Building and Painting a

STURMGESCHUTZ III AUSF G

in 1/48 Scale

Armor Modeling How-To

by Kevin Townsend

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INTRODUCTION

This work documents the methods I used to finish Tamiya's Stug III Ausf G (Early) model in 1/48th 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 secret or proprietary. Few are my own creations – most I picked up from others and adapted through trial and error to fit my way of working. Part of the fun of this hobby is experimenting and finding the techniques that work best for you. That said, I hope this work can be of assistance to others trying to achieve the same effects regardless of subject and scale.

The work includes more than just the model. To 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 can tell a story—ranging from the very simple story we see here to complex dioramas.

Although this modeling project is relatively "advanced", much of this "how-to" guide is written with the novice in mind. I have tried to keep things simple even when describing advanced methods. I also hope the "grizzled veteran" will find things of interest. None of us has mastered everything - we can all learn from one another regardless of what we build and what scales we prefer.

If you gain anything from this work, then I have met my goal. Good modeling and God Bless

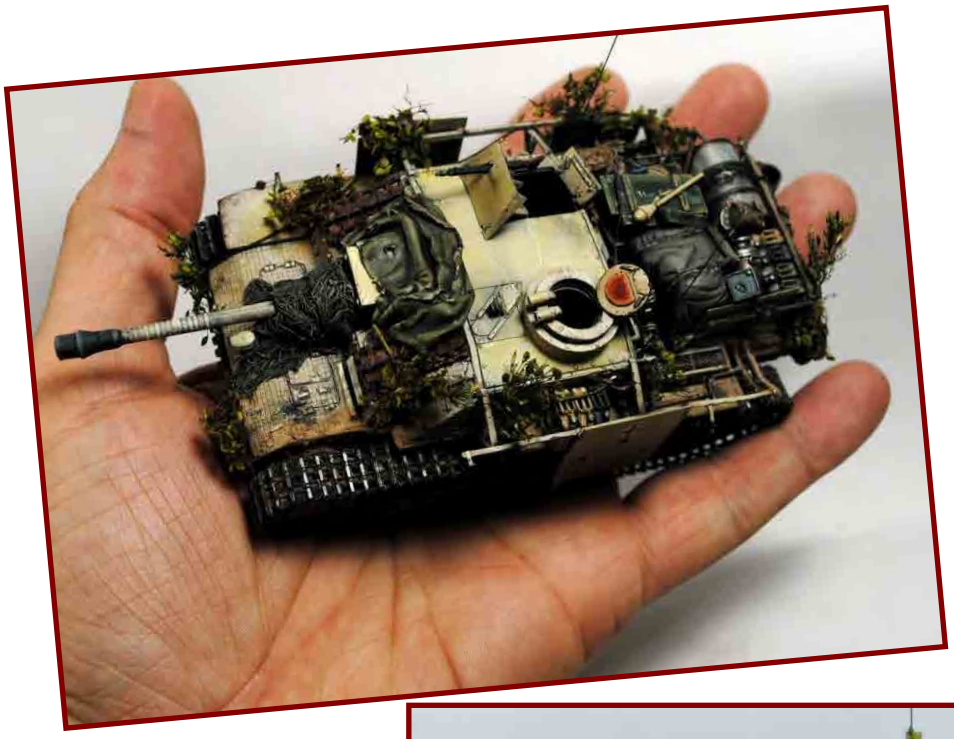
"The Sturmartillerie...is a weapon to assist the normal Infantry Division. Their use during attack corresponds to the Escort Artillery of the last war, that is the elite of the Light Artillery. In order to make them useful for other purposes, such as on the defensive, there is the additional requirement for the ability to be used as part of the normal Artillery—in an indirect fire role… Finally, they would be a superb offensive anti-tank weapon, and could replace the divisional anti-tank element in this role."

"The Sturmartillerie fight as escort artillery with the infantry. They do not attack like tanks or break through, instead they carry the infantry attack forward by quickly eliminating dangerous targets via direct fire. Instead of fighting in large numbers like tank units, they will be used in platoon strength as a rule."

"This platoon, or even single gun, will appear by surprise, destroy the target and then disappear before it can be targeting by enemy artillery."

"Being armored and motorized makes it possible for them to fight and survive in the combat zone of the infantry and provide close support at the right time against decisive targets that survived the artillery preparation or are not suitable to engage with other weapons."

-Erich von Manstein, 1936



The obligatory shot of the model held in the palm of the hand shows how small these quarter scale kits are. Despite the small size and simplicity of the kits compared to their more bloated and complex 1/35th scale brethren, one can still pack a tremendous amount of detail into these tiny canvases.

While the model itself is certainly the "main point" in this little creation, notice how the addition of a couple crew figures transform a plain armored vehicle model into a piece that tells a simple story. Based on the two antenna, the vehicle is clearly a command version. However, radio silence would prevail in the time preceding an assault. The commander looks at his watch while holding a flare pistol in the air. Clearly, the time for H-hour is almost upon use. The gunner uses a traffic control sign to hold the following units in place.

The Real Thing

Sturmgeschutz III Ausf G:

Length: 6.14m (5.4m without gun)
Width: 2.95m
Height: 2.16m
Combat Weight: 23.9 metric tons

Max Speed: 40 km/hr
Avg. Road Speed: 20 km/hr
Cross Country: 12-15 Km/hr
Fuel Capacity: 310 Liters
Range: 155 km road/95 km cross country
Grade Climbing: 30^0
Trench Crossing: 2.3m
Step Climbing: 60cm
Fording Depth: 80cm
Ground Pressure: 1.04 kg/cm^2

Powerplant: Mayback 11.9 liter water cooled V-12 producing 265 HP @ 2600 rpm
Steering: Differential
Drive: Front Sprocket
Suspension: Torsion Bar
Track: Dry Pin, 93 links per side

Main Armament: 7.5cm Sturmkanone 40 (L/48)
Secondary (early model): 1 x 7.92mm MG 34

References:

-Sturmgeschutz III Vols 1-II: Peter Muller & Wolfgang Zimmerman
-Sturmgeschutz & Its Variants: Walter J. Spielberger
-Panzer Tracts No. 8: Sturmgeschutz: Thomas L. Jentz & Hilary Louis Doyle
-Sturmartillerie & Panzerjager 1939-1945: Bryon Perrett (illustrated by Mike Chappell & Mike Babrocke)
-Sturmgeschutz III In Action: Bruce Culver (illustrated by Don Greer)

THE REAL THING

In 1935, Erich Von Manstein suggested that *Sturmartillerie* (assault artillery) be used in a direct-fire support role for infantry. An armored infantry support vehicle mounting a 75 mm artillery piece in a fixed, fully integrated casemate superstructure was developed and designated the Sturmgeschutz III. The vehicles' primary mission was infantry support. Although they could engage enemy armor when encountered, early vehicles with their short-barreled howitzers were ineffective against the T-34 and KV-1. Later models, the F and G, were up-gunned with a high velocity 75mm cannon.

The Ausf G was the final model, built from December 1942 until the end of the war. The vehicle continuously evolved with modifications being introduced nearly every month. Over 7,800 G models were produced (from a total of over 10,000).

As the war turned against Germany the StuG was used more often as a tank destroyer. Being easier and cheaper to produce than a turreted tank, it even replaced tanks in many Panzer Battalions. Thus, the StuG saw service as an infantry support vehicle, tank destroyer, and a battle tank.

With the StuG being increasingly used as a tank destroyer, the Sturmhaubitze (StuH) 42 was designed to provide infantry support. This vehicle was identical to the StuG except for the main gun – it mounted a 105mm howitzer in place of the 7.5 cm cannon. The first vehicles were built on repaired Ausf F chassis in late 1942, but all production vehicles were built on the G chassis starting in March 1943 and continuing until the war's end. Nearly 1,300 were built.

Modelers will often use photos and other documentation to recreate a specific vehicle. There is certainly nothing wrong with this, and researching an individual vehicle can be very interesting. However, I chose to build models that are generally representative of the type, using photos as a guide to identify features, modifications, damage, and weathering common to the variant. This method lends itself well to a vehicle as the StuG III Ausf G because of the vast numbers built. The following photos are a sampling of those I used for reference and inspiration. Many of the vehicle features seen in these pictures found their way onto my model. More photos, illustrating specific features, are included elsewhere in this book alongside the discussions of modeling the features.

Although showing a knocked-out vehicle, this StuG is similar to my models in many ways. Not only was it produced during the same timeframe, it was also produced by Miag as indicated by the Zimmerit pattern. It also carries spare track in the same locations and—as a study of photos indicates was common—it has sustained damage to the fenders. Photos also show Schurzen was often missing or damaged.

The top vehicle is missing the rear Schurzen plate on the near side. The next plate hangs in some disarray. The vehicle also carries spare track on the hull front and a good amount of stowage on the rear deck. As is common on vehicles operating off road in soft ground, it has built up a heavy layer of dark mud on the lower hull, tracks, and running gear. The bottom vehicle apparently displays a full set of Schurzen plates. It also carries spare track on the hull front and the sloping forward portion of the superstructure. Foliage is carried for additional camouflage and a tarp covers the gap between the gun mantel and the superstructure roof. This area was not particularly weather or water-tight and photos often show a tarp covering the gap.

STURMGESCHUTZ III AUSF G: MODIFICATIONS DURING PRODUCTION-1943*

	Dec 42	Jan 43	Feb 43	Mar 43	Apr 43	May 43	Jun 43	Jul 43	Aug 43	Sep 43	Oct 43	Nov 43	Dec 43
Commander Cupola	360° Rotation on Ball Bearing Race										Fixed		
Fume Extractor	Roof	Vertical rear wall of superstructure											
Driver's Left Side/Superstructure Pannier front armor	View Port	View port deleted and pistol port put in place. Pistol port was placed farther forward than view port to allow increased slope on armor on front of superstructure side panniers											
MG Shield	N/A	Folding shield installed. Often retrofitted to earlier vehicles.											
Gun Sight Guard	N/A	Hinged/Sliding armored guard over roof opening for gunner's periscope											
Driver's Periscope Kraftfahrferurohre (KFF) & Front Plate.	Installed. 50mm plate with supplemental 30mm plate bolted each side of holes for KFF.				KFF phased-out Feb-Mar. Single 50mm plate with supplemental 30mm plate bolted on. Holes for KFF no longer present								
Smoke Grenade Launcher	Not Installed		Installed				Not Installed. Earlier installs often remained.						
Schurzen Side Skirts	Not Present					Installed. Sometimes retrofitted to earlier vehicles beginning Jun Mountings inadequate – often resulted in loss of plates							
Front Hull Armor ALKETT	50mm with supplemental bolted-on 30mm plate					Single 80mm plate							
Front Hull Armor MIAG	N/A		50mm with supplemental bolted-on 30mm plate								Single 80mm plate		
Zimmerit ALKETT	No Zimmerit											Waffle Pattern	
Zimmerit MIAG	No Zimmerit									Small squares with dimple impressions			
Cupola Shell Deflector	Not present										ALKETT introduced in October. Present on all new vehicles by Feb 44		
Gun Mantle	Welded, angular gun mantle											Cast saukopf introduced. Not universal	
Muzzle Brake	Two chamber muzzle brake					Improved muzzle brake with side flanges							
Stugs Produced using Pz III AusfM chassis	142 were produced on this chassis made by MAN. Featured deep wading exhaust, fenders hinged front and rear. 50mm hull armor with 30mm supplemental plate bolted on, single piece glacis hatches. These chassis likely all used by MIAG												
Return Rollers	Rubber Tired											Steel. Stocks of rubber-tired used as available	

* Meant as guide only. Based on Spielberger. Not all changes were implemented by all manufacturers at the same time. "Old" parts used as long as inventories existed. Availability of new parts affected production. Lag between time a modification was first available and the time it was present on every Stug built often several months. Further variation caused by field installations, modifications, and maintenance using whatever parts available. This chart address only major changes made during production and does not consider the numerous minor detail changes.

STURMGESCHUTZ III AUSF G: MODIFICATIONS DURING PRODUCTION-1944*

	Dec 43	Jan 44	Feb 44	Mar 44	Apr 44	May 44	Jun 44	Jul 44	Aug 44	Sep 44	Oct 44	Nov 44	Dec 44
Commander Cupola	Fixed								360º Rotation on Ball Bearing Race				
Fume Extractor	Vertical rear wall of superstructure												
Driver's Left Side	Pistol port												
MG Shield/Mount	Folding shield installed.				New MG mount installed - could be remote controlled from inside vehicle. Mount consisted of new shield. Gunner's hatches opened to side instead of prior front to back.								
Gun Sight Guard	Hinged/Sliding armored guard over roof opening for gunner's periscope												
Driver's Front Plate.	Single 50mm plate with supplemental 30mm plate bolted on.												
Smoke Grenade Launcher	Not Installed. Some surviving early Stug III Gs may still have been equipped.												
Schurzen Side Skirts	Installed. Inadequate mountings.				Installed. New mounting brackets consisted of brackets on rear of plates fitted to triangular or rectangular tabs on rails mounted to each side of vehicle								
Front Hull Armor	Single 80mm plate												
Superstructure Armor Right side by gun	50mm plate 30mm supplemental plate bolted on.												
Zimmerit ALKETT	Waffle Pattern									Zimmerit Discontinued			
Zimmerit MIAG	Small squares with dimple impressions									Zimmerit Discontinued			
Cupola Shell Deflector	ALKETT installed since October 43. Present on all new vehicles by Feb 44												
Gun Mantle	Welded, angular gun mantle and Cast Saukopf both installed.												
Co-Axial Machinegun	No coaxial MG						Coxial MG installed in Welded mantle starting June				Coaxial MG for Saukopf beginning in October		
Muzzle Brake	Improved muzzle brake with side flanges												
Close Defense Weapon Nahverteid-Igungswaffe	Not installed					Installed starting in May. Limited availability resulted in installation never becoming universal							
Crane Mounts on Superstructure Roof	Not installed										Mounts installed Starting in Oct.		
Return Rollers	All steel. Existing stocks of rubber-tired return wheels used as available (scantily through the end of 1944)												

* Meant as guide only. Based on Spielberger & Jentz/Doyle. Not all changes were implemented by all manufacturers at the same time. "Old" parts used as long as inventories existed. Availability of new parts affected production. Lag between time a modification was first available and the time it was present on every Stug built often several months. Further variation caused by field installations, modifications, and maintenance using whatever parts available. Surviving earlier Ausf Gs likely retained features present when they were manufactured. This chart includes only the major modifications and does not address the numerous minor detail changes. This chart address only major changes made during production and does not consider the numerous minor detail changes.

In the addition to the aforementioned tarp, the top vehicle also displays significant damage to its running gear and fenders—mostly likely caused by a mine or mines. A camouflage net is draped over the gun tube and stowage is haphazardly tossed on the rear deck—including a bicycle. Note the horseshoe hanging from the blackout light on the bow. The bottom photo shows a relatively pristine vehicle, assigned to the Grossdeutschland Division, being used as a reviewing stand for a parade. Of note is the field-applied stowage rack on the rear deck and the spare wheels which have been relocated to the rear of the hull. The installation of stowage racks was very common and photos show a bewildering variety of designs. As different times in 1944, standardized designs began to be installed at the various manufacturing plants.

Top: This vehicle was likely produced in the May/Jun 43 timeframe. It has a full set of Schurzen but several of the plates hang unevenly. Early hanging brackets did not securely hold the plates and as a result they were often lost.

Middle: Another early production vehicle. The only Schurzen plates in place are the upper two in the center protecting the sides of the fighting compartment. Note also the field installed stowage rack and the relocated spare road wheels. The open guide horn tacks are also very apparent.

Bottom. This mid-production vehicle also features a stowage rack on the rear deck. This may be the factory-installed rack—it is at least a similar design. Of interest are the pieces of wood in the rack presumably to keep items from falling out. Note the foliage on the vehicle for extra camouflage. This vehicle features the later style Schurzen mounting system with the triangular tabs.

The Kit

I used the Tamiya early Stug III Ausf G kit (#32540). There's really no need for an in-depth review. The thing is typical Tamiya: reasonable accuracy, good detail, and nearly perfect molding and fit—a simple kit that be built into a great model straight from the box or used as a basis for super-detailing. The photo is from the Tamiya Website

The kit depicts an early model G and is everything I expect from Tamiya; clear instructions, perfect fit, and perfect casting. It is fairly simple, consisting of only about 230 parts and contains the familiar cast metal hull—liked by some, hated by others. I have no issues with it. A few details, such as weld seams, can be improved upon. Tracks are length and link with appropriate sag molded into the top run—nice! Guide horns are solid instead of the more appropriate hollow type. While solid horns became more common as the war continued, most early StuGs feature tracks with open guide horns, and this type remained prevalent throughout the war. Again, this is minor niggle, but purists may want to either replace the otherwise excellent tracks or drill out the guide horns.

The kit provides options. You can build the StuG II or StuH 42— the gun is the only difference. Also included are parts for the schurzen (side skirts) designed to the protect the vehicle against anti-tank rifles and shaped-charges. This were fitted started in the summer of 1943. The plates are cast as one part for each side. Edges are beveled to give an indication of scale thickness, but some will still want to replace these. The kit also provides the option to use the early bolt-on front supplemental armor or the single homogenous plate. Decal options are available for three vehicles —overall yellow for Norway and Russia, and yellow with red-brown for Russia. All three vehicles are dated 1943: appropriate for the early model. The decals are bit on the thick side (typical Tamiya), but are perfectly printed and apply without any significant issues. A figure of the vehicle commander, in winter gear, is also included.

The Tamiya kit, built straight from the box per the instructions, represents a vehicle built in the Apr-May 1943 timeframe. Certainly "early". But by not using certain parts (smoke grenade launcher, bolted-on front armor) and by using other parts (Schurzen), you can extend this out to when Zimmerit began to be applied (Sep for Miag and November for Alkett). If you add the cupola shell defector and Zimmerit you can possibly push the date to about Feb-Mar of 1944. So the kit can be used as a base to build a mid-production model, as well. I added Miag pattern Zimmerit on my model, and used features which would be consistent with a vehicle probably built in October or November of 1943. My vehicle is a battered survivor with significant wear and damage, and so can likely be dated to the summer or early fall of 1944.

While not nearly as popular as the larger 1/35th scale, in my opinion 1/48th is an ideal scale for armor models. Tamiya's quarter scale kits are relatively simple, ideal for novices. Although 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 braille scale (1/72nd) or especially the more bloated scale (1/35th), 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 much generally somewhat simpler than larger kits while being easier to handle and work with than smaller ones. Other advantages include the smaller size and less expensive cost. The scale is also compatible with 1/48th scale model aircraft and "O" Gauge model railroad kits and accessories.

Right: The kit parts and pieces. Included is the metal hull tube, several sprues of well-packaged parts, a length of cord with which to fashion tow cables, and a decal sheet. You can build an attractive, respectable kit straight from the box. (These two photos are not mine—they were downloaded from a review on the internet.)

Construction and Detailing

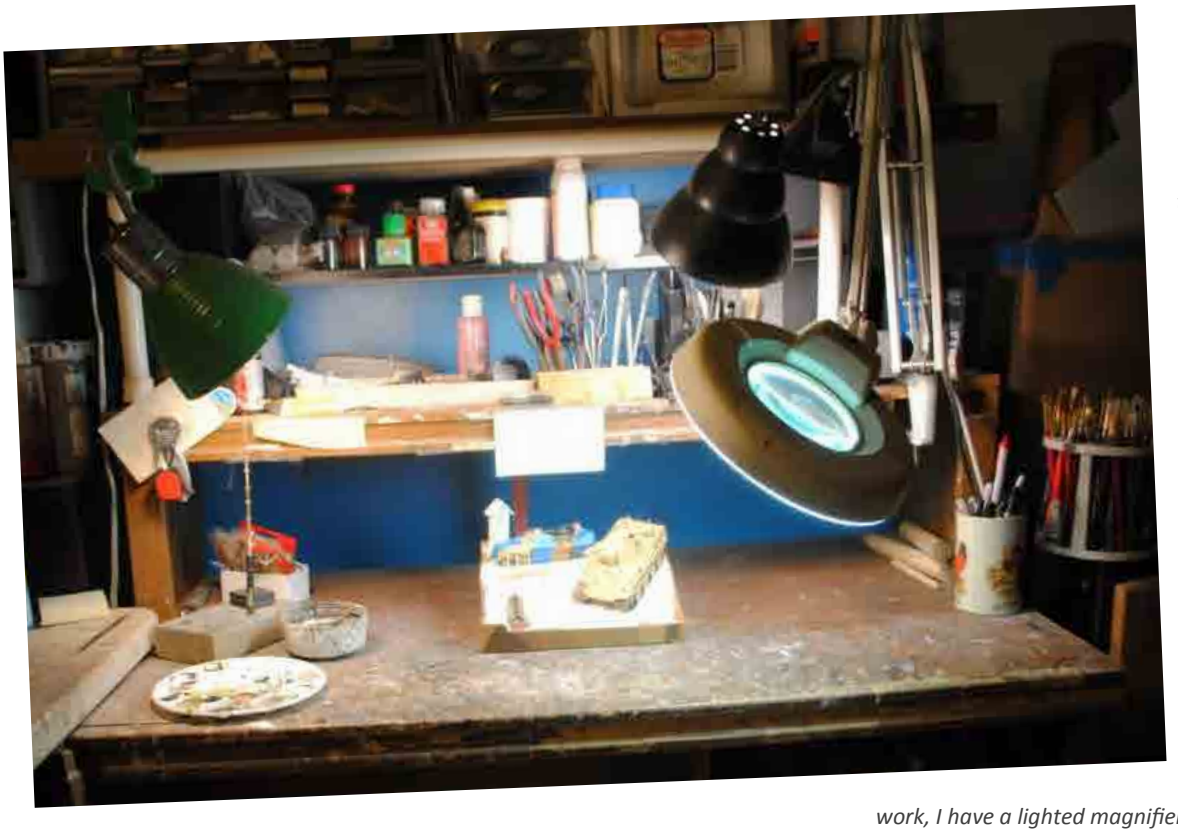
This photo shows the finished model prior to painting. Many parts and assemblies are not yet permanently attached, including the wheels and tracks, stowage, spare tracks, tarps, and nets. The photo clearly shows much of the extra detailing work done to the kit, the stowage which is a mixture of model accessories and scratch-build items, and the aftermarket items used including the outstanding Monroe Perdu Zimmerit and OKB resin tracks. The figures at this point are no more than mannequins. Although the 1/48th scale kits are smaller and generally simpler than the larger 1/35th scale kits, their detail and overall effect does not have to suffer in comparison.

Sturmgeschutz III Ausf G

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 aftermarket sets, and I used two on this build. Whether using aftermarket parts or not, 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. None of this is very difficult, even for a fairly novice modeler.

When building a model straight from the box, you can generally follow the instructions as written. The one caveat I would make to this statement is that instructions, while they usually have color call-outs, concern themselves only with assembly. It is up to the modeler to study the instructions to determine which things should be painted prior to assembly, which can be painted after, and which sub-assemblies should be painted prior to final assembly. This planning becomes doubly important if we are going to add parts and features or replace kit parts with aftermarket items. In these instances, we should determine – before we start building – the point in the process at which these additions would be most appropriately made.

Before we dive into the build, there is one additional point I would like to make. Although processes such as assembly, painting, and weathering are usually considered separate steps and are dealt with in different sections of most books, they are in fact very closely related. The modeler generally should know, prior to starting work, what he envisions the final piece to look like. In this instance, I wanted to depict a battered veteran. Not only would this require faded, battered and chipped paint along with some heavy weathering, it would also require damage and field-modifications commonly seen in photos of StuGs. This damage includes damaged and missing fenders and Schurzen, as well as damage and wear on other areas such as road wheel rubber, sheet metal, and Zimmerit. All this damage is most appropriately applied during the construction process. I also desired to enhance the detail on some kit parts and pieces and use various aftermarket products to replace kit parts or provide additional detailing. Again, these parts were put in place during assembly based on a careful study of the instructions and planning conducted before starting the build. The following photo study shows the alternations made and the order in which I assembled my model. Some was based on need, others simply personal preference.



My workspace is a "U" shaped desk with tables and storage comprising each arm of the "U" and my workbench at the base. This photo 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 so I can move them as needed. 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:

The tools and materials you choose and how you work is up to you. 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, and fewer still that were required for this build. 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. My recommendation is to buy only what you need or will use. Your collection will still rapidly grow! Let's look at the tools used for this project:

Top: A good hobby knife with a supply of blades is indispensable, such as this X-Acto knife with #11 blade. If I could only have one tool, this is it. It performs a myriad of functions—cutting, scraping, etc. Most of what we must 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. Bottom: For most plastic modeling tasks, I use Tamiya Extra Thin Cement. There are instances 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 or super glue can be used, as can wood glue or even white glue depending on the task.

Top: 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. Middle: Although not mandatory (hand tools can do everything it can), my Dremel Motor Tool is probably my second most-used tool. It is a great time and labor savor, but you must use care as 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". Bottom: Rubber bands and tapes can serve as clamps, masks, 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

Clockwise from top: 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. For scratch-building and sculpting, a variety of files, putty spoons, dental tools, brushes, etc. are quite useful. There's also a use for pliers, wire cutters and various tweezers. 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. Rulers—standard, metric, and scale—are vital when converting and scratch-building, as are dividers or calipers to transfer measurements. A square is 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. In some instances a homemade tool can be just the ticket to perform a given task. When sculpting figures, tarps, or stowage with epoxy putty, you can use fancy purpose-designed tools, or various dental picks, needles, and such for working and shaping the putty. But 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 the 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.

BUILDING THE MODEL:

Plastic parts come molded to plastic sprue trees. We can't just rip the parts from the trees, they must be carefully removed to prevent damage. They can be cut free using a hobby knife, but be careful with thin or small parts as they can easily break. I prefer to use a sharp sprue cutter to nip the part free. Any remaining plastic nub can be removed with a hobby knife or sanding stick. The same hobby knife or sanding stick can remove the tiny mold seam lines that may be present around the edges of parts. Beware that plastic is soft and easily damaged. Sanding will leave scratches that must be removed with finer grits. Other molding imperfections may also need repair. Ejector pin marks are small circular indents made when the ejector pins push the soft plastic out of the mold. Often, these marks are in places that will not be visible on the finished model and can be ignored. If they are visible, shallow marks can simply be scraped away with a hobby knife or sanded flush with sanding sticks. Deeper marks must be filled.

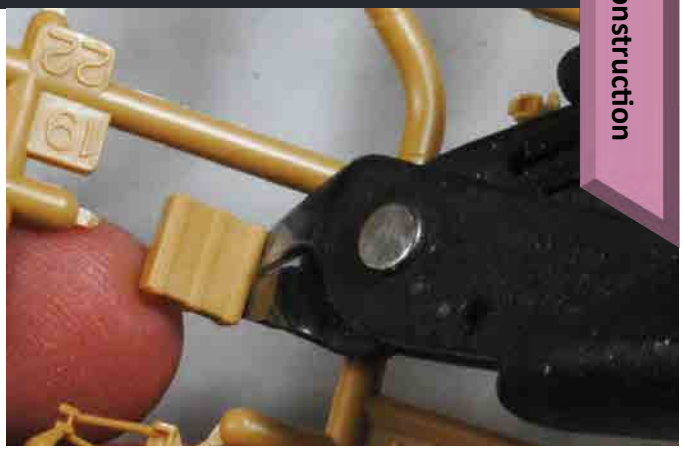
Before breaking out the glue test-fit the parts. With this Tamiya kit, parts fit together perfectly with no trimming or sanding necessary. But this isn't always the case. If the parts don't fit perfectly, study them to find what is preventing the perfect fit. Sometimes a bit of trimming or sanding can 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. These work by "welding" the parts together. For most applications, I use thin liquid cement, but thicker glue can be used if you prefer. When using the thicker glue, use the syringe-like applicator tip to apply cement to the mating surface and press the parts together. With thin liquid cement, hold the parts together and use the supplied brush to 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 hold the 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.

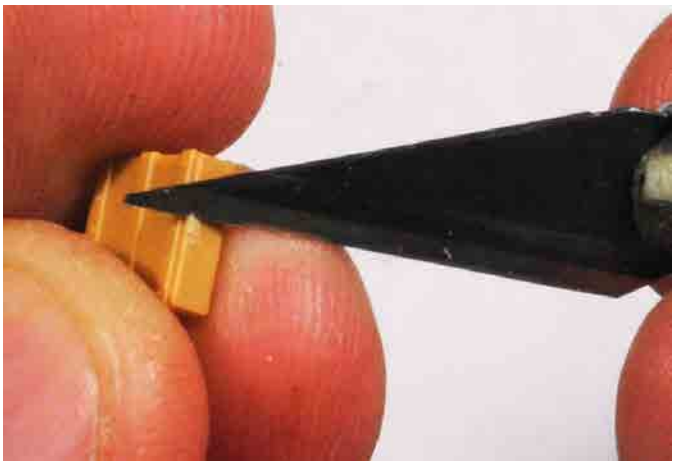
Parts will usually mate together perfectly. If the glue was applied evenly and the parts fit perfectly, any visible joint can be removed simply by sanding. If there is a gap, filler will be needed. Thick gap filling super glue can be used to fill small gaps. I don't do this as the cured glue will be harder than the surrounding plastic making it difficult to smooth without damage. Large gaps can be at least partially filled with styrene strip or rod. For filling 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 or eliminating the need for later sanding.

If painting parts prior to assembly, make sure you do not get paint on the mating surfaces (if you do, 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.

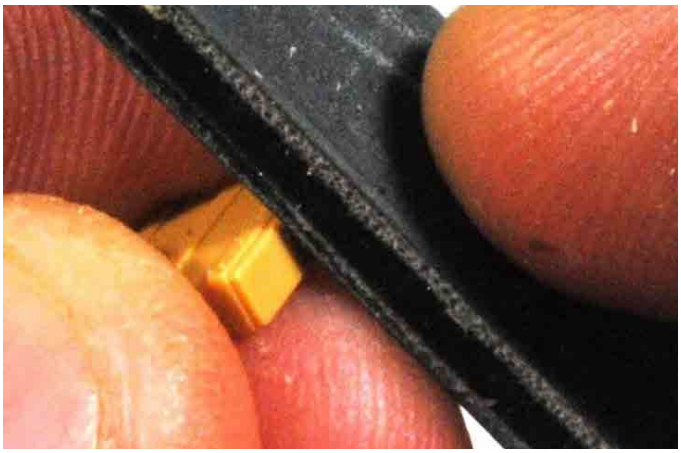
With all that in mind, and tools in hand, let's build our StuG! The following photo essay shows the steps and order in which I built my vehicle.



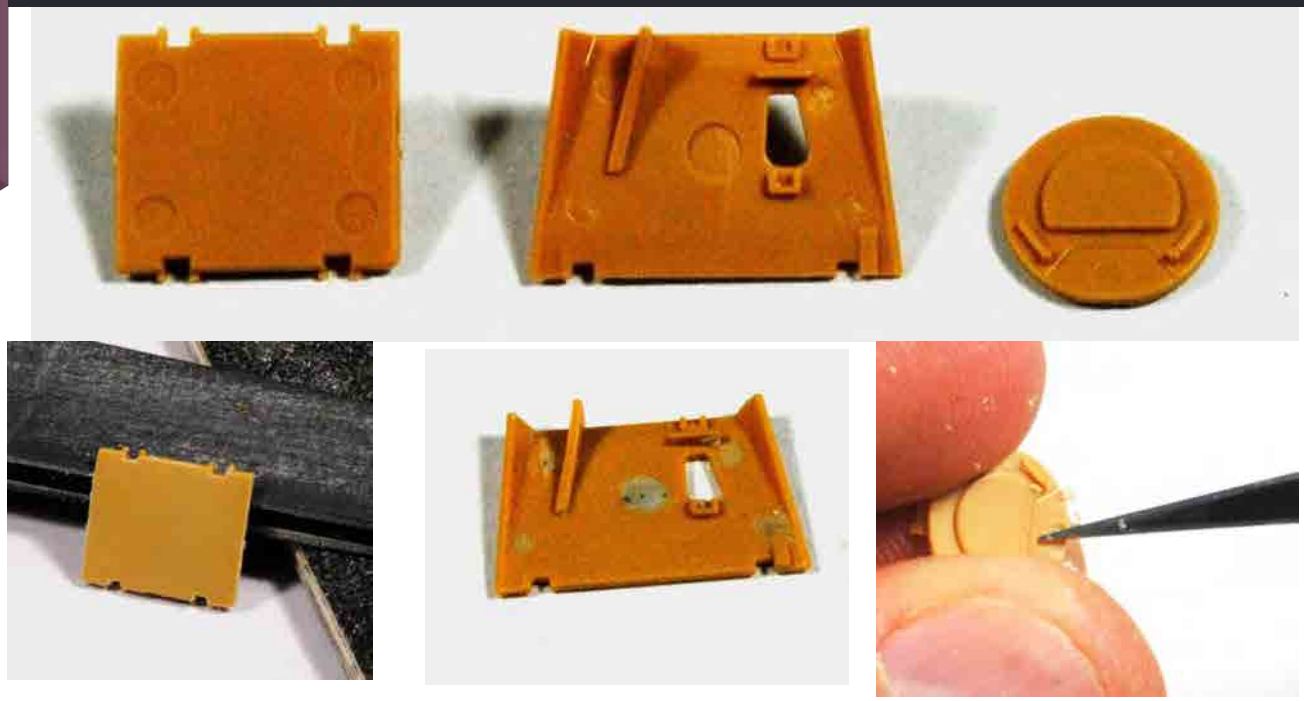
I use sharp sprue nippers to remove parts from the trees. Place the flat side against the part and squeeze—the part will be cut cleanly from the tree with little left-over plastic.



Any little left-over nub of plastic can be cleanly sliced off with a sharp hobby knife or removed with a quick pass from a sanding stick.



A sanding stick can also be used to remove tiny mold-part lines that may be present around the edges of parts. These are usually small and hard to see, but they WILL show up under a coat of paint if not removed.



Top: Ejector pin marks (leftover from the molding process) are normally hidden on the inside of parts. However, in cases where both sides of a part are visible, there may be marks. These can be very shallow (such as in the round commander's hatch) or very prominent. Bottom: These can be removed in several ways. If there is no other detail nearby to worry about, they can be sanded away. They can also be filled (I use Magic Sculpt Epoxy putty—it's water soluble so after filling the indent a swipe with a damp finger is all that is needed to smooth it out). If the marks are shallow and small, they can simply be scraped away with a hobby knife.

Why the Popularity of WWII German Subjects?

It seems that in popularity (and availability), the model armor and figure markets are dominated by WW2 German subjects. Availability (supply) is determined by demand. Demand is driven 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 believe 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 scare 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.

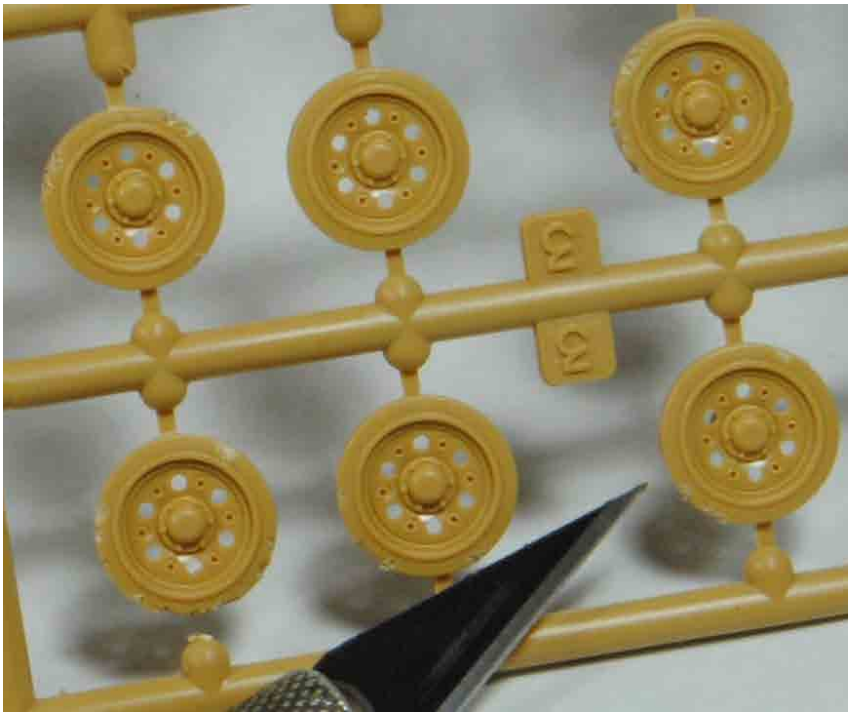
Germans also fought in both eastern and western Europe, Italy, and Africa in all terrain types and weather conditions. So no matter what theatre a modeler is invested in (except the Pacific), Germans were there in force.

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 comparatively 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 manufactures 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! In comparison, 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.



DAMAGED ROAD WHEEL RUBBER

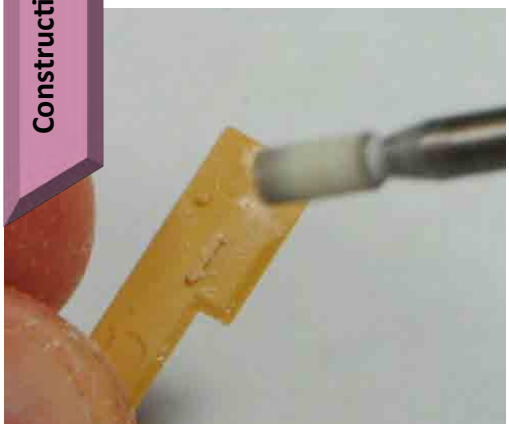
Rubber on road wheel tires was subject to damage. Many photos show the tires chipped and nicked. In some instances, the tire is gone altogether. The photo on page 8 is an extreme example. I added various amounts of damage to several of the wheels on my model. This consisted of nicks and cuts carved into the plastic with a hobby knife—always taking care not to cut into the "metal" rim of the wheel.

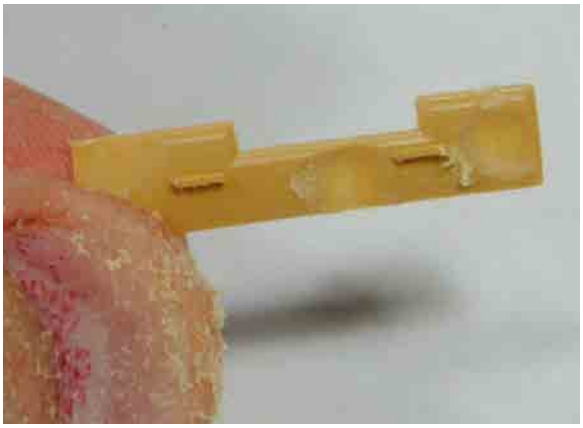
SHEET METAL DAMAGE

There is one thing I generally do not do and cannot recommend. That is heating the plastic parts and then bending them to shape. Not only does this run the risk of severe damage (melted parts), but it also usually looks just like what it is—melted and bent plastic. The main obstacle to overcome when making realistic bends in plastic sheet metal is the unrealistic thickness of the plastic. In many cases, photo-etched parts near scale thinness can be purchased on the aftermarket. However, unless you are doing extensive bending and twisting, it is not too difficult to get a realistic look from the plastic part. The main tool I use for this is aa appropriately shaped cutting bit in my Dremel "Stylus".

THE REAL THING

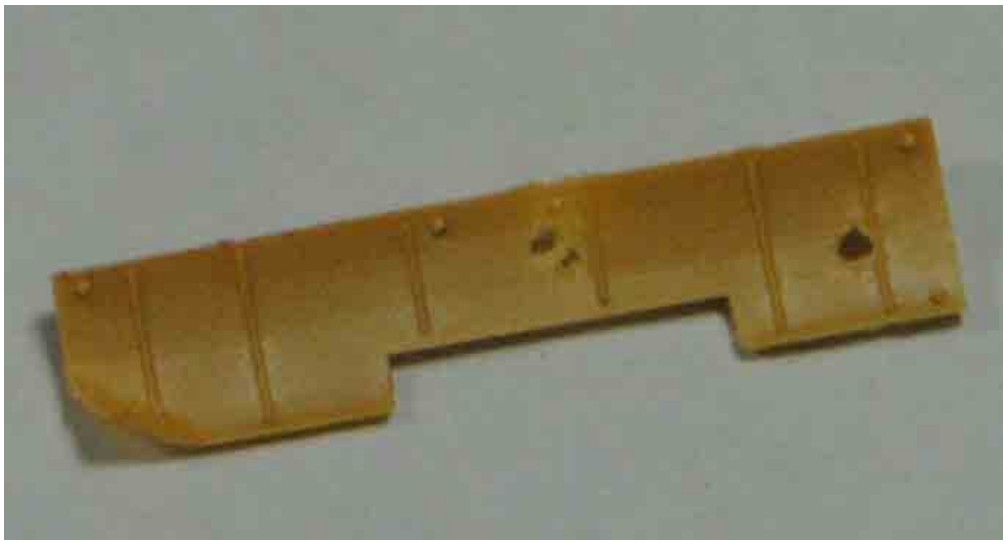
This detail of a photo shows the exhaust guard over the mufflers and the exhaust deflector either side. These were simply sheet metal fittings and, by virtue of their low location, were easily damaged. Many photos show them mangled or missing. The purpose of the deflectors was to deflect the exhaust so it did not stir up dust behind the vehicle. The exhaust guard is included in the kit. I chose to add some bends and shrapnel holes. The exhaust deflectors are absent from the kit, but in all fairness to Tamiya, these were often missing on actual vehicles, too.





