow, but by then nearly 85% of Panzer Armee Afrika's vehicles were captured British or American - making British sand and US Olive Drab as common as German colors.

Winter Camouflage:

On snow-covered ground, a yellow tank with green and brown camouflage would be quite a stand-out. It was common for German armies to paint their tanks white in winter. Other armies often did the same. The Germans used a water-based whitewash that would wash off when the spring thaw and rains came. It was used either to cover the entire vehicle or was applied in a broken pattern over the normal camouflage. If there were a shortage, vehicles at the front received priority. Often, rear area and non-combat vehicles were not given the winter white paint. Tactical numbers and unit emblems were usually not painted over. The whitewash was very common on the Eastern Front but rare on the Western Front—possibly because the terrain was not as open and barren.

German Armored Vehicle Markings:

Markings serve to identify the vehicle, and are thus diametrically opposed to camouflage. Large, excessive, or conspicuous markings can defeat the purpose of camouflage. National markings can serve to prevent friendly fire, but this also can provide enemy gunners with an aiming point. So markings were often minimal, small, subdued, or absent altogether.

Depending on who has air superiority, it can also be very important to either hide yourself from aerial observation or clearly identify your-

self to your own aircraft. Thus, early in the war, Nazi flags were often displayed prominently on the upper surfaces of German vehicles, while later in the war allied vehicles used large white stars surrounded by a white ring for the same purpose. Late in the war, the use of foliage to camouflage German vehicles became much more common.

Markings carried by German vehicles often included license/registration plates, divisional symbols, tactical signs, rank pennants and flags, victory (kill) markings, maintenance markings, and even vehicle names.

Few, if any, vehicles ever carried all these markings, and shortages of time and material sometimes resulted in vehicles carrying no markings at all—especially toward the end of the war. It would be wrong to consider markings on German vehicles to be standardized, despite what regulations stated. Due to many changes of these standards, lack of published guidebooks or stencils, unit preference or tradition, and the ignorance of those applying the markings, there was wide variation. Vehicles that were loaned or transferred to other units may have carried partial or complete markings from both units! Colors were often unofficial or varied with different camouflage schemes. Colors may have been changed because markings were too visible or not visible enough! Photos are our best reference.

National Insignia - The Balkenkreuz:

In the Polish campaign, the “Greek Cross” was solid white, but it was found enemy gunners used this as an aiming point. During the French Campaign, crews painted the entire cross in yellow, or simply used a white border, leaving the center in the vehicle’s Panzer Grey color. This became the norm until it was found that on sand or yellow colored vehicles, the cross was not visible even at medium ranges and that it was necessary to fill in the center with black. The crosses were applied using stencils, except on Zimmerit-coated vehicles where they were applied by hand. Crosses were normally about 250mm (about 9.8 inches) across. Soft-skinned vehicles usually did not display the cross. However, all captured vehicles—including softskins—usually displayed larger than normal crosses, especially on the roofs. There was variation, and near the end of the war, it was not unusual to see vehicles with no markings at all.

3-Digit Tactical Numbers:

Commanders needed to control their units in action, so a three-digit numbering system for armored vehicles was used. In addition to Panzer units, it was adopted by Sturmgeschütz units in 1942, and from July 1944 Panzergrenadier halftracks were also required to use the system (although many were already using it). Initially, the numbers were carried on small metal rhomboid-shaped plates, but these were difficult to see, and the larger numbers became the norm. A 1944 order specified that the numbers were to be 30cm tall and 5 cm wide. The 251 was to carry the numbers on the upper armor plate, with the middle of the number approximately two meters before the rear end. Use declined toward the war’s end and by the Spring of 1945 many vehicles were devoid of markings.

The system was easy: first number was the company, second number was the platoon, and third number was the vehicle. Thus, 425, would refer to the 5th vehicle in the second platoon of the 4th company. Regimental commanders would use an R, so that the regimental commander might be R01 and the adjutant would be R02. Battalion commanders would often use Roman numerals—thus the battalion commander would be I01 for the first battalion in the regiment and II01 for the second battalion. It was an easy system to read—and not only for friendly units. For security reasons, variations were often seen. Commanders could use non-existent company numbers to identify their vehicles. Thus, if the regiment had eight companies, the regimental commander might use 901 instead of R01. Another deception might be to start numbering vehicles within a platoon at 5 instead of 1. Thus the 1st vehicle in the 1st platoon of the 1st company (the company commander) might carry a number of 115 instead of 111. Units sometimes had more than 9 companies, but the numbering system didn’t change. The 2nd vehicle in the 3rd platoon of the 13th company would be 1332.

Colors varied, but black or red with white outlines were the most common. The white outline only, or yellow with a black outline, was often seen—as was solid black, red, green or even other colors.

For further reading and research, see the “References and Resources” Appendix.



Sd.Kfz 251/1

Ausf A



Sd.Kfz 251/1

Ausf B



Sd.Kfz 251/1

Ausf C





Sd.Kfz 251/1 Ausf D

Opposite Page: Top shows an unarmored (ungepanzerte) Ausf A. The flat vision port covers are the main indicator this is an unarmored version. Some other minor details were also different. Other than the fighting compartment side vision ports, the A and B were identical. The middle photo shows the Ausf B. This vehicle has been retrofitted with a forward gun shield—they came from the factory with the same crane mount as the Ausf A. All A/B models came from the factory as 251/1s and were converted, as needed, to other variants in the field. It was only with production of the C model that many of the variants were purpose-built at the factories. The bottom photo is an Ausf C along with an Sd.Kfz 250/3. The differences in the nose, rear fender, stowage box location, and tool stowage from the B to the C are evident. These photos also clearly show the 3/4 length track runs and interleaved road wheels. Note the complex shapes of the armored hulls. Above: This photo shows a 251/1 Ausf D captured by the Polish resistance. Compared to the photo of the Ausf C the simplified hull shapes, especially at the rear, and the integral stowage boxes on the hull sides are clearly visible.

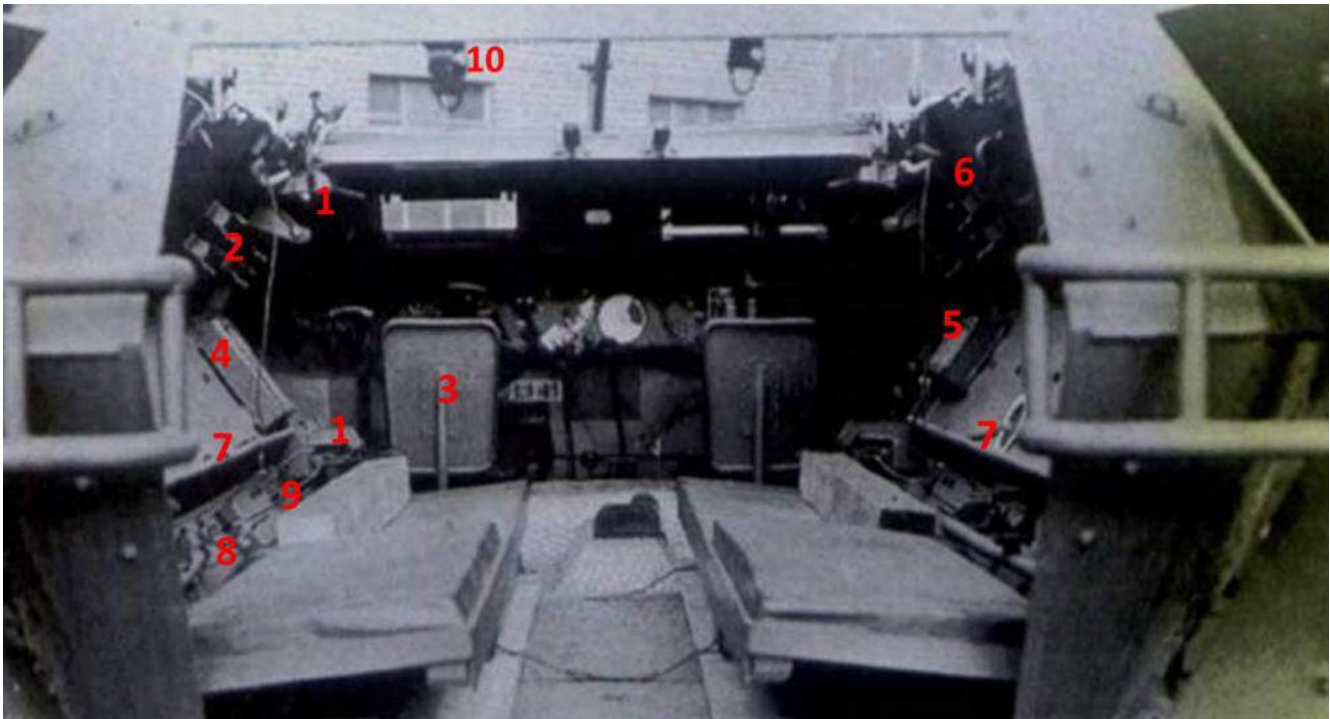


These two Ausf Ds, a 251/1 and a 251/21, show some of the features adopted on final production vehicles. These changes were implanted to further simplify production. Please note these changes were not all implemented together, or even at the same time in the different factories. Stores of existing parts would have been used as well, resulting in a mix of features on many, if not most, late production 251s. The 251/1 displays the standard two-piece side-opening engine hatches, but it has the late flat vision port covers. The 251/21 has the standard "D" profile vision port covers but features the late single piece rear-opening engine hatch and the side opening radiator hatch. It is impossible to be too dogmatic about what mix of features any post-October 1944 251 coming from the various factories may have had. The halftrack on the left is covered with foliage—this became quite common in the latter stages of the war as the Allies gained air superiority. Note the crewmen are anxiously watching the sky for the appearance of the dreaded "Jabos" (fighter bombers).

251/1 Ausf A/B Interior Layout

these were attached directly to the hull. Seat design and interior stowage was also different. All A and Bs came from the factory in the 251/1 layout and were converted to other variants in the field as authorized/needed.

The Ausf A/B had a different interior than the C/D. In the C/D interior fittings were attached to a metal liner. Stowage and fittings were entirely different. In the A/B,



Above: This photo shows many of the features of the interior. This vehicle is one fitted-out for a heavy machinegun section. 1: This shows the top "claw" and bottom "tray" designed to hold the heavy MG tripod. 2: 2x racks for single MG-34 spare barrel holders. Behind these, not visible in the photo, are two rifle racks. 3: Early style driver/co-driver seats. 4-5: Spare vision block holders. 6: 2x rifle racks. 7: Shelf. Soldier packs were placed on this providing a backrest for the seating. 8: MG-34 rack. 9: Double spare barrel rack. 10: 2x rifle racks under rear crosspiece.

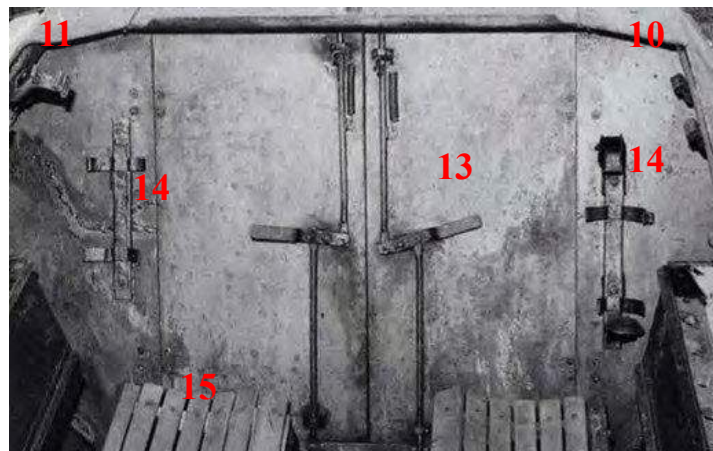
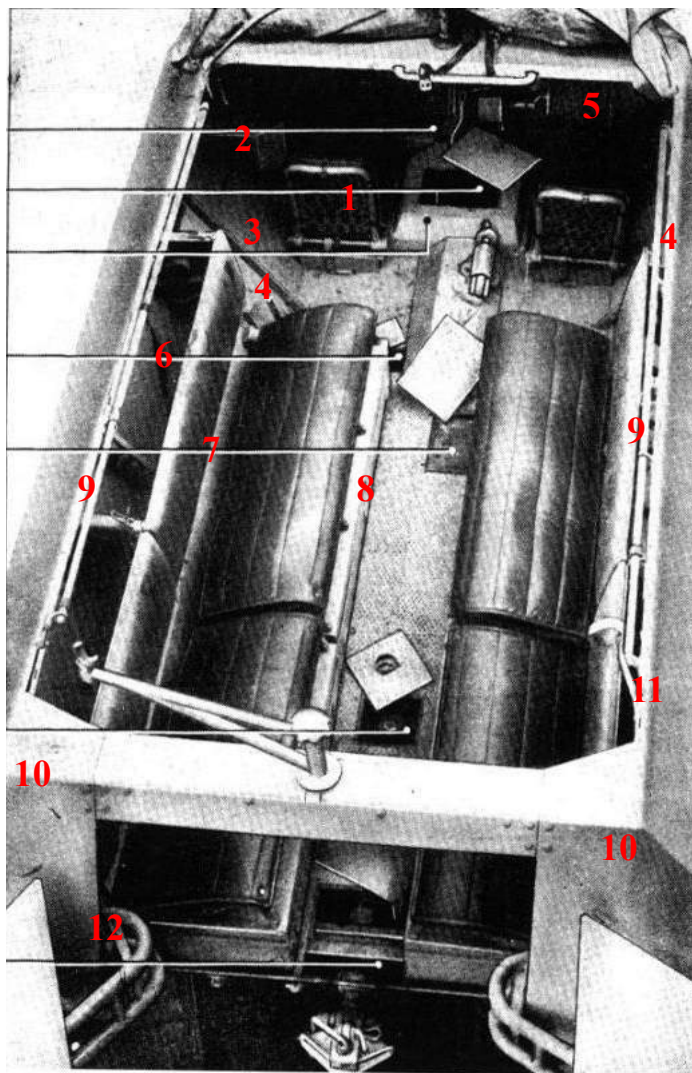
Right: This shot shows details of the early pattern driver/co-driver's "tractor" seats. Note the seat mount attaches to the hull side wall rather than the floor.



Left: Here we see ammo boxes stowed under the left seats. A larger footlocker-type box is under the right. Note this seat sits higher. It appears the seat has been dismantled and is just sitting on top of the crate. This photo also shows the rear door locking mechanism to good effect.

Based on field experience, the interior of the Ausf C was completely redesigned. This design was also used in the D—the only difference being the simplified hinges on the new rear doors. On final production Ds, the padded leather seats were replaced with wooden slat park bench style seats. The interior of many variants differed from the standard, some significantly so.

251/1 Ausf C/D Interior Layout



Left: This photo (showing lubrication points) is from a German manual on the 251. The complex clamshell door and hinges of the A-C models can be seen. The photo above shows the simplified doors and hinges of the Ausf D. 1: The latter style standard seats. 2: Not visible in this photo, mounts for the driver's MP-40 and magazines are here, as are a few other fittings. 3: This photo clearly shows the flange where the forward and aft halves of the hull on all models was bolted together. 4: Spare vision block holders. 5: Radio location on the Ausf C/D. 6: Rifle rack, for four rifles on each side. A seatback covers the racks. 7: When not on their mounts, MGs were stored in racks under the rifle racks. 8: Under each bench seat was a floor-mounted stowage bin. 9: A handrail was fixed along the top of the both sides of the fighting compartment. Stowage hung over the sides was often tied to these rails. Under the handrail on the right side were the bows for mounting the foul weather tarp over the fighting compartment. 10: Fitted to the inside rear hull were racks to hold drum magazines for the MG-34 and bags for spent cartridges. 11: This fitting secured the butt of the MG attached to rear crane mount, holding it stable during movement. 12: A view of the hinges on the Ausf A-C. 13: The flat one-piece doors of the D with simple hinges and

latches. 14: Fire extinguisher mounts. 15: Wooden slat seats on late Ds.

Lower Right: Although this photo was taken inside the 251's little brother (an Sd.Kfz 250), it shows very clearly the sustained-fire mount used by a heavy MG section. Note the MG is rigidly fixed in the mount. A telescopic gunsight is fitted to the left side and elevation/traverse are accomplished by hand wheels. This increased effective range significantly beyond the standard free pivot mount and iron sights.



Sd.Kfz 251/1

The 251/1, the standard personnel carrier, was the most widely produced variant of the halftrack. All Ausf A and Ausf B models left the factory as 251/1s. These were converted in the field to mortar carriers, gun tractors, engineer vehicles, command vehicles, and ambulances as needed using parts ordered through supply channels. In addition to the driver and co-driver/machinegunner, the vehicle carried a squad of 10 soldiers.

A sub-variant of the 251/1 was fitted-out to carry a heavy machinegun squad. The forward machinegun mount and shield could be replaced with a sustained fire mount with telescoping sight and elevation/traversing wheels. This allowed accurate long-range fire. Mounts for stowing tripods were fitted inside the vehicle behind the front seats.

Tactics:

As effective as tanks were, they were vulnerable to anti-tank weapons, especially in broken terrain. They needed infantry support. In the fast-moving advances that characterized Blitzkrieg, the armored infantry mounted in their halftracks could keep up with the tanks and provide this support.

The basic Panzergrenadier unit was the gruppe or squad, usually 12 men mounted in a half-track. The squad was led by a squad

leader, a junior NCO, armed with a machine pistol. In mounted combat, he commanded the vehicle and directed the vehicle mounted machine gun, an MG34 or later an MG42. When the squad fought dismounted, either the leader or his assistant remained with the vehicle (as did the driver and machinegunner) while the other leader controlled the dismounted element consisting of a machine gun team and the remaining riflemen. The driver was responsible for the care of the vehicle. A Panzergrenadier platoon was made up of 3 squads, with the platoon HQ in a separate vehicle. The HQ consisted of a platoon commander, usually a junior officer but sometimes a sergeant, a driver, a radio-operator, 2 runners, and a medic. This group was often mounted in a 251/10 or, later in the war, a 251/17.

The halftracks' armor provided protection against small arms fire, but the presence of enemy artillery or anti-tank guns usually forced them to take cover and dismount. The squad's machinegunners could engage targets on the move, as could the rest of the squad if necessary from over the sides. More normally the mounted squads used fire and movement, advancing, stopping and firing to cover other half-tracks. A halted half-track provided a good firing position but was vulnerable. As a result, firing halts were generally no more than 15-20 seconds. The normal dismounting procedure was via the rear door, but for rapid dismounting, the squad could jump over the side as well as out of the back – even on the move at slow speeds. Once dismounted, the Panzergrenadiers fought as normal infantry. When facing anti-tank defenses and strongpoints, the Panzergrenadiers could precede the tanks, or a mixed force of tanks and soldiers might attack from both the front and flanks to neutralize the enemy defenses.

Although the image of the Panzergrenadier is tied to the Sd.Kfz 251 half-track, there were never enough of these vehicles to go around. Most Panzer divisions had only one battalion of SPW-mounted infantry. Often, Panzergrenadier divisions had even less. Most Panzergrenadiers rode to battle in trucks.



This 251/1 Ausf C belongs to a heavy machinegun squad as evidenced by the sustained-fire heavy MG mount. The vehicle is painted dark grey with mud applied as camouflage. The heavy machinegun section was a support weapon tasked to provide concentrated fire on decisive or threatening positions. At close ranges, it could use a standard MG mount and function as a normal 251/1.



Left: An Ausf. B. As these vehicles were not factory-fitted with gun shields, sand-bags were often used. In this case, two logs serve the same purpose. Note the spare tracks being used as supplemental armor on the nose and sides.

Below Left: The radio in the A/B was mounted on the right side behind the co-driver. Later Ausfs placed the radio on the dash in front of the co-driver.

Below: This C model in Russia has been camouflaged with mud painted on in a cross-hatch pattern.



Another Ausf. C. Note the unusual "kill markings" placed forward of the Balkenkreuz on the right side of the vehicle.



Left: A heavily-stowed C model in worn winter whitewash.

Below: Left: A Panzergrenadier unit moving through a field of grain. Note the Panzershrek stowed outside the hull. Right: This was often mounted on a bracket inside the hull at the left rear. According to instructions, a panzerfausts case could replace the front right bench seat—I assume the soldiers sat on the crate?

Bottom Left: Any soldier will immediately recognize this—get sleep when and where you can. Of interest is the stowage at the rear. This appears to completely block access to the rear door, making entry and exit over the sides of the vehicle mandatory.

Bottom Right: An Ausf D in Hungary near the end of the war. Note the missing right and damaged left fenders. Missing and damaged fenders are common in photographs.



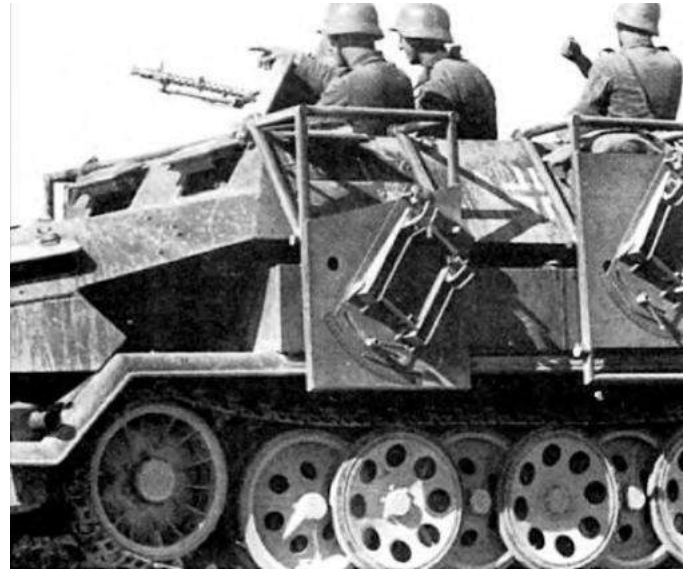
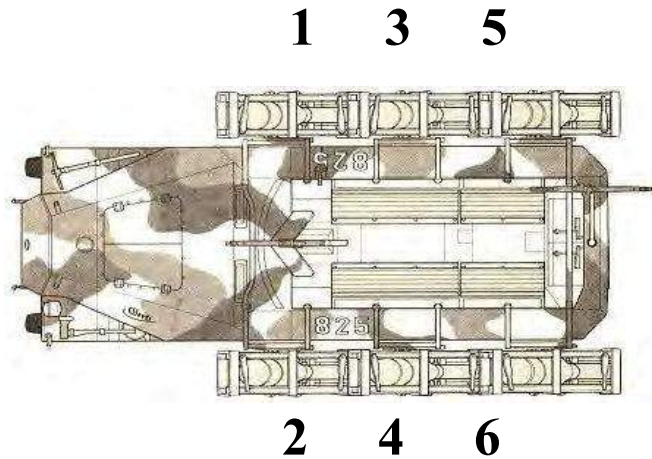


Above: Launching the rockets. Note the pile of used firing crates discarded by the vehicle. Below: A good view of the Wurfrahmen 40 fitting to a 251/1 Ausf C. The angled bars on the inside edges of each front fender were used by the driver to "aim" the vehicle toward the target. Elevation of the rockets was adjusted on the platforms themselves. This crude aiming was all that was necessary—the inherent inaccuracy of the rockets rendered any finer aiming useless.

Suka Zu Fuss

Another sub-variant mounted the "Launch Frame 40" (Wurfrahmen 40). This was fitted on all Ausfs and used throughout the war. It consisted of a vehicle-mounted framework with base plates for six 280mm and 300mm high explosive or 320mm incendiary rockets. The rockets were firing directly from their shipping crates. To aim, the vehicle was turned toward the target. Rudimentary sights were mounted on the engine cowl. Launchers could be angled from 15 to 40 degrees giving a maximum range of 2000-2,300 meters depending on the type rocket. Although spin stabilized, the rockets were inaccurate, so were ripple fired in large numbers against area targets. Ripple firing all six rockets took 10 seconds. The vehicle was successful as a support weapon for the panzer formations, especially in urban areas. Many cities and villages on the Eastern front suffered from this. They were also extensively used in Normandy in 1944. Due to the weight of the rocket, reloading was slow and cumbersome. Because of the open top, the weapon could only be fired with the crew out of the vehicle at a safe distance. A control box connected to the launchers with a cable was used for firing. Due to the similarities of the rockets to aerial dive bombing by Ju 87 Stuka aircraft—mobility and high explosive power—the weapon was nicknamed "Stuka zu Fuss" or "Walking Stuka". It was also sometimes referred to as "Heulende" or "Bellowing Cow". The vehicle normally carried a crew of four: driver, commander, and two gunners.





Above left: The firing sequence of the rockets.

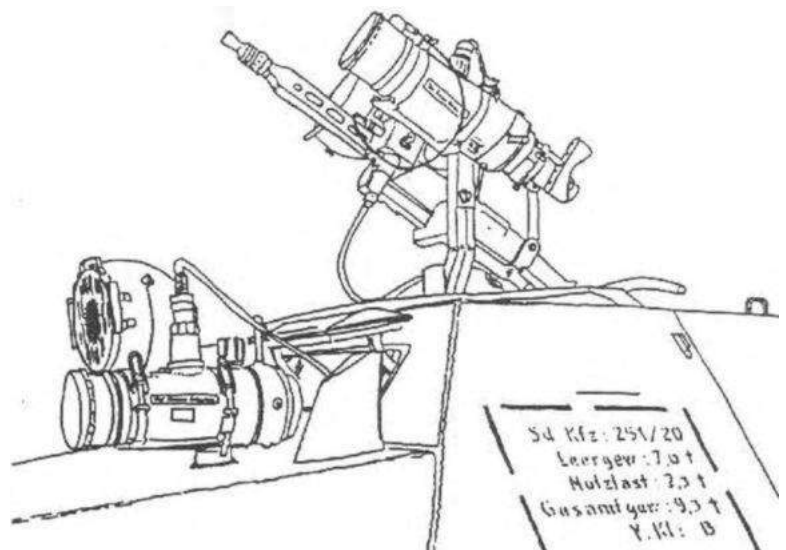
Above: A view of the rocket frames without the rockets present. The arms that hold the crates (see photo on the bottom of the previous page) are folded up against the platforms. The semi-circular shapes below the arms are the mechanism for adjusting elevation.

Left: A photo sequence showing the rockets being loaded. This gives an indication of their weight.

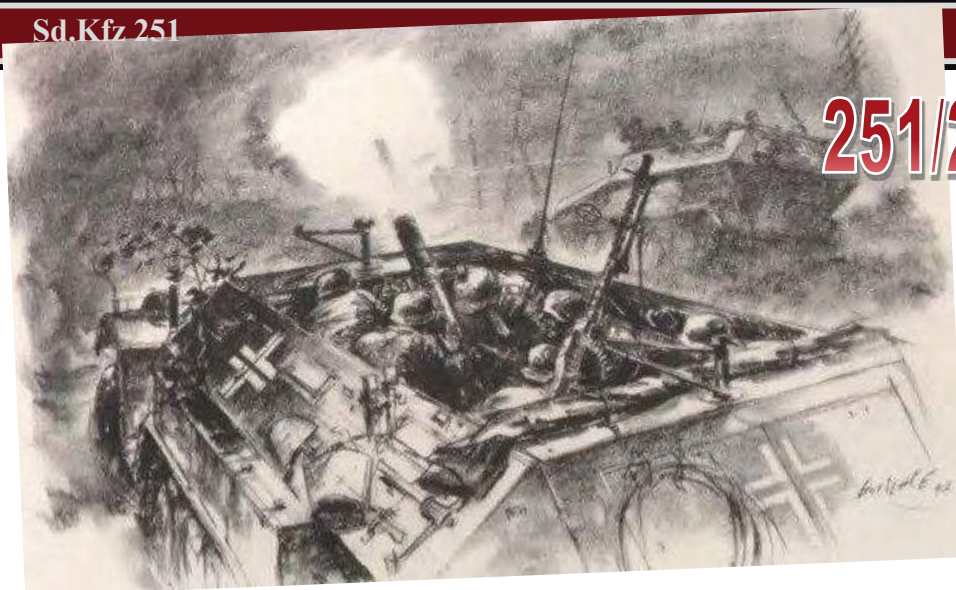
Falke

A final variant of the 251/1 was the infrared-equipped "Falke" (Falcon) designed to carry panzergrenadiers into battle in support of the IR-equipped Panther "Sperber" (Sparrow hawk) tanks and large IR searchlight-fitted 251/20s "Uhu" (owl). See the section on the 251/20 for more details. While prototypes were fitted-out with the equipment and tested, the vehicle was never used operationally. Both the driver and MG gunner were fitted with a small IR searchlight and sight. The driver's was fixed on the engine deck top in front of the driver's vision port. The gunner's were fitted to the machinegun mount.

A sketch (from www.pietvanhees.nl/251/) showing the driver's and gunner's IR gear fitted to the Sd.Kfz 251/20 "Uhu". The Falke's gear would have been identical



251/2 Granatwerfer



A 1942 print by Walter Gotschke, part of a set showing panzergrenadiers in action, showing a Sd.Kfz 251/2 Ausf. A. Note that these early models (A/B), unless they were fitted with the heavy machinegun mount, had the same crane machinegun mount foreward and aft. The gun, mount, and shield were normally removed on the /2 so it would not interfere with the mortar.

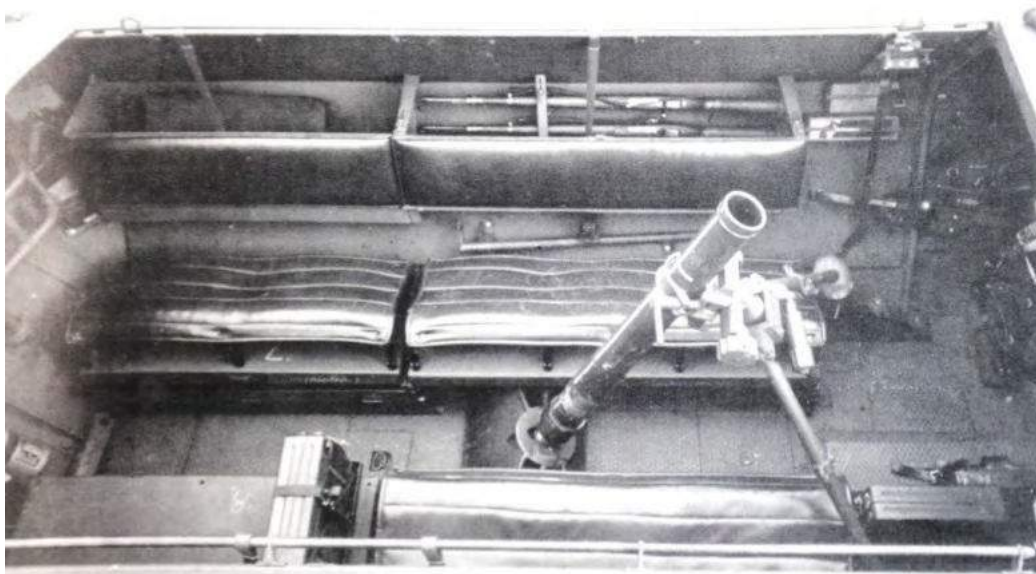
The 251/2 was a support variant mounting the 8cm mortar. A base plate was built into the floor and the right rear seat was removed for ammunition storage. The forward machinegun was eliminated as it would interfere with the mortar. A second mortar base plate for firing outside the vehicle was provided. The crew consisted of eight men. The basic load of 8cm ammunition was 66 rounds. The heavy platoon of a Panzergrenadier company or a pioneer battalion normally had two of these vehicles. Entire platoons of these vehicles were assigned to higher levels of command. The mortar was mounted facing forward. Rough aiming was done by pointing the vehicle, aided by a line painted on the driver's vision block. In early models an aiming stake was mounted on the front of the vehicle similar to that on the Stuka Zu Fuss. Fine adjustment were done with the mortar's panoramic sight. The weapon could elevate from 45-90 degrees. Maximum range was 2,400 meters, but the weapon was usually deployed between 400 and 1200 meters short of enemy positions.

The mortar, used throughout the war in all theaters, gained a reputation for accuracy and rate of fire due to the training of the crews. The tube was smoothbore and the rounds were fin stabilized. In addition to the rounds' integral propellant charge, additional charges could be added between the fins to increase range. For carrying, the 136.6 lb. weapon could be broken down into tube, base plate, and bipod. A trained minimum crew of three (five was the norm) could achieve a rate of fire of 15-25 rounds per minute. One fine-tuned aiming adjustments, one handled ammunition, and the others served as assistants. One could stabilize the bipod by hand for more steadiness. Primary ammunition was high explosive and smoke. Captured ammunition of the same caliber could be used (with a slight reduction in performance). The weapon could also fire illumination rounds at night.

Generally, mortars were employed individually when fighting mounted, but both mortars of the heavy weapons platoon were used together when fighting dismounted. During the attack, mortars engaged dangerous targets with concentrated fire, usually in tandem with the heavy machinegun squad. Once the enemy positions were penetrated, fire was shifted to engage targets in depth and nests of resistance. In defense, the mortars acting in coordination with other heavy weapons and artillery, filling the gaps where they were ineffective or inadequate.

The 251/2 Ausf C interior. Some of the ammunition stowage is also visible on either side of the right side front bench seat. A rack carrying more ammunition boxes was carried in place of the right rear seat.

Clearly seen in this photo are several standard 251 interior fittings. These include the seat-back stowage bins and rifle racks, spare vision block holders, the fire extinguisher on the right rear door, and the (seen directly behind the mortar between the seat and seatback), the stowage rack to hold an MG34





Left: A 251/2 based on rare riveted-hulled Ausf C. Due to a lack of armor welding capability, some Ausf Cs made by one factory featured riveted rather than welded hulls. Note the similarity of this photo to the print on the previous page.

Below: A 251/2 Ausf D with the rest of its platoon being inspected by Field Marshal Rundstedt. The crew are in their assigned position with the crew leaders standing at attention. The vehicles are in inspection order—clean and clutter free.



251/3 (I.G.)

Amongst my references there is probably more confusion about the 251/3 and the 251/6 than almost any other variant. Although not mentioned in many references, the 251/3 was originally designed to tow the 7.5cm light infantry gun. It was manned by a crew of 7 and carried 120 rounds of ammunition for the gun. The ammo boxes were carried in racks located in place of the forward left and rear right bench seats. Each rack carried 7 boxes. Additional boxes were carried in pairs behind each front seat.

251/3 Funkpanzerwagen

Sometime around the beginning of 1943, the designation of the 251/3 was switched from a gun tractor to a radio/command vehicle. Thus, all the gun tractors would have been built on the Ausf A-C. Photos of radio vehicles built on the A/B chassis and captioned as a "251/3" are surely mislabeled. These vehicles would actually be 251/6s or field modified vehicles.

As production of the C model stopped in August of 43, most 251/3 radio/command vehicles produced must have been D models although Cs would have been produced for several months. There were several sub-versions based on their mission (panzer, artillery, command/control, or air to ground coordination). There were also variations within the sub-variants and numerous field modifications. The 251/3 was the second most widely produced variant of the 251 (behind the 251/1).

The main distinguishing external feature are the antennas. The type antenna depended on the radio installed. Some photos show a frame antenna, although this is mostly seen on the earlier 251/6 (which the radio version of the 251/3 was designed to replace). Most photos show whip antennas, a 8-9 meter collapsible mast antenna, a 2 meter star antenna, or a combination of types. Photos show an incredible amount of variation of where and how these antenna are mounted. One vehicle seen displayed a collapsible mast mounted in the fighting compartment behind the driver, a star antenna on the rear hull, and a long antenna mounted on the roof. Some display stowage brackets for the mast antenna on the outer hull sides, some do not.



An interesting photo of a 251/3 Ausf D. Note the worn winter whitewash. Hoops for the fighting compartment cover are in place, but the cover is not. Note the skis tied to the side of the vehicle and the prominent 2 meter star antenna. Visible crewmen wear the reversible winter parka and a variety of headgear.



A view showing the radios and rack mounted in place of the right rear bench seat. Different radios/communications equipment were carried by different 251/3s based on mission and sub-variant as follows:

- /3.1 carrying FU-8 and FU-4*
- /3.2 carrying FU-8 and FU-5, the tank formation radio.*
- /3.3 carrying FU-7 and FU-1, for air-ground co-ordination*
- /3.4 carrying FU11, FU1 and FU12, command version*
- /3.5 carrying FU11, and FU1, command version*

Antennas on this vehicle appear to be a star on left rear and a rod on the right rear.



Above Left: A 251/3 Ausf D directs infantry operations in support of Panther tanks.

Above: This Ausf C, missing its front fenders and wearing a coat of winter whitewash (the gun shield is not covered) appears to carry a Kurblemast telescoping antenna on the rear of the hull. That is the only indication this is not a standard 251/1.

Left: This 251/3 carries a star antenna on the rear of the right side of the hull. There does not seem to have been a standard location of the various antenna. Photos show a variety of combinations and locations. One photo shows the Kurblemast being mounted inside the fighting compartment behind the driver's seat!



Originally, the 251/4 was a Munitionswagen, working in concert with 251/3 (I.G.)s and carrying ammunition and other support equipment. When the 251/3 was redesignated a Funkpanzerwagen, the 251/4 took over gun towing duties. By November of 1944, production of this variant had ceased. The vehicle was used with various guns. For example, three vehicles were authorized to tow two 7.5cm IG guns and carry the needed ammunition. Five vehicles were authorized to tow three anti-tank guns and transport associated ammunition and equipment.

251/4 (I.G.)

A crew limbering (or unlimbering) an anti-tank gun from an Sd.Kfz 251/4 Ausf D. Both the vehicle and gun carry foliage for additional camouflage.

251/5 Pionierpanzerwagen



Externally identical to the 251/1, the 251/5 was designed to transport pioniers (combat engineers) and their equipment. Differences consisted only of internal stowage. Due to the amount of equipment carried, crew size was reduced to eight. The 251/5 was gradually replaced by the 251/7 and production ceased in 1944.

An interior shot of the 251/5 Ausf C. The only difference from the /1 is in internal stowage. Note that in this instance, a stowage bin replaces the right rear seat. Other photos depict bins in place of both rear seats. Configuration and equipment carried probably depended upon the unit and its current mission.

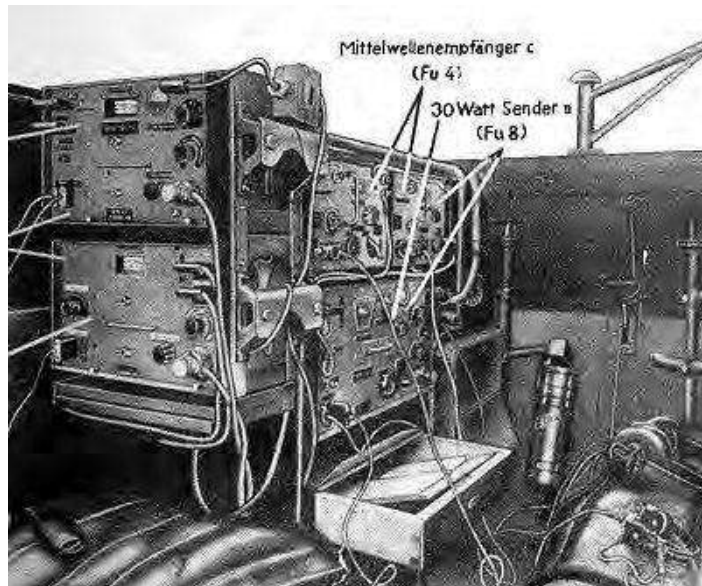
251/6 Kommandopanzerwagen

General Guderian's 251/6 (based on the Ausf A) during the French Campaign. The vehicle is readily identifiable as a 251/6 by the large frame antenna.



The /6 was a command version of the 251, issued in limited numbers to commanders and communications units. Sub-variants were fitted with different radios. The frame antenna was mounted but being conspicuous, it was gradually replaced by star antennas beginning in 1942. The vehicles were also fitted with a kurbelmast antenna in 1942. Field modifications used a wide variety of antennas included field-expedient examples and frame antennas from other vehicles. Most /6s were also supplied with coding and cipher machines (enigma). A scissors binocular is often seen. The 251/6 carried a crew of 7 or 8. It was armed with an MG 34.

The vehicle was replaced in service by the 251/3, which was issued more widely—down to the company level—and become the 2nd most produced version of the 251. References are sometimes contradictory. Some definitively state the /6 was produced only on the A and B chassis, while others have it continuing even on the D. What is certain is that the /3, originally a gun tractor, was redesignated sometime between August of 1942 and March of 1943 as a radio vehicle. This vehicle replaced the /6. By January 1944 the /6 was no longer listed as in production (existing vehicles continued in use as long as they were serviceable). We can positively say the /6 was produced using Ausf A and B models, and was almost certainly produced on the Ausf C (photo evidence backs this up), but probably not on the D. We can be fairly confident that any photo of a radio/command vehicle on the Ausf A or B chassis should be captioned as a /6, and not as a /3. The opposite would be true for similar vehicles on the D chassis—these are almost certainly /3s and not /6s. Of course, to muddy the water further, with field modified vehicles anything is possible! For example, it would certainly be within the capability of field workshop to transfer the radios, equipment, and fittings from an earlier model 251/6 into a 251/1 Ausf D. But would such a vehicle retain the 251/1 designation on unit strength returns, or would it be listed as a 251/6 or even a 251/3?



Above: The radio rack taking the place of the rear right seat.

Left: Here we see Guderian's 251/6 Ausf A in action. In addition to the radio rack on the right rear, the crew is using the right front seat as a "table", operating an Enigma cypher machine. Note all the crew packed behind the seats on either side of the vehicle.

Like the 251/3 there were several sub-variants (sources state between 5 and 9) based on the radios carried. Configurations include:

- FuG11 - FuG Tr. (Before 1943)
- FuG11 - FuG12 - Kdo.Fu.Tr. with 9 meter pole antenna and frame.
- FuG12 - FuG19
- Fu.Tr.100Mw(gp)
- Fu.Tr.80Mw(gp)
- Fu.Tr.30Mw(gp)
- Fu.Tr.15Kzw(gp)



Left: Two Ausf Cs, possibly 251/3s, but more likely (based on the frame antenna) 251/6s. The vehicle on the right is also fitted with a Kurbelmast on the right rear. Right: Vehicles served as long as they were above. This is an older 251/6 Ausf B still in service in 1944. Note the extra side stowage locker on the fender.

251/7 Pionierpanzerwagen

in boots. They were on point for many assaults. They were the troops who carried the demolition charges and flamethrowers—and they suffered some of the highest casualties. The Sd.Kfz 251/7 was one of their specialist vehicles.

The first version of the 251 modified for the pioneers was the 251/5. The 251/7 gradually replaced the /5 and was made in much larger numbers, being the third most-produced variant behind the 251/1 and 251/3. The /7 was fitted with brackets for mounting two assault bridge treadways. A number of units rearranged these brackets and placed boards between them for extra stowage since the

The sturmpioniere—assault engineers—were jacks of all trades. They created—and cleared—obstacles. They laid—and removed—mines. They built—and destroyed—bridges. They ferried troops of equipment including pyrotechnic and demolition equipment, chainsaws and carpentry tools, mines and mine clearing tools, wire, etc. With increased interior stowage, crew size was reduced to 7-8 men.

The vehicle carried two machine guns in the same mountings as the 251/1. Photos shows the vehicle was sometimes fitted with 37mm antitank guns, the 2.8cm sPzB, or other “unofficial” guns in place of the forward machine gun.



Left: Engineers in their Sd.Kfz 251/7 Ausf D operate with Panther Tanks in Russia. The vehicle appears to be in overall dark yellow.



Bottom Left: Is it a 251/6, a 251/3, or a 251/7, or none of the above? This Ausf C carries the bridge supports normally seen on the 251/7, but instead of bridges it mounts a frame antenna that appears to be from an Sd.Kfz 231 six-wheeled armored car. This is clearly a field modification, but I do not know if it were built on a /7 or if the bridge supports were simply added to mount the antenna. The research tool “Occam’s Razor” tells us the simplest explanation is normally correct, so I believe this modification was fitted to a /7 rather than go to the trouble of mounting bridge supports that would not be needed. Could the vehicle fulfill the role of a 251/3 or 251/6 for an engineer unit? The vehicle is missing both front fenders. Note the anti-tank magnetic mine in front of the co-driver’s vision port.



Above: The interior layout of the 251/7 Ausf C. Note the stowage bins in place of the rear seats and the anti-tank rifle mounted underneath the front seatback rifle rack.

Left: This 251/7 Ausf C mounts a 3.7cm anti-tank gun in place of the forward MG: a combination of the 251/7 and 251/10. I have seen photos showing 251s—and especially 251/7s—mounting a variety of guns including the standard MG, the 3.7cm, the sPzB 41 squeeze-bore gun, and even a captured Russian heavy machinegun.



Bottom: Although the bridges are missing, this is clearly a 251/7 based on the bridge mounts. It was not unusual for units to add boards between the mounting brackets creating additional stowage bin space on the hull sides.

251/8 Krankenpanzerwagen

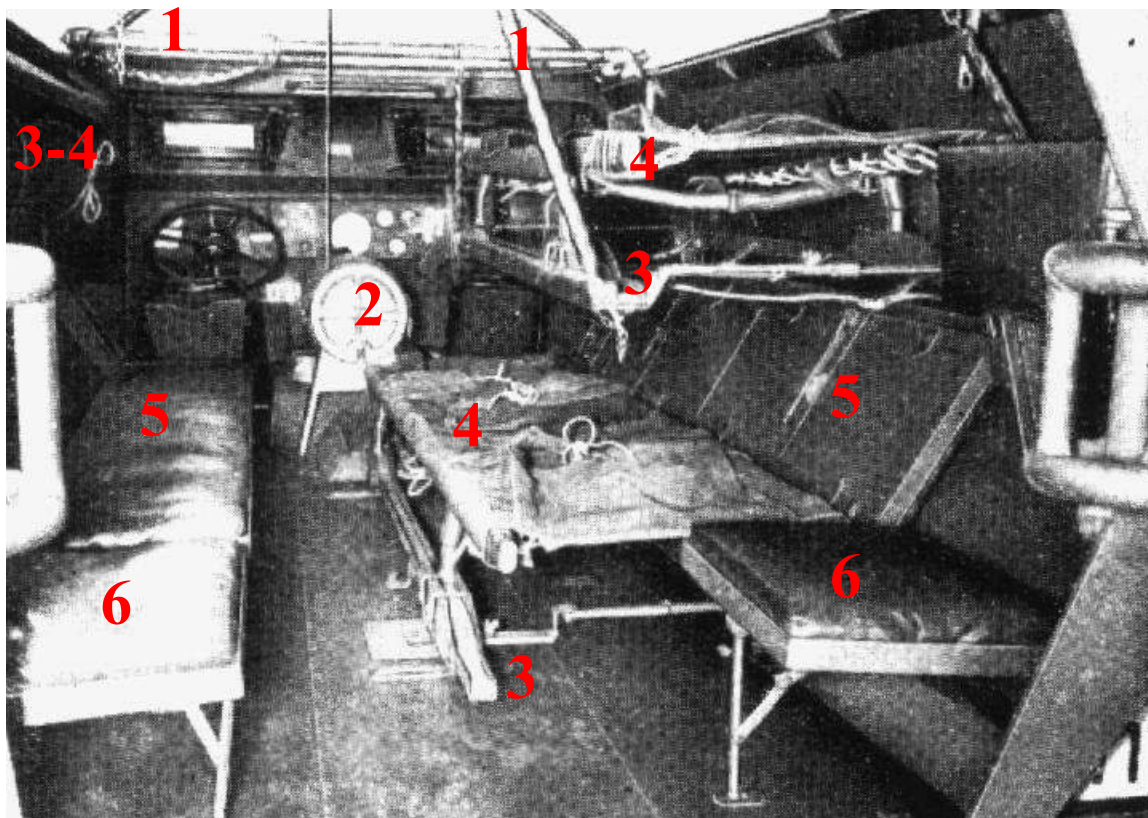


The /8 armored ambulance was built on all models of the 251. Field modified ambulances could differ from factory versions. The vehicle was used by panzer regiments, armored Panzergrenadier regiments, panzer recon battalions, and Panzerjäger battalions.

A water tank was carried between the driver and co-driver. There were 2 folding stretchers on each side (only used on one side at a time to allow for passage down the center aisle). There were seats for a medic and four walking-wounded on each side that folded up against the sidewall when the stretchers were in use.

Taking stretchers through the rear doors was hard, so the armor strip over the door was often removed according to my references. However, I have found no photos confirming this. A folding step was fitted under the rear doors on the factory model. The vehicle was manned by a crew of two or three and was marked by prominent red crosses and flags (often omitted on the Eastern Front as neither side particularly respected red crosses).

Below: This view of a 251/8 armored ambulance clearly shows the crossbars from which the stretchers are suspended. Normally these were only hung on one side as seen here as there was no center isle when they were hung from both sides. Note also the tarp bow at the front. The cover on the /8 was higher than normal, and the front bow was permanently fitted. It was hinged to bend forward if needed. The factory-built 251/8 also was fitted with a folding step on the rear to assist entry into the fighting compartment. This is visible to the right of the tow hitch.



The 251/8 interior (factory—field models may have varied)

1: On the front and rear were crossbars for the top litters to hang from.

2: Water Tank

3: Litter supports. The bottom litter mounted in brackets fitted to the floor. The top litter sat in a mount suspended from the crossbar chains.

4: Litters: While there were two on each side, only one side were used at a time to allow passage up and down a center isle. When not in use, the brackets and litters were folded and stowed against the upper hull side.

5: Seats for walking wounded were available on each side. When not in use, they were folded up against the hull.

6: A single folding seat for the medics was located on each side at the rear.

SPWs AUTHORIZED TO A PANZERGRADIER BATTALION:

In mid 1943, the SPW-equipped Battalion of a Pa Grenadier Regiment had, on average, the following SPW (this example is the 1st Battalion of Pz.Gren Regiment 12, 4th Panzer Division):

Battalion Headquarters:

3x 251/3
1x 251/8
2x 251/11
Total: 6

Each Infantry Company (3 total of 3 platoons each):

12x 251/1
2x 251/2
1x 251/3
3x 251/10
Total: 18 per company of a total of 54

Signals Company:

1x 251/3
1x 251/11
Total: 2

Anti-tank Platoon:

1x 251/3
4x 251/4
Total: 5

Infantry Gun Platoon:

1x 251/3
3x 251/4
Total: 4

Each Heavy Weapons Platoon (2 total)

1x 251/3
1x 251/4
6x 251/9
Total: 8 per platoon for a total of 16

Pioneer Platoon:

6x 251/7
1x 251/10
Total: 7



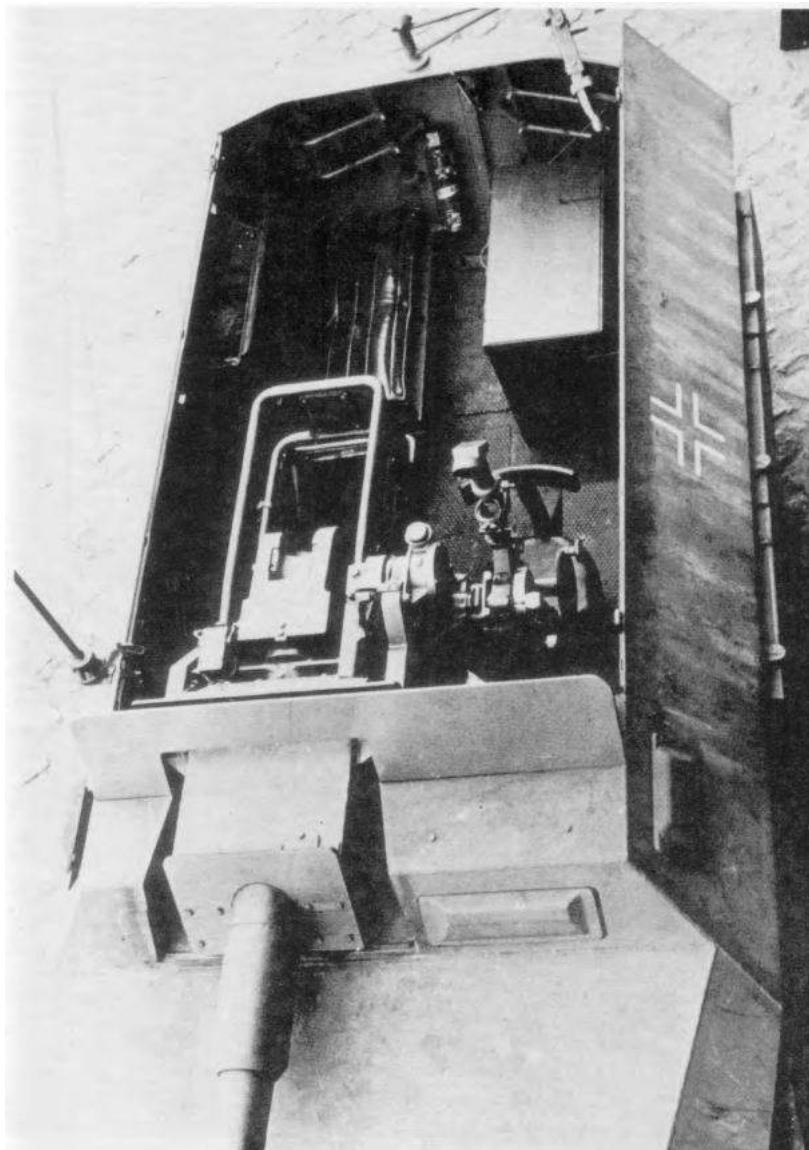
In this vehicle, the litters are mounted on the left side. Both the rear seats are folded and a variety of stowage, including a ration container and a water can, are in their place.



This photo gives us a closer view of the permanently mounted folding front tarp bow. The soldier is laying on the folded down seats. The stowed litters and racks are visible against the hull side



Ambulances were often prominently marked with red crosses (although this was not always the case in Russia as neither side in that conflict particularly honored red cross markings). From a study of photographs it is apparent there was no set design, location, or size as a variety of different markings can be found.



The 251/9, called "Stummel", or stump, due to its short barrel, was a close support weapon for the panzergrenadiers since StuGs and other assault guns were not always available. Combining the proven gun with the halftrack provided a simple solution.

The 251/9 was armed with the 7.5cm KwK 37 L/24 howitzer. On C and early D model halftracks, the 251/9 carried the gun in the same mount as the StuG III assault gun requiring that the right-hand side of the driver's compartment armor be cut away to fit the gun. This eliminated the co-driver's position. Traverse was limited, but adequate since rough aiming was done by pointing the vehicle. Later D versions had a higher mount above the driver's compartment. This resulted in a higher profile, but allowed the gun to be mounted in the field without extensive modification to the vehicle. The 251/9 had a three-man crew. Ammunition (32 rounds) was carried in a ready rack for 6 rounds on the right wall by the gun and in a large ammunition bin that replaced the left rear seat (the ready rack was not always present in the early models). The later version mounted a machinegun coaxially with the main gun. The rear machinegun mount was unchanged. The radio was relocated to the left hand side of the fighting compartment.

The 7.5cm KwK L/24 gun was designed as a close-support artillery gun firing a high-explosive shell, but it was also effective against lightly-armored tanks and soft-skin vehicles. Beginning in March, 1942, the MK IV and StuG III had their main gun upgraded to a long-barreled weapon. The short guns that were removed were used to create the Stummel and to arm later MK III tanks and other infantry support vehicles. These included the Sd.Kfz 233 and Sd.Kfz 234/3. The weapon could fire a variety of ammunition including armor-piercing, high explosive, high explosive anti-tank (HEAT), smoke, and even canister.

251/9 (7.5cm Kanone)

Top: An overhead view showing the interior layout with the low gun mount and cut-away roof armor on an Ausf C. This was used on Ausf C and early Ausf D 251/9s. The gun mount was the same as that used in StuG III. The large bin replacing the left rear bench seat is for ammunition.

Below: The latter high mount shown on the Ausf D (I have never seen photos of this mount on any other than the Ausf D). Although having a higher profile, this mount could be easily installed in the field.



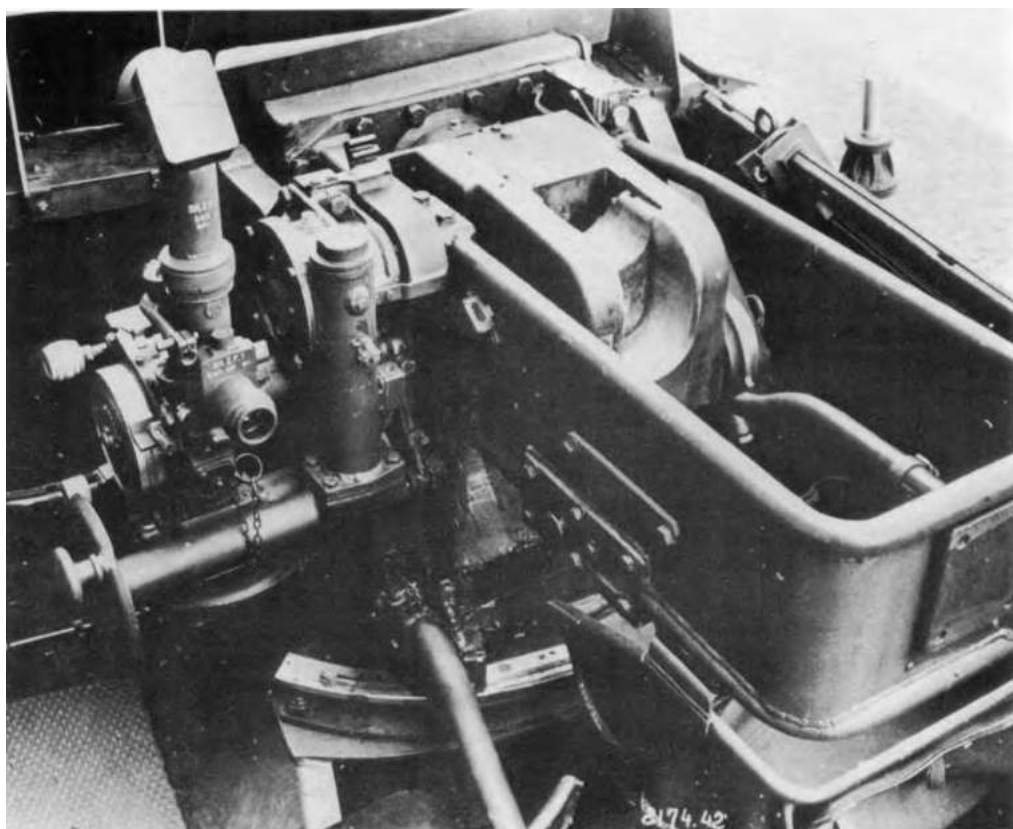
NOT a Tank! Although an armored vehicle possessing what had been a tank gun, the 251/9 was not intended to be used in the same manner as a tank. This was made quite clear in a German tactical manual issued for the vehicle in June of 1943.

“The vehicles should be concentrated together—parceling them out and employing them individually scatters their firepower and reduces their effectiveness.” It also stated that, when attacking bunkers and strongpoints, they should attack in at least pairs.

“Due to its weak armor, the Stummel is at a disadvantage against armor.” But it did carry armor-piercing shells, and if enemy tanks did appear, they should be the priority target.

The manual was clear that the Stummel, due to light armor, open top, and lack of close-defense capability, was not suitable for employment as a tank destroyer, for tasks that required self-sufficiency, or as the point vehicle during movement. “Such employment will always lead to the loss of this valuable weapon.”

The targets it was designed to engage were those that couldn't be engaged by the other heavy weapons of the panzergrenadiers or by artillery. Due to its speed, weapon power, and accuracy, it was effective for attacking enemy strongpoints and heavy weapons. Smoke could also be fired to blind enemy observation posts and bunkers.



Left: A good view of the gun and sighting mechanism on the early model 251/9

Below, another early 251/9, mounted on the Ausf D, in a column of 251/1s and tanks.



251/10 (3.7cm Pak)



Mounting a 3.7cm anti-tank gun, the 251/10 was normally issued to platoon leaders to provide additional fire support. Production began in mid 1941 and continued on the C and D models until early 1944 (when replaced by the 251/17) with about 300 made. Racks for ammo cans replaced the rear seats in the fighting compartment. Photos show a variety of gun shields, including the standard shield used on 3.7cm Pak anti-tank gun, a low partial shield protecting only the gunner, and field-improvised shields. Field modified 251/10s saw action prior to production as strength returns sometimes indicate "251/1 with 3.7cm Pak.". Photos also show Ausf A and B models fitted with the gun and full shield. Since the C model started production about the same time as the "official" 251/10 variant these earlier vehicles were likely field modifications. I believe vehicles fitted with the full shield are field modifications as the factory-built /10 had a low shield only on the gunner's side of the weapon. Photos also show the gun sometimes mounted on the 251/7. It seems that mounting this weapon on the 251 was quite a common occurrence.

The 3.7cm Pak was the main German anti-tank gun at the start of WWII. Early models of the Panzer III also used it as a main gun. It was found to be ineffective against heavier allied tanks such as the Matilda, Char B1, T-34, and the KV-1 and was soon replaced with heavier weapons. Even with tungsten core rounds, it could only kill a T-34 with a side or rear hit at point-blank range (a suicide scenario for the gunners). Its primary advantages were small size and ease of handling. Minimum crew was two men.



Top: A gun, with full shield, field-fitted to a battered Ausf B.

Above: A good view of the factory-produced shield including the altered driver's compartment roof with gun mount and angled bullet splash guard.

Right: Another 1942 Gotschke print, this time showing a 251/10 in action. The vehicle appears to be an Ausf A fitted with the factory-provided gun mount and shield.





Left: A factory-built 251/10 Ausf C. The bundle of logs on the nose are to assist with un-ditching or negotiating soft ground. This old veteran is battered—note the missing front fenders and radiator cap cover

Below: An iconic photo showing an Ausf A with field-fitted 3.7cm gun supporting an attack by Panzergrenadiers during operation Barbarossa.



When introduced, the 251/10 was the main weapon in the Panzergrenadier platoon for engaging enemy armored vehicles. High explosive rounds were used against enemy heavy weapons, troops, points of resistance, and field fortifications such as log bunkers. However, due to the limited ammunition carried, it was normally used only against targets that could not be effectively engaged by other organic or attached support weapons. Its speed and armor allowed it to be used in the front line of an attack or to provide support from close behind. Due to the height of the gun mount, it was ideally utilized from a hull down position. In the defense, it could rapidly move to threatened areas.

The 251/11 was a telephone communications vehicle used to lay wire and create field telephone networks. The bench seats on the right side were replaced with various stowage bins and racks to carry telephones, a switchboard, phone wire spools, and splicing/servicing equipment. Additional racks for phone wire reels were fitted to the front fenders. The crew used a long pole with a "U" shaped hook to place with wire on poles or in trees without having to dismount from the vehicle and climb.

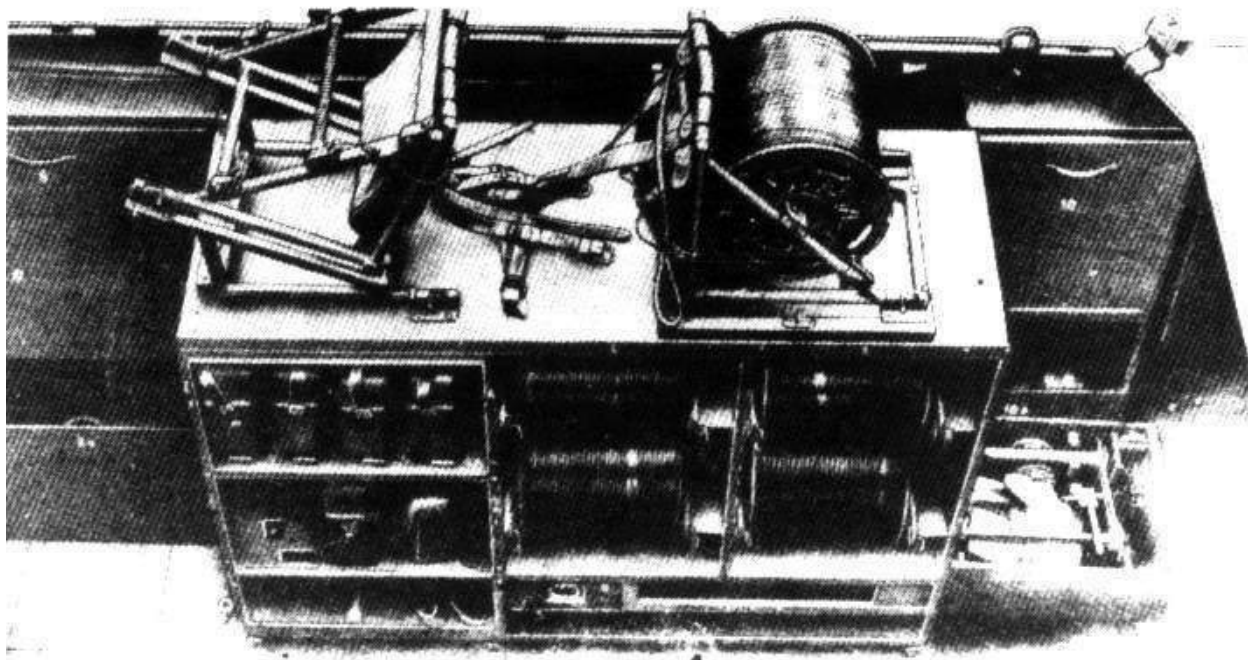
A few references adamantly state the 251/11 was only built on the Ausf C chassis, but as production ran from late 1942 until the end of war, it is probable the vehicle was built on both the C and D chassis. I have seen photos of Ds which are likely /11s.

251/11 Fernsprechanpanzerwagen



Right: Soldiers on the engine deck string wire using the long pole (with hook) and wire reel attached to the front right fender of this 251/11. While the fitting to mount a rack is present, no wire reel is fitted to the left fender on this example.

Below: The interior "office" of the 251/11. The right side bench seats were replaced by various cabinets, racks, field telephones, and wire reels.



251/12 - 251/15

German sources indicate these variants, designed to provide support for artillery units such as flash spotting and sound ranging, were under development. The 251/12 even appeared on at least one table of organization and equipment. However, no evidence (documentary, photographic, or testimonial) has been found indicating these variants were ever produced or issued.

251/16 Flammpanzerwagen

Flamethrowers are effective weapons. The morale effect (fear) they cause is often more than the actual damage they do. They are often unpopular due to the inherent dangers of using them, and also due to the fact captured flame gunners are not always nicely treated by their captors (summary execution was not uncommon during the Second World War).

Designed for close support, the 251/16 entered production at the start of 1943, seeing service on the Eastern Front, Western Front, and Italy until the end of the war. They carried two 14mm flamethrowers with armored shields, one on each side. The flame guns were fed from two 700 liter tanks located inside the vehicle which allowed for about 80 one-second shots. The pump and a small engine were mounted just in front of the rear doors, rendering the doors unusable. If a single flame gun fired, the effective range was about 40-50 meters, less if both guns fired. The side-mounted flame guns had a horizontal traverse of 160 degrees and vertical of plus or minus 40 degrees. Earlier C models were equipped with a third, 7mm projector, attached to the vehicle by a 10-meter long hose. This portable unit was used outside the vehicle and required supporting infantry to suppress any defensive fire. This small flamethrower was discontinued on later C models and all Ausf Ds. The vehicle was also equipped with 2 machineguns (the standard front and rear mountings). In 1944 the ignition system was improved, and new flame gun shields offering better protection were fitted.



This shot of an Sd.Kfz 251/16 Ausf D taken during a demonstration shows the side-mounted flame gun to good effect. The right side gun is in operation, sending out a jet of flame. Note that the crew are not wearing the protective overalls and hoods—unpopular items that were rarely used.

Crew size was four men (Driver, radio-operator/machinegunner, and two flame gunners). Fireproof overalls and hoods were available but were often not worn. A platoon consisted of six vehicles. Three supporting trucks carried enough flame fuel for two refills for the entire platoon.

Tactics Employed

(Excerpts from the Nov 1944 issue of the US Army Intelligence Bulletin).

-251/16s are normally employed by platoon, but can be used singly if needed - but always in cooperation with Panzer Grenadiers.
-Do not use these vehicles like tanks or

assault guns, as "point" vehicles, for protective duty, or as independent patrol vehicles.

-In the attack, the flamethrower vehicles move in extended order behind the Panzer Grenadier units.

-If the opposition remains under cover, it will be burnt out. Flamethrowers should be used against only those targets definitely within range. Firing otherwise wastes fuel and obscures vision.

-Direct the flame against the bottom of the target and then work up.

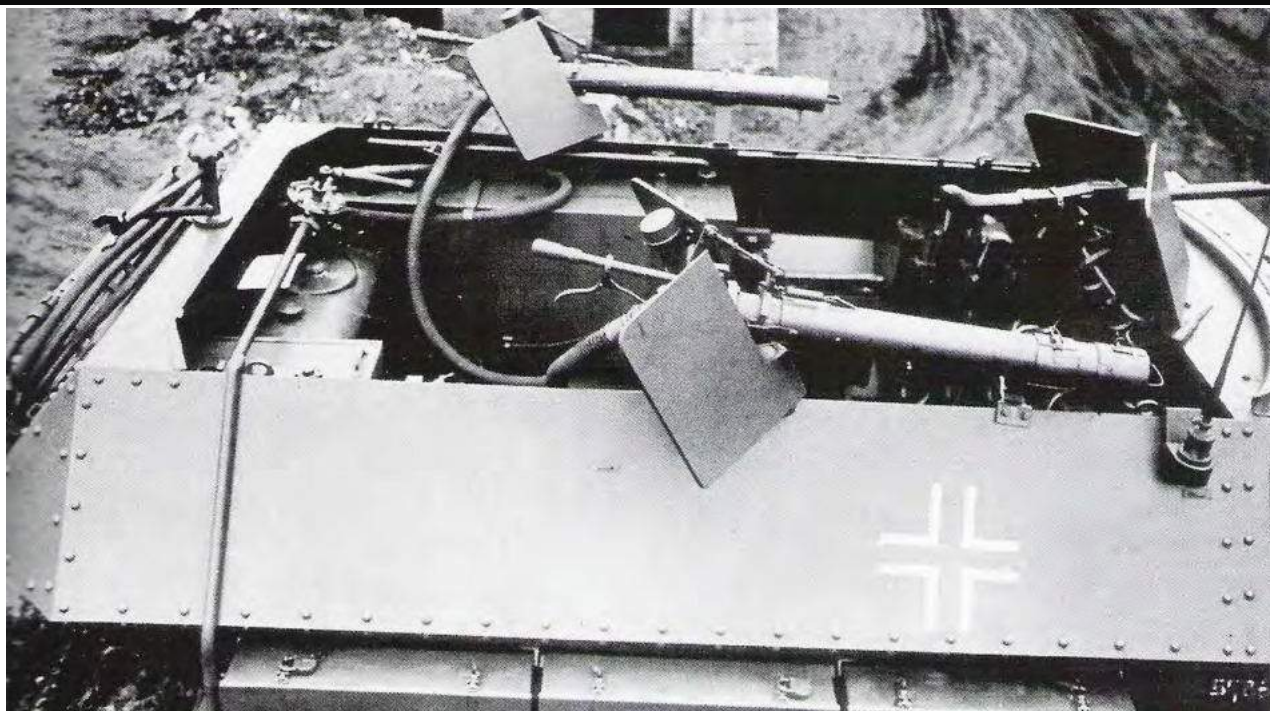
-Target type will determine whether fire is opened on the move or at the halt.

-Trenches will be crossed and engaged from the flank.

-Tree tops, roofs, and raised platforms may be set afire if the presence of hostile troops is suspected.

-If a large fire is desired, the target first will be sprayed with oil and then ignited by a burst of fire. This is especially effective when attacking dugouts, trenches, entrances to pillboxes and wooden buildings.

-Fire will not be opened in thick, natural fog, except by special order.



Above: An interior view of a 251/16 Ausf C built on a riveted hull. This is an early /16, possibly a prototype made for troop trials. It has the third, man portable, flamethrower mounted on the outside of the rear doors. This was of limited usefulness due to the relatively short (10 meter) hose attaching it to the vehicle and was discontinued in later models. This vehicle also features the earlier style flame gun shields with the larger aperture.



Left: An Ausf D. The crew wears the protective flame-retardant overalls. As seen on the photo on the facing page, these were not popular and were not commonly worn.

Right: This Ausf D features the later-style flame gun shields. There are larger with a smaller aperture and provided increased protection to the gunners.



2cm Flak 38 Auf SPW (Sd.Kfz 251)

This vehicle was never designated as a 251/17, although it is often misidentified as such. That is why I included it here. It was made in limited numbers (10 with gun and two command/control vehicles) and it equipped only one flak unit in the Luftwaffe's "Hermann Goering" Division. It was much photographed, giving the impression it was more common than it actually was. It carried the Flak 38 on full carriage with gun shield (layout and equipment of the command version is unknown). The bulged sides allowed the gun 360 degree traverse and could be lowered engage ground targets. This exposed the crew to ground fire, but the effective range of the 2cm was greater than most infantry weapons. While effective, it was complex and required extensive modifications to the 251 Ausf C chassis. The production version of the 251/17 offered the same advantages in a standard hull.

Where these vehicles saw action is a subject for debate. Most photos were taken in Germany prior to the division's transfer to Tunisia. It is likely the unit took the vehicles with them. One source states that one vehicle was lost in an accident, but the other nine deployed to Tunisia with 18 Batterie Flak Regiment "Hermann Goering" in early 1943. The bulk of the division sent to Tunisia went into captivity after the Allied victory. Vehicles and heavy equipment were destroyed or captured. If these vehicles did go to Tunisia, that would have been their only combat use. This theory is supported by Hermann Goering division organization charts. The chart for Tunisia shows 9 SPW 2cm. A later chart, from September 1943, does not show these vehicles. If that refers to these vehicles, they were almost certainly lost in Tunisia. I found no information on the use of the command vehicles.

Both Dragon and AFV Club, in their 1/35th kits, have decal variants for the vehicle on the East Front in 1944. There are also listings for the Hermann Goering division having 251/17s in 1944, but in my opinion, these are almost certainly production versions of the 251/17—not this unique variant. This error (if, in fact, it is an error) comes from mistakenly referring to this vehicle as a 251/17.



The Luftwaffe's 2cm Flak 38 Auf SPW with sides folded down to engage ground targets. Only a handful of these vehicles were made. Although never given the 251/17 designation (the vehicle was built in 1942 and the 251/17 designation was not used until late 1944), I have included the vehicle here as most references (and, indeed, model companies) list it as a 251/17 Ausf C.



Most photos of the vehicle were taken in Germany during testing and training. Photos in action are rare, and the vehicle's combat use is the source of debate. This photo may have been taken in Tunisia. The vehicle's paint and the crew uniforms (possibly Luftwaffe tropical) and terrain seem to so indicate. Information with the photo, while not able to confirm the Tunisia origin, did state some other photos on that roll of film were clearly taken in Tunisia. If, in the fact, the vehicles did deploy there, they were likely destroyed or abandoned—they were almost certainly not evacuated. However, in many sources, this (and similar) photo is captioned as being taken in Sicily or Italy. I believe the only reason for this is the possibly mistaken opinion the vehicles later served on the Eastern Front. If taken to Tunisia, the vehicles were almost certainly lost there.



The production version of the 251/17.

This version of the 251, while often called an anti-aircraft version, was actually intended to be issued to platoon commanders as a replacement for the 251/10. As seen on the facing page, this was not the first vehicle fitted with 2cm gun. A vehicle using the mount from the Sd.Kfz 222 fitted into the 251 had also been field tested. Photos also show unofficial versions which simply fitted the 2 cm flak 38 into the 251 body. This resulted in very limited traverse. The solution, the production version, used a

251/17 Schwebelafette

special gliding cradle “Schwebelafette” mounted in a standard body. Numbers of available vehicles never met demand and the 251/17 was not universally issued to the Panzer and Panzergrenadier units. Reports from 1-15 January, 1945 show 244 in service.

In the Schwebelafette carriage, the gun was suspended by the gunner's weight. It had 360 degree traverse, could elevate 60 degrees and depress 10 degrees. A braking device could lock the gun in both elevation and traverse. A small turret-like gun shield, 10mm thick, provided protection for the gunner. The loader was seated below and in front of the gun. 600 rounds of 2 cm ammunition were carried in detachable box magazines (armor piercing and high explosive rounds were available). The gun could engage both ground and air targets. A telescoping sight (3x magnification) was provided for aiming at ground targets. Aerial targets were engaged using a multiple ring open sight. The weapon had a maximum effective range of 2,200 meters, a practical rate of fire of 180-220 rounds per minute, and a cyclic rate of fire of 450 rounds per minute.

NOT a 251—but this armored car features the 20mm Schwebelafette mount salvaged from a 251/17. While the gun is not in place, it is the best photo of the mount I have been able to find. It shows the mount, shield, and gunner's seat to good effect. Such field-modified vehicles were surprisingly common in the WWII German military.

For good information on the gun and mount, as well as interior details of this (or any) variant, I recommend the outstanding drawings and photos included in the Panzer Tracks series of books.



251/18 Beobachtungspanzerwagen



I have found several photos of this same artillery observation vehicle, the only one I have been able to confirm as a 251/18. It is clean and uncluttered, in inspection order for a review by Field Marshall Rundstedt. The vehicle, tactical number 001, was taking part in an exercise, so I do not know if the searchlight on the roof and what appears to be a siren on the fender are standard equipment or not. The large scissors binocular was standard issue on the vehicle. Other photos of this vehicle show a star antenna on the left side of the hull at the rear and a radio rack similar to that mounted in the 251/3 and 251/6 inside the hull at the right rear. Note the step welded on the side by the middle stowage locker.

The 251/18 was an artillery observation vehicle fitted with spotting telescopes and radios. There were four sub-variants, based on the type radio carried. Although the 251/18 designation was first authorized in August 1944, it does not appear that production started prior to October, and even then less than a dozen per month were made, making this a fairly rare vehicle, found only near the end of the war.

251/1 Ausf A with Map Table - Field Modification

Although certainly not the place, either chronologically or by Ausf, to discuss this vehicle, I decided to include it here as many references misidentify this vehicle as a 251/18. These vehicles were made and issued for the French campaign (and also saw service in Russia), long before the creation of the 251/18 designation. They also filled a different role. While the /18 was for artillery observation, this modified vehicle was issued to platoon, company, and higher commanders—serving basically the same purpose as the later 251/3 “Funkpanzerwagen”. These were field-modified and issued only in the 1st Panzer Division. The platform—from photos apparently of a standard design—was made for laying out maps. Photos of a few of these vehicles exist. One even displays what appears to be supplemental armor on the hull sides hanging down over the side stowage lockers.



A 251/1 Ausf A with map table. Note the battalion command pennant. Note also the antennas, indicating the vehicle has additional radios. Unlike other similarly-modified vehicles, this one appears to have supplemental armor fitted to the hull side. Perhaps this vehicle belong to an officer that feared for his safety? Or more probably belonged to officer who liked to lead from the very front, often putting himself and his vehicle in harm's way.

*Despite what many references on the Sd.Kfz 251 state, this is **NOT** a 251/18. All photos I have seen of this modification are on Ausf As and can be dated to 1940-1941—long before the creation of the 251/18 nomenclature and even serving a different role.*

251/19 Fernsprechbetriebspanzerwagen

While the 251/11 was designed to set-up telephone networks, the 251/19 was intended to operate and control them like a mobile operator/switchboard. As far as I can tell, it was never produced.

251/20 "Uhu"



One of the completed Uhús. The large searchlight is the primary feature. Also visible is the radiator top of the large generator in the fighting compartment and the driver's IR gear. .

The German army was one of the first to experiment with night-vision technology as far back as 1935. The advantages are obvious. The effect of night assaults on an enemy with no comparable capability could have been decisive—and not only from a tactical standpoint: when that enemy knows you can effectively kill in the dark, it will have a negative morale effect. While initial prototypes were created by 1939, the production of workable systems did not start until the closing months of the war when there were too few tanks and too little fuel to carry out effective operations.

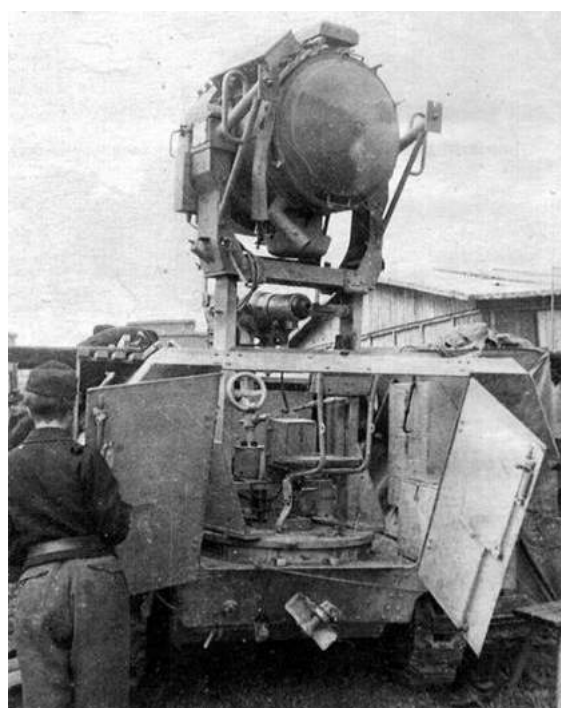
“Sperber” (Sparrow Hawk), fitted to the cupola of the Panther G tank and operated by the tank commander, included a 30cm IR (infrared) searchlight with a range of 600 meters and an image converter (night vision scope). From the end of 1944, some Panther Gs were fitted with this system (or at least the mounts on which to fit the system). There is only one documented small unit action where this system was used. Other than the fact it operated successfully without breakdown, nothing is really known.

Supporting the Panthers, and providing more illumination at increased ranges of up to 1,000 meters, was a vehicle mounting a larger 60cm. light. The first such vehicle was the Sd.Kfz 251/20 “Uhu” (Owl), although latter vehicles were to be built on the Bergepanzer 38 and designed “Uhu II”. Each Panther platoon was to have one Uhu in support. In addition to the large searchlight – which could rotate through 360 degrees and be secured in the fighting compartment when not in use – the driver was also provided with a smaller IR searchlight and sight. A large generator was fitted inside the vehicle to power the system. The generator’s exhaust was vented out the right rear stowage locker. The operator of the searchlight was also provided with a night scope. The crew likely consisted of three or four men. One MP40 and one MG-42 were also standard equipment. About 60 of these were made. It is unclear if the vehicle ever saw any operational service.

Operating in support were to be panzergrenadiers also equipped with IR gear. Sd.Kfz 251/1s “Falke” (Falcon) were fitted with IR scopes and lights for both the driver and MG gunner. Designed for the infantry was the “Vampir” (Vampire) system for the MP44 assault rifle. This consisted of a small searchlight and scope mounted on top of the weapon. Visual range was about 300 meters. The system was linked by insulated cable to a battery/control backpack. There is dispute over whether or not the system was ever issued or used. No photographs exist showing soldiers utilizing the gear in the field.



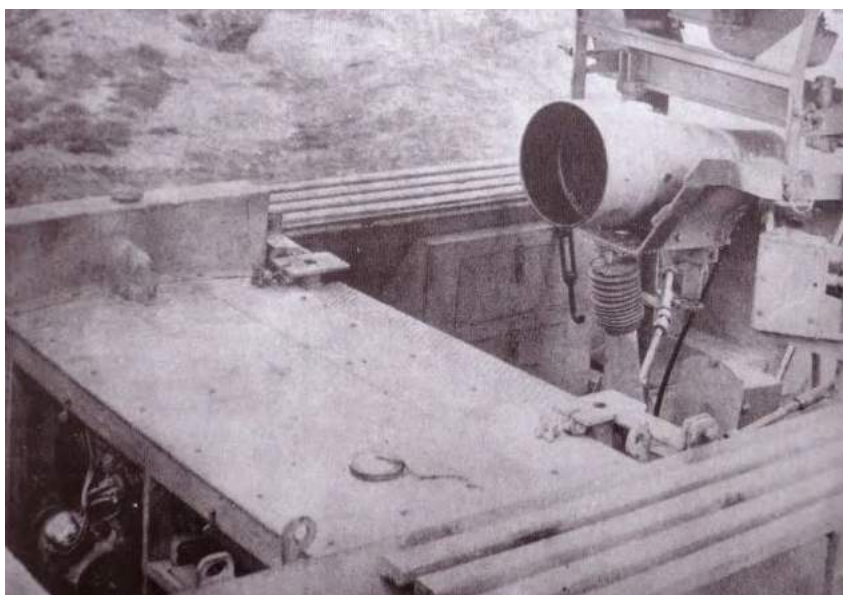
Above left: A Panther G "Sperber" with IR gear fitted to the cupola. This is the same gear fitted to the Uhu and the Falke. Above right: "Vampir" with the weapon-mounted scope and light and battery pack on the soldier's back.



Above: A front view of the searchlight. The operator's sight is visible just below the light. Also visible in front of the light is the generator. Note the walkways on either side of the hull to service the light.

Above Right: This photo gives a good view of the operator's station.

Right: This photo offers a good view of the generator. Note that due to its size and location there is no direct communication between the driver's and fighting compartment. The roof of the driver's compartment is visible in the lower left corner, showing how little space the driver, gunner, and generator operator have to enter and exit the vehicle. The two large lugs on the rear of the generator are for the light to mate to when in the folded and stowed position. Researchers should be aware that most photos that supposedly show the interior of the Falke are actually pictures of the Uhu with the light and generator removed.



251/21 "Drilling"

As the Luftwaffe up-gunned its aircraft to 2cm , and then 3cm guns, numbers of 15mm and 20mm guns became available. The "drilling" mount, originally intended as a close air defense system, fitted three of the guns. In the 251, it created a cheap weapon system effective against infantry, lightly armored ground targets, soft-skinned vehicles, and aircraft. Production started in August, 1944 and several hundred were produced on the Ausf D chassis. Many references state air defense was its purpose, but the training pamphlet clearly stated, "The Drilling is an offensive and strong point weapon of the Panzergrenadier Battalion. It is primarily intended for ground combat; engaging air targets is a secondary task."

The weapon traversed 360 degrees, elevated 49 degrees and depressed -5 degrees. It was

Top: First production versions used the standard Drilling mount - taller than the later mounts purpose-built for the 251- that mandated armor plates on the front and sides of the hull to cover the gap between the hull and the bottom of the gun shield. This armor was also provided for the rear, but most crews removed this piece. This photo also shows the early gun shield that slopes up from front to back (if sitting level). This necessitated a second, smaller, shield over the sight to protect the gunner's head.

Bottom: The later style mount was lower and did not need the additional armor plates. The later shield was higher at the front (with a sighting aperture), not requiring the second, smaller shield.

Middle: A transitional model was also seen—with the later shield, but the earlier higher mount with additional armor. Photos also show that sometimes the guns were fitted with flash suppressors and other times not. It seems the earlier version was more likely to have these fitted than later versions.

Inside the vehicles, the bench seats were removed and replaced by three folding seats—two on the left and one on the right. The first 85 vehicles had two extra sets of ammunition feed boxes (each set consisted of one large and two smaller boxes). These were stowed in the rear on each side. Later vehicles had only one extra set of ammunition feed boxes stowed on the right and a large stowage bin holding another 1000 rounds on the left. Note there were variations in the interior arrangement.



fed by three ammunition feed bins mounted below the guns. The bins for each side gun held 250 rounds while that for the middle gun held 500 rounds since this gun was harder to reload. The center gun was also used to adjust fire onto targets more than 500 meters distant. A telescopic sight was used for ground targets while a ring sight was used vs. aircraft. The guns were offset to allow clearance for the ammo belts and feed chutes. The first two guns fed from the left while the third fed from the right. Ejected cases and links were collected in the pedestal.

The gunner's seat was suspended from the mount. Elevation was adjusted by the gunner's weight. He traversed by shoving with his legs. A hand grip on each side of the weapon contained the triggers.

In addition to the 1000 rounds carried on the mount, an additional 2000 rounds were stowed on board.

THE DRILLING IN THE AA ROLE:

Anti-Aircraft (AA) was not the Drilling's primary function, but it was still a key role. The Drilling was undoubtedly the most effective Sd.Kfz 251-based AA weapon system made. To paraphrase the manuals:

- AA is the responsibility of the Drillings during the march, at rests, and at vulnerable choke points (narrows, bridges, crossroads, obstacles, etc.).
- A triangular formation is normally used when providing such protection, but the vehicles must be positioned so as not to give away the locations of camouflaged and concealed troops. Positions should be constantly improved (cover, concealment, camouflage).
- When engaging ground targets, there must be constant observation of the sky and the vehicle must be able to switch quickly to the AA role.
- The platoon leader must provide clear orders on when and how to open fire.
- Fire should be concentrated on the most dangerous aircraft, and not split between multiple targets. Dividing fire reduces effectiveness.

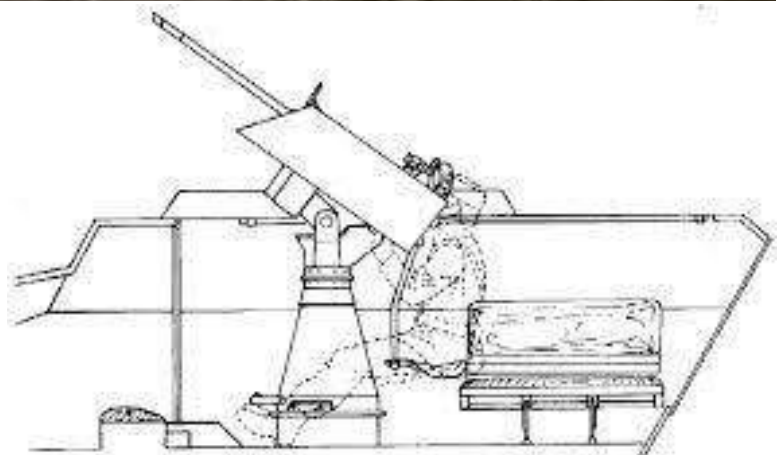
The guns were normally loaded with a ratio of 1 armor-piercing to 8 high explosive shells. This made the weapon effective against infantry, soft-skin and lightly-armored vehicles, as well as aircraft.



Above: The Drilling weapon system. The three large boxes mounted on the pedestal are the ammunition feed bins. Ejected shells were feed into the central pedestal.

Above Right: This photo of a destroyed 251/21 shows the pedestal without the ammunition bins. This is also the original type gun shield.

Right: A diagram showing how the gunner operates the weapon.



251/22 (7.5cm Pak)

The 22 was the last variant of the 251 produced and was the result of an order by Hitler that all suitable vehicles be used to mount anti-tank guns. The PaK 40 was fitted to the vehicle by simply bolting the upper carriage of the gun to a platform mounted in the halftrack. To clear the hull sides, the bot-

tom corners of the gun shield had to be cut away. This modification was actually included in guns straight from the factory. A section of the roof over the driver's compartment was cut away to fit the gun's recoil mechanism. The co-driver's seat, three of the four bench seats, and the rifle racks were removed. Ammunition was limited – 17 rounds were carried in a rack to the right of the gun and a small "ready rack" under the gun held 5 more rounds. Some additional ammunition could be stowed under the floor plates. When available, some crews carried additional loose rounds. Crew size was probably four men. Nearly a hundred were factory-produced between December 1944 and February 1945. Numbers of field-modified vehicles, and production figures after February (if any) are not available.

The vehicle, being no more than an ad-hoc tank destroyer, was basically a desperate attempt to make up for the late-war shortage of tanks and tank destroyers. While it gave the panzergrenadiers a mobile anti-tank asset, its effectiveness was mitigated by the fact it overloaded the vehicle chassis and carried limited ammunition. Due to the fact the vehicle had light armor and was a larger, more visible target than an emplaced towed gun, crew vulnerability was also increased.

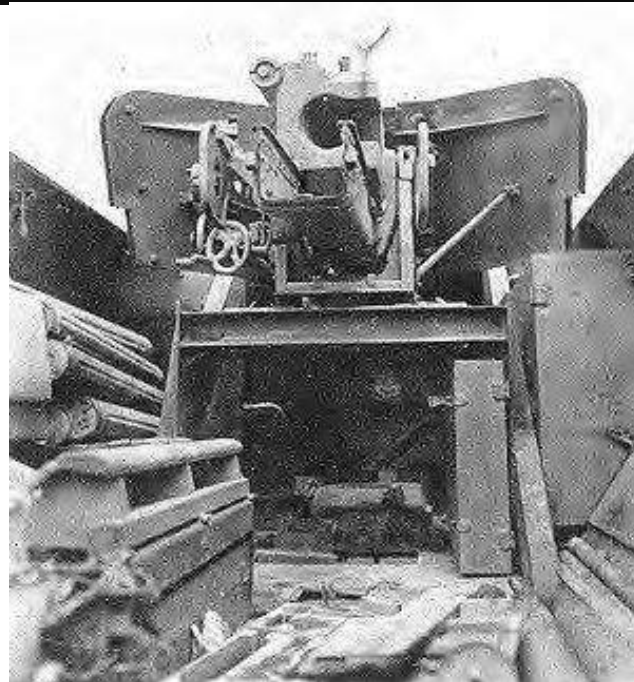
The 7.5cm PaK 40 was the backbone of the German anti-tank forces through most of the war, and was extensively used both as a towed version and fitted in numerous vehicles. About 23,500 were produced. It was effective against nearly every Allied tank until the end of the war.



This photo of the 251/22 prototype clearly shows the Pak mounted in the fighting compartment. The vehicle is painted in factory-applied hard-edged camouflage.



The /22 was both factory-built and field-modified using factory-provided conversion kits. Many were converted from earlier 251/9s, as was this sample. As the co-driver's seat was removed, the vision port on that side was normally just blanked over. On this particular vehicle, apparently made from an early 251/9 with the cut-out hull to fit the lower gun mount, the entire aperture has been covered by an armored plate. On the 251/22, I have found photo evidence of all combination of standard and late production Ausf D features ("D" profile or flat vision port covers, single or down engine access hatches, etc.).



These photos show the interior of the 251/22. All the bench seats except the left rear are removed to provide space to work the gun. The co-driver's seat was also normally removed and the vision block blanked over (but I have seen one photo where the vision block is still operational, and, being open, likely means the co-driver's seat is also in place). Note the limited access to the driver's seat—he must crawl in and out under the gun mount. Clearly visible is the small and larger ammunition stowage bins to the right of the gun on the loader's side. Loose ammo tubes are stowed on the left side.

251/23

This variant was authorized, but there is no evidence it was ever made. It would have been similar to the Sd.Kfz 250/9 and would have featured the same mount, turret, and weapons as the Sd.Kfz 234/1 and Aufklpz 38(t)

Field Modifications

There were many unit-level and officially approved field modifications of the 251, such as the map table addition and some others we've already seen. Many consist of different equipment or weapons mounted on standard vehicles. Some consist of adapting vehicles to serve the purpose normally filled by another variant of the 251—such as adding 3.7cm guns to the standard 251/1 to make a field-expedient 251/10, or taking a 251/1 and adding radios and antennas to make an expedient 251/6 or 251/3, or of adding red cross markings and flags to make an expedient ambulance. Sometimes, simple details were altered to better suit unit needs or simply for comfort of the crews. This includes minor changes such as adding, deleting, or relocating stowage lockers and other equipment. Here is a small sample of field modified vehicles. It is by no means all inclusive.



Some modifications were made by the crew simply for their comfort or convenience. This 251/6 has been fitted with what appears to be an aircraft canopy, perhaps from a Russian PE-2?



Based on my photo surveys, most field modifications were simply the use of different or non-standard weapons. We've already seen the 3.7cm PaK mounted on the 251/7. Other non-standard weapons include the sPzB 41 squeeze bore gun seen above mounted on what appears to be a 251/1. I've found photos also showing anti-tank rifles and even a Soviet heavy machinegun. At top right we see a Drilling mounted in a 251 Ausf C. This is the standard Drilling mount without the 251 specific items such as the gun shield.



Above: This 251 Ausf A or B mounts the standard 3.7cm gun. As we have already seen, this was very common practice. Prior to the adaption of the 251/10 nomenclature, such vehicles were often listed in strength reports as "251 with 3.7cm PaK". What's unusual about this vehicle is the mounting frame and launch rack for a single Wurfrahmen 40 rocket on each side. The fender mounted stowage lockers have been repositioned as well.

Left: Another 3.7 cm PaK mounted on a 251/1, this time an Ausf C. The top panels of the gun shield are folded down to lower the vehicle profile. Side-mounted stowage bins have also been added. These are not based on the 251/7 bridge mounts, but are purpose built as additional stowage. I have found more than one vehicle from this unit (21 Panzer Division) with this modification in North Africa. This photo was taken in 1942.



The gun fitted inside this Ausf D appears to be an MG 151 mounted in an aircraft turret—perhaps the type seen in the Condor or the Blohm & Voss flying boat. Color plates I have seen of this vehicle show the colors as being green over yellow.

Right: Two vehicles assigned to the driving school of the 233rd Panzer Division in Denmark fitted with Woodgas Generators. There were seven such vehicles. The vehicle in the background is a 251/1 Ausf C. That in the foreground is 251/1 hybrid. I have photos of the both the front and rear of this unique vehicle. Forward of the hull joint it is an Ausf C. Aft of the hull joint it is an Ausf D. This is the only such hybrid vehicle I have found.



Russian forces have modified this captured 251/1 Ausf C into an armored recovery vehicle by fitting a crane and covering the fighting compartment—most likely converted into a field workshop.

Right: This Ausf D was captured and used by Yugoslavian partisans. The vehicle is fitted with twin 120mm mortars. Note how a semi-circle has been cut from each side of the halftrack to allow the mortars to fully rotate and depress in all directions. Note the very intricate and unusual camouflage pattern on the vehicle—even carried onto the gun tubes. There also appear to be expedient mountings for 2 MG 34s—one mount on each side at the front of the fighting compartment.





Top: Many modifications consist of anti-aircraft weapons fitted to the 251 to give it more firepower and/or an anti-aircraft capability. This vehicle is interesting in that the hull has been modified by cutting away the top portion and angling it outward. This is clearly to allow the gun full traverse.

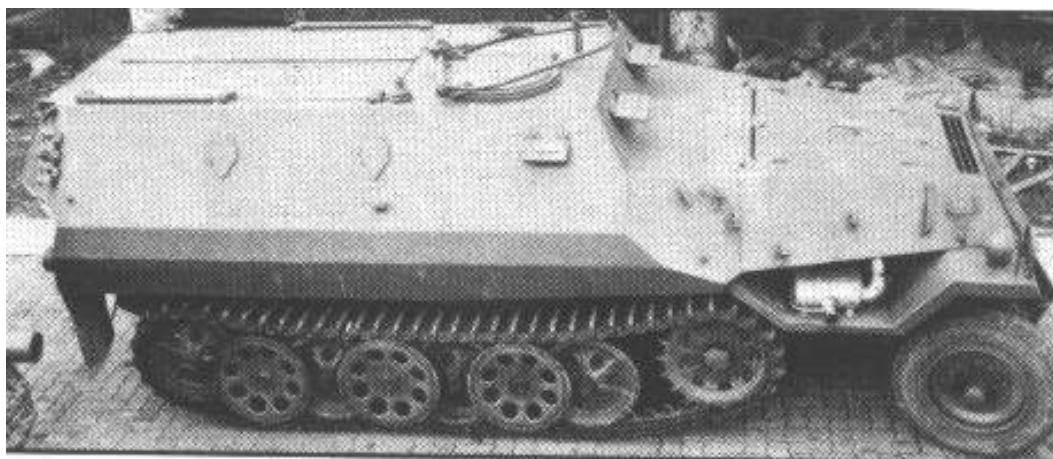


Below Left: This vehicle, a captured 251 put to use by French forces during the liberation of France, carries a Renault tank turret over the forward part of the fighting compartment (the rear portion seems to have kept its open top). The German cross on the side of the vehicle has been painted over and a small French flag painted immediately over the forward side stowage locker and the upper right of the hull rear. There is probably one on the nose as well. The painted camouflage pattern appears to carry up onto the turret, indicating the conversion was done by German forces prior to the vehicle's capture.

Czech OT-810

In the aftermath of WW2, the Czech army needed new equipment and the problem was temporarily solved by pressing captured German vehicles into service, including the 251. A number of these vehicles were refitted with the Tatra T-928-3 engine (HKL-6p, D-7p) in the early 1950s. Other than this change, the German design was used mostly unaltered until the mid 1950s. The aging German vehicles were replaced by the OT-810. Visually very similar to the 251, it had an air-cooled diesel engine (drawing its cooling air from above), somewhat different superstructure shapes, and an enclosed fighting compartment that included chemical warfare protective equipment. The suspension received a new dry chain track and drive sprocket, replacing the maintenance-intensive German version. The vehicle was unpopular - difficult to operate, very cramped, and maintenance was not easy. Soldiers called it "Hitler's Revenge". Production stopped in 1962 with over 1100 built. It continued in active service well into the 1980s before being regulated to the inactive reserve. The last were sold in 1995, making the vehicle one of the longest serving WW2 German-designed armored vehicles. Of the samples that survive, a few are in museums, but in an ironic twist of fate most have been converted by historical reenactors or movie studios to resemble the original German Sd.Kfz 251 C or D models. Chances are that if you see an Sd.Kfz 251 on the big screen or at a historical reenactment, it was originally an OT-810.

Below: The Czech OT-810





INTERNET RESEARCHER

BEWARE! At first glance this photo appears to be an authentic picture of a Hetzer and 251/1 Ausf D both sporting field-applied ambush camouflage. While I'm not an expert on the Hetzer and cannot speak to that vehicle (although it looks pretty good to me), close examination quickly reveals the 251 is not a 251 at all, but rather an OT-810. Note the absence of side stowage lockers—the vehicle simply has sheet metal applied to give the correct hull shape. The biggest give-away are the tracks and sprockets. This reenactment group has done an outstanding job with both their vehicles and their photography—this photo could easily fool the unwary.

SD.KFZ 251 REFERENCES:

1: Especially useful are the **Panzer Tracks** books by **Jentz, Doyle, and Friedli**. These rely entirely on original documentation, photographs, and actual vehicles and parts. Anything that cannot be confirmed is not included. That makes these the most reliable sources available. The scale drawings are also outstanding. **Panzer Tracks 15-2** covers the Ausf A-C in the years from 1939 to 1940. The Ausf C and D from 1943 to 1945 is addressed in **Panzer Tracks 15-3**. **Panzer Tracks 15-4** provides some additional details on later variants and experimental versions. These were my primary references. Other Panzer Tract publications contain some additional information on some variants of the 251, such **Panzer Tracks 11-1** (Armored Observation Vehicles) which has information on the 251/18 and 251/20. **Panzer Tracks 14** (Armored Combat Engineer Vehicles) discusses the engineer variants.

2: Another recommend book is **Sd.Kfz. 251 Half-Track 1939-1945**. This is an Osprey New Vanguard book by Bruce Culver and illustrated by Jim Laurier. Although an older publication with some minor inaccuracies, the Osprey is a very good and inexpensive general overview. I highly recommend it. If you were looking for a single book giving an overview of the history and variants of the 251, this would be it.

3: Piet van Hess's website on the 251 (www.pietvanhess.nl/251) is the best online source I found.

4: The **Bundesarchiv** (www.bild.bundesarchiv.de) are a great source for photos—you can search by year, location, keyword, or photographer.

5: Although hard to find now, **251 Half-Track** by David Doyle is an excellent reference. While it contains only brief introductory text, it has hundreds of photos, well captioned. This is a very useful book for those interested in the 251.

6: Squadron's "In Action" books are also good general overviews with lots of photos and good drawings of many key details. **Sd.Kfz 251 In Action** is by Charles Kilmet addresses this vehicle.

7: The book **Mittlerer Schutzen-Panzerwagen: Sd-Kfz 251** by Waldemar Troja is useful for the many good photos, drawings, and color plates. The text is in German. Beware, however, the book does contain some inaccuracies in both the text and color plates.

8: **German Half Tracks at War 1939-1945** by Paul Thomas is part of the "Images of War" series of books. It is primarily a photo book covering all German halftracks. Although some photos are captioned incorrectly, it has many good photos of the 251.

10: I also referred to **Tank Power Vols VI and X** by Janusz Ledwoch, both covering the Sd.Kfz 251. Although these books are fairly comprehensive with good photos and color plates, they contain many inaccuracies and some of the color plates are questionable. Information from these books should not be considered as reliable unless checked against other sources.

This chapter provides a general overview of the vehicle. Some additional information can be found in the chapters on the different variants.

Over the course of this project, I have amassed a collection of hundreds, if not thousands, of photos of 251s. When searching online for information, I suggest using a few different search engines and cast a very wide net. For example, when searching, I entered a variety of terms including: German halftracks, WWII Halftracks, Hanomag, Sd.Kfz 251, Sdkfz 251, schutzenpanzerwagen, etc. For the variants, I also tried various terms including, 251/3, Sd.Kfz 251/3, Sdkfz 251/3, Funkpanzerwagen, WWII command halftrack, WWII communication vehicles, etc. You can search for various components such as engines, weapons systems, etc., to find even more data. Try both regular searches (to find information) and image searches. When you locate a good site, use its internal search function (if any) to dig for even more treasure.

2

"Project 251" Modeling the Sd.Kfz 251



Quarter Scale Sd.Kfz 251 Kits

By Kevin Townsend



Quarter Scale Sd.Kfz 251 Kits

Kit Availability, Reviews, and Comparisons

Modelers who build in 1/35th and/or 1/72nd scales have very rich pickings of Sd.Kfz 251 Ausfs and variants. For those contemplating building a collection of 1/48th scale Hanomag, there is good news and bad news.

The good news is that kits depicting the Ausf B-D have been released over the years. These include the old Bandai 251/1 Ausf B, AFV Club's 251/1 Ausf C and two Tamiya 251/1 Ausf Ds—one the standard personnel carrier and the other an identical kit that also includes parts for the Wurfrahmen 40 launch frames and rockets as well as additional crew figures.

Numerous aftermarket conversion kits and accessories have also been released. Using these, combined with only minimal conversion, one can recreate all Ausfs and the majority of 251 variants.

The bad news is that half of these kits—the B and C from Bandai and AFV Club—are no longer in production. This makes acquiring the kits harder and more expensive. The AFV Club kit has only recently ceased production and is still readily available. As of this writing (January 2017) some retailers still have stocks which can often be had for reduced prices, and there are many for sale on online stores such as EBay. The Bandai kit has been out of production of decades, is rare as hen's teeth, and can be relatively





expensive when found. The kit is poor by today's standards. While it can be built from the box, the result would not be an accurate model. For many, the cost and work needed to make an accurate kit from the Bandai model can be a bridge too far.

Still, all that should not be a deterrent. As mentioned, the AFV Club kit can still be found relatively easily. It's a nice kit, and with work, it can even be back-dated to an Ausf A or B. Plus, both the Tamiya D models are still in production, and most variants of the halftrack were built on D models. Thus, using only the widely available Tamiya kits, the aftermarket, and some basic conversion and scratch-building techniques, one can create most variants of this vehicle.

Bandai

"B" is for "Bandai". And "B" is for "Bad", which the "Bandai" kit is. "B" is also for "Back in the Day", when the "Bandai" kit wouldn't have seemed all that "Bad". But it does suffer by modern standards. In comparison with the other 251 kits, it suffers a lot. Still, as I wanted my collection of 251s to be complete—both in Ausfs and variants as well as available kits—I needed to include a Bandai kit.

Title Page: The long out-of-production Bandai kit. It is the only Ausf B to be released in 1/48th, and while it is fairly accurate dimensionally, detail is crude, lower hull shapes are incorrect, and the interior (what there is of it) is wrong for the A and B models.

Left: The two available Tamiya kits are identical except that the "Stuka Zu Fuss" kit contains extra parts for the rockets and launchers and crew. The Tamiya kits include figures, accessories and infantry gear. While some detail, especially the interior, is somewhat simplified, the kit is a joy to assemble, offering typically great Tamiya molding, engineering, and fit.

Above: The AFV Club offering depicts the Ausf C. It is the most detailed of the kits, although there are a couple minor inaccuracies, instructions that are unclear in a couple areas, and a few instances of poor fit.

Right: While I can wholeheartedly recommend the AFV Club and Tamiya kits, the Bandai offering has overly simplified details as seen here. It also has numerous inaccuracies, both in shape and detail. It simply requires too much work to create a reasonably accurate model. Still, for those of us who built the Bandai kits in the 70s when they were state-of-the-art, the kit has nostalgia value. That would be the only reason to build one.

By my count, the kit contains 90 parts. The parts come on two sprue trees individually bagged inside the box. The upper and lower hull pieces are not bagged. Decals are generic and do not represent any specific vehicles. While I haven't used the decals, they seem to be quite thick. But there has been no yellowing or visible cracking with age. The kit includes 3 figures which, surprisingly, while not great are not all that bad. They are also comparable in size to the Tamiya figures—surprising as the Tamiya figures are somewhat undersize for 1/48 scale. Rifles are also included but are oversize and crude. The figures are on a single parts sprue tree.

The instructions are complete and simple. Detail is simplified, crude, and heavy. For example, both the radiator cap and rear doors should stand proud of the surrounding hull, but they are only scribed lines in the plastic. The side engine vent covers, when closed, should be nearly flush with the armor, but they are separate parts which stand proud. The joint between the hull halves is prominent on the upper hull, but absent on the lower hull (although all but about an eight inch of this will be hidden behind the stowage lockers). The visible joint between the nose and engine armor is absent entirely.

There are also quite a few inaccuracies. On the actual vehicle, other than the nose, the hull itself was the same from the A/B to the C. But the Bandai hull has little in common, shape-wise, with the accurate AFV Club kit. The angle of the upper portion of the nose is too steep, and it fits flush with the lower section instead of slightly overlapping. The underside of the hull around the tracks and running rear and rear bottom of the hull are incorrectly shaped. The angle where the rear armor

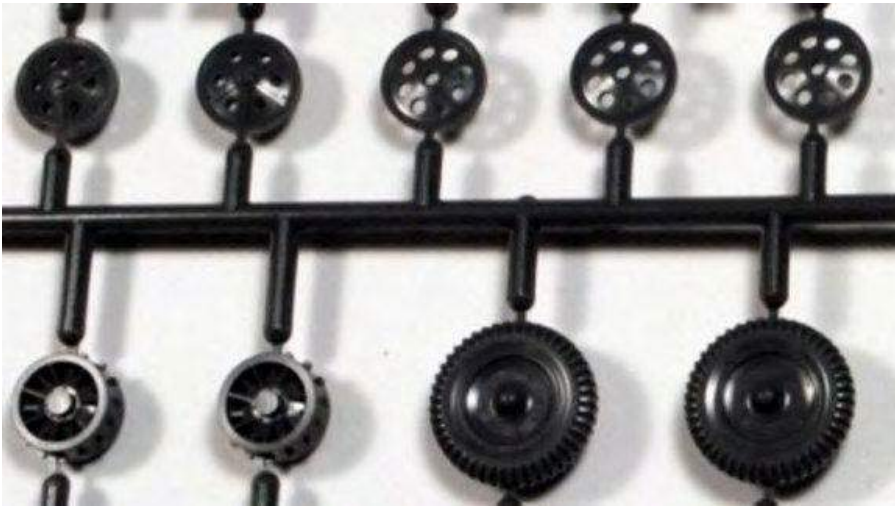


joins the side armor is also wrong.

Suspension detail is lacking and incorrect. Like other details, the wheels are crude. So are the sprockets. The tracks are simple vinyl bands. They are not very flexible, the attachment points are large and prominent, and the detail is simplified and crude. While useable, they really should be replaced.

The interior of the A/B was completely different than that of the C/D. The Bandai interior is not only poorly detailed, it apparently is based off the later C/D interior. In Bandai's defense, it actually looks a lot like the original Tamiya 251/1 kit interior – even down to the incorrect (for the /1) water tank between the front seats. Lacking are the complex hinges for the rear doors. What detail that exists is heavy, crude, and, above all, wrong. Like the tracks, the interior must go.

Unlike the other 251 offerings in this scale, Bandai included the engine in their kit. It isn't too bad, but it does lack the large radiator with prominent double fans. This feature would be clearly visible through the open engine access hatches. Other details in the engine compartment are also lacking. In short, a visible engine bay would still require a great deal of work.



These sprue tree shots (Bandai top in grey, AFV Club center in green, and Tamiya bottom in yellow) show the relative level of molded detail on the front wheels, drive sprockets, and road wheels. Level of detail is similar on the AFV Club and Tamiya kits, but simple and crude on the Bandai kit.

Note also the engineering. The front wheels of the AFV Club and Bandai kits are single pieces, while Tamiya molds the inner hub as a separate part. Tamiya and AFV Club mold the drive sprocket as two pieces, with appropriate hollows molded in. Bandai has a solid, one piece sprocket. AFV Club also connects the inner three road wheels with half circles that fit over the axles of the interleaved wheels. The middle wheels are attached to each other with plastic circles that fit over the same axles. While this results in a strong, positive fit of the parts, they are very difficult to remove from the parts trees without breaking as the attachment circles are very, very thin and fragile.

AFV Club

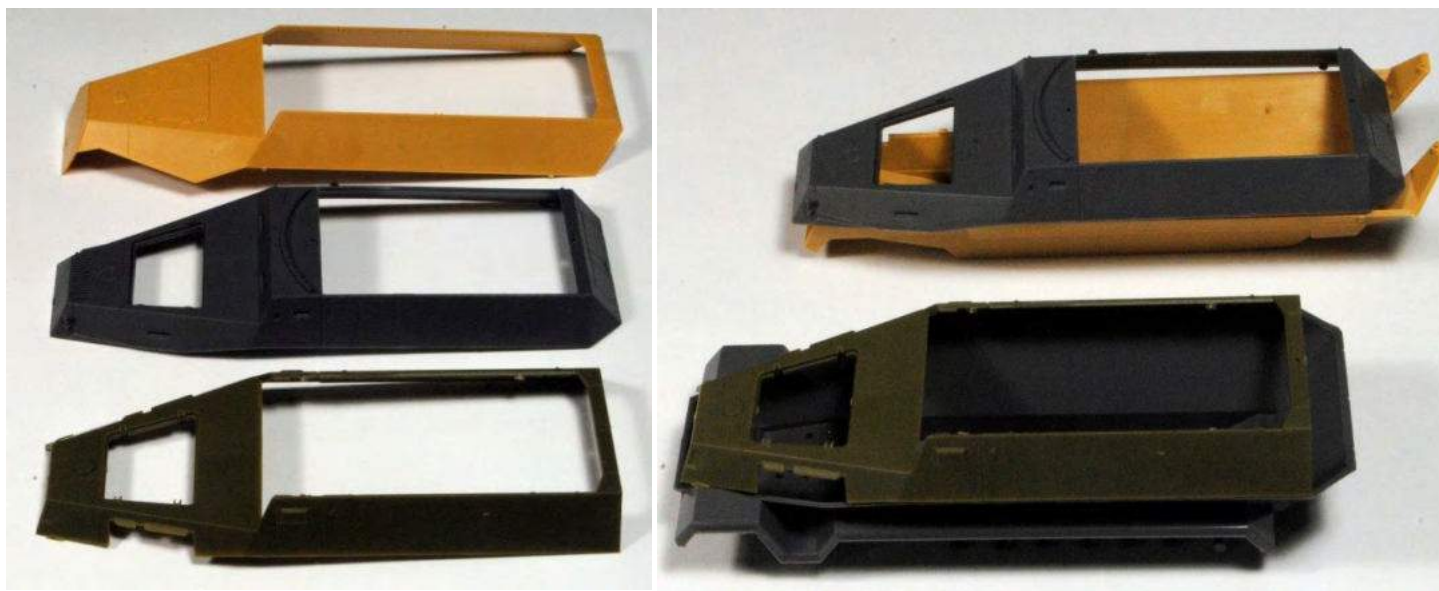
“A” is for “A” – which is the letter grade this kit gets. For detail and accuracy, this is the best of the bunch. The kit contains 207 parts – 205 plastic parts on 6 individually bagged sprue trees and 2 vinyl tracks. The kit is very similar to AFV Club’s 1/35th scale offering. In fact, minus the larger kit’s individual torsion bars and rear axle, the parts count between the models is not significantly different. Engineering is also similar. It does not contain any figures like the other offerings, nor does it contain accessories and gear like the Tamiya kits do. It does have a few weapons to fit in the vehicle’s weapon racks. Molding is superb and detail is excellent. The instructions, while complete, are not clear in a couple areas, so test-fitting and fiddling with parts are essential to ensure correct fit. Decals are first-rate, and options are provided for five different vehicles serving in Africa and on the Eastern front.

There are some minor fit issues. The engine access hatches (molded as one piece) just do not fit easily into the top armor piece over the engine. I have found it necessary to cut the part into individual hatches and then slightly trim/sand until they fit properly. But with the other parts, especially the complex hull, if you take care, you can achieve a perfect fit with no putty needed.

Tracks are vinyl, but they are very nicely detailed inside and out. They glue easily with model cement or super glue, but you must take care applying them. As the rear axle is very fragile it is quite easy to break stretching the tracks in place. I recommend reinforcing the axle or adding a brace in an invisible area. AFV Club takes an interesting approach to the wheels. The inner road wheels are molded three to a piece connected by small rings which help align the wheels and, in theory, add strength. But these rings are very fragile and it is hard to remove them from the sprue trees without breakage. Don’t worry if you do break one or two – they will still fit together. The only problem with the suspension is that, although it sits perfectly level with all wheels on the ground without the tracks, once the tracks are put on, the front wheels do not touch the ground. If on a scenic base (as mine are) this is no problem, make the ground fits the wheels. But if you plan to display it on a flat base or shelf, you will have to make some adjustments.

The interior is quite nice – much more detailed than the simplified Tamiya offering. The only, minor, inaccuracy is that the under seat stowage bins sit slightly too high – by about 1-1.5mm. This does not affect fit and is hardly noticeable.

Compared to the other offerings in this scale, it has many more parts (even counting Tamiya’s link and length tracks). Assembly is correspondingly more complex. Where the other companies’ kits have single-piece hull tubs, the AFV Club lower hull is made of multiple parts. But if you take care during assembly (take to heart my earlier note about test-fitting) it will go together fairly easily. Also unlike the other offerings, the rear of the hull, with doors and hinges, is a separate sub-assembly. Again, take great care lining everything up and all will go together with no major issues.



Comparing the hulls. Left: The upper hulls (yellow Tamiya, grey Bandai, green AFV Club). Right: This shows how close in size the pieces are. The Bandai upper sits on the Tamiya lower and the AFV Club upper sits on the Bandai lower. In fact, in most dimensions the kits are within 1 – 1.5mm of each other. The Bandai and AFV Club kits are nearly identical - close enough that many parts would be interchangeable. This allows a modeler to correct the woefully inaccurate Bandai Ausf B using many pieces—including the entire hull except for the nose and fenders—from the AFV Club Ausf C.



The lower hulls:

Top: The Bandai and Tamiya lower hulls are one-piece tubs. The AFV Club kit's hull is in several pieces (a couple suspension parts are not shown in this shot). Care must be taken to ensure all parts are properly fitted and aligned.

2nd: Note the shape of the bottom of the hulls, especially toward the rear. The Tamiya and AFV Club kits are correct. The Bandai kit has significant inaccuracies. With the exception of the nose, the hulls of the A-C should be identical. The AFV Club hull is spot on. Not so Bandai.

Bottom left: The suspension components. AFV Club is quite detailed. Bandai consists of simple holes the axles fit into. The axles are merely molded onto the backs of the road wheels. Tamiya hits the median—there is basic detail. This is adequate as this area is all but invisible on the finished model.



Tamiya

"T" is for "Tamiya". "T" is also for "typical". This kit is "typical" "Tamiya". As mentioned above, Tamiya issues two kits. They are identical except that the Stuka Zu Fuss kit includes the rockets, frames, and four extra figures.

Not counting the included infantry equipment sprue, the halftrack kits consists of 153 parts on 4 individually bagged sprue trees. The extra sprues in the Stuka Zu Fuss contain 100 additional pieces. The kits also include an infantry equipment sprue containing 88 pieces of weapons and gear—great for adding stowage. In addition to the aforementioned weapons/equipment sprue and four Stuka Zu Fuss crewmen loading rockets, the Tamiya kits each include two figures in winter uniforms, a jerry can, 2 buckets, 2 spare road wheels, 2 sections of spare tracks, a (rather poor) Panzerschrek, ammo case for the Panzerschrek, and a grenade case. Where the Tamiya kit excels is engineering. It is simple to assemble. The parts fit perfectly. Instructions are also very clear and quite detailed. Both kits come with markings for three different vehicles. Other than being somewhat thick, the decals are nice and apply easily.

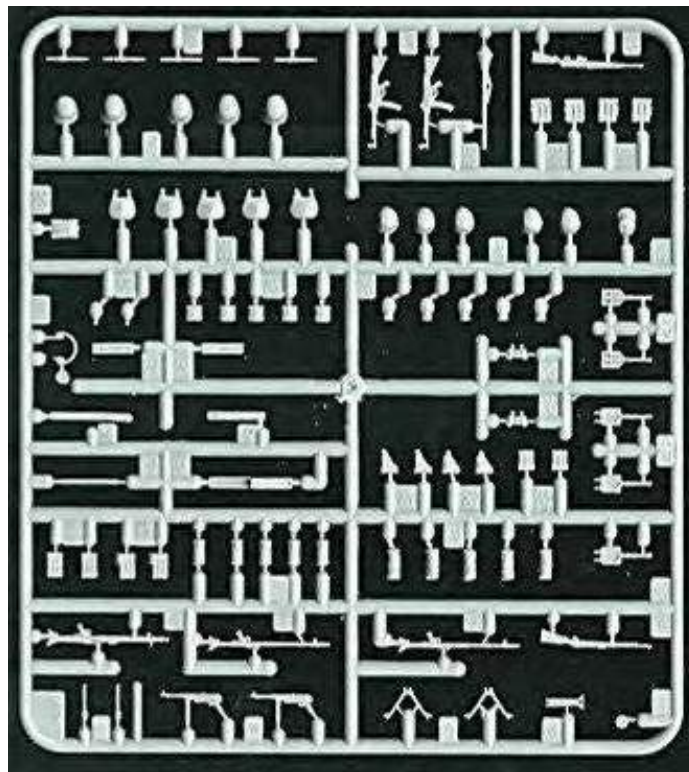
For the most part, detail on the weapons and gear is superb, but detail on kit itself is only adequate. I have heard this is because Tamiya rushed the model into production to pre-empt AFV Club. I do not believe this. The level of detail, and parts count, is almost identical to Tamiya's 1/35th scale offering. While they may have hurried it into production to beat AFV Club, I do not believe detail suffered. It is what it probably would have been regardless. The areas that lack detail are the rear suspension (invisible behind the wheels and tracks anyway) and portions of the interior. In the A and B models, brackets were welded directly to the armored hull. In the C and D, they were fitted on a liner. This liner is molded as part of the inner hull on the AFV Club kit. It is lacking on the Tamiya kit. Again, this is not very noticeable on the finished model. It could be added from a very thin of sheet plastic if the modeler desires. Also missing on the Tamiya kit are details inside the vision ports, the flange where the hull halves are bolted together and some

fittings such as spare vision blocks, the driver's MP 40, and its associated ammunition. Again, most of this is not very visible. If the interior contains clutter (stowage and figures) it can be ignored. Or the basic details can be easily added from bits of styrene. On the exterior, the only apparent detail lacking is the conduit to the headlight. Other tiny bits, such as the steering arm, are also lacking, but these details are almost completely unnoticeable.

Tamiya includes link and length tracks. They assemble easily, fit perfectly and look good. But they are not as detailed (especially on inner surfaces) as the rubber band tracks in the AFV Club offering. I think the track pads could also stand to be a bit thicker.



Packaging of the kits is similar across the board. All come in a sturdy cardboard box of roughly equal size. Inside, the sprue trees are individually protected in plastic bags. Only in the Bandai are the large hull halves not so protected. Rubber tracks in both the Bandai and AFV Club kits are loose in the box. All include instructions (Tamiya's are clearly the best), and several decal options (Bandai's are very generic). The Bandai and Tamiya kits come with figures, and Tamiya includes a good deal of extra gear and equipment, too.



A big "plus" for the Tamiya kits is the inclusion of this sprue tree of infantry gear. It offers rifles, automatic rifles, assault rifles, machine pistols, machine guns, ammunition cans and belts, magazine pouches, spare barrel carriers, bayonets, and other weapon accessories. Helmets are included with and without camouflage covers. Canteens are included with two types of canteen cup. Two types of entrenching tools and pistol holsters are also present. In addition to standard infantry equipment, the set has a map case, two binoculars, a set of headphones, a panzerfaust, and two stick grenades. I wish the set included more than one Mauser G98k. No pouches are included for this rifle, either, as these are molded on some of the Tamiya figures (but none included in the halftrack kit). Still, the inclusion of this sprue is a great—and very useful—addition to the Tamiya kits. Parts from these sprues have found their way into all my halftracks.

Kit Comparison

Bottom Line

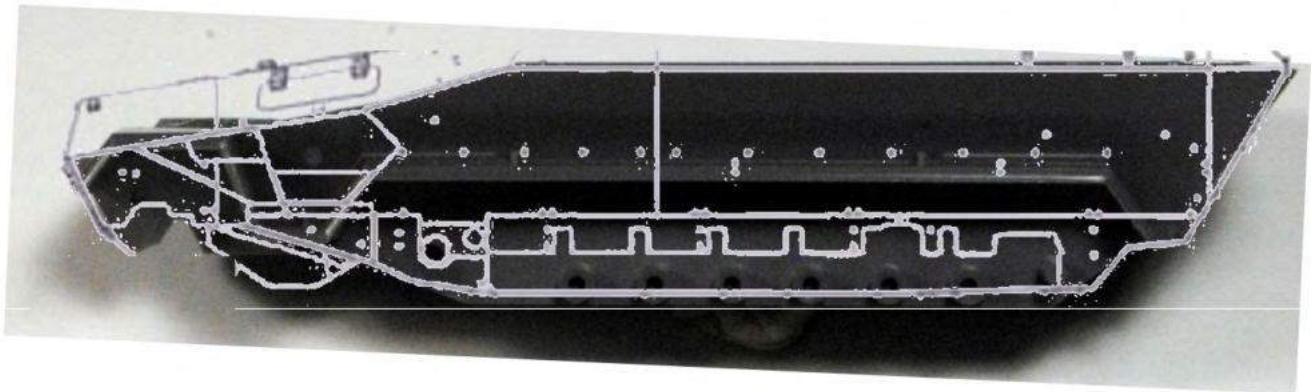
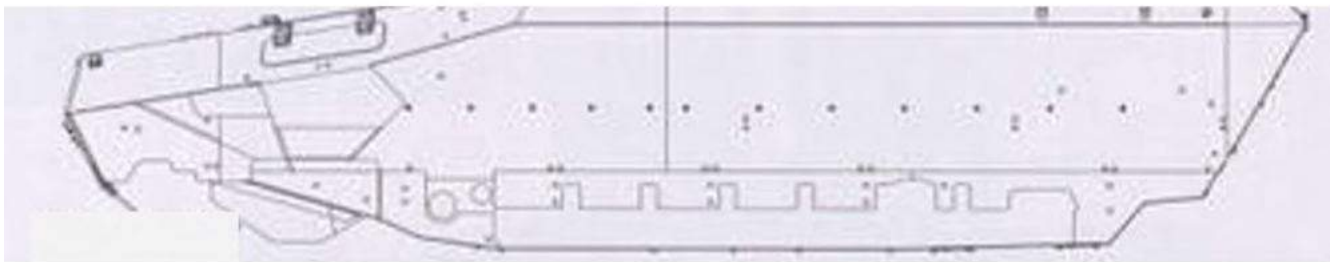
I am not a rivet-counting purist (I mean no disrespect to those of you who are). Therefore, I prefer the Tamiya kit. I like the link/length tracks and I love the simplicity. Most of the missing detail can be ignored or simply added (or implied). That said, the AFV Club kit offers better detail, but is much more complex and finicky. The kits are also similarly priced. The Bandai kit can, straight from the box, be built into an attractive model recognizable as an Ausf B. But if you want an accurate rendition, it will require a ton of work. So it's all up to your personal choice. But it's really a matter of comparing apples and oranges. If you want a "C", the AFV Club kit is your choice. If you need a "D", Tamiya is your choice. If you want an A or B? As we will see on the following pages, the Bandai kit is NOT your only (or even best) choice. The good news if you want a series of 251 variants, is that, although the Tamiya kit is the only one still readily available, almost all variants were built on the Ausf D – only a couple require earlier versions and these can all be made on the C. You can avoid the Bandai kit altogether!

Options for Building an Ausf A or B

Tamiya sells the Ausf D. AFV Club made a C model that is still readily available. But you want an Ausf A or B! There are several roads you can take. Not all require the rare and inaccurate Bandai kit. Each has its own advantages and disadvantages. Let's take a look.

Option 1

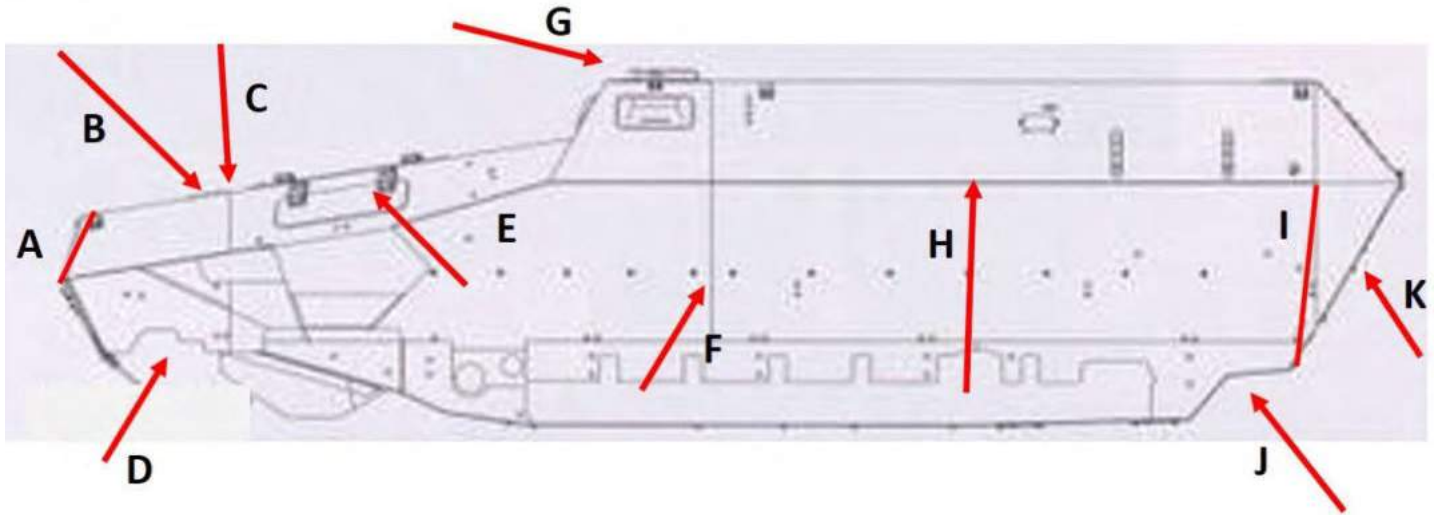
BUILD THE BANDAI KIT AS IS. This is probably the simplest option, although you may still want to replace the tracks (we will look at track options later). This option requires you to accept that it is not accurate, but have fun building it anyway. You will get an attractive model that at least resembles a 251 B. Anyone familiar with the vehicle will recognize it. Of course, anyone who knows the vehicle will see the inaccuracies. Enjoy the nostalgia. As for the interior? Remove the water tank, fill it with figures/stowage, or simply accept that it is completely wrong. Or cover it with a tarp...



This photo series graphically shows the inaccurate shape of the Bandai hull. The top photo shows the kit part. The second photo shows the same portion of the A/B hull (part of a drawing by Hilary Doyle from Panzer Tracts 15-2—the same drawing shown on the facing page). The red line on the top photo is a tracing of the same area on the Doyle drawing. The bottom photo shows the drawing overlaid on the kit part. You can see that generally the size and most shapes are not too bad. But the rear lower area of the hull is completely off. This section of this chapter tells what needs to be done. Refer to the Chapter on the 251/6 to see how I fixed this—and related—issues.

CORRECT THE BANDAI KIT. Almost no part will remain unaltered/replaced. This is almost a scratch-building operation. Correct the rear underside (difficult and complex), correct the rear armor shapes (not too hard once the underside is fixed), reshape the nose (not real hard), replace all the missing and crude details, replace the tracks (and sprockets, too, if you have extras), and completely redo the interior.

Option 2



To correct the Bandai kit hull, numerous changes repairs are required as shown above and explained below.

- A: The kit angle (in red) of the top nose piece is way too sharp. It should be nearer to the vertical
- B: The radiator cap should stand proud. Inside, it is simply a scribed circle.
- C: The visible joint between the nose and the middle armor is not present and should be scribed in.
- D: The front underneath area is the wrong shape. The Bandai kit is also missing the engine “hump” underneath the chassis.
- E: On the original vehicle, the engine side vent covers rest nearly flush with the armor when closed. The covers are also flat. The Bandai kit has domed covers that stand proud of the surface.
- F: The visible joint between the hull halves is present only on the upper hull of the Bandai kit. It is absent on the lower hull. However, other than the top eight inch, this will not be visible and need not be corrected.
- G: The bullet splash rail should have an inverted “L” profile. On the Bandai kit, it is just a thick plastic strip molded to the hull roof.
- H: The upper armor should slightly stand-out from the lower armor. On the Bandai kit, they fit flush.
- I: The kit angle (in red) of the rear hull is wrong. This is related to the more major problem at J
- J: The rear underside of the vehicle is shaped almost completely wrong.
- K: The rear doors should overlap the armor surface around them. In the Bandai kit, the doors are simply scribed into the plastic.

In addition to these changes, a completely new interior is needed. No model (either production or aftermarket) of the correct A/B interior exists, so this would be a scratch-build. Also, while the Bandai tracks can be used, fixing the hull shapes might require other changes to the Bandai suspension (I don’t know—I didn’t use the Bandai lower hull, suspension, or tracks in my build) which could result in the tracks not fitting properly. Of course, the tracks are poor and should be replaced anyway.

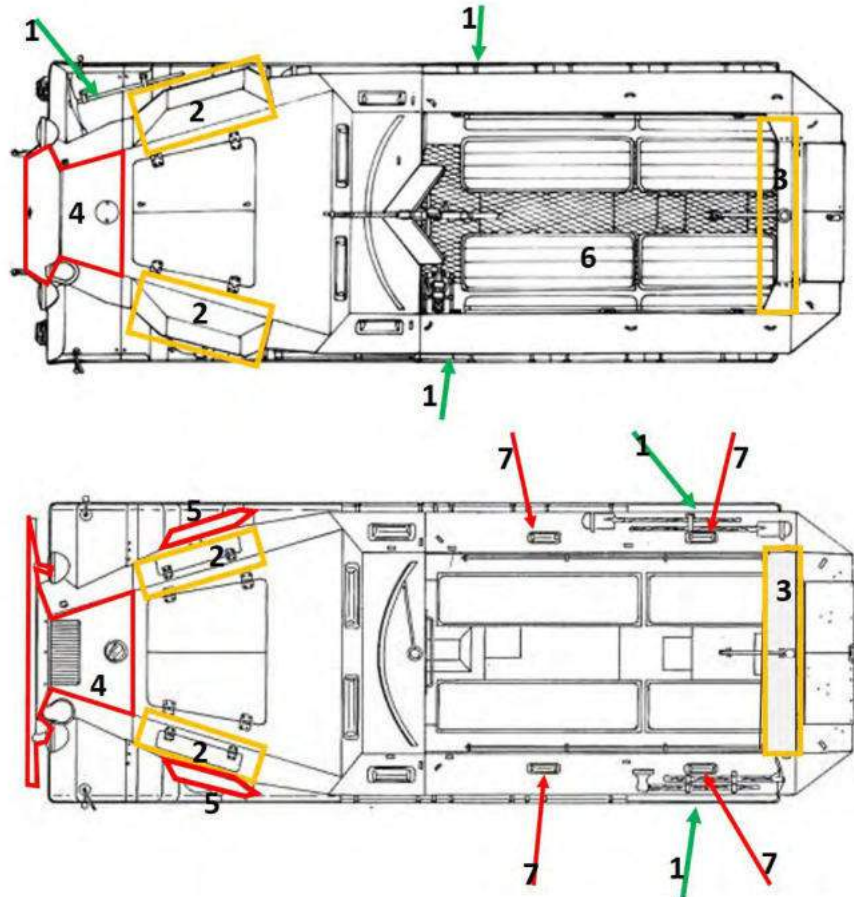
Option 3

BACKDATE THE AFV CLUB KIT. Other than the nose, and construction of the rear doors, the hulls on the A/B and C are nearly identical (The A/B has two-piece rear doors with the hinges bolted on while the C uses single piece doors bent to shape with welded hinges). Other detail differences—fender shape, tool stowage, engine vents, locker placement—are easily changed, most simply requiring the repositioning of parts. Most of the parts needing relocating are separate pieces anyway in the AFV

Club kit, so this isn't a problem. The nose area is the most work, but as it is mostly flat plates, it should be well within the abilities of most modelers. New fenders would need fashioned, and this might be the most complex part of the conversion. The interior still needs redone—the A/B guts were different than the C. The drawings here (made in cooperation with Mr Bruce Culver) show what needs done. It looks like a lot, but it's really not—all the changes are simple. Other than the fenders, this would be easier than Option 2, and would probably result in a better-looking, more accurate model.

RELOCATE CONVERT SCRATCH-BUILD

1. Relocate many pioneer tools from fenders to upper hull sides
2. Replace armored box side vent covers with flap covers
3. Reshape/widen rear top piece
4. Main difference – reshape nose, add upper vent, add bumper
5. Add smaller armored vent covers
6. Redo interior. C interior is not appropriate for A/B models
7. Ausf A only – Add side vision blocks on fighting compartment upper hull sides.
8. Relocate fender stowage boxes rearward
9. Reshape Fender



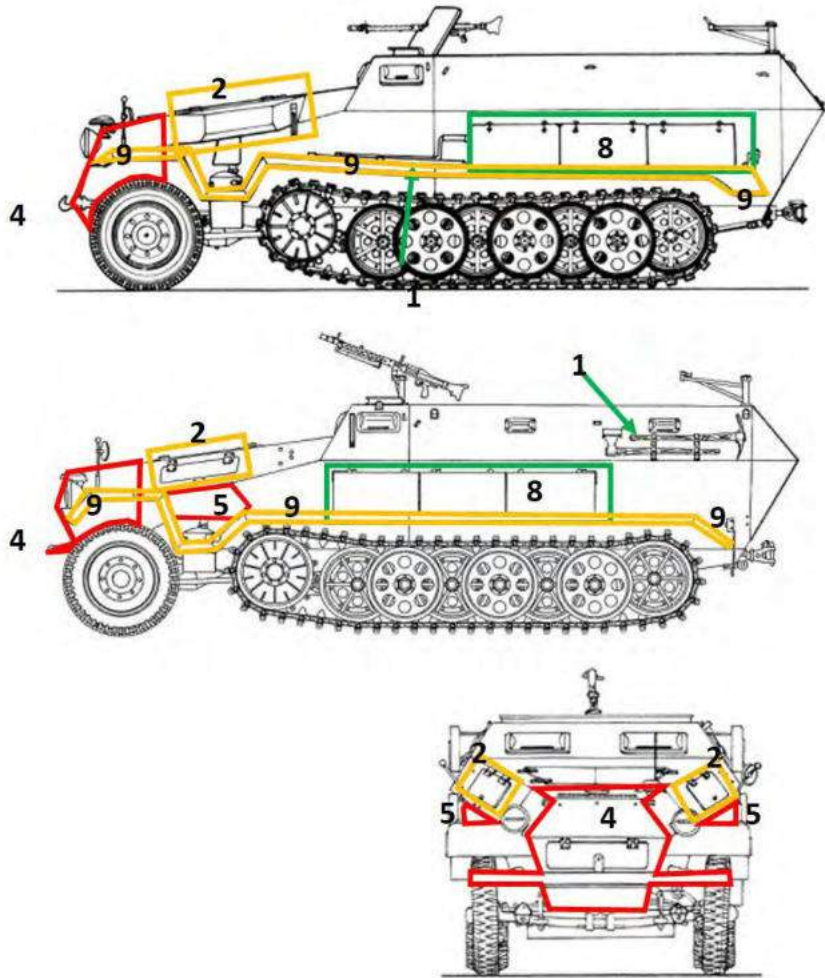
KITBASH THE BANDAI AND AFV CLUB KITS. This option is similar to option 3, but uses both the AFV Club and Bandai kits. This is probably the easiest option and might give the best results. The downside is that it requires two out-of-production kits. The AFV Club kit will not be around forever, and it seems a shame to “waste” one simply to fix another old kit. Basically, the AFV Club kit would be the primary donor, with the appropriate parts from the Bandai kit used to help with the update. This will only be the fenders, and large portions of the nose (which will still have to be corrected). The rest will all be AFV Club or scratch. That's how little of the Bandai kit is actually correct and useful. Of course, a new interior will also be needed—little of the AFV Club kit will be useful in this regard. If you do chose option 3 or 4, remember to sand away the molded-on liner inside the hull of the AFV Club kit as this was not present on the A or B model halftracks.

Whichever option you chose, do NOT use the 1/35th Zvezda Ausf B offering as a guide (the only 1/35th A/B available as of this writing) as it is also incorrect. It uses the C/D interior rather than the correct early interior. Eduard offers an update set, but while it corrects most problems, it does not fix them all. Building a new interior based on reliable research sources and original photos is the best path to take.

Option 4

RELOCATE
 CONVERT
 SCRATCH-BUILD

1. Relocate many pioneer tools from fenders to upper hull sides
2. Replace armored box side vent covers with flap covers
3. Reshape/widen rear top piece
4. Main difference – reshape nose, add upper vent, add bumper
5. Add smaller armored vent covers
6. Redo interior. C interior is not appropriate for A/B models
7. Ausf A only – Add side vision blocks on fighting compartment upper hull sides.
8. Relocate fender stowage boxes rearward
9. Reshape fender



Option 5

KITBASH THE BANDAI AND TAMIYA KITS.

The Tamiya is an Ausf D, so the Bandai hull would have to be corrected if this option—the one I used—is chosen. However, the suspension and hull bottom remained unchanged during 251 production. As this is the area needing the most work on the Bandai kit, using the Tamiya kit to provide donor parts is feasible. When I was building my B, I had a spare Tamiya kit, and a whole bunch of spare parts from both AFV Club and Tamiya. So I chose this option, correcting the Bandai kit using spare bits from primarily Tamiya, but also AFV Club, and a good deal of old-fashioned scratch-building. Why? As mentioned previously, I wanted both an Ausf A or B and a Bandai kit in my collection simply for “completeness”. Plus, Mr Bruce Culver was nice enough to provide a Bandai kit to me free of charge—it would have been rude not to use it. Finally, I knew the supply of AFV Club kits in finite, and I still had plans to model a couple 251 variants based on the Ausf C chassis—more than I had AFV Club kits for. I didn’t want to “waste” an AFV Club kit. This option is shown in detail in the chapter on my 251/6.



This photo shows the Tamiya hull bottom mated to the Bandai lower hull. The parts are easily cut and swapped—being a near perfect fit. Only in the nose area was additional fiddling and putty work needed. This change allows the Tamiya front and rear suspensions to be simply drop-fitted onto the Bandai kit. Note the Bandai rear hull has been cut away. This is to allow me to correct the angles where the rear attaches to the sides, and also to remove and replace the doors. While the Tamiya suspension lacks some of the detail of the AFV Club, I prefer the offering primarily for the length/link tracks and ease of assembly. That makes this a simple fix for the Bandai kit’s major flaw.

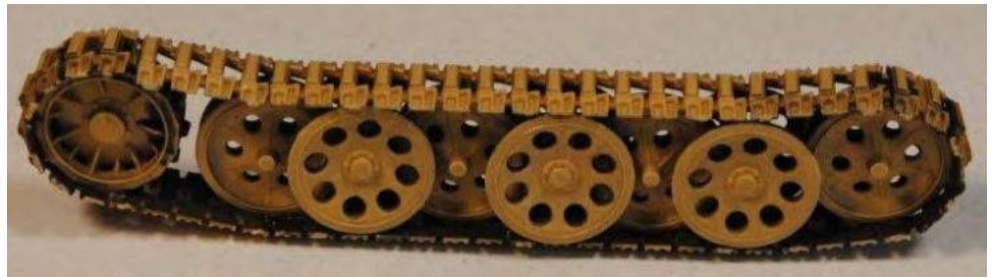
Track Options

I have no major issues with the tracks included in either the Tamiya or AFV Club kits, and have used both. The Bandai tracks, while probably useable, should really be replaced. Still, none of the sets are perfect, so let's look at what options are available.



This photo clearly shows the track. Note the thickness of the track pads and the way the track sags and rests on the top of the wheels. The vehicle had 55 track links on the right side and 56 track links on the left. How do the various kit and aftermarket tracks compare?

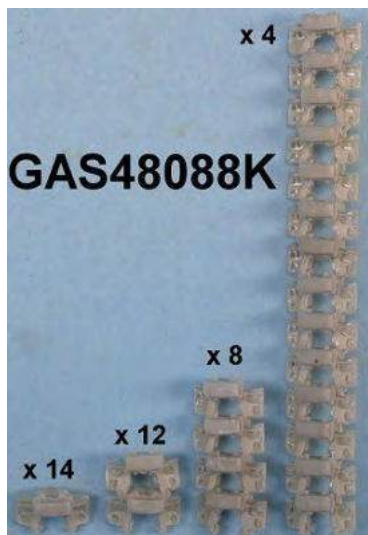
Tamiya tracks. Being link and length, they can be assembled and glued to the wheels and taken on/off the vehicle for painting. Detail on the outside is good, but minimal on the inner face. The track pads appear too thin. There are 60 links per side, making them a bit small, scale-wise. Still, they look very good on the model.



AFV Club vinyl tracks (left) and Bandai (right). The AFV Club tracks are very accurate, not so the Bandai. However, it appears that if a small wedge were to be cut from between each link on each side, the basic shapes would be improved slightly. The AFV Club track glues easily with styrene glue or super glue and the joint is invisible. The Bandai joint is large and prominent. The Bandai tracks are also very stiff—it would be difficult to get them to lay realistically over the road wheels. The AFV Club tracks have no problems in this regard.

AFV Club tracks. These are rubber-band style tracks and must be painted and glued into a loop before being stretched over the finished road wheels. This could result in breakage of the track joint or the fragile axles on the idler wheels (although I had no issues). There are 54 links per side, the track pads are the proper thickness. Detail—inside and out—is good. Other than the rubber-band style which many modelers do not like, these tracks are fine. As seen, they are easily glued to the wheels to create needed sag.

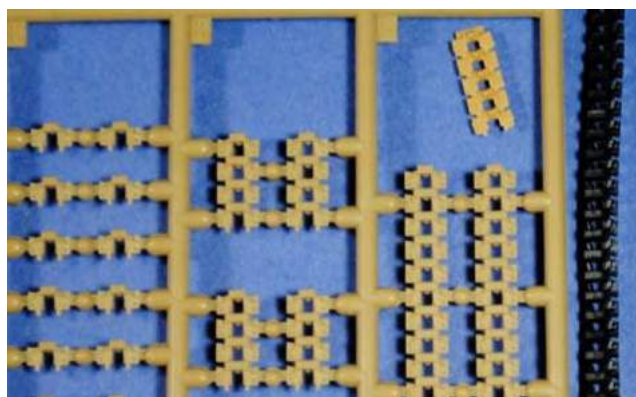




An option I haven't tried are aftermarket tracks from Gaso-line. I do not believe these are still in production. This photo is from their website. This set contains 110 links (or 55 per side unless extras are included). Being provided in different lengths, they likely do not require heating and shaping as many resin tracks do. They look to be as easy to use as Tamiya's link and length (assuming they are not too difficult to remove from casting blocks and to clean-up—always a potential problem with small, thin resin parts). Detail looks quite good, at least as good as the AFV Club offering. Cost is reasonable at about \$6-7 (depending on exchange rate Euro to Dollar).

Another option is to use tracks from the 1/72nd scale Revell Famo (Revell Germany kit #03141). The Famo chassis used a scaled-up version of that used on the 251. The 1/72nd Famo track fits well on the 1/48th 251. Likewise, 1/35th scale 251 tracks will fit on the 1/48th Famo. (Thus, there is hope for two old Bandai kits!) The Revell kit is readily available and can often be picked-up quite cheaply (although it retails for \$17.50). I was curious about how the track would work on the quarter scale 251 and how it compared to the AFV Club and Tamiya offerings. My local hobby shop has a "cash-back" program where you save your receipts. Once you have spent a certain amount of money, you get 10% of that value off your next purchase. This allowed me to pick up a Famo basically free—a good price for an experiment!

The photo at right shows part of the Revell sprue along with a length of rubber band track from AFV Club, and a loose length of track from Tamiya. All appear

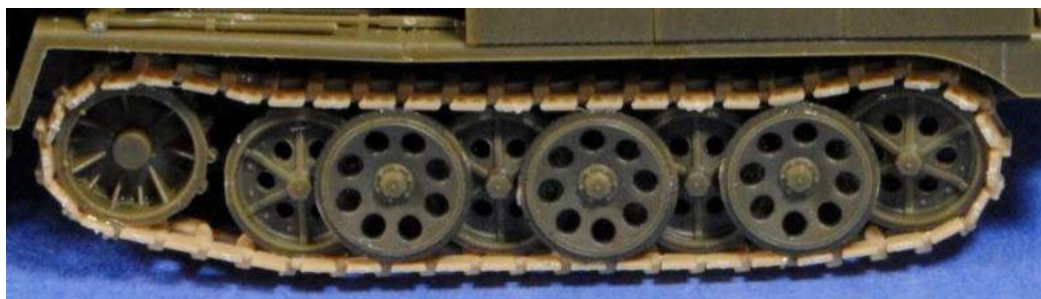
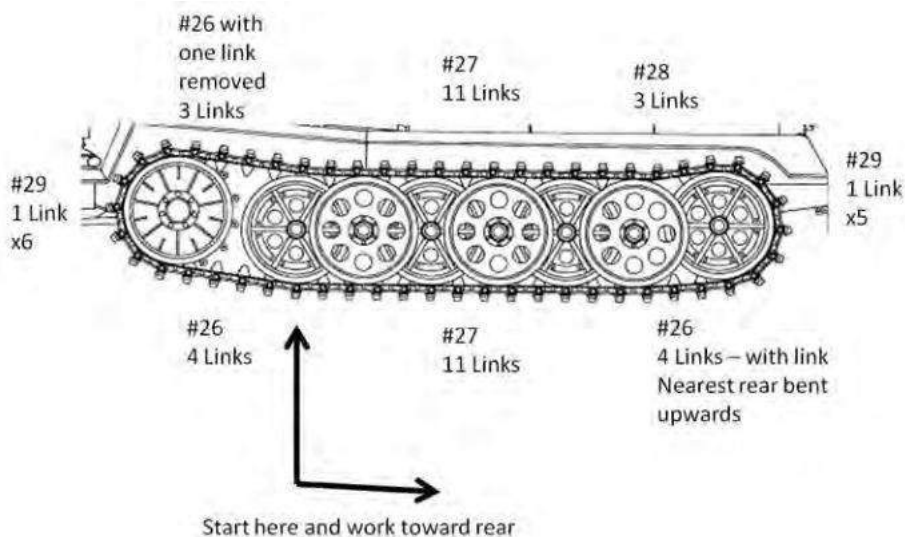


quite similar in size and design. The Revell track is, in fact, very similar to the Tamiya track in design and construction. Detail is also comparable (with the Tamiya offering being slightly superior). Also like the Tamiya track, the track pads are too thin. Although I would imagine that over time and with wear, the track pads on the actual vehicle would be worn down, too. The links on the Revell track are the biggest, with only 47 being needed—two less per side than what is included in the kit, giving you a few extras for mess-ups or stowage.