Using a relatively slow speed to avoid melting the plastic, I use the cutting bit to gradually thin the plastic from the inside in areas where the damage will be. Obviously this method can only be used on parts where one side will not be visible. How do I gauge when the part is thin enough? Nothing scientific—I hold it up to a light and when I can see though it, it's close enough.

At this point in time I am working only on the kit -provided exhaust guard. The exhaust deflectors on either side of the exhaust are not included in the kit. As I planned to make these from thin sheet metal, I left this step until later in the process so that I did not damage the parts when handling the unassembled hull.



Thinned areas can then be damaged as needed. Dents and bends can be made using pliers to bend the thin plastic (it bends easily being paper thin, but be careful not to break it). Bullet and shrapnel holes can be gouged with a the point of a sharp hobby knife.

Working with Photo-Etched Parts:

While no PE detail sets were used for this build, I did use some PE screening - and many aftermarket sets include photo-etched metal parts. While good for small and scale-thick details, I am generally 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. I believe that painting and weathering account for at least 80% of the final effect. This is just my opinion, and many modelers swear by PE. So you make the choice to use PE parts 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.

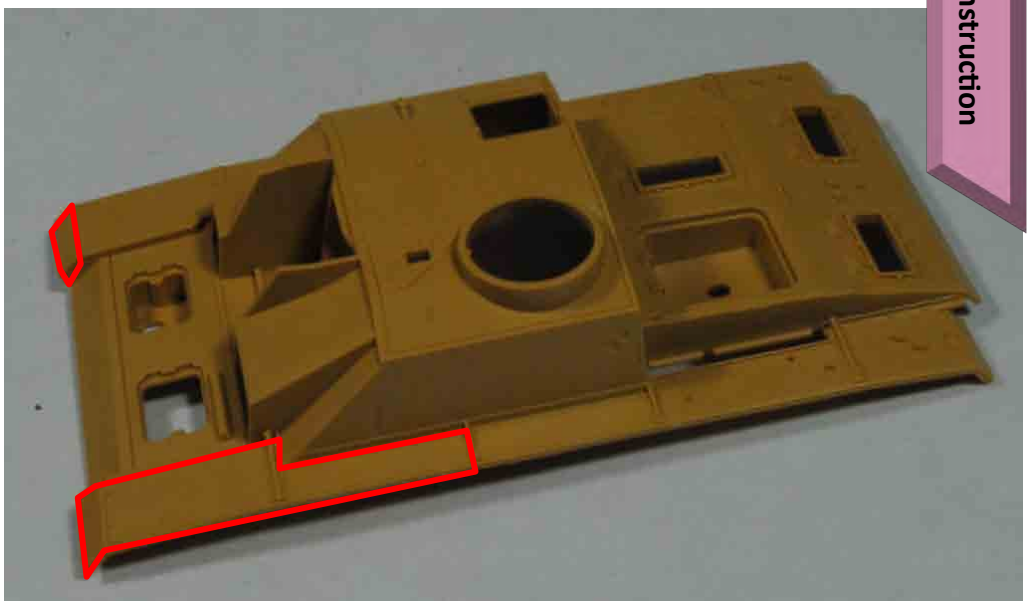
Often, the parts need bent into shape. While this can be done with pliers (or an improvised bending tool or some sort), specialized bending tools are also available. Be careful—the parts are thin, and if you don't get it right the first time, they may break when re-bending.

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 parts attached—they are be fragile and easily damaged.

DAMAGED AND MISSING FENDERS

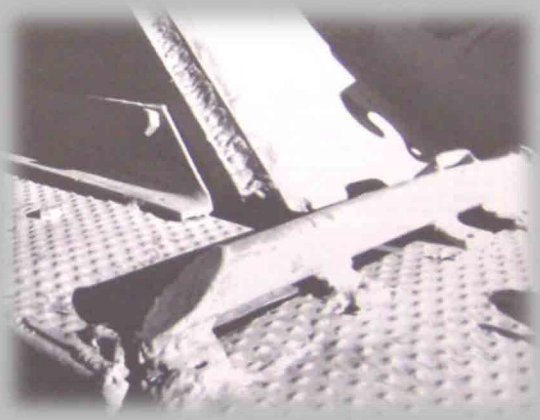
Areas to be removed were identified (outlined in red in this photo) and the "offending" fenders were simply cut away with sprue nippers, being careful not to damage adjacent areas. The edges of the cuts were cleaned-up with a hobby knife and sanding sticks.



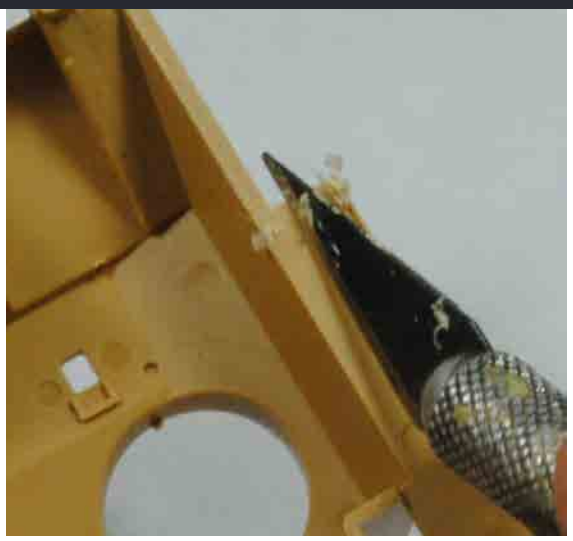
THE REAL THING

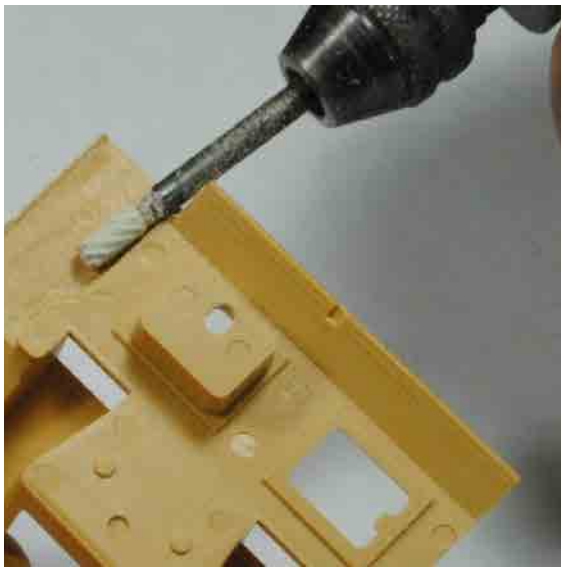
Many photos of StuGs throughout the war—early to late—show missing or damaged fenders. The damage I included on my vehicle mimics the damage we see in these photos—and in numerous other similar photos I came across in my research.

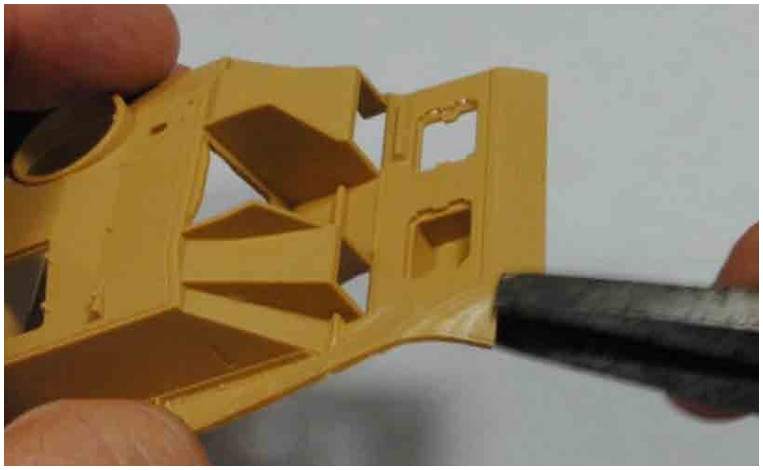
When removing fenders, pay attention to the pieces the actual fenders were made of and their method of attachment to the vehicle. This will give you clues about how and where they will bend/break or be removed. For example, the below photo shows how two pieces of fender are joined together at a fender support were the superstructure panniers slope up in front.



Exposed finder edges will be way over scale thickness and should be thinned down. As these photos show, that can be accomplished using a hobby knife (and a scraping motion), sanding sticks of various grits (start coarse and end with fine), or even the Dremel as we have already seen. Any of these methods, or a combination, can be used and will result in a much thinner appearance to the exposed end of the fender.





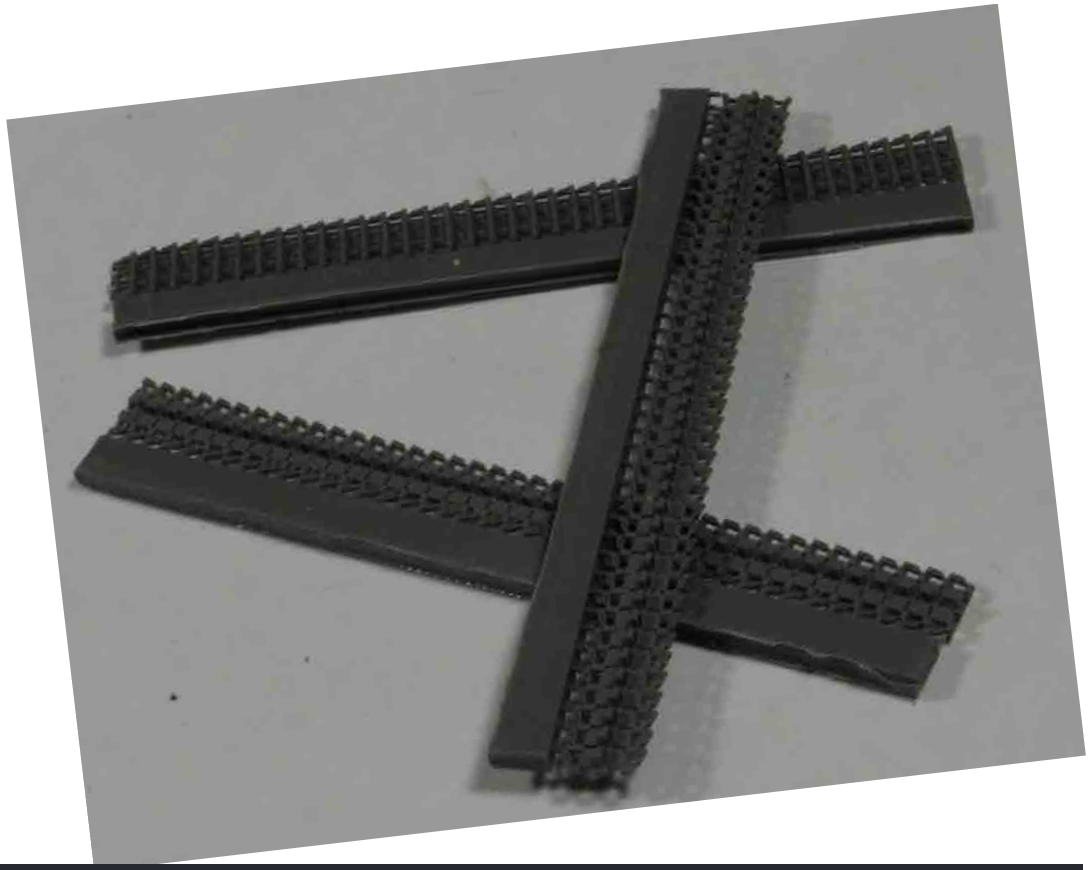


Bent fenders can be depicted using the same methods we just discussed. I thin the fender somewhat to make it easier to bend. While I do not apply heat to melt the plastic, I will give it a dunk in boiling water to soften it a small bit. The, using pliers, I bend the plastic as needed. If making more extreme bends, do it a little at a time to avoid cracking or breaking the plastic.

This shows the realistic result that can be achieved without resorting to expensive (and at times difficult to work) photo-etched metal parts. Small dents and nicks can simply be carved into the plastic using a hobby knife and/or shaped file. Inset: In my opinion, one of the most vital things to do after any modification or conversion to test fit applicable parts. Here we see the upper hull temporarily mated to the lower hull. This will let you know if your work did anything to interfere with fit. It will also let you know where additional work is needed. This may consist of gap filling or additional detailing that may need done.

OKB Resin Tracks

The OKB resin track set for the 40cm open guide horn Pz III/IV series includes six runs of 40 links each. Each run comes attached to a large block of resin left over the molding process. The block also serves to provide strength to the track helping to prevent warping or breakage. In addition to these blocks, there is a good amount of resin flash in the open guide horns and the holes in the skeleton links. They are exceptionally well detailed on both the inner and outer track faces.



I tried these tracks and was favorably impressed. My assessment: If the kit you are building has lousy tracks, or if you want to use a different kind of track (such as Winterketten, Ostketten, etc), then OKB is a great choice – certainly easier than individual link like Fruil and as good as or better than most other resin track. But If your kit has acceptable tracks (Tamiya, for example), then these will likely add little to the model in exchange for the extra work and cost. Don't get me wrong, these are very well cast and very well detailed – more so than the Tamiya tracks. The cost is also reasonable. Installing them isn't as easy as the perfectly-fittingTamiya track, but isn't hard, and probably isn't too much more time consuming considering the Tamiya tracks have mold lines and ejector pin marks that must be dealt with prior to assembly. The moral of the story: If you need, or decide you want to replace your kit's tracks with aftermarket, you probably won't be able to find better replacements than these.

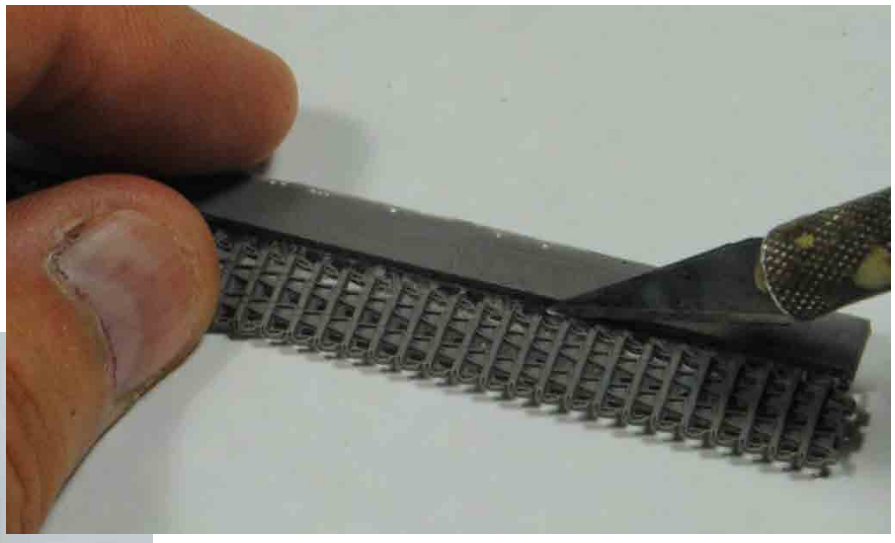
These tracks offer other advantages in addition to the fine detail. There are plenty of extra links – I had 58 (a Pz IV will use more track and thus have fewer spare links). The extra allows for breakage (which I did not experience), errors, and spares to put on the tank. That alone can almost make them worth the cost. As these tracks have to be shaped anyway, modeling broken track is easier with these than the more rigid Tamiya tracks. You can also adjust the amount of sag.

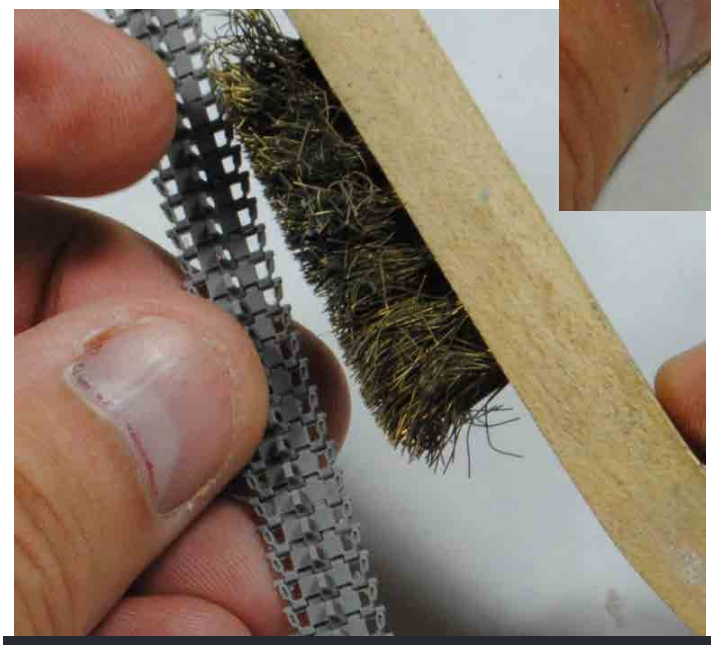
I chose to try these tracks for a couple reasons. One, I had heard rave reviews about them. Two – I wanted open guide horns on my tracks. The Tamiya tracks are cast with solid guide horns. This is not necessarily wrong. While the open horn tracks were almost universal on early Stugs – and remained prevalent throughout the war so far as I can tell – it seems solid guide-horn tracks were available for the PzIII/IV series from late 1942, so they could certainly be present on a "late early" or a mid-production Stug III Ausf G and became more common with the passing of time. For open horns, one could simply drill-out the guide horns of the Tamiya tracks. While that would probably give an acceptable result in this scale, it simply wouldn't look as good as the molded open guide horns.

In the end the tracks look very good. And that's the most important thing. I do not regret using them, but if I were doing the project all over again I probably would use Tamiya's kit tracks – these don't add much (other than price) to the Tamiya kit. The open guide horns certainly look better than drilled-out ones, but in this small size the difference is negligible. They do, however, save the work of drilling out the kit horns. The OKB tracks would really shine when replacing sub-standard kit tracks or putting a different kind of track on a kit. But it's great to have options, and the choice is yours. Kudos to OKB for offering them!

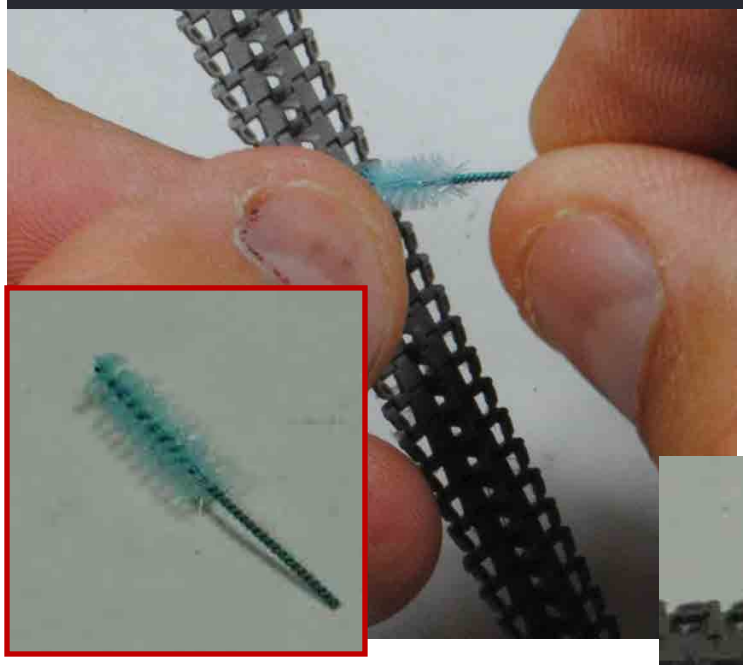
The tracks were assembled at this point not only because they are among the first steps in the instructions, but also primarily because they must be built prior to attaching the upper and lower hull halves. There is not enough room between the fenders and return rollers to fit the track later. This is one of those instances where pre-planning is vital to success.

The tracks are easy to remove from the casting blocks. Scribe lightly with a sharp hobby knife and, after a couple passes, the track will come free.

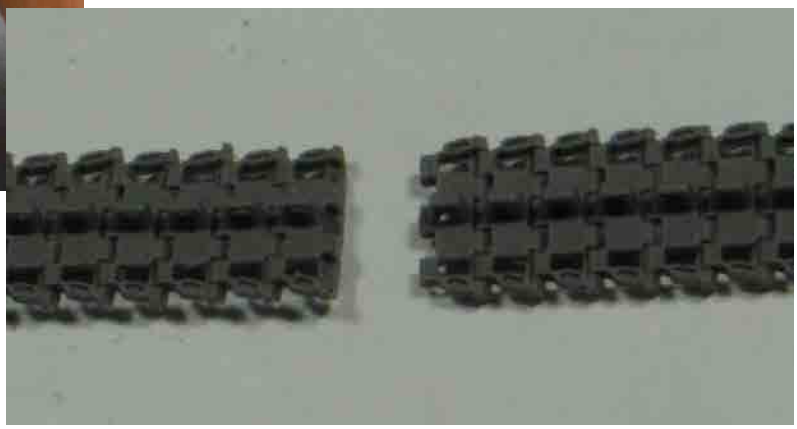




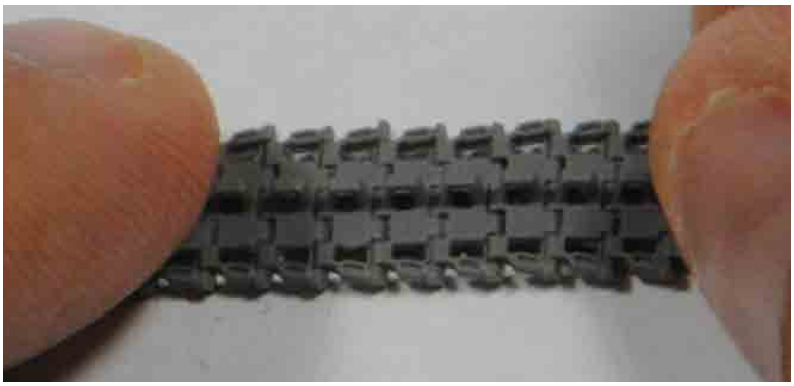
To *remove flash or any lingering bits of the casting gates, I LIGHTLY rub the edge with a brass brush. A quick pass is all that is needed. This also removes any flash from the edges of the tracks.*



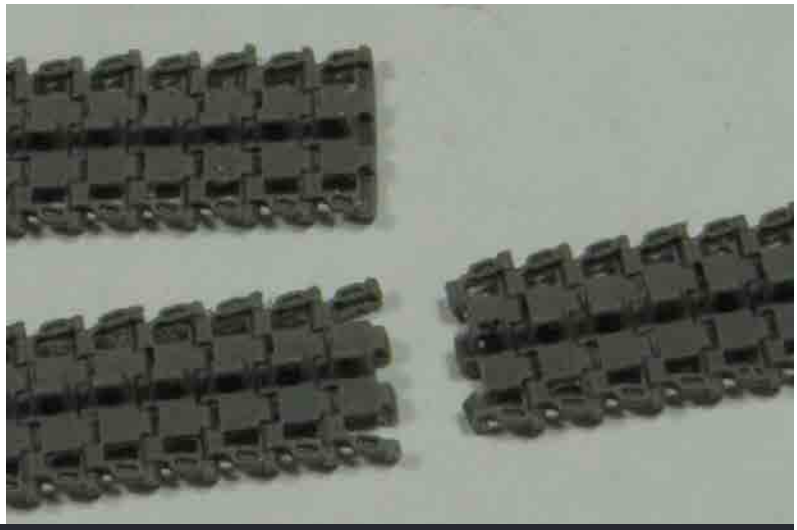
There is quite a bit of flash that can be difficult to remove from recesses and small openings without damaging the relatively fragile tracks. To tackle this task, I used small interdental brushes. These can be pushed into the holes to remove the flash. I just used the brushes themselves (inset), I saw no need for the handle they fit into. But do use care, the tracks will easily withstand normal handling, but they are relatively fragile. One the plus side, there are no mold seam lines or ejector pin marks to deal with – both of which are present on most plastic tracks.



Right and Below: The ends of each track run are designed to fit well into the receiving end of the next track run. This is great if entire track runs are needed, they fit perfectly together. Can you even find the joint?



Bottom: But for this build, I needed two complete and one partial track run per side. Thus, the perfectly-fitting track runs have to be cut to length making them not perfectly-fitting any longer. This is the set's biggest flaw. It is very much of a challenge to get these things fitted and mated-up to the kit being used without having visible joints. But it can be done with work. In this example, the joint is invisible on the inside of the track – but there is visible damage on the cleat on the outside of the track. Placed on the bottom track run, however, this will not be visible. Users of this stuff would be well-served if OKB included perhaps one less full run (the set comes with six) and provided the last run instead as a series of smaller sections and individual links. This would make custom-fitting the tracks to almost any kit much easier. Of course, it would almost certainly make the tracks cost more, too, so everything is a trade-off.



THE REAL THING

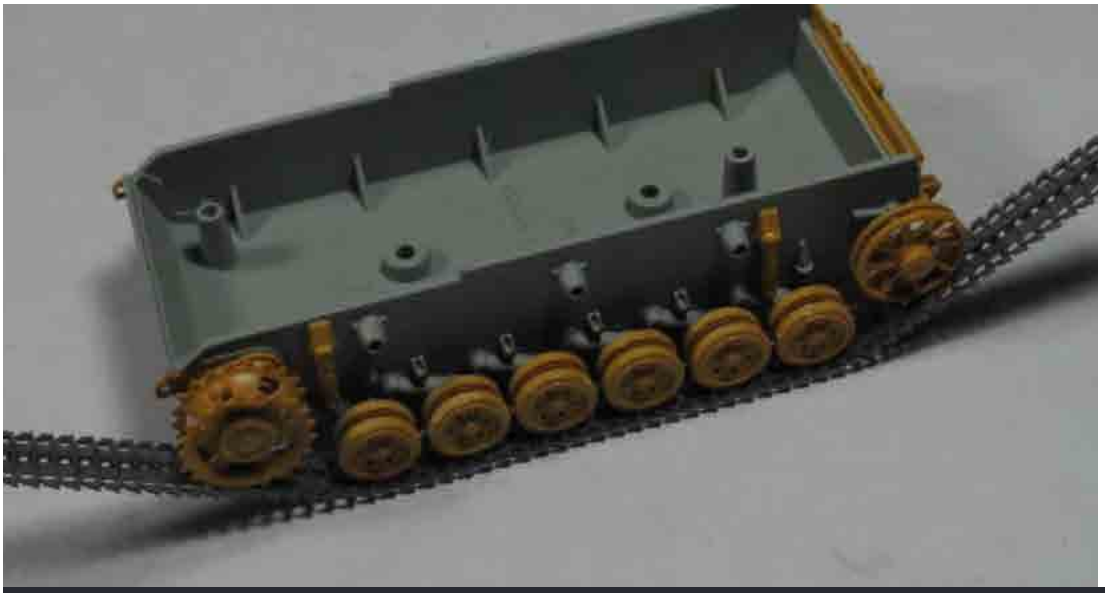
These photos (from questmasters.com) show the inside and outside of PZ III/IV tracks. The dry-pin track links are joined with pins. A cotter pin through the end of each pin prevents it from falling out. Shown are both the earlier open guide horn links and the later solid guide horns. Other than that feature, the tracks are nearly identical and are interchangeable.

Note the Panzer III chassis utilized 93 links per side. This is the same number included in the Tamiya kit. The OKB links are very slightly larger (1.04 times the size of the Tamiya links). While this is close enough that they still fit fine around the drive sprocket, only about 89 1/2 links are needed to achieve the same amount of sag included in the Tamiya kit. I wanted a slight bit more sag simply because I like the look so I used 91 links per side.

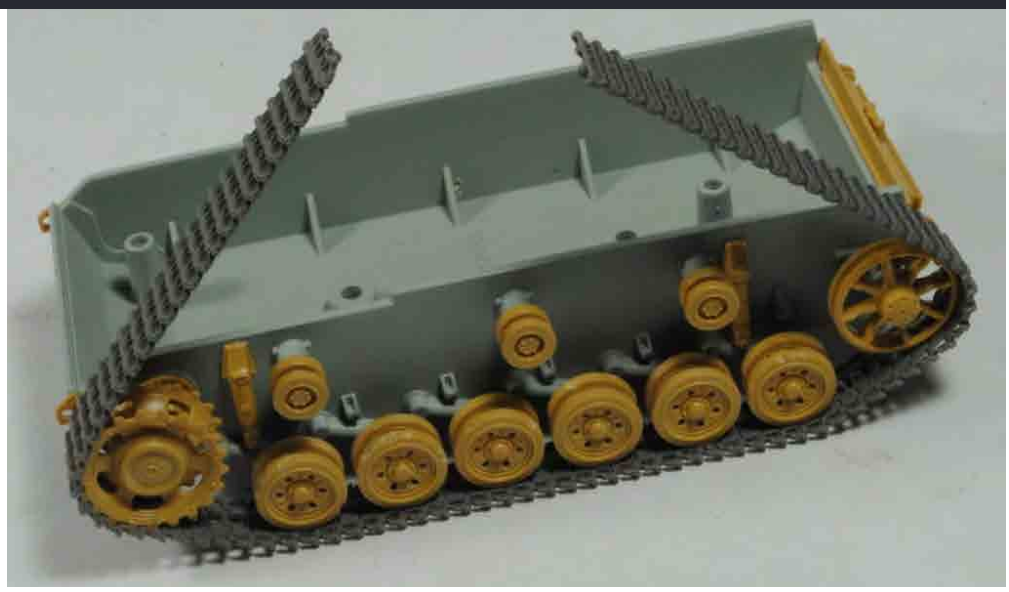
After measuring the kit and OKB tracks, I determined I needed 91 link track runs. The first track run was created. The vehicle wheels were friction fitted in place without glue in order to assemble the track runs around them so they would still be removable for painting.

Although I worked only one side at a time, I placed the wheels and a temporary length of track on the other side – that way when the vehicle is sitting on the bench, it sits level and the tracks aren't glued on at a stupid angle to the wheels.

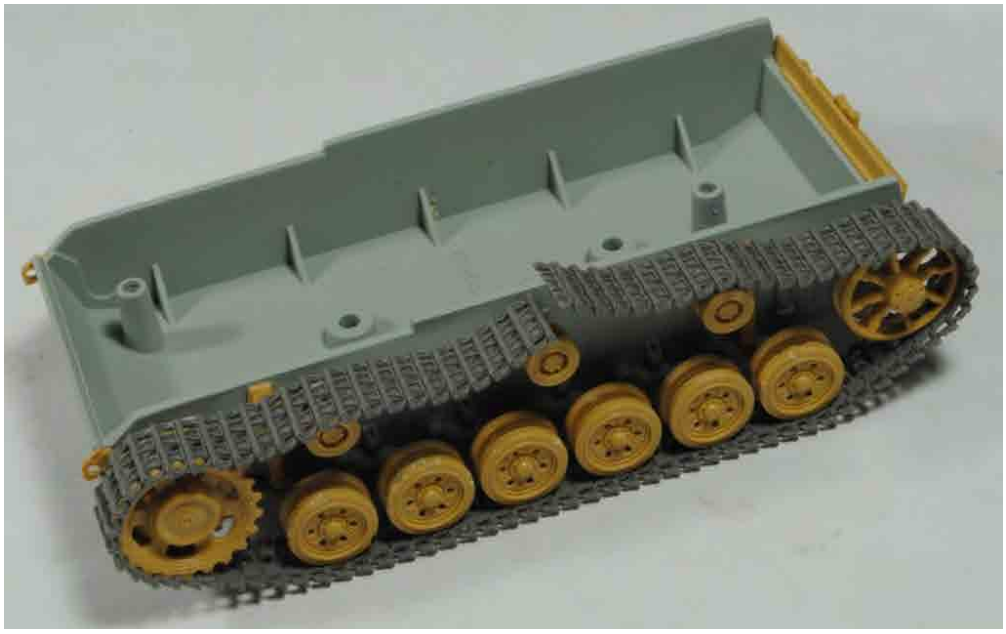
Where you have the tracks join is up to you. I decided that I would like to have the ends meet on top of the center return roller. With the roller below and the fender above, this would be the least visible spot. Only the edge of the track will be visible here. So, to ensure the tracks met here, I counted the number of links of Tamiya track from the middle of the front road wheel to the top of the center return roller and determined the same distance on the OKB track and glued that link to the bottom of the front road wheel. I then secured the entire bottom run to the wheels with superglue. These are resin, so model cement will not work.



The tracks are a wee bit flexible, but they won't bend too far without breaking. I was able to bend them up to join the drive sprocket and return roller and glued them in place.

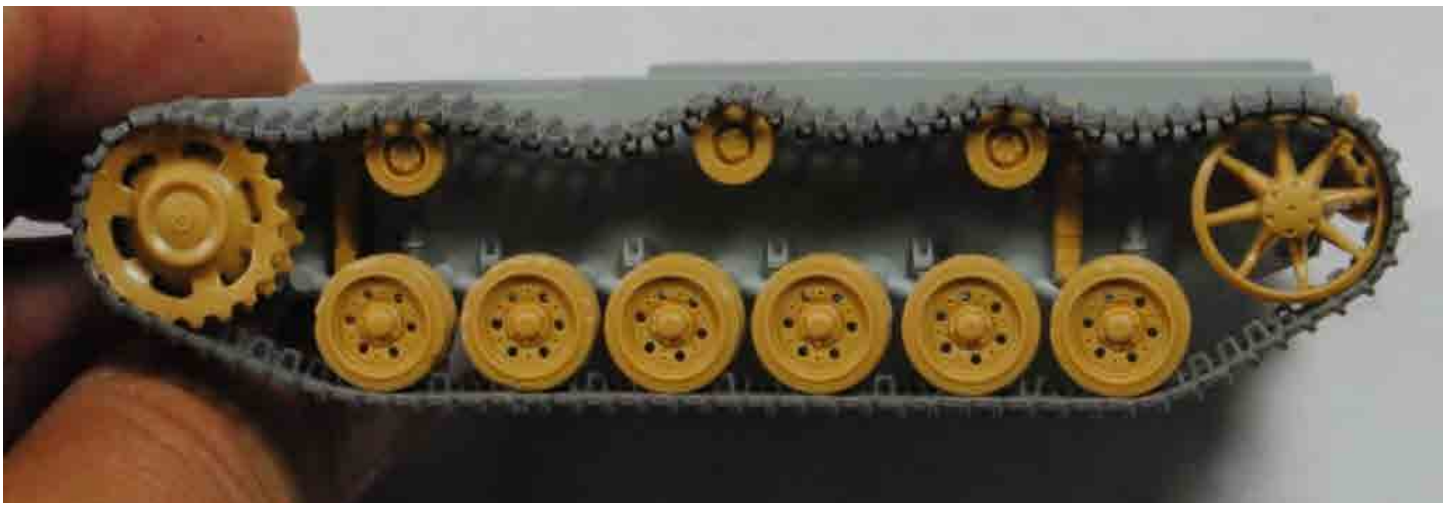


From this point, heat was needed. I used a hairdryer. Short blasts are heat are all that is required to soften the thin resin. It was worked around the drive sprocket and idler and glued in place.

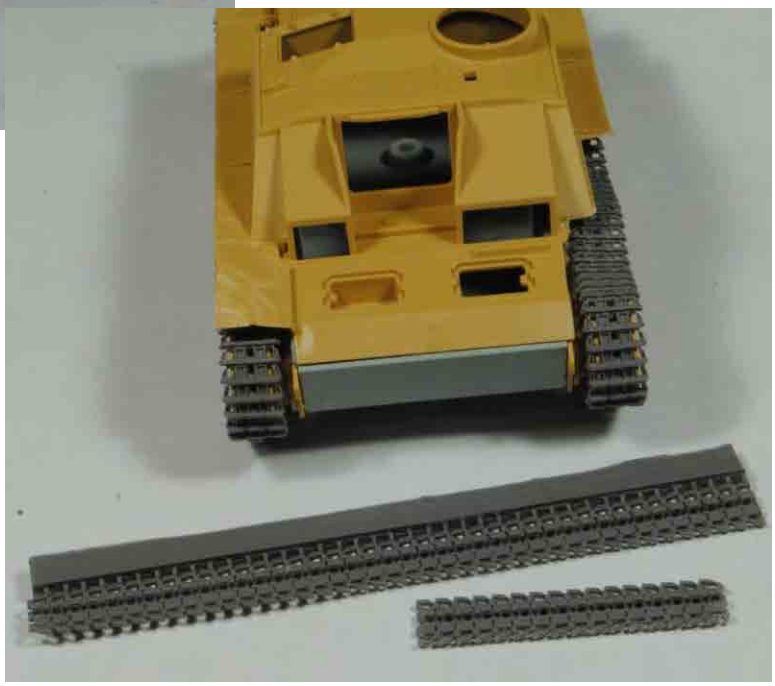


Then, gradually working from both ends toward the middle, sag was added by heating and shaping until the ends joined up over the center return roller.

And we have finished track!



As always, a test-fit of major components every step of the way helps prevent nasty surprises later.

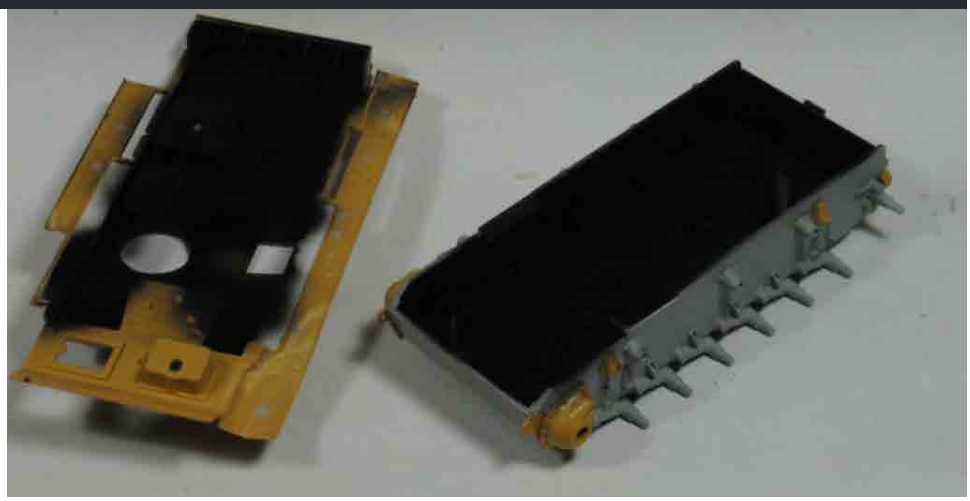


There are some things you MUST be aware of. The tracks on the Pz III/IV were directional – so check to make sure you are putting them on correctly (although as photos show, the Germans' themselves didn't always follow this dictum - and yes, if put on backwards, the tracks still would have worked (otherwise the vehicle couldn't have been operated in reverse). Check the Tamiya instructions and photos of actual vehicles.

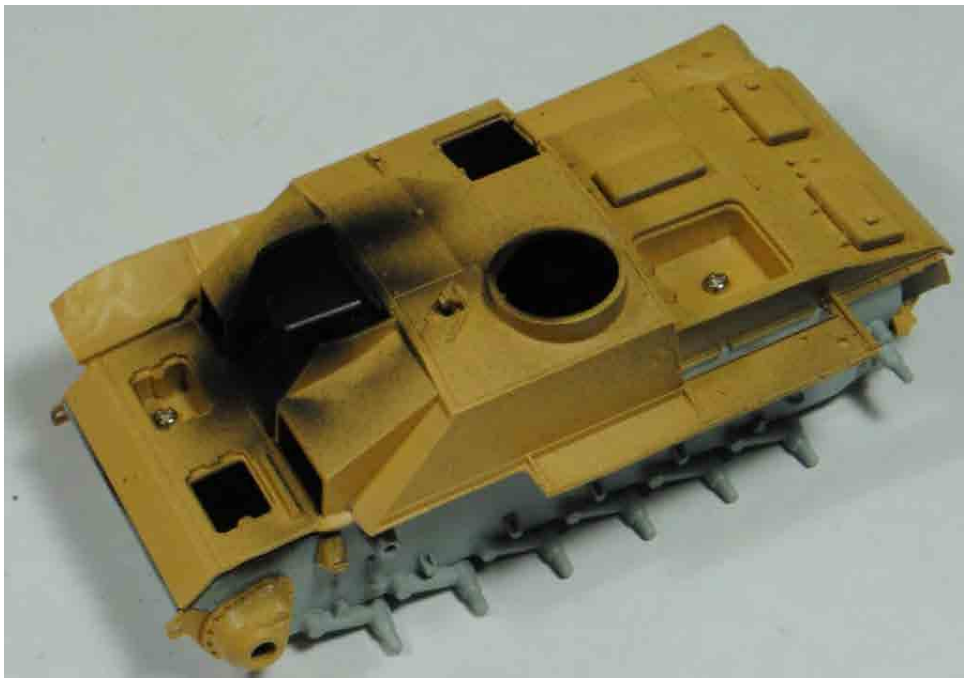
This photo also shows the spare links. Even using these tracks on a somewhat longer PZ IV kit would still leave you plenty.

This photo shows the track assembly removed for painting. You may ask why I chose to glue the wheels to the tracks and allow the whole assembly to be removable for painting. Why not just leave the wheels separate and install the tracks after painting? You could do this if you want, but it will take some ingenuity in how you engineer it – there is NOT enough space between the return rollers and fenders to put in track in place after assembly. Proceed in whatever fashion you wish, but be just beware of this fact. I chose this method for a couple reasons. One was to ensure proper and perfect fit. The other is because assembly after painting (and most weathering) runs the risk of damaged the finish working the parts into the position, with glue runs, or other general "fat-fingeredness".

Continuing the Assembly

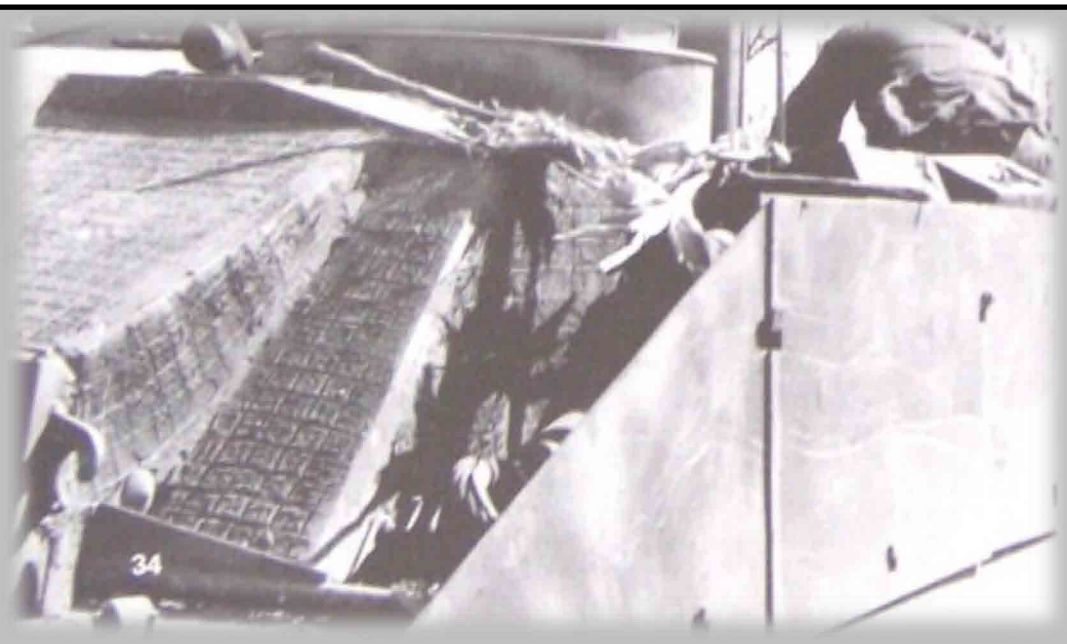


Here is where pre-planning is necessary. While I could continue building the model and adding parts, I planned to install the Monroe Perdu Zimmerit. So only the main hull components were put together at this point. All small fittings that would either interfere with the placement of the Zimmerit or that would go on top of it were left for later. I planned to have the hatches open but with figures in the hatches, no interior would be visible. So the inside of the model was simply sprayed black. The sponson bottoms in the kit are open, so these were filled with sheet plastic to avoid seeing daylight though the hatches. The gun mount and the interior portion of the mantlet were also assembled, painted black, and glued in place prior to joining the upper and lower hull.



Once this work had cured, the upper and lower hull halves were joined. The lower hull is metal, so plastic model cement will not work. Plastic pieces were glued to the metal tub using superglue. The upper hull was attached with both glue and the two screws provided. Note these two screws are hidden under hatches, so the screws must be put in place prior to attaching the hatches.

Once the hull halves were joined, hatches and vent covers were put in place. The model was prepped for the application of the Zimmerit by giving it a coat of Primer. I used Vellejo Dark Red. This is necessary because the adhesive used to apply the paper Zimmerit will not adhere to the bare plastic, but will bond the primer layer.



THE REAL THING

Despite instructions and specifications from the Army, factories engaged in the production of armored vehicles used varying methods of Zimmerit application resulting in different patterns. Miag, the factory pattern I chose to depict, used a series of small squares as seen above. Zimmerit was a paste-like coating made largely of glue and sawdust whose purpose was to help defeat anti-tank magnetic mines. It did this by creating a rough surface with stand-off from the underlying metal, rendering magnetic mines far less effective at sticking to the vehicle. It was used from the fall of 1943 to the fall of 1944 when it was ordered discontinued due to unfounded concerns that projectile strikes could ignite it. Additionally, the time it added to the production of the vehicle resulted in an unacceptable delay.

Monroe Perdu Zimmerit

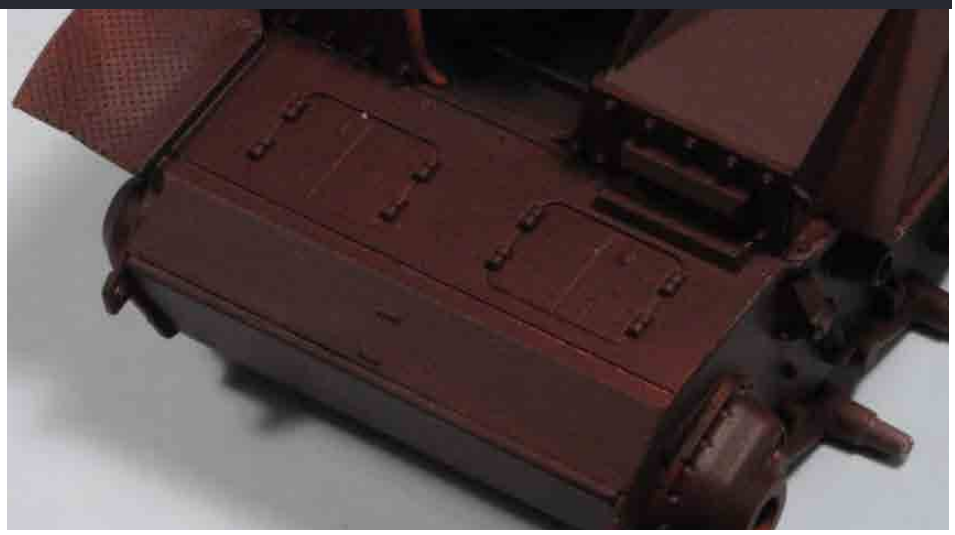
Zimmerit was not applied on early StuG III Ausf Gs, so is not required to build the kit. I wanted to try Monroe Perdu's (MP) paper Zimmerit product, so that largely drove my choice of modeling a Miag StuG build in or after September of 1943. I used the MP product and was very favorably impressed. If you want to add Zimmerit to your kit, there is no better option than this manufacturer's product – pure genius: you absolutely positively, cannot do better for Zimmerit than this stuff – very highly recommended. Being relatively inexpensive, the sets are very good value for the money. If there is a downside to this product, I don't know what it is. I should also note, it was in the mailbox within three days of my wife ordering it.

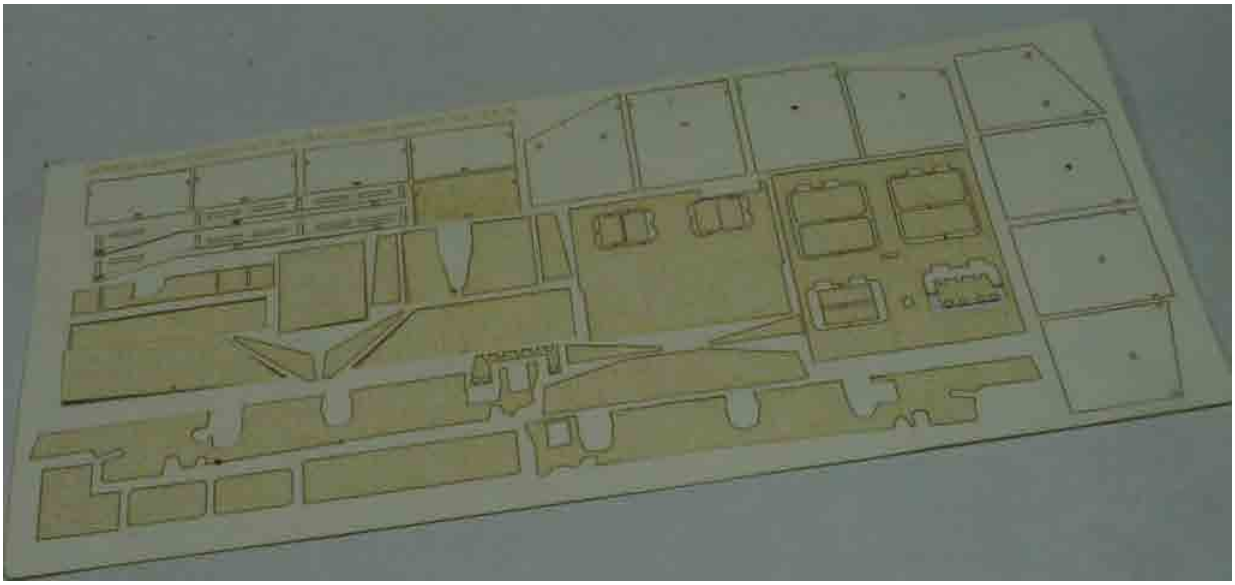
Made of etched-paper, the range currently includes a variety of Zimmerit patterns from different factories made to fit a variety of vehicles. It is very highly detailed, scale-thin, and relatively easy to use. It is laser cut on the paper so it is very easy to remove from the sheet – very little cutting and trimming is required. The shaped parts fit nearly perfectly where they are designed to go (some minor trimming – easy with a sharp hobby knife – was needed on a few pieces). There are even, where appropriate, some optional parts. The set I have even has some extra bits to help you if you make a mistake. Making a mistake is actually quite to do with this simple product.

Also included are paper schurzen and brackets. I love the Zimmerit, and while these are nice enough, I don't think they are as useful. The brackets – which must be bent to shape seem to me to be quite fragile. But in fairness, they don't have to hold too much weight. I did use the Schurzen plates, but I chose to make my own rails and brackets.

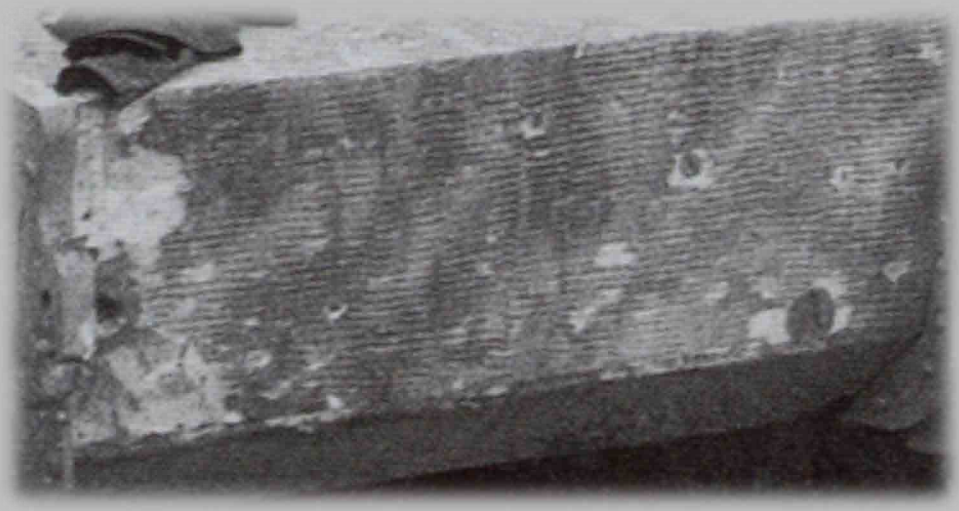
It is your choice whether to apply the Zimmerit on most parts before or after assembly. Some pieces (the bow for example) overlap two kit parts and cannot be applied until after the hull halves are assembled. I chose to put all the needed pieces in place on the mostly assembled hull. I figured it would be easier to place them on a semi-complete hull than it would be to hold a small part while placing the Zimmerit (with the risk of dropping and losing said small part). Only the basic hull and parts requiring Zimmerit were put together. Other bits, pieces, and fittings were left separate for now. You have other options, too. If you want damaged Zimmerit, you can do it before or after application. I certainly think the "before" option is probably easiest and is the one I chose.

There are some vehicle details we need to decide what to do with. The Zimmerit parts have cutouts for many of the details it will fit over, but not all (such as the mounting points for the Blackout light mount shown here). You can either trim these off (my choice) and add them back later over the Zimmerit, or you can make cut-outs in the Zimmerit to accommodate them.



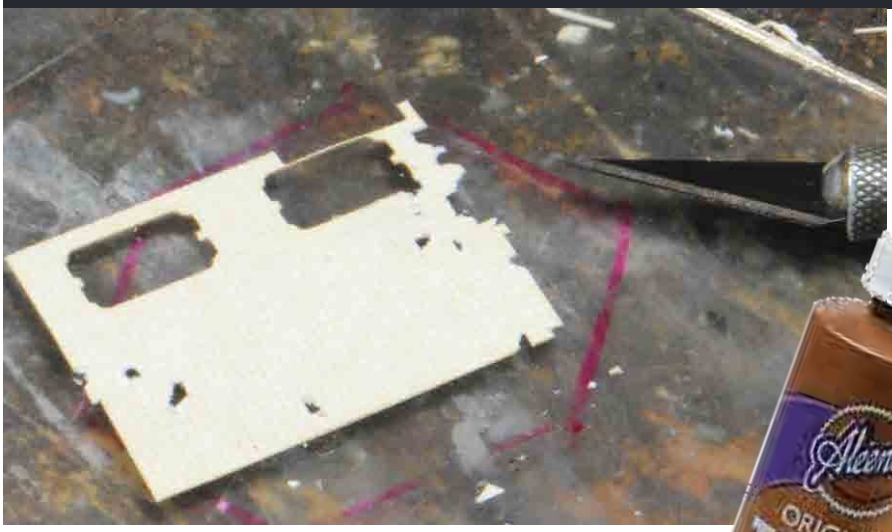


With the model now prepped, the product can be installed. Shown is the sheet of Zimmerit (including Schurzen plates and rails) provided by Monroe Perdu. The attention to detail is evident.



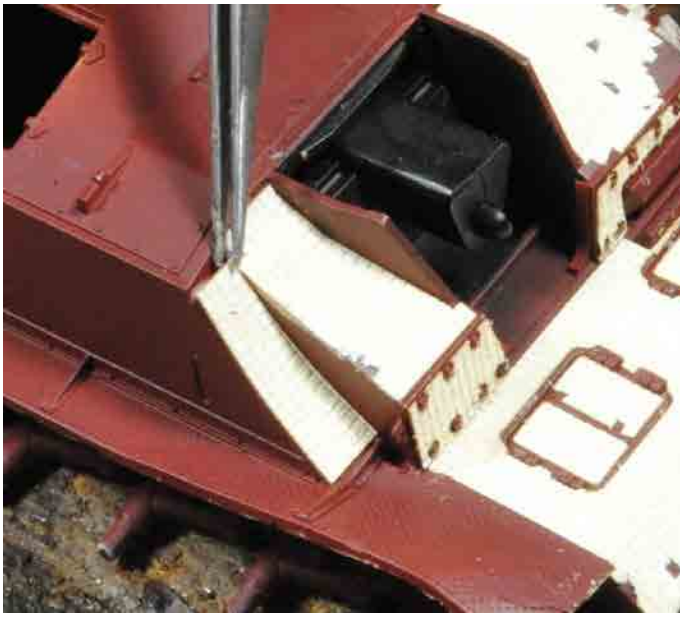
THE REAL THING

This photo shows chipped and damaged Zimmerit. The material was applied in a couple layers and was quite tough. Most chipping and flaking only involved the top layer and revealed the underlying Zimmerit. Some chipping appears to have exposed bare metal or the primed surface. Obviously, full or partial penetrations could blow off large amounts of the material.

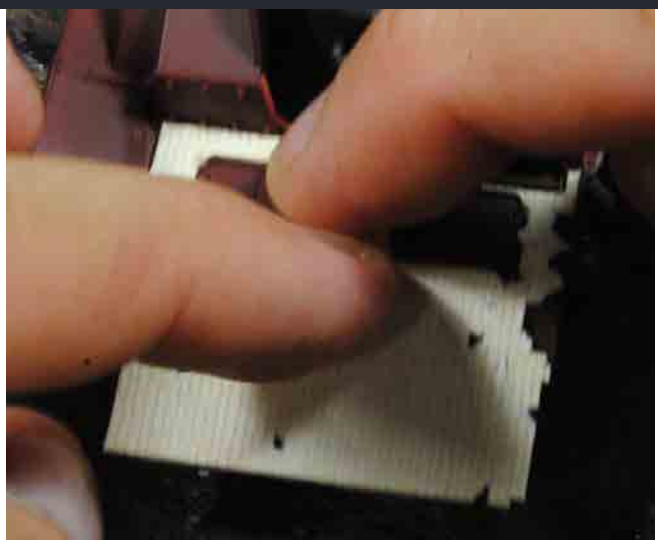


Being paper, the Zimmerit can be "damaged" using a sharp hobby knife. This can be done before or after application. In most cases, I added damage before.

I used this tool as my primary application tool. The rounded end was very useful for burnishing the product down onto the hull. The blade end (or the back of the blade) was used to reach into recesses. The instructions, and other reviews on the web, recommend PVA Glue (white glue) for this stuff. I would certainly not recommend using a thin, weaker glue such as Elmer's. While it may work, I just can't really see it. I used a thicker, somewhat stronger stuff – Tacky Glue. Another option might be a slow setting two-part epoxy glue (like JB Weld which takes an hour or so to set). While this would give an absolutely permanent joint, the thick glue would be more difficult to apply as a very thin layer than the white glue is. In the end, both the instructions and users have all said white glue, so I used white glue. It was a good choice.

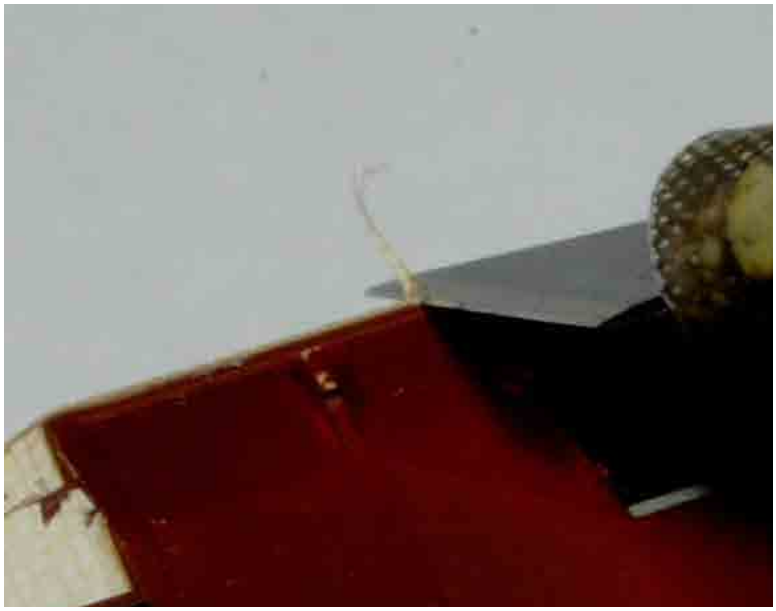


There are a couple ways to apply the parts. I used both depending on the part and the area it was going into. For most of the panels, I found it easier to "paint" the glue onto the panel and then put the part in place using a pair of tweezers

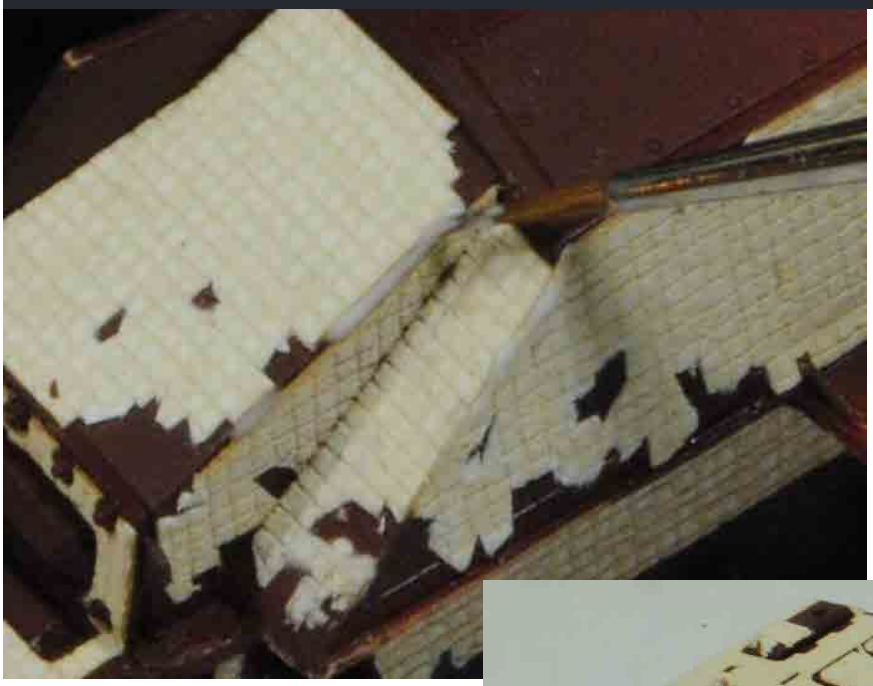


Above: For more complex shapes, and panels with hatches, I applied the glue to the part and then put the part in place. I did not want to "paint" these panels with glue as the glue is thick and dries clear – I feared it would obscure scribed hatches and other details.

Left: Regardless of method used, once in place, the part should to be pressed down into firm contact with the plastic. I used the rounded end of the aforementioned tool to lightly burnish the part down. Any excess glue squeezed out (such as that visible by one of the hatches) was cleaned up with a damp brush.



The parts fit very well, and test-fitting will find most areas where adjustments need to be made. But, in the event the part overhangs a bit, such as we see here, it is easy to trim the excess with a sharp hobby knife blade.



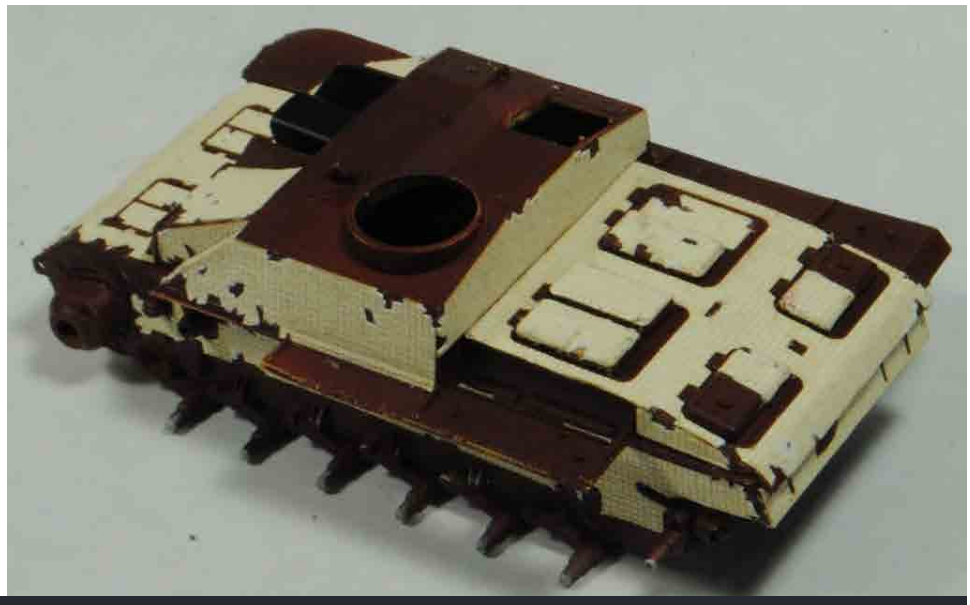
Joints and slight gaps between Zimmerit pieces were filled with a bit more Tacky Glue applied with a fine brush. You could also use putty if you like, but the gaps and joints are so small, I found this easier.

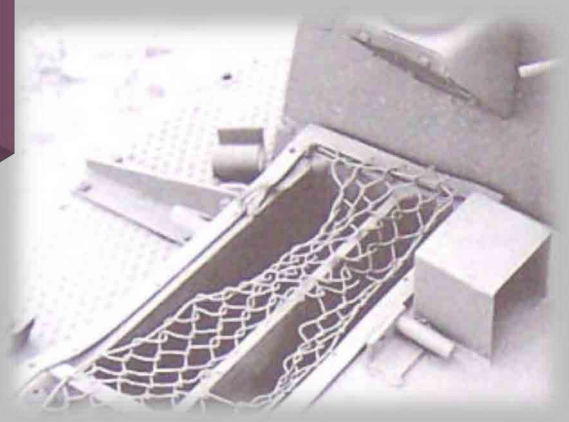
The finished Zimmerit looks outstanding and was easy to apply.

FURTHER ASSEMBLY

Additional distressing can be done after the glue fully cures if desired. Assembly could now continue per the instructions. Any parts being attached to the paper Zimmerit were put in place with superglue as model glue will not adhere to the paper product.

Make sure the primer is removed from any area where plastic parts will be glued. Below, we see the primer lightly sanded away where the commander's cupola will fit to the hull roof. For model glue to provide a strong bond, there must be good plastic to plastic contact.



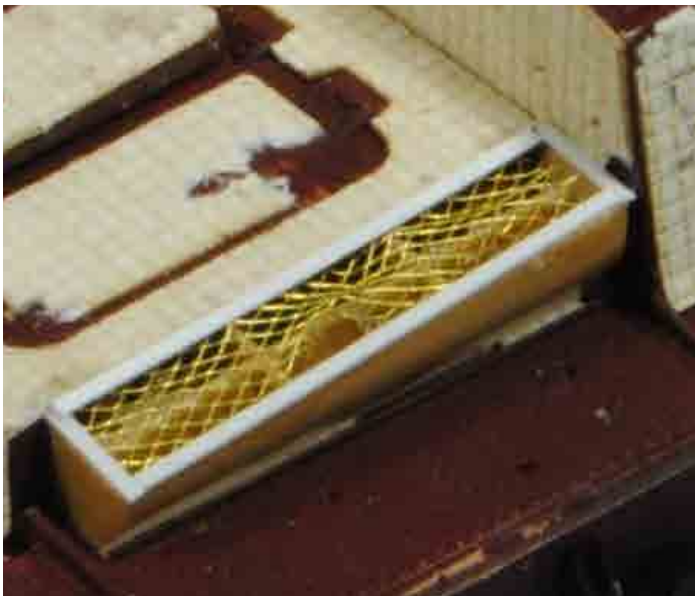


THE REAL THING

Screens over the air intakes were held in place with a thin metal frame. As seen, these were subject to damage.

SCREENS AND EXHAUST GUARDS

Screens over the air intakes were made from a sheet of fine brass mesh. I purchased the sheet (about 5 x 7 inches) years ago and have used it for several projects. The sheet metal frame around the screen was fashioned by very thin Evergreen strip—.5mm wide and .25mm thick.



Working With Styrene Sheet and Shapes:

Companies like Plastruct and Evergreen make sheet plastic in all colors, textures, and thicknesses and sell a variety of forms such as strip, bar, rod, tube, "U", "L", "I", tread plate, siding, clapboard and on and on. This is very useful when detailing or scratch-building. The only tools you really need are a good hobby knife, a metal straightedge, some sanding sticks, and perhaps a scriber (I use dental tools).

Thin plastic can be cut with scissors, but it can cause the sheet to curl. Plastic can also be cut with a saw, but it can result in ragged or chipped edges and burrs. I use a hobby knife and a straightedge to score the plastic along the line I 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 plastic model cement.

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 scriber (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 and stretch them to make antennas and wires. 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 and thickness. It will retain its shape - for example, a hex rod will still be hex rod, just a longer and thinner one.

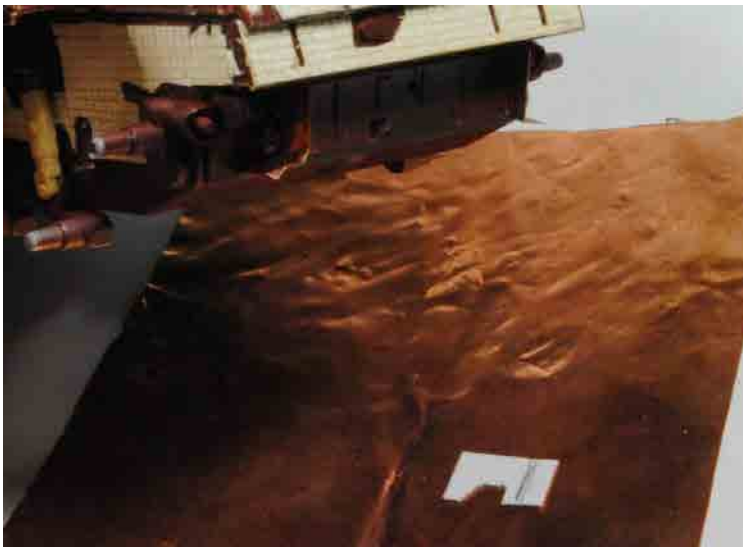
To stretch sprue or styrene, carefully heat it over a candle flame until soft enough to pull to the length/thickness you need. With practice, you get good, consistent results.

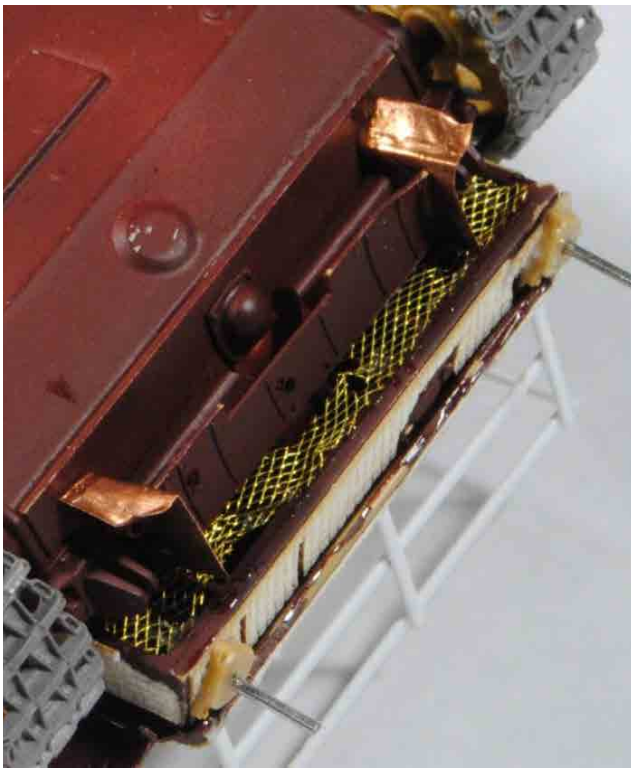
Thin plastic rod or stretched sprue can also be used to fashion missing weld seams. Simply use a piece of appropriate size, put it in place, and soak it with liquid cement. Once softened by the glue, it can be easily textured with the tip of a hobby knife to create the weld texture.

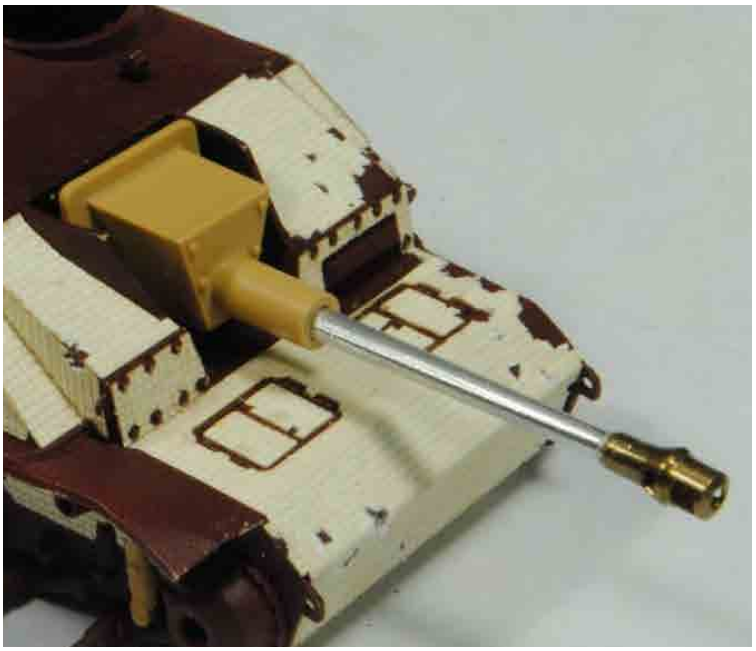
These are just a few samples of what can be done. If you plan on working with styrene parts, sheets, and shapes, a very useful resource is the book by Evergreen titled "Basic and Advanced Tips and Techniques of Styrene Modeling" compiled by Bob Hayden. While an older book, and somewhat outdated, it has 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.

A piece of the same screen was used in the gap underneath the rear armored hull overhang

Below: The exhaust guards were cut from a sheet of thin copper. A template made from a piece of index card (seen in the photo below left) was used as a guide. The pieces were superglued into place and damaged/ distressed appropriately.

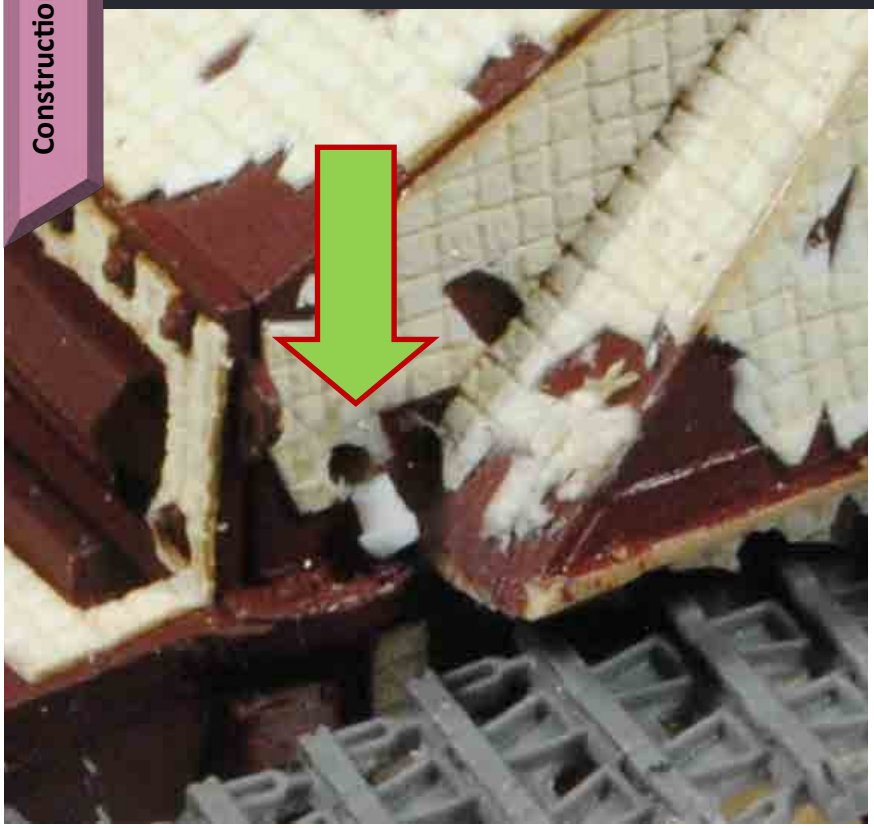






The Gun

The kit-supplied gun mantle was used. Into this was fitted a turned aluminum gun with brass muzzle brake. This is an old part I have had in my scrap box for several years. I do not know who made the part or even what kit it was designed for. However, it was nearly identical in diameter to the kit barrel and the muzzle brake was also very similar. It fit with only a little trimming of length. While there is nothing wrong with the kit barrel, I believe this part looks very nice.



Above: The scissors binocular is included in the kit, and the part is designed to fit in the hatch as shown. I like the look of the sunshade extension tubes. By a lucky coincidence, the smoke grenade launcher tubes were the required size. Since my vehicle was made after these were discontinued, I simply used a couple of the smoke grenade launcher parts to fashion the sunshades.

Above: The earliest Ausf Gs had a viewport to the left of the driver. These were soon replaced with a simple pistol port which allowed the front of the panniers to move forward and have more slope. The pistol port is absent in the kit. A modeler could just put a tiny disk of plastic in place to represent the closed pistol port. I chose to the model the port open. A suitably-sized hole was first drilled through the upper hull. The plug itself was fashioned from a piece of styrene rod, carved to the needed shape. A small "chain" runs from the plug inside the hull. This is a very tiny length of styrene rod. So small, it's hard to see even in this enlarged photo. While the part is a tiny detail that will likely not be noticed by many viewers, it will reward those who may be looking for it.

Right: Based on photos I saw depicting early Ausf Gs with field-installed stowage racks on the rear deck, I chose to move the spare road wheel mounts from the rear deck to the rear of the hull. As they are separate parts, this is easy to do. I replaced the shafts with lengths of paper clip wire and drilled-out the hubs on the spare wheels to fit them in place. One of the spare wheels is heavily damaged. Not only is the inner rubber tire nicked, but the entire tire on the outer wheel is gone. This was simply cut away using sprue nippers and sanding sticks (taking care not to damage the "metal" wheel rim.

STOWAGE

Many photos of StuGs show stowage racks on the rear deck. Many of these were field-installed. By mid-late 1944, factories were putting racks on at least a portion of the StuGs rolling off the assembly lines. While these factory-installed racks were of a standard (or at least similar) design, the earlier field-installed racks show wide variation. Photos also show that many vehicles were heavily stowed. This includes military gear, spare tracks, tarps, extra road wheels and such. It also includes a wide variety of other items.

Stowage can be sourced from several locations. Many kits include some bits. This kit had a couple lengths of track a couple spare road wheels. Accessory and figure sets are a good source. The Tamiya German Infantry and Panzergrenadier sets include two sprues of infantry gear and weapons. Their Jerry Can set includes not only jerry cans but also oil drums and some miscellaneous gear. The Field Maintenance set includes a variety of tools, ammo crates and the like. There is also the aftermarket. We have already seen that I had plenty of extra OKB Track Links. Companies like Black Dog and Plus Model also make accessory and stowage sets. Some are designed for a specific vehicle while others feature more "universal" bits and pieces. Many items are also fairly easy to scratch-build.