The drawing (my notes added onto a portion of a drawing downloaded from www.blueprints.com) shows how I assembled the Revell tracks. The part numbers shown as those on the Revell track sprue. I found that stared on the underside in the center of the first road wheel and working backward was the best option. Make sure not to glue the drive sprocket into position before the tracks are fitted to allow it to rotate, as needed, to engage the links.

As the tracks are different sizes, the Revell tracks do not engage properly with the AFV Club drive sprocket. The fix is to remove the rollers underneath the track on the AFV Club part (leave only 5) and to lop off the track guide horns on the Revell single links that fit around the drive sprocket. None of this will be visible on the finished model, being hidden under the fenders.

The final result is shown here. The result is comparable to the Tamiya offering. Detail is not as good as the original AFV Club track, but many modelers prefer link and length. Many modelers also prefer plastic to resin (I will gladly work with either). For all these reasons, this is a viable option.



Details Sets, Conversion Kits And Accessories



If you so desire, detail sets for both the Tamiya and AFV Club kits are available. Shown is the Hauler set for Tamiya (photos from Hauler). These are nice photo-etched sets. I did not use them. While they are improvements over the kit parts, in many cases they are not significant improvements. I believe good painting and weathering is more important to the final look than loads of tiny details. Not only that, most of these details are internal—and most of my vehicles are filled with stowage and figures, rendering many of these improvements much less visible.

We've seen the kits available and options to make the standard Sd.Kfz 251 personnel carrier. While the kits are acceptable out of the box (the Tamiya kit can use a bit of basic detailing as will see in the chapter on Construction), detail sets are available. While I did not use most of them, that is not an indictment of the kits; simply my personal preference due to the fact I was building so many halftracks. Using these sets to detail each build would have become very expensive. Some of the available kits are shown here.

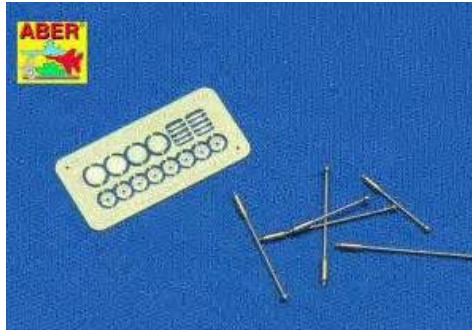
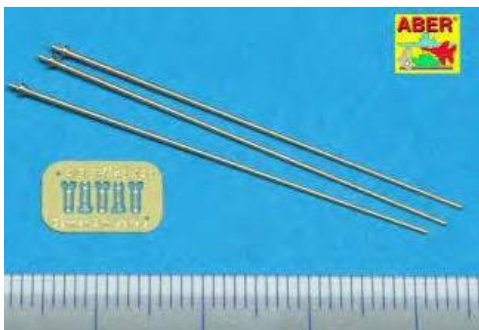
In addition to the aforementioned detail sets, there are many other accessories—both specific to the 251 and more generic—are available. A few examples are shown here, but this is by no-means anywhere near an all-inclusive listing. Black Dog makes a stowage set (#48055) specifically for the 251 Ausf C. They also

make a more generic German Infantry Equipment set (#48025) which I found very useful, as I did the Plus Models German Ammunition and Medical Containers set (#4023). Aber offers, in metal, generic German antennas (#48A20), fender width indicators (#48A19), and clamps/clasps (48A02). Also useful during the project was Tamiya's Jerry Can set (32510) which contains both early and late German jerry cans as well as British and US types. It also includes Allied and Axis fuel drums and various other bits of stowage. Many other resin aftermarket sets are available representing basic stowage and German gear. Also, don't forget "O" Gauge model railroad accessories—many of these can very useful for quarter scale modeling. Several were used in the course of my project. The various sets, kits, and other bits I used for this project are reviewed detailed in the appropriate variant build chapters.

What if you want one of the many variants? Other than Tamiya's Stuka Zu Fuss, no kits are available in this scale. Scratch-building is required for many of the variants. In some cases, you can covert parts from other kits or from the aftermarket to make a particular variant. Examples of both these options are found in later chapters of this book on specific variants. The aftermarket—specifically the French company Gaso.line—sells conversion kits to make some variants. In some instances, based on variant, these are specific to either



*Black Dog's stowage set (#48A055) made for AFV Club's Ausf C. Other than the open side stowage lockers, the parts will work on Tamiya's halftracks with little or no modifications.
Photo from Black Dog's website.*



Some of Aber's products—antennas and width indicators (see text for details). Photos from Aber's website.

Below: Generic German equipment sets I found useful: Black Dog's "German Infantry Equipment Set" and Plus Model's "German Ammunition and Medical Containers" (Photos from the companies' websites).

Bottom: Tamiya's very useful Jerry Can Set.



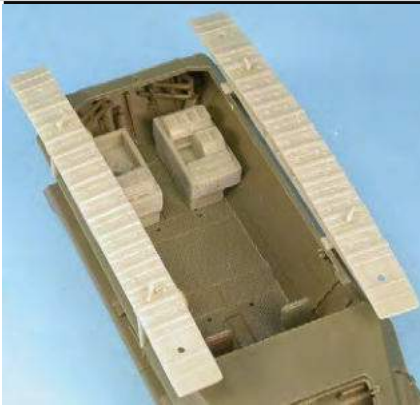
the AFV Club Ausf C or the Tamiya Ausf D. In other cases, while the kit may be designed to fit a specific manufacturer's kit, it can be made to fit in the other. I obviously included here only those conversion kits/options available at the time of this writing and that I am familiar with, so it may not be all-inclusive. To my knowledge, as of this writing, Gaso Line is the only source of conversion kits to make variants other than the standard 251/1. As far as I know, they make conversion kits to convert the AFV Club Ausf C into the 251/7, 251/9 (early low mount), 251/10 and the Luftwaffe's 2cm Flak 38 Auf SPW. With the exception of latter, all of these could also be fitted to the Tamiya Ausf D with only minimal conversion work. For the Tamiya Ausf D kits, Gaso makes conversions for the 251/16 and 251/22. With work, the /16 could be fitted to the AFV Club C model. Another conversion kit, from Kiwi Resin, is the long out-of-production kit to convert the Tamiya vehicle into the late model 251/21. Unlike the Gaso kits, which are very nice, well cast, and drop fits into the plastic kits, the Kiwi kit requires a great deal of work and is not for the inexperienced resin modeler.

Gaso's kits are well detailed and accurate. They are also well engineered, going together well and, for the most part, simply being drop fits in the plastic kit, replacing the kit parts. We will look specifically at each applicable kit and how I used it in the appropriate variant chapters.

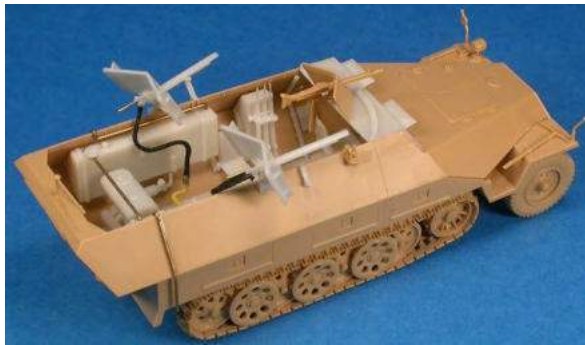
For most other variants, scratch-building is almost the only option. But, there are some kits that could provide good donor parts. For example, Tamiya's "German Infantry on Maneuvers" set contains folded MG tripods which could be used in a 251/1 heavy machinegun section vehicle. If you can find it, one of Bandai's old German infantry sets included a mortar which could form the basis for the 251/2. Plus Model's resin German Ammo and Medical Containers set (part number PM4023) includes five mortar ammunition cases. Companies, such as Gaso Line, make guns in 1/48th scale which could be used to help create a 251/4 (or early 251/3 gun tractor). For the infrared vehicles (Falke and Uhu) MR models made a set, now out of production, which included the driver/gunner light and scope. These were made for the Panther tank, but can be made to work with the 251. A few parts are also available as 3D prints from Shapeways (designed by Cristian Hoeltge) as are radios. For those interested in a 251/21, available from CMK is a very nice Drilling kit. This kit, however, is only of the gun, and does not include parts to make a 251/21. The modeler would have to make the gun shield, modify the vehicle floor, and create the ammunition stowage. For any other variant, while you may be able to scavenge and scrounge parts from various kits, scratch-building is your main option. See the appropriate variant chapter for info on how I tackled the subjects.

Most of the stowage sets and conversion kits are, for the most part, resin. Don't let resin scare you away—as we will see in the chapter on Construction, working with resin is different than working with plastic, but is not difficult. Clean-up of parts is normally much more involved than working with plastic kits as excess resin from the casting process must be removed. Also, normal plastic model cements will not work with resin. Resin also offers outstanding detail, and, due to the capabilities of the molding/casting process, often have fewer parts than comparable plastic kits.





Model by
Domingo Hernandez



Model by Mike Rinaldi



A selection of Gaso.line's conversion kits for the Sd. Kfz 251. These include the Sd.Kfz 251/7 (#48072K), 251/9 (#48073K), 251/10 (#48079K), 251/16 (#48083K), the Sd.Kfz 251/22 (#48082K), and the Luftwaffe's 2cm Flak auf SPW (251/17 #48122K). These are all excellent kits, well worth the money, that will help the modeler create an accurate rendition of these 251 variants. (Photos from the Gaso.line website). These kits include all needed parts and simply replace the applicable kit parts, making these extremely easy to use. In the case of the 251/16 they even add interior details missing in the Tamiya kit, such as the flanges where the front and rear hull halves join. They also offer a new driver's compartment roof with open vision port covers. While these are resin kits requiring normal resin clean-up procedures and with the occasional warped or broken small part, I highly recommend them.

At right are a page of instructions from the "251/17 Ausf C" kit shown above. It is typical of Gaso's instruction sheets. It consists of a parts list along with photos of each part. This is actually very handy. Since the resin parts come with the typical excess resin left over from the casting process (flash, thin resin webbing filling open spaces, mold pour blocks, etc), the photos actually help the modeler determine what is part and what is excess resin trash.

This aids and the speeds the clean-up process. Gaso's instruction sheet also includes several photos of the assembly process and finished models. These are labelled with the corresponding part numbers. While not as detailed as Tamiya's instruction sheets, the clear photos are mostly adequate. There are only a few instances of possible confusion in the more complex kits, but the photos from multiple views and angles generally clear this up. This kit includes plastic parts for the gun from ACE models. A copy of the applicable parts of that kit's instructions are included. A turned metal barrel from Gaso.line is also included.





These photos show the contents of the kit. The excellent metal barrel is shown above. At right is the sprue tree from ACE models included in the conversion kit. This is injection molded plastic, but is not up to the standards of a company like Tamiya. Detail is a bit and soft and crude in comparison. Not all parts are needed—the base for example—since the gun is mounted in the vehicle. Also shown are Gaso's resin parts (before clean-up). Detail is very good. See the chapter on Assembly for information on resin kits and their construction. Note that it replaces nearly all of the side and upper hull parts of the AFV Club kit it is designed to work with. This allows the modeler to simply replace the kit parts, making the conversion simply a drop-in, with no cutting or alteration of parts needed.



The above kit is probably the most complex, being resin, plastic, and metal. It also includes a piece of brass wire for making grab handles. It totals nearly 70 pieces. Most of the conversions are much simpler. At left we see the parts for the 251/7 before clean-up and (from Gaso's website) after clean-up. As you can see, most parts address the assault bridge ramps—the two ramps, four mounting brackets, and 4 tiny screw handles and secure the ramps to the mounting brackets (in real life—on the kit, pegs cast into the brackets fit in holds on the underside of the bridge—the screw handles are simply an added detail. Also included are two stowage bins (each partially filled with engineer gear) designed to replace the AFV Club's rear seat. Although this conversion kit is designed for the AFV Club kit, it can be made to fit the Tamiya kit with minimal effort. Instructions for this, and all Gaso conversion kits and kits, are of a similar style to those shown on the facing page for the "251/17 Ausf C".



The two kits shown here are representative of the Gaso offerings. Fit of the parts is generally very good with little or no putty work needed to fill gaps. For more details on each conversion kit and how it is incorporated in the model kits can be found on the chapters on the individual variants.

I have minor niggles with a couple of the kits, but they are very minor. While the actual 251/10 usually had both rear seats replaced with ammo racks, the kit provides only one—and it is too long to fit on the rear seat. As you will see in my chapter on the 251/10, this is easy to resolve. On the 251/7, the grab handles on each corner of the assault bridge ramps are absent in the kit, but easily added from some bent wire.

The bottom line is that, if you don't mind working with resin, the Gaso kits offer great detail, excellent quality, and a good price.

THE "PANTHER" TANK:

Some claim Panther was the best tank of WWII, but reliability issues argue against this claim. A response to the Soviet T-34, the Panther had excellent firepower and protection (from the front), but suffered in other areas. Still, it commanded respect from its enemies, and its strengths influenced the development of heavy allied tanks such as the Soviet IS-2, American Pershing, and British Centurion.

Length: 22.5 ft.

Width: 11.2 ft.

Height: 9.8 ft.

Weight: 49.4 tons

Number Built: about 6,000

Primary Gun: 75mm

Secondary Armament: 2x MG34 machineguns

Armor: .60 in. to 4.72 in.

Engine: V-12 petrol Maybach HL230 P30 690 hp

Speed: 34 mph

Range: 155 miles

Suspension: Double torsion bar with interleaved road wheels

Crew: 5

Other Kits Used in "Project 251"

While this project was designed to create a series of Sd.Kfz 251 halftracks, and while these vehicles feature in all my vignettes and dioramas, they are not always the sole kit used in any of the creations. We've already seen the conversion sets and some of the accessory used. We will see more of these in later chapters. Several Tamiya figure sets were used, often multiple copies of a figure set (three sets of late war Panzergrenadiers for example). These will be reviewed and discussed in the chapter on Creating and Making Figures. Some kits provided only donor parts. Other kits appear in my vignettes and dioramas alongside my halftracks. Let's take a look at many of these other kits.

Tamiya's 1/48 Panther G

As the 251 was a Panzergrenadier vehicle designed to support the tanks, I used the very nice Tamiya 1/48 scale Panther G with a couple of my halftracks. The Panther G, kit #32520, is a typical Tamiya kit—perfect engineering, fit, and molding with very nicely rendered surface detail. There are options such as different exhausts, gun mantlets, and engine fan covers. Detail is appropriate for late model Gs. There is no Zimmerit anti-magnetic mine paste (which factories ceased applying in September 1944 due to the mistaken belief it could cause fires) which limits to the model to a later vehicle unless Zimmerit—homemade or aftermarket - is added. Although nice, and great value for the money, it is not perfect.

This kit includes the die-cast metal hull tub that Tamiya used with many of their early 1/48th releases. While I like the weight it gives to the model, detail on the tub is somewhat lacking. The final drive housings are also simplified. Likewise, wheels and sprockets have detail only on the outer faces. The good news is that most (if not all) of this is not visible on the completed model.

The link-and-length track is perfectly engineered. Follow the instructions and there is no issues at all with fit. There are some visible ejector pin marks on the inside of the tracks, but a drop of super glue as filler and a bit of sanding make these quickly disappear. Purist may decry the fact that the track guide horns are not hollow, but in this scale, that is fine with me. If it bothers you, get an aftermarket set (or drill them out as I did for the tank accompanying my 251/20).

Grab handles are just little nubs of plastic. The super-detailer can easily replace these with fine wire. The side armor skirts are simplified, one piece, and too thick. These are best left off or replaced with new ones (scratch-built or aftermarket). I chose to leave them off as I think the vehicle looks better.

These "complaints" are mere niggles—they will pass unnoticed by most people and none present any problem or detract from the appearance of the finished kit. I have only one real complaint. The periscopes are just hollow covers, there is no periscope nor glass present.

I included Panther tanks with both my 251/3 and 251/20. While I built both my Panthers basically

straight from the box, there were some detailing enhancements made to correct the deficiencies noted above. The vehicle posed with my 251/20 was further converted into a command tank and equipped with Infrared equipment. Refer to the chapters on Construction, the Sd.Kfz 251/3 and the Sd.Kfz 251/6 for details of how these great little models were built.

For those wanting more detail, aftermarket detail sets, gun barrels, fenders, tracks, and Zimmerit are available.



Krupp Protze Kfz 69 with 3.7 cm PaK

The truck, kit no. 32580, was used only as a donor kit for parts. For my Sd.Kfz 251/10, I wanted to model a field modified vehicle fitting the standard 3.7cm gun on the 251. the Gaso kit depicts the factory fitting. I combined these two kits, using the Gaso gun and mount with the Tamiya shield, sight, and elevating/traversing mechanisms. The kit includes six seated figures useful as seated passengers and drivers in other halftracks. Some of the decals were also useful. While I did not build the kit itself, it appears to be of typical Tamiya quality, with good detail, accurate shapes, and a low parts count. The small 3.7cm gun is a nice little kit on its own. The gun is simple (under 25 parts total including the arms, wheels, and axle assembly), but is very well done. The figures are the same ones included in earlier Protze release, so are not of the same quality as the more recent 1/48th scale figures. They are also short—they are only about 5'5"-5'6" in scale height.

The Krupp Protze was built in several versions including a telephone truck, staff car, radio mast carrier, prime mover for the 3.7cm Pak, personnel carrier, ammo carrier for the 2 cm flak gun, and generator carrier for the anti-aircraft spotlight (usually towed). Sometimes the 3.7cm Pak or the 2 cm flak was mounted directly on the vehicle. There was an armored version built in very limited numbers in the late 1930s. The kit is typical Tamiya.



Tamiya's 1/48 Africa Corps Kubelwagen



clear plastic. Only a couple ejector pin marks (on the inside front doors) are visible, but these are very faint and easily removed. My only criticism is the lack of driver foot pedals—something noticeable with no driver in place.

The model is clearly designed as a "cross-over" for aircraft and armor modeling—of the five marking sets included, four are Luftwaffe and only one is army. Two nice figures in tropical gear (both Luftwaffe—one a pilot) are included. As tropical uniforms were similar, it doesn't take much work to convert the figures to army. These figures are taller than the average 1/48 Tamiya offering, being close to actual 1/48 scale. The size difference is quite noticeable alongside most other Tamiya 1/48 scale figures.

While my halftrack was painted in European dark grey overpainted with desert sand, I chose to depict the Kubelwagen in a factory tropical scheme. Building and painting followed all my normal processes. Things unique to this vehicle are shown here.

"Tub Car" is the literal translation of Kubelwagen - WWII Germany's "Jeep".

Tamiya makes two versions of this little vehicle in 1/48—standard and tropical (with different exhausts, larger balloon tires, and different spare tire fittings). This kit, #32503, is the tropical version. The kits are not direct-downsizing of the larger 1/35th scale kits, being quite different in some areas. Engineering and fit of the parts is excellent—it's an absolute joy to put together. It consists of just under 60 parts, so it is a simple build. One part—the windscreen—is molded in

Kubelwagen:

The Volkswagen Kubelwagen (based on the Beetle) was for the Germans what the Jeep was for Americans.

Despite lacking 4-wheel drive, the vehicle had good off road mobility. Thanks to its smooth underbody, it would propel itself like a motorized sled when its wheels were sinking. The air-cooled engine was tolerant of hot and cold climates, and, lacking a radiator, was less vulnerable to enemy fire.

It was produced throughout the war with no significant design changes and was modified to perform many roles.

In 1969, VW resurrected the design for the German army and for the civilian market - being known as the "Thing" in the US.

My model depicts a "tropical" version with balloon tires.

Length: 12 ft 3 in
Wheelbase: 7 ft, 10 in
Width: 5 ft 3 in
Weight: 1,576 lbs
Engine: 985cc Air-cooled, flathead 4-cylinder producing 23.5 bhp
Ground Clearance: 11 in
Top Speed: 50 mph
Number Produced: 50,435

2cm Flakvierling 38:

One of Germany's first 20mm anti-aircraft guns was the Flak 30, but it suffered from a low rate of fire of 110 rounds per minute. The Flak 38 was otherwise similar but doubled the rate of fire while reducing weight.

The 20mm was not as effective as the heavier 37mm—a weapon which offered the same rate of fire, but with deadlier impact and longer range. To keep the Flak 38 competitive, the Flakvierling was introduced.

“Vierling” means “quad”. The weapon consisted of four guns on a single mount with collapsible seats, folding handles, ammunition racks, and a triangular base with a jack at each leg for leveling the platform. The guns were elevated and traversed together using two hand wheels. The gun was fired by two pedals—each of which fired two diametrically opposite guns. Thus, the guns could be fired in pairs or all together, in either the semi or fully automatic modes. It was effective against both air and ground targets.

In addition to the towed mount, the weapon was also mounted on various half and fully tracked chassis.

Tamiya's Flakvierling

I used two of these excellent little kits—one appeared in my Sd.Kfz 251/22 diorama and the other was simply a donor kit. It provided a gun and several related accessories for my 251/17. The kit also includes four figures, including two that are seated. These were among some of the most useful figures for my overall project—nearly every part of all figures from both sets found their way into my vignettes and dioramas.

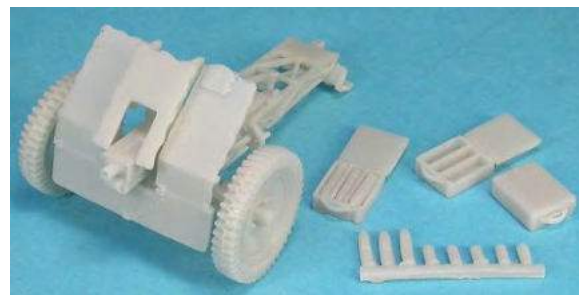


This photo, from Tamiya, clearly shows all parts and accessories included in this kit. The figures are very useful. The astute reader will be able to pick-out most of the figure parts from two sets in the various dioramas and vignettes in this book. While the kit is acceptable out of the box, detail sets are available.

Gaso.lines 7.5cm Light Infantry Gun

The information provided earlier on the Gaso conversion kits holds true for this little gem (kit #50241K) as well. It is a very detailed kit, and the gun shield is cast realistically thin. It includes 32 resin parts. This includes not only the gun, but also three ammunition cases (1 closed, two open), and several loose rounds of ammunition. Clean-up consists of the standard removal of excess resin flash and mold pours. Some of this is challenging as some of the small parts for the trail (and the tiny elevation and traverse hand wheels) are quite little and fragile. Still, with care and a sharp hobby knife, it is not too difficult. The kit is fairly complex, and placement of some of the parts can be a bit confusing. Thankfully, the directions include photos from many angles allowing the modeler to figure out where everything goes. Care is required when fitting and aligning the gun shields especially. This is not a kit for resin beginners.

There are a couple small details missing from the kit. On the actual gun, there were three small armor plates (arranged in an accordion fold) attached to the bottom of the gun and the gun shield that closed the gap when the gun was elevated. If desired (especially if posing the little howitzer at a high angle), these can be added with sheet plastic.



7.5cm Leichtes Infanteriegeschütz 18

The 75mm Light Infantry Gun was an infantry support weapon used throughout the war. It was found in the cannon company of an Infantry Regiment. The carriage could feature pneumatic tires (as in the kit) or steel-rimmed spoke tires. The gun could be drawn by horses or vehicles.

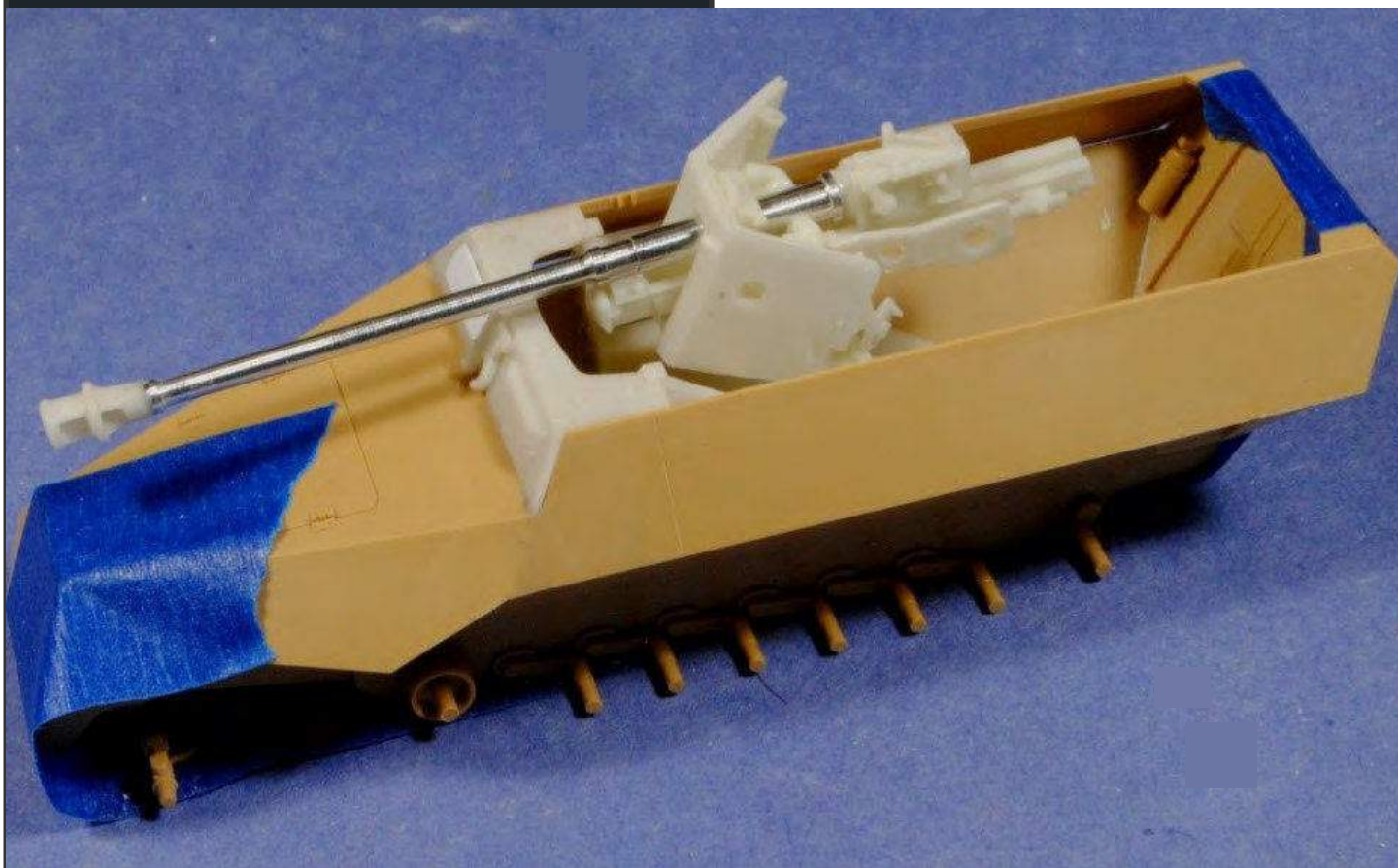
Weight: 882 lbs	Barrel Length: 3 Ft
Elevation: -10° to 73°	Traverse: 12°
Crew: 5	Rate of Fire: 8-12 RPM
Max. Range: 3,550 meters	

Ammunition: High Explosive or Hollow Charge (Hollow Charge was meant as an anti-tank round, although penetration was minimal).

Top: The assembled kit (from Gaso's website)

3

"Project 251"
Modeling the Sd.Kfz 251



Construction and Detailing

By Kevin Townsend



Construction and Detailing

We all enjoy different aspects of modeling. My favorite tasks are painting and weathering. Some prefer the building. I even know one fellow who enjoys adding decals most of all! The good news for me is that while I have my favorite aspects of modeling, I enjoy them all. I also enjoy researching my subjects and documenting my builds.

Of course, before we can paint, weather, add decals, or document, we have to build the model. How you approach this is entirely up to you. Most are probably content to build the models straight from the box. Others will enhance the kit details with some basic modeling work or aftermarket detail sets. Still others will go “whole-hog” and super-detail every aspect of the model and correct even the most minor of discrepancies. All of these approaches are perfectly fine. I fall in the middle of the spectrum. I generally do not use aftermarket detail sets—although I have used some in the past and I have nothing against the aftermarket. However, I will correct major issues and add simple details. I am also content to build stock, straight from the box kits provided they give me a reasonably accurate model of the subject. Thus, for this project, I normally built the AFV Club Sd.Kfz 251 Ausf C straight from the box while adding some simple, basic missing details to the Tamiya kit. The Bandai kit required extensive reworking. All of these kits represent the 251/1 variant of the halftrack, so modeling the numerous other variants requires conversion. In some cases, conversion kits are provided by the aftermarket. Some of these simply replace kit parts. Others are more involved. Most of these are resin kits, but do not let that deter you. Resin, while it requires different methods than plastic, is not difficult to work with and can provide outstanding detail. Photo-etched metal detail sets and replacement parts for many kit items are also available, but I did not use any for this project. Unfortunately, in this scale, the aftermarket doesn’t provide for all variants, so a certain amount of modeling work in the form of conversion and scratch-building is needed. Dread nought! None of it is very difficult, even for a fairly novice modeler. The key is not to look at the complex whole—break it down in manageable, simple components and then build these. Then assemble these into the complex whole. In the following pages, we will at examples of all these methods.

My workspace is a “U” shaped desk with tables and storage comprising each arm of the “U” and my workbench at the base. The photo on the facing page shows the bench itself. We need nothing fancy—just an area where we can safely and comfortably work. My most-used tools, glues, and other materials are on the shelves directly in front of me. My paint brushes are at the front right. Paints are in the drawer (not visible in photo) at my right side. Plenty of light is provided by the two desk lamps (with daylight balanced bulbs) on articulating arms fitted to a PVC pipe framework. For detail work, I have a lighted magnifier on an articulating arm with rotating base. I can swing it in front of me or out of the way very easily. Everything else I often need are in storage bins above the desk or in drawers to my right and left. Although my main library is in another part of the house, my useful modeling references and historical references with color plates are in a shelf behind me. Also behind me is a cabinet where I store bases, bulk groundwork material, and my stash of unbuilt kits.

Tools

While I often say that what you tools and materials you choose and how you work is up to you, it really is a true statement. An almost limitless supply is available, but like everything else, we all have the tools we are most comfortable with using. I have lots and lots of tools, bought by myself or received as gifts over the years. Many are quite fancy. Still, there are only a handful I use on a regular basis. The basic required toolkit is really very...basic. If you are building straight from the box, you can probably get by with a simply hobby knife (with spare blades), the appropriate glue, and perhaps some sanding sticks. Beyond that, your tool needs will be driven by the tasks you need to perform and your personal preference. As I am normally a figure modeler and not a plastic kit builder, my tool set is skewed toward that part of the modeling spectrum. Still, I am comfortable with the tools I have and have found them sufficient to meet the needs of this project. We will look at these tools, and discuss others that are available on this and next couple pages. My recommendation is to buy only what you need or will use. Your collection will still rapidly grow!

1: A good hobby knife with a supply of new, sharp blades is indispensable, such as this X-Acto knife with #11 blade. If I could only have one tool, this would have to be it. It performs a myriad of functions—cutting, scraping, etc. Most of what we need to do to assembly a plastic model kit can be done with this tool. It is a “generalist”. That said, there are “specialists” that perform specific functions better. I have found a good set of sprue nippers ideal for removing plastic parts from the sprue trees they are molded on.

2: Glues are also needed. For most plastic modeling tasks, I use Tamiya Extra Thin Cement. There are instances, however, when thicker cement, such as the “Testors” glue, work better. These only work on plastic. If you are dealing with resins, metals, wood, or other materials, then a good two-part epoxy glue (I like J-B Kwik) or super glue can be needed, as can wood glue or even simple white glue depending on the task.

3: Often we need to sand away imperfections, mold marks, or clean-up glued seams. Sand paper, sanding films, or sanding blocks can be used. I prefer sanding sticks. You can pay for expensive hobby ones, but I get mine from the fingernail section of the cosmetic isle! They are the same thing at only a fraction of the cost. In this photo, the two black coarse sticks are hobby sticks from Stevens International, while the two finer grit sticks are cosmetic products.



4



5



5: A variety of clamps (including tape and rubber bands) can be used to hold parts for gluing and curing.

5: Although not needed (hand tools can do everything it can), my Dremel Motor Tool is probably my second most-used tool. It is faster and easier than hand tools when drilling, cutting, sanding, etc. You must use care, however, the high speeds can melt or damage plastic. But for resins and metals, it's the "Bee's Knees", the "Cat's Meow", and the "Duck's Nuts".

6



7



6; Various useful bits. Rubber bands, tapes (painters tape, clear tape, and double-backed tape) can hold parts together, hold parts for painting, attach nameplates to bases, and a myriad of other functions. Spare hobby knife blades, razor blades, and scissors will find lots of use. Paperclips provide the wire pins I use to attach figures to vehicles and vehicles and figures to bases. Sticky putty can hold parts while they dry, and index cards can be used for both cardstock and notetaking. Old paintbrush handles can stir paint or glues or can even be carved and fashioned into homemade tools.

7. A good selection of small drill bits often are needed. The pin vises that hold the bits can also be used to hold figures and other subassemblies by their paperclip mounting pins for painting.

8



9



8: For scratch-building and sculpting, a variety of files, putty spoons, dental tools, brushes, etc. are quite useful.

9: There's also a use for pliers, wire cutters and various tweezers.

10



10: For cutting wood and plastic strips and shapes, a razor saw and miter box is handy. I use a simple (and inexpensive) X-Acto model.

11



11: Rulers—standard, metric, and scale—are vital when converting and scratch-building, as are dividers or calipers to transfer measurements. A selection of squares are also useful. The three metal billets are some of my most-used, yet simplest, tools. I use them in combination with a razor blade to bend photo-etched parts. I also use them as squares and straight edges. I've even used them as simple weights! I would be lost without them.

12



13



12: Some other things that are occasionally useful in scratch-building: various templates, a circle cutter, and the compass/straight-edge thingy.

13: While I do not have one of these (I get by with the X-Acto version), this thin razor saw is worth the investment. Here, in this photo from the Mirco-Mark website, we see it in use with a small miter box. This includes adjustment stops to ensure exactness when making multiple parts.

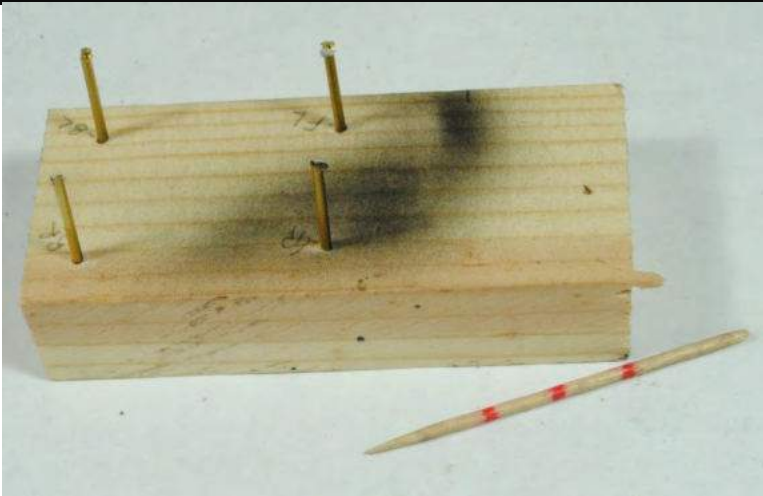
14



15



14-15: Other potentially useful tools that I do not use. The Chopper can be used to create exact cuts in styrene and wood strips. This photo is from the EMA Model Supply website. The photo-etch bending tool (from the Micro-Mark website) is used to bend photo-etched pieces to shape. While these type tools can be convenient, the same functions can be accomplished with tools we've already seen without the additional expense of these specialist tools that perform the task they are designed for to perfection, but have limited utility for anything else. I generally prefer tools that are multi-function, but (as always) the choice is yours.



We are not limited to commercially available tools! There are times when we can make our own tools to perform a specific function, for simple convenience, or due to our style. The odd looking jig in this photo was purpose built to allow me to bend, hold, and glue the parts for the frame antenna for my Sd.Kfz 251/6. The toothpick is my favorite sculpting tool. The red bands simply let me immediately distinguish it from a common toothpick. This high-tech implement was been sanded to a fine point on one end while other end has been rounded. It was then coated with super glue and sanded smooth once dry. I use it for nearly all my epoxy-putty sculpting tasks. It's cheap, and when lost or damaged it only takes a couple minutes to make a new one.

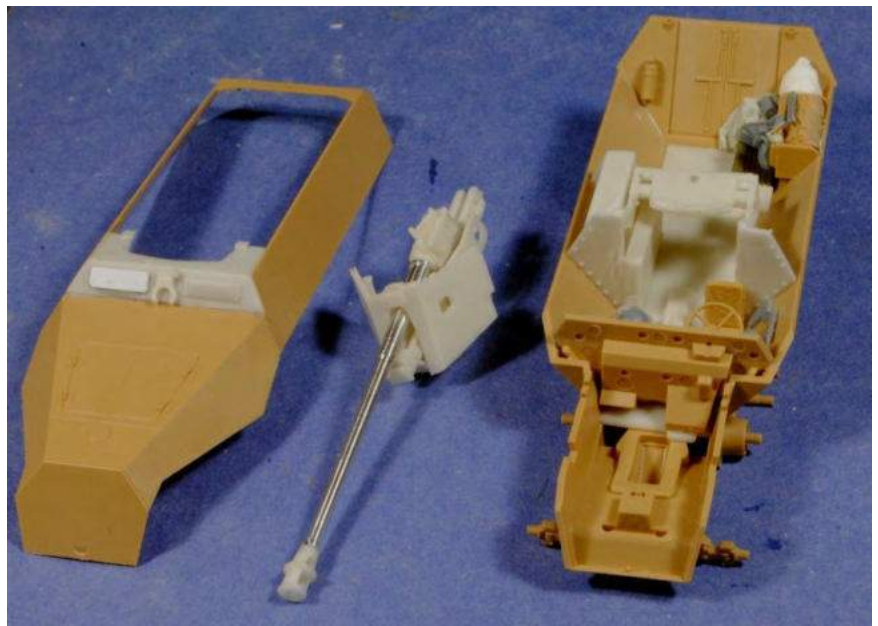
Assembling Plastic Models

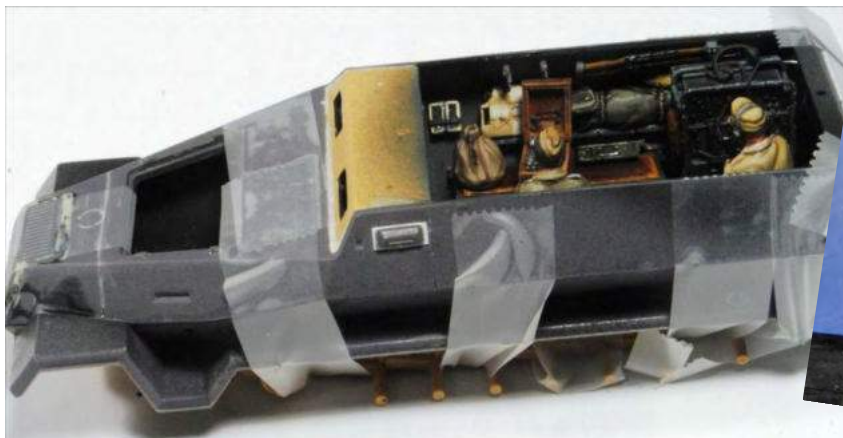
As with anything else, research is the important starting point. What do you want to model? What kits are available? Are they accurate? We need to learn our subject to know what, if any, changes or enhancements we need to make to the model and how we wish to finish and display the kit. The internet is a useful source, but use trusted sites and/or verify the information with other good sources. Books from publishers such as Osprey and Squadron are helpful. You can probably find good information at the local library. If you have access, actual vehicles or reproductions can be found on display in various locations—but be aware they may have been altered or may be inaccurate in regards to finish, markings, etc.

Once we have our kit, it's time to build! Whoa, not so fast. We should plan our build before we begin. Most kits have instructions, but these usually deal only with assembly. While they may list colors used, they do not normally consider the painting process. Study the instructions and the parts to determine what must be painted prior to assembly and what can be painted after. Some can even be painted while still attached to the sprue trees. Must certain areas be painted before others are assembled? Can the model be built in sub-assemblies that are fitted together in final assembly after painting? As we shall see with my halftracks, the interiors were built and painted prior to joining the top and bottom hull halves. Large assemblies such as guns and gun shields, were left off the model for painting and weathering, being joined only after the painting process was complete.

As seen in the photo at right, plastic parts generally come molded to plastic sprue trees. Parts must be carefully removed from these trees to prevent damage. Do NOT twist or break the parts from the trees. They can be carefully cut using a hobby knife, but

Whether building a kit stock, using a conversion kit, or scratch-building, we must plan our assembly. For these halftracks, I invariably built and painted the interior prior to joining the hull halves—the interior would be very hard to paint afterwards. I also use usually leave large assemblies, such as the PaK 40 seen here, separate until after all painting and other assembly is completed.





On this halftrack (the 251/6) the interior is painted and seated figures permanently put in place prior to joining the upper and lower hull halves. Note the tape that holds these pieces tightly together while the glue dries.

The large Infrared spotlight assembly on my 251/20 was also left separate for painting.

While this Sd.Kfz 251/1 looks complete, it isn't. Not only do the figures still need to be attached (only the driver and machinegunner are currently in place), but small fragile parts such as the antenna and fender width indicator bars are still absent. It would be very difficult to handle the model without breaking these small parts, so I usually leave them separate until after the model is fitted to its final base and will no longer require any handling.

It is for all these reasons that the planning process is essential to modeling success.



make sure you don't put pressure on thin or small parts as they can easily break. I prefer to use a sharp sprue cutter. Put the flat side of the cutter against the part and carefully snip it free. Any remaining plastic nub can be easily removed with a hobby knife or sanding stick.

The same hobby knife or sanding stick can also remove the tiny mold seam lines that may be present around the edges of some parts. Just beware that plastic is relatively soft and easily damaged. Sanding, especially with coarse sand paper or sanding sticks, will leave scratches that must be removed with finer grits.

In addition to mold seam lines, there may be other molding imperfections that need repaired prior to assembling the parts. The most common are ejector pin marks. These are normally small circular indents made when the ejector pins pushed the still soft plastic out of the mold. Often, kits are designed so that these marks will not be visible on the finished model. If so, then they can be ignored. This is not always possible. If shallow, the marks can simply be scraped away with a hobby knife or sanded flush with sanding sticks. If they are deeper, they can be filled with gap filling super glue or plastic disks and then sanded flush with the surrounding plastic once cured.

Sometimes, especially on old kits such as the

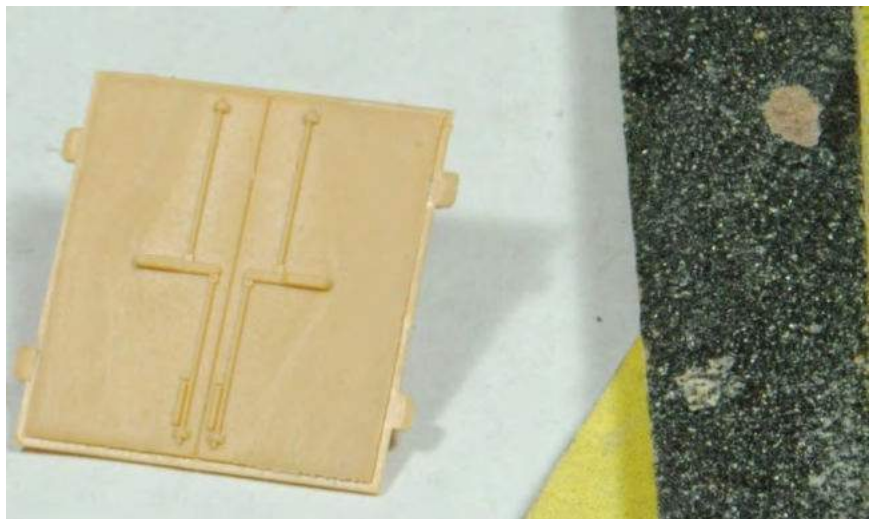
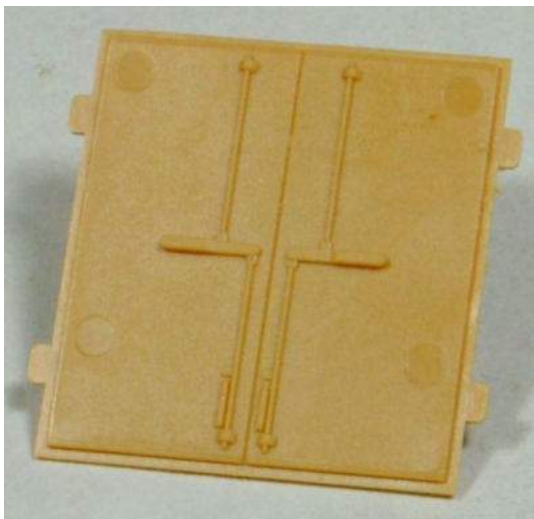


Sprue cutters are designed to remove parts from sprue trees. No other tool will do it as effectively. Put the flat side of the nippers against the part and snip it free.



Left: the fine mold seam line around the front tires (and other parts) can be removed by scraping with a hobby knife. However, I prefer to remove these normally fine lines with a fine grit sanding stick.

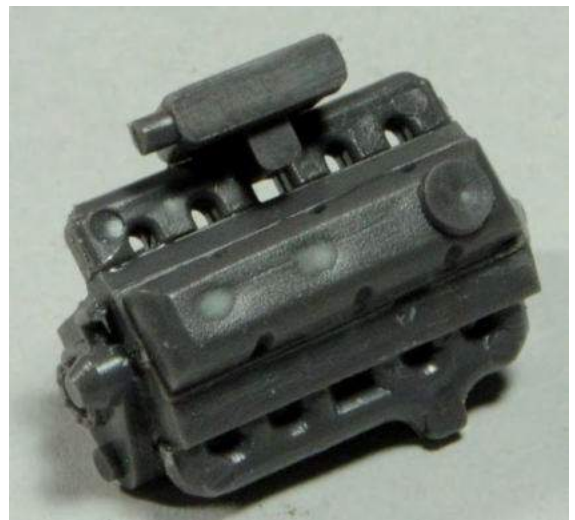
Below: Shallow ejector pin marks are clearly visible near each corner of the interior back doors of the Tamiya kit. Most parts have these marks, but they will often not be visible on the finished model and can be ignored. In many instances, however, they will be visible and must be removed. Very fine marks such as these can simply be sanded away. I use a fairly coarse stick to remove then and then finer grit sticks to remove the scratches.



Bandai halftrack, there will be sink marks in the surface of the plastic. If so, these can be filled with epoxy putty. I use two-part putty such as Magic Sculpt. As these putties are water soluble, the putty can be pushed into the sink mark and smoothed with a damp finger, eliminating the need for any further sanding once cured.

A final step before breaking out the glue is to test-fit the parts. With these kits, most parts fit together perfectly with no trimming or sanding necessary. But this isn't always the case. If the parts don't fit perfectly, study them to find what is preventing the perfect fit. Sometimes a bit of trimming or sanding can solve the problem. If not, then after the parts are joined, the resulting gap will need to be filled.

Bonding plastic parts is best done with plastic model cement. Plastic glues work by "welding" the parts together—melting the plastic on both sides of the joint and fusing them together. For most applications, I use thin liquid cement, but thicker glue can be used as well if you prefer. When using the thicker glue, use the syringe-like applicator tip to apply cement to the mating surfaces of both parts and press them together. With the thin liquid cement, I hold the parts together and then, using the supplied brush, apply cement to the joint. Capillary action will wick the glue into and along the joint. Press the parts together and hold for a few seconds. If needed, especially with large or long parts, hold the



The sink marks on the top of this Bandai engine have been filled with a simple swipe of Magic Sculpt two-part epoxy putty.

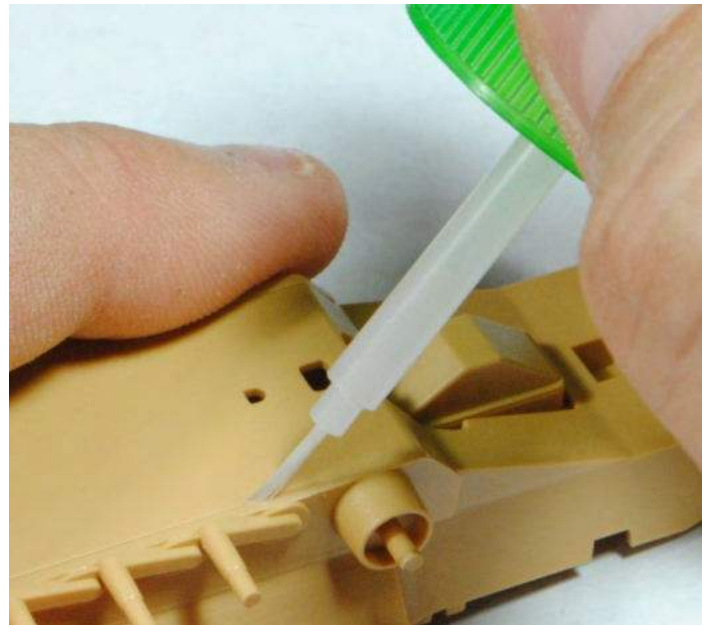
parts together with tape, clamps, or rubber bands until the glue cures. Be careful not to get excess glue on the parts, but if (when) you do, allow it to fully cure and then carefully sand it away.

When working with clear plastic parts such as windscreens, I prefer to attach them with white glue unless they are load bearing. White glue is water soluble, so any mistakes can be easily cleaned-up without damaging the clear part.

In most cases, the parts will mate together perfectly. If the glue was applied evenly and the parts fit perfectly, any visible joint can be removed simply by sanding. Other times, if there is a gap, filler will be needed. For small gaps, thick gap filling super glue can be used. I prefer not to do this with plastic parts as the cured glue will be harder than the surrounding plastic making it hard to smooth without damaging the plastic. Large gaps can be at least partially filled with styrene strip or rod. Many modelers use a model filler putty such as Squadron Green Stuff. This can be diluted with thin model glue. I prefer to use a two-part epoxy putty such as Magic Sculpt. This is water soluble, so can be smoothed with a damp finger or brush after application minimizing the need for later sanding.

If painting parts prior to assembly, make sure you do not get paint on the mating surfaces (or if you do, to remove it before joining the pieces). The paint will prevent the cement from reaching the plastic. This will result in a very weak paint-to-paint bond instead of a strong plastic weld.

Right: To apply thin liquid cement, hold the parts together and apply the glue, using the provided brush, to the joint. Capillary action will draw the glue into and along the joint. Thicker plastic model must be applied to the mating surface of each part before they are pressed together. But don't use too much or it squeeze out of the joint and make a mess.



Below right: The interior front portion of the Tamiya halftrack has numerous ejector pin marks when assembled. This is not a bad thing—this area is not meant to be seen on the finished model. However, in a couple instances, I modeled the engine hatches open and provided an engine and other details in the forward compartment.

This required the marks to be removed. In this instance, I simply filled each ejector pin mark with a swipe of Magic Sculpt epoxy putty.

Below: As we shall see throughout this work, I use epoxy putty—primarily Magic Sculpt—for a variety of tasks. These putties generally come in two parts—resin and hardener—which are mixed together to make a clay-like substance that allows 30 minutes to an hour of working time before it begins to set.



Working With Styrene Sheet and Shapes:

Companies like Plastruct and Evergreen make sheet plastic in all colors, textures, and thicknesses. Also available are shapes and forms in a staggering variety (strip, bar, rod, tube, "U", "L", "I", tread plate, siding, clapboard and on and on). All of this is very useful when scratch-building. Many tools are also available, but all you really need is a good hobby knife, a metal straightedge, some sanding sticks, and perhaps a scribe (I use dental tools).

Thin plastic can be cut with scissors, but I don't recommend this as it can cause the sheet to curl. Plastic can also be cut with a saw, but I generally don't recommend this either—it can result in a ragged or chipped edge and lots of "burrs". The best way to cut plastic is to use a hobby knife and a straightedge to score the plastic along the line you wish to cut. Then simply bend the plastic away from the score and it will snap cleanly and exactly. Usually, scoring about a quarter of the way through is enough. If a burr does form, simply scrape it away with your hobby knife.

Styrene is easily glued with liquid cement.

Throughout this work you will find many tips for working with this material, such as cutting your strips too long and trimming them to length after gluing to ensure perfect fit and exact length.

You can also scribe the plastic using a similar method to cutting it—making panel lines for example. I hold the straightedge tightly against the sheet and draw the scribe (a dental tool in my case) towards me. You can achieve a uniform depth by using a uniform pressure. If a burr or raised edge forms, you can simply scrape it away.

You can heat pieces of the plastic sprue trees the model parts come on and stretch them to make antennas, wires, and other stuff. The styrene plastic forms—rod, hex, strip, etc., can also be stretched like sprue. Gently and evenly heat the part over a candle and draw it out to the desired length, thickness. It will retain its shape - for example, a hex rod will still be hex rod, just a longer and thinner one. With practice you can achieve uniform results. This technique is useful for example when making tapered antennas.

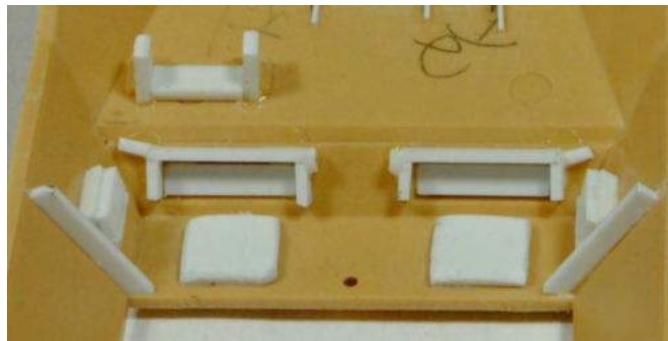
Assembling the AFV Club & Tamiya Sd.Kfz 251/1 Kits

In this section, we will look at the basic strategies to assemble and provide basic detailing to the AFV Club and Tamiya Sd.Kfz 251 kits. As they are engineered differently (primarily in the construction of the road wheels and tracks) somewhat different methods must be used to put them together. The AFV Club offering is very well detailed straight from the box, but the Tamiya kits (while they feature adequate details and near perfect parts fit) can benefit from a bit of easy detailing using styrene strip and rod.

We will not address the Bandai kit here. In the chapter on available kits, we saw just how much work is needed to correct this old kit. To see how I tackled that task, refer to the chapter on the Sd.Kfz 251/6.

BUILDING AND DETAILED THE 1/48 TAMIYA SD.KFZ 251 KITS:

With the exception of the Wurfrahmen 40 rockets and frames, these kits are identical and are built using identical methods. The Tamiya kit has very clear instructions and is quite easy to built with nearly perfect fit. For the most part, they can be built straight from the box per the instructions. However, it lacks some of the detail of the AFV Club kit. Most of this in areas that are not particularly visible on the finished model (such as the suspension behind the road wheels). In these areas, the lack of detail is acceptable to me and no additional detailing was added. However, some simple additional detailing in the interior can yield significant improvements to the appearance of the finished kit. For those of you "super-detailers" out there, there are aftermarket details sets available. The interior of the Ausf C and Ausf D were basically the same, so the AFV Club parts could also be used to detail the Tamiya kits.



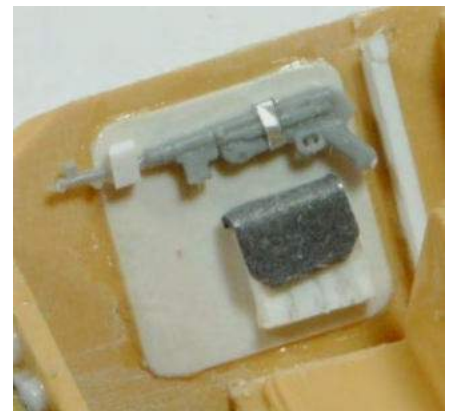
Left: some of the basic detailing of the Tamiya kit's is in the driver's compartment. Blocks of styrene bar stock depict the vision blocks, while plastic strip forms the framework around the vision ports with plastic rod making in the handles. Pieces of sheet plastic, sanded round at the edges form the "headache" pads over the seats. Little of this

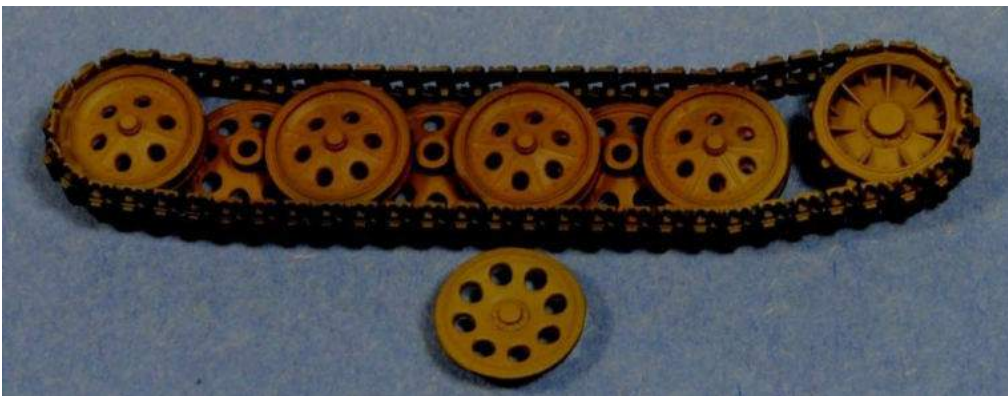
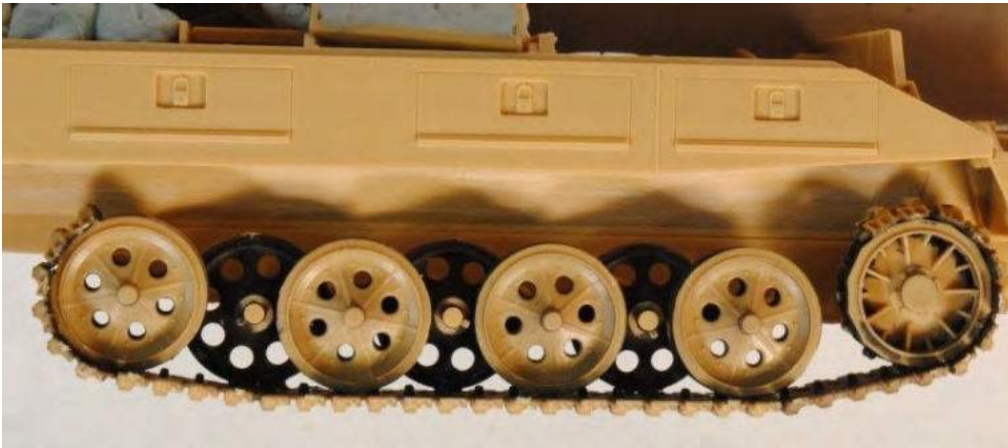
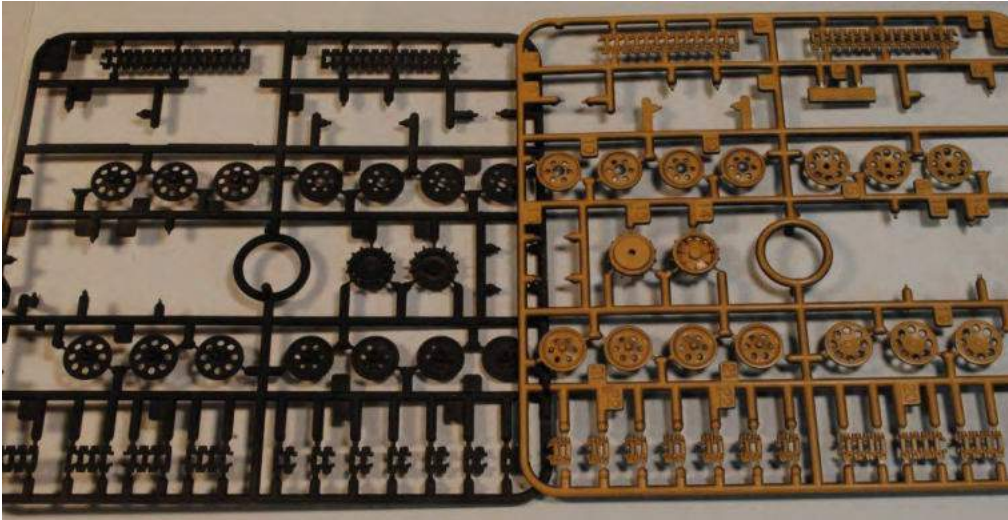
will be clearly visible on the finished model, so these basic details are enough.

Plastic strip is used to create the flange where the front and rear halves of the hull are glued together.

Right: On the sides, by the front seats, pieces of sheet plastic form the liner attached to the inner armor. Using a bit of plastic "L" and a piece of metal foil, a gun mount for an MP-40 (Tamiya) is added. The magazine holder is scribed plastic with a sheet pewter cover.

Not seen here, other bits, such as the spare vision blocks, are copies of the AFV Club kit parts made by mash-molding.





The Tamiya kits' tracks are a snap to build as long as you follow the instructions. I pre-paint the inside of the tracks and road wheels black using a spray can while the parts are still on the sprues. The wheels are placed (not glued) on the axles. Only the outer three road wheels are left separate. The tracks are glued in place per the instructions. Once the glue cures, you have a single-piece comprising the wheels (minus the three outer wheels), the sprocket, idler wheel, and tracks. This can be removed from the model and painted separately. Only after all painting and weathering is complete do I glue the assembly onto the axles. The final step is attaching the outer road wheels.

Did you fail to achieve a perfect fit and have a slight gap where parts come together? No worries. Just fill the gap with some fine



To stretch sprue or styrene, carefully heat it over a candle flame until soft enough to pull to the length/thickness you need. With practice, you get good, consistent results.

plastic rod or strip and soak it with liquid plastic cement. Once softened by the glue, it can be pushed into the gap. Once cured, it can be sanded smooth, and, since it is all the same material, will be invisible.

Thin plastic rod or stretched sprue can also be used to fashion missing weld seams. Simply use a piece of appropriate size, put it in place, and soak it with liquid cement. Once softened by the glue, it can be easily textured with the tip of a hobby knife to create the weld texture.

If you plan on working with styrene parts, sheets, and shapes, a very useful resource is the book by Evergreen titled "Basic and Advanced Tips and Techniques of Styrene Modeling" compiled by Bob Hayden. While an older book, and somewhat outdated, it has several useful chapters on scratch-building and converting using Evergreen styrene products. I highly recommend it. I believe it can be downloaded from the web.



MASH MOLDING

I use a method I call “Mash Molding” to quickly make simple parts. It has the advantage of being quicker and cheaper than traditional molding/casting methods and bad casts can simply be remelted and used again.

1. Using a blob of epoxy putty and plenty of talcum powder to avoid sticking, I make an open-faced mold by pressing the part in the putty. A length of sprue glued to the back of the part makes it easy to handle/remove. In this case, I am making copies of a tractor-style seat (from the Tamiya Flakvierling kit, but I also used the method to copy some of AFV Club’s interior parts—such as spare vision block holders—for use in detailing the Tamiya kits’ interiors.

Once the putty cures, you have a rigid open faced mold. The rigidity is needed to ensure the mold doesn’t deform when you mash the molten plastic into it.

2-4. To use the mold, just take a bit of sprue tree and heat it over a candle until it’s molten (but not boiling or bubbly as this will cause a bad casting). 3. Simply mash the molten plastic into the mold and allow it to cool. This will

take only a couple seconds. Remove the part and cut/trim off the excess sprue.

MOLD MAKING

While mash molding has utility as quickly and easily making small simple parts using the same plastic the model is made of, it obviously has serious limitations. There are times when you may need to create “proper” molds and cast your own parts (or copies of parts). If copying parts, be aware of copy right laws. You can copy parts you have purchases for you own use, but if you try to sell them (or even give them away to friends) you are probably violating copy right. You can buy, from places like Micro Mark, complete molding and casting sets containing RTV (room temperature vulcanizing) rubber to make molds and casting resins to cast parts, along with the associated mold release agents, mixing cups, etc. While expensive, these work quite well. Instructions are included in the kits or can be found online.

However, for this project, I never had need of anything so sophisticated. Everything I needed to mold (whether it copies of kit parts or copies of parts I had made) were suitable to cast as single-piece castings using open-faced molds. I used “Mold Builder” - a liquid rubber mold-making agent. It is easy to use. Simply fix the part to a flat surface and paint on a layer of the rubber. Once this cures, add another layer, and so on until you have built up the mold to the thickness you need. Then, using whatever casting material is suitable for the part, cast what you need.

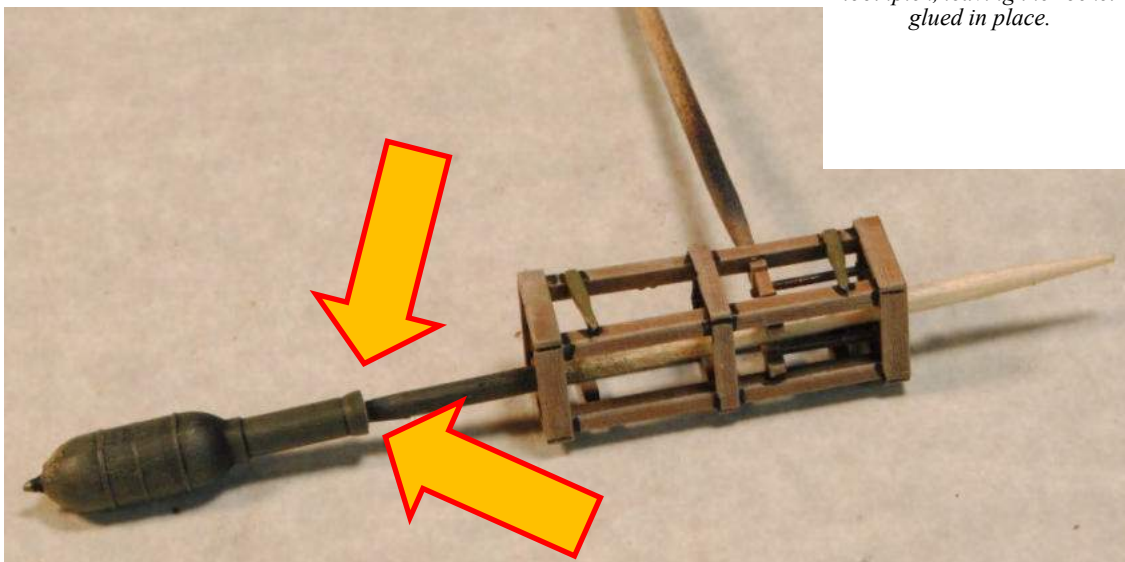
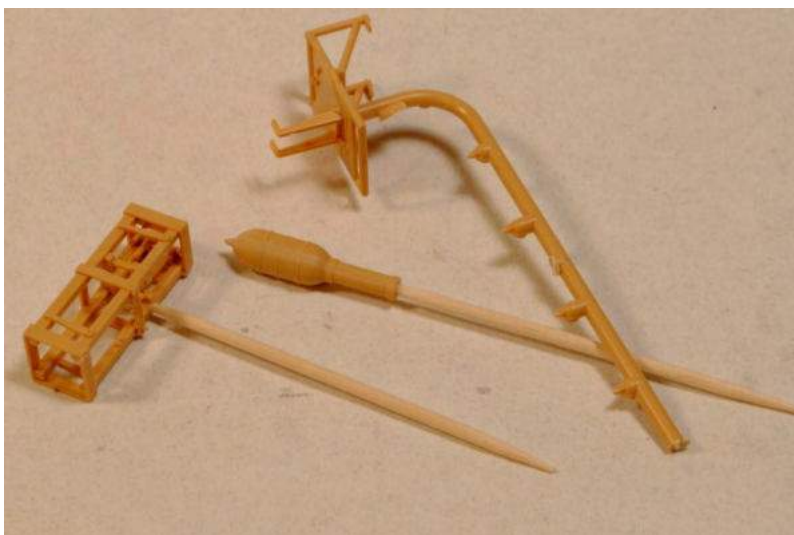




Top: The exterior of the Tamiya kit is built per the instructions. However, I add a couple small details missing from the kit. The conduit and wire for the Notek light are added from two lengths of plastic rod—one for the conduit up the side of the hull and a thinner one running from the light to the conduit. Also, small tie downs are added to each front corner. While these could easily be made from styrene, I have some tiny parts that fit the bill in the scrap box.

Second: The “Stuka Zu Fuss” halftrack is built identically to the normal version. The rocket frames, crates, and rockets are assembled, but are painted separately before attachment to the model (they are attached after painting but prior to weathering). I use lengths of excess sprue glued to the rear or toothpicks inserted into drilled holes to hold the parts.

Below: A simple trick to glue the painted rockets into the painted crates. The toothpick holding the rocket is simply friction-fitted into the rocket's exhaust. To fit it into the crate, I put a small drop of superglue on each side of the bottom of the rocket (marked by arrows). Then, using the toothpick, I simply pull the rocket through the crate until the glued surfaces mate with the bottom of the rack. Continued pulling removes the toothpick, leaving the rocket glued in place.



Working with Photo-Etched Parts:

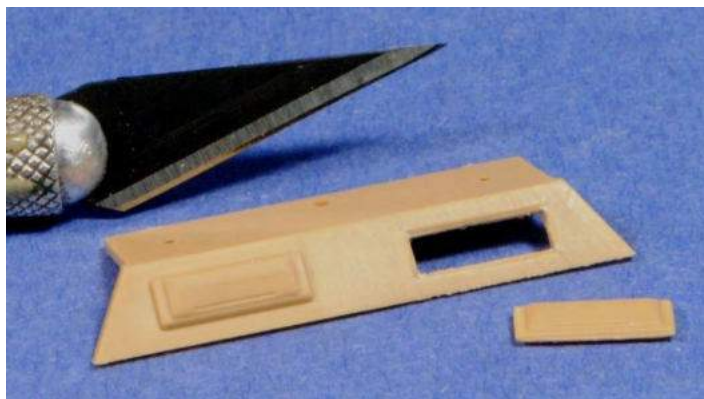
While none were used for these conversions, some kits - and many aftermarket sets - include photo-etched metal parts. While good for small and scale-thick details, I am not a fan: for the effort and price, they are not a great improvement over stock plastic parts - especially if the latter are carefully assembled and painted. This is just my opinion, and many modelers swear by them. So you make the choice to use them or not.

To cut them from the fret, I use a sharp hobby knife and an old CD as a cutting surface—it is hard enough but will not significantly blunt the blade. For very small parts, I like to place the whole fret in a Ziploc bag and cut them out through the sides of the bag to capture parts that try to fly away.

Often, the parts need bent into shape. While this can be done with pliers (or an improvised bending tool or some sort), specialized bending tools give the best result. Be careful—the parts are thin, and if you don't get it right the first time, they may break when re-bending.

Model glue will not work with metal. Epoxy is usually too thick. Super glue is the best choice. For very small parts, a bit of clear paint (or Pledge Future floor polish) can be enough to affix them to the model.

Be careful handling a model with photo-etch attached—they can be quite fragile and easily damaged.

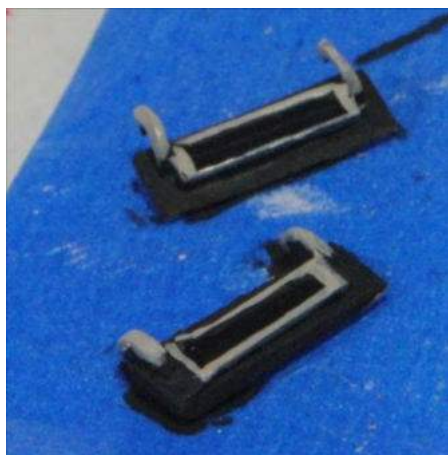


On the AFV Club kit, the covers on the vision ports are separate parts, with other pieces forming the interior hardware. This makes it fairly easy to open the ports. With the Tamiya kit, more work is involved, but it can still be done.

Left: It is quite easy to trim off the molded-on covers. Use a sharp Hobby knife and carefully slice them off.

Below Left: The interior frame is built as we saw on page 10. The block and pivots are easily fashioned from bits of styrene. I usually paint the inside of the covers before attaching them to the model.

Below: Here we see the finished covers in place. Note the Tamiya roof piece in this photo is mounted on the Bandai Ausf B kit.



Why the Popularity of WWII German Subjects?

It seems that in popularity (and availability), the model figure and armor markets are dominated by WW2 German subjects. Availability (supply) is determined by demand. Demand is driving by what modelers want and will pay for. Therefore, it wasn't availability that *originally* determined popularity, but rather the subject's popularity that drove manufacturers to offer so many WW2 German kits. Why are the soldiers and vehicles of an evil regime who lost the war so popular? There are probably many reasons.

I think it's mainly because the Germans had the most visually interesting vehicles and uniforms. Numbers and complexity of chassis types, variations, field modifications, and camouflage patterns (both factory and field applied) were overwhelming. The Germans were very innovative and created more specialized vehicles (often quite ill-advised and/or competing for scarce resources) than other nations. Uniforms, for lack of a better term, were "sexier" than those of the other combatants and used in bewildering numbers of types and varieties of camouflage (both official and unofficial). The modeler has almost limitless scope for creativity and artistic expression. You could spend an entire modeling career without building the same thing twice – and if you do build the same thing, you can give it a different finish each time! You can almost put any available weapon system on any available chassis! There are loads of unique and interesting vehicles—both factory and field-modified.

Germans also fought in both eastern and western Europe, Italy, and Africa in all terrain types and weather conditions. So no matter what theatre a modeler is invested in (except the Pacific), Germans were there.

There is also the "appeal" of bad guys and underdogs in popular culture. Corrupt characters and cultures fascinate us. Darth Vader and the Empire are more interesting than Luke Skywalker and the resistance. Confederate subjects are more popular than Union subjects. The counter to this argument is that WW2 Japanese subjects are rare. But the Pacific war was largely a sea and air war, and there are loads of Japanese ship and airplane models. The Pacific offers little for an armor modeler.

It may partly be a "self-feeding" popularity. Popularity and availability cannot be completely segregated. The subject is popular, so manufacturers make more kits. The Germans built countless vehicle variants on each chassis, so the manufacture can get a lot of mileage from a mold – a few new parts added to an existing kit creates a whole new kit resulting in even more German kits. All this means hobby shops will likely have far more German kits than kits of other nationalities, so it's much easier to find a German kit. If you want to build the latest, cutting-edge, models, German subjects are your best choice simply because there are more of them.

Still, despite all the potential reasons – variety, historical fascination, and availability - I feel visual interest is the primary one. Not only were German vehicles built to perform a function, it seems were built to look good doing it! Allied vehicles were simple, standardized, and functional (which is probably part of the reason they won the war). Of course, my belief that visual interest is the primary reason could be mainly because that is the reason I am interested in the subject matter. This may have biased my thinking.

The undeniable fact is that German subjects are popular.

BUILDING THE AFV CLUB SD.KFZ 251 KIT:

For the most part, the AFV Club can be built straight from the box per the instructions. Fit of some parts (such as twin engine hatches) can be fiddly, but with care and careful test-fitting, it can be put together with no major issues and little, if any, filler putty needed. My one area of concern are the road wheels and tracks. The tracks are rubber band type. These can be glued together with normal model cement, but they must be stretched over the drive sprocket, idler wheel, and road wheels. That, when combined with the thin, fragile axles, makes breakage a possibility. Let's look at how I chose to tackle this aspect of the AFV Club build:



Above: To further make it easier to stretch the tracks over the wheels, the rollers on the sprocket under where the tracks will go were shaved off.

By building the wheels (including the rear idler) as one unit, they can be removed from the vehicle for painting.



Top: To give extra strength and to ensure alignment, the kit road wheels are linked with molded circles and arcs. These are very tiny and very fragile and are almost impossible to remove from the sprue tree without breakage. As can be seen in the top photo, I broke one. No big deal. I painted the inside of all wheels black prior to assembly to ensure areas I would difficulty painting after assembly would be in a suitable deep shadow color.

Below: The wheels were assembled as one solid unit. The wheels, and the idler wheel were temporarily placed on the hull and the idler wheel fixed to the road wheels with a wedge of plastic in back and some epoxy putty between the back of the idler wheel and front face of the rear inner road wheel. This provides plenty of extra support to the idler wheel by fusing it with the other wheels. The stress of stretching the tracks into place will be spread among all the wheels instead of being borne by the idler wheel and it's fragile axle.

My Modeling Philosophy

All should enjoy the hobby how they please—there is room for all without belittling those with different interests. I like everything and build/paint whatever catches my eye: mostly figures, but also models now and then. I've built dozens of figures and one truck, one airplane, one ship, and (until now) one tank. My work is mostly historical, but includes Sci-Fi, Fantasy, Girlie, horror, and Hollywood.

I'm not a rivet counter—but I have nothing against you who are. I feel historical pieces should be true to history, but there is such a thing as “close-enough” and room for artistic license/interpretation. To me, the look, feel, and emotion of an event are at least as important as the historical details. But I admire those determined to model every detail with exacting accuracy. If that's your thing, cool. If you like alternative history/paper panzers, that's cool, too. You like pink panzers? Why not?

I prefer pieces that tell a story - those are the most interesting and are usually the pieces that attract the most viewers. But there is nothing wrong with a static stand-alone piece. I build for me -what I want on my schedule. I sometimes sell pieces, but I don't do commissions. That would be doing what someone else wants—which would sap my enjoyment of the hobby. I go to shows and enter competition, but I do not build to garner awards. If a piece wins a medal, fine, if it doesn't, fine. But if awards, recognition and commissions are how you enjoy the hobby, go for it.

I enjoy modeling. I also enjoy history. And I enjoy photographing my projects and creating how-to booklets and articles. Thus I get four hobbies in one (modeling, history, photography, writing)! Do you enjoy social networking? There are lots of modeling forums out there. It's not my thing, but I do lurk on various sites.

That is how I have fun in the hobby. Do what you enjoy (but don't hate on those who do it differently).

Multi-Genre Modeling

There are those who, without exception, stick to a particular genre of modeling (cars, armor, aircraft, ships, etc.). That's OK (unless they take an “elitist” approach and look down their noses at others). Don't put those blinders on - we have a lot to learn from each other.

If there's a model show in my area— car, ship, armor, railroad, or dollhouse—and I'm not busy, I'll check it out. Same with magazines in the bookstore or surfing the web. I almost always learn something I can apply to my primary area of interest or some tool that's extremely useful, some technique worth trying or some way of doing something I would never have dreamed of. Friends often ask how I did something or compliment me on my creativity. But few of my methods are my idea—by casting my net wide across the entire modeling spectrum I pull in all kind of useful things.

If you're exclusively an armor modeler, no problem! But check out the local model railroad shop or show for example—you WILL find things useful in the way of groundwork, weathering, tools, and so on. You'll also find plenty of cool “O” Gauge (1/48th) accessories. Several of them are included with the models shown in this book.



Above: To further make it easier to stretch the tracks over the wheels, the rollers on the sprocket under where the tracks will go were shaved off.

By building the wheels (including the rear idler) as one unit, they can be removed from the vehicle for painting.



Prior to gluing them into a loop, the tracks were painted and weathered. Care was taken not to get paint or pigment powders into the attachment points. See the chapter on Painting and Weathering for my method of painting the tracks and vehicle.



After all painting and weathering were complete, the tracks were stretched into place onto the wheels. Being rubber band tracks they have no sense of weight and lack the appropriate sag onto the road wheels.



The tracks were made to lay on top of the wheels by using small amounts of super glue. The overall result is nearly as good as link-and-length tracks (such as provided in the Tamiya kit) would be. If using link or length tracks on the AFV Club kit (see the chapter on available kits for options), then the tracks, drive sprocket, road wheels, and idlers can be built as one unit as I do on the Tamiya kit which we will see later in this chapter.



The only interior piece on the AFV Club kit I find sub-standard is the MP-40 submachinegun. This weapon is way too small, being only about 2/3 the size of the Tamiya piece. It would look like a toy even in the hands of a 28mm wargame figure. I normally replace the AFV Club MP-40 with Tamiya pieces. Note that the rifles AFV Club provides for the rifle racks and their machineguns are perfectly fine.

Assembling Resin Kits

care and be safe—and don't breathe the dust, it is bad for the lungs. Resin is very versatile and will accept just about any type of paint topcoat. Many paints, however, will not adhere well to bare resin, so use a good primer. Also be aware that some of the chemicals and solvents we use may attack the resin—if in doubt, do a test on an unneeded piece (the casting blocks are good for this). As with any modeling medium, use caution and be safe when working with tools and chemicals.

Parts do not come on parts trees—they are often attached to a large resin casting block that needs removed. Depending on size this can be done by sanding, with a hobby knife, or razor saw. You can also use a motor tool, but this creates LOTS of dust. Resin is also brittle and can break if handled roughly. Also, the casting block can sometimes cover detail that must be re-sculpted after the block is removed. If small details are nearby, it can be better to cut away the bulk of the casting block with a razor saw, leaving a small amount near the details and then carefully removing this with a hobby knife. Examine the part. In addition to the casting blocks, there may be mold seams lines that must be removed. There may also be tiny pinholes (or larger craters) made by air trapped in the mold. Usually a bit of filler will take care of these.

Don't store resin parts in lofts, direct sunlight, or above fireplaces or heating radiators. These areas can become very hot and the resin can warp. The same rule applies to the finished model. If a part is warped, it can often be straightened by applying a bit of heat (dunk it in hot water or use a hair-dryer). It will usually straighten itself out, returning to its original shape. If not, carefully reshape by hand and "fix" the new shape with a dunk in cold water.

Clean the parts before assembly and painting—glues and paints will not adhere well to the mold release agent.

Standard model glue is designed to weld plastic parts together by dissolving the plastic at the mating surface. It is absolutely worthless for resin which it will not dissolve. For resins, use either super glues or, if you need a strong joint (weight bearing/etc.) then use a two-part epoxy. Both of these glues will glue resin to resin, plastic, or metal.

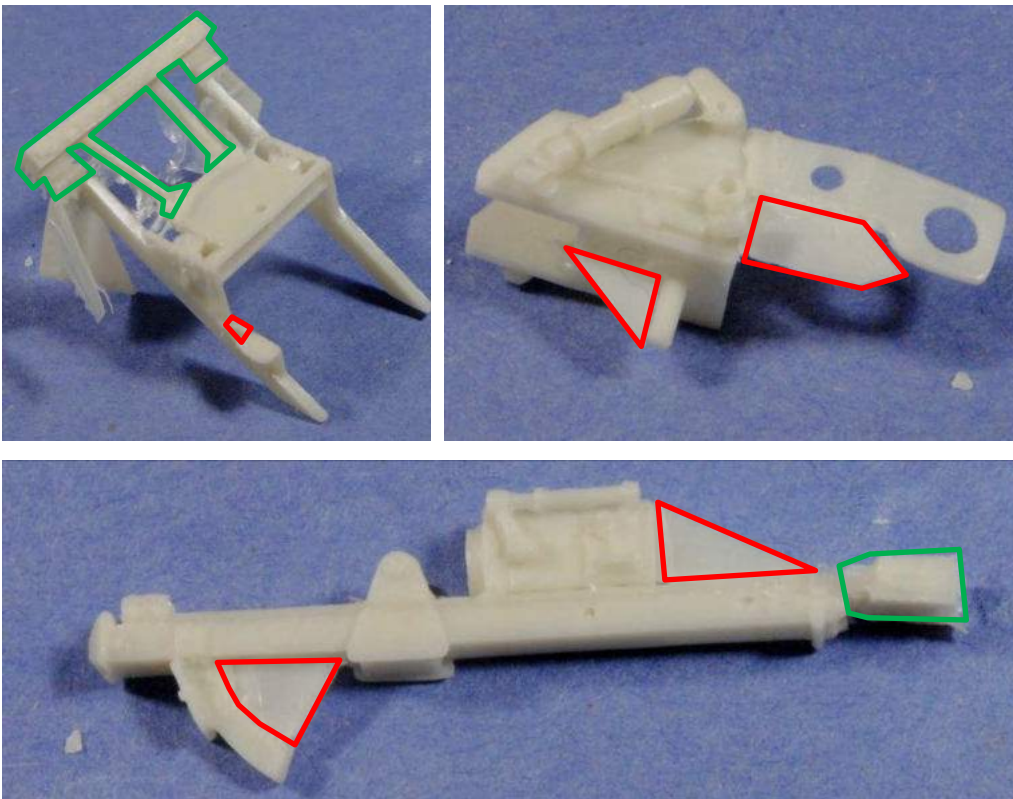
Resin is a great material to work with. While plastic kits are limited in quarter scale, if we add resin kits and conversion kits, there is actually a large amount of subject matter available. Let's look at example of building a resin kit. We'll use the excellent Sd.Kfz 251/22 conversion kit from Gasoline designed for use with Tamiya's 251 Ausf D (part #48082).



Above: Typical of resin kits there are some flash and mold pour blocks that must be removed—carefully as some parts are small and fragile. A couple parts displayed minor warping. A turned aluminum gun barrel is included. It looks a mess in this photo, but clean-up is not difficult. The kit is simple and well detailed, creating a nice replica of this variant. Instructions include a parts list with photos of each part. This eases clean-up by making it easy to tell what is "part" and what is excess resin. Construction is simple, so assembly instructions are only exploded drawings and photos—simple but sufficient. Resin casting allows deeper undercuts and more complex parts than injection molded plastic. Resin kits therefore often have far fewer parts than comparable plastic kits. They also usually offer outstanding detail. Clean-up is different than with plastic parts. With plastic, you must remove parts from trees, remove mold seam lines, and fill/remove ejector pin marks. With resin, there are mold pour blocks to remove. Mold seam lines may or may not be present, depending on whether the part was cast in a one, two, or multiple piece mold. Once the parts are cleaned up, construction proceeds pretty much as with any kit. The big difference is that plastic model cement will not work on resin parts—I use super glue for most parts. For heavy or load-bearing parts, I use two-part epoxy glue.



The instructions are seen in the top two photos. Note the exploded view drawing of the gun.



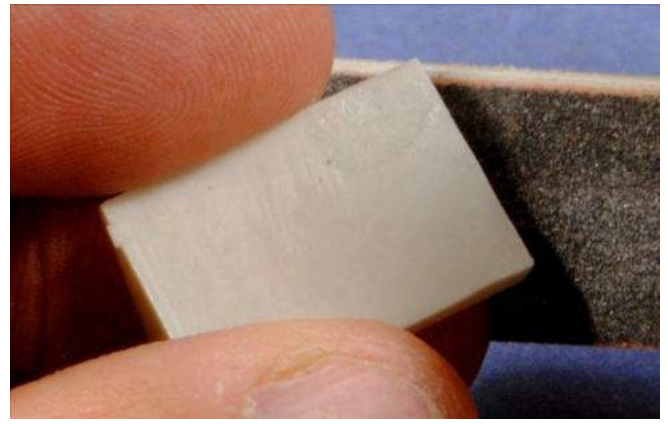
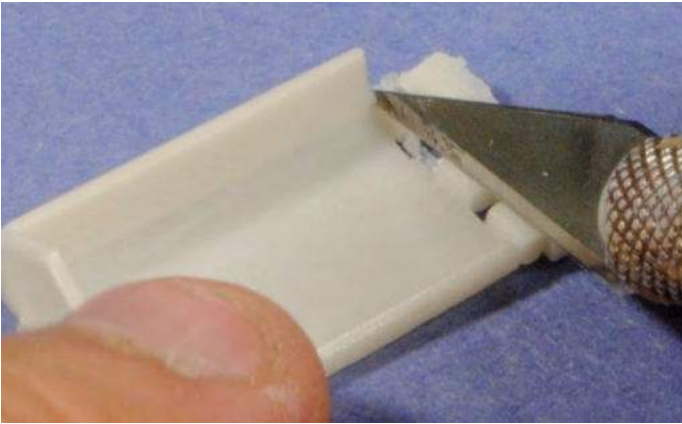
The three photos above illustrate the excess resin often left on parts.

The green-outlined areas show excess resin left over from the casting process. This is lumps of material remaining at the casting gates. Depending on the part, these can be small and easily removed or quite large and substantial.

The red-outlined areas show excess resin often found in voids or other places where mold pieces come together. These are usually quite thin (little more than flash) and easily removed. On this kit, the only one that offered a challenge is seen at bottom right. This piece, attached to the gun's recoil guard, was as thick as the guard itself and required careful removal to avoid breaking the part.



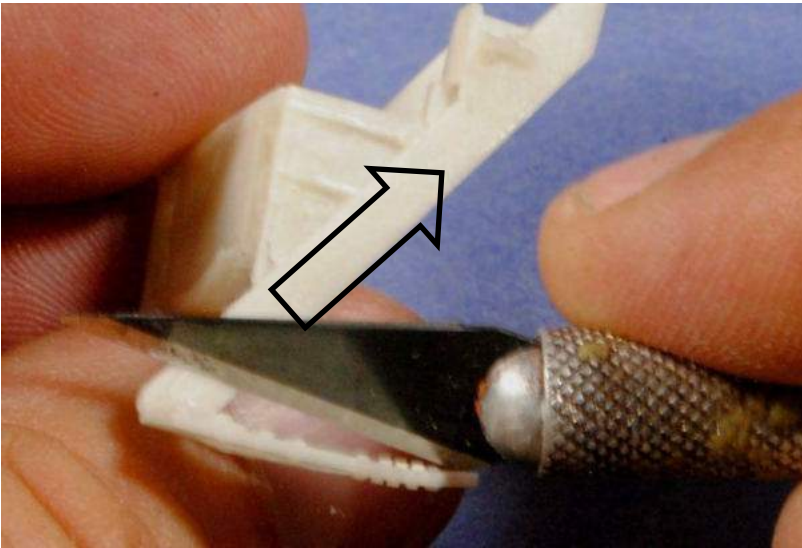
The muzzle brake was plugged with excess resin. A quick touch with a round cutting disk in my Dremel cleaned most of this out. A square needle file took care of any remaining. The result was a one-piece hollow muzzle brake.



*Top Left: The casting gates on the Gaso parts are small and thin. Scribing with a sharp hobby knife was sufficient to remove them. In fact, they usually snapped off by themselves. If the casting gates are too thick for a hobby knife, you can use a razor saw, such as this outstanding model by JLC (Photo from the Track48 web forum). With care, you could also use a cutting or sanding disk in a Dremel Motor Tool. **Just be careful not to breath the resin dust produced—it is an irritant.***

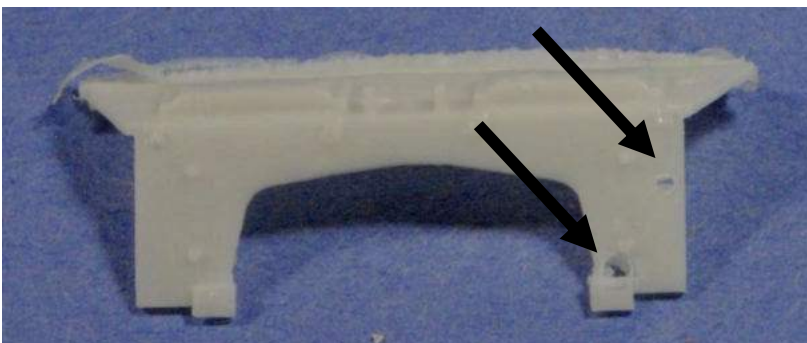
Above: After cutting off the casting gate, any remaining material or unevenness can be fixed with a sanding stick.

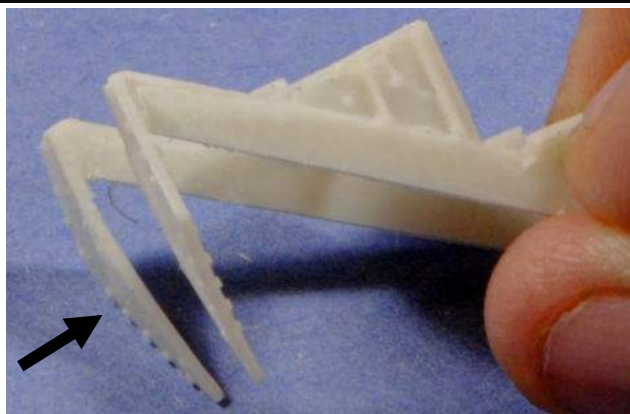
Left: To remove mold seam lines, I scrape backwards with a sharp hobby knife. Scraping backwards removes the material without running the risk of the blade biting into (and damaging) the soft resin.



Left: Resin parts sometimes have small (or large) pin holes caused by air trapped in the mold. The arrows point out two such holes. These can be filled in a variety of ways. Small holes can be quickly filled with gap-filling super glue.

Below Left: My favorite method is two-part epoxy putty. I prefer Magic Sculpt. These putties are water soluble—so a bit of putty in the hole, followed by a swipe with a damp finger (or brush) and the hole is filled. This smoothes the soft putty and no further sanding will be needed once cured. The final result is seen below. Later in the chapter we will take a more detailed look at Epoxy Putty and its uses.

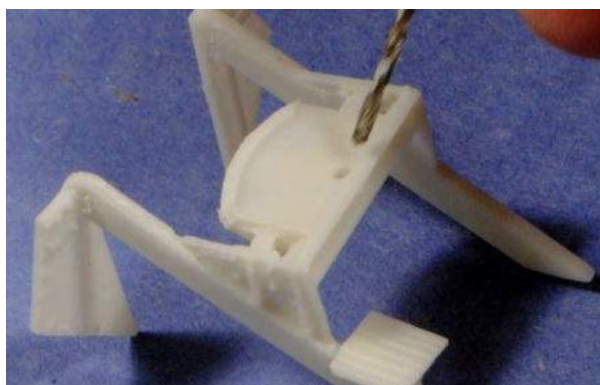
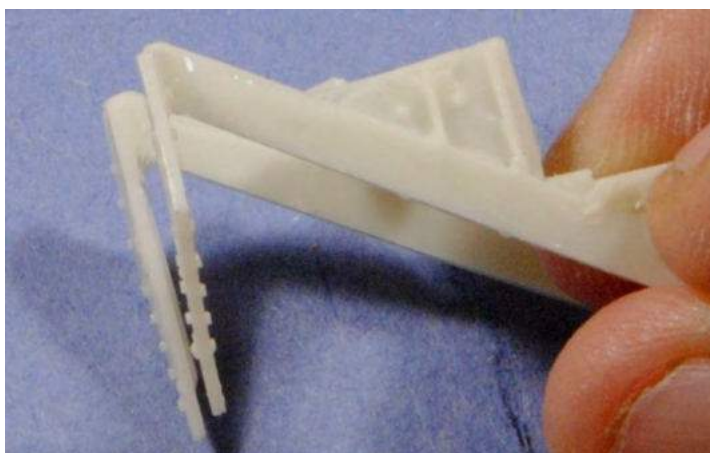




Above: A couple parts showed minor warping. The slightly curved pieces at the arrow should be straight. If the resin used is fairly flexible, minor warping like this can be corrected by simply gluing it in the correct position. However, I am afraid to bend thin resin parts for fear they will break. No worries—warping is simple to fix.

Above Right: A quick dunk in hot water softened the resin. Resin has a “memory”. After heating, the parts straightened themselves out. Had they not done so, it would have been easy to gently bend the heated resin into place and holding it until cool (or fixing it quickly with a dunk in cold water).

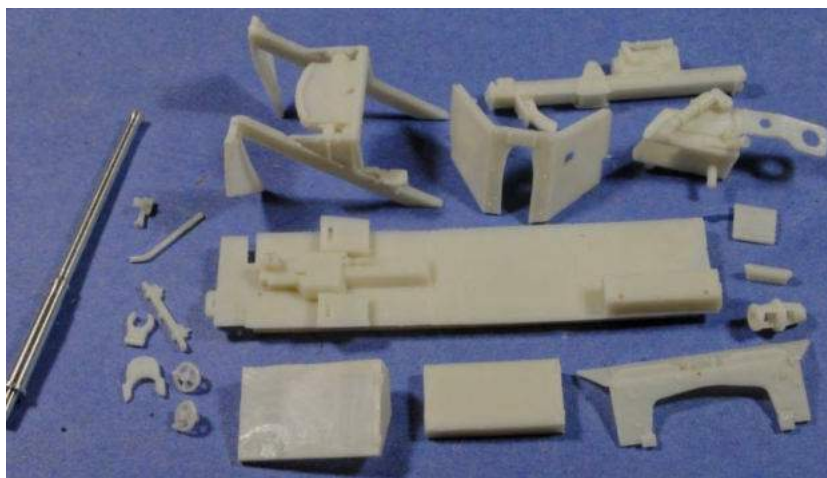
Right: Here we see the straightened part.

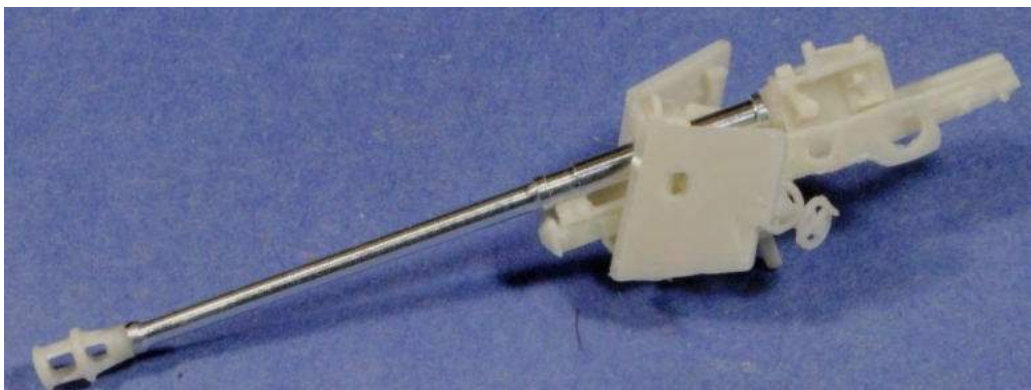


Left: Excess resin often clogs index holes in parts. If so, it is a simple matter to drill them out.

Below Left: With the parts cleaned and prepared, they are ready for assembly. This proceeds as normal, only using super glue instead of plastic model cement.

Below: Resin kits often have no index marks or holes to ensure positive fit/alignment of parts. In this case, I put the gun mount loosely in place and taped the upper hull temporarily in place. Then, I adjusted the mount until it was sitting in the proper place. Holding it in place with a finger, I applied a bit of super glue with a dental tool. Once this had set, I removed the upper hull and finished gluing the gun mount in position. A test fit then verified that everything lined-up properly.





The assembled gun ready for painting and installation in the model. The model was built in sub-assemblies as seen at the bottom of page 6. More detail on this model can be found in the Chapter on the 251/22.

Other examples of building resin kits can be found in several of the variant chapters.

Other Detailing

We have already seen several examples of adding basic details to the Tamiya kit using styrene bits and pieces. These enhancements were added to nearly all my Tamiya vehicles (unless, in a particular instance, they would not be visible). We have also seen how easy it is to open the armored view port covers. There are other things that can be done as. These include both commercial and handmade changes. Companies make aftermarket detail sets or other replacement parts. We looked at several examples in the chapter on Kits. While I chose not to use any of these with my vehicles, that is not because the products are inferior. Additional homemade detail changes include opening engine access hatches or stowage lockers. The Bandai kit includes an engine which can be fitted into any of the vehicles with some work. This engine is basic and needs some detailing.

Most German armored vehicles had radios and antennas. While unique “specialist” antennas will be discussed in the appropriate variant chapters, we will look at common types here.

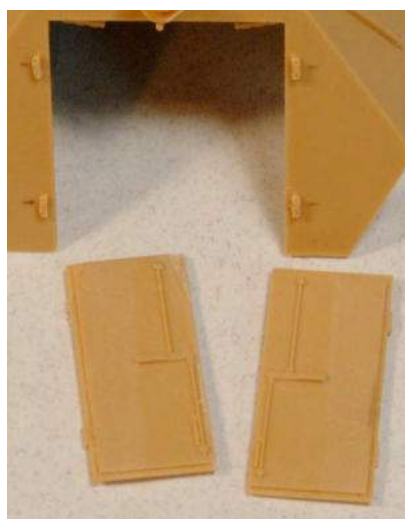
Several of my 251 vignettes and dioramas include other models. Most of these will be discussed in the appropriate chapter. However, as I built more than one Panther—and the techniques used for it are useful on various other armor models—I chose to include basics on it here.

Finally, we can include minor battle damage under the heading of basic detailing.

Detailing (as well as conversion and scratch-building) can be done using a variety of materials including styrene, resin, photo-etched metal, card-stock, etc.. Just take care to use the proper glue to bond each material.

None of this is hard. We will look at some examples on the following pages. Other examples can be found throughout the chapters on individual variants.

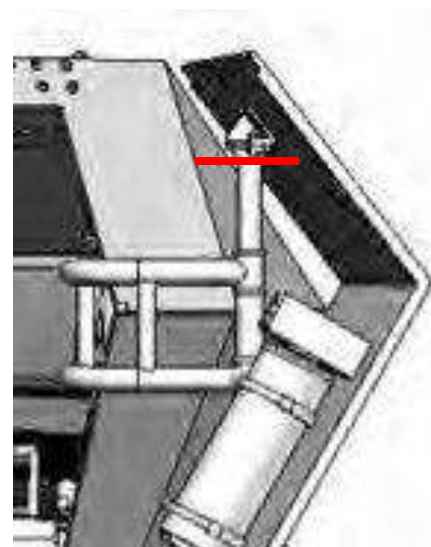
OPENING DOORS AND HATCHES

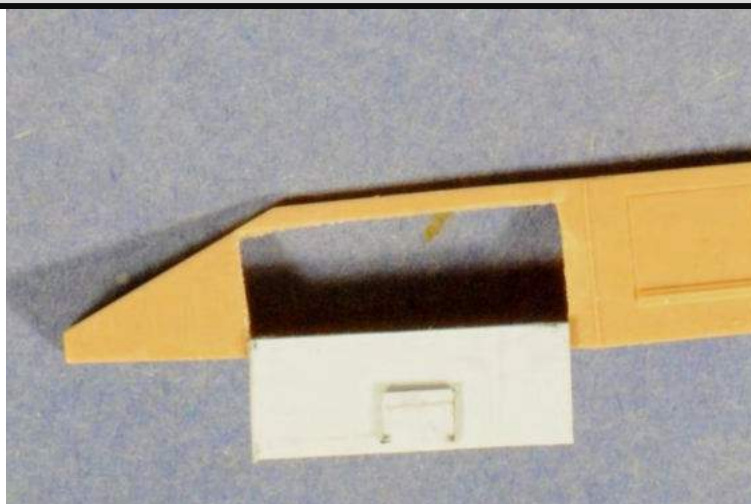


The Tamiya rear doors are molded as a single piece with the hinges attached. Still, the doors can be opened with a small amount of surgery. Half of the hinges were cut from the doors and glued onto the rear hull. Using a new, sharp hobby knife, the doors were cut in half at the molded-in dividing line. One or both doors can be glued in the open position.

The AFV Club kit has separate doors, but the hinges are molded in the closed position.

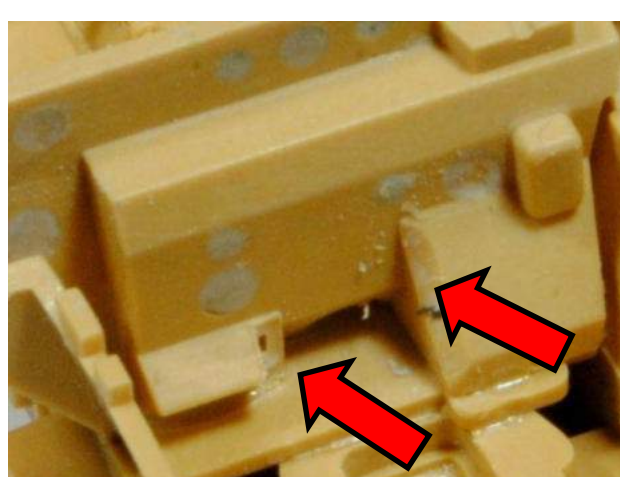
Opening these doors simply requires the hinge attachment points to the doors to be cut from the hinges and glued in place on the door. The doors and hinges can then be glued in the desired position. The CAD drawing (from Track 48) illustrates this. Each hinge would have to be cut at its four attachment points to the halftrack (top and bottom on both door and hull) at the part indicated by the red line. These parts should be fixed to the hull/door, allowing the hinge and the door to pivot.



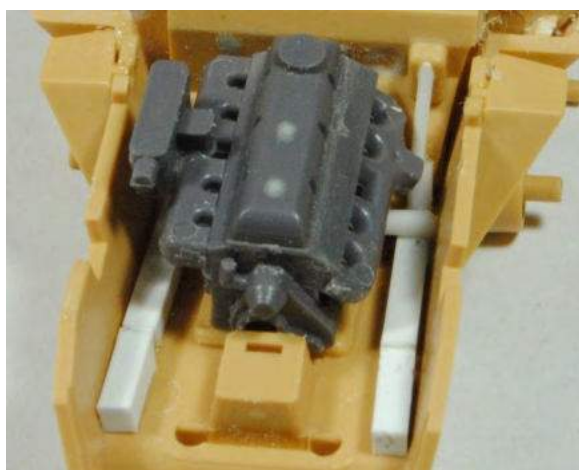


Above left: The molded-on hatches on the Tamiya kit have been cut away and new hatch covers made of sheet plastic. It is possible, but difficult, to remove the hatches and save both the upper hull and the hatches. You can really only do this if you have an extra donor upper hull—save the hatches from one and the hull from the other. Above right: Like the engine hatch covers, one of the side stowage lockers was cut open and a new locker door made from sheet plastic and glued in place.

MODELING THE ENGINE COMPARTMENT



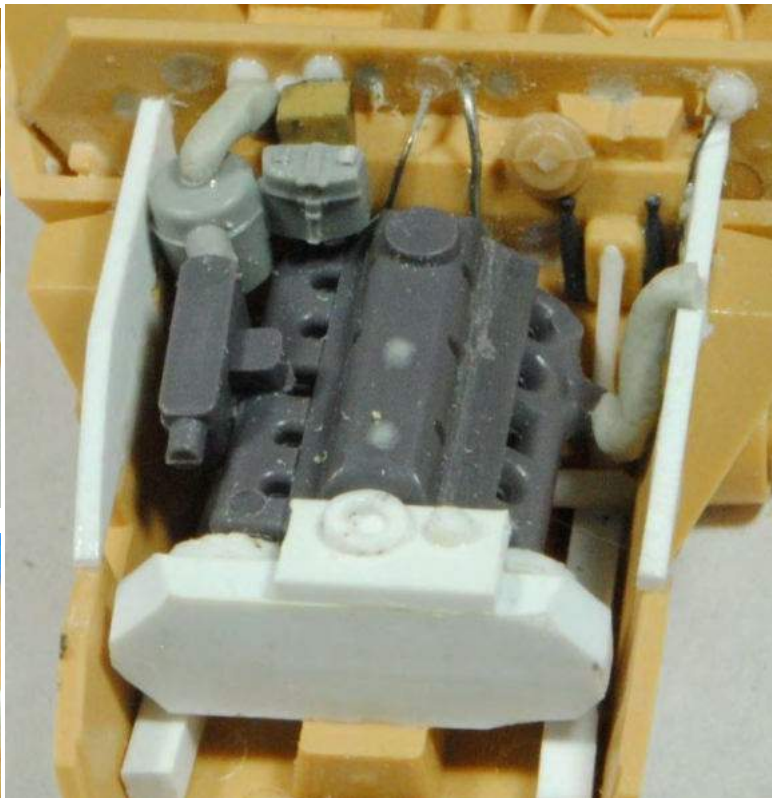
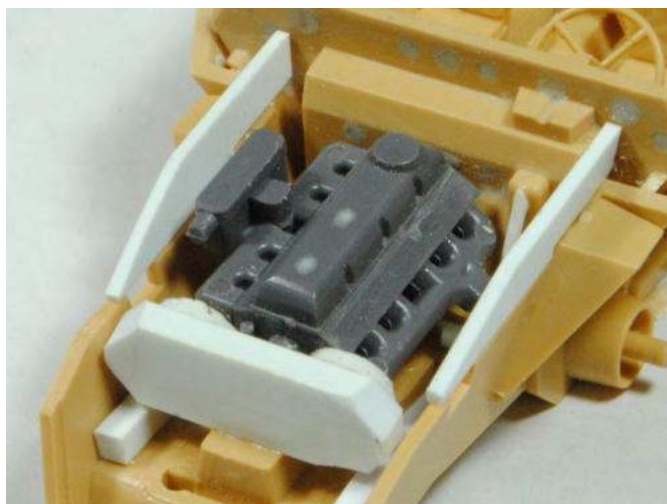
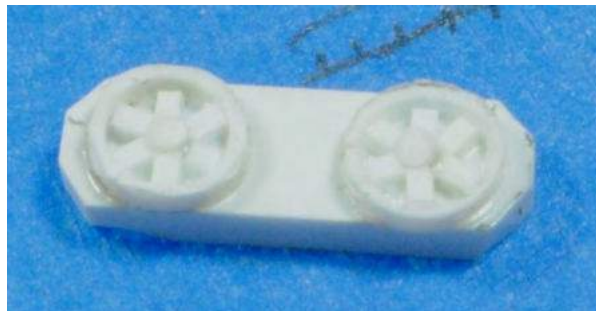
The engine from the Bandai kit forms the basis of the vehicle engine. It was built straight from the box as a starting point. In order to fit in the Tamiya hull, the bottom front of the engine had to be sanded on a slope and the rear transmission hump cut off (red arrows). The Tamiya hull also had to be slightly trimmed at the arrows for the engine to properly fit. Note also that all the ejector pin marks were filled with epoxy putty.



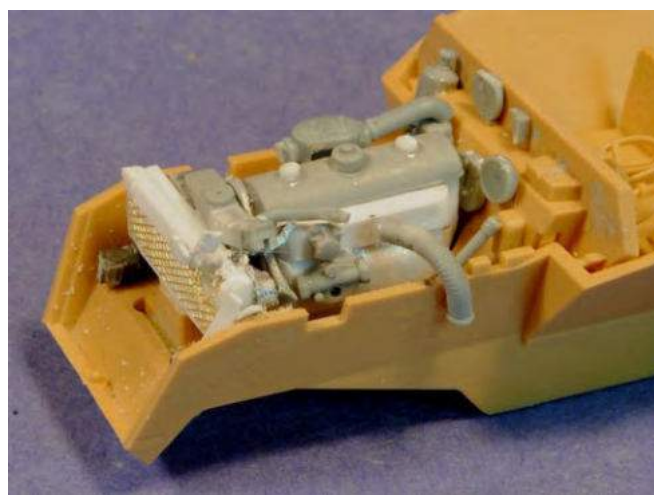
Left: The engine was fitted in place. To ensure clearance with the top of the hull, test fit the pieces every step of the way. Using bits of plastic, the vehicle frame and steering linkage were put in place. We only have to add parts that will be visible through the open engine hatches.

Opposite Top Left: If the hull top were simply placed on the lower hull, the viewer would be able to see the ground through the sides of the hull. Therefore, the lower hull sides need extended. The extensions were made with lengths of plastic strip trimmed to fit the hull sides.

Opposite Top Right: The visible portion of the radiators was cut from a thick strip of plastic bar stock. The fan shrouds are slices of plastic tubing and the fans are bits of plastic strip with a plastic rod slice hub.



The hull sides and radiator assembly in place. The top of the radiator assembly was added from a sheet of plastic and detailed with other bits of plastic. Details were added using gizmology—pieces of styrene and bits from the scrap box were added to replicate the basic forms and shapes of various engine components. Hoses were fashioned from rolled-out “sausages” of epoxy putty. Conduits and wiring were made from metal wire.



Don't have a Bandai engine? No worries. For the damaged engine in my knocked-out 251/17, I started with basic shapes made from styrene (far left). This was then detailed using the same methods as seen above. As part of the front of the radiator would be visible through the damaged armor body, it was detailed using brass mesh and styrene strip.

ASSEMBLING AND DETAILING TAMIYA'S 1/48 PANTHER G TANK



Above: Fine etched-brass screen was cut to shape and placed over the engine ventilation ducts. Note the inside of the hull is hollow and is quite visible through these openings. Either block them off or, as I did, simply paint the inside of the hull black so nothing is visible through the screening and grates.

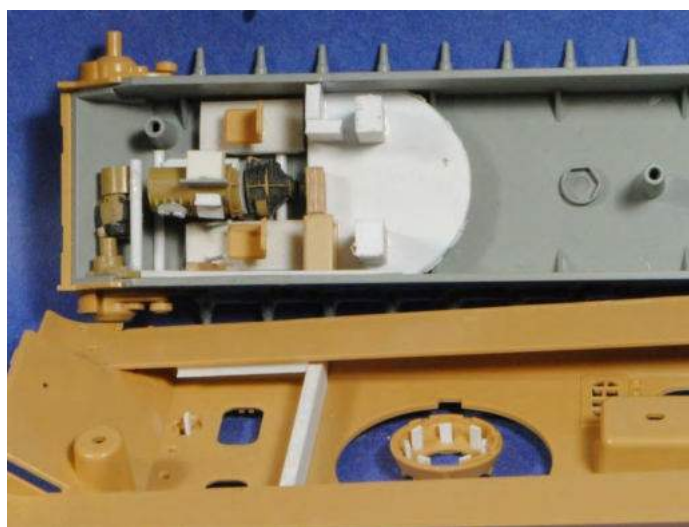
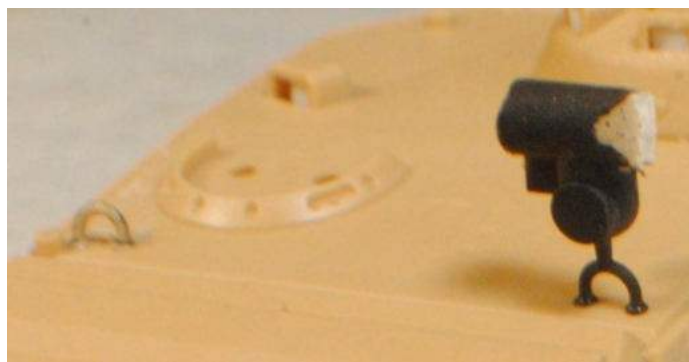
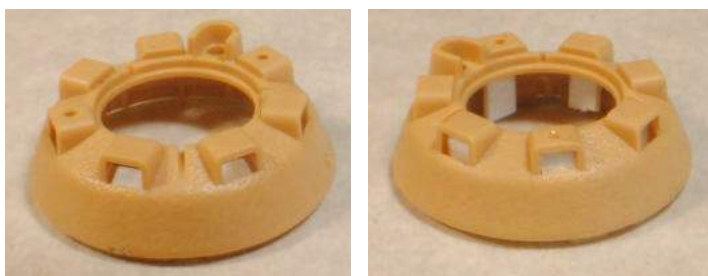
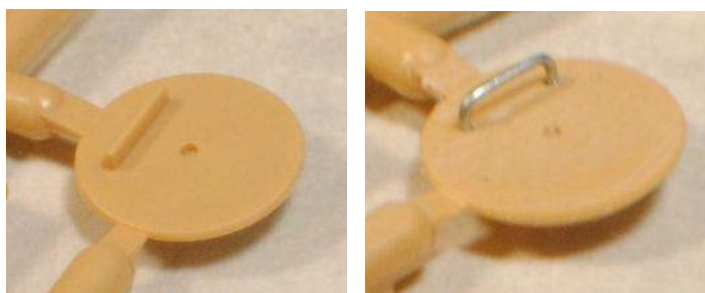
Top Right: Grab handles on the hatches are simply plastic nubs. These were snipped off and new handles fashioned from wire. To make the handles, take a length of wire and bend it to shape around the end of a pair of needle-nosed pliers. Drill two matching-sized holes in the plastic and superglue the handle in place. It's best to do this as one of the last steps in assembly to avoid handling—and thus crushing with fat fingers—the handles.

Right, 2nd from top: Periscopes are conspicuously missing from the kit—only the hollow armor covers are molded in place. Periscopes were cut from a suitably-sized piece of plastic strip and glued in place inside the armored covers.

Right, 3rd from top: A tip for working with small parts. The lifting rings on the turret are tiny! This makes them hard to handle and easy to lose. The solution! Cut off a piece of the sprue tree with the part to serve as a handle! This allows you a firm hold on the part and makes it easy to precisely place the piece. One the glue has set, simply snip off the piece of sprue tree and sand the part smooth. In this photo, the ring on the left side of the picture is complete. The one on the right still has the bit of sprue tree attached. This tip can be used to install many small parts.

Bottom Right: The hatches on the Tamiya kit can be posed open, however there is no interior included. If crew members are positioned in the open hatches, this is no big deal—simply paint the interior black and nothing will be visible. However, if a hatch is to be open with no obstruction, the portion of the interior visible through that hatch should be modeled—at least in basic form. Only enough detail to be convincing in the dark interior is needed. In this instance, the driver's hatch was to be open so the driver's compartment was modeled. This was made from various scraps using "gizmology." Inside the upper hull, only a bulkhead and the side of an ammo storage bin adjacent to the driver were needed. Periscopes were also added. My tank represented one made during the timeframe the interiors were left in red-brown primer. This further helps by keeping the interior darker than an ivory color would be.

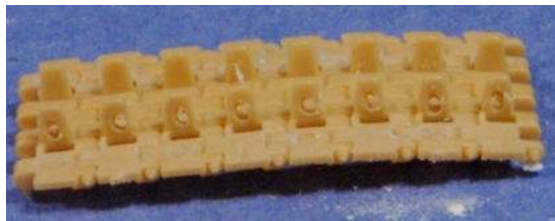
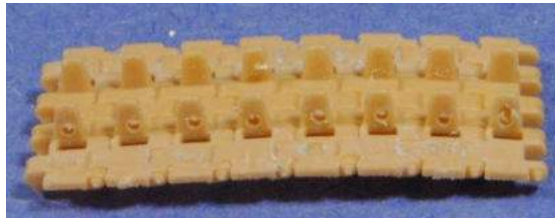
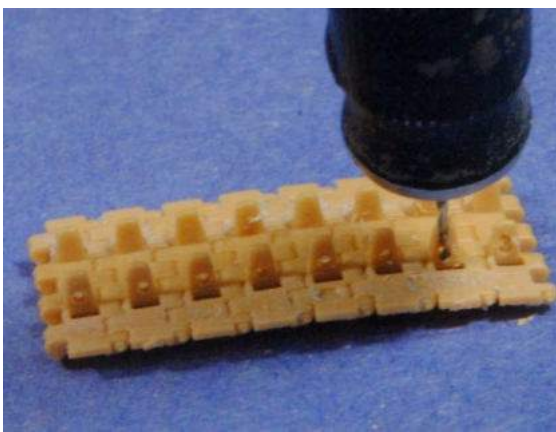
Some of my halftracks include other kits. In two instances (251/3 and 251/20) these are Panther G Tanks. While Tamiya's kit is very good (see sidebar next page), it can benefit from additional detailing. The enhancements made to this vehicle include some simple detailing that can easily be applied to many other model kits, and, since I made more than one, I include the information here. Other kits are discussed in the appropriate variant chapter.





After painting in suitably dark colors, the little bit of interior modeled will look perfectly convincing through the small open hatch.

Below: Note that if hatches are open, then interior hatch detail must be added. In this instances, a crewman will be in the hatch, so only rudimentary detail made from styrene bits was needed.



The Panther tracks should have hollow guide horns, but the kit parts are molded solid. In this small size, that will not be an issue for most modelers. If you do decide you need to rectify this flaw, aftermarket tracks are available. I drilled a hole in each visible link. This results in a round hole only (top right). While that may be good enough in this scale, it is easy to do better. Once the drill goes through the horn, pull the bit up at a 45 degree angle while still turning the drill (I used a small bit in a pin vise). This results in the oval holes. The visual difference between the round and oval holes can be seen above.



Left: To create bullet and shell splinter damage to sheet metal areas (such as these Panther rear stowage bins), I thin the plastic from the inside with a cutting bit in my Dremel Motor Tool. I use a very slow speed to avoid melting the plastic. Once I have the plastic paper thin, I gouge it from the outside with the tip of a hobby knife to create realistic holes.

Bottom: To bend fenders, DO NOT heat and bend them—I think that looks like just what it is: melted plastic. Instead, like above, I thin the plastic from the inside with a cutting bit in my Dremel Motor tool and then bend the plastic with a pair of pliers. That was done with the front left fender. A missing fender (common on Sd.Kfz 251s) the fender can just be cut away. As we see on this Panther fender sometimes the remains of broken mounting bracket might be present. This one was fashioned from a strip of plastic.



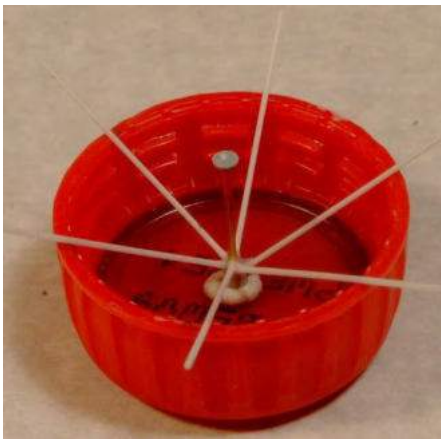
Sheet metal areas and fenders were often dented. Minor dents can simply be cared into the plastic with a hobby knife or a file. To smooth the dent and blend it in with its surroundings, I go over the area with a bit of fine steel wool.



The best advice I can give for the Panther kit is to follow the instructions. Make sure the upper and lower hull are fitted together BEFORE gluing the machine gun ball mount to the glacis plate or attaching the engine access hatch—these parts cover the screws that attach the upper hull to the diecast lower hull. The tracks, if you follow the instructions, are a snap to put together—note that inner surfaces were pre-painted in black just as I did for the halftracks. As seen in this photo, the tank was finished in five sub-assemblies for painting: tracks, turret, hull, and cable. For the cable, the kit supplies the ends and a length of nylon thread. I replaced the thread with a length of braided steel leader line from the fishing tackle section of the local department store.

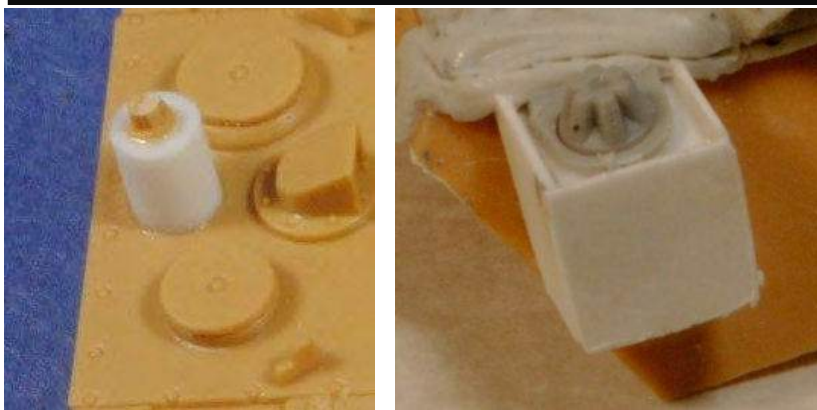
ANTENNAS

Most German armored vehicles were fitted with radios, which means they had one or more antennas. Most of these were simple tapered rod antennas. While you can buy aftermarket examples, these are easily made with stretched sprue of lengths of styrene rod. Most of these were either 1.4 or 2 meters depending on the radio set/frequency (most Sd.Kfz 251 antenna were 1.4 meters long). Some vehicles used specialist antenna such as frame antennas or large telescoping antennas. I used both these in this project, and details for these type antenna can be found in the chapter on the 251/6 and 251/3 respectively. Also common on command vehicles were star antenna—typically 2 meters. As I used several of these in the project, we look at making them here. The basic antenna can be made of plastic or metal rod. To make the star itself, I use a simple coke bottle cap as shown below.



This star antenna was made to fit on top of the kurbelmast. It is a bit larger and more complex than a normal star antenna, but I make both using the same methods. The “stem” was made of a piece of wire with a suitable plastic bit on top and bottom. This piece is not present on the standard antenna. This was temporarily tacked into the bottom of a bottlecap using a bit of Blu-Tack.

Why a bottle cap? The rim of the cap has gaps in the threads which allowed me to accurately measure the distance between the antenna rods and, by resting the rods on the rim, in ensured an even angle on each rod. Once the rods were dry, the rim served as a measuring device—I simply snipped off each rod at the outside edge of the rim and this ensured all were the exact same length! Think out the box—anything can be a tool. The standard, smaller, star antenna rods were snipped off at the inner edge of the rim. This results in an antenna of the same design, only a bit smaller.



Above: Antenna mounts for standard antenna are normally included in the kit. For other antennas, such as the star, mounts can easily be scratch-built using appropriate plastic bits. Right: On the rear deck and turret of this Panther, we see a 2 meter star antenna, a 1.4 meter rod, and a 2 meter rod. The rod antenna are styrene rod.



TARPS AND COVERS

The Sd.Kfz 251 carried four tarp bows that fit across the fighting compartment and supported a foul weather cover. In photos, this cover is usually absent or stowed, but often times we see it in place or covering only a portion of the fighting compartment.

There are options for modeling this cover. Tarps, both in place and rolled/stowed are available from the aftermarket. They can also be made using various methods. My preferred method is to use a two-part epoxy putty such as Magic Sculpt. We've already seen this putty is effective at filling gaps. It can also be used to good effect creating various items of stowage and for converting figures. We will see examples of all this later in this chapter and in the chapter on building/painting figures. Here, we will see how it can be used to model tarps and covers.



An unarmored Ausf A with the foul weather cover loosely in place.



Left: I make my tarps from epoxy putty. There are various brands, but I prefer Magic Sculpt. Take the same-sized blobs each of resin and hardener and mix them thoroughly together. To roll it into a sheet, I place the putty on a sheet of glass, use plenty of talc to avoid sticking, and roll it out with a dowel rod. Do NOT use Vaseline to prevent sticking as some suggest. While it will work, it will also make a gooey mess. Talcum powder works better and is easy to clean up. After about 30-45 minutes it has hardened enough to hold its shape and be easy enough to work with without floppy all over the place, but is still flexible enough to work.



Below: I make tarp hoops from plastic strip. If the hoops will not be visible under the tarp, I use strong, substantial relatively thick strip. If they will be visible, I use much thinner strip of even thin strips of brass. In this case, I making a cover loosely applied over the entire fighting compartment. To ensure the hoops were of a uniform height and shape, I taped an ink pen along the center line of the upper hull and formed the hoops over this. Once the glue holding the hoops had dried, the tarp was put in place, but was left loose at the front and rear, and a tear was added over the front hoop. I temporarily placed the upper hull on the lower hull to see how much of the interior I needed to model. It turned out to be very little, just the rear doors, and fire extinguisher. This was built and painted as normal. Invisible portions were not built and very simply painted black (deep shadow). This tarp was made for my 251/1 with Holzgasantrieb (Wood Gas Drive).



An important thing to remember when scratch-building or sculpting is that, unless we are making a working model, there is no need to make something as it is actually made—it only has to look like the subject. In this case, we don't have to make a draped tarp, only something that looks like a draped tarp. There is also no need to recreate something all in one step, it can be broken down.

Above Left: Here, two plastic bows have been put in place and a rolled-out sheet of putty has been fitted over the rear end of the open-topped fighting compartment. This is then left to cure. That was step 1 in making the tarp on my 251/3.

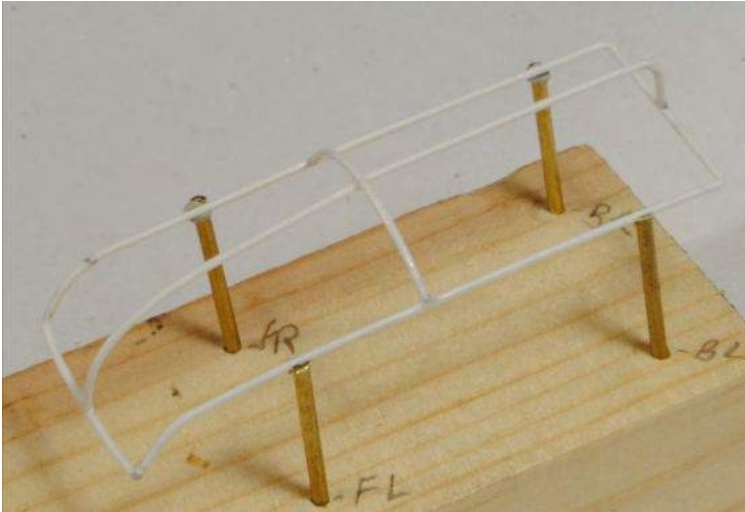


In step 2, above right, the basic form of the tarp is finished. The rolled portion of tarp was not made from rolled-out putty. It was made from a "sausage" of putty put in place and then shaped/detailed with my toothpick sculpting tool (seen on page 6). In the final step, Left, some additional bits of putty have been added to the edges of the original sheet, smoothed into the first layer, and wrinkles/creases added with my toothpick sculpting tool. Using other small bits of putty, loose tie-down tabs have also been added. For a more in-depth look at my sculpting methods, refer to the chapter on Building and Painting Figures.

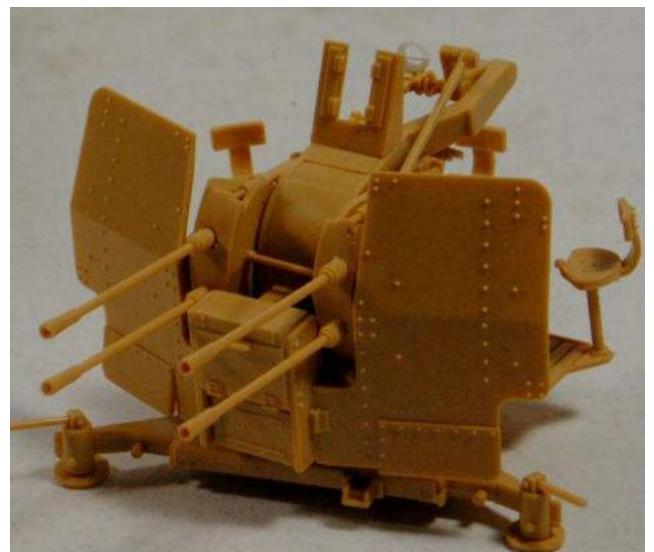
This tarp, seen on my 251/17, was made from a single rolled-out sheet of putty attached to two plastic hoops. Once put in place and shaped (the forward end loosely folded back a couple times over the center portion), details, wrinkles were teased into the still soft putty with my toothpick tool and a damp paintbrush. Finally, before the putty was fully cured, seams were gently pressed into the putty using a hobby knife. Note the patch—this was made from a bit of left over putty.



At Left we see a final example of both antennas and tarps, in this instance from my Sd.Kfz 251/6. Using the homemade jig seen on page 6, I assembled the frame antenna from thin plastic rod. This results in a very flimsy construct. However, that is not as issue as I planned to cover a large part of the antenna with a tarp—folded back enough for the viewer to see the form of the antenna. The tarp was made from a rolled-out sheet of putty, carefully super glued in a couple key spots to the antenna and then carefully shaped over the frame using my toothpick tool and a damp paintbrush. The final result, after painting but before attachment to the vehicle, is seen at left.



GUN BARRELS AND GUN SIGHTS:



Above Right: A final detailing example, this time my build of Tamiya's 1/48 scale Flakvierling for my Sd.Kfz 251/22 diorama. One very simple, but HUGE improvement is simply using a small drill in a pin vise to hollow out the ends of the barrels, which are molded solid. Note I also replaced the solid gunsight with a hollow sight made from a ring of plastic (cut from a styrene tube) with a plastic rod for the cross piece. Little improvements such as this are very easy, yet add immensely to the appearance of the finished model.

Stowage

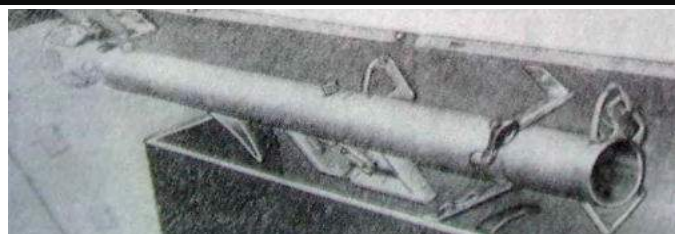
Look at photos of WWII era vehicles. You find many that are uncluttered, but you will also those that look like rolling flea markets. Crews lived in their vehicles, and, since they were vehicle-mounted, could carry more stuff. We find a wide range of official, unofficial, issued, pilfered, enemy, and civilian gear loaded on vehicles. There were load plans for packing vehicles including the Sd.Kfz 251. Photos from the appropriate German manuals clearly show the extra vehicle gear placed in the appropriate brackets, crew weapons in the provided weapon racks, and their packs in the stowage bins behind the rear seats (or, for the Ausf A and B, on the shelf behind the seats forming improvised seat backs). While these plans were likely adhered to for inspections and perhaps even at the start of a campaign, they would quickly be “overtaken by events” and time wore on.

My models run the gamut. Some—such as my Sd.Kfz 251/11 are relatively uncluttered and more or less follow the load plan. Some, such as my Sd.Kfz 251/6 and 251/4 hold a large amount of clutter and gear. Still others, such as my 251/7 which has been hastily abandoned, have gear scattered and in disarray. Most certainly looked lived-in.

As we saw in the chapter on available kits, the Tamiya kits come with some extra gear. Tamiya also make accessory sets (such as their “Jerry Can Set” which contains stowage items. After market sets—both for general gear and those specifically designed for the 251—also are available. Finally, we can make our own stowage fairly easily. I used all these sources.

The sequence you use to build, paint, and attach your stowage will depend largely on the model, the stowage, and your personal preference. As we have seen, I build and paint the vehicle interior prior to gluing the hull halves. Clearly, stowage must also be in place. Most of this I attach during construction, however in some instances it may be better to leave the stowage part separate until the interior is painted. I follow that process in this small scale simply because I believe it easier than trying to attach the small parts after painting. Doing so without damage would be difficult. For exterior items, which are easier to place after painting, I often leave stowage items separate until after painting. The choice is yours. We will explore how to paint the items—both before and after assembly—in the chapter on Painting and Weathering.

Beware—your stowage must not only be realistic, it must be stowed in a believable fashion. Items don’t magically stick to the sides of vehicles—they must be somehow secured.



Above: This photo shows how the Panzerschrek was mounted above the stowage bin on left rear hull interior. The photo below shows how I replicated this on the model. German instructions also state that for carrying the Panzerfaust, the packing crate containing the rockets should take the place of the front right seat. I guess the troops were supposed to sit on top of the box?



The interior of my 251/2. The mortar bits for the /2 (bipod, baseplate) are scratch-built. Ammunition is a mix of scratch and parts from Plus Model's "German Medical and Ammunition Containers" set. Stowage is a mix of Tamiya and scratch-built. A couple of the rifles are AFV Club. Much of the stowage I use in my vehicles is Black Dog.

As seen here, for interior stowage I usually add it prior to painting. It would be difficult to add all these small pieces after painting and still manage to get the same fit without smearing glue and damaging paintwork. Exterior stowage (being less, larger pieces, and easier access) is normally left separate until after painting.



Here is the exterior stowage for the same 251/2. It is painted prior to attachment to the vehicle. In some cases, the stowage items themselves can be assembled in sub-assemblies. In this example, the spare track links and bucket are one piece.

Once these are fitted to the vehicle, tie downs will be added from fine wire or ship model rigging. In the photo below left, these gas cans and oil can have been tied by their handles to the handrail running along the inside of the hull top. It is important that our stowage be realistically attached and not just magically stuck to the vehicle.



Above and at right we see another example of stowage from many sources. I added hull-side stowage bins to my 251/10 based on a period photo. These bins are loaded with gear. During construction, extensive test-fitting was done to find the base way to fit all the various bits into the bins. All the Jerry Cans are from Tamiya. Some of the other stowage is shown above. The sources are:

- The two bundles of gear and equipment are from Black Dog's "German Infantry Equipment Set"
- The sack, tent roll, and folded tarp are from the Tamiya "Jerry Can" set.

The crate is from Plus Models "German Ammunition and Medical Containers" set.

-The lantern is a model railroad item.



MAKING YOUR OWN STOWAGE

Right: Packs, individual or in groups, were made from Magic Sculpt epoxy putty. Top: It was rolled-out, cut to shape, and the individual packs pressed into the putty. Middle: Using my toothpick tool, details were impressed into the putty to create the pack flaps and any wrinkles. Bottom: The packs were put in place on the vehicles, and the hand hold straps on top were bits of pewter foil (probably Duro as it cures flexible and will break with handling). Most other infantry gear is from Tamiya. In the top left corner of the photo, under a helmet, canteen, and mess kit is an assault pack (from Black Dog) a rolled greatcoat made from a "sausage" of epoxy putty, detailed with my toothpick, has been wrapped around the top and sides of it.



Below: An Enigma (encryption/decryption) machine was made from plastic bits. A block of styrene bar stock forms the basis of the machine. A wedge of plastic and a couple random bits form the workings. The lid is a simple tray. While there is little detail present, the entire piece is quite small. Details were simply painted on before the device was glued in place.



In this example, the blanket roll is an old part from the scrap box. The bags were sculpted in place. A blob of Magic Sculpt was pressed into the stowage bin and shaped with my toothpick, a putty spoon, and a damp paintbrush.



The wadded-up zeltbahn (poncho) thrown on the rifle rack is rolled-out Magic Sculpt wadded up and thrown on the rifle rack.



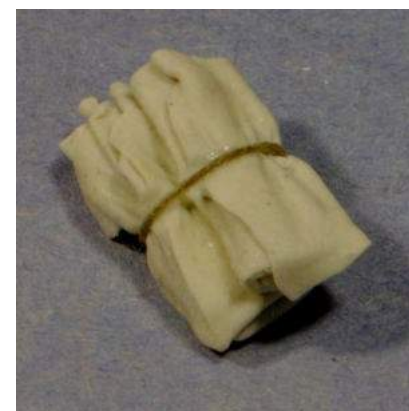
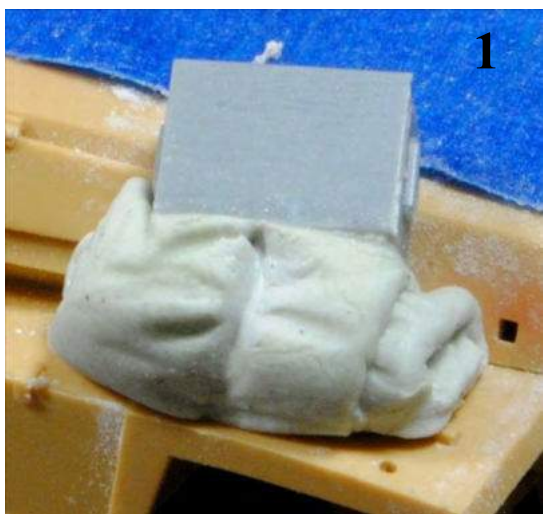
Shown on this page, there are several ways to make folded and stowed tarps, blanket rolls etc. These examples are from my 1/48th Sd.Kfz 250/10, but the process was the same with my 251s. I like to model the stowage right on the vehicle, but I want it to be removable for painting. Therefore, I use talcum powder on both putty and model so prevent sticking. There are also other ways as we will see.

1: One method is to just a wad of putty and shape it with fingers and other putty tools. Details are added with my toothpick and the whole is smoothed with damp paintbrush. Note an indent for the tie down has been added and a box has been pressed into the putty to give it a sense of weight.

2. Some effects (a lot of loose ends and edges, for example) are achieved with rolled-out putty folded and shaped as needed. Further wrinkles can be sculpted into the soft putty. Again, an indent for tie downs is added.

3: The methods can be combined. Rolled-out putty can be rolled to fashion the ends. These can be put in place (as shown) and then a blob of putty added between them and shaded as needed.

For tie downs, rather than try to wrap a line around the part and tie a tiny knot, I do it in steps. A length of appropriate material (in this case model ship rigging) is glued in place and then a separate knot made, cut to length, and glued on the rope.





An in-progress shot of the 250/10. All three tarps made on the previous page are visible on the various fenders. Other stowage bits are Tamiya and Black Dog. The bags hanging on the hull sides are simply blobs of putty with wrinkles and seams added with my toothpick. The tarp over the two tarp bows is a single piece of rolled-out Magic Sculpt. It was glued on the back right corner, and then gradually teased into shape with my toothpick, a rubber cone paint shaper, and a damp paintbrush.



Crates and boxes are fairly easy to make. Unless you need an open box, a simple block of styrene the appropriate size and shape can serve as a basis. Other styrene bits can add bracing boards or other details. An open box can be made just a real one, only using lengths of styrene strip instead of boards.

Woodgrain can be added as shown in the photo at right. Drag, do not roll) a Dremel sanding disk lengthwise along the plastic "board". This will scratch and scribe fine uneven lines into the surface, making a good representation of woodgrain. The coarseness of the sanding drum will determine how rough the grain is.



Even making large heaps of stowage (ala many aftermarket stowage sets) is not difficult. Here we see the process I used with the Kubelwagen in my 251/6 diorama. 1: I used a sheet of aluminum foil as a barrier so the putty/glue wouldn't fix the part to the model. 2: Then I gradually started building the stowage blob. Here, a gas can, grenade case, and first aid box are glued to each other. Note the vehicle seats are held in place with a blob of poster putty to ensure everything will properly fit. 3: The lump-o-stowage is built up piece by piece using Magic Sculpt epoxy putty for tarps, tents, etc. These are pressed together and other items are pressed into the putty/glued to each other as needed. Parts from Tamiya, Plus Models, and Black Dog, as well as scratch-built pieces can be found within the lump. 4. Once it all cures, it can be easily removed for painting. The foil can be discarded—any that remains stuck to the stowage is ok as it be on the bottom of the pile, out of sight.



3



4



Miscellaneous Modeling Tips:

-If liquid superglue runs where you don't want it, Blue-tack can be used to remove the excess by blotting gently.

-For tapered antennas use stretched sprue rather than a plastic rod. With practice you can get the exact taper you need fairly easy.

-For chicken wire or fence fabric, use mesh "tulle" (like what is used on bridal veils). It's pronounced "tool" and can be purchased in the fabric section.

-Weld seams can be made with plastic rod or stretched sprue. Use a piece of rod/sprue of the needed size. Glue it in place and coat with liquid glue. Once softened by the glue, it can be textured with the tip of a hobby knife (a knife blade whose tip has broken off is ideal for this).

-My workbench is protected by a thick, heavy sheet of glass. I work on top of the glass. Any glue or paint spills can be easily cleaned-up. In fact, when using superglue, I will often put a small puddle directly on the glass in an out-of-the-way place. It can later be scraped-off with a razor blade. Another handy thing to do is put the instruction sheet for the kit under the glass. That way it is always readily visible, parts can be laid on directly on the instructions, the instructions are protected, and they are never in the way.

-Cotton swabs that use plastic shafts (they're hollow) can be heated and stretched in the same manner as sprue to create various sizes of tubing.

-Need to drill a hole (or series of holes) to an exact depth? Wrap a piece of blue painter's tape around the drill bit at the appropriate depth. That way, you can easily see (and feel) when you've reached the desired point.

-Have an old CD changer, Walk Man, or MP3 player that no longer works? Before you toss it, take it apart. It's full of various little gears and bits that can be quite useful when scratch-building and detailing.

-I usually make grab-handles from bent wire. When making numerous grab-handles that need to be the same size, I will mark the width on a pair of needle-nosed pliers with a piece of masking tape. That way the wire gets put at the same point each time for identical handles.

Conversion and Scratch-Building

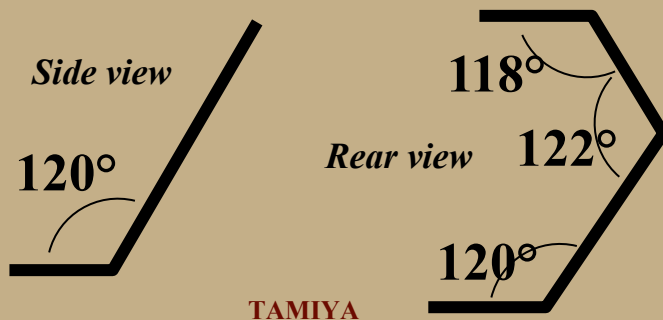
In truth, we've already seen how to do these tasks. The tools, materials, and methods are no different that what we have already covered. In many cases, conversion kits are available for the variant you want to make—those by Gaso.line are simple drop-in kits replacing the kit parts. You would simply build these as if they were a multi-media kit (plastic, resin, and perhaps a metal gun barrel). Other times, the conversion you need is not available in kit form. In this case, you have to convert the parts you need from something similar or make your own from scratch. While it may appear difficult, it really isn't.

There are a couple key "rules" to remember that will aid you in making the process easier and your final goal obtainable. First, we do not have to model the object *as it actually existed*. Instead, we model the object *as it appeared* (unless, of course, you are making a working model). What I mean is simply that only the look of the part matters. For example, when discussion stowage,

we saw we could make a tent roll by simply shaping a blob of putty—there was no need to make a putty tent and then fold and roll it into position. Equally importantly, we must look at the object not as a complex whole, but as a grouping of simple shapes. There aren't that many basic forms—spheres, circles, cubes, squares, rectangles, triangles, pyramids, cylinders, etc. ANY task, not matter how complex, can be broken down into simple steps using only basic shapes.

While several of my vehicles used commercially available conversion kits, some of these were further converted. Other variants required extensive conversion. These conversions are detailed in the appropriate build chapter. When doing conversion work, the best references I can suggest are the Panzer Tracts books. These include scale drawings of the vehicles, often from many angles, in 1/35th scale. They also include 1/20th scale drawings of many of details. In most cases, I used these drawings as my starting point. While I remained as close to them as I could, there were a few instances where I had to slightly “fudge” some dimensions in order to get a good fit into the kits. Unfortunately, however, not all the details I needed to make are shown in these scale drawings. In these instances (my Sd.Kfz 251/11, for example), I simply had to guess. I used the best photos I could find, then extrapolated the unknown dimensions using known dimensions. For example, the Panzer Tracts drawings would give me dimensions of floor plates, seats, etc. Using these, I can compare known dimensions in the photo to unknown dimensions and make a pretty good guess. The final judge is the Mki Eyeball: if it looks right, it is right. If it looks wrong, it is wrong. Period.

APPROXIMATE HULL ANGLES



When making items such as the drawer unit, or making the flanges were the hull halves come together, it is useful to know the angles of the various corners in the hull. The Sd.Kfz 251 hull is basically a hexagon—but it's slightly skewed.

The Tamiya and AFV Club kits have slightly different angles. They are shown at left. These angles may not be exact, but they will get you very close.



AFV CLUB

Converting Scale Drawings and Plans to 1/48th Scale:

When converting or scratch-building, you often need to work from scale drawings or plans that are some other scale than 1/48th. The 1st step is to verify the scale of your drawing or plan. Don't assume what it says is correct. Measuring a known dimension and divide it by the stated scale. Compare this to your drawing to determine its accuracy.

Once you know the scale of the drawing or plan you are working from, you can enlarge or shrink this to 1/48th. Simply divide the scale of the drawing you have by 48 and express the result as a percentage. Remember, if you're building to a larger scale than the plans you have, the percentage must be greater than 100; if you're going smaller, the percentage will be less than 100. Below is a handful of conversion percentages between common modeling scales and quarter scale (1/48th)

Drawing Scale - 1/48 %

1/6	12
1/9	19
1/12	25
1/16	33
1/18	36
1/20	42
1/24	50
1/25	52
1/32	67
1/35	73
1/43	90
1/56	117
1/64	133
1/72	150
1/87	181
1/96	200
1/100	208
1/144	300

4

"Project 251" Modeling the Sd.Kfz 251



Painting and Weathering

By Kevin Townsend



Painting and Weathering

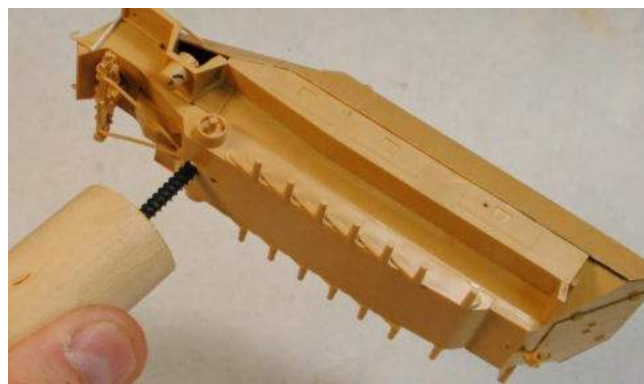
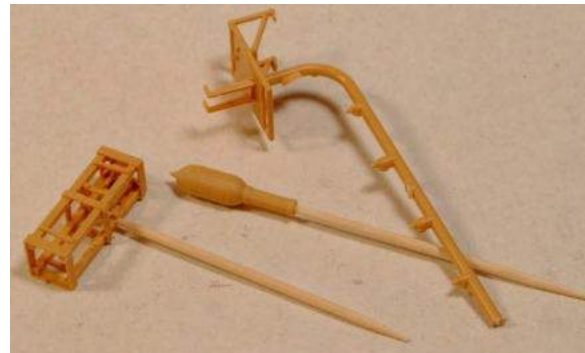
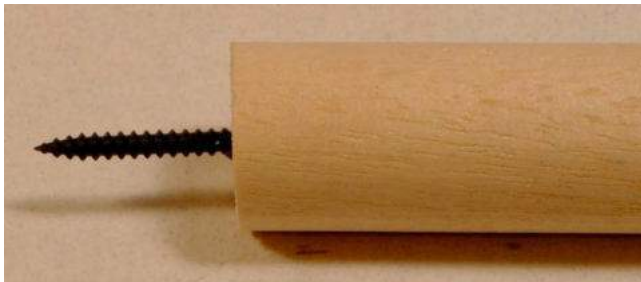
Many modeling books and articles approach painting and weathering separately. This is a mistake. The finish on our model is not the result of separate processes, but rather an integrated approach that begins even before we start assembling the kit.