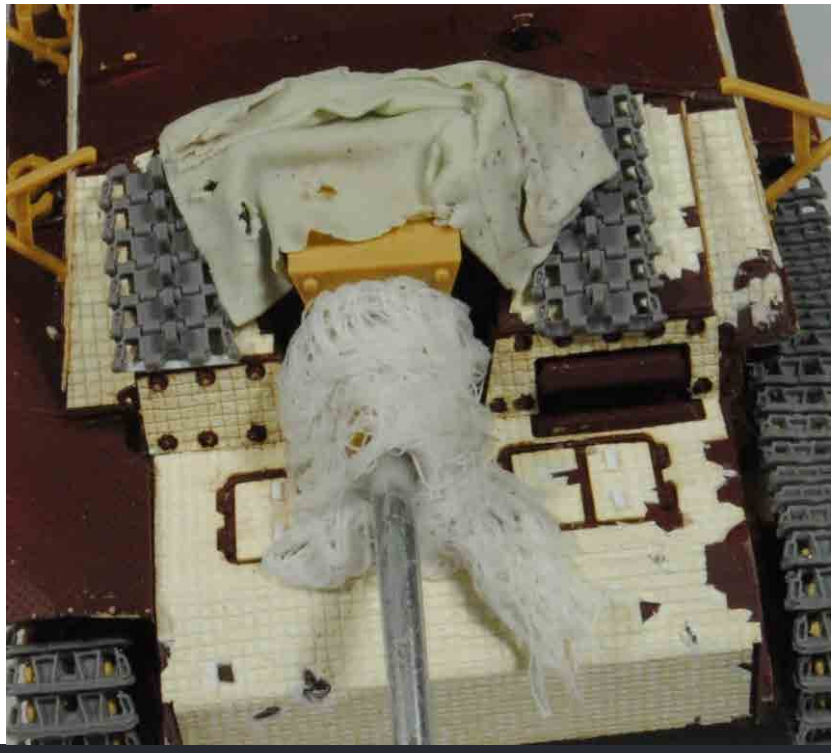
THE REAL THING

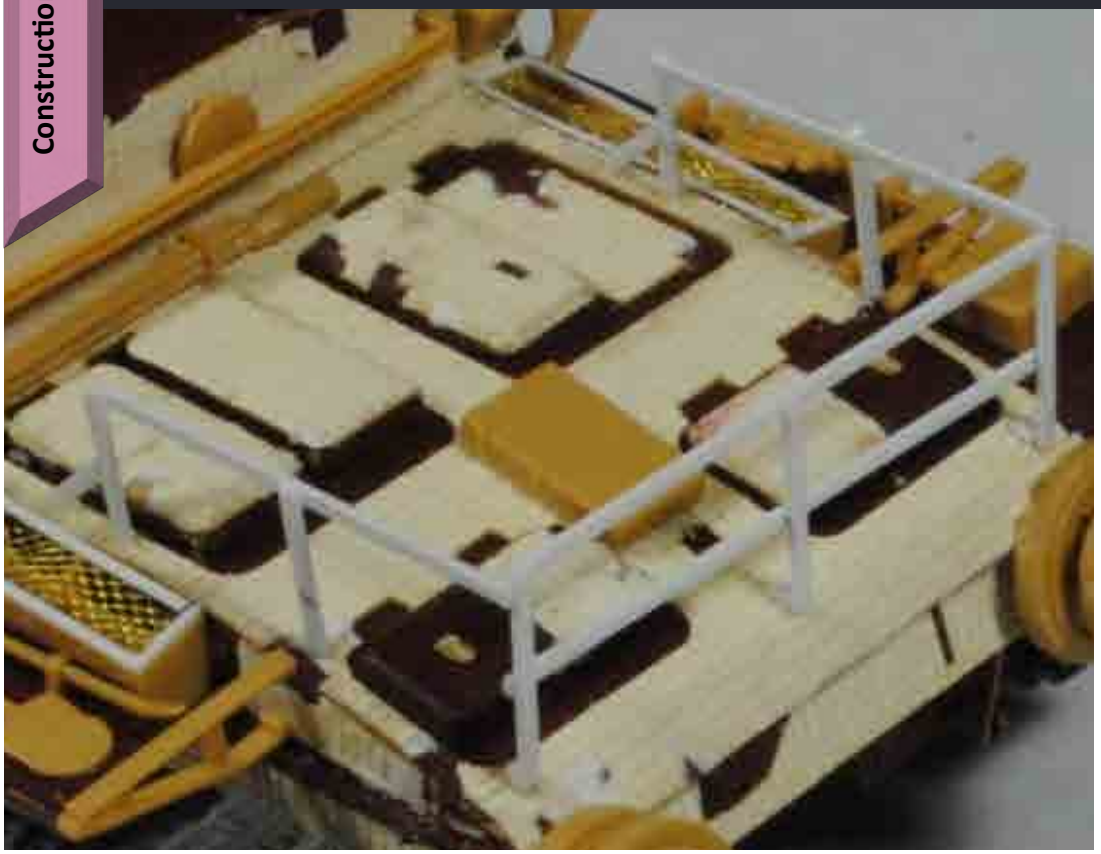
On page 8-9 we saw some of the photos that inspired my build including stowage racks and stowage. Here are some more photos. Note the variety of racks and other methods of stowage. Equipment stowed includes personal gear (helmets, gas mask canisters, canteens), tarps, crates, of spare road wheels in various locations, spare tracks used not only as extra armor but as improvised stowage racks, boards serving to line stowage racks to prevent items falling out, etc. This is only a sampling. In fact, most photos of StuGs show stowage of some sort.

For the netting, I raided the first-aid box and grabbed a gauze pad. A suitably-sized piece of the gauze was soaked in a mix of water and white glue (Elmer's in this case) and put in place. I wanted the net to be removable for painting. While the white glue will not stick to the plastic or the metal gun barrel, it would stick to the paper Zimmerit so I used a barrier of aluminum foil. You could also use plastic wrap.

For the weather cover, I turned to my go-to stuff, Magic Sculpt epoxy putty. Epoxy putties consist of two parts – resin and hardener – that are mixed to form a clay-like substance. While there are several brands on the market, and while they each have their own strengths and weaknesses, I prefer Magic Sculpt. The putty can be worked like clay while soft, and once cured can be cut, filed, sanded, and so on. I prefer to do most of my work while the putty is soft. In the discussion of tools, I placed a photo of my homemade toothpick shaping tool. While this is my most used putty tool, I also use various putty spoons, knives, and dental tools to work the putty. It is water soluble, so can also be shaped and smoothed with a damp brush. We've already discussed how the putty can be used to fill gaps, and in this section we will we see a few different ways to work it for making stowage. Later we will examine its use in sculpting figures.

For this application – the foul weather tarp on the mantlet—I wanted a thin sheet. To get this, I roll the putty out flat using a dowel rod on a piece of glass. Plenty of talcum powder ensures it doesn't stick (don't use Vaseline as I've heard some folks suggest – that just makes a gooey mess). Magic Sculpt is so workable, you can roll it out very thin. In this instance, it's no thicker than a sheet of paper. When first mixed and rolled, it is very limp and flexible and will not hold a shape. Before working it further, I let it start to firm up just a little – where it's still soft and flexible enough to easily work, but also somewhat holds its shape. That's normally about 30 minutes or so. Then, using a razor, I cut it to shape. At that point, it was put in place on the mantle and teased into the position I want using a paintbrush and toothpick. I also added some tears and holes with the point of a hobby knife. Note that the spare track links it will be draped over are also in place to ensure the putty is shaped properly to fit over them. Once cured, everything can be removed for painting as we see at the lower left. This photo also shows the spare tracks made to fit in the rack on the rear of the fighting compartment.





Top: The stowage rack is constructed of 1mm x .35mm styrene strip. Plastic model cement attached the parts together. Superglue attached it to the Zimmerit.

Bottom: Using only the largest bits of stowage, different arrangements are test-fitted without glue until I find a combination I am happy with.

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 first step is to verify the scale of your drawing or plan. Don't assume what it says is correct. Measure a know 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

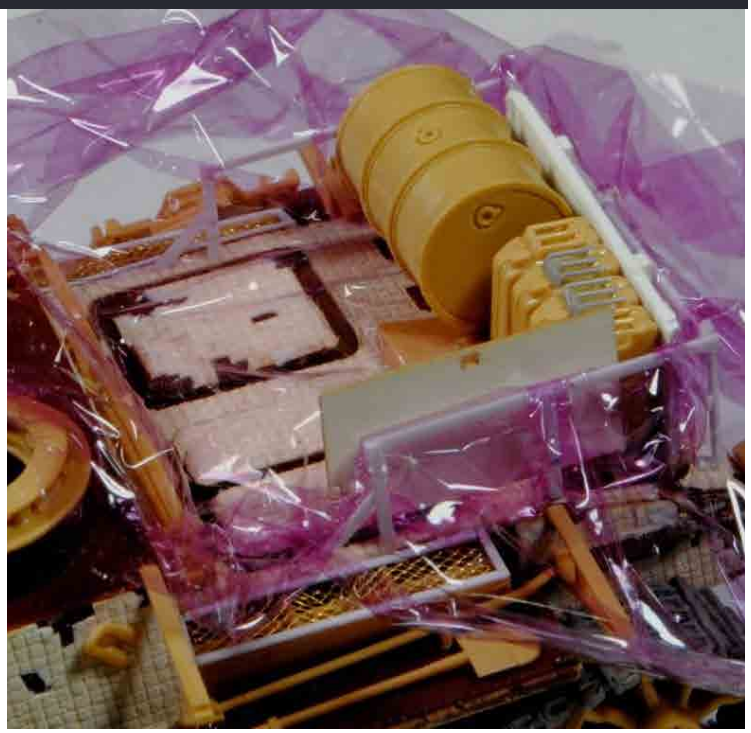
The base piece for my stowage will be an old wooden door taken from some poor peasant's shed. Not only will this non-military item provide a bit of interest, it can also provide a bit of color depending on how I paint it. Perhaps surprisingly, I do not use wood to create scale wood parts—I don't think the grain, even of fine wood, is realistic in scale. I make my wood from plastic as shown.

Top Left: A piece of plastic is cut to size and individual boards are scribed using a metal straightedge and the tool shown.

Top Right: Grain is etched into the plastic by dragging—not rolling—a Dremel sanding disk over the plastic. Different grits result in smoother or rougher wood.

Left: Additional distressing, such as the rough ends of the boards here, can be added with a hobby knife.

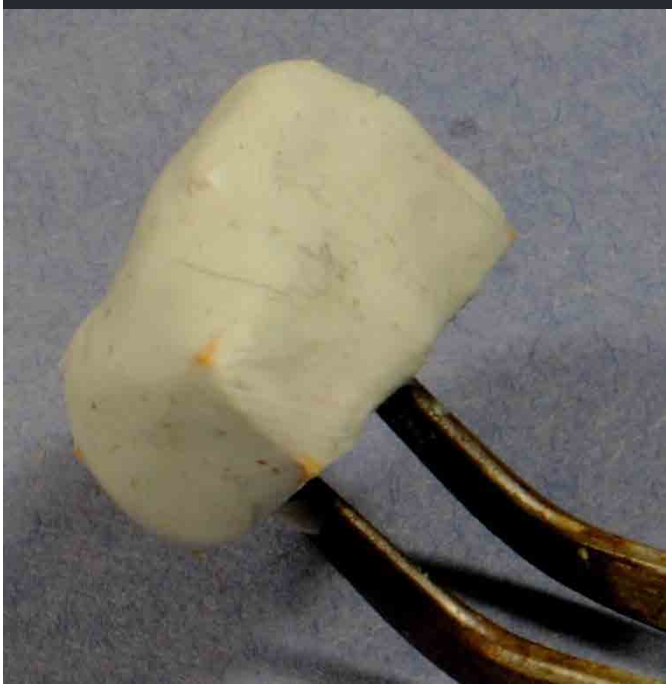
Below: Cross braces are put in place using more styrene strip and our door is complete.

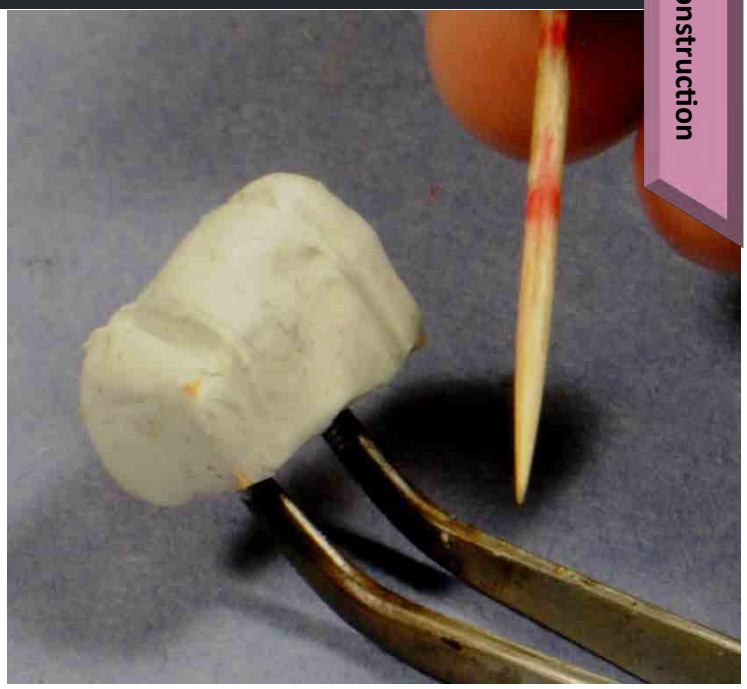


Above: It was my intent to make the mass of stowage all one piece, removable for painting. The reason I wanted it all one piece is to avoid having to assembly and reassemble the parts—like a jigsaw—before and after painting. The probably of getting so many parts to fit perfectly is almost nil. I wanted it removable for ease of painting—both of the stowage and the vehicle. Therefore, I put a plastic wrap barrier between the stowage and the vehicle in case any glue accidentally found its way to that area.

Above right: I started by setting the door in place. The barrel (from the Tamiya Africa Corps kit) was glued to the door. Four Tamiya Jerry cans were glued to each other then glued to the door. A piece of the Monroe Perdu Paper Schurzen was then glued (using superglue) to the Jerry cans.

Right: Another items I wanted was some tarp-covered boxes. I used some old bits (a Tamiya crate and some lengths of styrene rod) to form the basis of the part. Several blobs of freshly mixed Magic Sculpt were then stuck in place on the boxes. The putty is an adhesive and will stick in place.





Top Left: Using my fingers and a metal putty spoon the putty was smeared and smoothed over the part in the basic shape of the tarp. Using a damp paintbrush, it was then smoothed out removing all the fingerprints and tool marks.

Top Right: Using my toothpick sculpting tool, indents were made where the tie-down ropes would lie.

Bottom Left: The tie-downs were made from model ship rigging thread and superglued in place. Folds and wrinkles were added using my toothpick tool and the work smoothed, as needed, with a damp brush. The part was then set aside to cure.

Bottom Right: Another thin sheet of putty was rolled-out and wadded up in the area in front of the jerry cans. A corner was draped over the barrel. The putty was superglued to the barrel, jerry cans, and Schurzen plate.

Top Two Photos: While this new sheet of putty was still soft, the tarp-covered crate and two ammunition crates (from the Tamiya Field Maintenance set) were put in place. A Plus Model ration can fit in the space between the boxes and the spare track rack on the rear of the fighting compartment. It was superglued to the tarp-covered boxes. Before the wadded-up tarp completely cured, a milk canister (a metal model railroad product), a toolbox, and an oil can (both from the Field Maintenance set) were pressed in place. The wadded tarp simply serves as a base to fit these parts into and to tie the various bits of stowage from the jerry cans forward to the boxes together.

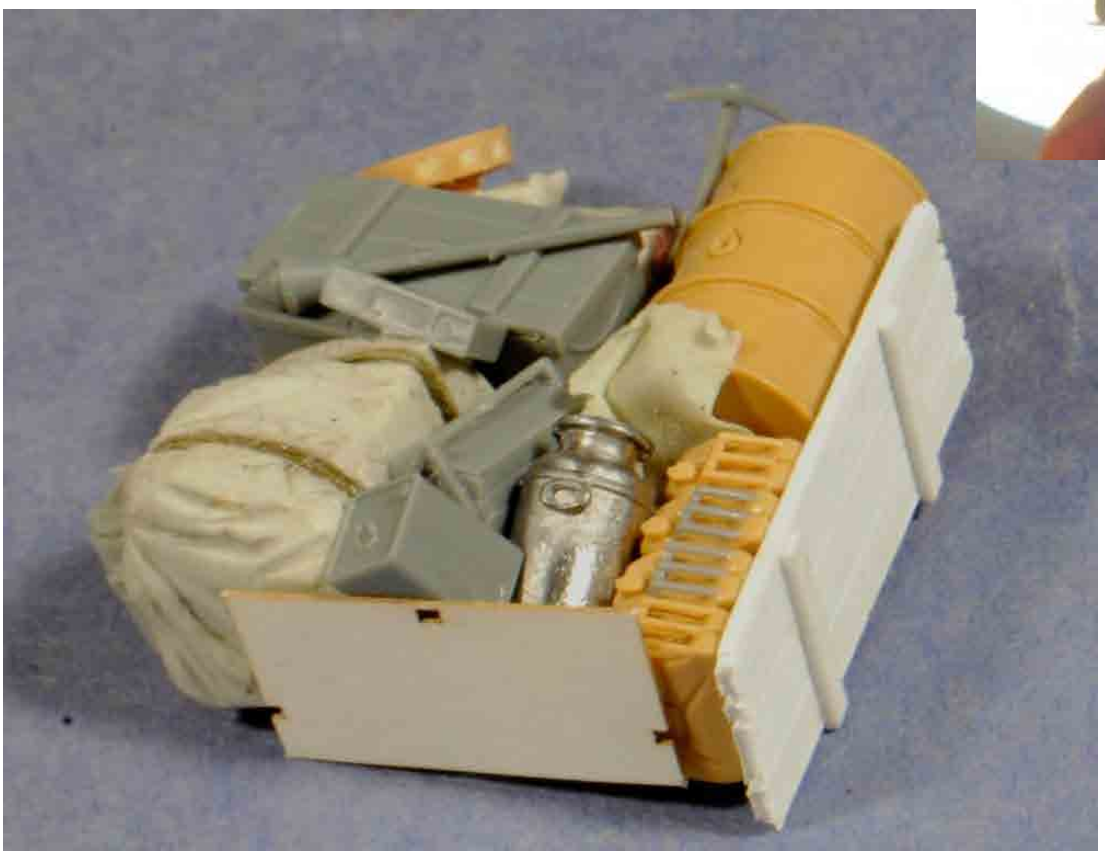
Bottom: A sausage of soft Magic Sculpt was roughly shaped into a rolled tent. Details were pressed into the soft putty using my toothpick tool and model ship rope was wrapped around the piece. While still soft, the piece was fitted into place alongside the right side of the stowage rack forward of the barrel and adjacent to the ammo crates. It was superglued in place.

Top row: Another piece of putty was rolled-out and loosely rolled into a blanket roll. This piece will serve as another bit of filler.

Bottom Left: Here we see the tent roll we made previously put in place. The blanket roll we just make is loosely draped over this and worked into position under the ammo crates and forward of the rear wall of the fighting compartment.

Bottom Right: While the putty was still soft, the damaged road wheel was pressed into it. This kind of detail is important. A wheel has weight, and it would not just sit perched atop a blanket, but will sink into it.

Left, Top and Bottom: Here we have two views of the finished piece of stowage removed from the vehicle. Note also the addition of a couple small arms ammunition boxes, a panzerfausts, a wine bottle, and a pickaxe. The pickaxe and bottle are from Tamiya's British Infantry set, and the other items are from any of the German Infantry or Panzergrenadier sets.

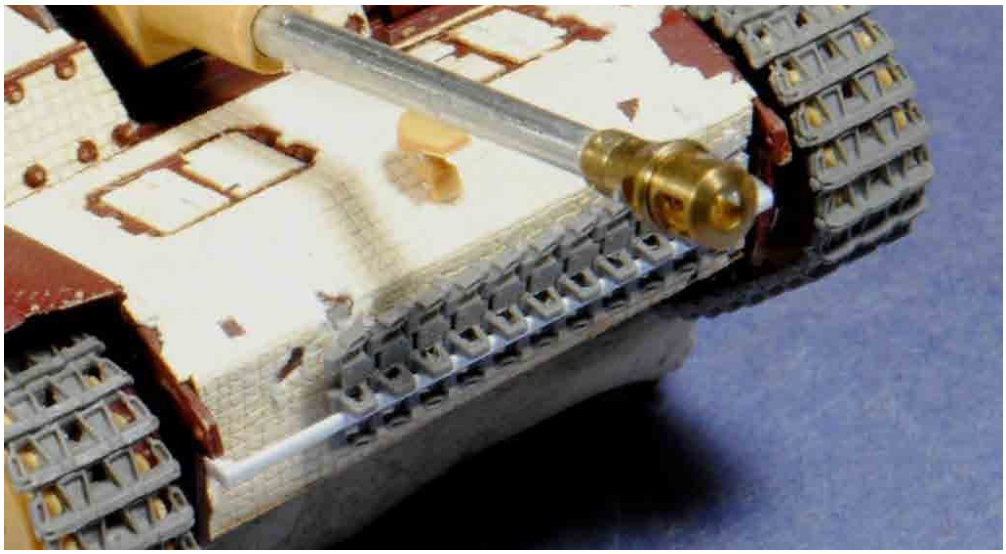


Above: Here the piece is held up to a light. You can see that it is not a solid mass like a commercially cast piece would be, but rather has numerous openings and gaps. I think this results in a very realistic look.

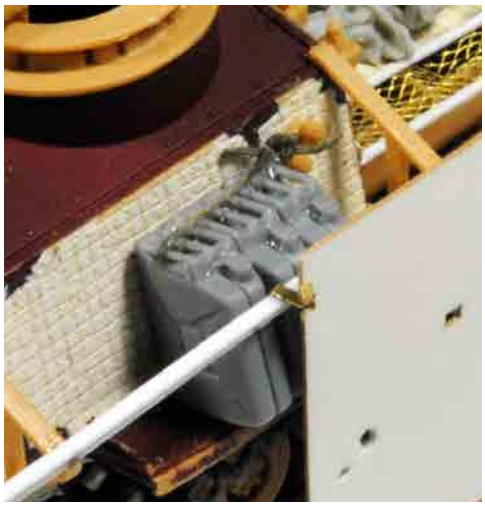
A test fit, without the plastic wrap in place, reviewed a small gap at the front corner of the tarp-covered box where it did not fit against the hull as good as it should.

Another bit of putty, put into place and teased with my toothpick tool into the shape of a wadded up piece of cloth (possibly a zeltbahn poncho) nicely filled this gap.

As a final touch, some Tamiya gas mask canisters were hung from the rear of the stowage rack using painter's tape straps. Canteens hang from a bit of model ship rigging thread attached to the rack. All these parts are permanently glued in place and will be painted in situ.



A field-installed spare track rack was placed on the front hull. This was made from bits of styrene. A length of OKB tracks fills the rack, but will not be permanently glued in place until after painting.



Above: Another bit of stowage—three jerry cans— was created only after the Schurzen and their associated brackets and rails were fitted in place (as we will see shortly). This was done to ensure they fit without fouling rails or plates. This is also a good example of the fact that when sculpting or scratch-building we do not have to model reality—only the appearance of reality. The three cans were assembled and glued together. Rather than try to tie the cans using tiny string to the tiny lifting eye, the rope (model ship rigging thread) was glued to the cans. A separate knot was glued to the lifting eye. That way, after painting, the cans will be simply sat in place and will have the appearance of being tied to the vehicle.

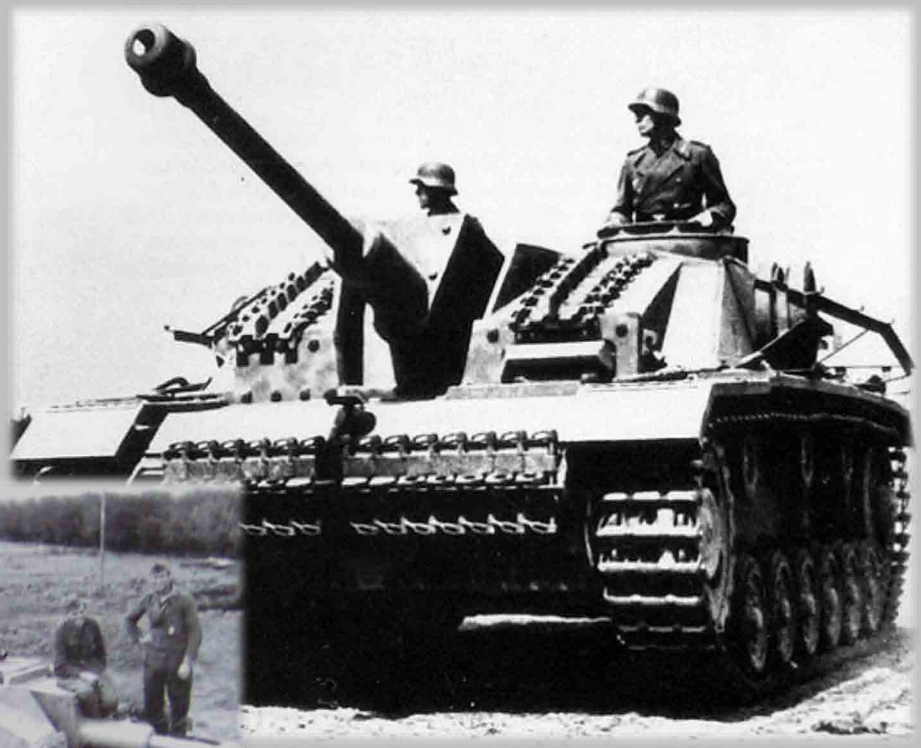
SCHURZEN

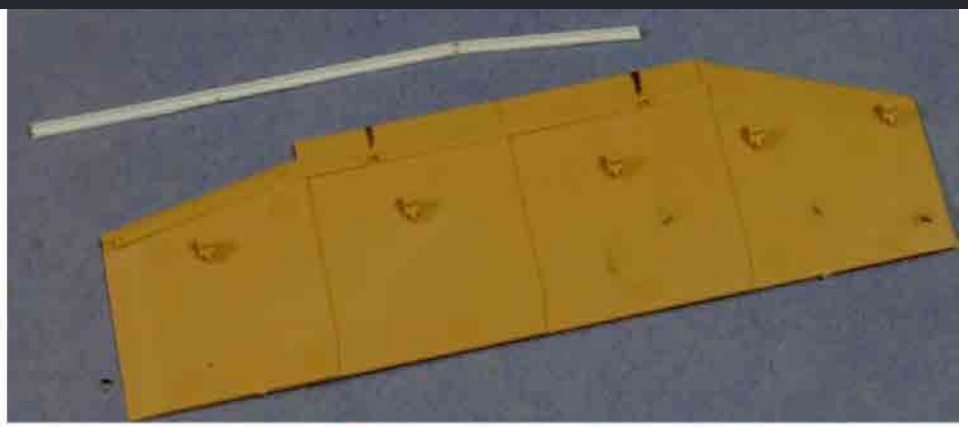
Beginning in May, 1943 extra armored plates were hung on rails on the sides of the Panzer III and Panzer IV families of vehicles. Contrary to popular belief, these plates were not introduced to defeat shaped-charged weapons such as the bazooka or PIAT, but rather were designed to defeat Soviet anti-tank rifles which posed a significant threat to the relatively thin side armor or the vehicles. Although thin—only 5mm—these plates provided effective protection against flank shots from anti-tank rifles and smaller anti-tank guns. These solid projectiles would tumble, deflect, deform, or even disintegrate after penetrating the stand-off Schurzen plate greatly reducing their effectiveness against the relatively thin side armor of the vehicles. Explosive projectiles would detonate against the plate before reaching the vehicle. While a more effective method of attaching the plates was developed by mid 1944, earlier mountings were inadequate which often resulted in the plates falling off. Many photos show missing or damaged plates.

The kit parts have several issues. The brackets that mount to the hull are separate parts, but the rails, fender mounts, and plates are all molded as one piece. The plates are also very much over scale thickness. The rails are molded flat, although photos clearly show these were made from angle iron. The kit plates are useable if you wish to model a complete set and don't mind the thickness or other inaccuracies. However, for damaged, missing, or simply more realistic plates the kit parts should be replaced. This could be done via aftermarket photo-etched parts. You could also make your own plates and rails with thin sheet plastic using the kit as a pattern. The Monroe Perdu Zimmerit set includes etched paper rails and plates. I chose to use the plates, however the rails have the same issue as the kit parts, being flat rather than angle iron. I chose to make the rails from Evergreen 1.5mm "L" angle Styrene.

THE REAL THING

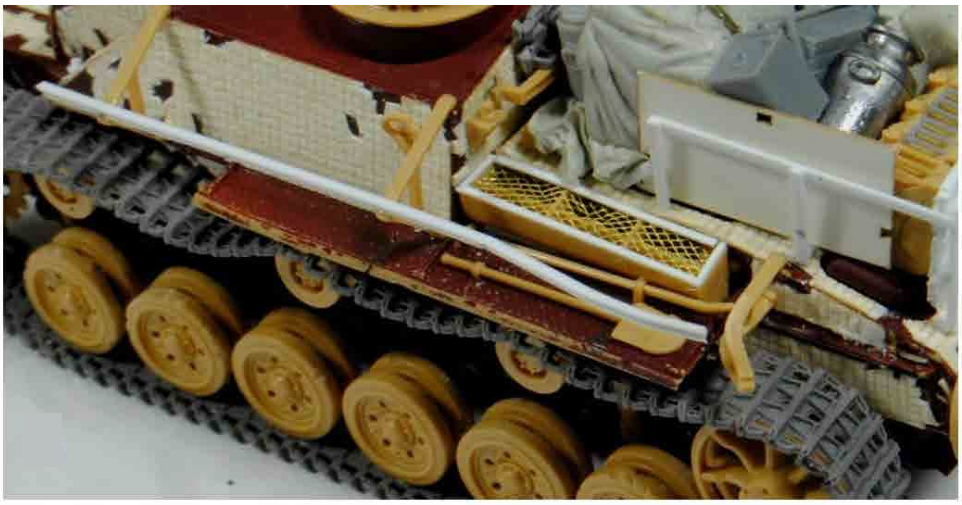
Many of the StuG photos we have already seen show the Schurzen plates in various "configurations" from complete to disarrayed to missing. The photos below show damaged plates—these proved an inexpensive way to provide substantial additional protection to the weak flanks of these vehicles. The large photo clearly shows the angle iron mounting rail, although all the plates are absent.





Using the kit parts as a guide, new rails were made from Evergreen 1.5mm "L" angle styrene strip.

These were glued to the kit-supplied brackets that had been attached to the hull during earlier stages of construction.



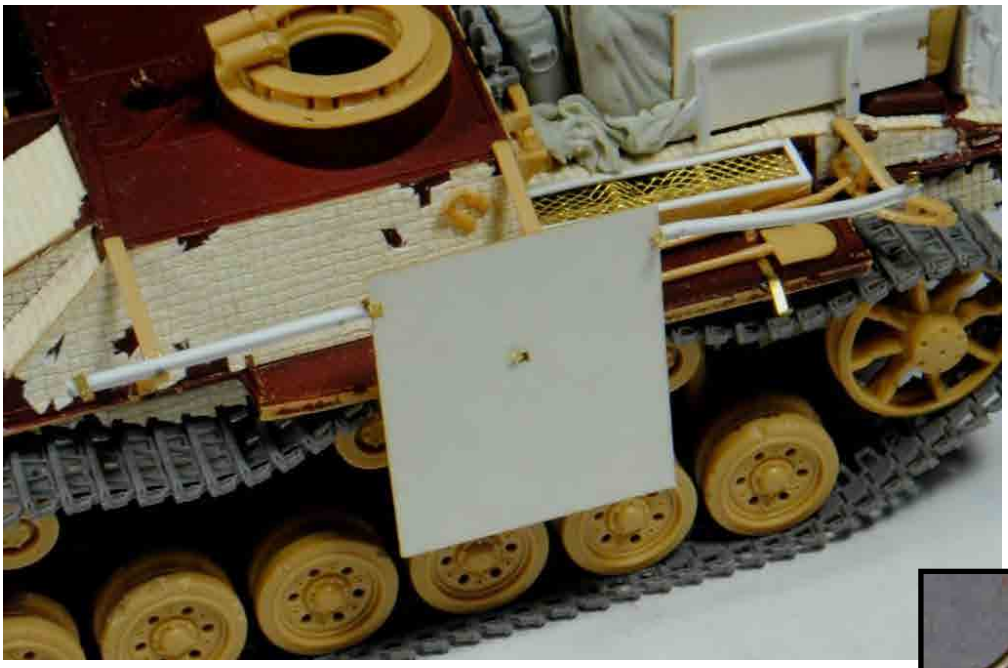
The rail and bracket on the left rear of the vehicle were bent using pliers to depict earlier damage.

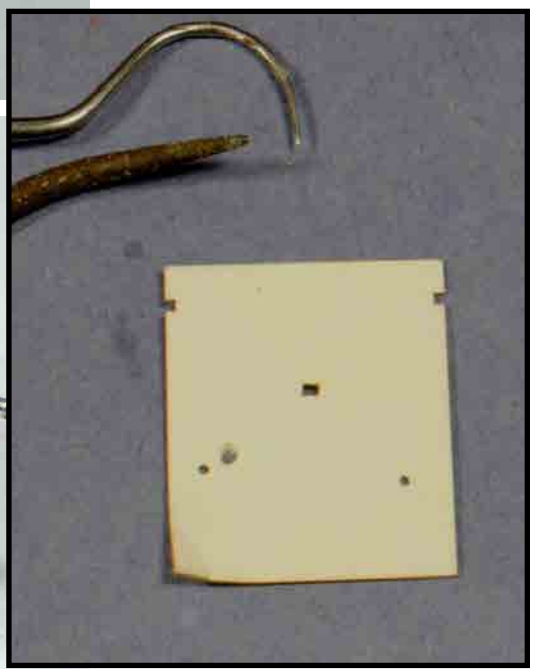
To create the mounting tabs welded to both the rails and fenders, I used bits of a Photo-Etch (PE) fret left-over from a model ship project. These are about 1mm thick. I cut the pieces 5mm long for fender brackets and 2.5mm long for rail brackets. The last 1mm of each piece was bent up at a 90° angle. This was done on a piece of glass to have a smooth surface. The brass piece was held down using one of my metal billet tools and the end bend upwards using the edge of a razor blade. While you can invest in PE bending tools, I've always found this method suitable for my needs.

Again, using the kit parts as a guide, the mounting tabs were glued in place on the fender and rails using superglue.

Below left: The Schurzen plates were test-fitted to both the left side (one plate) and right side (3 plates—two large and one small) of the vehicle. These can be removed for painting.

Below: Being paper, the plates can be easily bent (such as the bottom left corner here) or damaged by projectiles. For small holes, a needle or the dental pick shown were used. Larger holes and tears can be torn with other tools. Don't go overboard—unless you vehicle has been strafed by a heavy machinegun wielding fighter plane or assaulted by a "battery" of anti-tank rifles. While there are extreme examples, most photos show undamaged plates. And keep in mind that while effective, the plates would not protect the vehicle against large caliber hits.



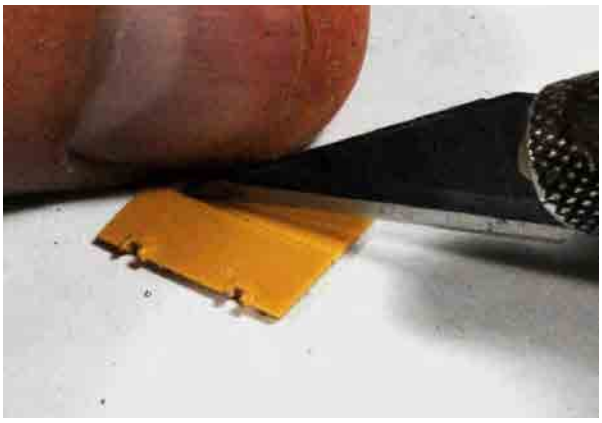


FINAL ASSEMBLY

The last steps prior to painting were done at this time. Some small, fragile parts such as antenna will not be addressed until after other painting and weathering is complete. Other parts, such as chains and ropes, will also be added after the painting process.

Top and Second left: We've already seen how the sizeable ejector pin mark in the rear of the gun shield was removed by filling with Magic Sculpt. On the kit part, the handle is simply a molded-on plastic nub. This was shaved off and replaced by wire bend to shape using a pair of pliers.

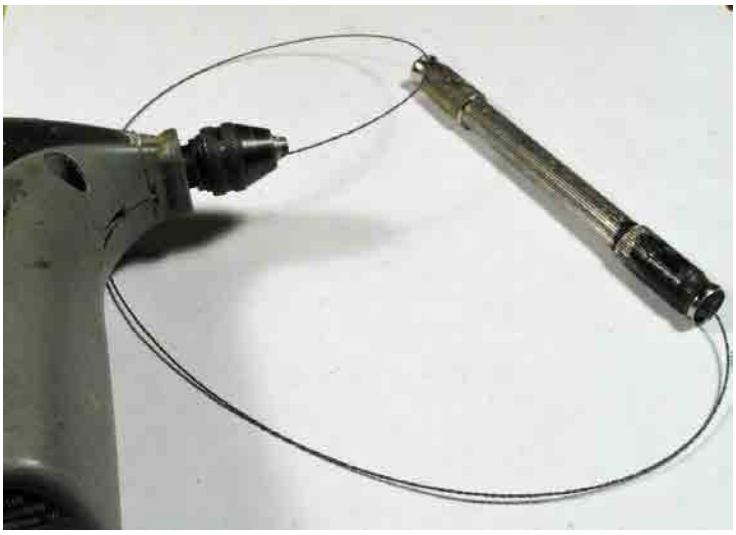
Third and Bottom Left: The gunner's hatch, while a separate piece, is designed to be depicted closed. The two-piece hatch is molded as one piece and there is no interior detail. The hatch was cut into two pieces using a sharp hobby knife and interior details were added. Rivets are simply slices of thin styrene rod. Stretched sprue would work as well. The latch is made of various bits of thin styrene strip with a handle fashioned from the same rod the rivets were cut from.



Below. Additional details were added and the hatch and shield glued in place. Note this also required a short length of spare track links to be glued in place in the rear bracket as these could not be put in place with the hatch in the way. A test fit of the large stowage piece was also done to ensure the hatch did not interfere with its placement.

THE REAL THING

Here is the actual gun shield. Note the machinegun can be positioned on one of two mounts—one to fire through the shield to engage ground targets and one to fire over the shield to engage aircraft. The shield is hinged and can be folded down. It can be latched to the open hatch to lock it in place.



The last step prior to painting was making the tow cables. The kit provides the ends and a length of cord from which to cut the cables. To me, the cord does not look realistic and I decided to replace it. Top left: Five strands of fine wire were twisted together. This was done by placing one end of the wires in a pin vise and the other end in my Dremel Stylus motor tool. At LOW speed, the wire was twisted until I had the look I wanted. Top right: The wire was cut into two 90mm lengths and the kit-supplied ends glued in place with superglue. Bottom left: The wire can be bent to shape. One cable was placed on the spare wheel mount and draped over the stowage on the rear deck. The other was hung over the right side bow and Schurzen rail. Below right: The shaped cables removed for painting.

Sturmgeschutz III Ausf G

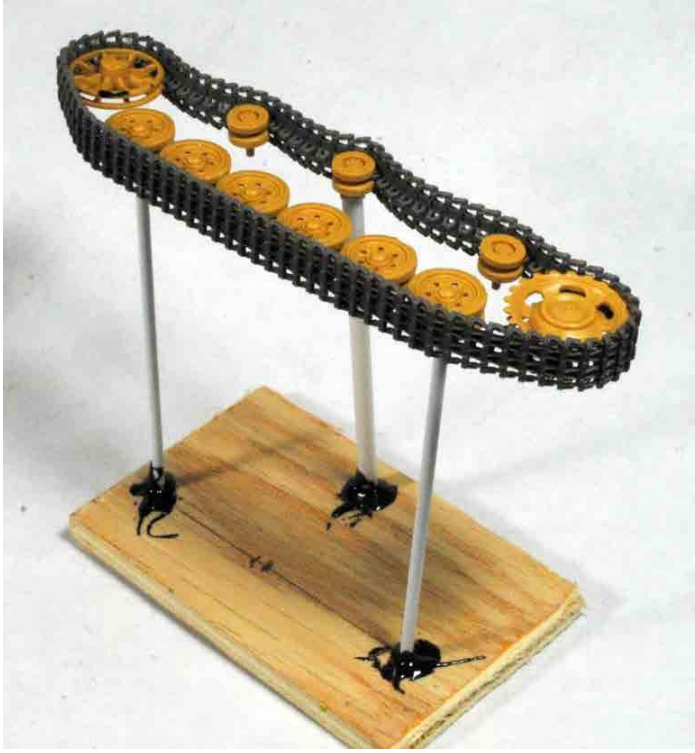
Two views of the assembled model ready for painting. The crew figures have been posed to ensure their fit. We will discuss the posing, sculpting, and painting of the figures later in this booklet. The tow cables are present in this photo. These photos clearly show all the modifications and additions made to the basic kit.

Above: The various sub-assemblies and individual parts broken down for painting and weathering. How much or how little of a kit you assemble prior to painting is your choice; influenced by the kit design and your personal preference.

Left: It's best to use some sort of jig to hold the parts for painting rather than handling them in your hand. Holding them can cause damage to paint such as fingerprints, smears, or skin oils creating a glossy appearance. And, of course, you'll end up with painted figures. For the basic vehicle, I used a dowel rod of a large enough diameter and length to hold comfortably. A hole was drilled into the end and a screw was epoxied in place. This, in turn, screws into a hole drilled in the bottom of the hull. Yes, the hull is metal, but with the right drill bit it is still quite easy to drill a mating hole.

The track assemblies were placed on a simple homemade jig that features two styrene rods and one styrene tub epoxied into holes drilled in a piece of scrap wood. The rods friction fit in the mounting holes of the fore and aft road wheels while the mounting peg of the center return roller fits into the tube.

Although not shown, other parts were mounted on toothpicks inserted into holes drilled in the bottom of the pieces. The spare tracks had lengths of styrene rod handles superglued to the back of the part. After painting, these will simply be snipped off using sprue nippers and the spare tracks put in place.



My Modeling Philosophy

All should enjoy the hobby as they please—without belittling from those with different interests. I like everything and build/paint whatever catches my eye: mostly figures, but models now and then. 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 believe pieces that tell a story are the most interesting and usually 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 documenting my builds. Thus I get four hobbies in one (modeling, history, photography, writing)! If 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 find 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.

Painting and Weathering

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 timeframe. This will affect the colors and markings the vehicle will carry, it's overall condition, and will influence weathering. Obviously, any deleted, added, or rearranged equipment, other field modifications, and damage will be modeled during assembly as we have already seen. If the vehicle is be caked in mud, much of this could even be added during construction and painted later, 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. 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 to 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 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 generally follow a process something like that graphically shown on the next page.

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 do not use enamels so here I will discuss primarily acrylic painting methods. Note that the various types of type normally cannot be mixed together as they use different solvents as thinners. So while they cannot be mixed, they can usually be applied over each other without affecting the underlying colors.

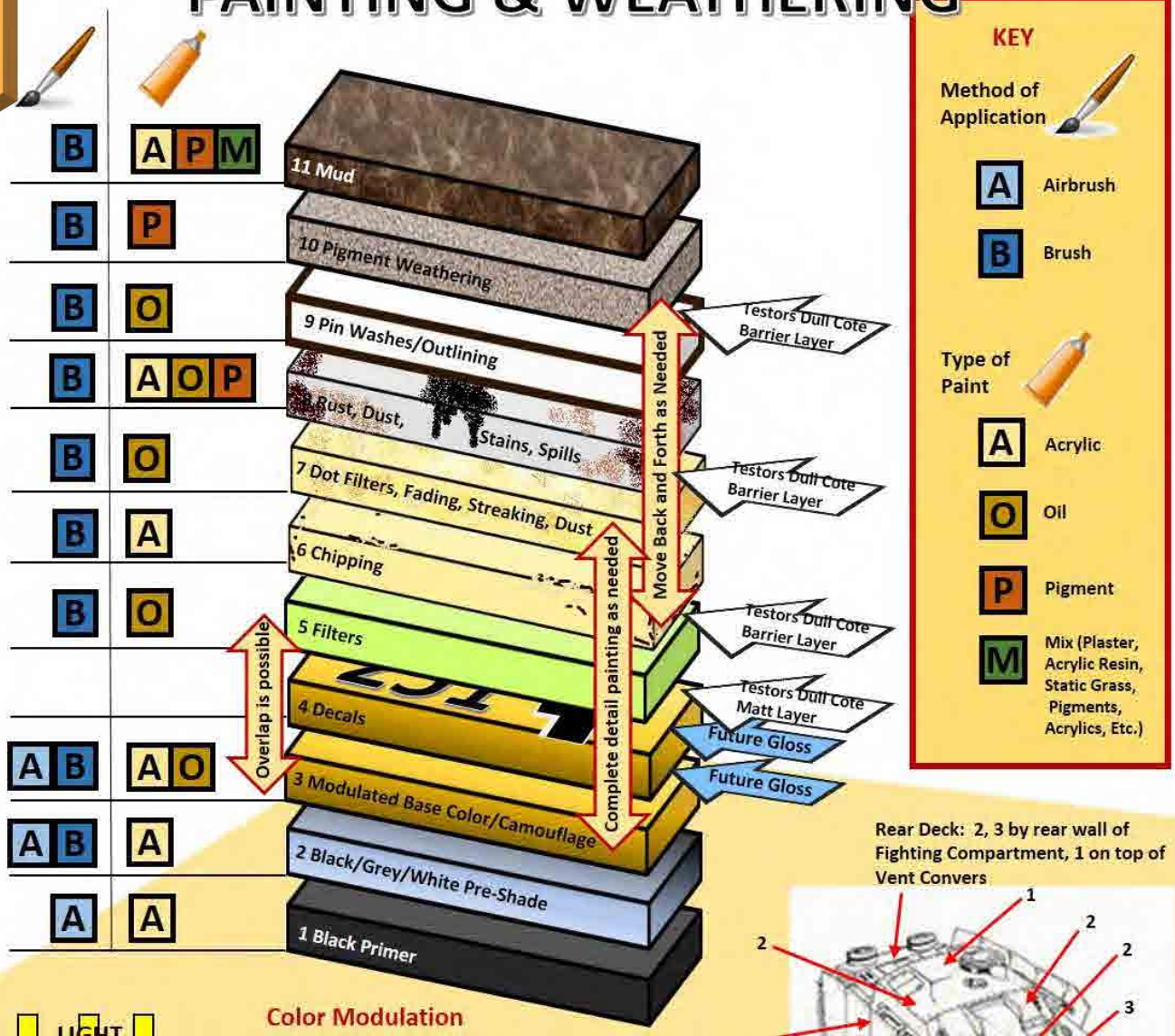
For nearly all of my painting tasks, I use **ACRYLIC PAINTS**. These are water-soluble paints with excellent adhesive qualities. They are stable and will not yellow over time. They can be thinned with water and do not have the harmful fumes many other types of paint have. For airbrushing, I use Vellejo Model Air paints, as these already come thinning for airbrush use. For brush-painting, I use either craft acrylics (Delta Ceramcoat, Apple Barrel, Folk Art, etc.) or the same Vellejo Model Air colors I use for airbrushing. These paints dry quickly, allowing the application of many layers of paint in a short time. The downside to fast drying is there is little time to manipulate the paint once it is applied to the surface. Being alkaline in nature, these paints can be hard on paint brushes. The good news is that the brushes can be quickly and easily cleaned with water as long as you do not let the paint dry on the brush.

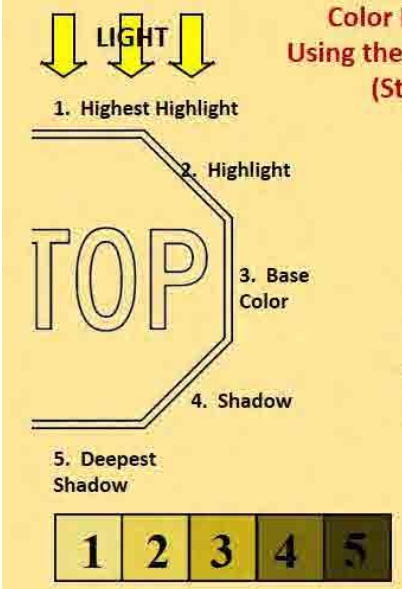
I use **ARTIST OIL PAINTS** for many weathering tasks. These paints consist of finely ground pigment suspended in a drying oil. They do mix with or affect the acrylics I use for most of my painting tasks. They also take a long time to dry, providing plenty of working time. If I am applying a paint type over a like paint type (oil on top of oil, for example). I will apply a "barrier" 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, that is what it was designed for).

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

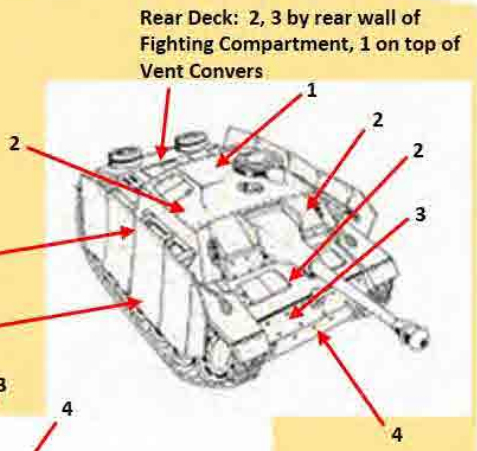
Bottom: While artist oil paints are of little or no use for basic model painting, they are ideal for many weathering applications. As these are thinned with oils, they will not affect or mix with acrylic paints and vice versa.

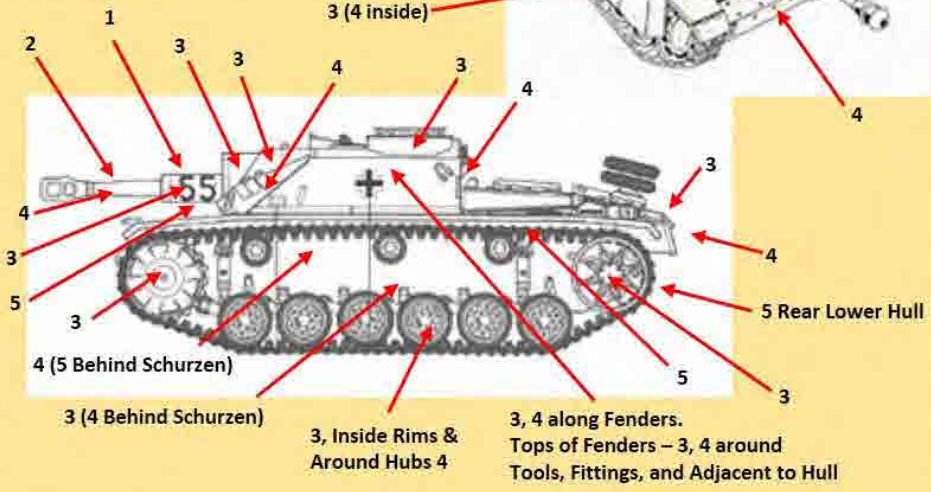
PAINTING & WEATHERING





Color Modulation Using the Stop Sign Rule (Steps 2-3)





If applying a paint type over a like paint type (oils over oils for instance), the thinner in the new layer and "reactivate" the underlying layer and cause the layers to mix, which is likely not the effect we are after. I normally apply a "barrier" between the two layers in this instance. I use **TESTORS DULLCOTE** in a rattle can. This is a clear flat lacquer that not attack, nor be attacked by, oils or acrylics. I also use this product when I need a matt cote (that is, after all, what it was designed for).

I use **PIGMENTS AND PASTELS** for a variety of weathering tasks. I tend to use these terms interchangeably. Pigment powders, such as the many colors by Mig, are available commercially. However, I normally use the pastel chalk 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 dry or mixed with water, rubbing alcohol, turpentine, or mineral spirits. The advantage of the commercial pigments is that, being specially made, they sometimes offer better adhesion, but the different isn't really very noticeable. The chalks were much less expensive and you can grind them into different sizes or grits.

As we proceed through the build, we will look at various techniques using all of these types of paint.

Top: 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.*

(StuG drawings on the facing page are from Blueprints.com)

Above: 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 dust to even heavily built-up mud.

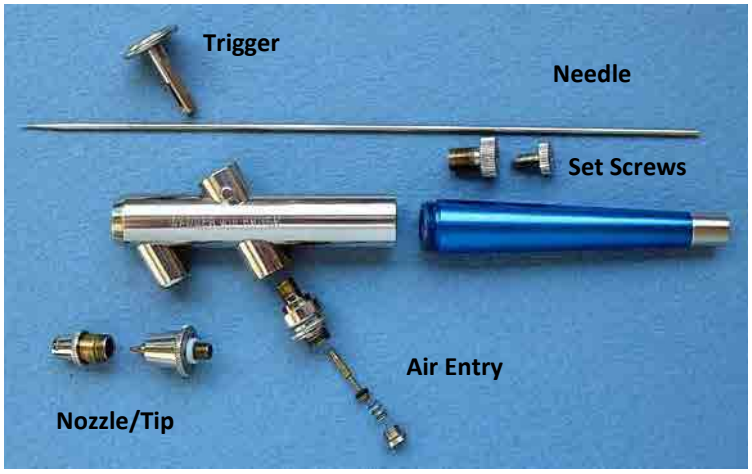
AVOIDING DISASTER: THE IMPORTANCE OF BARRIERS:

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 good result with a brush—I often brush-paint camouflage patterns, for instance. For brush painting, you need good quality brushes. While some small brushes (size 0 or smaller) are useful for some painting and weathering tasks, for overall base color 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 and to paint smaller details. We need quality brushes for other reasons, too. 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. The enemy of a good brush-painted finish is brush marks. While many finishes were in reality brush-painted, brush marks in this scale are not appropriate. 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.

AIRBRUSHING



Top: This shows what comes 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.

Middle: The pressure regulator is fitted 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.

Bottom: 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.

Good results can be obtained with a brush, but, I recommend an airbrush if you can afford one. It is a great time saver and will easily do many things that are difficult with a brush. A fancy expensive airbrush is not needed unless you plan to use it often for complex tasks. Spray paint in rattle cans can be useful for overall coverage such as priming, but have limited utility beyond that. I often use a combination of all three methods.

I use a simple ingle-action airbrush. The trigger controls air flow while the needle is manually adjusted. For general modeling, it is sufficient. A double-action brush allows you to control both air and paint flow via the trigger. Each brush is different, so you should consult the operator's manual for specifics on use of your brush.

The main factor in keeping your airbrush functioning well is to keep it clean. While spraying, when between colors, I flush the brush with Windex (assuming I'm using acrylics) and clean the needle. After I'm finished, I disassemble the brush and thoroughly clean every component. After assembly, I flush the brush out with Isopropyl alcohol and then water. I follow this process as Windex contains ammonia that can damage the 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 a matter of personal preference. You can use "canned air" designed for airbrushes, or use compressed air tanks. There are also many varieties of air compressor on the market. I use a 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. What you use it up to you.

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

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.

- **Prepare Model Parts**
  - Clean and dry all items
  - Use holders that don't require handling the items
  - 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 necessary with Vellejo 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 and nozzle.

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

- **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 and put everything away back in its place so you can find it all easily when you next need it.

AIRBRUSHING TIPS: There are several factors that will affect the quality of your paint.

- Your paint job will only be as good as the surface it is painted on. Minor blemishes WILL become 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.

- 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. With the Vellejo Model Air paints, I still usually slightly thin the paint. For thinning, I use Windex.

- 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.

- 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 thin the paint or move closer to the model.

- 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.

- Splatters can mean the paint is to thin. Add more paint to the mixture or start over.

- 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. Repair the surface and make sure it is thoroughly clean. Repaint. Cleaning the surface prior to painting and painting in a clean 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 using all the various techniques described on the previous pages. Painting steps are keyed to the diagram on page 58. With that, let's start painting the StuG.

LAYERING OF PAINT AND WEATHERING:

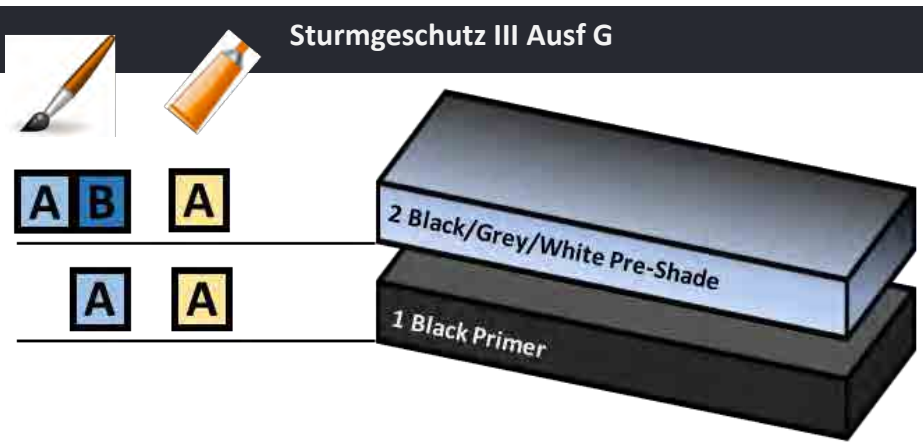
Most of my models have several layers of paint and weathering. There are layers of pre-shading, shading, base coloring, and highlighting. There are multiple layers of weathering. In some cases, there are two base colors (the underlying camouflage and the winter whitewash for example) with weathering 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.

PAINTING METHODS AND "STYLE":

Modeling is very much an individual hobby. We are all free to develop our own methods and styles. Regardless of what some may think, there is no "approved" method or style. I like a "modulated" finish with various levels of color, shading, and highlighting. But this is not the only way to paint a model. You can also paint in solid colors with no modulation, highlighting, or shading at all. It's your model—paint it as you wish.



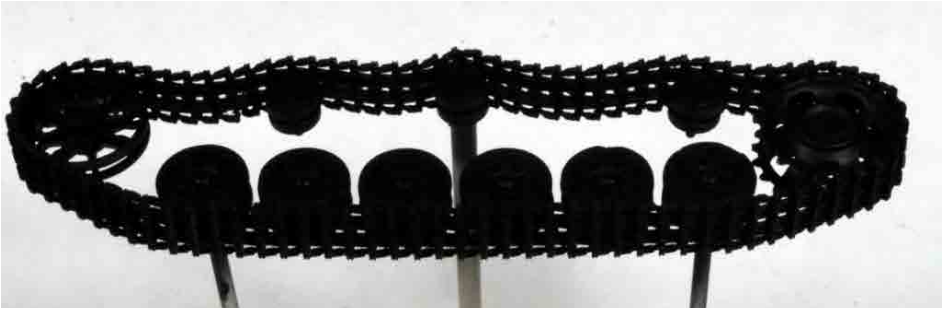
STEPS 1 AND 2: PRIMING AND PRE-SHADING

There are many ways to skin a cat. Same with painting a "modulated" - shaded and highlighted—finish. I nearly always prime with black. Priming is a vital step as we have already discussed. Black is my color choice simply because any area I can't reach with the airbrush or brush is in a suitable dark shadow (black) color. Note that these impossible to reach areas MUST be pre-painted before assembly as we've already seen with the vehicle interior. I then often pre-shade with black and white prior to adding the base color. This is really an optional step. You can also go from primer straight to base color, adding it in dark to light colors to provide the color modulation. In fact, if I am painting a multi-color camouflage scheme, that is what I normally do as the multiple layers would obscure the pre-shade. But for a monochrome finish, like this dark yellow, Panzer Grey, or Olive Drab, I usually pre-shade prior to adding the base. Let's look at the process.

PRIMING

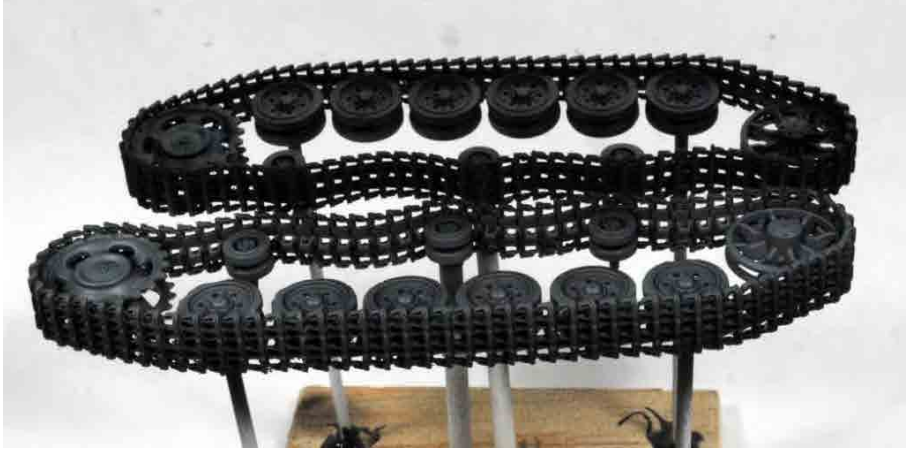
I prime the model with black as discussed above. While this could be done with rattle can or brush, I prefer using the Vellejo Black Surface Primer (near right) and an airbrush. While I would normally spray every part of a vehicle, I did not try to cover all the paper Zimmerit. The paper does not need priming like the plastic does and I wanted to minimize the number of paint layers over the Zimmerit to avoid obscuring its fine detail. Also shown at the right are the other Vellejo Model Air Colors used in the next step, pre-shading: Black, White Grey, and White.

All other sub-assemblies were primed completely in black.



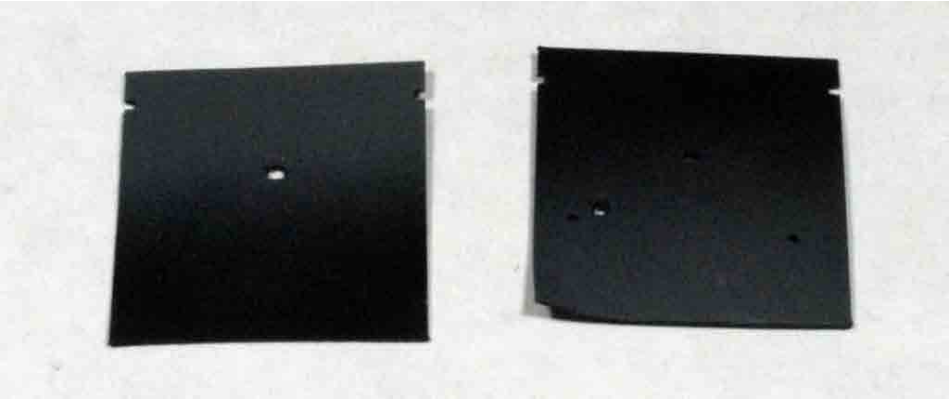
PRE-SHADING

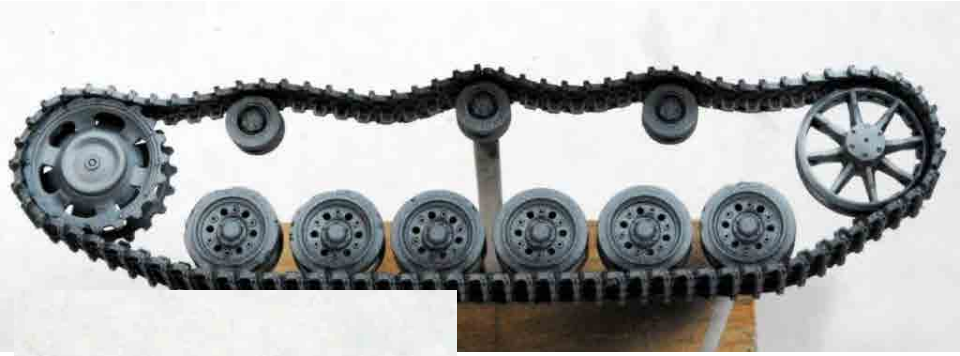
The Black primer serves as the deepest shadows in the pre-shading. For the next layer, I mixed Black with White Grey to create a medium grey color. This was sprayed on surfaces that would receive some light such as vertical surfaces and the tops of lower horizontal surfaces (fenders, rear deck, etc.) as seen here, allowing the Black to show through in deep shadows.



This color was also sprayed from a low angle up onto the wheels to provide a pre-shade to these shadow areas of the wheels.

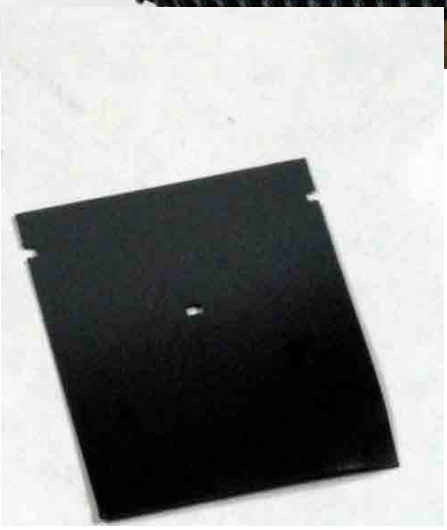
. The Schruzen plates also got some of the grey. The inside of the plates (near right) will be in shadow, so the lower portion of the plate remained black while the upper portion received the medium grey. The outside of the plates (far right) will be better lit, so only the bottom portion received the medium grey, the top portion will be lighter.

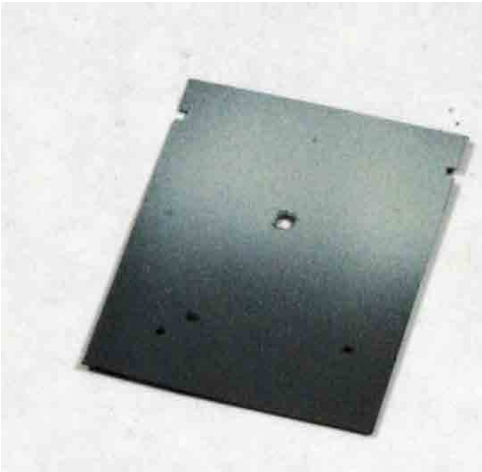




The next layer was a lighter grey created by mixing only a little Black with White Grey. This was airbrushed only on the top edges of vertical surfaces, upper horizontal panels, and the centers of selected other panels.

It was sprayed on the wheels from a high angle down onto them, highlighting only the upper surface of each wheel.



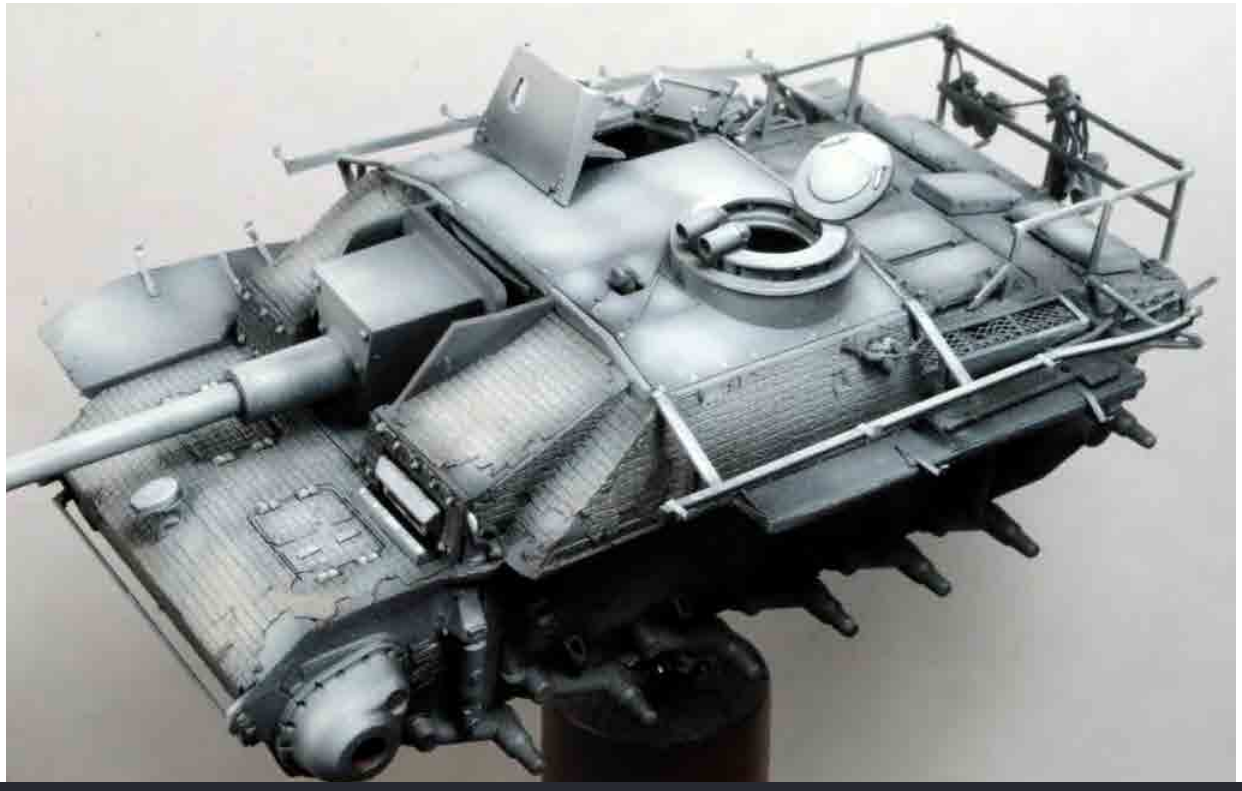


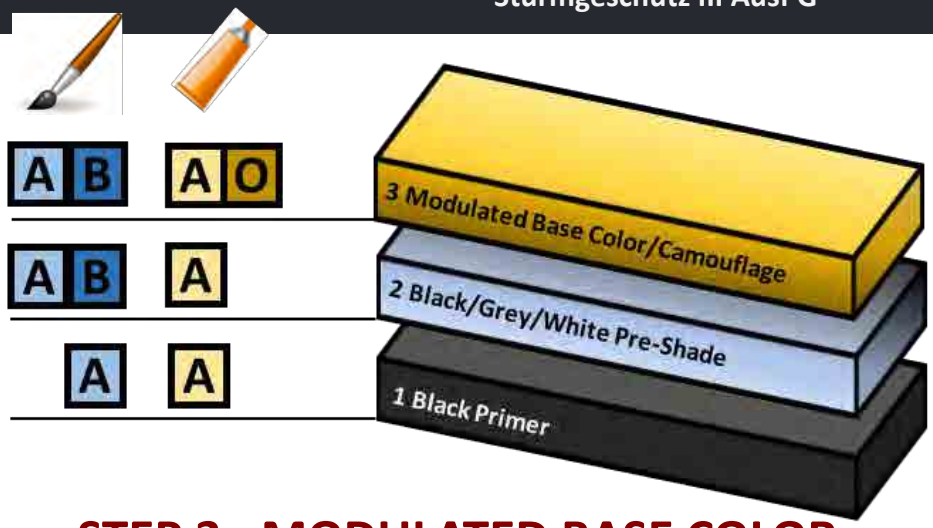
Here we see the same two Schurzen plates we saw on the previous page. The inside of the plate, in shadow, has not had any of this color applied. The outside face of the plates have had this lighter color put in place on the top portion over the medium grey lower portion.

It all looks very stark now, but the main color layers followed by the various filters will tone down and blend everything together into a seamless transition of color from dark to light. What the viewer will "see" as Dark Yellow, will in reality be several layers of numerous different colors.

The next two layers of pre-shade were also applied with the airbrush. White Grey was applied only to the highest upper surfaces and edges. White Grey mixed with White was then applied to the centers of selected top panels and high edges of things like the stowage rack and Schurzen brackets and rails. From above, the vehicle now looks predominantly white and light grey, while from below it looks mainly black and medium grey.

The final layer, shown below and on the wheels at left, was brush-painted. This consisted of pure white on the very top edges of upper fittings and panels, bolt heads, and select items such as the driver's armored visor, the top of the black-out light, the top of the Schurzen rails and mounting tabs, and the road wheel rims.





STEP 3: MODULATED BASE COLOR

As with the pre-shading, there are options in this step, too. It's entirely up to you how you wish to proceed. You can skip the pre-shading and simply modulate the base color using the same methods we just discussed with pre-shading. Or, you could simply apply a very thin layer of the base color over the pre-shading, letting it show through to provide all your modulation. In fact, when I am painting the vehicle a Panzer Grey or other dark color, that is exactly what I often do. For a lighter color, such as the German Dark Yellow, this could potentially cause it to look too grey. So while I will still apply fairly thin coats to take advantage of the pre-shade, I also apply the base color in three to five different values to enhance the modulation effect. The bottom line is that there is no single correct technique—use whatever method you are comfortable with and that provides the effect you are after. Only by building/painting models and thus gaining experience will you develop the ability to predict which combination of methods will work best for what you are trying to do.

For the modulated base coat, four values of dark yellow were applied to the model using the exact same methods we saw with the pre-shading. The colors used to create these values are shown at right.

The darkest color was created by mixing Cam. Med. Brown with Khaki Brown.

The second color was straight Khaki Brown.

The third level was made by mixing IAF Sand wth Khaki Brown.

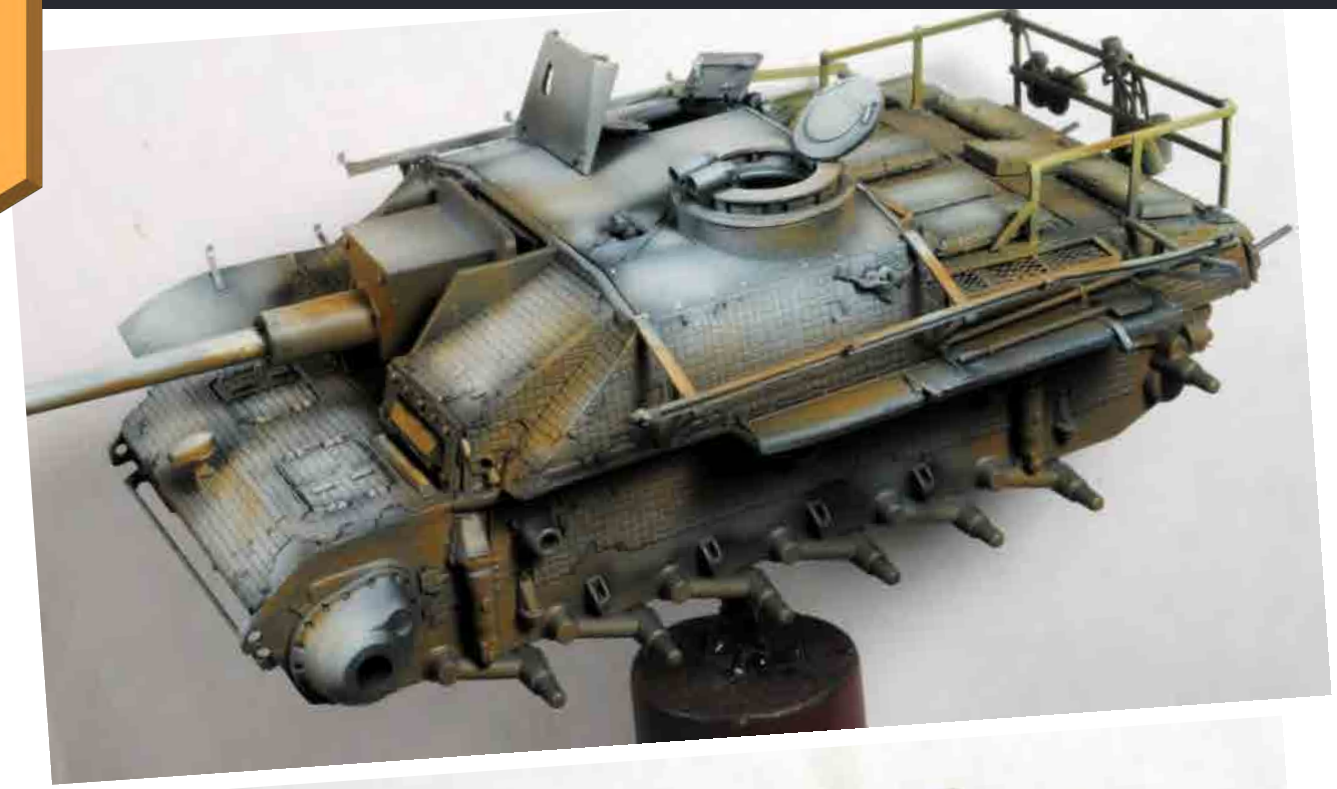
The final level was made by adding more IAF Sand to this mix.

Failure is an option:

In the book "Art and Fear" by Bayles & Orland is a story of a ceramics teacher who divided his students into two groups on the first day of class - one group would be graded on quantity only and the other would be graded on the quality of a single pot. The results were surprising—the finest pots were made by the "quantity" group! They had been churning out pots, learning from their mistakes, and getting better while the "quality" group sat theorizing about and planning for perfection rather than making pots. All they had to show for their efforts were great ideas and a poorly made pot – they lacked the practical experience to do better.

This applies to our hobby. Our first efforts will not be masterpieces, but by viewing this in a positive light – not being discouraged – we learn, improve, and become more creative and more resilient – seeing errors not as reasons to quit, but as challenges to overcome.

We don't aim to fail, but we shouldn't be afraid to. We learn as much – or more – from failure as from success. So build models, do your best, be happy with the result, and use the experience to do even better next time. Don't be afraid to change course mid-stream if a technique doesn't work or if your idea turns out to be impractical. Try new things and experiment. If you put off a project until you "get better", you will never be good enough to tackle the project—the only way to gain the needed experience is to do it!

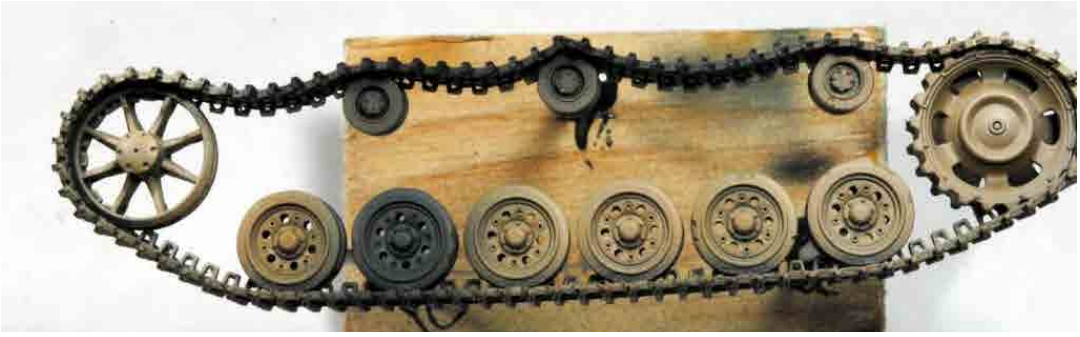


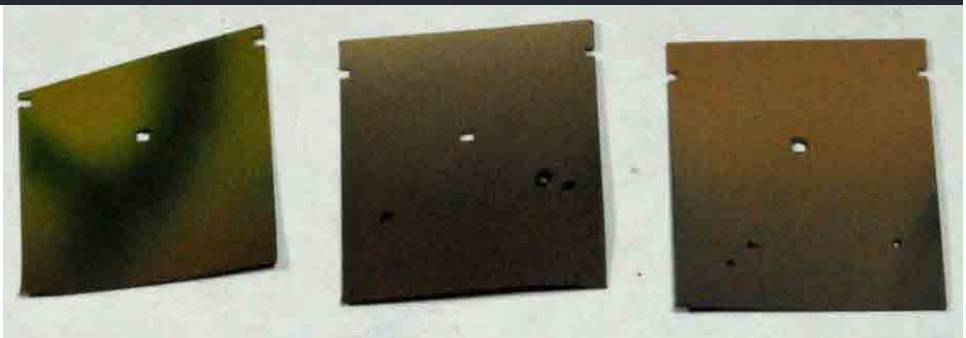
So as not to obscure the pre-shade, the paint was thinned about 25% more than normal to provide semi-transparent layers of color that would allow the pre-shade to show through. Additionally, the base colors were not applied over the entire vehicle—only to applicable areas for each color. At the top we see the darkest color was applied only to the lower hull and shadow areas on the supper hull. In the bottom picture we see the actual base color—straight Khaki brown—applied only to upper sides and non-horizontal surfaces.

Below: The two highlight values were applied primarily to top horizontal surfaces, the top edges of vertical surfaces that would catch light, and randomly to the centers of some panels. Note that since my stowage rack is a designed to represent a field-installed piece, I used a slightly different color (U.K. Light Stone) to paint it. This was applied very thinly allowing only the pre-shade to provide the needed modulation.

I also varied the color on road wheels that had been replaced, perhaps due to mine damage or just general wear. Two wheels (under the missing fender section—likely caused by a mine) were painted Dark Yellow (and then highlighted by adding Sand to the Dark Yellow). A road wheel on the other—perhaps cannibalized from an older vehicle—was painted Panzer Dark Grey (and then highlighted by adding Intermediate Blue to the Panzer Dark Grey).

The color difference between the three dark yellows used on the vehicle (vehicle, rack, replaced wheels) looks extreme, but I did't want it to be completely lost under subsequent layers of color and weathering.





In the center is the inside of one of the Schurzen plates. It is darkest in the deep shadow area over the lower hull. The top portion is in medium shadow with only a bit of highlight at the top above the mounting rail. At the right is the outside of a plates. It shows shadow only near the ground and where it is bent inwards. The plate at left, was painted using a different dark yellow color with green camouflage added. It represents a plate "borrowed" from another vehicle. The brighter yellow and the green will also add a bit of color and visual interest to the model.

This wraps up the airbrushed portion of the modulation process, but we are still not complete. Some final highlighting, edging, and color variation will be added using paintbrushes and both acrylic and oil paints.

THE REAL THING

Here we see a crew changing out a road wheel. This was normal maintenance accomplished when a wheel was worn or damaged. Although vehicles usually carried one or more spare wheels, in many campaigns German maintenance units did not have enough spare road wheels and road wheel arms to repair all the damage incurred (a lot due to Soviet mines). This often led to the self-defeating practice of cannibalizing some vehicles to keep others operational. It's just such a scenario some of the components on my tank represent. This shows how small details can help tell a story and turn a model into a teaching tool.

But is it Art…?

It's popular, especially in the figure modeling world, to refer to modelers as artists and modeling as an art form…but is it? A better question might be, "what difference does it make?". Call it whatever you want, it changes nothing.

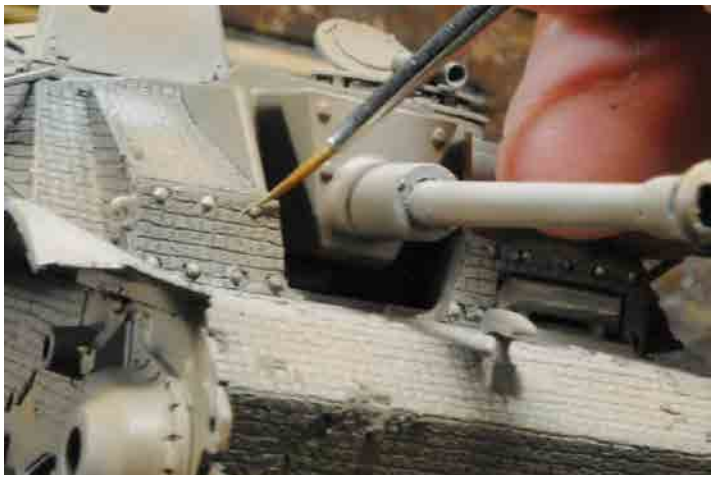
What is art? The Mona Lisa? Michelangelo's sculptures? A white canvas with a splatter of paint on it? Construction paper shapes glued to a paper plate by a child? The dictionary defines art as, *"the conscious use of skill and creative imagination especially in the construction of aesthetic objects; 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 qualify. 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.

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 most 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. 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 of us 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.