Like anything else with model building, painting and weathering are a process, related to other processes. The painting and weathering process actually starts in our planning stages. When planning, we must decide not only what vehicle we will model, but also its location and condition. This will affect much more than the colors and markings the vehicle will carry. Obviously, any deleted, added, or rearranged equipment or other field modifications will be modeled during assembly. But you must also consider any damage sustained, such as missing or bent fenders, bullet or shell holes, missing components, etc. These are all arguably part of the weathering process and must be addressed during assembly of the vehicle. If the vehicle is to be caked in mud, much of this could even be added during construction, especially that on the lower hull, under the fenders, and pressed into the wheels.

As each model is potentially different, you must study the model and the effects you are trying to achieve to determine the best way to proceed. Kit instructions, while they usually list colors, do not normally consider painting. They deal only with assembly. So it is up to the modeler to determine how painting will affect the sequence. What things must be painted prior to assembly, for example? Clearly, the interiors of the halftracks would be much more difficult—if not impossible—to paint after the top and bottom hull halves were joined together, for example. Generally speaking, the base colors and camouflage are applied prior to weathering. This would include decals, since the vehicle would look wrong if the paint were weathered, but the decals were sparkling new and clean. But as, always, there are exceptions to both these general rules. If the vehicle carries a new coat of paint over the old (such as winter whitewash or a vehicle repainted for desert operations) it may serve us best to paint and weather the original color before painting the top color and applying further weathering. And a vehicle whose markings which are newly applied may not match the weathering of the vehicle itself (of course, if you go this route, it should be apparent to the viewer—such as modeling the crew in the act of painting the marking—so the lack of weathering on the markings doesn't appear to be just an oversight by the modeler). Weathering is also usually done in layers. For example, old paint chipping may be beneath dust and dirt layers while new paint chipping may be on top. Mud is also applied in layers, with older dry mud under newer wet mud.

So as we can see, there is no one set order of applying paint and weathering. But generally speaking, I follow a process something like that listed below. Each of these steps and methods will be detailed in the following pages. We've already seen some of this in the chapter on assembly. There is, by necessity, a great deal of overlap in the building and painting processes. Please note this process is geared specifically for the 1/48 scale Sd.Kfz. 251. Steps may vary with different vehicles and/or different scales.

- Inner surfaces of wheels and tracks are painting in Black prior to assembly to ensure any area that can't be reached later is in an appropriate dark shadow color. Wheels and tracks/road wheel units are then assembled.
- The interior of the vehicle is built, primed, painted, and weathered before the hull halves are assembled. Personal gear and equipment inside the vehicle is fitted and painted.
- After the hull is assembled but prior to the attachment of wheels, tracks, guns and any parts left separate for painting ease, the vehicle (and the separate assemblies) is primed, pre-shaded, and painted using color modulation techniques.
- Decals are applied, and several layers of Dullcote are applied to both matt the surface and protect the decals from the weathering process.
- Details, tires, and tracks are painted either now or at whatever point in the painting/weathering process is appropriate.
- Weathering is applied as desired in as many layers as needed including filters and washes, oil paint weathering, pencil lead, chipping, dust build-up, etc.
- Heavy, built-up applications of mud are added if and where needed.
- Pigments are applied.
- Additional painting and weathering layers are added as needed/desired.
- Sub-assemblies, wheels, and tracks are fitted. The vehicle is attached to the base. Final small details (fender width indicators, antennas, etc.) are attached.



It's best to handle the actual parts as little as possible during the painting process. This protects parts from potential damage and fingerprint oils. It also protects your hands from paint and solvents. To hold the hull during painting, a handle was made by gluing a screw (with the head sliced off) into a hole drilled into a thick 6-inch length of dowel rod. The screw was then screwed into one of the existing holes in the bottom of the kit.

Make sure to place the screw in a location where is no danger of punching through into the finished interior. Many other parts were held by toothpicks. These were friction fitted into either holes drilled into areas that will be hidden on the final model or into existing holes such as the axle hole in the back of a road wheel on the track assemblies or into the exhaust hole on the bottom of a rocket. Parts or subassemblies can also be held by a length of sprue tree glued to the back of a part. After painting, this "handles" can simply be snipped off with sprue cutters. Parts using metal mounting pins can be held by the pin in a pin vise.

Terms, Definitions, and Techniques



There are several ways you can apply paint to your models—brush, spray can and airbrush. The method you use is entirely up to you. Before we get into detailed step-by-step examples of painting and weathering techniques, let's take a moment to look at some the types of paint and pigments that are used in the process and to define the terms and techniques we will be using to finish the example models. We'll look at detailed examples of each of these things throughout the chapter.



Top: While I use many brands of water-based acrylic paint, I do most of my model airbrushing with Vallejo Model Air Paints. These come pre-thinned and ready for use.

Top Left: While artist oil paints are of little or no use for basic model painting, they are ideal for many weathering applications. As these are thinned with oils, they will not affect or mix with acrylic paints and vice versa.



Below Left: I often use pigments and pastels. Pigment powders, such as the many colors by mig, are available commercially. However, I normally use the pastel sticks which can be purchased at most any hobby or craft shop (do NOT get the oil-based variety). Ground into a powder on a piece of sandpaper, they are similar to the commercial pigment powders and much cheaper. These are very versatile and can be used to create a variety of effects from fading to rust to even heavily built-up mud.

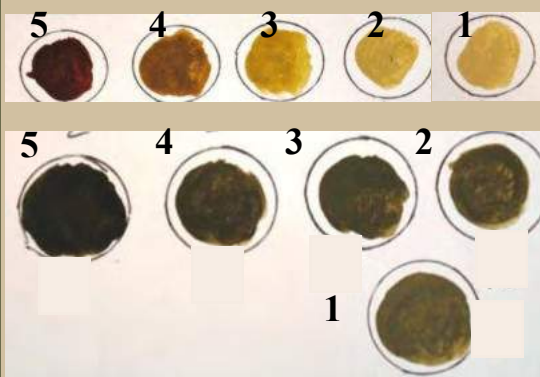
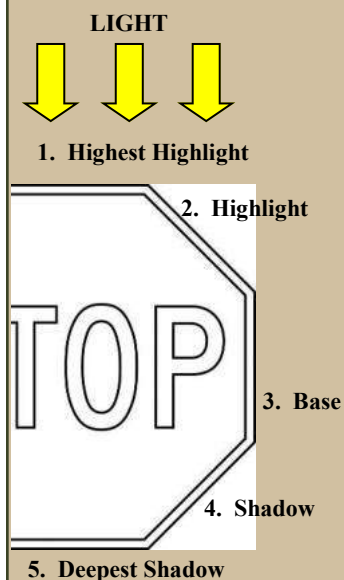
- Base Color, Highlights, Shadows, “Modulation”:** These are all terms I use in association with my method of painting models as if they were lit by overhead lighting. When painting figures (see the appropriate chapter) I usually start with my base color and add highlights followed by shadows. When painting models I usually paint dark to light. I start with the darkest shadow and proceed to gradually lighten each successive layer of paint until I reach the high highlight. Refer to my modulation methods shown on page 5. Color #3 would in these instances be my base color—the color I am actually trying to represent. Colors #4 and #5 would be shadow colors—how the base color looks in shadow areas. Colors #1 and #2 are my highlight colors—how the base color looks in well lit areas. In other words, I paint as if each different color were simply a different value of the same base color. Please note that while I often use 5 different values, that is not a hard and fast rule. Sometimes only 2 or 3 is enough. Other times, it may require more. Use what is needed to achieve the effect you are after. All this begs the question of why paint highlights and shadows on our models? Won't the room light provide this naturally? The answer is no. I call this the concept of scale light. Our brains are trained to use highlights and shadows to help judge such things as distance, shape, texture, etc. When we look at things in the real world, they are life-size and so is the light. When dealing with scale models, the light source is still life-size while the miniature is much smaller. Therefore, we must “scale-down” the light to pro-

The graphic at right illustrates “value”. The base color in this case is #3.

Each block represents either this color, or a lighter or darker value of that color. On the model these do not represent five different colors—they are meant to depict the same color as seen in a continuum from light to dark. You certainly do not have to use painted highlights and shadows—you can paint your models in a solid color if you wish. But consistency is important. Since I highlight and shade my figures, doing so with my models is necessary.

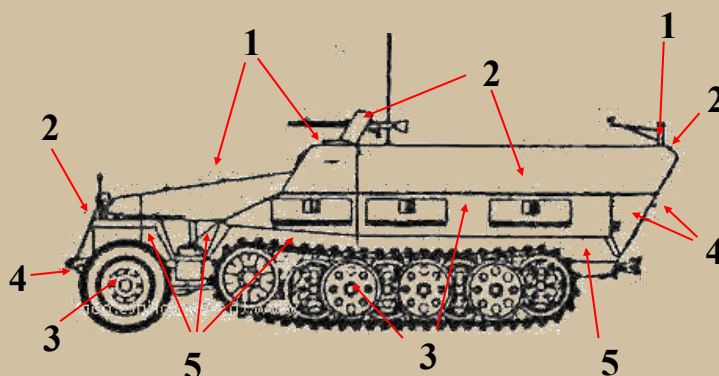


Color Modulation, the Stop Sign Rule, and the Sd.Kfz 251



To reinforce the modulation, during the weathering process any filters or dot filters are applied with lighter colors put predominately on upper works while dark colors on mostly lower. This also aids weathering by increasing the apparent grime on lower portions of the vehicle and dust on upper portions.

Shep Paine developed the “Stop Sign Rule” to illustrate how highlights and shadows should be painted on miniature figures. This rule is summed-up in the self-explanatory diagram at left. While designed to illustrate the concept on figures, it work very well to show how “color modulation” works on armor. “Modulation” is nothing more than a fancy term meaning shading and highlighting—highlights on upper surfaces, and shadows on lower surfaces as if your model was lit by a halo of light from above. The angles of the various armor plates on the Sd.Kfz 251 are remarkably similar to those of a stop sign. Using the number values in the stop sign diagram, the picture below show how this applies to the halftrack. For a more detailed discussion of color theory and concepts such as overhead lighting, highlighting and shading, see the chapter on Building and Painting Figures.



I start by pre-shading the vehicle with black on the undersides, and white on upper surfaces as seen at left. These colors are allowed to show through slightly on the following base color. This not only provides a bit of shading/highlighting (modulation), but also serves to differentiate and outline various panels. The colors I use for Dunkelgelb and German Green are show at left. They are, from darkest to lightest (all colors are Vellejo Model Air):

Dunkelgelb:

- 5: German Red Brown Primer (or Tank Brown)
- 4: Camouflage Medium Brown + Dunkelgelb
- 3: Dunkelgelb
- 2: Dunkelgelb + Sand Yellow
- 1: Sand Yellow

German Green:

- 5: German Green + Black
- 4: Same as 5 with more German Green Added
- 3: German Green
- 2: German Green + Light Grey Green
- 1: Same as 2 with more Light Grey Green Added

Some other color mixes include:

Panzer Grey: 5: Black Primer 2: Black Grey
mediate Blue 2: 3 + Intermediate Blue and Grey Blue
Blue 1: 2 + Grey

Camouflage Red Brown: 5: Tank Brown + Black 4: Tank
Brown 3: Tank Brown + Cam Med Brown 2: Cam Med
Brown 1: Cam Med Brown + Sandy Brown

vide the same visual clues to our brains. That is why painted highlights and shadows enhance realism. It's the same concept as making a circle drawn on a piece of paper look like a sphere just by shading certain parts of it. The larger scale the model (and therefore the closer to life-sized) the more gradual and subtle these highlights and shadows must be to appear realistic. This effect gets more pronounced as scale gets smaller—more contrast between light and dark is needed on small scale models to achieve the same effect. In the end, the choice to shade and highlight is yours. But you should be consistent. If figures are shaded and highlighted, models should be too. The same holds true for groundwork and any other elements present in your scene.

- **Acrylic Paint:** Acrylic paints are water-soluble “plastic” paints with excellent adhesive qualities. They are very stable and will not yellow over time. Acrylic paints dry quickly, allowing the application of many layers of paint in a short amount of time. The downside to fast drying is that there is little time to manipulate the paint once it is applied to the surface. Natural and synthetic brushes can be used with acrylics. These paints, being alkaline in nature, can be hard on natural brushes. If the paint dries in a brush, it can be very hard to get out without using strong solvents that could damage the brush. The good news is that brushes can be quickly and easily cleaned with water. When finished painting, clean brushes well with warm water and mild soap.
- **Oil Paint:** Oil-based paints consist of finely ground pigment suspended in a drying oil. These do not mix with or affect the water-based acrylic colors I primarily use for painting. They also take a long time to dry, giving you plenty of working time. For these reasons, they are ideal for many weathering techniques.
- **Pigments, Pastels, and Pencil Lead:** I use pigments and pastels for a variety of weathering tasks. Pigment powders, such as the many colors by mfg, are available commercially. However, I normally use the pastel sticks which can be purchased at most any hobby or craft shop (do NOT get the oil-based variety). Ground into a powder on a piece of sandpaper, they are similar to the commercial pigment powders and much cheaper. These are very versatile and can be used to create a variety of effects from fading to rust to dust to even heavily built-up mud. The powder (pigments or pastel) can be applied wet or dry. For dry pigments, pick them up on a brush and deposit them where you wish. You can grind or feather them into the paint with a brush. To fix them in place, simply load a brush with mineral spirits, rubbing alcohol, or pigment fixer and touch it to the area, allowing the fixer to flow into the pigments. To apply them wet, mix them with water, rubbing alcohol, mineral spirits, paint, or thinner and paint them on. Once dry, excess can be blown, brushed, or rubbed off. I do not fix them in place by spraying with a clear coat as that can alter their color. Even pencil lead can be ground into a powder and applied with a brush or the tip of a finger to recreate worn or bare metal areas.



- **Clear Coats—Future and Dullcote:** Future (actually “Pledge With Future Shine”) is a clear acrylic floor wax. It is nearly water thin and can be applied with a brush or airbrush. It is great for applying a gloss coat to a surface. As we shall see, decals work best on a gloss surface. While Future can be used for many things, I use it primarily under and over decals. The other clear coat needed is a matt coat. For this, I use Testors “Dullcote” Not only does this provide a dead flat finish, it is also a lacquer that is not affected by

Top: Pigments or pastel powders can be applied dry. Simply pick them up with a brush and deposit them on the model. Depending on what you are trying to accomplish, they can be either rubbed or sprinkled onto the surface. They can be locked, or “fixed” in place with rubbing alcohol, turpentine, mineral spirits, or pigment fixer. Please note that rubbing alcohol will attack acrylic paints, so if you are using that as a fixer, there should be a barrier layer of Dullcote between your acrylic base and your pigments. Turpentine and Mineral spirits will not affect the acrylics, but they will mix with any oil paints present, so a Dullcote barrier over any oil paint weathering layers may be needed prior to applying pigments.

Middle and Bottom: To depict worn or bare metal areas, pencil lead can be used. It can be applied using the tip of the pencil, or it can be rubbed into a powder using fine sand paper. That powder can be applied in a manner similar to pigments. It can even be rubbed on with a fingertip!



Top: Dullcote and Future. Future is a gloss liquid acrylic floor was that can be applied with brush or airbrush. It is quite thin and requires no additional thinning for airbrush use—my preferred way of applying it. Dullcote is a lacquer in a rattle can, and I normally use it straight from the can.

Above: If you wish to airbrush Dullcote (or any other paint from a rattle can) you can “decant” the paint into airbrush bottle as seen in this photo from *Finescale Modeler Magazine*. Simply fit a bit of soda straw to the nozzle (ensure you get a good seal). Cover the open top of the bottle with foil. Stick the straw through the foil into the bottle and spray away! Once you collect the paint, let it sit for awhile until all the bubbles—the aerosol propellant—boils off leaving only the paint.

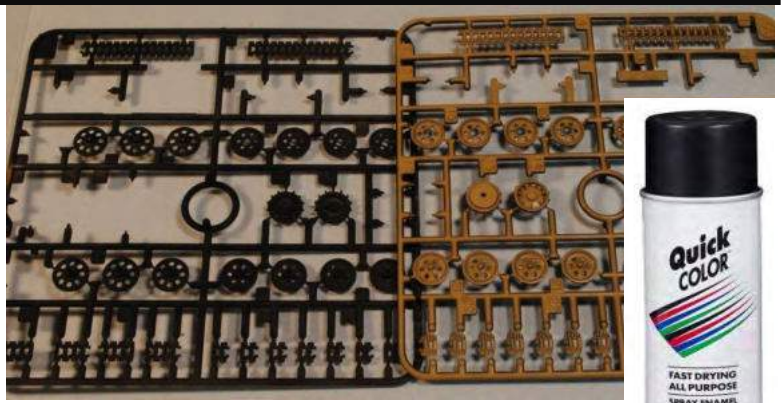
Right: The basic dot filter process. At near right, we see dots of various colors of oil paint placed all over the nose of this 251. In the photo at far right is the same area after the dots have been blended using a brush damp with mineral spirits into each other and surrounding area. Note how the underlying colors are subtly altered and the streaks running down the side of the vehicle.

neither acrylic nor oil-based paints and thinners. Therefore, it can be used a barrier coat when needed.

- **Dry-Brushing:** Although this is a viable technique to bring out detail, it is not one I often use on models. When I dry-brush, I normally use a flat brush. I dip the tip of the brush in the paint and then, on a piece of paper towel, wipe most of the paint away so that when the brush is drug over the surface of the model, paint is deposited only the high points and edges. It is best done in layers—using less and less paint of a progressively lighter color.
- **Washes and Pin Washes:** A wash is no more than a very thin application of paint—almost more of a dirty thinner than a thin paint! It tends to accumulate in low areas and around details. While they have their uses, I rarely use an overall wash, preferring more precisely applied applications. A pin wash is the same thing surgically applied. This is normally done with a fine-tipped brush applying the wash into panel lines and around details to provide outlining. While these can be applied with either acrylics or oils, I prefer oils simply because the long working time gives me plenty of opportunity to clean-up any mistakes. Acrylic washes tend to leave a hard line or color (tide marks) where the wash ends. They can also dry splotchy.
- **Filters:** Like a wash, these are thin applications of paint. They are a very thin transparent glaze (thicker than a wash) of color that subtly alters the underlying color without obscuring it. These are great for very subtly altering the color of various panels, for reinforcing highlight and shading, and for creating bleached paint effects. Like washes, you can use oils or acrylics, but I prefer oils.
- **Oil Dot Filters:** Similar to filters above, these are actually thinned while on the model! The process is shown in the photos below. I apply dots of selected colors of oils to the affected areas. I then take an old brush (flat or round) damp (not wet) with mineral spirits, and gradually blend the oil dots into each other and feather then into the underlying surface. They can be left thick in places, blended almost entirely away in places, and/or streaked in more places. As we proceed through the examples in this chapter we will see many ways of using and applying these. Don't be afraid to play with color, either! The effects you can achieve are nearly endless.



As we saw in the chapter on assembly, I assemble the tracks and road wheels as a single unit prior to painting. There are options. You could assemble the tracks in top and bottom runs, allowing you to paint each wheel and the tracks prior to gluing everything together. The choice is yours. Either way, painting the inside of the road wheels would be problematic once everything is assembled. I paint the inside the wheels and tracks, right on the sprue trees, prior to assembly. While the entire assemblies will be airbrushed later—starting in a black color—I do this simply so that any hard-to-reach areas on the assembled wheels and tracks will already be in a suitable dark shadow color. As the parts are painted right on the sprue trees there is no need for any precise application of paint or for any complex masking. I do this with inexpensive generic Black spray paint. Brush painting would be too tedious and airbrushing would be too time consuming (readying the paint, cleaning the brush afterwards, etc.).



My airbrush rig is shown here. I use a basic Badger Model 200 Single Action Airbrush. For propellant, I use a very simple diaphragm compressor. With this set-up, I consider the pressure regulator and moisture trap to be essential. Without it, I would have no way of setting (or regulating) the air pressure coming out of the brush. It also prevents trapped moisture from causing paint splatters.

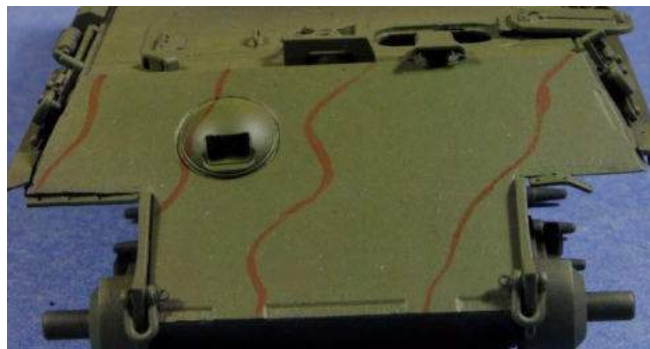
Types of Paint

There are various types of paints you can use. Most modelers use either acrylics or enamels. Painting techniques, while similar, do have differences. I paint with acrylic paints so here I will discuss primarily acrylic painting methods. For brush-painting, I use either craft acrylics or the same Vallejo Model Air colors I use for airbrushing. Note that acrylics and enamels cannot be mixed with one another as they use different solvents and thinners. So, while they cannot be used together, enamels can be applied over acrylics without affecting the underlying color and vice versa. I use oil paints for many weathering tasks, and these also will not affect or interact with the acrylic paints. If I am applying a paint type over a like paint type (oil on top of oil, for example). I will apply a “barrer” layer between the two layers. For this, I usually use Testor’s Dullcote. This is a clear flat laquer that will not attack, nor be attacked by, either oils, acrylics, or enamels. I also use this when I need a matt coat (that is, after all, what it was designed for).

For more information on paint types and paint brushes, as well as information on color theory and paint mixing, refer to the chapter on “Creating and Painting Figures”.

AVOIDING DISASTER: THE IMPORTANCE OF BARRIERS:

There is one very important factor we should be aware of. Be aware of how a layer of paint will affect other layers underneath it. For example, you can use Isopropyl Alcohol (rubbing) alcohol as a fixer for pigments. But rubbing alcohol will attack acrylic paints. Likewise, using mineral spirits will attack underlying oil paint streaks and filters. The solution: a barrier. I use Testors Dullcote (a clear flat laquer). Bottom line: always consider how a paint/weathering layer will affect the layers underneath. If in doubt, test on a scrap of plastic first.



Brush Painting

Done with care you can achieve a very good result with a paint brush. In fact, many of the camouflage patterns I used in this project were brush-painted. For brush painting, you need good quality paint brushes. (Note: for a detailed description of brushes and color theory, refer to the chapter and building and painting miniature figures). While some small brushes (size 0 or smaller) are useful for some painting and weathering tasks, for overall and camouflage painting, larger brushes—size 2 or even larger—are the way to go. A large brush not only covers more area with each pass, it also holds more paint. As long as the brush has a fairly fine point, it can also be used to delineate areas of color for camouflage patterns. We also need quality brushes for other reasons. For example, you don't want a brush that sheds bristles as you paint, making your paint job look hairy. You also want a brush that will retain its point and hold its shape. For that reason, I do not use synthetic brushes.

Then enemy of a good brush-painted finish is brush marks. While many finishes were in reality brush-painted, brush marks in this size are considerably out of scale. We normally want our finishes to be as smooth and even as possible. The key to this is to use paint that is not too thick. We also don't want paint that is too thin. Paint that is too thick may give us complete coverage with a single coat, but it may clump, obscure fine detail, and display brush marks. Paint too thin may run all over the place and take many coats to get good coverage. A good compromise is paint that flows from the brush like ink from a pen. It should take two-three coats to get complete coverage. Here's a tip: if you do have some minor brush marks, they can be partially filled and obscured by giving the area a coat of Future Floor polish. This is a thin acrylic finish that dries smooth and glossy whether sprayed with an airbrush or painted with a brush.

My brush-painting methods are shown at left:

Top: Throughout this project, I always airbrushed the base color. However, the camouflage pattern was sometimes brush painted. Here we see the Panther tank displayed with my Sd.Kfz 251/20. I chose to brush paint as I wanted a hard-edged camo pattern and thought that would be easier than masking around all the angles and fittings. These could be left separate until after painting, but I prefer to attach these prior to painting—it's easier to get a good bond on bare plastic plus attaching tiny parts without smearing glue on painted areas would be difficult. As the base is modulated, the camo needs to be, too. I mixed a base, shadow, and highlight color using Vallejo Model Air colors. I only mixed three colors. As the paint is thin to allow brush-painting, the overlap area between each color will provide further modulation.

Second: To avoid brush marks the paint is—thin enough it takes 3 coats to get complete coverage. I start by outlining appropriate areas. This is done with the point of #1 or #2 round brush.

Second: The areas are filled in using the thinned paint applied with a #2 or #4 round brush (narrow or small areas vs. large areas). The darkest color mix is applied in low and shadow areas and the lightest color is used on upper surfaces.

Third: The same process was done with the yellow stripes. In this case, the vehicle was then air-brushed with Future floor polish. This not only prepares the surface for decals, but the Future fills any brush-marks left over from the brush-painting process. Note, Future is very thin and self-levels well so it can be brush-painted easily—I just sprayed it as it is quicker and easier.

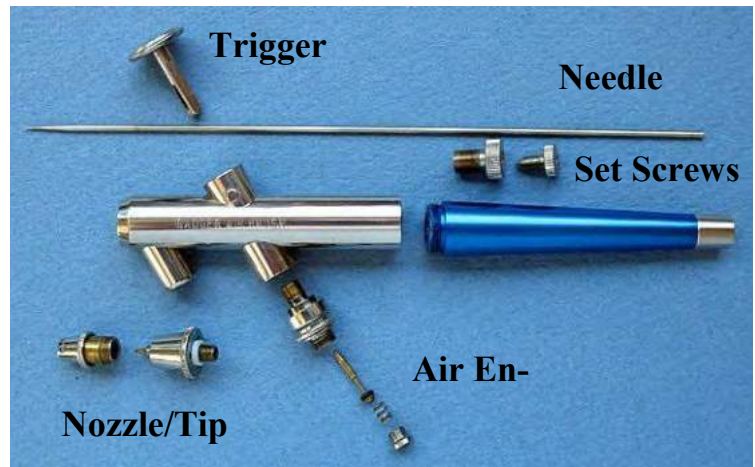
Airbrushing

While good results can be obtained with a brush, if you plan on making this a hobby, whatever genre you choose, I recommend an airbrush. Not only is it a great time saver, but it will easily do many things that are difficult with a brush. Unless you plan to use it often for complex tasks, a fancy expensive airbrush is not needed. Spray paint in rattle cans can be useful for overall coverage such as priming and base-coating, but they have limited usefulness beyond that. As we shall see, I often use a combination of all three methods.

I use a single-action airbrush. With this type brush, pressing the trigger allows air to flow through the brush. Air pressure is determined by the settings on the regulator and compressor you are using. Paint flow and spray patterns are determined by how far you manually set the needle to project into the nozzle and tip of the brush. This is the easiest type brush to use, but it does have limitations. For general modeling, it is sufficient. The double-action brush allows you to control both air and paint flow via the trigger. It is much more difficult to master, but allows greater control and artistic effects. Each brush is different, so you should consult the operator's manual for specifics on use of your brush.

Regardless of the type brush you chose, the main factor in keeping it functioning well is to keep it clean. While spraying, when I am between colors, I flush the brush with Windex (assuming I'm using acrylics) and remove and clean the needle. After I'm finished spraying, I disassemble the brush and thoroughly clean every component. Windex and Q-Tips are used. Each part is wiped down and all excess paint removed from both the brush and the cups. After assembly, I flush the brush out with a bit of Isopropyl alcohol and finally water. I follow this process as Windex contains ammonia. Ammonia can damage the small rubber seals and etch the plated metal parts if allowed to stay in the brush, so I ensure it is thoroughly rinsed.

Air supply (propellant) is also a matter of personal preference. You can buy "canned air" designed for airbrush use, or even use compressed air tanks. There are also many varieties of air compressor on the market. I use a simple Badger diaphragm model. This is relative inexpensive, but requires a separate regulator in order to be able to adjust air pressure. It is also fairly noisy.



Top: This shows what is included with the Badger Model 200—the brush and three paint cups. As I usually use fairly small amounts of paint, I prefer the small metal open top cup. This brush is a siphon feed. When the trigger is pushed, air flows through the brush. It siphons paint from the cup, mixes it with air, and sprays it out the nozzle and tip. The needle, which fits through the nozzle, controls the amount of paint and the width of the spray pattern. It's location in the nozzle is determined by screwing the set screws on the end of the brush in or out. For normal cleaning, only the nozzle, tip, and needle need removed from the brush. The width and thickness of the spray on the model are determined by a combination of air pressure, paint flow, and the distance you hold the brush from the model. There is no one single optimal combination of settings. The task and user preference determine what is best in any situation. All I can say is practice. While practice may not make perfect, it will certainly make proficient.

Bottom: The pressure regulator fitted in the airline between the compressor and the brush. The pin and set screw to the left of the gauge determine the amount of air allowed through the line. This, in turn, determines the pressure. Each setting will have two pressures—when at rest (the highest), and when air is flowing because the trigger on the brush is compressed (the lowest). When I refer to air pressure, I am talking about this lower pressure as it is the one applicable to paint flow.

What you use it up to you.

With a spray can, you simply shake the can and spray. Using an airbrush is somewhat more complex. I generally use the following routine when working with mine:

- **Prepare Model Parts**

- Clean and dry all items
- Use holders that don't require handling the items themselves
- Arrange everything, in order of need, within easy reach

- **Prepare the Paint**

- Thin the paint. Start with the Manufacturer's recommendation and adjust from there
- Strain the paint if needed (a tea strainer works). This is not needed with Vallejo Model Air paints which come thinned for airbrush use. However, if thinning thick paints (such as craft acrylics) for airbrush use, this step would apply.
- Arrange paints in order of need within easy reach
- Have thinners/cleaners standing by
- I keep a sponge, wet with cleaner, beside my painting station to occasionally clean the air brush needle.

- **Paint**

- Dial in pressure, test on a piece of card, adjust as necessary. Once all is good, paint the model.
- Between colors, run some thinner/cleaner through the brush, clean the needle, and remove excess paint from the paint cup, wipe the nozzle and needle clean

- **Clean Up**

- Place painted parts back on your workbench
- Thoroughly clean the airbrush (this is the best thing you can do to get ready for your next painting session).
- Clean the work area
- Put everything away back in its place so you can find it all easily when you next need it.



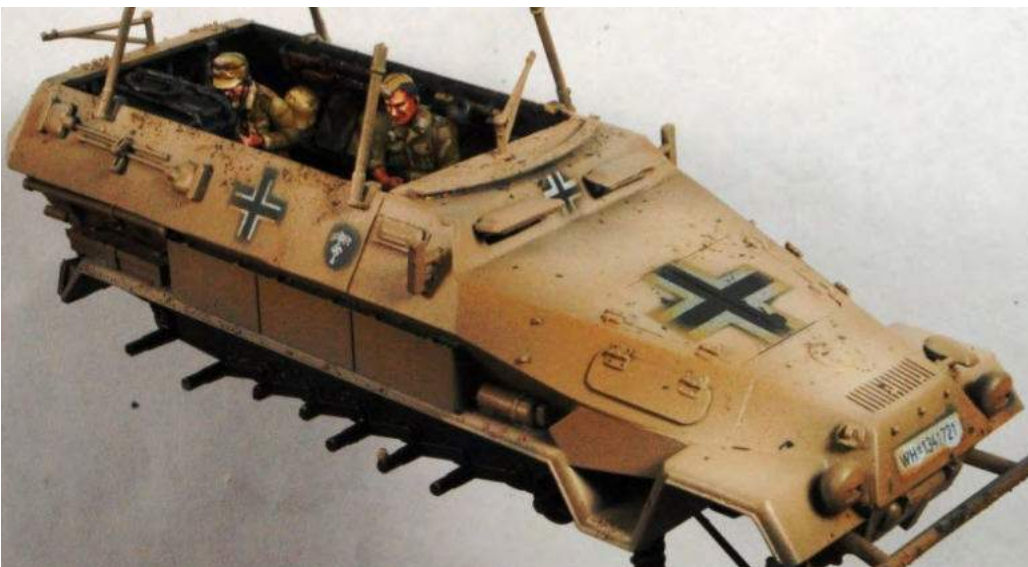
An airbrush is not a difficult tool to use. With practice, even with a relatively basic brush, you can achieve spectacular results. All you really need is a rig where you can adjust or control air pressure and paint flow. How fast you move the brush across the target and how close you hold the brush to the surface are your other means of controlling results.

AIRBRUSHING AND SPRAYPAINTING TIPS: Whether painting with the airbrush or a simple rattle can, there are several factors that will affect the quality of your paint.

- Your finished paint job will only be as good as the surface it is painted on. Minor blemishes WILL become very visible under a coat of paint. Time spent ensuring the surface is smooth and blemish free is time well spent! For paint to properly bind to the surface, the surface MUST be clean of dust, oil, and contaminants. Wash the model with a mild detergent and warm water prior to painting. Allow it to COMPLETELY dry.
- Prime the surface. Primer serves two vital functions—it gives the color coat a good surface to adhere to, and it highlights any defects in the surface so that you can fix them prior to applying your color coats.
- For airbrushing, thin the paint as needed with the appropriate thinner for the type of paint you are using. Paint should be thinned to about the consistency of milk.
- Adjust the air pressure until you find the amount that is just right for the painting task you are performing. There is no magic-formula—a lot depends on the airbrush, type of paint, and your preference. Generally, since I use acrylics, I prefer a higher pressure to prevent paint drying on the nozzle. While it can, and does, vary, I usually use 20-30 pounds of pressure for general spraying and about 15 pounds of pressure for detail work. Adjust the needle to widen or narrow the spray pattern.

- For rattle can spray-painting, ensure the paint is thoroughly mixed in the can. It's best to shake the can for at least 1-2 minutes. Sitting the can in warm (not too hot) water for a bit before painting helps thin the mixture allowing it to flow better.
- Do not rush and try to paint the model too quickly. Patience is a virtue. Multiple thin coats are better than a single, heavy coat. Allow the paint to THOROUGHLY dry between coats. Longer is almost always better. Do not expect to get complete, even coverage on the first coat. Any defects you notice should be repaired between coats. The best way to repair blemishes is careful wet-sanding—but make sure the paint is COMPLETELY dry. If you can smell it, it's not dry.
- Begin and end each spraying pass off the model (in other words start spraying in front of the model and keep spraying until the can/airbrush is past the rear of the model). Spray over the model in a straight line, without stopping. This helps prevent the buildup of too much paint on any one area which could lead to drips and runs.
- An "orange peel" texture means the paint is drying before it has a chance to level out. Repair the surface and, if airbrushing, thin the paint. If spray-painting, move closer to the model. Move across the model slower.
- Drips and runs means the paint is too thick or is drying too slowly. Again, repair the surface. Move away from the model or move across the model faster.
- Blobs of paint can be caused by old lumpy paint or by a dirty airbrush. As always, repair the surface and thoroughly clean the airbrush/spray-can nozzle. Thin the paint if needed. If the paint is old, throw it out and get new.
- Dimples or other imperfections are normally caused by surface contamination. Again, repair the surface and make sure it is thoroughly clean. Repaint. Cleaning the surface prior to painting and painting in a clean (i.e. relatively dust/cat hair-free environment) can help prevent this problem.
- If gloss paint appears flat or dull, it is drying too much before it hits the surface. Fix this the same as "orange peel".
- I use acrylics and they can dry on the needle during painting causing stoppages. I keep a piece of Windex-soaked sponge nearby and press the tip of the brush into it from time to time to keep the nozzle clear. It also helps to clean the airbrush often.

In the following pages, we will see many examples of both brush painting and airbrushing.

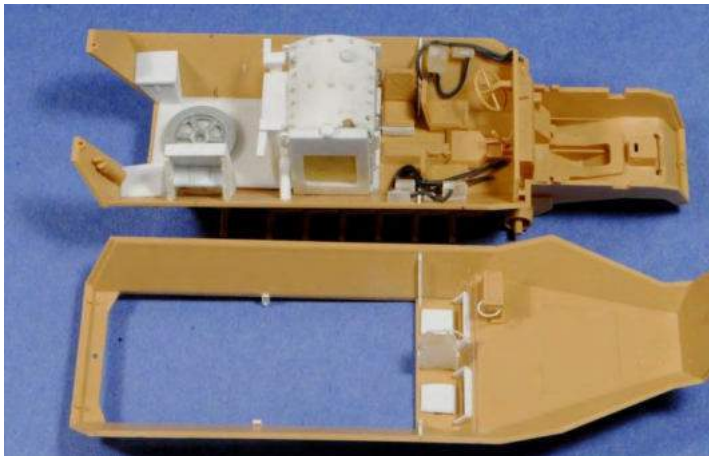


Here is a good example of color modulation (highlighting and shading) applied with the airbrush. This vehicle displays a desert sand color applied on top on an original base color of dark grey. No additional filters, washes, or weathering have yet been applied. Note all the various colors of desert sand visible on the vehicle. Upper surfaces, receiving the most light, are lightest. The color gets darker as the surface gets lower and/or nears vertical. The intent is represent a single color with differing amounts of light hitting each different angle. As a side note, you can see the seated figures were painted and fitted prior to the hull halves being joined.

Painting the Vehicle Interior

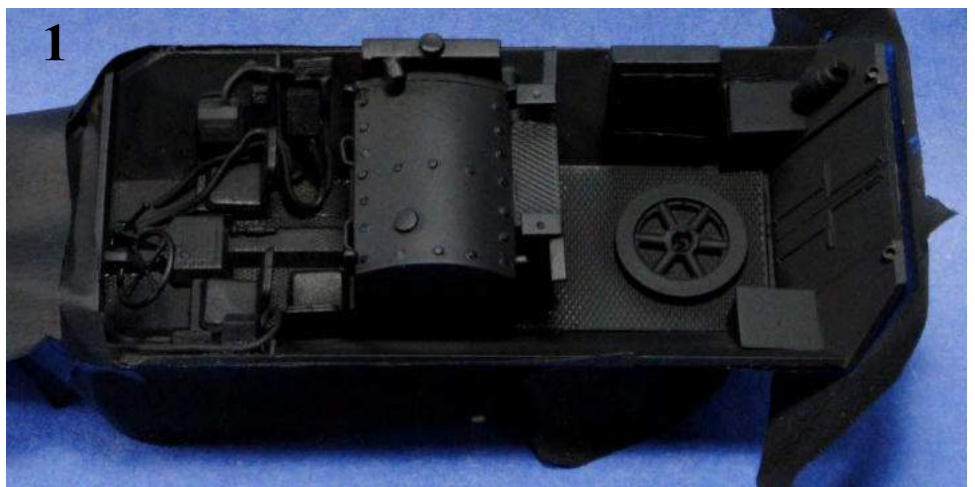
were joined. Nor would it be practical to paint the exterior until this is done. Therefore, I assemble, paint, and weather the interior prior to assembling and painting the exterior of the vehicle. In larger scales, I would likely leave most of the personal gear, supplies, and other stuff separate until after painting. In this scale, I add all these items prior to painting. While this may complicate the painting process, I feel it would be very difficult to add so many tiny painted parts after painting without damaging finishes and/or leaving glue marks, fingerprints, and other flaws from the process. Also, having everything assembled ensures shadows and highlights are consistent and all fall in the same direction. The following step-by-step example illustrates my interior painting processes.

In this small scale, I completely assemble the interior—including personnel gear, supplies, and other equipment—prior to painting for reasons described above. But it's a personal choice—you can leave these items separate if you so choose.



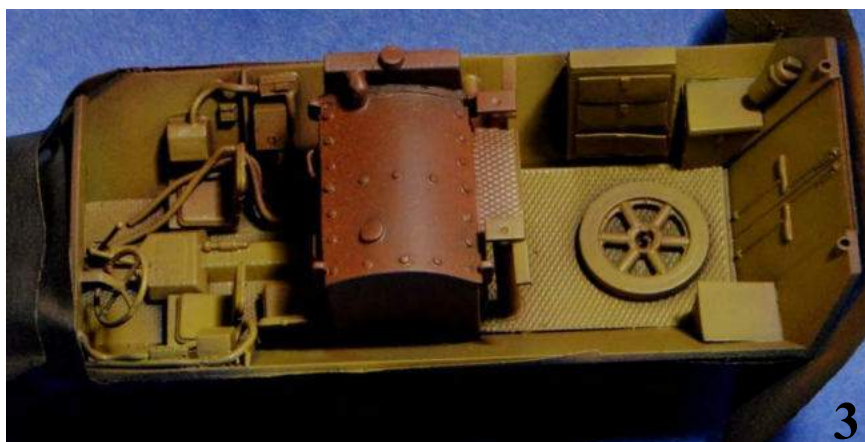
For this step-by-step example we will look at the 251/20. the interior of this vehicle is a combination of kit parts and scratch-building. In addition to the hull and fittings, there are two other large subassemblies to paint. The generator (already fitted into the hull) and the large IR spotlight (left separate for painting). To depict the fact these are indeed three separate elements that have been combined together, they will all be painted a slightly different shade of dark yellow.

I started with black primer. Primer shows up any imperfections. These were repaired and the affected areas reprimed. The black also serves as a very deep shadow color for any areas that cannot be painted later with air-brush or brush.

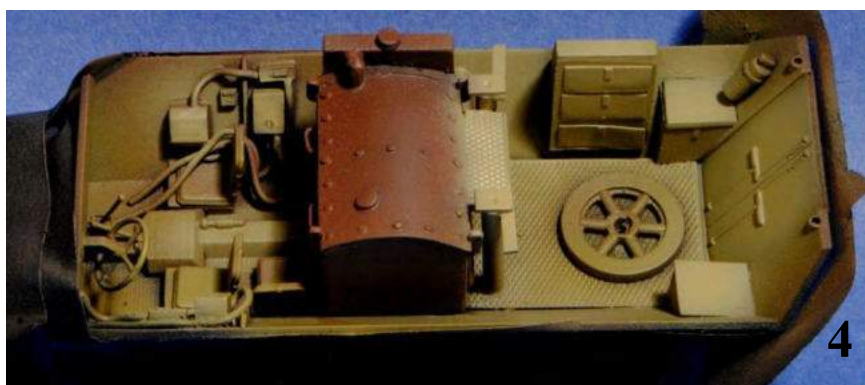




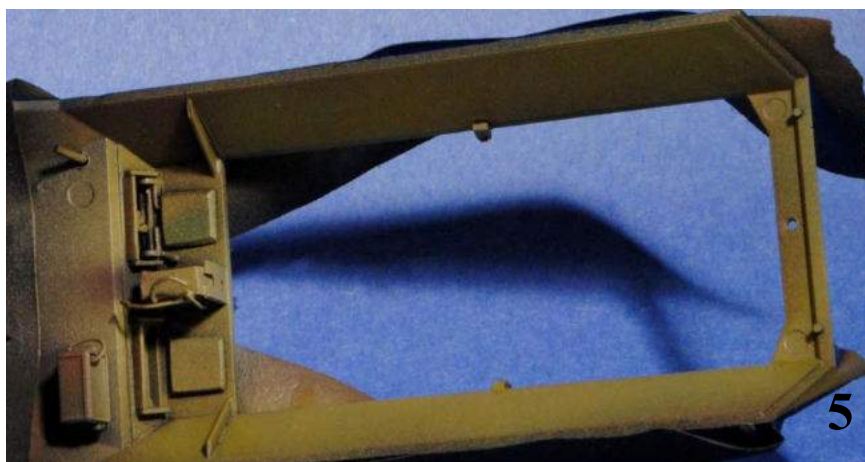
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4



5

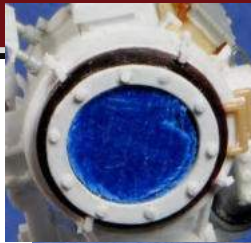
We discussed color modulation on page 5. The same techniques are applied to the interior. Many modelers use a somewhat extreme modulation (that actually looks pretty good) and then tone it down to the point it is very subtle during the weather process. I take a somewhat opposite approach. My initial modulation is gradual and subtle, and then I tend to reinforce this with my later washes, filters, and edging (both dark and light). Note the colors listed in the example on page 5 are only samples. I often use slightly different colors. In this case, I painted the vehicle, generator, and light in somewhat different colors. Dunkelgelb had many variations, and by doing this we emphasize the various assemblies may have originated in different places, being brought together for final assembly. The first colors for all three different parts was applied with the airbrush.

2) The shadow color (color 4 in page 5 chart) was next. This consisted of Vallejo Model Air "Tank Brown" and "Dark Yellow" along with thinner (Windex) in a 1/1.5/5 ratio. This was sprayed on all areas, letting the black show through in the deepest shadow. These first two colors were applied to all three of these major parts (hull, generator, light). From here, the colors diverged.

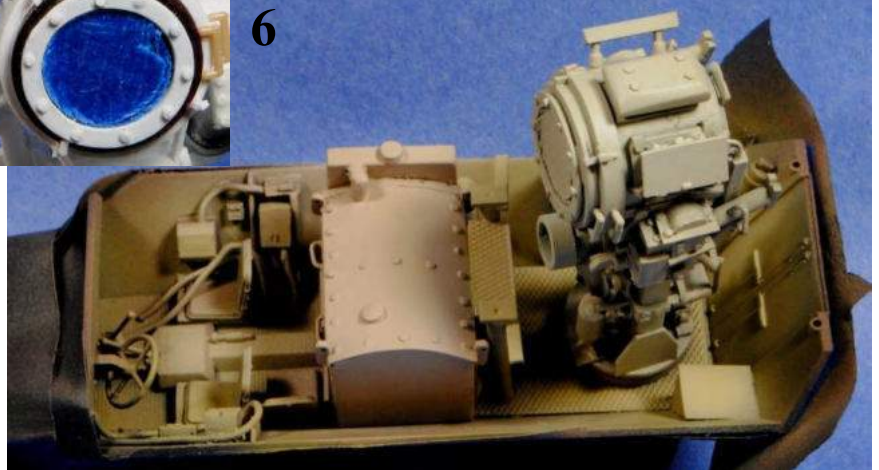
3) The base color was next (color 3 on the page 5 chart). For the hull this was Dark Yellow (VA) mixed with thinner at a 2/1 ratio. On the inside of the upper hull, which is almost entirely in shadow, this was as light as I went. Further highlighting, as shown below, continued with the lower hull.

4-5) Highlight colors (colors 2 and 1 on the modulation chart) were sparingly applied. The first highlight was created by mixing Sand (VA) and more thinner with the Dark Yellow. The final highlight, on horizontal surfaces only in the rear of the fighting compartment, was created by adding USAF Light Grey to the mix. As the upper hull is mostly in shadow, note that it appears darker. Color #3 is the lightest color present here with the exception of the exposed face of the radio rack. It was sprayed with color #2.

6) The generator was next. Its base color (color 3) was Cam. Brown (VA) and thinner. Lights were added by first adding Sand Yellow and thinner and finally by adding Sand/USAF Light Grey and thinner. The spotlight was finished by adding a base color made by mixing UK Light Stone (VA), Cam. Brown (VA), and thinner in a 3/1/2 ratio. Lights were created by adding first more UK Light Stone, USAF Light Grey, and thinner and finally by adding more USAF Light Grey and thinner. The light is shown in place in this photo to emphasize the difference in colors between the various assemblies. The modulation technique really "shines" on assemblies like the light due to all the nooks, crannies, and shapes. The shading and highlighting can really emphasize these. Insert: Prior to painting, the light lens (a piece of colored clear plastic) was masked with a circle of tape cut with a circle template and a sharp hobby knife.



6



7) Some overall filters and washes were next. These filters were applied using very thin oil paint (90-95% thinner) painted on like a normal paint coat. These filters serve only to slightly tint the underlying color. They are built up in several layers—each layer using either the same color to enhance the effect or different colors. I like lots of layers of paint—it gives depth to the finish, adds visual interest, and really enhances the 3D aspect of the model. I apply darker filters in shadow areas and lighter filters in highlight areas—this serves to enhance the effect of the modulation. I use the same colors throughout, thus somewhat softening and blending the difference in color between the hull, light, and generator.

Shadow areas were filtered with:

- Burnt Umber
- Burnt Sienna
- Dark Purple (mix of Cadmium Red/French Ultramarine Blue)

Areas where the base color is dominant were filtered with:

- Burnt Sienna
- Yellow Ochre

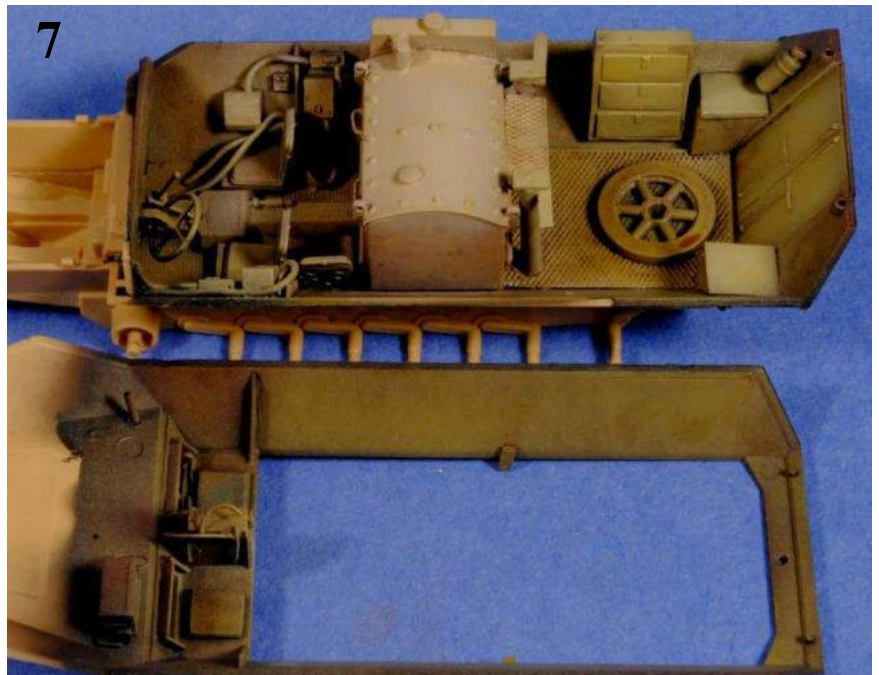
Highlight areas received the following filters:

- Yellow Ochre
- Cadmium Yellow
- Yellow Ochre/Titanium White
- Titanium White

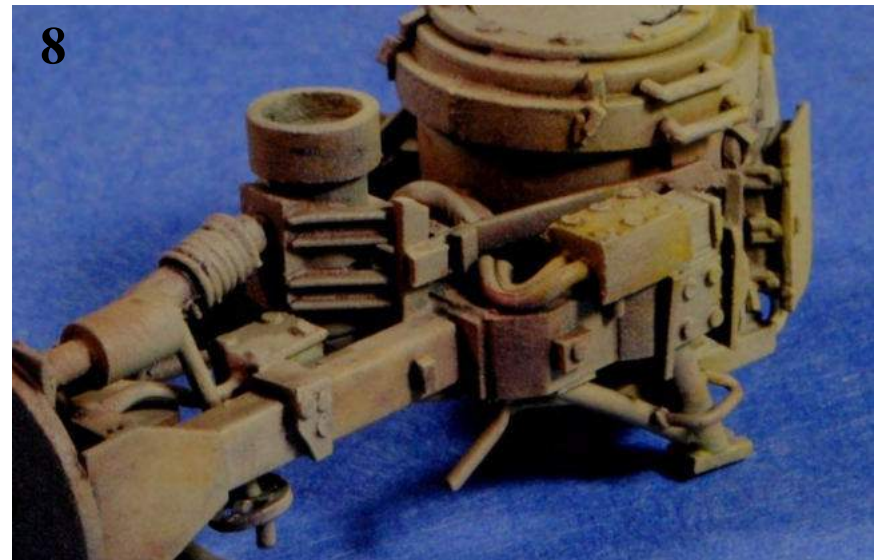
After the filters, the floor and other high-traffic areas were given a wash of Burnt Umber oil paint.

8) This shows the spotlight after the filters were put in place. Note the purple in the shadow areas. Purple is the complimentary color to yellow (opposites on the color wheel). This is an example of shading using complimentary colors. Placed side by side, complimentary colors appear brighter. Mixed, they become muted and darker.

7



8



9



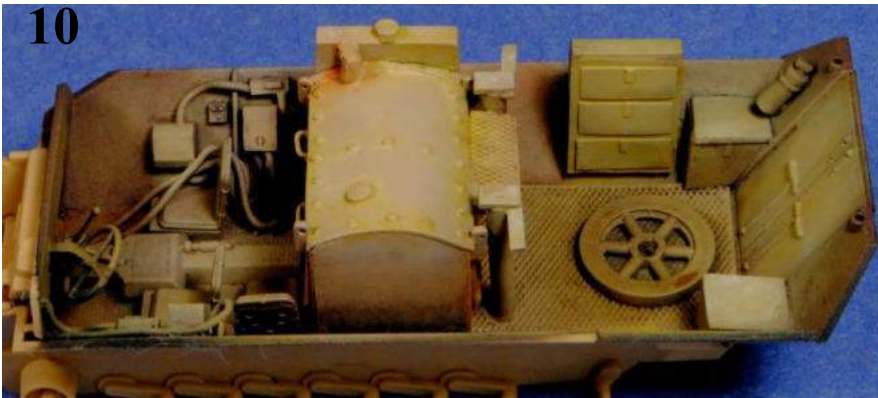
9-10) The interior was lightly weathered. Dot filters were applied and blended. This was only done after a barrier layer of Dull Cote was put on top of the first layer of filters so that the mineral spirits in the second layer would not affect the underlying colors. Dull Cote is a lacquer—it will not be affected by the mineral spirits. As the vehicle is fairly new, dot filters were applied sparingly since this technique is most useful for depicting wear, dirt, fading, and general grunge.

11) After the filters had dried, details were brush-painted using acrylic paints using, depending on the item, the same methods discussed previously or the same methods I use to paint figures and their gear.

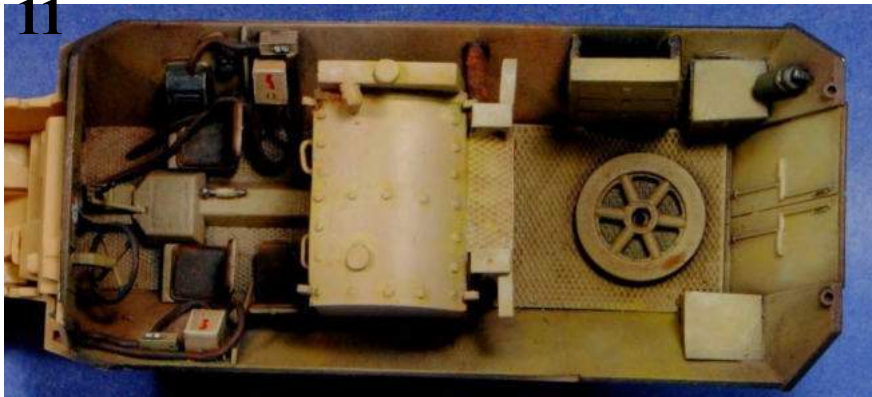
12) Edges, bolts heads, and the top of other fine details were picked out with thin acrylic glazes of a very high-highlight color. These were mixed from Vallejo Model Air paints using Sand and/or White Grey. They were thinned with water and applied with #0 brush.

13) The final step in shading & highlighting (modulation) is to outline details and panel lines. I do this with a Black, Burnt Umber, or mixed thin pin wash of oil paint applied with a fine pointed brush. Combined with the previously done edging, this really makes details “pop”.

10



11



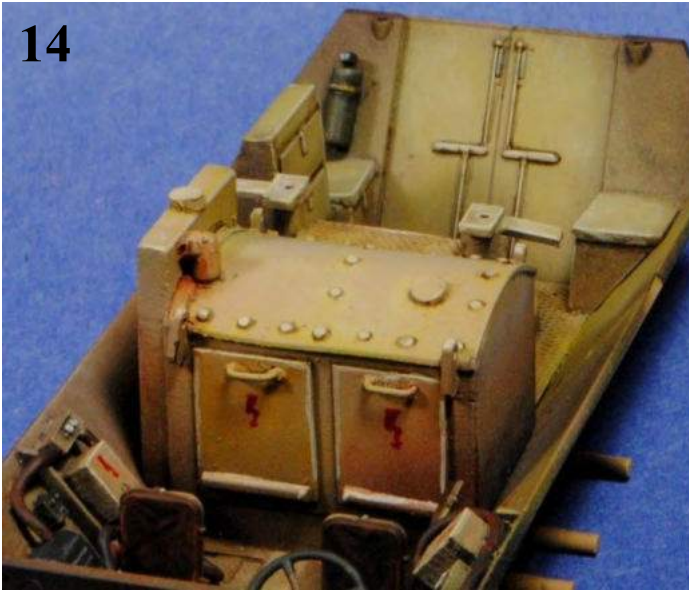
12



13



14



14) The finished hull. Note the covered front portion is in shadow while the open rear portion is lit. The front of the generator is lit only from above due to the near proximity of the driver's compartment roof and the inward slope of the upper hull. Therefore, the top is in bright light, but the front only has a pool of light top center. Same with the rear hull—the doors are brightly lit, the area beside them is in the shadow of the sloped open hull.

Below Left: The interiors of most of my 251s are quite visible. That is not always the case with other models. The Panther accompanying my 251/20 features an open driver's hatch. This requires a small bit of the interior to be visible. This was scratch-built using styrene shapes and bits from the scrap box. As the inside of the vehicle will be in deep shadow, interior detail is merely "suggested". Since little light would enter through the small hatch and these vehicles featured a primer-colored interior a dark color palette was used. The interior was first painted Black. This was then oversprayed with German Primer Red, leaving the black as the dominant color in all areas other than the driver's area under the open hatch. Other items were painted as needed, and then a dark wash of black oil paint was applied, followed by some edging in lighter colors. Finally, the floors were dry-brushed with Steel and pencil lead was rubbed on in the most visible wear areas (such as the top of the seat frames).



The example we've just looked at represents a relatively new and clean sample. What if we desire more weathering? Lets look at some additional techniques we can apply to our vehicle interiors to achieve this. The following photos are from my Sd.Kfz 251/1:

15



16



Next, paint chipping was done. This is really a bit of artistic license—I do it because it looks good. German primer was quite good, and the combat life of armored vehicles was only about 3 months or so, so not much chipping, in reality, would have happened. And, in this scale, most would not be visible. Still, it adds to the wear and tear of the vehicle. 15: To give a layered effect to the paint chips, I added the first layer in a higher color than the base—in this case Sand Yellow. They were dotted in with a small brush. 16: For the next layer German Red Brown + Black was added inside the first layer of chips.



17: Edges that would get a lot of wear (top of seat frames, door handles and edges, equipment rails, etc.) were rubbed with a soft lead pencil. The floor tread plate was lightly dry-brushed with Andrea Lead (a color in their Silver Paint Set).

18: For dirt on the floor, pigments were dissolved in Mineral Spirits and applied as a wash. Additional dry pigment powder was sprinkled on top of the wet wash. Dark color pigments were used in wash, while both light and dark earth colors were sprinkled on. To sprinkle the pigment in place, simply pick up the powder with a brush, hold it over the desired area, and tap the brush with your finger.

19: Once dry, the excess powder was brushed away with a soft brush leaving a nice, dirty floor behind.



20: This photo shows the inside of my Sd.Kfz 251/3. The first layer of dirt on the floor was added in the same fashion as above. For wetter mud, pigments of a darker color were mixed with glossy Pledge Future floor polish to give them a damp look were applied. For very wet areas, Future was also applied on top of the pigments.

(Note: the holes visible in the floor and seats are there to receive the mounting pins of figures inside the vehicle—I usually use paper wire pins to fix my figures to vehicles and groundwork.)



With the interior complete, we can continue assembly and paint the exterior of the vehicle.



Painting the Vehicle

Base Color



After the interior is complete, any figures that would be difficult or impossible to fit after the vehicle is assembled (such as drivers) are put in place and the hull halves are joined. The vehicle is then assembled. Normally, wheels and tracks and other large assemblies, such as guns, are left separate. Tiny, easily broken parts, such as fender width indicators are also normally not added until the vehicle is complete and glued to the final base. Holders for the various assemblies are fabricated (see page 3) and painting can continue. I invariably paint the base color using pre-shading and airbrushing techniques as shown on this and the next page.

The open top of the hull was masked and the hull wiped clean of any debris and fingerprints. To mask the interior, the inside was filled with tissue paper and index card was fitted into the equipment rails to prevent direct overspray into the top. This, plus careful airbrushing ensured no paint went where it wasn't supposed to.



21: Pre-Shading: After priming (with Black), White was then sprayed from above, resulting in a natural highlighting and shading. Black was then applied around the hatches and prominent seam lines. If the base coat is applied thinly, this pre-shading will show through, helping to shade and highlight the vehicle. If brush painting, this step is not necessary as it will be covered by the base layer.

22: Using Vallejo Model Air Colors, the dark yellow was painting. Here, the first three levels have been applied using the colors shown on page 5. Color #5 was applied only to the undersurfaces, and lower back of the hull. Color #4 was applied to the vertical sides, upper portion of the back of the hull, the nose, and other near vertical areas. Color #3 was applied to all upper surfaces.



23: The final two colors were added. Color #2 was added to the upper hull sides and the sides of the engine compartment. Color #1 was lightly sprayed in the middle of panels on upper surfaces only.

Note how the preshading shows through around the panel lines and hatches. The model shown in these three photos is my Sd.Kfz 251/1





Another example of pre-shading, this time using three colors. The vehicle is same Panther see saw on page 9. Black Primer was followed by red-brown primer allowing the black to show through in shadows. Finally, White was sprayed on upper surfaces. The green was applied in light coats so that the pre-shade showed through. The pre-shading applied most of the modulation—the green was applied in only two values. On upper areas the color applied was a 2/1/2 mix of Cam Green, German Green (both VA) and thinner. For lower areas, a bit of black was added to the mix. This is another example of shading using complimentary colors. We've already seen purple used to shade yellow. I chose to use the dark red color as red is the complimentary color to green. For a more in-depth discussion of color theory, refer to the chapter on Building and Painting Figures.



My Sd.Kfz 251/6 was finished to represent a halftrack that was sent to Africa in Dark Grey and was repainted Sand while in theatre. As the dark grey would be almost completely covered (visible only around markings and some chipped/worn areas), I did not modulate the grey. The vehicle was simply sprayed with Vellejo Model Air Panzer Grey. Decals were applied as we will see later in this chapter. Rather than repaint the vehicle and markings, the Germans often sprayed the sand color around the original markings. I did the same. The markings were masked using raised masks (paper elevated slightly from the surface by little balls of Blu Tac). By not being flush against the surface, the masks will allow some paint under resulting in a soft edge, as if the markings were simply sprayed around when the vehicle was painted in the field.

The desert sand color was applied using my normal color modulation methods, I applied the sand using three Vellejo Model Air colors—Cam. Medium Brown, Khaki Brown, and IAF Sand (the colors are shown on the top of page 4) The mixes, from darkest to lightest, were as follows:

- 5: Cam Medium Brown with a bit of Khaki Brown.
- 4: Khaki Brown with a bit of Cam Medium Brown added.
- 3: Khaki Brown
- 2: Khaki Brown with a bit of AIF Sand added.
- 1: IAF Sand

Once the raised masks are removed, the vehicle looks as it appears in the photo on the bottom of page 12.



Masking

Unless you paint entirely by hand, you will need to mask some areas of your model during painting. Perhaps the reason is to protect an already painted area from overspray. Maybe it is to paint an intricate multi-color camouflage scheme. Or perhaps you chose to paint markings rather than (or as a supplement to) using decals. There are numerous ways to mask. We have already seen how I use tissue and index card when spraying the exterior to protect the interior. We've also seen a raised mask used to protect previously applied decals and obtain a soft-edged camouflage. What about masking the camouflage itself?

You could use masking tape cut into shape and placed on the model. As an alternative, putty—Blu Tack, Silly Putty, or a purpose-made putty such as the Mig Camouflage putty reviewed on the next page—can be used. Test first to make sure your putty doesn't leave any residue behind (the Mig putty will not, but some poster putties will). This is my preferred method.

Masking fluid is an option, but many of these contain ammonia which can attack Future floor polish and some acrylic paints. Take care applying masks over delicate details as they can be rough to remove without damaging the parts.

Loose masks, such as card or Post-It notes simply held over the surface can work in the same fashion as the raised mask we have seen. The sharpness of the paint edge depends on how far the mask is held from the surface. These can be cut to shape. Holes can also be put in them if painting a mottled scheme.

Other methods, such as Cling Film and pre-cut masks, are often used on aircraft models, but are not as useful on armor models. Still, they are an option.

Stencils can be used instead of decals for painting markings if you so desire.



Above we see the back of the paper mask used to cover the registration plate on my 251/6 we see on the facing page. Two small blobs of Blu-Tac (reusable poster putty) are pressed into place. These also stick to the vehicle, holding the mask about 1-2mm away from the surface. This allows the painted edge to be somewhat feathered. If using poster putty, test it first on a painted scrap to ensure it doesn't leave any oily residue behind when removed.

Right: Tape can also be used to mask, as long as the surface shape is not too complex and here are few raised details. In this case, the regular camouflage and markings were added, some basic weathering done to indicate the underlying paint was older than the top layer, and then the pattern masked and the vehicle over sprayed with winter white. This top coat was irregular and transparent in places. Note how in the top photo the interior is masked. In the bottom photo, that masking is removed as no more airbrushing will be done. Further weathering can now be applied over the entire vehicle. In this instance, both the underlying camouflage and the winter white colors have been modulated.





Left: For masking camouflage for airbrushing, I sometimes use MIG Production's "Masking Putty". It's pricey, but it works well. Silly Putty (or poster putty) can be used in the same fashion. In fact, the MIG product is very similar to Silly Putty in many ways. The putty is quite soft and flexible. It feels slightly oily, but it leaves no residue behind at all – either on your fingers or on your models. If you pull slowly, you can stretch it just about forever. But give a quick tug and it breaks cleanly. It's self-leveling. Wad it into a ball and drop it back in the tin, after an hour or so, it will have settled right back into the shape it originally was. If kept in the tin when not in use, I don't think it will ever dry out.

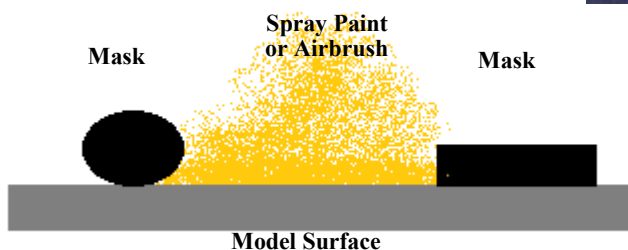


Right: Hard-edged camo can be brush-painted, but masking and spraying is quicker and can yield better results. I pulled and flattened pieces of the putty on a sheet of glass and cut the masks roughly into shape with a hobby knife – it cuts very easily with a knife or scissors. Then I just picked them up and applied them to the model. A tiny bit of pressure will stick it in place pretty good. I used a putty spoon to make any final needed adjustments. If you cut your piece a little small – no issues, just stretch it to fit. The self-leveling qualities are great here – in a couple minutes, the putty will snug down quite nicely over details such as rivet heads, hinges, panel lines.



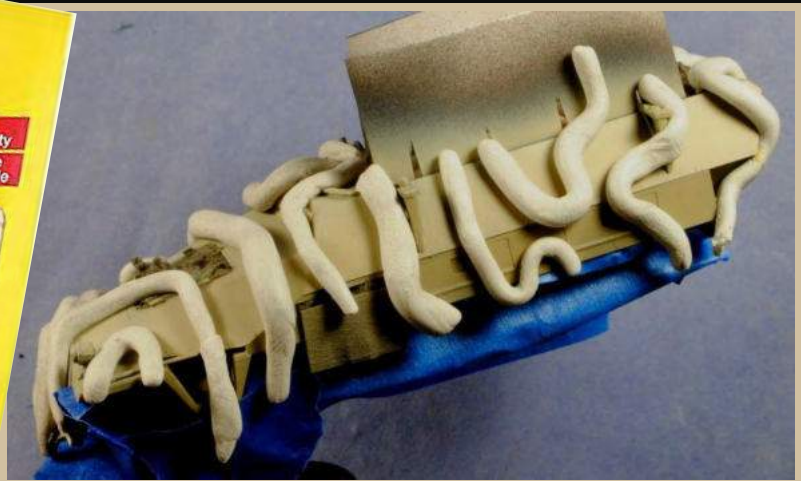
Once happy with the pattern, spray your color. Note in this example (my 251/22), the camouflage pattern is modulated to the same degree as the base color. Remove the putty (it peels off very easily or can be lifted with more putty – it sticks tenaciously to itself), and you have a nice clean pattern. Paint seems to absorb right into the putty, leaving the putty no worse for wear and just as pristine and residue-free as it was before.

If you apply the putty in a "sausage" where the outer edge is slightly elevated over the model, it will leave a soft, feathered-edge pattern.



Left: Masks can allow you to paint hard or soft-edged camouflage. If the mask fits tightly against the surface (near left), the demarcation line will be solid, creating a hard-edged pattern. If the edge of the mask is slightly raised (far left), some paint will get past, resulting in a slightly blurred, soft-edge pattern.

While many airbrushes can paint very fine lines, sometimes it's easier to use masks rather than try to freehand a complex pattern. In this case, I wanted a series of relatively thin lines with distinct but feathered edges. Poster putty was used as a mask. While I often refer to this stuff as "Blu-Tac", it in fact has several brand names including the original "Blue Tack" and many others. It also comes in both blue and white varieties. Whatever you use, test it first to make sure it doesn't leave any residue behind or lift paint. As in the illustration at the bottom of the facing page, I rolled the putty into sausages and applied it to the model. When I sprayed, this kept the pattern tight and acted as a mask while still allowing some slight feathering at the edges.



Markings can also be masked and painted as I did the red crosses on my Sd.Kfz 251/8. Red disks were air-brushed using a masking tape (blue painter's tape) mask. A strip of tape was put on a piece of glass and discs were cut from it using a sharp new blade in a circle cutting tool. The tape was peeled-up, placed on the model, and paint applied. Strips of tape covered the crosses, and the white was sprayed. The tape was then removed.

Right: To make tape masks for markings, use a sharp knife. A shape template, a straight edge and tools such as the circle cutter shown are useful.



Painting Camouflage

mored vehicles were painted at the factory in overall dark yellow. They were then camouflaged with the addition of Red Brown and/or Olive Green paint. Although this is the look we might be attempted to recreate, we don't have to follow the same process. If, for example, that dark yellow base color will be mostly covered by the olive green on your model, you can, if you choose, paint the olive green as your base and apply the yellow on top. It will look the same either way—the amount of time and paint required are the only differences. The only instances when this would not hold true are cases where one color was clearly painted over another.

Your camouflage can be brush painted or airbrushed. Brush painting will give you a hard-edged camouflage pattern. Airbrushing will give you a soft, feathered-edged pattern unless you use some sort of a mask. As we have already seen choice of method is entirely up to you. You should, however, be consistent with your color application. If the base color is modulated, so should be the camouflage.

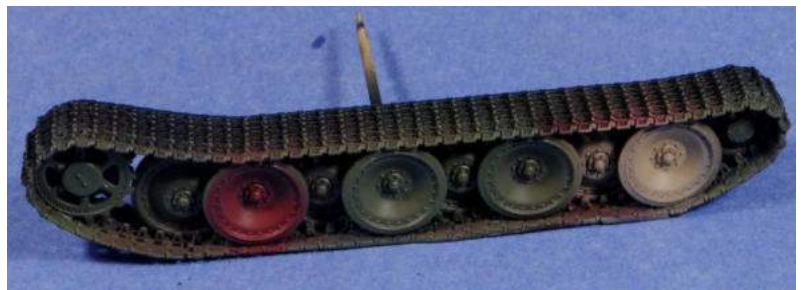


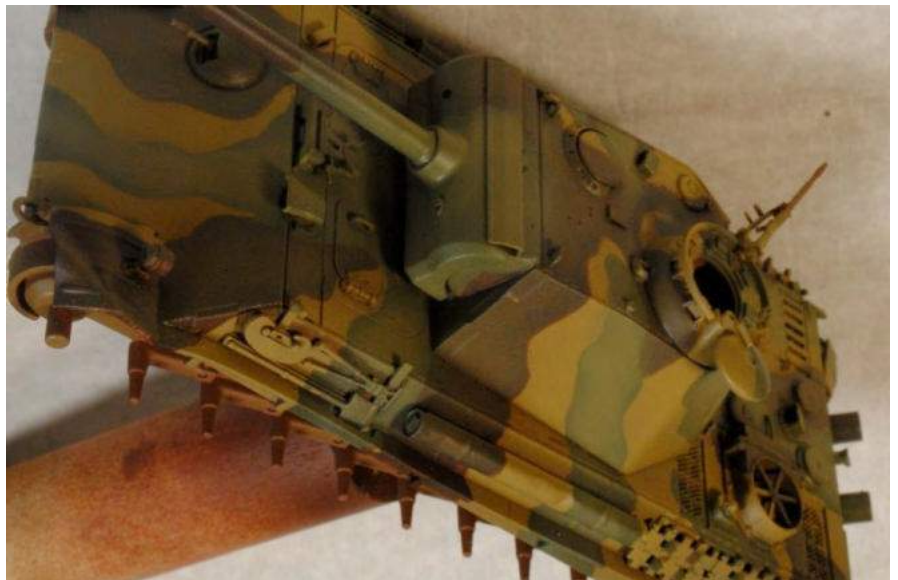
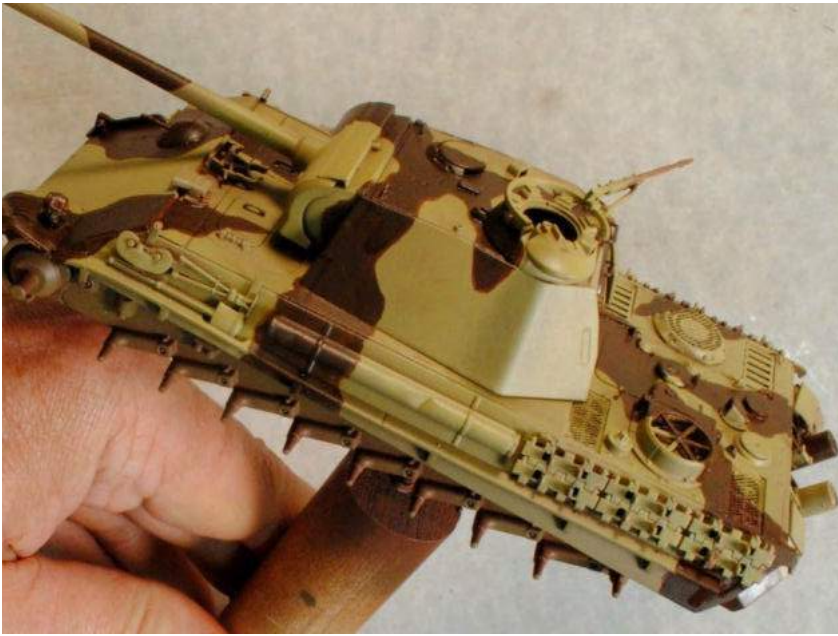
24: Camouflage was applied the same way as the base color—starting dark and working to light. Colors used were those shown/listed on page 7.

25: The colors were tied together, and the starkness of the camouflage muted, with a light overspray of thinned Dark Yellow. This is a completely optional step that sometimes I apply and sometimes I do not depending on the effect I am trying to create.



Right: Don't be afraid of variation. Research will give you ideas. After the Germans started using Olive Green as a base color on several of their large tanks and tank destroyers, existing stocks of the dark yellow parts were likely used up without necessarily being repainted. Hence, a couple wheels were painted in dark yellow. Also, replacement parts may not have received more than a primer coat. One wheel was left in the red-brown primer color, with a bit of red added and sprayed on highlight areas. All this will contribute to the raggedy, beat-up look of the tank. This is the Panther we have seen on pages 9 and 20.





As seen on this Panther tank (the companion to my 251/3 prior to the application of decals and winter whitewash) the techniques of brush painting and airbrushing are not mutually exclusive.

Top: After the dark yellow base color was applied, the Red Brown was added. I outlined the color with a brush as seen on page 8 making sure to leave a sharp demarcation line. Then I filled-in the outlined areas using the airbrush. By doing it this way, I did not have to use masks to achieve the hard-edged camouflage. After the basic camo was brush-painted, a lighter color was airbrushed over the center of the brown areas to provide modulation, variation, and visual interest.

Bottom Left: After the brown, the same method was used on the green.

Bottom Right: Finally, using the airbrush, the vehicle was misted with Dark Yellow to tie everything together and soften the contrasts. I did make a potential error here... It might have been better if this misting had been done after the application of decals rather than before.

The moral: Don't be tied to a particular method. Use what works—and what you are comfortable with—to give you the effect you desire.

Applying Decals



Waterslide decal application is a problem for many modelers. Improper application can lead to the decal carrier film being visible, ruining the effect of the decal. But the good news is that it is not hard to get good results. With a little care, your decals can appear to be painting on. At left we see the tactical number and cross on the side of the my Sd.Kfz 251/21. Properly applied on the surface prior to weathering, they appear quite realistic.

With care, decals can look as good as painted markings. I add decals after painting, but prior to weathering (after all, markings would be weathered the same as all other paint). Decals do not adhere well to flat paint. This can cause bubbles or silvering, causing any carrier film around the edge of the decal is very visible. First, coat the area where the decal will go with a gloss finish. I use Future floor polish. Then apply the decals as seen here. After applying the decal, I add

another coat of Future. While the carrier film may be invisible it is still there. Without this top coat, any dry-brushing or oil paint streaking you do will deposit paint on the edges of the film making it visible once again. Once all these layers are dry (wait at least 24 hours after each coat of Future before proceeding) I cover everything with Dullcote to return the finish to its original flatness.

If you are using dry transfers (rub-on markings) instead of water slide decals you don't need to apply these over a gloss coat like water slide decals. But decal setting solution applied on top can help seal them to the model.

Setting Solutions and Solvents:

These help your decals conform to surface shapes and details, hide decal edges, and prevent "silvering" due to trapped air under the decals. These products help make the decals appear to be painted on. I use Microset Setting Solution and Microsol Solvent. These – and similar – products work by softening the decal carrier film allowing it to more easily conform to the shapes on the model. The setting solutions are milder and help the decal to snug down on the surface. The solvents are more powerful and can almost melt the decal film, allowing it to stretch and settle to conform to almost any surface texture or curvature – including rivet detail and zimmerit anti-magnetic mine paste patterns.

After my coat of Future is thoroughly dry, I apply decals. I put a drop of setting solution in place immediately prior to putting down the decal. It helps the decal slide smoothly to where it needs to go and then locks it in place as you blot away excess water and solution.

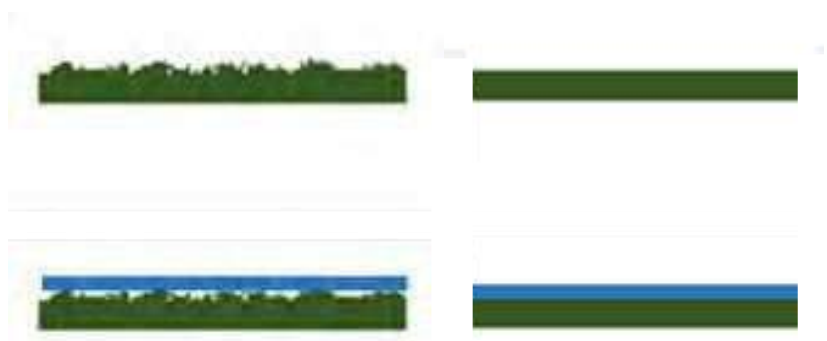
If surface texture or details require the use of a solvent, I apply a drop of this on top of the still damp decal and carefully blot away any excess. Solvent softens the film, so do not touch the decal after this or it may come apart. Solvents may cause the decal to wrinkle – do not panic! Leave it alone, as it dries it will smooth and conform to the model's surface. Since decal thickness can vary, and some surfaces can be quite rough, a single application of solvent may not be enough. Check the surface once dry. If there are air bubbles, prick them and apply a bit more solvent. If the decal still has not settled into and around surface details, apply more solvent and let it dry again. Repeat as necessary. It may take nearly a dozen applications.

Once the decal is firmly in place and completely dry, I apply my overcoat of Future.

Decal Problems:

But what if something goes wrong, or what if the decals are bad?

- If the decal tears, or if it leaves a gap where it



This graphic shows why decals should be applied only on glossy surfaces. In the top row, we see an enlargement of a flat-painted and gloss painted surface. The flat surface is rough, absorbing light and thus appearing matt while the glossy smooth surface reflects the light.

When the decals are applied, bottom row, the flat surface can cause air to become trapped, leading to "silvering", where the decal film is very visible. On the glossy surface, the decal snugs down and conforms to the surface.

was cut or pricked to fit around details simply touch-up the flaw with matching paint.

- If decals are bad, and fall apart when soaked in water, coat the decal sheet with a clear spray coat or a product like Microscale Superfilm to hold the decals together.
- If the decal refuses to stick, and setting solutions do not do the trick, try applying the decal onto a thin layer of wet Future. Once dry, apply another layer of Future on top as normal. As an alternative method, dilute a small amount of white glue into the water you soak the decal in.
- Old decals might have yellowed with age. Try taping the sheet to a window that's exposed to the sun for a couple days. This may bleach the yellow out of them.
- To help prevent problems, protect your unused decal sheets from humidity and temperature fluctuations by storing them in air-tight containers kept in a dry, cool, dark place.

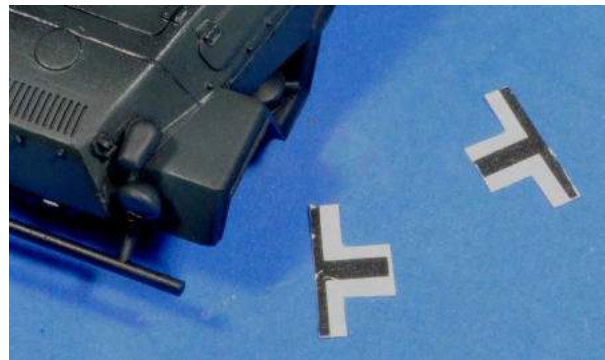


Tools for applying decals are tweezers, Q-Tips, a paintbrush, and setting solution and solvent. I use Micro Set and Micro Sol respectively. These both soften the decal film, allowing it to better conform to the surface. Setting solution is mild and is usually all that is needed on a flat surface. Solvent actually "melts" the decal film, allowing it to conform to rough surfaces (such as Zimmerit or other surface details). DO NOT touch the decal after solvent has been applied as it can easily disintegrate. It may shrivel up. Don't panic! It will straighten out as it dries. Note that it may take several applications of solvent to get the decal to conform to a really rough surface.



26: In areas where decals would be applied, the model was sprayed with Future floor polish. This results in a smooth gloss surface. A flat surface is rough which could lead to trapped air under the decals, causing "silvering". The gloss prevents this.

27: Most decals are cut from the backing sheet and used as-is. This decal will be placed on the engine access hatches. In this case, since the engine hatch has a deep scribed divide, I chose to cut the decal in half. I also trimmed the film as close to the decal edges as possible to avoid any film overhanging the edges of the door. As an option, I could have left the decal intact and used decal solvent.

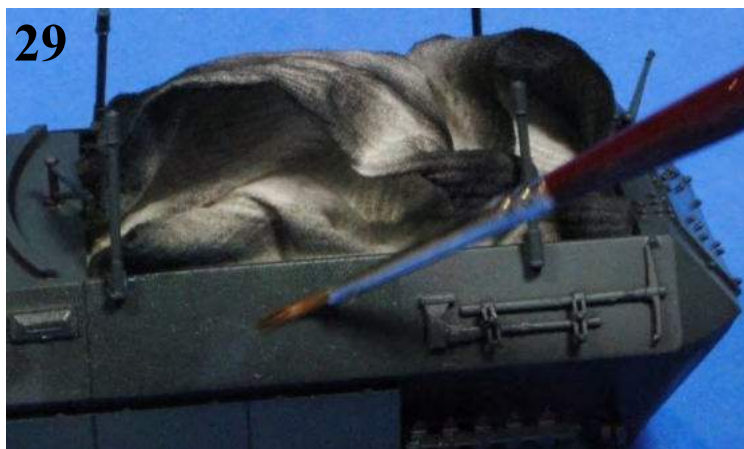


28

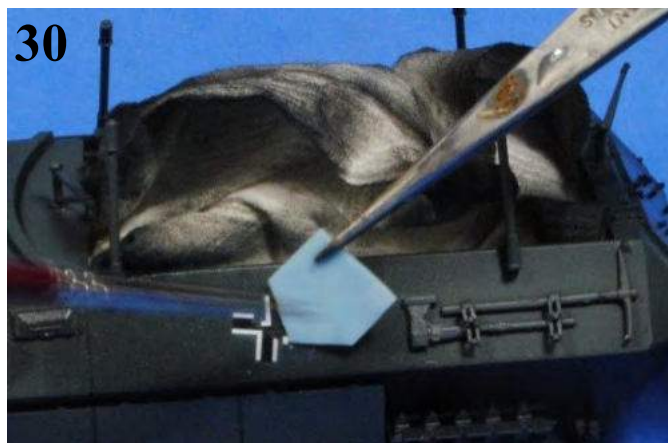


28: To apply, cut the decal you want from the sheet and give it a few seconds dip in water. Then set it aside for a few more seconds while the film loosens.

29



30



31



32



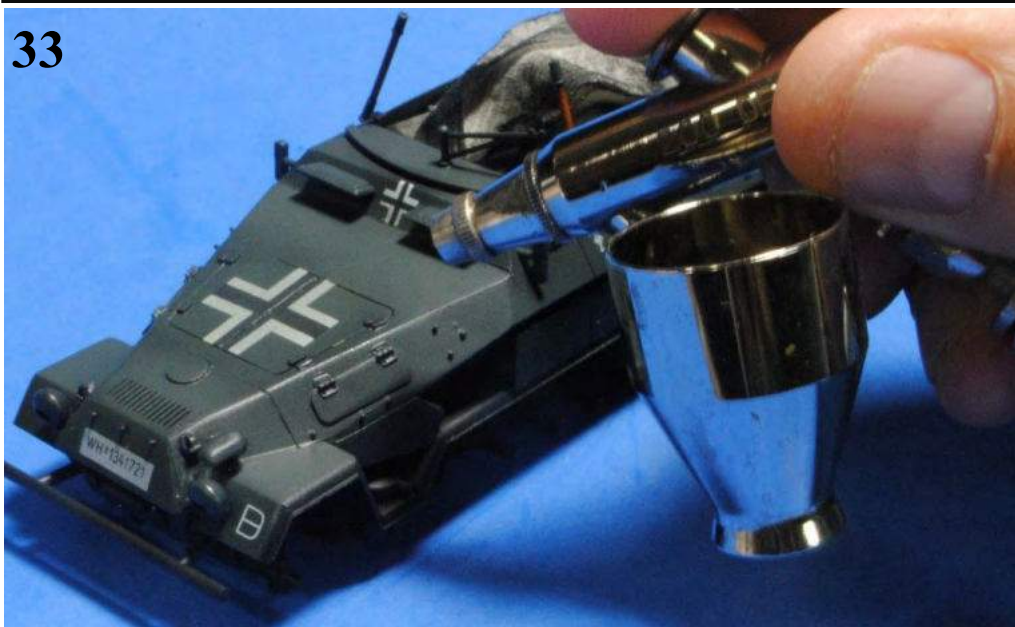
29: While the decal film softens, apply some setting solution to the model where the decal will go.

30: The decal is brushed off the backing onto the model. This is usually simple and easy, but sometimes problems can occur. Here, the fragile decal cracked. It was simply coaxed back into position and the break was invisible. A new decal could also have been used.

31: More setting solution was added to the decal. If this were a rough surface, solvent would be used instead.

32: Excess solution and water was blotted away with a Q-Tip, pressing the decal firmly into position. Note—do not touch a decal softened with solvent. Once dry, if there are any air bubbles, carefully prick the area with the point of a hobby knife and apply more solution. On rough surfaces, if the first application of solvent did not properly seat the decal, apply more. Several applications may be necessary.

33



33: Once all the decals are in place and any water, setting solutions, and solvents are completely dry, apply another layer of Future to seal the decal. If this is not done, while the decal film may not be visible, any later dry-brushing will make it very apparent. The raised edge will also catch filters and washes. By sealing the decal between layers of Future, this is prevented. Once the Future is dry, apply as many layers of clear flat (I use Testor's Dullcote) as needed.

34



34: If all was done properly, your decals will look painted on. As a final step since the decal white and black looked very harsh on the dark grey, I misted a very thin coat of Panzer Grey over the decals to tie them in with the vehicle. This is an optional step that I sometimes use—or not—based on the effect I am trying to achieve and how “weathered” I want the markings to look.

Making Your Own Waterslide Decals:

With all the halftracks in this series being made from just three different kits, decal options are limited. A person could hand paint their own markings, or mask and spray them. There is also a small selection of aftermarket decals for German armor available in quarter scale. Another option is to make your own decals. You can purchase blank decal paper for laser and inkjet printers (make sure you get the correct type). The paper comes in clear and, since most printers cannot print white, it also comes in white. Most come with instructions you should follow to ensure success. Create your graphics on a computer or download graphics from the internet. Then simply print your graphics on the decal paper. I suggest printing them first on regular paper to ensure you have sized them correctly and they look like you expected. After printing, the ink needs to be “fixed” to the paper so it doesn’t run when you dip your decal in water. You can use fixer made especially for this purpose, or you can simply spray the printed sheet with a clear flat or semi-gloss. Allow to thoroughly cure—at least a day or two. A simple test—if you can smell the paint, it’s not fully cured. Once the sheet is prepared, use it like you would any decal sheet.

Basic Weathering Techniques



“Weathering” consists of various techniques to create the appearance of wear, dirt, and the effects of the elements on the vehicle being modeled. The number of different possible techniques and the method of applying them is almost endless. So are opinions on how much weathering is enough and how much is too much. Ask 30 different modelers and you’ll get 50 different opinions. I believe that nothing brings a model to “life” and depicts the rough use military vehicles are subjected to than well planned and executed weathering. On the flip of the coin, nothing can ruin a model faster than poor weathering. Some would even argue that weathering detracts from the model by obscuring detail or is used as a crutch to hide painting mistakes. To me, this part of the build is probably what I enjoy the most because of the range of creativity allowed. This portion of the chapter describes the methods I normally use, to a greater or lesser extent, on all my models. The amount of weathering you chose to apply to your models, and the methods you chose to use, are totally up to you.

Paradoxically, while weathering enhances the realism of a model, a great deal of it is little more than artistic license. Yes, military vehicles spend a great deal of time in the field and can get extremely dirty and muddy. But a crew’s survival depends in large measure on the functionality of their vehicles, so they are often cleaned and maintained. Most paint is relatively tough, and—at least for the WW2 German military—the life expectancy of a combat vehicle was measured in days or weeks instead of months and years. Therefore, realistically speaking, large amounts of paint chipping, flaking, and fading as well as months of accumulated crude and grim are rarely completely accurate. But a large part of what we do is visual art where it can be as important to capture the feel, drama, and emotions of something as much it is to capture the exact details (see the chapter on the “Ten Commandments of Composition” for a detailed look at “artistic license”). So what this weathering does for us is to depict the fact the vehicles had a rough existence in an unforgiving environment.

There are three keys to successful weathering. They are essentially the same three

The amount and type weathering you apply is totally up to you—determined by your subject and preference. Weathering can be fairly basic or extreme. You can use it to depict the entire gamut for a clean new vehicle to a battered and filthy veteran.

things we've seen all along – research, planning, and execution.

As with the details of the models themselves, research is important. We need to know what theatre or area our vehicle operated in so we can study the environment in that region. What type of elements was it exposed to? What colors of earth, dust, and mud were prevalent in the area? We want to determine what type of action the vehicle saw and how long its exposure was. We also want an idea of how the vehicle operated and what type of actions the crew would perform. All of this allows us to progress to our second key – planning.

We want our vehicles to look realistic, so we need to plan what we will do to ensure our weathering is convincing and not overdone or fake in appearance. Determine how much paint damage and crud build-up is consistent with the service life of the vehicle. Work out what areas of the vehicle would be kept cleanest for operability and what areas would see the most activity and traffic by the crew. Determine what weathering colors are appropriate for the region. Also determine what techniques will work for your vehicle and region. A lot of rain marks and rain streaking, for example, would probably be inappropriate for the desert. A great deal of dust, however, would be very appropriate. A vehicle operating in a wet, muddy climate would look out of place with a clean undercarriage and suspension. While this vehicle would likely have a great deal of mud building, the amount of dust it displays would likely be minimal. Speaking of dust and mud, determine on which areas of the vehicle these would collect. Be aware how factors such as missing fenders will affect this mud build-up pattern.

Finally, we have execution. While it may sound counter-intuitive when making a dirty messy vehicle, our work should be “neat” and “clean”. In other words, apply weathering with at least as much care as we took with painting. While you can use a large variety of methods, either by themselves or in conjunction with other methods, and while you can use a large variety of colors, the methods and colors used should be consistent on all parts of your vehicle – for example don't use one set of methods and colors on the turret and a completely different set on the hull. Amounts and patterns may vary, but the colors and methods should remain fairly consistent throughout.

Each modeler has their own approach to weathering, and you should develop and use the methods you are comfortable with and that give you the results you desire. I have tried many techniques. There is no one “correct” universal method. But the example I use in this section – my 251/2 – shows the primary methods I have used on most, if not all, the halftracks in this project. As was true with painting, the vehicle is weathered in sub-assemblies. These include the complete hull, the track assemblies, the front wheels, and other items left separate for the painting process.



My 251/2 prior to the start of the weathering process. Note the hull is completely assembled except for tiny fragile details such as the radio antenna and the fender width indicators. The mortar and the seated crew members were glued into place before the top half of the hull was added.

Wheels and the track assembly are left separate. The dark yellow base color was airbrushed using the previously explained color modulation methods. The red brown and olive green colors were brush painted, also using the modulation methods, but only three colors –shadow, base, and highlight—were used for each of these. Dark yellow dapples were then hand-painted on top of the camouflage. This camouflage scheme is based on a photo of an actual 251/2. The only markings carried by this vehicle are the registration plates. Also apparent in this photo, the vehicle was given a misting of a dust-colored paint to tone down the high contrasts of the camouflage, visually tie everything together, and serve as a base for further weathering. The wheels and track assemblies were painted and weathered at the same time as the hull using the same colors and methods.

But for the sake of clarity, we will detail those after we finish with the hull.



35

35: The first layer of oil paint dot filters was next. Dabs of paint (burnt umber, burnt sienna, titanium white, yellow ochre, cadmium yellow, crimson alizarin, and cobalt blue) were put on an index card.



36

36: Dots of the paint were applied to the model—with light colors predominantly toward the top, darker colors toward the bottom. Only tiny amounts of the crimson were applied otherwise the model could look like it was smeared with lipstick. Small dots of the blue were put in deep shadow areas only.

37: Using an old #2 round brush moist—not wet—with mineral spirits, the dots of color were carefully blended into the finish and into each other. In some areas, they were blended almost entirely away, in other areas they were left fairly thick. In some cases, they were streaked downward in the direction of water flow. The long drying time of oils allows me to push the paint around and “play” with it until I get the effect I’m after and am happy with the result.



37

38: As already mentioned, an advantage of oil paints are that they are slow drying, allowing plenty of time to work. Also, if you make a mistake, they can be easily removed with mineral spirits and turpentine. Finally, the oils—and their solvents—will not damage the underlying acrylic paint. These advantages allow you to use multiple techniques and create all manner of effects. Here we see the grunge being scratched by a toothpick moist with thinner.

39-40: After the first layer of dot filters is dry, I add a high-highlight edging to all corners, raised details, and edges. This is done with acrylics, using a high-highlight mix of the base color. This effect, when combined with the later pin wash, really makes details pop. These detail photos show the effect close-up in a couple of areas.

Remember, when looking at these photos (or any photos in this work) that the actual model is 4.75 inches long. In many cases, you are viewing the actual effect much larger than life size. This not only magnifies the size, it also magnifies the effect—effects that appear quite muted and subtle on the actual model can appear very stark and over-scale when viewed larger-than-life.





41: Chipping is next. This is more an artistic application than a historical one. Still I like the effect. The application is often referred to as "mapping" since it resembles contour lines on a topographic map. The first layer is applied using a bit of foam sponge, dipped in paint and dabbed onto the model is likely areas of wear and chipping. This is done with a very light color. More exact placement, as well as scratches, are added with a fine-pointed brush using the same color.



42: For simple scuffs, that's enough. For deeper gouges, a dark mix of black and red brown primer is carefully dotted into the middle of light color dots. This creates a very realistic chip, with a raised—highlighted—edge. Note that camouflage colors, green and brown, can be chipped showing the dark yellow base color. In this case, since those colors were already filled with yellow dots, I kept that type chipping to a minimum as it had the potential for creating a confusing look.



43: On high wear areas, like the top edge of the fighting compartment and the hand-rail, I picked up some powdered pencil lead with my finger (see page 6) and rubbed this on. A cotton swab could have been used instead of my own digit.



44-45: At this point, a barrier of Testors Dullcote was applied. This will prevent the next layer of oil paint dot filters from affecting the previous layer. Once acrylics are thoroughly dry, additional layers of acrylics can be added with affecting the underlying color. This is not true with oils. Applying a new oil layer on top of an older layer, will "reactivate" the old paint, so a barrier is needed. This second layer is used to create built-up dust and dirt on horizontal surfaces, in corners, and nooks and crannies. It was applied on top of the chipping so the chipped didn't all look new. Dots of light-colored oil paint (primarily titanium white and yellow ochre) are put on the horizontal surfaces. With a mineral spirits-moist brush, these area blended in and pushed into corners and other areas where dust and dirt would accumulate.



Now that we've addressed dust build-up on the horizontal surfaces, let's turn our attention to the vertical surfaces.

46. The next layer of oil dot filters represents rain marks and streaks of dust, dirt, and rust. First, the same dirt colored oil paints are dotted on the top of vertical surfaces.

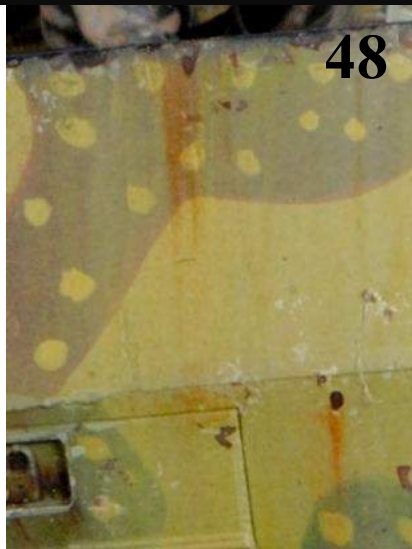
47. Again, using a brush that is moist—not wet—with mineral spirits, the dots are dragged downward until they disappear, creating subtle (and not-so-subtle) streaking.



48: Rust streaks are added the same way using burnt sienna oil paint. Streaks start from any appropriate place.

49: The rusty muffler is first coated with Brown Iron Oxide acrylic paint. While wet, various rust-colored ground-up pastel chalks are dabbed onto the surface using an old brush. Not shown here, a thin wash of Black oil paint (thinned with mineral spirits) will darken the effect and lock the chalks in place.

Other spills and stains can be added using the same dot filter methods we have already seen.



50: Finally, a pin wash using thinned Black oil paint is applied around all raised details, hatches, and panel lines. This dark outlining, when combined with the earlier light edging really brings out the detail in the kit. I've read many articles where the modeler says they use a size 3/0 brush for this. I use a larger, size 0 brush. It is the fineness of the point, not the number of bristles that determines how fine a line a brush will paint. And a 3/0 is so small it holds very little paint. A well pointed 0 brush will do anything a 3/0 will do, and will do it better. These pin-washes can be applied with oils or acrylics. I prefer oils simply because the long working time makes cleaning up mistakes easier.

All that remains to be done for the hull to be basically complete is to paint details including the pioneer tools, stowage bin locks, and Notek tail light lenses.

Weathering is a personal process—add as much or little as you choose, there is no right and wrong answer. But make sure the effects you use are believable for your vehicle and environment and that the colors used work with each other and any groundwork you place the vehicle on. While minimal, muted, and subtle weathering is usually a safe bet (and is probably the most popular among modelers) cases of extreme weathering—if properly done—can look very good. Personally, I tend to prefer my vehicles very dirty and beat-up.

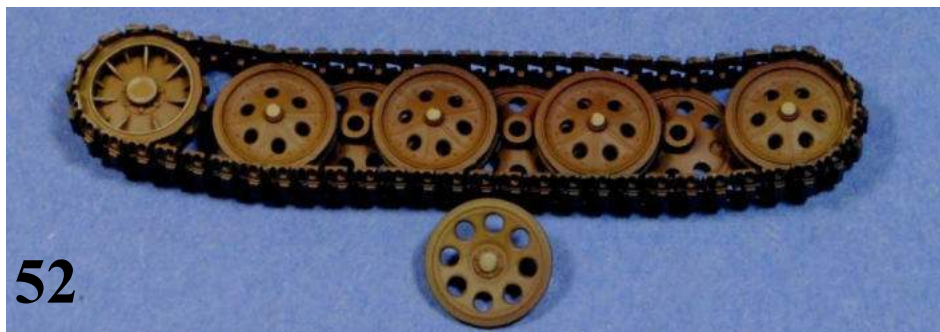


51: The running gear was partially painted at the same time as the hull. The remainder of the painting and the weathering will be done simultaneously. On the Tamiya kits, I completely assembling the track run and wheels prior to painting. I leave the three outer road wheels on each track run separate for painting, as it made getting to the inner wheels easier. When spraying the yellow, the wheels were modulated as well as the hull. Inner wheels were left in shadow color, and the bottom portion of each dish road wheel was given a bit of highlight color.

52: The wheels will be largely obscured by dirt and mud, so they do not get as much detail painting and weathering as the upper hull. Edges and hubs were given a high-highlight edging color just like similar areas on the hull.

53: Rather than dot filers, the wheels were given a heavy wash of a mix of Burnt Umber and Black oil paints thinned with mineral spirits. After this dried they were given (not shown here) outlining pin washes of Black around the hubs and lug nuts.

54: The tires, both on the front wheels and the road wheels, were painted. For worn rubber tires, rather than pure black, I use a mix of black, very dark grey, and dark brown. Note that even the drive sprocket has rubber tires. It also doesn't have teeth like the drive sprockets on most armored vehicles—rather it has rollers sandwiched between the two halves of the wheel. The tracks themselves were given a base-coat of Brown Iron Oxide craft acrylic paint. This was applied with no effort to push the paint into deep shadows, nooks, and crannies—in these areas the black primer was allowed to show through.



Left: A simple trick to painting tires without using a mask. I use this method for both the front tires and the road wheels. Take a thin wash of black and apply it to the edge of the wheel. Capillary action will cause it to wick around the rim, giving you a perfectly painted line. Then just paint the rest of the tire normally. For the tire itself, I use a mix of Black, Charcoal and Burnt Iron Oxide to give a worn, dark grey color to the tires.



55

55-56: Next, pigments/pastels were added. For the first layer, ground-up pastel chalks were mixed with water (a drop of dish soap will help break the surface tension and allow them to mix better) and "painted" onto the wheels, tracks, and lower hull of the vehicle. Different effects can be achieved using this medium depending on what type fixer (water, rubbing alcohol, mineral spirits, etc.) is used and whether they are applied wet or dry. Water is not as "tenacious" and the excess chalks are easier to remove. While still wet, some additional, even lighter, pigments were lightly sprinkled on.

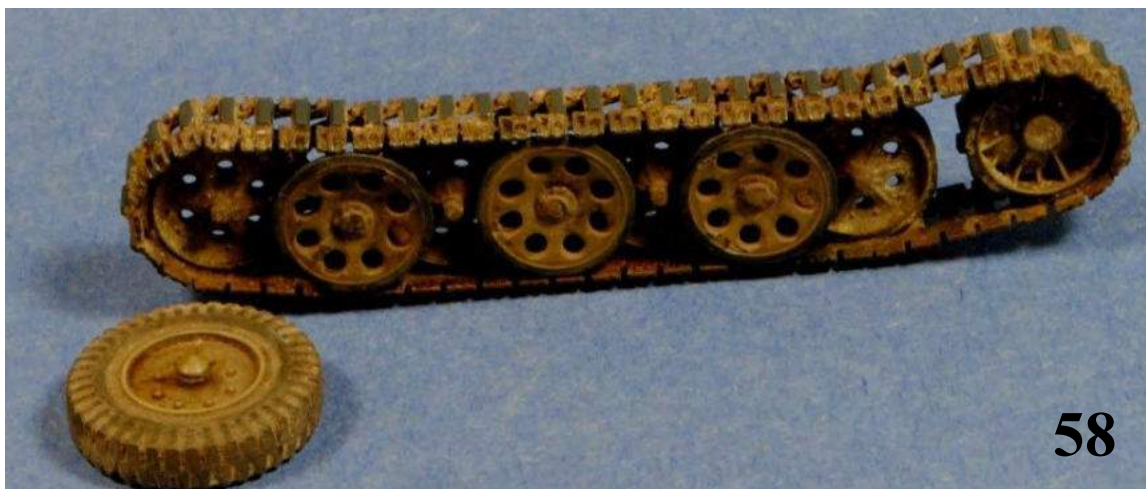


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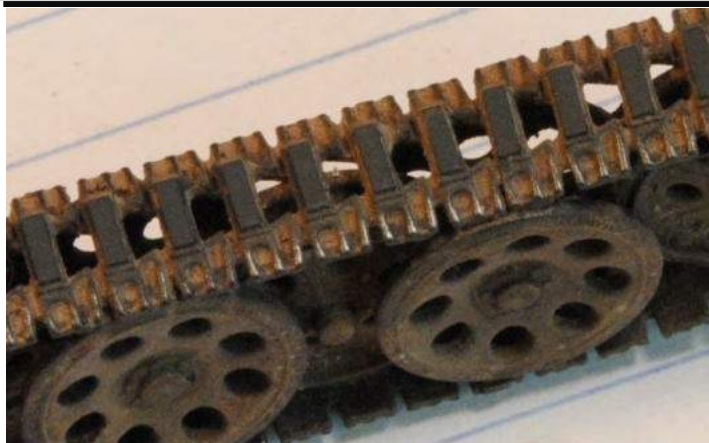
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57. Once thoroughly dry, this was rubbed-off with a stiff brush, leaving a layer of dust and dirt as a base for further pigment applications. This layer was a fairly light color—old, dried mud is generally a lighter color than newer and wetter mud.



58

58. The same thing was done with the wheels and tracks. On the front tires, the sidewalls and tread were rubbed with a damp finger to remove most of the pigments—leaving it accumulated around the rim and inside the tread pattern, creating a very realistic dirty tire. The tracks were lightly rubbed with pencil lead using the same method as before. Track pads were then painted a charcoal color and the outer road wheels glued in place.



Let's step away from the 251/2 for a bit and look at how these and similar techniques can be used on other vehicles and in other situations.

Top: These close-ups of the tracks and a front wheel from my 251/1 show the realistic results that are obtained by using these methods. For a light, general build-up of dust, dirt, and grime, we can stop here (as I did on my 251/1). For heavier mud, we can continue as seen on the next page.



2nd Row Left: The same method is used for AFV Club's vinyl tracks. I paint these prior to gluing them into a loop

2nd Row Right: Use appropriate pigment colors. Dark colors can represent darker or muddier earth, while light colors are good for dried mud or dust. Grey and brick colors can be used in urban rubble environments. Oil paints are good for fuel and oil spills—such as the leaking grease seal seen on one of the road wheels.



Left and Below Left: We've seen dust applied with dot filters and pigments. It can also be applied as a wash—either on its own or in conjunction with the other methods (as I did here). Yellow Ochre and Titanium White are mixed with mineral spirits to the consistency of milk and applied to areas where dust would accumulate—primarily on horizontal surfaces and the suspension. The advantages of oils are that they can be worked and pushed around and even removed for a very long time. The effect of this dust build-up is quite noticeable on my 251/6. Look on the fenders, around the suspension arms, on horizontal surfaces, and in the various nooks and crannies.

Let's now return to the 251/2

59: In this instance, I wanted a heavier mud build-up on the hull. For this darker colors of pastels/pigments were applied. A couple different shades of medium and dark brown were heaped onto the appropriate areas of the suspension. This was done by picking up the powder with a brush, holding it over the target area, and tapping the brush with a finger. At this point, there is nothing holding the loose powder in place.



60: To lock, or "fix" the pastels into place, a brush loaded with rubbing alcohol was touched to the model, allowing the liquid to wick into the powder. Note that the alcohol will attack acrylic paint, so make sure a barrier layer of Dullcote was applied over the base acrylic paint prior to the application of any pigments. This is where pre-planning is vital. Instead of the rubbing alcohol, Mineral Spirits could also be use. This will not affect the acrylics. You could also use commercially available pigment "fixer".



61: Once dry, the hull looked like this. More applications and layers can be added as desired until you happy with the result. If there is excess, much of this can be knocked off with a stiff brush.



62: Wetter areas can be simulated by adding a bit of Future floor polish.





63



63: The wheels and tracks were attached to the vehicle, and any needed touch-ups were done. Any remaining details (such as pioneer tools) have been painted. With this, the weathering process is complete. The only assembly that remains to be done is the attachment of the fender width indicators (that due to their fragile nature will not be added until the vehicle is on the final base), and the external stowage that was painted separately. In the top photo, note the oil spill on the edge of the engine hatch. This is done with oils like a dot filter. Place the color and then drag in into the shape desired with thinner-moist brush.

Not shown earlier (because it is rarely present since most models feature a closed engine compartment) any visible engines were painted along with the interior before the hull was closed up. The methods used to paint and weather the engine compartment were the same as the rest of the vehicle. Heavy washes of oil colors are good for depicted general grime and oil spills and stains. Note the rusty manifolds—painted using the same methods and colors as the exhaust and muffler.



Advanced Weathering Techniques

The previously described techniques and methods were generally used to some degree on all the halftracks in this series. On some vehicles, additional methods were used to depict heavily worn or layered paint or a thick build-up of mud. Most of these things could be accomplished using the methods we've already seen, but there are other methods that in these instances will work just as well or even better.

Let's start with a discussion about the methods used to create worn, flaking, or chipped paint and move on to the creation of thick, heavy mud.

Salt, Hairspray, and Thinner Methods of Weathering Paint:

These are methods used to distress the top layer of paint allowing the underlying colors to show through. Applications include such things as worn winter whitewash over the base color, desert sand color wearing away from the underlying panzer grey, or simply old paint flaking and wearing off the primer or bare metal underneath it. Using one or a combination of these methods a modeler can create chips, scratches, flaking, wear, etc. Like anything else, there are a million ways to skin the cat – these are just more tools in our toolboxes.

The key is having a lower, or base, coat of color that will not be affected by distressing the overlying top color. Thus, the two layers must either be different types of paint (using different thinners/solvents such as using acrylics over enamels) or there must be a barrier of some sort between the two layers. I use acrylic colors for both the upper and lower levels, but I put a barrier coat of clear flat (Dulcote) lacquer between them to protect the lower layer from damage when I distress the upper level.

There two basic ways to proceed.

- You can put a soluble/removable layer under the top layer. The salt and/or hairspray methods are an example of this. Then, after applying the top color, you can attack the soluble/removable layer.

- Or you can paint the top layer directly over the lower layer (or barrier) and then attack that layer using paint thinner.

Sound confusing? It's really quite easy. Let's look.



THE SALT METHOD:

As implied by the name, this uses salt as a mask. In the photo at top, the vehicle has been base-coated and decals have been added. The goal is for some of the underlying color to show through a flaking and chipped topcoat of desert sand.

First, areas that would not be affected by the top color were masked. In this case, the markings were masked using raised paper masks.

Salt was applied. The surface where I wanted the salt was dampened by adding water with a paintbrush. While still wet, sea salt was sprinkled on. I use sea salt as the grains are not a uniform size like table salt. Once dry, excess can be removed or more added.

Once happy with the salt mask, the overlying color was painted bottom. It was applied and modulated as normal and then allowed to dry.



Above Left: Once dry, the salt is knocked off with a stiff brush revealing a realistically chipped and flaking paint scheme. Additional chipping can be painting using normal methods (see page 34). Additional weathering can proceed as desired.

Above Right: For the hairspray method (explained below), use any type of hairspray you like. I would certainly recommend avoiding colored hairsprays or anything with glitter in it... As mentioned previously, for the salt method, I use sea salt because of the irregular size of the grains.

THE SALT AND HAIRSPRAY METHOD:

In this technique, hairspray is used as a soluble layer between the two layers of paint. The hairspray method can be used by itself, without salt, but I prefer to combine the two methods. In this instance we will paint a very worn winter whitewash over the base color.

Near Right: The vehicle is painted, decals applied, and weathering is done. Areas to be unaffected by the new layer are masked off (in this case markings were masked with raised paper masks). Here the method diverges from the salt method.

Instead of wetting the vehicle with water, it is sprayed with hairspray and the salt is sprinkled on the still wet spray. Like the salt method, once it dries excess salt can be knocked off or more hairspray and salt added. As stated above, the salt is optional—the spray can be used by itself.

Far Right: The top layer of winter white is applied in a thin irregular pattern and modulated as normal.





Above Left: The salt is knocked off with a stiff brush. Where we were only using the salt method, we would now be finished. But don't forget, we've added a soluble layer of hairspray between the camouflage and the winter white. This allows us to further distress the paint.

Above Right: We can now remove more of the white by attacking the layer of hairspray between the colors. Using a stiff brush, damp with water, we can scrub off the white. The water will dissolve the layer of hairspray allowing the white to be removed. The amount of water on the brush and the amount of scrubbing we do will determine how much paint is removed. As stated above, the hairspray method could be used by itself without the salt. We can simply rub off the topcoat using the water damp brush. The paint can also be scratched off with a tool such as a toothpick to represent scratches and scrapes.

Left: Using this method, we can rub off as much or as little paint as we wish. By using the salt and hairspray method together, we can recreate not only chipped and flaking paint (the salt method), but we can also recreate areas where paint has been worn away (the hairspray method).

Once you have worn, removed, and chipped the paint to your satisfaction, seal the paint from further damage with a barrier layer of Dullcote before proceeding with further weathering.



REMOVING THE TOP COAT USING THINNER.

Whereas in the previous two methods, the top layer of paint is distressed by attacking the soluble layer underneath, this method attacks the paint from without – not needing the underneath layer. Still, like the earlier methods, the underlying layer of paint needs to be of a different type or have a barrier layer underneath. Apply the top layer and wait for it to dry enough to handle it. Then, just take a brush (toothpick, or other device) damp with thinner and simply rub away the top layer. It can be combined with the other methods.

The gun on my 251/22 was done by combining this method with the salt method. A base coat of a very dark rust was applied, followed by a barrier layer of Dullcote. Salt was added prior to the application of the yellow top coat. This was done as normal by wetting the surface with water and sprinkling on the salt. The dark yellow top coat was painted and modulated using my normal methods. The salt was rubbed off leaving chips. Then, a stiff, flat brush moist with thinner (rubbing alcohol) was used to in a manner similar to dry-brushing, to rub away the paint off the corners, edges, and other wear areas. The Dullcote prevented this action from harming the underlying rust color.

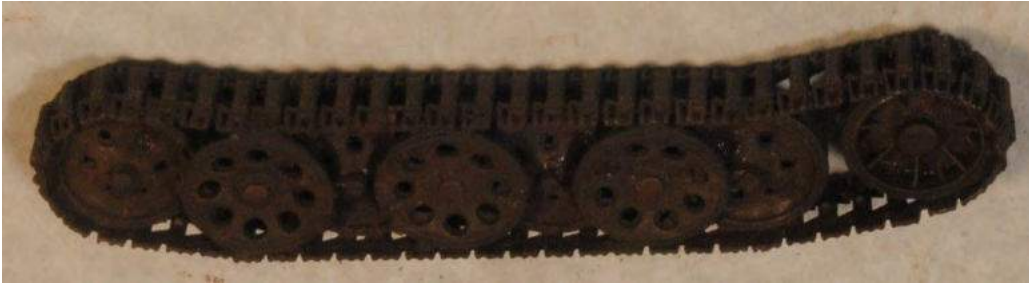


This can be done with multiple layers of paint. Here, the dark yellow was applied followed by the barrier coat. The green camo was sprayed and the brown camo brush-painted. Then, the same paint thinner method as above was used to remove some of the camo revealing the dark yellow base coat underneath. You can clearly see where the rubbing alcohol caused some of the camouflage, especially along the edges and the brown stripes, to flake and wear away.

These methods can be used to create anything from subtle chipping and wear to almost complete paint destruction.

Heavy Mud Build-up:

Like many other effects and methods, there are numerous ways to apply heavy mud. It could be built-up entirely of pigments—but the thicker the layers of pigments get, the more fragile and prone to flaking the effect will be. For anything more than a light or moderate layer of mud, I prefer to use some sort of putty or paste. We can use the same Celluclay and methods we use for making groundwork (see the chapter on Groundwork). The advantage to this is the mud will be the same color and texture as the ground. We can also use a modeling paste or putty. This can be applied during assembly before painting and painted along with the vehicle. It could even be airbrushed—and if the dividing line between vehicle and mud is indistinct, so much the better. I prefer to add the mud layer after painting as part of the normal weathering process using the methods we see on these pages:



Top: The first layer of mud consisted of water, Future floor polish (for a wet look), mud-colored paint, and dark pigments mixed together and painted on all tracks, wheels, and vehicle undersides. This imparts a wet, dirty look from muddy water and crud thrown up from the muddy road or earth. We can stop here or add more mud.



Middle: For heavy mud build-up I use a specially made paste. The basis of my paste is Elmer's ProBond wood putty. This is basically a textured acrylic putty—very similar to the product many hobby companies sell as groundwork material (only at a fraction of the cost). It comes in various colors, but I usually get the lightest color—it's easy to make darker, but not so easy to make it lighter. The putty is water soluble, so it can be thinned as needed or even mixed with acrylic paints. If you desire, it could be added straight from the tube. I make a thick paste made of the putty, Future floor polish, and mud-colored acrylic paints. A bit of pigments are added, too.



3rd: This mix is slathered on the tracks, lower hull, and on the suspension/under the fenders. Some additional pigments were sprinkled on the wet putty. This resulted in a realistic variation of color and texture once the putty dried. This example is the Panther G displayed with my Sd.Kfz 251/3.



Top: Some of the wet look is from the Future in the putty/paint mix. Additional Future was applied to various places on the tracks, wheels, and under the fenders as needed to give the mud an appropriate wet look.



The caked mud and wetness under the fenders and on the hull can be seen easily here.

It would not do to put such a wet and muddy vehicle on a nice dry road. The Panther was embedded into the groundwork—it is sunk into it instead of setting on top. The groundwork was made using the same colors, and Future provided a wet look. Although groundwork is explained in another chapter, the important lesson here is that the vehicle and groundwork must work together and be complementary.

This tank was also painted using the salt and hairspray method to apply the white over the standard camouflage. The halftrack we saw in that example is in the background. The filthy worn finish on these vehicles is consistent with the end-of-winter thaw.



In some instances mud splatters may be needed. For example, a vehicle missing a fender will throw up a good amount of mud and muddy water onto upper portions of the vehicle. We can make splatters and splashes on vehicles and groundwork using the same colors and method. I load a brush with very thin mud-colored paint and blast it with an airbrush—using air only, no paint. This splatters the paint realistically and allows exact placement of the splatter. You could also load an old paintbrush or toothbrush with paint and run your finger over it, flicking the paint. If doing this, practice first to ensure you can aim the paint in the proper direction. With my method, it's much easier to control the direction, size, and location of the splashes.



LAYERING OF PAINT AND WEATHERING:

Most of my models have several layers of paint and weathering. There are layers of the base colors—pre-shading, shading, base coloring, and highlighting. There are multiple layers of weathering. In some cases, there are two base colors (the underlying camouflage and the winter white-wash for example) with weathering between and on top. Much of the early layering is hidden by later layering, but this is not wasted effort!

We judge finished models by their overall appearance—not by the road we took to get there. Layering is how things happen on real vehicles—paint can be in layers as can dirt and grime. And even if a large portion of an early layer is not visible through later layers, bits of it will be. All this is a great deal of effort, but the finished model is that much better. One can almost “read” the history of the vehicle in the layers of paint and dirt built up on it. Some may consider such weathering extreme, but I have spent time in the field, and know just how dirty and banged-up armored vehicles can get.

But you don't have to copy my methods. Modeling is largely a solitary hobby and each of us is free to do things as we see fit.



Some final examples of weathering. Top: My 251/8. On the grey-colored base, orange filters on some panels work well to give the grey a warmer tone and provide some variation. If done correctly, the filter color itself isn't apparent, it simply serves to slightly alter the underlying color. Dark blue filters work very well in shadow areas. After a barrier coat of Dullcote, additional dot filters and streaking was applied. A layer of pigments provides a dusty layer to the wheels, tracks, and undercarriage. The base the vehicle was placed on depicts a suitably dry, dusty environment which used the same pigment colors to tie everything together.

Bottom: My 251/6. As the desert is dry, streaking (often caused by rain) is minimal. Dust is not, so dust washes were applied in combination with dusty pigments and light-colored dot filters. Note the chipped and worn paint—especially on the wood antenna supports where in some cases the sand color has worn away revealing the underlying grey while in other places it has worn all the way down to the bare wood.



Above: this vehicle, fitted with a woodgas generator (one of seven such used by the driving school of the 233rd Panzer Division) represents an old, worn out vehicle. But it is a relatively clean school vehicle. There is no mud and dust is fairly light. But the paint is old, worn, and faded as depicted by lots of chalky dot filters, streaking, and chipping. The scratch-built woodgas system was base-coated in a very dark rust color over black primer and further finished with dark washes, various rust-colored pigments, and pencil lead rubbed on high points to give a metallic sheen.



Left: This 251/17 is placed in a diorama depicting the wet autumn woods of the Hurtgen Forest. Note the mud build-up under the fenders and on the hull. Future provides the wetness. The wheels and tracks are covered with wet mud. They are coated with a mud-colored mix of paint, pigments, water, and Future floor polish.

Note also that the shield around the 2cm gun is a different color than the vehicle.

Perhaps this is a factory-supplied conversion kit fitted in the field.

Painting Gear, Equipment, and other Items

Our vehicles and other models often feature additional bits of equipment, personal items, and other supplies and “junk.” That applied to the exterior of the vehicle is usually painted separately and applied later. The exception would be items that have been on the vehicle a long time and thus feature identical weathering. These can be added prior to painting if you so choose.

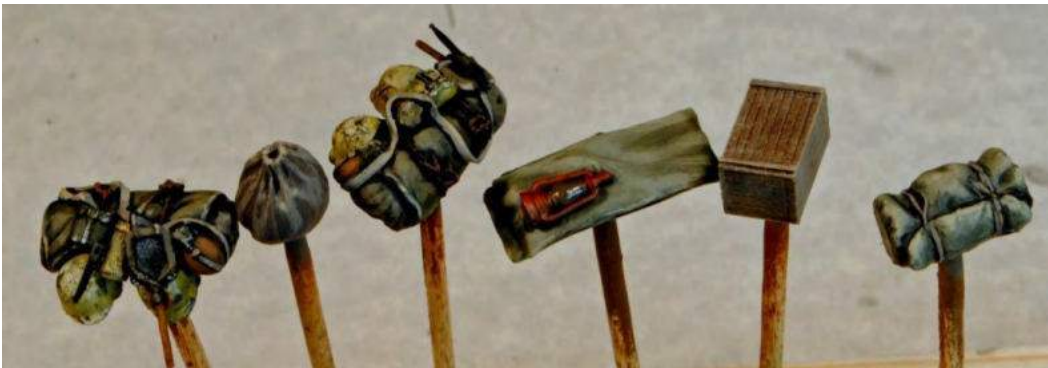
Much of this is painted and weathered using the exact same methods we used on the vehicle. This would include such things as gas and water cans, ammunition boxes and metal supply containers, tools, buckets, spare track links, etc.

Other gear, such as backpacks, tarps, blankets, shelter quarters, etc., would be painted using the same complimentary techniques with which we paint our figures. These are detailed in the chapter on Building and Painting Figures. The short version is that after painting the items in the desired base color, highlights are added with lighter values and shadows are added with darker values. These are all done with acrylic paints. The base colors are opaque, while highlights and shadows are applied in semi-transparent glazes of lighter and darker values of the base color. Note the main difference is that I paint vehicles from dark to light, but with these items, I start with the mid range color.



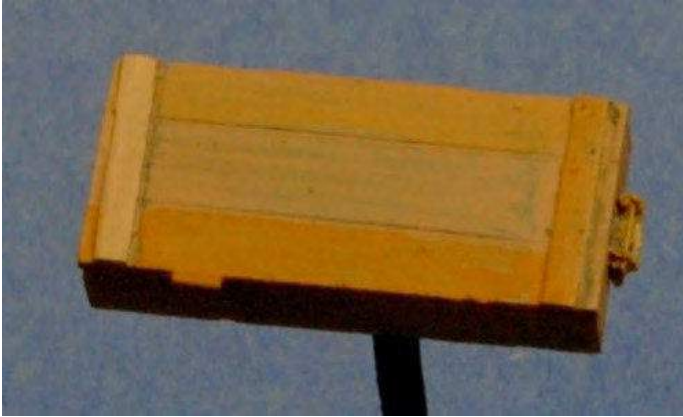
Top: With the exception of the tarp and wooden crate, this stowage for the 251/1 was painted using the same methods as the vehicle.

Middle: Stowage from the side bins of my Sd.Kfz 251/10. These items were painted using the same methods I use for figures. Note the glass on the tiny lantern. Although the piece is cast metal (a model railroad part), a few coats of Future give it a realistic shine.



Below Left: Here we see the items fitted into the vehicle. Below Right we see the ammo racks and containers for the 37mm gun. These are fitted inside the vehicle. Note the various colors of gas/water cans and ammo cans. Not everything was painted at the same time using the same colors. This variation not only adds visual interest, it is realistic.





A good method for painting woodgrain parts such as crates and tool handles. Paint the boards in various light wood colors. Next, apply a heavy wash of an appropriate dark oil paint color. Let this set for about an hour and then wipe off the excess with the stiff brush. This will leave nice streaking representing woodgrain. Finally, using a very light color, give the edges a high-highlight. Paint details, add a dark pin wash, and you are done.

Below: The finished 251/2 with stowage and foliage added. Note how the painting of the vehicle, stowage, and figures are all complimentary—all are appropriately shaded and highlighting and everything is weathered appropriately. Note also the vehicle camouflage colors and patterns are very similar to the groundwork (the purpose of camouflage in the first place). In other words, everything looks as if it belongs together. All the elements form an integrated whole.

This is the result of research, planning, and execution.



The Question of Color Accuracy

Logic would dictate determining AFV colors and camouflage patterns would be cut-and-dried. Logic would be wrong. Existing *primary* documentation on German vehicle camouflage is slim – much was lost at war's end, and what we have is often vague or open to interpretation. Photographic evidence is unreliable in regards to colors (this applies to the poor period color film in addition to black and white). Colors degrade over time, so even good color photos taken of vehicles in original paint long after the end of the war are unreliable. Museum pieces are often painted using whatever “close-enough” colors were available, or were painted based on secondary research. To me, none of this is a big problem - exact data for many historical things is sparse. The modeler has to make the best guess he/she can with the information available (artistic license).

But some in the armor modeling community make a big deal of it. Lots of ink is spilled discussing “correct” colors, and heated argument generated by those with firmly entrenched positions often supported by evidence that is mostly opinion and assumption – or based on a single real-life example whose history is not certain. Some are willing to attack those who question or disagree with their self-proclaimed expertise. I've seen circular arguments such as “The Germans used Dark Yellow. Vallejo produces a Dark Yellow Paint. Famous modeler X used Vallejo Dark Yellow on the model that recently appeared in X Modeling Magazine. Therefore German tanks must have been the same color as Vallejo Dark Yellow.” I've seen positions staked on the faulty argument that “We can't prove it didn't happen, therefore it must have happened.” To further muddy the water, there have been many so-called “historians” that positively assert things as “fact” without stating their own credentials or their sources. Modelers often accept and pass-on these “facts”, thus perpetuating and giving validity to errors. There is remarkably little original research on the subject—most books, magazines, website, and modelers simply repeat what someone else has said.

So, what are the correct colors? In my opinion it doesn't matter. I do NOT mean Lemon Yellow, Neon Green, and Violet are good German camouflage colors or that pink is a suitable substitute for Panzer Grey. What I mean is that by using any of the available colors by the various paint manufacturers (Tamiya, Vallejo, etc.) you will be close-enough that you can't be definitively proven wrong. There are many reasons I make this statement.

Historical reasons why it doesn't matter:

1. “In the ballpark” is as close as we can reasonably expect to get. There is some doubt about exactly what the exact colors were to begin with. Even where specifications and color chips exist, those are “goals” or “ideals” that may or may not have been realized in reality. These samples do not exist for many colors including the vital Dark Yellow (Dunkelgelb). Pinning down “Dunkelgelb” is problematic - descriptions range from Dark Yellow, to Sand, to a Greyish-Yellow. The same variation is found in surviving painted items.

2. “Official” colors can vary. Different paint manufacturers or even different lots from the same manufacturer will usually have slight differences. How they are thinned and applied can have an effect. The underlying color, whether primer or old paint can also make a difference, especially if the new paint is applied thinly. All this is especially true for colors applied in less than ideal field conditions. If “official” colors weren't available, vehicles were painted with whatever was at hand. For example, in North Africa, German vehicles were sometimes painted in borrowed Italian or Luftwaffe colors or with captured British paints. Official colors can even change over time, so the same color “number” or “name” might reflect different shades at different periods.

3. Weather and elements had their turn at influencing the color. Dust, sun, rust, etc., can all alter colors.

An as example of all this, after the first Gulf War I drove a Humvee around Kuwait that was so pink we added a “Mary Kay Cosmetics” sticker. Other than the registration plate, that was the only marking the vehicle carried! The interior was still green, and the wheels were black (put that on an IMPS show table – you'd be accurate, but you'd be crucified by the judges!). In my 3+ decades in and around the military, I never saw nor used an “official” color chip of any kind, and it is normal to see a wide range of color variations in any motor pool—even among vehicles newly arrived from the factory! Color exactness just isn't that important on a tactical vehicle.

Modeling reasons why it doesn't matter.

1. We are not viewing a life-size vehicle up close. We are looking at a scale model which is similar to viewing a life-size vehicle from farther away. Colors fade in intensity with distance. One popular theory of scale distances states we should fade our colors about 10 percent toward neutral grey in 1/35th scale (less for a larger scale, more for a smaller scale). To put it the other way, if we use the supposedly accurate color, it would look too bright and intense. This is complicated by the fact that none of the paint companies indicate if or how their paint is mixed to replicate this effect at any given scale. Therefore, just like our historical research, our best paint choice is no closer to exact than “somewhere in the ballpark”. Further, different modelers practice this to different degrees. Myself, for example, I prefer more vivid saturated colors and do not lighten my paints for scale distance at all.

2. Then, we mess with our paint once we apply it. Washes, filters, and “modulation” (shading and highlighting) alter the actual or apparent color so that even if we started with a perfect scale color mix, we've just changed it!

3. Just as in real life, we add mud, dust, rust, fading, and other weathering techniques which also affect the color.

4. Finally, the light source we view the model under (sunlight, florescent, incandescent, etc.) can affect the apparent colors.

So, when creating your miniature masterpiece, use something close, and it will look fine. At least 95 percent of the people who view it won't know any better, and for those few that do (or think they do), I contend that no one's eyes are calibrated enough to spot an exact shade of color through all those variables. Even if they have 100% verifiable color chips on hand, those won't take scale distance nor weathering into account – and most importantly those chips are only government specified ideals: they in no way indicate the actual colors of the vehicles that rolled out of the factory. Thus, you have quite a bit of latitude in the exact shade of panzer grey, dark yellow, red-brown, olive green, or whatever other color you are replicating.

Please note, however, that I have no problem with a modeler who believes that one manufacturer's color is better than another or that prefers a certain shade of olive green, etc. It is a hobby, after all, and is supposed to be fun.

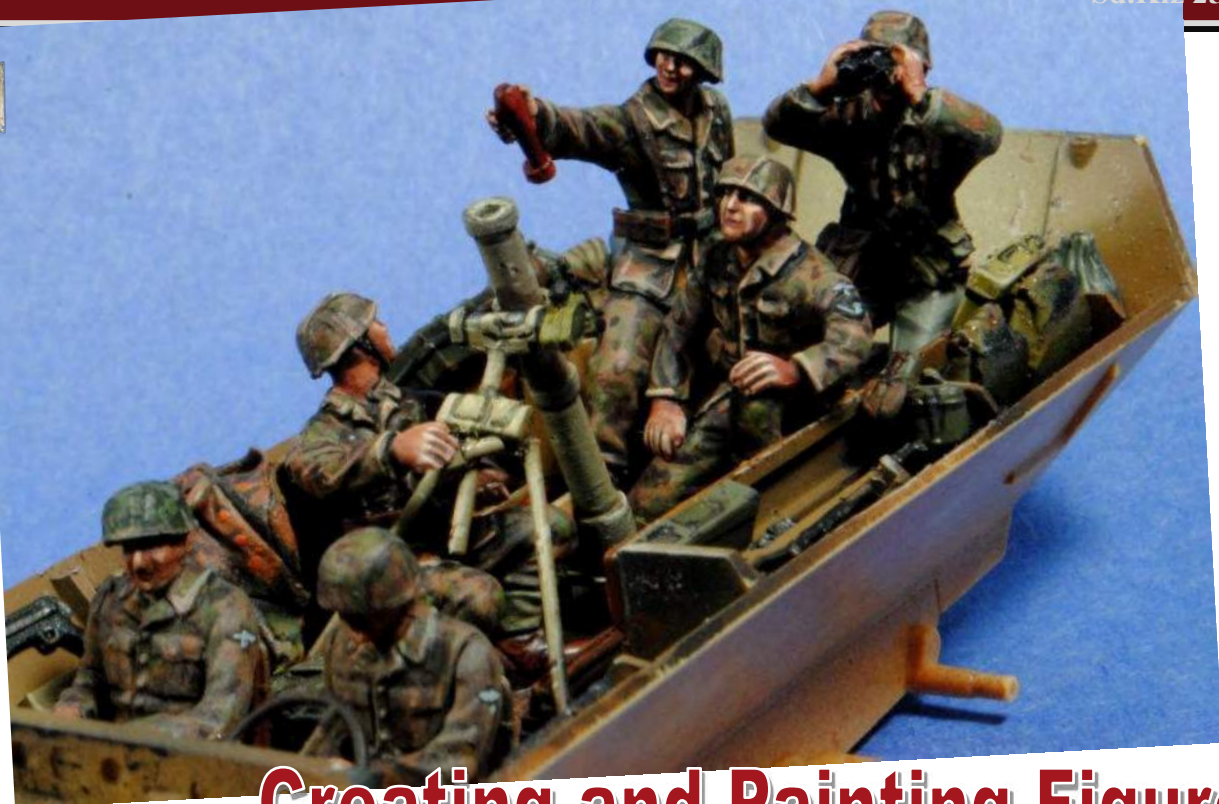
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"Project 251" Modeling the Sd.Kfz 251



Creating and Painting Figures

By Kevin Townsend

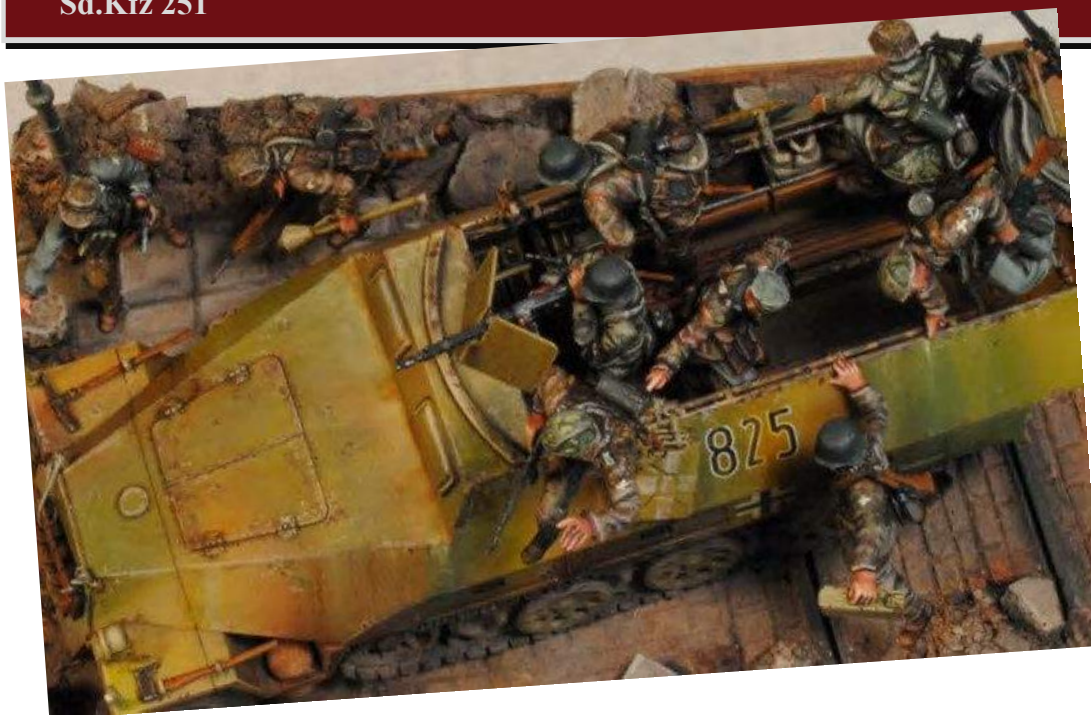


Creating and Painting Figures

Why figures? Although this project is about modeling the Sd.Kfz 251 in 1/48 scale, it is the figures that illustrate how the vehicles were used in action. They provide an immediately recognizable sense of scale. They add “life” to the compositions, and it is primarily through them that the stories are told.

This project is primarily about armor modeling, and in these smaller scales the models are generally the main focus. Any figures present are often relegated to supporting roles. That does not mean the figures are unimportant. Figures do several advantageous things for us. They provide an immediately recognizable sense of scale. With a figure on, in, or nearby, the viewer instantly grasps how big or small a vehicle is—a single figure in the commander's hatch is enough to fulfil this function. Figures also catch the eye, so they can be very useful to draw attention to a part or feature of a vehicle just by being placed in the area. Their actions can help explain the function of the vehicle. For example, infantry can deploy from an armored personnel carrier, immediately indicating its purpose. Do the sides of a vehicle open up to form a fighting platform for the crew manning a gun? If so, the crew can be shown in the act or raising or lower the platform. This gives the modeler a reason to have one side up and one side down showing both “modes” in one setting. Not only do these type things show the scale and operation of the vehicle, they also add a bit of interest by telling a simple story. Figures also provide human interest—a vehicle by itself just sits there. But the addition of figures bring it life, and it is the figures, more often than not, that are key in telling a story. In vignettes and especially dioramas, that story is often as important—if not more so—than the vehicle. Even if the “story” is simply the vehicle doing its thing, it's the crew and passengers that perform those operations.

For more elaborate stories, figures can become critical. They should be planned for from the start; not just stuck on or around the vehicle as an afterthought. Their roles and attitudes are portrayed by the actions they are performing and by their posture and facial expressions, although in small scales these latter things might have to be exaggerated to be seen and understood. Figures not only have to fit within the scene itself, but, most importantly, they must work with each other and the models. Actions and gestures have to be clear, believable, and exactly aimed - they must look at each other instead of past each other. Anatomy and pose must be correct, believable, and clearly show what each figure is doing, about to do, or just did.



In my diorama featuring the Sd.Kfz 251, the figures transform the piece from a half-track sitting in the street to an action-packed event. An entire squad of soldiers deploying from the vehicle tell us immediately that this is an armored personnel carrier. The urgency of deploying over the sides under the covering fire of a machinegunner lets us know they are in action. Their orientation, as well as the gestures of the officer and NCO and the aim of the machinegun clearly convey the direction in which the enemy lay. The cobblestone street, curb and sidewalk, streetlight, and railroad place this event in a larger village, town, or city. The rubble and other damage tell us the town is at war. All of these figures are from a single Tamiya 1/48 Panzer-grenadier set. While some are stock, most are conversions and/or made from parts from two or more figures. The vehicle driver is the only one not visible in this photos.

Below: Despite their shortcomings, these four figures serve to illustrate some of the advantages of the Tamiya plastic figures. They are, in reality, all the same figure—one of two included in every Tamiya Sd.Kfz 251! The man at far left is basically built stock, with only different equipment than recommended glued in place (drinking from a canteen rather than carrying a machinegun). The second figure features a new head and left arm as well as a repositioned right arm. The third man has been cut apart and put back together in a seated position, with adjustments made at the waist, hips, knees, and ankles. His arms have been repositioned and he has been given different headgear. The fourth man uses only the upper torso, head, left upper arm, and boots of the figure in question. He has been given a new left forearm and right arm. His lower torso and legs were swapped with another figure, and the pants/coat resculpted as needed to match.

None of these changes were especially difficult. The main consideration when converting or sculpting figures is to ensure the pose and anatomy remain correct. These are the important aspects. All else is cake!

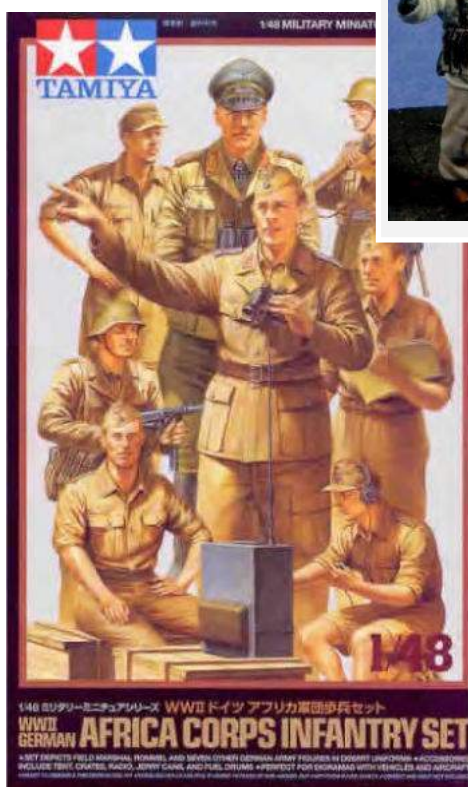


Above: A stock Tamiya figure (from the DAK Kubelwagen kit). The figures generally have good pose and anatomy and look fine when painted.

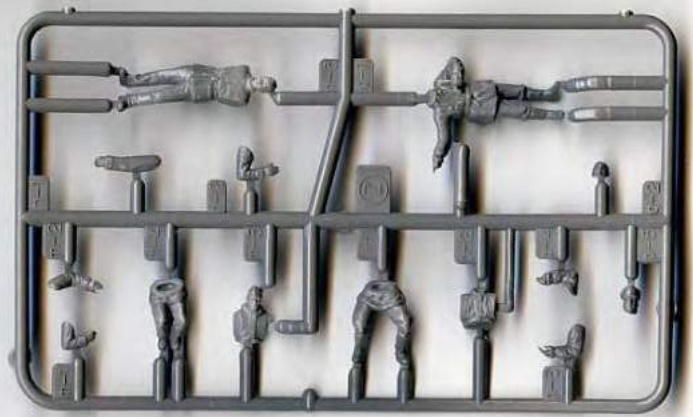
Opposite Top: Figures in my 251/2 prior to joining the hull halves. All are conversions or kit-bashes made from several figures. The simplest figure is the loader—he is stock except for a new right hand and mortar round. This is a great example of posing the figures to show the purpose and operation of the vehicle. Note that the seated figures and the mortar must be glued into place prior to the hull halves being joined. The standing figures can be added after assembly and painting. Test-fitting must be done to ensure everything fits and to determine the required order of assembly and painting. This is why it is important to plan and build the figures in conjunction with the vehicle and not as an afterthought.

Title Page: A detail from my Sd.Kfz 251/22 diorama.

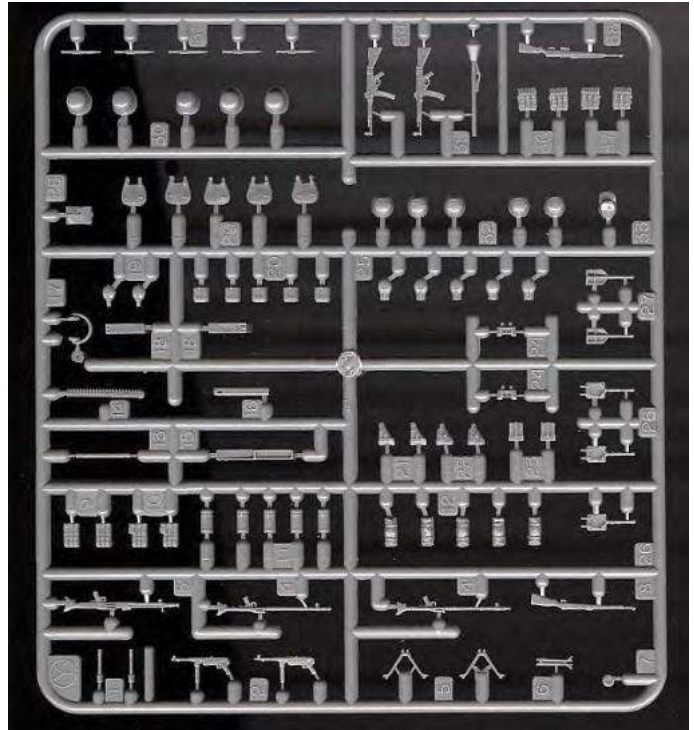
Tamiya 1/48 Scale Figure Sets



Each Tamiya halftrack comes with two figures in winter gear. The Stuka Zu Fuss kit contains four additional figures loading rockets, dressed for warm weather. In addition to the figures included in the halftracks, the primary figure sets used in these dioramas include the German Infantry (#32512), German Panzergrenadier (#32514), German Infantry on Maneuvers (#32530), German Field Maintenance (#32547), and the German Africa Corps Infantry (#32561) sets. The sets include 8-15 figures, lots of weapons and equipment, and often other gear as well. Other figure sets including the Russian, American, and British Infantry sets (#32521, #32513, #32526) proved useful in some dioramas and are similar. Also useful for this project were the figures included in other Tamiya quarter scale kits, most notably the Flakvierling and Krupp Protze models. Many of the figures in these vignettes and dioramas are stock, but most were converted - some extensively so. Many figures—perhaps the majority—are based on parts from more than one of the Tamiya figures. As a case in point, the figure in the inset above (shown actual size on a printed page) is made from the same figure as those shown on the bottom of the previous page!



The Tamiya figures come in multiple pieces as seen above. Some come with two-piece body and legs, others as one. Some have partial or complete arms molded on, most have these as separate parts. The same applies to the heads. Simple changes can be made to the figures by simply swapping parts, as long as the resulting new pose works. The sets (except the maintenance and Africa Corps sets) come with 2 of the equipment/weapon sprues seen at right. Any additional weapons, equipment, and/or accessories included are molded directly to the figure sprues. One of these sprues also is included with each Tamiya halftrack kit.



I chose to use Tamiya plastic figures for this project. Why? In 1/48th scale the selection of figures is slim compared to the more popular 1/35th scale. Compared to other offerings in quarter scale, the Tamiya figures are varied, plentiful, and inexpensive—important considerations in a project requiring dozens of figures—over 100 in fact!

Each of the Tamiya halftrack kits include two soldiers in winter gear with a variety of weapons and equipment on a separate sprue. This equips the figures and leaves plenty of extras for stowage. The “Stuka Zu Fuss” halftrack also includes four figures loading rockets. Tamiya also offers several figure sets. These are similar to many of their 1/35th scale offerings—many appear to be pantographed down from the larger scale. While the detail and crispness may be marginal in 1/35th, they are not as bad in the smaller 1/48th. Some sets are better than others in this regard, and faces range from good to passable to those that look somewhat like Odo from “Star Trek, Deep Space Nine”. Each set contains multiple figures—usually a dozen or more, and the sets often contain various uniforms, as well as infantry, tankers, vehicle crews, etc. Each figure comes in multiple pieces, giving some multi-pose capability to the sets, and lending them well to conversions—another important consideration in a project such as this one. A few figures have some gear molded on, but most is left separate. Each infantry set comes with two identical sprues of weapons and equipment (these are the same sprue included in each of their halftracks). There are plenty of options. For example, many sets contain choice of headgear including caps, helmets, camo-covered helmets, etc. Canteens are provided both with and without cups. A large variety of weapons and gear are also included and gives you plenty of extras. The Field Maintenance set includes a variety of tools, maintenance equipment, and tank gun ammunition. The Africa Corps set has far fewer figures, but it includes a large selection of jerry cans, 200 liter drums, a tent, and radio, and other accessories.

Perhaps most importantly, the pose and anatomy of the figures are very good and quite natural. These are the most important aspects of figures and one in which some of the more expensive aftermarket sets fall short. The sets offer excellent value for the money being under \$20 a set as of this writing (January, 2016). In fact, each set costs about the same (or even less) than a set of 2-3 aftermarket figures.

The main downside to the figures, other than soft detail, is that they are a bit too small, scaling out to only between 5’3” - 5’10” - closer to 1/50th scale than 1/48th. One could argue that they match the average height of people of the time. The weapons and equipment scale out perfectly. In quarter scale, a six-foot man should be exactly 1.5 inches tall, these figures are only slightly larger than 1.25 inches. Still, they look good with the vehicles, and their size ensures they fit well inside. Their small size limits the ability to use them in conjunction with most aftermarket figures, but this is not as large a disadvantage as it may appear since the Tamiya figures are available in larger numbers and more varied poses (including action poses) than the aftermarket provides in this scale.

I normally work in 54mm or larger. Rarely do I deal with wargame-sized miniatures which these 1/48th scale figures are similar to. The techniques I use for large and small figures are basically the same, but there are some differences. The following information and photos detail my methods for working with these Tamiya figures.

Assembling Tamiya Figures

Since these figures are made from the same plastic as the kits, assembly is the same. Parts are removed from the sprue trees, cleaned-up, and assembled using the same methods and adhesives. Tamiya instructions for figures are more basic than for their vehicles, consisting simply of a drawing of the finished figure with part numbers indicated and color keys (for painting) present. Examine the parts and plan the assembly. Test fit the pieces without glue. This is an important step. Determine what order parts must be assembled in, where additional clean-up of parts to improve fit is needed, and where additional work will be required to fill gaps between mating surfaces. This is even more important for kit-bashed figures (using parts from more than one figure) and conversions than it is for the stock figures.

It is up to you how much of the figure you assemble prior to painting. Parts whose joints will require putty work should probably be assembled prior to painting if



Above: Being plastic, Tamiya figures assembly just like the vehicles. Both these figures are stock. The one at left is a multi-piece figure consisting of head and upper torso with upper left arm, lower torso and legs, left forearm, and right arm. Equipment has not yet been added. The other figure need only have the right arm attached. Fit is very good with little putty needed. Most importantly, pose and anatomy are correct.