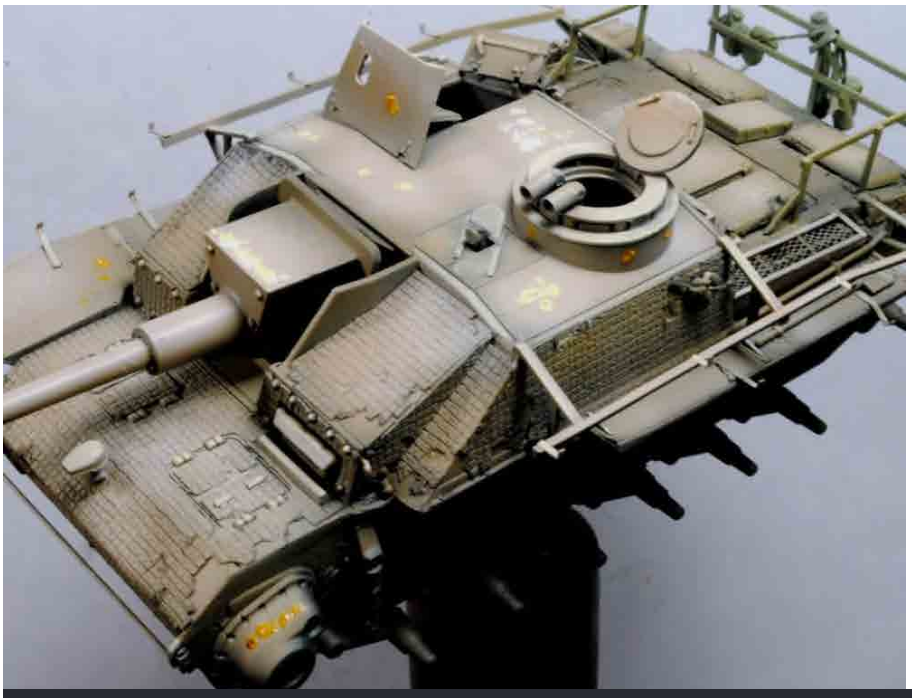
On the other hand, I think most who prefer the term "artist" do so simply because it sounds more impressive—a higher level than craftsman or modeler. By calling themselves "artist" they can look down their noses at mere modelers. On a still more negative note, there are those who claim "artistic license" 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. 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. If others like them, too, great!



Switching to paint brushes but staying with acrylic paints for now, I added more modulation. This consisted of the colors shown above left—IAF Sand, Sand, and either color mixed with White. These lighter—high highlight—colors were applied to top edges, various bolt heads, hinges, latches, high points of smaller items, the rim around the commander's hatch, and items such as these.

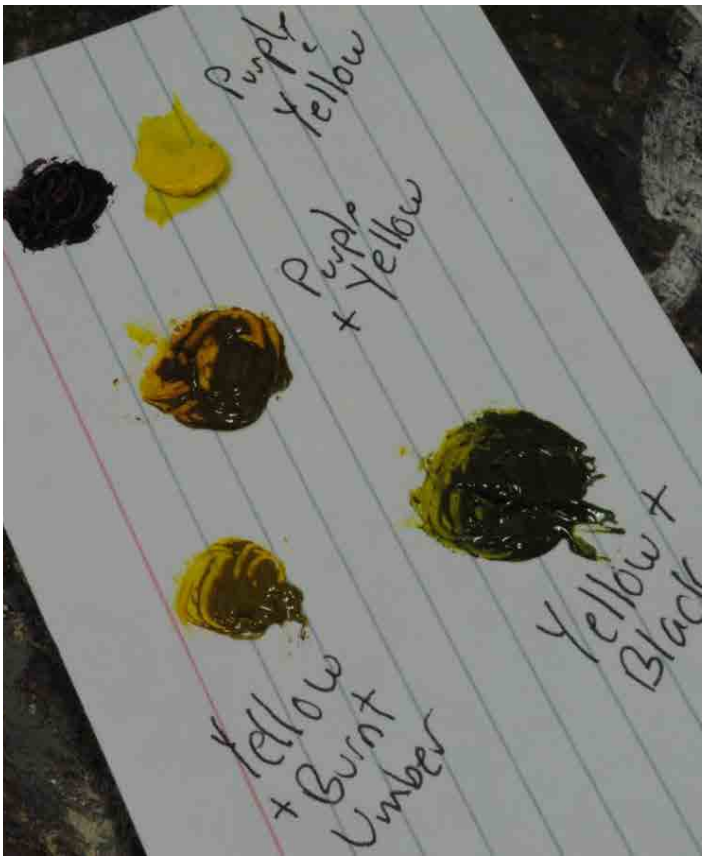
Next, oil paints were used, also applied with a brush. I used Yellow Ochre, White, a mix of Yellow Ochre and White, and German Three Tone Fading from 502 Abteilung. (The local hobby shop had these on clearance for $1, so I gave them a try. While they are fine, they are really no better or worse than other oils—they just come in convenient colors). I put small bits of oil on an index card to soak up the excess oil.



These are applied in a method very similar to what we will see in Step 7 (Dot Filters). As for my painting chart, there is a great deal of overlap between steps and the progression is not clear cut. Dots of colors were applied to various panels. These dots are straight oil paint with no thinner. (For thinning oils, and cleaning the brushes used, I use the Mineral Spirits shown above).

Left: Using a brush damp (not wet) with Mineral Spirits, the dots of oil are worked into the surface and feathered out avoiding hard edges. These colors are used not only to apply some additional highlighting to high areas but they can also vary the color of certain panels adding more visual interest to the model. Don't worry if it looks a bit stark at this point—the overall filters we apply in Step 5 will tie everything together.

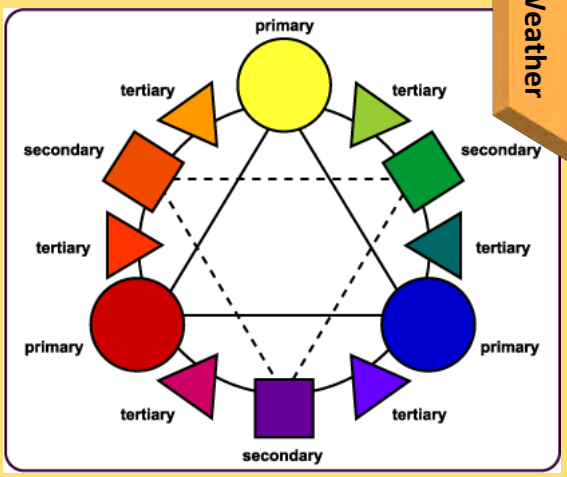
Above: For adding more shadow I decided to shade using complimentary colors (see next page). Crimson Alizarin was mixed with French Ultramarine Blue to get purple—the complement to yellow.



Left: Playing with color is fun—we can achieve different effects based on how we mix. At top we see the compliments Yellow and Purple. To shade Yellow we can add purple. We get a different shadow effect by adding Burnt Umber. But if we add Lamp Black… we get Olive Green! Incidentally, this was exactly the mix used by the U.S. Army.

The purple was mixed with Mineral Spirits to create a thin glaze. A glaze is a bit thicker than the filters I usually use, but not much. It adds a thin, transparent layer of color to the areas it is applied to—allowing the original color to show through and remain dominant, but still modifying the color. I often use glazes to provide highlights (using lighter glazes than the base color) or shadows (using darker glazes than the base color).

COLOR THEORY AND COLOR MIXING:



Having a practical understanding of color theory saves us time when choosing and mixing colors and helps us get better, more consistent results. I suggest getting a color wheel and learning how to use it.

-**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).

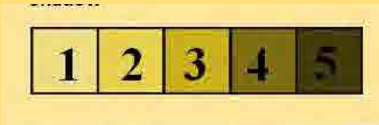
-**Tertiary Colors** are created by mixing a primary and secondary color.

-**Neutrals** are technically not colors and can not 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** are opposite each other on the wheel, for example purple and yellow, red and green, or blue and orange. When placed beside each other, they create the highest contrast, but when a color is mixed with its compliment it appears more subtle or muted. These colors can be used for shading. For example, purple is a great color with which to shade yellow.

-**Warm and Cool colors** 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 (a winter scene would have lots of cool colors while a passionate scene could use warm colors). Normally, I prefer a warm palette unless I doing a winter or a "dark" (as in evil) scene/

-**Value or Shade** is the relative lightness or darkness of a color. We use value to shade and highlight. In the below examples, the base color is marked "3". Highlights are to the left and shadows are to the right.



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, there will come a time when what you need isn't readily available, especially when using several values of the same color for shading and highlighting. It's far easier to mix these from a single base color than to match commercial colors.

It may seem common sense to highlight by adding white and shade by adding black, but this usually isn't a good answer. Adding white can make your color appear chalky, and black can muddy colors. For example, lighten red with a bit of flesh or orange, and add dark brown or dark green for shading. Lighten green with yellow or tan. Shade yellow with brown or purple. For white, start with an off-white made by adding blue, brown, grey, or green. Then you can add white for highlights and more of the other color for shades. Using different colors give different effects. Shading white with blue gives a very cold white, while shading with brown or grey results in a warmer color.

The best way to learn is to practice and experiment. A color wheel can help you predict results. It's not hard—you can probably become an expert with about an hour of practice.

The thin glaze is applied as needed in shadow areas. Using an even thinning mixture, I also applied it as a "wash" over the Zimmerit. Settling in the grooves, it makes the detail on the product really pop out. .

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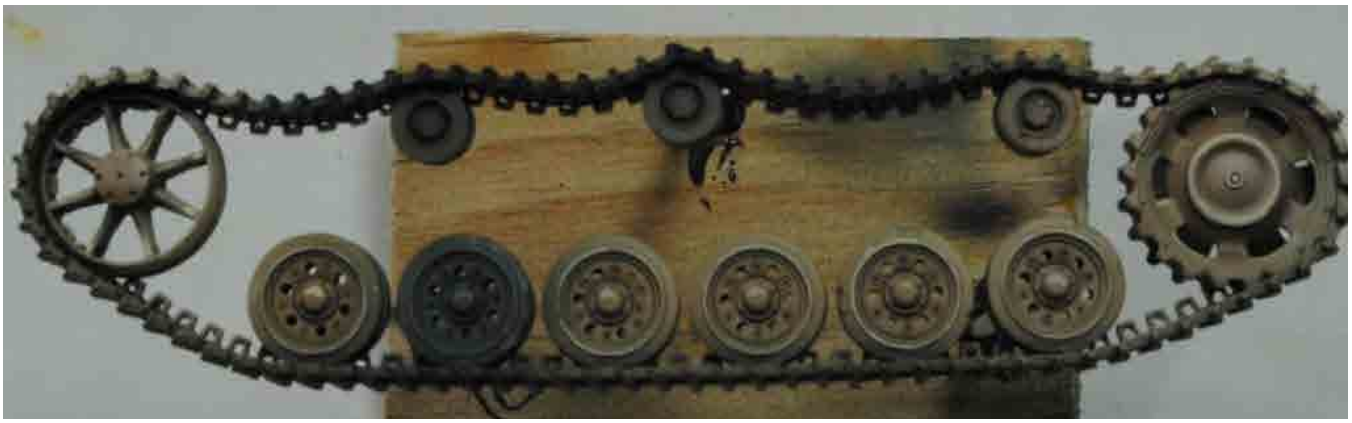
The photo at right shows the modulation effect on the rear exhaust guard. This had originally been painted in the shadow color when airbrushing the pre-shade and base color. In the brush-painting stage, the raised portions were highlighted and a few layers of the purple shadow glaze added. Compare these darker areas on the lower rear portion of the vehicle with the more well-lit portions of the rear hull above. The photos below show the vehicle will all "modulation" complete. Note the relative lightness of raised areas and small details. Later outlining (pin washes) will combine with this to really make these details "pop".



STEP 4: DECALS

With care, decals can look as good as painted markings. I add decals after painting, but prior to most 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 to be 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.

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

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 (the blue lines in the bottom row), bottom row, the flat surface can cause air to become trapped, leading to "silvering", where the decal film is very visible. On the gloss surface, the decal snugs down and conforms to the surface.

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.

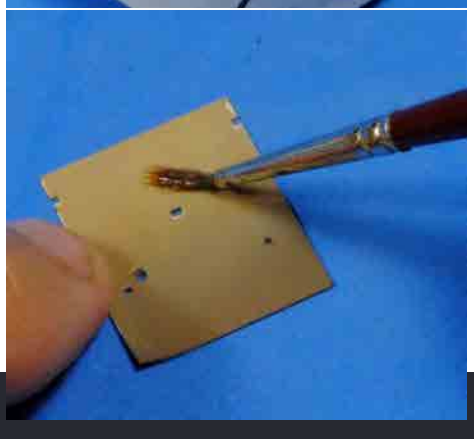
Once the decal is firmly in place and completely dry, I apply my overcoat of Future.

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 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.

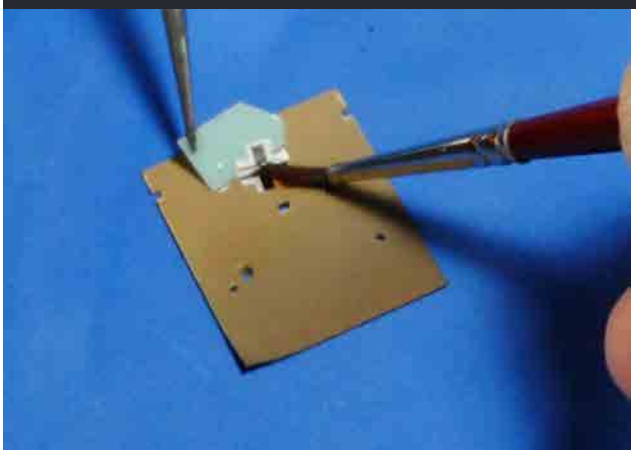
Tools for applying decals are tweezers, Q-Tips, a paintbrush, and setting solution and solvent. I use Micro Set and Micro Sol respectively. These both soften the decal film, allowing it to better conform to the surface. Setting solution is mild and is usually all that is needed on a flat surface. Solvent 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.



Above: In areas were 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.

Top Right: 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.

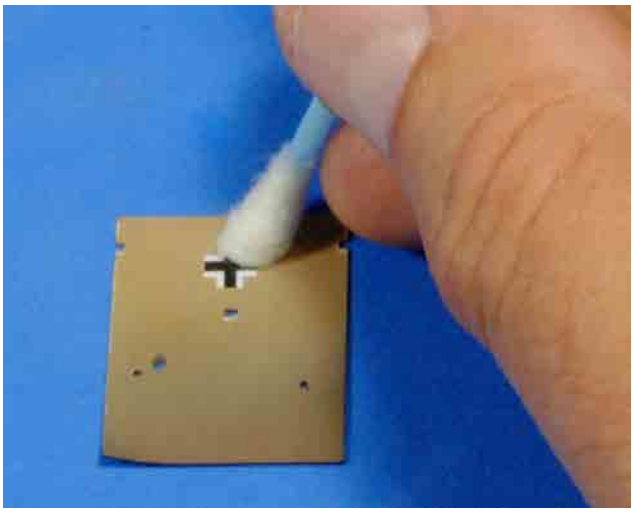
Bottom Right: While the decal film is loosing, apply some setting solution to the area which will receive the decal.



The decals is brushed off the backing onto the model. Once in place,
more setting solution is added to the decal. If this were a rough surface, solvent would be used instead.

Excess solution and water are 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

Below we see how effective decal solvent can be at settling the decal down over rough surfaces.

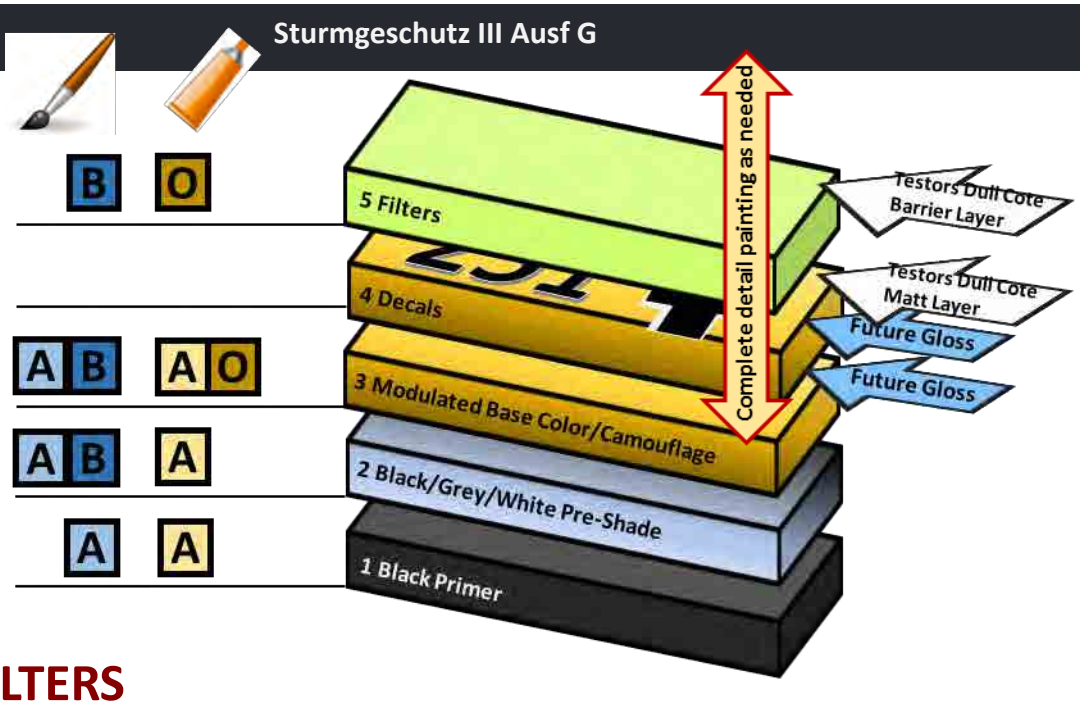


Once all decals are in place and any water, setting solutions, and solvents are completely dry, apply a another layer of Future to seal the decal. If this is not done, while the decal film may not be visible, any later dry-brushing will catch the edges and make it very apparent. The raised edge will 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 Testors Dullcote) as needed.

If all was done properly, your decals will look painted on. Decals are very minimal on this build, consisting only of the national Balkenkreuz on the rear hull and one of the Schurzen plates.

THE REAL THING

By regulation, German armored vehicles carried a variety of markings including the national Balkenkreuz, tactical numbers, formation signs, and tactical symbols. Other markings could also be present such as railroad placards and command pennants. Sometimes unofficial markings such as "kill" markings and vehicle names were also present. A study of photos quickly reveals that vehicles which carried all required markings in the specified locations were actually the exception. Look at the photos of StuGs I have included throughout this book. The most common marking is the cross, but even this is not standard. Sometimes we see it on the hull, other times on the Schurzen, and sometimes both (one of the vehicles shown on page 9 even apparently has the cross on the commander's cupola).



STEP 5: FILTERS AND BEGINNING TO PAINT THE DETAILS

The model, as is, is starting to look pretty good. Hopefully, we have seen that a monotone finish does not have to be boring and is, in fact, anything but monotone. However, some of our contrasts are rather stark and abrupt. We can "visually blend" all this together with the use of filters. These can also slightly alter the color or appearance of selected panels and pieces. This is really nothing more than what we have already seen, simply another layer. While I have broken my painting and weathering process down into steps to make it easy to explain and understand, it really is seamless with a good deal of overlap and back-and-forth between the various steps.

We also have consider the other various details on the model such as tools, sights, tracks, road wheel tires, and other items that are colors other than the vehicle base color. These are painted at whatever point in the process they need to be painted into order to be weathered, as needed, along with the remainder of the vehicle. As we proceed through the painting process, we will discuss these details at the point where they were painted.

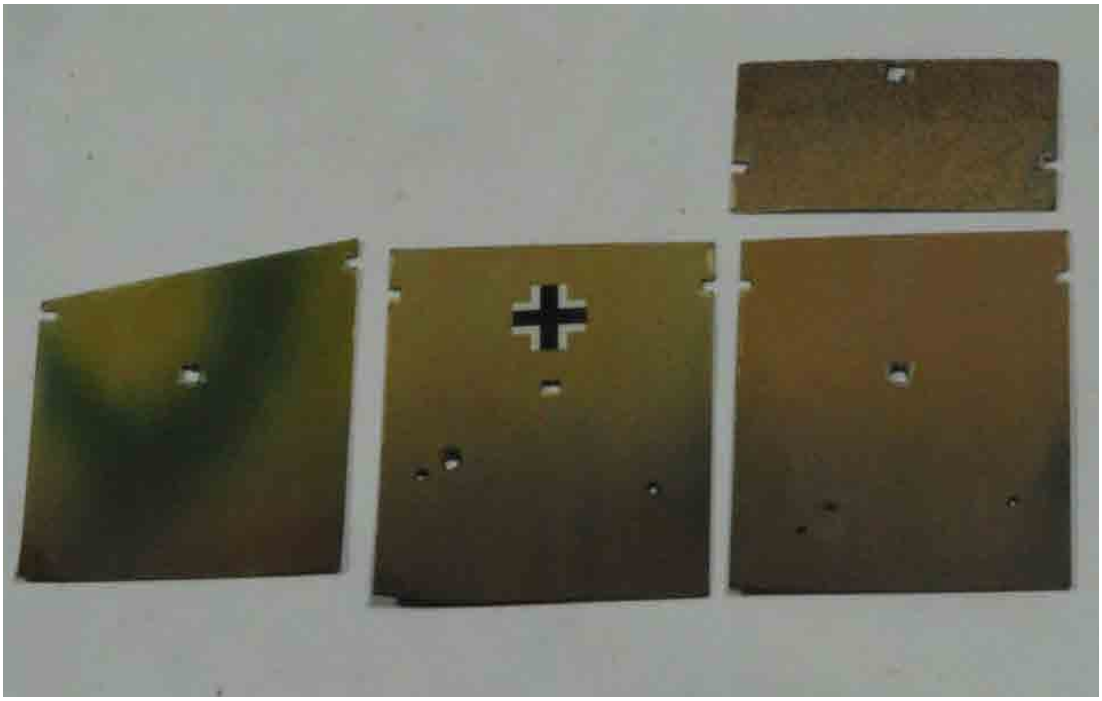
I started this process by painting the muzzle brake and adding "kill" rings to the barrel. The kill rings were included on the kit decal sheet. However, as these were actually hand-painted in the field , I thought the decal looked way too uniform and neat. After applying the decal, I hand-painted over the markings with several different values of white and light grey. The muzzle brake was painted black as a base color. The first highlight was created by mixing Midnight Blue and Pewter Grey (craft paints) with the Black and adding this to the top and sides of the muzzle brake. The second highlight was created by adding more Pewter Grey and applying this to the top of the muzzle brake and the flanges. The final highlight was straight Pewter Grey applied only to the flanges and edges.

The top photo shows the variety of oil paints I used to create the filters. Although new oil paints applied over old paints will reactivate the old paints, this will not be an issue in this case as there several barrier layers between this layer and previous oil layers. These barriers are the two layers of Future and the layer of Dullcote. The bottom photo shows small amounts of many of these colors mixed with Mineral Spirits to create very thin mixes of oil paint. These were applied by brush where desired

Filters mixed were:
-Purple (using the same red and blue as earlier to further reinforce selected shadows)
-German 3 Tone Fading
-Neutral Grey
-Neutral Grey + Yellow Ochre
-Yellow Ochre (these last four filters were applied over select portions of the vehicle to slightly dull the contrast, "visually blend" all the modulation colors, and subtly alter the color on various Schurzen plates)
-Burnt Umber (used in select shadow areas)
-Burnt Umber + Black (this slightly thicker filter was applied as a glaze to the barrel to slightly darken it, recreated the look seen in many photos)

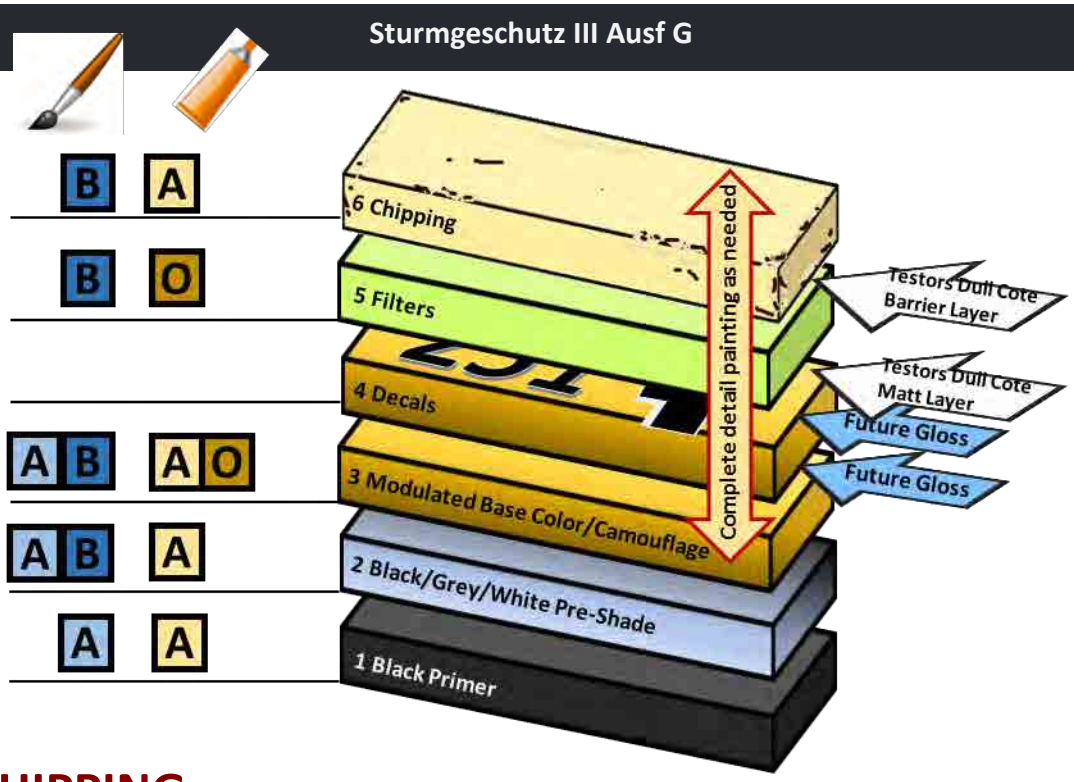
THE REAL THING

It has been something of a fad in recent years to paint barrels and muzzle brakes in different, contrasting colors to the rest of the vehicle. This is almost invariably a primer color as if the barrel was replaced without being repainted. While there is some photo evidence this happened, it appears to have been quite rare. What is certainly incorrect is to paint these items in red iron oxide primer—barrels and muzzle brakes were primed in a heat-resistant black lacquer. What appears more common are barrels that, while still the same dark yellow as the vehicle, appear to be darker. I can only assume this is either because of the underlying black primer or due to heat burning the paint—possibly both. I did notice when studying photos of StuGs that the muzzle brake often appeared very dark, as if it were still black. This is illustrated by the above photos of StuG Ace Leutnant Walther Oberloskamp's vehicle. This is the look I tried to achieve with my model. In these photos, note also the kill rings on the vehicle barrel.



Photos on this page show the vehicle after the filters have been added and dried. While the modulation is still very apparent, some of the high contrast has been slightly reduced, giving a more subtle transition between colors. Note also how the gun barrel has taken on a slightly darker appearance with less uniform color. Finally, note the Schurzen plates. The filter slightly reduced the starkness/brightness of the decal colors. It also slightly varied the apparent color between similar plates as best shown by the two nearest plates in the bottom row.

AS MANY OF THE NEXT STEPS WILL ALSO USE OIL PAINTS, IT IS IMPORTANT TO ADD ANOTHER DULL-COTE BARRIER LAYER



STEP 6: CHIPPING

Prior to adding dot filters, dust, rust, and other weathering, I often add chipping. This can also be done after adding these other things. In fact, one can move back and forth between the steps. For example, we can add chipping and flaking prior to weathering to represent old chips. Newer chipping can then be added on top. Chipping can be done with either acrylics or oils as you prefer. I normally use acrylics. We also continue to paint details as needed. I started by painting the damaged areas on the Zimmerit.

Chipping is sometimes a controversial technique. It certainly owes as much to artistic license as to reality. In this scale, many chips would hardly be visible, and most combat vehicles did not survive long enough to sustain the level of wear we often model on our vehicles. I am a fan of the technique. While the realism may be arguable, it certainly helps impart the feeling of hard-use and wear on a vehicle. In that sense, it is a useful technique to help tell the vehicle's story and to portray the tough field conditions they operated in.

Let's look at how this was done.

THE REAL THING

We saw this photo previously, but it perfectly illustrates the effect I was after with damaged Zimmerit. At the factory, the Zimmerit was applied in two thin layers on top the red oxide primer. The top layer was textured. Many photos show the Zimmerit chipped, flaked, or damaged. In most instances, it appears that the damage was confined to the top layer or that, at the very least, a "skin" of the material remained adhered to the vehicle. In these instances, the color of the exposed material is that of the Zimmerit itself. Source state this was a light tanish-grey color. In some instances, it appears the material was chipped or flaked off completely, revealing the red oxide primer underneath. In instance of small-caliber shell/bullet strikes or of partial penetrations, the bare metal of the vehicle would have been exposed. If, after damage, the area was repainted, then there would be no difference in color in the damaged area.

Prior to other weathering, I painted the damaged Zimmerit so these areas would be weathered along with the rest of the vehicle.

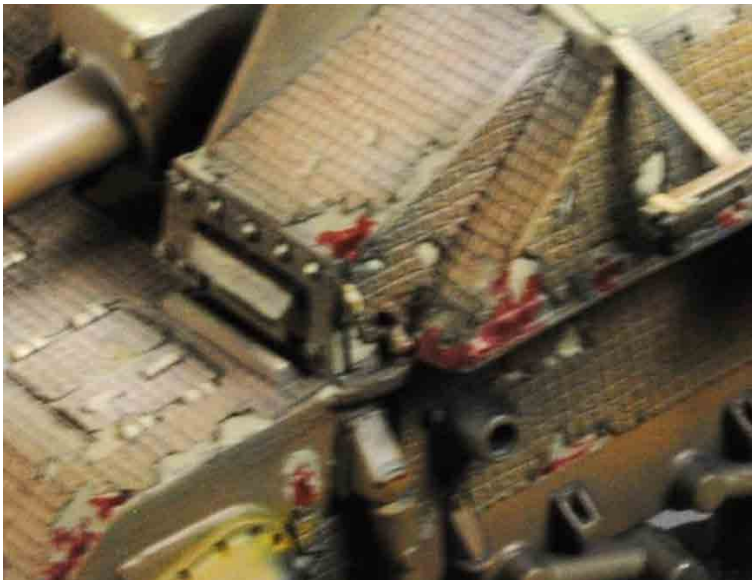
Top: I started by painting the damaged Zimmerit areas in a mix of US Grey Light and Sand Yellow. This is as far as this damage went in most areas.

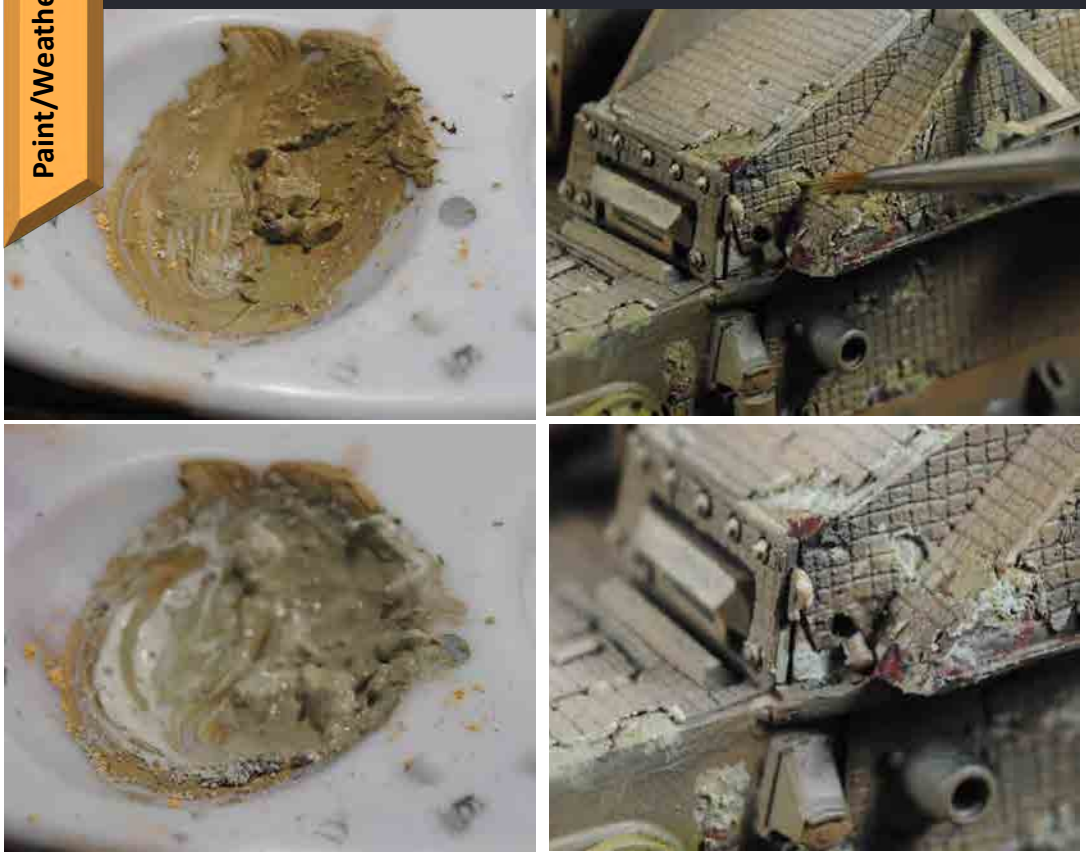
Middle: Only in heavily damaged areas did I go down to the primer. These areas were painted in a mix of German Red Brown and Chocolate Bar (a dark redbrown craft paint).

Bottom Left: Shading and highlighting were created by adding a line of high highlight color to top edges and a line of Dark Burnt Umber under the shadow edges.

Bottom Right: Areas taken down to the bare metal were painted with a mix of Dark Iron (Andrea), Black, and Burnt Umber (craft paints). Dots of rust were added with Brown Iron Oxide (another craft paint).

While it looks fairly good at this point, the work can still be improved. Most photos of damaged Zimmerit show the chipped areas to have a rough texture where the remains of the material are still adhered to the vehicle. Here, the gaps are smooth. So Texture needs added.





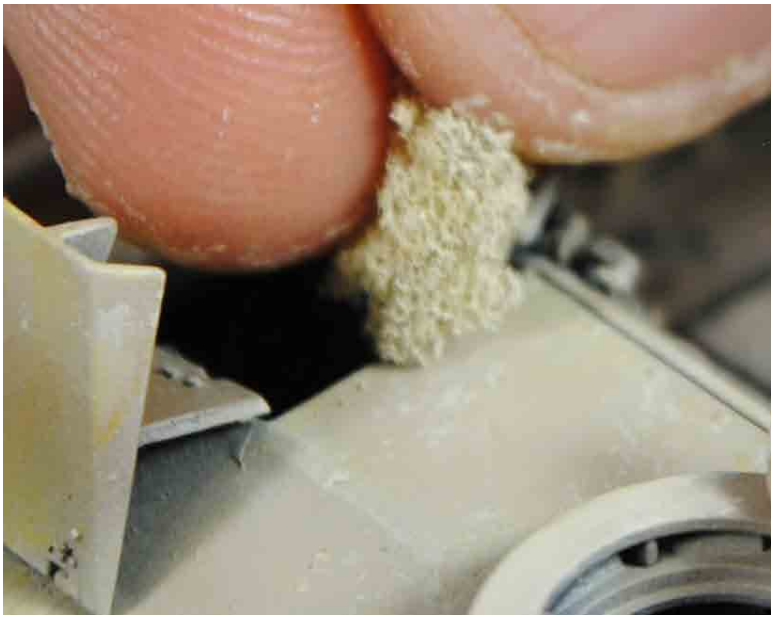
To add this missing texture in the chipped areas, I mixed a bit of the US Grey Light and Sand Yellow paints with some appropriate colors of pigments (light grey + yellow ground-up pastel chalks) and stippled this mixture onto the damaged areas to roughen the texture, better matching my reference photos. This process was then repeated using the same mix with White Grey paint and light grey pigment added to add some color variation and highlighting. I am now quite pleased with the result.

THE REAL THING

This photo (of a captured T-55 pressed into Israeli use as the Tiran V) shows the effects we are trying to achieve with chipping. Note the variety of colors and types of chipping. Small scuff show as a lighter value of the base color. Some chipping simply reveals the underlying color. Deeper chips go all the way down to primer or bare metal—which quickly oxidizes. Note also the variety of sizes and shapes of the paint chipping. Notice also the color variations in the sand– colored paint on the vehicle. This is the effect will try to recreate in the next step: Dot Filters.

A study of photos, like the T-55 seen in the sidebar above, reveals several "types" of chipping. These can be simply scuffs and scratches which normally appear as a lighter value of the base color. We also see smaller chips, revealing underlying paint or the bare metal of the vehicle. These smaller chips are often found in clusters in high traffic areas. Finally, we see larger chips, usually where paint has flaked off or been struck by heavy objects. The latter of these are usually found on edges, where heavy items would be taken on and off the vehicle, and where pieces would bang together, such as the edges of hatches.

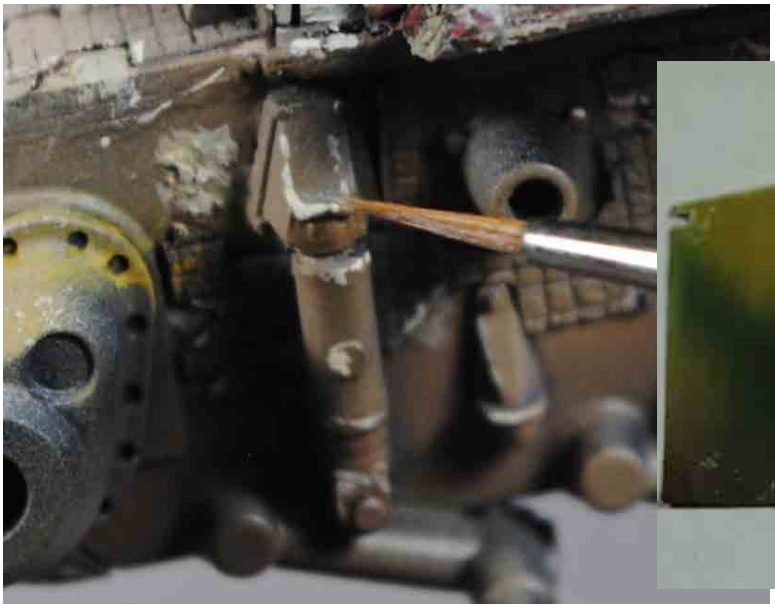
These different types of chipping lend themselves to different methods of application—using a sponge for the small chip clusters and a brush for larger paint chips. Those are the methods I used with this vehicle. For extreme damage, one could use other methods such as hairspray or salt masking just to name a couple. These other methods were not used on this build and so will not be discussed in these pages, but examples can be found in many of my other builds. In addition to types of chipping, we also see that chipping should not be randomly distributed all over the vehicle, but should be concentrated along edges, wear areas, and high traffic areas.

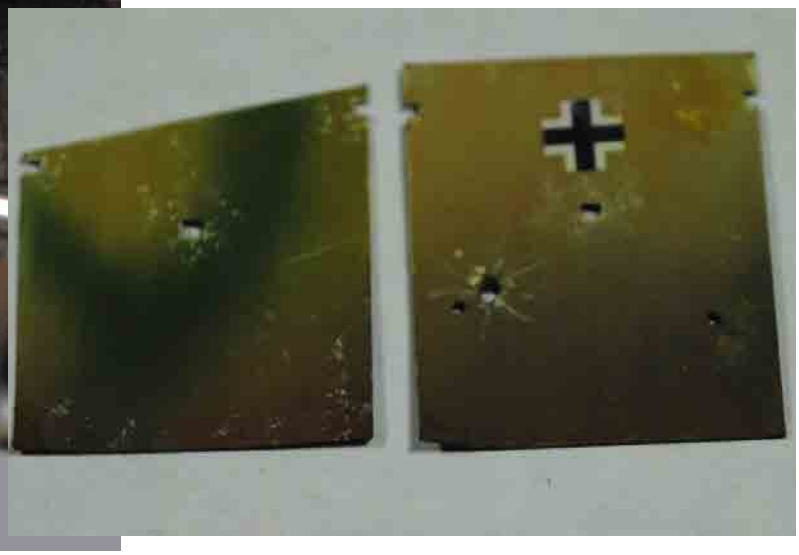


Like most everything else, the chipping is built up in layers. I started with small, light-colored scuffs and scratches using a bit of sponge torn off a piece of packing foam (above left). This was dipped in paint, and the excess blotted out on a piece of index card (above). The sponge was then stippled and dotted onto the model in the appropriate area leaving tiny marks. I did this with a variety of light tan and light yellow paints.

Setting the sponge aside, I moved to the brush (size "0") to add more "surgically applied" chips and scratches (below left).

The photo below shows a couple of Schurzen plates at this point in the process. In addition to chips, note the scratches and shell splinter splash marks. Note that where camouflage paint is applied to the Schurzen plate, some of the chips simply reveal the dark yellow paint underneath.





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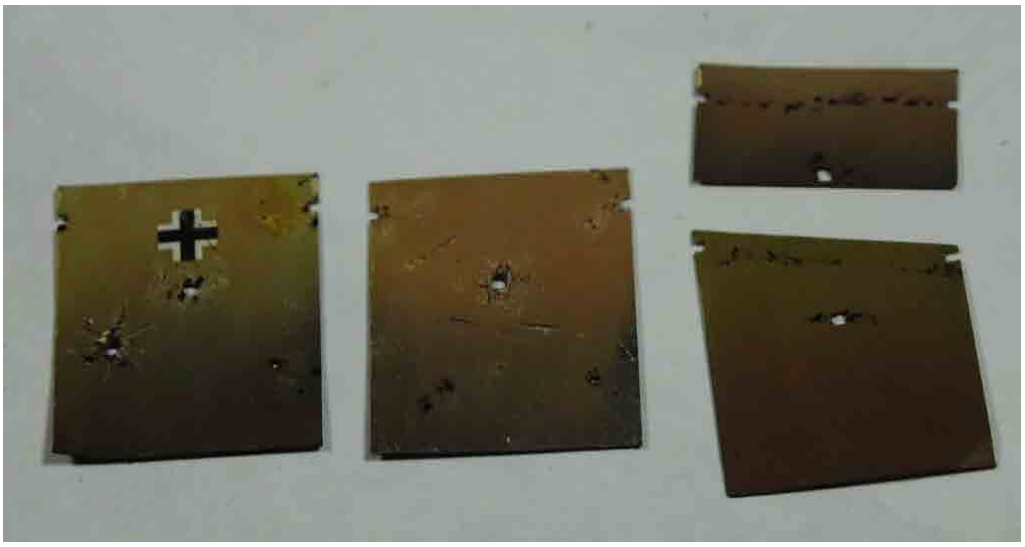


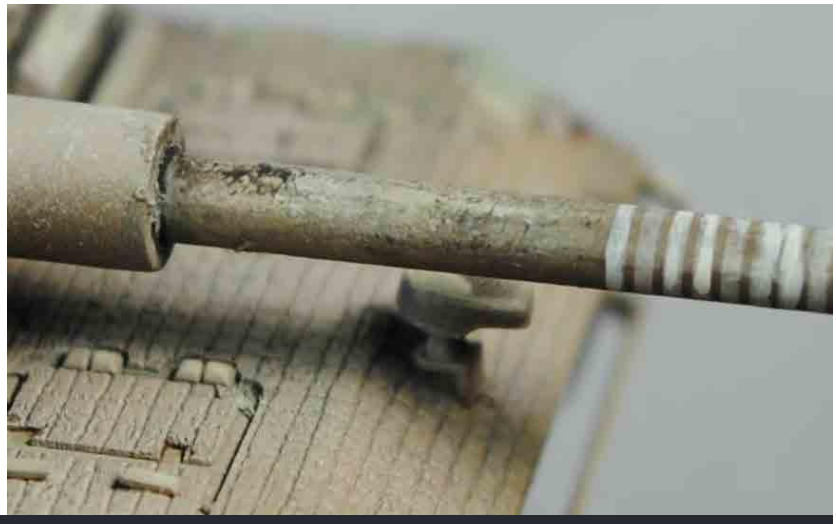
After the light colored chipping is complete, I mix a dark color made from Tank Brown and Black and apply this to the inside of many of the lighter chips, making them appear deeper. In some areas I use the sponge, but most of these are added with the brush. Note on the inside of the Schurzen plates (near plates) the chipping is linear where the plate would rub and bang against the rail.

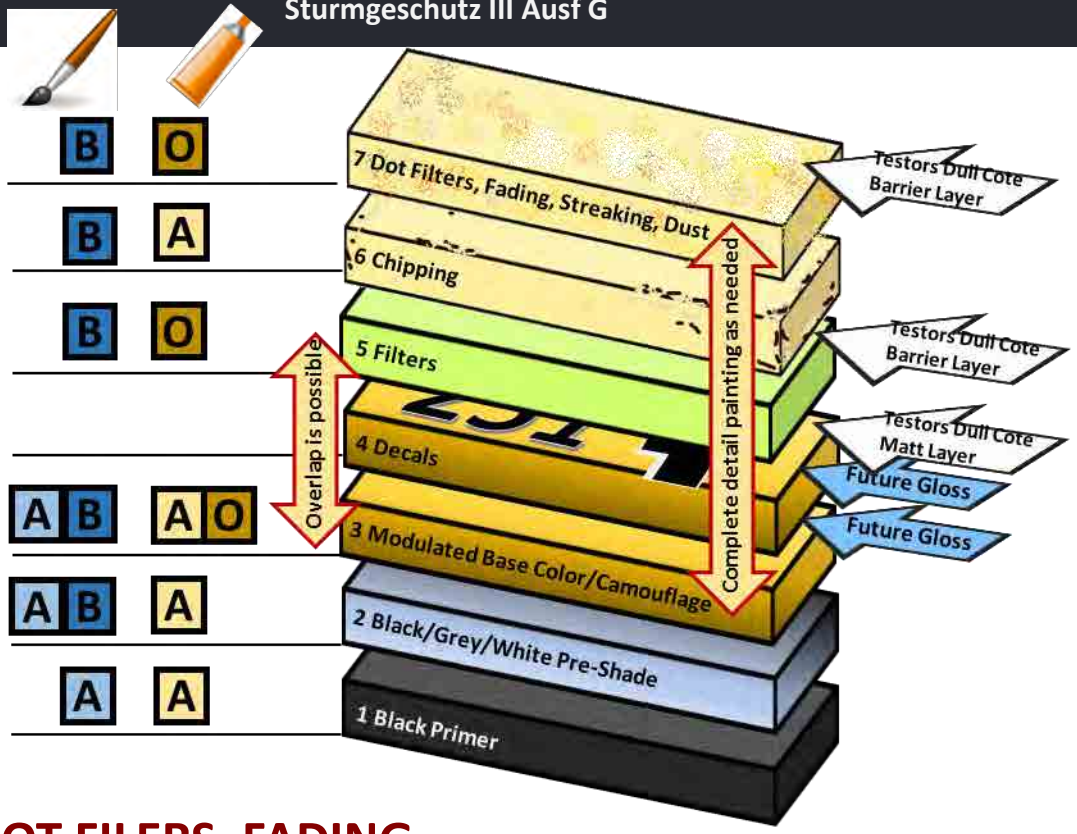
Compare the photo above with the T-55 on page 85.

Chips reveal either the underlying color, the primer color, or the bare metal color. On the gun barrel, this means very dark grey chips were added.

With the chipping work complete (unless we chose to add more later), some of the chips are very subtle, while many are quite stark. We will tone this down a bit in the next step.

Note while I use acrylics for chipping, we could also use oils. It's all based on personal preference.



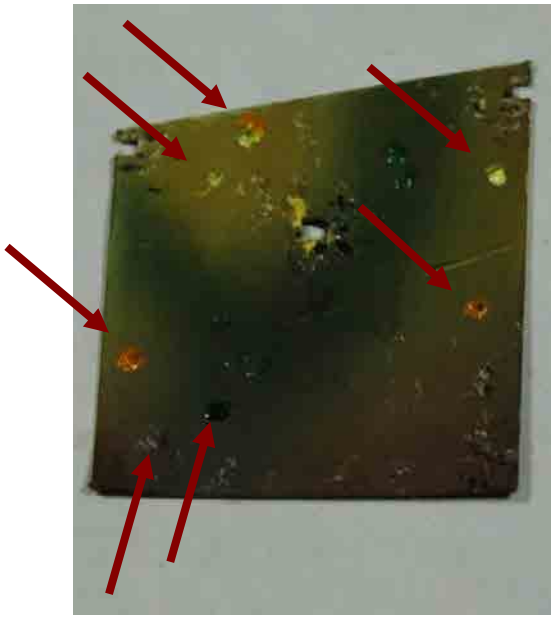


STEP 7: DOT FILERS, FADING, STREAKING, DUST

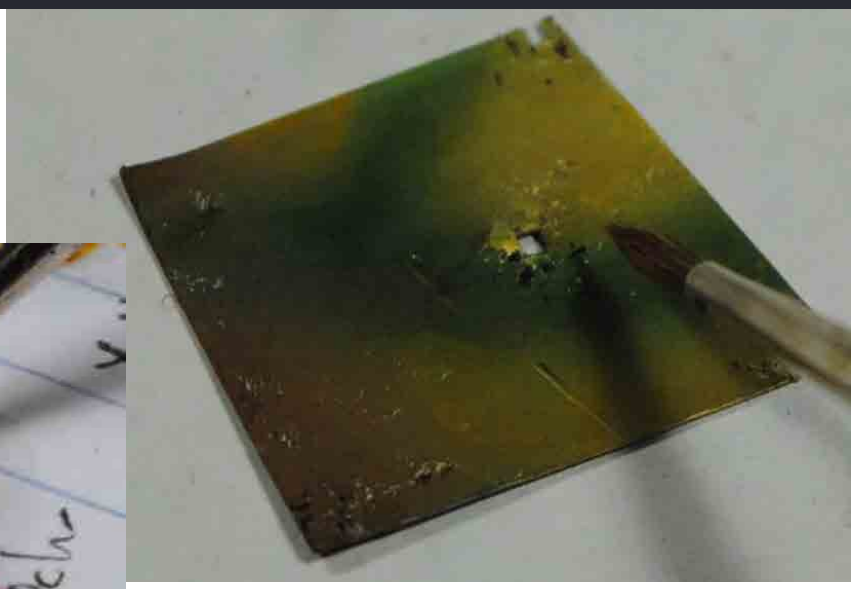
With the chipping complete (for now, we can add more later if needed), we will return to oil paints for the next stage. A barrier layer of Dull-cote had been put in place after Step 5 so the layer(s) we are adding here will not affect the filers. In this step, we will seek to recreate some of the color splotching and variation we saw in the "Real Thing" sidebar on chipping. The dot filter technique is useful to recreate not only faded paint and discoloration, but also flaking and peeling paint. We will also use these techniques to add some dust build-up in appropriate areas and some streaking caused by rust and dust carried down the sides of the vehicle by rain runoff. As always, we can add a little or as much of these effects as needed. Let's get to it.

These dot filters were applied using the same methods as the ones we used for modulation (see pages 71-72) only we are not uniformly blending these into the surface. For yellow areas, I mixed several colors of whites, greys, and yellows with oil paints. For the green area of camouflage on the one Schurzen plate, I mixed a couple colors of green. While not shown, I also mixed some various dark browns and red browns.

Right: Using this Schurzen panel as an example, several dots of various colors have been added as pointed to by the arrows.



Then, using a brush damp with Mineral Spirits, the dots are blended and streaked into the underlying colors. Some are blended almost entirely away, others are left mostly intact. The choice is yours.

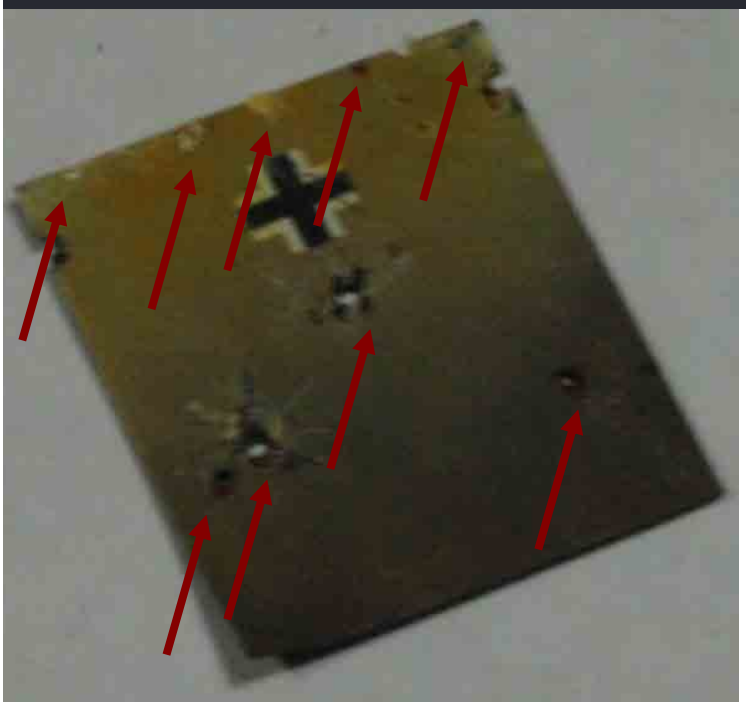


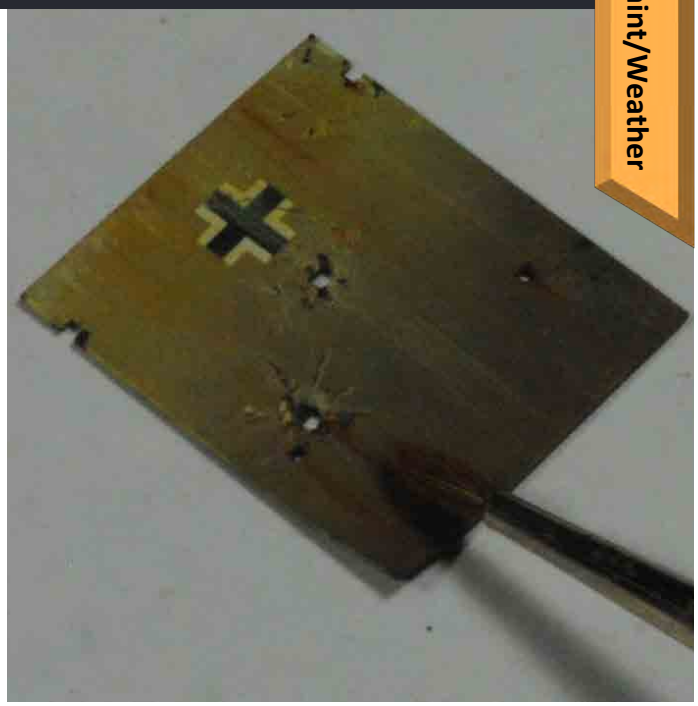
While this process works well on many surfaces such as the fighting compartment roof and Schurzen plates, it is not as effective on the rough surface of the Zimmerit. The thick oil paint would tend to build-up in the grooves in the pattern. But there is an alternative method (shown at left) of applying the dot filters that gives basically the same effect.

Top Left: Some paint is picked-up with a brush damp with Mineral Spirits.

Left: Most of the paint is rubbed-off on an index card.

Below Left: Small amounts of paint are then deposited only on the high points of the Zimmerit using a method similar to dry brushing—only in this instance we are using a damp brush. Again, as much or as little paint as desired can be deposited at any given point and blended in or away as desired.





Steaks—rust streaks and rain marks—were added using similar methods. Above left: Dots of rust color (Burnt Sienna oil paint) and dust-colored paint were added to the points where the streaks would begin. Top right. Using our thinner-damp brush, drag the dot of oil paint down to create streaks. As before, blend as much or as little of the paint away as you desire.

Here we see the dots of color applied to the hull prior to blending them. The Yellow Ochre and the Yellow Ochre mixed with White make great dust colors. These are good to put in areas where dust would collect.

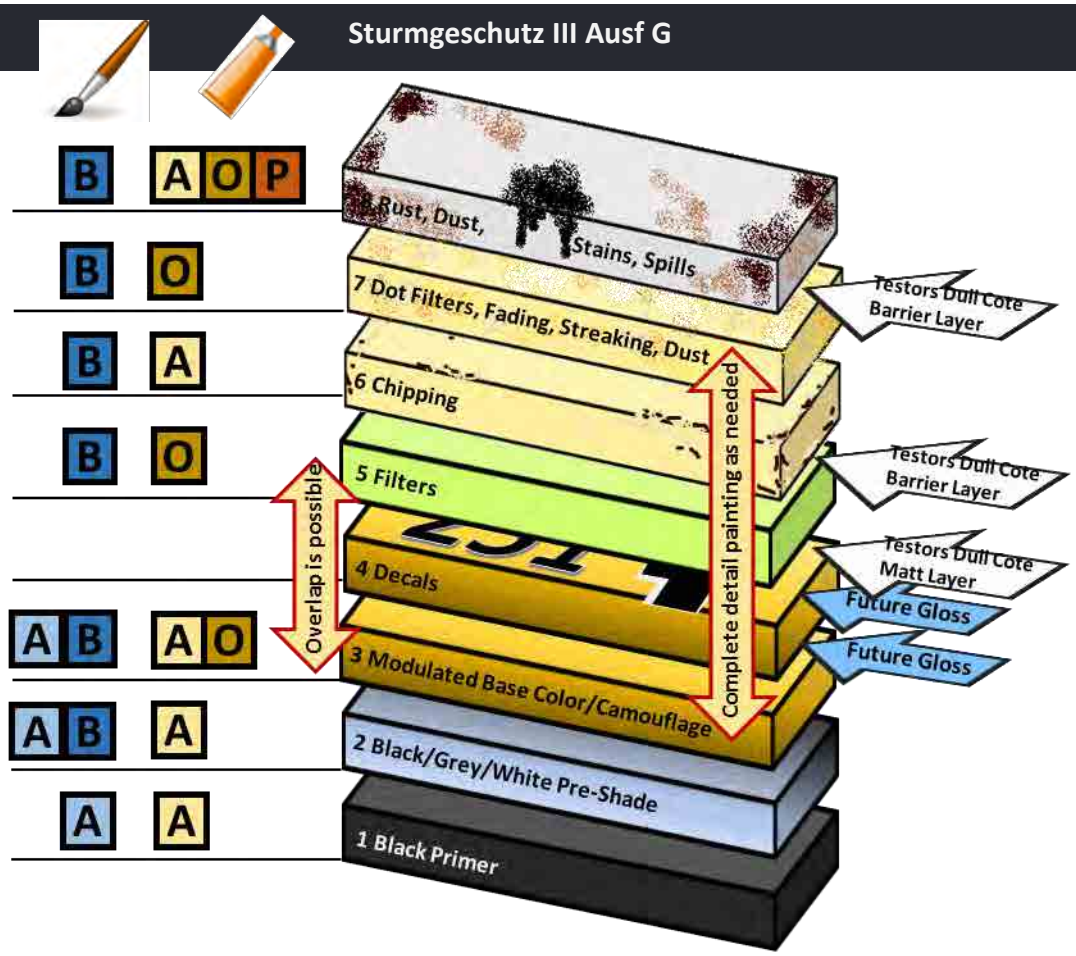
Top: Here is the final result on the vehicle hull. After blending in the colors we applied in the previous photo, I added dots of darker oil paint to the lower hull. These consisted of Burnt Umber, and a lighter brown made from a mix of Burnt Umber and Yellow Ochre. These were blended in to the lower hull to provide a layer or dust, dirt, and general grime and grudge.

Bottom: Here we see the dirty, streaked Schurzen plates. A barrier layer of Dullcote was applied to lower hull to protect the finish there from any of the solvents than may be used when putting down pigments in a later step.

Prior to moving to the next step, some more detail painting was accomplished. This was done with acrylics. The gunsight protruding through the roof and the periscopes in the commander's cupola were painted Black, highlighted with Charcoal and outlined with Pewter Grey. Glass areas were painted a very dark green (Model Air Olive Green), given a highlight of Vineyard Green, and a coating of clear gloss. The scissors binoculars were painted, highlighted, and shaded using similar colors as the vehicle itself.

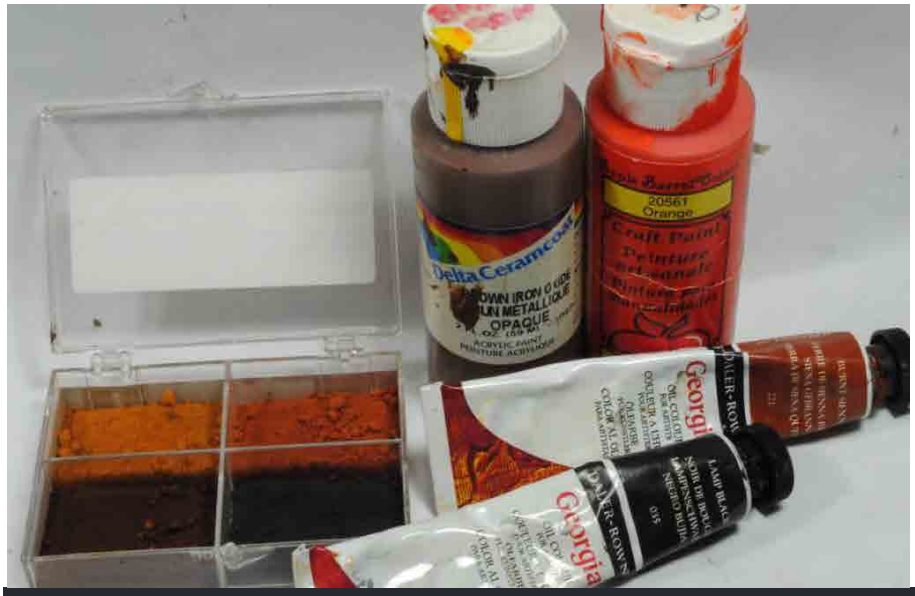
Top left: The leather pad on the commander's hatch was first painted in Sandy Brown. Top right: The edge of the pad was highlighted and "worn" using a mix of Sandy Brown and Khaki stippled and dotted onto the leather. Then, using acrylic inks (seen at left), the middle of the pad was painted in Brown. Inks have very intense color and are as thin as water. And while like other acrylics they dry quickly, water will reactivate them. In this case, I used this characteristic to add scratches by scuffing the surface with a damp toothpick. Finally, the pad was outlined in Black.

The metal parts of the tools were base-colored in a mix of Lead (Andrea), Black, and Burnt Umber acrylics. Areas of rust were given a thin glaze of Brown Iron Oxide. A mix of this color and Orange were stippled on freshly rusted areas. Highlights were created on the metal using Lead. Highest highlights were created with Steel (also from Andrea). Wood areas were painted Raw Sienna and then streaked with an oil paint mix consisting of Burnt Umber and Burnt Sienna. Going back to acrylics, highlights were created with a mix of Raw Sienna and Khaki.



STEP 8: RUST, DUST, STAINS, SPILLS and FINISHING THE DETAILS

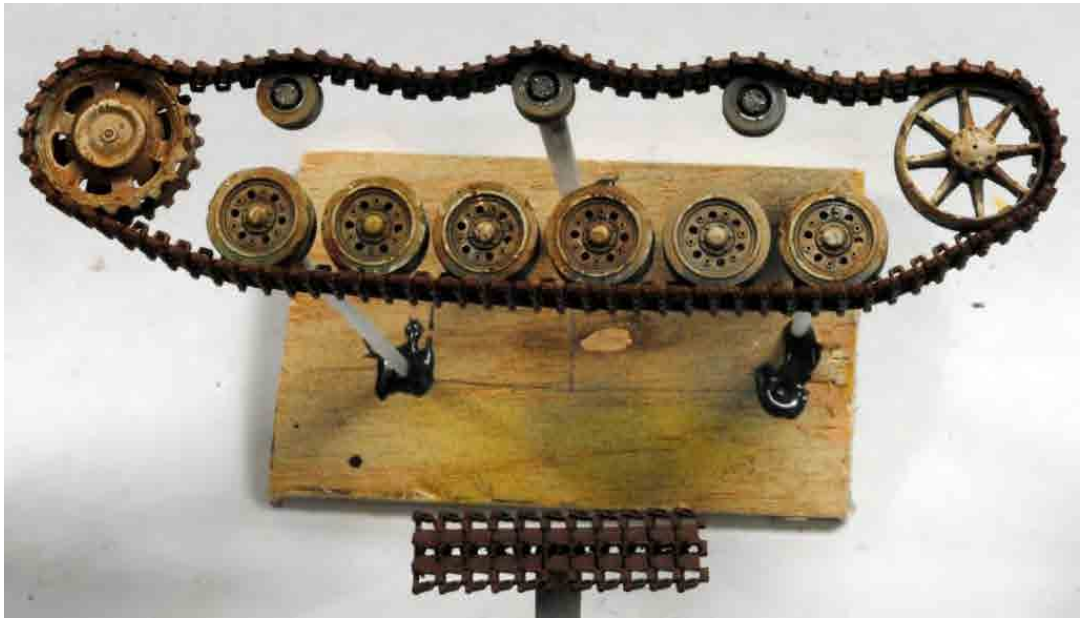
Continuing with our painting process, we now transition into Step 8. Although I have broken this process down into steps for ease of understanding and explaining the techniques, it really is a seamless process with a good deal of overlap and back and forth. Few of the techniques we will discuss in this section are new. In addition to continuing our painting and weathering process, we will also finish painting the various details on the vehicle and will begin to add bits of stowage as they and the underlying areas on the hull are completed. Without further ado, let's dive in.



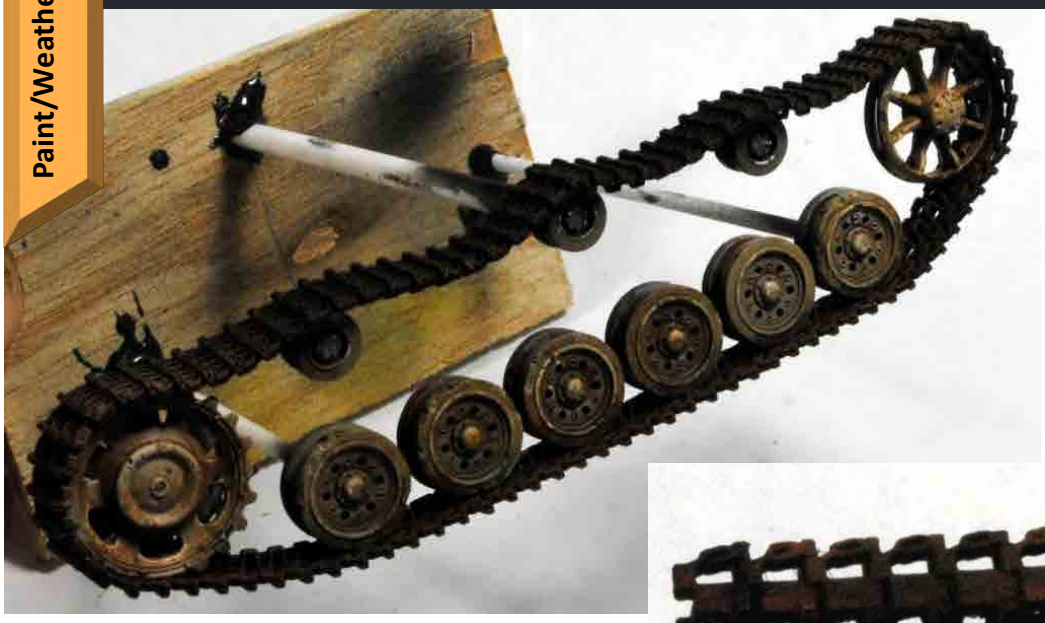
Here are the various paints I use to create rust effects. Craft acrylic colors consist of Brown Iron Oxide (a dark rust color) and Orange. Oil colors are the Burnt Sienna we used to create the rust streaks in the last step and Lamp Black. Also useful are various rust-colored pigments—Black, Dark Rust, Medium Rust, and Light Rust. Ground-up pastel chalks in similar colors work just as well.

To paint the rusty mufflers, they were first coated with a thick layer of Brown Iron Oxide acrylic paint (top). Then, using an old brush no longer useful for painting (below), various colors of rust pigments were stippled onto the wet paint, creating a rusty texture (middle). Black pigments were stippled onto and around the exhaust pipes to simulate soot build-up (bottom).

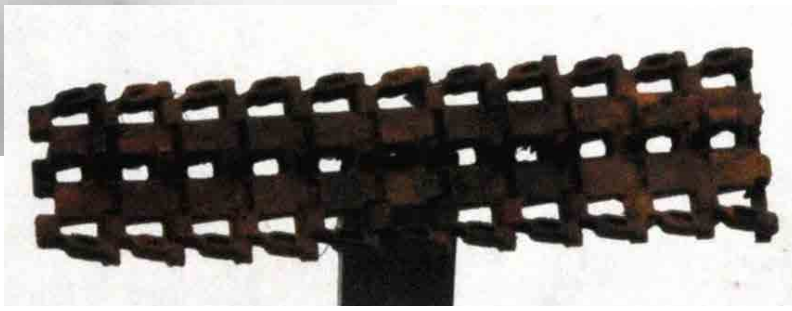
Tracks, both those on the wheels and lengths of spare link, were given a base coat of Brown Iron Oxide.



Sturmgeschutz III Ausf G



All the various tracks and spares were given a heavy wash of Black oil paint. From this point, the methods used on the vehicle tracks and the spare tracks diverge—those on the vehicle are in use while the spares have been allowed to rust.

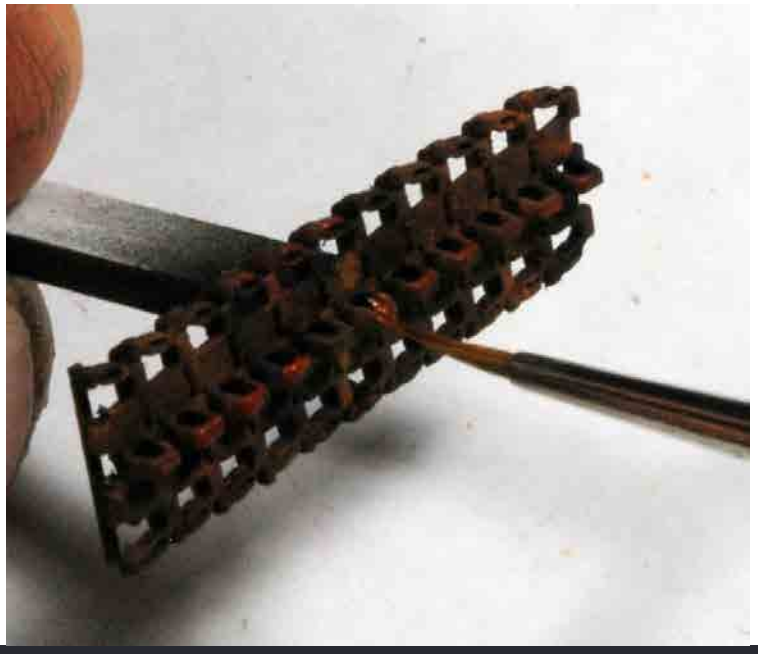


To create the rust on the spare track links, various rust-colored pigments were stippled onto the still wet oil wash (top right). This varies the color and provides visual interest.

Once this had dried, a light rust color was created by mixing Brown Iron Oxide and Orange acrylic paints (middle right).

This mix was sparingly applied to the highest points on the track (bottom right).

I decided to attach the spare track links to the vehicle at this point so they would be subject to further dust and mud weathering as if they had been on the vehicle for a while. Prior to doing this, a couple other details required painting.



Stains and spills, such as fuel and oil, can also be added with oil paints. For these, I mix a bit of Black plus Green oil paint, Small dots are picked up with a brush moist with Mineral Spirits and deposited on the appropriate areas of the vehicle (around fuel fill points, grease fittings, areas where oily parts may have been worked on, etc.). These can then be blended, thinned, or streaked as needed right on the vehicle.

The net was primed in Black and then sprayed with US Dark Green (far left). The upper portion and sides were dry-brushed with Light Grey Green. Finally, top surfaces were dry-brushed with a mix of Light Grey Green and Khaki (near left).

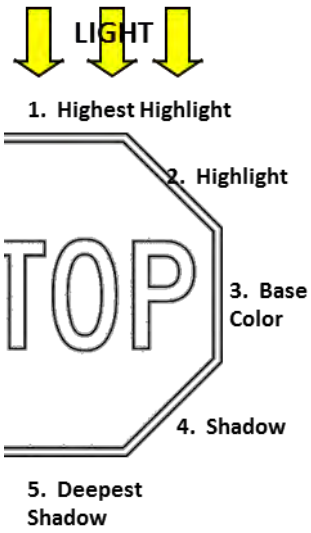
The ragged tarp covering the gun mantle and part of the spare track links on the sloping forward edge of the fighting compartment was painted using the colors shown here. It was primed using the Black Surface Primer. It was painted using Black, Olive Drab, Timberline Green, and Khaki paints to create the base color, highlights, and shadows.

While the section on Figure Painting later in the booklet will address in detail all the "whys" and "hows" of painting these type of items, we will look at the basics on the next page.

Sturmgeschutz III Ausf G

*We should be consistent in our painting methods. I highlighted and shaded the vehicle, so other things must also be highlighted and shaded. I refer to my highlighting and shading process as the "**Concept of Scale Light**". When we look at an actual item, it is life-sized and so is the light that illuminates it. However, when we shrink an object down in size (scale), the item is now smaller, but the light is still life-sized. Therefore, we must also scale down the light. This is where color modulation, highlighting, and shading come into play. The shadow and highlights that light creates on an object help our eye determine shape, texture, and other factors. To scale down the light, we must enhance these natural highlights and shadows with painted highlights and shadows.*

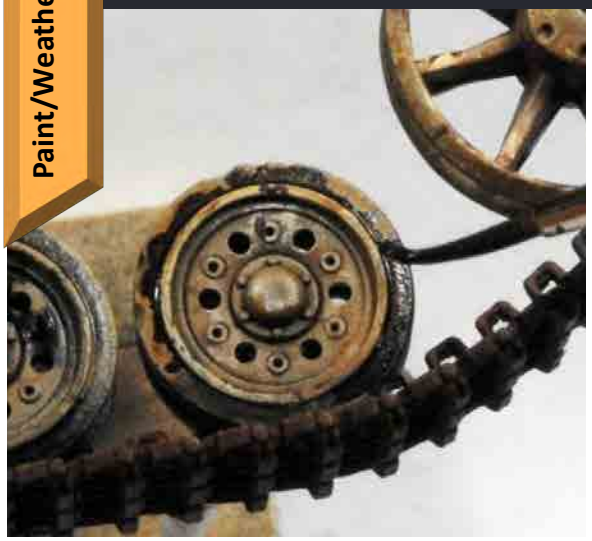
*Although I have seen models painted with some very dramatic lighting effects—such as light coming from a side or even colored light—I paint most models as if they were lit with a halo of light from above. Imagine being outside at noon on a cloudy day. This is the "**Concept of Overhead Light**". The late great Shep Paine developed what he called the "Stop Sign Rule" to demonstrate this concept. We saw this in the Painting and Weathering Diagram on page 58. It is shown again at left. We have used it to paint the vehicle, and will use it to paint the stowage and figures as well.*



A graphic illustration of how it is applied is shown on the facing page. I brush-paint using acrylic paints for this process. A base color is put in place first. This is an opaque layer of color. To avoid brush marks, I thin the paint enough that it takes two-three coats to get good even coverage. Next, highlights are applied. Normally, several layers are used, each being a lighter color and covering a smaller area than the previous. These are applied with paint thin enough that it creates a semi-transparent glaze—lightening the base color, but still allowing that color to show through. Once the highlights are complete, the same process is done with shadows. Let's look closely at this example. The tarp was first primed in Black following my normal practice.

1) The base color is Olive Drab.
2) The first highlight consists of Olive Drab lightened with Timberline Green.
3) The second highlight consists of the previous mix with Khaki added.
4) The third highlight is again the previous mix with even more Khaki added.
5) The final highlight is straight Khaki. This is applied in rough dots and lines only to the edges of the tarp and the edges of the various tears and holes.
6) The first shadow was created using Olive Drab mixed with Black
7) The final shadow is straight Black.

The spare track links, tarp, and net glued in place on the vehicle.

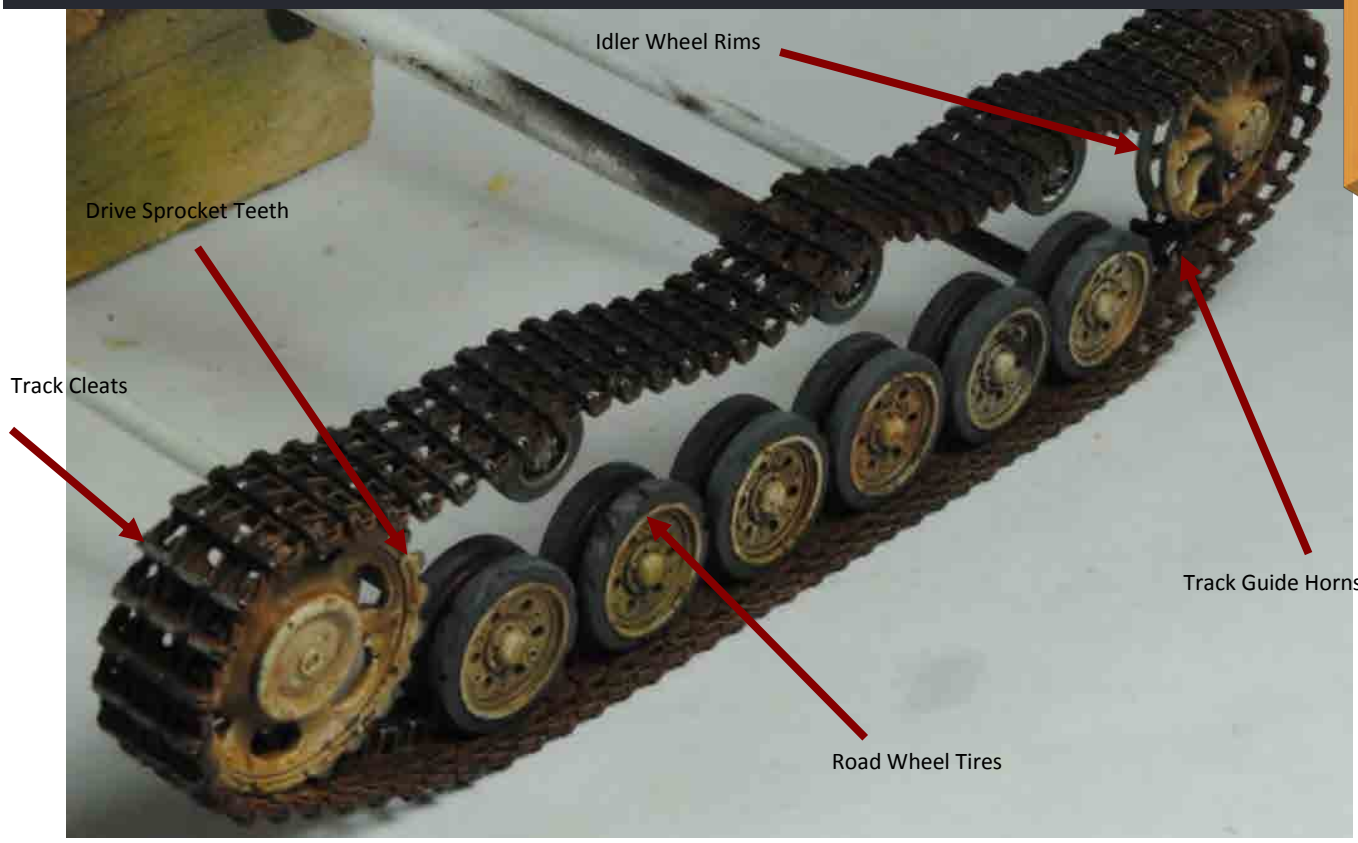


I used a brush to freehand the black rubber tires on the road wheels. Some people use masks to avoid getting the paint on the hubs, but the raised rim on the wheels makes it easy to paint these. As a first step, I take thin Black paint, almost a wash, and apply it with a brush. I touch the loaded brush to the edge of the rim and let the thin paint wick around the rim (above left). This leaves a near perfect demarcation line of black around the rim (middle). The remainder of the tire can then simply be painted without masking or fear of slopping paint where we don't want it. This large view of the wheels clearly shows the modulation and chipping effects on the road wheels, as well as a grease stain on one wheel. The interior and rear faces of the road wheels were painted in Red Oxide Primer (above right). While I personally believe these areas on the actual vehicle would have been painted Dark Yellow, there is some slight evidence, and room for argument, that these hard-to-reach areas may not have always been painted, and thus would have been left in primer.

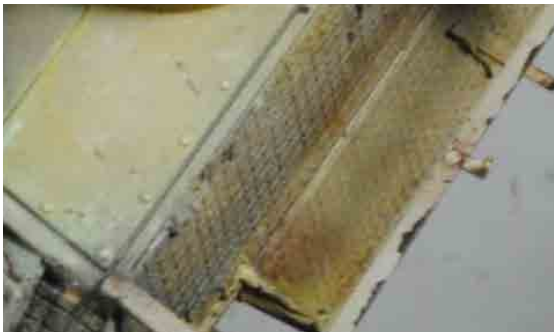
Once complete, the spare wheel was mounted in place on the hull. That way it will be affected by the dirt and mud weathering which will be applied to the vehicle.