Left: If the figures will be in or interacting with the vehicle, the affected portion (as a minimum) of the vehicle must be built prior to the figures. This allows you to use the model when posing the figures to make sure everything works together properly. This is necessary even with stock figures to ensure everything fits properly. Before final assembly and painting is the time to find this out—not after.

Below: Due to the molding process, some details can be soft. Note the cuff where it joins the arm in the top drawing. This can be improved by taking a sharp hobby knife and trimming the joint as shown in the bottom drawing—basically hollowing out the cuff around the arm. The same process can be done as needed around pocket flaps, straps, etc., to sharpen detail.



practical. In larger scales I often build in subassemblies and leave weapons and gear separate until after painting. However, I normally completely assemble small figures prior to painting since it is more difficult to glue all those tiny pieces onto a painted figure without damaging the finish. Completely assembling the figure prior to painting also ensures all shadows and highlights are consistent and fall at the same angles. But this is not a hard and fast rule – do to design or pose, you may find some figures must be built and painted in a certain order.

If planning and clean-up was done well, the figure should go together with little or no trouble. But sometimes gaps may be present at joints. Gaps, if minor, can be filled with thick super glue. Larger gaps can be filled with modeling putty such as Squadron “Green Stuff”, but I prefer epoxy putty. As it is water soluble, a quick swipe with a damp finger will both remove excess and smooth the joint, removing the need for further sanding after the putty cures.

Although the Tamiya figures are not bad for their size, and, or the most part, can be built straight from the box, there are still some areas where they can use some help. While belts and “Y” harness straps are molded onto the figures as needed, other straps – such as those on the gas mask canisters and weapon slings – are often absent. These are easily added using paper, thin sheet plastic, putty, or other materials. I prefer to use strips of tape. For smooth leather, electrical tape works well. For courser materials, strips of blue painter’s tape are my choice. Some detail is rather soft and can be enhanced with a bit of carving and cutting





with a hobby knife (such as deepening undercuts around pocket flaps and jacket skirts or squaring off jacket cuffs around wrists, etc.)

For attaching the figures to the base (or vehicle), I like to use metal pins – paperclip wire works well for this. Drill a hole up from the bottom of the foot (or other contact point) up into the leg. Cut the pin so it sticks out the bottom of the foot at least a half inch and epoxy or super glue it in place. The pin is metal, so plastic cement will not work. The pin can also be used to mount the figure onto a temporary painting base or hold it in a pin vise for painting. That allows you to hold the figure without having to touch the figure itself, running the risk of damaging the figure or the paint. Once painting is complete, the pin can be cut shorter if needed and used to attach the figure to the base, vehicle, or other feature of your composition.

Prior to painting, prime the figure. Priming provides “tooth” for the paint to stick to. Flaws are often not noticeable until they are covered by paint. These areas can then be fixed and re-primed. There are a variety of primers on the market and what you use is largely a matter of personal preference. Do not prime or paint surfaces that will later be glued. If painted surfaces are attached to each other it creates a paint to paint joint – a very fragile bond that will likely fail later. Primers are available in a variety of colors. For these small-scale figures, I prefer to use black. Since the figure is normally fully assembled prior to painting, black primer ensures that any area I can’t reach with a paint brush is already a very dark shadow color.

Top and Center: Although plastic can be glued to plastic, I usually use metal pins (lengths of paperclip wire) to mount the figure to the vehicle. I do this since the figures are usually placed after painting, and a paint to paint joint is weak. Plus, the contact area on figure to vehicle joint is often small (sometimes only the bottom of a foot). The pin extends up into the leg of the figure as far as I can fit it. This also reinforces the thin ankle area. All this ensures a strong joint that won’t come loose - fitting a seated figure back into the driver’s seat of a finished vehicle if it were to come loose would be difficult. Note the jumping figure—I used this method, but attached the figure at the knee. For the crew inside the mortar vehicle (center right), you can see the pins and corresponding holes drilled into the vehicle floor and seats.

Bottom: The pins are also useful for mounting the figure to a temporary painting base—I use small wooden blocks. The mounting pins of the three standing figures are simply friction fitted into the square blocks. This will hold them secure and allow me to paint with figures without having to handle them. The seated figure (which, due to the secure way it will fit inside the vehicle, doesn’t need a mounting pin) simply has a hole drilled in its bottom and a toothpick inserted which will hold the figure. A mounting pin in a similar position could be chucked into a pin vise to hold the part. The pins also serve to mount the figures into the groundwork on the finished base.

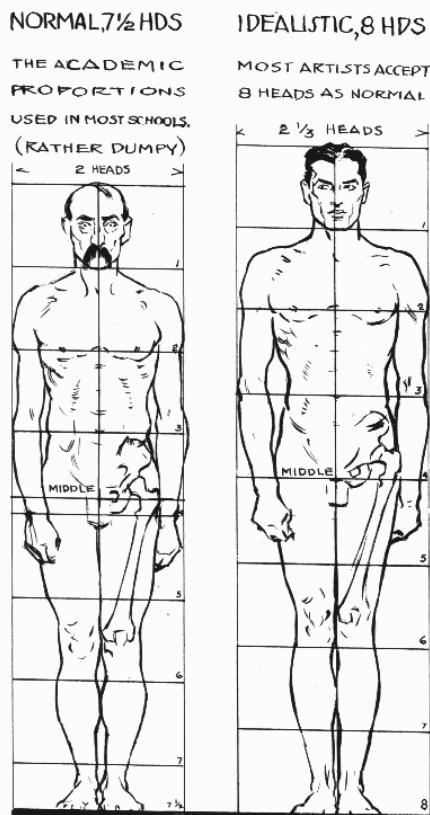
Note the use of blue painter’s tape to fashion slings and straps. Electrical tape, paper, metal foil, or very thin sheet plastic can also be used.

Anatomy, Proportion, and Pose

The Tamiya figures are plentiful and varied enough that it is certainly possible to create a wide range of vehicle crews, vignettes, and dioramas using only straight from the box figures if that is your desire. However, there will probably come a point where what is available does not adequately meet your need. Fear not, converting these figures is quite easy.

When converting a figure—whether it be a simple swap of parts, minor alterations of pose, or nearly complete resculpts—the first and most vital step is to get the anatomical proportions and pose correct. If these are off, no matter what else you do or how well you do it, the figure will never look right. Certainly, accurate measurements are important and tools such as calipers are useful for this, but the best judge of what is right or wrong is your trusty “Eyeball, Mark I”. If it looks right, it is right. If it looks wrong, it is wrong. I find the accompanying anatomy diagrams to be very useful. These diagrams showing male proportions were drawn by Andrew Loomis in the 1950s. They can be found online, as well as his drawings showing proportions of females and children. I find it handy to reproduce these in the scale I am working with and use them as my guide. Proportions can vary from person to person, sex, and age, but we shouldn’t stray too far from them. The human body is an amazingly complex form and recreating it is much more of an art than a science. Yes, people come in different sizes and shapes, but some things (like the size of a normal adult male head) are fairly consistent. Therefore, the head makes an ideal unit measurement.

Many miniature figure artists use an idealistic proportion where a man stands 8 heads tall. For an adult male, the head should be about 9 inches from chin to crown. This gives us a figure that stands 6 feet tall. The bottom of the knee/top of the shin is at a 2 head height. The crotch is at 4 heads. The navel is 5 heads off the ground and the nipples at 6 heads. Shoulders should be about 2 heads (or 18 inches) wide. When the arms hang straight, the finger tips should reach mid-thigh level. Our “bend point” is at the center of the



Above: These drawing by Andrew Loomis show how to measure correct proportions using the size of the head as a measuring stick. A typical man with “idealistic” proportions will have a head that is 9 inches tall from the chin to the crown. Standing 8 heads tall gives him a height of 6 feet. Most figures use this proportion. Perhaps actually more typical are the normal proportions shown. The head is still 9 inches, but the man only stands 7 1/2 inches high. People come in different sizes, and you can mix and match figures from different manufacturers, but head size should remain relatively consistent and gear/equipment sizes should be absolutely identical.

Above right: When assembling or sculpting figures, make sure movement is natural as well as anatomy and pose. For example, when we walk, our arms swing opposite the movement of the legs. For example, in mid step when the left leg is forward and the right leg back, the right arm will be forward while the left is back. Your best reference is people—simply observe!



body (4 heads high if using idealistic proportions). Model a shorter or taller individual by keeping the head the same size (more or less, depending on what looks right) and making the body and/or legs proportionally shorter or taller as needed. I have heard of modelers “correcting” the height of Tamiya figures by adding a wedge of plastic between the upper and lower torso halves. While this would make the figure taller, it would also skew the proportions – arms and legs would be too short relative to the body and the head would appear too small.

Proportions for women are generally the same as for men—about 8 heads high. A woman with an 8.25 inch head, standing 8 heads tall, would measure 5’6” in real life. By using the head as the basis for measurement, a woman’s smaller head results in narrower shoulders, too. Children are NOT just little adults. The 8-head tall rule of proportions we’ve learned does not work for children. Not only are they shorter, their heads are proportionally larger. Their legs are also shorter in proportion to the length of the torso. Proportions of the head and face are different on children.

While not specifically shown in the chart, there are some other basic measurements you can use to help ensure your figures look right. The size of hand is approximately the distance from the hairline to the chin—in other words the hand covers the face. Arms are about 3 1/2 heads long, with the forearm being about 1.7 hands long.

As you convert or create your figure, ensure arms and legs are the same length, the correct

length, and that knees and elbows are in the correct places. During conversions, as we cut and reposition our little figures, joints can tend to “migrate” and we must always be mindful to keep them in the right place. Make sure figures only bend in proper places—we do not want “spaghetti” arms or legs; limbs should be straight between joints.

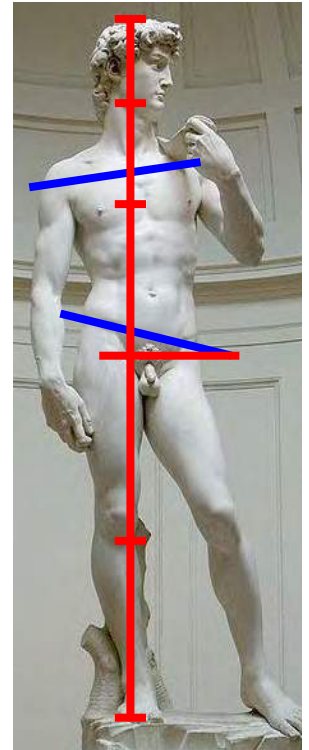
The pose must be believable. Movement of one part of the body affects other parts. As we move, we shift our limbs, shoulders, and hips in opposition to each other to maintain balance. If an arm is held forward and up, the other arm might be held low and to the rear. Hips tilt in various poses. If one hip is raised, the shoulder on the same side will be lowered. If a hip is moved up and forward, consider moving the shoulder down and back. Note that the spine is S-shaped, and note how it bends. The neck does not project straight up from the shoulders, but rather is angled slightly forward.

If standing in a balanced position, the head is positioned over the foot set to take the majority of the body’s weight (the supporting foot). The hip on the supporting side will be higher than the other side. As we move, we constantly move our feet to maintain this relationship (closely watch someone walking). If we violate this rule, it should be for a good reason – a figure in mid stride or one that is jumping, falling, or braced to receive an impact.

Your best bet is to have a model (preferable of the same sex, age, and build of the figure you are creating) assume the pose and copy from life. Photos are another possible source of information. You can also always look in a mirror and assume the position yourself (ignore the laughter of your spouse). An advantage of using yourself is that you not only see, but also feel, how a pose works and how your joints and muscles move.

You can use all this to create motion in a figure. An off balance figure, one that couldn’t hold its pose for more than a split second, is obviously in motion. Emphasize motion and action by exaggerating the pose. An exaggerated pose, with the limbs hyper extended, leaves no doubt about what motion the figure is performing and creates a dynamic composition. Exaggeration is often necessary when working in miniature to convey the intent of the gesture in the small size and through the various layers of clothing and equipment. It’s the same concept as an actor exaggerating body language and facial expressions in the days of silent films to help portray emotions using only a visual medium.

I’ve devoted a great deal of space to this subject, and that is entirely appropriate—the more time you spend here making sure it’s all correct, the better your finished figures will look! Does it all sound confusing? Don’t worry, It’s really quite simple—the average human body can be used quite easily to measure itself! Anatomy books, or books on how to draw people can be helpful, but are not required. Your BEST reference is people. Watch others. Have a friend pose for you. Try out the pose yourself. Be aware of body language and expression! Remember the story you are trying to tell and take account of the action being performed. Make sure everything matches and works together.



Michelangelo's "David" is a classic example (pardon the pun). The figure stands 8 heads high. The bend-point at the waist is at the 4 head height point. Note the counter rotation of the hips and shoulders. The foot supporting the figure's weight is directly under the head, and the hip on that side is higher while the shoulder is lower.

Converting Tamiya Figures

Conversion can be simple - just a swap of a head, hand, or piece of equipment. They can be so complex that little of the original figure remains. Or they can be anywhere in between. Even if we are not building a figure entirely from scratch, we still normally have to remake or repair at least portions of the figure when doing any but the simplest parts swaps. Repairing anatomy, rebuilding joints, recreating clothing, etc. all require putty work. In other words, we need some basic sculpting skills. It's really quite easy if we remember and follow five cardinal rules:

1) Observe, observe, observe! Note how pose and movement affect the position of various parts of the body as we have already discussed. Look at how material folds and wrinkles. Heavy material will have only a few large folds and wrinkles—lighter weight cloth will have many more sharper wrinkles. Material that is being compressed will wrinkle differently than material that is being stretched. Don't just create a few random wrinkles and call it good—it will not look realistic. Note how clothing shows the basic forms of the body underneath. A strap supporting a heavy bag will not rest lightly on the shoulder, but will somewhat “sink” into clothing and/or the soft body tissue underneath. Study real examples of items you are sculpting. Mentally break them down in separate shapes and forms that can be easily made—and then make them!

2) Be aware that altering one area may affect others. For example, we can't just take an arm that is hanging loosely at a figure's side and reposition it so he is holding it over his head. If the arm raises, so must the shoulder. If the shoulder moves, so will the hips. As the body underneath moves, the wrinkle patterns in clothing will change. Thus, there is a practical limit to how far we can adjust the position of arms, legs, torsos, etc. without requiring a major resculpt of the figure. Likewise, adding or removing equipment may alter the way clothing fits or affect a figure's pose – a figure will show at least some strain when made to carry a heavy weight, for example.

3) How something is actually made or actually works is completely irrelevant! We are only concerned with how it *looks*! When determining how to make something, pay no attention to its actual function—it's all about the form! For example, if you need to make a buckle, don't try to make a scale working buckle! Simply create the basic shapes with putty or plastic. While not a real buckle, it will look far better (and be far easier to make).

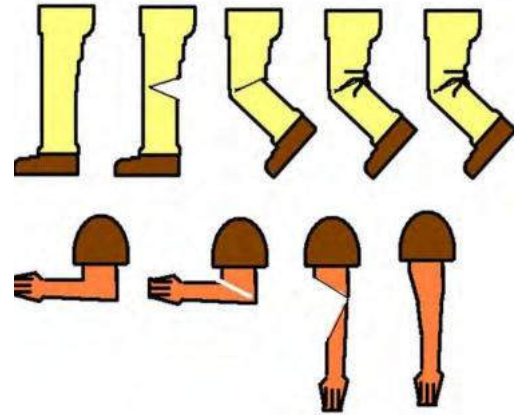
4) We don't have to sculpt an item all in one sitting. Study the item and break it down into easy tasks. If sculpting pants, for example, I do one leg at a time and allow the putty to thoroughly cure before sculpting the next one. This is so I don't accidentally stick my thumb into an area I've already finished, damaging or destroying it. After the legs are done (and cured) other details such as belt loops, the fly, rolled cuffs, pockets, buttons, etc., can be added in as many applications of putty as it takes.

5) Unless you are sculpting for future production, you do NOT have to make items that can be *convincingly* painted (such as most insignia in this small scale, for example).

The simplest conversion is probably just swapping parts, such as a hand, arm, head, foot, etc. Often times, with the multi-pose nature of the Tamiya parts, we can just substitute parts when building the kit. Or we cut off and replace parts (hands, for example, are not molded separately but are attached to an arm). For heads and hands, I like to slightly hollow out the collar or sleeve so the new part slides into place realistically. But, as we have seen, there are limits to parts swaps. Swapping that lowered arm for the raised one may also require us to swap the applicable torsos, too.

Equipment, straps, and belts can be carved away or added (using tape, paper, etc.), but this usually requires more work since belts and straps alter the wrinkle patterns in the garments they contact and the weight usually causes equipment straps to sink into clothing rather than just rest on top of it. Unless, of course, that new strap rests on top of an existing one – for example, the strap for the gas mask canister crossing over the shoulder on top of the molded "Y" harness strap.

Another fairly easy conversion is bending a straight arm/leg or straightening a bent arm/leg. If repositioning a knee or elbow, make your cut on the inside of the joint to ensure the limb remains the correct length. Straight limbs can be bent by removing a wedge of material and closing the limb to the desired position. Bent limbs can be straightened by making a cut and opening to the desired angle. For plastic figures, you will have to cut almost all the way through the joint to be able to bend it to the desired position. You can also simply cut it in two and glue it back in the correct position. A piece of metal wire can be glued in holes in both pieces and the joint bent to shape – sort of like an articulated action figure. Make sure the limb remains the correct length and the joint remains in the correct position. Fix any damage with putty. Note that changing

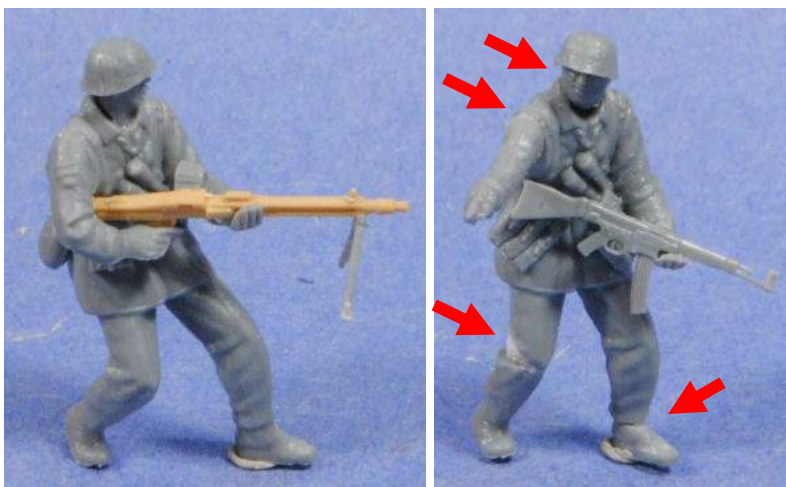


Above: To repose a plastic figure, simply cut it apart at the joints and put it back together in the pose you want! Refer to the diagram above.

For instance, to close a straight arm or leg, cut out a "V" behind the knee or in front of the elbow and close the joint. To open a bent knee or elbow, cut almost through the part from in front of the elbow or behind the knee and straighten it. Ensure the limb stays the correct length.

Always make sure anatomy remains correct—reposing one part may affect others. For example, if you raise an arm, the shoulder will also rise. Lifting a shoulder will cause one of the hips to lower, and so forth. Also make sure the pose appears natural. Getting pose and anatomy correct is the most important part of any conversion! Once the figure is reposed, simply repair the joint and any lost detail using epoxy putty or other preferred means.

Below: These two figure are actually the same! The figure on the left, shooting the Machinegun from the hip, is built stock. The MG sling and other needed straps have not yet been added. Note the similarity to the man at the right—the changes are simple. The right arm has been swapped with a pointing right arm. This was a simple one-for-one exchange. The head, a separate part, was trimmed at the neck to allow it to be turned about 45 degrees—from looking front left to looking front right. The machinegunner is leaning backwards slightly while the pointing man is upright. This was done by slightly straightening the right leg. It was opened at the knee. In this photo, the leg has been fixed with putty, but the trousers have not yet been repaired with an additional application of putty. The change in pose also mandated the left foot be at 90 degrees to the leg instead of slightly bent. The foot was cut off, a wedge of plastic removed, and the then glued back in place. These very simple changes—within the skills of even a new modeler, result in a substantially different figure.





Here we see examples of an easy conversion and something much more complex. The figure at top left (from my 251/22 diorama) is essentially stock—the only change being a bandage replacing his headgear. The heads of most Tamiya figures are cut off flat just above the eyes to allow a hat to be fitted. For this conversion, a cap was glued in place and then carved away (left), leaving only a foundation on which to build. This was then given a thin coating of epoxy putty which was shaped with my favorite sculpting tool (see below) into a bandage and teased into hair.

Above center and right: This is the same figure—the grenade-throwing soldier from the Panzergrenadier set.

Here he is being made to jump from the halftrack, although fundamentally a similar pose, note the slight changes made at the hips, right ankle, left shoulder and elbow, and the new right hand. Epoxy putty was used to repair the damage and the figure was mounted to the vehicle as shown on page 7



the position of arms and legs may affect the wrinkle pattern on clothing requiring even more conversion work. Normally, however, with the small size and simple detail of the Tamiya figures, this is not a significant issue. The same procedure can be used to bend a head at the neck or a torso at the waist, whether bend front to back or side to side.

While I have made some very radical changes to the Tamiya figures, these simple methods well all that was needed for most of the figures, combined with some creative swapping of parts among the various figures. The photos and captions show how it was done. More examples can be found on the following pages and in the build chapter on each variant.



Doing sculpting work on figures is essentially the same as making tarps and other bits of stowage on details. I use the same epoxy putty (mostly Magic Sculpt) and the same tools. While you can use fancy purpose-designed tools, or various dental picks, needles, and such, I've found my most-used tool is a simple toothpick.

I sand one end to a sharp point and round the other end. I coat it with superglue and sand it smooth. It only takes a few minutes to make and is easily replaceable. Still, I usually add red bands from a permanent marker so I don't get it confused with other toothpicks I use for a variety of purposes. In addition to this tool, I have a couple paintbrushes I use to smooth the soft putty. The putty is water soluble, so a damp brush can be used to blend the putty into surrounding areas and smooth away tool marks or fingerprints. If care is taken during the sculpting and smoothing, no additional carving or sanding will be needed once the putty cures. Unless of course you prefer to work the putty after it hardens. It can be done either (or both) ways.

Like slings and straps, other details can be added, too. The helmet netting on these British soldiers are small pieces of fine brass mesh. The scrim is epoxy putty, rolled thin, cut into strips, and folded, twisted, and cut into random shapes. All these items were glued in place with super glue.





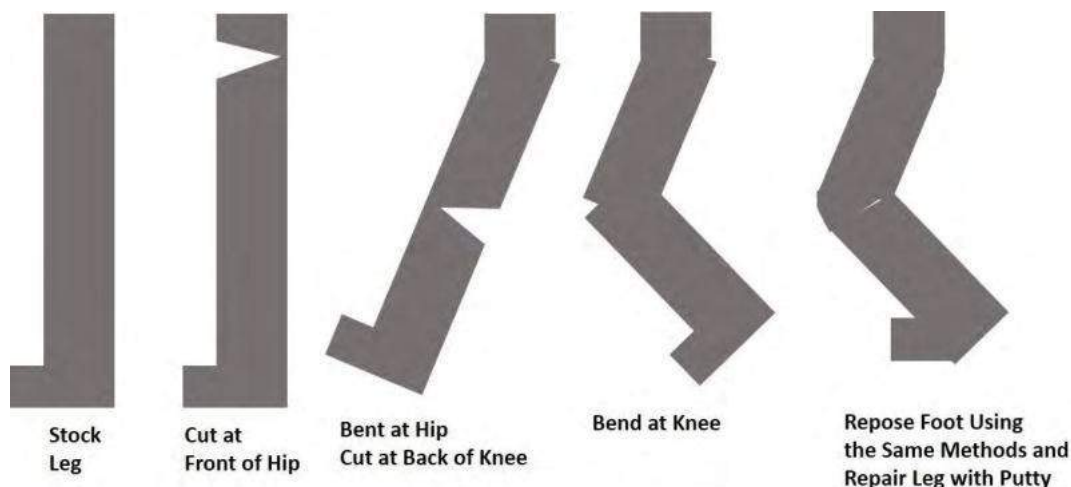
Let's look at the sculpting process with the Panther tank loader from my 251/20 diorama. The same process applies whether we are sculpting from scratch or converting a figure. In #1-2, the figure is posed. He uses a tanker's upper torso, and a set of legs from the Field Maintenance set with detail carved away. The boots and pants where they blouse over the boots were from one of Tamiya's winter figures included with the halftracks. The cap is also Tamiya and the head is a full head with hair from the Infantry on Maneuvers set. A bit has been carved away for the cap to fit pushed back on the head. Suspenders are strips of Duro. I like Duro for fine details such as this as it quite flexible and holds shapes well.



For the winter trousers, I work one leg at a time. I first add putty to the required shape and bulk (#3) before smoothing it with a damp brush or other suitable tool (#4). It is blended into the bit of Tamiya trouser over the boots and cut off straight at the top. Then, using my toothpick

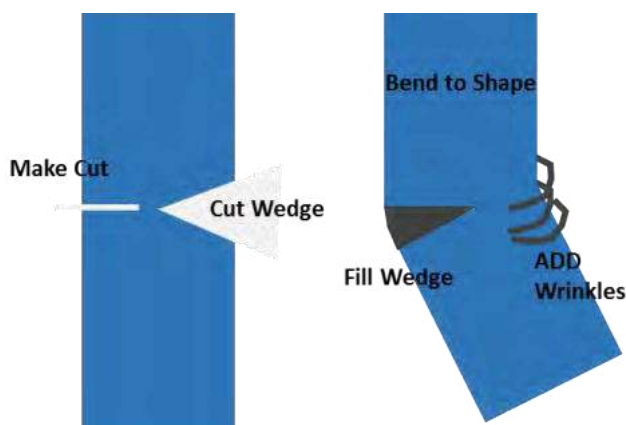


sculpting tool (#5) I add folds and wrinkles using a rolling motion and then set aside the figure for the putty to cure (#6). The next leg is then done. Finally, in a last application of putty (#7) pocket flaps, trouser fly fronts, and any other needed details are added. Suitable arms were fitted and the joints puttied as needed. I also use Magic Sculpt to putty any gaps at joints. As it is water soluble, you can put the putty in place, give it a swipe with a damp finger, and you're done. The painted figures is seen at #8.

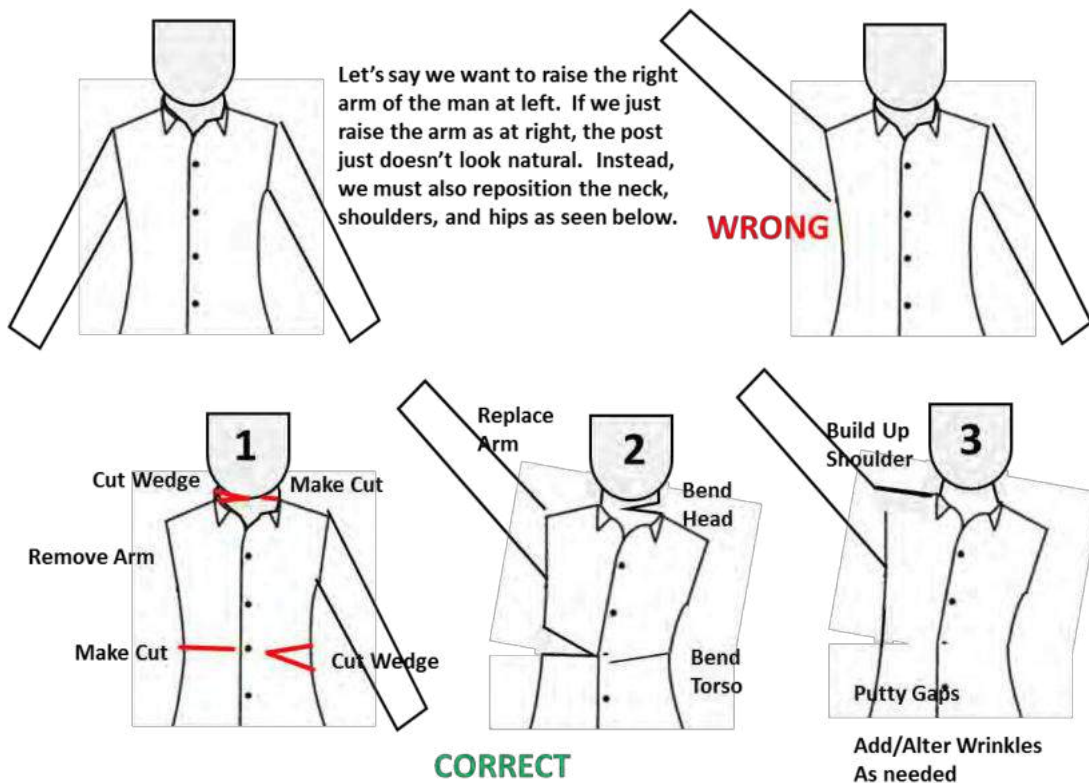


Top: The same technique to open or bend an arm/leg can be used on multiple joints on the same limb. Here, a leg is bent at both the hip and knee. If the foot is going to be resting on something, it can also be bent at both (or either) the ball or ankle. Keeping anatomy correct is the only limit.

Middle: In this small scale, simply cutting a wedge and bending is usually enough. But for repositioning thick items (like a torso), we may need to both cut a wedge on the inside of the joint and a line on the outside of the joint. Otherwise, the part may be too hard to bend in to its new position. Putty then corrects the damage. Note that cloth will wrinkle up on the bent inside of the joint. This must be built up using putty—you cannot get away with simply carving new folds into the plastic, as it would not look realistic.



Bottom: There is a practical-limit to how far changes can be pushed before major changes or even resculpting must be done. While it may seem easy to raise a lowered arm by simply cutting it off and repositioning it, there is a limit to how far it can be raised. In this example, raising the arm over the head also requires changes to the hips/waist, neck, and right shoulder. If the figure is wearing belts, straps, and equipment, this will alter the way they sit. It will also change the wrinkle pattern on the arm, waist, and right shoulder. The lower jacket skirts may also require alteration as may the legs. This is a major conversion. The lesson: Although Tamiya figures come in several parts, they are not truly multi-pose. Only certain parts will work together properly without further changes.





Above Left: Using the same methods, it's not too hard to replace an entire limb, such as the new arm seen here. A piece of thick wire forms the "bare" arm. To give the putty something to adhere to, I wrapped the wire in finer wire. The hand is a Tamiya piece. Middle: Putty was put in place for the sleeve and smoothed using a damp paint brush. Right: While the putty was still soft, the folds and wrinkles were sculpted in using my toothpick tool. Cuff details were added using a hobby knife.



Far Left: The same methods can be used to create entire figures from scratch. To do so, I usually print a copy of the Loomis diagram to the scale I am working in. Then, using this as a guide, I will create a stick figure mannequin as seen. In some cases commercial parts can be included if I have a suitable torso, arm, leg, etc. Then the mannequin can be posed as needed, fleshed out with putty to lock the joints in place, and then the clothing, gear, and equipment sculpted on.

Above center and right: For conversion or sculpting, I cannot

recommend highly enough the book "Dynamic Wrinkles and Drapery" by Burne Hogarth. Although designed for drawing, the book is also a great reference for sculpting—not only for clothing of all types and weights, but also for basic anatomy. I use my copy extensively. It is an old book, but is still readily available. It can also be downloaded as a .pdf from the internet.



The point illustrated (in a non-German, non-WW2, larger scale example): Here, puttees have been made with pewter foil wrapped around the leg much like a real puttee (leg on the left), and Duro putty added and sculpted to shape (leg on the right). Note the putty leg looks much more natural, in scale, and conforms to the leg better. It was also much quicker and easier to do.

Final Musings on Scratch-building and Sculpting:

Often, a scratch-building or sculpting project can look very daunting at first glance. But it's almost never as hard as it may seem. The key is not to look at a complex thing as a whole—break it down into its component parts. There are only a few basic shapes—lines, squares, polygons, circles, triangles—and only a few basic forms—cubes, spheres, cylinders, cones, and pyramids. If you break that complex item down into its basic shapes and forms which are individually easy to make, the job suddenly seems much easier.

Having a hard time figuring out how something is made or operates? You can consider what it's designed for or how it's used for clues. But how something is, in reality, built or operates is irrelevant (unless you building a working model); it's only how it looks that matters.

The same applies to sculpting. For example, are you trying to add puttees to a figure? Good luck trying to wrap a strip of anything around a tiny leg and get it to look right and be in scale. Instead, apply a thin coat of putty and simply press in the spiral design with the sculpting tool of your choice. The task will be much simpler, much quicker, and the result will look much better!

Can the Size Problem with Tamiya Figures be Fixed? What About Using Tamiya Figures with Other Brands?

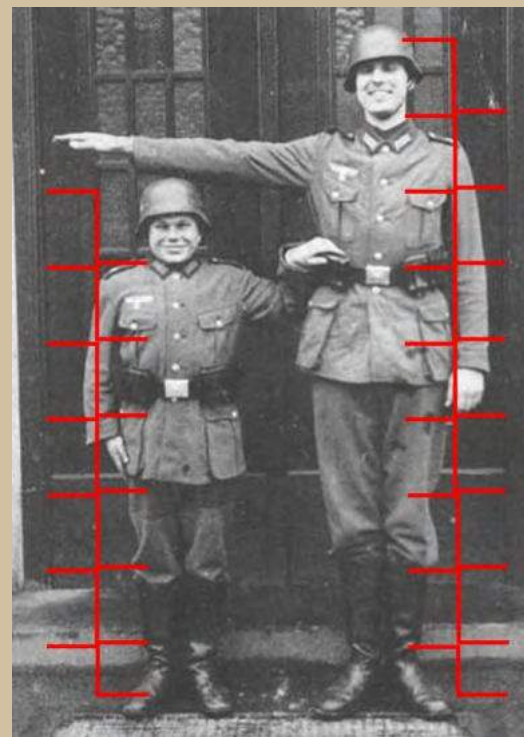
We have seen that Tamiya mini men are too small. Yes. Sort-of. The only critical dimension in which they are too small is one most of us won't notice. Even though we all come in various sizes, an adult male head is fairly consistent at about 9 inches tall (see the Loomis diagram on page 8). Thus a man who stands 8 heads tall is 72 inches, or 6 feet tall. I've included a photo of two Germans sized to match the Loomis diagram. Note the heads are the same height, but one man stands about 80 inches (just over 8.5 heads) while the other is 57 inches (just under 6.5 heads).

We are conditioned by seeing figures sculpted in "ideal" proportions. Most people fall short (pardon the pun). Data collected by the US during WWII shows the average height of a US soldier was 5 foot, 8 inches. Average weight 144 pounds. The hat was a size 7 or 7 1/2. Chest was 33 1/2 inches, waist was 31 inches. Shoes were size 9. German soldiers were, on average, about two inches shorter than US soldiers.

Some Tamiya figures scale out to only 5' 2" or 5'3". Some are as tall as 5, 10". Most are in the 5'6-5'7" range. So they're not bad. However, as they are sculpted using ideal proportions their heads are actually a bit too small! Their gear is fine. So, in theory, you could correct the Tamiya figures by replacing heads with correctly scaled 1/48 aftermarket heads. But guess what, because we expect ideal proportions, they would appear as if the heads are too big!

So, can the Tamiya figures be fixed? Short answer - No. Long answer - yes, but it would be easier to sculpt a new figure from scratch! You could increase the height by adding a shim at the waist (most figures have separate upper and lower halves). But realistically, you could only gain a scale inch or two. If you added more, the arms and legs would appear too short. To correct this, arms and legs would have to be lengthened both above and below the elbow/knees. While this would give you a figure of correct height - they would be skeleton thin with a pin head. They simply could not be realistically fattened and still maintain any of the original figure.

Ok, so what can be done? Best bet is to use them "as is". They look fine. They only appear too small if that is what you are looking for. You can mix and match them with aftermarket quarter scale figures and/or wargame figures as long as the difference is not too extreme. But if you do this, keep in mind head size should be consistent and gear/weapons should be absolutely identical. So, if you mix/match, use the same size head on all figures and use the Tamiya gear and weapons. If you do, the height and weight differences will look perfectly normal.



Not all figures are created equal—even from the same company! The photo at far left (not my photo—I downloaded it from the Armorama website—I do not know the photographer's identity) shows size differences between Alpine, Gasoline, Rest Models, and Tamiya. Note the size differences. At near left, we see two Tamiya figures! The shorter is from the Africa Corps set while the tallest is the from the Africa Corps Kubelwagen. Still, many of these figures could be used together with no issues.

Most could be as long as they were not posed near each other. The two Tamiya Africa figures, for example, are from my 251/6 diorama. Not only are they geographically separate on the base, one is inside a vehicle. All this serves to effectively camouflage the size difference.

Major Conversion/Sculpting Example



Although I used Tamiya figures and parts exclusively for my Sd.Kfz 251 vignettes and dioramas, the same procedures and processes work for other 1/48th scale figures. As we have seen, I used the Tamiya figures simply due to availability, quantity, and price. I also wanted consistency as my intent has always been to display the models together as a set. These conditions do not apply to other quarter scale models. In this example, we will look at a major conversion—almost a total resculpting—of one of Model Cellars' outstanding 1/48th scale WWI pilot figures. I converted with figure to display with my rendition of the Sd.Kfz 250/10 (the 251's little brother). Although the figure is different and the scope of work is larger, my methods remain the same. Putty is applied, smoothed, shaped with various tools including my toothpick tool and paintbrush, and then smoothed again. I work in small increments and allow them to completely cure before doing the next task. This is primarily to ensure I do not stick my finger or thumb into an area that has already been finished. Let's see how it was done.

These same methods can be used to sculpt a figure almost entirely from scratch using a mannequin such as that seen on page 14.



At left is the finished figure I created to pose with my Sd.Kfz 250/10. I always include at least one figure with a model—it adds visual interest, gives a sense of scale, and can be used to draw attention to a certain feature or area of the vehicle. The inspiration for my sentry was the color plate shown above left (artist/source unknown). As a starting point, I used the above figure from Model Cellar. I have made several larger scale figures and busts from this company, and the quality is outstanding. This was a figure my wife purchased a few years back, but that I really had no use for (not building 1/48th WWI aircraft). It came in handy here. The vast changes are readily noticeable, and include more than just detail changes—the pose has been tweaked, too.



As always, getting the pose and anatomy correct was the vital first step. Here, I was starting with an already great figure. But I did want to alter the pose slightly. All unwanted detail was first carved away (which was most of it). The head was fitted to a "neck" made of wire and bent to the desired position. A Tamiya helmet was also fitted. Rather than standing with the weight on both legs, I shifted the figure slightly so most weight was on the right leg. This required the right leg to be removed and placed slightly more toward the center. The left leg was moved slightly outward and forward. Note the right shoulder was also slightly lowered. With this vital process complete, the sculpting work could begin.



1: The first application were the pockets on the left—the slash pocket edge and the pocket flap. I also added a helmet strap (I later replaced this with pewter foil as it proved to be too fragile for handling).

At near left is the figure compared to a Tamiya figure from my 251/11. Note the size difference, making the figures incompatible.



2: The left coat cuff and the head scarf were next. Putty was simply smeared in place and shaped. 3: These were followed by the upper portion of the coat and the shoulder straps. 4:

To make the collar, a "sausage" of putty was wrapped around the neck, flattened, cut to shape, and then worked. The small collar tab is a tiny bit of putty applied in the same way. The soles of the straw over boots are flattened pieces of putty glued in place and, once totally cured, cut and sanded into the approximate boot shape.



5: The boots were added one at a time. Once the putty was put in place, it was shaped with a putty spoon and paint brush. The details were worked in using the point of a hobby knife. 6: A foundation for the coat was applied. Texture was cut into it to give the top layer something to stick well to. 7: On top of the foundation, the skirt of the coat were added. The foundation allowed me to work this layer without pushing it off the figure. As this is heavy cloth, folds and wrinkles are kept to a minimum. 8: Prior to fitting the right arm, the area under the arm, including the right slash pocket and pocket flap needed to be added. To make a pocket flap, simply apply a small ball of putty, flatten it out, and cut it to shape. I lifted the corners slightly with the tip of a hobby knife to give it a realistic hang. 9: The arm is a piece of wire, bent to shape. Another fine wire was wrapped around it to give the putty something to adhere to. Once the arm and hand are glued in place, the wire can be carefully bent and worked until the pose is just right. That process is still ongoing here. 10: The weapon is a Tamiya piece from the Russian Infantry set. Although the figures may be small, the weapon scales out exactly at 1/48th. The basis of the hand is a Tamiya gloved hand (from a figure from the Sd.Kfz 251 kit) with the fingers and thumb cut away. This is affixed to the gun in the proper location. 11: To make the mitten, a small blob of putty is pushed in place, blended and feathered onto the hand, and shaped to the weapon. The finger is cut with a hobby knife. The thumb was added with a tiny bit of putty. Once everything was in place, it was smoothed and blended with a damp paintbrush.

12



13



14



12: Once the pose was finalized, it was locked in place with a bit of putty representing the bare arm. I nearly always sculpt the underlying anatomy (although a bit thin since the putty clothes are over scale thickness). This ensures I don't press folds and wrinkles too deep and that the shapes of the underlying anatomy show through in the folds and wrinkles. 13: A sling was added using thin plastic card. The buckle is a tiny ball of putty pressed to shape. A small retaining ring around the sling is made with foil. 14: Putty was applied to the arm and shaped to form the sleeve and cuff. A bit of putty was also applied to the left arm to bulk this up slightly.

At left we see a couple views of the finished, unpainted figure.

At right was see the figure posed with in-progress 250/10.



Painting Concepts and Basic Color Theory

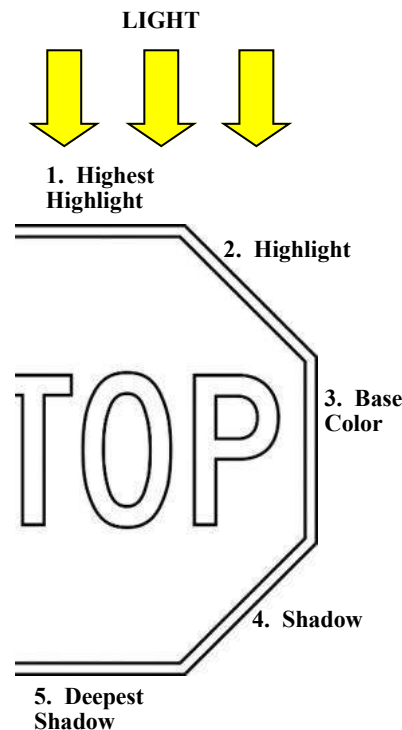
The style and methods you use when painting figures is entirely up to you – but it should complement your vehicle models. If your vehicles are shaded and highlighted (modulated) then your figures should be, too. If your vehicle is painted in solid, “unmodulated” colors, shading and highlighting on figures should be kept to a bare minimum.

Figures are nearly always a focal point of any composition, so your figures should be painted to at least the same standard as the vehicle. We’ve all seen models that were carefully and expertly assembled and painted...only to have a thrown together and sloppily painted figure posed with it. A well-painted figure also lets the uninformed viewer know that the dirty/messy appearance of the vehicle is intentional and not just sloppy painting! While good brushes and proper lighting are important, the main ingredient for successful figures is simply attention to detail – be neat and paint “in the lines”. Understanding some other key concepts will help us improve the quality of our mini-men.

Overhead Lighting: When “modulating” the colors on our vehicles, we place darker shadow colors on lower areas and undersides, and we put our lightest highlight colors on upper and top horizontal surfaces. This is overhead lighting. The late, great Shep Paine referred to this as the “Stop sign Rule”. See the accompanying graphic. We paint our figures in the same fashion - as if they were illuminated by a halo of light from above. When painting multiple figures, or if painting parts separately for later attachment, ensure lighting is consistent. If shadows and highlights of a figure fall in one direction while those on his equipment fall in another, it will not look right. Multiple figures should be lit consistently. You can, of course, get creative and paint “directed light” effects on your figure (where the figure is lit from a side or from underneath). The challenge of directed light is that you must be consistent with all elements in the composition and it can “compete” with the normal lighting in the room. For the overwhelming majority of our figures and models, overhead lighting works perfectly.

Scale Light: Our brains are trained to use highlights and shadows to help judge such things as distance, shape, texture, etc. When we look at people they are life-size and so is the light. When dealing with miniature figures, the light source is still life-size while the miniature is much smaller. Therefore, we must “scale-down” the light to provide the same visual clues to our brains. That is why painted highlights and shadows enhance the realism of a figure. It’s the same concept as making a circle drawn on a piece of paper look like a sphere just by shading certain parts of it. The larger the figure (and therefore the closer to life-sized) the more gradual and subtle these highlights and shadows must be to appear realistic. This effect gets more pronounced as figures get smaller—more contrast between light and dark is needed on small scale figures to achieve the same effect.

The most common method of painting figures is similar to the modulation methods armor modelers use—painting as if illuminated by a halo of light from above. This is overhead lighting, and it creates realistic highlights and shadows on figures as we see on the military policeman at far right. Shep Paine referred to this as the “stop sign” rule. It is illustrated here. Highest highlights are on the top surfaces while deepest shadows are on bottom surfaces farthest away from the light source. In this example we see a base color, two levels of highlight, and two levels of shadow. While this is adequate, in actuality, I add as many levels as needed to get the effect I am after. This can be as few as one or as many as four or five levels of highlight and/or shadow. In the photo of the policeman, note the highlights and shadows are largely painted on. This is the concept of scale light.



Scale Distance: Looking at a 1/48th scale figure at a viewing distance of one foot is the same as looking at a real person from almost 50 feet. If it can't be seen at that distance, it doesn't need to be painted. For example, in large scale figures, we must paint all details of insignia and buckles. In 1/48th scale, the mere impression of detail is often enough. Distance also makes things appear lighter. One theory states that 1/48th scale our colors should be about 10% lighter than the real thing to avoid looking too dark. Above 1/35th scale we really don't need to worry about this. There is no need for fancy formulas or measuring—if it looks right, it is right. If you apply this lightening principle to your vehicle, you must for the figures, too. I must admit, I do not lighten my colors for this effect – I prefer the look of the more saturated colors. Call it artistic license.

To paint effectively, we must be able to see. Good lighting in the work area is a must. All the lights on and around my painting desk are daylight-balanced light so my colors appear true. For very fine detail work, I also have a large magnifying glass with a light ring on an articulated arm. While it may seem to go without saying, a good grip on the figure is absolutely necessary. I mount the figure on a temporary painting base that is a comfortable size and weight to hold while I paint. Many of us get the shakes in our hands when painting. I eliminate this to a large degree by having support for my painting hand.

The most important painting tools are brushes. Without quality brushes, we cannot achieve quality work. Quality sable brushes can be expensive, but get the best you can. I do not use synthetics. They are acceptable for many basic painting chores, but I've found they do not hold paint well and they tend to (permanently) bend double after painting into recesses. Brush size is indicated by a number – the larger the number, the larger the brush. Thus, a number 4 brush is larger than a number 2 brush. Small brushes are identified by a number of zeros, the more zeros the smaller the brush: for example 10/0 is smaller than a 3/0. Brushes also come in different shapes, round and flat being the most common. There are only a few I use on a regular basis: 2/0, 0, 1, and 2 round brushes, and 2 and 4 flat brushes. For fine work, I rarely use smaller than a 2/0. A 0 with a good point will handle nearly all fine detail applications. Don't use too small a brush. Many think a tiny brush is the best for tiny figures, but if you paint with acrylics like I do, a tiny brush (3/0 or smaller) holds so little paint it is likely to dry on the bristles before you can deposit it on the figure. Remember, it is not the size of the brush, but the fineness of the point that counts most—there is little you can do with a 3/0 that you can't also do with a fine-pointed 0. (Note: there is no standard on brush size. A size "0" from one manufacturer may be significantly larger or smaller than a size "0" from another manufacturer). A brush, if cared for, will last a long time. Before use, dampen the brush and gently roll the point on a piece of index card to be sure the bristles come together in a needle point. After use, clean them thoroughly. A little soap (or a conditioning brush cleaner) will help to keep them supple and preserve the point.

There are many types of paints. Each type has inherent strengths and weaknesses. Painting techniques and methods are also different. I paint figures with acrylic paints almost exclusively, so here I will discuss primarily acrylic painting methods. I mostly use craft acrylics such as Delta Ceramcoat, Apple Barrel, and Folk Art. These can be purchased in most hobby and craft stores as well as many department stores. As I write, they cost about \$1—\$1.50 for a two-ounce bottle. Their quality and cost compare very favorably with the much more expensive paints sold by many model and figure dealers and stores. For airbrushing I use mostly Vallejo Model Air colors, but I do not use my air-brush for figures. Still, these colors can also be applied by brush and are useful for figure painting. For metals, I use the excellent metallic paints by Liquitex, Vallejo, and/or Andrea. All of these are acrylic paints and mix well together. Please note that techniques for using other type paints, such as oils, can be significantly different. Note also that different types of paint cannot be mixed with one another as they use different solvents and thinners. They can often, however, be applied on top of other, dried, types of paint.

The best way to learn to work with paints and colors is simply practice. Go with what works and what looks right. While it's certainly not necessary to have an in-depth knowledge of color theory, a basic understanding can help us make informed decisions and better predict results. A simple color wheel can be a useful tool.

Primary, Secondary, Tertiary, and Neutral Colors: Primary Colors cannot be derived by mixing other colors. All color combinations come from them. The primary colors are red, yellow, and blue. Secondary Colors are created by mixing two primary colors. They are orange (red + yellow), green (yellow + blue) and purple (red + blue). Tertiary Colors are created by mixing a primary and secondary color. Neutrals are technically not colors and cannot be mixed from other colors. These are white (the absence of color) and black (the presence of all colors). For practical purposes, we can include grey and brown as well. While these can be mixed, I've found it easier to have a few different browns and greys and mix others I need from them.

Complimentary Colors: These colors are opposites on the color wheel. Purple and Yellow are compliments, as are Red and



Although not absolutely necessary, a good color wheel can help you predict the result when mixing colors. It can also help you make color choices by providing information on complimentary colors, triads, warm and cool colors, and so on.

Green or Blue and Orange. When placed beside each other, they create the highest contrast. A color mixed with its complement appears more subtle or muted. Therefore, compliments can be used for shading. For example, purple is a great color with which to shade yellow. Orange can be darkened with blue, and so on.

Warm and Cool colors: Color temperature can be used for certain effects. Warm colors are from the red side of the wheel, and cool colors from the blue side. These can be used to help convey emotion or even temperature. We could emphasize a cold winter scene by using lots of cool colors while a passionate scene could use warm colors. Colors can have various “degrees” of “temperature”. For example, we could create a warmer white by shading with grey or brown and create a cooler white by shading with blue.

Value or Shade is the relative lightness or darkness of a color. We use value to shade and highlight. Shadows are darker values of our base color and highlights are lighter.

In theory, if you had the three primary colors, plus black and white, you could mix everything else you need. But in reality, it's better to have a wider selection of colors. Still, unless you have a collection of hundreds of paint colors, you will find instances where you need to mix the color you need. This is especially true when using several values of the same color for highlights and shadows; it is far easier to mix these values from a single base color. Remember, you don't want highlights and shadows to appear as painted ones. Rather, you want them to look like natural lighting on a constant color. Therefore, you want your highlights and shadows to be different values of the same base color. Let's look at some examples.

While it may seem like common sense to create highlights by adding white and to create shadows by adding black, this usually isn't the best technique. Adding white can wash-out your work and make it look chalky. There are other problems. For example, if you lighten red with white you get pink. Lighten green with yellow or tan. Adding black is often useful to create shadows, but can make your colors (especially lighter colors) dirty or muddy looking. Instead, can use various darker colors. Colors can also be darkened by mixing it with its complimentary color (the color opposite on the color wheel). To shade yellow, for example, use brown or purple instead of black. Note the different effects achieved – each of which can prove useful depending on the overall effect you're after.

When painting white, I very rarely use “pure” white for my base color. I use an off-white, light gray, or light tan – or even light earth colors to depict a white garment with ground-in dirt (such as winter camouflage). I then add off-white or white to create highlights. There are several reasons to start with a darker base color. First, highlights can be added: this could not be done if you started with pure white. Secondly, white (and many other very light colors) is difficult to effectively shade. By starting darker, one need add fewer shades. Soldiers are often dirty. A “dingy” white looks better in a military modeling setting.

I also do not use a “pure” black. I start with a very dark gray or I create a base color by adding a bit of blue, gray, green, brown, or flesh to the black paint. Highlights – used sparingly to avoid a washed-out color – are then created by adding more those colors or by adding flesh tone. When highlighting very dark colors such as black or dark blue, remember that less is more. It is too easy to over highlight these colors making them look gray or extremely faded. Shadows are then added with black.

Red can be another difficult color. I start with a color or mix slightly darker than my intended color. Red is then used for the highlights. For higher highlights I add orange or flesh. Shadows can be created by adding dark brown, greens, or black.

The best way to learn is to practice and experiment. It's not hard—you can probably become an expert with about an hour of practice. What we can do with paints and brushes is limited only by our imaginations—there are no rules!

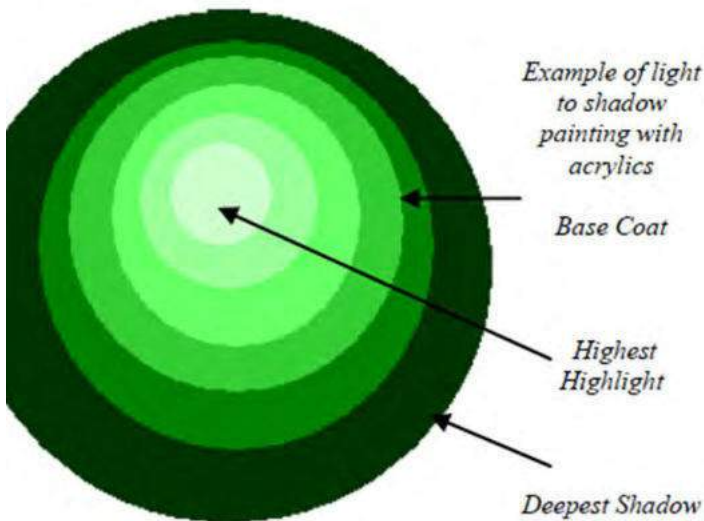
Before painting carefully study the figure and plan the best approach – what must be painted before painting something else? How will parts to be added later affect highlighting and shading? If painting parts separately, take care to make sure shadows and highlights are consistent and fall in the same direction. Generally speaking, I paint from the inside to the outside. I start with inner garments and then paint outer garments and finally belts and equipment. Depending on the figure (and my mood) I paint flesh areas either first or last. This pre-planning is much more important than following an arbitrary rule such as “always paint the face first”. Every figure is different and must be tackled in the way that best suits both it and the painter.

As previously mentioned, I paint with acrylic colors. Different methods would be used with different types of paint. To apply the paint, it must be the proper consistency. Often times the paint comes from the bottle too thick. It should flow from the brush like ink from a pen. If it is too thick, it will clump up, be hard to apply, and could possibly obscure details on your figure. If too thin, it will be hard to control and could run all over the figure. Thin the paint to a consistency where it flows easily from the brush without



Your work will only be as good as your brushes! The first size brushes are Vellejo sable brushes—sizes 4/0, 3/0, 2/0, 0, 1, and 2. I rarely, if ever use the 3/0 and I believe the 4/0 is practically useless for acrylic painting. It holds so little paint, it dries out before it can be deposited on the model. It is not the number of bristles, but the fineness of the point that determines the detail work the brush can do. A variety of flat brushes can also be useful for dry-brushing. These, however, are of limited utility of figures in this small scale.

Painting Miniature Figures



leaving brush marks. Two or three coats should be needed for good complete coverage. Acrylics can be thinned with acrylic thinner or distilled water, but I use tap water and it works just fine. If it's not thin enough, just add more water. If it's too thin, let it set and thicken or add more paint. Usually about three or four parts paint to one part water is about right for base colors (but it varies with the thickness of the paint). Throughout this discussion on painting, I will refer to several techniques, defined below:

- **Base Color or Base Coat:** This is the opaque base—normally the mid-range—color you start with. In most instances, this is the color you are trying to create before the application of shadows and highlights.
- **Glaze:** A glaze is an application of thin paint, used primarily for adding shadows and highlights to the base color by altering its value. Glazes are usually two or three times thinner than your base coat, or about one part paint to one part water. See the example on the previous page.
- **Wash:** A wash is the application of very thin paint. The paint flows only into recesses/crevices. It is useful for things such as groundwork to make details stand out or to outline rivets and panels and vehicle. Washes can be applied overall, or very specifically targeted to certain items or areas. Washes are many times thinner than your base coat – four or more parts water to one part paint. The ratio is not hard and fast, but depends on the thickness of the paint, the effect you want, and even the color!
- **Blending Wash:** If the differences between highlights, base colors, and shadows are too harsh or too stark, the graduations can be softened and the values of color visually “blended” by selectively applying a thin

These illustrations graphically show how to paint highlights and shadows using acrylic paints. If using oils, the base, highlight, and shadow colors can be applied separately and blended together at the edges to create smooth transitions from light to dark. Acrylics dry too quickly for this, so we use a “visual” blending of multiple glazes of color. Our base coat is fairly opaque—it should be thin enough not to leave brush marks, but thick enough to get complete coverage. Glazes are thinner—these are semi-transparent, allowing the underlying color to show through. We use them for shading and highlighting. Highlights and shadows are nothing more than lighter and darker values of the same color—in this case the base color. In the second illustration, the base color is marked “B”, with highlights to the left and shadows to the right. While each figure and painter is different, I normally use the following method of application. I paint the base color first, getting good complete coverage. Then, using transparent glazes, I gradually build up highlights, working in smaller and smaller areas, until I have the effect I am after. I then do the same with shadows. Study the previous photo of the military policeman—how many levels of highlight and shadow can you find? Note the lightest colors are on the highest edges and the darkest colors in the deepest shadows.



Acrylics are hard on brushes but properly clean and care for them and they will last a long time. These are both size 0 brushes. Obviously the one on the left remains more useful for detail work than the one on the right.

“blending wash” of the base color. It is much thinner than a normal wash and performs the same function and works in a manner similar to a filter applied to a vehicle.

- **Feather:** This technique is used to eliminate hard edges, or tide marks, between shadow, base, and highlight colors. As you apply glazes, do not allow a hard edge to form between colors. Blend (or feather) away this edge, using a moistened brush if necessary. The goal is have the various values blend seamlessly into one other rather than have sharp, distinct borders.
- **Dry-Brush:** Dry-brushing is a technique used to pick out only the high points of an object. It is no different than the dry-brushing methods we use on our models. This technique is useful to create rough textures.

It is important to prime figures before painting. Primer is designed to stick well to the underlying surface and provide a layer for the actual paint to adhere well to. I prime small figures in black. This ensures that any deep shadows inside creases and under equipment (places I may not be able to reach with a brush) will be a black deep-shadow color. Although black is my preference, many other primer colors, such as white, grey, and dark red, can also be used. The choice is yours.

Acrylics dry too quickly to allow blending of colors on the figure to achieve subtle highlights and shadows. Highlights and shadows must therefore be built up with multiple layers of thin glazes. The key is to make transitions between the highlight, base, and shadow colors smooth to enhance the realistic effect. No matter what I’m painting – be it a face, a shirt, a helmet, etc., I follow the same basic process as shown on the previous page.

First, the base coat is applied. I generally use the largest brush I can. On quarter scale figures, this is still usually a relatively small brush. This is often a #2 round or flat when painting large areas of clothing and a #1 or #0 when painting other items. If the paint is thinned correctly, it usually takes two or three coats to get a smooth, solid, opaque layer of color.

After the base coat is dry, I paint highlights. Highlights serve to gradually lighten the base color on those areas receiving the most illumination from the overhead lighting. The number of highlights varies with the amount of light falling on the part in question. Some areas may only need one or two value changes through the use of highlights, others may need three or four. Each value change is a separately applied highlight. These highlights are usually applied through the application of thin, semi-transparent glazes of progressively lighter colors painted over the top of the base color and any previous highlights.

Shadows follow highlights. These I paint using thin, semi-transparent glazes of progressively darker color painted over the top of the base color. Like highlights, it can require multiple, darker applications of shadow color to build up to the desired effect. I use as many different highlights and shadows as needed to in order to get the effect I desire. My eye is the judge – if it looks right, it is right.



This photo shows why I like to prime in black. All areas difficult to reach with a brush, deep undercuts, etc., are in an appropriate deep shadow color. Also, under a bright light, it really shows the high contrast between highlight and shadow. Also, black is a good color to base dark colors on.

After all other highlighting and shading is done, the item is “outlined”. Deep shadow areas in seams, under pocket flaps and collars, around belts, etc., are outlined with a thin line of very dark brown or black paint (or other color as appropriate). Then the top edges of collars, the tops of seams, etc. are painted in the highest highlight color. I have found that this little bit of extra highlighting and shading works wonders at enhancing the 3D aspect of my figures and really making the details “pop”.

If needed, a blending wash can be used to help visually blend the transitions between color values.

Finally, details such equipment, belts, insignia, buttons, etc. are painted. Details likewise usually require highlighting and shading.

Consider the steps shown graphically on the previous page. Note the very gradual buildup of highlights and shadows and the smooth transition between color values.

There is an alternate method that sometimes lends itself well to painting certain dark items in this scale. That is to use the black primer as the base color and simply build up to the color you want by adding progressively lighter glazes on top of the black.

Patterns and Textures

In this small scale, some methods must be simplified. Normally, when painting camouflage or other patterns on larger-scale figures, I would base-color, shade, and highlight each individual color, as we see in the tarp example. But normally, my methods in this small scale are more abstract. I paint the entire pattern, then highlight the item with glazes of flesh and shade with glazes of dark brown and/or black. See the accompanying photos showing how I paint camouflage.

Various textures and surfaces can be recreated using different techniques.



On this page, we will look in more detail at some basic painting techniques we have touched on earlier.

This graphic shows my technique for painting clothing items.

- 1: Base Color*
- 2: 1st Highlight*
- 3: 2nd Highlight*
- 4: 3rd Highlight*
- 5: 4th Highlight—Edging only*
- 6: 1st Shadow*
- 7: 2nd Shadow*
- 8: 3rd Shadow, outlining only*
- 9: To visually blend all the colors, and tone down the contrast, the cape was given a very thin blending wash (really only a filter) of the base color.*

Rain Cape/Shelter Half:

B: Olive Drab (VA)/Timberline Green (1/1)

1L: B + Timberline Green

2L: Timberline Green

3L: 2L + Khaki

4L: Khaki (edging only)

1S: Olive Drab (VA)

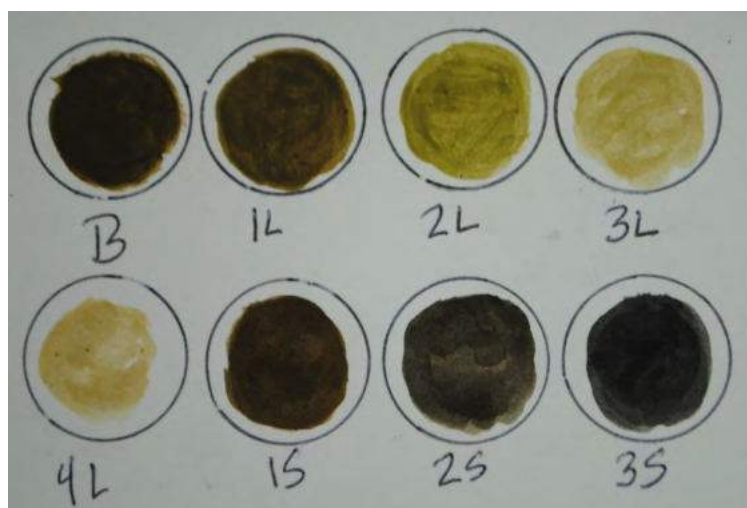
2S: 1S + Black

3S: Black (outlining only)

Blending Wash: A thin application of the base color to visually tie everything together.

The colors used are shown at right. Note that while the base color is fairly opaque, the remainder of the colors are transparent.

This example is a Russian soldier from my Sd.Kfz 251/22 diorama.





Painting camouflage. Normally, I would paint, highlight, and shade each color. In this scale that is not practical. (1) The first two colors are in place—the dominate color I selected as a base, and the first camouflage color. (2) A third color is put in place. Add more colors as needed. (3) To tie everything together I apply a “blending wash” (a thin layer of base color) over the entire pattern. (4) Shadows are applied. Depending on the main camo color (green or orange-brown) this is done with either a glaze of black or very dark brown. Deep shadows and outlining are black. (5) Highlights are sparingly applied with thin, transparent glazes of flesh color. A second application is applied to the tops of creases, folds, and edges. (6) Once the basic uniform colors are done, details can be painted, weathering applied, and the figure is done. Weathering can be applied by adding dirt colored glazes to appropriate areas, or with a dusting of pigments—basically the same methods you would use on the vehicle kits. Use the same weathering colors to tie the figure to the vehicle and the ground.



Larger items, such as this tarp, can have the colors painted individually. In the photo above left, the base color and the first stripes have been added. The base color was painted, and then highlights were created by dry brushing since the tarp has a rough, woolen texture. Shades were added with glazes as normal. Then the large stripes were painted, highlighted and shaded in the same fashion. In the photo above, the thin stripes have been added. Again, they were highlighted and shaded using appropriate colors. But we're still not done yet! With all the colors in place, an overall dry-brushing with a high highlight color helps unify everything. Deep shadows were applied using glazes of very dark brown and/or black. Note the edges. To give a frayed/worn appearance, dots and lines of light colors were randomly placed all around the edges of the tarp.

When recreating a rougher surface, I sometimes apply initial highlights by dry-brushing. Shadows are always applied with glazes. Highest highlights are still usually done with glazes. For smooth items like leather, never dry-brush unless you are trying to recreate suede or badly scuffed leather. Other textures and materials can be replicated by varying painting techniques such as making transitions to high-light/shadow more abrupt or by adding a bit of gloss or semi-gloss varnish into the paints. An example of creating textures with paint is worn leather, done as shown on the next page. Even this small scale, woodgrain can also be convincingly painted. Examples can be found on the next page.

The same is true for metals, but the paint must be smooth and the contrast between base coat, highlight, and shadow is usually greater to help recreate the reflective surfaces and the vast difference between gleaming highlights and deep shadows. Pencil lead (applied with a pencil, or powdered and rubbed on with a finger or cotton bud) can create a very realistic metal sheen using the same method we saw when weathering our vehicles.

Painting Flesh

Whether painted first or last, the face is the most important painting task. It is generally what viewers look at most closely. It's the feature that makes a figure "human". The face will often, quite literally, make or break a figure. It's the face – and its expression – that gives the figure character and conveys, more than anything else, its "attitude". While the techniques used to paint flesh are the same base coat, highlight, and shadow technique we've already seen, we must remember we are recreating flesh – not cloth or some other texture. The transitions between shades of light and dark must normally be more gradual and smooth. I normally use more highlights and shadows on the face than on any other area, with less value variation between applications. Carefully feather the edges together – smooth transitions here are vital to achieving a realistic effect. Consider the figure itself - obviously, a child's face is smoother than a weathered warrior.

When painting faces, I begin with the eyes. Both eyes should be the same size and looking in the same direction. I use the method shown for small-scale figures. In this small scale, considering that in the sunlight our figures may be doing the "Clint Eastwood" squint, we could probably get by with a dark line for the eye and a small black dot for the iris – especially if the eyes are in the shadow of a helmet brim or cap visor.

Once the eyes are painted, paint the rest of the face and any other visible flesh. Be careful when painting around the eyes. Leave a very small bit of the eyelid lines showing to outline the eye. Remember when mixing your flesh color that persons who spend a lot of time outside tend to be darker. Not everyone has the same complexion. There is no one "be-all-end-all" flesh tone mix. In these dioramas, several different flesh colors are used. Highlights are applied to the forehead, ridge of the nose and nostrils, chin, tops of cheekbones, lower lip, upper eyelid, top edge of bags under eyes, the ear lobes and edges, and tops of any folds or wrinkles in the skin. Apply shadows to the hairline, eye sockets, sides of nose, under the nose, under bottom lip, under the cheekbones and chin, under the jaw and behind the ears. The deepest shadows are in the eye sockets at the inside corner of the eye, under the eye, and under the chin. If the figure wears a hat, I plan in advance how this will affect the highlights and shadows and paint accordingly.

To help further blend and unify the colors together especially at this and larger scales, I often add a "blending wash" of the base flesh color to help soften transitions.

Next are any other details such as lips, teeth, etc. I usually add a glaze of reddish-pink to the lower lip. Often, a tiny bit of dark red feathered in just under the cheekbones and at the tip of the nose can give help give life to a figure. Figure nails are also painted at this point. I coat the nail with the medium shadow color, then paint the nail in a highlight color, leaving a border of the shadow color.

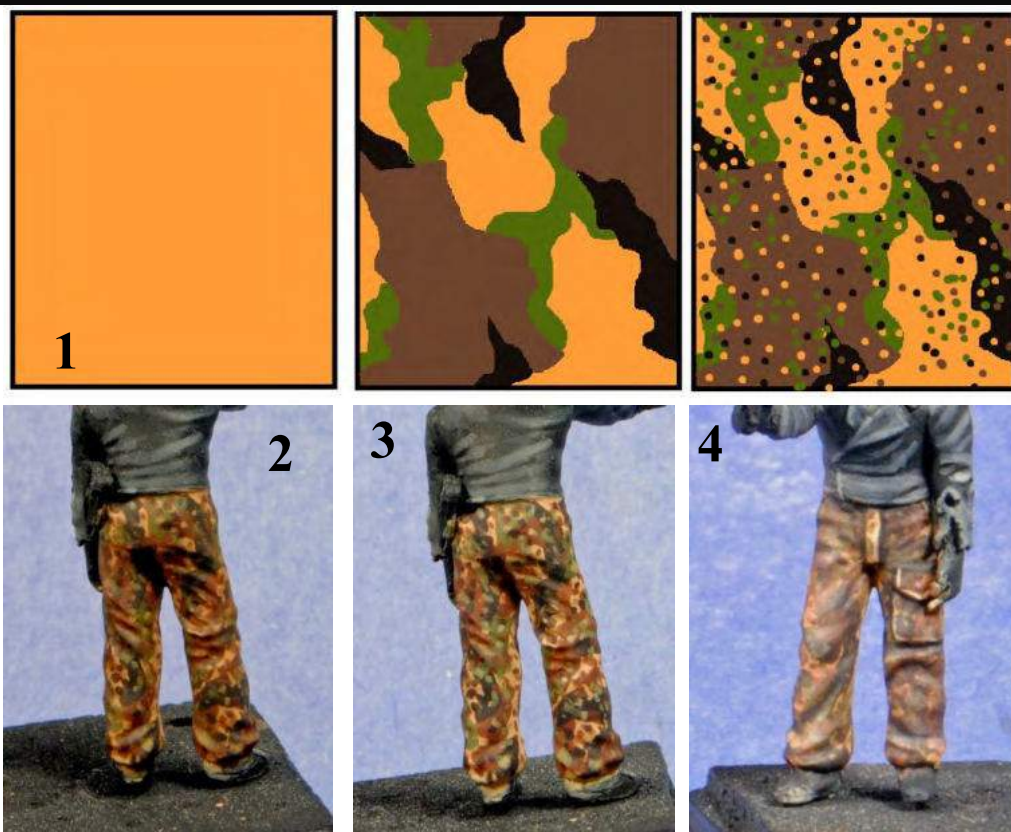
A five-o'clock shadow can enhance a figure when used appropriately. Mix a dark bluish-gray and add a very thin glaze – almost a wash - to the beard areas, heavier in shadow areas such as under the lower lip and under the jaw. Of course, this dark growth is not appropriate for a young blond-haired man, so use it sparingly.

The hair is last. Don't try to paint individual strands in this scale, but rather concentrate on forms and shapes in the hair. I base coat the hair in the darkest shadow color, and then progressively add lighter colors to get depth and highlight. Deep shadow areas can be enhanced with a dark wash. Highest highlights are picked out with careful applications of glazes.

For painting different races of individuals, I use the same methods. Only the colors used are changed.

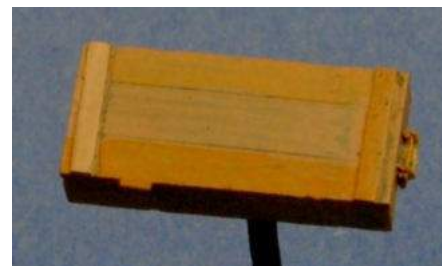


As an alternate method, good for especially dark colors, is to use the primer for the base color and simply build up to the highlight color using glazes of successively lighter colors.



Another example of camouflage. (1) shows the basic steps. First, the camouflage was coated in a base-color of Cam Brown and Sand Yellow in a ratio of 3/1. The first camo color, covering about 1/3rd of the yellow was a brown color created by mixing Nutmeg Brown and Burnt Umber in a 2/1 ratio. The last colors were Dark Burnt Umber and Russian Uniform. Finally, dots of each color were randomly applied over all other colors. (2) This photo shows the camouflage at this stage. (3) The colors were visually blended and the starkness toned down by applying a blending wash of color about halfway between the first two shades. This was created by mixing Raw Sienna and Nutmeg Brown and thinning the paint with water until it was little more than a filter. It doesn't make a lot of difference, but it takes down the contrast a bit. (4) Shadows were applied with thin glazes of Dark Burnt Umber and/or Black while highlights were applied with thin glazes of Flesh.

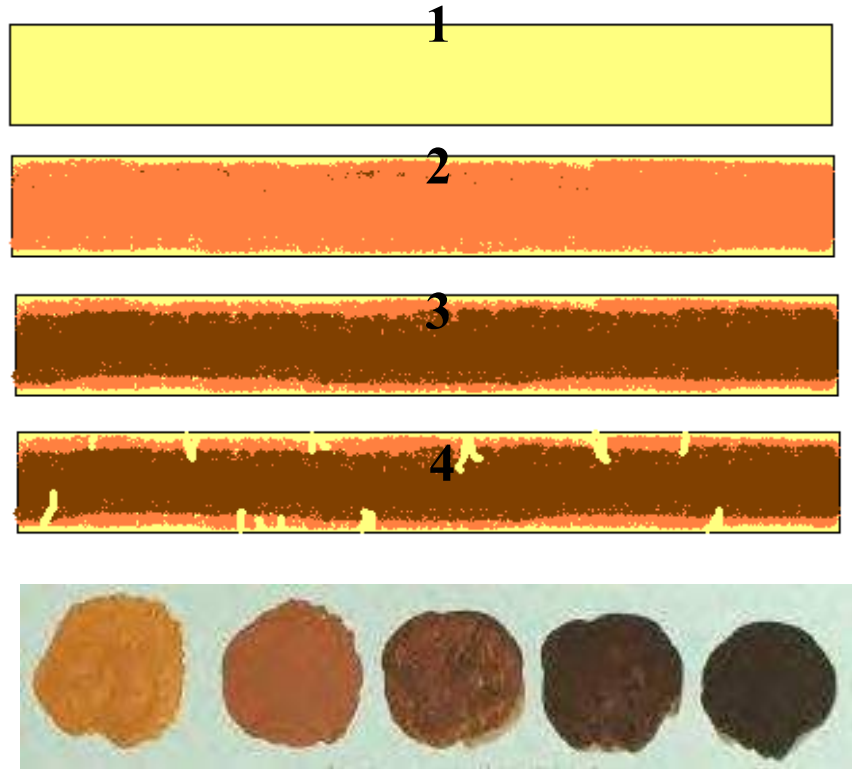
Right: Woodgrain. I paint the boards in various natural wood colors. Obviously, a single piece of wood such as a weapon stock would be painted in a single light color. This is followed by a dark wash of Burnt Umber (or other suitable oil paint color) to tie everything together. A pin wash of Black is applied between the boards and around each board (outlining). Next, some very light dry-brushing can be done to bring out any scribed wood grain in the paints. I also, using a light color, add outlining on the edges of individual boards. This, combined with the pin washes, really makes the wood pieces "pop", just like it did details on the vehicle itself. Details on the wood, latches, rope handles, stenciling, etc. are added last. In this instance, the parts had grain molded in. If the part is smooth, grain can be simulated by making the Burnt Umber oil paint wash a bit thicker, and streaking it with the brush. The brush marks this process leaves will realistically represent grain. For the washes and glazes, either oil paint or thin acrylic can be used. Note that if I were depicting painted wood, I would paint the item in a more "normal" manner. However, wood effects could still be allowed to show through in areas where the paint is worn.



Left: note the various textures in the gun. It is not simply painted black or silver. The wood stock was made as shown above using dark red-brown acrylic paint for the grain (note—do your research, some stocks may be different colors or even different materials—in this case the stock is wood, but the pistol grip is a dark red brown plastic material). This particular weapon features a blued finish. The base color is Black, Oily Steel (Vellejo) and Prussian Blue. Highlights are created by adding more Oily Steel. Outlining of various parts and pieces was done in black. The magazine was painted in Dark Iron (Andrea), given a wash of Black, and the ribs were picked out with Oily Steel. Note that not all weapons are blued. Many weapons (US weapons for example) are parkerized—resulting in a grainy dark grey color. As always, research is key.



My method for painting worn leather is shown here. 1) I start with a light base color. 2-3) Using darker colors, I gradually add glazes of color, letting the previous, lighter, colors show in the worn areas. 4) Finally, I add scuff, and scratches and often high edges by using my first color or even a color somewhat lighter than my initial color. Below, a sample of some of the colors and the sequence of application I may use to create black leather. The colors, all acrylic craft paints, are from left to right: Golden Brown, Nutmeg Brown, Burnt Umber, Dark Burnt Umber and finally Dark Burn Umber + Black. Pure black may be used for shadow edging and perhaps Golden Brown plus a bit of lighter khaki for edging on the highest edges. Obviously, different colors would be used to create different colors of leather.



Weathering

There are many things we can do to weather figures. We've already seen how to recreate worn leather. The methods for figures and vehicles are little different - our vehicles and figures operate in the same environment, and weathering should be similar. Weathering is a process that should be planned from the beginning. In fact, holes, patches, torn or missing shoes, field modifications to equipment, etc. are things that must be addressed first in the construction phase. I keep weathering constantly in mind as I build and paint. A few effects are:

- **Dust:** For light weathering, such as a bit of dust on an otherwise clean object, I often use a bit of pigments in the same colors used on my groundwork and vehicles. Alternatively, a simple glaze or wash using earthy colors can be sufficient. While dry-brushing could also be used, I prefer glazes as dry-brushing is not as easy to precisely apply and can have an over-scale appearance in this small size. I normally then cover these areas with a very thin blending wash of the darkest groundwork color. The feet and lower legs also get this wash. This blends the dirt into the item, ties a figure to the groundwork, and gives a sense of visual continuity.

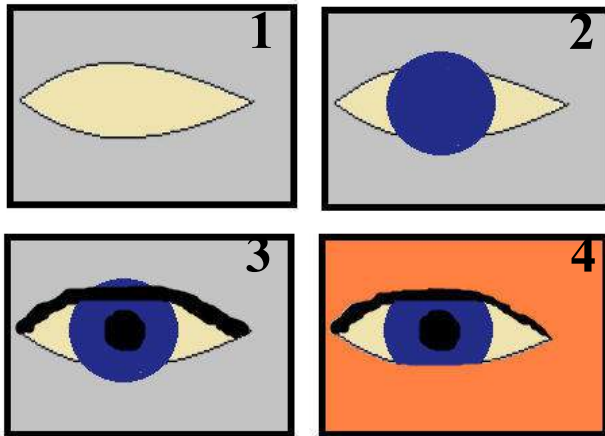
- **Ground in dirt:** This type of dirt cannot be realistically done with simple dry-brushing and washes. I mix the dirt color right into the base color and add to appropriate areas such as the seat of the pants, lower trouser legs, elbows, etc. Then, each highlight color and shadow color also gets the same treatment. Pigments can also be used to blend the colors into the dirt. This technique results in very realistic heavy, ground in dirt. Alternately, heavy glazes of light earth colors can be added to highlights and glazes of dark earth colors added to the shadows.

- **Stains:** For stains (blood, oil, food, etc.) place a thinned drop of the appropriate color on the spot where you want the



Top: The colors I often use for flesh are shown above. The color I forget to label is "Parchment". All colors are Delta Ceramcoat craft acrylics. For painting, I use the best brushes I can get in size #2, #1, #0 and, for the smallest details only, a #2/0. There is little a smaller brush can do that a well-pointed #0 can't do just as well.

Middle: I start the face with the eyes. Not much detail is needed in 1/48 scale. Paint the whites Parchment (1) or a light flesh color. Do not use pure white—that is too stark in this scale. A dot of very dark blue, brown, or black makes an iris (2). A black line and a dot serve as the pupil and upper eyelid (3). The base flesh color is painted around the eye (4). This is then highlighted/shaded as needed. I generally do not paint a "catchlight" (white dot on the eye to depict reflected light). I prefer to give the finished eye a coat of clear gloss to get a natural reflection.



Bottom. After the eyes, I paint the rest of the flesh. (1) Make sure the eyes are the same size and looking in the same direction. (2) The base color is applied. I used Dark Flesh. (3) The first highlight is added by mixing Medium Flesh with Dark Flesh. (4) The second level of highlight is Medium Flesh. Note it is applied in smaller areas. (5) Two more levels of highlight are applied: Medium Flesh plus Antique White and then Antique White only to highest areas such as the top of the ears and tip of the nose. (6) Three levels of shadow are applied. First is Dark Flesh plus Candy Bar Brown; the second is made by adding Chocolate Cherry to the first shadow mix; and the final shadow is made by adding Black to the mix. Note how the same process is applied to the hands. (7) Details are painted. A very thin glaze of Dusty Purple is added to the bags under the eyes. Some Burgundy Rose adds color to the cheeks. The lower lip is given a highlight glaze of Dusty Rose. Teeth, if visible, would be "dotted" in with Antique White. Hair is given a base color using the flesh dark shadow color. Highlights were added with appropriate colors. Eyebrows are added at the same time using the same color.





Fingernails are added by first placing a dot of the mid-range flesh shadow mix and then adding, on top of this, some of the high highlight color mixed with a tiny bit of Dusty Rose.

Below: The field grey jacket and trousers are painted. Colors of items vary as is my normal practice. Items were given a base coat, four levels of highlight (the last of which was a very high highlight on edges only) and three levels of shadow (the last of which was black outlining). The outlining—both with highlight and shadow, really makes details “pop”. The figure was finished by painting the various equipment items, insignia, and details.



stain, and, using a moist brush, feather the edge of the stain into the surrounding color. The amount of thinning and feathering depends on the type and the age of the stain. Such things should normally be kept to a minimum (especially blood), but in this scale some exaggeration may be needed to get the point across. Acrylics or oil paints can be used for this staining.

Perhaps paradoxically, because the level of detail is less and highlight to shadow transitions do not have to be as smooth, gradual, and subtle, it is actually much easier to paint a small figure than it is to paint a large one! I'll spend a month or more building and painting a single figure in 54mm and larger scales. In that same time period, I can build and paint all the figures needed for a couple of these smaller scale dioramas.



Far left: The pants and hat on this tank commander were painted using the black primer as a base. Note the leather jacket. As this is a relatively large piece (compared to a belt of equipment item), in addition to using my worn leather methods combined with normal painting procedures, I used some yellow and dark brown acrylic inks (from Andrea) to enhance the highlights and shadows, adding a tiny bit of semi-gloss to the leather texture.

Left: The white colors on this filthy tanker were dirtied with the addition of a bit of grey and brown. Even the highest highlights are not pure white. Additional mud and dirt were added using glazes of appropriate colors in appropriate place (light and dark earth colors on highlight and shadow areas respectively).



Below Left: In this scale our figures are rarely displayed as stand-alone pieces. They are usually part of a larger creation including vehicle(s) and/or groundwork. It is vital that these elements all work together. This is more than the consistent weathering mentioned above. Note that all use about the same color saturation. They are all highlighted and shaded to the same degree—note especially the light colored edgings and dark outlining. In smaller scales, I really like to push the contrast on the highlights and shadows. Note also that the lighting is consistent: all elements are lit from above. Imagine the light at noon on an overcast day. Note also the importance of research. The figures wear a variety of uniform items (often on the same figure) including field grey items, camouflage smocks in at least two different patterns and colors, and SS camouflage uniforms.

Below: Sample figures



Sample Color Mixes and Methods

I paint figures almost exclusively with acrylics, using mostly craft acrylics as they are good quality and inexpensive. For airbrushing I use Vellejo Model Air—they function better without as much thinning and fuss. The Model Air colors also work well for brush painting. Unless specified otherwise, colors are Delta Ceramcoat. Apple Barrel paints are identified with (AB), Folk Art (FA), Vellejo (V), Vellejo Model Air (VA). Key: B = Base Color, L = highlight (1L, 2L = 1st highlight and 2nd highlight), S = Shadow. Highlights and shadows are normally applied with glazes. For color mixes, if no ratio is listed, the colors were mixed “by eye” until they looked right! I normally paint from the inside out: shirt, pants, jacket, belts, equipment/etc, but I like to paint flesh last. Many prefer to paint flesh first. The choice is your, but sometimes the figure’s design will or mandate painting in a particular order. In the chart below the colors for each item are generally listed in the order they were applied.

German



FIELD GREY SAMPLE #1:

Above: the range of acceptable color is vast! Within a diorama, and even on the same figure, I will often vary the exact shade used.

B: Green Grey (V) + German Green (VA) + Panzer Grey (VA)
 1L: Green Grey (VA)
 2L: 1L + Country Tan (AB)
 3L: 2L + Parchment
 1S: German Green (VA) + Panzer Grey (VA)
 2S: Black

FIELD GREY SAMPLE #2:

Use the color above, simply replacing the Country Tan and possibly even the Parchment with Wedgewood Green



FIELD GREY SAMPLE #3: (The tunic in the photo below left)

B: Green Grey (V)/Olive Drab (VA)/Charcoal 1/1/1
 1L: B + Green Grey (VA)
 2L: Green Grey (V)
 3L: 2L + Wedgewood Green
 4L: (Edging only) 3L + Light Grey (VA)
 1S: B + German Green (VA) and Black
 2S: 1S + Black
 3S: Black

FIELD GREY SAMPLE #4: (The trousers in the photo below left)

B: Same as jacket with more Olive Drab and Charcoal added
 1L: B + Light Grey Green (VA)
 2L: Light Grey Green (VA)
 3L: 2L + Country Tan (AB)
 1S: B + Olive Drab and Black
 2S: 1S + Black
 3S: Black

FALL CAMOUFLAGE:



B: Country Tan (AB) + Light Grey Green (VA)
 Medium Brown: Autumn Brown
 Dark Brown: Dark Burnt Umber
 Orange: Raw Sienna + Tangerine
 1S: Dark Brunt Umber
 2S: Black
 1L: Dark Flesh
 2L: Medium Flesh

SPRING CAMOUFLAGE:

B: Country Tan (AB) + Light Grey Green (VA)
 Dark Green: English Ivy + Black

Light Green: English Ivy + Straw

1S: Charcoal

2S: Black

1L: Dark Flesh

2L: Medium Flesh



SS CAMOUFLAGE UNIFORM:

B: Cam Brown (VA)/Sand Yellow (VA) 3/1
 Brown: Nutmeg Brown/Burnt Umber 2/1
 Dark Brown: Dark Burnt Umber
 Green: Russian Uniform (VA)
 Blending Wash: Mix of Base and Brown
 1S: Dark Burnt Umber
 2S: Black
 1L: Dark Flesh
 2L: Medium Flesh

WHITE WINTER UNIFORM:

B: Dolphin Grey + Pewter Grey (AB) + Nutmeg Brown
 1L: B + Antique White
 2L: Antique White
 3L (Edging): White
 1S: B + Pewter Grey and Burnt Umber
 2S: 1S + Burnt Umber and Charcoal
 3S: 2S + Black

DIRTY WINTER WHITE:

B: Cadet Grey/Pewter Grey (AB) 2/1
 1L: Cadet Grey
 2L: 1 L + Antique White
 3L (Edging): Antique White
 -In heavily soiled areas, mix a tiny amount of

Autumn Brown in with both the base color and highlights. Feather these areas into the surrounding base color.
 1S: B + Pewter Grey (AB) and Burnt Umber
 2S: 1S + Burnt Umber
 3S: 2S + Black
 -Glazes of Burnt Umber were applied in the shadow areas of heavily soiled areas. Pigments could be used, but these tend to obscure the underlying highlights and shadows while glazes allow these to show through.

REVERSIBLE PARKA CAMOUFLAGE (And Zeltbans):

Variations were used. Here is a sample:
 B: Mushroom (AB) + Light Grey Green (VA)

Brown: Burnt Umber/Autumn Brown 2/1
 Green: Cam Green (VA)/English Ivy Green (AB)/Black 3/1/1
 Rain Marks: Realistically, these would not be visible in this scale, but for effect I applied tiny little lines of US Dark Green in select areas.
 1S: Dark Burnt Umber
 2S: 1S + Black
 3S: Black
 1L: Dark Flesh
 2L: Medium Flesh



ITALIAN CAMO MATERIAL:

AL:

B: English Ivy Green (AB)/Olive Green (AB)/Dark Yellow (AB) 1/2/1
 Brown: Burnt Umber/Autumn Brown 2/1
 Yellow: Dark Yellow
 1S: Dark Burnt Umber
 2S: Black
 1L: Dark Flesh
 2L: Medium Flesh

BROWN LEATHER JACKET:

B: Autumn Brown. This was given a heavy wash of Dark Burnt Umber, allowing the base to show through in highlight and wear areas.
 1L: Raw Sienna
 2L: Antique Gold (non-metallic)
 1S: Dark Burnt Umber + Black
 2S: Black
 -Touches of Chestnut, Brown, and Yellow acrylic inks (Andrea) were sparingly added to provide color variation, further highlight and shadow, and a bit sheen.

TROPICAL OLIVE DRAB UNI-



FORM COLOR:

This color varied widely. Various colors or mixes used were made from Olive Drab (VA), Timberline Green, and/or Olive Green (Musket Miniatures). Additional variation is sometimes added with Khaki, Country Tan (AB) or Wedgewood Green. Highlights are generally added with Khaki and/or Country Tan (AB). Shadows are mixtures of Olive Drab (VA), Dark Brunt Umber, and/or Black.



TROPICAL LUFTWAFFE UNIFORM:

These were tan rather than olive. Mixes of Raw Sienna and Country Tan (AB) was used. This was lightened with Country Tan (AB) and/or Sandstone (AB) and shaded with Burnt Umber and/or Dark Burnt Umber.

HELMETS/GAS MASK CANISTERS:

B: Black Grey (VA) + German Green (VA)
 L: B + Light Grey Green (VA) on crown of helmet and edge of rim.
 1S: B + Black applied to sides of helmet
 2S: Black applied under the rim
 Chipping on the gas mask canisters was done using Oily Steel (V).

CANTEENS AND MESS KITS:

-Metal Areas: German Green with Light Grey Green (VA) edging and Black outlining.
 Chipping: Oily Steel (VA)
 -Canteen Cover: Burnt Umber with Country Tan (AB) or Nutmeg Brown (AB) highlights and Dark Burnt Umber shadows.
 -Outlining is done with Black.

WEB GEAR:

German Olive Green web gear came in a variety of colors and shades. The same colors used for tropical uniforms can also be used. A faded sample is:

B: Light Grey Green (VA)
 1L: B + Country Tan (AB)
 2L: Country Tan (AB) or Khaki
 1S: B + Dark Burnt Umber or Olive Drab (VA)
 2S: Dark Burnt Umber of Olive Drab (VA)

GAS AND WATER CANS, AMMUNITION BOXES, PANZERFAUSTS:

Often painted the same color as the vehicle base color, i.e. Panzer Grey or Dark Yellow. Many equipment items (gas/water cans, ammo cans, etc.) are painted German Green. Research is key. Items are shaded and highlighted appropriately. Use the other equipment examples included here as a guide.

TROPICAL EQUIPMENT (HELMETS, GAS MASK CANISTERS, ETC.):

Much was painted in sand colors over the top of the base European colors. I paint these items in various sand colors and apply chipping using both the underlying color and Oily Steel (VA).

RUCKSACKS, PACKS, TARPS, ETC:

These are painted field grey, olive drab, brown, tan, or grey as appropriate. A dark grey-green tarp may have been painted as follows:

B: Black Grey (AV)/German Green (VA)/Olive Green (VA) 1/1/1
 1L: B + light Grey Green (VA)
 2L: 1L + Light Grey Green (VA)
 3L: Light Grey Green (VA)
 4L (Edging): 3L + Wedgewood Green
 1S: B + Black
 2S: Black

MEDIC'S RED CROSS VEST:

White:
 B: Cadet Grey
 1L: B + Antique White
 2L: Antique White
 1S: B + Pewter Grey (AB)
 2S: Pewter Grey (AB)
 Red:
 B: Red Iron Oxide
 L: Bright Red
 S: Candy Bar Brown

GERMAN MILITARY BLANKET:

B: Hippo Grey + Grey Blue (VA)
 1L: B + Grey Blue (VA)
 2L: Grey Blue (VA)
 3L: 2L + White Grey (VA)
 4L (Edging): White Grey (VA)
 1S: Hippo Grey
 2S: 1S + Black
 3S: + Black
 -Orange Stripe: Terra Cotta. Lights were created by adding Tangerine, Shades were created by adding Burnt Umber

-Blue Stripe: Night Blue. Lights were created with Williamsburg Blue. Shades were created with Midnight Blue.

LITTERS:

B: Vineyard Green (AB) + Hippo Grey
1L: B + Wedgwood Green and Cadet Grey
2L: 1L + Wedgwood Green



1S: B + Black
2S: Black

HELMETS:

B: Olive Green (VA) and US Dark Green (VA).
L: US Dark Green (VA).
S: B + Black
Helmet and liner straps were simply painted on. The straps were painted, outlined in Black, and the top edge given a high highlight version of the base color.

US Uniforms came in a variety of colors. Numerous different mixes were used. Here are some samples.

WOOL TROUSERS:

Three mixes were used for these: Olive Drab (VA); Olive Drab + Camouflage Medium Brown (VA); and Camouflage Medium Brown (VA). These were highlighted using Timberline Green and Country Tan (AB). Shading was applied using Dark Burnt Umber and/or



Black.

M41 FIELD JACKET/GAITERS:

B: Various mixes of Olive Drab (VA), Timberline Green, and Khaki (AB).
L: B + Khaki (AB) and/or Parchment.
S: Olive Drab (VA), Dark Burnt Umber, and/

or Black.

M43 FIELD JACKET:

Two mixes were used to vary the color slightly. One mix consisted of Olive Drab (VA) and Wedgwood Green. The other mix was Olive Drab (VA), US Dark Green (VA), and Country Tan (AB). Lights were created by adding Country Tan (AB) and/or Wedgwood Green. Shades were created by adding Olive Drab (VA) and/or Black.

WEB GEAR:

Even more variety was shown here with different colors mixed and matched on each figure. Three color mixes were used for the web gear. One was Khaki (AB). Another was Khaki (AB) plus Olive Drab (VA). Third was Khaki (AB) plus US Dark Green (VA). Lights were created by adding Khaki and/or Parchment. Shades were created by adding Olive Drab. Outlining was done with Black.

RUSSIAN UNIFORM:

Many were straight Russian Uniform (VA). Variation was provided on others by mixing Russian Uniform with Timberline Green, and UK Light Stone (VA) in various ratios. Lights were created by adding UK Light Stone (VA) and/or Khaki (AB). Shades were created with Olive Drab (VA), Dark Burnt Umber, and/or Black.

PADDED JACKET.

B: Timberline Green/Raw Sienna 3/2
1L: B + Khaki
2L: 1L + Khaki
3L (Edging): Khaki
1S: Olive Drab (VA)
2S: 1S + Black
3S (Edging): Black

GREATCOAT:

B: Charcoal/Dark Burnt Umber 1/1
1L B + Pewter Grey (AB) and Nutmeg Brown (AB)
2L: 1L with more Pewter Grey (AB) and Nutmeg Brown (AB)
3L: 2L + Country Tan (AB)
4L (edging): Country Tan (AB)



1S: B + Black
2S: Black

HELMETS:

Helmets are a mix of US Dark Green (VA) and Russian Uniform (VA). Lights were created by adding Timberline Green and shades by adding Black.

WEBGEAR:

Again, various mixes were used, similar to the uniform color only lighter. Various mixes and highlights were created using Olive Drab (VA), Timberline Green, Country Tan (AB), Mushroom (FA), and Khaki.



BATTLEDRESS 1:

B: Olive Drab (VA)/Nutmeg Brown (AB)/Timberline Green 3/3/2
1L: Same without the Olive Drab
2L: 1L + Timberline Green/Territorial Beige (AB)
3L: 2L + Territorial Beige (AB)
1S: Olive Drab (VA)
2S: Black

BATTLEDRESS 2:

B: Olive Drab (VA)/Coffee Bean (AB) 1/1
1L: B + Territorial Beige (AB)/Timberline Green
2L: 1L + Territorial Beige (AB)
3L: Territorial Beige (AB)/Timberline Green 2/1
1S: B + Olive Drab (VA)
2S: Olive Drab (VA)
3S: Black

Note: Canadian soldiers also used Battledress, but the color was somewhat darker and greener than the British version. A mix of Russian Uniform (V)/Timberline Green/Charcoal 1/1/1 might be a good starting point.

HELMETS:

B: US Dark Green (VA)/Cam. Green (VA) 2/1
L: B + Timberline Green
S: B + Black

WEBGEAR 1:

B: Olive Drab (VA)/Trail Tan 1/1
 1L: B + Trail Tan
 2L: Trail Tan
 1S: Olive Drab (VA)
 2S: Black

WEBGEAR 2:

B: Olive Drab (VA)/Trail Tan/Timberline Green 2/1/1
 1L: B + Khaki/Timberline Green
 2L: 1L + Trail Tan
 1S: Olive Drab (VA)
 2S: Black

RANK CHEVRONS:

Territorial Beige over Olive Drab (VA) base with the top edge picked out with Territorial Beige + Antique White.



General

FLESH:

B: Dark Flesh
 1L: Medium Flesh
 2L: Medium Flesh
 3L: 2L + Antique White
 4L: Antique White
 1S: Candy Bar Brown
 2S: 1S + Chocolate Bar
 3S: 2S + Black
 Details: Depending on weather, tiredness,

etc. touches of red can be added to the cheeks and/or the tip of the nose, bags under the eyes can be added in purples or greys, lips are usually a mix of Medium Flesh and Burgundy Rose highlighted by adding a bit of dark pink. Flesh tones can vary by race and even from individual to individual. Different effects can be achieved with different colors.

LEATHER BELTS AND STRAPS:

The method and colors shown earlier in this chapter are generally only used for larger items (like boots) in this small scale. For belts, straps, and small bits of gear, I use a simpler method:

-Brown Leather:

B: Autumn Brown
 L: Golden Brown or Country Tan (AB)
 S: Dark Burnt Umber

-Red Brown Leather:

B: Autumn Brown
 -Glaze of Chocolate Bar
 L: Raw Sienna
 1S: Dark Burnt Umber
 2S: Black

-Black Leather:

B: Autumn Brown
 1st Layer of Color: Burnt Umber
 2nd Layer of Color: Dark Burnt Umber + Black
 L: Raw Sienna
 S: Black

GUNMETAL:

Research is key. Few weapons were left in bare steel, most were blued, parkerized, or painted. Blued weapons were painted a mix of Black, Midnight Blue, and Oily Steel (V). Highlights were created by adding Oily Steel (V). High highlights are straight Oily Steel (VA). Shadows are black. Rubbing pencil lead on metal areas can also create a realistic worn sheen. Parkerized weapons were base-coated in Charcoal, but shaded/highlighted using the same colors.

WOODEN STOCKS AND HANDLES:

Any light wood color such as Country Tan (AB), Raw Sienna, or Autumn Brown is used for the base. The item is then given a thick glaze of dark brown or dark red brown color, streaked on to create a wood grain appearance. Highlights are added to edges with a lighter color of the base color. Shadows are added with Dark Burnt Umber and/or Black.

COWS:

-White:

B: Cadet Grey, Antique White, and Country Tan (AB)
 1L: B + Antique White
 2L: Antique White

1S: Cadet Grey + Country Tan (AB)
 2S: Pewter Grey (AB) + Burnt Umber
 3S: 2S + Charcoal

-Brown:

B: Brown Iron Oxide + Raw Sienna
 1L: Raw Sienna
 2L: 1L + Straw
 1S: B + Burnt Umber
 2S: Burnt Umber
 3S: Dark Burnt Umber

-Skin around the nose: Dusty Rose + Black, highlighted with Dusty Rose and coated, were appropriate, with Clear Gloss

-Hooves: Charcoal, shaded with Black and highlighted with a mix of Pewter Grey (AB) and Burnt Umber

-Udders: These were painted using the white colors, and given a glaze of the most color were appropriate.

-Eyes: Whites were painted with Antique White slightly tinted with Dusty Rose. The Iris is Brown Iron Oxide and the Pupil Black. The eyes were coated with Clear Gloss.

6

"Project 251" Modeling the Sd.Kfz 251



The "Ten Commandments of Effective Composition"

By Kevin Townsend



The "Ten Commandments of Effective Composition"

I firmly believe the best compositions—whether single figures, vignettes, or dioramas—are those that tell a story. For dioramas, and to a lesser degree vignettes, the story is absolutely essential. It is barely an exaggeration to say that in a diorama the story is as important as the models and figures—perhaps even more so!

There is certainly nothing wrong with building stand-alone models. But some, myself included, prefer to go a step farther. Figures give an immediate sense of scale. Groundwork provides a setting and context. Our piece then, whether a single figure or vehicle, a small vignette, or a large and complex diorama is a 3D photo—a moment frozen in time. The choice is yours. Stand-alone models can masterfully built and painted, but I am invariably drawn to the pieces that have a story to tell. To me these are the most memorable, even if they not technically the best.

One distinction many clubs and organizations make between vignettes and dioramas is the absence or presence of a story. In my series of halftracks, you will find pieces that are technically vignettes and dioramas – but I generally make no clear-cut distinction and tend to use the terms interchangeably. But I agree that while any composition can tell a story, the story is central to a diorama. But even a vignette will have at least a rudimentary story as the elements present should be related to one another somehow. Lacking a story or a relationship, our vignette or diorama is just a collection of figures and/or things that may well leave the viewer confused about what he/she is looking at.

When storytelling, no matter how simple or complex or large or small our piece is, all elements (vehicles, figures, groundwork, base, etc.) should support our story like chapters in a book or scenes in a play. In most cases, the story should be immediately apparent or the work has failed at some level, but there are times when riddles or even treasure hunts can be effective as long as they are not too difficult and are able to keep the viewer's attention for long enough. You are limited only by what you can imagine and what you can successfully create.

Of course we want our viewer to understand our story, and it is the composition of the piece that ensures this. Composition is nothing more than the arrangement of elements on the base. The compositional process is simply arranging and rearranging these elements until they look good. While a successful diorama will usually appear to be spontaneous and perhaps even random, in reality it is anything but. Careful planning must go into the piece to ensure the viewer reads your story in the order you desire and gets the point you are trying to make. It can often require a great deal of ingenuity in design, construction, and painting. Even if you are simply creating a single stand-alone model or vignette with no special story to tell, you still want the viewer to see it to its best advantage. This can also require detailed planning and exacting placement of all those elements.

While you can create perfectly fine dioramas using stock figures and vehicles, this will limit you to what is available commercially. You will soon find that, to tell the story you wish, you will often have to convert what is available or create elements from scratch to get exactly what you need.



The difference between a vignette and a diorama.

On the facing page is a diorama, full of drama. The halftrack has just been ambushed by a US Squad who is now approaching the vehicle. The bazooka damage on the nose is highlighted by posing the bazooka gunner there, admiring his work. US Soldiers surround the vehicle while the squad leader provides direction to the surrendering German crew, two of which are dead and one wounded. Not visible in this photo, a US soldier is approaching the rear of the halftrack, cautiously peering inside, weapon at the ready. A BAR gunner and kneeling rifleman provide security.

At left is a vignette. No story is present, only three soldiers looking at the vehicle. The vehicle is placed to draw the viewer's attention to the woodgas generator. One figure is a mechanic leaning over studying the woodgas burner, further drawing the viewer's attention to this vital area on the vehicle. As figures attract the eye, it can be a good idea to place them near features on the vehicle you want the viewer to see. The position of the other two figures simply form a "stop" for the viewer's traveling eye and direct him or her back toward the halftrack.

I generally have a basic idea of what I want before I start. My initial composition work will be with sketches and mock-ups. It is also during this process I work out factors that will be needed for later construction—poses of figures, damage to vehicles, orientation of guns, etc. Many of these must be worked out prior to construction of our models. For example, before I can fit figures into vehicles, I need to know what actions they will be performing and what poses they will need to be in. Then, using my partially-built models and posed figures, I finalize the composition. While I may make some changes as I go, all the basics are locked-in at this point. Only then can I build the groundwork, detail the figures, and finish construction of the vehicle.

Although often overlooked, the compositional process is critical. This chapter looks at my "Ten Commandments of Effective Composition" in detail. I learned the hobby through the books, articles, and pamphlets of the great Shep Paine. A good deal of my methods were shaped by his. Therefore, the reader familiar with his work will find a lot they recognize in this chapter.

How do we develop an idea, take the story we see in our minds' eye, transform it into a vignette or diorama that will attract and hold our viewer's attention, and allow them to see the point we are trying to make? My "Ten Commandments of Effective Composition" is the process I use to accomplish all this, ensuring to the extent possible my pieces are successful.



I prefer to work out my composition using partially assembled, but unfinished and unpainted figures and vehicles. This allows me to change poses and details as needed, and to work out relationships without running the risk of breaking fragile parts or damaging finished paintwork. And, of course, if the models were finished, altering them to meet compositional needs would be problematic. This is the same diorama seen on the facing page.

The vignette shown here is quite simple—an Sd.Kfz 251/2 in action. The story the composition tells is simply one of the vehicle doing what it was intended to do—provide fire support using the 8cm mortar. But while simple, every detail was carefully thought out and considered. Compare this vignette with my “Ten Commandments” as you read through them.



I chose the term “Commandments” because it is catchy, and “ten” because we all know that when commandments are involved there must be ten of them. In actuality, they are suggestions rather than commandments. As rules, they are not carved in stone – etched in Jello is probably more descriptive. Do not read these commandments as “thou shalt” and “thou shalt not”, but rather as “usually”, “sometimes”, or “normally”. Even though assigning separate numbers to each may indicate they are somehow unique entities distinct from one another, there is, in reality, a great deal of overlap between them. They are not used in any order, and they are not used by themselves—they all must be used in conjunction with each another. Their relative importance is based on the story we are trying to tell and our overall goal. In fact, I do not always list or present them in the same order. Not every “commandment” applies to every composition, and there are exceptions to everything based on what you are trying to achieve. They can be used with the simplest stand-alone figure to the largest and most complex diorama. They can apply equally to a single diorama or to an entire display or exhibit. They are essential when composing a complex story. They can also enhance the visual appeal of your finished works. Even if no story is intended or if you are simply building a model sitting on a base with a bit of groundwork and perhaps a figures, they can help you display your figures and models to the best possible effect.

They are not meant to be, nor can they be, used as any type of “checklist”. They are simply an easily understood vehicle in which to put my compositional processes, thoughts, and ideas on paper. They have come about after decades of modeling experience and studying the works of others. They reflect what I have observed to be those things which make a piece really effective. So, use them as you wish... but ignore them at your peril.

1. HAVE A SINGLE MAIN POINT



I stated previously that there is no order of importance for my “commandments”. That is not entirely true. This first commandment is truly first. Our goal – our main point – is absolutely first among equals. It is of paramount importance. Without this, we cannot continue.

Clearly, you cannot begin to compose until you know what it is you are composing! Just like the old “chicken and egg” argument, sometimes your idea comes first and then you buy the kits you need while other times you may buy a kit you like and then decide what to do with it later. But the composition process, whether it begins pre or post kit acquisition, all starts with an idea.

Ideas come from many places – books, magazines, photos, stories, other modelers, and – of course – your own imagination. If you are working from a photo or a story, keep in mind there is no need to copy it exactly. Sometimes an image (or the written or spoken word) may not translate easily to three dimensions. You also limit your options if you try to exactly copy an image.

Once you have your idea, you must gather data. We obviously think of researching appropriate vehicles, units, and uniform details, and so forth. But we must also consider what type of buildings and architecture were present in the area and timeframe we are creating. What about the ground itself? Different colors of earth, and different consistencies of mud, exist in different places. Plant life varies, as does the weather and the seasons. This research is necessary to make a realistic (and hence convincing) scene.

Once we have our subject and our idea and have done the necessary research, we can develop our goal – the main point we are trying to get across. What is it we want to accomplish? If all you plan to do is build a model and then place it on a shelf with no base, groundwork, or figures, you’re pretty much done with the planning stages and can go right to construction. Otherwise, we MUST have a goal in mind or the effectiveness of our finished product will be hit or miss (mostly miss, I’m afraid). There are end-

less possibility. For example:

- Maybe you simply want to show your model in its natural habitat. This requires a base and a bit of groundwork. A tank might be on the ground, on a road, in a town, in rubble, in the mud, and so forth. Maybe an aircraft is on an airfield or in a hanger. Perhaps an amphibious vehicle is in or near the water. A ship could be at sea. And so on.

- Maybe your goal is to show the vehicle doing what it was designed to do or to emphasize its function. In addition to the base and groundwork, now perhaps we need figures. We also likely need some sort of activity – a personnel carrier should carry troops, a command vehicle should be performing some command function, a maintenance vehicle should be fixing something. Perhaps you wish to draw attention to a particular feature or function of the vehicle. An all-terrain vehicle may be negotiating rough terrain. A vehicle will all-wheel steering might be posed in a turn, showing this feature. An amphibious vehicle might be entering or leaving the water.

- Or maybe you have a story you want to tell – something to elicit some type of response from the viewer. Maybe you want to make a point that's humorous, poignant, or educational. Perhaps your story is designed to recreate a moment from history. If this is the case, look at the event from all angles and directions—you may be best served by recreating the event, but you may make your point better by depicting the moment just before or just after. Keep an open mind and use your imagination.

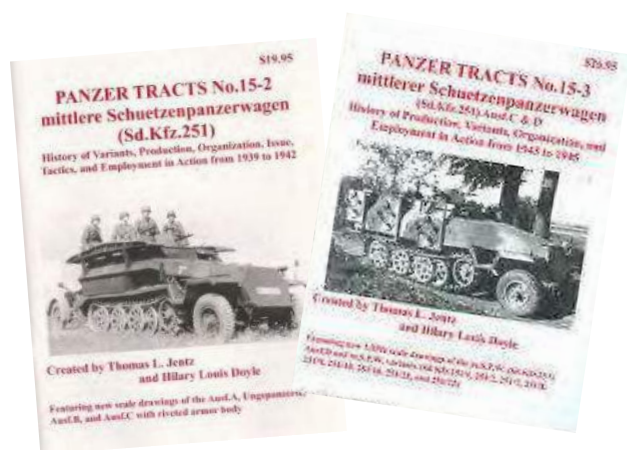
All of these goals require a degree of planning to ensure we place the elements (vehicle, figures, groundwork, other stuff, etc. etc.) in the best possible locations and arrangements to achieve our goals. I spend at as much time as needed in this process to ensure I get everything just the way I want it. The compositional process is the foundation you are building on, and with a flawed foundation your construct will be weak. When a display, vignette, or diorama misses the mark, it is usually because of poor planning or no planning at all. The time you spend here is never wasted.

Of course, none of these goals are mutually exclusive. A model can tell a story that emphasis its features and functions while operating in a realistic environment. Still, even if your idea includes multiple goals, one must be primary. Generally, we want a single point or punch-line. Everything else is support. In addition to this main plot, sub plots and “sidebar” stories are fine, but they should support the story. There should be no doubt what the main point it. The main point should normally be what the viewer notices first.

The most useful references available when researching the Sd.Kfz 251 are the Panzer Tracts books by Thomas Jentz and Hillary Doyle. These rely entirely on original documentation, photographs, and actual vehicles and parts. Anything that cannot be confirmed is not included. That makes these the most reliable sources available. The scale drawings are also outstanding. Panzer Tracts 15-2 covers the Ausf A-C in the years from 1939 to 1940. The Ausf C and D from 1943 to 1945 is addressed in 15-3. 15-4 provides some additional details on later variants and experimental versions. Many other books and references are available. Another work I found useful is the Osprey New Vanguard book by Bruce Culver with color plates by Jim Laurier. While an older book and thus not completely error free, it is a great overview of the vehicle, the Ausfs, and all the variants with numerous photographs and color plates.



The vignette on the facing page was inspired by the photo at top, and by the interpretation of that photo as a color plate in the Osprey New Vanguard series book on the Sd.Kfz 251 by Bruce Culver seen above. While I took the color scheme and stowage from this source, I posed the vehicle in action rather than in motion, which I thought better met my goal of illustrating the purpose and armament of the 251/2.



PANZER TRACTS No.15-4
Final Developments of the
Schützenpanzer Sd.Kfz.251 to
Vollketten M.S.P. Kätzchen



Hillary Louis Doyle, Lukas Friedli
and Thomas L. Jentz

Featuring 36 pages of 65x110 and 61x87 scale drawings of the 251/200, 251/201, 251/202, 251/203, 251/204, 251/205, 251/206, 251/207, 251/208, 251/209, 251/210, 251/211, 251/212, 251/213, 251/214, 251/215, 251/216, 251/217, 251/218, 251/219, 251/220, 251/221, 251/222, 251/223, 251/224, 251/225, 251/226, 251/227, 251/228, 251/229, 251/230, 251/231, 251/232, 251/233, 251/234, 251/235, 251/236, 251/237, 251/238, 251/239, 251/240, 251/241, 251/242, 251/243, 251/244, 251/245, 251/246, 251/247, 251/248, 251/249, 251/250, 251/251, 251/252, 251/253, 251/254, 251/255, 251/256, 251/257, 251/258, 251/259, 251/260, 251/261, 251/262, 251/263, 251/264, 251/265, 251/266, 251/267, 251/268, 251/269, 251/270, 251/271, 251/272, 251/273, 251/274, 251/275, 251/276, 251/277, 251/278, 251/279, 251/280, 251/281, 251/282, 251/283, 251/284, 251/285, 251/286, 251/287, 251/288, 251/289, 251/290, 251/291, 251/292, 251/293, 251/294, 251/295, 251/296, 251/297, 251/298, 251/299, 251/300, 251/301, 251/302, 251/303, 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Throughout the composition process, always keep your goal in mind, and test every element you put in the diorama against that goal. If it detracts, it shouldn't be there. There should be a logical reason for everything and every action in our composition. We've all seen the diorama or display, that while perhaps technically brilliant, left us cold because there seemingly was no point. While there is nothing wrong with large dioramas, it is often these that fail in this regard – they simply bite off more than they (or the viewer) can effectively chew. Or they have so many sub plots and sidebar stories that the main point is lost in the chaos.

In this project, my primary goal was to create the series of halftracks and show them doing what they were designed to do. The variant *is* the story, and the setting and figures are how that is put across to the viewer. This goal became the main point I wanted my viewer to see. Some of the compositions are simply vignettes that place the vehicle in its habitat, show its function, and/or draw attention to certain features. Others tell a more complex story. It matters not – my planning process is the same for all. The one difference is that my collection is designed to be viewed as a whole, not individually, so when composing each vignette or diorama I



This photo shows my vignette of the armored ambulance. What does an ambulance do? It transports wounded. There are two casualties in the vehicle—a litter case and a walking wounded. Who crews ambulances? Medics! Likewise, there are two present—one driving and one overseeing the wounded. Where does an ambulance take the wounded? To the hospital, of course. Note the sign pointing the direction—the same direction the ambulance is traveling. Time is often of the essence when dealing with wounded. The laws of war protect such vehicles assuming they are prominently marked with the Red Cross or Red Crescent. Thus, we have the military policeman giving a marked ambulance the right of way and waving it on. My goal is to emphasize the “ambulance” aspects of this halftrack and depict it doing what it was designed to do. All the elements support this simple story.

also had to consider its interaction and continuity with the entire group. So while each model tells its own little story, together they tell the story of the evolution and use of the Sd.Kfz 251 halftrack. This changes my process in no way other than to standardize things such as finish on the bases and design of the nameplates.

As you progress through the other nine “commandments” always remember to view them through the lens of this first, primary, “commandment”. Always keep this one in the forefront of your mind and you will not go far wrong.



Although there is an emphasis on the 251/7 due to size, the story is really with the figures. The scattered equipment tells us the Germans probably abandoned the vehicle hurriedly—but not before booby-trapping what they left behind as indicated by the sign. Still, that hasn't stopped one Sad Sack from picking up a German helmet. The story provides a bit of humor to the collection. “Jokes” such as this should be very easy to see and understand or they will not be effective.



Here is my diorama featuring the Sd.Kfz 251/22. While I kept the title consistent with other vehicles in the series, listing just the variant, this composition could have used a more descriptive and dramatic title such as "Surrounded", "Gottendamerung", or simply, "The End". Those titles also illustrate the main point—a small group fighting desperately but about to be overrun and wiped out. The Sd.Kfz 251/22 was a weapon of desperation, so it is depicted in a desperate scene. The German soldiers are bunched tightly and fire in all directions. That, combined with the circular base, clearly indicate they are surrounded. The number of dead and wounded indicate they are on the losing end.

Russians even enter from the rear of

the composition, taking cover on the far side of the flak gun engaging the single surviving German on the overpass (top inset). The punctuation mark is the Russian about to drop the jerry can "cocktail" (a gas can wired with grenades) out of the 2nd floor window of the building (bottom inset). The scene is modeled just before the "climax" of the event—the viewer can clearly see what is about to happen. So while the halftrack itself with the figures clustered immediately around it are the main focus (defined by size, location, and colors), these two sub-plots reinforce and support the story. Still, they do not overpower or steal attention away from the main focus. Although we will discuss other aspects of composition later in this chapter, note how the various levels add interest and allow me to fit the vehicle, flak, building, overpass, and 18 figures in a space about 6.5 inches across. The building and overpass work together to tightly frame the main focus and trap the viewer's eye in the scene. Dead space is non-existent—there is something going on everywhere. But all that action is part of, or directly supports, the story being told.



The main point here is simply to show off the distinguishing feature of the 251/9—the 7.5cm gun. The gun is located front and center in the composition. Two crew figures reinforce this point. There is a sub-plot—a third soldier milking a cow. However, this is located back behind the vehicle in the rear corner of the composition. It will not be the thing the viewer notices first and does not detract from the main point. In fact, it reinforces the “story” of soldiers performing routine actions in the rear area.

Note the soldier cleaning the gun. He interacts with the vehicle, provides action and draws the viewer's attention to the main feature of the vehicle—the gun. The soldier looking on also, by the direction of his glance, takes the viewer to where I want them to be.

2. DIRECT THE VIEWER'S EYE



Now that have our goal—our main point—firmly in mind, we can begin to put things together. We will start by considering a “phantom person” we must keep continually in mind during our compositional process. This most important person in the process is NOT the modeler. In fact, this most important person isn't even present when you are composing and building your piece. But it is with this person that the success or failure of our composition resides. When a diorama fails in its intent, it is often because this person was not given their just consideration in the planning process. That person is the viewer who can be expected to see it. Why have I chosen to use “viewer” in the singular rather than the plural “viewers”? It is because, while dozens or perhaps even hundreds of people may see your work, generally only one will view it at a time.

When I say “viewer”, I am not referring to the modeler's family and friends (whether in person or online). They have an interest in the modeler, may be involved in the work from start to finish, and when they view the piece, the modeler will usually be present to explain his or her ideas and walk them through the composition. If these are the only people who will see your finished work, the process is much less vital that it is if trying to catch and hold the attention of, and get your point across to, the “general” viewer. This “general” viewer found at shows and other public displays has no interest in the modeler other than his or her work, and may – or may not – have knowledge of or interest in the subject matter. This latter point can be important – the less knowledgeable on the subject your likely viewer is, the simpler you will need to keep your concepts.

This general viewer will notice, study, and understand your story (success), or it will not catch their interest and they will walk on by (failure). The outcome will be decided in seconds. So, like a TV commercial, you must hook your viewer quickly. We can twist the old saying, “the customer is always right” into “the viewer is always right”. If our work doesn't attract or hold the viewer's attention, it is our fault – not theirs. Understanding how the viewer will view our work is critical to the composition process. If we understand how this viewing process works, we can manipulate it.

So how does the viewer look at our work? The viewer will first, as they approach, take an overall look at your composition. They will notice large and prominent things like large vehicles, buildings, hills, trees and such. As they arrive, the whole thing will come into focus and, if the modeler has done his or her job correctly, the viewer will see what is going on, will note the main focus, and in most cases will “get” the point the modeler is trying to make. All this we can call “Phase 1” of the viewing process. If we've managed to capture the viewer's attention, they will move on to “Phase 2”. In this phase, their gaze will move across the diorama taking in details. They will likely view our piece from their left to right. Why? Because we read from left to right which conditions us to view things in that same sequence. In fact, this is so important, when I use terms like “left” or “right”, I am looking from the point of view of the viewer, not the finished work. Same with “front” and “rear” – “front” is closest to the viewer, “rear” is farthest away. It is during this second viewing phase, if we understand how the viewer looks at our work and have composed our piece accordingly, that we can figuratively take them “by the hand” and lead them through our story, viewing things in the order we wish them to be viewed.

What we want to accomplish is to direct the viewer's eye so that he/she “reads” our story the way we want them to. To do this, we must consider the “stage” on which our story is set. Just like the stage in a theater production or the screen in a movie theatre, our base is the setting upon which we place our 3D picture. It is thus a vital part of our composition. Please note that by “stage”, I

do not mean “groundwork”. They are not synonymous. The stage is simply our base – our working area – and the groundwork is simply one element placed upon it.

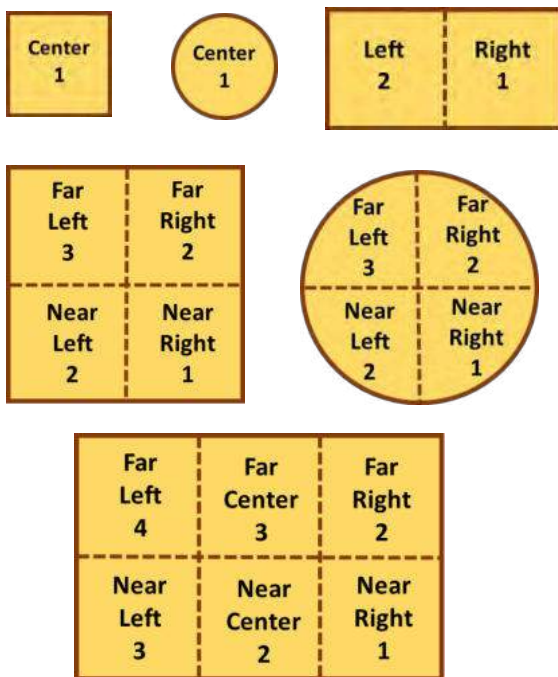
We can imagine our stage as being divided into separate and distinct areas. The stage for a single figure display may contain only one area, while a large diorama may have six or more. Although a large composition can be broken down into manageably sized areas, size isn’t the most important factor. More important is the terrain and activity as well as the viewer’s left-to-right journey across the composition. We will label these areas of the stage as shown in the accompanying diagram.

It is important for us to understand that some areas of this stage are visually stronger than other areas. We know the viewer reads our work from left to right. That means, all else being equal, the right side of composition is the visually strongest because the eye stops there. Near areas are visually stronger than far areas. The relative strength and weakness of each area on our stage is also shown in the accompanying diagram. This is not to say that strong areas are “good” and that weak areas are “bad”. It simply refers to how strong, or dominant, each area is relative to the viewer’s viewing process.

Since our stage has areas that are visually stronger than others, the position of figures, and, to a lesser degree, other elements, relative to the viewer also has variable strengths and weaknesses. This factor can be used to emphasize, or deemphasize, certain characters in our play. For example, a large element (vehicle/building/etc.) is usually stronger than a small element like a figure). A figure facing the viewer is visually stronger than one placed at an angle or facing the side which is still visually stronger than one whose back is to the viewer. A standing figure (especially on a height) is visually stronger than a kneeling or prone figure (especially one in a ditch or trench).

Clearly want our main point and things we want the viewer to see in the visually strongest areas of our composition. Maybe we want our viewer to see things in a certain order to make our story most effective. Even if we’re not telling a story, we likely want

- Large objects and figures catch the eye and draw a viewer to them. If these are not our main focus, they can be placed near our main focus to draw the eye to the area.
- Figures are our friends in many other ways, too. Our viewer will likely follow their glances and gestures, so they can point out or look at what we want the viewer to look at. Figures on the edge of the composition can look back in toward the center, keeping the viewer’s eye in the piece rather than wandering off the edge. If they do look, gesture, or shoot off the edge of our com-



When we understand the relative visual strengths of each part of our composition, we can arrange our elements to their best advantage. The diagrams at left show various sizes of bases divided into imaginary areas. Each of these has been assigned a relative visual strength number from 1 (strongest) to 4 (weakest). Note the shape of the base really doesn’t matter in this regard. These diagrams also do not take mitigating factors—such as elevation—into effect.

At right we see this theory in action on a flat, relatively featureless stage—probably the closest I will get in this project to the diagrams at left. What I am primarily trying to show is the 251/20 and its large Infrared Searchlight. Note that this is conspicuously spaced in the visually strongest part of the composition. Note also that the larger (and thus visually stronger) tank is somewhat “minimized” or weakened by being placed in the rear and being painted a darker color that better blends into the groundwork.

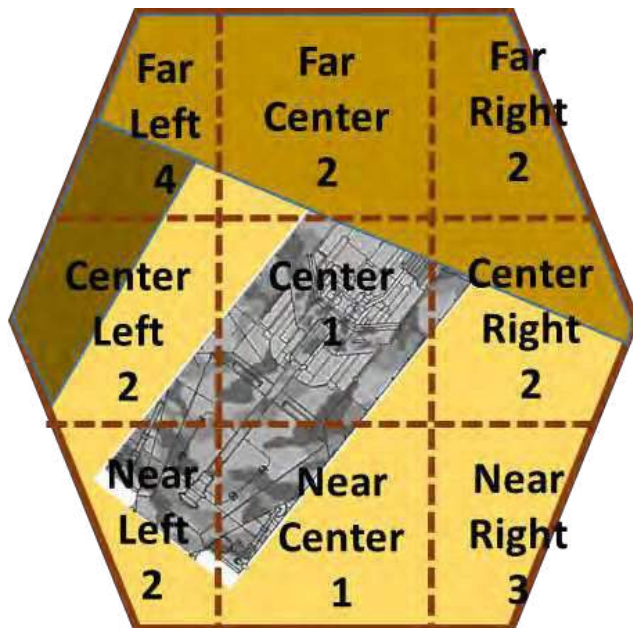




Let's return to the Sd.Kfz 251/22 diorama to look at several of these things. An important part of the compositional process is manipulating these areas of visual strengths and weaknesses to support our goal. Many, if not most, of the other commandments help us do just that. For now, let's look at how things such as elevation, action, and even color, can affect relative visual strength. My 251/22 diorama, shown at left, is built on several levels: street level, step level, overpass level, and upper floor level. In what is normally the visually strongest area of the stage there is...nothing but some rubble. The vehicle, due to size and brighter colors, is likely the main focus. Events in the rear, on the overpass, also gain strength due to their higher elevation. So, we might adjust our relative visual strength numbers as shown in the drawing below. Of course this is all relative, and the numbers weren't arrived at by any hard and fast scientific measurement. Nor are there any rules on how many areas you visually divide your stage into: in this example, the base is a hexagon only 6 1/2 inches across—certainly small enough for the viewer to take in the whole thing in a glance. As such it could easily be considered a single area instead of the nine I have divided it into for this example. This staging exercise is simply another tool you can use, as you compose your piece, to help the viewer see what you want them to see and to understand your main point.

Some other things to note: The building and overpass trap the viewer's eye and channel it right to our main point. On the overpass, the seated German's machine pistol points the viewer to the Russians behind the gun—as does the hand railing hanging at an angle. This is reinforced by the kneeling Russian behind the gun who is pointing toward the halftrack, sending the viewer back to the main point. The people and things that point "off stage" (the halftrack's gun, the wounded tanker with pistol, and the NCO by the halftrack, all point at imaginary enemies in the general direction of the viewer. In other words, their gestures don't send the viewer out of the composition. Also, the vehicle faces generally to the left—against the grain of the natural movement of the eye. All of these factors help keep the viewer in the composition and direct their eye about the scene.

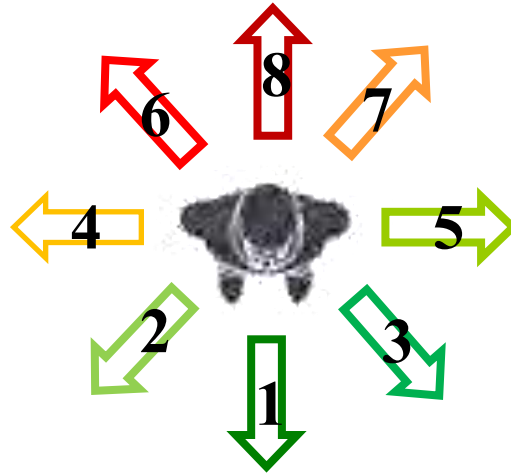
As for the diorama itself, note that while it features an Sd.Kfz 251/22, the main point is that these soldiers are surrounded and things are about to end badly for them (the Russians are already entering the stage far left, they are clearly attacking—and winning, and many of the Germans are already casualties. This desperate situation is fitting for the Sd.Kfz 251/22 as it, itself, was something of a measure of desperation.



certain elements in our scene or aspects of our vehicle to be highlighted. If all else is equal – i.e. we have a flat base with plain groundwork – the near right is that area. Fortunately, not all else is equal. We can manipulate the relative strength and weakness of areas of our stage. What are some of the things we can do?

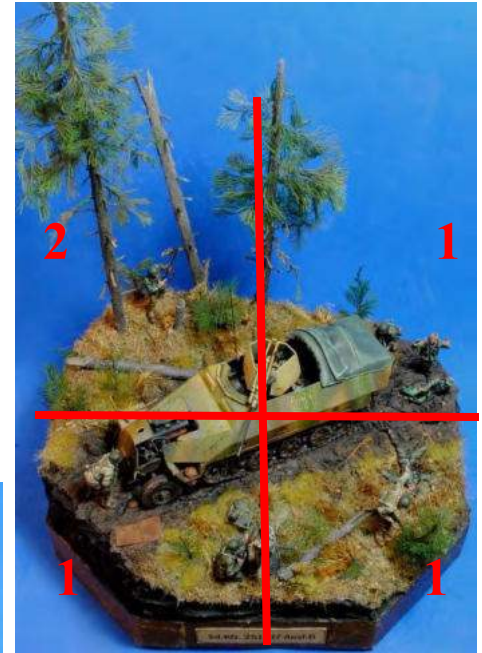
- We can add elevations – taller areas are visually stronger than lower ones. Simply adding elevation is a good way to draw attention to an important element of our scene.

The diagram at the right shows the relative visual strength of different directions a figure can face. In this case, toward the bottom is toward the front of the composition—toward the viewer. We can see that a figure facing the viewer is strongest (#1) while a figure facing directly away is weakest (#8). So why do some facings which seem the same—such as 4 and 5—have different relative strengths. It is because the eye moves from left to right. A figure facing or moving toward the left, against the grain, is visually stronger than one moving with the grain



The photo below right is a detail from the diorama shown on page 2 of this article. The surrendering

Germans (upper right) and the directing US Squad leader (lower left) are clearly related and direct the viewer back and forth between them. This is done by gestures, facings, and glances. Note that all these face somewhat toward the viewer—based on the diagram, they are positions #7 (US) and #2 (German). I could have placed the squad leader up on the hill where he is orientated more toward the viewer (position #3), but he would be a visually weaker portion of the composition. And to have the same interaction, the surrendering soldiers would then have their backs to the viewer (position #6). This arrangement is thus clearly better. Although the squad leader would be on a higher plane if placed uphill, he would be behind the vehicle and searching soldier in the trees in area #2 of our stage. As is, this entire little story is in a very visually strong position.



Here we see a plan view of the same diorama. We can visually divide it into viewing areas. Note the vehicle is large and overlaps all areas of the stage. Important actions—the squad leader directing the surrender of the surviving crew and the bazooka gunner carefully checking-out the result of his shot to the front of the vehicle—are all in visually strong areas. The only element (other than the backdrop of trees) in the weakest area is simply a soldier providing overwatch security—only incidental to the story being told. Elevation, activity, and vehicle orientation alter the normal visual strength of the areas (see page 9) to the strength shown.

position, there should be an identifiable reason for it. Since such gestures can take the viewer out of our composition, I usually like to have such gestures “aimed” in the general direction of the viewer himself, in effect involving them in the action.

- Bright colors also catch the eye. While we are often limited by what is historically accurate, we do have leeway, both in colors and often in patterns. We can, for example, visually lighten or darken certain parts of our stage with colors or shadows.
- The eye follows linear features, so low walls, roads, ditches, downed trees, etc. can literally “point” the viewer to where you want them to go—either specifically or more subtly by just pointing in the general direction.
- Walls, tree lines, hedges, and other barriers can block movement of the eye, keep it from wandering out of the scene, and “channel” it to where we want it to go. Linear objects can also be used to “connect” separated, but related, elements.
- We can use the direction things are facing or moving to our advantage. The viewer’s eye is traveling from left to right, therefore things facing to the right tend to speed the viewer along, but things facing toward the left are moving against the natural way the viewer is looking—going against the grain, so to speak—and forces the eye to slow down. .

3. SHOW ACTION AND INTERACTION



The 251/1 above is a very action-packed diorama. Note the action is moving from right to left—against the grain of the viewing process. The action fills the stage—we really only have one staging area (see diagram on page 9). It is also clear this is an attack, as soldiers are moving in the direction the MG is shooting (a retreat could be shown by moving in the opposite direction). The enemy is clearly located off-stage to the lower left—vaguely in the direction of the viewer instead of the next model display to the left. Note the pointing figures and pointing weapon.

The 251/3 diorama at right lacks this dramatic action, but actions and interactions still tell a story. Although the tank is in the visually strongest area of the base, the half-track is at the highest elevation and is highlighted by its numerous—and very tall—antennae. The relationship of the officers to the vehicle is made apparent by the fact they are officers and by their proximity to the vehicle. They are studying a map and looking off stage toward the viewer. The tank commander is looking the same way with his binoculars, cementing his relationship to the main group. This is clearly a mixed infantry-tank unit preparing for offensive or defensive operations. We can divide the stage in four areas here (see diagram on page 9). Near left is devoid of action, but the space is filled by the thawing creek and culvert. As seen, the figures and vehicles are in what would be a very weak position at far left, but elevation and size mitigate this—giving them at least visual strength parity with the larger tank.

Action is more appealing than static, but must be meaningful. Reasons for actions or gestures should be apparent or implied. Action for its own sake does nothing to help tell a story. In this project the action is often the vehicle doing what it was designed to do, and the figures interact with each other and the vehicle (and sometimes an unseen enemy) to reinforce this and sometimes to tell a story as an added bonus!

Multiple elements in your scene should interact in some meaningful way – their relationships must be established or they are simply a collection of things on a common base or in a common display. In most instances, actions and interactions should either be part of or support the main point in some way. To this end, things such as their orientation to each other and other elements of the piece, the direction of their glances and gestures, and where and how they touch are all vital and should be worked out prior to beginning construction. For example, if a figure is pointing, what is he/she pointing at? Why? If yelling, what message are they conveying? To whom? To what purpose? These things should be apparent to the viewer, even if they are only implied and not physically present in the finished piece.

For example, a group of figures and/or vehicles moving in a wedge (or arrowhead) formation with



weapons firing are clearly attacking. Some firing from cover while others break cover to advance illustrates fire and maneuver. The direction of their attack clearly shows where the off-stage enemy is located. A tightly clustered group, firing in all directions, are clearly surrounded. Adding wounds, casualties, destroyed equipment, and contorted yelling expressions gives you a desperate last stand. Refer back to the photos of my 251/22 diorama.

At its very simplest, the placement of one or more figures near or operating a key feature of a vehicle (interacting with the vehicle) will draw the viewer's attention to that feature. At least they will illustrate scale, add human interest, and keep the viewer in the scene. In my 251/1 Holzgasantrieb vignette shown on page 3 of this chapter, these are the only functions the figures fulfill.

Speaking of figures, it is in this stage that their poses and positions should be finalized. Figures provide our human element and are key in storytelling. They also attract the eye. Therefore, their importance in our composition is disproportional to their size. So take your time and make sure you get them right. Note that in this small scale, expressions and gestures are harder to see and interpret—therefore they may have to be exaggerated. When figures are interacting, the way they are positioned relative to one another can also serve to impart their mood and status as we see in the accompanying diagram.

One of my pet peeves is the seemingly universal “random pointing figure” often posed as a single figure display or part of a vignette. As we have seen, a pointing figure can be useful to direct our viewer's eye – but if the figure is pointing at nothing or for no reason it is simply a distraction. A single-figure display of a pointing figure says to me, “Don't look at me... Look at the figure (or model) over there!” If your composition includes a pointing figure, the viewer will try to discern the reason and will become confused if there is none. However, if incoming fire is being received, the pointer could be used to indicate the direction from which it is coming. A man pointing in the direction that others are attacking/shooting, reinforces the direction of attack. Still, however, to avoid the “look over there” effect of a pointing figure, if the figure is pointing off scene, I try to have them point in the direction of the viewer when practical.

BODY POSITIONS FOR TWO FIGURES



Shared Position



Profile Position



Given Position

SHARED POSITION: This looks most natural and should normally be used, especially in non-hostile, non-threatening situations. Both figures are viewed in strong positions, but note that the figure on the right is in the visually strongest position unless he/she is sitting or prone.

PROFILE POSITION: In this position, the figures are both viewed in relatively visually weak positions. Still, this position is good to impart a dramatic or tense conversation between the figures—and the closer they are to each other the more dramatic and tense the situation is. It's also a good position for hand-to-hand combat.

GIVEN POSITION: This is a good way to throw emphasis on one figure in the conversation. In this case, the figure on the right is facing us, while that on the left is looking away. This is emphasized if the weak figure is at a lower level, is sitting, or is prone.

Let's compare these three figures from my 251/6 diorama to what we've learned so far.

The center figure (the senior of the three officers) is facing more or less toward the viewer in position #1, but is slightly masked by the tanker (with black hat) in front of him. This tanker is to the right in the visually strongest position, but his back is to the viewer in position #6. The gesturing figure is in position 3, but also slightly higher than the other two. Emphasis is also drawn to him by the gesture and the fact he is slightly distant from the other two. All of this combines to give the figures rough parity of visual strength with the advantage going to the gesturing man.

The gesturing man and the tanker are in the profile position to each other while they are each in the shared position with the middle man. So what is happening? Perhaps these two figures—gesturer and tanker—are on opposite sides of a disagreement and the senior commander is weighing the arguments. At least that was the picture I was trying to present.





Left: The random pointing figure! Sort-of. He is speaking with a man holding a map. He is also in a Luftwaffe uniform—probably an air liaison. Are they discussing a mission? Are they lost (common enough in the desert)? I leave it to the viewer to decide. Speaking of the viewer, note the figure is pointing toward the viewer and not off the scene to either side or the rear.

Below Left: Earlier, we saw a close-up of the main point of this diorama—the soldier picking up the helmet and the squad leader pointing out the booby trap sign (in fact, if the viewer looks closely enough, they may find two booby traps inside the vehicle). Note how they interact. The soldier is in mid turn, looking over his shoulder at his squad leader who is pointing out the sign and probably saying some unflattering things. The two main players are connected by their poses and glances. This also provides the “dialog” of the vignette even though it is only a still picture. The other soldiers complete the story simply by their presence—this is merely a squad on patrol passing the abandoned vehicle.



A detail from my 251/17 diorama shown on page 2. To clearly indicate what happened to the vehicle, the bazooka gunner, holding his bazooka, closely examines the effects of his shot. This interaction between figure and vehicle directly supports the story by indicating what has just happened and draws the viewers attention to this area.

4. USE A TIGHT COMPOSITION

There is not much to say about this “commandment”, although it can have an impact on the effectiveness of your story and a huge impact on the visual appeal of your piece. For this reason alone, it is worthy of having it’s own commandment. Tight compositions are visually more appealing than loose, open ones—they simply look better. The closer together you put things, the more solid is their relationship. Tight compositions are also better at conveying stress and drama. Tightly framing your scene adds emphasis by helping to eliminate dead space and not allowing the viewer’s eye to wander. Return to the photos of my 251/22 or 251/1 diorama. Notice how tight the arrangement is in both instances. Now visually imagine both of these dioramas being on a base twice the size with the figures and other elements spread out farther. A great deal of the stress, drama—and thus impact—would be lost.

In all my halftrack compositions, note how tightly the scenes are framed by the base and how close the elements are to each other.

Generally, I will cluster my elements as closely together as possible without them looking contrived or unrealistic. The more stress, drama, and tenseness I want, the closer I will put things, and the more “stuff” I will pack in.



Right: Although this composition, featuring my 251/9, is not any “looser” than my 251/1 or 251/22 dioramas, note the stress level is much less. Not only is there less dramatic action going on, but the figures are more spread out. Still, between the close frame around the vehicle, road, building, tree, gear, cow, and figures, the diorama is quite tight—the viewer’s eye can take in the whole thing at once.

Note also the balance of the piece. The large vehicle in the lower right is balanced by the building in the upper left. The tree, cow, and milking soldier at far right are balanced by the standing soldier at near left and the action of cleaning the gun. While it would likely have better to have the gun cleaner facing the viewer the fact the gun is on the right side of the vehicle rendered this impractical. He still serves his purpose of drawing the viewer’s attention to the gun.



5. HAVE BALANCE

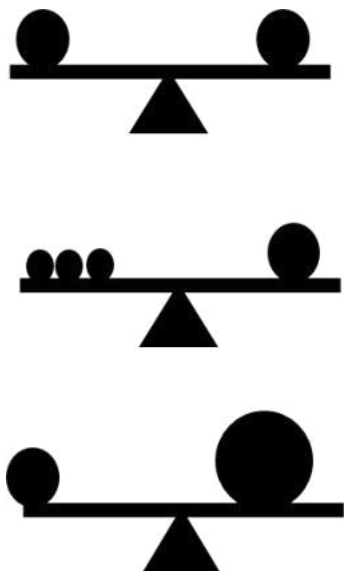


Balance is a factor that *can* affect story telling, but its importance lies primarily in visual appeal. Imagine our piece on a teeter-totter. Action or items on one side should be balanced with action or items on the other side. A large item can be balanced by another large feature, several small items, or by some type of action. Even groundwork elements or a bit of debris can provide balance. Open, unused space can also affect balance.

While we generally want to avoid dead space, a single lone element out by itself can provide balance point should still be prominent and should be supported by the additional elements.

Balance is NOT symmetry. Symmetrical compositions can look contrived. However, if your story is one of exact formality, such as military drill or a parade, then symmetry might well be preferred!

Your viewer will not consciously notice that your composition is balanced. However, he/she will definitely note if it is unbalanced—it will simply look wrong to them.



At left we see several examples of balance, with the top example being symmetry. Above Right is my 251/6 diorama. Due to activity and numbers, the three figures in conference and the Kubelwagen balance the halftrack and the air guard. The higher elevation of the Kubelwagen and the fact the halftrack extends into the middle of the composition while the Kubelwagen is on the edge help with this. Front to rear, the halftrack, figures, and gear balance the higher ground, Kubelwagen, and air guard. All the stowage in the Kubelwagen help give it “weight”.



6. USE ALL THE ELEMENTS

Your composition and the overall effect of your finished piece are influenced by more than just the models and/or figures you put on your stage. The base, groundwork, nameplates, and even colors you use can all have an effect.

Groundwork is a central part of your piece that should be considered from the start since your models and figures will have to interact with it in some way—even if they are just resting upon it. But it does more than just serve as a stand. It provides context. Its features, shapes, and elevations can direct the eye. It serves as your frame or backstop and can help keep your composition tight. Groundwork elements can fill dead space and provide balance. But take care that it stays in the support role and doesn't distract—that large building or tall tree, while it may look good, can upstage, overshadow, or even hide your main point. If you find this is the case you should adjust size, numbers, angles, or locations until it properly fulfills its intended role.

You must, of course, make sure your models and your groundwork complement each other and realistically portray the things they are meant to. A sparkling clean vehicle has no place in the middle of a muddy morass. People and vehicles on campaign will show wear and clutter, dirt and damage while those preparing for a parade and inspection will be in their best order. Research is important with your elements, as non-regulation uniforms and equipment were often worn or carried. Sometimes what was specified in regulations was absent.

You can tell many stories with absolutely stock, straight-from-the-box figures and kits, but often these will require modification to some degree to appropriately tell your story. We've already seen how gestures, expressions, and locations can help tell our story, guide the eye and provide balance. While many may get queasy at the thought of major surgery on their models and figures, minor modifications—such as head, arm, or equipment swaps—are easily within the ability of most modelers (see the chapter on Building and Painting Figures). There is also a large aftermarket to draw from for parts, accessories, and conversion kits.

Even the colors you chose can help you tell your stories. You can use areas of highlights or lighter colors on your stage to draw attention to certain areas, while shadow areas and dark colors can lessen the visual strength of certain things. Colors that are relatively “warm” (from the red side of the color wheel) or “cool” (from the blue side of the color wheel) can be used to help convey



Note the important roles groundwork plays in these three dioramas (all have already been seen in this chapter if you wish to refer back to larger photos). In all cases it provides context—a damp, chilly forest; a warm Mediterranean village; a European city. But it does more. It also, in all three instances, serves as a backdrop to “frame” the picture—by rising ground and trees; by a house, wall, fence, and tree; and by a large building and overpass. The groundwork in all instances also provides visual interest—rising ground, colors, and details. In the 251/22 diorama we have already seen how the fallen overpass railing visually connects action on the lower level with imminent action on the upper level. Compare the village and city scenes. Even without the figures and vehicles, the viewer would see one scene at piece and one at war. It's the groundwork that tells that part of the story!

Note also how in each case, the groundwork has been realistically created and painted with the same care as the figures and vehicles. Vehicle weathering is appropriate for the setting. Pay attention to color. In the 251/17 diorama, note how the patterns and colors of the groundwork mimic the camouflage patterns and colors on the vehicle (the whole purpose of “camouflage”). Note the difference between the warm, bright, “happy” colors of the 251/9 diorama compared to the mostly darker colors of the 251/22 setting. Yet note that the brighter colors of the 251/22 help draw attention to it in the overall darkness of the scene.

None of these factors are accidental. All were carefully considered and planned during the composition process. Leave nothing to chance.

emotion and even actual temperature. As an example darker, colder, gloomier, colors can help reinforce a story of defeat while brighter, warmer shades can be used for a victorious setting. While we are often limited by historical accuracy, we always have a certain amount of wiggle room with tints and tones and shades—especially with our groundwork.

Don't forget the base itself! As Shep Paine used to state, this is the frame of your picture—you wouldn't put a masterpiece in a cheap, ugly frame. Make sure your base is attractive and nicely finished. Certainly the size and shape of your base can vary. The shape (round, linear, square, etc.) can help reinforce your story as we have already seen. You don't have to use a standard shape. For example, I once used a spearhead-shaped base on which to mount an infantry charge—with the point of the spear toward the enemy. Size is also important. Always size your base for your composition and not the other way around! Determine what you need and then acquire or make your base. I always prefer to use the smallest feasible base for any composition. This keeps things tight, avoids dead space, looks better, and takes up less room in the display cabinet! A common mistake I see is using a base far too large. In these cases, elements tend to get spread out, lessening their dramatic effect, and there is either a great deal of dead space or so much clutter and so many sub-plots that the main point gets lost. In addition to size and shape, other features of your base affect your piece as well. Material, color, and finish come to mind. A regal king would not be placed on a rustic base, for example. A pink platform is probably unsuitable for a group of SS men slaughtering a squad of Russians.

You also have the option of visual aids. Most common is a nameplate. In this series of halftrack builds, I have chosen to use plain nameplates simply listing the variant of halftrack. This was done for standardization—I also used the same materials and finish for each base even though size and shape vary. But certainly, in many cases I could have chosen more dramatic or descriptive names. Some complex ideas may require a descriptive nameplate to get your point across. In rare instances you may want more than that, such as descriptive card placed near the piece. While this is fine if it only provides supplemental information, if the card is required for the viewer to understand what is going on, your idea may be too complex and might need reworking. Many viewers simply will not take the time to read the card, will thus fail to see your main point, and will quickly pass your work by. Sometimes, modelers may provide a small “brag book” or information sheets that tell about their subject or provides details on how the model was built and/or painted. Placed near the piece, it is there to provide more information if the viewer is interested. No matter what type visual aids you use, if any, they should be made to a standard equaling the rest of your piece and presented in a professional manner.

Rarely considered, even the method of display can add to or detract from your story. What type of display are your pieces in and how are they arranged? What type riser, if any, are they sitting on? Do you display the model (or models) on a piece of velvet or other cloth? Are there photos, artifacts, related models, or other supporting items in the display? If so, make sure the model(s) remains prominent.

Make sure everything looks good together. An item or element that would not logically be present (something for the wrong region or time period, for example) will be a distraction. A bright, garish color in a sea of dark could well serve to highlight an important point or it could be a distraction.



For this project, to help visually tie all the various vignettes and dioramas together, I used identically finished bases (but not necessarily of the same size and shape). See Chapter 7 for a discussion of how they were made. Basically, I cut wood to the size and shape needed, and finished it by covering the bare wood with shreds of brown paper bag. The bases were then given a clear satin coat. Many had a wood strip “frame” built on top to contain the ground. Note there was no need to finish portions under the groundwork. A plain foam pad was fitted to the bottom of each base.

For the same reason, the nameplates used for each



piece followed a standard pattern and design—simply listing the name of the variant. Had these been designed as stand-alone pieces, I would have used more dramatic and descriptive titles, such as “Zum Angriff!” for the 251/1 or “Gotterdammerung” for the 251/22, and “Ambush” for the 251/17.

My Sd.Kfz 251/20 diorama is a good example of many things we've discussed. We saw, on page 9, how the halftrack is placed in the visually strongest part of the scene, and is further highlighted by its light color—while the larger tank is behind and darker.

The “action” such as it is, moves from right to left, against the grain of viewing. The buildings form a backdrop, keeping the viewer from leaving the scene in that direction.

Note the base and nameplate are consistent with the other halftrack models in the series.

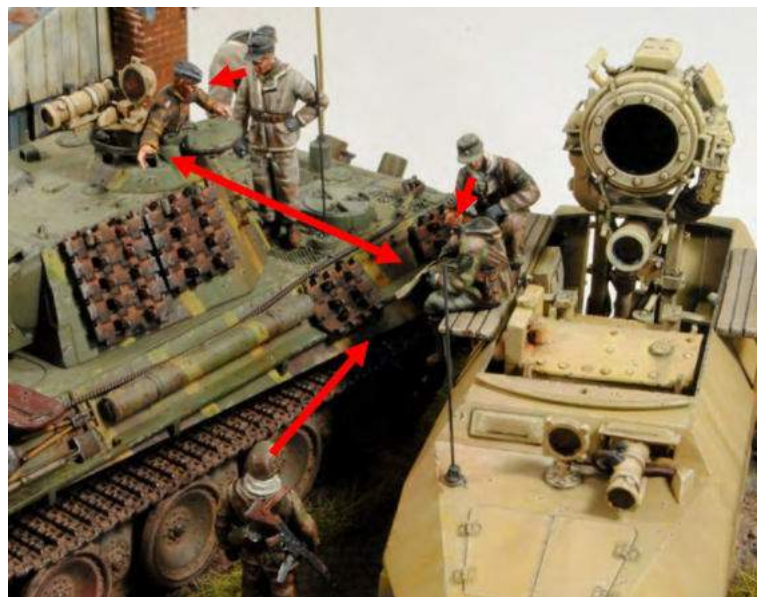
The groundwork itself depicts an area ravaged by war. It is fairly dark and gloomy. Grasses are somewhat brownish and yellowish while the tree/shrubs are bare. This is all consistent with a setting of March or April 1945—the timeframe when this scene would have occurred. Note also that the base tightly frames the action and groundwork elements such as buildings, ruins, a pole and fountain, and various bits of debris both add visual interest and fill any potential dead space caused by the long overhanging gun barrel on the tank.

Note how the figures work together with each other and with the vehicles. As mentioned previously, they not only give a sense of scale, but can draw attention to features on a vehicle and provide human interest—tell a story. Two crewmen sit on the walkway on the side of the 251 hull. One, an officer is conversing with the tank commander while his senior NCO points out something on this map. Another tanker, standing behind the turret, also engages with the tank commander. An infantry NCO, between the vehicles, is also paying attention to what the seated officer is saying.

In the bottom photo, we see the back of this “conference”. We also see the other tank members arming the vehicles. One is hoisting shells from packing crates to a tanker standing on the rear deck. This man is, in turn, passing them to a figure inside the turret. This subplot still supports the main story as we will see below.

A final soldier, carrying a machinegun, is approaching the halftrack from in front of the tank. He is in the visually weakest area of the diorama, but is not really necessary for the story.

All this taken together is not an in-depth story, but does show the infrared equipped halftrack and tank preparing for action. This is appropriate as we know these vehicles trained together, but details are sketchy of whether they actually saw combat together. The axis of the conversion runs between the tank cupola where the IR gear is located to the rear hull of halftrack, where its IR gear and generator is located. Thus, since figures tend to catch the eye, it draws the viewer's attention to the special features on these unique vehicles. It also shows the connection between the vehicles, designed to work together on the battlefield. The figures loading ammo are located near the star antenna, indicating the Panther is a command tank. This action also clearly indicates they are preparing for combat or an exercise—not simply talking or debriefing. Thus, the figures and their actions are as vital as the vehicles in telling the story of these two vehicles.



7. MINIMIZE DEAD SPACE



Dead space is empty, unoccupied areas of our stage. It is usually boring and detracts from our final result. While there can be times when dead space can help tell a story by implying vast distances, loneliness, and emptiness, in most cases it simply detracts from and, in extreme instances, even swallows up our main point. This commandment goes hand-in-hand with maintaining a tight composition.

Without doubt, the primary offenders I have seen are pieces placed on bases that were too large. This either results in a lot of boring dead space, or the modeler fills it with so much stuff to compensate that the main point is lost in the clutter. A fix to this problem is simply to size the base to the scene and not the scene to the base. One of the things I always do in my compositional process is to try and compress the scene as much as possible (tight composition), and make the base as small as I practically can. Look again at the diorama of the 251/22 shown on page 7. In a hexagon only 6.5 inches across I have placed a road, building, railroad overpass, vehicle, flak gun and 18 figures. My first take was on a base 8 inches across. I decided I could make it smaller and tried a 7 inch base. I was still able to shave another half inch off! There is no dead space anywhere to be found!

Your subject matter can also cause dead space. While this project is about armor, think for a moment about a large aircraft. With the space between the wings and tail and around the nose, it would actually fill little of the base it sits on, leaving a great deal of potentially dead space. In these instances, you can't remove dead space by more tightly framing the scene. You would either have to select a smaller or differently shaped subject or fill the space in some way. In the case of the aircraft this could include fueling, arming, or maintenance.

It doesn't take much to fill these dead areas. Often times a single figure, shrub, stump, fence, wall, bit or debris or discarded equipment, oil stain on a road, small animal, etc. can serve to fill the space nicely. Look at the diorama on the facing page. The long gun of the Panther and the angle of the vehicles leaves potential dead space in front of them. Note how the figure, well, pole, and larger building (as well as bits of other scattered debris) not only help fill the space, but provide balance to the vehicles, too. Just take care you don't overfill such space to the point your main point is lost in the three-ring-circus of activity going on all around it.

Let's examine the 251/3 diorama seen at right. The halftrack is actually placed in what would normally be the visually weakest area of the base (far left), but the high elevation—rising vertically from the ground in front, tall antenna, and figures transform this to the visually strongest area of the base! It is further highlighted by being on the dark road. The large tank, meanwhile, in what would normally be the visually strongest portion of the composition, is minimized by being at a lower elevation and on color-matching ground.

What about dead space in this composition? There is potentially plenty of it. The long, overhanging gun could cause dead space in front of the tank. This is mitigated by turning the turret to the tank's right. Thus, the frame can be cropped fairly close to the front of the tank. The near left portion of the composition is completely devoid of models and figures—it has the potential to be a large area of dead space. But the tank gun intrudes into this area with the turret being turned. The culvert and icy creek nicely eliminate any remaining dead space.

In addition to filling dead space, this bit of groundwork helps in other areas too. With nothing here, the composition could be unbalanced toward the rear. It also aids in story-telling. The broken-up ice helps indicate the scene is set during the late winter/early spring thaw.



8. USE SHAPES AND ELEVATIONS



We've already seen many examples of this commandment, such as how elevation can provide emphasis by increasing visual strength and how elevation and shapes can help direct the eye. We've discussed how shape can help tell our story—a circular base for a diorama featuring a surrounded group, for example. There is no need to rehash these—as stated earlier all these commandments are interconnected. But there are also other ways where we can take advantage of shapes and elevations.

Elevations can do more than just direct the eye and provide emphasis. Rising and uneven ground can add visual interest. The 251/17 diorama shown throughout this chapter could have been placed on level ground, but it wouldn't have looked as good. The same is true for my 251/6 seen on the facing page. Never overlook the third dimension. Consider the 251/22. The multi-level aspect of that diorama allows much more to be placed in the scene than would be possible on a flat base.

There is no rule saying a base must be square. A corner can be “cut off” to eliminate an area of potential dead space. The base can compliment our piece in other ways. A tall, vertically-oriented piece can be put on a pedestal, while a low, squat piece can be put on a low, flat base. Get as creative as you wish—just make sure, as always, your creativity does not overshadow or detract from your main point.

Even elements at the same level can be at different elevations—a standing and prone figure, for example, or an 88mm Flakgun next to a low-slung Pak 40 anti-tank gun. Items at different elevations can still interact—for example figures can be looking at, talking to, or gesturing to each other.

Don't forget your model and your base are also shapes that interact with each other. There are a couple “rules” you should keep in mind to regulate this interaction. **NEVER** put anything parallel to the edge of the base. We want the viewer to ignore the arbitrary frame of the base, seeing our piece as spontaneous like a photo snapshot. Items parallel to the edges destroy this illusion by looking contrived. This includes groundwork elements, too. Even if you are using a building façade as a backdrop, it should be placed at a slight angle to the edge of the base. Similarly, vehicles should never be exactly parallel to the edge of a road (a railcar on a railroad would be an obvious exception).

Another thing we should do is to place our large vehicle slightly off-center. A moving vehicle should have more space in front of it than behind it (assuming it is moving forward). This not only visually gives it room to maneuver but also helps imply movement by allowing it to go only forward.

The obvious exception to the parallel and offset rules is when you are trying to create a picture of symmetry and order, such as a formal military parade or a well laid-out bivouac.



Elevation can help draw attention to an important, but relatively small or minor, element. The Russian in the 2nd floor window preparing to drop the Jerry Can/Grenade cocktail into the vehicle is a case in point. He is the punchline—the exclamation point. If the viewer has any doubt how this scene will play out, he puts those doubts to rest. Therefore, I placed him at the highest level in a central, visually prominent place. Imagine if he had been placed at one of the arrows—either in the lower window or at the corner of the building behind the gun. In both places he would fill the same role, but would not be as visible. Ditto if he had been positioned in place of the German soldier firing the MG through the open door. Note all the elevations in this scene—street, sidewalk, steps, halftrack, overpass, and 2nd floor.



Top: Look carefully at this plan view of my 251/9 diorama. The only nearly parallel lines you will find are the edge of the road and the front of the building. Both of these are at an angle to the edge of the base. So is the fence and the halftrack. Note that both the building and the halftrack are off center—one to the far left and other to the near right. This provides both visual interest and balance. As for elevations, the building, fence, wall, tree, cow and back of halftrack all form a backdrop for the scene. Figures on the edge of the composition (most all of them) look back into the scene, further helping to prevent the viewer's eye from wandering.

Middle: The road and halftrack in this diorama move from far right to near left. The vehicle is also slightly offset to the rear of the composition by about half an inch. Although the frame is fairly tight, there is still about 3/4 inch more open ground in front of than behind the vehicle. This, combined with the fluttering flag and the waving traffic cop all serve to imply movement. Note also this movement is to the left—against the grain of how the viewer looks at our composition.

Bottom: We have already seen how the rising ground at the rear of my 251/6 diorama helps provide both interest and balance. But note the steep angle and the off-set from center of the halftrack. Even the Kubelwagen, in the rear corner, is not parallel with the edge. Close, but the approximate 10 degree angle is enough to preserve the illusion of spontaneity.



9. ARTISTIC LICENSE IS OK

Let's start by stating what I do NOT mean when I say "artistic license is ok". Obviously, this applies only to historical subjects—for Sci-Fi and especially Fantasy pieces, anything goes. But for historical pieces, we should try to be good stewards of history in my opinion. Russian partisans should not be engaging Japanese infantry in North Africa. I do not believe pink is a suitable substitute for panzer grey no matter how pretty it may otherwise be. Unless you recreating a scene from a Hollywood movie, M-47

tanks should not be painted in panzer grey with large, prominent, German Balkenkreuz markings.

But we must also remember we are creating visual art. We are not creating reality—only the impression of miniature reality. Sometimes it can be necessary to take a few liberties with facts to help tell our story and transfer the image we see in our "mind's eye" onto our stage. Maybe it's something as simple as clustering figures together unrealistically tightly to convey stress, drama, and emotion. Maybe it's slightly brightening or darkening a color to help imply mood or temperature, or to draw attention to or mute an object, vehicle, or figure. In other words, in some instances, it may be better to create the *impression* of reality rather than reality itself. Simply put, there are three instances in which we use artistic license. One is to fill gaps in knowledge. Perhaps information about a unit's markings or colors are non-existent or details about an event are lacking. Recreating these things requires us to take our "best guess". The second is to create a more visually appealing piece. And finally, three is to capture the impression, emotion, and drama of an event rather than just the look of an event. This is a generally accepted practice in the art community, but often provokes controversy in the hobby realm. It is, in fact, just another tool we can use, or not, as we choose. I am willing to stretch the truth or make minor liberties in the interest of telling the story or to creating a more visually appealing piece. To me, the feel (emotion, drama, stress, etc.) of an event is at least as important as the exact look. Your beliefs may vary.

Almost all of us—even we who claim to be staunch opponents of any type artistic license—use it whether we realize it or not. How so? For one, our scenes are artificially cropped—just like photos. We often times cut off sections of buildings, fences, etc. (sometimes even vehicles in "wedgie" vignettes and dioramas) that extend beyond our frame. This normally doesn't bother the eye as we are accustomed to seeing it in photos and paintings. We often minimize blood and gore in battle or post-battle scenes, being content to give the impression of carnage without actually creating it. We use license sometimes simply due to our style. Extreme color modulation where almost all panels and surfaces are painted separately is an example—if done well it looks really good, but it's arguable how realistic it is. The same holds true for some weathering techniques. Chipping, especially on small scale models, is almost always overdone. Chips are usually overscale and often excessive (especially on a vehicle whose combat life-expectancy was measured in days or weeks). Still, if done well it looks good, and—perhaps more importantly—helps give the *impression* of hard use and rough conditions. And these are only a few examples.

There are even instances where we take liberties with scale. For example, not all 1/48th scale figures are created equal—even from the same company. Still, figures of notably different sizes can be used in the same composition if they are not located near one another, are at different levels, or partially masked (such as by being in a vehicle, for example). Another example is trees. It's generally better to use small, shorter trees in our dioramas—a full-sized tree, even in a small scale, can be a foot tall or higher.

We can also play with scale on buildings. When making buildings, I usually make them a bit too small. Ironically, I've found that if made strictly to scale, they often appear to be too big. This is especially true of multi-floor buildings. In that instance, I normally shorten each successive floor by about a scale foot (or even a bit more)! This is because we are accustomed to viewing tall buildings from ground level where they seem to get smaller as they rise. This shortening of successive floors helps to recreate this perspective even though we look at models from above! It seems strange, but it works. Obviously, if figures are present on these upper floors, they can only be compressed so much. In 1/48th scale, I may actually model the building at 1/50th scale or even 1/56th scale. These subtle reductions not only keep our composition slightly smaller, they help ensure that background buildings remain in the background in a supporting role and do not, by virtue of size alone, steal the show.

There is one thing for which I believe we should NOT claim artistic license. We should not use it as a crutch for poor workmanship, lack of research, or plain laziness. In other words, artistic license is something we normally apply to the more subjective aspects of model building and story telling. It is less applicable to objective parts of the hobby—removing seam lines and ejector pin marks, painting "within the lines", having correct details on the model, etc. It should go without saying that the goal of the hobby is to have fun, and you should build your models however you wish. Still, if you put your creations in the public eye (shows, displays, internet, etc.), you should be prepared for criticism if your work is poorly executed in these objective areas.

Our work should also be able to pass the "sniff test". Does it smell right? By this I mean it should be plausible and should make sense. We've all seen that great diorama or model that just has something...wrong. Tamiya's "Stuka Zu Fuss" halftrack features a figure lifting – by himself – a 280 pound rocket. Even my version, where two soldiers lift, is borderline. Or a figure carrying a jerry can that has no sense of weight? The fuel alone would weight over 30 pounds, not counting the can. A single person could carry this, but its weight should be apparent (other arm slightly pushed out as counterbalance, or knees slight bent, or figure slightly leaning to one side, but with head still upright, etc.). How about a 50-ton tank hiding inside a house, sitting on the wooden floor – that's strong wood! Or a vehicle parked inside a structure – with largely intact walls surrounding it. Was it air dropped?

When composing your diorama, put yourself in scene. Think about what you're doing. Does it pass the "Sniff Test"? First, is it possible? Make sure it does not defy gravity or the laws of physics. What kind of surface is it on – will it leave an impression? Will the surface hold the weight? For that 50 ton tank sitting on a wood floor... a better diorama would be the tank in the basement after



Since our models can be considered a form of visual art, let's take a look at how famed artists use artistic license, and how we might, too. Above left is a detail from Lady Butler's painting "Scotland Forever" and above right we see most of John Trumbull's "Declaration of Independence".

No one would accuse these artists of being historically inaccurate. The faces accurately depict the men they are meant to. Details of uniform, clothing, and setting are spot on. In fact, Lady Butler actually had cavalry charge at her while researching her painting just to see what it was like! Surely, no license was taken? Look again. The Lady Butler painting is an impossible image. The horses are all heading directly at the viewer on converging collision courses with each other. They are so close together, the riders' legs would be crushed by neighboring horses. Still, while reality may be absent, I'm sure the impression of reality is there. I'm willing to bet when being charged by cavalry, it certainly looks like every horse is coming directly at you. And the Trumbull painting? His image creates a scene in which all but 15 of the original signers are present in the same room. Such a meeting never actually happened. But by combining several meetings and creating a composition full of historic likenesses, he evokes emotions of patriotism.

the floor collapsed – crew members scratching their heads. The same applies to people, animals, and gear. I saw a diorama where a single figure was lifting a Panther tank road wheel over this head onto the back of the tank - I'm guessing the wheel is too heavy to actually do that (a bit of research would be called for here). A heavy ammo can sitting on a rolled tarp will sink into the surface - not stand proud above it. Flexible things like ammo belts and strap ends should hang straight down (unless something other than gravity – such as centrifugal force caused by a high-speed turn – is acting on them). Stowage should be tied or otherwise attached to vehicle or positioned in a location where it could just sit. It should NOT



The building in my 251/9 diorama is a good case in point about taking liberties with scale. It is closer to 1/56 scale than 1/48th. If the figures were near the doors, it would be obvious that they would have to stoop to get inside! But due to its location in the background, it doesn't look out of place.



The “Sniff Test” At far left is a detail from Tamiya’s “Stuka Zu Fuss” kit. Note the figure in the back carries a rocket, with no sense of weight, on his shoulder. Once you realize these rockets weigh nearly 300 lbs, this just doesn’t make sense. No amount of artistic license can explain this away. The two figures in the foreground (and in my rendition shown at left) is just plausible. Still, it would be better for three, or even four, men to be shown lifting the rocket—just like in actual photos from the war.

appear magically stuck to the side!

Second, would people actually DO that? Stowage, camouflage nets, foliage, etc., should not interfere with the sighting, elevation, and traversing of turrets and weapons or operation of the vehicle. Imagine yourself as the crew. Would you load it that way? Don’t bury often-used items under rarely-used items. Lightweight or fragile stuff should not be placed under large, heavy things. Would stowage fall off or go flying when the vehicle starts, stops, or turns? If so, rethink how you have it placed. Dirt is an enemy of weapons – ammo is kept clean, and (generally) not thrown on the ground or stored in mud holes. Of course, people can be stupid and can (and sometimes do) violate these “rules” with tragic – or funny – results. A composition (tragic or humorous) can even be built around such a mistake.

Consider all these things in your composition process. Start with the plausibility/possibility/probability of the scene as a whole. From there work your way down to the details. If you choose to violate the laws of gravity or any of these other “rules”, make sure there is an obvious – and plausible – reason for doing so.

Stowage should be properly stowed. Have you even seen a model where stowage was seemingly magically stuck onto the side of a vehicle? Note how things are attached in these photos. The spare road wheel is tied to the handrail running alongside the inside top of the hull. In the far photo, the heavy spare tracks are simply draped over the nose of the vehicle. This is probably sufficient. The spare baseplate for the mortar is hanging on the front of the vehicle. This is both logical and supported by wartime photos. But it isn’t just glued on the nose. It is tied to the



tie downs on each top corner of the front of the hull. Likewise, the bucket is hanging by its handle from one of the same tie downs. Tools are clamped to the fenders (the clamps are molded-onto the parts). Foliage is properly tied or wedged into appropriate places where it provides camouflage without hindering the operation of the vehicle.

But is it Art...?

Is modeling art? It's sometimes popular to refer to modelers as artists (especially in the figure modeling realm) and modeling as an art form...but is it? A better question might be, "what difference does it make? It's only a subjective label, after all". Call it whatever you want, it changes nothing.

What is art? The Mona Lisa? Michelangelo's sculptures? A white canvas with a splatter of paint on it? Construction paper shapes glued to a paper plate by a kindergarden class? It can be all of these things. The dictionary defines art as, "*the conscious use of skill and creative imagination especially in the construction of aesthetic objects; also: works so produced*". So, yes, modeling can be art – I've seen wonderfully imaginative, creative, and perfectly-executed evocative pieces that, by any definition, would surely qualify as art. But if we build a model or figure straight from box, paint it per instructions, and set it on a shelf...? Where is the creative imagination part in that? Skill... yes—if it's done well. But it's little more than a 3D paint-by-numbers exercise (which, I guess, can also be "art" depending on how it's approached and your definition of art).

Art can be different things to different people. So while there's an objective definition in the dictionary, interpretation is purely subjective. I think those two words – objective and subjective – are what separates most modelers from artists. Art is usually subjective – aiming at emotion; portraying a feeling or evoking a response. Modeling is usually objective – aiming at recreating reality. If you doubt that, visit web forums or modeling clubs and listen to people berate a model for being 1mm too short or listen to them argue endlessly over the exact right shade of a particular color (a laughable exercise, but that's another subject). And no matter how much we may like to call ourselves artists, judging at shows is primarily on objective aspects - how well a model is built, sculpted, painted, etc.—rather than the more subjective "artsy" aspects. Some organizations (like IPMS and AMPS) even use checklists and detailed scoring systems, removing even more subjectivity—a completely inappropriate method of "judging" art.

So, as we have seen, modeling can be art, and some modelers are truly artists. For most it is simply craft – and modelers can be craftsmen of great skill (or little skill or anywhere in between). Technical proficiency is objective and can be physically measured. The same person can be both artist and craftsman depending on the intent of the particular piece they are making, the story or emotion it portrays, both the skill and creative imagination that goes into it, and, perhaps most importantly, the response of the viewer.

On the other hand, I think most who prefer the term "artist" do so simply because it sounds more impressive—a higher level than mere craftsman or modeler. By calling themselves "artist" they can look down their noses at mere modelers. On a still more negative note, there are even those who claim "artistic license" as an excuse for poor craftsmanship or to justify a lack of research.

So, is it art? You tell me – because I really don't care what label is attached to it. My ego does not need fed, nor will my methods or subject matter change depending on what they're called. I just have fun creating things that are appealing to me.

10. PLAY WITH IT



There are times when the perfect composition comes to me in a flash of inspiration, but this is rare. More often, I start with vague idea and work out arrangements and details through a process of trial and error. I take as much time as needed with this process because it's always time well spent. Most pieces that fail do so due to planning errors made in the compositional process—often before construction has even begun.

While it can vary, my process is normally similar from piece to piece. It starts with an idea. I will usually then start the process by making sketches and drawings. Once I am happy with these, I will usually proceed to working with 3D mockups of my idea. These often include large assemblies of the models—hulls, turrets, possibly tracks and wheels, etc. Figures will be at least tacked together with poster putty or tape. I don't worry about adding equipment or details at this stage. Cardboard or paper forms are often used for other details. I will arrange and rearrange things until I am happy. Then, I will let it sit for a few days, looking at it from time to time. Often a better idea or arrangement will occur to me.

I prefer NOT to work with finished models. This is important, especially when it comes to reposing figures—if they are already finished, you are much more locked-in and have less room for alterations. Plus, the more you handle a finished model, the more likely you are to damage it.

The first important thing we are doing during this process is determining the viability of our idea. Will it even work? For a very simple scene, this usually isn't a problem or even a consideration. But for a more complex story it becomes vital. I like to show the mock-up to trusted friends to see if they "get" the point I am trying to make. If they don't, then alterations are needed. I ask them for feedback on my idea. Sometimes certain stories may just be too complex or difficult to render visually. If you are working from a photo, keep in mind you do not normally have to copy the photo exactly—not only would doing so limit your options, flexibility, and arrest your imagination, but that 2D representation make not translate well into a 3D diorama.

Also during this process, we finalize the elements present, their arrangements, and their relationships to each other. We determine the poses, gestures, and expressions on the figures. In many ways, the figures are our most important elements, so make sure you get them right. Experiment—arrange and rearrange until you find the best possible arrangements. Do this even if you think you



already have it - you may actually stumble onto something better and even come up with new ideas. Once we have our composition locked in, we can start building and painting our elements.

Obstacles may be encountered anytime during the process. Don't be afraid to make changes when you discover something doesn't work or something else would work better. This may involve adding, deleting, changing, or moving an item or element. Maybe that building you planned is overshadowing your main event—make it smaller or replace it with something else. If a vehicle is too large, use a smaller one or reposition the one you have in a visually weaker portion of your stage. Maybe you come up with a way cool little subplot or other idea, but it really doesn't work well with your main point—don't force it in; simply file it away for use with another project.

As you work through this process, keep in mind all the other things we've discussed in this chapter. Study your elements, arrangements and details. In no particular order, some things to look at are:

- Make sure every element present should logically be there, is in a logical place, and is performing a logical activity. If it doesn't, it should be deleted. Make sure all actions and gestures are understandable and explainable. For example, there should be no figure pointing randomly at nothing.

The photos here show my compositional process.

At the top we see the initial stages. The models are partially complete and their relationship, along with other large elements (such as the AA MG tripod) are assembled. Note the ground basically has two levels.

In the middle, the figures have been added. The interior of the halftrack was completed enough to allow posing of the seated figures and to make sure the standing figure fit. Figure gestures and relationships have been worked out. Note the seated air guard and the standing figure in the halftrack are all watching the "conference" in the foreground. With everything now locked-in, I can proceed.

The bottom shows that changes can still be made. The ground has been changed to three levels (the Kubelwagen is between the height of the air guard and halftrack. The relative positions (and elevations) of the three figures in conference have been changed (see page 13 of this chapter). A driver has been added to the Kubelwagen—also looking toward the conference, and some supplies have been piled on the ground to fill a bit of dead space.



Some photos from my Sd.Kfz 251/22 diorama further illustrate the process.

Above left: As this is a complex scene, I made a fairly complex mock-up. Here, the vehicle and gun are in place, but I haven't started working on the figures yet. Once I did, I realized I could make the base smaller as discussed earlier in the chapter.

Above right: I pose vehicle crews after assembly of the vehicle interior, but before any added stowage, equipment, or painting. This allows me to fit the figures to the vehicle, and then to fit any additional stuff around the figures. In this case it was complex as the gunner and loader must interact properly with the gun.

Left: At far left is my initial construction of the Russian dropping the jerry can/grenade cocktail. While he fit in the scene, the pose did not look natural and I didn't think it made sense having him lift the heavy can with one hand. Thus he was reposed in the act of dropping the can as seen at near left. This small change makes a great deal of difference in the appearance of the figure.



- Make sure your main point is indeed the main point. It should be obvious and, in most cases, what the viewer notices first. If other elements interfere, change or move them. Ensure your main point is in a visually strong location.
- Make sure relationships of figures, vehicles, and other elements are clearly established.
- Make sure your arrangement does not appear arranged. Even though we have carefully placed every element, it should normally look random and not contrived. Symmetrical balance should be avoided. Ensure items and elements are not parallel to the edge of the board and to each other.

Conclusion

There you have it—my method for composing dioramas and vignettes. Although I have committed this to paper in some sort of orderly fashion, it is in reality no more than a thought process. If you are just beginning, it may serve you best to consider each “commandment” one at a time. But as you gain in experience, all the commandments will merge into one creative process. Each modeler is, of course, different—a unique individual. While I have tried to include what I consider as general “truths” and have shown my method, you will have to adapt these concepts to your ways of thinking and working.



Compare this in-progress photo of my 251/22 with the finished product seen on page 7. Here, the figures' poses have been worked out, most conversion work completed, and even most equipment in place. Putty work to repair joints and gaps still is needed, as are straps and belts. It is their positioning that is still being finalized. Astute viewers will note one major change. Look to the right of vehicle's nose. Here, we see a Panzerschrek team advancing. The wounded tanker with the pistol is located out of sight under the overpass behind the vehicle. As I felt this figure better helped tell the story than the antitank team, their positions were swapped. In the final version, the wounded tanker is by the vehicle fender while the two antitank men are under the overpass (above). These figures are not visible from the front of the composition and will only be found if the viewer looks for them. Still, they serve to fill potential dead space under the overpass behind the vehicle.



Remember, composition does NOT tell your story—it is simply the tool you use to allow your vehicles, figures, and other elements, to tell your story. While this process and these factors can be valuable aids, they do not take the place of your main, most important tool. That is your imagination.

Also remember there are no hard and fast rules. The right technique, the right method, the right idea, and the right composition is simply the one that works.

Above: An example from my 251/17 diorama. As the action and interaction between the US squad leader and the surrendering Germans is the most important part of my story, great care was taken to ensure it worked. As discussed earlier, it is placed in the visually strongest area of the stage and each figure is placed in the visually strongest possible facing. There are two other figures in this little portion of the stage but not how they were placed not to interfere with the main action. The dead German is lower than all the other figures (even though the ground he is on is at a higher elevation than the squad leader). The soldier beginning to search the half-track is behind the action, with a visually weaker facing, and is leaning over.

7

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/1 Ausf. D

By Kevin Townsend



Sd.Kfz 251/1 Ausf. D

My first experience with adult modeling was in 1974. I was 13 years old. Inspired by the work of Shep Paine, this first attempt featured Panzergrenadiers deploying from an Sd.Kfz 251/1. Forty years later, the first halftrack of my “Project 251” essentially recreated this model.

The basic personnel carrier of the Sd.Kfz 251 was the most widely produced variant. It was the “taxi” that transported the Panzergrenadiers around the battlefield. Its mobility allowed it to keep up with the panzers in order to provide infantry support. Its armor gave it some protection. Fittingly, it was the first vehicle I built for my collection of halftracks.

Assembly, Painting, and Weathering

As the Tamiya kit represents the basic personnel version of the halftrack, no conversion of any sort was required or desired. Other than the basic interior and exterior detailing added to all the Tamiya kits (see the chapter on Assembly), the model was built stock, straight from the box. Likewise, painting and weathering proceeded exactly along the lines of the methods we have already discussed in detail. Stowage is a mix of items included in the kit, the Panzergrenadier set, and Tamiya’s Jerry Can Set. A couple items were scratch-built from epoxy putty.

Figures

All the figures in this diorama came from a single set of Tamiya Panzergrenadiers. While some were built stock, most were mixed and matched, using parts from more than one figure. Many were converted —some extensively. As the figures interact with the vehicle, and because the figures all had to fit in close proximity to each other, the figures had to be posed and built concurrent with the assembly of the vehicle to make sure everything worked and worked together.

Top: Four figures worked straight out of the box. Three are shown, the fourth was the driver.



Middle and Bottom: Other figures were conversions. Some of these conversions consisted simply of swapping parts. An example is the pointing NCO shown at far right. Others were fairly minor consisting of parts swaps with limited reposing. Some figures were subjected to major surgery. Note the middle figure in the photo below. Both elbows, left shoulder, waist and hips, right knee, and the right ankle were all repositioned. Figures were painted as explained in the chapter on Creating and Painting Figures.



Below: Three of the figures painted.



WAFFEN SS CAMOUFLAGE UNIFORMS:

Selecting the proper colors and patterns from the plethora available causes no end of heartburn for the modeler. It doesn't need to—there really is no right answer. The names and designations we use today are post war inventions by collectors: the SS did not identify or differentiate the various patterns. These patterns were used indiscriminately and concurrently with each other. If you check photos, you often find a mix among the various soldiers even of the same squad. Still, there are a few generalizations we can make:

-Plane tree patterns were the earliest. If making a figure prior to 1943, one of these is the best bet. (Look up SS Plane Tree Camo on the internet to see what these patterns looked like).

-After late 1943, pretty much all patterns were in use and remained so for the rest of the war.

-Note that the palm patterns were never used on the shelter half (zeltbahn).

I actually like to mix and match patterns in a diorama or vignette. I think the variety and variation add to the visual appeal of the piece. The astute viewer will note at least three different patterns in this small diorama.

Modeling Waffen SS Subjects:

Is it ethical/moral to model Waffen SS subjects? It's history; I see no issue with it—sort-of.

I would not make or approve of a model glorifying the SS, Nazi doctrines, or genocide. I am leery of SS apologists who claim they were not related to those who ran the concentration camps or minimize their war crimes by stating all armies commit atrocities. Sure, there was a distinction between the combat arm of the SS and the camps—but not a clear-cut distinction. And Yes, there are always individuals who commit war crimes, but it was institutional in the SS - such behavior was the norm and was rarely punished.

We have to be aware of the feelings of others; NOT political correctness, simply common courtesy. I would display anything at a model show. But for a public display at a library, museum, or other public venue, I would not show anything with swastikas—it's just a model to us, but to a Holocaust survivor who lost everything and everyone, it's something they live with every day and is still very real. Who are we to tell them it's just a model or is "history"?



Left: The finished interior. The holes visible in the floor and seats are there to receive the mounting pins of figures inside the vehicle. As the driver's seat will be impossible to reach once the hull halves are assembled, the driver was glued in place prior to further assembly.

As for stowage, the sacks and shelter quarter are epoxy putty, all else is Tamia.

Composition

How does this diorama compare to my "Ten Commandments of Composition?"

1. HAVE A SINGLE MAIN POINT: The story here is simply the vehicle doing what was designed to do – deliver infantry to the objective. The soldiers deploying from the vehicle clearly indicate its purpose.

2. DIRECT THE VIEWER'S EYE: While this commandment may seemingly not apply to such a small and simple composition, it does. The direction of movement is against the grain, arresting the viewer's eye. Aimed guns, pointing figures, and direction of figure movement is vaguely toward the viewer. Thus, even though the action points off stage, it does not point to the displays or exhibits around the diorama—it points at the viewer, again keeping him or her in the scene.

3. SHOW ACTION AND INTERACTION: This scene is all action – all of it pointed at—interacting with—an off-scene enemy. The vehicle's machine gun, the pointing NCOs, and the movement of the figures – and vehicle – are clearly toward the enemy. This is obviously an attack.

4. USE A TIGHT COMPOSITION: The figures in and on the vehicle are in such close proximity extensive test-fitting was needed to make sure they all fitted together without conflict. The base is barely larger than the vehicle and figure grouping. This composition could not be any tighter.

5. HAVE BALANCE: Again, there is really only one large component located centrally and filling almost all the stage— it is balanced.

6. USE ALL THE ELEMENTS: The figures and vehicle are clearly in a close relationship. Both are important to the story. The groundwork tells us we are in a war-torn urban environment and the base is as small as possible.

7. MINIMIZE DEAD SPACE: The tight composition, with the base sized to tightly frame it, eliminates dead space. In any areas where figures are not present, the space is filled with rubble, the railroad, and the streetlight.

8. USE SHAPES AND ELEVATIONS: Note the vehicle, the streets, and the railroad embedded in the street are not parallel to the edge of the base. This generally looks better and less contrived.

9. ARTISTIC LICENSE IS OK: Again, other than the "generic" vehicle and setting, this commandment really doesn't apply to this composition unless you consider my style of painting to be "artistic license".



ATTACK! - THE SPW IN ACTION:

“....Schaub and his company reconnoitered in the direction of Iwot. It was determined that strong enemy forces were there. An attack was ordered on the locality for 10 March, after the regiment had reorganized all of its forces. The attack was to be conducted by three Kampfgruppen.

...The attack started at 0700 hours. After a five minute artillery preparation, Oberleutnant Schaub and his SPWs approached Iwot. They entered the northern and northwestern portions of the locality, where they saw the enemy's antitank guns—but from the rear. The enemy had expected the attack from the opposite direction. In that regard, he was right, since one of the three Kampfgruppen was also attacking from that direction.

Schaub ordered his men to pick up the tempo and charge the antitank gun position. The weaponry on the SPWs opened fire as the vehicles picked up speed. The rounds slammed into the enemy's positions. As the company started to roll up the enemy positions from the rear, Schaub ordered the company to complete its move through the village and on to the bridge.

Schaub's SPW ran over a machine-gun position. The SPWs of the company fired with everything they had. The raced through the surprised enemy and took the bridge. The riflemen from the other companies then proceeded to mop up,

house-by-house. Flak fired into pockets of resistance. Partisans also took part in the fighting. The acting commander of the regiment's infantry gun company was gunned down by a 10-year-old Soviet boy with a submachine gun.

When news arrived that two other Kampfgruppen were having problems in advancing on Antonowka, Oberleutnant Schaub and his men were summoned in that direction. He was given a Hungarian tank company in support.

Schaub had two of his platoons dismount and attack from the west. He moved around Anontowka with his heavy weapons and entered the village from the north. His heavy weapons opened up and let loose with a thunderous roar. A heavy machine gun that fired on Schaub's vehicle was silenced by a direct hit.

The Soviets engaged the armored vehicles with antitank rifles. One round struck the side of Schaub's vehicle. There was a murderous crash, but the vehicle remained undamaged. Five minutes later, the fighting for the village was over. Schaub's men had taken two villages. Schaub had his men set up defensive positions; he ordered patrols sent out.”

-From the book “Panzergrrenadier Aces”, by Franz Kurowski

10. PLAY WITH IT: While I knew from the start I wanted several figures in and on the vehicle, it was not until working with the partially assembled figures and vehicles that I was able to determine how many would fit and how they would fit together.



The cover from a 1942 series of lithographs by German artist Walter Gotschke showing panzergrenadiers in action. Many of the prints feature the Sd.Kfz 251. The cover makes a comparison between the WWII Panzergrenadiere and the grenadiers of Frederick the Great's army. Considering the combat effectiveness of the panzergrenadiers, the high casualties they sustained, and the disproportionate amount of awards and medals they earned, the comparison is not an invalid one. All the prints can be found at <http://www.warreliefs.eu/forum/art-decor-exotica-third-reich/set-prints-panzergrenadier-603/>

More views of the finished figures



Bases

Your base is more than an afterthought—it is an important component of your finished piece. I have seen great models lessened by being placed on a low-quality base. In the figure-modeling world, vertically oriented pedestals are very common. For models, such a relatively large base is unnecessary, a horizontally oriented platform is more appropriate. Still, the base should look nice—as Shep Paine states in many of his books, it is the frame for your model picture. But nice does not have to mean expensive. In order to achieve consistency of style and finish for the several models in my halftrack project, I chose to make my own bases using the following method (the base pictured is for either the 251/1 or Stuka zu Fuss—they are both identical in size and shape and were made at the same time). While the size and shape of the bases may vary from model to model in the set, the basic method of construction and finish remain the same.



1



2



3



4



5

Using an appropriate thickness of wood (3/4 inches in this case), the needed size base was cut and any rough edges sanded smooth.

1) To cover the base, I use shreds of brown paper bags. Some were coated with various colors of wood stain to create color variations.

2) To attach the shreds to the wood, I used a spray adhesive. Both surfaces (the paper and wood) were sprayed. This stuff is VERY tacky—like contact cement, you have little ability to reposition shreds once put in place.

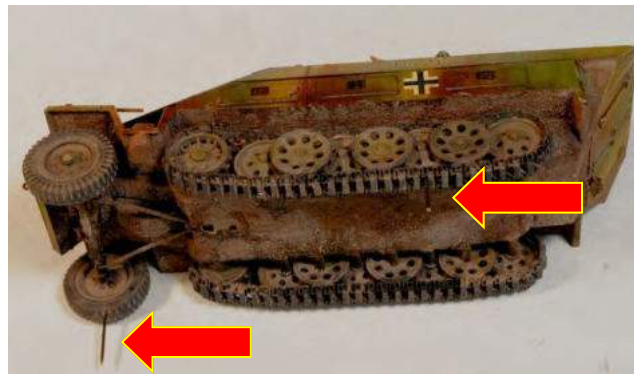
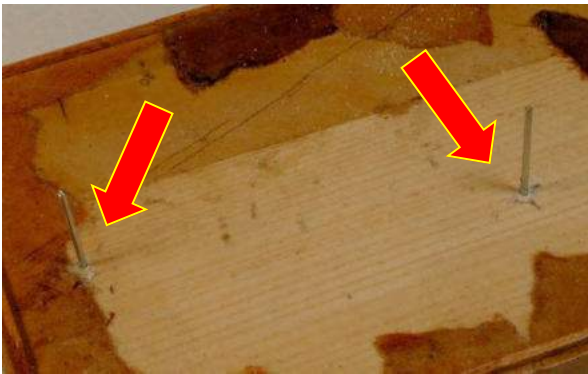
3) The shreds were glued in place around the edges of the base, needing only to intrude slightly onto the top and bottom of the base as these would later be covered (the top by groundwork and the bottom by a foam pad).

4) A strip of 1/16th wood, stained a maple color (a good match for the shreds) was put in place as a border around the top edge of the base. This will serve as edging for the groundwork. At this point, the entire base was sealed with several coats of clear satin spray paint. This protects the finish and gives the base a nice sheen.

5) A 1/8th inch-thick foam black foam pad was glued to the base bottom.

Although other bases in the project were different sizes, shapes, and in some cases designs, they were all finished identically.

Groundwork



Just like I did for the figures, I pin the vehicle for mounting to the base. Metal pins were glued into holes drilled in the bottom of the right front tire and one of the middle road wheels on the left side. These pins fit into corresponding holes drilled into the surface of the base. Here, the base holes are marked by lengths of paper-clip inserted into the holes to protect them while creating the groundwork. Although not pictured, it is important to check the fit of the halftrack to the base at every step to make sure the wheels and tracks fit solidly to the ground.

I decided to run a railroad through the street—I thought it might add a tiny bit of visual interest. The rails were glued in place prior to pouring the plaster. I used a “U” channel and an “L” channel. I used the “L” simply so I would have a flat surface to glue to the base. The “U” provides some replication of a rail profile (in this scale, we don’t have to be correct—we just need the correct appearance, and this method gives us that). These were glued to the base as shown in the drawing at bottom and the photo at left. The plaster was then poured into the base cavity formed by the border of wood strips.



Below: The real thing

Right: The street light was made from various bits from the scrap box with a length of aluminum rod to give it height.





Top Left: Water putty (powder mixed with water to make a plaster-like stuff) was poured in place, taking care not to get it in the rails. Another batch of water putty that had been mixed, trowelled out flat, and allowed to cure was cut into the basic shape of the curbing and glued in place on the plaster. Once the base was cured, the surface was sanded fairly smooth and any bad imperfections were patched with more putty and resanded. Top Right: Next came the labor-intensive part: the pattern of bricks was drawn with a pencil on the road surface and the bricks cared in using a dental tool. Some were damaged accidentally and others were damaged intentionally as part of the ruined city aspect of the base. Bottom Left: After all the bricks were scribed, the vehicle was put in place—another test fit—and the areas where the wheels and tracks contacted the ground was lightly outlined. The same thing was done with the two dismounted figures. This was done to ensure that rubble would not affect the placement of these vital elements. Note: after the rubble was put in place, these outlines were erased. Bottom Right: Rubble was put in place next. Large piles were roughed-in using blobs of Sculpt-a-Mold (an instant plaster-impregnated shredded paper-Mache type material). Individual bits were broken up chunks of plaster (leftovers from earlier projects), some plaster bricks, and finally some blocks cut from thin cork board (the same stuff bulletin boards are made of). The street light was made from various bits from the scrap box with a length of aluminum rod to give it height.



The first stage of painting was simply to give the bare plaster a heavy wash of Burnt Umber oil paint thinned with mineral spirits.



Top: Next, individual bricks and stones were picked-out in various acrylic colors. Look at stones and bricks in real life—this variation is accurate. The contrast is stark at this point, but later steps will tie it together.

Middle: Colors were added in various layers of acrylic paint washes and dry-brushing. The final two steps consisted of outlining the various large bits of rubble and curb/sidewalk sections with black and hitting the highest highlights and stone edges with a light mix of Country Tan and Antique White. These final outlining and edging steps really give the base a 3-dimensional look and make the details pop. This look (somewhat dark with stark shadows and highlights) is simply my style of painting—and it matches what I did with the vehicle and figures. This is important to give the finished vignette a unified appearance.



Bottom: The last step was to apply the same colors of pigments that were used on the undercarriage and suspension of the halftrack. To protect the acrylic finish of the groundwork, I painted on a layer of Dullcote prior to applying the pigments. Some were just dusted on the base with a soft brush. In some especially dirty spots, the pigments were applied just like the build-up under the vehicle fenders. After placement, they were fixed in place with rubbing alcohol (hence the Dullcote barrier—otherwise the rubbing alcohol could attack the acrylic paints). While it may seem reasonable to fix and protect the pigments with a layer of Dullcote over the top, I do not recommend applying a clear spray over the pigments—it could alter the color and drastically lessen the effect).



The vehicle was attached to the base using five minute epoxy. Interior figures were glued in place with super glue. External stowage (that had been painted separately using the same methods as were used on the vehicle) and the fragile fender position markers were attached. Make sure stowage is actually tied, wired, hooked, or wedged on the vehicle—not just magically sticking to its sides. Then the remaining figures were put in place. Figures were attached using mounting pins in the same fashion pins were used to mount the vehicle to the base. The jumping soldier with the ammunition can is pinned at his knee to the vehicle lockers. The figure jumping off the front of the passenger compartment is pinned by his ankle to the Jerry Can. The soldier vaulting over the vehicle side at the rear is pinned through the bottom of his foot to the rolled tarp draped across the back of the halftrack. Others are pinned to the vehicle seats, floor, or groundwork.

A nameplate for the base was made on the computer, printed on nice cardstock, sealed with clear satin paint, and attached to the front of the base with double-sided tape.

The antenna is a length of plastic rod.

8

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/1 Ausf. D Wurfrahmen 40 "Stuka Zu Fuss"

By Kevin Townsend



Sd.Kfz 251/1 Ausf. D mit Wurfrahmen 40 "Stuka Zu Fuss"

For this vehicle I used the Tamiya kit. It is absolutely identical to the standard Sd.Kfz 251 Ausf D kit, even including the same winter figures, gear, and stowage. This kit simply adds additional sprues comprising parts for the rockets, frames, crates, and figures.

With the exception of the rocket launcher weapon system (which was built per the kit instructions), the model was built, painted, and weathered in almost exactly the same fashion as my 251/1 D. Stowage consisted of personal gear, ruck sacks, rifles (in the racks), Jerry cans, and various tarps and bags. The kit figures were used. The poses of the figures are the only nit I have to pick with the set. The four figures are essentially two each of two figures with only different arms. The kit has two figures handing uncrated rockets, even though the rockets were shipped, loaded, and fired in their crates. There is no reason for them to have done so. Further, one superman in the kit is hefting a rocket all by himself—not a easy feat to be solo-lifting nearly 200 lbs. of high explosive. Most reference photos I found in my research show the crates being lifted and placed by upwards of four men. Thus, I chose to use only the two figures shown lifting (or repositioning) a crate by themselves. This highlights both the rockets and the laborious loading procedure. The other figures went in spares box.

Assembly, Painting, and Weathing

These processes proceeded as we have previously seen. Any differences or additions are seen on the following pages.

As the figures are depicted in shirt sleeves with no gear, their gear was just randomly thrown about the vehicle. The rifles remain in the racks. Tunics were fashioned from epoxy putty. One is neatly folded on a rear seat, but one is just thrown over a stowage bin and one hangs from the rear machinegun mount (don't glue the mount in place until after the rocket frames are attached). Belts and suspenders were made from metal foil with Tamiya equipment attached. Ammunition pouches for the rifles were made from bits of plastic strip. These belts were draped over the seats and glued in place.

Below: Other than the folded/stowed tunics, stowage is entirely from Tamiya.



Crates, Rockets, and frames were assembled per the instructions and were left as separate sub-assemblies during painting. The rockets were primed with Black and over-sprayed with German Green and then Light Grey Green to create shadow and highlight. Decals were applied and final highlighting/shading was done by brush. This consisted of a light green color dry-brushed on edges and black outlining. Details were then painted.

Like the rockets, the crates were primed with Black. A wood color (Sandy Brown) was sprayed on allowing the black to show through in shadow areas. Next, Sand Yellow was sprayed on highlight areas only. With this basic wood color in place, the remainder of the paint was applied by brush. This consisted of a wash of Burnt Umber oil paint to bring out the grain, dry-brushing with Country Tan to pick out the edges, and finally outlining with black. Details, such as the carrying handles and internal rails, were painted as needed.



(Note: The grey crate was painted using the same methods, only different colors. As the crates can from various manufacturers, colors could vary from natural wood to grey to field grey, etc.)



How does this diorama compare to my “Ten Commandments of Composition”? Like the last example, there really isn’t much to discuss here. The story is simply the vehicle performing the function it was designed for. Groundwork provides context and the figures – in the visually strongest part of the base - draw attention to the rockets and the loading process.

Composition



PLANNING YOUR GROUNDWORK;

Doing proper research is vital—dirt, mud, rocks, grasses, and plants from one place may not look like those from another. Color and quality can vary. Although groundwork is usually just support for your model, bad or incorrect groundwork can ruin the overall effect. Simple observation is a great research tool, as are photographs and memoirs. The internet and tourist books are also great sources.

I normally (but not always) prepare my groundwork after the figures and vehicles are constructed but before they are painted. This allows me to use the actual pieces without fear of damaging finished paint. This also allows me to work out exactly what size base is needed and to plan the exact layout of the various groundwork elements, contours, etc. that may interfere with fit of the figures and models. For complex pieces, I often first make mock-ups and drawings.

Not only must your groundwork allow for proper fit of your other elements, it should also compliment your model and story without distracting from it. In that regard, I'm generally of the opinion that "less is more". For example, to model a scene in a forest, you could make lots of trees. But that might block the view of, or interfere with, your story. Instead, use one or two trees, a couple stumps, a fallen log, and lots of forest litter.

Basic Groundwork

This vignette is a prime example of minimalist groundwork. The halftrack with protruding rockets and frame takes up most available space, and the figures manhandling the last crate use up the remainder. The only groundwork possible, or needed, is just basic ground with grass and weeds. The vehicle and figures are pinned to the base using the same methods explained in the last chapter. The groundwork itself was created somewhat differently as shown on these pages:



Top: For this scene, I decided to include the corner of a ruined fence (to fill a bit of empty space in the front left corner of the composition). This was made from strips of wood. Once the glue was thoroughly dry, the fence was "painted" using a model railroad product designed to weather wood called "Weather-It". A wash of this product result in an old, grey look to the wood. Bottom: In addition to the fiber flocking (static grass) I use to create grass, a variety of materials can be used to create groundwork. These can be things you pick up on your daily walks, get from the dried plant section of the local floral shop, or purchase from groundwork/model railroad vendors. Top Row: Sticks are picked up in the park. The rubberized horse hair comes in blocks that can ripped into shreds to make thicket and vines. Middle row: Shredded foam comes in a variety of textures and colors. Also shown are some dried leaves from the kitchen spice rack. Bottom row: dried floral material makes some of the best plants. Why? Because they are plants. Mother Nature miniaturizes herself well. Also shown are pre-made grass clumps (by Greenline in this case). Some have various colored wild-flowers attached to them. While these flowers are not convincing in large scales, in 1/48th, they look just fine.

1) For basic groundwork, I use "Celluclay" - a grey-colored shredded instant paper Mache' type material. Mix with water to the consistency of modeling clay and apply using putty knives, spoons, fingers, or whatever else. I also mix in a large dollop of white glue or Elmer's Wood Glue to help ensure the edges don't curl up as it dries. I also pre-color my groundwork mix by adding the appropriate colors of acrylic paint into the wet Celluclay mixture. Here, the Celluclay is applied. Don't put it on too thickly or it will take forever to dry. If I need to make hills or banks, I use wood or foam to build up the base under the putty. Here, the ground is flat, so the putty was applied in a fairly flat layer, indented slightly where the wheel ruts in the country track would be. The tooth-picks mark the location of the mounting holes for the mounting pins of halftrack and figures. All groundwork construction is done before the Celluclay dries.

2) The stump (a length of stick) and the fence corner were glued in place. To provide ground texture, small rocks and gravel from the driveway are sprinkled onto areas that will not be grass-covered and pressed slightly into the damp mixture.

3) While the Celluclay is still wet, grass is put in place. I use a variety of different materials. Most are available at hobby shops, craft shops, or model railroad stores—model rail scenic materials (such as those by "Woodland Scenics") work well in 1/48th scale. Mostly I use static grass. A thin mixture of white glue, water, and a bit of acrylic paint (matching the ground color) is painted on applicable areas and grass sprinkled on. Excess can be gently blown off.





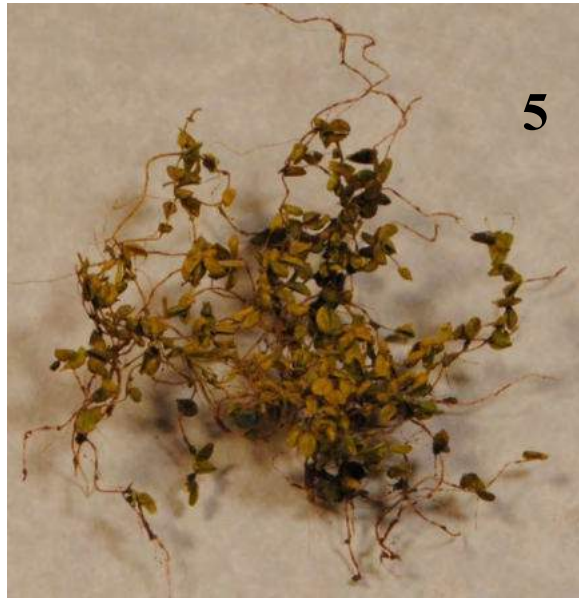
4

4) At this point the halftrack and figures are temporarily put in place and pressed slightly into the soft ground. This serves to give them a sense of weight and ensures they sit firmly on the ground instead of hovering unrealistically over it. It also allows me to place grass clumps and other plants without interfering with the fit of the figures and models.

5) The bit of brush was made from a shred of rubberized horsehair. Using tweezers, it was dipped into white glue (thinned a bit of water) and then dipped in a pile of tiny leaves (from the kitchen spice rack). This resulted in a realistic looking bit of brush. This was then glued in place along the edge of the broken fence.

5

6) The halftrack and figures were removed. Note that grass clumps were not placed under the halftrack where they would be invisible anyway. Note also that although everything was either pre-colored or comes in green colors, the effect is not realistic—it looks very toy-like at this point, and will need to be painted.



6



7) First, the bare earth areas were dry-brushed with several shades of highlight color, starting with slightly lighter than the base color and proceeding to almost white. Next, a very thin wash of black was applied. This dry-brushing and wash was also extended to the fence, stump, and rocks embedded in the ground. Next, grasses, both clumps and static grass, were heavily dry-brushed with a mix of green and yellow paint. The final dry-brushing was almost pure yellow with a bit of dusty tan color. All this serves to dull down the garish colors, visually blend the elements, and serve as a rudimentary high-lighting and shading. Go back and apply more washes and/or dry-brushing as needed (in as many different shades as needed) until you are satisfied with the result.

8) Finally, using the same pigment colors that were used to weather the vehicle, the ground was lightly dusted with pigments. These were lightly sprinkled on both dirt and grass areas (this was done by loading a brush with dry pigments, holding it over the surface, and tapping the brush). Then, with a soft brush, the pigments were lightly rubbed into the surface. This serves to tie everything to each other and to the vehicle. It also gives a slightly dusty appearance to the ground.

9) Lastly, the vehicle and figures were glued in place. The halftrack doors, fender position markers, rocket aiming rods, and antenna were glued in place. The nameplate was added to the front of the base and another halftrack was complete!



9

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/2 Ausf. D

By Kevin Townsend



Sd.Kfz 251/2 Ausf. D



This long-serving vehicle could be built on any model of the 251 using any of the available half track kits. I chose Tamiya's "D" for an opportunity to portray the "Ambush" camouflage pattern.

While rare on the 251, there are few photos showing the vehicle with this camouflage (whether factory or field applied is unknown), and one is a 251/2.

Assembly

From the exterior, the 251/2 doesn't look much different from the 251/1, other than the fact that the forward MG and shield usually are not mounted because of the possible interference with the mortar and because the spare baseplate for using the mortar dismounted was sometimes hung on the nose of the vehicle. Still, if you look carefully, you will note that the mortar tube extends beyond the top of the vehicle. Most of the differences between this variant and the /1 were internal. A baseplate for mounting the mortar was built into the floor, as well as two brackets onto which to place the legs of the mortar. One of the rear bench seats was removed to allow for ammunition storage. Other ammunition cases were mounted on the floor plates or the hull walls. Therefore, the exterior of the vehicle was assembled and painted as normal. The differences were internal. There is no existing conversion kit for the 251/2, so most of the changes will have to be scratch-built. Way back in the day, Bandai included the German 8cm mortar in one of their infantry sets, and this can be used if you can get your hands on one. As the weapon and ammunition cases are fairly simple, I chose to scratch-build. Note that while some ammunition containers were made of wood, some were pressed steel. These latter types are included in Plus Models' "German Ammo and Medical Containers" set. I used both types in this project.



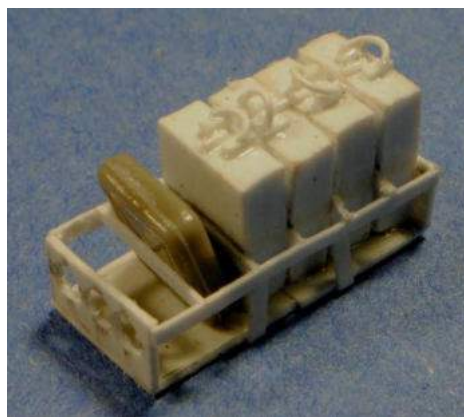
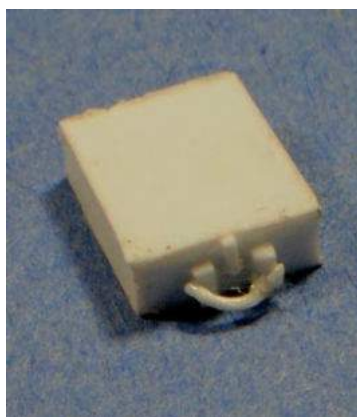
My camouflage scheme was based on this illustration of a 251/2 from an unknown unit. The illustration is based on the photo below. While the mortar is not visible, it is assumed to be a /2 based on the lack of MG and the presence of what appears to be a mortar base plate hanging on the nose armor. No markings are visible. The illustration above appears in the book, "SdKfz Half-Track 1939-1945" by Bruce Culver and illustrated by Jim Laurier. In my opinion, the Ambush pattern was one of the most attractive—and effective—camouflage patterns used during the war.



Hinterhalt: The "Ambush" Camouflage Pattern:

By the summer of 1944, with the Soviets and Allies rampaging toward Germany from both east and west, the German army was completely on the defensive. Furthermore, Allied air power was proving decisive, making movement near impossible during daylight. During this time, some German factories (mainly tank factories) were ordered to apply a new camouflage scheme designed to aid in the concealment of combat vehicles hidden under trees and other foliage. Referred to as the "Ambush" (Hinterhalt) pattern, the paint simulated the look of sunlight filtered through foliage. The scheme consisted of a dark yellow base color (dunkelgelb) with random patches of olive green (olivgrün) and red brown (rotbraun). Dark yellow spots were added to the green and brown areas, while spots of olive green were added to the dark yellow areas. In the field, the effect was further enhanced by the addition of foliage to the vehicle.

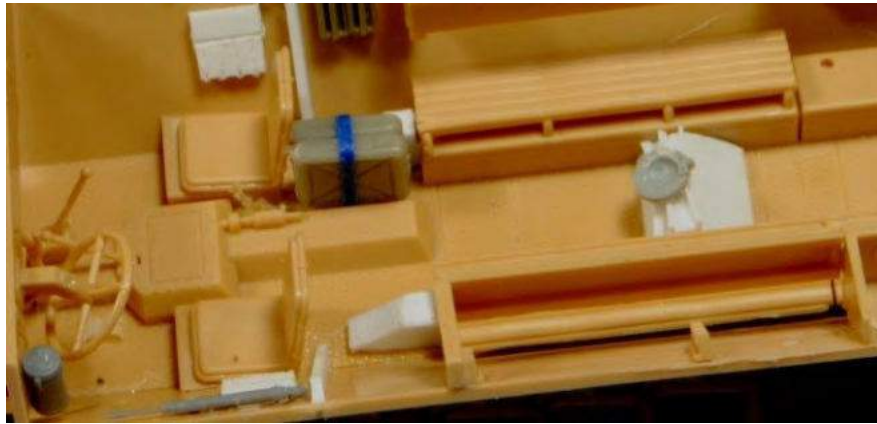
There were variations – some factories applied the



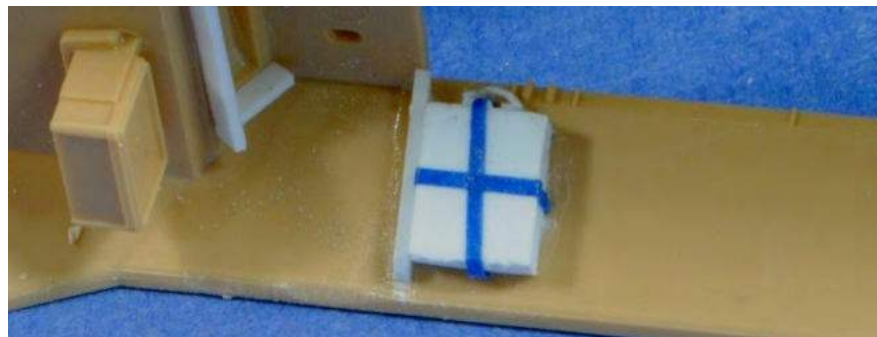
Mortar ammunition was packaged in metal containers and wooden boxes. The metal containers in this conversion are resin pieces from the Plus Models "German Ammo and Medical Containers" set. Above left: The wooden boxes were made from blocks cut from plastic strip. Other bits of strip and rod were used to detail the boxes. A rack, above, was made from thin plastic sheet and strip. Since the mortar is in action, at least one box needed to be removed from the rack and modeled open. This finished box is shown sitting on the halftrack seat above right. The box was made from plastic strip with a sheet plastic lid and bottom. The mortar round in the box was made as shown later in this chapter.

camo in a "dot" pattern, while others used a "disk" pattern (a Google image search will reveal examples of each). The pattern was primarily applied to tanks and tank destroyers. In the field, crews and maintenance units sometimes painted other vehicles using a similar pattern. It seems to have been very rare on the Sd.Kfz 251. Whether the examples discovered were painted at the factory or in the field is unknown. The sample shown on the previous page does not seem to have the "dappling" applied in the dark yellow areas, indicating this vehicle may have been painted in the field (or it may simply be a factory variation). No markings are visible on this vehicle. My halftrack is closely based on this one.

The camouflage pattern was fairly short-lived due to complexity and paint shortages. Implemented in mid August, 1944, it was discontinued in mid September.



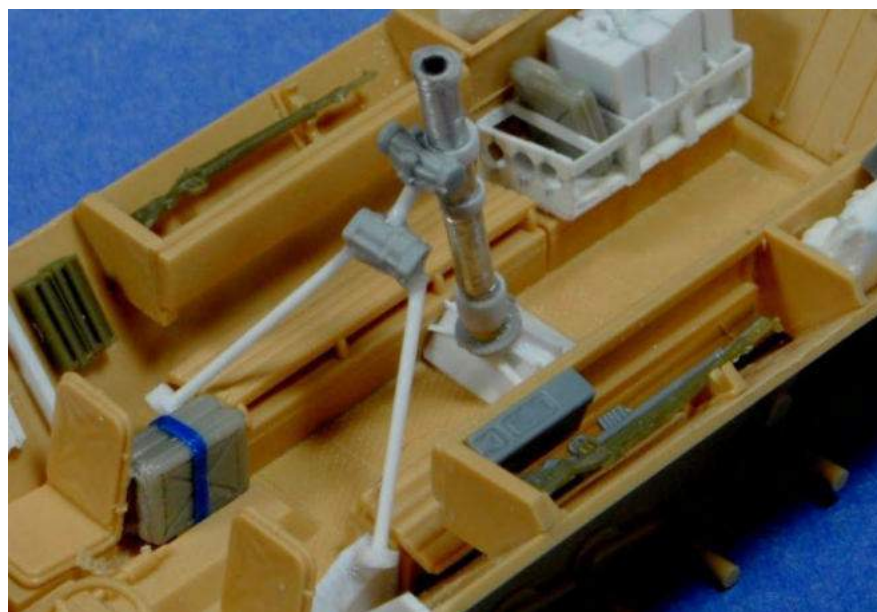
The base plate was formed from a plastic wedge cut from a thick plastic strip. It was detailed with small plastic strip and a circular piece from the scrap box. Footings for the mortar bipod legs were cut from plastic strip. Two Plus Model ammo cans were strapped to the floor aft of the co-driver's seat.



A wooden box was strapped to the upper hull wall. Detailing of the interior was otherwise the same as the other Tamiya halftracks in the series. Straps are blue painter's tape.



The mortar tube is a piece of aluminum tube detailed with plastic strip and a plastic ball at the end. The bipod legs are plastic rod. Elevating and traversing mechanisms are bits from the scrap box.



The Bipod and mortar tube were fitted into the halftrack. While the bipod was glued in place, the mortar was left separate as one of the figures needed to be glued in place prior to permanently fitting the mortar tube.

Once in place, additional details were added to both the tube and bipod to match diagrams and photos of the actual weapon found on the internet. This was done using "gizmology" - using various bits to create the look of the mortar parts.

Figures

It was my desire to model the crew serving the gun. This not only provides action and interest, but also clearly indicates the roles and distinguishing features of the vehicle. This was the 10th halftrack I build, so by this time I had plenty of figure kits and a box of spare figure parts. All this was used to pose the figures. They were built to fit with each other and the gun. Operating the weapon are a loader, gunner, and assistant, helping to secure the weapon with his hand. The vehicle commander scans the target with binoculars. A driver and radio operator are also in position. They were made as shown below:

Below : The first step in making the figures is to work out the poses making sure they fit in the vehicle and interacting properly with the vehicle, mortar, and each other. Also make sure they fit with no interference with the hull top in place. The figures are made from parts from several kits and figure sets. After assembly, any needed repairs and detailing was done with Magic Sculpt epoxy putty.



- **Driver and Co-Driver:**

These are both from the Tamiya Protze, modified to fit in the front seats of the halftrack. Their caps were cut away and replaced with helmets.

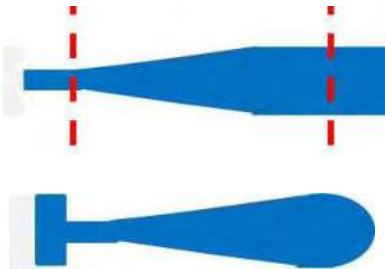
- **Gunner:** *Other than his helmet, he is made from parts from two Flakvierling sets. His left foot, both shoulders, and waist were repositioned.*

- **Loader:** *He is from the Panzergrenadier set with a different right hand.*

- **Assistant Gunner:** *Other than his helmet, all parts except his left leg are from the Flakvierling kits. His left leg is from the Field Maintenance set. His waist and both shoulders have been repositioned.*

- **Commander:** *His head, upper torso, arms, and binoculars are from a Flakvierling kit. His left leg is from Tamiya's Stuka Zu Fuss halftrack kit. His right leg is from the Panzergrenadier set, repositioned at the hip and knee.*

Figures were pinned using lengths of paperclip wire. The pins fit in holes drilled in the vehicle floor and seats following my normal practice.



Top left: The mortar rounds were made from stretched plastic rod. I used a rod of the correct diameter for the round. You could also use a piece of the sprue tree the parts are attached to. Note that whatever type plastic you stretch, it will remain its shape (round, square, hexagonal, etc.) it will simply stretch into a thinner version. I heat the plastic by rotating it over a candle. You can control heat by how high above the candle you hold the plastic. Once soft, it can be gently stretched to the desired diameter. I used a piece of the stretched rod where it begins to stretch from the full diameter. I made cuts at the red dotted lines. The top portion was rounded to create the nose. A slice of rod was glued to the thin end to form the ring of fins that spin-stabilized the round. While not detailed, it is more than adequate for this scale as it is quite small—being under 1/4 inch long. Two rounds were made—one to place in the open box and one to be held by the loader.



Above Left: Once the vital stuff (figures, weapons, ammo) was fitted, more gear was added. Constant test fittings ensured everything fit. Note the open mortar round box, with one round remaining, on the seat by the ammo rack.



Bottom The interior painted prior to the attachment of figures. The mortar will not be permanently attached until the assistant gunner is in place as the gun and figure fit closely together.



Left: The upper hull was detailed the same as the other halftracks, but I went used a simpler design for the view blocks since, with both seats occupied, they will be mostly invisible. The glass in the view blocks is simply thick gloss medium. The headphones are from the Tamiya infantry equipment sprue with thin plastic rod wire. This photo also shows a hull-mounted ammunition case.

Below: The hull interior with figures in place. The two standing figures are not yet glued in place. They will not be permanently installed until after exterior airbrushing is complete and masking over the open-topped fighting compartment is removed. The figures were painted using my normal methods. Although most wear the SS camouflage uniform, colors were varied slightly from item to item to add realism and visual interest.

Bottom: A mortar baseplate was (seen front center) was made. The plate itself was cut from a piece of plastic sheet. The handle is a length of wire bent to shape. The framing was made from a central piece of plastic rod surrounded by a framework constructed of plastic strip. The "cleats" to secure the plate into the ground, were cut from thin strips of sheet plastic. The plate was painted using the same methods we have seen. Ground-up pastel chalk, representing dirt, was caked into the openings in the framework. A rolled tarp was made from epoxy putty—rolled out thin and rolled up into the desired position. The rest of the stowage was painted using my normal painting methods. Additional external stowage is all Tamiya pieces. They were built and painted prior to attach-



Composition

Let's compare this little diorama with my "Ten Commandments of Effective Composition":

1. HAVE A SINGLE MAIN POINT: The story here is simply the vehicle doing what was designed to do – provide mortar fire support. Each crew member performs his assigned function.

2. DIRECT THE VIEWER'S EYE: While this commandment may seemingly not apply to such a small and simple composition, it does. The direction of movement is against the grain, arresting the viewer's eye. The aim of the mortar, and the direction the crew are looking are aligned and imply the presence of an off-stage enemy.

3. SHOW ACTION AND INTERACTION: The figures interact with each other to work the gun. As all this is in the vehicle, there is interaction there, too. Based on colors and camouflage patterns, the vehicle even interacts with the terrain it is in!

4. USE A TIGHT COMPOSITION: The base is barely larger than the and figure grouping. This composition could not be any tighter without aligning the vehicle parallel to the edges of the base, in which case the scene could be made much smaller, but it would look more contrived and loose visual interest. .



5. HAVE BALANCE: Again, there is really only one large component located centrally and filling almost all the stage—it is balanced. The vehicle, being closer to the right edge of the base than the left, and angled slightly, is balanced by the small tree.

6. USE ALL THE ELEMENTS: The figures and vehicle are clearly in a close relationship. Both are important to the story. The colors of the vehicle, figure uniforms, and groundwork are all similar and in similar patterns—the very purpose of camouflage.



7. MINIMIZE DEAD SPACE: The tight composition, with the base sized to tightly frame it, eliminates dead space. Any that might be present otherwise is filled by the small trees.

8. USE SHAPES AND ELEVATIONS: See #4 above.

9. ARTISTIC LICENSE IS OK: This command really does not apply to this situation. The vehicle itself is even based on photographic evidence of an actual vehicle.

10. PLAY WITH IT: The area where this most applied was in working out the positions and poses of the figures. While I knew from the start what their locations would be (based on German crew positions for the weapon), working out poses to make them all fit properly with each other, the mortar, and the vehicle was a challenging process.

Groundwork



Please note that the colors and patterns used on the groundwork were similar to those used on the halftrack itself. Not only does this help demonstrate the purpose and effectiveness of camouflage, it also makes the vehicle look as if it belongs in the scene and visually ties the whole composition together. The grasses are realistically depicted in various colors and lengths.

Right: I wanted my scene to depict soft ground. The heavy halftrack would not sit weightlessly on such earth, it would sink in. Note the ruts where the halftrack sits. These ruts “follow” the halftrack—extending from the rear of the tracks to the edge of the base. The halftrack drove to its current location—it was not dropped via helicopter.



It's important to ensure that stowage realistically hangs on the vehicle. I've seen models where the stowage seems to magically just stick to the side of the vehicle. I tied them to the handrail on the inside of the upper hull. For this I used fine model ship rigging thread. The foliage is the same dried floral material used to make the tree (see below). Some of the foliage was tied in place using the same method, other bits were wedged into various places on the vehicle or in the other stowage. This photo also provides a good view of the crew in action.



Below: For the tree, I started with a piece of "Sea foam", a dried floral material marketed by Joefix. This has a very realistic trunk and branch structure and makes for excellent trees in small scale. The "tree" was airbrushed a dark grey-brown color along the trunk and inner branches. The outer branches were airbrushed a dark green color.

The tree was finished by adding foliage. The foliage used were tiny leaves found in another Joefix product "brush" (seen at right in a photo from the Joefix website). This product features small branches with even smaller leaves. Of course, during handling and over time, many of these leaves fall off and collect in the bottom of the box. These were the leaves I used for the tree. The tree was sprayed with hairspray and the leaves sprinkled on. More hairspray fixed them in place. The base itself is identical to other bases used in this project. Groundwork was made as described in Chapter on the 251/1 Stuka Zu Fuss. Note that the small sapling in the back right corner is a piece of the Joefix Brush. Please note also that the colors and patterns used on the groundwork were similar to those used on the half-track itself. Not only does this help demonstrate the purpose and effectiveness of camouflage, it also makes the vehicle look as if it belongs in the scene and visually ties the whole composition together.





The groundwork was made basically as before, the primary difference being a wider variety of plants and grasses. The photo at top shows some bits of root, some rope, a ball of natural seaweed, some dried plants, the JoeFix foliage, Woodland Scenics "Field Grass",

The natural seaweed is a useful grass product. In the middle two pictures (from the tutorial on the "Military Miniature Warhouse" website—www.milminwh.com since I forget to take pictures) we see how it's used. A clump is torn from the ball with tweezers and trimmed flat on the bottom with scissors. The bottom is tip dipped in a puddle of white glue and the clump is stick to the base. In the photo at left, from an old project of mine, we see how the clump can be precolored simply by applying a very thin wash of the proper color paint.

The field grass (which comes in a variety of colors) is applied in basically the same fashion.



10

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/3 Ausf. D with Panther G

By Kevin Townsend



Sd.Kfz 251/3 Ausf. D with Panther G



As the 251 was a Panzergrenadier vehicle designed to support the tanks, I wanted to include a tank in at least one of my representations. I chose this one. I used the very nice Tamiya 1/48 scale Panther G.

For this version of the Hanomag, either of the Tamiya kits would work. Both contain the basic vehicle and the winter figures. I used the Sutka zu Fuss kit simply to get an extra set of that kit's figures for use with other vehicles. The basic halftrack was built in the same manner, making most of the same type changes, as I did with my 251/1s. The main differences are the radios, antenna, and equipment to convert the vehicle into a 251/3. To my knowledge, there are no conversion kits currently on the market to model this change—good old-fashioned scratch-building is needed. The photos and captions in this chapter show how it was done. While most of the figures in the vignette are versions of the Tamiya 251/1 Ausf. D winter figures, the tank crewmen are from Tamiya's late war Panzergrenadier set—the same set from which I made the 10 panzergrenadiers in my 251/1 Ausf. D vignette.

Figures

Most of the figures for this diorama were built prior to starting work on the models. This was possible due to the fact that only one figure (the seated radio operator) required the semi-assembled model be available in order to pose and fit him. This figure was created during the halftrack assembly process. Although explained in more detail in the chapter on Creating and Painting figures, three of these figures were made using parts from the same figure from three different halftrack kits. Simple conversions ensure this results in three completely different figures. The posed figures were used in the composition process and were painted concurrently with the models.



Above: These are figures made with parts from three Tamiya halftracks. The figure on the left was built stock (with the addition of slings). The three others are all the same figure! The center man of the trio was built mostly stock (with different equipment), and the other two were converted to one degree or another. Left: These two figures are from Tamiya's Late War Panzergrenadier set, built stock. While the Tamiya figures are not perfect, the poses are very natural, and the anatomy—with the exception of their small size—is very good. These factors are the most important things. Below: Some of the figures post painting.



GERMAN COMMAND/CONTROL:

In WWI, German infiltration tactics successfully broke through the allied lines, but failed to maintain momentum as the troops became exhausted and the allies brought up reinforcements.

The solution, Blitzkrieg, created a combined-arms assault with the speed of mechanization and the rapid communications provided by radio. Headquarters were equipped with motorized vehicles, often armored, and long-range radio to provide command and control to mobile operations. Orders were usually given in the form of map overlays with subordinate units assigned sectors, axis of advance, and objectives.

In the later war years, as the situation became more fluid (especially on the Russian Front), orders were issued almost exclusively orally, based on sketches or simple map overlays. Orders were usually only sent by radio during road marches and fluid combat situations where, due to the rapidly changing situation, interception by the enemy was not a big threat. Radio allowed commanders to control the columns and avoid traffic jams.

As illustrated by leaders such as Guderian and Rommel, German commanders and their command posts were usually far forward. Rear areas were given their own headquarters for both logistics and combat operations. At all levels, leaders were given missions, but were not told how to accomplish it—that was up to them.

"Prerequisite for the command and control of mechanized infantry was an expansive, anticipatory thinking, ability to make rapid decisions and the capability of transforming the decision into brief radio traffic. Additional means of communication were directional signals by means of tracer or pyrotechnics, hand-and-arm signals, and personal conversation, as often as possible, between commanders and subordinate leaders before and during an engagement. It was the birth of combat communications"

- Oskar Munzel, from his book, "Gepanzerte Truppen"

The Rasputitsa:

"The season without roads" occurs in the east during the Spring thaw. The land becomes a sea of mud, halting maneuver. Freezes and snow are followed by rapid rising temperatures. At the season's height, one can sink knee deep in open country and roads become quagmires.

"The muddy season! Bright sunshine follows snow and hailstorms which have swept across the steppe...it is so warm that the water mixes with the soil and dissolves everything into layers of mud and dirt.

...The surrounding landscape is a giant lake. Our vehicles are stuck...

...A battalion of young soldiers with fresh faces and new equipment arrives. Their boots are shining ...

...they were marching in rows of three and were singing! We step out of the heavily shelled huts and bunkers which have been our home and are unable to comprehend such a miracle. We stand there silently in our camouflage, caked with dirt, and we touch our stubby faces in disbelief. They march along a series of small grave mounds...and I get the impression that their voices tremble for a moment.

We lower our heads in silence and look down on our wet, clay encrusted boots. Somebody cracks a joke, a cruel joke under these circumstances, "They will stop singing pretty soon." But nobody laughs, nobody agrees with the joker.

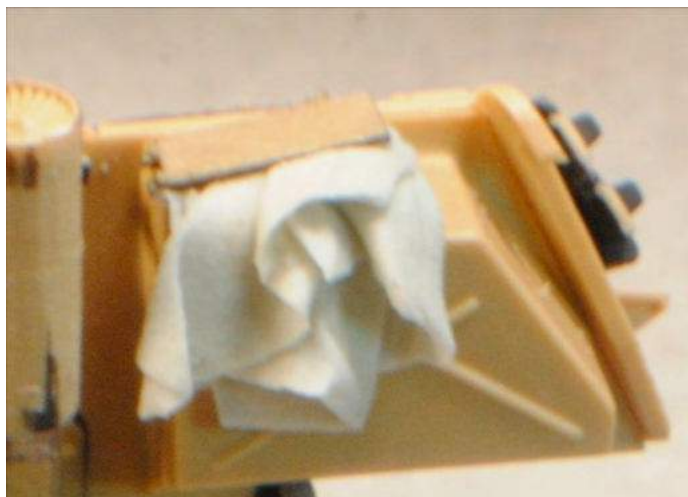
...The icy water reached up to our waist and flooded our boots; our pants clung to our thighs. But they will endure it, just like we did. They will enjoy the blessing of the bunker stove; its heat expels the water in our pants and socks into murky rivulets.

And when their uniforms have the proper clay crust, nobody will be able to distinguish them from us anymore."

-Hans Roth

Construction

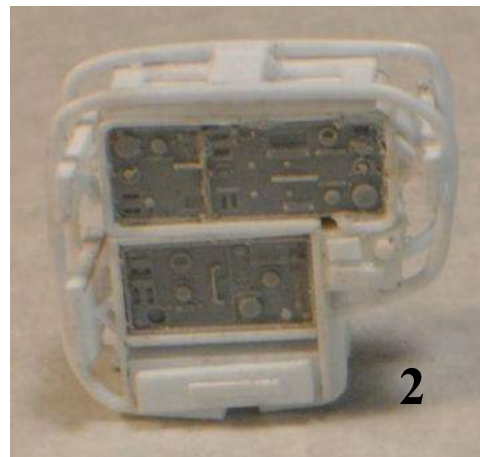
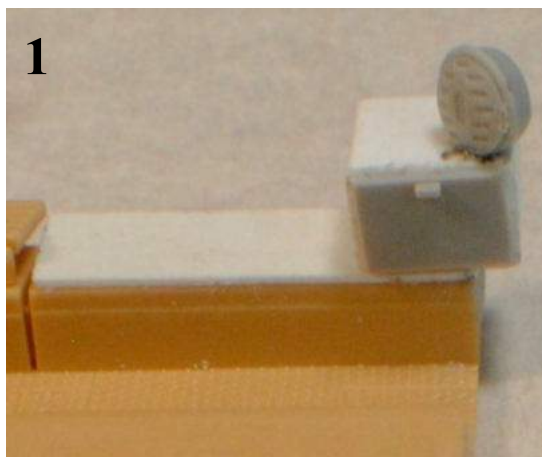
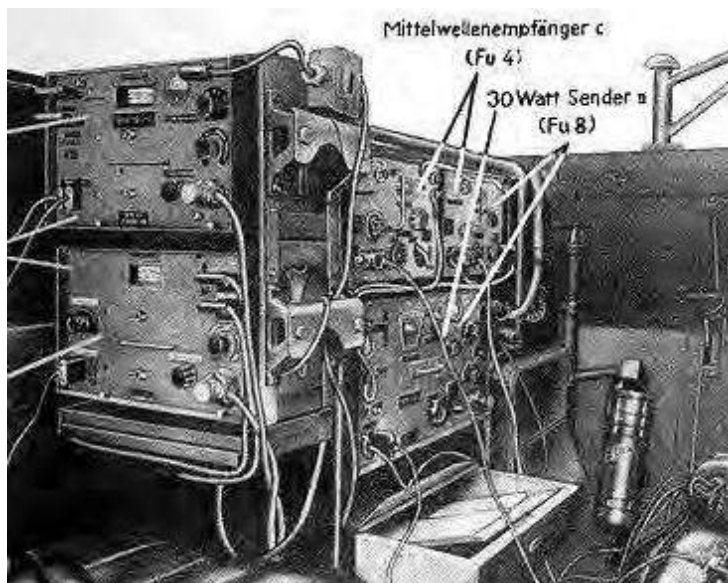
Construction was accomplished as shown in the chapter on building models. This applies both to the Panther and the 251 and includes basic detailing, battle damage, stowage, antennas, etc. Here we will look at items unique to the 251/3, such as the radio rack, radios, and the 9 meter telescoping Kurbelmast antenna.

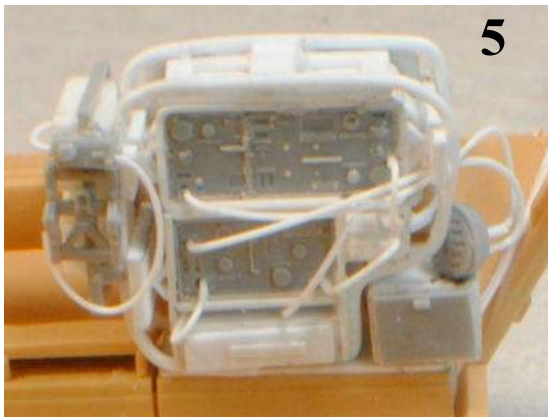
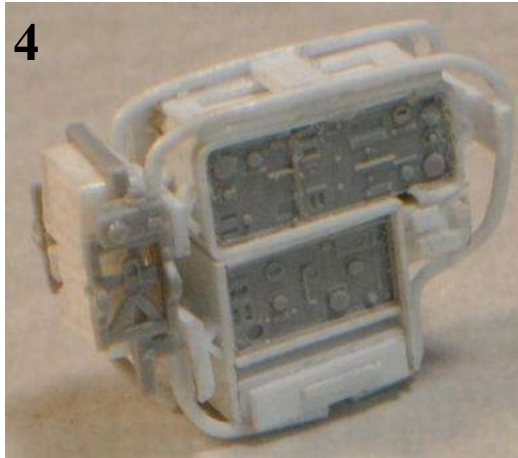
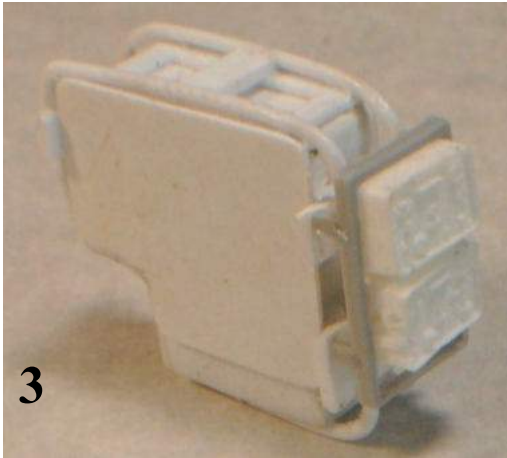


On the Panther a blanket/shelter quarter, tarp or some such was added hanging out of one of the rear stowage bins. This was made from a piece of epoxy putty rolled thin, crumpled up, and glued in place. The bin door is then glued in place on top of the blanket. Minor details such as this add a touch of realism by giving the vehicle a bit of "lived-in" feel.

The real thing for comparison. Photo from the German manual. (found at www.pietvanhess.nl/251).

While not an exact copy, mine looks fairly close. While the level of detail on my piece may be lacking in a larger scale such as 1/35th, it more than suffices in this smaller scale.





The radio rack was added where the right rear seat originally was. I left the bin under the seat in place—this (or a similar bin) is present on the 251/3. 1: The seat pad was left off and the bin top was levelled using sheet plastic. A small stowage box that sits next to the radio was fashioned from plastic bar stock and scrap bits. 2-4: The radio was built using the process of “gizmology” - using photos of the real thing and instructions from the 1/35th scale AFV club kit as a guide. Radios and boxes were assembled using bits from the scrap box and plastic sheet and strip. The rack, made from plastic rod, was glued in place around the assembly. I concentrated more on overall shape, size, and appearance than on getting all the tiny details correct as many of these tiny details would not be visible on the finished vehicle.

5: Wiring was added using thin plastic rod glued into holes drilled with a pin vise, and the radio glued in place. More wiring was run to the halftrack hull and, from there, to where the various antenna would be located. A final test fit of the figure was accomplished to see if any alterations were needed.



Below: Although sandbags could very easily be made from epoxy putty, I chose to use modified Tamiya bags. Sandbags were added around the gun shield. These are included in the Tamiya Jerry Can set. Copies made in a home-made mold were used as the basis for my bags (when copying parts, beware of piracy laws—you can make copies for your own use, but can't sell or even give them away). They were thickened somewhat using epoxy putty. Talc was brushed onto the bags and model (to prevent sticking to the halftrack) and they were pressed in place, conforming to the halftrack. Note on the removed sandbag at right, you can see the impression of the bullet splash rail pressed into the putty. After curing, they were removed for painting. Note the two stick grenades at the ready on one bag.

Above: Several photos of 251/3s show (and a couple surviving vehicles have) brackets on the side of the hull to hold the kurbelmaast when dismantled. As my vehicle mounts the mast inside, these are not really necessary. But they look cool and they may have been standard equipment on factory made vehicles, so I decided to include them. Some old 1/35th scale brackets of some sort from the scrap box looked enough like the photos (more gizmology) and were glued in place.

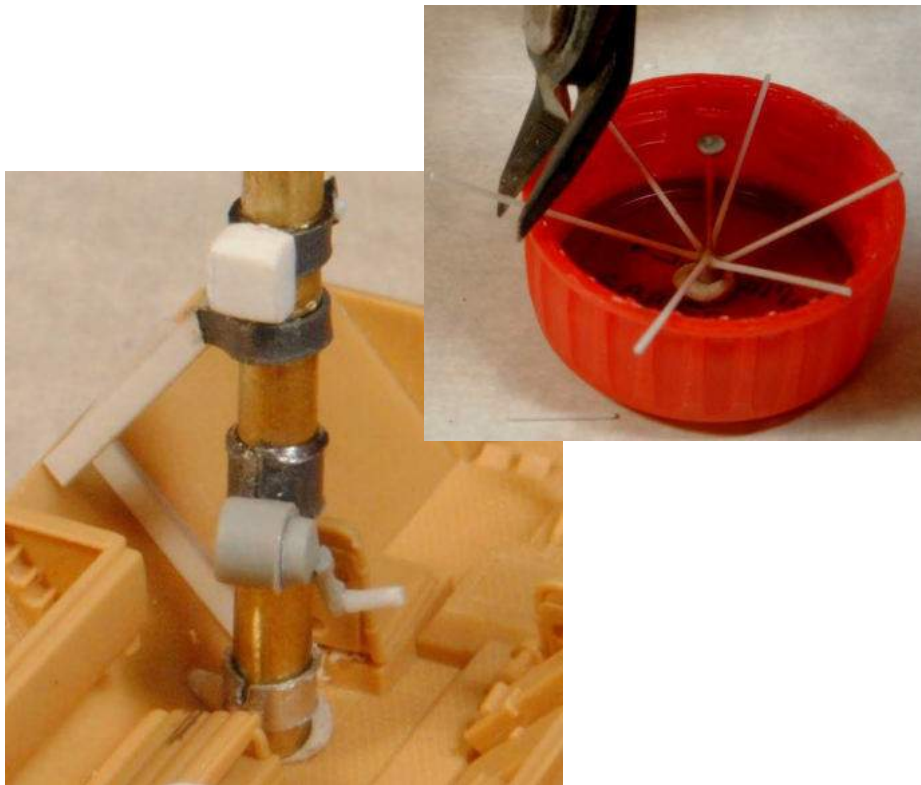


Next came the telescoping kurbelmast antenna. I did not make every segment telescoping. I used only four lengths of brass tubing and a final length of brass rod. (All pieces extend all the way to the bottom for strength, and the rod extends about 3/8" out of the bottom to mount into a locating hole drilled into the floor of the halftrack). Making each segment actually telescope would result in a mast that was way too big at the bottom. This stage is shown in the photo at left. At right, with sheet pewter strips glued around the mast to create the various joints, it actually appears to be a telescopic mast—which is all we need. When sculpting or scratch-building we don't need to recreate the actual item—only the appearance of the actual item.

Detailing included the sheet pewter joints, wiring made from fishing line (not very visible in this photo), and bolts made from slices of plastic rod. The base of the mast was detailed with bits from the scrap box.

Below: Mounting brackets were fashioned from plastic strip to make it appear the mast is held by brackets welded to the inside of the vehicle hull. In actuality, the mast is simply fitting to the vehicle by a mounting pin fitted into a hole in the floor—exactly the same way the figures were mounted in the 251/1. The mast is removable for painting.

The star antenna was made as shown in the section on detailing in the chapter on construction. As a review, it was made from scrapbox bits. The "star" was made using a Coke bottle cap as a guide to set angle and distance. It was also used to ensure a uniform length of each arm.



Painting and Weathering:

The vehicles in this diorama are depicted during the Spring thaw at the end of the Winter. Their worn winter whitewash is eroding and the vehicles are filthy, taking part in offensive operations in a muddy environment. Painting and weathering was done as illustrated in the Chapter on Painting and Weathering.

The interior of the halftrack, especially the floor is quite dirty. Not only were mud-colored pigments built up, but wet areas were depicted with Future floor polish. Again, this was done as shown in the chapter on Painting and Weathering.

Both vehicles are very muddy, with their suspensions and undercarriages being almost totally covered. In fact, the Panther is off

-road, sunk almost to the middle of the road wheels in mud. The mud, plus the worn winter white, was done as seen in the earlier chapter. The halftrack is missing a fender. When doing things such as this, we must consider how that would affect vehicle operations and weathering. In this case, with the missing fender, there is nothing to stop mud from being thrown up on upper hull. This was done by splattering a thin mix of water, paint, and pigments up onto the hull.

Some details of the paint, and especially the weathering, on both vehicles can be seen on the following page.



Above: The finished radios. Note the muddy, wet floor which matches with the terrain the vehicle operates in.



The stowage on the front of the vehicle is from the Tamiya kits—spare tracks and road wheels. The bundle of logs used for traction when stuck in the mud are simply a bundle of sticks. Please note that the stowage is properly secured to vehicle and not magically stuck in place. The mud on the suspension is a mix of paint, water, and pigments. The wet gloss is Future floor polish.

PAINTING THE DETAILS

See the chapter on Creating and Painting Figures for an abbreviation key.

SPARE TRACKS:

B: Brown Iron Oxide/Black plus a touch of Oily Steel (V)
 1L: Dry-Brush B + Tangerine
 2L: Dry-Brush 1L = Tangerine
 3L: Rub pencil lead on high points

SANDBAGS:

B: Pewter Grey/Nutmeg Brown/Country Tan (all AB)
 1L: B + Country Tan (AB)
 2L: 1L + Parchment
 1S: B + Dark Burnt Umber
 2S: 1S + Black

TARP:

B: Vineyard Green/(AB) Pewter Grey(AB)/Burnt Umber/ Black in a 6/3/1/1 ratio
 1L: B + Wedgewood Green/Country Tan (AB)
 2L: 1L + Wedgewood Green/Country Tan (AB)
 3L: 2L + Country Tan (AB)
 1S: B + Black
 2S: Black

PANTHER PERISCOPE GLASS:

Painted with a mix of Vineyard Green (AB), Prussian Blue , and Clear Gloss

Note the mud thrown up on the hull due to the missing fender. This can be done by blasting a loaded brush with an airbrush to create the splatter. You can also load an old toothbrush with paint and then run your finger across it, splattering the paint. No matter which method you use, practice first to be sure of your aim.

Below: This photo gives a good view of the worn paint effects that can be achieved using salt and hairspray as described in the chapter on Painting and Weathering. This method allows us to create the various effects we see here: wear, chipping, flaking, and scratching. The overall effect I was trying to achieve in this diorama is wet, muddy, cold, and miserable.



Below and opposite top: Photos of the Panther. The weathering is identical. The tow cables uses ends from the Panther kit. For the cable itself, rather than use the string included in the kit, I twisted three strands of wire together to make the cable. The heavy mud is a slurry made from Elmer's ProBond wood filler (a textured acrylic paste), water, pigments, and paint. This was liberally painted on the hull, suspension, and tracks. Additional pigments were sprinkled on for texture and to vary the color. Wetness was provided with Future floor polish.





Composition

This is a larger and more involved composition than the previous halftracks, involving a second vehicle and a larger base with more complex groundwork. While those crew were fighting their vehicles, the story here is a bit more subtle, but is present just the same. While the scene may look random, it is very carefully contrived to display everything and

tell the story to best advantage. Let's compare it to my "Ten Commandments of Effective Composition:

1. HAVE A SINGLE MAIN POINT: The story is not in-depth, but there is one. A radio operator mans his radio inside a command vehicle while a group of officers (a commander, tanker, and infantryman) study a map nearby. A tank commander scans the ground in front of his vehicle with binoculars. The story should be obvious—an attack is about to be launched and a commander holds an "orders group", discussing objectives, routes, timelines, and infantry/armor cooperation. Like most pieces in this project, one of the main "stars" is the halftrack variant doing what it was designed to do.

2. DIRECT THE VIEWER'S EYE: We've seen the near right side of the composition is usually the strongest visually while the far left is weakest. However, I have chosen to put my point far left! I made this area visually stronger by putting the highest elevation at that point. This combines with the tall antenna to really bring focus to the halftrack. I also visually minimized the size of the tank by having it face the viewer rather than be broadside as is the halftrack. The tank is also much lower and its white color blends it with the ground while the white halftrack sits on a very dark muddy road. The tank serves as a "wall", blocking visual exit from the composition off the right side while the high ground in the rear also traps the eye in the scene. It is in this "L" that the primary action—the orders group—takes place. The vehicles, facing the left, also cause the eye to pause rather than be rushed out of the scene to the right. The figures are at the intersecting point of the wall and the culvert—also serving to draw the eye to them. The horizontal lines at the top of the culvert, and to a degree the tank gun, underline the main focus, too.

3. SHOW ACTION AND INTERACTION: The actions and interactions tell the story. Anyone knowledgeable of German vehicles, will immediately recognize the halftrack as a command vehicle while the tank is an offensive weapon pointed at the off-stage enemy. The officers are in close proximity to each other around a map, they are obviously interacting.

4. USE A TIGHT COMPOSITION: The vehicles are in close proximity. So are the figures, who are also very close to the vehicles. The two enlisted crewmen occupy the halftrack. All this visually ties the scene together and clearly shows the relationships.

5. HAVE BALANCE: The halftrack and figures, at a higher elevation, balance the much larger tank at a lower elevation. The tank and stream in the forward portion of the composition balance the higher ground and halftrack toward the rear.

6. USE ALL THE ELEMENTS: The figures are key in the story even if the main focus are the vehicles. This story is framed by both the vehicles and the ground. The ground—snow and mud—matches the finish and uniforms of the vehicles and figures. An attractive base compliments the scene and is finished identically to the other bases in the series. A simple identification nameplate is



This is a good view of the overall composition. It also shows one painting tidbit not seen in earlier photos. With the tank turret slightly turned, note that the winter white does not cover the part of the hull that would be masked by the turret when facing straight ahead. Clearly the vehicle was painted in winter white with the turret in that position.

used, although I could have opted for a more descriptive title such as “Orders Group”. The roadside shrine provides a bit of interest, but it’s location clearly gives it a supporting role. Its peaceful nature is in stark contrast to the military force around it.

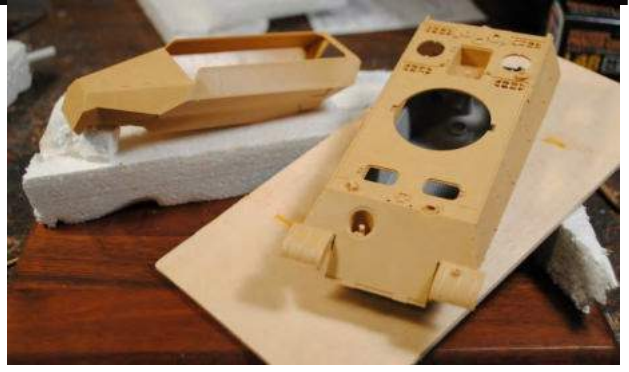
7. MINIMIZE DEAD SPACE: The tight composition, with the base sized to tightly frame it, cuts down dead space. The shrine and a small tree fill the space in the far left corner. Potentially, there is a large area of dead space at near left. However, the tank turret being slight turned causes the barrel to intrude into this space. That, plus the stream, eliminate the dead space in this area. Also, by having the turret slightly turned, we need less space in the front of tank, further eliminating dead space by reducing the dimensions of the needed base.

8. USE SHAPES AND ELEVATIONS: We’ve seen how the “L” formed by the vehicles frame the figures and how the elevations draw attention to the rear of the composition and help minimize the Panther which would otherwise be completely dominant. The linear wall “underlines” the halftrack, drawing even more attention to it. The shapes of the ground and position of the vehicles also show one other thing—the direction of movement is clearly forward, off the base and toward the enemy. This is an attack they are preparing—not a defense.

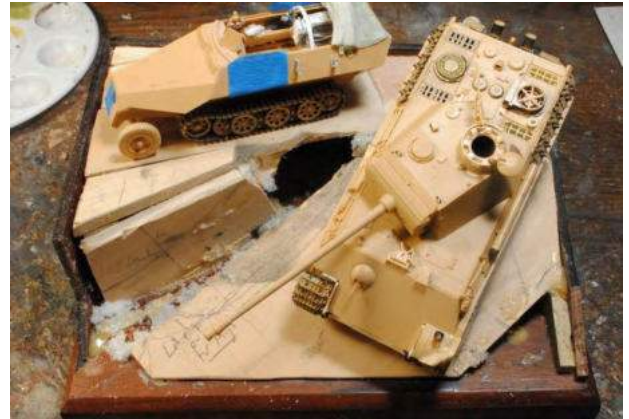
9. ARTISTIC LICENSE IS OK: There is little license used here. The vehicles do not represent specific vehicles—they are more generally representative of the types. Perhaps they are parked a bit too close together, but this only serves to tie them together and minimize any dead space. No specific location, date, or operation is clearly identified (although it is probably late winter/early spring on the Eastern Front—quite possibly one of the operations launched to break the siege of Budapest in Feb/Mar 1945).

10. PLAY WITH IT: Although this was the scene as I imagined it my mind’s eye, I did experiment with different arrangements but did not, in the end, make any major changes to the vehicles or figures. This “playing around” with it did, however, influence the design. Originally, I planned a house or ruined farm building behind the halftrack, but didn’t like this and replaced it with the shrine. I also decided to add the culvert and small creek during this stage.

Top: I started the composition process using just the unassembled hulls of the vehicles. I already knew basically what I wanted—and what I didn't. I didn't want just two vehicles sitting side-by-side. I wanted some contour, with the halftrack sitting higher to make it both more noticeable and to draw more attention to the height of the kurbelmast. This exercise let me determine what size base I needed, and I picked an old scrap base from my collection to build my diorama on.



Middle: Once the vehicles were basically complete, but prior to painting, I finalized the composition. Ground forms and contours were made of scrap wood with Styrofoam filler. Once the contours were in place, the sides, front, and back of the base were added using 1/4 inch plywood and any gaps between the base and the edge of the groundwork were filled with water putty. It doesn't have to be pretty at this point—just strong and functional.



Bottom: The base was finished using the same shredded brown paper bag method used on the other bases. From this point, working on the groundwork and models can proceed in any order or at the same time. With all major components at least built (or mostly built) the composition was finalized to make sure everything properly fits together with no conflict. Any final adjustments can be done at this point. Note that the shrine is not the one included in the final diorama. I thought this one (that I had made some years ago and never used) seemed too big and out-of-scale. So I later made a replacement for it. That is exactly the reason I like to include this final composition step—so I can eliminate or change those things that don't look right and add things that I feel would benefit the overall appearance of the piece.



Groundwork

I wanted to recreate the Spring thaw setting, with its old dirty snow, muddy road, and thawing creek. As I posed the Panther off road on the soft ground, I thought it was appropriate to sink the Panther into the mud—something that heavy does sit on top of very soft ground. As the groundwork has numerous elevations, this has to be built prior to the creation of groundwork. I used old scrap wood and Styrofoam to create the forms on an old scrap base of the correct dimensions. Once this was done, I build up the sides of the base with thin 1/8th inch plywood and finished the base using the same techniques as the other bases in the series. The photos here and on the following pages show how it was all done.



An excellent photo of a kampffgruppe consisting of Mk IV tanks and SPW-mounted grenadiers. A 251/3, identifiable by the star antenna, sits along the road. It is quite possibly the command vehicle for the group. This diorama possibly portrays a similar formation preparing for offensive operations. Even though the weather in my scene is a bit different, the similarities can be seen. Often times photos can be our inspiration, but remember we don't have to copy them exactly.



The Styrofoam form that makes up the culvert was covered with a thin layer of Woodland Scenics Lightweight Hydrocal plaster. Once dry, a dental tool was used to carve in the individual stones—basically the same process I used to make the city street in an earlier chapter.



The pedestal for the roadside shrine was made from an old white-metal porch post that came with a figure. I built the figure years ago, but did not use the included porch post. To make the pedestal, I just cut out most of the middle shaft of the post. The cross is made of plastic strip in a couple different sizes. The tiny little Jesus (about 7mm tall) was fashioned from Magic Sculpt epoxy putty. A blob was used for the body and two strings were glued in place for the arms. A fatter string, bent appropriately, formed the legs and feet. A tiny ball forms the head. Any additional needed details can simply be painted on. Unlike a commercial sculpt, when working simply for myself I've found that anything that can be convincingly painted does not have to be sculpted.



Top: Basic groundwork was made as before. The wall was given a grey wash, and individual stones were picked out in various colors. Streaking was done in the same manner as on the vehicles. Dry-brushing with greys and tans and washes with Black and Burnt Umber oil paint were applied as needed. Pre-colored Celluclay was put in place. Road ruts and footprints were pressed in and grasses added. Brownish colors were used for the static grass and weeds. Bits of tree root formed the trees and bushes. Other than the pre-coloring and static grass (painted as before, but using "deader" colors), no additional groundwork painting was done at this time. The shrine was painted with wood base colors, and highlighted/shaded/weathered with various dry-brushings and washes. The toothpicks mark the mounting pin holes for the figures and vehicles. Note the "trenches" that have been left in the groundwork for the Panther tracks to sit in.



Middle: For areas where the snow completely covers the ground, plaster patch material (from Home Depot) was used. This dries white, but was painted using washes of grey and, near muddy areas, browns. Finally, it was dry-brushed with off-white. All this gives the snow a slightly dirty and muddy look—appropriate for melting snow near a road.



The second, lighter, layer of snow was made using Woodland Scenics “Snow” and Matte (or Gloss) medium (above left). The medium (flat for duller snow and gloss for wetter) is brushed on areas where snow is desired and the snow is sprinkled on. Once dry, excess is blown off. Layers can be built up as needed. This can be applied heavily, or lightly—as shown in the above right photo of another project. It has a very realistic looking texture. A misting of Dull Cote can help hold it in place.



The Woodland Scenics snow was applied over the top of the plaster and on other areas that needed a lighter coat of snow. Slushy areas were created with snow mixed with gloss medium and applied as a paste with more snow sprinkled on top.



The last thing, prior to adding the water and painting the mud was to glue the Panther in place in the ruts. Using pre-colored Celluclay, clumps of mud pushed-up by the tracks were put in place alongside.

Once everything was dry, the mud—and border areas between the snow and mud—could be painted. Future floor polish was applied to wet areas.

Note that the tank doesn't sit on the terrain—it sits in the terrain!



For the water, I used Woodland Scenics "Realistic Water". Vellejo "Still Water" could also be used as the products are very similar. The Vellejo product is thinner, and must be used in shallower applications. The Woodland Scenics product is a bit thicker and can be poured in 1/8th inch thick layers. Both are cloudy at first, but dry clear. In the photo above right, the first 1/8th inch layer has been poured. One more will be required after this completely dries—about 24 hours.



Mud splatters on the snow were made by loading a brush with very thin mud-colored paint and blasting it with an airbrush—using air only, no paint. This splattered the paint realistically. The same method (top of facing page) was used to splatter mud on the superstructure of the halftrack where the fender is missing.



Below: Almost done! The base showing the mud areas painted with washes of dark mud color and glazes of lighter mud colors on the high points. The Woodland Scenics water, tinted with mud colored paint, was also used to make puddles in the low areas of the road. Another tree (also made from a root) has been added by the shrine. Note the filthy snow on the road edges—the washes were carried up on the snow in addition to the mud splatters. The figure has been added to the tank turret, and the first layer of the creek is drying nicely. Once completely dry, more layers will be added to build the water up to the depth desired.





Top: The mud was given a wet look, as needed, with one or more applications of Future floor polish. Some areas are much wetter than others.

2nd row: As the thaw is just setting in, the creek would still be at least partially frozen. This requires ice. There are several great methods to make this, but since I needed fairly small thin pieces of broken-up ice, I used a 1/16" piece of plexiglass. I started by smashing it with a hammer (be careful and take necessary safety precautions) to create a bunch of small, irregular shards. I then selected the ones I wanted and painted them with a heavy coat of Gloss Medium mixed with a tiny amount of Wedgewood Blue so that the medium would be cloudy when dry. While the medium was still wet, I sprinkled more of the Woodland Scenics Snow on top and then allowed the pieces to cure.



The halftrack and figures were fitted to their base by their mounting pins with five-minute epoxy. The nameplate was attached with double-sided tape and the diorama was complete.



*Left: The finished pieces were "floated" in the final layer of Woodland Scenics water.
Right: Once the water cured, the effect was quite nice.*







12

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/6 Ausf. B With Kubelwagen

By Kevin Townsend



Sd.Kfz 251/6 Ausf. B

When Mr Bruce Culver generously donated an old Bandai 251/1 Ausf B kit to my project, I decided it would be the ideal platform on which to model the 251/6. As the incorrect interior would need to be completely replaced anyway, the conversion to a /6 would not entail any work that didn't already need to be done to correct the Bandai kit. He was also nice enough to provide the radio set and associated parts from a Tamiya 250/3 kit, making the conversion even easier still.

Originally, I had decided to pose the vehicle next to Rommel's Sd.Kfz 250/3 "Grief" (or Griffon). However, after careful research, I decided this would likely be incorrect. The Sd.Kfz 251/6 I wanted to build would be most suited to late 1941. Vehicle lists for the Afrika Korps show the 21st Panzer Division had three 251/6s at that time—one assigned to Division Headquarters, one to the Signals Battalion, and one to the Engineer Battalion. All photos and other evidence I found for the command & control 250/3s were dated to 1942. So I decided to include a DAK Kubelwagen instead.

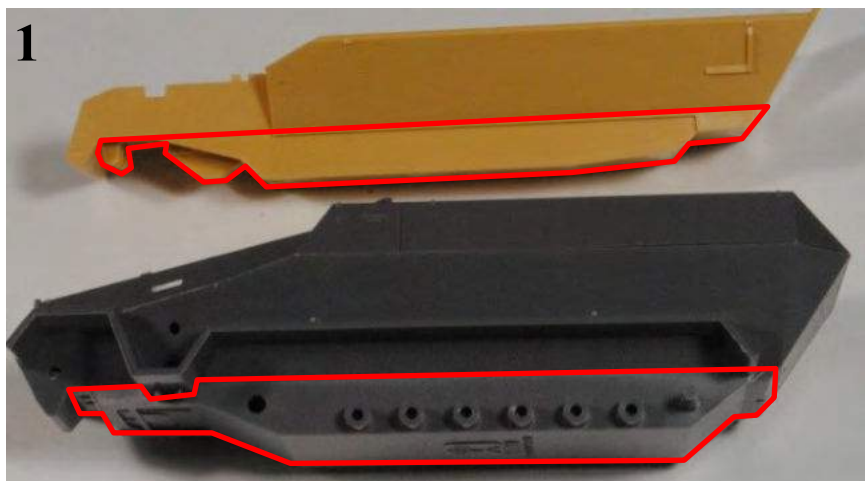
As we saw in chapter 2 (Kits), the old Bandai model has shape issues that need to be corrected; mostly in the rear lower hull, but also some on the nose as well. We also discussed several options for creating an Ausf B. I chose to update the Bandai kit using parts from the Tamiya Ausf D and good old-fashioned scratch-building. The Tamiya DAK Kubelwagen is an excellent little kit that requires no detailing or corrections. I did, however, make some minor changes based on personal preference. This chapter shows how the update/correction/detailing/conversion of the Bandai kit was accomplished and how the vehicles and figures were staged and finished.



My rendition was based largely on these two photographs. The top photo, showing a 21st Panzer Division 251/6 from late 1941 was my primary inspiration for the activity in the scene, the striped Bedouin tarp, and the command pennant (likely from the Engineer Battalion headquarters). The bottom photo provided the air guard with tripod mounted anti-aircraft machinegun. Both vehicles appear to have been shipped to Africa in their original Panzer Grey color and have been repainted in Desert Sand. I followed suit.

Frankenkit

Correcting and Detailing Bandai's Old Ausf B Kit



Back in “the day” (the 1970s), Bandai’s little quarter scale kits were state-of-the-art. They even included basic interiors—something almost unheard of even with larger scale models. Many of their kits are still viable even today, although by modern standards their details can be a bit crude and the tracks are usually quite poor. Still, as far as 251s, this is the only Ausf B model in town. While recognizable and capable of being built into an attractive model straight from the box, it takes a great deal of work to create an accurate Ausf B. Combining the kit with the Tamiya lower hull is only one way to proceed.

1. As a first step in resolving the shape issues on the Bandai hull—as well as correcting detail issues on the rather poor Bandai suspension and running gear, The outlined area on the Tamiya hull (yellow) will be cut away and used to replace the outlined area on the Bandai hull (grey). This is an easy cut, with the bend in the hull (at the point it goes from vertical to angled) being used as a guide. To make the cuts, I scribed carefully with a new, sharp hobby knife blade. This is more exact and less damaging than trying to use a saw or Dremel—although it takes more time.



2. The Tamiya piece cut from the hull. To help ensure a good fit later, it's important to make the cuts straight and even and possible.

3. In addition to the hull bottom, the angle where the rear armor meets the side armor is also incorrect on the Bandai kit, so the rear lower portion was cut away as well. I also cut out the doors as they should stand proud of, and slightly overlap, the rear armor. This photo shows the Bandai lower hull after cuts.

4. Prior to grafting on the Tamiya hull, the Bandai upper and lower hulls were temporarily attached with tape. This will help ensure the Tamiya/Bandai parts are glued in the correct alignment and the correct angles.

5. The Tamiya hull bottom glued in place. As great care was taken to get the cuts straight and exact, the pieces join together with a very clean joint (at least at the rear where the hull shapes are most compatible).

6. Before the glue cured, test fitting with both the sprocket and idler wheel (with some track links attached) was done to ensure proper clearance under the fenders. The alignment of the lower hull pieces was slightly adjusted to ensure the correct fit and spacing.

7. The Tamiya front portion was fitted in place on the Bandai hull, the fit was not as good here, and some plastic/putty work will be needed to correct this area.

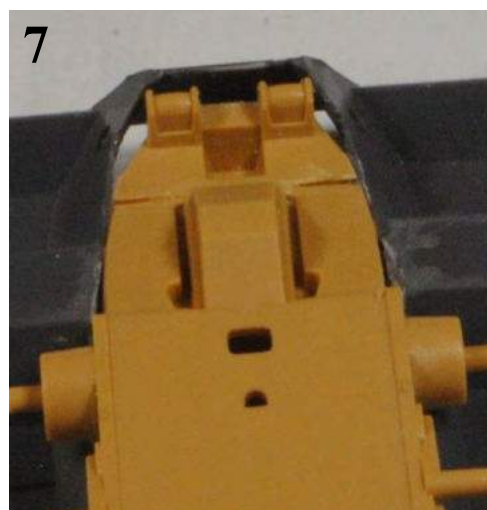
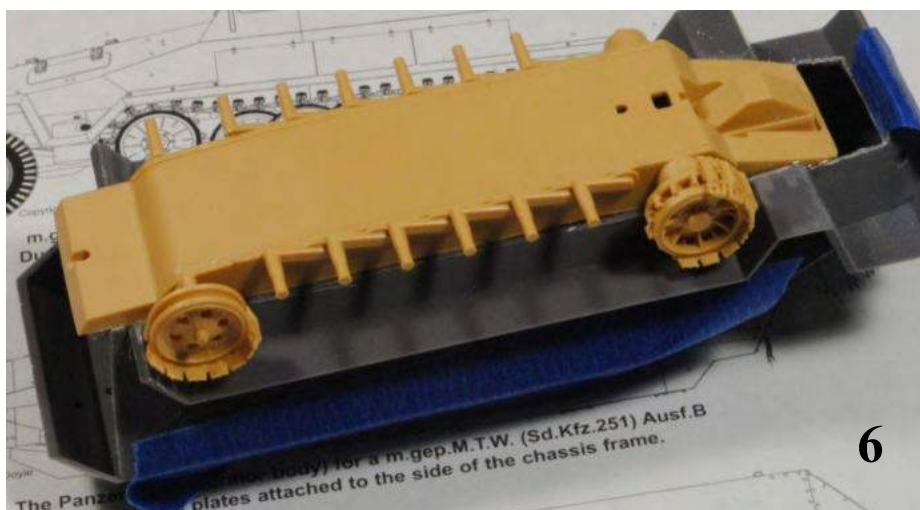
8. The front axle was loosely fitted in place, along with the wheels. The road wheel and track assembly was also temporarily fitted in place. This allowed me to adjust the fit of the front suspension so that the vehicle sat level with all wheels and tracks correctly on the ground. As the Tamiya front wheel is slightly larger than the Bandai, care was taken to center the axle was centered exactly under the fenders to avoid the fender fouling the wheel.

Note also that strips of sheet plastic have been fitted to the rear of the lower hull sides to square these up properly.

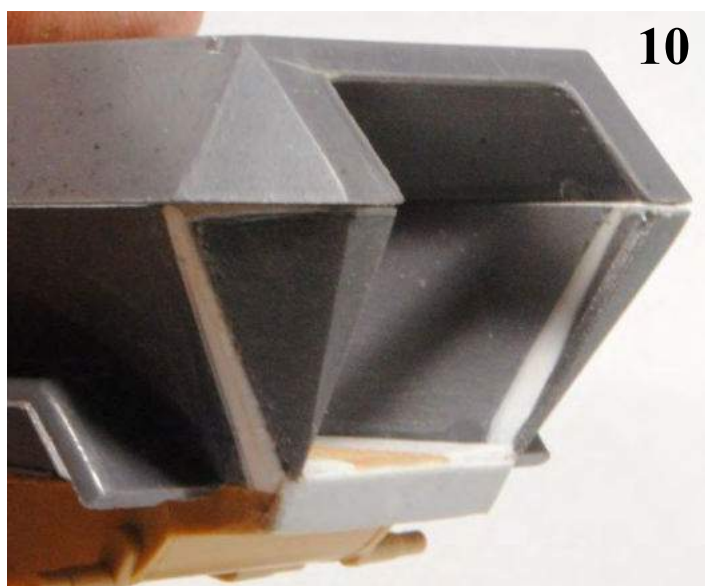
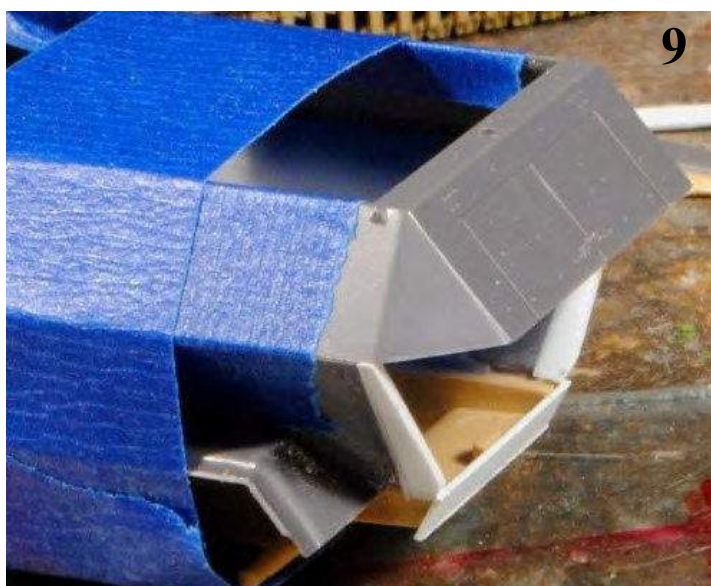
9. The rear end was squared and shaped using lengths of sheet plastic. I usually cut these slightly oversize and trim them to final shape after gluing. This ensures a perfect fit. In this case, I make the sure the joint at the rear of hull was vertical, matching the same joint on the upper hull, rather than angled toward the front as the kit incorrectly portrayed the joint.

10. The lower rear hull was glued back in place at the correct angle. Note on the angled side pieces, the upper hull should project slightly over the lower hull—in other words there should be a noticeable step. The new





angle caused a variable gap along the length of the joint with the upper hull. A plastic strip was put in place and sanded to shape. At this point I was not too concerned about exact fit on the outside of the hull—this can be corrected with putty once the hull is joined. But since the interior must be built and painted prior to joining the hull halves, I was concerned that there be no visible gap on the inside.





11

11) The upper nose on the Bandai kit sits at too much of an angle—it should be closer to vertical. Fixing this will require the upper vent be moved forward. Both parts were cut from the upper hull.

12) Using a sheet plastic backing for strength, the parts were glued back in place in the correct locations.

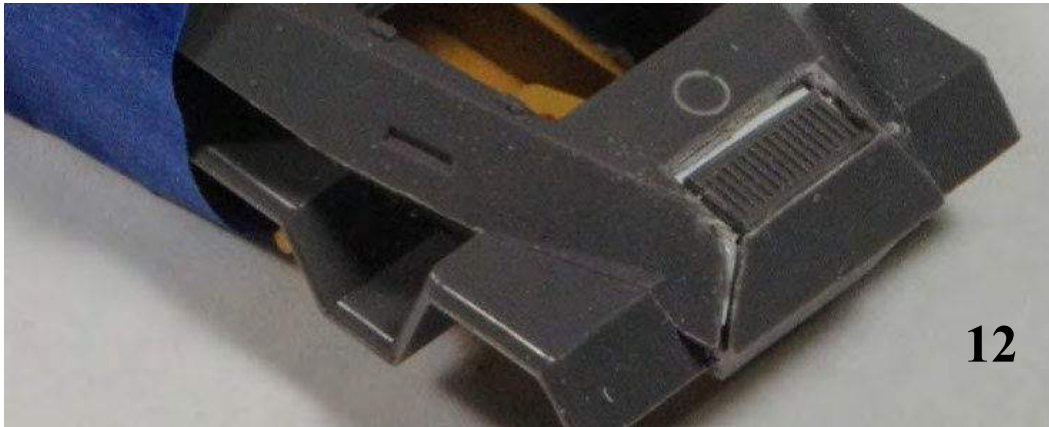
13) Note that on the Bandai kit, the top and bottom of the nose fit flush. This is incorrect. The top should slightly overhand the bottom as shown on the correction here.

14. The gaps were filled with Magic Sculpt epoxy putty. The putty was pressed in place with a putty spoon and smoothing with a damp finger.

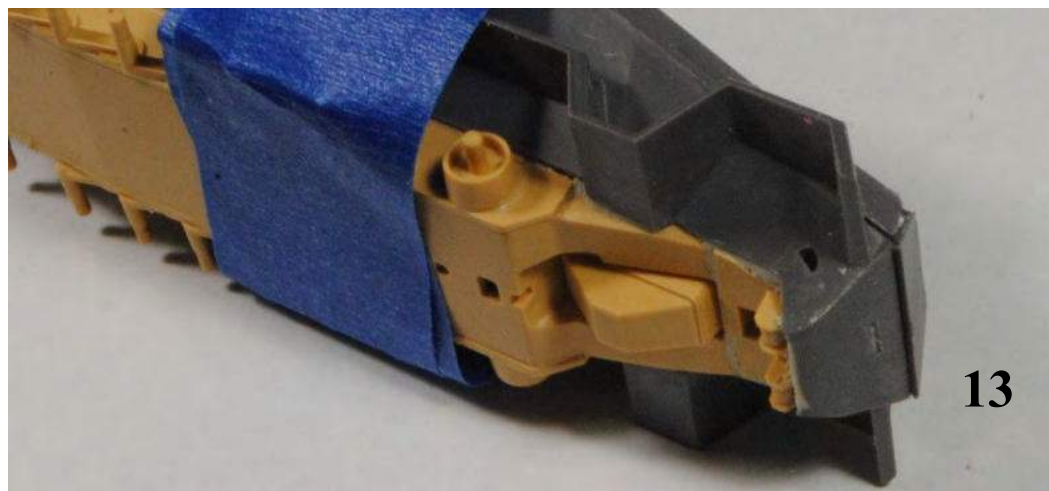
15. Although this smoothed the putty nicely, it is important to have perfectly flat plates and joints. After the putty cured, the area was sprayed black and examined from all angles under a bright light. Any areas that needed touch-up, and any places where a visible joint between putty and plastic existed, were lightly sanded to correct the deficiencies.

16) Since the Bandai interior is both inaccurate and poorly done, and since I had already sacrificed a Tamiya kit for the lower hull and suspension, I chose to use the Tamiya floor and dash board as well. The incorrect (for an Ausf B) under seat stowage bins and front seat mounts were cut away and replaced with sheet plastic. It is of little concern that the new sections do not have the same tread plate. The under seat areas will not be visible (due to the presence of both stowage and the rear seats) and the floor under the front seats will be masked by the new seats and are in the forward hull where they are not very visible anyway.

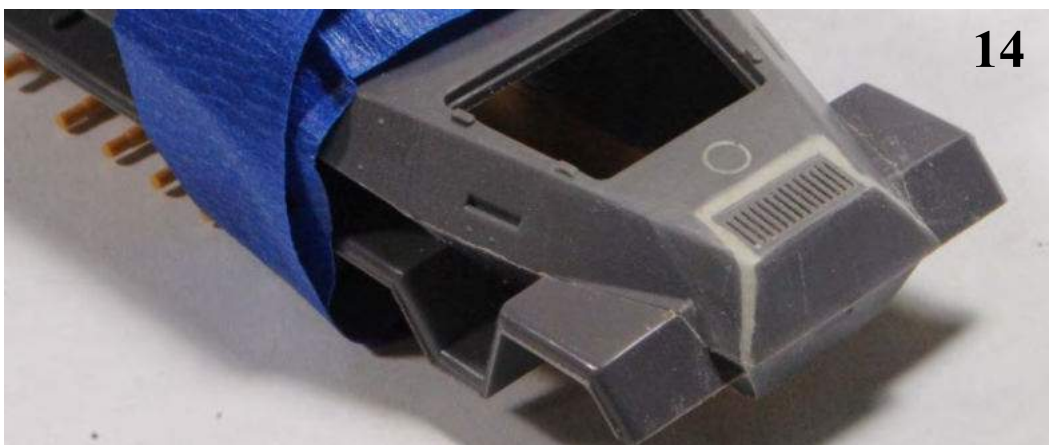
17. Since I had used the Tamiya hull bottom as the lower hull, the floor piece fit perfectly. No putty or filling was required. The dash fit well at the top, but the Bandai



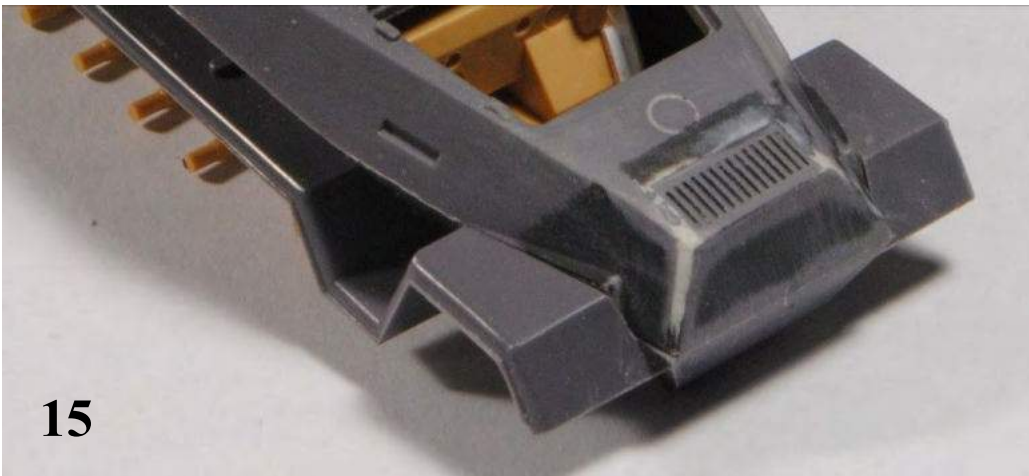
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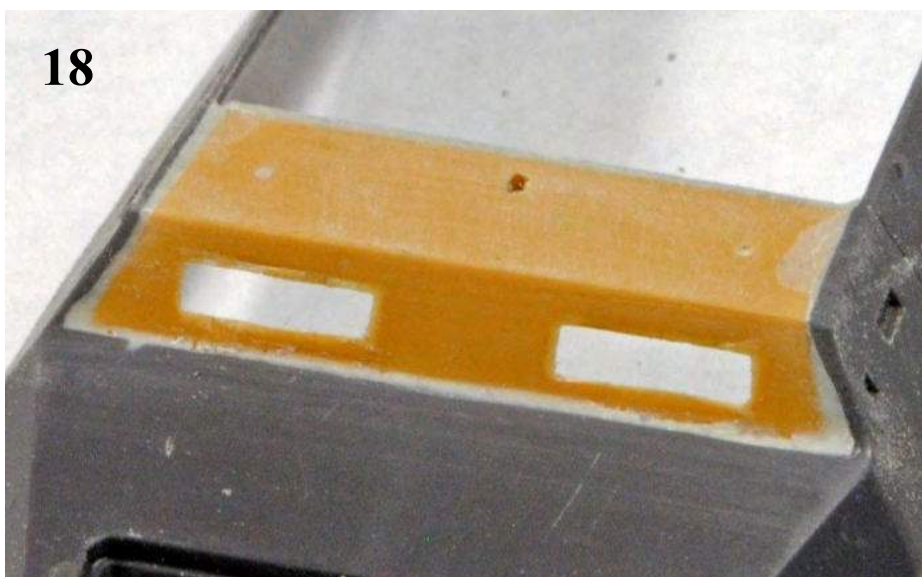
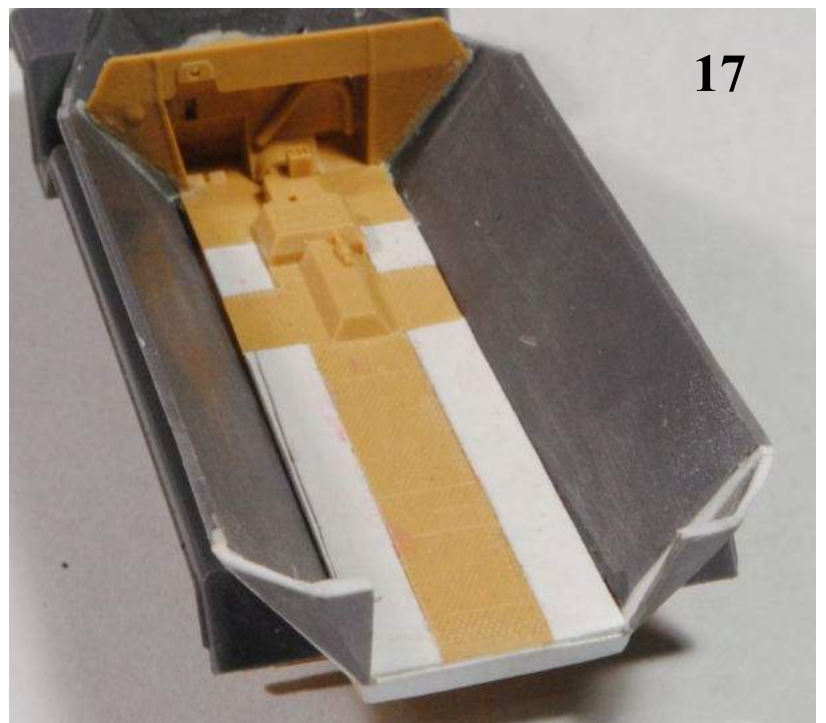
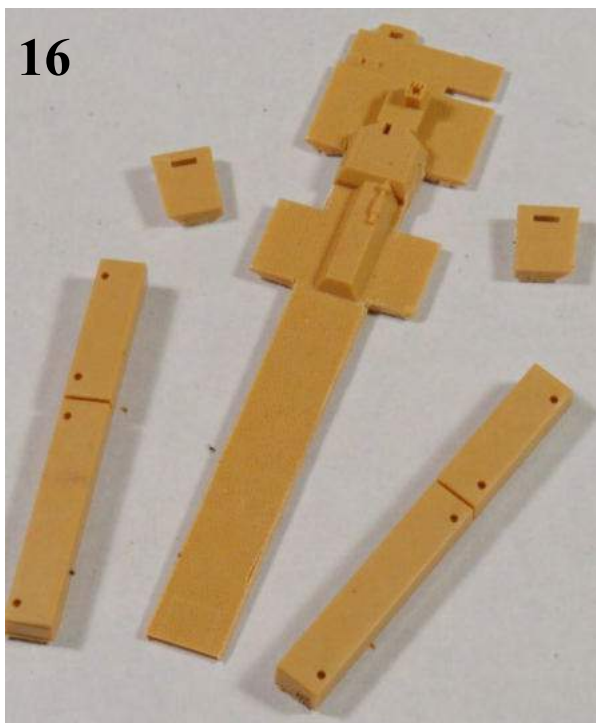


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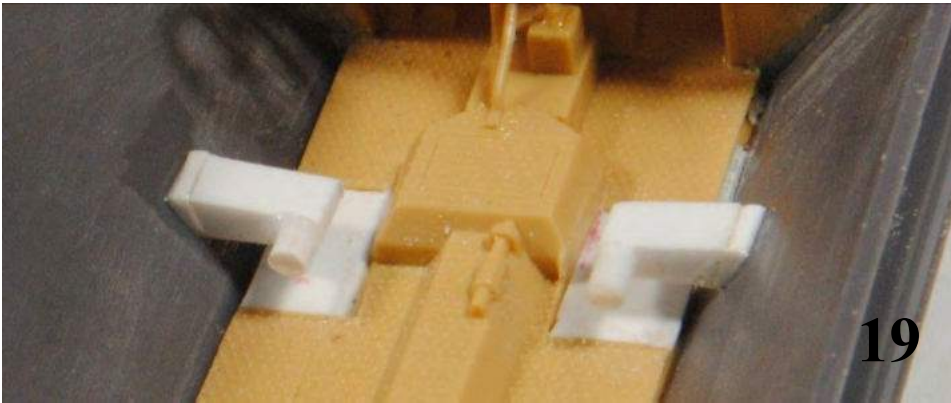


hull angles are slightly different than the Tamiya, leaving slight, wedge-shaped gaps at the bottom. These were filled with a swipe of Magic Sculpt.

18) Having decided I wanted the view ports open, I decided this would be easier with the Tamiya part than the Bandai. The Tamiya visor covers are hollow and the plastic is thin. Simply slicing them



off with a sharp hobby knife leaves nice, square openings and the covers themselves remained undamaged and useable. The Bandai plastic is thick with only dimples where the separate visors are attached. Opening the ports would be difficult—and it would be even more difficult to make the openings square. As the poorly-detailed Bandai bullet splash rail needs replacing anyway, I simply cut off the Bandai roof section and grafted the Tamiya part in its place. A bit of putty fixed the fit.



19

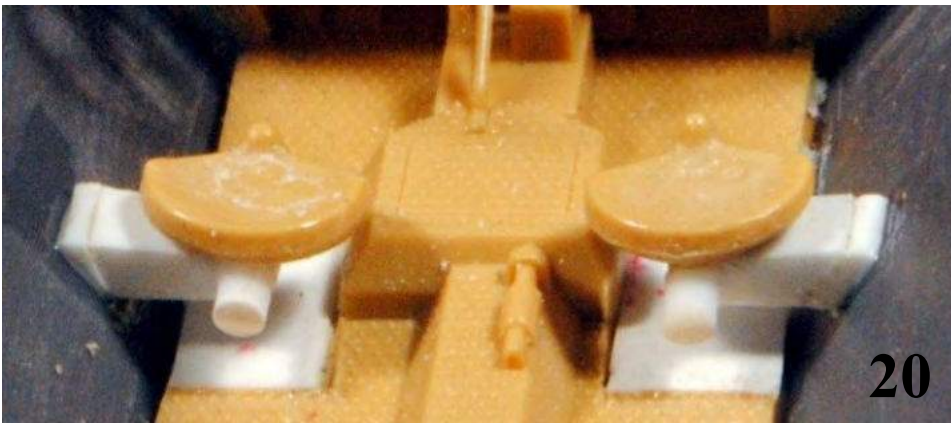
19. The seat mounts were simply wedges of plastic glued to the hull sides with a length of plastic rod glued to the end.

20. Using the mash mold method shown in the chapter on assembly, tractor-style seats (copied from those in the Flakvierling kit) were made and installed.

21. As the seatbacks needed to curve slightly, and had a lip around the edge, I chose to make these using epoxy putty. Putty was rolled-out to the needed thickness and the recessed portion of the seatbacks pressed into the soft putty using a styrene form.

22. The putty was then placed on a curved surface to cure.

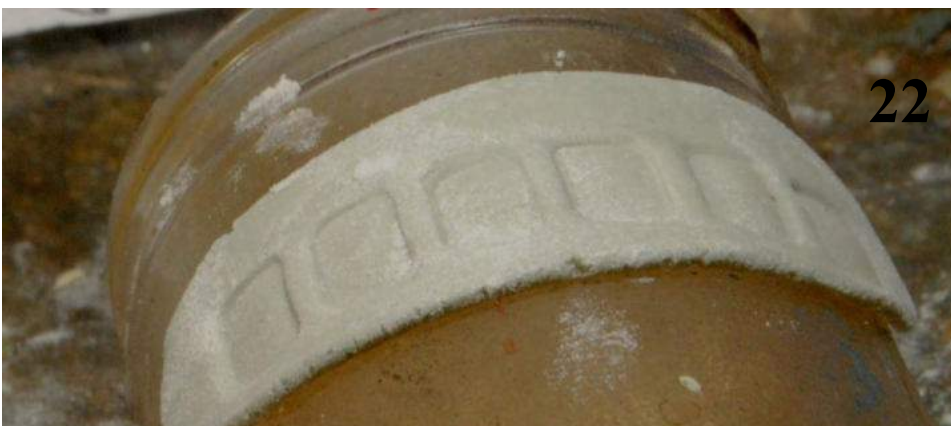
23. Once hardened, the seats were cut out and sanded to shape. I made several and selected the two most uniform pieces to use on the model. The remainder were discarded.



20



21



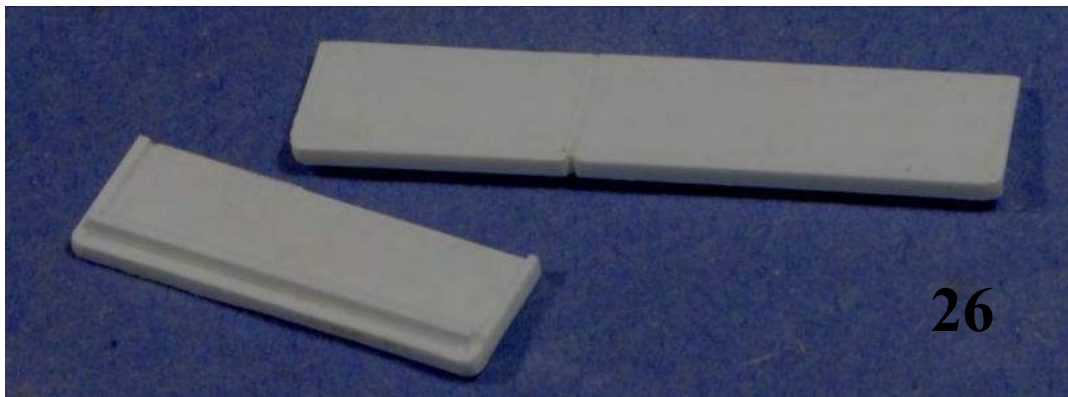
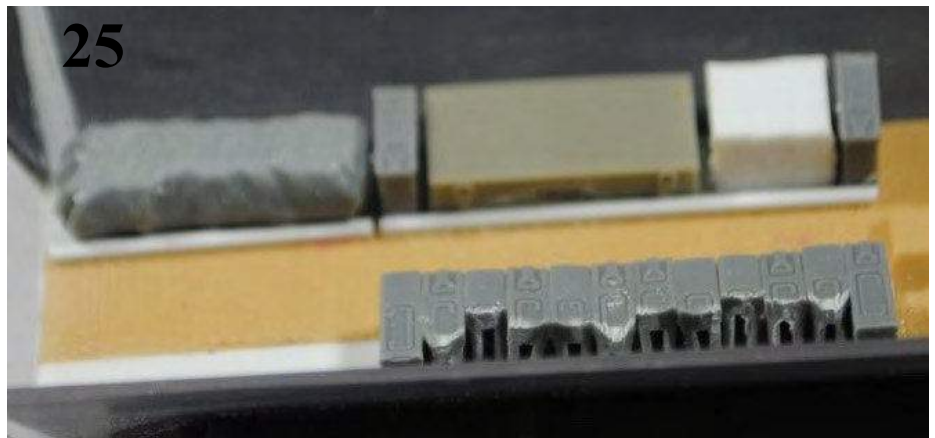
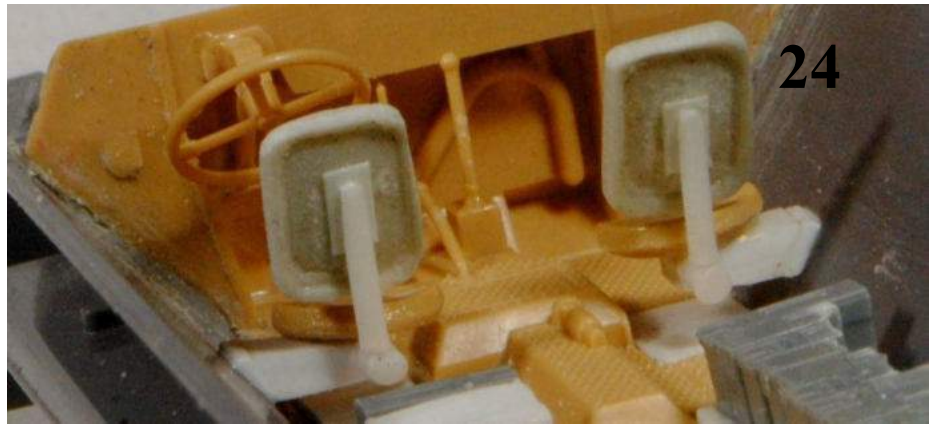
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24. The seats were detailed with thin sheet plastic and plastic rod. They were then attached to the seat mounts.

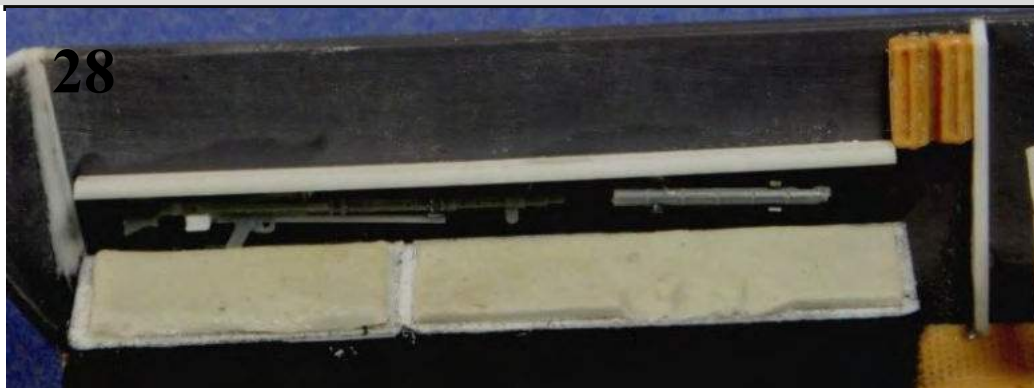
25. The forward edges of the under seat ammo racks were added from plastic strip. Stowage was then placed. Various bits were placed under the left seats. Ammo cans, from Tamiya, were placed under the right. As only the front of the cans (other than the cans at each end) will be visible, I cut each can in half and made two cans from it. Thus, I needed only 7 cans to model the 12 cans under the seat.



26. Rear seats are sheet plastic with a plastic strip rim and underseat bar (to rest on the stowage, allowing the seat to sit at the proper angle). Here we see the bottom of the right seat and tops of the left seats (made as one piece with a scribed line demarking them).

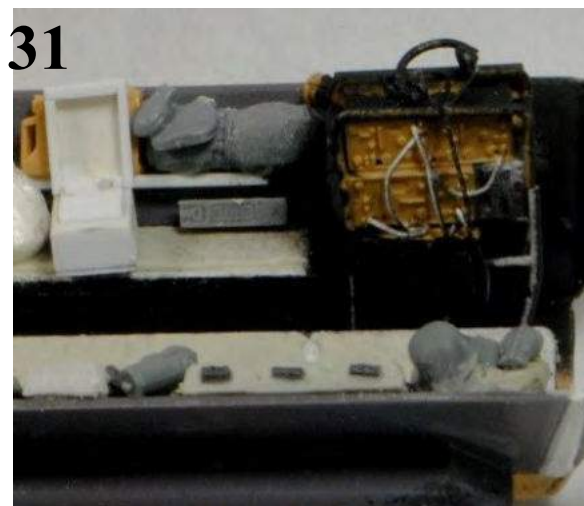


27. Seat cushions are epoxy putty. The figures were pressed into the soft putty to ensure they sit properly "in the padding" rather than hover above it. The spare vision blocks are mash-molded copies of the AFV Club parts. The joint in the hull halves is a plastic strip. The under seat stowage and underside of the seats were pre-painted black prior to assembly as these areas will be difficult to paint once the lower hull interior is completely built.



28. Shelves were added from plastic strip. The MG 34 and double spare barrel canister are Tamiya parts in racks made from plastic bits and sheep pewter. On the right side, only the empty racks were added below the shelf.

Stowage was added to the interior as seen in the chapter on Construction and Detailing



29-30: The radio from Tamiya's 250/3 (far left) was modified with a changed frame, addition of hardware, plastic rod wiring, and a Tamiya headset to match those installed in the 251/6. 31: The rear and bottom of the radio, and the back corner of the lower hull were pre-painted black and the radio glued in place. The wonky legs were straightened as they were glued down.

Enigma and Ultra:

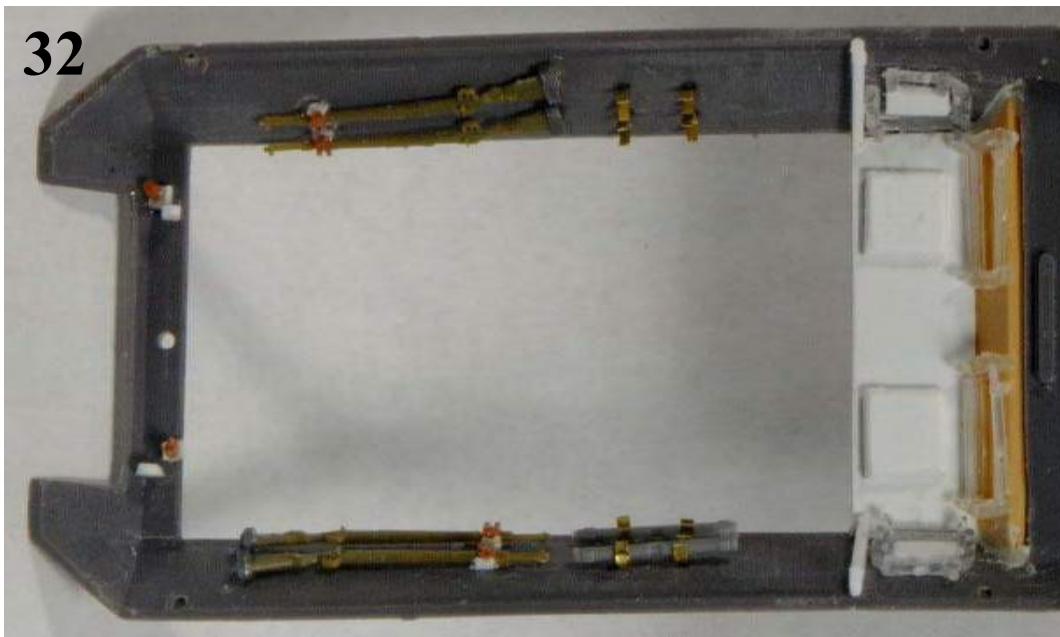
While many German military communications were transmitted by wireless and telephone, messages of vital importance were sent in code using "Enigma" machines. The *Enigma* resembled a typewriter, which scrambled the text typed into it by means of notched wheels or rotors. The messages could be unscrambled by a similar machine with its rotors adjusted to the same settings as the sender. Settings were changed approximately every 24 hours, according to code books listing the daily variations. With millions of possible variations, the Germans believed that *Enigma* was unbreakable, and indeed, with the limited technology then available to Allied codebreakers, this confidence was seemingly well-placed.

Before the war, the Poles, using an *Enigma* obtained by their intelligence services, had some success at developing a primitive computer to break the code. This was given to the Allies at the start of the war. British codebreakers operating at Bletchley Park, were able to break the code and read most *Enigma* traffic. To conceal the fact they could read German codes, the information obtained was considered top secret and known as "Ultra". Only a select few commanders were made aware of the source of the "Ultra" information, and it was used sparingly to prevent the Germans realizing their codes had been broken.

Though *Enigma* had some cryptographic weaknesses, in practice it was German procedural flaws, operator mistakes, failure to systematically introduce changes in procedures, and Allied capture of key tables and hardware that, during the war, enabled Allied cryptologists to succeed and "turned the tide" in the Allies' favor. It has been claimed that as a result of the information gained through this device, hostilities between Germany and the Allied forces were curtailed by two years.

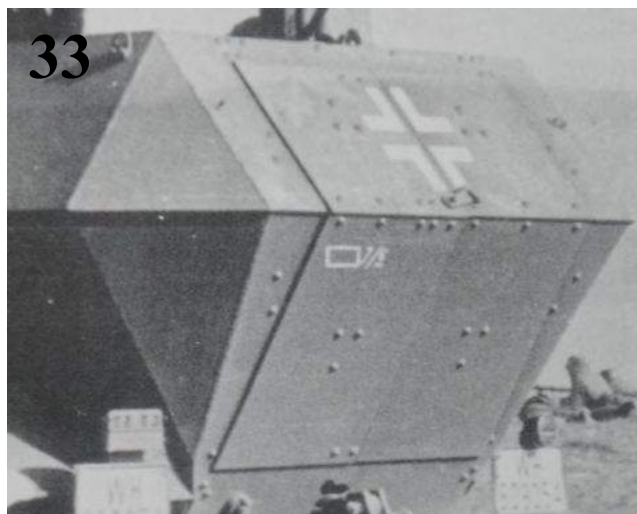


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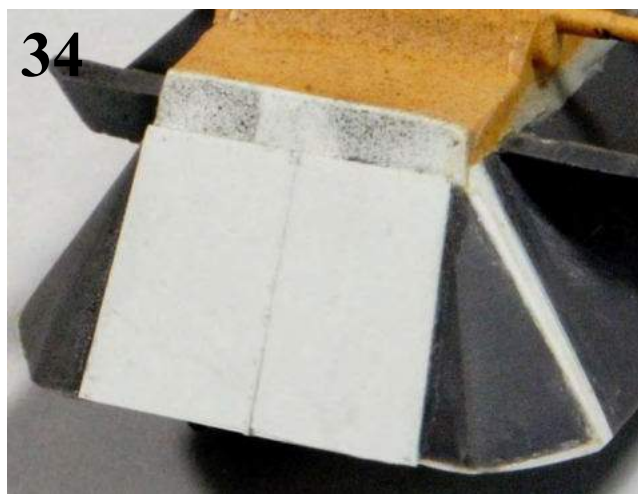
32. Details were added to the upper hull. The flange between hull halves and the headache pads were made as we have seen on the Tamiya kits. The view block parts were made from plastic bits and pieces. Spare barrel holders were made from lengths of photo-etched brass fret bend to shape around the edge of a metal straightedge. Rifle racks were made by wrapping lengths of sheet pewter around the butt ends of the rifles. The fore end clamps were bits of "U" channel and small fasteners from Tichy Trains. The racks across the rear top crosspiece are empty.

33



33: Note the design of the rear doors. They are not flush with the armor, but overlap it and stand proud. Also note that the top plates overlap the lower plates. On the Bandai kit, the plates are all flush and the doors are just scribed in, mandating replacement. Later models of the 251 featured doors made from one plate, but these early models used two plates for each door.

34



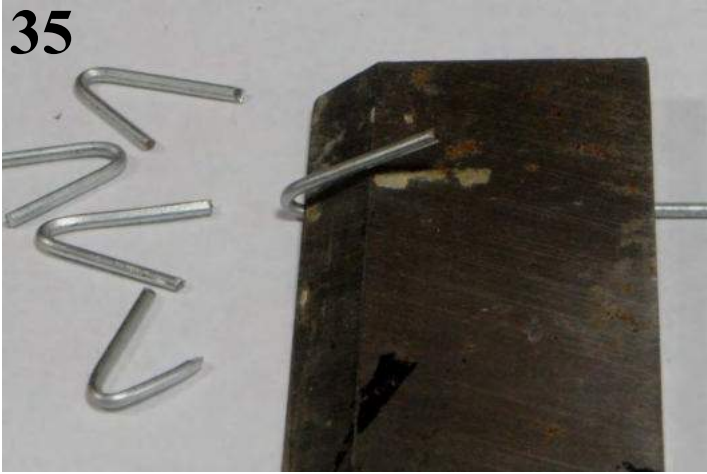
34: The doors had been cut away earlier. Here, the lower hull doors have been cut from plastic (the joint between the doors simply scribed in) and glued to the lower hull.

DEUTSCHE AFRIKA KORPS (DAK) VEHICLES:

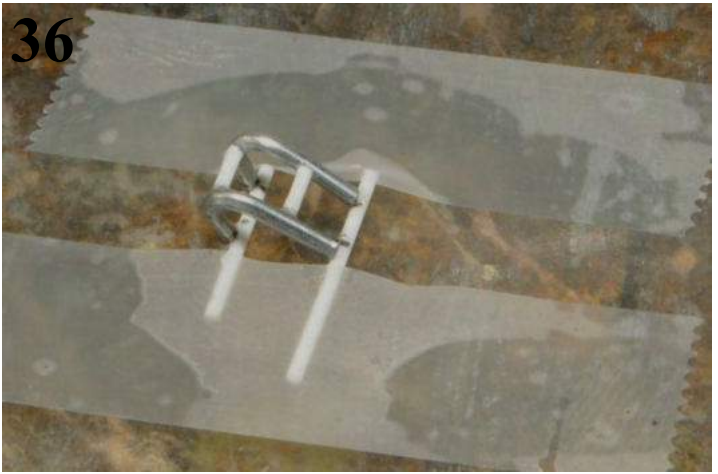
For a motorized corps in a war of maneuver, vehicles are vital—and were always a problem for the DAK. This was not only because of shortages—of which there were always plenty. Unlike the vehicles of their British enemy, many, if not most, of the German vehicles were not designed for topical use. Many were only two-wheel drive. Lack of paved roads, dust, and sand destroyed engines and springs resulting in an extremely high breakdown and unserviceability rate. For example, in January, 1942 nearly 70% of the 21 Panzer Division's authorized vehicles were either lacking or unserviceable. Thus, the DAK relied heavily on captured British vehicles—especially soft skins and transports. In the summer of 1942, nearly half of the DAK's vehicles were captured British vehicles.

The Sd.Kfz 251, while present, was always in short supply. Strength returns from December 1941 show 14 present out of an authorized 75, while Strength returns from November of 1942 show that out of 73 authorized, only 15 were present. The few issued to the infantry were often withdrawn and used as command and communications vehicles instead.

35



36



37



38



35: To make the hinges, I started by bending soft aluminum wire into the needed curved shape. I used a convenient jig to ensure identical bends.
 36: The remainder of the hinges were made from plastic rod. For the two vertical attachment bars, I taped overlength rods 8mm apart on a piece of glass. Then, using 3mm spacers, the parts were glued together. 37: The mounting points on the doors and hull were made from plastic bits.
 38: The bottom portion of the hinges were trimmed to length and glued into the lower hull. The door latch mechanisms were made from bits of plastic. That is what we see in this photo. Using the upper hull and constant test fitting, the top portion of the vertical bars on the hinges were trimmed to shape.

39



38: The upper portion of the rear doors (with the joint scribed in) was glued to the upper hull. Note the doors project below the bottom of the upper hull. This is needed as the doors stand proud of the hull, and if this was absent, there would be a gap between the top and the bottom of the doors. The same details added to the inside of the lower doors were also added to the inside of the upper doors.



40



40

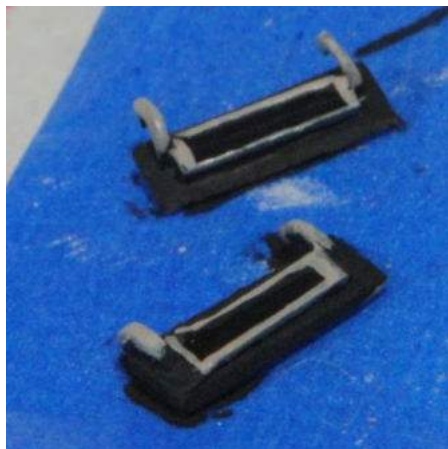


41

40: Prior to joining the hull halves the interior was painted and seated figures put in place.

41: The kit parts provided for the side engine access hatch covers were way too thick. They were also domed. These were replaced with thin plastic card. The engine hatch hinges from the Tamiya donor kit were shaved off with a sharp hobby knife and applied to the hatches. The fire extinguisher is Tamiya. The armored vent covers are from Bandai, but in the kit, there are open at the rear where they should be solid. This was filled with sheet plastic and putty.

42: The inside of the vision port covers, earlier shaved from the Tamiya parts, were given basic details from plastic bits and pre-painted since they would be inaccessible once applied. They were then glued in place.



42



Changes in Organization and Equipment for Units in Africa:

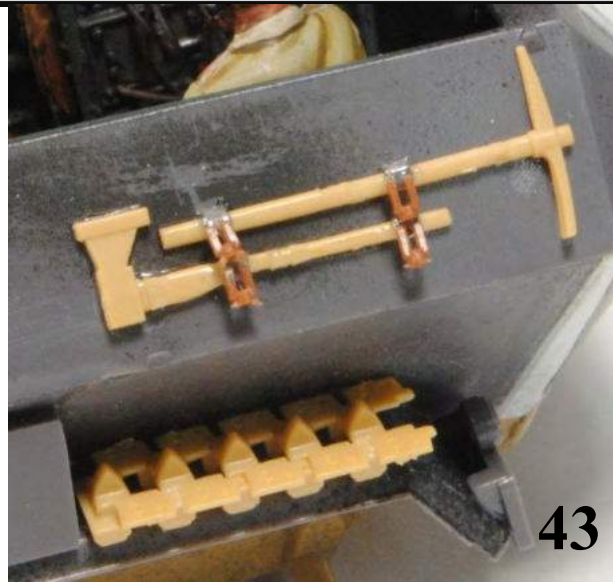
(From a report by Major General Alfred Toppe – German Army Quarter-master General)

German units deployed to Africa with normal tables of organization and equipment. Changes were effected immediately:

- a. Dust filters were fitted to vehicles.
- b. Water units - supply, transportation, and geological - were organized. Owing to increasing transportation difficulties, many remained in Italy.
- c. Vehicles were camouflaged with desert-colored paint.
- d. Tropical uniforms were issued.

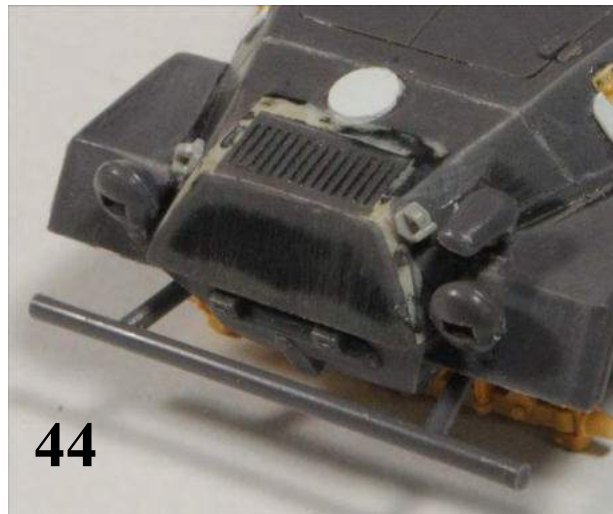
In 1941, additional changes were necessary:

- a. Antitank units rearmed from 3.7cm to 50-mm guns, and again in 1942 to captured Russian 76.2-mm guns due to increased effectiveness of weapons used on both sides.
- b. Infantry units were assigned antitank guns, since tank warfare is the deciding factor in the desert. The aim of furnishing each battalion with eighteen 76.2-mm antitank guns was never achieved.
- c. Types I and II tanks were withdrawn and replaced by Type III tanks. These were replaced after the winter of 1941-42 by Type IV tanks.
- d. Motorcycles were replaced by Volkswagens. Even half-track motorcycles proved unsatisfactory."



43

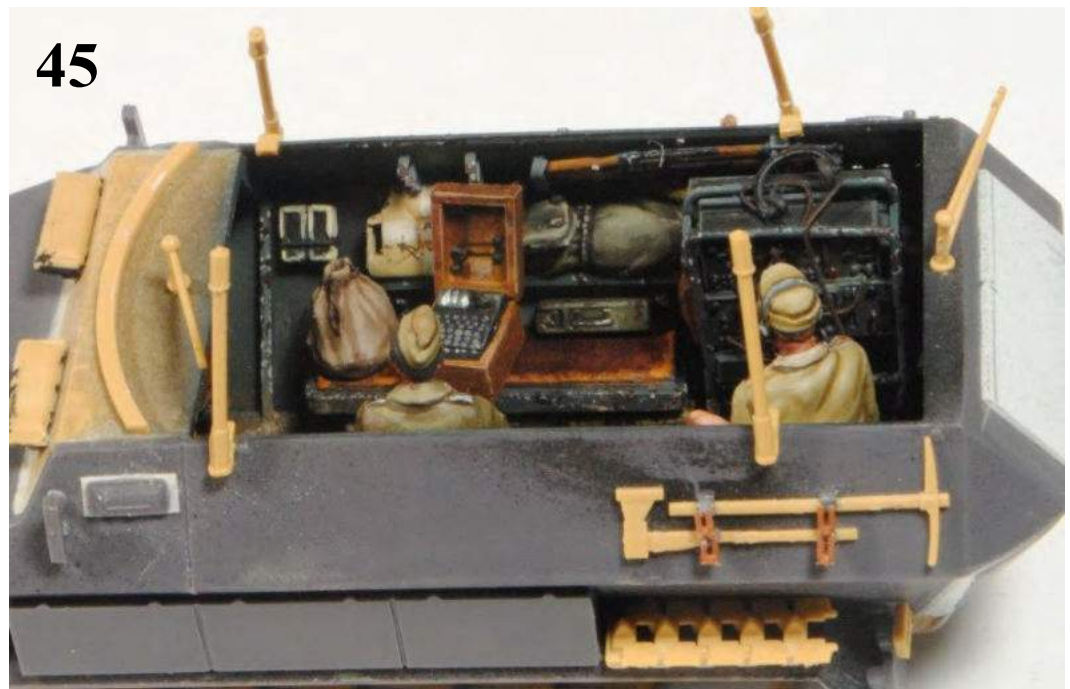
43: The kit tools are fairly poor. The shovels (on the right side) were used, but were given new handles from plastic rod and new clamps. On the left side, I used the Tamiya pick and axe. As the molded-on clamps were in the wrong location, these were shaved off and new clamps installed. The new clamps are bits of lead foil and small turnbuckles from "Tichy Train". The Bandai license plates were used. A bit of spare track from Tamiya was put in place. Tool stowage on the fender and rear lower on the right side is a combination of Bandai parts and scratch-built parts.



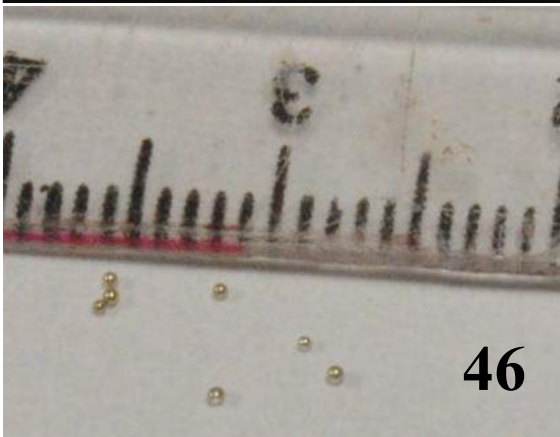
44

44: The Tamiya front suspension and Bandai bumper were added. Although the bumper attachment and bottom hull shapes are not exactly accurate, they will be largely invisible behind the front wheels. The radiator cap is plastic card. The armor joint was scribed in. Headlights, front engine access cover, and Notek light are from the Bandai kit. The rear Notek is Tamiya. The tie downs on the nose are wickets from the scrap box.

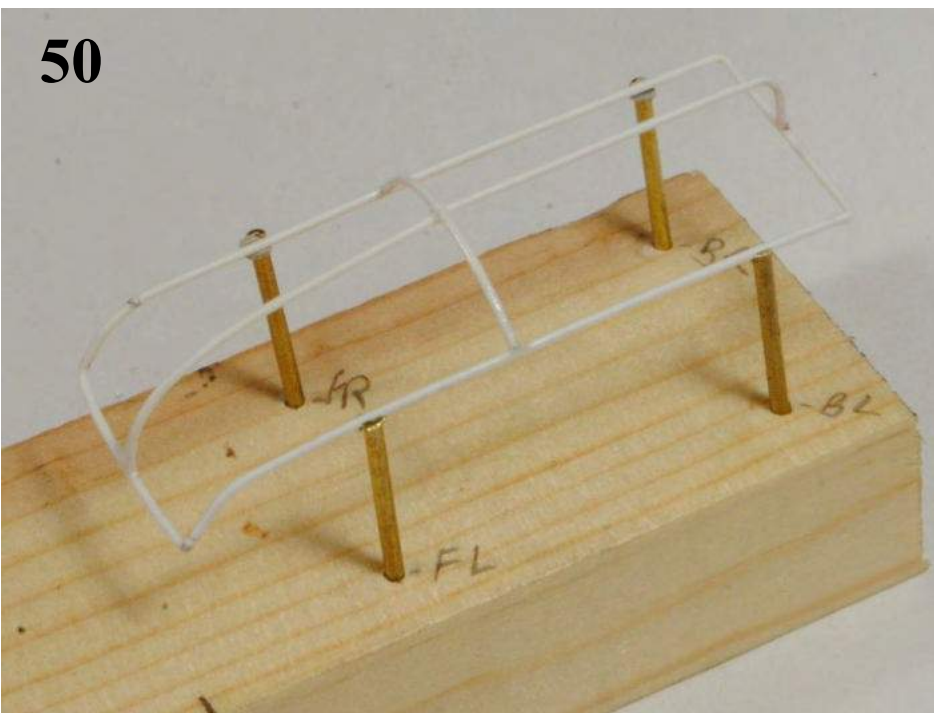
45: The MG crane mounts are Tamiya. The antenna mounts came from the same Tamiya 250/3 kit as the basic radio.



45



There are multiple ways to apply rivets. Plastic rivets are made by some companies included Grandt Line. Archer even makes rivet decals. In retrospect, I should have used one of those methods. I tried something new. 46: I have a bag of tiny beads (less than 1/2mm). 47: To place a rivet, I applied a small dot of superglue using a sharpened toothpick. 48: A bead was picked up with the end of a damp toothpick and applied to the glue. 49: Although the rivet is spherical, the glue filled the space around the bottom making it appear domed. The method was quick and easy. However, I believe the rivets appear slightly oversize. Still, once a coat of paint was applied, they looked acceptable. I could have improved this process by drilling a small "divot" in the plastic for each to fit into.



50: To help make the frame antenna, I made a jig of brass rods and a wooden block. The rods were notched at the top to hold the plastic rod securely. The plastic rod was bent to shape by taping it to a variety of appropriate forms and heating it with a hot-air gun (for paint stripping). The various bend pieces were cut to shape and fitted together in the jig.

Painting

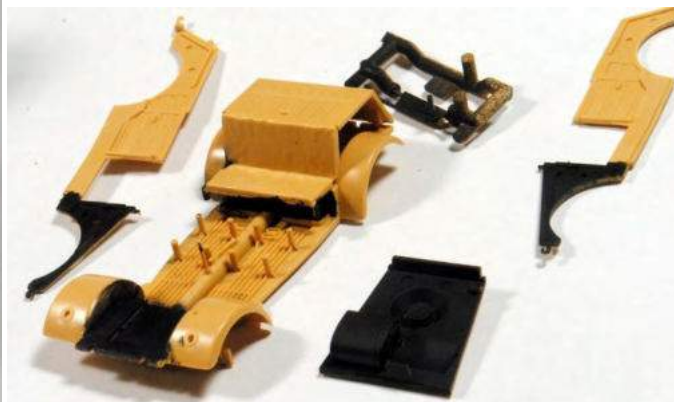
The vehicles and figures were painted and weathered using my normal methods as shown in the chapter on Painting and Weathering. In fact, several in-progress photos of the painting and weathering of this vehicle can be found in that chapter.



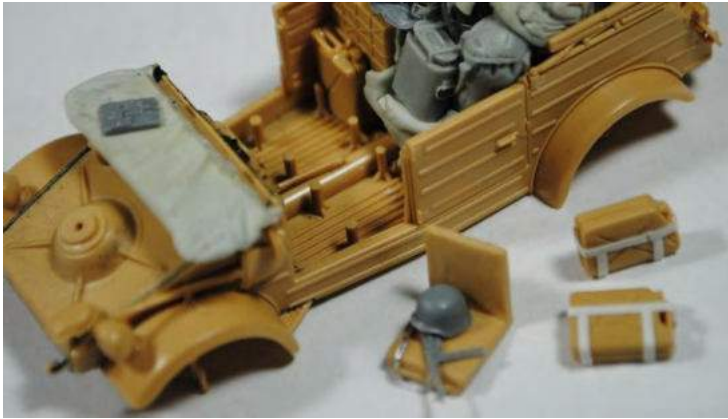
The vehicle after assembly, ready for painting. The antenna, tracks, wheels, and the standing figure are not yet glued in place, being left separate for painting. The tarp was made as shown in the chapter on Construction and Detailing. It is glued to the antenna. Per the reference photos I was using for my diorama composition, I wanted to sunshade on top of the vehicle, but didn't want it to totally obscure the interior or the antenna, thus the tarp is folded back in places and the shape of antenna clearly shows through.



The Kubelwagen

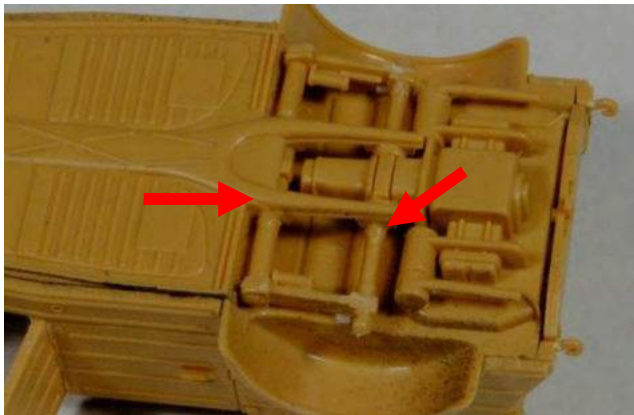


Above Right: Some areas, up under the dash and under the rear seat will be difficult to reach when painting. So, I sprayed these with a bit of black so that anything I can't get too later will be in deep shadow.



In addition to the large mass of stowage in the rear seats and on the rear deck (see the chapter on Construction and Detailing for how this was made), stowage also includes a helmet and MP 40 (with foil strap) on the passenger seat, two jerry can racks made from Tamiya cans and plastic strip, and a windshield cover fashioned from epoxy putty.

I wanted to sag the suspension of the vehicle under all the weight of the stowage. The rear axle and pivot is molded to the chassis in two places on each side. These are marked by red arrows. These were cut and the axle positioned in a compressed position, using a plastic bit (below photo) as a stop and also to provide strength. With the tires in place and the vehicle glued to the base, this will not be visible.



Here is the final result. The rear suspension is compressed and the back wheels slightly splayed.

Figures

The figures were created and painted after construction of the hull interior but prior to painting it. The seated figures were permanently fixed in place prior to the upper and lower hull halves glued together. This is especially necessary for the radio operator as his headphones and microphone cords must be fitted and attached to the radio. The Kublewagen was also built at this point to ensure proper fit of the driver.

Most figures are from the Tamiya Afrika Korps set, although some arms are swapped around. The standing officer with arms behind his back is a mish-mash of the Rommel and pointing officer figures with a field cap. The seated clerk is from the Tamiya Protze kit. In this photo, he still needs to be converted into tropical uniform (baggy trousers will be added over his marching boots). The standing figure in the halftrack is from the Kubelwagen kit with different arms. Not shown is the Kubelwagen driver, built stock with no modifications.



Converting marching boots into baggy trousers: Carve away the boots down to the approximate shape of bare legs. When working putty, I work one leg at a time to avoid thumb accidents. A leg is "repaired" by using Magic Sculpt, applied and then smoothed with a damp brush. Finally, using my toothpick sculpting tool, folds and wrinkles are formed. A final smoothing, and the leg is finished. Wait for it to cure, then do the other leg.





Note the difference in size, even though they are all Tamiya figures. The Kubelwagen figures (tall figure center and seated figure at the figures' far left) are close to true 1/48 scale—they stand about a scale 5'10". Some of the others are significantly smaller. Since the tall standing figure will be in the halftrack and not beside the other three standing figures, his height will not be as noticeable (and will not be a distraction). The only figures near him will be seated and inside the vehicle hull, masking the difference. Likewise, the Kubel driver will be in that vehicle, away from the other figures. Thus we can see that posture and distance can disguise small scale differences in figures.

The AA tripod is an old 1/35th scale piece from the scrap box.. I cut down and sanded/filed the pieces smaller in every dimension. New feet were made from slices of plastic rod. The gun mount was made from plastic rod and a bit of "U" channel. The gun and ammo belt are Tamiya. The rear leaf sight is a bit of plastic bar and the front sight is a photo-etched part left over from a tiny ship build.



DESERT HARDSHIPS:

The war in North Africa was waged on flat, featureless, rocky, sparsely populated desert terrain. The ground is flat with no cover, and is hard to dig into. Conditions are harsh—daytime temperatures average near 104 degrees and can exceed 110 degrees, and at night temperatures can fall to near (or below) freezing. Rainfall is rare - less than an inch per year. Sand storms are frequent and blinding.

Lack of landmarks made navigation difficult. It was easy to get lost. Specialist British units, such as the Long Range Desert Group (LRDG) and Special Air Service (SAS) mastered desert navigation. With vehicles modified for the environment, they were very successful at using the trackless interior to reach German rear areas for both raiding and reconnaissance.

It was the most technological theatre of the war, meaning it was purely mechanized warfare, fought with no horses or mules. But the rocky ground and fine sand infiltrated everything and were hard on vehicles and equipment, requiring special filters be fitted. Engines and tires wore out quicker than in other climates. Allied vehicles were better designed to operate in the environment than German vehicles, and the Afrika Korps relied heavily on captured vehicles.

North Africa was a logisticians nightmare. Roads were scarce and supply lines often extended hundreds of miles from ports and railheads. Essentials of modern warfare—water and fuel—were hard to come by and had to be trucked from distant supply points.

Rations were monotonous and delivery was unreliable. German field rations were not designed for the environment. Captured British rations were highly prized. The daily water ration could sometimes fall to as little as half gallon a day per man for all purposes—drinking, bathing, and keeping vehicle radiators full.

Flies were a common complaint of all soldiers of all armies. The swarms could not be escaped and got into everything. They made eating difficult, and carried disease. This, combined with poor rations and lack of proper acclimatization, resulted in high numbers of Afrika Korps personnel being on the sick and disabled lists.

Largely due to the harshness of the desert, the soldiers of the Afrika Korps considered themselves a breed apart—an elite—and proudly wore their "Afrikakorps" cuff title.



Groundwork



It's never too early to start the compositional process. Here is my first take, using the basic form of halftrack, Kubelwagen, and AA MG. The ground is just Styrofoam. One figure—the Kubelwagen driver—has yet to be built. The photos on page three were my primary inspiration. While it's hard to tell in black and white photo, I do not believe the command pennant is the black, white, and red of a division. Even in black and white, red appears distinctly different from black. I believe it is a battalion command pennant, showing the black, white, black colors of an engineer battalion. According to strength reports from the Sep-Nov 1941 period, the 21st Panzer Division had three 251/6s—one in headquarters, one in the signals battalion, and one in the engineer battalion. I believe this to be the latter vehicle.



In the middle is the final composition. More levels of ground are here—the Kubelwagen now sits at an intermediate height as one layer of foam was removed from the left side (as viewed). The Kubel was also turned slightly to it's left so the driver is looking at the three-man group in conference. They have also been slightly repositioned. The standing figure in the halftrack and the sitting figure by the MG are also looking at them. Some supplies and a field radio add a bit of interest.



Groundwork was made using my normal methods. The ground was built up on the base and over the foam forms using several applications of Celluclay. Different pre-mixed colors were used to represent different textures of ground. On bare ground, sand and small rocks were pressed in as normal. Larger rocks on the embankment are broken-up plaster and kitty litter. Sand areas are Celluclay with no rocks and sand, but texture was added by stippling on thinned pre-colored acrylic paste (The same Elmer's ProBond I used to make mud).

Bottom: Tire tracks were added using tires and spatulas. Footprints in sand were made with rounded ends of various paint brushes. Supplies were pressed into the sand to give them a sense of weight.

Top: Figures and vehicles were fitted to ensure depressions existed for their feet, wheels, and tracks to fit into.



Middle: Grass tufts were added. Here we see the base prior to painting.



Bottom: Various rocky and sandy colors have been applied with an airbrush.



Not shown, but following my normal methods, washes of oil paints were added to selective areas using various dark rocky and sandy colors. Finally, the base was dusted with the same color pigments as were used to weather the vehicle. This gives everything a suitably dusty look and ties everything together.

Composition

Composition of this diorama is simple and straightforward. It shows a command vehicle commanding. Compare it to my “Ten Commandments of Effective Composition”. There are a couple things to note about this diorama:

- The halftrack is front and center (slight toward the visually strong right side) in the composition. It’s also the largest element. Details, such as the pennant and tarp attract attention. All this makes this vehicle the main focus of the scene.
- The multi-level groundwork not only provides visual interest, it ensures elements toward the rear—such as the AA MG and Kubelwagen—are not masked by the halftrack.
- Note that none of the elements are aligned parallel to the base edges. This helps provide a look of random spontaneity and gives a “snapshot” appearance to the scene rather than the staged and arranged look of parallel lines.
- The main distinguishing external feature of the Ausf A/B is the different nose. Here, this feature is placed closest to the viewer in the visually strongest portion of the composition, drawing attention to this feature.
- Figures also attract the eye, and the soldiers in the vehicle draw the viewer in under the tarp to see the interior. They are operating the radio and encryption machine, reinforcing the purpose of this variant. The telephone wires and command pennant also clearly indicate this vehicle serves as a command post. The three figures in discussion at the front left-center of the work are in reality the main story. This is where the action and interaction are happening. This figure grouping is discussed in detail in the “Ten Commandments of Effective Composition” chapter.



13

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/7 Ausf. D

By Kevin Townsend



Sd.Kfz 251/7 Ausf. D

With the assault bridge ramps this vehicle was one of the most distinctive variants of the 251. It was also one of the most numerous, being the third most produced. Photos show a wide range of configurations, stowage, and weaponry making the 251/7 a great canvas for the modeler.

My model was built using the Gaso.line 251/7 conversion set. This was reviewed in the chapter on Construction and Detailing. The brackets are suitably thin and the attachment lugs are very small and fragile. The bridges are beautifully detailed and cast. Designed for the AFV Club kit, the set will also work with the Tamiya kit. The rear seats are replaced by stowage bins, and the bridge brackets and bridges fitted to the side. Other than the conversion and stowage, the halftrack was built and finished in the same manner as the other Tamiya halftracks.

I chose to model my /7 as being hastily abandoned in Normandy. The crew has taken much of the portable gear with them and, as befitting engineers, have booby-trapped the vehicle. A British squad is passing the vehicle, which has been roped-off and marked as “Booby Trapped” by the Allies. Still, that has not deterred one individual from picking up a German souvenir—a helmet in this case. He is being admonished by the squad leader who is pointing to the sign. I can only imagine the things he may be saying...

The assembly and painting process were done as we have already seen in previous chapters. Those things specific to this vehicle are seen on the following pages.

Assembly and Painting



This photo of an abandoned 251/7 was one of the inspirations for my diorama, and one of the references used. The viewer will note the similarities between the ground here and the ground in my diorama.

Interview with an SS Combat Engineer: (excerpts from an interview conducted by Jeff Johannes)

Training: “We were trained as both infantry and combat engineers. We learned to fire all types of weapons...and to be experts in demolition. My squad was usually made up of ten men and...was usually assigned to an infantry battalion to support them in combat.”

Vehicles: “We were supposed to be mounted in halftracks and trucks. For the most part of the war, only the first battalion...had halftracks...and the rest of the regiment had trucks...we ended up walking a lot...”

Uniform and Equipment: The only camouflage clothing that I had was the smock and helmet cover. I did not have a smock all the time but I recall having the helmet cover most



Above: The finished interior. The engine compartment (detailed using the Bandai kit as a basis) was finished in primer red. Manifolds were painted using the same rust color and pigment applications I use for vehicle mufflers.

The inside is strewn with discarded equipment and empty ammunition containers as if the crew left in a hurry.

What they could not carry was booby-trapped—note the trip wire tied to the rear door handle and running to a grenade underneath the mines stowed on the driver's side of the vehicle. Another grenade is under the map case on the floor.



Inset: The only modification to the plastic kit itself required to convert the vehicle into a 251/7 was to relocate the antenna mount from the outside of the hull (where it would have fouled the bridge) to the inside of the hull.

of the time. When we wore the camo smock we tied it high around our waist to have access to our tunic pockets... we were always at the end of the supply chain when it came to everything, including uniforms and equipment... the Division staff and Panzer units were given new uniforms and equipment first, and then it would trickle down to those in the Panzergrenadier units; if you were truck borne you usually ended up with what was left... we usually had our Eagle insignia on the side of our various enlisted caps”

“...We often did not go into combat with full gear so we stuffed our tunic pockets with food and ammunition. Speaking of tunics, I was rarely issued a new one... I wore the same one from the start of the Russian campaign until I was wounded in October when it was thrown away due to all the lice. It was rare to receive a complete new uniform while on the front.”

“...I was MG No. 2 and I usually carried two boxes of ammunition and two spare barrel carriers. Later, when I became a squad leader I carried the MP 40. Every time I went to the front or on a mission, I would leave everything behind that made noise. We often left behind our gas mask containers and bread bags.”

2nd Panzer Division:

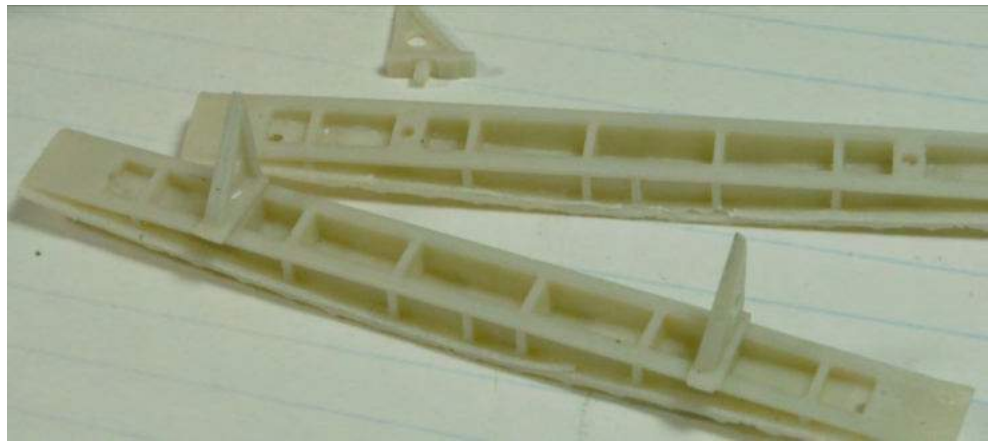
My 251/7 is in the markings of the 2nd Panzer Division. This division served in Normandy and saw action at one point near the end of the campaign against the British 50th Infantry Division – the unit I chose to depict with the British infantrymen.

The 2nd Panzer was an armored division in the German Army, the Wehrmacht, during World War II. Created as one of the original three German tank divisions in 1935, it was stationed in Austria after the annexation and then participated in the campaigns in Poland (1939) and France (1940) before it returned to Poland for occupation duties (1940–1941). It took part in the Balkans campaign (1941) and then transferred to the Eastern Front in September 1941. The division fought with Army Group Centre in the battles of Moscow (1941) and Kursk (1943). After heavy losses on the Eastern Front it was sent to France for rehabilitation (1944). It fought in Normandy and was almost completely destroyed in the Falaise Pocket (1944). It was rebuilt once more and fought in the Battle of the Bulge (1944) and in the defense of the Rhine (1945), surrendering to US forces at war's end



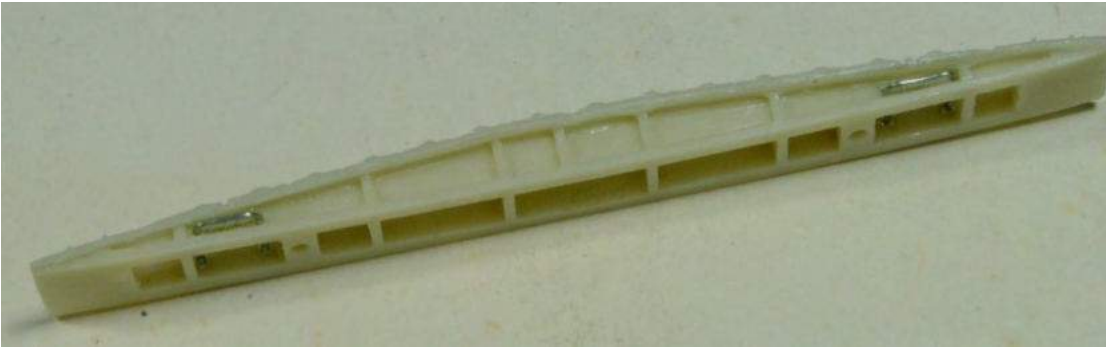
Left: To mount the bridges, a line marked the location of the forward mount on each side. This was marked 4mm aft of the joint between the front and rear hull halves. Below: The bridges were snapped together without glue.

Care was taken to ensure the mounts were square. 3rd: The mounts were then put in place on the hull making sure the front mount lined-up with the pencil line location marking. Each mount has a small lip that fits over the top of the hull ensuring correct alignment. Once the bridges were properly located, super glue was used to fix the mounts in place.



Once cured, the bridges themselves were removed for painting leaving only the mounts in place.





The bridges were detailed with the addition of metal wire hand holds on each corner.

Figures and Composition



The poses and positions of the figures were worked out in the compositional process. Two figures—the front and rear figures of the grouping—were stock. Alterations to the other two consisting of slight pose and direction of glance changes were worked out at this time. The basic vehicle and a paper mock-up of the main terrain features assisted in the process.

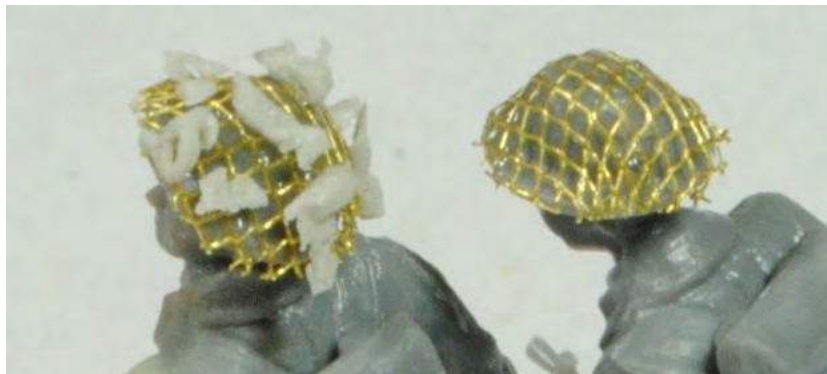
In this instance, the compositional process was fairly easy. The sign indicates booby traps, but that but that hasn't stopped one sad sack from picking up a discarded German helmet. The squad leader is pointing out the sign and scolding the offender—it's left up to the viewer what he is saying. Humor can be effective, but must be kept simple for the viewer to understand. Before I even started construction, I already knew what story I wanted to tell and had a pretty solid idea of the poses and relationships. The walking figures are just "decoration" to indicate the two soldiers are part of at least a squad column. They were built straight from the box. In the compositional process, I simply worked out what changes had to be made to the other two figures in order for them to interact in an understandable manner. This required a slight change of pose on the left leg of the soldier to depict him turning instead of walking. The squad leader was given a new, pointing, left arm. Both heads were slightly repositioned to look toward each other. The figures were built and painted as we saw in the chapter on Figures.

British 50th (Northumbrian) Infantry Division:

The 50th Division saw distinguished service in the Second World War. Pre-war, the division was part of the Territorial Army (TA) and the two *Ts* which form an *H* in the divisional insignia represent the three main rivers of its recruitment area, namely the rivers Tyne, Tees and Humber. The division served in almost all of the major engagements of the European War from 1940 until late 1944 and also served with distinction in North Africa, the Mediterranean and Middle East from mid-1941 to 1943. The 50th Division was one of two British divisions (the other being the 3rd Infantry) to land in Normandy on D-Day, 6 June 1944, where it landed on Gold Beach. Four men of the division were awarded the Victoria Cross during the war, more than any other division of the British Army during the Second World War.



A new arm was made for the squad leader. Wire formed the basis. This was covered with putty and smoothed with a damp brush. Finally, folds and wrinkles were pressed into the soft putty with my toothpick sculpting tool. His head was also slightly turned to the right, looking at the sad sack.



Left: The sad sack was slightly modified—his left leg was repositioned at the knee to alter him from a walking to a turning pose, and his head was turned to the right, looking over his shoulder at the squad leader.

Above: Helmet netting was made from fine brass mesh. Scrim was created from tiny bits of Magic Sculpt epoxy putty, rolled out thin and crumpled into appropriate shapes.



Above and opposite top: The finished figures. Although suffering from the height issues as the other Tamiya figures, their British Infantry set is fairly nice, containing some marching infantry, fighting infantry, tank crewmen, and crewmen for the Bren Gun carrier. It also includes a civilian. As normal with the Tamiya sets, 2 sprues of infantry weapons and gear are included.



Let's compare this diorama to my "Ten Commandments of Effective Composition:

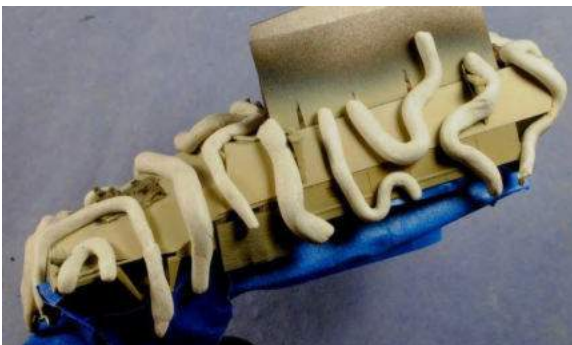
- 1. HAVE A SINGLE MAIN POINT:** While the vehicle is the first thing the viewer notices due its sheer size and position in the composition, it is the figures that are really the story in this diorama. The halftrack is still vital—without it there would be no booby-traps and therefore no story. The two figures who make up the main focus are front and center with the sign sort-of between them. Once the viewer looks at this area, the main focus and story should be immediately apparent.
- 2. DIRECT THE VIEWER'S EYE:** The viewer will most likely notice the halftrack first as they approach. But as they look at the scene, they will note the main focus front and center. It is natural to follow glances and gestures. Here, the squad leader points at the scene while looking at and talking to the sad sack. The sad sack, while moving in the same direction as the squad leader, is slightly pivoting and looking over his shoulder at the squad leader. He clearly holds the German helmet out in front of him. The figures move with the gain of viewing, but the sad sack's glance back at the squad leader, breaks this plain by looking against the grain. This can cause the viewer to pause, further highlighting this figure. The halftrack also moves against the grain.
- 3. SHOW ACTION AND INTERACTION:** The actions and interactions of the figures tell the story with the sign and vehicle providing direct support. The other figures are just moving along, helping to frame the scene and show there are more than just the two figures.
- 4. USE A TIGHT COMPOSITION:** Everything is fairly close together, keeping the composition tight. It is easy to take it all in in a single glance.
- 5. HAVE BALANCE:** Front to back, the halftrack sits in the middle with the figures in front are balanced by the hedge at the rear. Left to right, the figures balance themselves.
- 6. USE ALL THE ELEMENTS:** The figures are key in the story supported by the halftrack. This story is framed by both the vehicle and the ground. The tree line forms a backdrop. An attractive base compliments the scene and is finished as are the other bases in the series. A simple identification nameplate is used, although I could have opted for a more descriptive title, perhaps even one taken from a WWII poster about booby traps.
- 7. MINIMIZE DEAD SPACE:** The tight composition, with the base sized to tightly frame it, cuts down dead space.
- 8. USE SHAPES AND ELEVATIONS:** The different levels of ground (road, ditch, embankment) provide a bit of visual interest and realism. While the tree line, ditch, and road are basically parallel, they sit at a slight angle to the base. The vehicle is also running off the road at the slight angle. So there are few parallel lines and nothing is parallel to the base edges.
- 9. ARTISTIC LICENSE IS OK:** This commandment is mostly inapplicable to this scene. While the vehicle may be generic and not representing a specific vehicle, its unit is real and it's marking and camouflage are consistent with the location and time period. The German unit the vehicle belongs (belonged) to and the unit represented by the British soldiers did meet at the end of the

Normandy campaign.

10. PLAY WITH IT: Although this was the scene as I imagined it my mind's eye, I did experiment with different arrangements but did not, in the end, make any major changes to the vehicles or figures. This "playing around" was useful, as mentioned, in working out the final poses of the two central figures.



The finished vehicle prior to attachment to the base. The great detail in the Gaso bridge parts is clearly visible in this photo. The chain hanging on the front hooks is a model railroad part. As we saw in the chapter on painting, the camouflage was applied with an airbrush and masking was done with poster putty. As was often the norm on German vehicles, the engine compartment was left in red primer.



Base and Groundwork



The base and groundwork were made primarily as discussed in earlier chapters. Features unique to this composition are shown here.

As I wanted a ditch and bank at the edge of the road, I made the groundwork in a tray, with cut-out sides for the ditch and a raised back for the bank. The base was finished using the same procedure as for the other halftracks in the series.



The inside of the base corresponding to the road surface and bank were filled with Styrofoam. Wooden dowels were sunk through foam and into the wooden base below to mount the figures upon.

Opposite top: Some of the materials used to make the groundwork. The MiniNatur product is a pull apart vine-like material with attached leaves. It can be pulled into chunks and sheets and used for various foliage, vines, and weeds. The Super Leaf product are tiny bits of colored paper representing small leaves.

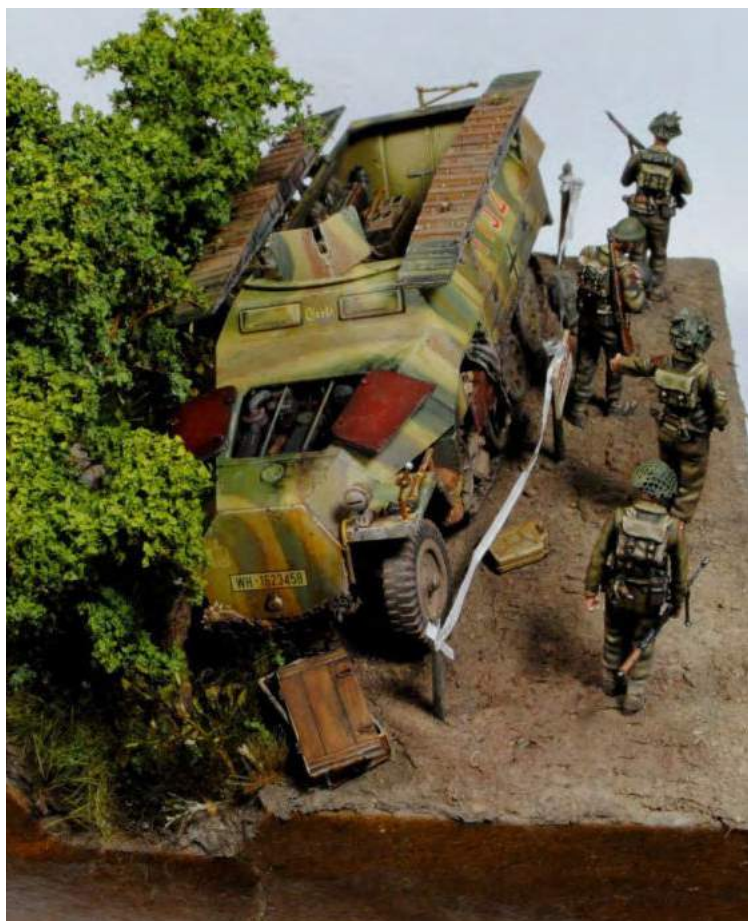
While useful in quarter scale and smaller, their effect would likely not be as good on larger-scale scenes. The Scene Scapes grass mat is an 11 x 5.5 sheet of static grass that, like the MiniNatur product, can be pulled apart and applied to the ground as needed, creating very realistic grass.



The Super Leaf product was used, in combination with Seafoam (as we used with the 251/2), to make the trees. The seafoam trees were airbrushed an appropriate wood color. Once cured, they were sprayed with hairspray and the leaf material sprinkled on. This was built-up in multiple layers until the foliage was the desired thickness (left). To provide some color variation, the trees were airbrushed a lighter shade of green from above, and finally were highlighted with a small bit of pure yellow spray directly from the top (right).



The finished groundwork. The paperclip wires are simply in place to keep the Celluclay from plugging the holes in the dowel rods in which the figure mounting pins fit. Wet areas in the ditch were created with Future floor polish. These photos show the realistic effects that can be achieved in this small scale using a variety of natural and artificial products and realistic painting.



14

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/8 Ausf. C

By Kevin Townsend



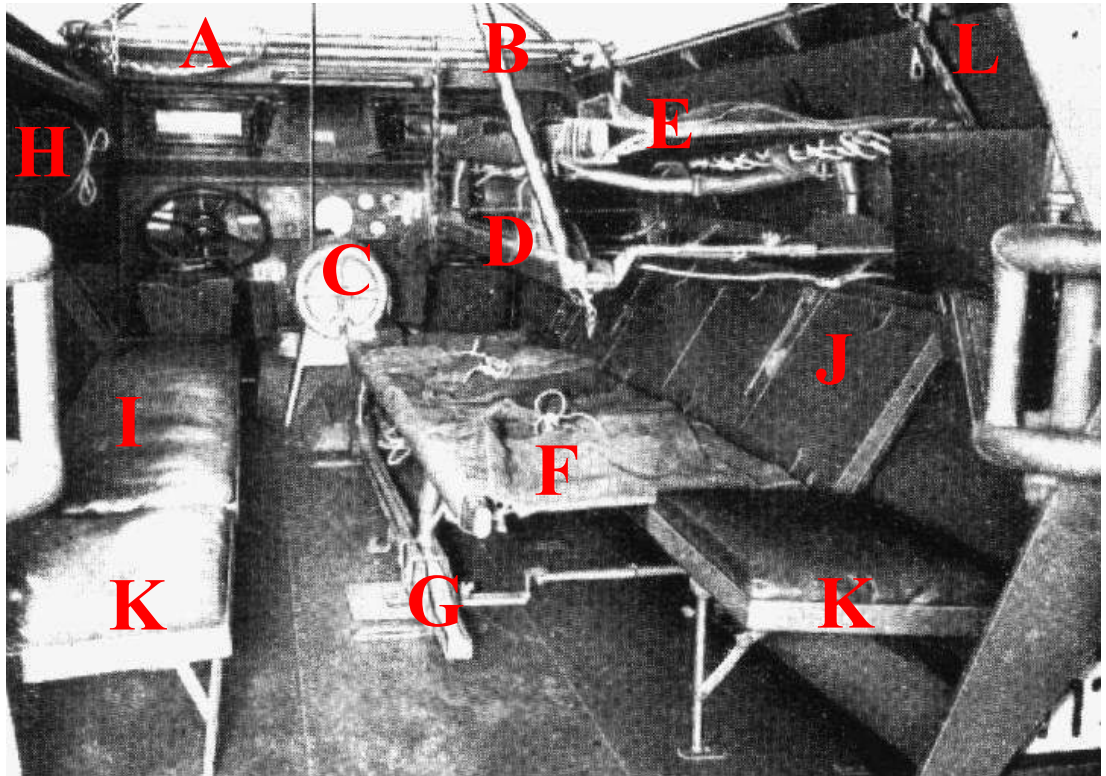
Sd.Kfz 251/8 Ausf. C

As the /8 was made on all models of the 251, any of the 251 kits can be used. I made a “C” for reasons of “convenience” and “art”.

I ruled out the Bandai Ausf B due to accuracy and availability issues. The AFV Club kit has a more suitable floor—the Tamiya kit would require more work as the under seat stowage bins are molded as part of the floor. I also thought the red cross markings would look better on a Panzer Grey background than a Dark Yellow one. Other than the floor, the changes would be largely the same whichever kit was chosen. Numerous changes were required to model a /8. These are shown on the next page.



Assembly



- A/B: The cross bar and suspension chains to support the top stretcher rack on each side. Stretchers could be mounted either side, but were used on only one—otherwise there would not be space to move between them. Behind the crossbar can be seen the front roof bow. The bows were higher than on standard halftracks to allow plenty of room for the medics to work and the front bow was permanently fitted in place. B. The inboard suspension chain from the rear crossbar.
- C. Water tank. Unique to 251/8. That it was included in original Tamiya 1/35th scale kit was a manufacturer's mistake.
- D/E. D is the rack to hold the upper stretcher. It hangs from the suspension chains from the crossbar and hooks to the halftrack side wall. When not in use, it is folded up against the side wall. E is the stretcher. It sits in rails on the rack.
- G/F: G is the lower rack. It mounts onto floor fittings and, can be folded up against the side wall when not in use. F is the stretcher.
- H: These are the stretchers/racks for the left side of the vehicle. Not in use, they are folded up and attached to the side wall as stowage.
- I/J. I is the passenger seat is in the down position, providing seating for walking wounded. J is the passenger seat folded up. Note the folded legs.
- K: Folding seats, in the down position, for the medics to use.
- L. From other photos, it appears this bracket hangs down from each side of each mounting bar. I believe these are to attach the folded stretcher racks to when not in use and stowed. The front bracket on the right side can also be seen in this photo.
- Factory vehicles had a folding step under the rear door and the front tarpaulin bow was hinged allowing the wet weather tarp to be opened from the front. Photos show some had water can racks on the outside of the rear doors. Crews sometimes removed the armored plate above the doors to make moving stretchers easier. I have even seen photos of vehicles that have large 200 liter water drums mounted on brackets on the upper right hull side.

In addition to this photo (and similar photos), also helpful in construction was the 1/35th scale 251/8 conversion set from MR Models. Photos of the completed kit and the instruction sheet found on the internet were a vital reference in making this model.

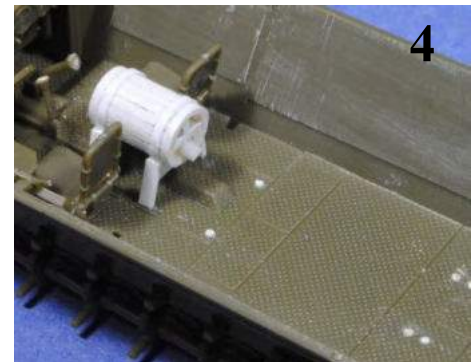
German Medics at the small unit level:

Attitudes towards medics and wounded varied by theater. In North Africa and Western Europe, most soldiers of both sides respected the Red Cross, and, in general, followed the rules of war. In these theaters, medics were well-marked, with German medics usually identified by marked helmets, vests, and armbands. Vehicles carried prominent red cross markings and flags. On the Eastern front it was different with neither side respecting the Red Cross. By the end of 1941, both sides stopped wearing medical hat bands and vests because they only made medics targets. Few wore more than an armband.

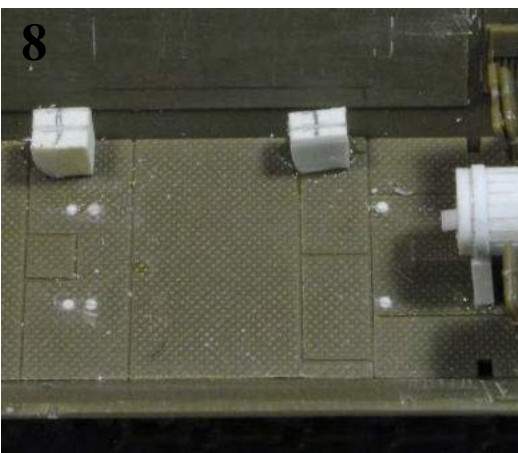
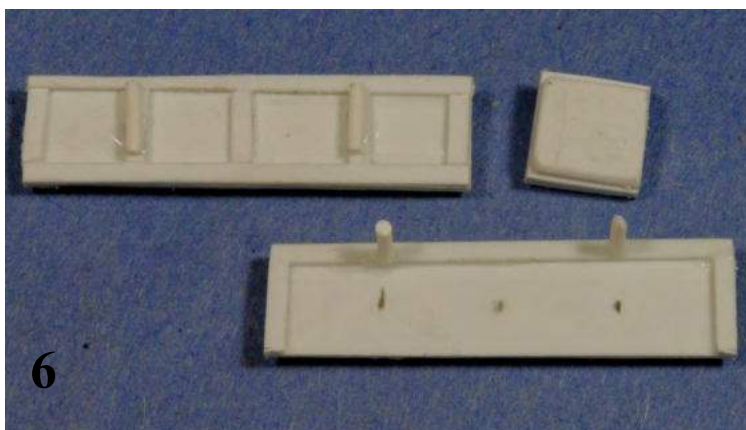
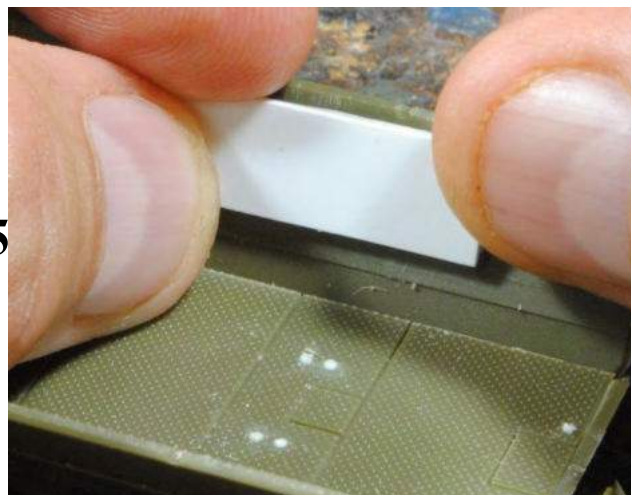
Unlike Allied medics, German medics often carried pistols. This led Allied soldiers to be skeptical of their non-combatant status even though the Geneva Conventions allow medical personnel to be armed for self-defense. They were NOT armed to shoot badly injured soldiers as has been sometimes claimed.

In the German Army, Each company normally had several soldiers - "Hilfskrankenträger" (auxiliary stretcher bearers) - with advanced first aid training. If necessary they donned an armband, a basic first aid pouch and recovered wounded

The photo below clearly shows the front tarp bow. The bow is hinged on both sides to the front crossbar (at the red arrow). Doyle's drawings in Panzer Tracts 15-3 show this feature quite clearly. The inset shows the shape of the front bow. The hinge point in the photo is the same one pointed out in the inset drawing. Factory-made vehicles are easily identified by the bow and the rear step.



1. The water tank form was made from a piece of 1/4" plastic tubing. I found a dowel rod that exactly fit the inside and this was glued in place and coated with super glue to make it smooth. The ridged texture was added using 1mm plastic strip. This strip did not come within 1mm of the edge. 2. Additional strip was added around the ends, and the visible end of the barrel was detailed with more strip (the other end of the barrel will not be visible on the finished mode.). The spigot is a length of plastic rod. The cross braces for the rack stand were glued directly to the barrel. These were cut from plastic strip with a semi-circle carved out of each to fit the contour of the barrel. 3. Tie-down straps are thin plastic strip. Legs were made from thicker strip. There were cut over-length and only trimmed to the exact length after the glue had cured. The front legs are shorter as they will rest directly on the vehicle's transmission hump. 4. The finished barrel glued in place in the halftrack. Also notable in this photo, the holes for the kit's seat mounting pins have been filled with bits of plastic rod and the raised lines for placing the seat backs, weapons racks, and other vehicle equipment have been sanded away as they are not needed.



5. Seats were made from sheet plastic. The cushions on the small medics' seats were also plastic. The cushions on the bench seats were made from epoxy putty as these would have to be somewhat "deformed". The seated wounded was pressed into one seat to leave the shape of his bottom (so he would have a sense of weight when glued in place) and the folded seat was pressed against the hull wall, flattening the cushion on the lower edge. 6. The underside of the seats were detailed with plastic strip. Detail on the seats in the down position is minimal as these will not be visible. Detail on the raised seats will also likely not be visible behind the litters, but basic detail was added just in case the viewer can glimpse this area. The legs—both extended and folded—were made from plastic rod. 7. Small hinges were cut from plastic strip. 8. To give a good gluing surface, and to make sure the seats sat properly, small plastic blocks were glued to the floor under the seats in the down position. These blocks will not be visible on the finished model. 9. The first bench seat is put in place, and the seated figure is test-fitted. Test fitting is important to ensure the figure sits properly on the seat and his feet touch the floor.

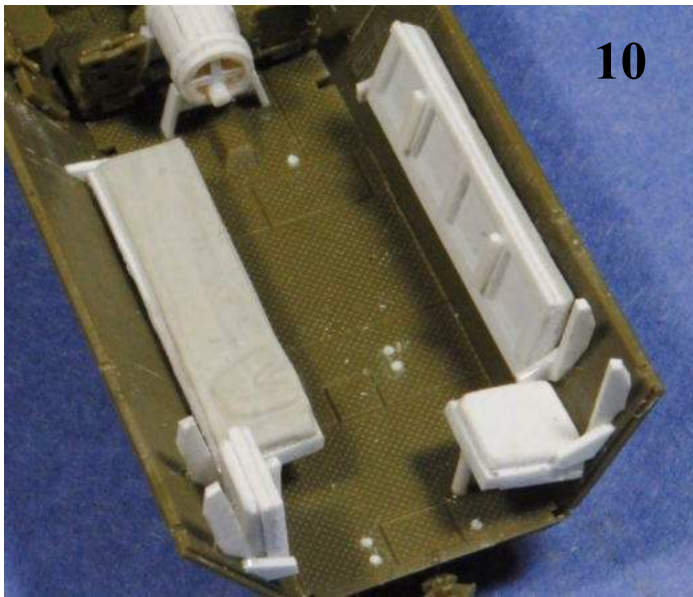
comrades and/or provided basic aid.

Krankenträger" (Stretcher bearers or combat medics) were full-time medics constantly marked with identifying markings. They carried two medic pouches and a pistol. There were usually four in a 1941 infantry company.

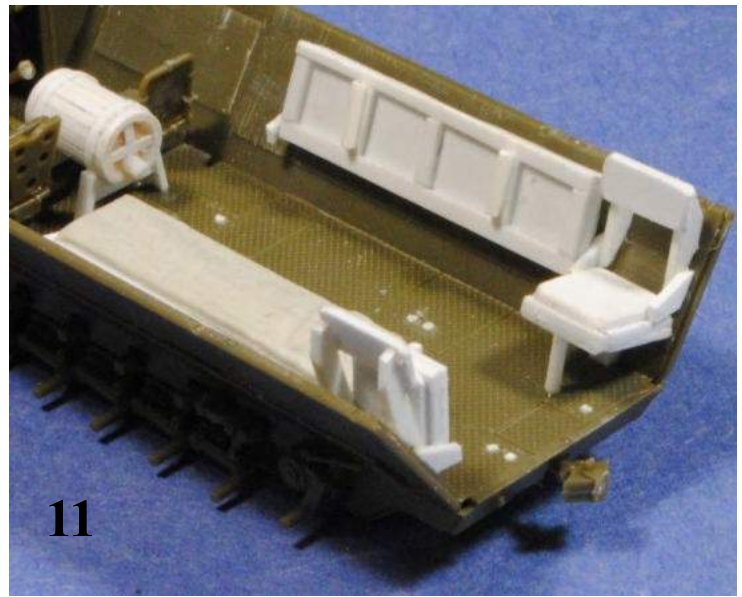
Each company formation usually had a "Sanitätsunteroffizier" (medical NCO). They were responsible for medical treatment in the company during garrison and in the field. They were specially trained in a medical school (training lasted about 6 months). They were marked with a Red Cross armband and a caduceus emblem on the left sleeve and wore the medical branch's cornflower blue branch of service colour.

Medical services were run by the battalion surgeon. In the Panzer Divisions, a doctor often accompanied the attack in an armoured ambulance. Aid Stations and Clearing Stations were established at least a kilometre distant from other logistic facilities to prevent them being involved in combat.

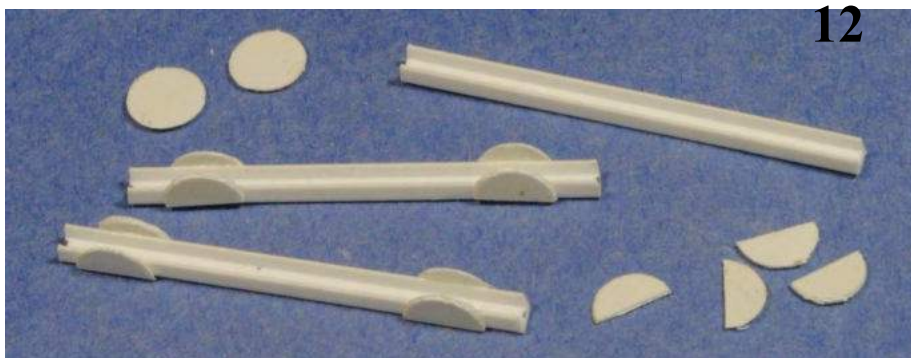
In action, each company established medical collection points where the wounded were brought. Company medics treated the wounded and transferred them to the Aid Station as needed.



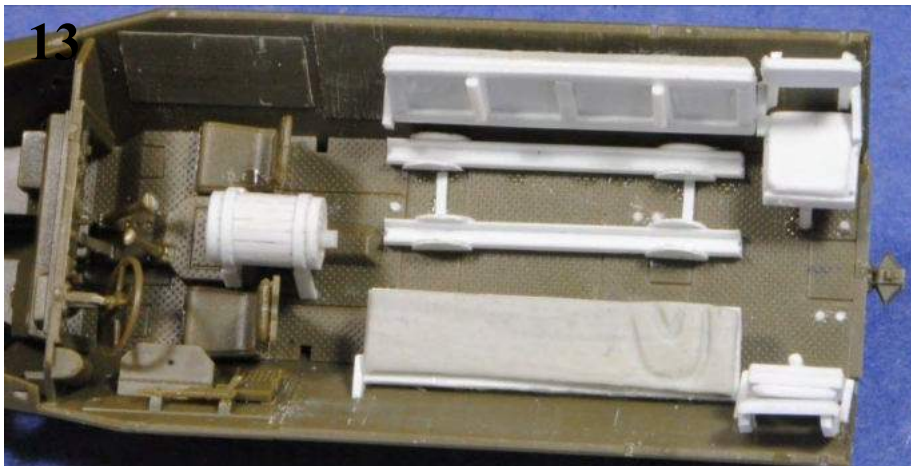
10



11



12



13



14

10-11. The remaining seats were put in place. The backrest supports for the medic seats were cut from plastic strip and glued in place, followed by the backrests themselves, made from more plastic strip. Constant test fittings with the upper hull and hull rear sub-assembly were done to ensure everything fit together. Final assembly after painting is NOT the time to find out something doesn't fit.

12-13. Stretcher racks were made from "U" channel plastic strip. The brackets for the stretcher legs were made from plastic disks cut in half. The disks were punched from thin sheet plastic using a paper hole-puncher. The floor rack was glued to the floor with the folding portion of the frame simply made from plastic strip. Little detail is needed as this area will be all but invisible on the finished model.

14. The basis for the litters were cut from rolled-out epoxy putty. Plenty of talcum powder was used to avoid sticking. The tops surfaces between the side bars was slightly dished by gently pressing in a dowel rod.

15



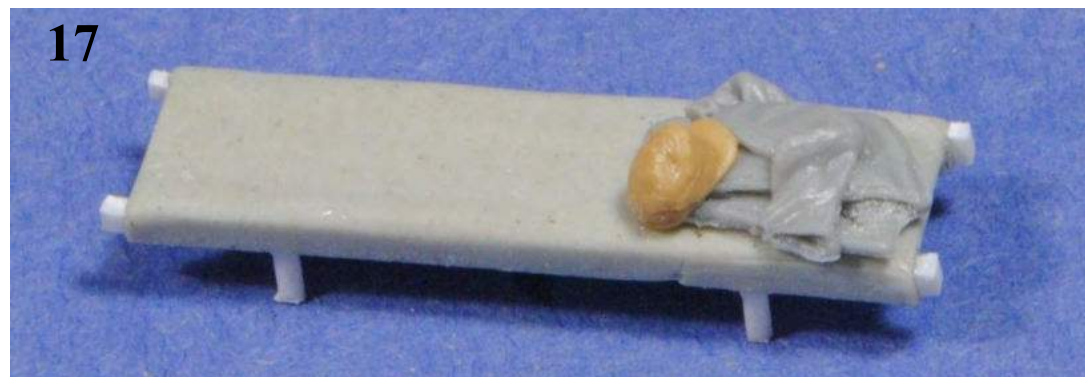
15. The litter case was made from a figure from the Tamiya Stuka Zu Fuss halftrack. This is an appropriate figure as he is not wearing a jacket—only an open shirt. The figure will be largely covered by a blanket, so there was no need to correct the cut-apart joints. A bit of putty forms a pillow.

16



16. Blocks of putty do not make realistic looking litters, even with a slightly dished top surface. To make them look more like fabric stretched between two side poles, the bottom ends of the fully-cured blocks were carefully carved and filed hollow.

17

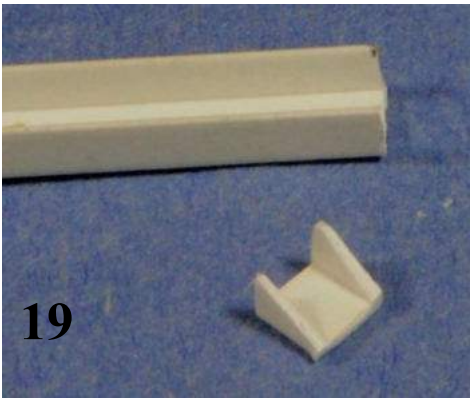


17. To complete the litters, details were added. The protruding ends of the telescoping wooden handles were fashioned from tiny bits of plastic strip. The legs of the stretchers were plastic rod. Like the water tank legs, these were cut over length and, once the glue was dry, were gradually cut to length, fitting them to the rack and gauging by eye until they looked correct. The unoccupied litter has the wounded soldier's discarded jacket (from the Black Dog German Accessory set) and hat (Tamiya) glued in place.

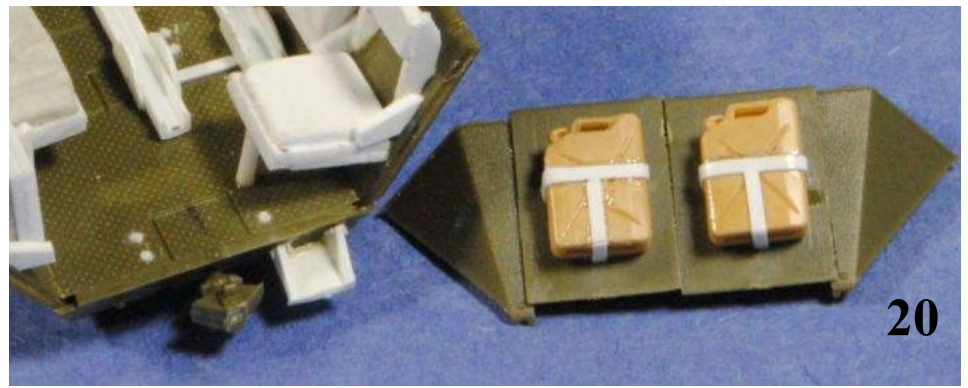
18



18. More putty was rolled-out paper thin and put in place as a blanket. The blanket hangs down so it hide the attachment point of the upper stretcher rack. The figure's head is flat to allow placement of a hat. The remainder of the head was eventually finished using a Tamiya hat carved into the shape of a bandage.



19

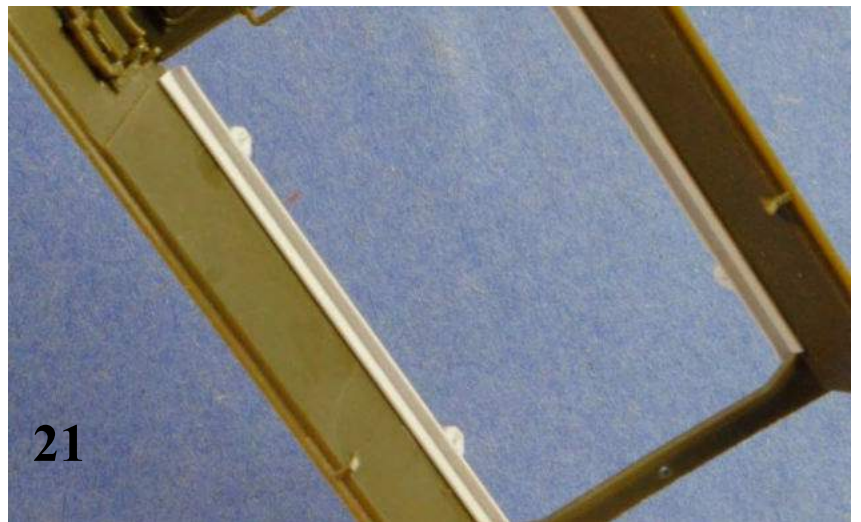


20

19-20. The rear folding step was made from a another piece of "U" channel plastic strip—significantly larger than that used for the stretcher rails. The step was glued in place beside the trailer hitch. Tamiya jerry cans, with thin plastic strip jerry can racks, were glued to the rear doors.

21. The brackets for mounting the crossbars were made from "L" shaped plastic strip and bits of regular plastic strip cut to shape.

22. The rods themselves were made from steel wire. The fittings for the chain are lengths of aluminum tubing. These were just slid over the wire, but not glued in place until I was able to temporarily assemble everything to make sure they were located properly. The end pieces are plastic rod drilled to accept the wire. The plastic rod was then cut and sanded until the rods fit in place on the rack. They were glued in position as seen in 23.



21



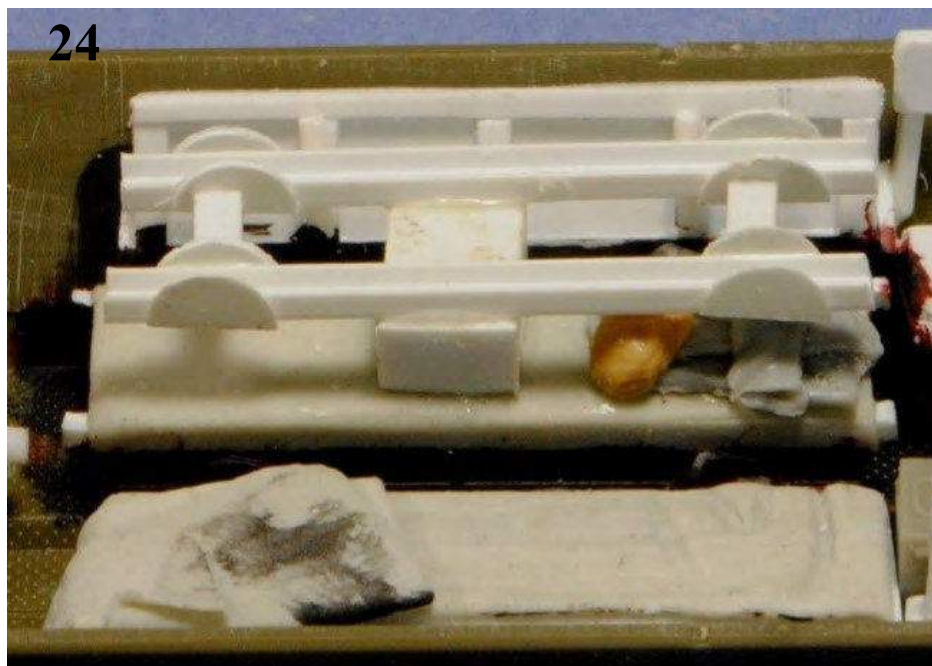
22

Throughout the entire build constant test-fittings are a must to make sure everything works well together. A test fitting of all sub-assemblies was done at this point to confirm the block holding the upper rack was indeed invisible, that the upper litter and patient did not conflict with the crossbars, and that the seated patient fit with no issues. Proper planning and constant testing will ensure there are no surprises later.



23

24. The area behind and under the bottom litter was painted black and the litter glued in place. Now the reason for the hanging blanket becomes clear. Suspending the upper stretcher rack from fine chains (just like the actual vehicle) would not provide a strong-enough construct. A large plastic block was glued onto the bottom litter to serve as support for the upper rack. The hanging blanket will hide this.



25-27. Making the stowed litters was a two-part process. First, the basic forms were made from plastic strip. Pewter foil straps were wrapped around each and the two pieces glued together. In the second step, the front, top, and bottom of the construct—except for the straps—was given a coat of Magic Sculpt epoxy putty. This was then shaped with my favorite sculpting tool (a toothpick—pointed at one end, rounded on the other, coated with super glue, and sanded smooth) to add various folds and wrinkles. After the putty cured, the litter assembly was attached to the inside upper hull. A test-fit was again done to make sure the litters did not interfere with the fit of the seated figure.



The German Military Blanket:

At the beginning of the war, regulations stated every man would be issued a blanket. This was soon changed to stipulate blankets would be issued during the fall and winter (along with gloves, scarves, etc.) and be returned to depot during spring and summer months.

The blankets were light grey with a stripe at each end (red on one end, blue on the other) allowing the owner a reference point to roll the blanket in a consistent manner for attachment to the field pack. They measured 80 x 53 inches. This design had been used in the German army for nearly a century.

According to one veteran, the reason for the different colors of stripe on each end was to designate head and foot, "why would you want to smell the last guys feet!". He claimed red was for the head.

In addition to the standard German military blanket, the German military also used stocks of captured blankets from conquered nations.

28



28. The hinged front tarp bow was bent from a piece of wire. The hinges are slices of plastic rod.

Below: The painted interior prior to the attachment of the figures. All were glued in place prior to further assembly and painting.

Opposite Top: The figures fitted into place. The blanket and red cross markings provide an attractive contrast to the grey.

Painting, Weathering, and Figures



Painting and weathering followed my normal procedures as explained in the chapter on Painting And Weathering. For markings, the registration plates are decals while the red crosses were masked and sprayed, also as seen in the chapter on Painting and Weathering.

The figures were posed, built, and painted as seen in the chapter on Creating and Painting Figures. Four figures, two crewmen, one litter case, and one walking wounded were placed in the vehicle. We've already seen how the litter case was made. The other figures were created as seen below:



For the figures, I used seated figures from the Tamiya Krupp Protze truck kit for the driver and seated patient. Both of these were minor conversions: the driver simply to fit in the halftrack and the patient had his hat carved into a bare head, his left arm repositioned, and a sling was made from epoxy putty. The standing medic was made from parts from Tamiya's "Afrika Korps" set (converted). His tropical trousers were modified to represent regular trousers hanging loose over his boots. Equipment items (suspenders and gas mask canister strap) were carved away and his vest made of epoxy putty. The armband was simply painted on. The military policeman is from the "German Infantry on Maneuvers" set.



Groundwork

Groundwork was made using the methods we've seen previously. The finished ground, prior to attachment of the vehicle and military policeman is seen at left. The base is very simple, being only a bit of road intersection with a street sign and a couple bits of old debris.

The sign post is a piece of plastic bar stock. The signs themselves were cut from plastic strip. The finished sign was painted before being attached to the base. The barbed-wire was made using a method I picked-up from Kyle on the Track48 web forum. It is simply wire, with tiny blobs of 5-Minute epoxy added with a toothpick and teased into little spikes and barbs. Caulk would work just as well. The barrel is a Tamiya piece (from the Jerry Can set). It was crushed by heating it with a hot-air gun (for stripping paint) and mashing the end of it once it started to get soft. Holes were made by thinning the plastic from the inside with a Dremel Motor Tool and then gouging the holes with a sharp hobby knife. The barrel was painted a very dark rust color, rubbed with powdered graphite for a metal effect (pencil lead rubbed on a piece of sandpaper and applied to the part with my finger), and then given a wash of black oil paint. Rust-colored pigments were applied while the wash was still wet. Once dry, excess was removed with a brush. The result is a very realistic old, rusty barrel.

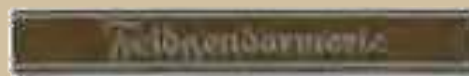
Feldgendarmerie:

The Feldgendarmerie were military police, trained in the criminal code, law enforcement, passport/identification law, weapons, and self-defense. They were also trained as infantry. Duties included policing in areas under army control, traffic control, handling of prisoners of war and refugees, and partisan suppression.

As the war turned against Germany, they were tasked with maintaining discipline in the army. Their often brutal and arbitrary policing earned them the nicknames of "Chained Dog" (after their gorget) and "Hero Snatcher". Soldiers deemed to be deserters were summarily executed. They also administered the penal battalions.

After the German surrender, some Feldgendarmerie units in the west were allowed to keep their weapons and assist the Allies with processing of prisoners and maintenance of discipline.

They were identified by their distinctive gorget (with luminous markings), a badge on the upper left tunic sleeve, and a cuff band on the left sleeve of both tunic and greatcoat.



Composition

Like many vehicles in this series, composition is very basic—other than the function of the vehicle there is no particular story. The vehicle, with the associated sign and military policeman fill the stage. The vehicle is clearly on the way to the hospital. The fact it is in the road being waved on by the policemen and the fluttering flag all indicate movement. The vehicle is moving toward the hospital as indicated by the road sign. This movement is against the grain of the viewing direction, causing the viewer's eye to pause to take it in. There is more empty space forward of the vehicle than behind, implying (along with the clues above) the vehicle is moving forward. Nothing is parallel to the edges of the base. Composition is tight with no dead space. This is, of course, a trade-off. If things were parallel to the base, it could likely be made a bit smaller. However, it looks better this way, which is the most important consideration. The base design and nameplate are consistent with the other halftracks in the series. The groundwork appears dry and dusty with the colors matching the dust and dirt on the vehicle. Also, with the dry environment, there is no heavy build-up of dried mud on the vehicle. Everything is complimentary and works well together.



COLORS USED: See the chapter on Creating and Painting Figures for the abbreviation key

Red Cross Markings: White areas were masked and sprayed Light Grey (VA) and highlighted with White Grey (VA). Red areas were masked and sprayed Hull Red (VA) lighted with Scarlett Red (VA).

Stretcher Racks: German Green (VA) is the base. Color. Highlights were created by adding Sand Yellow (VA). Shades were created by adding Black.

Litters:

B: Vineyard Green (AB) + Hippo Grey.
 1L: B + Wedgewood Green, Light Grey (VA)
 2L: 1L + Light Grey (VA)
 1S: B + Black
 2S: Black

Red Cross Flag:
White:

B: Cadet Grey
 1L: B + Antique White
 2L: Antique White
 1S: B + Pewter Grey
 2S: Pewter Grey
Red Cross:
 B: Red Iron Oxide
 L: Bright Red
 S: Candy Bar Brown

Rolled Tarp:

B: Black Grey (VA)/German Green (VA)/OD Green (VA) 1/1/1
 1L: B + Light Grey Green (VA)
 2L: 1L + Light Grey Green (VA)
 3L: Light Grey Green (VA)
 4L: (Edging) 3L + Wedgewood Green
 1S: B + Black
 2S: Black

15

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/9 Ausf. D (Early)

By Kevin Townsend



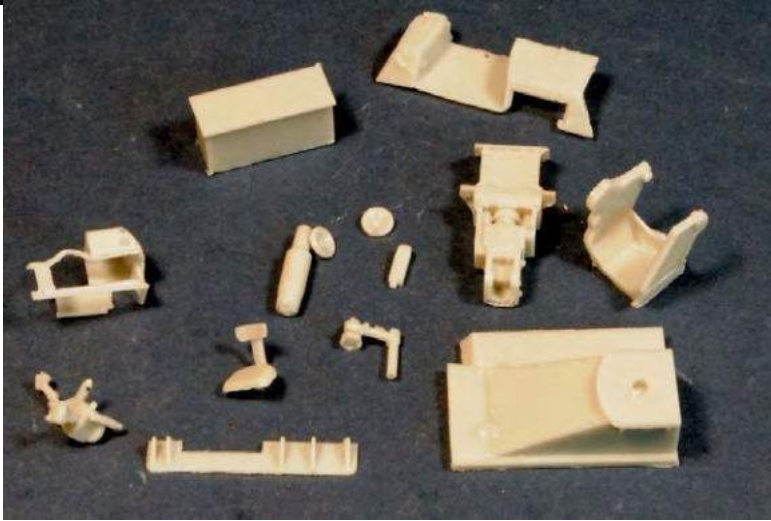
Sd.Kfz 251/9 (Early)

Although not used for the kit for which it was designed, the Gaso.line conversion kit is still up to the task with only minimal modification.

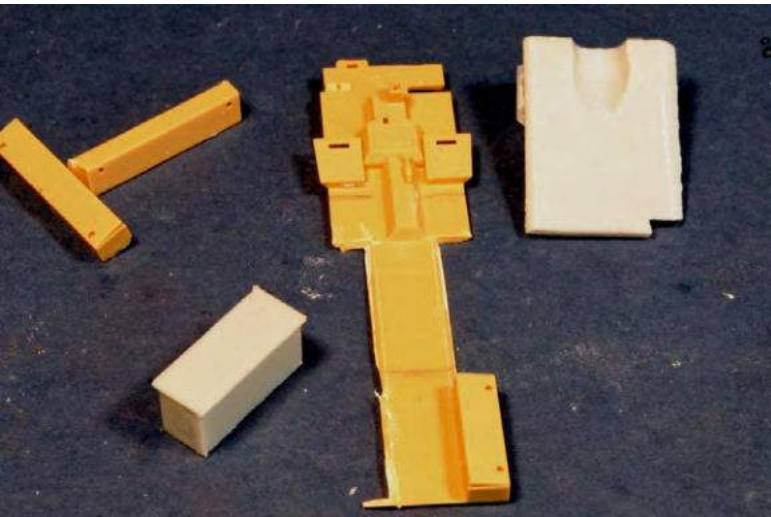
This model combines the Tamiya 251/1 and the Gaso.Line resin 251/9 conversion set designed for the AFV Club kit. The conversion represents the early 251/9 design, so it is suitable for both the C and early D models of the halftrack. Some details, such as an ammunition ready rack and relocated radio mount, are not included, but that isn't a problem—my research indicates not all the early versions had these details fitted. Detail of the Gaso kit is quite good and the casting and fit are excellent, making the conversion quick and simple while producing a high-quality model. While it is simply a “drop-fit” for the AFV Club kit, there is a bit more work required to fit it to the Tamiya kit, but it is not complex or difficult as seen in this chapter.

Three figures are included in my vignette. The figures and some of gear come from the Tamiya “Field Maintenance” Set and the Tamiya “German Infantry on Maneuvers” set. A couple parts from other sets were also used.

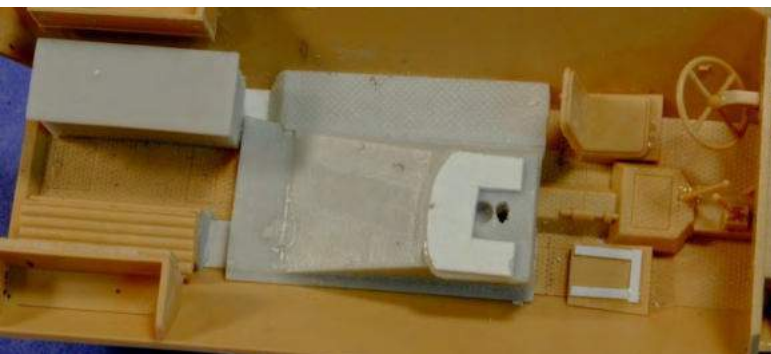
Assembly



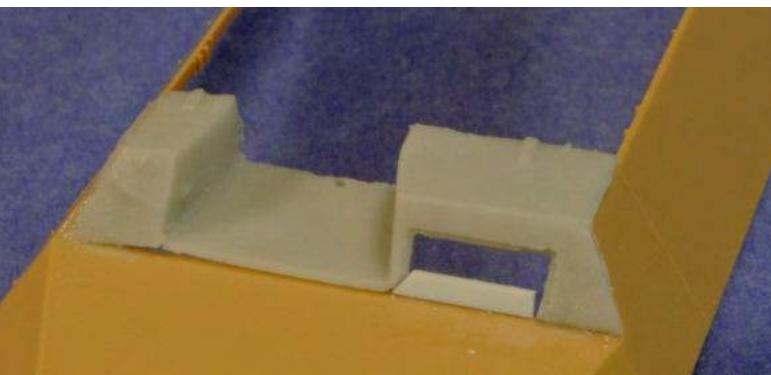
The resin kit parts are clean-up (removing flash and excess resin left over from the molding process). There is damage on the driver's compartment piece—the bottom strip below the view block aperture is broken. While the manufacture would probably replace the part there is no need—it is a simple repair. Additionally, a couple parts had some small air bubble pits that were easily filled with thick super glue.



The kit is designed for the AFV Club halftrack, but I used the Tamiya kit. This required the removal of three molded-on under seat stowage bins. A bit of resin must also be removed from the underside of the Gaso floor piece to fit over the Tamiya transmission cover. The sides of the floor piece must also be slightly beveled to fit the Tamiya hull. Note that none of this work is needed if the AFV Club kit is used instead—for that kit it is simply a drop-in conversion.



A quick test-fit shows that after the changes made above, the parts fit very nicely into the Tamiya kit, but the gun sits just a tad bit low for that model. This image shows the Gaso floor and ammo storage locker installed. The holes in the floor from the removed bins have been filled with sheet plastic. The mount for the missing front seat (these were removed from the Stumme) was made from plastic strip, and a sheet plastic spacer added to raise the gun slightly.

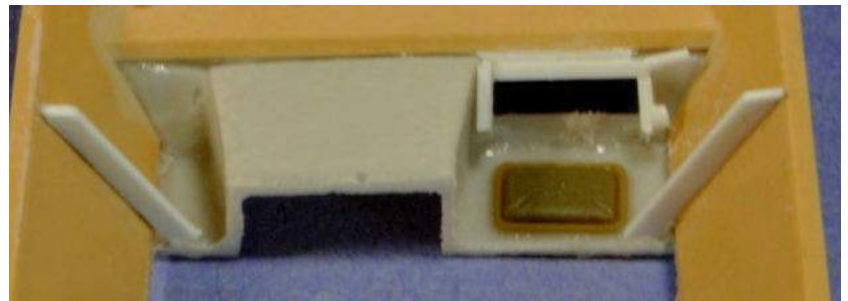


The roof piece added. A bit of plastic strip was put in place to fix the broken viewport. This will be further repaired (as will the slight gap under the gun aperture) with two-part Magic Sculpt epoxy putty.

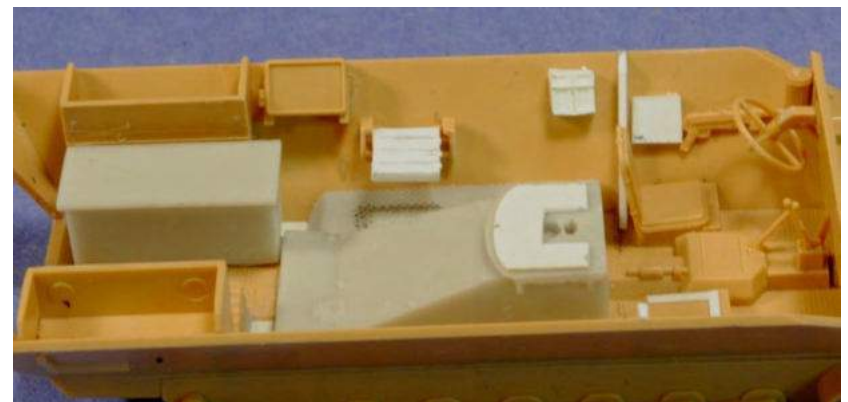
The putty repairs completed. The spacer allows the gun to sit correctly. The armored cover for the view block (not yet attached in this photo) was cut from the Tamiya roof piece. (In the AFV Club kit, these are separate parts)



The same details were added as were added on the other Tamiya halftracks—the flange where the forward and aft hull halves were bolted together, basic detail on the inside of the vision block, and a “headache” pad (left over from the AFV Club kit converted into the 251/10—the Gaso conversion piece had these built in).

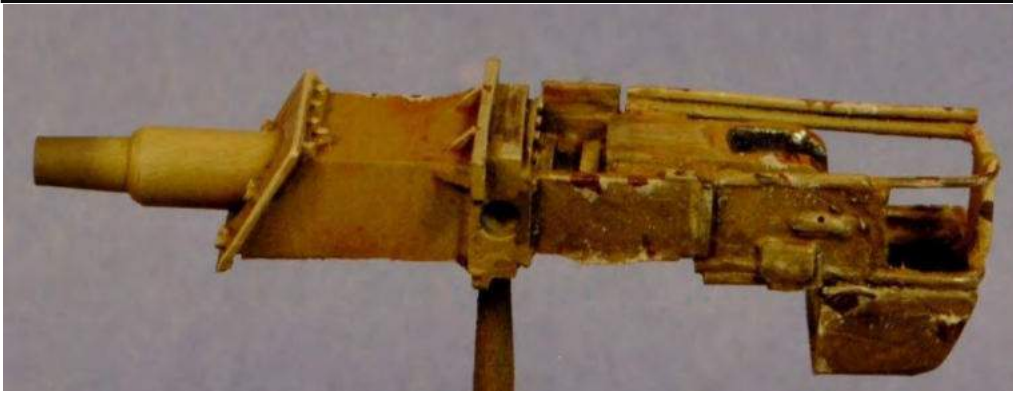


Details added to the left side of the hull include the flange, spare view blocks, and the MP-40 and magazine case. The radio was relocated to forward of the stowage bin and the operator’s folding seat was made of plastic bits.



The Gaso gun mount was built and installed. Some stowage was also added in the bins: a couple packs and a rolled tarp. An ammunition ready rack was also made and attached to the right side of the hull. The rounds are cut-down shells from the Tamiya German Maintenance set. That set includes the longer rounds for the later Panzer IV with the long barrel. The rack itself was made from sheet plastic. Note that my references are mixed as to whether or not this rack was mounted in the early, hull-mounted, version of the stummel. The gun (and the armored shield) were left separate for painting.





Top two photos: The finished interior, and the finished gun.

Bottom: The upper hull was attached, and the exterior of the vehicle received the same detailing work the other Tamiya kits did. The halftrack was then then painted and weathered using the exact same methods already discussed in earlier chapters. The yellow was air-brushed and the green was brush-painted. After painting, the gun and armored shield were put in place. As always, the fragile fender width indicators were left until the vehicle was attached to the final base.

Decals are left-overs from other Tamiya halftrack kits.





Figures

The man cleaning the gun is from the Tamiya Maintenance Set. His head has been slightly repositioned. The arms are from the Tamiya Shuka Zu Fuss kit. Both hands were slightly repositioned. The standing man is from Tamiya German Infantry on Maneuvers set. He is absolutely stock. The soldier milking the cow is, like the man cleaning the gun, a mix. His upper torso and arms are from the maintenance set while the legs are from the Tamiya Flakvierling. Both of his arms were slightly repositioned at the shoulders. The bucket and jerry can (his seat) are also Tamiya products. The cow is from an O Gauge model railroad set by Model Power (#MDP-6171). The set contains 36 unpainted 1-piece animals—cows, horses, sheep, goats, and deer. They are quite toylike, and many would be unusable without extensive conversion/ detailing work, but the cows are passable.



Composition

My “Ten Commandments for Effective Composition” were explained earlier. Compare them to this diorama to see how I followed by own rules.

1. There is a single main point—the halftrack. The crew is cleaning the weapon and have just received a small resupply. They have either completed a combat mission or are preparing for one. The background sub-plot of the man milking the cow fits with the ration can set-up on the barrel. Is a meal imminent?
2. The action is at the gun, which draws attention to the vehicle’s main distinguishing characteristic. A figure interacts with gun, further drawing attention to this feature.
3. The composition is fairly tight, but not stressfully so. After all, this is a fairly peaceful and calm scene.
4. Due to the small, compact nature of the diorama, there really aren’t many places for the viewer’s eye to wander, so it’s easy to direct. The vehicle sits in the visually strongest part of the scene, the gun is front and center. The standing soldier’s gaze points to the vehicle. The vehicle faces the left helping keep the viewer’s eye in the scene.
5. The scene is well balanced. The building and vehicle balance each other both left-right and front-rear. The cow-milking subplot balances the pile of equipment.
6. All elements—vehicle, figures, groundwork, base compliment each other. The building, tree, wall, and fence contain the scene. Warm colors were selected throughout. This helps convey a pleasant, happy setting. Warm colors are those on the red/yellow side of the color wheel while cool colors on those on the blue/green side. The colors selected can help convey emotion (and even temperature) as much as arrangement and groundwork can.
7. There is no dead space. Something is happening or is present everywhere in the diorama.
8. The vehicle does not sit parallel to the base edge. Neither does the building, road, or sidewalk. The building, wall, and tree form a backdrop and partially frame the scene.
9. Again, this commandment does not much apply to this diorama. Other than the “generic” nature of the vehicle and scene, and possibly my selection of some of the colors, no real artistic license is used. Although it should be noted that my style of highlighting and shading is actually a type of artistic license, as are some of the popular weathering methods (such as heavy chipping).
10. I knew what I wanted to do, but I did try various arrangements I decided during the “play with it” stage of composition that I needed something else, and the tree was added. I had also originally planned the halftrack to be behind the cow-milking sub-plot to make the latter more visible, but I found this drew too much attention away from the main point. I also tried various locations for the standing figure until I found the spot I liked best.

Groundwork

I had already decided to model the vehicle with the gun being cleaned. But rather than sitting in a field (or on the steppe), I wanted to create a more “peaceful” or “pastoral” setting. An internet search for photos and ideas yielded a photo of a kit by Miniart that looked like it was just the ticket. Something similar would create an attractive little diorama and would also fit in well with my compositional philosophy. There was plenty of opportunity for adding little details and sub-plots to both enhance the story and add interest. Unfortunately, the kit was in 1/35th and not our beloved quarter scale. That left me the option of building it myself. This was no obstacle—in fact, even had the kit been available in 1/48th, I still probably would have built it myself, anyway—simply so I would have something that was uniquely “mine” rather than identical to what everyone else builds. It is not difficult to create buildings and, by doing it myself, it allowed me to tailor the setting to my specific diorama and gave me a one-of-a-kind creation. On the following pages we’ll see how it was done.



My complete farmyard before the attachment of the vehicle and figures. It was inspired by the photo below—Miniart's boxart photo of their kit 36008 "Italian Villiage Diorama".

Although I changed dimensions and design somewhat, the similarity between this kit and my final result should be obvious.



Top: I was not modeling a ruined building, and no interior was needed, therefore, so I decided to build the structure as a solid block of plaster. Based on my dimensions, I made cardboard mock-ups to ensure all looked correct. Once satisfied, I used the mock-ups as a guide to make mold boxes of sheet plastic. Doors and windows were made from additional strips and blocks and plastic. I made a box for the building, attached shed, and a large sheet of plaster to use for the back wall and any other needs. The inside of the mold boxes were coated with a mix of white glue/water and very fine sand was sprinkled on so the walls would have texture once done.

2nd: The boxes were laid out level. Plaster patching material (from Home Depot) was mixed with water to a thickness where it would sluggishly pour from a cup and the mold boxes were slowly filled. Fill from a corner, slowly, to minimize bubbles. These were set aside to fully cure.

3rd: The next day, the mold boxes were removed. They are one-use only as they must be broken apart to get the plaster forms out. The forms were not perfect—there were a few large air bubbles and some of the edges of doors and windows were damaged when removing them from the boxes. No worries—more plaster can be used to patch them up (it is “Plaster Patch-N-Fill” after all.)

Bottom: The shed was glued to the main building, patching has been done, and any needed sanding was accomplished. The pencil lines mark areas where the plaster covering will be chipped away revealing the stones underneath.



Scale Model Buildings - Resources:

Commercially, there is limited availability in our beloved quarter scale. But that doesn't mean you must make your own—you have plenty of other options.

-Don't forget model railroad stores! "O" Gauge is essentially the same as the 1/48th scale. Complete buildings and kits are available as are all types of accessories. Even if you chose to build your own, you can get ready-made plans from online vendors such as www.scalemodelplans.com

-Many architectural models and supplies are also offered in 1/4 scale, O gauge or 1/48th scale. Check out www.modelbuilderssupply.com for an example.

-Pre-fabricated building material are available in plastic, in a variety of scales and sizes, from such companies as Plastruct and Evergreen.

-I found an outstanding article online by Emmanuel Novallier called "Miniature Building Construction in Foamboard". His work is amazing. Even if you don't adopt this methods, the photos of his buildings are enough to make downloading the article worthwhile.

-The internet is great tool for ideas and research. You can find photos of anything. Architectural website are another source of information. Municipal websites can also be of help—I found a publication put out by the city of Philadelphia called "The Row House Manual" which was invaluable in modeling one for another diorama.

Scale Model Buildings - a Question of Scale:

1/48th is 1/48th, right? No so fast. When making buildings, I usually make them a bit too small. Ironically, I've found that if made strictly to scale, they often appear to be too big. This is especially true of multi-floor buildings. In that instance, I normally shorten each successive floor by a scale foot (or even a bit more)! This is because we are used to viewing tall buildings from ground level where they seem to get smaller as they rise. This shortening of successive floors helps to recreate this perspective even though we look at models from above! It seems strange, but it works. Obviously, if figures are present on these upper floors, they can only be compressed so much.

As mentioned, I also slightly reduce the overall size of the building. In quarter scale, I may actually model the building at 1/50th scale or slightly smaller. I did just that with the building in this chapter—it is actually about 1/52nd scale. These subtle reductions not only keep our composition slightly smaller, they help ensure that background buildings remain in the background in a supporting role and do not, by virtue of size alone, steal the show.

The lesson: like a good magic show, part of diorama making is effective illusion. This once again proves my compositional point that, "Artistic License is Okay."



Top: The marked areas where carefully recessed using a chisel blade in my hobby knife.



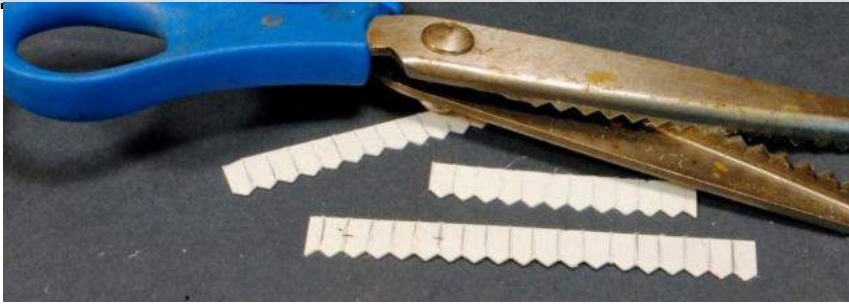
2nd: In the recessed areas, the exposed stones were scribed into the plaster using a dental tool.



3rd: The window and door frames were added using Magic Sculpt two-part epoxy putty. The putty was applied and, while still soft, was cut into irregular stone shapes. Stone texture was added by impressing the soft putty with an actual stone.



Bottom: in preparation for making the roof, shingles and eave trim were made from thin sheet plastic. Paper Edging scissors (from the scrap-booking section of the local craft store) were used to cut the decorative edging into the plastic. Tools are where you find them.



Likewise, the shingles were cut using pinking shears (found in the sewing or scrap-booking sections of the craft store). The lines representing the individual shingles were then scribed into the plastic strips using a triangular riffle file



The support beams for the roof were made from plastic bar and glued into recesses cut into the plaster. Prior to attachment, wood grain was scribed in as shown on page 83. The decorative trim was glued to the supports along the roof line.



For the roofs, sheet plastic was cut to size and glued in place.



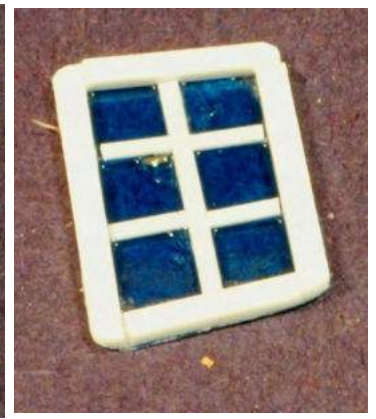
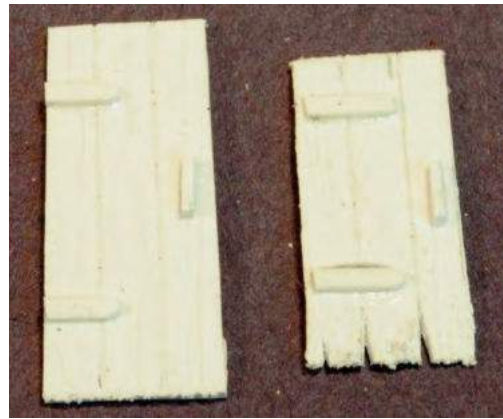
The strips of shingles were glued on in an overlapping manner (each overlapping the previous by about half it's length).

Note: The plastic shingles can be left smooth and painted as slate or tile. Alternately, wood grain can be scribed into them and they can be painted as wood. The shingles can be further distressed, broken, misaligned, etc. to represent a damaged or poorly maintained roof.

The wall along the back of the scene was made from the large sheet of plaster. Details were cut into it in the same manner as was done on the building. Doors and windows were painted black so any gaps would be in shadow.



Doors were made from sheet plastic with the wood grain added. Individual planks were scribed. The shed door was distressed with a hobby knife. The window was made from plastic strip on a backing of clear blue sheet plastic. (This looks good in front of the black backing and hides/disguises the solid plaster behind it)



Doors and windows were glued in place. The shutter was made using the same method. The shutter dog (latch holding the shutter open) is a bit from the scrap bin. The wood fence was cut down from a 54mm Armand Bayardi resin part. The bottom third of the fence was cut away, converting the part from a 54mm waist-high fence with narrow pickets, to a higher quarter scale fence with about 8" pickets.



With the building, vehicle, and figures at least partially complete, the composition could be finalized. Compare this with my "compositional rules" discussed in chapter 4. Note the halftrack is in the visually strongest part of the scene with gun front and center. The figure draws the eye to the gun—the unique feature of this vehicle.





Not Shown: I decided to add a tree behind the wall. This was made as seen in the chapters on the 251/2 and 251/7. The only difference is that the leaves are "Foliage" from Hudson & Allen (now out of business). They are basically just dyed birch catkins. To attach these to the sea foam, the tree branches were pressed into a puddle of white glue (that had been tinted green with acrylic paint) and then rolled in a pile of the leaves. Once dry, it was sprayed with Dullcote to further fix the leaves in place.

The road bricks and pavement blocks were cared in the plaster just like we saw with the 251/1. The steps were made from epoxy putty. Painting started with various washes of oil paints applied directly to the plaster and epoxy putty. Note the various colors used to create a realistic variation. The pavement was colored with washes of Black, Burnt Umber, the two colors mixed, and Yellow Ochre. The building was washed with a mix of Cadmium Red and Titanium White with various amounts of Yellow Ochre mixed in.



Details were painted with acrylic paints. Further color variation was added as was shading and highlighting. Streaks were added with oil paints in the exact same manner as I do on the vehicles. To really make the details "pop", outlining was done in black and the top edges of bricks, stone, and cracks were given a high highlight of a very light color.



Wooden areas (shingles, trim doors, window, and shutter) were painted in various acrylic old wood colors made by mixing various browns and greys.



The flaking and peeling paint on the doors, window, roof trim, and shutter was made using a "reserve chipping" method. First, these areas were given an uneven wash of dark green (a mix of Dark Forest Green and Black).



Next, rather than make chips in the paint, the paint itself was applied by stippling on with a sponge. First was English Ivy Green (AB). This was followed by more layers, each made lighter by adding progressively more Wedgewood Green to the mix.



Next, the pieces were lightly dry-brushed with a mix of Wedgewood Green and Country Tan (AB). Finally, edges were picked out with pure Country Tan (AB) and individual boards outlined with pin washes of Black. The result was a worn, chipping, dirty wood.



The roof was finished by dry-brushing the shingles with Country Tan (AB). The roof was then given a very thin wash of Black oil paint to outline the different shingles. Hinges were given a rusty look by painting them with Brown Oxide. The bottom portion was shaded by mixing some Black and Natural Steel (V) into the mix. A highlight was added to the top edge with Terra Cotta.



All the various "bits" added to the base. Note especially the barrel. Other than the bands, there is no detail cast into the barrel. All the individual boards and wood grain are simply painted. Each board is edged with a high-highlight color with a thin black line between the boards. The boards are painted a variety of slightly different wood colors streaked onto a brownish-grey base to create an appearance of wood grain. The milk canister was painted using Andrea Miniature's "Silver" paint set, consisting of base, highlight, and shadow acrylic colors along with brown, blue, and black acrylic inks. The effect is quite realistic. The milk jug, seats, and barrel are all "O" Gauge model railroad parts.



The rest of the ground work was finished using the same methods described in Chapter 3. The wildflowers are included as part of the pre-made grass clumps and come in various colors.



16

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/10 Ausf. C Field Modification

By Kevin Townsend



Sd.Kfz 251/10 Ausf. C

This variant of the 251 has long been my favorite. Why? In my “first modeling life” (my high school years in the 1970s prior to dropping out of the hobby for about 15 years) I made a model of this variant using the Tamiya halftrack kit and the Tamiya PaK 36 kit—which included an optional mount to fit the gun to the halftrack.

My vehicle was modeled missing a fender and in worn winter camouflage. It was, perhaps, the best model I had made up to that point. It was rife with inaccuracies (most inherent in the kit but some were my unknowing mistakes), but it was certainly the pride of my collection, and was one of only a handful of models I kept as I entered marriage and military. In fact, it survived most of the many moves I made while in the service and did not meet its demise until moving to my current location in New Jersey in 1998! Unfortunately, I have no photos of that old model. I considered making a miniature version of it for this project, but in the end decided I wanted at least one Afrika Korps (DAK) vehicle in the set, and this one seemed to fit the bill. Some of the photos I found during my research inspired me to go with the DAK vehicle.

For this vehicle, based on the “C” Model halftrack, I used the AFV Club kit. I also purchased Gas0.line’s excellent little 251/10 conversion kit. However, this kit represents the “factory” 251/10. I wanted to model one which had made in the field by mounting the standard Pak 36 on the 251. I acquired this gun from Tamiya’s Krupp Protze kit and kit-bashed my version using parts from both Gaso and Tamiya to create the combination of gun mount and gun shield I needed to make this version.

Figures:

As always, a vehicle needs figures in my opinion, and for this vehicle, I turned to Tamiya’s 1/48th Africa Corps Infantry Set (part number 32561). It was perfect for this vehicle. The set is one of the nicest Tamiya has produced in this scale. Two seated figures (one operating a radio) serve well as driver and radio operator with only minor conversion. Three standing figures are suitable as-is. Three other figures (including Rommel himself) are also included in the set as are plenty of accessories—including fuel drums, Jerry cans (both early and late patterns), a tent, two crates, various tarp/blanket rolls, some personal kit, a radio, a radio bat-

tery, and other things most useful. In fact, there is quite enough in this set to provide all the figures needed for a DAK halftrack, and to load it with stowage as well! Which, combined with some aftermarket stowage, is exactly what I did as seen in the photos and captions on the following pages.

This vehicle is an Ausf C. The front machine gun mount and shield are carried where the rear crane mount would normally be—they were interchangeable based on the tactical situation. The side stowage bins are apparently metal brackets welded on the hull with wood between them.

These are NOT 251/7 assault bridge supports - they are placed too far forward and rearward and are the wrong style. In my research, I found one other vehicle, from the same division, modified in a similar fashion. The vehicle bears the insignia of the DAK and the 21st Panzer Division. The eagle is curious. Could the vehicle perform ground-air liaison duties? The DAK did use the 251 for this purpose. If so, the vehicle might need to carry extra radios. The tall antenna in a non-standard location indicates this is possible. One source has the photo taken at the time of battle of El Alamein while another dates the photo after the battle of Kasserine Pass. I believe the former more likely. It appears to be painted a solid color—probably Yellow Brown. Note that the gun carries the full shield—the top is just folded down. This vehicle inspired my model. The North African theatre is fascinating: there are many examples of equipment and vehicles that go against standards and regulations, with field modifications and the use of captured equipment/vehicles being quite common. Colors used are as much what was available as what was regulation. Captured British paint as well as paint borrowed from the Luftwaffe/Italian forces was used.



The most important set for this conversion is the Gasoline 251/10 conversion set. Most of the parts are shown here. Also included, but not shown in this picture is a rack loaded with ammo cans. On the actual vehicle, there were normally two racks, one in place of each rear seat holding 7 cans each. The kit includes one rack, and it holds 9 cans. It is too long to fit in place of the rear seat and must be altered somewhat or relocated—a not impossible scenario in a field modification. Note the resin mold pours that remain attached to the parts. These must be removed very carefully as some of the parts are very small and quite fragile. Detail on the resin pieces is excellent. The kit is designed for the AFV Club halftrack. The driver's compartment roof piece simply replaces the one that comes in the AFV Club kit. No cutting or modification to the halftrack is required to use this conversion set.

DAK Uniform Colors:

The olive drab cotton tropical uniform was similar to the standard uniform but with open collar. Insignia were embroidered in dull blue-grey on tan backing cloth. Neckties and pith helmets were also issued, but seldom worn. Canvas boots (high or low) were issued, but the high boots were unpopular and were often cut-down to make low ankle boots. Sidecaps were available, but the peaked cap was nearly universal—worn whenever possible as the steel helmet was a “cooking pot” in the heat. Helmets, mess kits, and gas mask canisters were normally painted a sand color. Leather equipment was often replaced by olive-colored canvas webbing.

The olive color of the uniform varied widely depending on length of use and different manufacturers’ batches. It ranged from true olive through every shade of khaki, to a bleached sand color. Field caps were often deliberately bleached as an unfaded cap was the sign of a newbie.

The Luftwaffe and Navy had similar uniforms, but these were more golden tan than olive green. Luftwaffe trousers featured a large pocket on the left thigh.

A great deal of latitude was tolerated. Locally purchased scarves were popular and practical, and Italian and captured British clothing was used.



The figures are from Tamiya’s “Afrika Korps Infantry” set. The driver and three standing figures were built stock. The map held by one figure is a piece of folded pewter foil. The radio operator required modification to both legs and the waist to allow him to fit inside the vehicle. His microphone is a piece of plastic bar. Here, he is shown with the driver being test-fitted into the halftrack. When test-fitting, put the overhead piece in place to insure it fits properly! He has been reposed, but no putty work has yet been done to repair the joints.



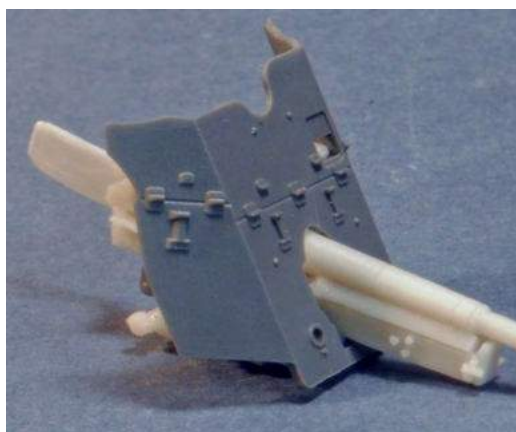
Assembly, Painting, and Composition

Except for the replacement of both rear seats with ammunition racks and the driver's compartment roof with the Gaso part, the AFV Club kit was built stock—including using AFV Club's rubber-band style tracks. The conversion kit, however, was altered. The resin Gaso gun, and a portion of the mount, was combined with the Tamiya full gun shield and mount to create my vehicle.

The vehicle was painted first in Panzer Grey, then the desert colors were applied over this using salt masking as seen in the chapter on Painting and Weathering. The interior was left in panzer grey.

As for composition, I'll leave it to you to compare it to my Ten Commandments. The scene is very straightforward, simply depicting the vehicle in an appropriate setting. Figures include both DAK and Luftwaffe, so this is likely an air liaison vehicle. As to their activity? They are pointing while consulting a map. Perhaps they are planning air support for an attack? Maybe they are lost (not uncommon in the desert) and are looking for landmarks.

The photos show the process.



Above: The gun is a combination of Tamiya and Gaso.Line parts. Both guns are fine - I like the detail on the Gaso gun, but I wanted the full shield, requiring the sight be positioned differently. I used the Tamiya shield and mount with the Gaso gun and sight.

Top Left: This photo (the hull top is temporarily in place) shows most of the alterations made to the vehicle's interior. The roof of the driver's compartment is the Gaso.Line part—it replaces the kit part perfectly. You can also see the additional radio I added right behind the co-driver's seat. This seemed a logical place to put a second radio set. This is the Tamiya part from the Afrika Korps Infantry set. Note that the rear seat stowage bins are in place, but the seats have been left off to fit the ammo racks.

Bottom Left: The sides of the stowage bins were fashioned from plastic sheet with the "L" brackets made from "L" shape plastic strip.

Humanity in the Desert War:

While many campaigns displayed a disregard for humanity peppered with atrocities, the desert war was fought "cleanly", marked by a mutual respect and humanity on both sides. Why? I see two primary contributing factors.

One is the harsh environment all soldiers suffered equally. This shared experience created a common bond. The very nature of the terrain meant population was sparse, and thus civilian casualties were very low. This spared combatants the moral dilemmas encountered in more densely populated regions.

Just as important were the quality of the soldiers and leaders. The soldiers considered themselves an elite. Both sides were led by moral men who respected their enemy and the rules of war. More "barbarous" units—such as the SS—had a smaller presence.

This is not to say that the battles were not fiercely contested. They were fought with great violence—but when the smoke cleared, the prisoners and the wounded could expect to receive fair and proper treatment.

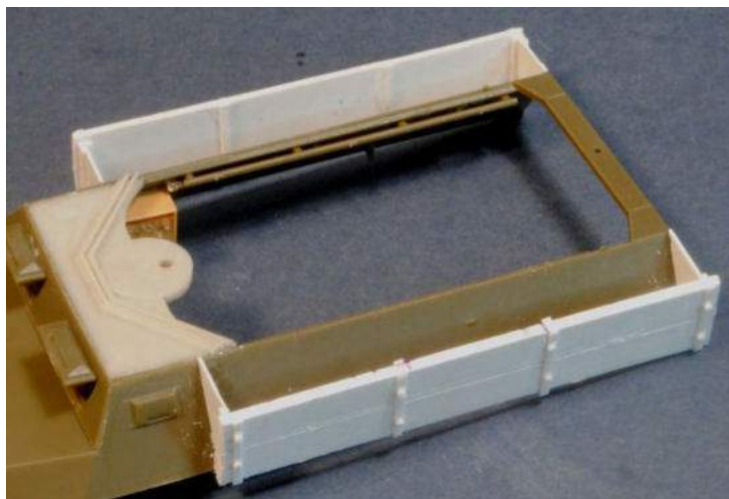
This (relatively) humane conduct of the war is probably a key reason why the campaign has an enduring fascination and is remembered by the participants with less of the bitterness we see in many other theaters of the war.

DUST:

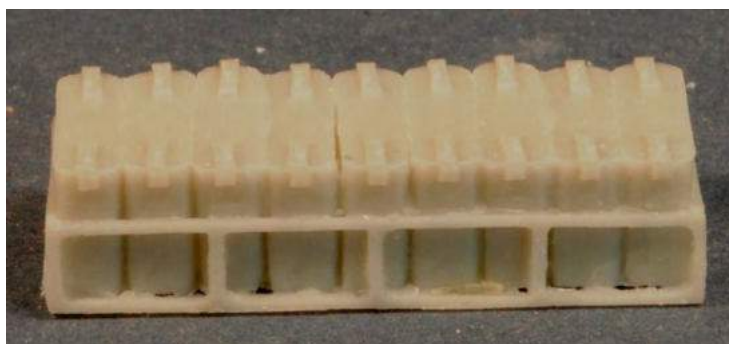
"On 13 March 1941 I transferred my headquarters to Sirte so that I could be closer to the front. In order to save time I attempted to reach this area by airplane. In the area of Tauroga a sandstorm came up. The pilot of the airplane turned around, although I tried to get him to fly on. The trip was then continued by car... Huge clouds of a reddish blue hue obscured our vision and the car crawled slowly along the coastal road. Often the wind was so strong that one could not drive at all. Sand dripped down the car windows like water. It was only with difficulty that we could breathe through a handkerchief held in front of the face and perspiration poured from our bodies in the unendurable heat... In the silence I made my apologies to the pilot of my airplane."

- Rommel

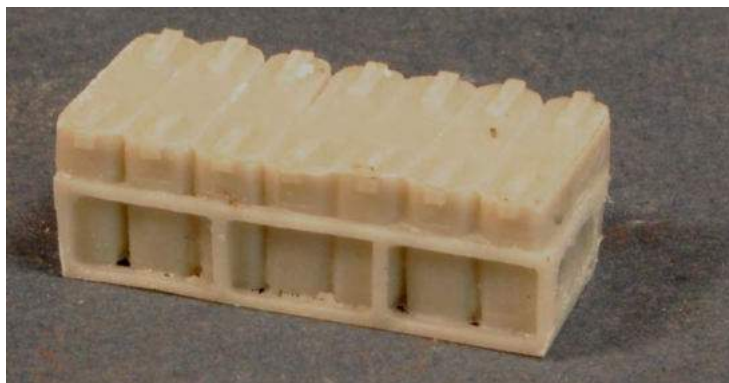
"The "Brescia" and "Trento" Divisions were supposed to attack Tobruk from the west and to raise a great deal of dust in the process in order to deceive and pin down the enemy. During this time the main attack group was supposed to swing around south of Tobruk in a wide arc through the desert and attack from the south-east. The dust which was thrown up deceived the enemy so thoroughly that he guessed that the attack would come from the west and paid no attention to the enveloping movement. When the enveloping group had reached its jump-off positions, their columns were struck by heavy British artillery fire. However, the air was soon full of heat vibrations and gusts of sand blew into the faces of the enemy. Good visibility



The wooden sides of the stowage bins were made from sheet plastic with the individual boards scribed in place. The metal reinforcing strips are plastic strip and the bolt heads are slices of plastic rod. Woodgrain was scratched into the wood with a coarse Dremel sanding drum.



Gasó's ammunition can rack is too long to fit in place of the rear seat.

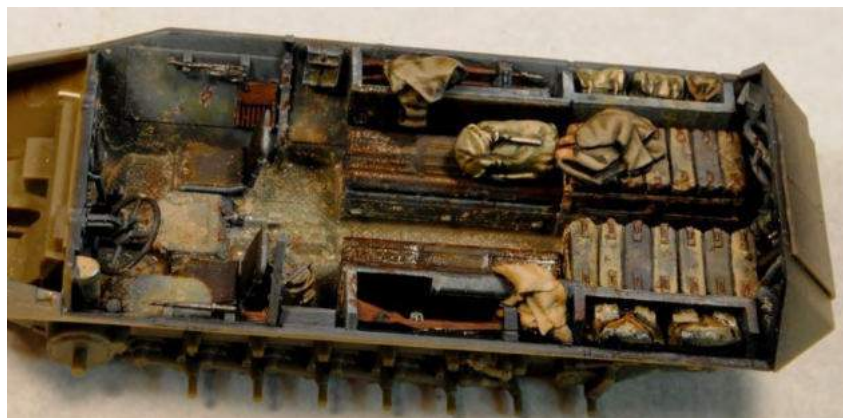


I shortened it by two cans. If both ends of the rack will be visible, you must remove the cans from the middle (and then re-glue the halves back together) to keep the rack symmetrical. Since, in this case, the end closest to the doors will not be visible on the finished model, I simply chopped-off two cans from that end. A one-sided mold was made using Mold Builder (see the chapter on Construction and Detailing) and a second rack was cast.



Cans were painted in various colors. They were all base-colored either Panzer Grey or German Green. Then, most of the cans were painted in a sand yellow color (I used a couple different mixes for this). While still slightly wet, some of the paint was rubbed off for a worn look. Chipping was then added to both the cans and the racks themselves. The edges and latches on the cans were rubbed with pencil lead.

*The interior painted.
In the desert, as I
know from experience,
dust gets into every-
thing. The interior
was given a wash of
dusty-colored pig-
ments thinned with
water.*



*The driver and radio
operator were fitted in
place prior to the hull
being closed up.*



*As the stowage ar-
rangements were com-
plex, everything was
arranged and test-
fitted prior to painting.
A photo record al-
lowed me to remove
items for painting.*



*The vehicle and stow-
age were painted sep-
arately. As the tracks
are the rubber-band
style, they were also
painted separately,
and prior to being
glued into a loop.*



soon vanished completely...

On 11 April the encirclement of the fortress of Tobruk was completed. The "Brescia" Division opened the attack. A great deal of sand was blowing and the British artillery could therefore not be expected to direct any aimed fire...

At about 1300 several enemy tanks moved past Ras el Madauer toward our lines. Because of the tremendous amount of dust, which moreover was being blown toward our positions, it could not be seen whether they were followed by any additional tanks and whether it was really a major attack. Therefore, I immediately committed all the antitank guns which were available in this area. It actually was a major attack and we succeeded in knocking out several tanks and halting the enemy advance...

Around 1800 on 30 April a new attack was opened against Ras el Madauer. Numerous Stukas cooperated with us. Soon the hill was hidden in thick clouds of smoke and dust. The visibility of the enemy was reduced to zero. It was impossible for them to deliver any aimed fire. Our attack led to a complete victory..."

- Rommel

A word of caution about the AFV Club kit: with the tracks and wheels applied, the front wheels sit slightly off the ground. If on a base with ground-work, this will not be an issue as the ground can conform to the vehicle. But if displayed by itself, this will need attention to ensure the vehicle sits level.



16

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/10 Ausf. C Field Modification

By Kevin Townsend



This variant of the 251 has long been my favorite. Why? In my “first modeling life” (my high school years in the 1970s prior to dropping out of the hobby for about 15 years) I made a model of this variant using the Tamiya halftrack kit and the Tamiya PaK 36 kit—which included an optional mount to fit the gun to the halftrack.

My vehicle was modeled missing a fender and in worn winter camouflage. It was, perhaps, the best model I had made up to that point. It was rife with inaccuracies (most inherent in the kit but some were my unknowing mistakes), but it was certainly the pride of my collection, and was one of only a handful of models I kept as I entered marriage and military. In fact, it survived most of the many moves I made while in the service and did not meet its demise until moving to my current location in New Jersey in 1998! Unfortunately, I have no photos of that old model. I considered making a miniature version of it for this project, but in the end decided I wanted at least one Afrika Korps (DAK) vehicle in the set, and this one seemed to fit the bill. Some of the photos I found during my research inspired me to go with the DAK vehicle.

For this vehicle, based on the “C” Model halftrack, I used the AFV Club kit. I also purchased Gas0.line’s excellent little 251/10 conversion kit. However, this kit represents the “factory” 251/10. I wanted to model one which had made in the field by mounting the standard Pak 36 on the 251. I acquired this gun from Tamiya’s Krupp Protze kit and kit-bashed my version using parts from both Gaso and Tamiya to create the combination of gun mount and gun shield I needed to make this version.

Figures:

As always, a vehicle needs figures in my opinion, and for this vehicle, I turned to Tamiya’s 1/48th Africa Corps Infantry Set (part number 32561). It was perfect for this vehicle. The set is one of the nicest Tamiya has produced in this scale. Two seated figures (one operating a radio) serve well as driver and radio operator with only minor conversion. Three standing figures are suitable as-is. Three other figures (including Rommel himself) are also included in the set as are plenty of accessories—including fuel drums, Jerry cans (both early and late patterns), a tent, two crates, various tarp/blanket rolls, some personal kit, a radio, a radio bat-

tery, and other things most useful. In fact, there is quite enough in this set to provide all the figures needed for a DAK halftrack, and to load it with stowage as well! Which, combined with some aftermarket stowage, is exactly what I did as seen in the photos and captions on the following pages.

This vehicle is an Ausf C. The front machine gun mount and shield are carried where the rear crane mount would normally be—they were interchangeable based on the tactical situation. The side stowage bins are apparently metal brackets welded on the hull with wood between them.

These are NOT 251/7 assault bridge supports - they are placed too far forward and rearward and are the wrong style. In my research, I found one other vehicle, from the same division, modified in a similar fashion. The vehicle bears the insignia of the DAK and the 21st Panzer Division. The eagle is curious. Could the vehicle perform ground-air liaison duties? The DAK did use the 251 for this purpose. If so, the vehicle might need to carry extra radios. The tall antenna in a non-standard location indicates this is possible. One source has the photo taken at the time of battle of El Alamein while another dates the photo after the battle of Kasserine Pass. I believe the former more likely. It appears to be painted a solid color—probably Yellow Brown. Note that the gun carries the full shield—the top is just folded down. This vehicle inspired my model. The North African theatre is fascinating: there are many examples of equipment and vehicles that go against standards and regulations, with field modifications and the use of captured equipment/vehicles being quite common. Colors used are as much what was available as what was regulation. Captured British paint as well as paint borrowed from the Luftwaffe/Italian forces was used.



The most important set for this conversion is the Gasoline 251/10 conversion set. Most of the parts are shown here. Also included, but not shown in this picture is a rack loaded with ammo cans. On the actual vehicle, there were normally two racks, one in place of each rear seat holding 7 cans each. The kit includes one rack, and it holds 9 cans. It is too long to fit in place of the rear seat and must be altered somewhat or relocated—a not impossible scenario in a field modification. Note the resin mold pours that remain attached to the parts. These must be removed very carefully as some of the parts are very small and quite fragile. Detail on the resin pieces is excellent. The kit is designed for the AFV Club halftrack. The driver's compartment roof piece simply replaces the one that comes in the AFV Club kit. No cutting or modification to the halftrack is required to use this conversion set.

DAK Uniform Colors:

The olive drab cotton tropical uniform was similar to the standard uniform but with open collar. Insignia were embroidered in dull blue-grey on tan backing cloth. Neckties and pith helmets were also issued, but seldom worn. Canvas boots (high or low) were issued, but the high boots were unpopular and were often cut-down to make low ankle boots. Sidecaps were available, but the peaked cap was nearly universal—worn whenever possible as the steel helmet was a “cooking pot” in the heat. Helmets, mess kits, and gas mask canisters were normally painted a sand color. Leather equipment was often replaced by olive-colored canvas webbing.

The olive color of the uniform varied widely depending on length of use and different manufacturers’ batches. It ranged from true olive through every shade of khaki, to a bleached sand color. Field caps were often deliberately bleached as an unfaded cap was the sign of a newbie.

The Luftwaffe and Navy had similar uniforms, but these were more golden tan than olive green. Luftwaffe trousers featured a large pocket on the left thigh.

A great deal of latitude was tolerated. Locally purchased scarves were popular and practical, and Italian and captured British clothing was used.



The figures are from Tamiya’s “Afrika Korps Infantry” set. The driver and three standing figures were built stock. The map held by one figure is a piece of folded pewter foil. The radio operator required modification to both legs and the waist to allow him to fit inside the vehicle. His microphone is a piece of plastic bar. Here, he is shown with the driver being test-fitted into the halftrack. When test-fitting, put the overhead piece in place to insure it fits properly! He has been reposed, but no putty work has yet been done to repair the joints.



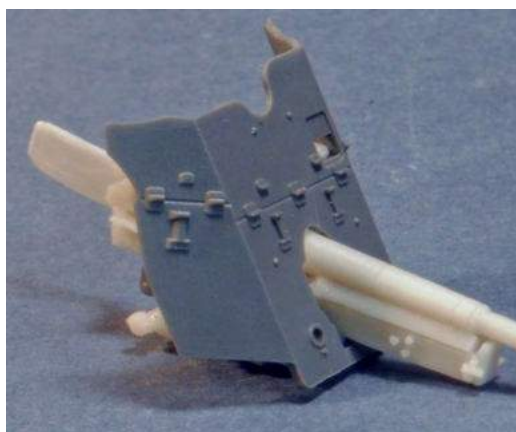
Assembly, Painting, and Composition

Except for the replacement of both rear seats with ammunition racks and the driver's compartment roof with the Gaso part, the AFV Club kit was built stock—including using AFV Club's rubber-band style tracks. The conversion kit, however, was altered. The resin Gaso gun, and a portion of the mount, was combined with the Tamiya full gun shield and mount to create my vehicle.

The vehicle was painted first in Panzer Grey, then the desert colors were applied over this using salt masking as seen in the chapter on Painting and Weathering. The interior was left in panzer grey.

As for composition, I'll leave it to you to compare it to my Ten Commandments. The scene is very straightforward, simply depicting the vehicle in an appropriate setting. Figures include both DAK and Luftwaffe, so this is likely an air liaison vehicle. As to their activity? They are pointing while consulting a map. Perhaps they are planning air support for an attack? Maybe they are lost (not uncommon in the desert) and are looking for landmarks.

The photos show the process.



Above: The gun is a combination of Tamiya and Gaso.Line parts. Both guns are fine - I like the detail on the Gaso gun, but I wanted the full shield, requiring the sight be positioned differently. I used the Tamiya shield and mount with the Gaso gun and sight.

Top Left: This photo (the hull top is temporarily in place) shows most of the alterations made to the vehicle's interior. The roof of the driver's compartment is the Gaso.Line part—it replaces the kit part perfectly. You can also see the additional radio I added right behind the co-driver's seat. This seemed a logical place to put a second radio set. This is the Tamiya part from the Afrika Korps Infantry set. Note that the rear seat stowage bins are in place, but the seats have been left off to fit the ammo racks.

Bottom Left: The sides of the stowage bins were fashioned from plastic sheet with the "L" brackets made from "L" shape plastic strip.

Humanity in the Desert War:

While many campaigns displayed a disregard for humanity peppered with atrocities, the desert war was fought "cleanly", marked by a mutual respect and humanity on both sides. Why? I see two primary contributing factors.

One is the harsh environment all soldiers suffered equally. This shared experience created a common bond. The very nature of the terrain meant population was sparse, and thus civilian casualties were very low. This spared combatants the moral dilemmas encountered in more densely populated regions.

Just as important were the quality of the soldiers and leaders. The soldiers considered themselves an elite. Both sides were led by moral men who respected their enemy and the rules of war. More "barbarous" units—such as the SS—had a smaller presence.

This is not to say that the battles were not fiercely contested. They were fought with great violence—but when the smoke cleared, the prisoners and the wounded could expect to receive fair and proper treatment.

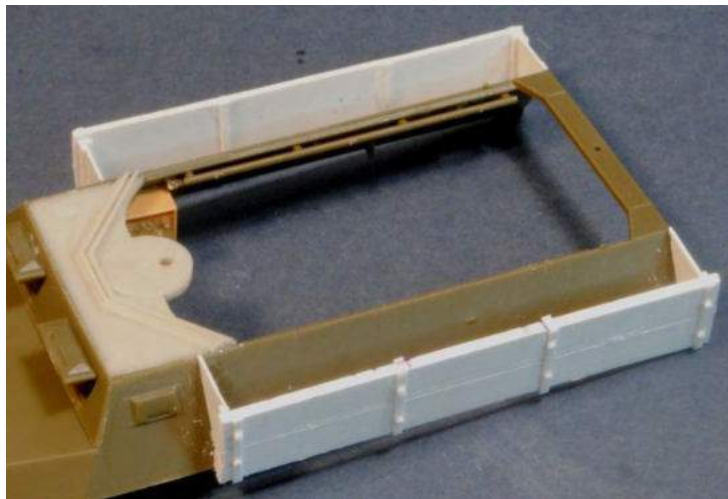
This (relatively) humane conduct of the war is probably a key reason why the campaign has an enduring fascination and is remembered by the participants with less of the bitterness we see in many other theaters of the war.

DUST:

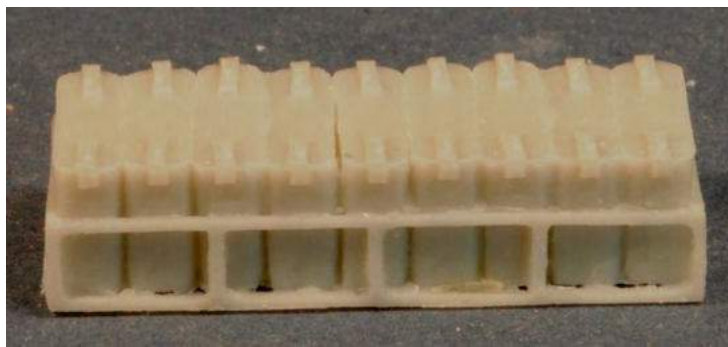
"On 13 March 1941 I transferred my headquarters to Sirte so that I could be closer to the front. In order to save time I attempted to reach this area by airplane. In the area of Tauroga a sandstorm came up. The pilot of the airplane turned around, although I tried to get him to fly on. The trip was then continued by car... Huge clouds of a reddish blue hue obscured our vision and the car crawled slowly along the coastal road. Often the wind was so strong that one could not drive at all. Sand dripped down the car windows like water. It was only with difficulty that we could breathe through a handkerchief held in front of the face and perspiration poured from our bodies in the unendurable heat... In the silence I made my apologies to the pilot of my airplane."

- Rommel

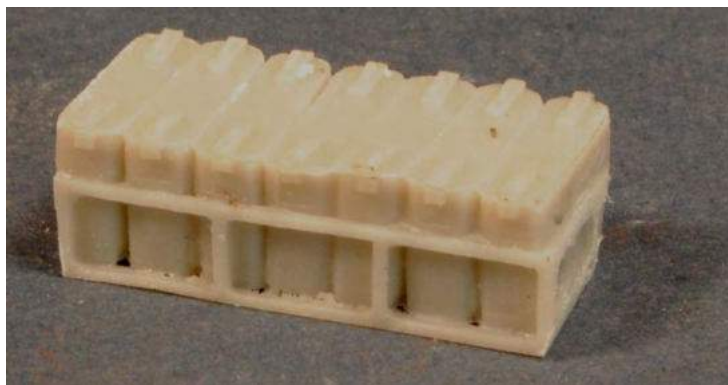
"The "Brescia" and "Trento" Divisions were supposed to attack Tobruk from the west and to raise a great deal of dust in the process in order to deceive and pin down the enemy. During this time the main attack group was supposed to swing around south of Tobruk in a wide arc through the desert and attack from the south-east. The dust which was thrown up deceived the enemy so thoroughly that he guessed that the attack would come from the west and paid no attention to the enveloping movement. When the enveloping group had reached its jump-off positions, their columns were struck by heavy British artillery fire. However, the air was soon full of heat vibrations and gusts of sand blew into the faces of the enemy. Good visibility



The wooden sides of the stowage bins were made from sheet plastic with the individual boards scribed in place. The metal reinforcing strips are plastic strip and the bolt heads are slices of plastic rod. Woodgrain was scratched into the wood with a coarse Dremel sanding drum.



Gasó's ammunition can rack is too long to fit in place of the rear seat.

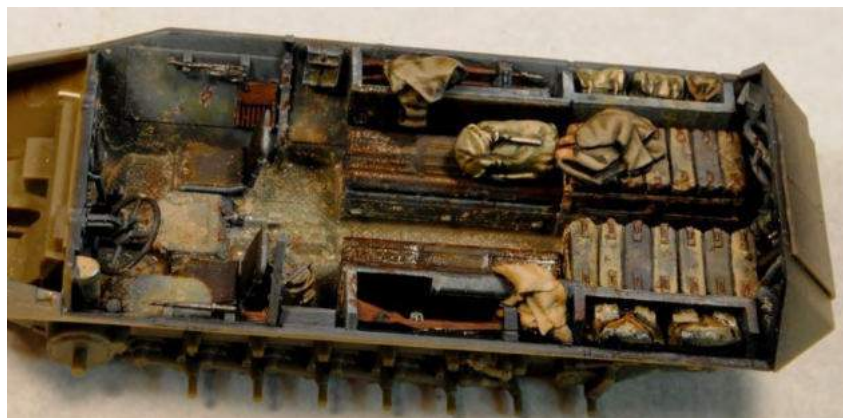


I shortened it by two cans. If both ends of the rack will be visible, you must remove the cans from the middle (and then re-glue the halves back together) to keep the rack symmetrical. Since, in this case, the end closest to the doors will not be visible on the finished model, I simply chopped-off two cans from that end. A one-sided mold was made using Mold Builder (see the chapter on Construction and Detailing) and a second rack was cast.



Cans were painted in various colors. They were all base-colored either Panzer Grey or German Green. Then, most of the cans were painted in a sand yellow color (I used a couple different mixes for this). While still slightly wet, some of the paint was rubbed off for a worn look. Chipping was then added to both the cans and the racks themselves. The edges and latches on the cans were rubbed with pencil lead.

The interior painted. In the desert, as I know from experience, dust gets into everything. The interior was given a wash of dusty-colored pigments thinned with water.



The driver and radio operator were fitted in place prior to the hull being closed up.



As the stowage arrangements were complex, everything was arranged and test-fitted prior to painting. A photo record allowed me to remove items for painting.



The vehicle and stowage were painted separately. As the tracks are the rubber-band style, they were also painted separately, and prior to being glued into a loop.



soon vanished completely...

On 11 April the encirclement of the fortress of Tobruk was completed. The "Brescia" Division opened the attack. A great deal of sand was blowing and the British artillery could therefore not be expected to direct any aimed fire...

At about 1300 several enemy tanks moved past Ras el Madauer toward our lines. Because of the tremendous amount of dust, which moreover was being blown toward our positions, it could not be seen whether they were followed by any additional tanks and whether it was really a major attack. Therefore, I immediately committed all the antitank guns which were available in this area. It actually was a major attack and we succeeded in knocking out several tanks and halting the enemy advance...

Around 1800 on 30 April a new attack was opened against Ras el Madauer. Numerous Stukas cooperated with us. Soon the hill was hidden in thick clouds of smoke and dust. The visibility of the enemy was reduced to zero. It was impossible for them to deliver any aimed fire. Our attack led to a complete victory..."

- Rommel

A word of caution about the AFV Club kit: with the tracks and wheels applied, the front wheels sit slightly off the ground. If on a base with ground-work, this will not be an issue as the ground can conform to the vehicle. But if displayed by itself, this will need attention to ensure the vehicle sits level.



17

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/11 Ausf. C

By Kevin Townsend



Sd.Kfz 251/11

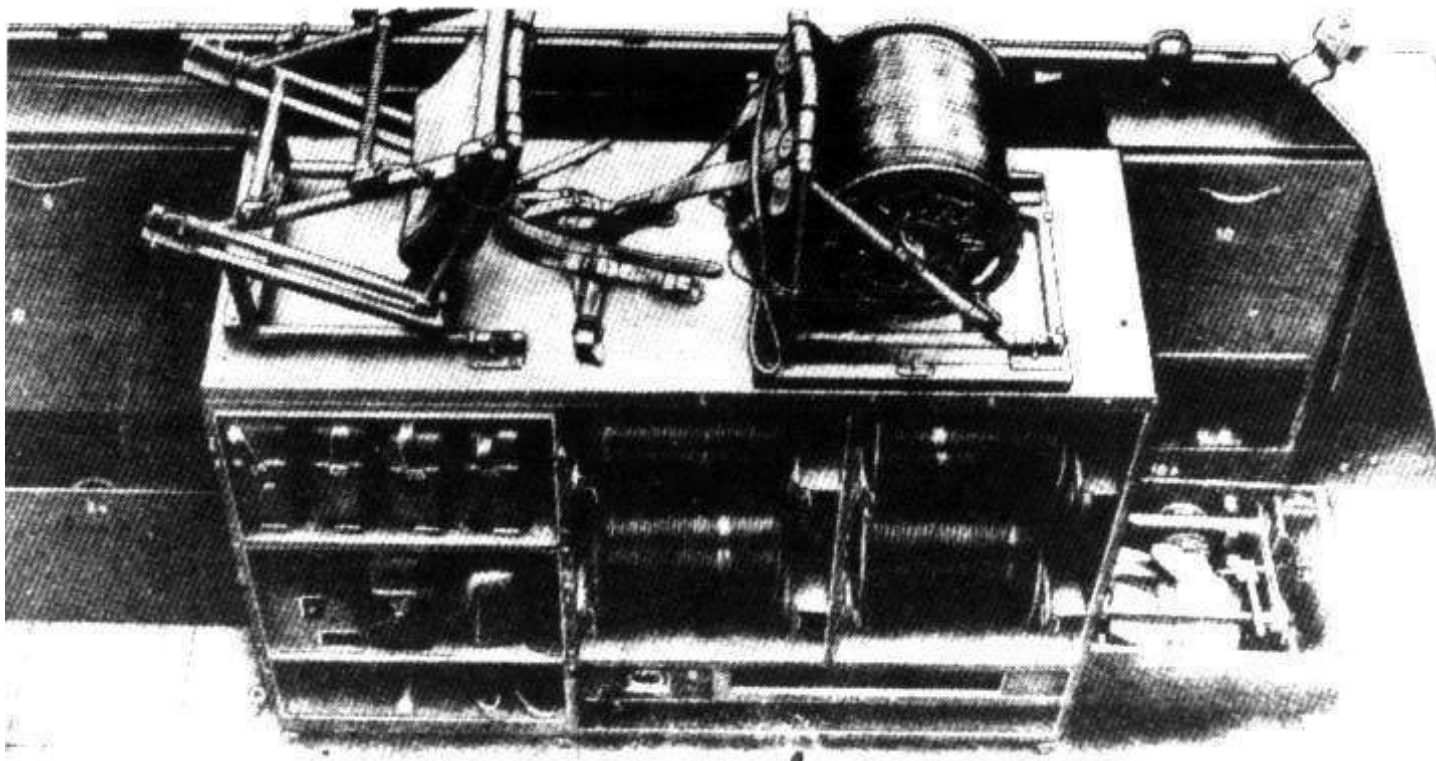
This interesting and fairly rare variant is little known and rarely modeled. To my knowledge there are no kits or conversion kits of this vehicle in quarter scale—and only one conversion kit exists in the bloated 1/35th scale.

The good news is that the conversion is simply a “drop-in” requiring no changes to the donor AFV Club Ausf C kit. All that is needed to leave out the seats, rifle racks, and seatback stowage bins on the right side.

In the photo I used as my inspiration (on the facing page), the wire is being strung in trees (a very common practice). I chose to depict the vehicle stringing wire on poles only because that is more immediately recognizable and understandable by the general viewing public.

How this relatively simple conversion was done is shown on the following pages.

Assembly



Above: The interior "office" of the 251/11. The right side bench seats were replaced by various cabinets, racks, field telephones, and wire reels

Right: Soldiers on the engine deck string wire using the long pole (with hook) and wire reel attached to the front right fender of this 251/11. While the fitting to mount a rack is present, no wire reel is fitted to the left fender on this example.



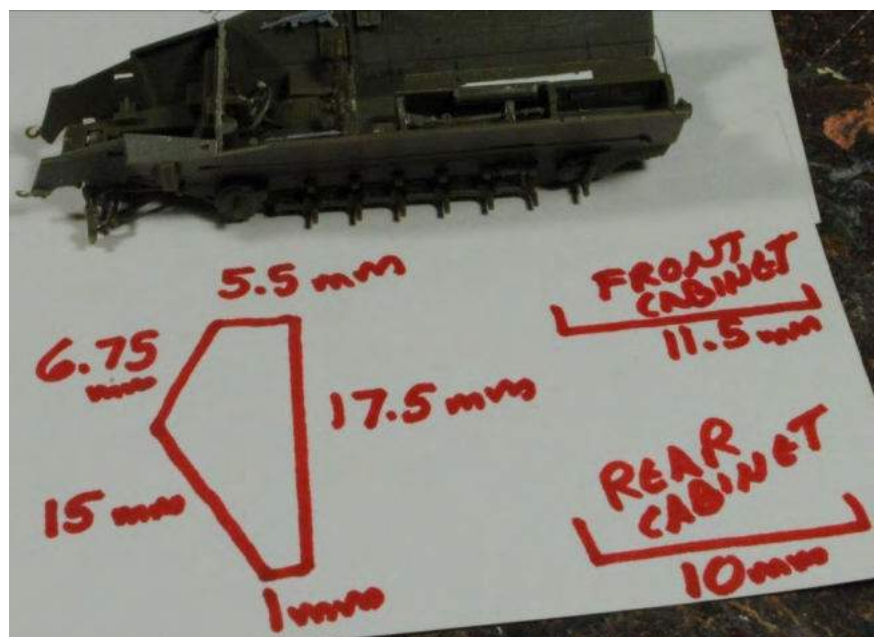
Top: The interior of the kit is built as normal except the fittings on the right side of the fighting compartment are left out. I replaced the tiny AFV Club MP-40s with more properly scaled Tamiya pieces.

Second: To my knowledge, there are no scale plans for the Sd.Kfz 251/11. The good news is that in the Panzer Tracts book, there is a clearer copy of the photo seen in the center of the last page. In that clearer photo, the floor plates are clearly visible. Using the floor plate marked by the red arrow below (this plate is visible in the photo, in the scale drawings of the 251/1 in Panzer Tracts, and on the AFV Club kit), I was able to scale the racks and determine where they should be placed. My results are shown in this photo.

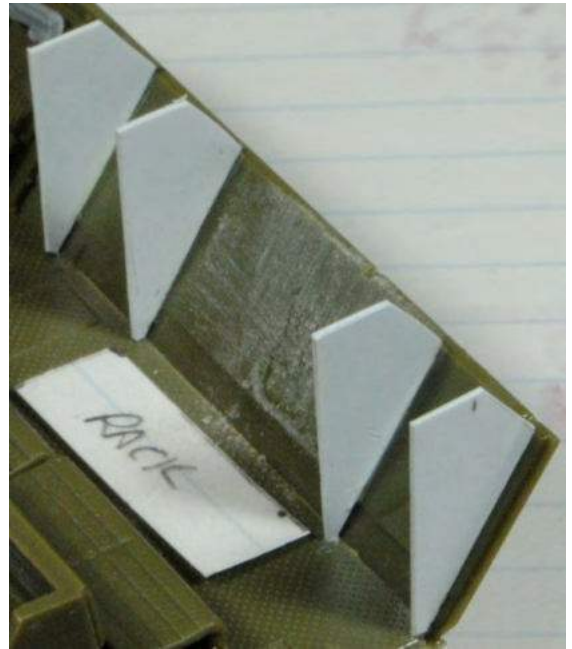
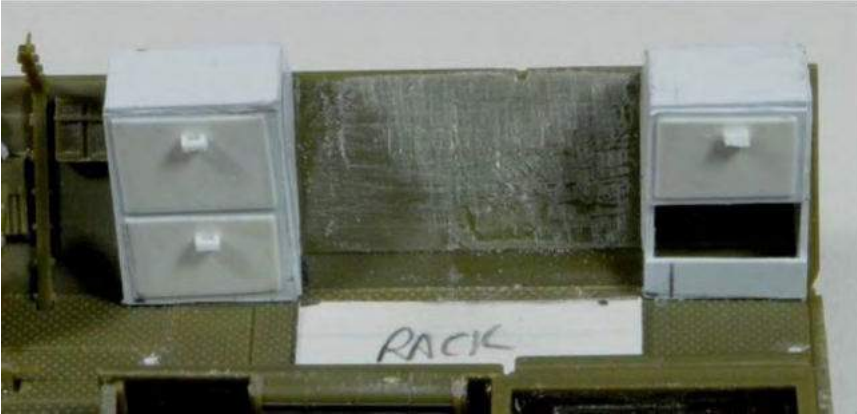


Left In an earlier chapter (251/20) we saw the interior hull angles on the Tamiya kit. Those on the AFV Club are very slightly different. The angles, according to my measurements, are shown here.

Right: More dimensions and scaling: In this case, the sizes for the cabinets along the hull interior right side. Once the size was determined, the parts were cut from sheet plastic. Pencil lines drawn on the hull side marked the location of the cabinet sides.



The sides of the cabinets were glued in place first. Once these were dry, the remainder of the cabinets were built using sheet plastic. The doors are very thin sheet plastic and the handles are small "U" channel strips.

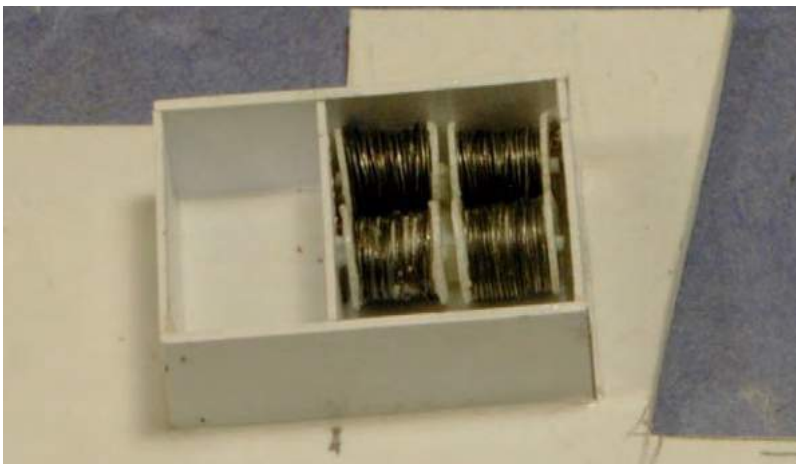


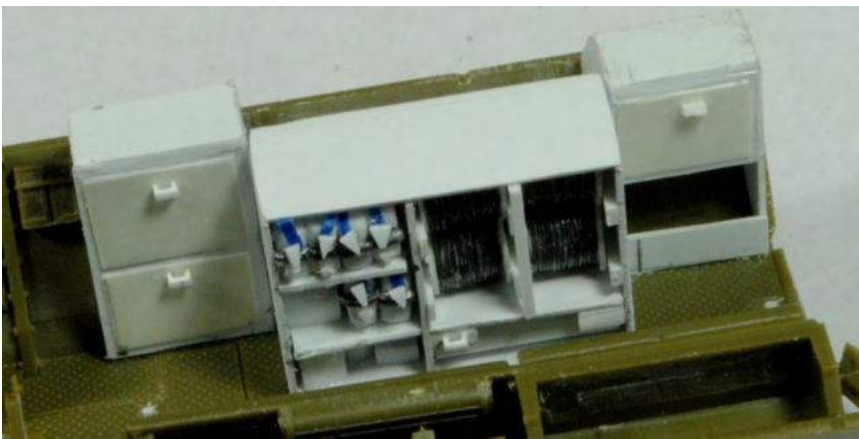
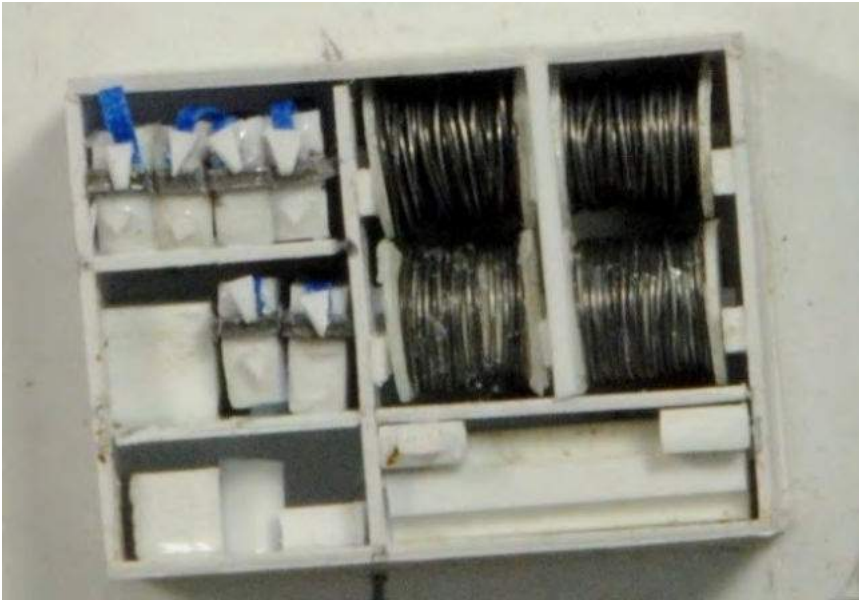
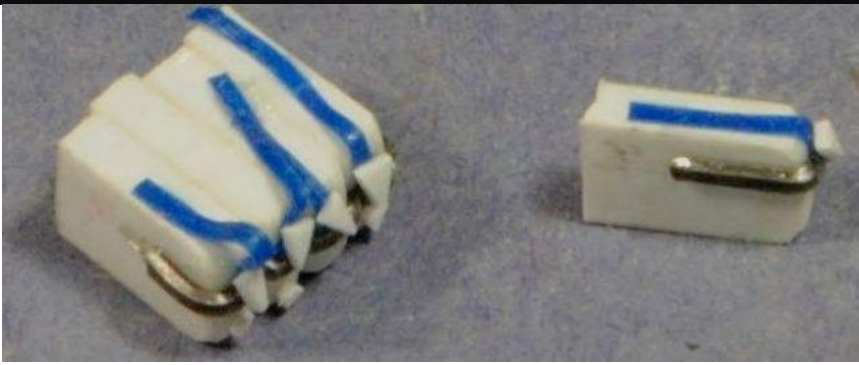
The reels stowed in the cabinet inside the vehicle will not have visible ends, and therefore do not need to be detailed.

Left: While I initially tried to cut these from thin sheet plastic with a circle cutter, I was having difficulty getting good circles in such a small size. As luck would have it, I found a hole punch which makes 6mm circles—the exact size I need.

Above, for the reel itself, I used the largest diameter plastic rod I could to minimize the amount of wire I needed. With a large enough rod, only one layer of wire was needed. The axles were simple slices of thin plastic rod.

Below Left: The cabinet side were glued to a piece of sheet plastic forming the backing. It will be cut to size once the cabinet has been constructed. The reels were glued in place, followed by the central vertical partition.





Top Left: The field phones will only be visible from one end, so only that end needed detailed. The phones were cut from plastic bar stock and shaped. They were detailed with sheet pewter (the flange were the top overlaps the body), bits of plastic (the crank cover and sling attachment) and painters tape (the slings).

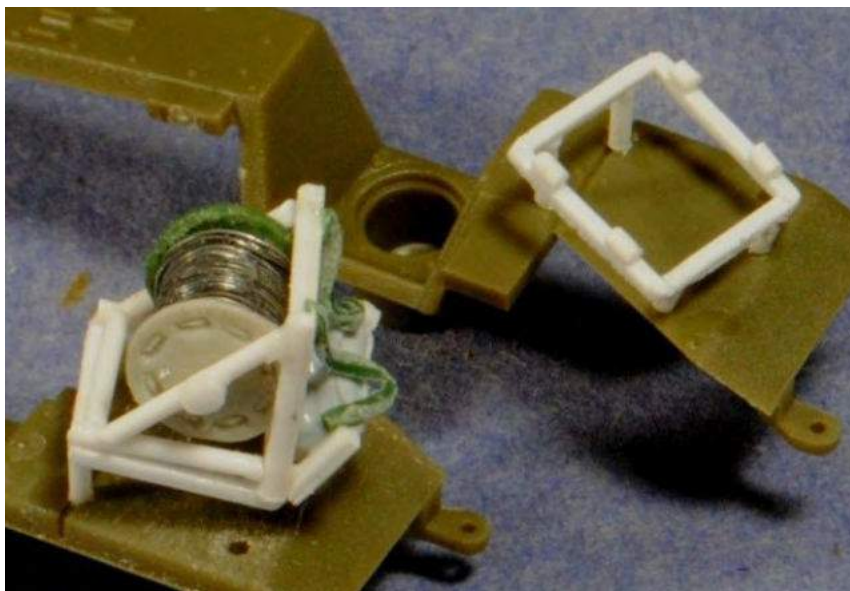
Middle Left: The remaining shelves and phones were put in place. The bottom areas were detailed with bits of plastic to mimic the reference photo.

Bottom Left The cabinet was cut from the backing and fitted in place in the halftrack hull.

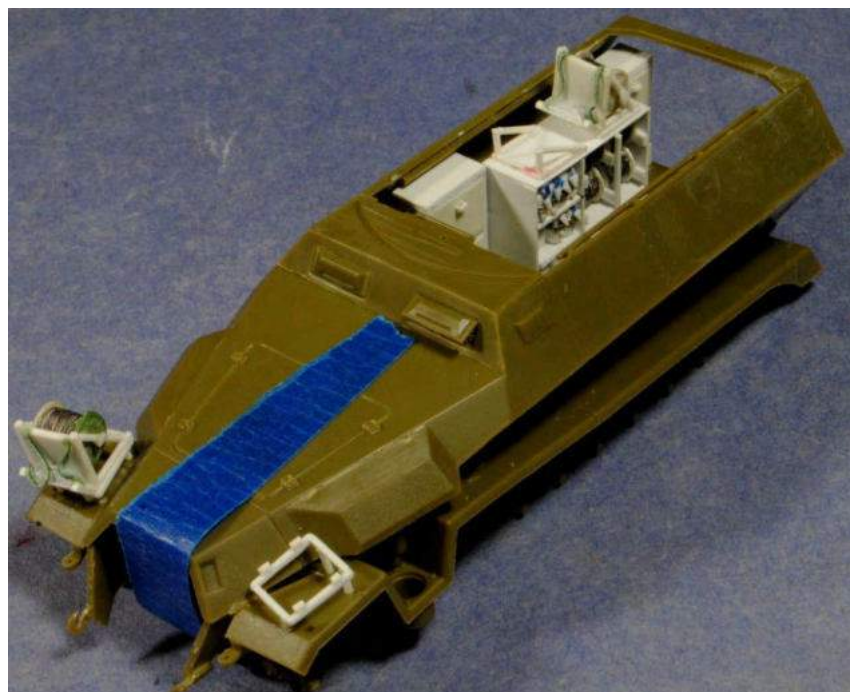
Right: The tiny ends for the telephone cable reels were stamped from epoxy putty (both Duro and Magic Sculpt worked equally well, although the Magic Sculpt ends were quite brittle and fragile). An oval stamp was fashioned by mashing a brass tube with pliers. The overall size stamp was a length of aluminum tubing. The result was tiny and basic, but passable, cable reel ends.



Other than the more detailed ends, the cable reels were made in the same fashion as those stowed in the cabinet. The frames and mounts were made from various lengths of rod and bar styrene stock. The straps for the reel frames were made from rolled-out Duro epoxy putty.



The mounts and frames fitted to the vehicle fenders.



A test fit to make sure everything plays nicely together. With this, the conversion work need to turn the vehicle into a 251/11 is complete and painting can begin.



Figures

In the photo I used as inspiration, it appears the crew are wearing improvised white winter garments over their standard uniform. I followed suit by posing figures using legs featuring low boots and gaiters with upper torsos from the Tamiya winter figures included with the halftracks. Unneeded details were carved and cut away. Skirts were fashioned from Magic Sculpt rolled-out thin. Other details were created with Magic Sculpt.

Top two photos: In these photos we see the crew figures posed and the skirts added. Most of the figures are posed in a manner similar to, but not identical, to the photo I used as inspiration. The figure sitting on the rear hull is considerably different. I have him looking toward the viewer to draw them into the scene.

Bottom two photos: The figures after all conversion work but prior to painting. As always, the figures and interior were painted, and the driver fitted, prior to joining the top and bottom hull halves.

Composition

The photo shown earlier in this chapter was the inspiration for my composition. Many elements from this photo were used—the type of vehicle, activity of the crew, placement and poses of the crew, uniforms, vehicle finish, and so on. To give the viewer the best view not only of this activity, but also the 251/11 specific equipment in the interior of the vehicle, I posed the vehicle so that primarily its left side was toward the viewer. This had the added benefit of having the vehicle move right to left—against the grain of viewer as we have already seen. Thus, the photo pretty much as is satisfied most of my “Ten Commandments of Effective Composition” requirements.

There was one area where I made a

changed based on artistic license. As was common practice, in the photo the crew is stringing telephone wire in the trees. I chose to replace the trees with poles. That way, the uninformed viewer will be able to immediately grasp what is going on. The poles scream “telephone” while trees do not.

The groundwork in this instance tells us the weather and season. Being winter, this likely means the unit is preparing for defense (where telephone would be the primary means of communication). Armored units were often kept in reserve to counterattack and stop any breakthrough. Therefore, this vehicle is likely stringing line to a second line or staging area location.

Painting and Weathering

Painting and Weathering was done using my normal methods. As the winter white is not very worn, it was applied directly over the black primer layer. Some wear and chipping was recreated with an appropriate Panzer Grey color. In line with my inspiration photo, weathering was kept to a minimum.

Groundwork



A snow mix was made from a mixture of Woodland Scenics “Snow”, a bit of the old, out of production Hudson & Allen “Snow” (I have a limited supply of this wonderful stuff, so use it sparingly), white glue, a bit of Future for a melting, wet look, and finally water. This is seen in the top photo.

The snow was troweled on the appropriate areas. As it is quite wet, it self-levelled itself sufficiently. Static grass clumps (from Silflor) were pressed into and partially covered by the snow. The wet, melting border between the snow and ground was lined with a mix of Future, water, and Autumn Brown acrylic paint. Some of the paint wicked into the snow mixture, adding to the realistic look of snow melting into mud.

This process was continued until I had the amount of snow and the look I was after. This is seen in the bottom photo.



The utility pole was made from a piece of plastic rod with woodgrain scratched in with a coarse sanding disk. Insulators are also bits of smaller plastic rod shaped as needed and attached with bent paperclip wire. A pin for mounting to the base was glued into a hole drilled up into the pole. The wires were fashioned from...wire!



19

"Project 251" Modeling the Sd.Kfz 251



2cm Flak 38 auf SPW

By Kevin Townsend



2cm Flak 38 auf SPW (Sd.Kfz 251)

This variant is likely one of the most well-recognized of the 251s. Everyone knows it's an Sd.Kfz 251/17 Ausf C... except it isn't. It was produced, used, and passed into history before that designation was even created.

This vehicle, widely known as a 251/17, was never so designated. It was produced only in very small numbers (less than a dozen) and equipped only the Herman Goering Regiment (later Hermann Goering Panzer Division). Still, it is perhaps one of the most recognized versions of the 251. This is probably due to its unique appearance with its complex design of bulged hull sides able to fold down into a fighting platform, and the fact it was extensively photographed by German war correspondents, perhaps leading to the impression it was more common than it actually was.

It was the unique folding side feature of the vehicle I wanted to spotlight in my depiction. Thus, I wanted a scene with the crew in the process of preparing the vehicle for action or a scene where one side of the vehicle faces an obstacle. This would allow a display where the vehicle had one side still in the up position while the other side was folded down—showing both aspects of this interesting and unique vehicle.

The base kit must be the now out-of-production AFV Club 251 Ausf C. Gaso Line makes a detailed conversion kit with all the parts needed to create this rare vehicle.

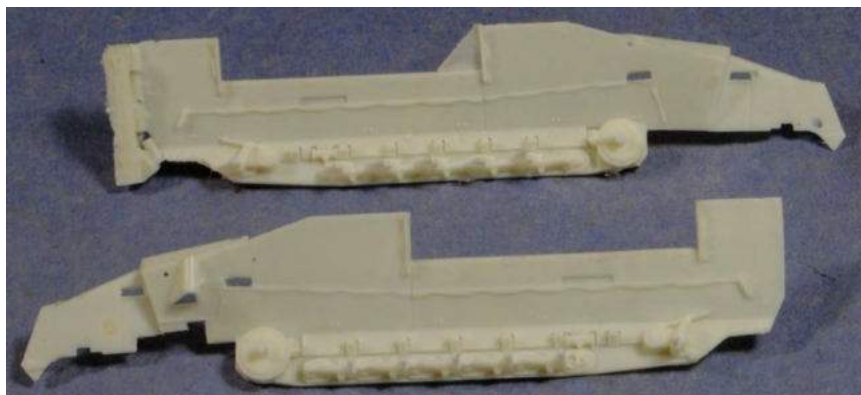
The vehicle was built and painted using the methods already described.

Construction, Painting, and Weathering

We saw a brief review of this kit in the Chapter on available kits. This is an excellent release by Gaso and includes everything necessary to create this vehicle using AFV Club's 251. No cutting is required—everything is a drop-in fit simply replacing the applicable kit parts. The set also includes a nice turned metal gun barrel for the flak gun (the gun itself consists of the plastic pieces from ACE model) and are included in the Gaso kit.

Construction was done as seen on the following pages. The vehicle was painted and weathered using my normal methods. As this was a Luftwaffe vehicle, Luftwaffe tropical colors were used.

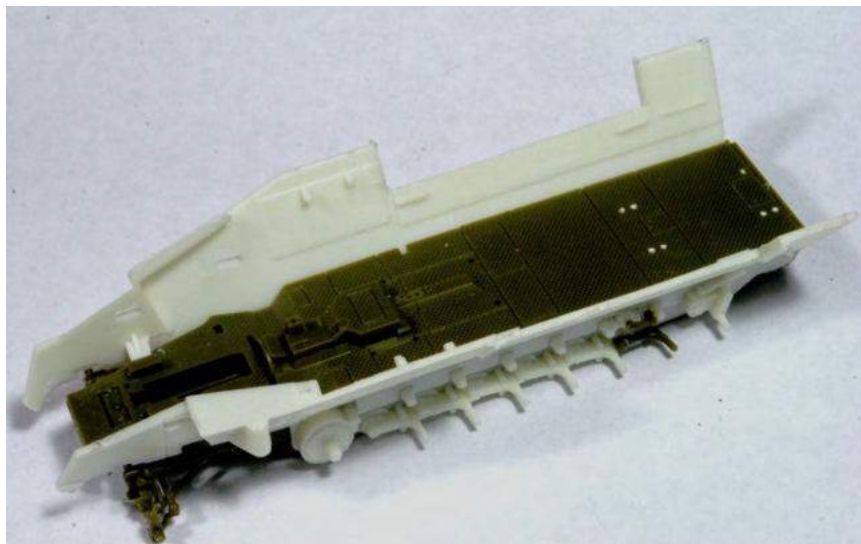
The Gaso Hull sides before clean-up (top) and after clean-up (bottom). The parts were not warped, but there were mold pour blocks and some flash to remove. Some pinholes needed filled.



Axles and mounting points (arrows) have excess triangular resin pieces left from the molding process. There MUST be removed or parts will not fit correctly.



With care, the replacement hull parts fit very well to the AFV Club parts. Note the holes in the floor to mount the seats are not needed and have been filled with .88mm plastic rod. The front holes still have to be filled.



The Luftwaffe's "Hermann Goering" Division:

Originally formed as a Special Police Battalion in 1933 when Goering was Chief of Police for the Berlin District, it was incorporated into the Luftwaffe as the "General Goering" Regiment in 1935. Units of the regiment participated in the Norwegian campaign and during the assault on the Netherlands and Belgium – the flak units' 88mm dual-purpose guns took a deadly toll on British and French armor.

The regiment was upgraded to a motorized regiment and renamed "Hermann Goering" prior to the invasion of Russia in which it took part. In 1942, it was upgraded to a division - organized similar to a Panzer Division. The unit was dispatched piecemeal to Tunisia, where the bulk of the unit went into captivity following the Allied victory. Those units which escaped were combined with elements still in France and Germany to reform the division, which then into action in Sicily.

After the fall of Sicily, the division participated in the Italian campaign until July 1944 when it was redeployed to the Eastern Front. It fought against the Soviets for the remainder of the war. At the end of the war, the division attempted to make their way west in order to surrender to US forces, but most were captured by the Soviets.

Combat Use of this Unique Vehicle:

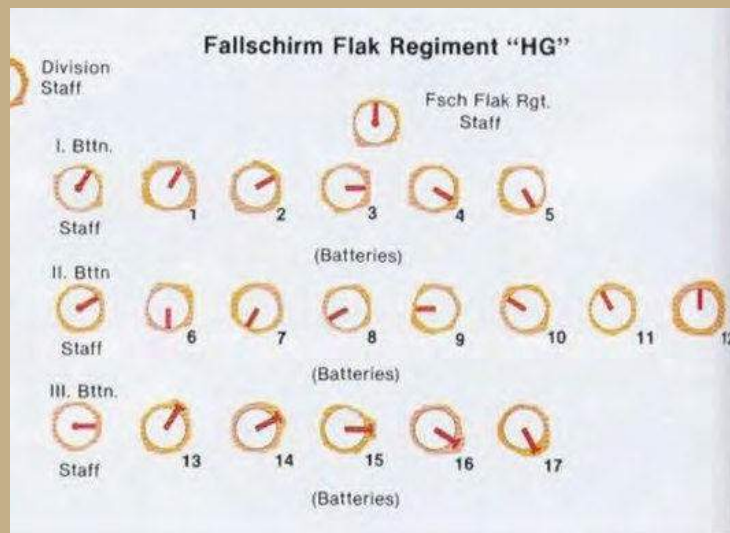
Where these vehicles saw action is a subject for debate. Most photos of them were taken in Germany during their initial training after issue. When the Herman Goering Division deployed to Sicily in 1943, I believe they took the vehicles with them. One stated that one vehicle was lost in an accident, but the other nine deployed to Tunisia with 18 Batterie Flak Regiment "Hermann Goering" in early 1943. Most other references are silent on the use and fate of these unique vehicles. While an internet source, by itself, may not be the most reliable source, there is other circumstantial evidence to support this position.



Most photos of the vehicle were taken in Germany during testing and training. Photos in action are rare, and the vehicle's combat use is the source of debate. These photos may have been taken in Tunisia. The vehicles paint and the crew uniforms (possibly Luftwaffe tropical) and terrain seem to so indicate. Information with the photos, while not able to confirm the Tunisia origin, did state some other photos on that roll of film were clearly taken in Tunisia. If, in the fact, the vehicles did deploy there, they were likely destroyed or abandoned—they were almost certainly not evacuated. However, in many sources, this (and similar) photos are captioned as being taken in Sicily or Italy. I believe the only reason for this is the possibly mistaken opinion the vehicles later served on the Eastern Front. This opinion likely comes from the mistaken identification of this vehicle as a 251/17. If taken to Tunisia, the vehicles were almost certainly lost there. It is, however, possible the vehicles did not deploy to Tunisia but instead joined the newly formed division in Sicily. If so, the captions indicating these photos were taken in Sicily or Italy are correct. Color plates based on these photos, show green camouflage over yellow.

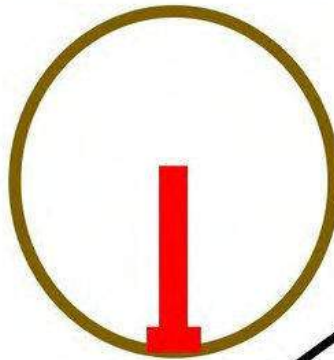


Although the organizational chart shown on the next page (from Bruce Culver's "Panzer Colors III" shows only 17 batteries assigned to the Flak Regiment, other sources make it clear there were 18. A listing of units available to Generalmajor Schmid for an attack in April, 1943 (Operation "Fliederblute" or "Lilac Blossom" - a spoiling attack to delay the Allied advance on Tunis) shows the following units from the Herman Goering Division available—including an 18th battery:



Battery 1-12, no bar
Battery 13-17, bar

A hypothetical 18th
Battery would look
Like this:



Looks to me this marking has the bar



The org chart from "Panzer Colors III" by Bruce Culver shows only 17 batteries, but take a close look at the tactical marking on this halftrack (a detail of the photo from the previous page) It certainly appears to carry the tactical marking of the 18th Battery. Such a battery is confirmed as having been in Tunisia with the regiment. While that does not definitively prove these vehicles served there, on balance the evidence shows they apparently did.

- 5th Light Infantry Regiment HG
- 1st Battalion, 1st Grenadier Regiment HG
- Elements of Flak Regiment HG
- 14th Company, 1st Grenadier Regiment HG
- 18th Battery, Flak Regiment HG
- 1st Company, Armored Pioneer Battalion HG
- 2/3rds of 4th Company, Armored Reconnaissance Battalion, HG

I believe this evidence all points to the deployment of these unique vehicles to Tunisia. Assuming they went to Tunisia, they were likely lost there. While some personnel were evacuated to help form a new division in time for the invasion of Sicily, all of the vehicles and heavy equipment were left behind to be captured or destroyed.

Marking options in kits depicting vehicles on the Eastern Front in 1944 must surely stem from the misidentification of this vehicle as a 251/17. Strength reports from the Hermann Goering division on East Front certainly list 251/17s during this later period, but I see no reason to assume there were anything other than the standard production 251/17 variant of the vehicle.

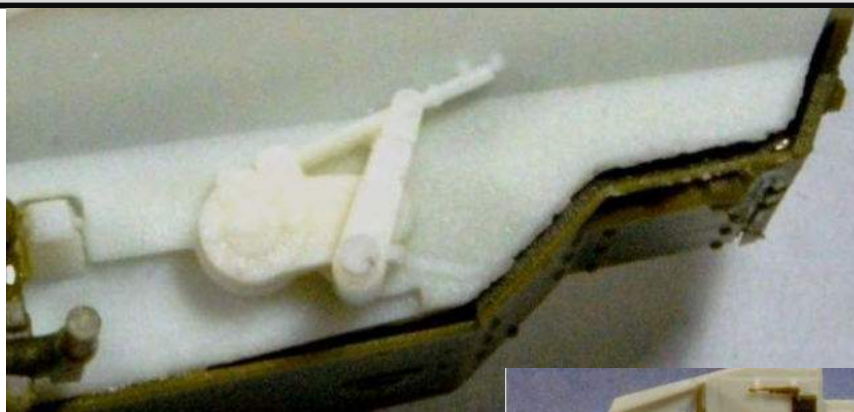
Hermann Goering Division Tropical Uniforms:

In North Africa, Sicily, and Italy the unit wore Luftwaffe tropical uniforms. These were Golden Tan rather than the Army's Olive Green. The uniform consisted of a four pocket tunic with pleated breast and bellows skirt pockets. The collar was worn open with no collar patches. The "Hermann Goring" cuff band was often worn on the right sleeve. The most popular trousers were baggy, gathered at the ankles, and had a large pocket on the left thigh. Shorts were also available.

While Army-style peaked caps were popular and often acquired by private purchase, they were seldom issued. The Luftwaffe had a cap complete with cloth peak that had a detachable skirt that hung down over the neck providing protection from the sun.

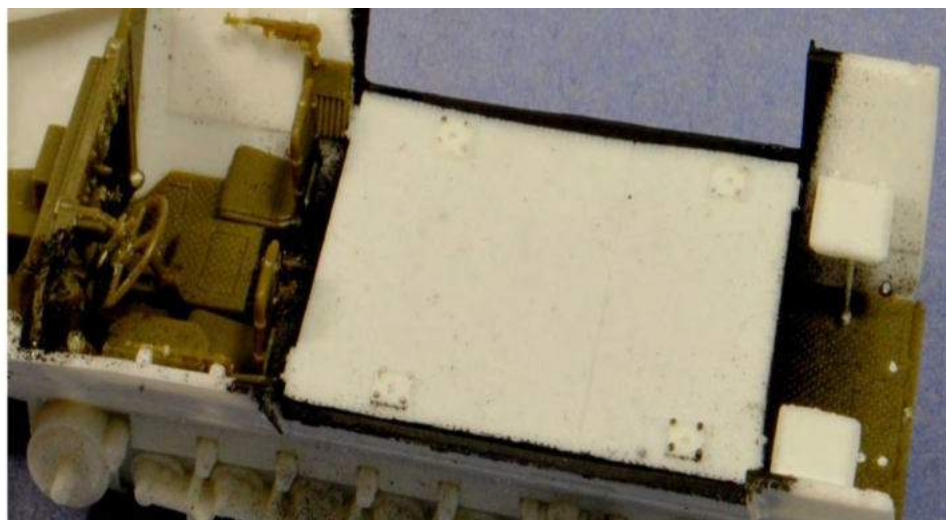
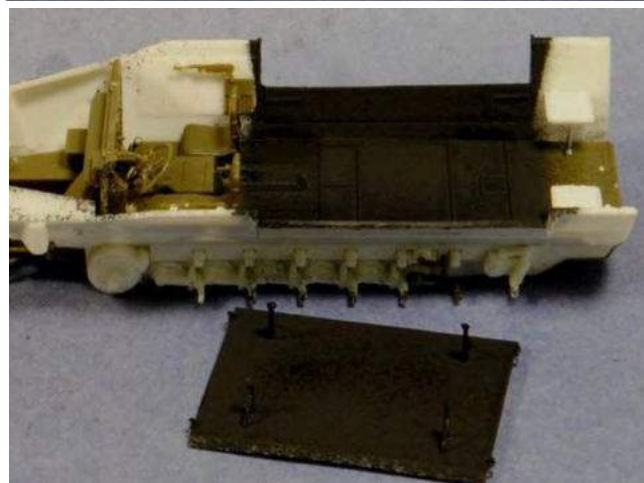
From July 1942, the unit used SS camouflage items, although these were never universally issued. Latter, the SS patterns were gradually replaced by items made in the Luftwaffe's splinter camouflage.

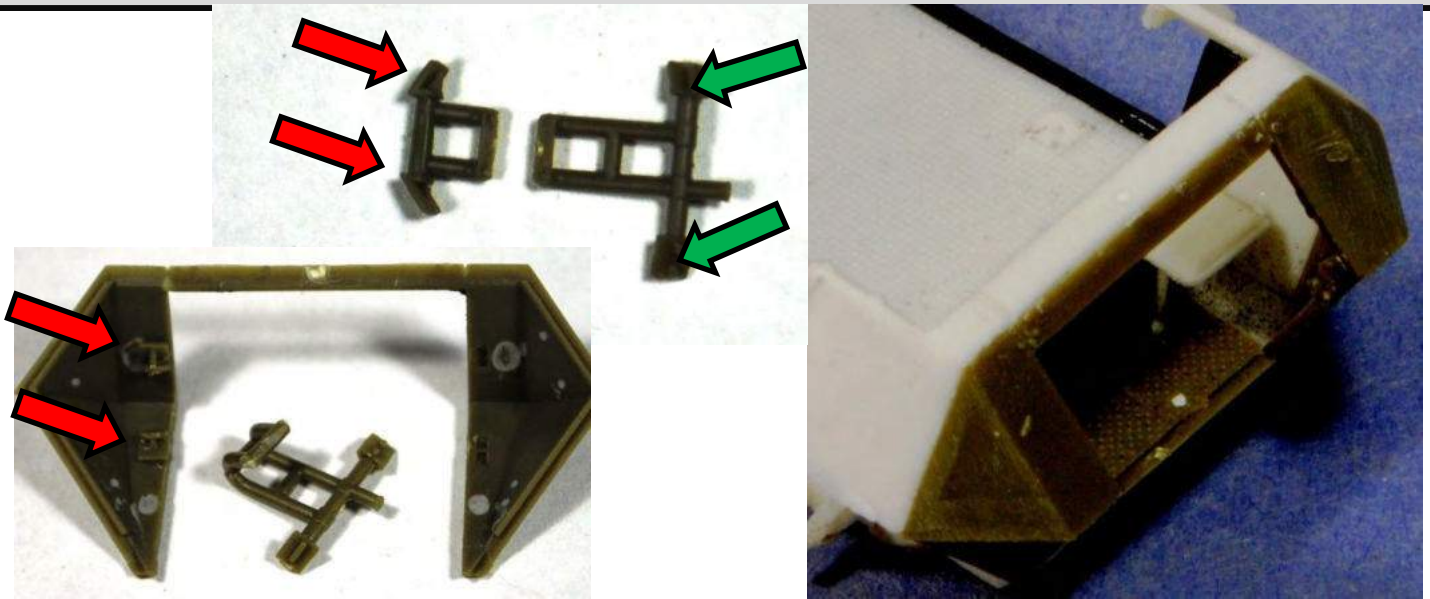
See page 83 for some painting guidance on Luftwaffe tropical uniforms.



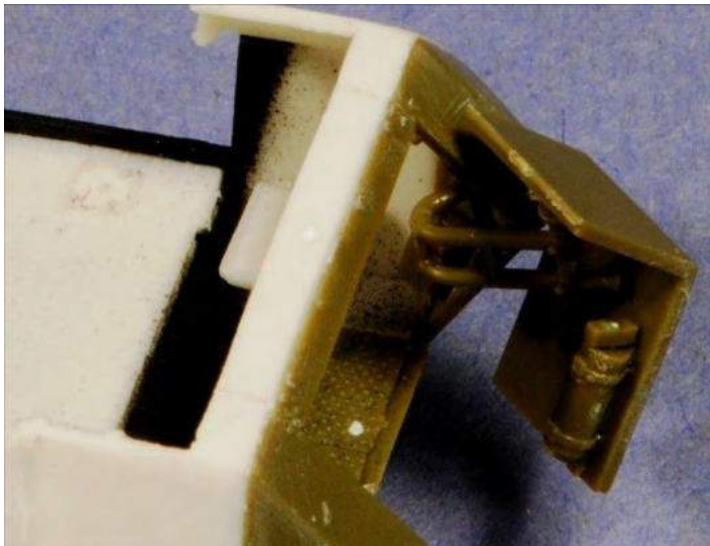
A small gap was present on the rear of the lower hull as seen here. This was simply filled with a bit of Magic Sculpt.

The raised floor and the support brackets were assembled prior to placement in the vehicle (right). As the area underneath it will be very difficult to reach, it was pre-painted in black prior to the floor being fitted into the vehicle. That way, any areas that cannot be reached for painting later will be in an appropriate deep shadow color.

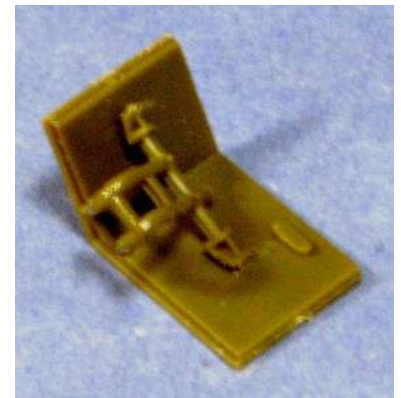




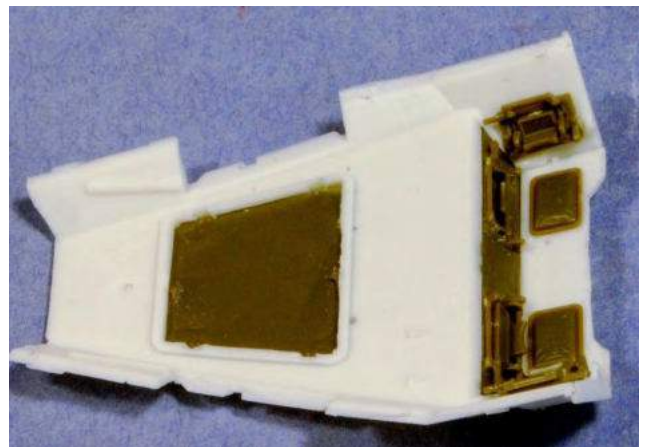
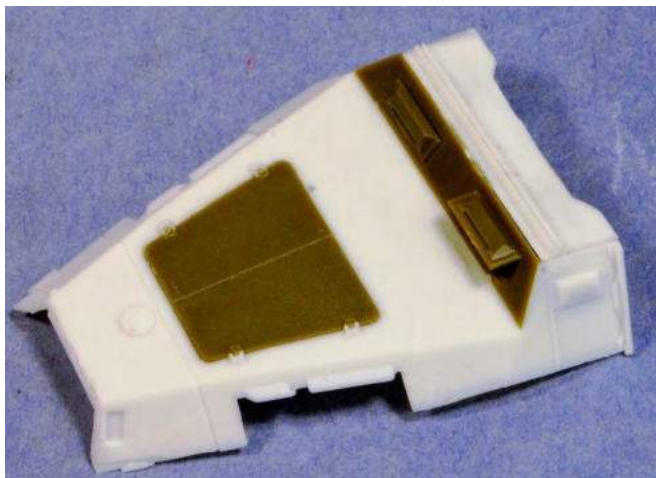
Even though the doors are molded as separate pieces, the hinge mounts are molded as part of the hinges, giving the modeler only one option for the doors—closed. To open a door, the hinge mounts on the hull must be removed (above left, red arrows). Optionally, the mounts on the doors can also be removed (green arrows). The hinges are then assembled and the cut-off mounts glued to the hull (and doors) as applicable (left). At this point, I attached the rear upper hull and rear clamshell. I did this prior to painting the interior as I figured the joint would need some work. It did not. Fit was quite good. Some sanding to ensure the parts sat flush was all that was needed.

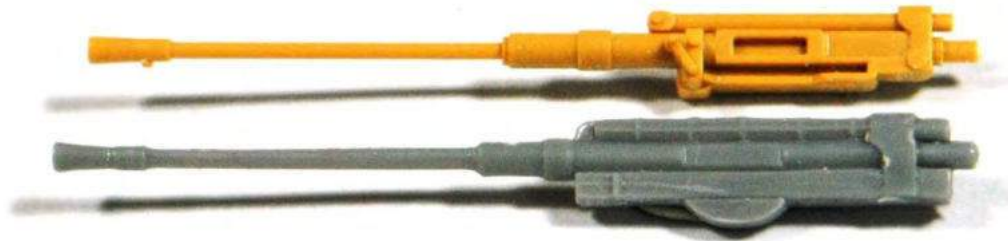


The doors were finished per the instructions. At left, we see a test fit showing how the modification to the hinge mounts allows the rear doors to be opened.



Below: The basic pieces of the front upper hull were finished. The joint where the driver's front plate and roof join each other and the body require some sanding and putty work. Parts were also added to the interior. The vehicle interior can now be painted. At a minimum, the driver's compartment should be painted before joining the hull halves as it would be difficult to paint after. The rest of the interior can be painted before or after.





This comparison of the gun from the Tamiya Flakvierling (top) and the ACE kit show the relative "chunkiness" of the ACE part.



Here is the assembled gun. A few details were cut from the Tamiya gun and used in addition to the wonderful turned metal barrel from the Gaso kit. As the Tamiya gun is detailed only on one side (the other side fits to the flakvierling chassis) once cannot simply swap the guns. Then central part of the shield is also attached to the gun here.



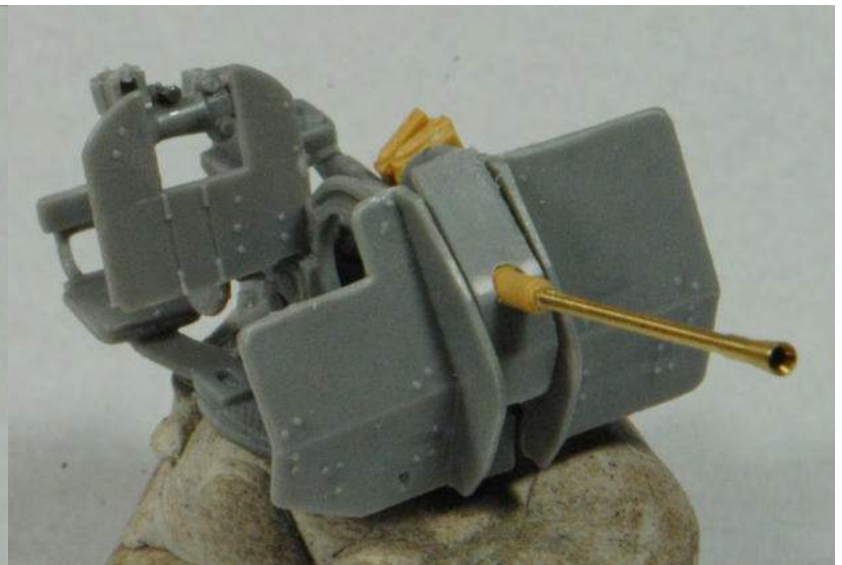
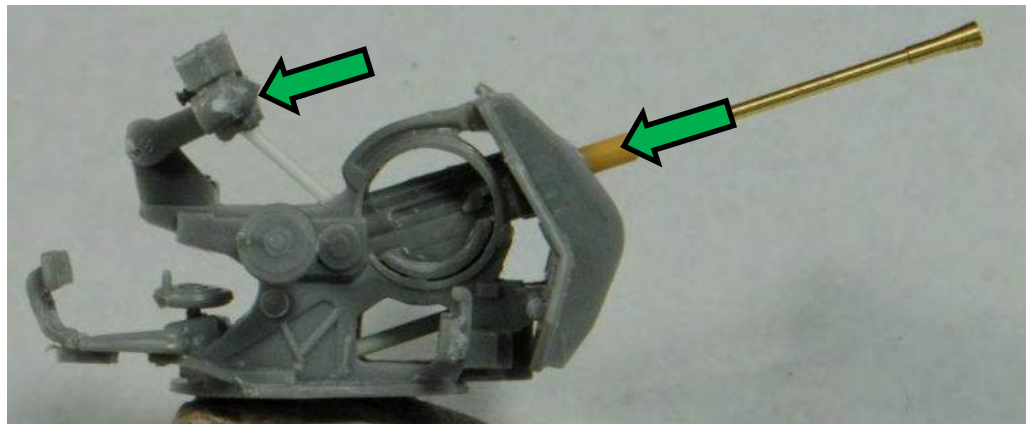
While detail on the ACE good is acceptable, there is no detailing inside the carriage. Using bits of plastic bar and rod stock, I created the linkages for the traversing and elevating gears. On hindsight, with the gun, shield, and figures in place, none of this will be visible and could have been left off.

Below: Due to the interplay of parts (gun, carriage, shields) and the work needed in the form of trimming and sanding to get a good fit, I did not assemble the gun in sub-assemblies—it was completely put together. Here, the gun has been glued into the carriage.

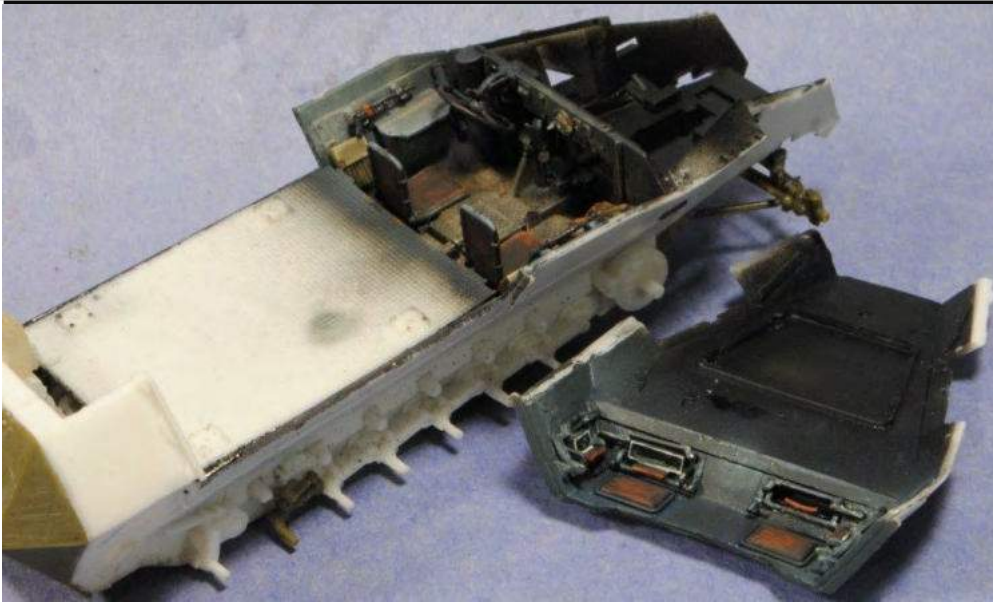


Before the glue holding the gun in place cures, the main shield was fitted. This allowed me some working time to make sure everything lined up properly and played well together.

Below: The gunsight moved with the gun via a linkage tied to the elevation wheel. Thus, the sight mount and gun should be parallel (the green arrows). The kit is not keyed to enforce this and the instructions do not mention it. Therefore, care is required. For the linkage, rather than try to clean the mold seam lines and flash off the kit part, I simply used a length of syrene rod.

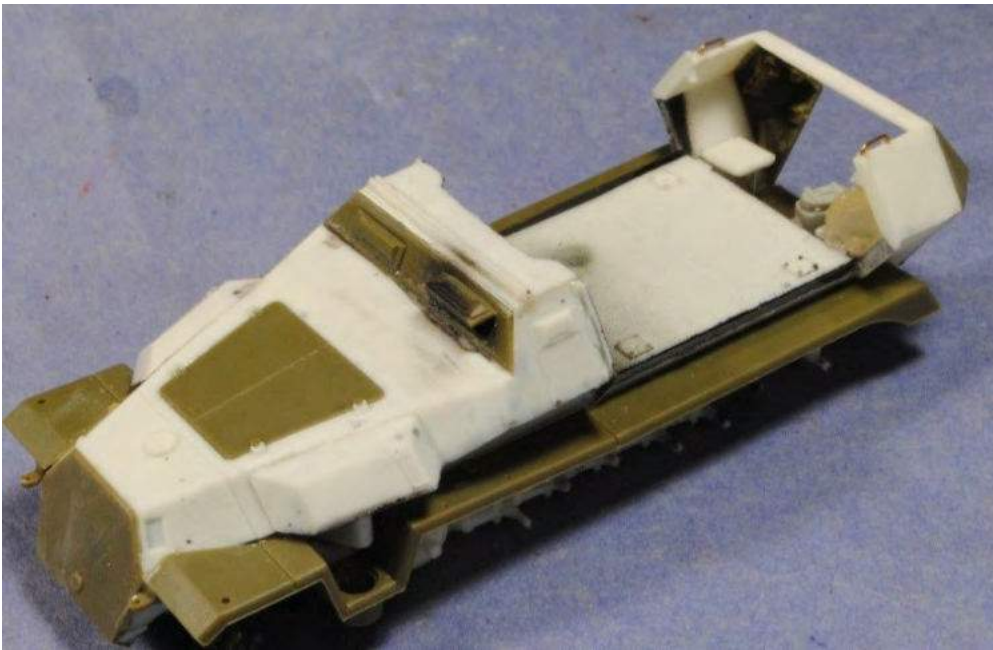


The finished gun ready for painting. The spare magazines in the ready rack are left-overs from the Tamiya Flakvierling kits (used in my 251/17 and 251/22 dioramas).



Top: The interior was painted and weathered using my normal methods and colors. I chose to use Dark Grey. The vehicles originally came from the factory in this color, but were repainted during the Tunisia deployment. I operated under the assumption that most of the interior would have been so repainted since it was largely open, but the driver's compartment, not being visible, may have been left grey.

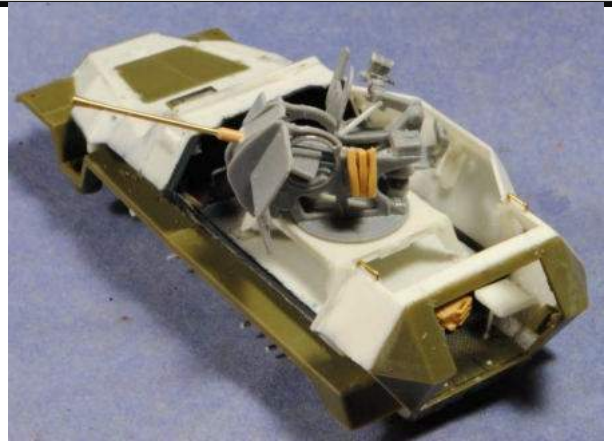
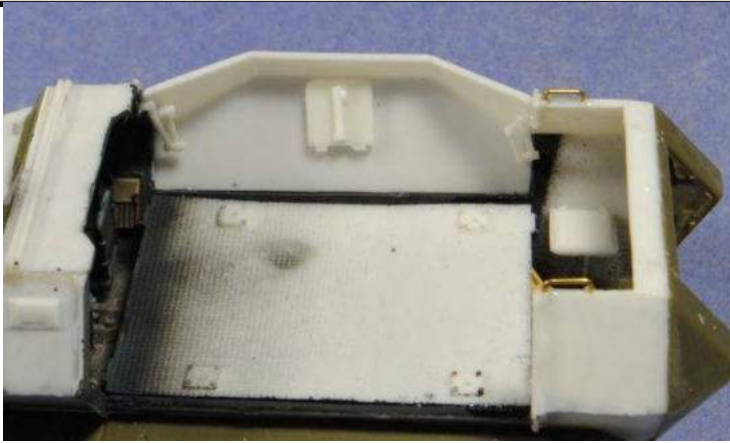
Middle: The upper hull was attached. Any gaps were filled with JB Weld two-part epoxy glue. This is black, so can be used to fill gaps without being visible on painted interior. The grab handles on the rear upper hull were fashioned from wire included in the Gaso kit.



Below Left: I wanted to model the vehicle with one hull side open and one closed. The hinges are cast in the open position (lower left). To model the hinge closed, simply cut off one arm and reposition the parts.

Below Right: A hull side before clean-up. The excess resin from the casting process is very easy to snip off. Note the air bubble on the lower right side in the photo. This was easily filled with a swipe of putty.





Top Left: The hull side, hinges, and folded seat glued in place. Top Right: Test-fit parts every step of the way to ensure everything works well together with proper clearance.

Below Left: I wanted to leave the left side of the hull separate for painting (it would be hard to get to the visible fender and underside of the hull side). The part was temporarily held in place with poster putty on the fender and the hinges were glued in place to the hull side only.



The hull side was removed for painting and the folded seat attached.

A final test-fit of all the various components prior to painting. The Gaso conversion works very well with the AFV Club kit and goes together quite simply. All in all, this is an excellent conversion kit. While relatively complex, it should not be too difficult even for a novice modeler.





Two views of the almost finished vehicle after all painting and weathering complete. The only thing that remains is to attach the fender width indicators. These fragile parts will not be put in place until after the vehicle is mounted on the final base.



Figures, Base and Groundwork

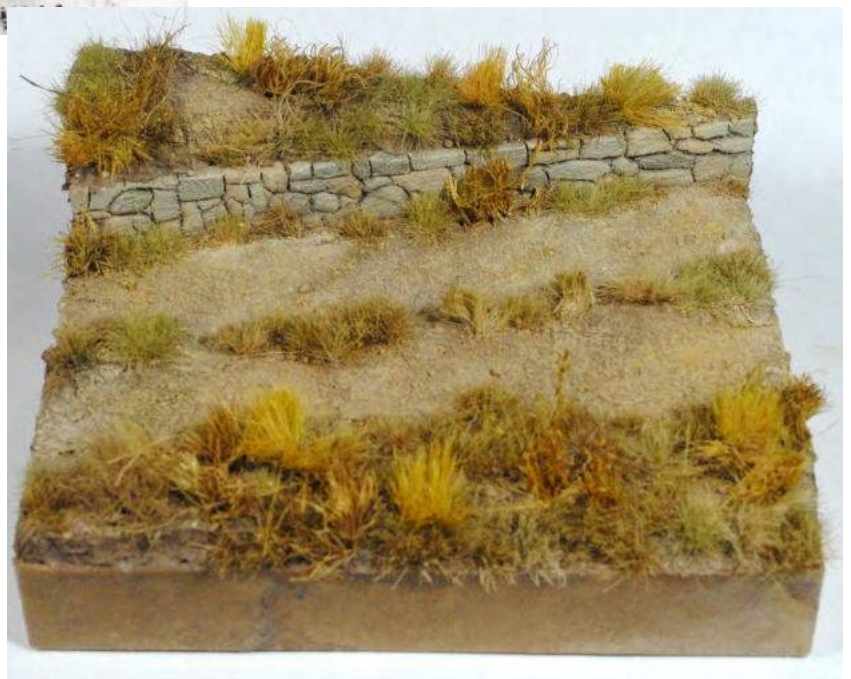
The figures were created from parts left over from all the figure sets I've used in other builds (this was actually the 16th model I built—only the 251/4 and 251/16 were built later). This included parts from the Panzer Grenadier, Field Maintenance, and Africa Corps figure sets and the 251 Stuka Zu Fuss and Sd.Kfz 250/3 kits. These were built and painted using my normal methods. The base and groundwork were built using my usual methods, detailed in both earlier and later chapters.



The four crew figures manning the gun. The gunner himself is from the Field Maintenance set, slightly modified. Likewise, the loader, from the Stuka Zu Fuss kit, is only slightly modified. The man with binoculars is from the Africa Corps set (head repositioned) with arms from the Panzergrenadier set. The man in the smock combines parts from the Panzergrenadier set and the Sd.Kfz 250/3 kit. The other two figures were added later.

The finished groundwork. The stonewall was created by pressing the shape of stones into a sheet of spackling compound. Grasses are a combination of pre-made grass clumps, unraveled rope, Woodland Scenics Field Grass, natural seaweed, and other dried floral material.

The same materials were used to create the natural camouflage the crew is applying to the vehicle.



Composition

I'll leave to you, the reader, to determine how well I followed my own "Ten Commandments of Effective Composition in this build". But I will mention a few things to consider.

- While I wanted to follow my reference photos (see page 4), I did not want to obscure the vehicle with natural camouflage. As a compromise solution, I depicted two of the crew members in the process of applying the camouflage. The other crew members demonstrate the function of the vehicle—by operating and feeding the gun as well as scanning for targets. Thus their locations and activities serve to explain the function of the vehicle, draw attention to key areas, and provide what story there is in addition to supplying the action and interaction.
- As with all these models, the compositions are tight and as small as practical in order to not only save space (a practical consideration with as many 251 models as I have made) but also to keep the compositions tight and therefore more interesting.
- The base is of the same design used in all other models in the series.



20

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/17 Ausf. D

By Kevin Townsend



Sd.Kfz 251/17 Ausf. D "Schwebelafette"

So far as I know, this version of the 251 is neither kitted in 1/48th scale nor do conversion sets exist. That leaves conversion/scratch-building as the only option. While the basic gun, and a few the other parts, comes from the Tamiya Flakvierling set, a good deal of this variant was scratch-built.

Scratch-built parts include the mount, shield, ammunition racks, and the modified roof over the driver's compartment. The variant was based on the "D" model, so one of the Tamiya kit must be used. The floor in these kits include the under seat storage bins, so portions must be re-built. The conversion is not difficult, even though it results in a radically different appearance.

I chose to model this version as a vehicle disabled in an ambush. The surviving crew is surrendering to the American squad that has ambushed it. Perhaps this incident takes place in the fall of 1944, possibly during the Battle of the Hurtgen Forest? Or perhaps it's one of the thousands of nameless skirmishes and engagements that occurred along the lines during late 1944 until the war's end.

Construction and Painting

During my research, I found no good photos of the interior of the vehicle. Those that did show the interior, or parts thereof, were usually of damaged or destroyed vehicles. There is some uncertainty of a few details including ammunition stowage. As for the mount itself, I did find a couple useful photos, plus there are good scale drawings in Panzer Tracts 15-4.

To create the battle damage, I studied photos of disabled/destroyed 251s and similar vehicles. The damage suffered by my model takes elements from 4-5 different wrecks and combines them. While severe, and certainly disabling, the damage is not catastrophic—I wanted to model a more-or-less intact vehicle to depict the variant. To create damaged sheet metal and armor plate, I never heat and bend the plastic. To me this just does not create a realistic effect. The molded plastic on the model is also over scale thickness. Damaged areas were either thinned-down (at least on visible edges) or replaced with thin sheet plastic. This was then gouged, bent, or broken as needed to create the damage. Some plates are missing or dislocated—including an engine hatch—so a destroyed engine was also needed. A few minutes on the web revealed dozens of useful reference photos. Rather than build an exact scale replica with every bit and widget accurately reproduced, “gizmology” was used to make an engine from various bits that looked the part—after all, a large amount of it had to be modeled in a blown-up condition. Let’s see how all this was done.



Photo of a disabled 251/1. It was one of several reference photos I used to model the damage on the vehicle. Note that armored plate generally does not bend and twist—it fractures.

The Sd.Kfz 251/17 in Service:

Numbers of available vehicles never met demand and the 251/17 was not universally issued to the Panzer and Panzergrenadier units. Reports from 1-15 January, 1945 show the following units were equipped and how many they had:

2 Panzer Div	5	3 Panzer Div	19	5 Panzer Div	24	7 Panzer Div	22
8 Panzer Div	27	11 Panzer Div	5	20 Panzer Div	19	21 Panzer Div	2
23 Panzer Div	7	24 Panzer Div	6	25 Panzer Div	15	116 Panzer Div	11
1SS Panzer Div	15	2SS Panzer Div	14	12SS Panzer Div	12	Hermann Goring	2
25 PzG Brigade	2	Fuhrer Begleit Brigade	13	Fuhrer Grenadier Brigade	24		
Total:	244						

I chose to depict my vehicle as a veteran of the 116th Panzer Division facing US Soldiers of the 28th Infantry Division. These units clashed in the Hurtgen Forest battles.

Battle of the Hurtgen Forest:

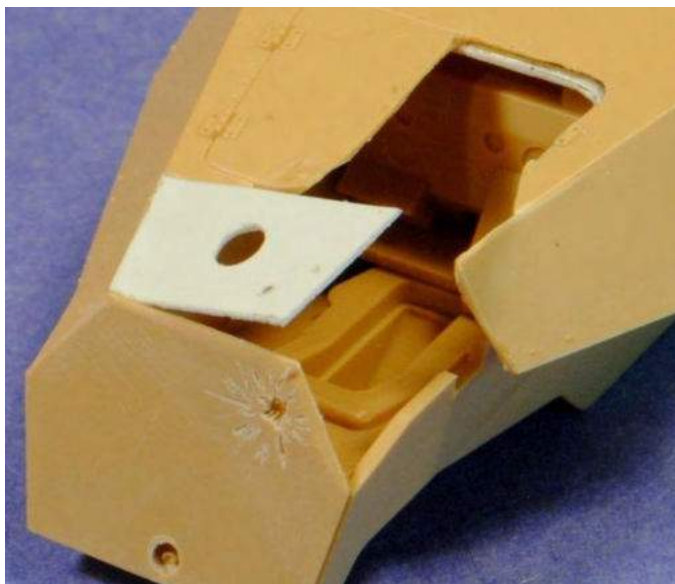
This diorama possibly takes place during the Battle of the Hurtgen Forest. Fought between 19 September and 16 December 1944, it was the longest battle on German soil during the war and the longest single battle the US Army has ever fought.

The US objectives were to pin down German defenders to prevent them reinforcing Aachen to the north, out flank the German lines, and secure control of the Rur River dams.

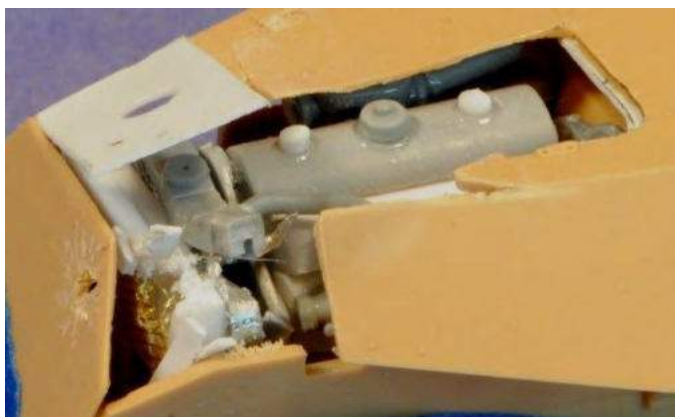
The Hurtgen Forest is a 50 square mile dense conifer forest broken by few roads, tracks, and firebreaks. US forces underestimated the impossibility of the dense wood and its detrimental effect on artillery and air support. They also underestimated the strength and resolve of their enemy. Even though they had a huge superiority in numbers (as high as 5:1), terrain and weather favored the defender.

The Germans fiercely defended the area to maintain control of the dams and because the region was the staging area for their offensive known as the "Battle of the Bulge". They took full advantage of the terrain, wet weather, and West Wall defenses to slow the American advance and inflict heavy casualties. The battle cost the US Army at least 33,000 killed and wounded. The battle was so costly, it has been described as an Allied "defeat of the first magnitude".

Aachen fell in late October, but the Americans failed to seize the dams or cross the river. The area was not cleared until January, 1945. Due to the fact the Battle of the Bulge grabbed the headlines and public attention, the Battle of the Hurtgen Forest has been largely forgotten.



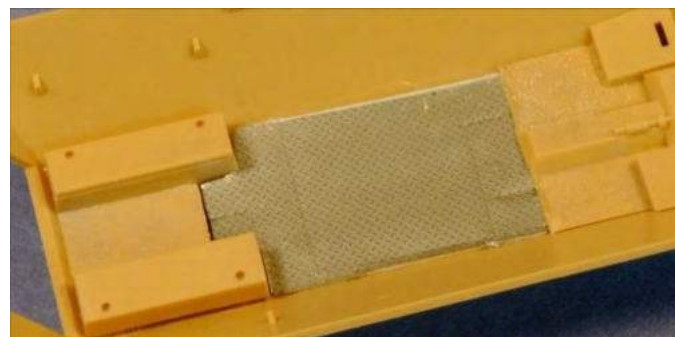
A jagged hole was cut into the front armor and "splash marks" carved with a hobby knife. One engine hatch door was cut away, and the front left armor plate removed. Parts of a couple other armor plates were broken and the visible ends thinned down to a more scale thickness. The front top plate was removed and replaced with a thin piece of sheet plastic. The armored starter-hole cover and radiator access cap were removed. A lip was added inside the engine hatch recess from plastic strip.



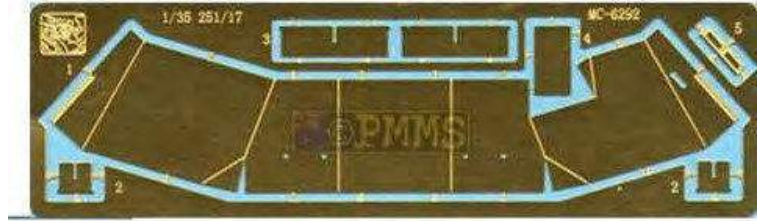
An engine was scratch-built as discussed in the chapter on Assembly and Detailing. It was suitably damaged. It's not an exact replica, but it doesn't need to be as large portions are not visible that those that can be clearly seen are heavily damaged.



The roof of over the driver's compartment was modified by first cutting out a semi-circle of plastic. A small "lip" was added to this cutout with plastic strip. A new bullet splash guard was made with "L" shape plastic strip. The holes for the kit's splash guard were filled with putty. Other details normally added to my Tamiya halftrack interiors were also put in place.



The next step was to remove the molded-in under seat stowage boxes. This necessitated replacing a portion of the floor. I used some old sheet metal tread plate for this. While it does not exactly match the model's pattern (nor exactly fit), it doesn't need to. Little of the floor will be visible under the weapon mount and with the ammo storage bins, dead body, partially covered roof, and other stowage.



Left: A photo of a surviving Schwebelafette mount. I used photos such as this and the scale drawings in Panzer Tracts as my starting point. Some of the dimensions had to be "fudged" slightly in order for the parts to fit in the Tamiya model. Below are the measurements I used for my conversion.

Above: I used this photo of a photo-etched shield included in Dragon's 1/35 scale model to help make my shield as we shall see. I sized the photo to match, as closely as possible, the dimensions I needed in 1/48th scale and then used it as a guide to make my parts.

Below: The measurements I used to create my gun mount. Please note, I made my mount from photos such as the one at left with no good drawings or measurements. Mine build used largely guesswork. Since I completely my rendition, Panzer Tracts 15-4 has been released with great scale drawings of the gun mount. While mine is not exact, I am pleased at how close I was able to come.

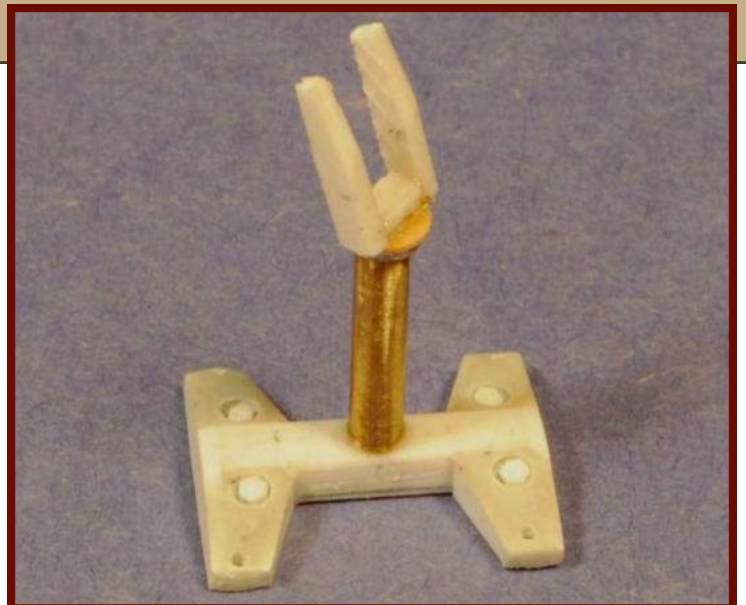
1/48 SCALE MEASUREMENT USED:

Overall Height:	32mm
Overall Width (side-side)	20mm
Base Height	3.2mm
Pedestal Height	16mm
Base Leg Length (front-back)	25.4mm
Gun Shield Height:	10.5 mm

1/48 SCALE MEASUREMENT USED:

Overall Length (font-back)	30mm
Base Width	3.2mm
Pedestal Diameter	3.2mm
Gun Mount Height (Pedestal to Trunnion)	11mm

As with any scratch-building project, if the complex-looking whole is visually broken down into its component parts and basic shape, the build process is much easier. Start with basic shapes and forms and build up details from these. The logical starting point for building the gun mount was the base and pedestal. The base for the weapon mount was made from plastic bar stock and sheet plastic. Epoxy putty filled gaps and hollows. Slices of hex-shaped and round plastic rod served as the attachment bolts. A length of brass tubing served as the pedestal with an old wheel from the scrap box serving as the traversing point on top of the pedestal. The "U" shaped mount was fashioned from three pieces of styrene bar stock. A slight bevel was sanding into the vertical pieces.



116 Panzer Division:

The 116th Division was formed in western Germany in early 1944 from remnants of the 16th Panzergrenadier and the 179th Reserve Panzer Divisions. The 16th had been mauled on the Eastern Front, and the 179th was a second-line formation that had been on occupation duty in France.

In 1944, it fought in Normandy and was trapped in the Falaise Pocket. Along with the 2nd SS Panzer Division, it was responsible for holding the pocket open to allow German troops to escape. It managed to escape, although with only 600 infantry and 12 tanks.

In October, it fought in the Battle of Aachen. After refitting, the division repulsed an attack from the US 28th Infantry Division in the Hürtgen Forest providing the name to the 28th of the "Bloody Bucket Division".

The 116th participated in the failed "Wacht am Rhein" Operation (The Battle of the Bulge). At the start of the offensive, it was well equipped with 139 tanks, but it was missing 60 percent of its organic transport. It later held the Allies at bay for other units to retreat, before being withdrawn over the Rhine in March where it opposed Allied attempts to cross the river.

On 18 April 1945, the majority of the division surrendered in the Ruhr Pocket. It was described by the Commander of the 9th Army as "the famed and best German Panzer Division". Remnants of the division continued to fight in the Harz mountains until 30 April, only surrendering after all of their resources had been exhausted.

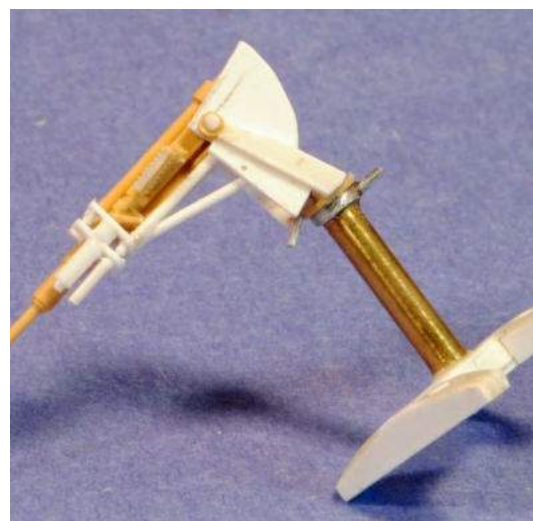


Far left: Wedges of plastic were added to the front of the mount, and, using a 5/8" circle template, a partial circle of plastic was added inside the left side of the mount. A small square of plastic was added inside the right side of the mount and a plastic strip shelf was added between. The gunner's hand brake was added to the front of the mount.

Left: The right side of the gun from the Tamiya Flakvierling consists only of a large plastic mounting block. This was removed and the gun detailed. The front trunnion mount was added using "horseshoes" of plastic strip with slices of plastic rod sandwiched between.

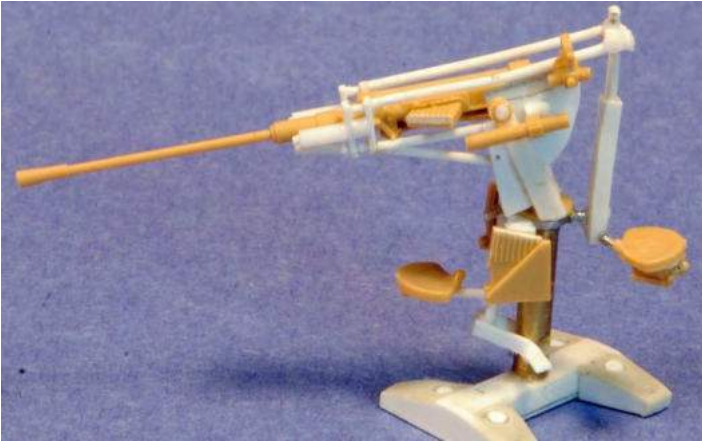
Below left: The gun was glued to the mounting shelf at the needed elevation angle.

Below right: The front of the mount was built using plastic rod, as was the lower portion of the frame.

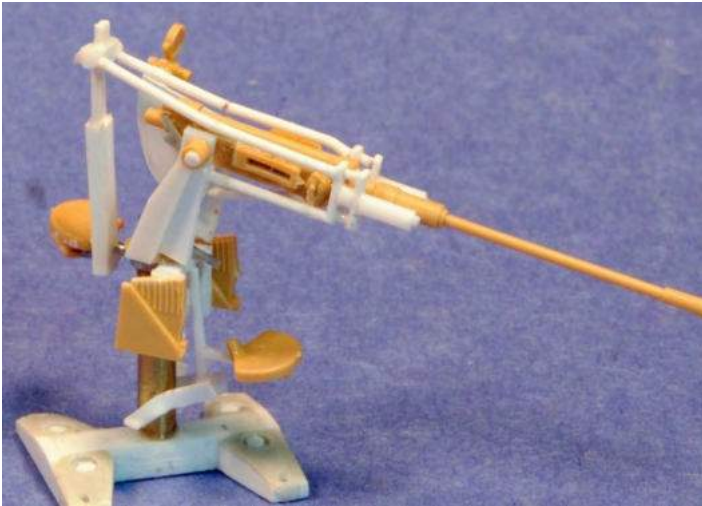


Left: The sliding mount for the seat was made from plastic bar stock and plastic rod. It was mounted to the pedestal with paperclip wire. Likewise, a seat from the Tamiya Flakvierling was mounted with paperclip wire.

The top portion of the gun mount frame was made from plastic rod bend to shape and glued in place. Note that a magazine had been added to the magazine well, too. This is a 10 round magazine made by cutting down one of the 20-round magazines included in the Tamiya kit.



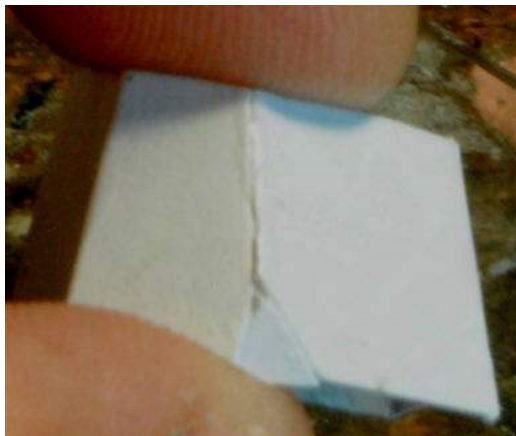
Left and below left: The finished gun, minus the shield. The mount for the ready magazines and loader's seat were made from plastic. So were the loader's footrests. The seat itself and the magazines/racks are from the Tamiya kit. The gun sights, both circle and telescoping, were fashioned from bits from the Tamiya Flakvierling kit.



3rd and 4th photos: To make the shield, I sized the photo of the Dragon shield (shown on page 5) to the correct size and printed it. It was attached to a piece of sheet plastic with double-backed tape and cut out. The bend lines were scribed using a small triangular file. When the template was removed, I had a scribed piece of plastic ready to be bent into the proper shape.



Bottom two photos: The turret was bent to shape, the joints soaked with liquid plastic cement and the whole thing stuck to an overhead view template using tacky putty. After it cured, the triangular wedges were glued in place and any cracks/gaps fixed with epoxy putty.



"The Bloody Bucket"

The **28th Infantry Division** is a US Army National Guard unit and is the oldest division-sized unit in the armed forces of the United States, tracing its lineage to *The Pennsylvania Associators* (1747-1777). The division was officially established in 1879 and was redesignated as the 28th Division in 1917. Originally nicknamed the "Keystone Division," during World War II German forces referred to it as the "Bloody Bucket" division due to its red insignia. This insignia can be seen on upper left sleeve of the figures in this diorama.

On 22 July 1944, the division landed in Normandy. It took part in the Normandy, Northern France, Rhineland, Ardennes-Alsace, and Central European campaigns.

The 28th suffered excessive casualties that autumn in the costly and ill-conceived Battle of the Hurtgen Forest. The divisional history conceded "the division accomplished little". The campaign was the longest continuous battle of World War II.

During the Ardennes Offensive (Battle of the Bulge) the 28th fought doggedly in place using all available personnel and threw off the enemy timetable before withdrawing on 22 December for reorganization, as its units had been badly mauled.

Afterwards the division participated in the reduction of the Colmar Pocket.

The 28th is also one of the most decorated infantry divisions in the United States Army.

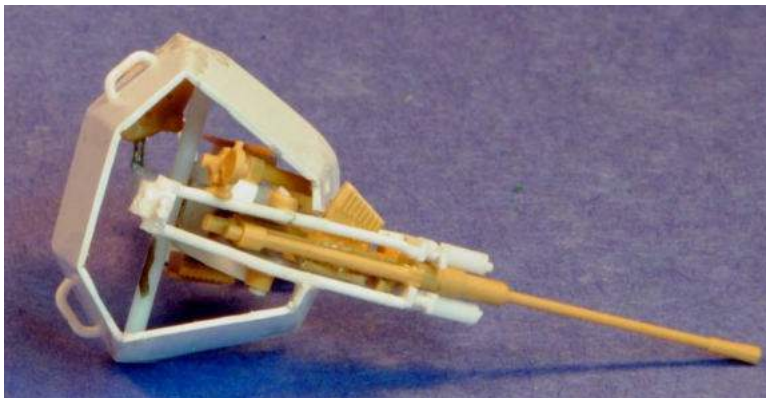
US Uniforms:

If there is an area where the concept of “close-enough” color applies, it is US Army uniforms in WWII. Army regulations threw around the term “Olive Drab”, but there were several colors of Olive Drab, ranging from a light Khaki, to various greens and browns. Specific shades weren’t described until 1944, and then only by number. For some items, such as web gear, the color changed during the war.

New uniform items were produced, but issue was never universal—even within the same squad.

Combine all this with different manufacturing lots and fading/weathering, and the average G.I. Squad displayed a wide range of uniform and equipment items and colors. This applied not only to clothing, but to footwear, too. For most, the shoe with gaiter was standard, but the M43 boot was issued widely in the last months of the war.

The American soldier had one of the most functional uniforms of all the combatants. While regulations stated it was to be kept clean and in good repair, emphasis was on comfort and functionality. The G.I. may not have had the most “military” appearance, but he had a uniform that was practical and comfortable. Many senior officers tried to regulate appearance, but it proved impossible to make the American citizen soldier look like a “parade ground” soldier. Comfort nearly always won over appearance.



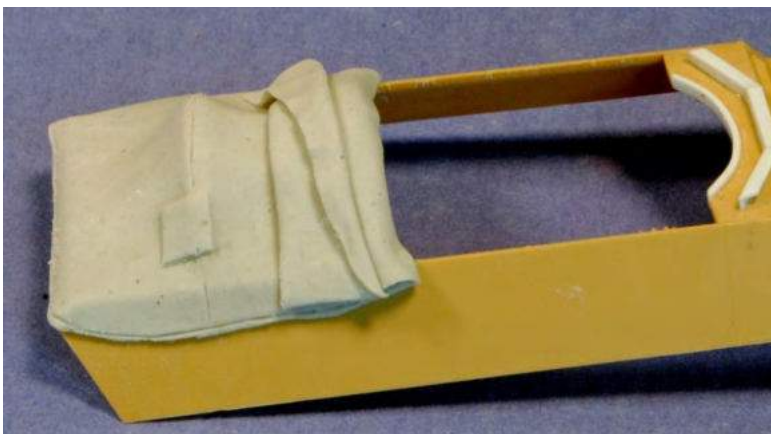
The shield was attached to the gun mount via a plastic bar fixed to the rear of the mount and both sides of the shield. Grab handles are plastic rod.

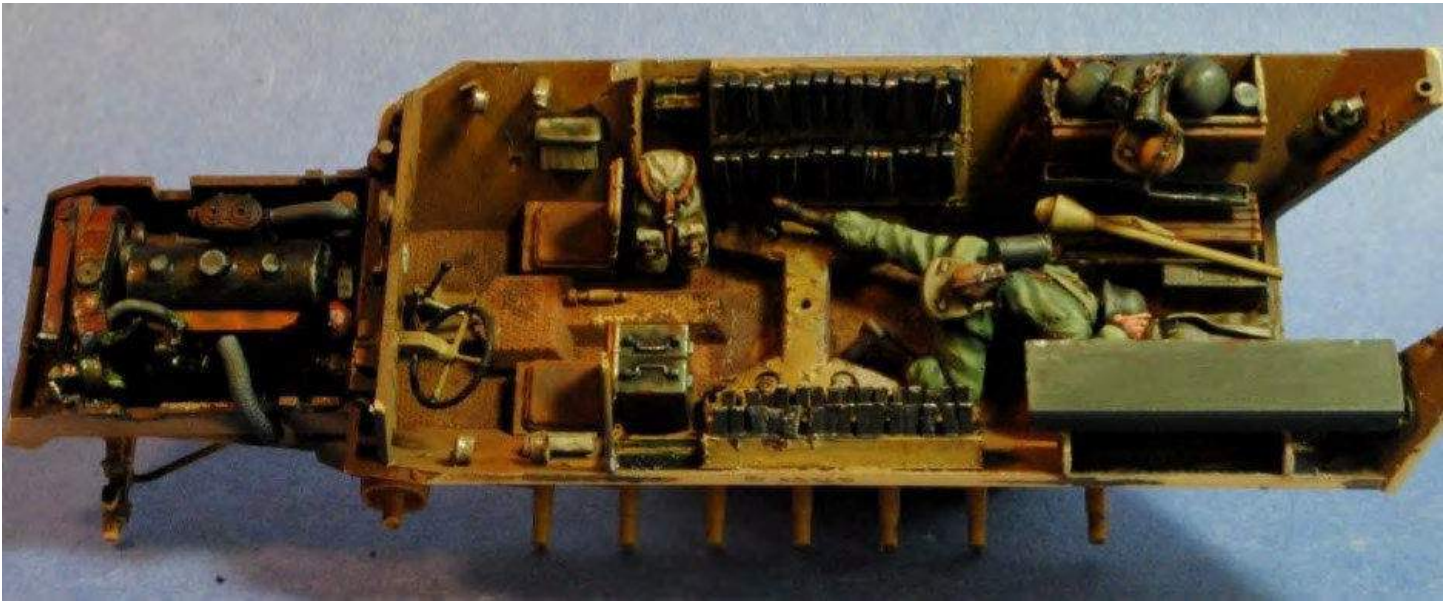


The magazine racks were made from a thick piece of plastic bar stock and wedges cut from a 4mm x 1mm plastic strip. I cut wedges as the magazines are curved and the ends projecting from the rack would not be completely vertical. The wedges, 30 per rack were glued in place and the racks glued into the vehicle hull. Note that the base of the gun mount must be put in place first or it will not fit into the hull. The dead guy is in place only for a test fit.



The tarp was made as shown in the chapter on Assembly and Detailing. Since it stretches over two frames rather than all resting all on one, I made it from a single sheet of rolled-out putty glued in place to the rear of the halftrack and shaped over the frames. Note the patch made from a small square of excess putty.





Before the hull halves can be glued together, the interior must be painted. This includes the dead crewman. Here we see the interior after painting and weathering. The spare barrel case and extra 20mm ammunition boxes are from the Tamiya Flakvierling. Other stowage is from Tamiya and Black Dog. Note the dead soldier is already painted and fitted in place. The base of the gun mount is also attached to the floor, but the pedestal and gun were left separate for painting.



The damaged fender was cut apart, thinned down from the inside, and torn with a hobby knife—like we saw in the chapter on Assembly and Conversion. Other bits of broken armor debris were made from sheet plastic.



The vehicle was painted, weathered, and mud was made as seen in the chapter on Painting and Weathering. The fairly heavy mud layer was made entirely of pigments. To make this thicker layer, I applied matt medium, and clumped the pigments on this. Once dry, they were fixed in place (and more sprinkled on) with mineral spirits. Damp mud was added using darker pigments mixed with Future. Finally, wet areas were given a coat of very thin Burnt Umber paint mixed with Future.

Figures

For the crew and ambushing Americans, I used Tamiya figures and parts. The two dead and the one wounded German are primarily made from parts from the Panzergrenadier set. All were converted to a greater or lesser extent. In fact, the dead German inside the vehicle uses the lower torso and legs from a figure from the US Infantry set, suitably modified into a German uniform. The surrendering figure is from the German Infantry on maneuvers set with the arms replaced.

For the Yanks, the Tamiya U.S. Infantry set was utilized. The figures are appropriate for Northwest Europe and wear a variety of 1941 and 1943 mode uniform items. All wear coats or jackets. Most were all built stock—the bazooka gunner is the only “kit-bash”, being made from parts from two figures. This set, like the other sets we have reviewed, contain a variety of figures (mostly in action poses) of infantrymen and tank crewmen. As normal with Tamiya figure sets, two sprues of weapons and equipment are included.

Building Award-Winning Models:

I build models for me—if they win an award, great. If not, fine. But for some, awards are important. Here are some tips, based on my years of competing/ judging at figure shows using the Open System. My work has won numerous Bronze, Silver, and Gold medals and many special awards—including People’s Choice Awards and several Best In Show awards. These tips should hold true for other judging systems, as well.

- Check the judging criteria of the organization. All are slightly different. None keep them secret. Know what the judges are looking for.
- Good basic work is vital! Assemble the kit neatly and correctly. There should be no visible ejector pin marks or inappropriate seams, joints, or gaps. There should be no glue marks and sanding scratches. Equipment should properly attached and not magically stuck to the vehicle.
- Scratch-built and converted parts are looked upon favorably (but stock is perfectly fine). However, the work should be well-executed. Extra detailing as appropriate should be done. Drill or hollow out gun barrels. Make sure straps are proper thickness and show a sense of weight.
- Painting should be smooth with no inappropriate brush marks or fingerprints, runs, smudges, cracks, etc. Colors should be appropriate. If using washes, be careful of “tide marks” or hard lines forming. Dry-brushing should be subtle. Items should display the proper texture and sheen. Be neat and paint “inside the lines”.
- Decals, if used, should be properly applied with no “silvering” or film showing around the edges.
- Weathering should be convincing, appropriate, and in scale. It should be consistent – for example you shouldn’t have muddy road wheels with clean tracks or undercarriage.
- For figures, faces are the most important. Pay attention to skin tones—they should reflect the climate the figure is in. Eyes should be the same size and look in the same direction. Don’t forget the details—everything should be painted to a high standard, whether it’s a stand-alone figure or supporting a model as part of a diorama or vignette.
- Be consistent. Make sure the shading, highlight, and weathering on all elements—figures, vehicles, groundwork, etc. are appropriate and the same. The piece should appear as a unified whole.
- Overall presentation is important, especially for dioramas and vignettes. The base for any kit should enhance its appearance rather than detract. Models should sit properly on the ground—a tank is heavy and should not have hovering wheels/tracks - it should show a sense of weight. A model can have a “WOW” factor. Kits that make judges look twice because of dynamics and presentation may receive better marks—and a dynamic kit or a diorama with a great story may be more easily “forgiven” for minor errors.
- Dioramas should have good composition and tell a story. All elements should be done to the same standard. Vignettes are about the same, but do not require the story. Technically, some of the pieces in my 251 series are vignettes, others dioramas.
- Don’t forget to clean the display dust and cobwebs off figures and models.
- Help the judges! You can (and should) In case of conversions/scratch-builds) provide details on how you made the piece and any appropriate references and historical information used. You can get bonus points for this in AMPS competitions.



One of my most prized awards is the St Petersburg Medal sponsored by AeroArt International and awarded for artistic excellence and for impact on the hobby as a whole. Only twenty of these were minted, and I have the honor of being awarded the fourth one.

The German soldiers posed. The first three are from the Panzergrenadier set, although as can be seen, they have all been somewhat altered. The wounded man has had both legs, his right arm, and hand repositioned. His head is from the "Stuka Zu Fuss" kit. The dead soldier outside the vehicle was changed only at the left elbow and right ankle. The surrendering soldier is from the German Infantry on Maneuvers set. His arms were swapped out for more appropriate arms. The nearest figure, also shown below right after conversion work was completed combines the upper torso, head, and arms (all repositioned) of a German figure with the lower torso and legs from a US figure. The gaiters were carved away to make marching boots and the trousers re-worked with putty. The jacket skirts were also added with putty.

Below: The US figures. The Bazooka gunner is a kit-bash using a crouching figure with different arms and a Bazooka. The other figures are stock—built straight from the box.



Composition

As I had worked out, using computer sketches and mock-ups, what I wanted to build, and had a good idea of the poses needed, I went ahead and built the figures so I could use them to finalize the composition. That process can be seen in the photo at left.

Let's look at how this diorama compares to my "Ten Commandments of Effective Composition".

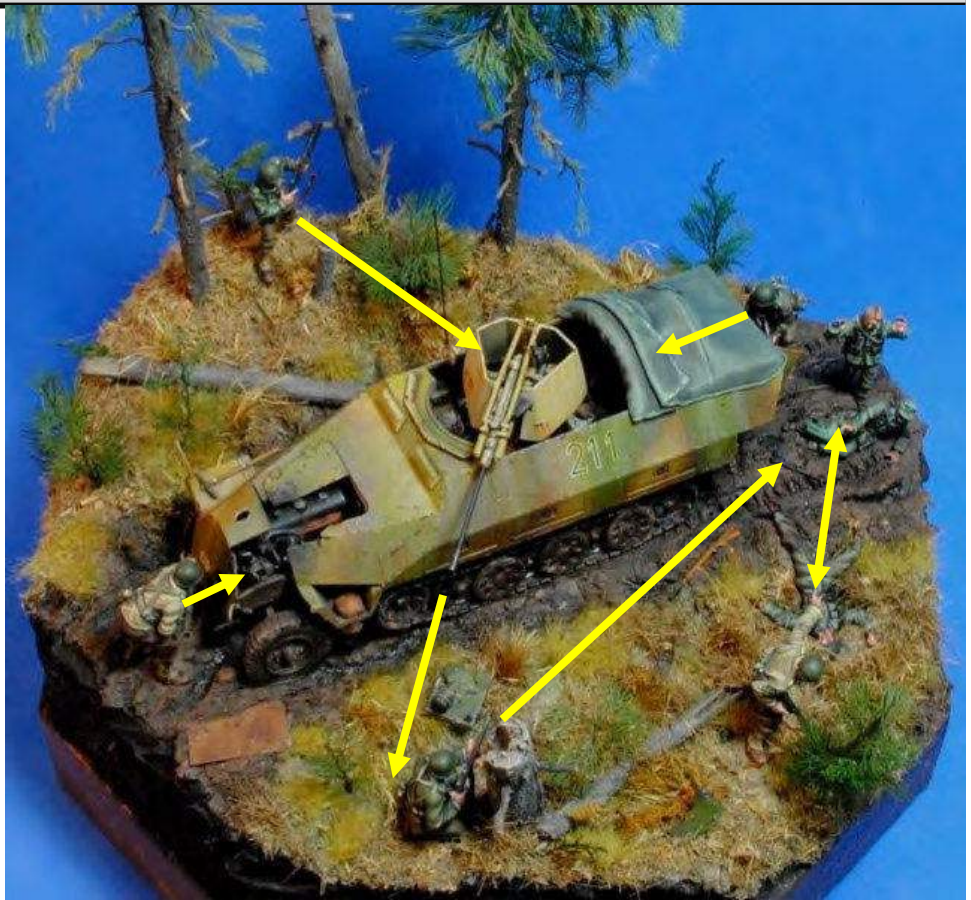
After "playing with it" for awhile using the posed figures and partly assembled vehicle, with dowel rods representing trees, stumps, and logs, the final composition has been arrived at.

1. Have a Single Main Point: There is one story, with one small, related, sub-plot. An ambush has obviously just occurred. The vehicle has been disabled and most of the crew made casualties. The survivors surrender to a U.S. squad. That it is the same squad that ambushed the vehicle is made clear by the sub-plot: the bazooka gunner checks out his handiwork.

2. Show Action and Interaction: The casualties make clear the action that has occurred. The closeness of the Germans to each other and the vehicle show their relationship. They interact with the American soldiers—the Squad leader directs their surrender, one soldier clears the vehicle, and two provide security. The bazooka gunner actually interacts with the vehicle.

3. Use A Tight Composition: The tightly clustered scene clearly ties everything together and heightens stress and the drama of the scene.

4. Direct the Viewer's Eye: The vehicle is center stage, the subplot is just in front, and the main action right behind, so their isn't much to direct. The trees and direction the vehicle faces keeps the viewer in the scene. The Americans form a circle around the vehicle, all looking at the main action. All this should keep the viewer firmly locked in the scene. The gestures and facings of the squad leader and the surrendering Germans direct the eye back and forth between them. The dead soldier is on this line.



This plan view, with the direction of facings, glances, and gestures marked with arrows clearly show the circular nature of the composition with the halftrack in the middle of the circle. All the key points and players in the story have one or more of these invisible arrows pointing to it, ensuring the viewer sees what I want them to. The main action is in the visually strongest part of the composition. Action "moves" against the grain of viewing.

5. Have Balance: All the elements and action are centered on the halftrack. Nothing exists to throw it out of balance. The higher elevation with trees in the back is balanced by more space, more figures, and more action in the front portion.

6. Use all the Elements: Both the vehicle and figures are needed to tell the story. Groundwork gives context. Trees form a backdrop. The base and nameplate compliment the composition and tie the diorama to the other, similarly-based pieces in the 251 series.

7. Minimize Dead Space: The base was sized to tightly frame the composition, eliminating any potential dead space.

8. Use Shapes and Elevations: The Germans are clearly trapped with nowhere to run. Not only do their adversaries form a circle around them, but the steep slope and thick, foreboding forest cuts off retreat from the back of the scene. The Americans have the Germans surrounded, so a circular base would work well. I chose a more angular base (easier to make), but it still gives the same impression. The angular shape also tightly frames the action eliminating potential dead space and conforms to the "formation" of the US troops.

9. Artistic License is OK: Other than the fact this is an apocryphal scene, this commandment really does not apply.

10: Play With It: I had a good idea of what I wanted before I started, still I tried various arrangements until I found what I thought looked best. Figure numbers and arrangement were finalized here, as were the various groundwork contours and bits.



Base and Groundwork

With composition finalized, the base and groundwork were built. The base and nameplate were fashioned in the same manner as all the other vignettes and dioramas in this set. I chose to place the scene on a slope, not only to provide interest, but to make sure no figures (or the vehicle) were partially or completely masked by other figures (or the vehicle). Note when making a scene, you do not have to make it all at once. I worked in sections—modeling the foreground first, followed by the background, followed by the road and the area where the dead soldier and squad leader are positioned.

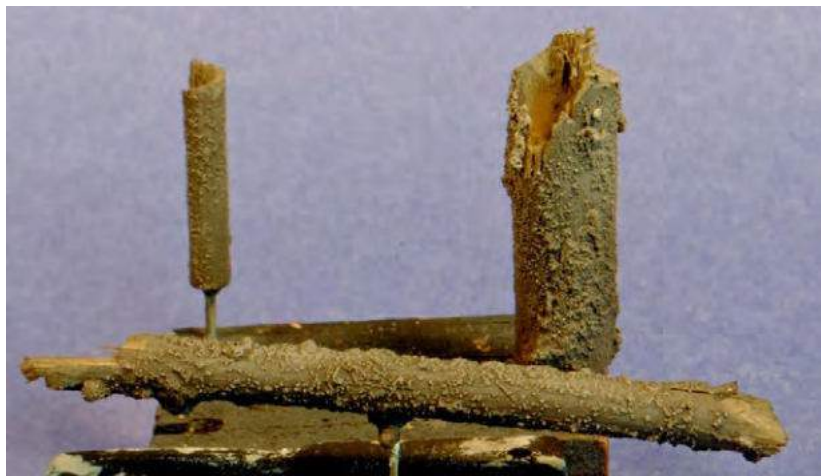
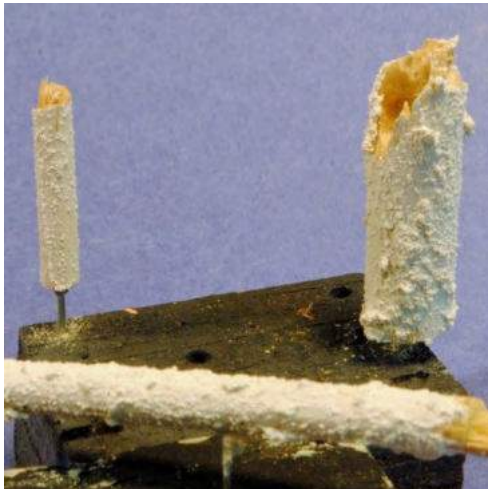
Top left: The base itself was made the same way the others were. Contours were built of Styrofoam. I cut this with a hot knife to prevent it flaking, shedding, and generally making a huge mess. While not shown here, the sides of the foam, above the wooden base, were covered with a rough layer of Plaster Patch-N-Fill and painted an appropriate dark color.

Above: While Styrofoam is light and easy to work, it does not provide good support for models, figures, and other elements. As seen in several of the previous chapters, I like to pin my figures, vehicles, trees, buildings, etc., to the wooden base. I normally use paperclip wire for this. In this case, I used dowel rods, sunk through the foam and into the wooden base. Holes were then drilled into the exposed ends of the dowels to mount the figures, vehicle, and trees onto. It's still lightweight, but very strong.



Right: In this composition, wooden dowels formed the basis of the trees, stumps, and fallen logs.





Top Left: To make the bark, the trees were “painted” with thinned Elmer’s Probond. This is the same acrylic putty I used to make mud in Chapter 4.

Top Right: The trees were painted in a mix of brown and grey. They were lightly dry-brushed to bring out the bark detail and given a wash of black

Far Left: Foliage is from Joefix. (#170—Green Fine Weeds). They also include this in their pine tree kits). This foliage—and dead branches made from an old root—were glued into holes drilled into the tree. At this point, the color is a bit too garish.

Left: The foliage was air-brushed with various greens and yellow greens to achieve a more realistic look.

Dead trees and fallen logs were made the same way, but without the foliage.

Small saplings were made using the foliage only.

Bottom: Forest litter is a homemade mix created by mixing various things from my wife’s spice (such as oregano, Italian seasoning, and other spices), crushed up fried floral material, brown static grass, and small bits of sliced-up rope and pieces of natural seaweed.



Grasses are a mixture of products we’ve already seen before—static grass, grass clumps, Woodland Scenics “Filed Grass” in various colors, lengths of unraveled rope, and clumps of natural seaweed.



Bottom: I worked on the base one section at time. On top of the Celluclay, I first glued down a layer of forest litter and some static grass. Then other grasses and weeds were applied. Dried plant material was glued in place. For grass clumps, some premade clumps were used. But the seaweed and rope were also used as we saw previously. Clumps of seaweed were pulled from the ball with tweezers, dipped in glue, and stuck to the base. Rope was cut into short lengths, dipped in glue, and stuck to the base. All this results in a wide variety of plants and grasses—very natural looking.

Once dry, bare-earth areas were painted





21

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/20 Ausf. D

By Kevin Townsend



Sd.Kfz 251/20 Uhu

Uhu! I See You!

The 251/20 “Uhu” (Owl) was designed to provide infrared illumination for night-fighting Panther tanks. Its distinguishing feature was the 60cm searchlight with infrared filter in the fighting compartment. An experimental vehicle made in small numbers (no more than 61), it was beginning to be issued to combat units as the war ended. Think of the havoc that could have been caused among Allied units if German night-fighting companies had reached operational readiness and been deployed in strength.

No kit, or conversion kit, of the Uhu exists in quarter scale at the time of this writing—and, so far as I know, only one kit in the much more populous 1/35th scale. All /20s were D models, so making one in quarter scale requires use of the Tamiya halftrack. All of the photos of the Uhu I found show that at least most Uhus converted/manufactured were made on the standard production model of the Ausf D and not the final production version (with single engine hatch, hinged radiator cover, flat vision view blocks, etc.). As the Tamiya kit represents this model, it’s ideal—it’s a complicated enough conversion even without needing to change vehicle details, too.

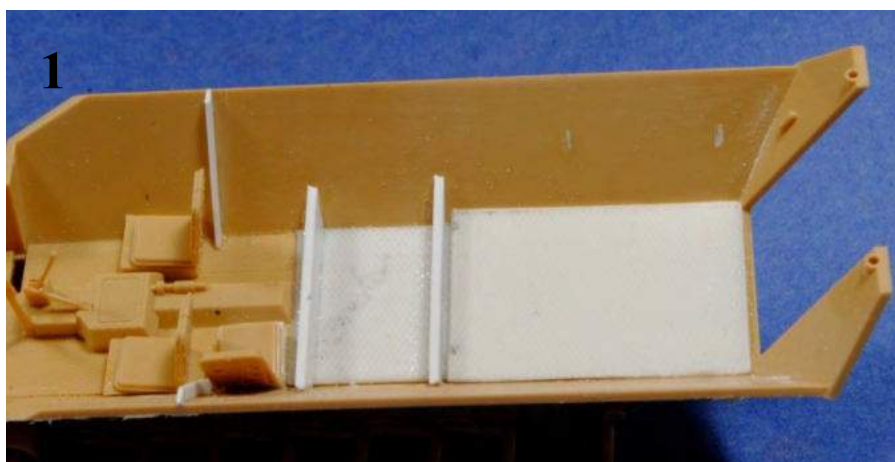
Good references are hard to find. For many of my 251s, I’ve used Panzer Tracts drawings and instructions from 1/35th scale kits as a guide, but there are no detail or interior views in Panzer Tracts and the 1/35th scale kit (AFV Club) has series issues—it lacks the generator that takes up most of the fighting compartment, and includes a roof over this portion of the fighting compartment that I can find no evidence for. I think the kit designer assumed the generator was a fighting compartment roof and ad-libbed this part of the kit. This kit instructions (and photos of the kit) were a good guide for the searchlight, however. A scale drawing of the vehicle exterior can be found in Panzer Tracts 11-1 (Panzerbeobachtungswagen), and can be used for many critical dimensions. Good interior photos and drawings can be found on www.pietvanhees.nl. Blast Models makes an update set for the 1/35th AFV Club kit that is quite good—photos of it were also used. Photos of the actual vehicle, plus these other sources have, I think, allowed me to create a fairly good representation of this unique vehicle. If not exact, it certainly looks the part!

Assembly

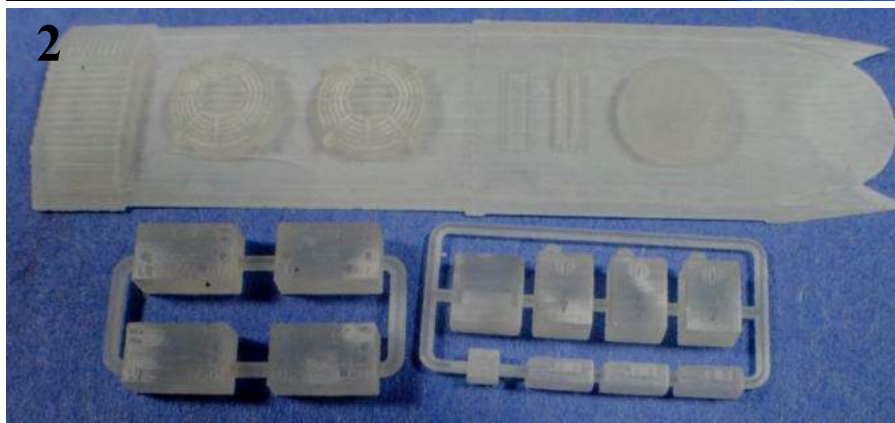
Top: As few Uhus were built, it is more important to copy a known vehicle than it is for more numerous variants. Photos show camouflaged and dark yellow vehicles. This photo was my guide for painting and weathering. Note there are no numbers on the registration plate and no other visible markings.



1) The kit floor piece containing the under seat bins was replaced with Plastruck Tread Plate. The driver and co-driver's area was built normally. The flange where the hull halves come together was added with a plastic strip. The gunner's seat was put in place using a wedge of plastic for the base and a spare seat from an earlier halftrack (left over from the Holzgas model where no interior was installed). The Uhu's rear deck was reinforced to support the weight of the light. A second piece of Plastruck Tread Plate was fitted, bringing the floor aft of the generator up to a level even with the bottom of the doors. Plastic strip formed the generator mounts.

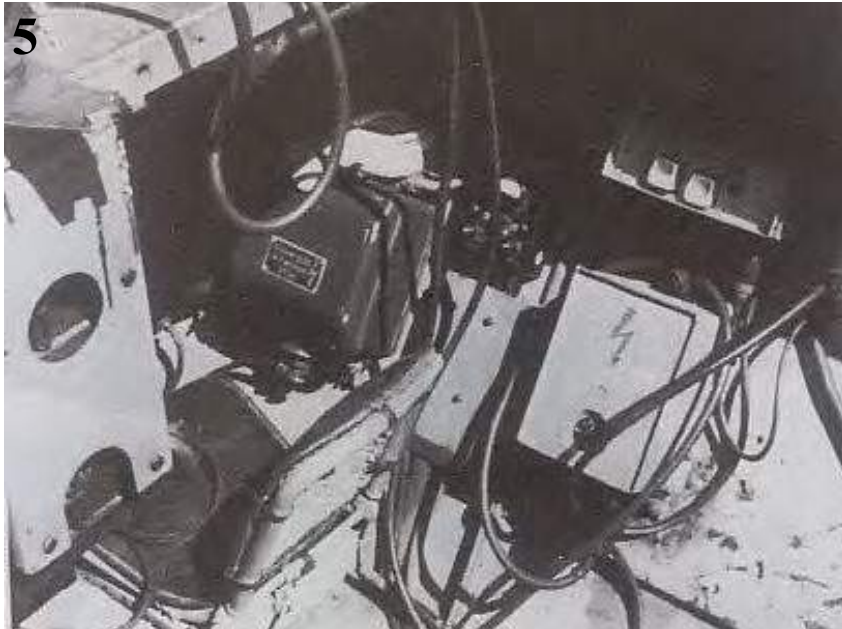


2-3) An acquaintance on Track48 web forum (Christian Hoeltge) designed these 3D Printed parts through Shapeways. I decided to give them a try. Detail and quality overall is outstanding. The parts are as easy to work with as plastic. Cost was a bit high, but not too bad. Shapeways service was very good and prompt. I used both his "Fug 5 Radio Set" and his "Power Unit for IR Sights Sd.Kfz 251 Uhu and Falke". While detail is perfect, they are so small (and will be in a hard-to-see spot) that simple blocks of plastic would have worked just as well.

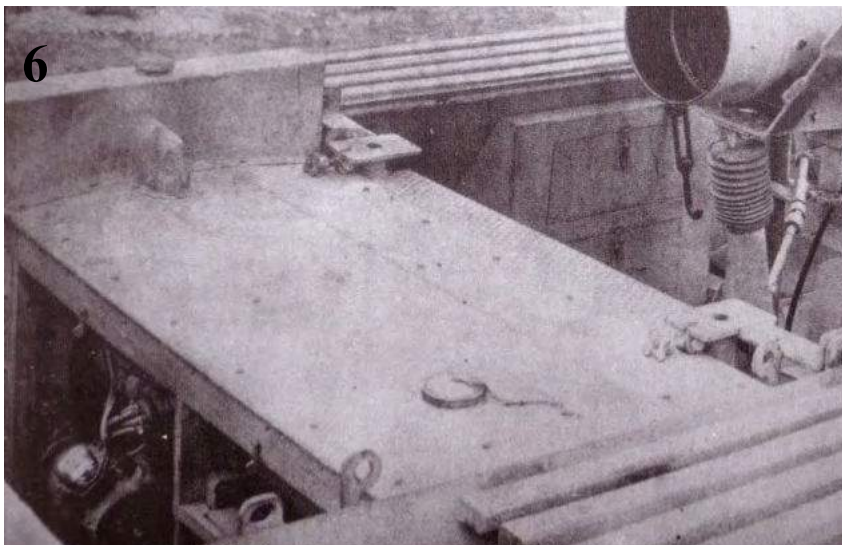




4) Christian's power unit parts were installed per my reference photos and cables were made from pieces of rubber "string". As the vehicle will not mount the forward machinegun (I've seen no photos of Uhurs with both the spotlight and gun mounted), the power cables for the gun's units merely sit on the co-driver's floor. Little, if any, of this will be visible when the vehicle is finished.



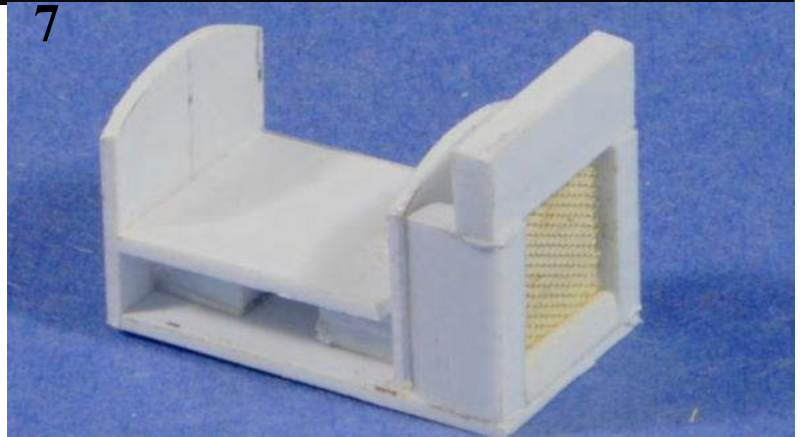
5) A photo of the co-driver's seat in an actual Uhu. This shows the area modeled in the top part of the above photo.



6) This photo shows the generator in place inside a Uhu vehicle. Note the covers on the near side have been removed. Note also that it completely blocks access from the front seats to the rear of the fighting compartment. The roof of the driver's compartment can just be seen in bottom left corner of the photo, showing how cramped conditions were inside the vehicle and how little space existed for the crew to operate—and enter/exit—the vehicle.

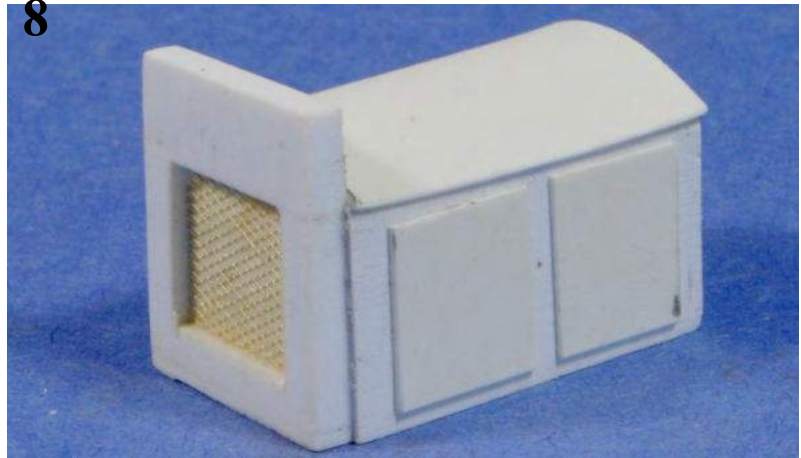
7

7) The generator was made in steps. I started with a frame consisting of the base, back, and a couple internal supports. The radiator was made from plastic strip. The screen was made from brass mesh super-glued to a piece of sheet plastic. Test fits were constantly done to ensure the generator fit and was the correct size to match my reference photos.



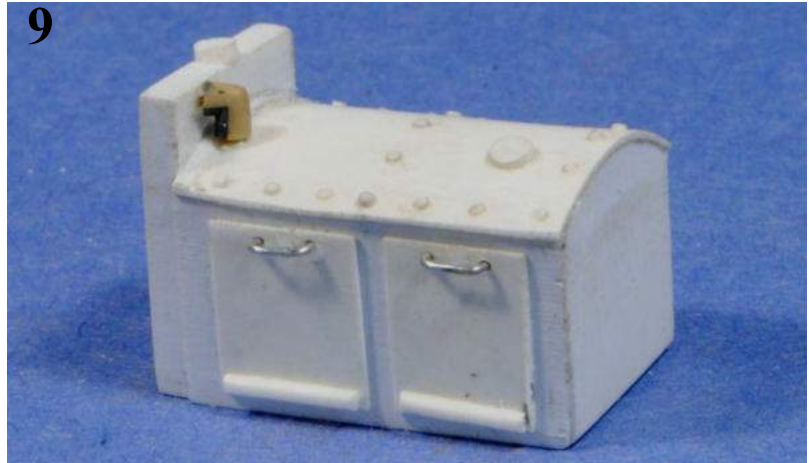
8

8) Joints in the radiator were sanded smooth, and sidewalls were added from thinner sheet plastic. The same was done to create the access panels. A thin piece of sheet plastic was also glued in place to create the roof of the generator body.



9

9) Details were added with bits and pieces of plastic. Plastic rod slices made the filler caps and bolt heads. Plastic rod, sanded flat on one side, formed the bottom mounts for the access panels. Wire was used to fashion handles.



10

10) The generator was glued in place on the supports inside the hull.



Night Vision— Active and Passive:

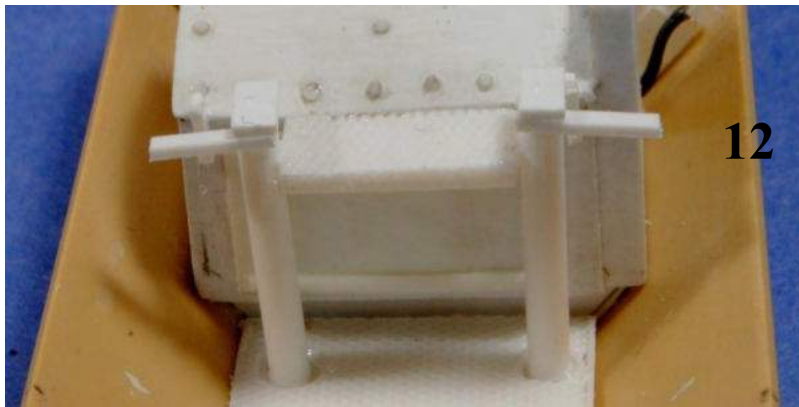
Night vision was in its infancy in WW2. This was what in U.S. terminology is known as “Generation 0” - an active technology that required a directed beam of infrared light. This is fine if you are the only combatant with the technology—if your opponent has infrared viewing devices, your light sources become readily visible and therefore easily targeted.

Passive night vision technology—devices able to use ambient light such as starlight or moonlight—were not deployed in combat until the Vietnam War. These “Generation 1” devices could amplify light about 1000x, but were quite bulky. “Generation 2” devices were similar, but more advanced technology resulted in better resolution in a less bulky package. Developed in the late 1980s, “Generation 3” technology gave better resolution even in extremely low-light situations. The next generation, now in development, will give even better resolution and will have the ability to instantly react to changes in lighting.



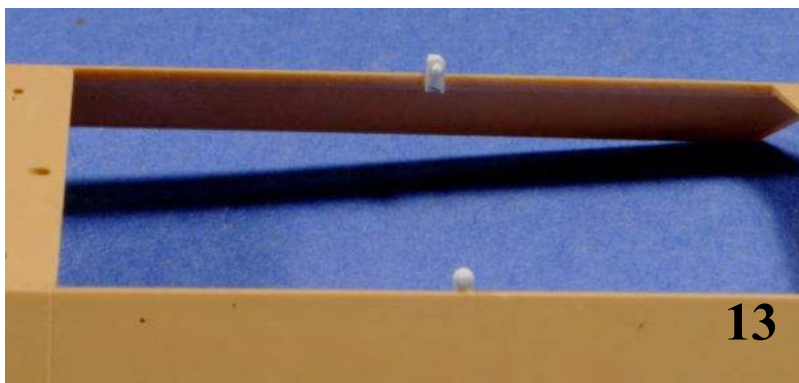
11

11) Lifting eyes were made from plastic strip, with a hole drilled through and sanded round at the ends. One was glued on each corner of the generator.



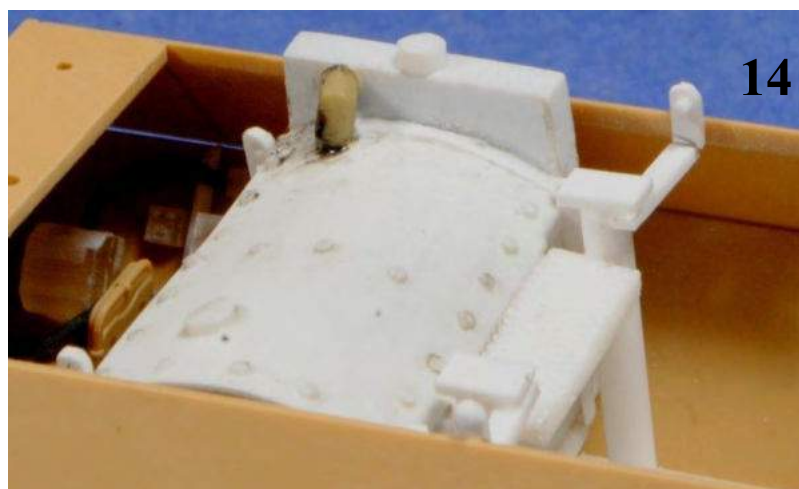
12

12) On the back side of the generator, two poles come up from the vehicle frame with flanges on the top. These are made to secure the light in the stowed position. These were fashioned from plastic rod and plastic strip. A piece of Plastuck Tread Plate forms the walkway between them. Bits of plastic strip form the brackets to secure the assembly to the insides of the upper hull.



13

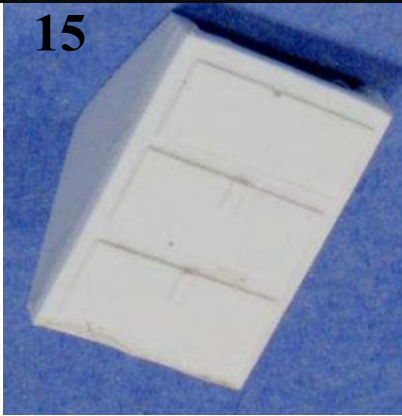
13) More plastic strip, with plastic rod bolts, form the attachment point on the upper hull



14

14) A test fit ensures the two parts of the brackets correctly mate together when the hull halves are joined.

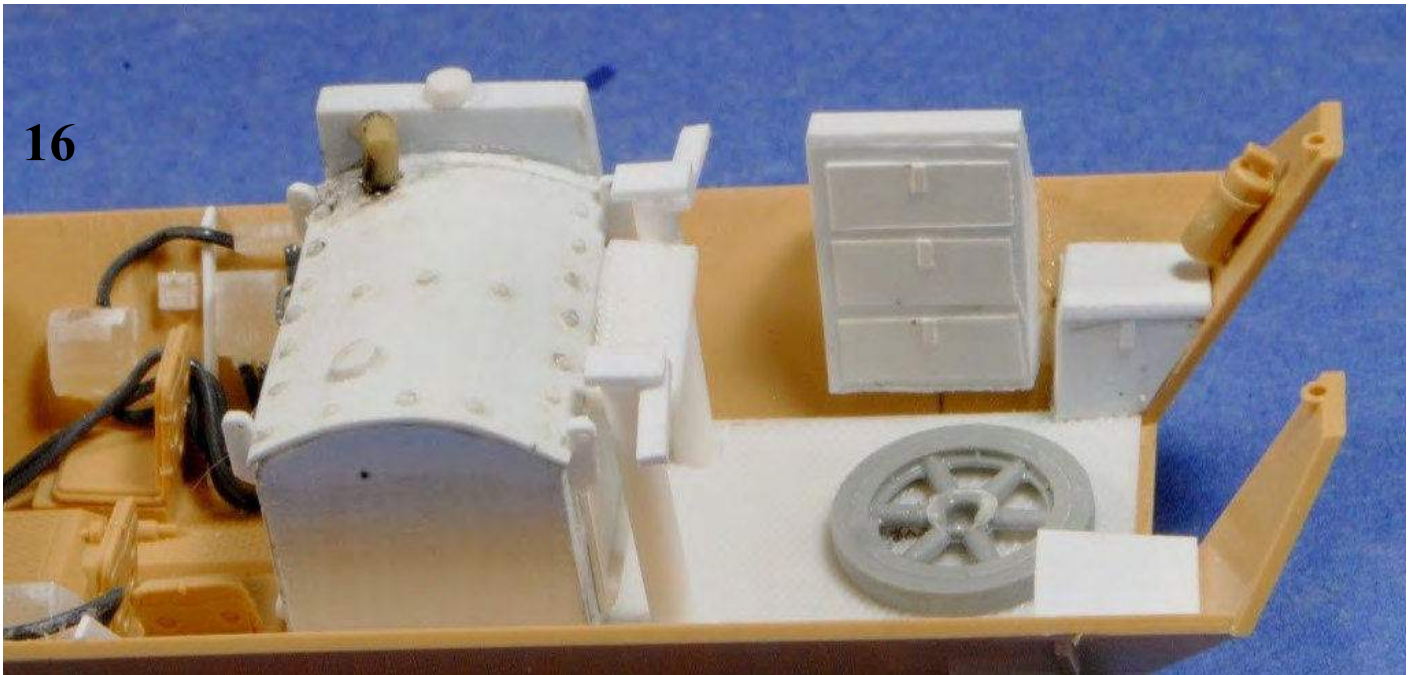
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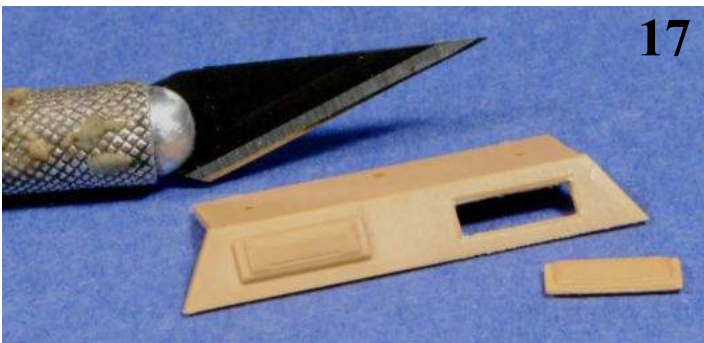
15) Some assemblies, like the generator we have already seen and this drawer unit, are easier to assemble separate from the vehicle. This was made of fairly thick sheet plastic. The faces of the drawers were made from very thin sheet plastic, as were the latches.

16) Once dry, it was fitted and glued in place into the lower hull. The smaller stowage boxes in the corners by the rear doors were built in place. The base for the searchlight was made from an old wheel.

16



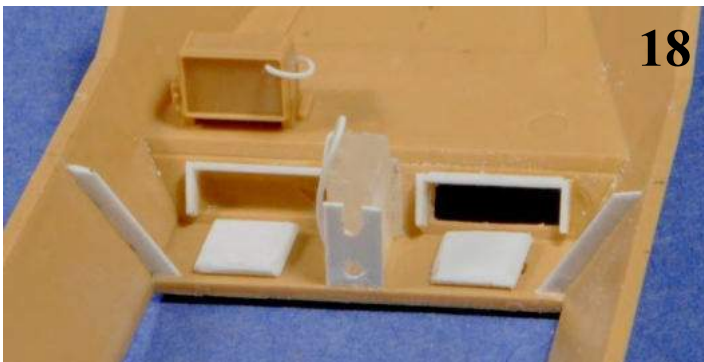
17

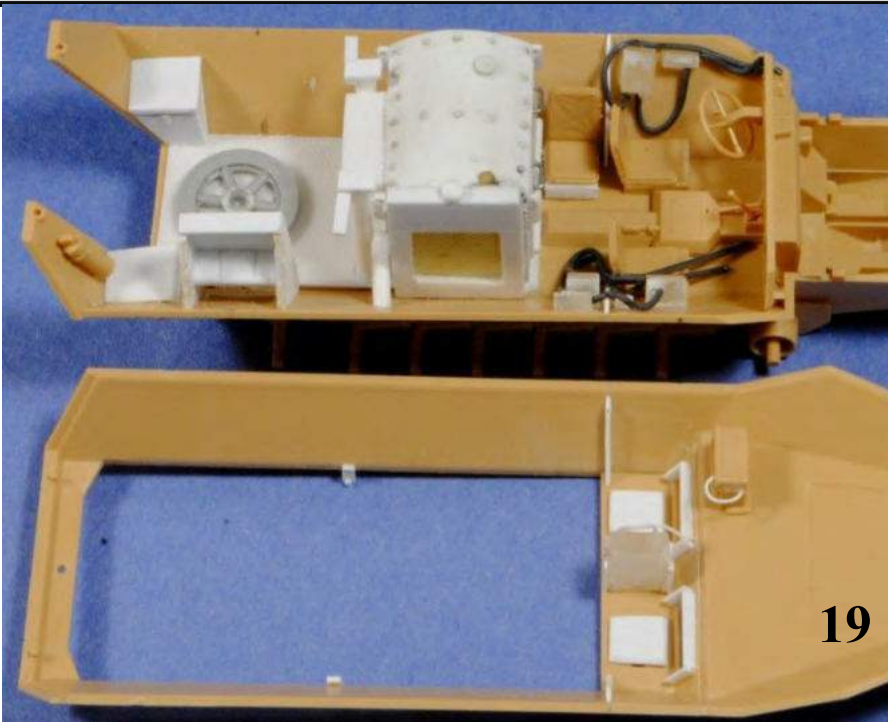


17) The driver's view block will need to be open, so it was carefully sliced off with a new, sharp hobby knife blade. If done carefully, both the resulting parts will still be useful.

18) The inside of the upper hull was detailed normal (headache pads, hull half joint, basic details on the inner view blocks). The radios are the Shapeways parts reviewed earlier. The radio bracket was made from sheet plastic. Wiring is very fine plastic rod.

18





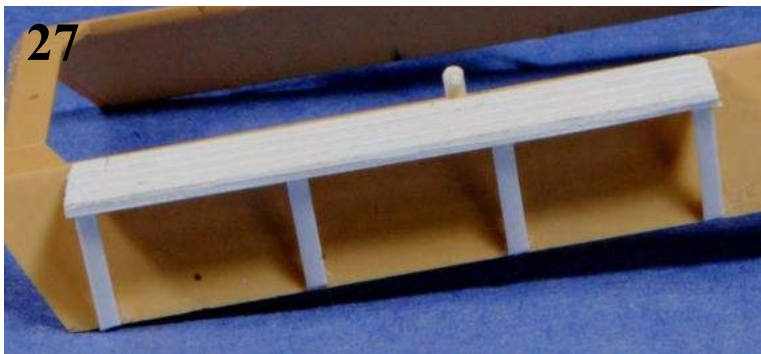
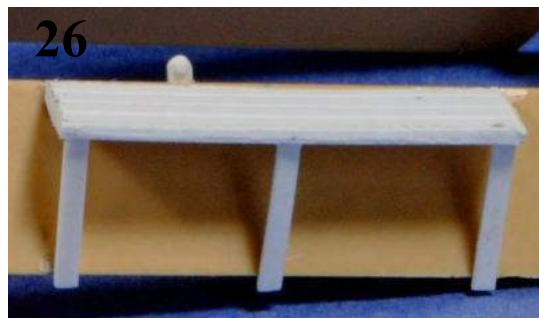
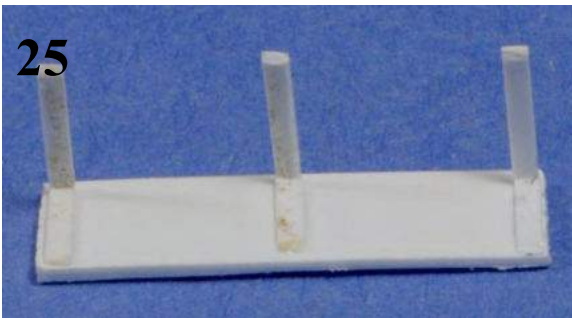
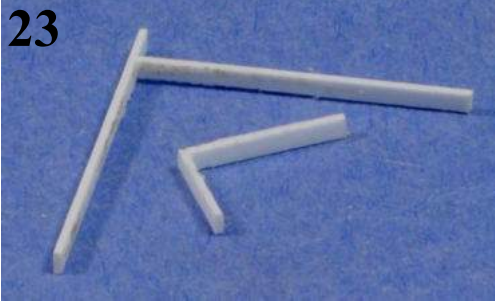
19) An exhaust pipe from the generator through the hull is a piece of plastic rod. Other than the spotlight itself, the interior is complete.



20-21) The scope for the driver was made by first making a basic form from plastic rod detailed with plastic strip. A base was fashioned from an old piece in the scrap box (bottom left). The scope was then detailed with slices and lengths of plastic rod. The cable attachment is part of a spare Tamiya antenna mount, and the cable itself is more of the rubber string (bottom right).



22) The driver's light was made from a piece from the scrapbox. I found a light perfect for my needs (I do not know from where it originally came). The mount was cut from an wheel hub and the light attached with a length of brass wire. More of the rubber string forms the cable. The light, scope, and vision block were glued in place and the cables passed through a hold drilled in the hull. The armored cover was shaped from a piece of "L" shaped plastic strip. The open top of this was filled with epoxy putty.



The catwalks were next. Photos show these to be varied—short on both sides, long on both sides, or one of each. When working with strip, I find it easier to cut the pieces long and trim once glued in place. 23) Shows the pieces glued together and after the joint has been trimmed to shape—both arms are still long. 24) The walks were made from a single piece of plastic with the individual boards scribed in. You could use separate strips for each board, but as each is just under 2mm in width, I found this option works just as well. 25) The supports were glued to the underside of the walks and the top of each brace cut to length. For what it's worth, I used a spacing between the supports of 15mm, center to center. 26) The walks are glued to the hull, leaving the bottom of each support unglued. 27) Once the glue along the top had cured, the bottom of each support was cut to length and glued in place. Measuring and cutting in this fashion, rather than pre-cutting all pieces to the exact length, ensures everything is square and exact.



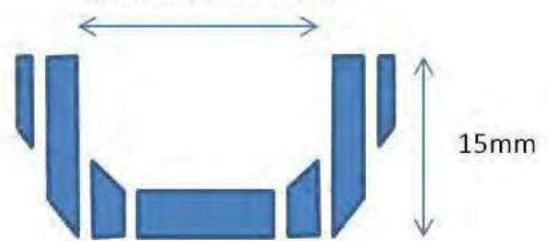
Let's move on to the spotlight. At first glance, this is a very complex and daunting-looking task. But like everything else, we can break it down in multiple, easily-accomplished tasks. I chose to model the basic form of the light next. This would be needed to ensure the supports and frame were the proper size. Diameter (5/8 inch—15.875mm) and length (15mm) were determined based on the Panzer Tracts drawing. 28) I had a piece of aluminum tube that was just slightly undersize. I cut it to length and super-glued a thin piece of sheet plastic around it to create the exact diameter. This also will give a good surface to glue future parts onto. 29) An end plug was cut to shape and glued in place. It wasn't glued flush, but was allowed to stand a bit proud of the surface. 30) Finally, a thick piece of sheet plastic was cut to shape, sanded into a dome shape, and glued in place on the rear.

31



Frame made from
Plastic strip,
2x4.8mm. Base
piece is 2.5x4.8mm.
Outer side pieces
are 1x4.8mm

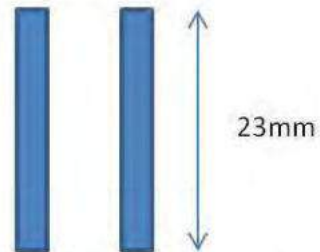
Inner space between arms
5/8 inch (15.875mm)



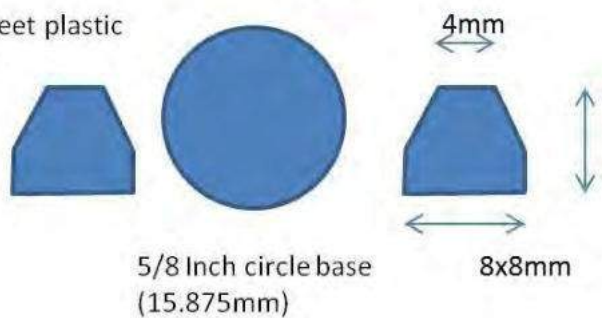
Thin sheet
plastic

16mm x 4mm

3.2mm
Channel



Thin sheet plastic
braces

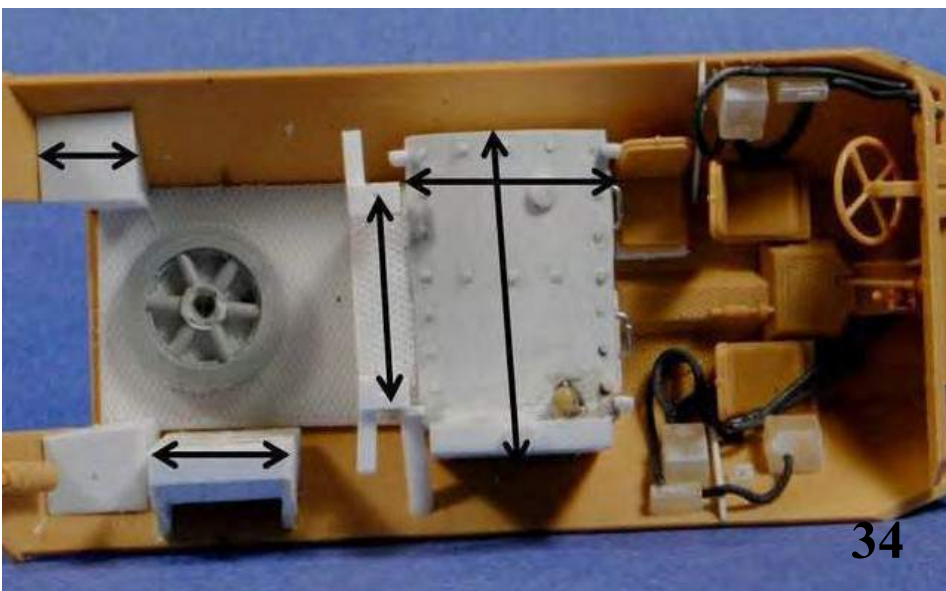


33

32



231 A base for the mount was made from a 5/8 inch plastic disk cut using a circle template. A peg was glued to the bottom to mate with the hole in the center of the wheel glued to the floor of the fighting compartment. 32) The light mount was made from plastic strip, sheet plastic, and plastic U channel. 33) This drawing (not to scale) shows the pieces that make up the assembly.



34) For those who may be interested in following my footsteps, here are a few more of my measurements:

- Rear stowage bins: 8mm deep
- Side drawer unit: 12mm wide
- Light support bracket: 16mm center to center
- Generator: 17mm x 21mm (radiator is 15mm wide)

35



35) Constant test fittings were done every step of the way to ensure not only that parts fit properly, but also that the build was staying the proper scale and matching my references. Although much work remains to be done, the vehicle is at least now easily recognizable as a "Uhu".

36) The operator's scope was made from a piece of aluminum tubing and various lengths of plastic rod and tube. The eyepiece is an old flash suppressor from the scrap box. 37) The mount was made from a piece of small "U" strip, with even smaller pieces of "U" forming the mounting arms. These were initially left over length. 38) The arms were cut to length and plastic strip was glued to the ends. Other tiny details were added as needed

39) The operator's scope, and other bits (including the last of the Shapeways pieces) were added to the lower portion of the mount. The box where the wiring for the light enters

36



37



38



39



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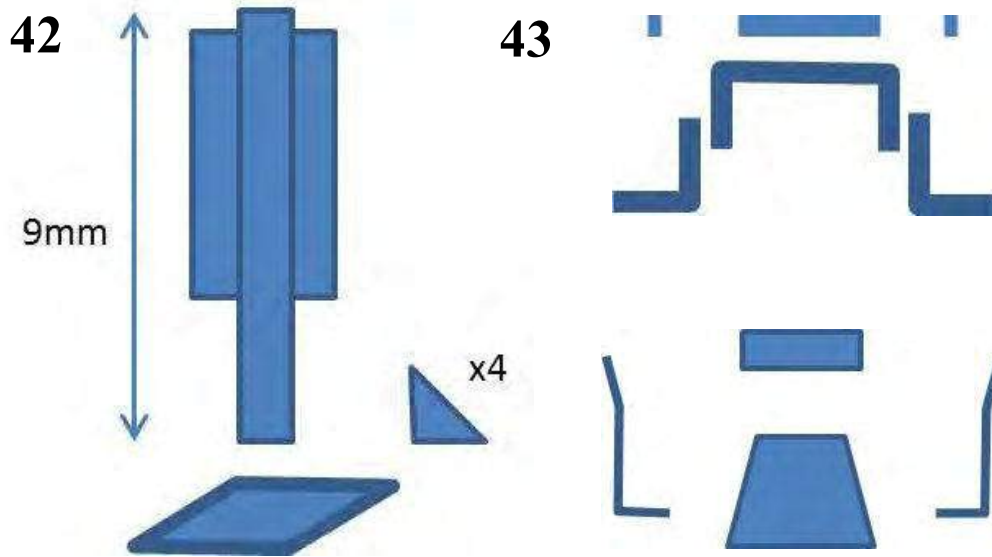


41

was added up top using a styrene block

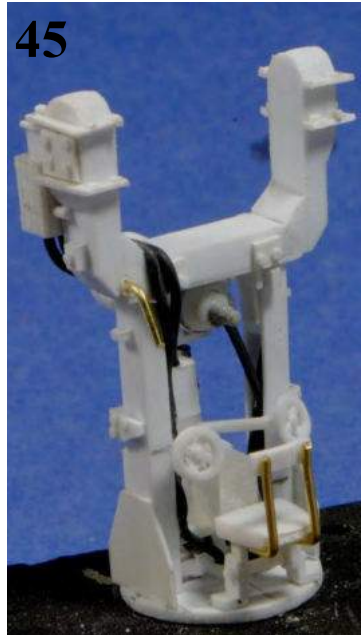
40) Wiring was added next. Various bolt heads were made from slices of plastic rod.

41 Elevating and traversing mechanisms were put in place. Both of these were made from plastic tubing and plastic rod. The "bellows" cover on the elevating mechanism was made by wrapping wire around the top of the piece. The base for the traversing mechanism was made from a square piece of thin sheet plastic. The supports are 4 triangles cut from thin sheet plastic. A parts breakdown is shown at 42. This assembly is 9mm tall.



42: A diagram of the traversing mechanism seen at the bottom of the previous page (photo 41)

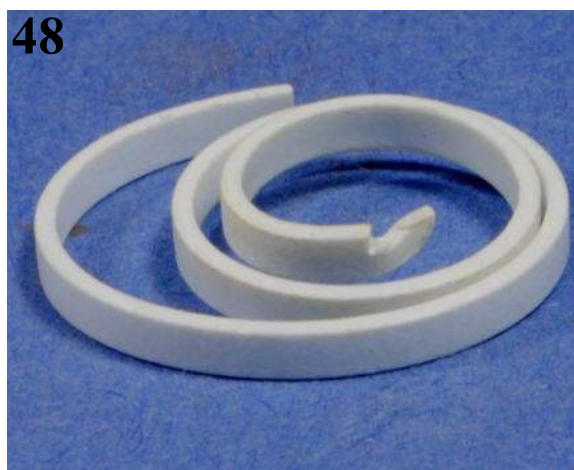
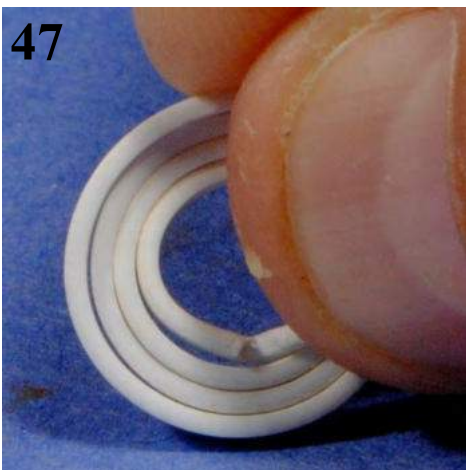
43) The top drawing shows the parts for the seat mount. The mount itself is a piece of 4.8mm "U" channel. This is attached to the base by another slice of "U" channel cut into two "Ls". A bar and two end bolts are pieces of plastic rod. The bottom drawing shows the parts breakdown for the seat. The seat is a piece of sheet plastic, cut to shape. The backrest is a piece of plastic strip slightly curved. The back supports are pieces of brass rod, bent to shape.



44) The seat and seat mount were put in place. The hand wheels were made from slices of 4mm tubing and very plastic strip.

45) Details and bolt ends were added to the upper portion of the mount.

46) The face of the light (including what will be the light itself) was made from a thick piece of clear red sheet plastic. This was painted black on the inside. The ring on the front was cut from a piece of sheet styrene, and the strips around and along the sides of the light are plastic strip glued into place.



47-48) When bending plastic strip to conform to, or wrap around, round surfaces, I gently bend the strip into a tight curl and hold it in position long enough to gain a bit of "memory". This results in a curved strip that easily wraps around the light.

49) Forms on the underside of the light, what appears to be a vent and an exhaust tube were made from various bits of plastic.

50) These were glued in place, and the light itself was glued into the mounting frame.

51) Major forms and shapes on the outside of the light were fashioned from more styrene shapes and/or scrounged from the scrap box.

52-53) A framework attaches the scope mount to the light itself to ensure both elevate and depress together. This was made from plastic strip joined with a bit of "U" channel. Once the glue had completely cured, this was fitted in place. The thin plastic strip was simply bent to conform with the contour of the light, cut to length, and glued in place.

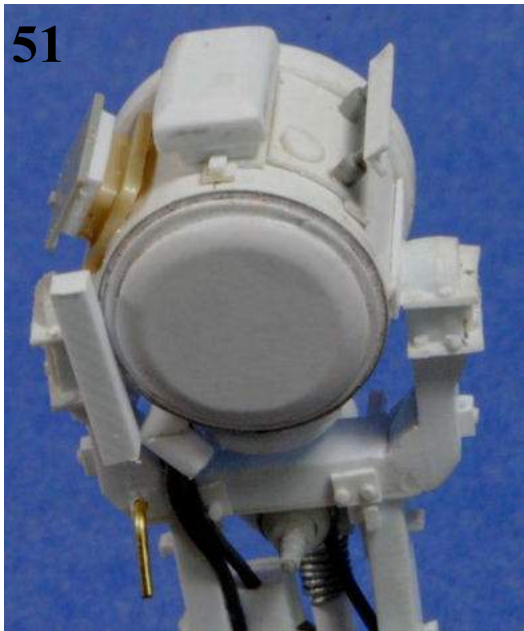
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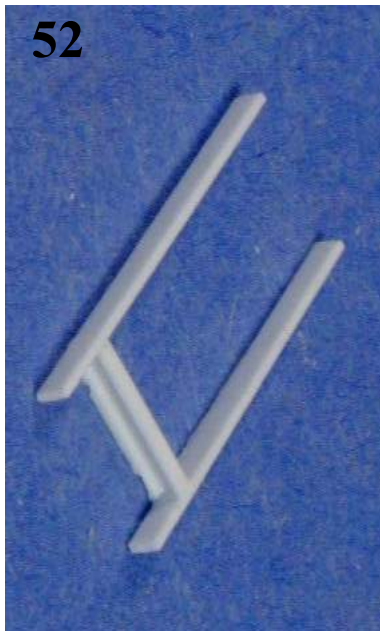
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51



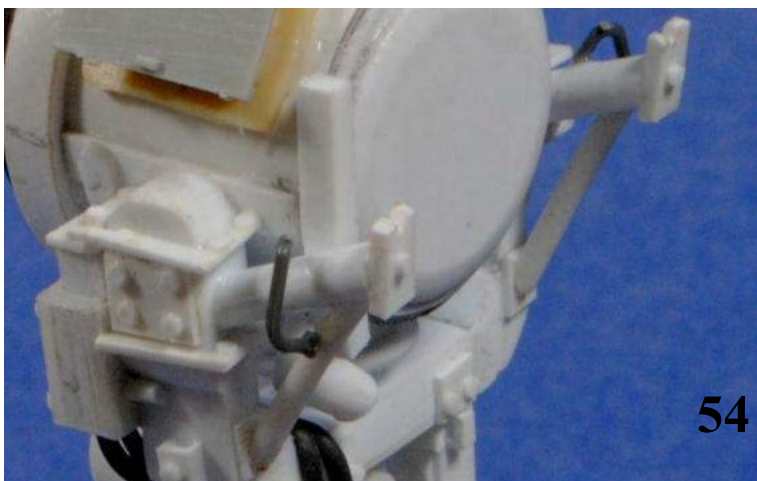
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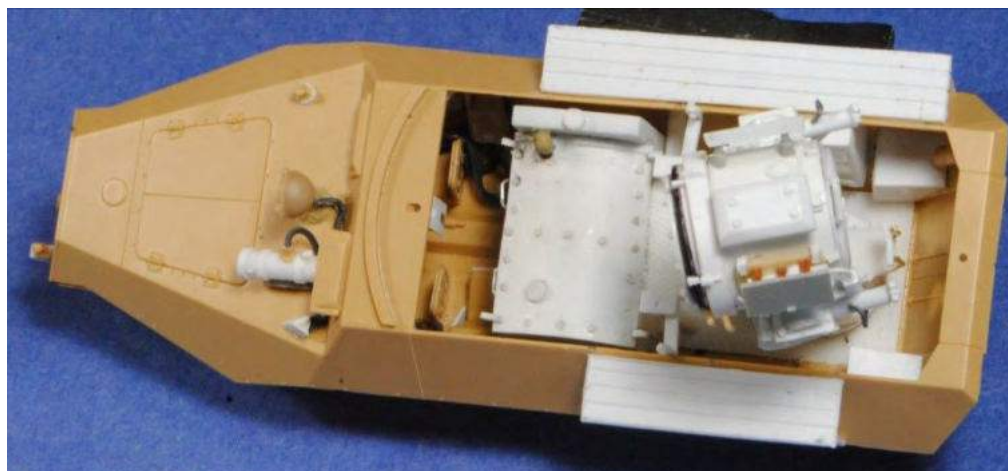
53



54



54) On the rear of the light are two arms that engage with the similar arms behind the generator when the light is reversed and folded down for stowage. These were made from various diameters of plastic rod (2.4mm for the arm, 1.5mm for the supporting arm, and about .75mm for the engagement pins). Bits of plastic strip were also used. The hand-holds are parts from the scrap box.



55-56) Final details (handles, plugs, wiring, latches, etc.) were added and the light sub-assembly was complete.

Left: A "plan view" showing the finished conversion prior to painting. The hull halves are not yet glued together and the light is not permanently mounted—these will be left as separate sub-assemblies for painting.



Above: The finished light, cradled in my fingers, shows the relatively small size of the finished piece.

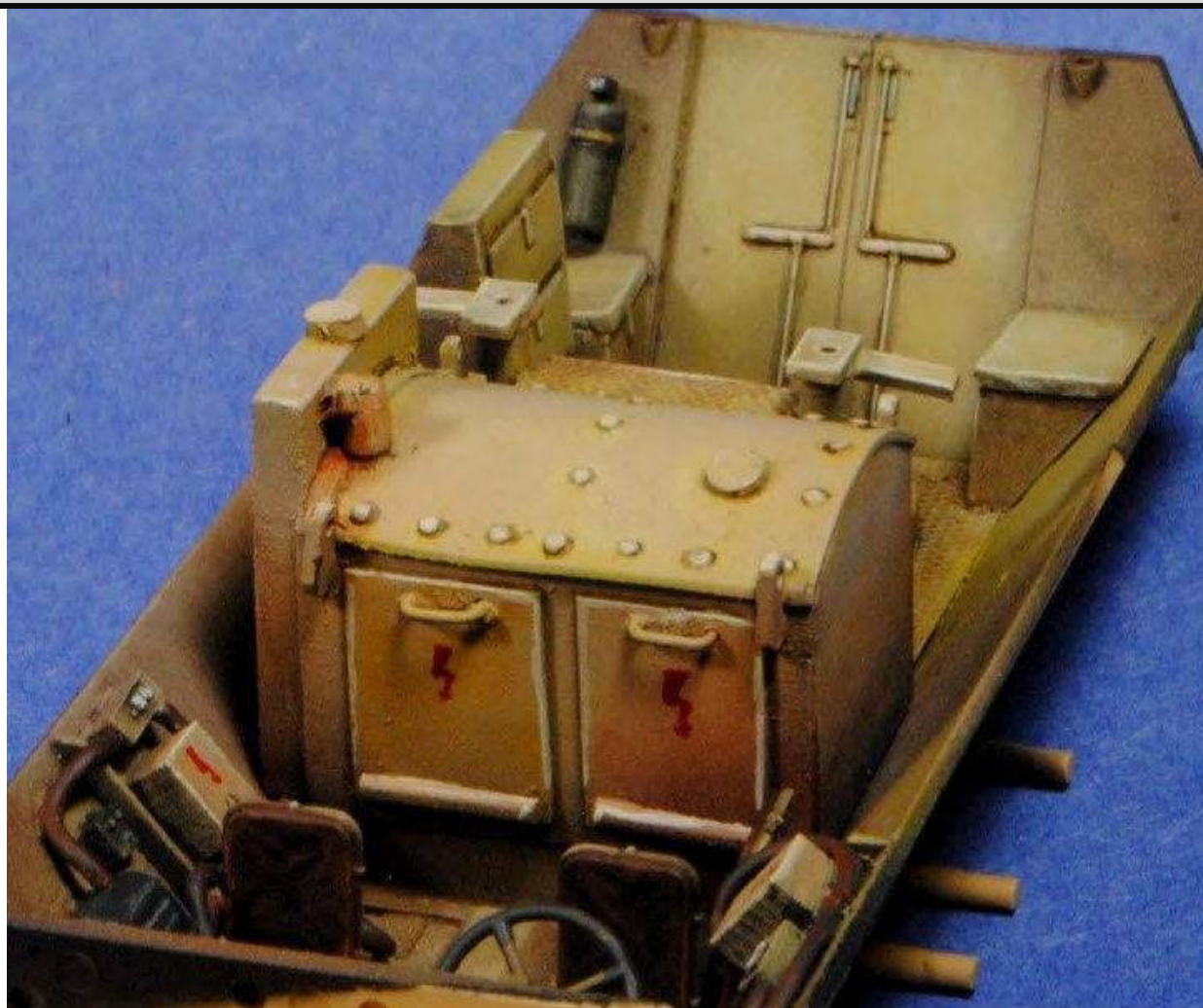
Right: A close-up showing details on the light. Note the various bolts (slices of plastic rod), handles (from the scrap box, bent wire, or thin slices of plastic "U" shape), latches (made with a slice of plastic "L" over a tiny length of plastic rod), and the various other fittings mostly made from styrene bits and also a few small pieces from the scrap box. Making any complex piece of equipment is easy if it's first broken down into basic forms. These simple shapes—spheres, cubes, rectangles, cylinders, etc.—are made and only then are other details added.

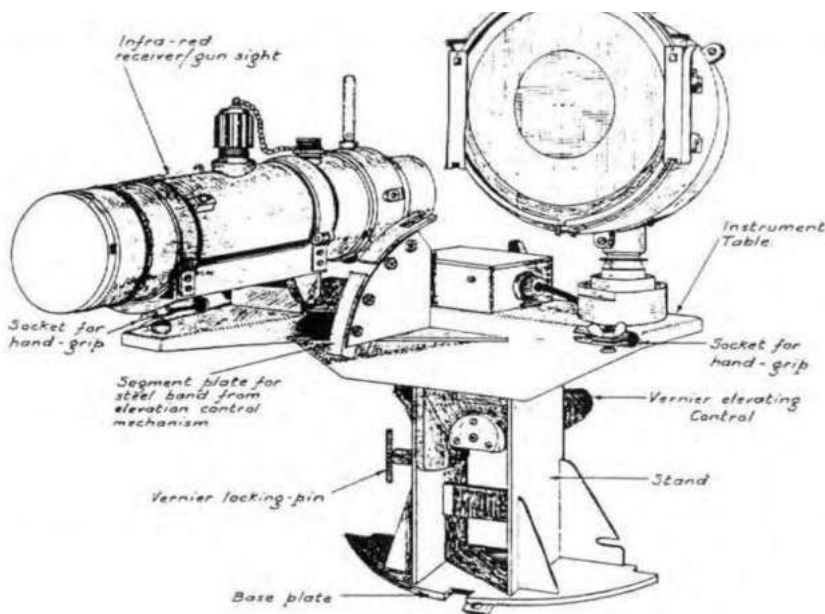
Below: final modification to the Tamiya halftrack was to add the Uhu generator's exhaust pipe exiting from the rear of the right side stowage lockers. This was simply made from a small piece of plastic tubing.



Painting and Weathering

Painting and weathering followed my normal methods. As this vehicle would represent a fairly new issue—perhaps even pre-issue during troop trials, I wanted to model it undamaged, and relatively clean. I also wanted to match my reference photo showing the vehicle is what appears to be plain Dark Yellow. Photos of other vehicles show them in factory-applied camouflage. To these ends, the vehicle was painted using my normal color-modulation (highlighting and shading) methods. Slight variation was provided with filters and dot filters. Chipping and streaking was very minimal. Some dust and grime was added to the wheels and undercarriage. The interior likewise is fairly clean, with a minimum of chipping of tracked-in dirt and mud. Photos of the finished vehicle and interior can be seen on the next pages.





“Sperber” - The IR Equipped Panther G Tank:

Originally, I had planned to model the Uhu by itself, but as it was designed to operate in support of IR equipped Panther tanks—it was not a stand-alone weapon system—I determined to pose the vehicle with an IR Panther. The IR gear was built using the same methods we have seen with the Uhu. In fact, the scope and light, being very similar, if not identical, pieces were built in exactly the same manner. It would have been better to make a mold of them and cast copies, but the Uhu was already assembled and partly painted before I decided to include the Sperber. Only the mount differed, and the construction of that is shown below. As for other detailing on the tank, much of it—periscopes, handles, screens, battle damage—was done in the exact same manner as we have already seen. Other changes and modifications are shown here.

The Panther IR gear from the Elliot article quoted in the sidebar on the following page.

Sperber:

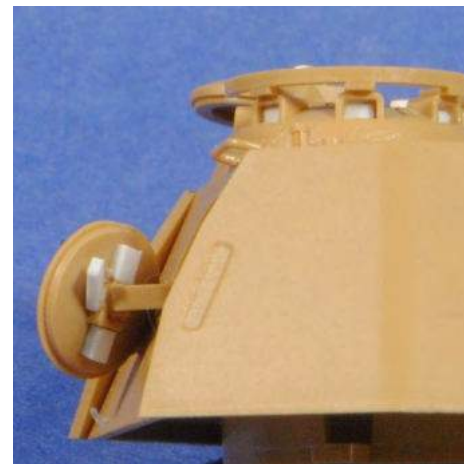
We visited “Sparrow Hawk”, or the IR equipped Panther, on page 199. Let’s take a closer look. Unlike Uhu (and Falke) where the driver, gunner, and light operator had night vision, only the commander was equipped in Sperber. He had to have his head outside his open hatch to use it. This was considered an acceptable risk as long as the enemy did not also have night vision. As for the operation, the following are excerpts from the article “Snoopers, Snipers, Peeping Toms, and Tom Cats” by Clive Elliot:

"Sperber kit consisted of a... headlamp with a...viewer for use with the 7.5 cm Kw.K.42 (L/70) gun, and a gun elevation control... the segmental plate accommodated a steel band, which was linked to the gun. This permitted co-ordination of movement between the gun and the infra-red system."

"The...viewer was lined up on a light source at about 600 meters; the gun was lined up using its normal sight. On going into action the steel band indicator linkage was disconnected, the bildwandler viewer and its infra-red lamp were then free to move. Looking through this the commander would give orders to the driver who was driving totally blind. Once ready to engage the target, the tank was halted, the gunner was ordered to traverse the turret until it lined up to the original alignment settings, the steel tape was then reconnected to restore the linkage to infra-red sight and gun. The commander looking through his bildwandler viewer then ordered the gunner onto target. This was a very cumbersome way to engage in night warfare, it would clearly be far if better



Photos of the gear. The upturned “horns” are handles for the tank commander.

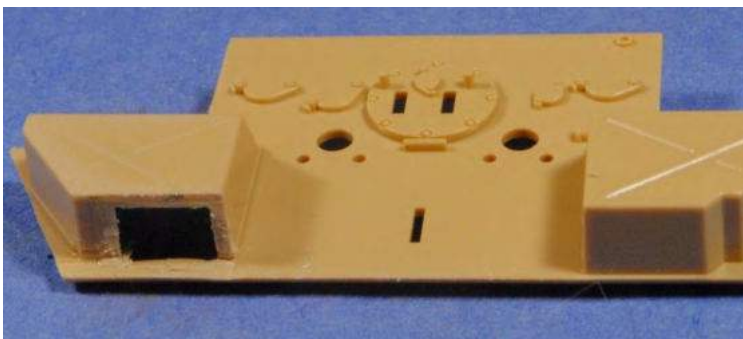


Since the vehicle will be a command version (Panzerbefehlswagen), some details needed added. Due to extra radios, the co-axial machinegun was removed. The opening was blocked by an armored plug (made from plastic rod). An additional antenna mount (a spare from one of the Tamiya halftracks) was added to the turret roof. Using plastic rod and another Tamiya antenna mount (each halftrack needs one, but comes with two—I have many extra) the mount for the star antenna was added to the rear deck.

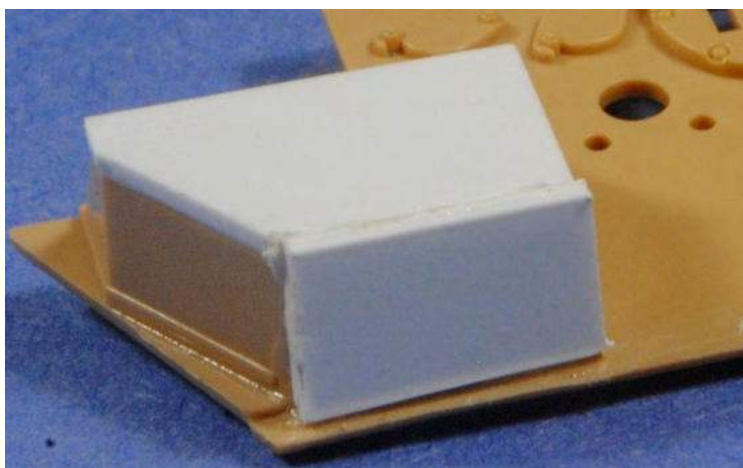
The antenna themselves were made as shown in the chapter on the 251/3.

The driver’s hatch and the escape hatch on the turret rear were both posed open. The driver’s hatch already has interior detail molded on. This had to be added to the escape hatch. This was done with bits of plastic strip and “U” form.

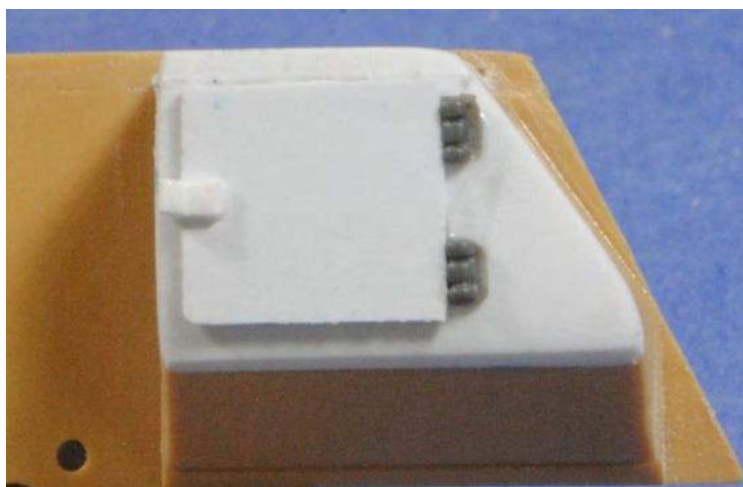
Top: On the IR Panther, the right rear stowage bin was replaced with an armored box for support gear. As the bins are molded onto the rear hull, it is easier to modify the bin than to make a new one. The top portion was cut off at the "step" and the "X" on the front of the bin sanded off.



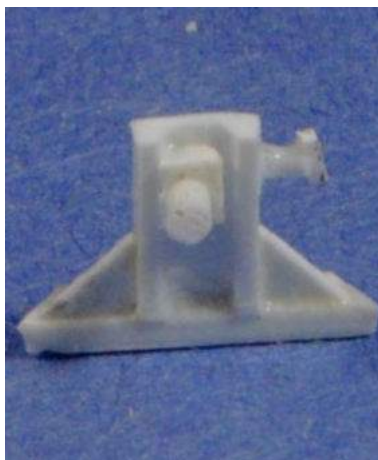
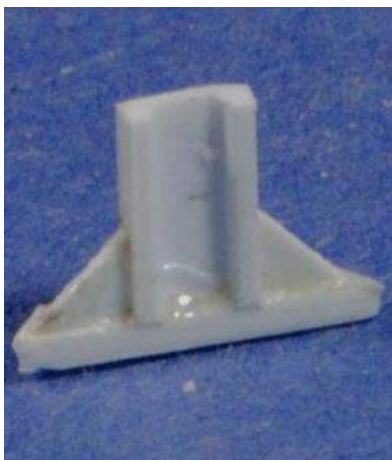
2nd. To match the height and thickness of the armored box, sheep plastic was glued in place. This was cut slightly oversize and sanded smooth and flush after the glue had completely set.



3rd: The door was cut from a piece of thin sheet plastic. The latch was made from plastic strip. The hinges were sliced from an old part in the scrap box.



Bottom: Just like we saw with the Uhu, scratch-building complex devices is not that hard if broken down into basic shapes. Left: The IR mount started as a "U" form glued to a length of plastic strip and braced with two small plastic triangles. Right: This was then detailed following photos and drawings of the actual device with other bits of plastic strip and rod. This part of the mount was then glued in place inside the commander's cupola of the tank.



if the driver and gunner also had night vision equipment. (There are scattered accounts of such set ups in post-war tank books, often they refer to the original system as "Solution A" and a three viewer system as "Solution B". But no photographs have yet been found to confirm that "Solution B" existed, although there was one photograph published it has since been exposed as a fake!)...

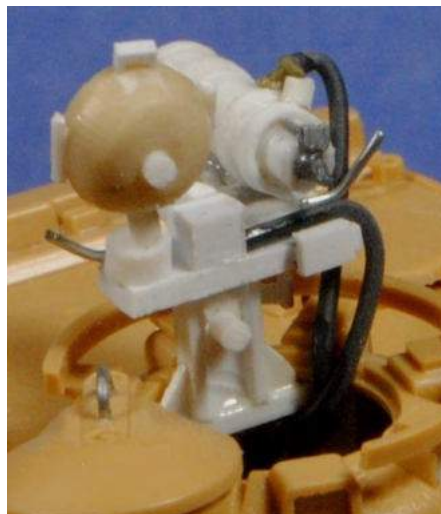
"...each of the four tank companies consisted of three platoons with five Panthers each... Each platoon had an APC with a large searchlight for identifying targets for the Panthers. This presumably was Uhu on the half-tracks... But a major problem was gun recoil and other vibrations, which caused the steel tapes linking the commander's bildwandler to the gun to misalign. In one mock battle, within a few shots being fired from each tank, the disorientation of the guns from their sights required that the exercise be abandoned."

In addition to all this, the equipment was crude. The system was ineffective in rain or snow, and was unable to tell friend from foe (it could not distinguish a Panther from a T-34, for example. Even if deployed in larger numbers, it does not appear it would have been very effective. But its impact on Allied morale in such a case cannot be underestimated.



Top: Left: The top of the mount was made from a couple bits of plastic shallow "U" channel and a small triangle of thin sheet plastic.

Right: This was glued to the mount. The mounting piece for the scope is another part of the scrap box, identical to the one I used on the Uhu. It cradles the scope nicely, but two parallel strips of plastic would work just as well. The light mount is a piece of plastic rod and the power supply is a piece of square section strip. The spotlight was actually carved from a scrap bit of resin! It was glued in place and detailed with small bits of plastic shapes.



2nd: The scope itself, and associated cables, were made using the same methods as we saw with the Uhu. The handles are pieces of paperclip, bent to shape and superglued in place.

Bottom: Brackets for the spare track links were made from "U" channel plastic strip. The brackets for mounting the tow cables on the rear deck were made from a smaller strip of the same shape. Bolts for mounting the spare road wheels were added to the left side of the turret. The spare wheel on the right side had the empty lug bolt holes drilled out and the ends of the mounting lugs glued in place. (Note the wheel is not yet permanently attached, just put in place for a test fit).





A test fit of all the spare track links, road wheels, and hull fittings was done to make sure all the assemblies "played nice" together. Prior to further construction, the hull halves must be permanently fitted together. Two screws are provided in the kit to do this—one hidden under the bow ball MG mount, the other hidden under the engine access hatch. The interior must be painted before the upper hull can be permanently joined to the lower hull. .

Painting the Camouflage: late in the war (at least from late October 1944 if not earlier), Panthers manufactured by MNH featured diagonal lines of red brown over an olive green base color. These stripes were separated by bands of dark yellow. Opinion is mixed, and evidence is scanty, but the pattern may not have continued over the roof of the turret and hull. This photo seems to so indicate. I thought it was interesting scheme and decided to replicate it.

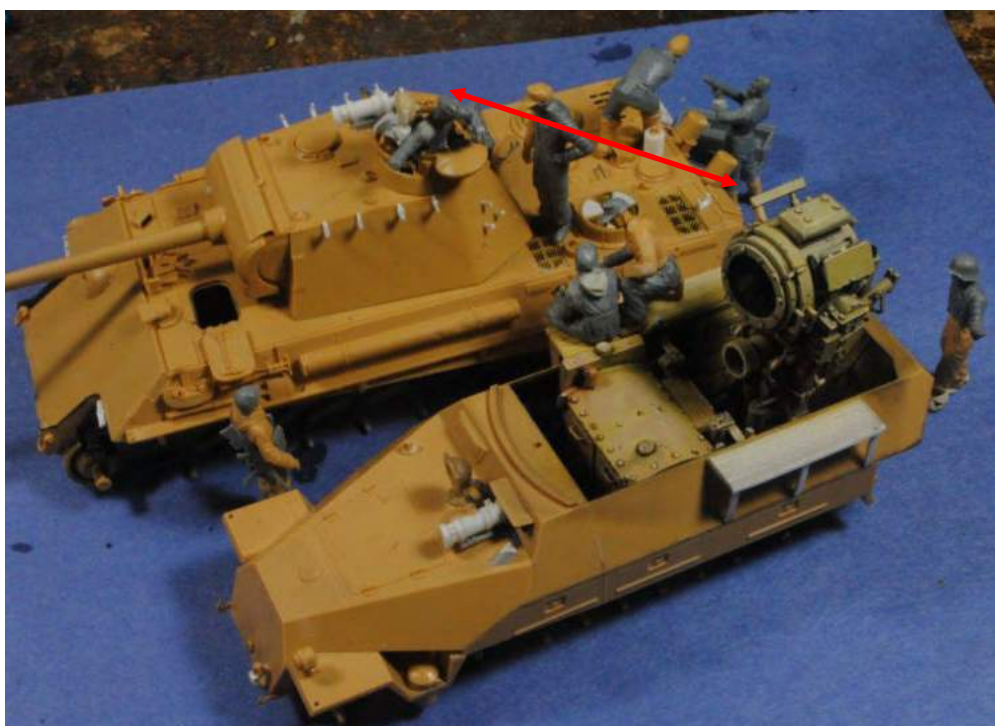
Below: My finished Panther. Barrels were painted in a heat-resistant black lacquer. Evidence seems to indicate some (probably replacement barrels) were not over-painted in the camouflage color.



Composition

HISTORY OR FICTION?

How does this piece stack up against my Ten Commandments of Effective Composition, and what, if any, historical precedent might it have since there is no evidence these vehicles were ever used together in action?



These compositional photos show the arrangement of the vehicles and figures. Not only was composition finalized in this step, the poses of the figures were also determined and created. This test-fitting also allowed me to determine the size of the needed base. The base itself was made using the design and methods we have already seen.

Note that the heaviest concentration of figures (the main point of the story) occurs along a line from the spotlight to the Panther commander's cupola. This line is located in the center of the composition and is an angle to the viewer. This is where the primary action/interaction is taking place. It also serves to draw the viewer's attention to the special features and function of the vehicles.

I prefer to pose the figures and work out final composition after construction but before painting the models. This allows me to use the nearly complete models without the risk of damaging fragile paint or parts (such as antennas, fender width indicators, etc.). After this point, painting of the vehicles and figures, as well as construction of any needed groundwork elements, can all occur pretty concurrently as my mood dictates.

The crewman loading ammunition is simply a sub-plot and serves only to show the scene takes place prior to the vehicles going into action (or, more probably, conducting trials or exercises).

Note that the position of the walking machinegunner changed in the final composition. This was done for reasons of balance.



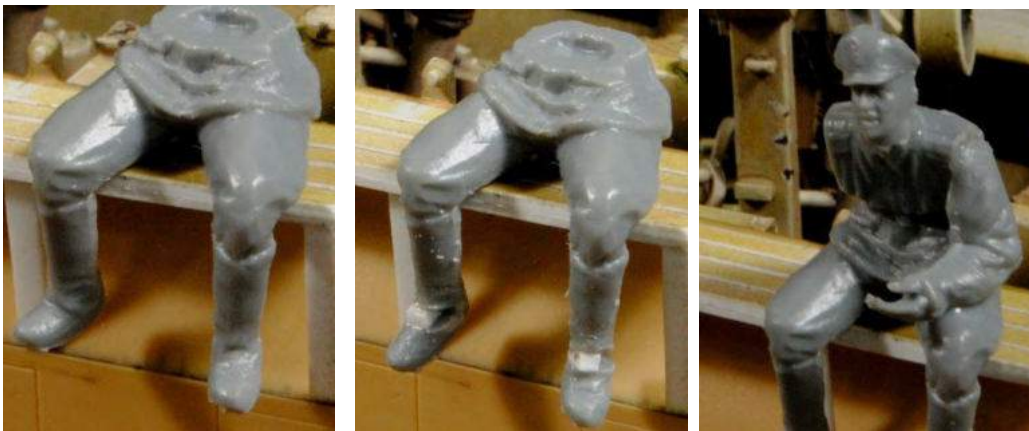
- 1) HAVE A SINGLE MAIN POINT:** The main point—the story—is simply the vehicles. It is left to the viewer to determine whether this is a training scenario or actual mission.
- 2) SHOW ACTION AND INTERACTION:** Here, the interaction between figures links the vehicles together, and literally forms a bridge between the various IR components.
- 3) USE A TIGHT COMPOSITON:** The scene is compact with elements fairly tightly clustered.
- 4) DIRECT THE VIEWER'S EYE:** The main point is in the visually strongest position on the base. Figure interaction and gestures directly link the Panther IR gear with the Uhu crew compartment.
- 5) HAVE BALANCE:** The groundwork elements and the walking machinegunner in this instance provide balance since of the weight of vehicle and figures are to the front and right.
- 6) USE ALL THE ELEMENTS:** Location highlights the Uhu, groundwork sets the scene and provides balance, figure dress tells us the season (late March/April) and weather (end of the Spring thaw), activity tells us a mission is being prepared for.
- 7) MINIMIZE DEAD SPACE:** The scene is tightly framed on all sides as close as possible and the vehicles are as close together as practical.
- 8) USE SHAPES AND ELEVATIONS:** Both the base and composition are rectangular, as generally are the vehicles. Everything is complimentary.
- 9) ARTISTIC LICENSE IS OK:** There is a great bit of this here! Most of my 251s are generic vehicles in generic settings—thousands were made and saw action in thousands of engagements, serving through the whole war on all fronts. But few Uhus were made, few issued, and there is only one time it MAY have seen action. That means very specific vehicles, unit, location, and situation I have no exact info on. It's unclear if the Uhu and IR Panther ever fought together, but trails and training were conducted. I wanted to use both vehicles—the Uhu was designed to support the Panther and they're cool together. So I chose to leave it up to the imagination of the viewer whether they are preparing for action or a training scenario. I obscured (or omitted) unit and tactical markings).
I could have created a totally “fictional” piece, but I believe we should be good stewards of history when creating supposedly historic pieces. I have no problem with sci-fi or fantasy subjects (I've made many) - but I like to keep my historical subjects plausibly historic—and it would be easy to cross that line with this vehicle. There is certainly nothing wrong with “paper panzers” or “Panzerwaffe 46” if that's your thing, but I'm not into them—I prefer a wide, clear line between my historic and my Fantasy/Sci-Fi pieces.
But I also like “cool”. Hence my decision to include the Panther. In research, there is tool called “Occam's Razor” which states that when confronted with competing hypotheses, the one that requires the fewest assumptions is probably correct. For modeling I use what I will call “Townsend's Razor” - when confronted with unclear historic possibilities, always chose the coolest one!
- 10) PLAY WITH IT:** This diorama is a great example of the evolution of an idea. Originally, I had just planned to depict a Uhu undergoing servicing and maintenance. Adding the Panther was a later idea. After I decided on the tank, the poses of the figures had to be worked out and then an appropriate setting designed. This composition went through numerous iterations before I settled on the final design you see in these pages.

Figures

With construction of the vehicles complete to the point where they are ready for paint, attention was turned to the figures. Basic information on figure conversions was covered in earlier chapters. For this vignette, I settled on nine figures—the crew of the Panther and Uhu. They are preparing for a mission, but I leave it to the viewer to determine if it an actual operation for just training/testing. We know the vehicles performed together at least for the latter option, but we cannot be sure about the historicity of the former. When posing the figures, both vehicles (with all tracks in wheels in place) were used to ensure figures interacted properly together (figures that should be looking at each other, were in fact making eye contact). On page 12 of the “Figures” chapter, we saw the construction of the soldier receiving ammunition on the rear deck of the Panther, we'll look at the creation of the remaining figures on the following pages.



Top Row: The tank commander, from Tamiya's Panzer Grenadier set, needed to lean forward at the waist and needed the legs put closer together. Far left shows the cuts made to do this—a wedge from the front of the waist, cuts inward at the hips, and material removed from the inner thighs. The other photos show the figure repositioned, glued in place, and the damage repaired with putty. Note the front of the thighs were cut down to allow the figure to fit in the cupola. This will be invisible on the final model and so was not repaired. Note also the raised right arm. This mandated the shoulder also be raised to keep the anatomy correct. This was done with putty and the shoulder strap replaced.



Bottom Two Rows: The feet of the Uhu Commander (also from Tamiya's Panzer Grenadier set) were molded at a 90 degree angle to the lower legs—designed to rest on a floor. But here, the feet are hanging in midair, so that pose was inappropriate. The front of the ankles were cut and the feet angled downward to a more appropriate angle. Plastic shims ensure the feet stay at the correct angle and add strength. The figure is to be looking up at the tank commander, so the back of the neck was shaved so the head sits at the appropriate up angle. To transform the smock from an SS camo smock to a Wehrmacht hooded smock, the foliage loops were shaved off with a sharp hobby knife, and a hood added from Magic Sculpt. The map is a piece of brass foil, crinkled appropriately. This Uhu crewman was made from a mixed assortment of parts—the upper torso, head, and boots from a winter-clad figure included with German halftracks. The legs are from the Field Maintenance set. The skirts of his coat had to be resculpted. Note the subtle turn and tilt of the head so he is looking at the Uhu commander while pointing at the map.



The walking machine gunner's upper torso, arms, and head are straight from Tamiya's German Infantry on Maneuvers set. The legs are from another Tamiya winter figure. This was a simple cut and swap operation, with a bit of putty needed to repair damage and close gaps.

The infantry NCO is stock from a Tamiya halftrack kit. The tanker is from the Panzer Grenadier set with a different hat and a replaced right arm.

The tanker loading ammunition is from the Field Maintenance set. His boots (and lower legs) have been replaced with winter boots cut from another Tamiya figure. His rolled-up sleeves were cut off and replaced with epoxy putty sleeves. His cap was converted, using Magic Sculpt, into a fur cap with the flaps down.

The final figure is only a torso, head and arm (made from various Tamiya parts) emerging from the rear hatch. No other parts of the figure will be visible on the finished model and need not be included.

The finished figures:



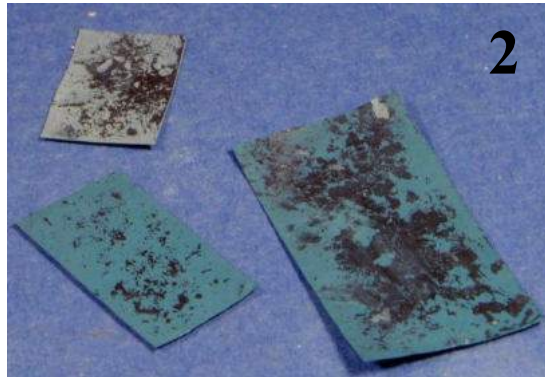
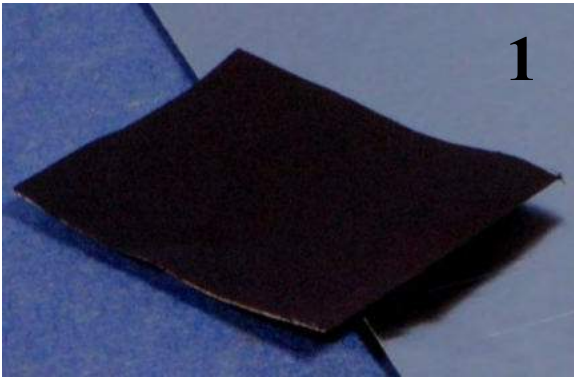


More views of the finished figures. In accordance with the situation and inline with the vehicles, the figures are also fairly clean and "fresh". Some of the white garments show staining that would likely occur over the course of a winter, but the figures uniforms themselves are not dirty or muddy and their equipment is in fairly good order. In diorama building, consistency is important—especially consistency of technique. If figures are shaded and highlighted, then vehicles and groundwork should be, too, for example. The elements in a scene should look like they belong together and not be just a disparate collection of "things". We normally also want such things as weathering to be consistent. If an element is weathered differently, there should be a reason for it. For example, we can build a story around fresh, clean, perfectly uniformed and equipped recruits or replacements in a sea of mud meeting dirty, ragged, old veterans

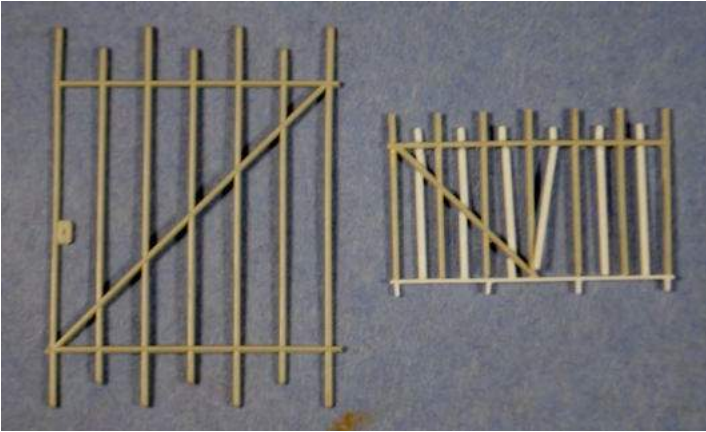
Groundwork



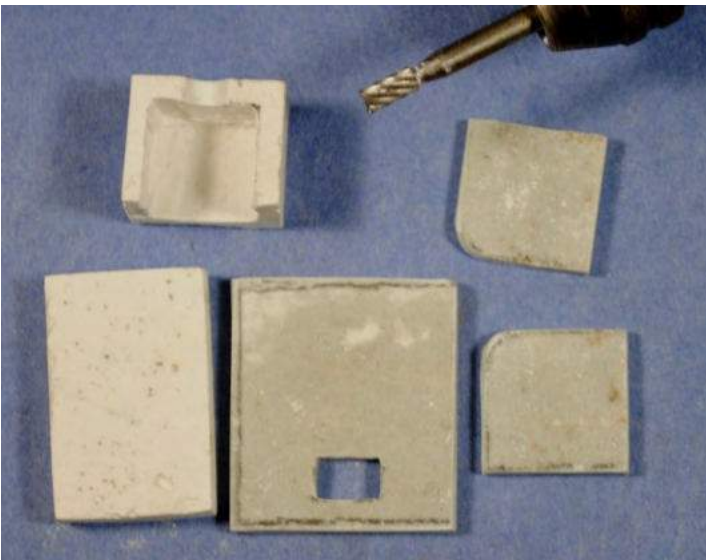
The first step in the groundwork process was to make some rubble. For bricks, I used Milliput "Terra Cotta" epoxy putty. I used this as it is already a reddish color. It was rolled flat using 1.8mm plastic strip as guides for the rolling pin to ensure uniform thickness (top left). Once it had started to cure but was still workable (after about 45 minutes), I used a razor blade to cut the putty into 2mm side strips. These were then chopped into 4.5mm lengths (top right). The result—about 15 minutes of work yields a nice pile of realistically sized and colored bricks (left). Those bricks that include the rough, broken edges of the rolled putty serve as broken brick debris.



I used silver embossing foil (available at the craft store) for corrugated steel (such as roofing). The pieces were cut to shaped, primed with Krylon dark red primer, and airbrushed a dark rust color (1). Next, using the salt and/or hairspray methods, the pieces can be painted in desired colors or left in the dark rust color (1). Painting is done prior to forming as the foil is thin and easily bend/crushed or otherwise damaged. To form the sheets, I sandwich them between two sheets of Evergreen corrugated plastic sheet (3) in the proper scale and design. This transfers the pattern in the plastic to the foil. It could also be done with one sheet—just use a toothpick to press the foil into the plastic corrugations. But I find it quicker and easier to use two sheets like a mold and press the foil between them. Once formed, holes and tears can be added with a drill bit or hobby knife. The sheets can be bent if needed. Additional rust or dirt can be added with pigments. The result (4) is very realistic and scale thick corrugated steel sheets. Additional rubble was made from plaster bits, plastic and wood strips, and bits from the scrap box.



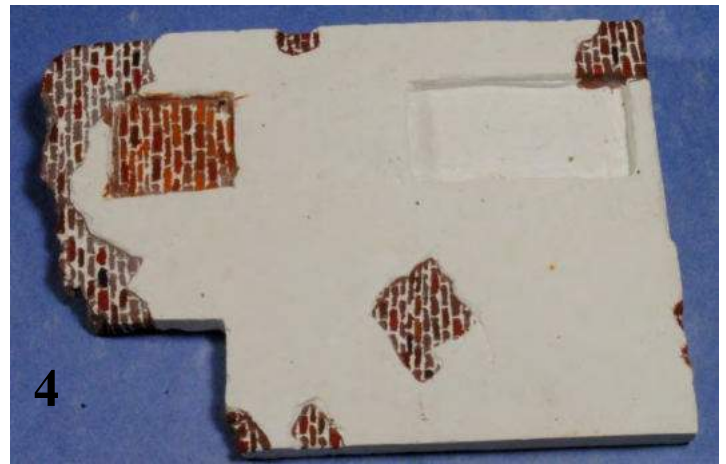
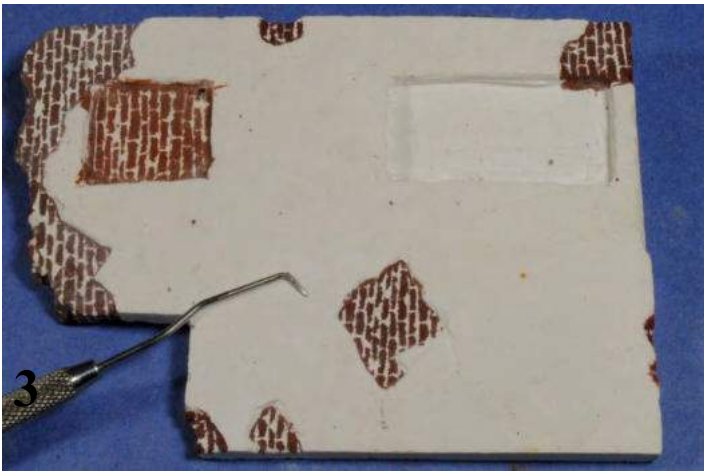
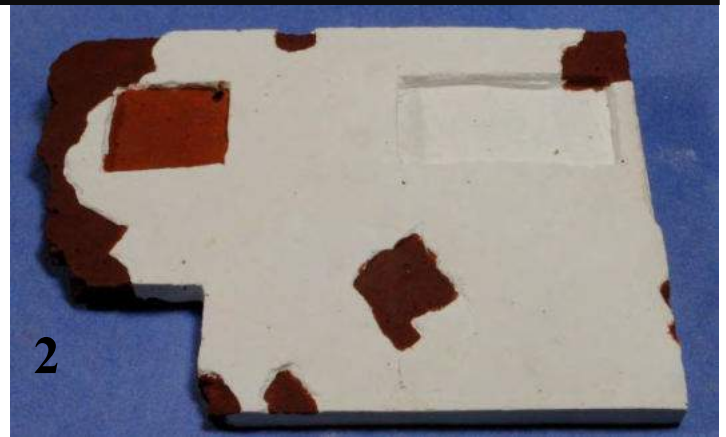
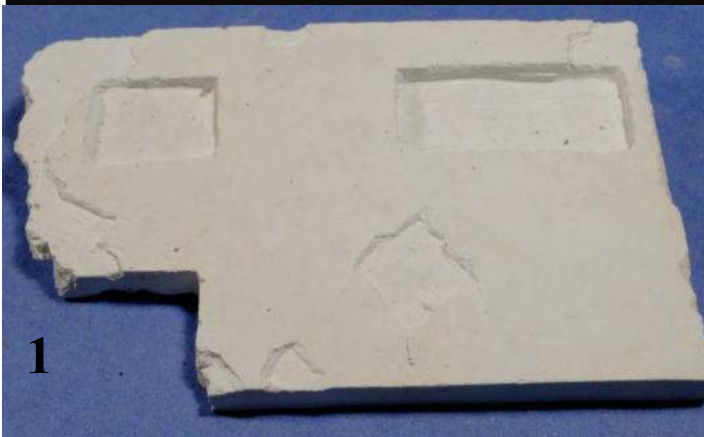
The broken-down gate is a “scaling down” of an old 1/35th scale part. The original part is seen at far left. At near left is the new part. The old part was simply cut in half, and more bars were added using plastic rod. A new base, made from plastic sheet and rod was also added. The whole thing could easily have been made from styrene forms, but the old gate was useful as a basic form and as a guide to ensure everything was aligned properly. The gate is simply one more piece of debris strewn on the ground. It may seem like a lot of work for little return, but in fact it's small details like this that combine together to create enhanced realism in scenes such as this one.



A well-fountain was made based on a photo of an aftermarket item I found on the web. The back and basin were made from plaster scraps, the basin being hollowed with a Dremel tool. The sides and base are rolled-out Magic Sculpt epoxy putty. A piece of tubing forms the spout. After painting, grates were added using old pieces of window screen, painted a suitable rust color.

The road surface was made using the a Tamiya printed cobblestone street section (more information on this product can be found in the 251/1 Holzgas chapter). For potholes, pieces were cut from the paper, and the wood base was routed out with a Dremel. The depressions in the base were filled with plaster. The road surface was glued in place, and the plaster chiseled away to form the holes. The natural grey color of the printed stones were used as the base color, and many stones were painted in various colors. As a final step (not shown here), the street was dusted with pigment powders).





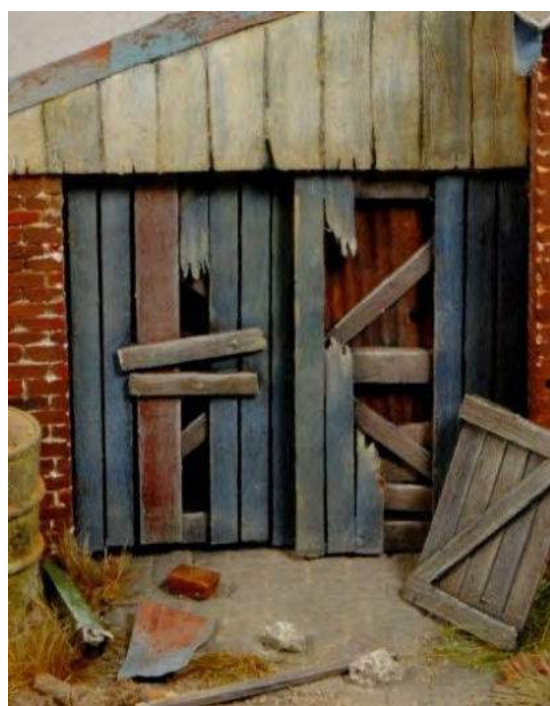
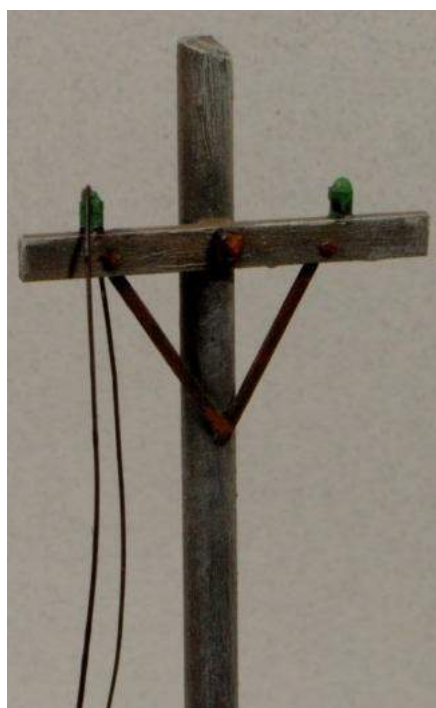
The buildings (facades only) were made mostly as seen in the 251/9 chapter. The basic forms were made in plaster cast in home-made mold boxes and details were added with putty, plastic, etc. Differences in methods are shown on these pages. Above: To make and paint plaster bricks at the same time I follow this process. 1. Prior to scribing the bricks, I paint the surface in an appropriate color. 2. Then scribe the bricks—the exposed plaster will represent the mortar. 3)

For variation, paint some of the bricks in various colors. 4) Finally, weather the surface with various washes of acrylic color and then with oil dot filters

and streaks. As we saw with the previous building, details (trim, doors, window frames, shingles, etc.) were made from bits of plastic shapes or sheet. After assembly, the buildings were painted using the same methods we have already seen. Additional debris for the scene—buckets, boards, barrels, old wheels, etc. etc. were parts from the scrap box, spare parts left over from kits/accessories used in my 251 project, and pieces of scrap plaster and wood. The key to realistic rubble and debris is to simply have enough debris with enough variety.



The rest of the groundwork was created and painted using the methods we have already seen. The results are shown here. The utility pole is simply a length of dowel rod. The crossbeam and the support braces are lengths of plastic strip. Bolts, washers, and insulators are tiny bits of plastic rod and strip. The wiring is simply very fine styrene rod.







22

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/21 Ausf. D

By Kevin Townsend



Sd.Kfz 251/21 Drilling

This vehicle packed a sting in the form of triple 15 or 20mm auto-cannons. It was made in large numbers in late 1944—there was even a special operation to get 200 ready for Operation “Wacht am Rhein” (The Battle of the Bulge).

While the prototype and some field modifications used the Ausf C, all production vehicles were built on the Ausf D. The basis of my model is the Tamiya Ausf D and the out-of-production Kiwi Models 251/21 conversion set. This kit is long out-of-production and very difficult to find. The Kiwi kit is the late version with the low mount that removed the need for additional armor plates. While the kit produces a decent rendition of the Drilling, it needs a great deal of work. I wanted a “transitional” vehicle with the later shield and interior ammunition stowage, but with the early high mount and additional armor plating. This required even more modification and conversion work. Figures are a combination of figures and parts from the Tamiya halftrack kit, the Flakvierling kit, and the Panzergrenadeir set. Available now, CMK Models makes a drilling, but it is the stand-alone mount and does not include the shield, floor mount, or ammunition stowage used on 251. Still, for someone wanting to make a 251/21, this little gem of a kit currently offers the best option.



The parts I was provided to build the Kiwi Resin Drilling conversion set. Please note that I was given a bag of parts—not a boxed kit—from someone who had received them from the gentleman who mastered the kit. They may or may not be representative of the parts released by Kiwi Resin. Based on photos of the Kiwi kit found online, I do not believe I had a complete kit.

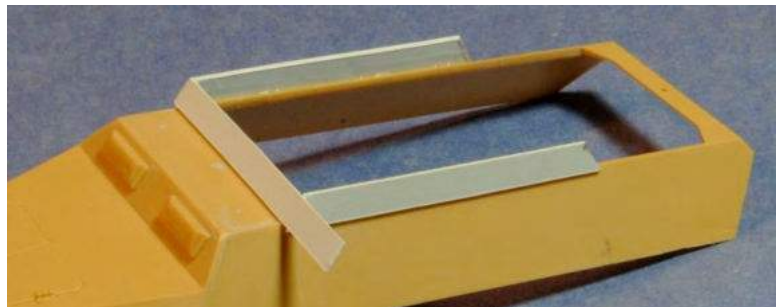
The Kiwi Resin conversion kit represents the late model 251/21. Note my kit was given to me by someone who got it from the person who mastered it, and it is not in the original box. I do not know if it is representative of the retail kit. For all I know, it may contain only rejected parts. Based on photos of the kit master I found on line, I do know my sample is missing parts. The kit contains a new floor for the Tamiya kit and the rear stowage bin—things the otherwise superior CMK Drilling kit (not designed for the 251) does not have. What's not included in my example are the extra ammo boxes or instructions. Detail is simplistic, but adequate. Design and engineering are good—the downfall is casting. There is a lot of flash, some is difficult to remove. Mold blocks must be removed, and some are in inconvenient locations. The big problem is air bubbles and other casting flaws such as resin not entirely filling the mold. A lot of work is needed - filling and even some resculpting—to fix some parts. There is not a single part useable without work. Still, despite the flaws, if you want a quarter scale 251/21, if you are willing to do the work, and if you can find one of these little kits, it's a good way to go.

If you cannot get the Kiwi kit, use the CMK Drilling. Remove the gunner's shoulder loops as these were not used in the 251 version. You will also have to scratch-build a gun shield and floor. Note the CMK kit represents the early higher pedestal so would work well for an early or transitional model.

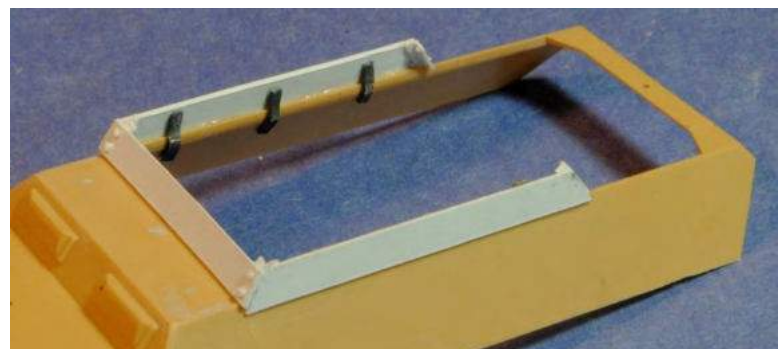
Let's see how I built my little diorama:

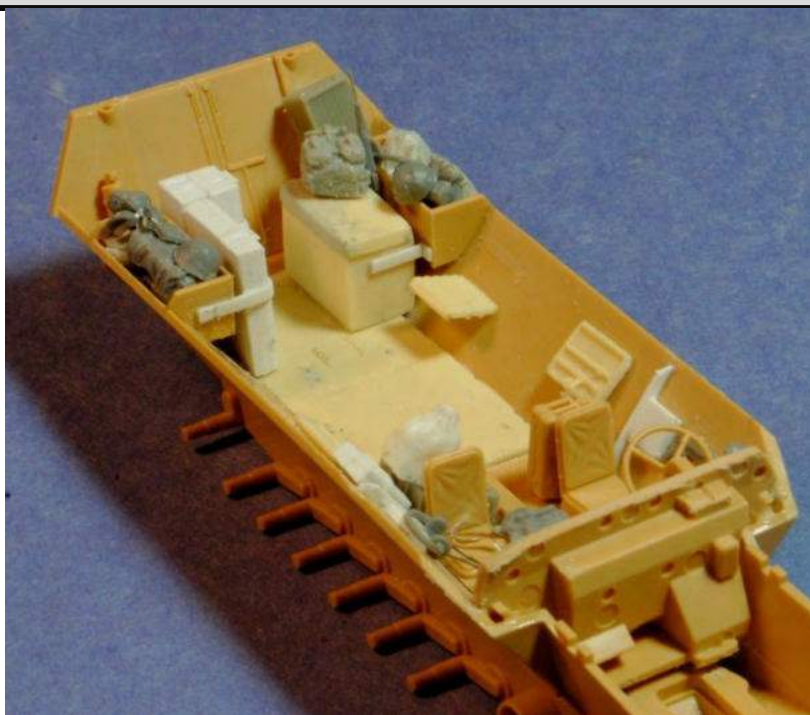
Assembly

The hull armor was made using the Panzer Tracts measurements scaled down to 1/48th scale. The side pieces should measure 42mm long at the bottom and be 4.6mm high. When making "boxes" like this, rather than cut the plastic to the exact size, make the end pieces too long. Then, once the glue is set, they can be cut and sanded to an exact fit.



The corner mounting brackets were made from "L" shaped plastic strip. Bolts are slices of hex rod. As the rear armor plate has been removed, holes for the missing bolts were drilled in the rear brackets. Mounting brackets along the sides are strips of pewter foil.



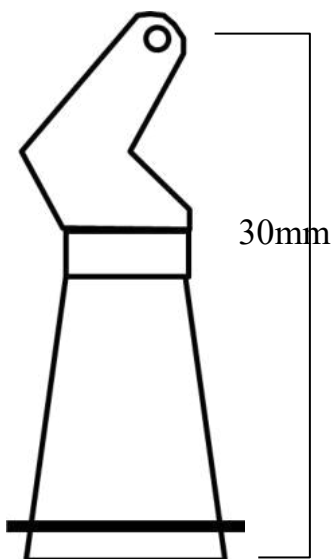


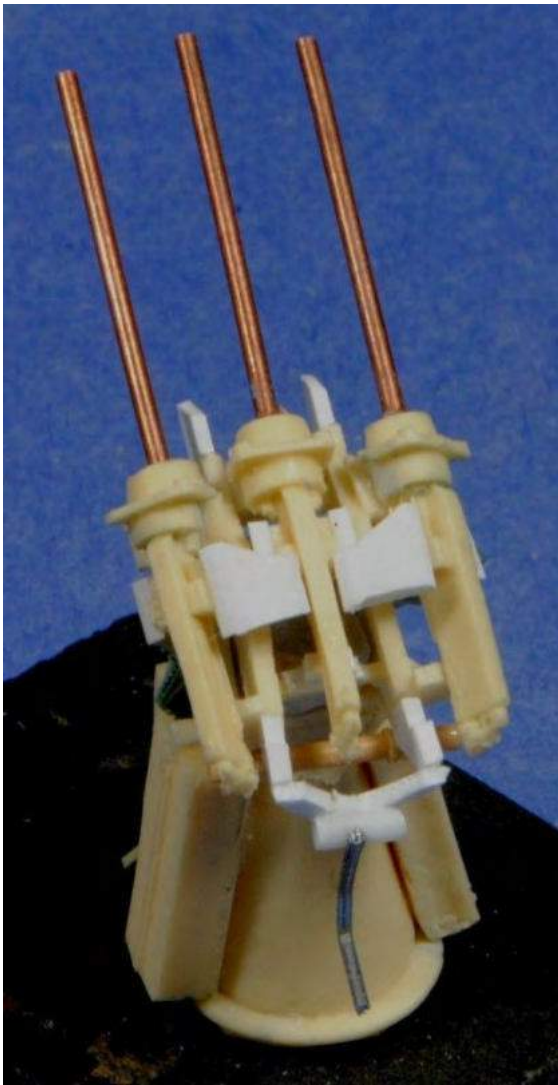
As with the other halftracks, the interior was tackled first. This included details added to all Tamiya halftracks (vision port details, headache pads, the flange where the hull halves come together, spare vision blocks, etc). The kit floor was cut away behind the transmission hump and the Kiwi floor added. This piece is oversize, so it can be trimmed/sanded to provide a perfect fit. The large ammo stowage bin from the Kiwi kit was added to the left side of the vehicle. The Kiwi part included the hull seatback stowage bin, but due to casting flaws this was cut away and the Tamiya part used. Other casting flaws were fixed with epoxy putty. This required new mounting brackets, made with plastic strip, to be installed.



On the right side, a set of spare ammo cases was scratch-built from sheet plastic using the Kiwi kit parts as a guide. The Kiwi folding seats were glued in place, one in the down position, the others folded. Stowage, from all the usual sources, was added.

The pedestal was next. The early, higher, pedestal was 150mm taller (3.1mm in 1/48 scale) than the later pedestal. Based on the Panzer Tracts drawings converted to the 1/48 scale the pedestal should be 30mm tall from the vehicle floor to the gun trunnions. The kit pedestal was raised with a sheet plastic disk on the bottom and a round shim between the top of the pedestal and the bottom of the gun mount. The chute to channel spent cartridges and links into the pedestal was carved from a piece of cured epoxy putty. Test-fitting with the armored hull, guns, and shield, revealed that, although the measurements were correct, the guns sat too high in the Tamiya hull. So the shim between the pedestal and mount was subsequently removed leaving only the plastic disk on the bottom.





The gun cradle was glued in place at the proper angle, and the ammo bins attached. Wedges of plastic strip were glued to the front of the cradle on which the gun shield would later be mounted. These were made per the drawings in Panzer Tracts. The poorly cast seat mounting lugs at the rear were removed and replaced with new plastic lugs. The seat mount is also a bit of plastic rod with a suspension bar made from paperclip wire plastic. To ensure a perfect fit, the seat itself was attached directly to the gunner's butt. The handgrips underneath are a part from the scrap box.

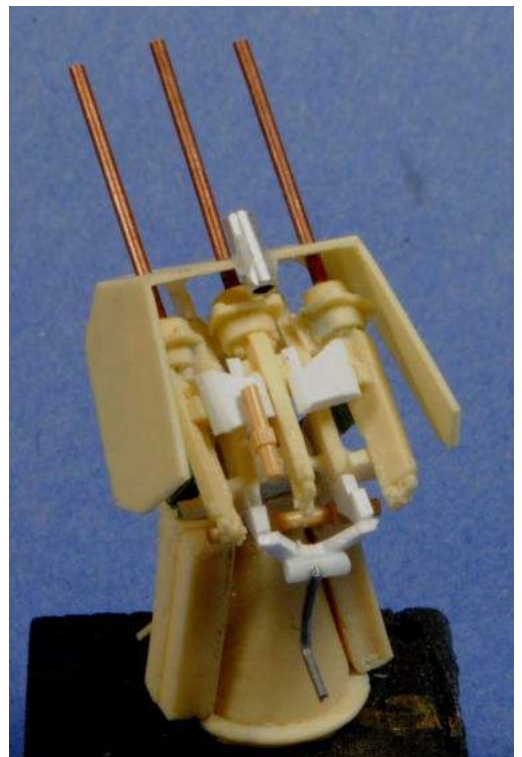
The gun barrels were cut from copper tubing. The guns were glued in place on the cradle. I used the gun shield to ensure the guns lined up properly with their apertures so all would fit as it should. Feed port covers and the ejection chutes designed to channel spent cartridges and links into the pedestal (missing from my kit) were made from sheet plastic.

Below: Ammo belts were made by rolling a small gear over a rolled-out piece of Duro epoxy putty. I used Duro as it remains somewhat once cured. This method would not look convincing in a larger scale or even for a belt in a prominent location in quarter scale—but for belts tucked up under the gun, they will look fine once painted.



Left: The ammo belts were attached.

Right: The gun shield was glued in place. The shroud over the aerial sight was made from a piece of aluminum tubing. The telescopic sight is a bit from the scrap box.



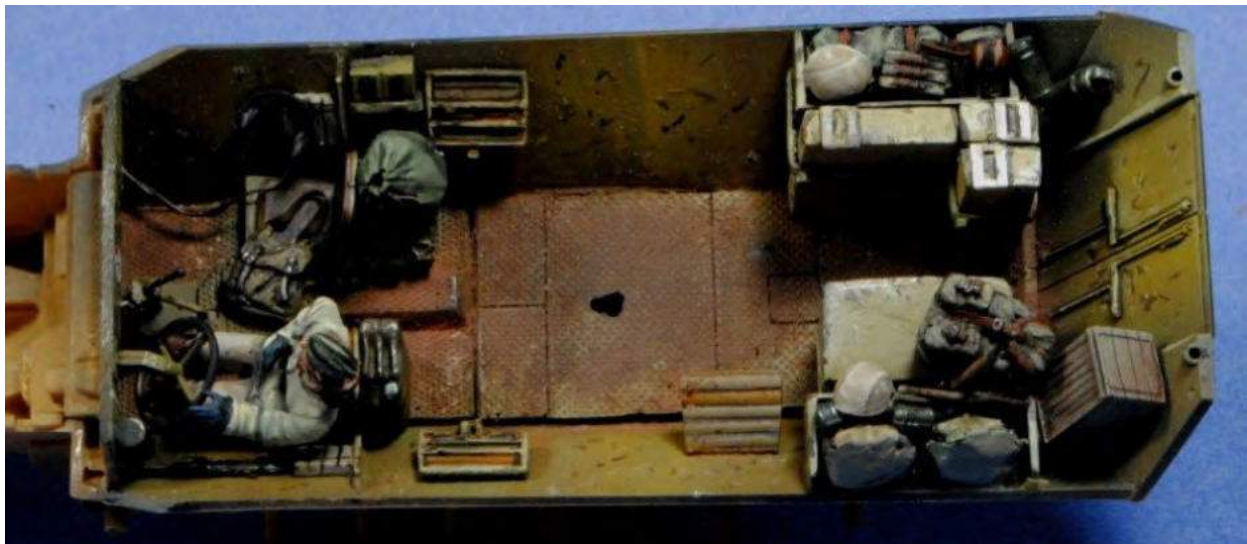
Using the hull and finished gun, the figures were posed and test-fitted. When posing, it was vital to make sure all the figures were looking (and pointing) in the same direction as the guns.

Painting and Weathering

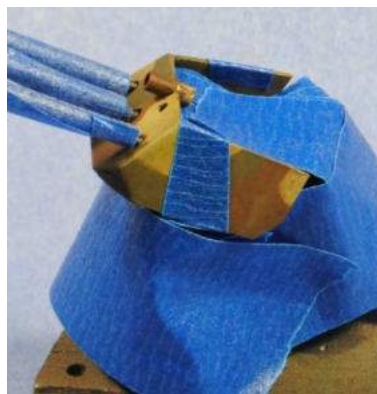
For the most parts, these processes followed my normal procedures. Specifics on this vehicle are shown below and on the following pages.



Below: Prior to the hull halves being glued together the driver has been glued in place. He is from the Tamiya Panzergrenadier set and is built stock with no modification.



Views of the finished Drilling mount with gunner attached. At this point the gun shield has only been given its base color. The rest will be painted with the remainder of the vehicle.



The camouflage colors were hand-painted and basic weathering was done. As seen in the chapter on Painting and Weathering, areas that would not be covered by the subsequent layer of winter white were masked using painter's tape. "Tubes" of tape (sticky side out) were rolled and slid over the gun barrels to protect them. A thin layer of hairspray was put in place prior to the application of the white to make the white easier to distress.



Above left: The winter white, modulated and dirtied on lower parts of the vehicle (by mixing in some brown paints) was thinly applied in an uneven airbrushed coat. When the tape was removed, a small bit of the original paint (on the rear stowage locker) was also lifted. This was touched up with some brush-painting.

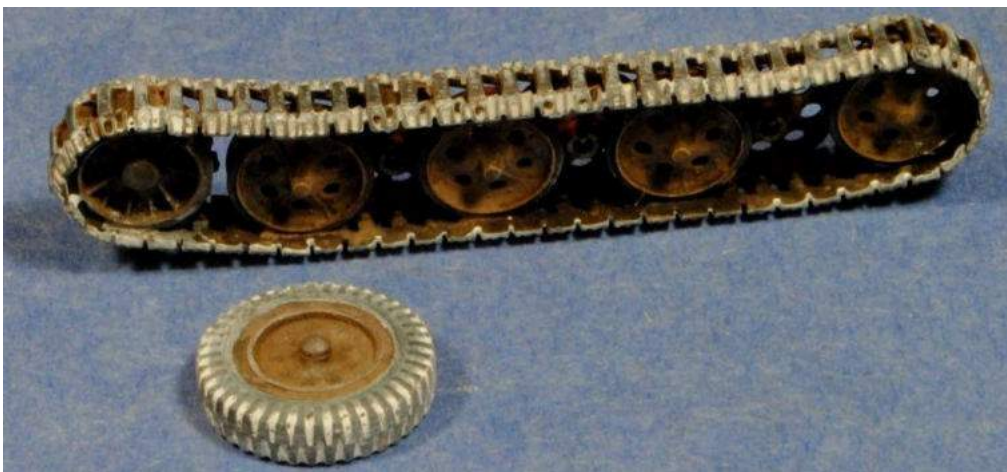
Above right and below: Weathering began by chipping. With hairspray under the white, the finish is fairly easily removed. Large chips and scratches were made with a toothpick moistened with water to attack the hairspray and lift the paint. Areas of whitewash that had been worn away by crew activity were recreated by rubbing off the white with a damp paintbrush. Once I was happy with the white, it was sealed in place with a layer of Dullcote and weathering was accomplished per my normal procedures.





These photos show the effects I was trying to achieve—both the camouflage itself and the type wear the winter white displays..

At this point the Drilling mount was put in place followed by the other two figures. These were put in before the epoxy glue used on the Drilling cured so that adjustments could be made ensuring all figures “played well” with each other and the vehicle. For compositional reasons, it was important that the direction of the guns,



Once the normal weathering was complete, it was time to pack snow into the tracks, wheels, and running gear. The first layer of snow was done with pigments just like grime is normally added. This ensures snow is packed into recesses in tracks and wheels.



The second layer of snow was made from a paste of Matt Medium, Elmers Pro-Bond Putty (white), and Woodland Scenics “Snow” (for texture). This was packed between the road wheels, and caked on the wheels and tracks.



The same mix was caked under the fenders. After this dried, the wheels and tracks were put in place. Other than small fragile details (such as fender width indicators) the vehicle is complete.

Figures

The figures were built and painted using the same methods we discussed in the chapter on figures. As we have already seen, the driver was taken from the Panzergrenadier set. This figure seems as if it were designed to fit in the halftrack and was used with no modification. The other figures were all made using parts from two or more figures. Many, if not most, of the parts come from the winter figures included with each Tamiya halftrack. As this project required the use of 13 Tamiya halftrack kits, I had 26 of these figures available. Nearly all the figures in winter gear in my various dioramas and vignettes use these figures or parts thereof. Also used in this instance were parts from the Flakvierling crew and the Panzergrenadier figures.

The diagrams on the following page, using photos from Tamiya's instruction sheets, shows the various parts that were used for each figure.

German Winter Camouflage Clothing:

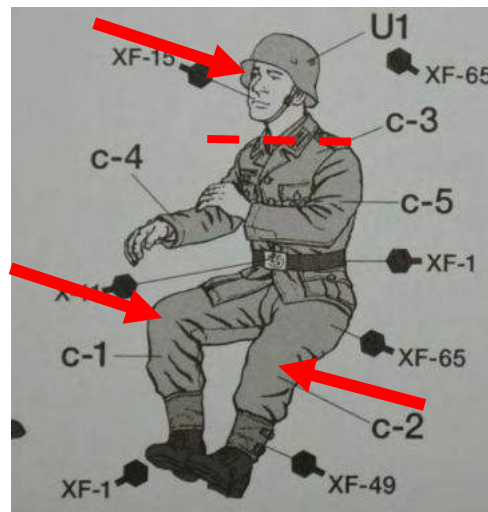
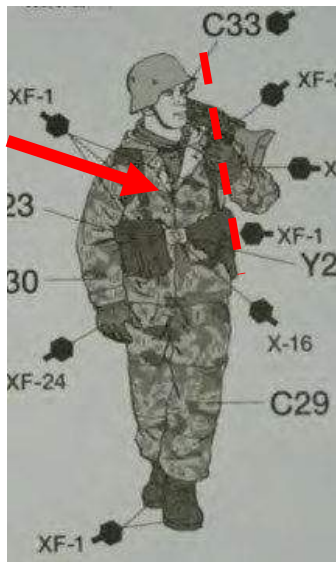
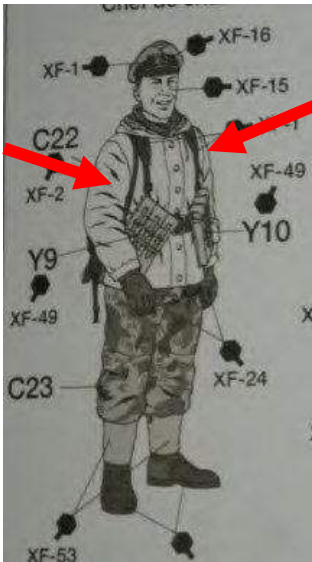
The first winter in Russia caught the Germans unprepared to provide suitably camouflaged warm winter clothing. The standard issue off-white denim fatigue uniform did not work as the suit was too tight-fitting to wear over warm clothing. Early in the war, units and depots often improvised camouflage clothing from local resources. The simplest expedient was a bed sheet taken from a local home. Locally made pull-over white snow shirts, sometimes hanging to the knees and helmet covers were also common.

Later issue items included light one or two-piece snowsuits worn over winter clothing. Loose-fitting camouflage smocks were issued in reversible designs of white on one side and camouflage on the other. In 1942, the Germans started issuing insulated hooded reversible garments; field grey or camouflage on one side, and white on the other. Felt-lined boots, scarves, knit gloves, and heavy mittens were also issued.

Helmets were often white-washed. White cloth covers or reversible white/camouflage covers were also seen. White face-masks were sometimes seen, too.

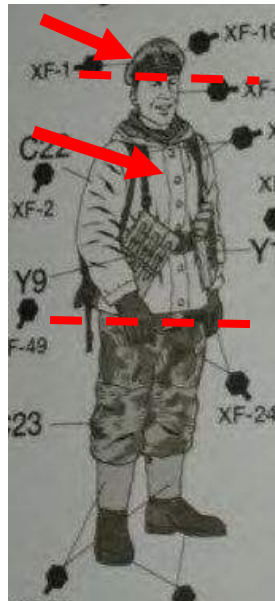
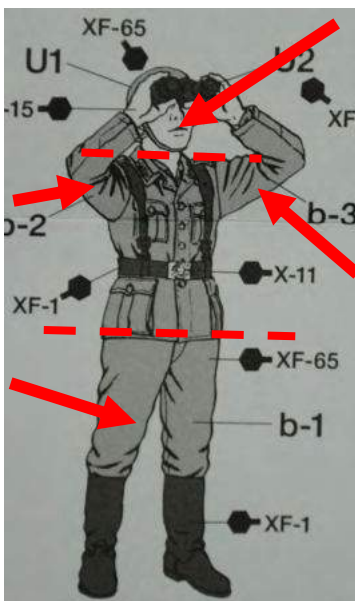
White clothing could become dirty with use, rendering them less effective as camouflage in the snow. Other items – web gear, packs, boots, gloves, and even faces – were often conspicuous. Also problematic was identification of friend and foe since other armies also adopted white camouflage in the winter. Colored cloth bands were sometimes worn on one or both sleeves as a recognition device.

The black and white drawings above and on the next page are from the Tamiya instructions. Red arrows indicate parts used. Dashes show cuts. After the figures were posed and built, gap filling, repairs, and any needed anatomy corrections were done using Magic Sculpt epoxy putty.



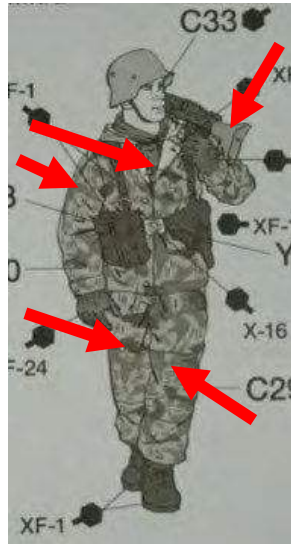
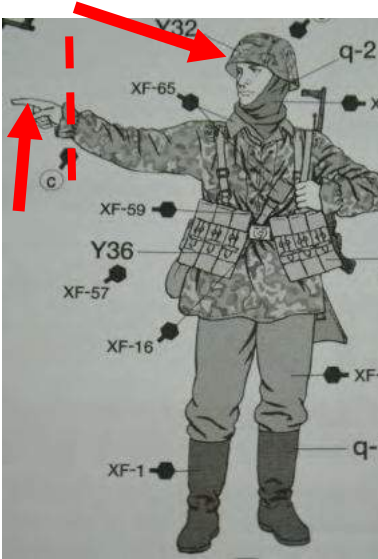
The first two figures above are the two figures included with each Tamiya halftrack. The gunner is kit-bashed from three Tamiya figures. His arms come from the figure shown above left. His torso is from the figure above center. This part has the upper left arm molded in place. This was removed. His legs and head come from the figure above right, as does his helmet. This figure is from the Flakvierling kit. The result, before any additional putty work, is shown at right. The additional work done included:

- Since the fight arm is slightly raised putty was used to raise the shoulder a bit, too.
- Putty was used to convert the jacket skirts into the bottom of the parka.
- Plastic strip was used to make the rifle ammunition pouches on the front of the belt.



The commander is also a kit-bash. The winter figure provided the torso and hat. The figure with the binoculars (from the Flakvierling) provided legs, arms, and head. As both are one-piece castings with separate arms, the legs were simply cut off below the skirts and swapped. Additional work done was:

- Building up the shoulders since the arms are raised.
- Bulking-up the sleeves to make a parka.
- Adding ammunition pouches and slung MP -40. The sling is a strip of painter's tape.



The pointing figure was mostly made using the Tamiya winter figure shown at center. The torso and legs were used stock, but the torso was slightly twisted to the right. The left arm was repositioned at the elbow, and the right arm raised. The head and pointing hand are from the figure at far left from the Panzergründler set. Note the tilt of the head to appear to be "sighting" down the pointing arm. Additional work done included:

-Since the arm is raised, the anatomy of the right shoulder was corrected by raising it some using putty.
-Equipment, weapon, and cap were added.



The pointing figure and commander after all construction and painting were completed.

Composition

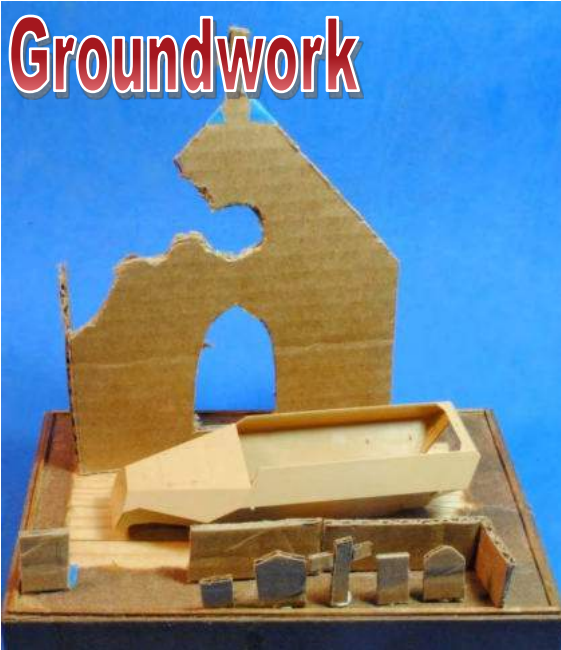
The story in this diorama is clear. Potentially hostile aircraft have been spotted and the crew stands by to engage. How does it stack-up against my "10 Commandments of Effective Composition?" What appears random is actually carefully planned out.

- 1. Have a Single Main Point:** Check! There is only one thing going on.
- 2. Show Action and Interaction:** Check! The vehicle and crew interact with an off-stage, but apparent threat. Guns point, a figure points, and binoculars look
- 3. Use a Tight Composition:** Check! The base tightly frames the vehicle. Only enough of the surroundings are included to place the 251 in context.

- 4. Direct the Viewer's Eye:** Check! This really isn't applicable. There's only one central thing to look at. Note that the action (pointing, gun aiming, etc.) is off-stage toward the viewer—not to the left or right so as NOT to direct the viewer to the next model display. The church forms a backdrop.
- 5. Have Balance:** Check! The vehicle is central. The chapel is behind, but is balanced by the unseen aircraft, wall, and graveyard in front. The higher elevation on the right is balanced by the direction of movement of the vehicle and the building being offset to the left.
- 6. Use All the Elements:** Check! The vehicle and figures combine to tell the story. The camouflage and groundcover tells us the season and weather, if not the location. Could this be the Battle of the Bulge after the weather started to clear enough for Allied airpower to be felt? The ruins show there has been fighting. The graveyard foreshadows the fate of the Reich. The vehicle's camouflage blends with the groundwork.
- 7. Minimize Dead Space:** Check! Only enough groundwork is included to square off the composition and provide context. The ruins, headstones, tracks, & snow, ensure there is something going on everywhere.
- 8. Use Shapes and Elevations:** Check! The shape of the base tightly frames the composition. None of the elements are parallel to base edges. Different elevations put the vehicle at an angle and provide added interest over a flat scene. The building provides a backdrop.
- 9. Artistic License is OK:** Check! (Sort of: this really doesn't apply either). The scene is apocryphal and the vehicle does not represent a specific vehicle, but rather is representation of the type. No location is given.
- 10. Play With It:** Check! Various arrangements and elevations were tried before I settled on this one. I considered various color schemes, camo patterns, and building designs. Some things were added as I went along such as the gravestones and the fact the building is a church

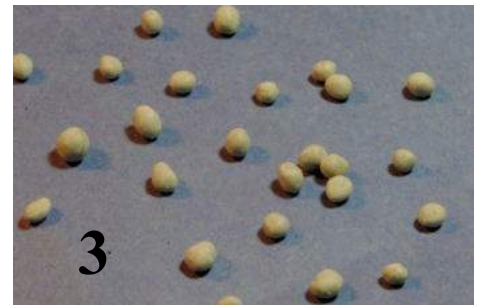


Groundwork



Prior to construction of the vehicle, basic composition was determined using the vehicle hull and pieces of cardboard. This allowed me to determine size and make an appropriate base. Here, the vehicle hull is shown in place with cardboard mock-ups of the main terrain features. For this exercise, it was not necessary to include the ground slope. The slope was added using a sheet of Styrofoam, cut to shape with a hot knife (a hobby knife blade attached to the collet of a soldering iron). The slope was then glued to place and the scenery built upon it.

Below: A plastic strip was attached to the ground to serve as the foundation for the stone wall (1). The gate posts were carved from left-over pieces of plaster (2). Most stones in the wall were made from little balls of Magic Sculpt epoxy putty (3) pressed into place while still soft. An occasional actual rock (from my driveway) was glued in place to add some variation in shape and texture (4). The still-soft putty had some texture pressed into it using a rock (2).



Like we saw with the building in the 251/9 and 250/20 Dioramas, the walls were cast from plaster using a homemade mold box. As this building was not a solid block like the one with the 251/9, the walls were cast in scale thickness. Some stony texture was added by sprinkling the inside of the mold box with fine sand. When casting, this was transferred to the plaster. Once the plaster was completely cured, I drew the door and window openings. These were then carefully drilled, cut, carved, and sanded to shape.

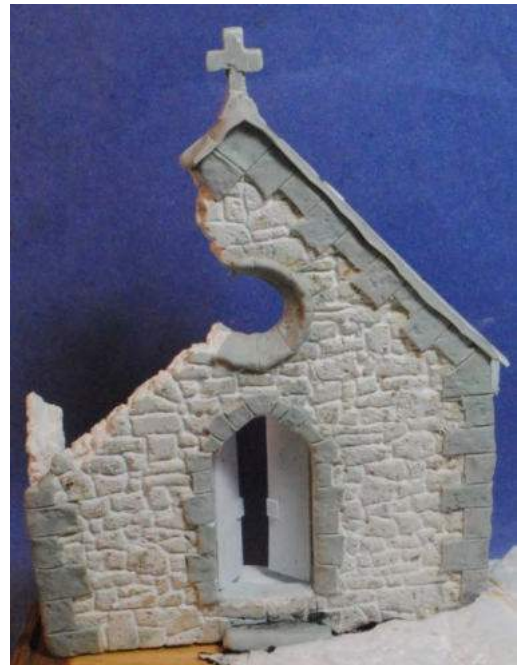




Above Left: Just as had been done with the bricks in the 251/9 diorama, the individual stones were carved on the exterior walls. The walls were then scrubbed with a brass wire brush to round the edges and provide some texture. A similar process was applied to the interior wall. As this wall represented a wall that had been originally plastered, it was sanded smooth, the area where stones were exposed was slightly recessed, and the stones cared in place. Again, this is the same process we used to replicate damage on the farm in the 251/9 article.

Above Right: Stonework along the edges of the doors, window, and roof lines (both inside and outside as appropriate) was added with Magic Sculpt epoxy putty. Just as we have seen before, once put in place and shaped, it was textured by impressing the still soft putty with a stone.

Right: The side walls were glued to the front wall.



Above left: The building was glued to the base and a floor was poured using plaster. Roof beams and boards were added using plastic bar and strip. The damaged doors were made from plastic just as we saw in the 251/9 diorama.

Above center: Shingles, made as in the 251/9 chapter, were added as needed.

Above right: Final detailing using epoxy putty was done. Other than the addition of rubble (made later from bits of broken plaster, sheep plastic, and plastic bar stock), the church is complete.



Headstones were carved from a sheet of rolled-out Magic Sculpt epoxy putty that had been allowed to cure. Inscriptions were scratched into the surface with a stylus.



I wanted a tree in the back corner. While searching the web, I found an excellent thread on Missing-Lynx.com by Dave Parks showing how he made a tree. I tried his method, and it worked like a charm. Here it is:

1) Materials needed for the basic form are simple a wire bent into a U shape (I used green floral wire and sprayed it with Red Brown primer) and some unraveled rope. Cut the rope to the length you need for the diameter of the finished tree.

2) I found a comb to be very handy in helping to unravel the rope.

3) The rope fibers were placed into the U-shaped wire. Since the wire will get a bit shorter when twisted, I made the tree slightly taller than what I needed.

4) The loose ends of the wire were chucked into a drill and the U end secured in a pin vise. Firmly holding the pin vise with one hand, I used the drill AT SLOW SPEED to twist the wire. This twisting causes the rope to project in all directions and locks it firmly into place.

5) The tree was removed from the drill and pin vise. I glued the twisted loose ends of the wire into a dowel rod tree trunk. This had been shaped with a hobby knife and stained with oil paints. A metal pin was glued into the bottom of the dowel rod for mounting to the base.

Not Shown: Scissors were used to trim the rope fiber branches into a Christmas Tree shape.



6) Very thin green acrylic paint with a wide, flat brush. Excess paint was blown off with canned air to prevent matting. 7) From the top, the tree was sprayed with Scotch Super 77 spray adhesive and static grass sprinkled on. Excess was gently blown off. 8) Once dry, snow was added by misting hairspray on and sprinkling Woodland Scenics on. This was done several times until I was satisfied with the result. The final layer was Hudson and Allen "Snow" - similar to the Woodland Scenics product, but with a slight sparkle.

Below: Ice cycles were made by streaking Woodland Scenics "Realistic Water" on a piece of glass and allowing it to dry. The individual streaks were peeled up and glued on the building as ice cycles.





The building was painted as before—putty portions were given a base color, plaster areas used the plaster as the base, and color was built up using various washes and dry-brushing. Top edges were picked-out in light colors and dark colors were used for outlining. Stains, streaks, and filters were added with oil colors. The first layer of snow applied was Sculpt-A-Mold instead of Celluclay since the Sculpt-A-Mold material is white. Wheel and track tracks were added. The bare spot where the tree kept snow from the ground was made with pre-colored Sculpt-A-Mold liberally covered with cut up rope to represent fallen pine needles.



The Sculpt-A-Mold serves as a base for the snow. The next layer was made by painting the snow areas with a heavy coat of thick Matt Medium. Woodland Scenic's "Snow" was then heavily sprinkled on and this was allowed to dry before excess was gently blown off. Final layers were snow were built up by sprinkling/piling on snow and then misting the base with hairspray to hold it in place. Like the tree, the final layer was the Hudson & Allen snow product.



23

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/22 Ausf. D

By Kevin Townsend



Sd.Kfz. 251/22 Ausf.D

Sd.Kfz 251/22 Pakwagen

“It was widely accepted in the ranks of those fighting in the east that death on the battlefield was preferable to an unknown destiny in a Soviet prisoner of war camp. This mentality often played a role in the many acts of bravery demonstrated by individuals or entire units. During the closing days of the war it was not uncommon for entire companies, battalions, and battle groups to fight to the last man, the survivors going into captivity only when ammunition was exhausted and wounds were too grave to allow further resistance.”

-Gottlieb Herbert Bidermann

Desperate times call for desperate measures. In many ways, the 251/22 was a desperate measure. It was created from a need to make as many 75mm antitank guns as possible mobile. From that perspective, it was a success. But the gun was too heavy for the vehicle, and the combination was a large, poorly-armored target—less than ideal for dealing for enemy tanks.

To portray the spirit that created this vehicle and the increasingly desperate—and hopeless—situation the German military found itself in the closing months of the war, I chose to model a vehicle with supporting infantry surrounded and facing annihilation. Kits used were, of course, the halftrack, Gaso.line’s excellent Sd.Kfz 251/22 conversion kit, Tamiya’s Flakvierling, and Tamiya’s Panzergrenadier and Russian Infantry sets. For the most part, the halftrack and conversion kits were build stock (the conversion kit was the subject of the “Assembling Resin Kits” section of the chapter on Assembly and Detailing where we built the gun and mount). Many of the figures were converted, some extensively so. The groundwork is scratch, showing that even a complex scene such as this one is not too difficult to create. The following pages show how it was all done.

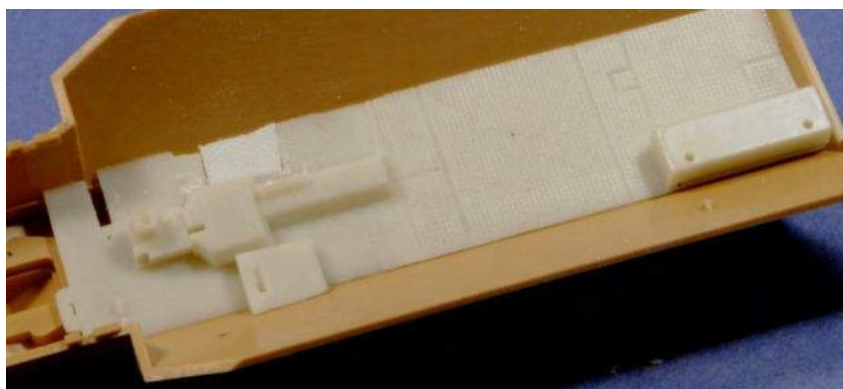
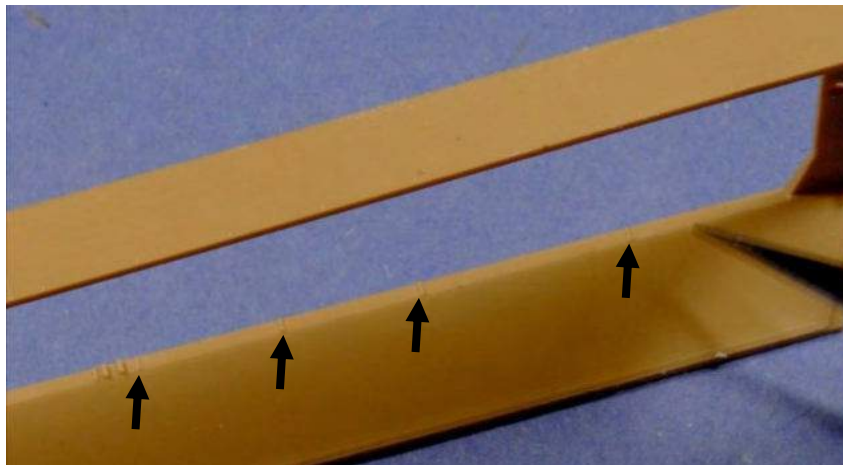


One of the inspirations for my diorama: an evocative painting of the Battle of Berlin “Potsdamer Platz 1 May 1945” by Gleb Vasiliev. This scene is a bit more orderly and open than my own, and Russians apparently come from only one direction. Many of the details on my figures were inspired by this painting.

The Stalingrad Academy of Street Fighting:

This was how Soviet General Chuikov referred to the street tactics he perfected at Stalingrad and used to good effect in Berlin. They emphasized careful reconnaissance of enemy positions—including approach and escape routes. Smoke or darkness was used to approach close to enemy positions before launching assaults. Large formations were too cumbersome in tight urban environments. Instead, assault groups of 6-8 men were used, backed-up by reserve groups ready to consolidate gains and resist counterattacks. These assault teams were heavily armed with grenades, automatic weapons, daggers, and sharpened entrenching tools used as axes in hand-to-hand combat. Assaults were supported by sappers who blasted through walls with explosives to enable assault house to house. Captured panzerfausts were often used for this. Flame-throwers were also used effectively. These groups moved at ground, rooftop, and cellar level.

The Germans often put their riflemen in upper floors beyond the reach of



Assembly

The Tamiya kit has several mounting pegs and index parts for stowage bins, hand rails, weapons racks, etc., that are not needed. These must be removed. Shown are the alignment marks for the hand rail. What can remain is the antenna mount and the pins for mounting the driver's side rear internal stowage bin.

The Gaso floor simply drops in the hull in place of the Tamiya piece. As the /22 can be built in a few configurations (there were slight differences between the factory build and field modification—there were also some differences between those converted from 251/9s and those made from other variants, primarily the 251/1. There is nothing wrong with the Gaso kit as it. However, I preferred to remove the passenger seat mount entirely. This was cut away and replaced with a piece of Plastruct treadplate.

I also chose to blank the co-driver's visor. This was a simple conversion—the original visor was simply sliced off with a sharp hobby knife and a blank, made from sheet plastic, glued in its place. This piece was then fixed to Tamiya's upper hull. While the fit was perfect on the sides and top, there was a slight gap at the bottom.

To fix the gap, I rolled a thin string of epoxy putty rolled-out on a piece of glass.

The string was put in place, and smoothed out with a simple swipe with a damp finger.



The Gaso kit has no index marks or holes to ensure positive fit/alignment of the gun mount. I put the mount loosely in place and taped the upper hull temporarily in place. Then, I adjusted the mount until it was sitting in the proper place. Holding it in place with a finger, I applied a bit of super glue with a dental tool. Once this had set, I removed the upper hull and finished gluing the gun mount in position. A test fit then verified that everything lined-up properly.

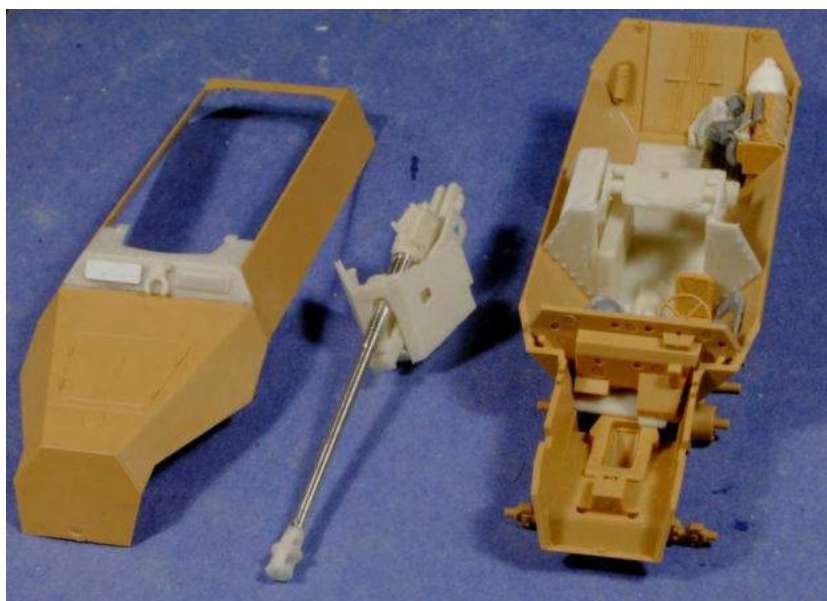


tank guns and ambushed tanks using panzerfausts from the basements and cellars. To counter this, each Russian tank was covered with sub-machine gunners who sprayed every aperture as the tanks moved forwards. Bed-springs were attached to the tank turrets and hulls to cause the panzerfausts to prematurely detonate. Heavy guns—152mm and larger, were used to blast buildings over open sights.

The presence of civilians made no difference to either side.

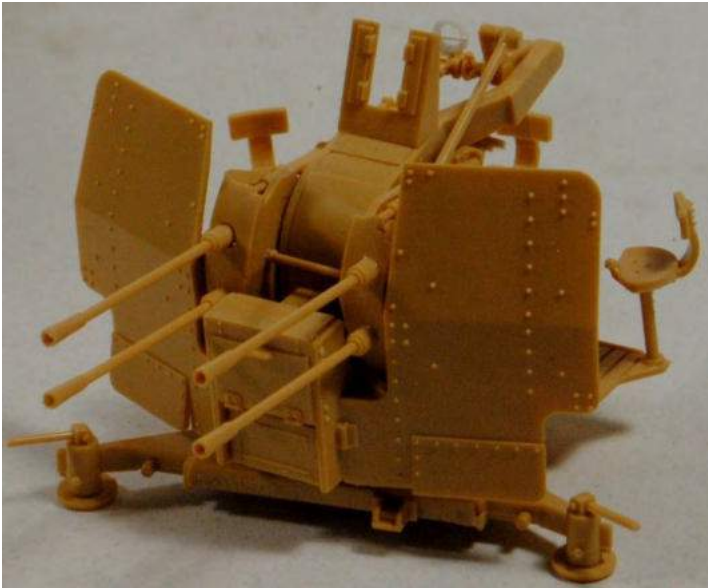


A final test fit of the gun with the hull taped together ensures all fits properly.



The hull and gun were left in three-subassemblies for painting. Detailing, painting and assembly of the vehicle then followed my normal methods. The gun was not fitted until the hull halves were glued together and the loader fitted in place. The gun and gunner were attached at the same time to ensure proper fit.

As I have found with all the Gaso conversion kits I have used, this one is very well detailed and engineered. Casting is first rate and fit is very good. It is a very conversion kit to build and makes for an attractive model once finished. I highly recommend Gaso projects.



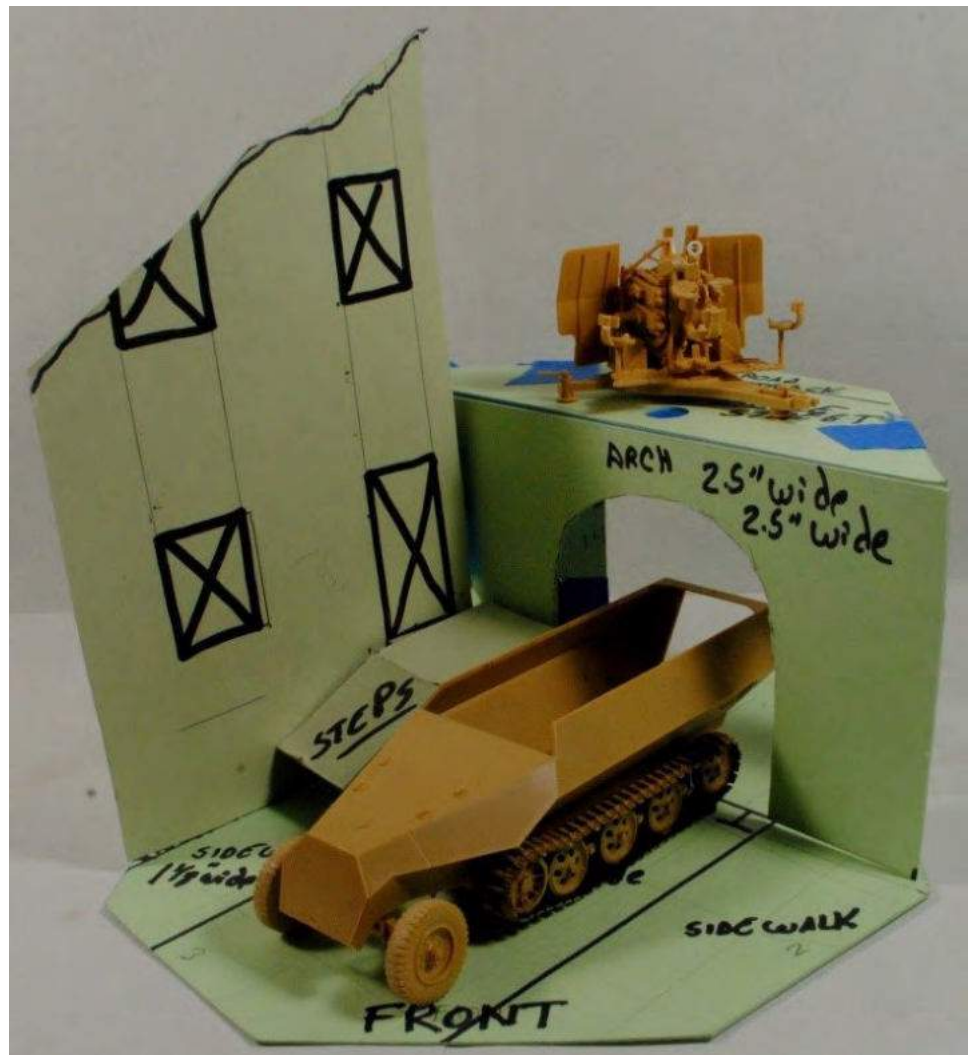
Left: The Flak assembled. The gun is not yet permanently attached to its base. This will only be done after painting and after final composition has determined what angle of traverse the gun will sit at. Apparent in this photo are the drilled-out gun muzzles and a new sight. The kit sight is molded solid. I cut this off and replaced it with a plastic ring sliced from a hollow plastic rod. It was detailed with .4mm plastic rod. The kit assembles quickly and easily into an attractive rendition of the gun.

Below: The groundwork was inspired by a photo I found on www.masterpiecemodels.com. The photo showed a diorama made using their "Fine Grain Hobby Cork" to make bricks and blocks. I liked the general arrangement and the multi-level setting. They say imitation is the sincerest form of flattery, so I adapted their design to my purposes. My terrain is not an exact copy, but it is quite similar in layout. I changed the architecture and modeled my scene in a ruined condition. This is a fairly complex scene, and I needed to have the terrain pretty much finished before I could make

Groundwork

the figures as they must interact closely with the structures. I started with cardstock mock-ups. This is actually the third one I made. I wanted a round (hexagonal is close enough) composition to clearly indicate "surrounded". Based on computer drawings, I initially estimated I would need an 8 inch diameter base to fit everything I wanted to put in the scene. That first mock-up also featured a wider road with a slightly higher arch. I immediately decided it was too large in almost all its dimensions. For the second attempt, I used a base about 7 1/4 inches in diameter. While it worked well, I decided I could go even smaller. To add to the overall visual impact and to increase the sense of drama and stress, I wanted to go as small as possible. This resulted in the final mock-up seen here—only 6 1/2 inches across.

Although my concept—what I wanted to do—was firmly in my head before I started, this shows we should still play with our composition and try some options. Although almost identical in design, I think my final, smaller, result is far superior in overall look to my starting point. As you can tell from the pictures, some other alterations and additions in detail were made during construction.





The base was made using my normal methods. For the basic shape of the structures, I poured plaster into mold boxes before. Top left: First, the street was poured. This mold box was built right on the finished base. The sidewalks were next.. Top Right: The overpass was is one piece. Bottom left: The building was cast in two 1/4-inch thick walls. The window and door apertures were built into the mold box. Once cured, the parts were glued together. Bottom right: Careful measurements and mold box construction results in near perfect fit of the all the parts (they are not glued in place here). I intentionally cast the front wall of the building a bit long. This was done to ensure it would be long enough. This would be the easiest spot to adjust fit if the various parts did not fit as I had planned.

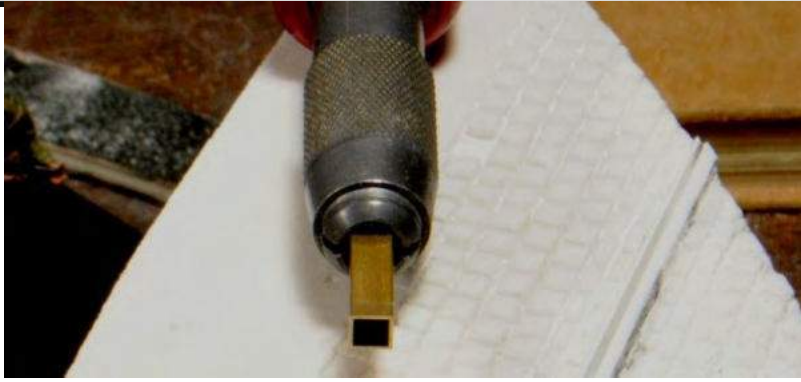
CA GLUE:

Working with resin calls for super glue – cyanoacrylic (CA). Any brands works fine, they are all similar. Some are very thin, others are thicker and can be used to fill gaps or pin holes as well as bond parts. Be careful with thin glues that they do not run where you don't want them to. Super glue offers a fast, strong bond that works on almost all materials.

To apply, I put a small puddle on a piece of glass on my workbench. Using a dental tool or hobby knife point, I pick up a small bit and apply it to the joint. With thin glue, capillary action will draw it along the joint. Gently squeeze the parts together for a few seconds until the glue sets. For instant setting, apply a bit of accelerator (such as ZIP Kicker) to the joint. Note that fumes from fast curing are an irritant: they look like thin, wispy smoke – don't inhale them. Also, using accelerator produces a lot of heat and can cause chemical burns if you get both CA and accelerator on your skin.

After the glue cures it can be sanded using files or sanding sticks if needed. Be careful on plastic joints – the glue can dry harder than the plastic, making it easy to damage surrounding areas while sanding the joint. Its hardness is similar to most resins.

If you glue your hand to a part, dissolve the glue with de-bonder, but CA glue cannot be removed from clothing.



Top: As we saw previously, the cobbles and paving were carved into the plaster of the lower street and sidewalk. A different method was used on the overpass. The railroad was made in the same fashion, but instead of plaster, a layer of spackling was used to finish the road surface. The cobbles and bricks were simply pressed into the spackling using stamps made from hollow brass tubing. After stamping, the surface was lightly scrubbed with a wire brush to round the edges of the cobbles and add a bit of texture.

Curbing stones were added to the top of the overpass using pieces of cast plaster. The irregular block surface was made from pieces of cork board (the stuff bulletin boards are faced with).

The mortar was made of spackling, thinned with water and applied over the surface, making sure it filled all the various gaps and recesses.

The excess spackling was removed with a damp sponge.

Details on the building façade were carved into the cured plaster using the same methods we've already discussed in the chapters on the 251/9 and 251/20.



The basic form of the steps were made from wood strip. The form was covered with epoxy putty—in this case Miliput Terra Cotta (the same stuff I used to make bricks with in the 251/20 Chapter). Texture was added by impressing the soft putty with a rock.

As we have seen before, rubble was added to the street sections. Where this is heaped, a foundation of Celluclay was put in place. The rubble consists of my homemade bricks and corrugated steel, as well as broken up plaster, boards and beams made of plastic strip, some pipe made of bits of brass tubing, plastic shapes to represent things like angle iron and other structural elements, and even some bits of screening and an old tire from the scrap box.



A railing was added to the overpass. This was made simply from 2mm plastic rod. After the glue cured, it was damaged and bent appropriately. The decorative balls on top of the posts were fashioned from bits of Magic Sculpt epoxy putty.

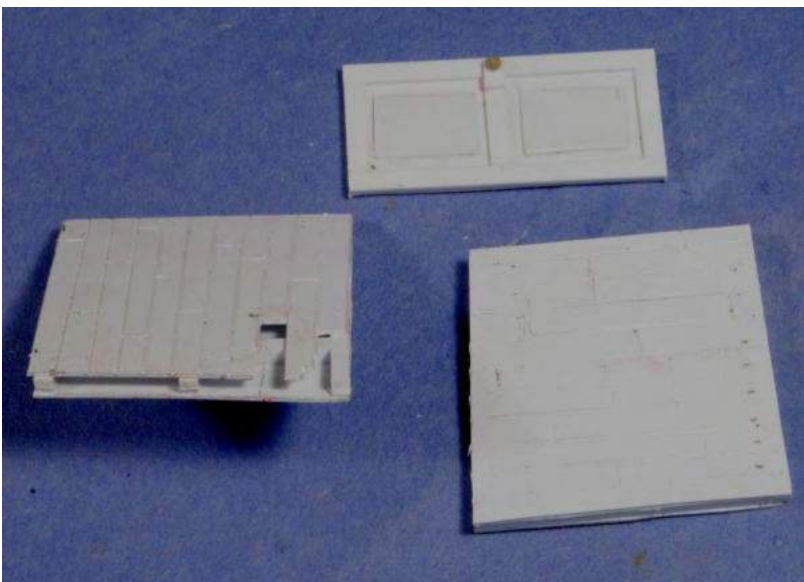
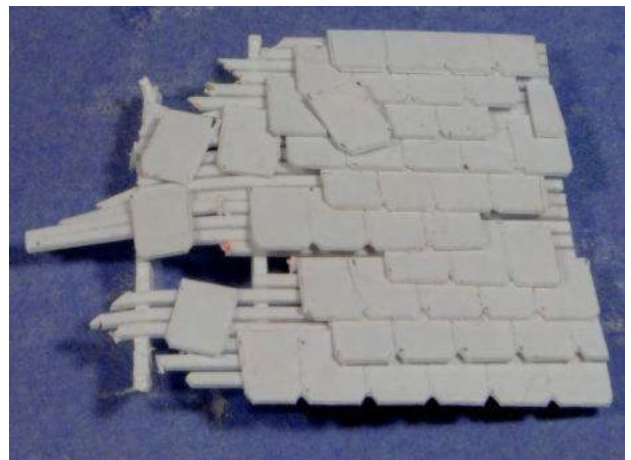
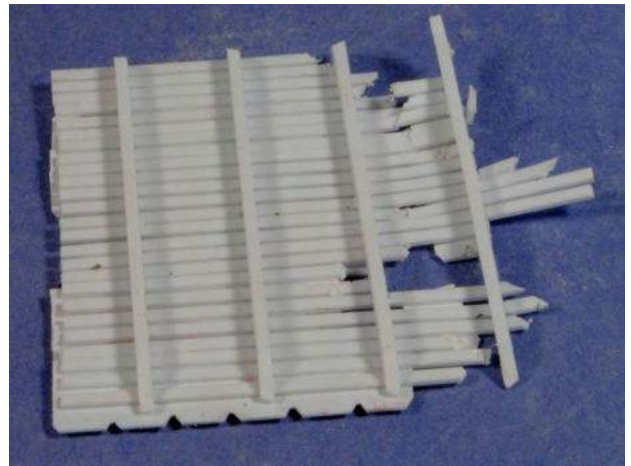


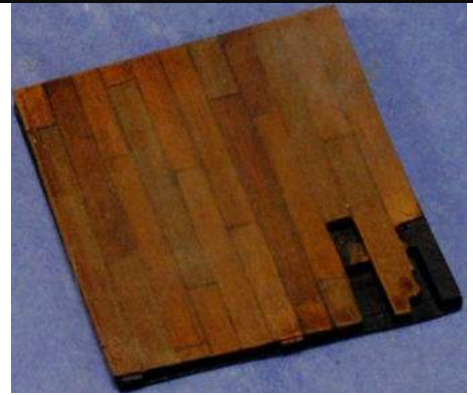
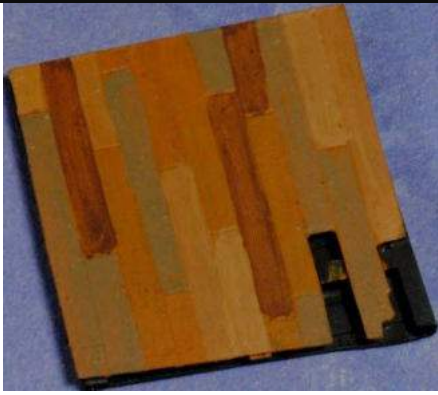
The building at least a partial second floor for the Russians to stand on was needed. To avoid having to build an entire interior—which with the damage would have entailed a collapsed roof and possibly floor—I chose to make most of the interior burnt out. A solid interior wall was made to separate the entry foyer area (and probably stairwell) from the rest of the building to accommodate both needs. The visible portion of the cellar is filled with rubble. The burned beams are burnt pieces of wood. The floor is sheet plastic with boards scribed in. Surviving window and door frames and plastic strip. Here we see the bricks already painted as we saw in the 251/20 diorama.

Bottom Left: Floors and ceilings were made from a framework of plastic bar beams sandwiched between layers of thin sheet plastic. Floor boards were scribed as needed. The door is made from plastic sheet and plastic strip. The knob is a ball of epoxy putty.

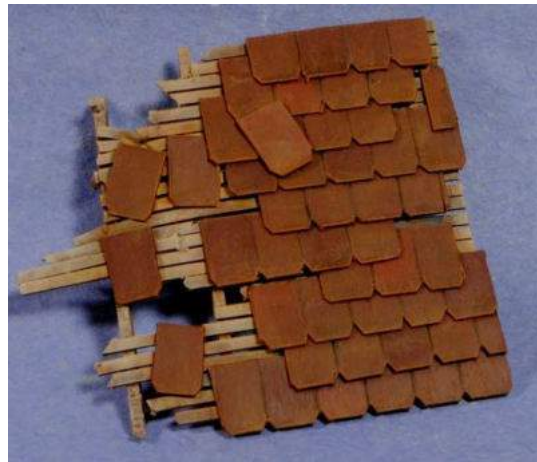
Below: Interior and exterior photos of the remains of the roof. This was made using plastic vertical beams faced with plastic strip slats. Shingles were made from thin sheet plastic—both in individual shingles and strips of shingles.

All of these sub-assemblies will be painted prior to final assembly. The building, streets, walls, and rubble were painted using methods we have already seen.





Above left: As previously mentioned, the floors are sheet plastic. Grain was added with a Dremel sanding drum and floorboards scribed in. The boards were painted in various wood colors. I didn't worry about streaking when painting—it adds to the woodgrain effect. Above center: The wood was then given a heavy wash of Burnt Umber oil paint. If doing a “clean” well-maintained floor this would be the final step. Above right: We want a dirty floor, so various dirt colored pigments were rubbed in using a brush.



Left: The roof was done in the same fashion. After the wash, the slats were lightly dry-brushed—from the top down—with Khaki. Clay roof tiles were painted in various terra cotta colors, washed with Burnt Umber oil paint, and lightly dry-brushed with a very light terra cotta color.



Below Far left: Prior to the interior wall and floors being installed, the building was painted inside and out (using the methods we have seen previously).

The middle floor was glued in place and, since space to work will be at a premium once the top floor and interior was put in place, the Russians were glued in place. Baseboards, made from plastic strip, were added to the front and side wall. After all this was done were the final floor, interior wall, and roof glued in place.

Prior to all the ground-work sub-assemblies being attached to the base, the figures (already finished) were put in place.



At this point in the construction, the piles of rubble seem very neat and orderly. After all the groundwork elements were glued together, so additional scattered rubble was added. This was made from bits of plastic, pre-colored plaster, my terra cotta putty bricks, kitty litter, and some fine gravel.

The fire damage was first sprayed with my airbrush using a very dark charcoal color. This was then scrubbed off of high points and wear areas using a flat brush moistened with thinner. Pigments (powdered pastel chalks) were used to finish the effect. These pigments were both piled in place and rubbed on using black, ash grey, and white. To fix them in place, they were misted with isopropyl alcohol using my airbrush.



Some more details were added to provide visual interest and a bit of color. A Volksturm poster was downloaded from the internet, shrank to the appropriate size using PowerPoint, and printed. It was glued in place on the wall. Ditto for the photo of Hitler. The frame was made from plastic strip and the broken glass from a piece of thin clear sheet plastic. The graffiti on the side of the building was simply painted on.





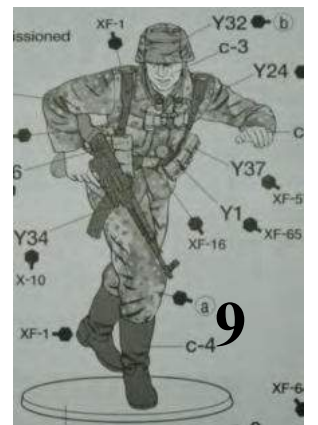
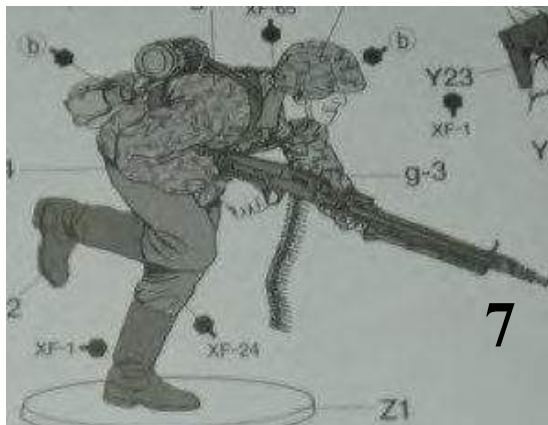
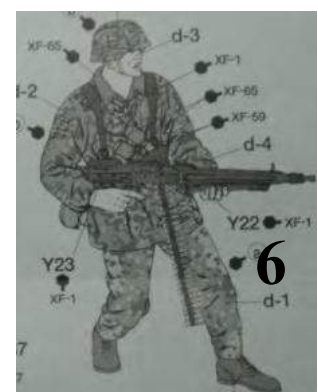
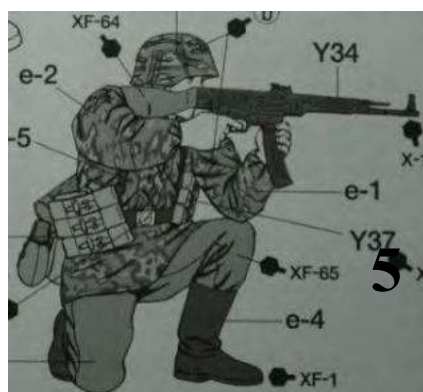
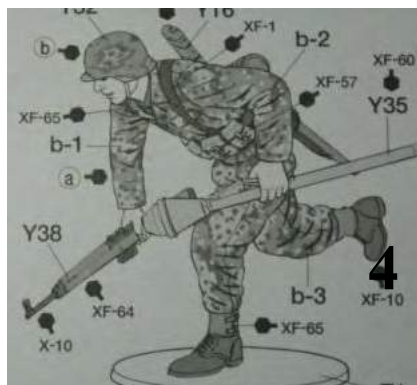
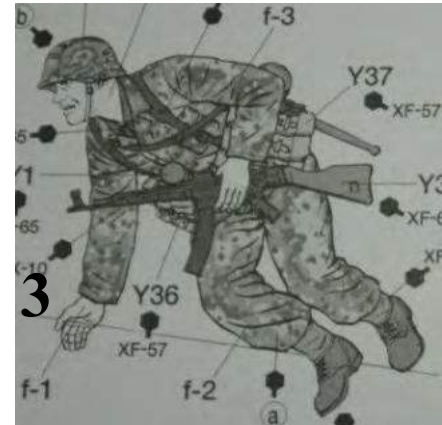
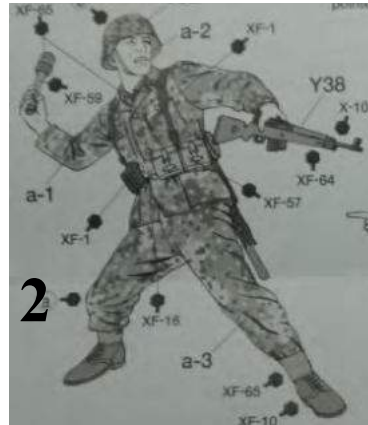
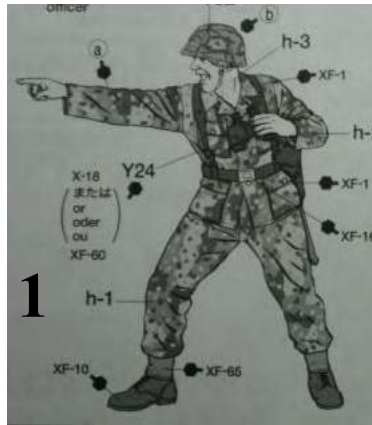
A good view of a portion of the finished groundwork. This also shows the main focus of the diorama—the vehicle, fighting infantry, and their imminent fate in the form of the Russian dropping the grenade-rigged jerry can out of the upper floor window into the halftrack. It is the large vehicle and the German soldiers clustered around it that the viewer will notice first, but the prominent location of the Russian soldier will soon attract the viewer's eye.



Action on the upper deck! In this sub-plot, Russian infantry overrun the flak gun. A surviving—though wounded—German soldier is trying to sell his life dearly.

Figures

There are 18 figures, German and Russian, shoe-horned into this small composition. While many are stock, most are converted to one degree or another. They were made in painted using the same methods we have discussed previously. Let's look, specifically, at how these figures were created.



A few German figures are built stock or nearly so. The others are conversions ranging from simple to in-depth. All but one of the German figures are based on parts from Tamiya's Panzergrenadier set. Other parts are left-over from several other Tamiya figure sets including the remains of two additional Panzergrenadier sets used in previous dioramas, the remains of two Field Maintenance sets and an Infantry on Maneuvers sets, and parts left over from two Flakvierling kits. All these various parts are now so jumbled in my figure parts box, I can't always say with certainty what figures are made with what parts—especially arms, hands, and heads.

To better show the conversions on the following pages, here we see drawings (from Tamiya's Panzergrenadier instruction sheet). I have numbered the figures in no particular order. As mentioned before, although the Tamiya figures are deficient in many ways, they are plentiful, inexpensive, fairly well designed and posed, and include a wide variety of equipment and weapons. All of this makes them ideal for a project such as this one, and they make a great basis for conversions.

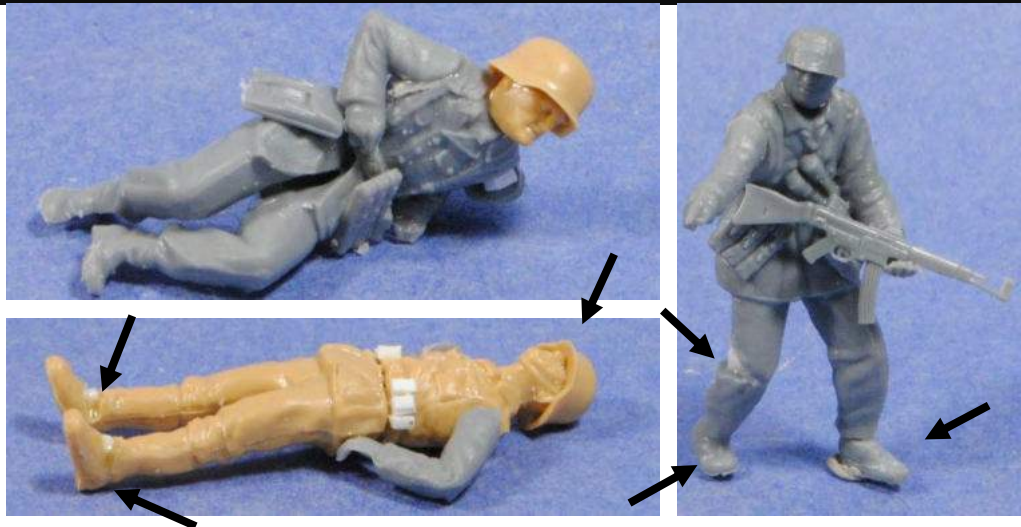


The stock (or nearly so) German figures are the kneeling shooter (#5 on the previous page), the soldier firing the machinegun from the hip (#6), and the man throwing the grenade (#2). This grenadier had the top of his head resculpted. The stock head is cut off flat above the eyes/ears for the helmet to be placed. In its place I added a bandaged bare head. The bandage was done with Magic Sculpt, while the hair was made from Duro. For very small details, Duro is a good choice. It is also very sticky—the tiny amount needed for hair will stick to the head even while being worked with a damp brush. Amounts of Magic Sculpt that small could dissolve or come apart.



The finished halftrack interior was used when posing the crew. They were designed to fit with the vehicle, the gun, and each other. The gunner's legs are from #8 and his torso from #7. My references show the cap was sometimes worn backwards so that the brim would not interfere with the gunsight. The loader is figure #1 with new arms from the Flakvierling kit. The shell is from the Field Maintenance set. The dead crewman has the torso from #8 and the legs from #7. The right leg is straightened at the knee. Both arms were replaced and repositioned. The photos show the figure before and after putty repair work. The putty not only filled gaps and resculpted damaged areas, it also made sure the figure fit well against the halftrack.

Note, most of the photos on these pages show the figures prior to putty work. A few photos show the figures after the putty work was complete.



The wounded man is the jumping grenadier (#3) with his legs repositioned so the right is behind the left and both feet are on the ground. The dead man uses parts (except arms) from the Flakvierling kit. Note how the ankles have been relaxed and the helmet pushed down over the eyes. The pointing figure is the same figure as the standing machinegunner (#6). Rather than leaning backwards, he leans forwards. This was done by straightening the right leg, and then adjusting both ankles so the feet fit on the ground. The right arm was replaced and the head was turned to the right.



Here we see the shell-shocked tanker before and after putty work and after painting. He was originally a painter from the Field Maintenance set. I bent him slightly forward at the waist, and—to make sure he wasn't staring at the ground—his head was tilted back. New arms were put in place. The shredded sleeve is Magic Sculpt epoxy putty. His hat was carved and hair added from Duro epoxy putty. The pistol is carved from an MG-34 handgrip and detailed with bits of plastic.



The Panzerschreck team are based on figures #9 and #4. Arms were replaced or repositioned. The panzerschreck and ammo crate are from any of the Tamiya halftracks. These do not include the shield, which was made from sheet plastic. The wounded man sitting on the rubble pile firing his MP 40 one-handed was an in-depth conversion. The legs are from #7, but are spread apart rather than being close together. This required material to be removed from the rear. This left a large gap in front fixed with epoxy putty. This also required the jacket skirt be resculpted in front. The torso and left arm are from #9—the arm was repositioned, hand replaced, and shoulder resculpted. The head was replaced and turned farther to the right. The right arm is from figure #1. Holes were added to the left trouser leg. This was done by scraping away a layer of plastic, repairing the damage with Magic Sculpt, and then tearing the holes with a sharp hobby knife. Both hands were replaced.



The remaining Germans can be seen at left and right. The vehicle crew is seen at left. The realistic metal effect on the shell casing was achieved by brush-painting S & J "Spray Metal Bronze" on the black primer. Three coats were applied. Once dry, S & J Brass polishing powder was applied with a Q-tip. Expended shells on the halftrack floor were painted the same way.



Russians! The two shooters are built stock from the Russian Infantry set. The pointing soldier had his right arm and hand replaced—a simple conversion. His gesture directs the viewer's eye back to the halftrack. The other figures are on the upper floor of the house. The overwatching figure is stock. The man with jerry can bomb is converted from a man pulling a machinegun. All that was required was to reposition his arms.





Composition

We looked at his diorama several times in the chapter on composition, but let's review here with a look at how it compares to my "Ten Commandments of Effective Composition".

1) HAVE A SINGLE MAIN POINT: The Germans are surrounded and their situation is hopeless. Still they fight. Russians advance from all sides, especially from the rear, clearly having overrun this portion of the collapsing defense.

2) SHOW ACTION AND INTERACTION: This scene is all action. German interact with Russians – both present and off scene – coming from all directions. They act in concert with each other, working together, communicating, and fighting. Likewise, the Russians cooperate with each against their German enemy.

3) USE A TIGHT COMPOSITON: A vehicle, flak gun, overpass, building, and 18 figures are closely packed in a small space less than seven inches across. The tightness and facings of the Germans show they can retreat no farther and the end is near. The nearness of the attacking Russians show this is a no-quarter, life and death struggle - and the end is not in doubt.

4) DIRECT THE VIEWER'S EYE: The vehicle is largest element and is central. It is seen first. The building, overpass, and flak gun form a partial frame and serve as vision "stoppers". The viewer, much like the Germans, is trapped in the scene. Gestures and pointed weapons further direct the eye and point to various semi-hidden elements that the viewer will find in due time. Even several of the "lines" provided by the groundwork serve the same purpose (such as the bent railing and the action on the upper street framed between the top of the overpass and the side of the building).

5) HAVE BALANCE: The scene is circular with the main point in the center. There are more, and larger, elements in the rear of the composition, but these are balanced by off-scene Russians coming from the front and even by the viewer him/herself.

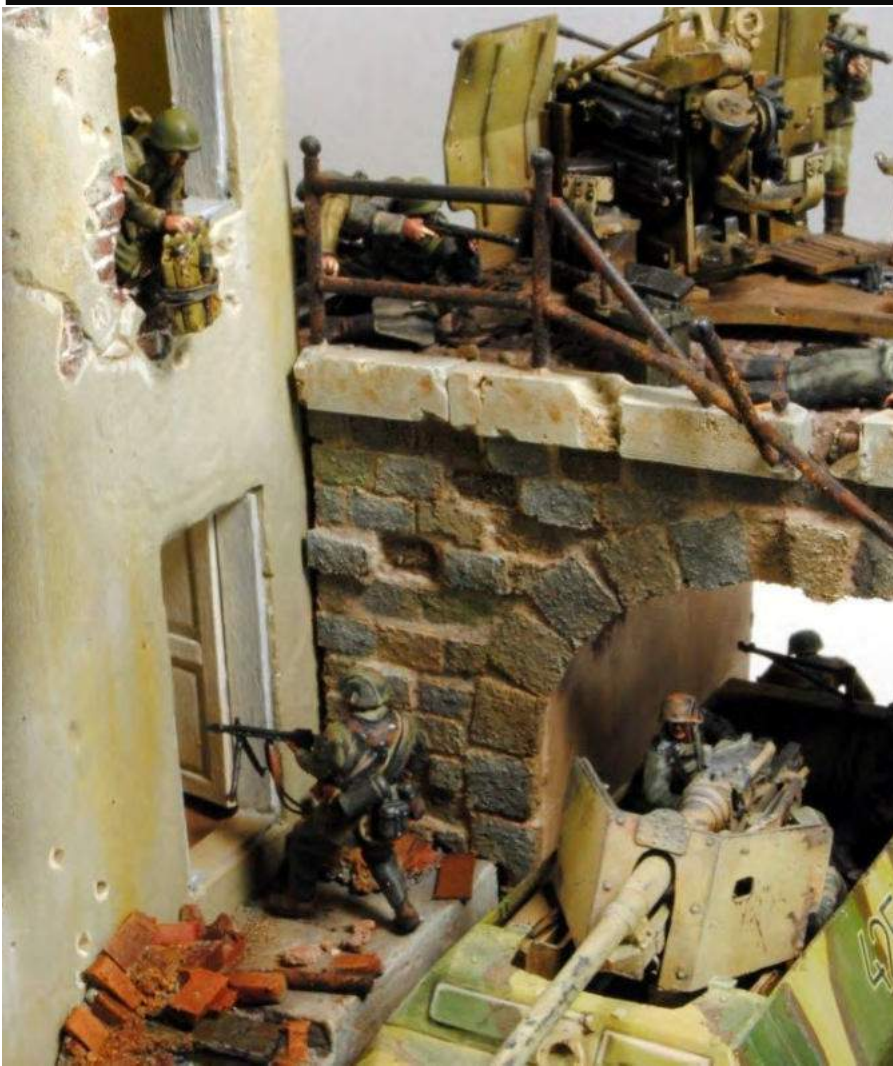
6) USE ALL THE ELEMENTS: The vehicle, figures, groundwork, and the shape of the base itself all help tell the story – either directly (vehicle and figures) or indirectly by setting the scene, providing context, directing the eye, or other such support. For example, the variety of uniforms worn by the Germans indicates they not a homogenous unit, but a hodge-podge forced together by the situation. Another example is the broken picture of Hitler in the ruins.

7) MINIMIZE DEAD SPACE: There is no portion of the composition that does not contain elements or activity that help tell the story. The closeness of the figures, tightness of the composition, and lack of any open space serve to increase the stress and drama of the composition.

8) USE SHAPES AND ELEVATIONS: The circular shape helps convey "surrounded" and mimics the German formation. Action shows attack from all sides. The multi-levels add interest and allow more things to be packed into the small space. Architecture forms a frame, trapping the viewer in the scene.

9) ARTISTIC LICENSE IS OK: This is mainly seen in the perhaps artificial closeness of the figures to each other and their enemy. But this makes the story very clear, stresses the hopelessness, conveys emotions, and adds drama to the composition. If the scene were more spread out, while the story would be the same, these things would be lessened.

10) PLAY WITH IT: While I had my concept pretty much worked out before I even began work. I have made adjustments. What we are looking at is actually the fourth iteration of the scene. My original idea did not include Russians actually in the scene – I decided to add them in the second take. The scene has also gotten progressively smaller. In my first mock-up and test-fit, I used an 8 inch hexagonal base and found it was too big. Next, I shrank it down to 7 ¼ inches. It worked much better, but I determined I could probably compress it even more. Thus, I ended up with my final 6 ½ diameter composition.



24

"Project 251" Modeling the Sd.Kfz 251



Sd.Kfz 251/1 Ausf. D Holzgasantrieb

By Kevin Townsend



Sd.Kfz 251/1 Holzgasantrieb

I was intrigued by photos I found showing the WW II German wood gas drive system mounted on the Sd.Kfz 251/1 and thought it was make an interesting—and simple—conversion.

Photos show this conversion fitted onto both the C and D models, so either the AFV Club or Tamiya kits can be used. As the Tamiya kit is more readily available and simpler, I chose it. The conversion is quite basic—consisting primarily of tubular shapes of various sizes with minimal additional detailing needed.

As these vehicles served as school vehicles in a “quiet” sector, weathering was minimal. I chose a very simple scene—a section of cobblestone—and a very simple story: students or mechanics checking out the wood gas system. The figures, two from the Tamiya Field Maintenance set and one from the Tamiya Infantry on Maneuvers set, were used stock.

The 233rd Panzer had seven of these vehicles. Based on the photos, at least three were C models, one was a D, and one was a hybrid (C front and D rear). The other two? I know of no pictures. Nor am I aware of any other vehicles assigned to other units in other regions (although based on numbers of wood gas generators produced, I wouldn’t be surprised if such existed). Therefore, I wasn’t too dogmatic about recreating a specific vehicle.

The photos of the finished model clearly show all the work that was required. Detail on how this little vignette was made is shown on the following pages. The vehicle and figures were built, finished, painted, and weathered as seen in preceding chapters. Modifications other the wood gas generator, such as basic added detail, and the tarp over the fighting compartment were also made in the same manner as before.

Opposite top are photos of some of the 233rd Division’s wood gas 251s. Markings, when present at all, seem to be only national insignia. The vehicles appear to be either in solid colors or in normal German camouflage. The photos I was able to find of German wood gas vehicles show a variety of configurations -these 251s are all similar but still show distinct differences in design. The top vehicle is particularly interesting. What we can see in this photo clearly appears to be a D model. But look at the photo of the same vehicle from the front in the chapter on the SPW (Schutzenpanzerwagen). This vehicle is a hybrid—the front half, forward of the hull joint— is an Ausf C while the rear half is a D, This is only such hybrid I have found.



Holzgasantrieb:

This means "Wood Gas Drive". Wood gas is one of the more successful alternatives to normal fuel. In petrol engines, the normal fuel can be replaced with little change to carburation. Diesel engines still need some diesel fuel to ignite the gas mixture, so more modification is necessary. Wood gas is clean and efficient.

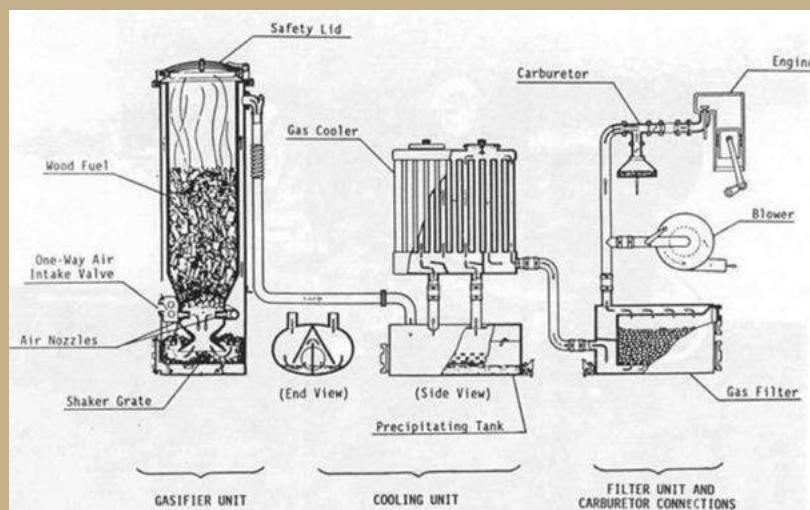
Due to fuel shortages and rationing, wood gas vehicles were used in large numbers throughout Europe. In Germany alone, nearly half a million vehicles (civilian and military) were converted.

German military units on occupation duty relied heavily on wood gas. One unit stationed in Denmark, the 233 Panzer Division, had seven Sd.Kfz 251/1s so equipped (at least two of these were assigned to the driving school). The unit also had a few Panzer I and Panzer II vehicles equipped with wood gas generators.

The 233rd Panzer Division:

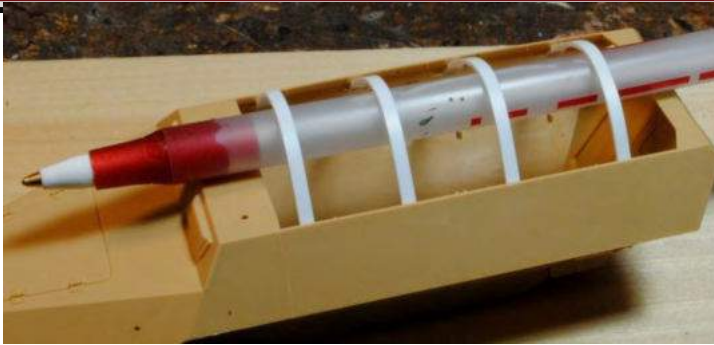
Renamed from the 233 Reserve Panzer Division, the unit was stationed in Denmark on occupation duty from late 1943 until the end of the war. While in Denmark, it trained panzer crews and motorized troops. This is very likely the role in which the wood-gas powered 251s were used.

The unit saw no combat apart from occasional Allied bombing attacks and commando raids.

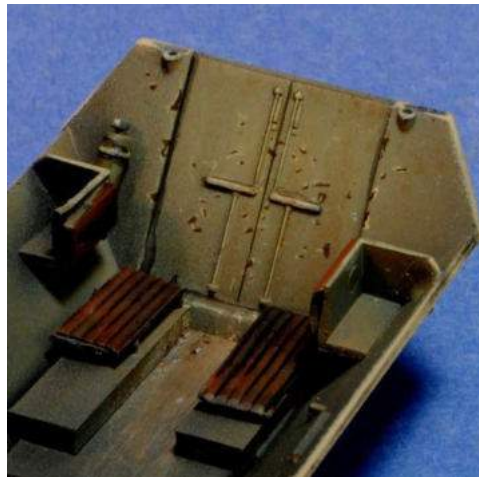
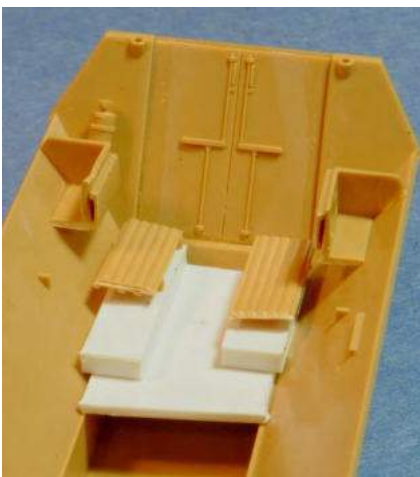


Wood Gas Generator

A simple schematic showing the operation of a wood gas generator. The gasses from the burning wood are trapped, cooled, condensed and filtered (cleaned of dust and ash). Compared to diesel, a vehicle powered by holzgas lost about 20% of its available horsepower. Perhaps the main disadvantage is that it took time to heat up and produce enough gas before you could begin driving.



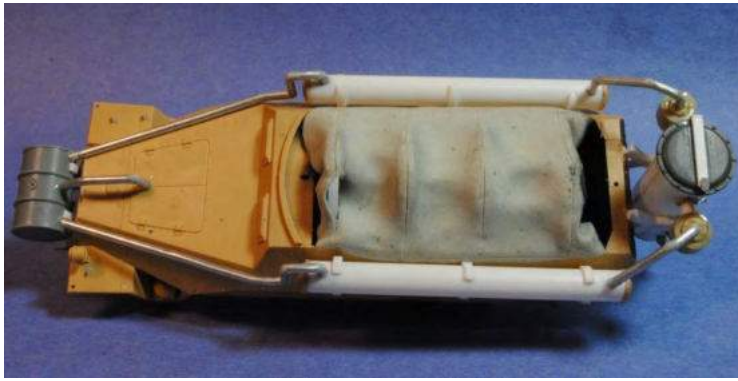
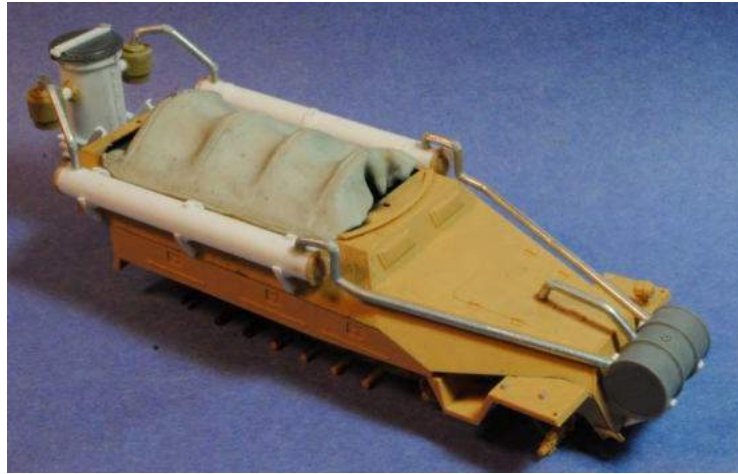
The tarp was made using epoxy putty as we saw in the chapter on Assembly. Above left: To ensure the hoops were of a uniform height and shape, I taped an ink pen along the center line of the upper hull and formed the hoops over this. Above right: The tarp was put in place, but was left loose at the front and rear, and a tear was added over the front hoop. I left the tarp loose since the doors could not be used due to the generator, and the crew needed some means of entry/exit. I temporarily placed the upper hull on the lower hull to see how much of the interior I needed to model. It turned out to be very little; just the rear doors and fire extinguisher. This was built and painted as normal. Invisible portions were not built and simply painted black (deep shadow).



Although I don't think they will be visible, I installed a bit of floor and some basic shapes representing the rear under-seat stowage bins, seats, and hull side stowage bins. This was sprayed first in Black for deep shadow, then with dark brown mixed with Dunkelgelb for medium shadow, and finally—sparingly—with Dunkelgelb highlights on the rear door. Highest highlights (with a bit of Sand Yellow added) were hand-painted onto door fittings. Details on the fire extinguisher and seat edges were painted and the interior was given a wash of Burnt Umber oil paints followed by a bit of chipping. The hull halves were then glued together, blocking off most of the interior.

Composition

- 1. HAVE A SINGLE MAIN POINT:** There is no particular story in this vignette—simply displaying the vehicle.
- 2. DIRECT THE VIEWER'S EYE:** As with the previous two vehicles, the main point fills the scene. The viewer's attention will be drawn to the wood gas generator due to location, size, and color. While the vehicle moves left to right, two figures stand at the nose looking back into the composition—preventing the viewer's gaze from leaving the scene. A third figure leans over closely examining the wood gas generator, hinting that the viewer should, too.
- 3. SHOW ACTION AND INTERACTION:** The figures interact with each other and the vehicle simply by proximity and the direction of their gazes.
- 4, 5, 7. USE A TIGHT COMPOSITION, HAVE BALANCE, MINIMIZE DEAD SPACE:** Like before, the small compact size of the stage ensures all this.
- 6. USE ALL THE ELEMENTS:** The figures are clearly related to the vehicle—two even wear mechanics overalls. The groundwork tells us we are in an urban environment and the sign on the wall tell us we are at a driving school.
- 8. USE SHAPES AND ELEVATIONS:** Again, nothing is parallel to base edges. The wall serves to help “frame” the gas generator—the most important part of the vehicle.
- 9. ARTISTIC LICENSE IS OK:** This command has little applicability to this vignette.
- 10. PLAY WITH IT:** While I knew I wanted the vehicle, these three figures, and the driving school sign, I tried several potential arrangements before settling on this composition.



While the conversion looks complex, it is mostly simple tubular shapes. The rear burner is Evergreen 1/2 inch plastic tube, detailed with Evergreen plastic strip and parts from the scrap box—mostly round shapes with bolts and rivets - from various road wheels, access hatches, and other fitting. The weld seam up the rear is Evergreen strip liberally coated with liquid styrene cement. Once softened, it was textured with a hobby knife. The side condensers are also Evergreen tube, and the tank in the front is from the Tamiya Jerry Can set.

The various pipes are made from aluminum tubing. The tubing bends easily and holds its shape, but tubing often kinks at the bends. To prevent this, I inserted plastic rod into the tubing prior to bending it to shape. Mounting brackets are made from slices of plastic tubing and plastic strip.

Groundwork

For the street, I used a Textured Sheet by Tamiya - Part # 87165. The sheet, about 8 1/2 x 11 inches, is printed on vinyl-like heavy paper with a raised pattern, giving it a 3D look and feel. Listed as suitable for 1/35th—1/20th scales, the pattern is not noticeably out of scale in 1/48th. The material is easily cut with a sharp hobby knife or scissors. It can be attached to a smooth base using double-backed tape, white glue, wood glue, contact cement, or spay adhesive. The sheet is colored, but straight from the package it looks too uniform and stark. Due to the raised texture, the sheet can be painted without losing the pattern. Rather than paint the entire sheet, I choose to use the printed colors as my base-color and selectively added color by painting many of the cobbles in different colors.

The wall and gate were made from plaster and sheet plastic respectively, just as was done with the house in the 251/9 diorama.



The street was given a dusting of pigments to finish the ground.



The German Occupation of Denmark:

Invaded on 9 April 1940, Denmark surrendered after two hours believing resistance was useless. Unlike other German occupied countries, the Danish government continued to function. Danes reacted in various ways. Few were Nazis, but some explored economic trade with the Germans. While some resisted most were unwillingly compliant. As time passed, the population became increasingly hostile, causing Germany to declare Denmark "enemy territory". In August 1943, they dissolved the government and instituted martial law, exposing the Danes to Nazi terror. In October the Nazis decided to remove all Jews from Denmark, but a leak from a German diplomat allowed the majority of the Danish Jews to be evacuated to safety in neutral Sweden.

Over 3,000 Danes died as a result of the occupation, 4,000 Danish volunteers died fighting in the German army while 1,000 merchant sailors died in Allied service). This is a low mortality rate (0.08%) compared to other occupied and belligerent countries. Denmark was liberated at the end of the war, and 40,000 people were arrested on suspicion of collaboration. Of these, 13,500 were punished— 78 received death sentences of which 46 were carried out. Most received prison sentences of under four years.

The metal on the holzgaz equipment was painted in acrylic colors and weathered using oil washes, dot filters, and pigments applied while the oils were still wet.

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"Project 251"
Modeling the Sd.Kfz 251



By Kevin Townsend

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Bruce Culver provided drawings, photos (many unpublished), personal expertise, and valuable suggestions and feedback. Bruce's "Panzer Colors" books were my modeling bibles back in the 70s, and several of his books were references for this project—including the old "Panzer Colors" series. Bruce also provided the Panther G used in the 251/20 diorama, the Bandai 251 Ausf B kit, and two AFV Club 251/1 Ausf C kits.

Fellow Modelers on the Track48 Web Forum provided feedback and ideas.

Kit Instructions from 1/35th Scale Dragon, AFV Club, Tamiya kits, and conversion kits from various manufacturers: (These were used as detailing/scratch-building guides)

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GLOSSARY of MODELING TERMS/TECHNIQUES

The glossary is provided simply to avoid confusion. As I am not primarily an armor modeler, I may use somewhat terminology. And, of course, a novice to the hobby may not understand many of terms I take for granted. Note that these are the terms I use—they may or may not have the same meaning as those by someone else.

ACCELERATOR: Also referred to by brand name (such as “Zip Kicker”, this is a fluid applied by brush or spray bottle that causes superglues to set instantly.

ACRYLIC PAINT: Acrylic paints are water-soluble “plastic” paints with excellent adhesive qualities. They are very stable and will not yellow over time.

Acrylic paints dry quickly, allowing the application of many layers of paint in a short amount of time. This allows the painter to effectively use glazes and layering techniques. The downside to fast drying is that there is little time to manipulate the paint once it is applied to the surface.

Natural and synthetic brushes can be used with acrylics. These paints, being alkaline in nature, can be hard on natural brushes. If the paint dries in a brush, it can be very hard to get out without using strong solvents that could damage the brush. The good news is that brushes can be quickly and easily cleaned with water. When finished painting, clean brushes well with warm water and mild soap.

Acrylics, while they are my preference, are not the only type which can be used. Each medium requires its own methods and techniques, and those used in this book may not be appropriate. Many artists use a variety of paints, depending on task, and preference. Be aware not all paints are compatible and will not mix with one another. Some paint may also attack the plastic model.

AFTERMARKET: Parts, accessories, and conversion sets made by various manufacturers for use with other models.

AIRBRUSH: A miniature spray gun used for painting where the flow of paint and air is adjustable. Requires a compressed air source such as an air tank, can of air, or air compressor.

BASE COAT: This is the “baseline” color. Shadows/highlights darken or lighten this.

BLENDING: See feathering.

BLENDING WASH: A blending wash is a very thin wash of the base coat color applied after all other shading/highlighting is done. It's more like tinted water than thinned paint. It's used to tone down shading/highlighting that is too stark or has too much contrast. It “unifies”, or ties together, the color.

CLEAN UP: This can apply to washing your hands/brushes at the end of a session, but it normally refers to the process of preparing pieces of a kit for assembly and painting by removing mold seam lines, ejector pin marks, mold “plugs” or “pours” removing flash and cleaning off any mold release agent residue or oils.

COLOR MODULATION: An armor modeling term that simply means shading and highlighting – painting darker colors in shadow areas and lighter colors on highlighted surfaces.

COMPOSITION: Composition refers to the arrangement of elements (figures, models, groundwork, etc.) on your base. It is the “story” that is told by the way the elements are posed, placed, and interact.

CONVERSION: This is a type of modification where a kit or a part is changed into something different.

CYANOACRYLATE: A fancy name for super glue. Can be used to glue just about anything. Useful for photo-etched metal parts.

DEBONDER: A liquid or gel used to debond super glue.

DECAL: Water-slide decals are decals printed on a carrier film on a piece of paper. Water releases the carrier film from the paper and the decal can be slid into position on the model. Dry-transfer decals do not need water. The decal is placed on the applicable area and the carrier is rubbed, transferring the decal to the surface.

DETAILING: A type of modification where you are not converting the kit, but are adding details not included in the kit.

DIORAMA: Any grouping of multiple figures and perhaps other elements that go together and have a common theme.

DOT FILTER: Dot of oil paint applied to the model and then blended, feathered, and streaked to depict dust, rain marks, fading, dirt, or other color variations.

DREMEL MOTOR TOOL: A very useful power tool designed to hold cutting/sanding/shaping/drilling/etc. bits in a chuck or collet.

DRY-BRUSHING: Dry-brushing is a technique used to pick out only the high points of an object. Generally, a flat brush is used. With the tip of the brush, pick up only a bit of paint. Wipe the brush on a piece of paper towel to remove most of the paint. Then lightly drag the brush across the surface of your work, just touching the high points, depositing a small amount of paint. You may have to do this several times to build up enough color. This technique is useful to highlight large areas, bring out details in groundwork, and/or to weather items.

DRY-FIT: Parts are fitted together without glue. It is used to determine where extra work is required to ensure proper fit of parts.

EPOXY GLUE: Usually a two-part glue (resin and hardener) that are mixed in roughly equal portions. Can be used to glue just about anything and provides a very strong bond.

EPOXY PUTTY: A two-part putty that is mixed to create a clay-like material. Can be used to fill gaps or sculpt various items and figures.

EJECTOR PIN MARKS: Small, circular indentations on parts where the ejector pins pushed the plastic out of the mold. Often, these are placed on rear surfaces of parts, but if they will be visible on the finished model they must be removed. Do this by sanding or filing.

FEATHERING: This technique is used to eliminate hard edges that can occur between shadow, base, and highlight colors when building up multiple layers of acrylic paints. As you apply glazes, do not allow a hard edge to form between colors. Blend (or feather) away this edge, using a moistened brush if necessary so that there is

a smooth, gradual edge between the two colors.

FILLING: Filling generally refers to eliminating any unwanted gaps between parts in the construction process. It can be done with gap-filling superglue, model filler putty, or two-part epoxy putty.

FILTER: A very layer of paint, often oil paint, applied over another color to subtly alter the tint.

FLASH: Excess plastic on parts left over from the molding process.

FUTURE: A water-thin acrylic floor polish by Pledge. Provides a high gloss surface. Is very useful as a base for, and for sealing, decals.

GIZMOLOGY: The process of replicating the appearance of something rather than recreating the item exactly by using various and pieces of just about anything.

GLAZE: A glaze is an application of thin paint, but not nearly so thin as a wash. It is thin enough for the underlying color to show through. It is used primarily to add highlights and shadows to a base coat of paint. Glazes are usually two to four times thinner than your base coat, or about one part paint to one or two parts water. Glazes are built up, one on top of another, to slowly build up colors.

GROUNDWORK: Groundwork is the “scene” your figure is set in. It can consist of modeled ground, road, water, building, ruin, etc.

KITBASH: Combining two or more kits to create a model.

METAL FOIL: Various thickness of sheet lead, pewter, copper or other materials (I used the foil that covers the caps on alcohol bottles). Useful for making belts and straps.

MICROSET AND MICROSOL: These are setting solutions that help decals conform to surfaces. Microset is normally applied to the surface and the decal floated onto it. Microsol is a stronger solvent normally applied after the decal is added to help it conform to surface details and irregularities. Similar products from other manufacturers (such as Solvaset) work in a similar fashion.

MITER BOX: A “box” that aligns the saw blade and part so that a pre-determined constant angle can be cut.

MIXING: Combining two or more colors to produce a different color, or value of color. For example, mix blue and yellow to make green.

MODIFICATION: Any conversion or detailing work conducted on your figure.

MODULATION: See “Color Modulation”

MOLD LINES: Thin lines are parts where the halves of the mold came together. Remove these when possible. They may be nearly invisible, but will show up under a layer of paint.

MOLD PLUGS: Resin pieces coming from one-piece molds may have blocks of excess resin left over from the molding process that need to cut, filed, or sanded away.

OIL PAINT: Paint in which the pigment is suspended in a drying oil. Unlike acrylics, which dry rapidly, oils take a long time to dry. Oils are useful for filters, dot filters, and washes.

OOB (OUT OF THE BOX): Building the model exactly as the

manufacturer intended with no additional detailing or modifications.

OVERHEAD LIGHTING: The model is painted as if it is illuminated by a halo of light coming from above (kind of like being outside on an overcast day). When using this method, highlights will be on “top” (facing up) of things and shadows will be on the “bottom” (facing down).

PIGMENTS/PASTEL CHALKS: Powdered pigment that can be purchased or created by grinding pastel chalks into powders. Can be applied dry, mixed with paint, or mixed with another carrier such as water, mineral spirits, rubbing alcohol, etc., and applied to the model. Used primarily for weathering.

PINNING: Pinning is used to attach parts to each other and to the base. A hole is drilled in each part at the attachment point and a metal rod inserted between the pieces. This makes for a stronger. It's not necessary with plastic parts that are attached with plastic-welding glue, but it useful for resin parts and nearly mandatory for metal ones.

PHOTO-ETCHED PARTS: Thin metal detail parts created with a combination of photographic and chemical etching processes. Parts must often be bent into the appropriate shape.

PIN VISE: A small handle with a tiny chuck or collet designed to hold small drill bits. Also useful for holding parts for painting by their mounting pins.

PINWASH: See “wash”. A pinwash is applied with a fine-pointed brush to a small area. Normally used to fill scribed panel lines or outline rivets/bolts and other surface details.

PLASTIC MODEL CEMENT: Bonds plastic parts by melting the material at the joint, effectively welding the parts together. Can only be used to bond plastic to plastic.

PRIMING: Priming is done prior to painting. The figure, or part, is coated with a type of paint known as primer. It provides “tooth” (or slightly roughens up) the surface of your figure so that the paint will adhere and cover well.

PUNCH AND DIE SET: A very useful tool for scratch-building and detailing. These precision sets are used to punch consistent holes in plastic or metal foil. Great for making buttons/rivets/etc.

RAZOR SAW: An ultra-thin fine-toothed saw for delicate exacting work.

RIVET COUNTER: A nick-name for a modeler who is particular obsessive about accurate details. A term of endearment or name-calling depending on your perspective.

SCALE: Scale is the relative size of your figure. It can be expressed as a ratio to a life-size object: 1/9th, 1/32th, or 1/72nd. It can also be expressed in figure size (normally millimeters): 200mm, 54mm, or 25mm.

Different manufacturers may calculate millimeter size differently. Some may measure to the top of the figure's head, while others may measure to the eyes or so on. For practical purposes this means that a 54mm figure from one manufacturer may be significantly different in size from a 54mm figure from another manufacturer.

There is a rough equivalence between scale and size – for example 54mm is about 1/32nd - 1/30th scale. The comparison is not exact, however. Consider a 54mm John Wayne (very tall man) beside a 54mm Napoleon (very short man). Both would measure 54mm, but one would be about 1/35th scale and the other about 1/30th scale. Thus, they would look totally out of place posed together (as if they wouldn't anyhow...).

The moral of this story is not to assume that the same scale

means the same size or vice versa.

SCALE LIGHTING: Scale lighting is a principle that refers to the “scaling down” of light itself to match the scale of your model. This makes your models look real. It is done by adding highlights and shadows to your figure in the painting process.

SCRATCH-BUILDING: Making something from “scratch” - in other words, not a kit. Normally done with sheet plastic, plastic strip, rod or other shapes, epoxy putty, metal foils, wood, etc.

SINK HOLE: A defect in a kit where the plastic (or resin/metal) did not completely fill the mold resulting in a void. Sometimes this can be fixed with putty. In extreme cases, the part may be completely useless.

SILVERING: This is what happens when air is trapped between the model surface and the decal. It makes the decal appear white or silver—and appear to obviously be a decal and not a painted-on marking.

SPRUE/SPRUE TREE: This is the plastic “parts tree” that plastic parts come molded onto. It is the result of channels in the mold that feed the molten plastic to the parts cavities.

SPRUE CUTTERS/NIPPERS: A very handy tool designed to snip parts from sprue trees.

STIPPLE: Stippling is a process where paint is “jabbed” onto the surface using the point of the brush in a poking-type motion. It is most useful for applying such things as “five o’clock shadow” to a figure’s face or mud to clothing.

STOCK: See “OOB”.

SUB-ASSEMBLY: A segment of a model that will be attached to the whole after painting.

SUPER DETAIL: See “Detail”. With super detailing, detailing is being taken to extreme to make the most realistic model possible.

TEST FIT: See “Dry Fit”

THINNING: This is the process of diluting paint from a thick to a thin mixture. It is used to create such things as glazes and washes. The paint is thinning with an appropriate thinner. Acrylic paints used in this book can be thinned with water, acrylic thinner, Windex, or rubbing alcohol. Oils are thinned with mineral spirits or turpentine.

VIGNETTE: A single figure, or small grouping of figures, and other elements, smaller than a diorama, which tell a story.

WASH: A wash is the application of very thin paint. The paint flows only into recesses/crevices. It is useful to apply to areas such as groundwork to make details stand out. Washes are many times thinner than your base coat – four or more parts water to one part paint. As the paint is very thin, be careful to control it or it can run all over the place.

WEATHERING: Weathering is the process of making models appear dirty, worn, aged, etc. It is a continuous process that begins in the planning stages and continues throughout figure construction and painting.

WET SANDING: Sanding using either wet sandpaper or sanding under running water. This carries away debris and results in a smoother finish.

WHITE GLUE: A water-based glue (such as Elmer’s) that is useful for paper, wood, and many groundwork applications.

MODELING SAFETY

Modeling isn't an inherently dangerous hobby, but we use things that can be harmful if precautions are not taken. Protect yourself and others by using common sense, using material and tools properly, and taking needed precautions with chemicals. This appendix can't cover every contingency. Carefully consider what you are doing to anticipate potential hazards. Your common sense is your best protection – if something seems uncertain, or hazardous, it probably is. In an emergency, call 911 or your local emergency number.

General Safety Considerations:

Have a comfortable work area with good ventilation and lighting. Avoid wobbly surfaces where tools can roll or paint can spill, etc. Avoid incidents with children/animals by ensuring your materials are locked or out of reach. Have easy access to a sink to flush skin and eyes in an accident.

Use materials and tools properly. Be careful when using a new product or using a product in a new or unusual way. That doesn't mean you can't get creative, take shortcuts, or try new things, BUT be aware of the dangers and limitations of what you are working with and anticipate potential hazards. Think before you act! Wear protective gear as appropriate when using chemicals or power tools and also when sanding resins (the dust can be an irritant). If you need a respirator based on a task or material, other folks shouldn't be standing around watching without one!

Modeling materials and food don't mix. Avoid using the kitchen table as a work space. Keep your food and drinks separate from containers you use to store modeling stuff, and label them clearly. If you have to guess which can is soda and which is dirty paint water, you have a problem.

Don't force yourself to work. If you're ill, tired, or distracted, stop. Give what you are doing your full attention. Take your time – rushing causes mistakes. Young modelers should always work with adult supervision.

Working With Sharp, Pointy Things:

Many tools are designed to cut – and our flesh is softer than what we wish to cut. My most used tool is a hobby knife. Make sure the blade is sharp. A dull blade is more likely to slip and cut you. Be careful with razor saws. Clamp your work - if you hold the part in one hand, and the saw in the other, you run the risk of cutting yourself.

If you do cut yourself, clean the wound properly and seek medical attention for serious cuts. Make sure your shots are current. Although I rarely have to use it, I keep a small first aid kit on my workbench that contains first-aid ointment, antibiotic/disinfectant, gauze pads, and Band-Aids.

Working With Power Tools:

While convenient, these can cause serious injury. Tiny bits can break and fly, Ceramic cutting disks can shatter. Be aware of where your hands and fingers are in relation to the bits. Always wear protective eyewear. Wear a dust mask if sanding or grinding. Wear a full face mask when grinding or cutting metal. Do not modify the tool or try to use it on ma-

terial it was not designed for. Bits or materials you are working on can get hot. Replace worn bits – they may not cut that white metal anymore, but are probably more than sharp enough to gouge into you.

Working With Chemicals:

Glues, paints, putties, and solvents are chemicals - some are harmless, some not. Some are non-toxic while some are poisonous or have dangerous fumes. Know what you are working with - read the directions/precautions on the label. Be careful mixing them; research the results first. Some combinations are harmless, others are harmful—some catastrophically so. For information refer to the MSDS (Material Safety Data Sheet) available from the manufacturer, on line (www.msdsonline.com), and maybe even from where you purchased them. Even the relatively harmless epoxy putties we work with can cause irritation to the skin and eyes. The more we use them the more prone to problems we become. It's a good idea to wear rubber gloves and to make sure only your tools come in contact with the putty – not your bare skin. Don't lick your tools and make sure not to get the putty – or its dust if you are sanding – into your eyes. I love Magic Sculpt—it is my favorite sculpting medium—but I have developed an allergy to it. I can still safely use it—IF I take the needed precautions.

If you have special medical conditions talk to your doctor about the chemicals you use to ensure they do not aggravate your condition.

Please note that this small appendix cannot cover every product and possibility. It is each modeler's responsibility to practice the hobby in a manner that is safe to themselves and others. Children should be closely supervised. Common sense is your best defense. If it seems dangerous, it probably is. Carefully consider the possible consequences of an action before taking it. Ours is not a dangerous hobby, but we can be hurt by carelessness. Take a close look at your methods. Have bad practices become a habit? Do you take health risks that you don't even notice?

Have fun and be creative – but be careful and be safe.



ABOUT THE AUTHOR:

Kevin Townsend retired from the U.S. Air Force as a Senior Master Sergeant in January 2006 after 22 ½ years of service. He currently works as an Air Force civilian employee performing Physical Security, Resource Protection, and Electronic Security functions.

Kevin began modeling in middle school in the 1970s inspired primarily by the works of master modeler, Shep Paine. Although mostly just a figure-modeling hobbyist, Kevin has done modeling work professionally for museums and model figure companies. Normally, however, he only builds and paints those subjects that appeal to him personally—he does not, as a general rule, do commission work. His figures—and models—have won numerous awards including Bronze, Silver, and Gold medals and special awards such as the “St Petersburg Medal”, “Most Popular Award”, and

“Best In Show”. Kevin is a member of the National Capitol Model Soldier Society (NCMSS) and the Artist Preservation Group (APG).

Kevin has been married since 1983 and has two adult children and six grandchildren. He currently lives in New Jersey with his wife of 32 years, Arden, and their two incredibly spoiled little dogs, Daisy Grace and Precious.

Kevin makes no claim that the methods used in this book are the only ones—or even the best ones. They are simply the ones he used to make these models. Few of the methods are his own original ideas—most were learned from others or picked up from various modeling sources. Part of the fun of modeling is learning and trying new things. This is truly a hobby where there are no rules and each person is free to go where their imagination takes them. Each modeler is encouraged to experiment in order to find the materials and methods that work best for them.

As of this writing (Spring of 2016), Kevin can be reached for comment or questions at:

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Modeling the Sd.Kfz 251

in 1/48 Scale



I have always had a fondness for both the Sd.Kfz 251 SPW and 1/48th scale—a scale offering good detail, compatibility with many forms of modeling, cost-effectiveness, and less space requirements than the more popular 1/35th scale. Combining these “likes” into one project resulted in this series of quarter scale Sd.Kfz 251 halftracks. While basic versions of the vehicle exist in this scale, the many variants do not. But there are a few conversion and detail sets on the market, and other variants can be recreated with simple scratch-building. In this booklet, I share my methods for building, painting, and weathering armor models and accompanying figures as well as composing and creating dioramas. The SPW is ideally suited for this purpose—serving throughout the war in many roles, on all fronts, in all terrain, and in all weather conditions. This allows the modeler an almost endless choice of paint schemes, weathering applications, and diorama settings.

by Kevin Townsend