THE REAL THING

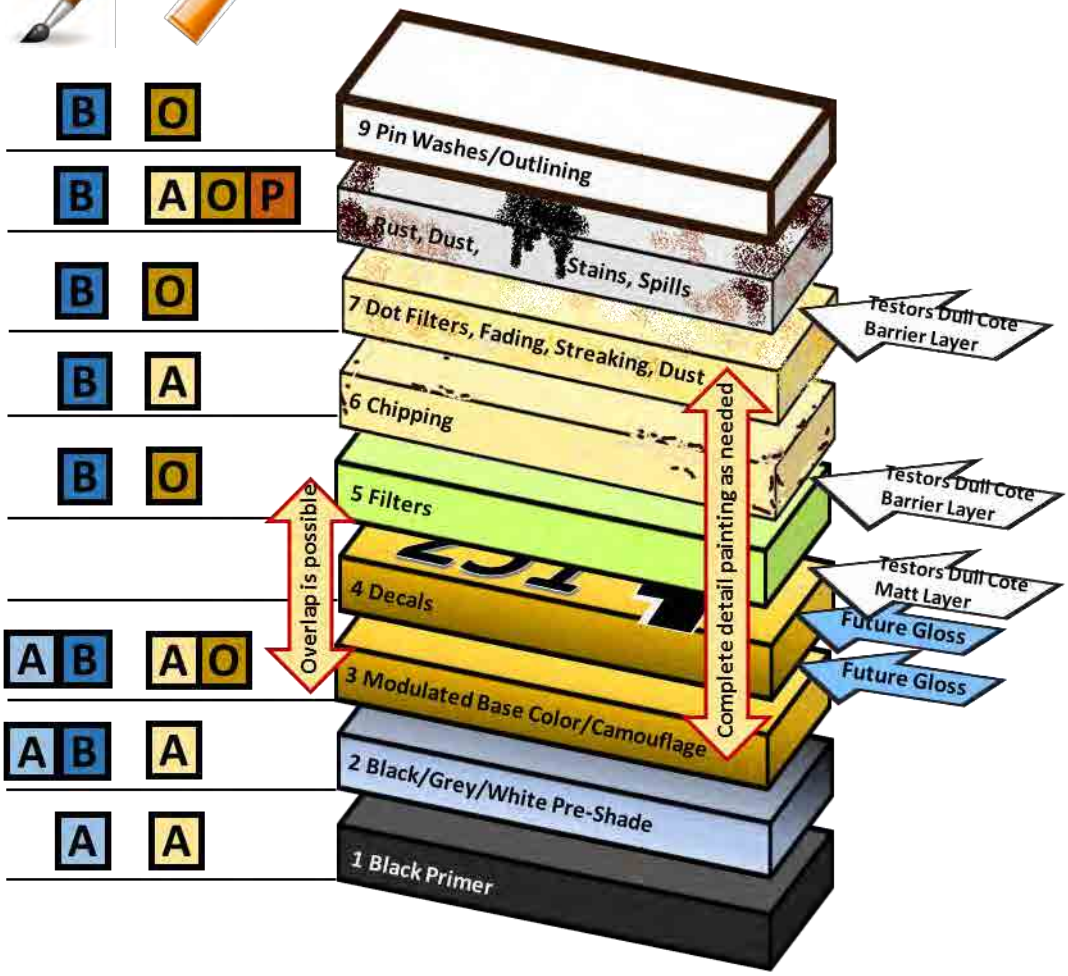
In this photo of a Panzer III, the interior surfaces of the spare road wheel mounted on the fender are clearly painted in red primer. While difficult to tell in this photo, it is possible the entire wheel is in red primer. At any rate, it opens the door to the possibility that the interior surfaces of at least some road wheels may have been left in primer. While a small detail, it does add a bit of visual interest, so I chose to follow suit on my model.



With the wheels themselves complete and the basic color laid down on the tracks, the details on the track and wheel sub-assemblies could be painted. The road wheel tires, already outlined in Black, were painted in 3/2 ratio mix of Charcoal and Black with a tiny bit of Brown Iron Oxide added. The top outer edges of the wheels were then given a highlight of this same mix with Trail Tan added. Worn metal areas,- the track cleats, guide horns, drive sprocket teeth, and the idler wheel rims were painted Lead (from the Andrea "Silver" paint set). This is a nice dark worn metal color.



A wash of dust-colored oil paint was created with a mix of Titanium White, Yellow Ochre, and Mineral Spirits. This was applied over the tracks, wheels, and lower hull. It was also applied on the upper hull in places where dust would settle such as on the fenders. This adds a general "dustiness" to the vehicles and will serve as a base for the later pigment applications.



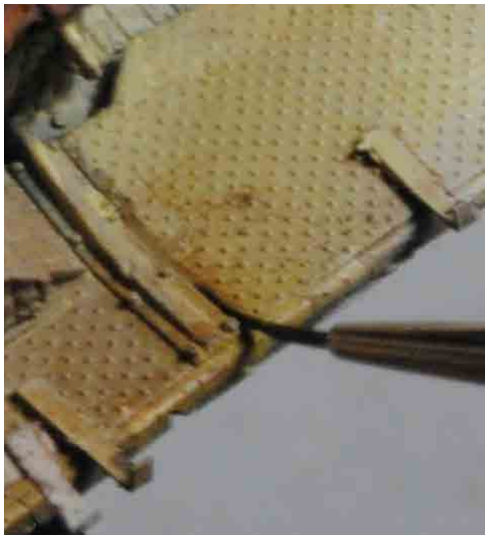
STEP 9: PIN WASHES/OUTLINING

Earlier in our painting process during the modulation steps, we applied high highlight colors along top edges, on bolt heads, and other details. The other half of that equation is deep shadow outlining in panels and around details. I have put that off until this point to avoid having these deep shadows obliterated or toned-down by all the various other layers of paint. Before we move to pigments and mud application, now is the appropriate time to add this outlining. Combined with high highlighting, this step will serve to make panel lines and small details really "pop", greatly enhancing the look of the model.

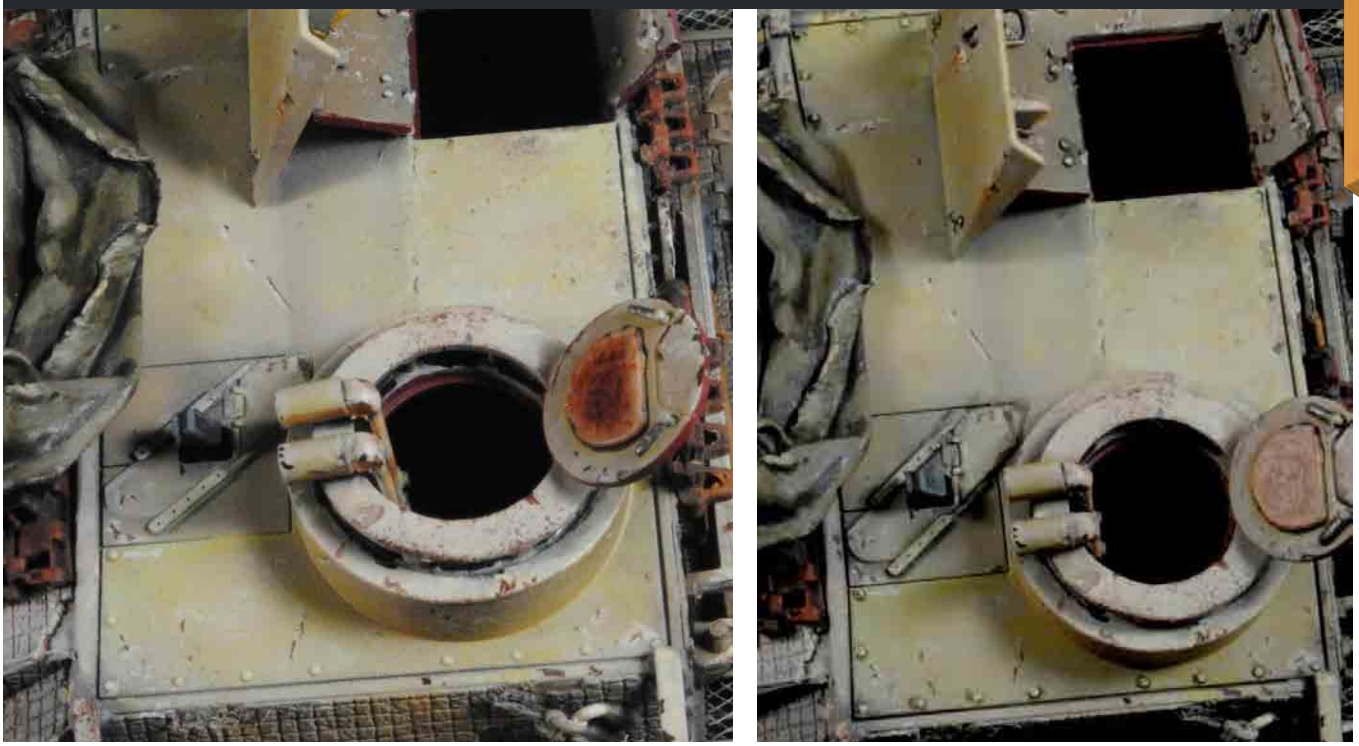
This step could be done with acrylic paints, but I use oils simply because they do not dry as quickly. This allows me to use a smaller brush without the limitation of the paint drying too quickly on the bristles. While this step could be performed with a well-pointed size "0" brush, in this small scale I usually use a size "2-0" simply for better control. Another advantage of oils is that any mistakes can easily be cleaned-up with either a brush or Q-Tip moist with Mineral Spirits. Acrylic inks would be another good choice, but as they dry with a slight semi-gloss sheen (requiring a Dullcote layer to matt them), I stick with the oil paints.

This step is relatively quick and easy. I thin the oils so they flow from the brush like ink from a pin, and apply the paint in all seams and panel lines, around rivet and bolt heads, and as outlining around tool clamps and other fittings.

This is the last step that affects the base color and finish of the vehicle. The final steps—pigments and mud—only add more dirt and mud to the vehicle.



A "Pin Wash" was applied in panel lines and around details. Unlike a wash applied overall, this paint was precisely applied with a fine brush. It helps provide a "3D" sense to raised details and recessed panel lines and helps make details "pop", improving the look of the finished model.



Here we see the fighting compartment roof before and after the application of the pin washes, graphically showing the different this step makes in the appearance of our finished model. The outlining in the panel lines and around raised details is very evident.

THE QUESTION OF COLOR ACCURACY

Logic would dictate that researching 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 suspect. 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 or she can with the information available (this is called 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 'Y' 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. So incorrect or questionable information becomes "fact through common knowledge". 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 likely be close-enough. There are many reasons I make this claim.

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. Evidence for "Dunkelgelb" for example is problematic ranging from Dark Yellow, to Sand, to a Greyish-Yellow. The same variation is found in surviving painted items. Therefore it is likely all these colors are correct.

2. "Official" colors can vary. Different paint manufacturers or even different lots from the same manufacturer will often 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. As an example, when looking at old black and white photos it can be difficult to tell if a vehicle is dark yellow or dark grey with a heavy coat of dust!

In my three plus decades in and around the military, I have never seen 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. An as example of all this, after the first Gulf War I drove a Humvee around Kuwait City International Airport 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!). I can state with some confidence that colors are much more important to modern modelers than they were to the personnel who built, operated, repaired and fought from or against the vehicles!

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. This 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. For example, I prefer more vivid and saturated colors and do not lighten my paints for scale distance at all.

2. Once we put our supposedly accurate color in place, we mess with 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!

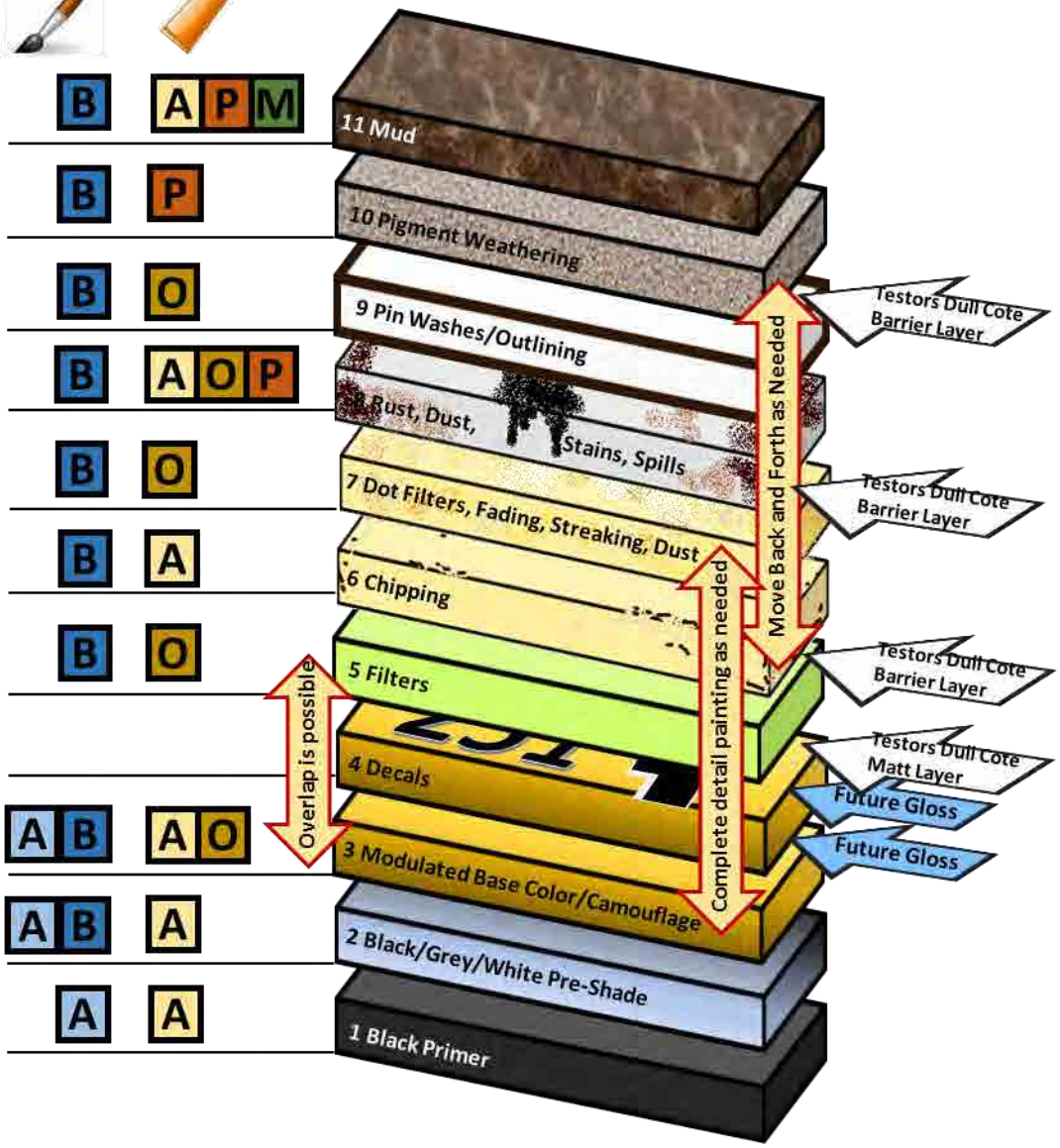
3. Then, just as in real life, we add mud, dust, rust, fading, and other weathering techniques which also affect the color.

4. Finally, the light source we view the model under (sunlight, florescent, incandescent, etc.) can affect the apparent colors. So can the quality of photography when looking at photos. In this booklet, for example, the photos pick up many of the color shifts and variations, but a good deal of the very minor and subtle differences are lost. The photos provide an "order of magnitude", but the model looks a bit different when viewed in person.

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. Even if they have items painting in verifiably original colors...it only proves what color those specific items were. 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. Since many components were built and painted at smaller factories before being sent to the main plants to be made into the finished vehicle, I wouldn't be surprised to see several slightly varied shades of color on a single vehicle.

All that said, 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. I will not argue with you about it. It is a hobby, after all, and is supposed to be fun.

These three chips all show supposedly verified correct Dunkelgelb (Dark Yellow). I have no doubt they do, but note the difference in color. The far chip is distinctly yellow while the middle is more of a sand color, similar to what I used in this build. The near chip looks almost grey (or at least it does on my monitor—our computer settings also affect how we see color).



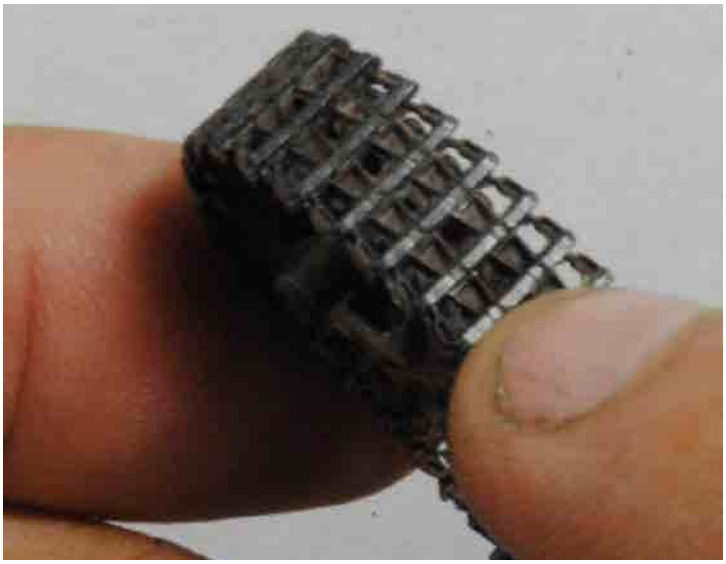
STEP 10 AND 11: PIGMENT WEATHERING AND MUD

In addition to the weathered vehicle base color, we've also added a good bit of other weathering in the form of stains and spills, dust, chipping, and rust. Weathering is, of course, a personal thing—unless you are modeling a specific vehicle at a specific time and place, you are free to add as little or as much weathering as you desire. We could certainly stop the build at the point we are now at. But armored vehicles operated on (and in soft ground, operated in, the terrain). As a result, they were often encrusted with dirt and mud. And I like to model dirty vehicles.

I decided to combine the Pigment and Mud steps in this instance as I used Pigments for both. But, like just about anything else, there are alternatives. Different methods and materials can be used based on personal preference, the effect you are trying to achieve, and even the design of the model itself. Many of the dust effects that can be applied with Pigments can also be applied with paint. For example, you could airbrush a thin layer of dust-colored acrylic paints over the lower hull, tracks, and running gear. We've already seen how dust can be added with oil washes. Pigments could have been used just as easily. I used primarily Pigments for mud on this build, too. But this could also be added with plaster, textured acrylic putty, groundwork material such as Celluclay or Sculpt-A-Mold, actual earth, or even epoxy putty. In many instances these mud alternatives can even be applied to the vehicle prior to painted and painted during the appropriate steps.

The Pigments I used for all the dirt and mud buildup on this vehicle were a combination of commercially available Pigments and ground-up pastel chalks. This gave me a realistic combination of colors and grits. Pigments can be applied in a variety of different ways. For example, they can be applied dry or they can be mixed with water, mineral spirits, turpentine, rubbing alcohol, or paint. They be "fixed" in place with rubbing alcohol, mineral spirits, or commercially available pigment fixer. Let's look at the methods and materials I used for this build:

Sturmgeschutz III Ausf G



I started the process with pencil lead. A soft pencil was rubbed on the edges of wear areas, like the top edges of the stowage rack we see in the photo above left.

Pencil lead was also applied as a "pigment" powder. The soft pencil was rubbed on sand paper to make a fine power (above). This can be applied using a brush, Q-tip, or even a with finger as I did. This powdered graphite was rubbed on some wear areas such as the tracks.

To add dust and dirt build-up on the tracks and a base layer or dirt on the hull, I mixed three colors of pigment powders—light consisting of yellow and tan pigments; medium, consisting of yellow, light brown, and grey; and dark consisting of dark brown with some yellow. Water was added to these mixes to make pigment washes. (Tip: When mixing water with pigment powders or pastel chalks, add a tiny bit of dish soap to help break the surface tension so the materials mix better.) I chose to use water for this application as it does not have the same tenacious hold on the pigments and the parts that fixers have. In other words, it is somewhat easier to remove pigments applied with water than with other fixers.

Above and left: These pigments were applied with both a wide and a fine brush, depending on where I was depositing the pigments. The darker mix was added to shadow areas while the lightest mix was applied to highlight areas. The various colors were allowed to mix and mingle on the vehicle. While they look fairly dark in these photos, they dry significantly lighter.

Right: Once completely dry, a brush can be used to rub off any unwanted pigments. A damp brush can remove even more of the material.

Next is mud-buildup. Old, dry mud is usually lighter than new, wet mud.

Top: To create the dry mud buildup, various lighter earth-colored pigments were picked up with a soft brush and deposited in heaps on the model in areas where mud would collect.

Middle: To fix this in place, I use rubbing alcohol. It is the most effective pigment fixer I have found. A loaded brush is simply touched to various areas on the model and allowed to flow and wick into the piles of pigment to fix them in place.

More pigments were sprinkled on top of this damp mix. To do this, I pick up pigments with a brush, hold the brush over the area I want the pigments, and tap the brush with a finger. The pigments fall where I want them to go.

THE REAL THING

This photo shows a StuG with a build-up of earth and mud on the hull, tracks, and running gear. Note the mud is not an evenly thick paste covering all these areas—it collects in certain spots and cakes on certain components while the reminder of the lower hull, although certainly coated with dust and grime, is relatively free of mud build-up. Note also that while the mud cakes onto the tracks, the cleats in contact with the ground remain clear of mud. Even in the black and white photo, the worm metal sheen is clearly visible. These are the effects I have tried to recreate on this model.

When the pigments dry, this is the effect.

Sturmgeschutz III Ausf G

A different process was used to add the newer, wetter mud. A darker color of pigments were blended and mixed with Future floor polish to create a wet, pasty, mixture. The pigments will kill most of the gloss, but when dry the mix will have a tiny bit of sheen - the appearance of dampness. This mix was applied to appropriate areas on the hull, tracks, and wheels with an old paintbrush.

Once this mix was dry, straight Future was added with an old brush to areas that I wanted to look wet.

These two photos—an overall and a detail view—show the final effect on the vehicle's hull.

With the hull and the wheel/track assemblies largely complete, these parts could now be joined together. Remember, the hull tub is metal, so plastic model cement will not work. I did not use super glue as I wanted to have time to work to ensure all the wheels were properly seated and aligned. So to attach these pieces I used JB Weld five-minute epoxy glue.

Once the epoxy dried on the track/wheel/hull assembly, the Schurzen plates were attached. Although I had painted four plates (three full plates and one half plate), I chose to only use three of the plates on the model. As these are paper, and the mounting brackets were made from brass, model glue will not work for this application, either. The plates were hung in place and then fixed with small amounts of superglue.

PAINTING AND ATTACHING THE REST OF THE STOWAGE

With the application of pigments and mud we have completed our Painting and Weathering graphic. But there are still some tasks that must be completed before we are finished with the painting stages. The large piece of stowage for the rear deck must be painted and put in place. Some additional stowage such as the canteens and gas mask canisters, tow cables, a chain, and some rope will be painted and affixed to the vehicle. Small details such as the antenna and the gunner's roof-mounted machinegun must be made, painted, and fixed in place. This last can only be done after the figures have been posed to ensure the machinegun does not interfere with the fitting of the gunner figure. Finally, a bit of foliage for camouflage will be put in place.

I started with the stowage. As this is an integral eye-catching part of the build, it should be painted with the same loving care as the vehicle. For the most part, it was painted and weathered using the same methods we've already seen. But there were some variations and new techniques used. Let's proceed:

Three views of the finished stowage. Although this had been built as one solid piece, careful painting gives it a very convincing look. Like the model, it was primed in black prior to painting. Although I used a brush instead of an airbrush, most items were painted in a fashion similar to the methods we've already discussed.

Painted equipment items were given a base color which was shaded and highlighted appropriately. Chipping and dot filters were added as desired. Some pigment "mud" was put on the damaged road wheel.

Cloth items such as tarps and tent rolls were painted using the same base color, highlight, and shadow methods we saw with the tarp over the gun mantle.

Other items were painted as seen on the following pages.

For the bare metal of the galvanized steel oil drum and the milk canister, I turned to Andrea's "Silver Paint Set" for assistance. This useful set includes three acrylic colors and three acrylic inks.

The first steps are seen at the far right. I painted the items in the base "Steel" color and then highlighted them using the light "Silver" color. I happen to have some of the old SnJ Spray Metal Polishing Powder. This is almost like a silver-colored pigment. Using a Q-Tip, a tiny bit of this color was rubbed onto the highlights of the milk canister only. These processes gave both items an appropriate shiny steel color - a good base on which to build the different effects I was after for these items.

Right: With the base color and highlight complete, I turned to the shadow "Lead" color and the "Brown" and "Ultramarine Blue" ink colors from the Andrea set.

The "Lead" color was painted in shadow areas and the inks applied as desired—the blue ink primarily on mid-tone areas and the brown ink mostly in worn/rusty areas. Both colors mixed were added to many of the shadow areas.

Below: Setting aside the milk canister for the moment, the next step concentrated on getting the galvanized look on the fuel drum. Various colors of white, black, and grey oil paint were mixed and applied as dot filters onto the barrel.

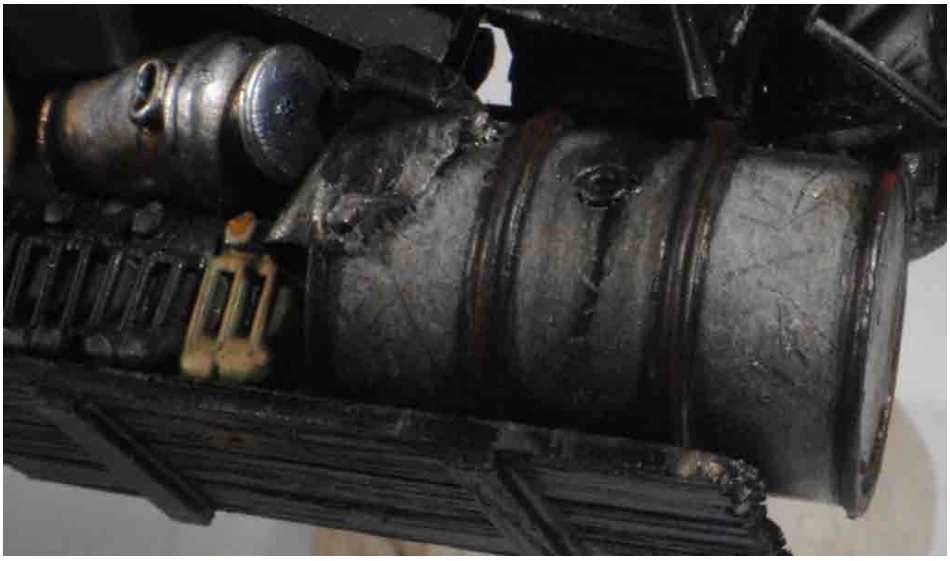
These dot filters were then blended into the metal and each other with a brush moist with Mineral Spirits. Scratches were added to the still wet oil paint with a sharp toothpick.

Sturmgeschutz III Ausf G

In photos of fuel barrels, it appears the rims and rolling flanges were not galvanized and took on a dark, rusty appearance. Using the same colors used on the vehicle, these areas were painted in an appropriate rust color.

Worn metal in these areas was replicated with pencil lead. As a final step, some spilled oil was added with a mix of black and green oil paints.

Finally, details on both the milk canister and fuel drum were outlined with a pin-wash of Lamp Black oil paint.



THE REAL THING

. Although research is sketchy, it seems that early in the war—until about 1944—most German 200L barrels were made of unpainted galvanized steel. The later, non-galvanized, barrels were painted dark yellow or green.

To recreate the worn wood with paint remnants, I used this process.

I started by painting the wood in various old wood colors—mixes of Khaki, Pewter Grey, and Coffee Bean craft acrylics.

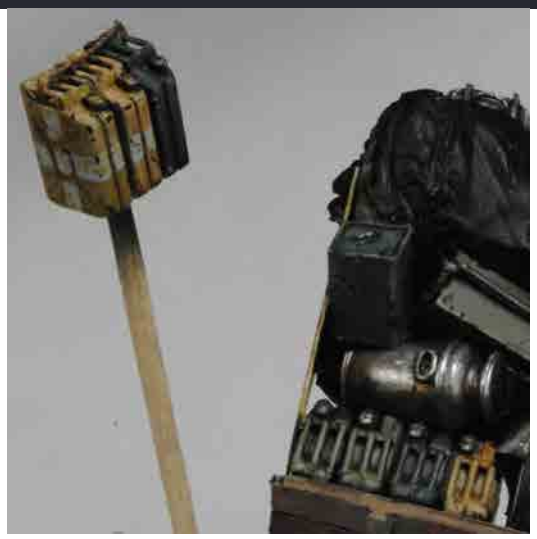
This was then given a dark wash made from a mix of Burnt Umber and Neutral Grey oil paints.

The red paint remnants were applied with a sponge—just like we added initial chipping to the vehicle, only using a heavier application. I started with a mix of Tank Brown and Fire Red. On top of this straight Fire Red was added. Finally, a small bit of Scarlett Red was added to replicate paint flaking and peeling.

The last steps consisted of lightly dry-brushing the wood with a mix of Khaki and Antique White craft paint, followed by outlining using Black.

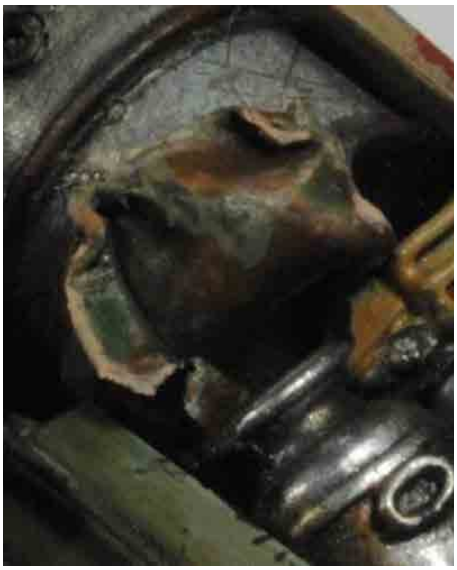
Sturmgeschutz III Ausf G

The Jerry Cans were painted in various colors. The grey cans are Dark Panzer Grey, highlighted with Pale Blue Grey and shaded with Black. Yellow cans are various mixes of Dark Yellow and Khaki Brown highlighted with Sand Yellow and shaded with a wash of Burnt Umber oil paint. The white crosses marking the water cans were painted USAF Light Grey. The green cans were painted German Green or US Dark Green and highlighted with Light Grey Green and/or USAF Light Grey. Shading was done with Black. After painting, the cans on the fender were glued in place.



THE REAL THING

Why did I use such a wide variation of color on the Jerry Cans? Check out this photo. While it is in black and white and we cannot know the color of the cans, we can see the wide variety of shades and colors present. The same wide variety can be found in other photos and on surviving cans.



For painting camouflage cloth, I use a slightly different method. In larger scales, I would paint, highlight, and shade each color individually. In this small scale, that is not always practical. This zeltbahn was painted in basic colors: Light Grey Green for the background, Cam Med Brown and Cam Green for the splinter camouflage, and a mix of Black and German Green for the rain marks (far left). Highlighting was done with a thin glaze of Dark Flesh and high highlighting on the edges was added with a thin glaze of Medium Flesh. Shadows were added with thin glazes of Dark Burnt Umber followed by Black (left).

OTHER COLORS and COLOR MIXES USED:

Ordnance Green/Dark Grey Equipment items: These were painted using the same colors as the Jerry Cans.

7.5cm Stu,K. 40 L/48 Ammunition Crates:
Base Color: Olive Green + German Green 1/1 ratio
1st Highlight: Base Color + Light Grey Green
2nd Highlight: 1st Highlight + USAF Light Grey
Shadow: Olive Green + Black
Outlining: Black
Chipping: Wood color created with a mix of Raw Sienna and Trail Tan
Rope Handles: US Grey Light
Stencils: USAF Light Grey

Panzerfaust:
Base Color: Dark Yellow
Highlights: Sand Yellow
Outlining: Tank Brown
Warning Placard: USAF Light Grey with Black outlining, pictures, and text

Tarp Covering Crates:
Base Color: Panzer Dark Grey + Mushroom 3/2 ratio
1st Highlight: Base Color + Mushroom & Pewter Grey
2nd Highlight: 1st Highlight + Mushroom
3rd Highlight: Mushroom
1st Shadow: Panzer Dark Grey + Burnt Umber
2nd Shadow: 1st Shadow + Black
Outlining: Black

Tent Roll:
Base Color: Olive Drab + Mushroom 1/1 ratio
1st Highlight: Base Color + Mushroom
2nd Highlight: 1st Highlight + Khaki
3rd Highlight: Khaki
1st Shadow: Olive Drab + Cam Med Brown
2nd Shadow: 1S + Tank Brown & Black
3rd Shadow: Black

Folded Blue-Grey Tarp
Base Color: Midnight Blue + Pewter Grey
1st Highlight: Base Color + Pewter Grey
2nd Highlight: 1st Highlight + USAF Light Grey
3rd Highlight: 2nd Highlight + USAF Light Grey
1st Shadow: Midnight Blue
2nd Shadow: Black

Gas Mask Canisters:
These were painted in various mixes of German Green and Panzer Dark Grey. Chipping was done with Steel. They were then given a wash of Black oil paint. Straps were painted Light Grey Green, highlighted with Khaki, and shaded with Olive Drab.

Canteens:
The wool-covered bodies were painted Burnt Umber with a highlight of Autumn Brown. Cups were painted German Green with Steel chipping. The straps were given a base color of Autumn Brown and then Black was added in the centers to create a worn look. Buckles were painted Steel.

Bucket:
Base Color: Steel + Charcoal
Highlight: Steel (applied to handle and top/bottom rims
Shadow: Lead
White Paint: Dabbed on with a sponge: USAF Light Grey followed by White Grey followed by white
Rust: Brown Acrylic Ink

Antenna:
Mount/Base: Pewter Grey with a wash of Black oil paint
Antenna: Charcoal + Black

Machinegun:
Gunmetal:
- **Base Color:** Black
- **1st Highlight:** Base Color + Steel and Midnight Blue
- **2nd Highlight:** 1st Highlight + Steel
- **3rd Highlight:** Steel

Bakelite Stock and Handgrip:
- **Base Color:** Brown Iron Oxide + Black
- **Highlight:** Brown Iron Oxide

Ammunition Drum:
- **Bae Color:** German Green
- **Highlight:** Light Grey Green
- **Shadow:** Wash of Black oil paint
- **Chipping:** Steel

Tow Cables:
The cables were painted a dark rust color, given a wash of Black oil paint, and a rub with pencil lead. Some rust-colored pigments were also applied. The remnants of dark yellow paint were dabbed on with a sponge.

Here we see the finished and attached stowage. Prior to placing the large piece of stowage on the rear deck, the gas mask canisters and canteens hanging on the stowage rack were painted. It would have been difficult or impossible to reach the backside of these items after the large piece of stowage was in place. Once this was in place, a length of model ship chain was fitted. This came from the package in black, but was given a wash of Burnt Sienna oil paint to give it a rusty look. The bucket is a Tamiya piece. It is hanging from a spare "S" hook included in the StuG kit. It was painted using the same rust methods we have already seen. The tow cables were repositioned somewhat since they were originally made. These were attached with superglue.

Finishing the Vehicle

Everything we created during the assembly stage has now been painted and attached to the vehicle. But there are still some small details such as the antennas and the gunner's roof-mounted machinegun that must be made, painted, and fixed in place. This last can only be done after the figures have been posed to ensure the machinegun does not interfere with the fitting of the gunner figure. Next, the model will be carefully studied for any flaws, and these will be repaired as needed. I have found viewing photos of the model is useful for this step—looking at the pictures on the computer screen you see the model much larger than life so any errors are readily apparent. Finally, When pleased with the rest of the vehicle, a bit of foliage for camouflage will be put in place. Let's procced:

THE REAL THING

On page 53, we saw a clear photo of the rear of the gun shield with the two gun mounts—one to fire through the shield at the ground targets and one mounted on top of the shield to engage air targets. In these photos we see machineguns mounted in both locations, an MG 42 at left and an MG 34 at right. Although both are being used to engage ground targets, the photos clearly show the two mounting points. In the right photo, note the spare tacks on the side of the superstructure have been painted camouflage like the rest of the vehicle.

I chose to mount an MG42 rather than the kit supplied MG34. Either is fine. The gun is a left-over part from my series of Sd.Kfz 251 builds. Each Tamiya infantry set also includes a couple of the guns. The ammunition drum is from one of the infantry sets. The mount for fitting the MG to the gun shield (see the photo above right) was made using small bits of styrene rod. The gun sight, folded down on the molded part, was cut away and replaced with a tiny piece of styrene bar in the raised position. The end of the flash suppressor on the muzzle was drilled out to give it a hollow appearance. The gun was built with the gunner mannequin in place to ensure that both fit without fouling each other.

The finished MG mounted on the vehicle.

THE REAL THING

Here we see a photo of the antenna base from, I believe, Squadron's Walk-Around series book on the StuG III. Note the antenna is black, as is the rubber base it mounts upon. While this was quite possibly painted in dark yellow on the original vehicle, this paint would quickly have flaked and chipped away.

The antennas were made from stretched sprue (see page 34). At top left, in the center, we see one of the antenna. The piece of sprue it was cut from is above it. A second antenna will be cut from the piece of stretched sprue below it. TIP: When we stretch sprue, it's natural to hold it horizontally. But for straight pieces (such as the German hollow copper antennas), it's easier to achieve straight lengths if the sprue is held vertically.

Left: Holes were drilled in the kit-supplied antenna mounts and the antenna glued in place and painted. In 1/48 scale, the 2 meter antenna should be about 41mm long.

THE REAL THING

Throughout the war, foliage was often used as additional camouflage, especially on vehicles in concealed firing positions. As the war turned against Germany, foliage was seen more often as defense against aerial observation, especially on the Western Front. The amount of foliage seen in photos varies considerably, but for combat use it could impair the operation of the vehicle and its weapons systems. The foliage was often tied or fixed to the vehicle, but it was also sometimes just laid on horizontal surfaces or hung by branches over Schurzen plates.

For this build, I wanted to add foliage to the vehicle for the variety, color, and visual interest, but did not want to obscure the vehicle details. Thus I opted for limited amounts of foliage like we saw in the photo on page 5 or in the photo at left.

Numerous products can be used to create the foliage. I used only two. For some of the branches and all of the leaves, I used a product from Joefix called "Foliage" (above left). This is a tree-like dried floral material. For smaller branches, I used pieces torn from a mat of rubberized horsehair (above right). This is sold by various manufacturers under different names. This is an old product from Hudson and Allen called "Vines".

I used some of the "Foliage" branches as is from the package. I also gathered leaves that had fallen from the branches and collected in the bottom of the box. To apply these, I dipped small bits of the horsehair mat in a mix of white glue and water and then dipped it in the pile of leaves.

The bits of foliage ready to be applied. At left are the pieces of Joefix "Foliage" and at right we see the pieces of leaf-covered horsehair. These various bits were attached to the vehicle using super glue.

The vehicle itself is now finished and we can turn our attention to the crew.

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 short sidebar 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 or animals by ensuring your materials are locked or kept 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 at all times. 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 material it was not designed for. Bits or materials you are working on can get very 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 sidebar 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.

Assault Gun Crew Uniforms

My model depicts an army vehicle in the summertime, so what follows is only a brief overview of army summer uniforms. Anyone wishing to model a crew is encouraged to do their own research on this complex subject.

Beginning in 1940, assault gun crews were issued a field grey version of the black Panzer uniform. This was complete with beret, but the beret was soon discontinued and replaced with the standard side cap. The side cap itself was gradually supplanted by the peaked version which began to be issued in mid 1943. Insignia on this uniform initially consisted of Panzer-like collar patches with skulls, but these were later ordered replaced with the standard army bar (Lutzen) insignia. Piping on the uniform was in artillery red. Photos, however, show that color patches and other insignia use was never completely standardized with various combinations seen until the end of the war. Both jackboots and the low laced boot were seen with the later becoming gradually more common.

Many other uniforms were also worn during the period depicted by this piece. These include the standard fatigue uniform dyed green, or the reed green drill "universal" uniform which began to be issued throughout the army in 1942. This was basically a lightweight version of the standard four-pocket service dress uniform. A green drill version of the standard tanker/assault gun uniform was also made. One version of this had a large flapped pocket on the left chest and another on the left thigh. These were worn both with and without shoulder straps. Vehicle crews often wore one of many variations of coveralls either over or in place of their normal uniform. These are seen in various khaki, stone, or green colors. Some were made from army or Italian camouflage material. Photos also show crew members in shirtsleeve order. The shirts were in various colors of grey or field grey, with or without pockets and shoulder straps. Different uniforms were often worn in the same unit and even in the same vehicle crew.

The group photo above shows StuG crewmen in a variety of uniforms. In addition to the standard Panzer-style wrap (both with an without the large breast and thigh pocket), we also see the universal uniform, the green version of the fatigue uniform, and a crewman just wearing a shirt. Most wear standard insignia. Headgear consists of a couple side caps, but most wear the peaked "einheitsfeldmutze". Footwear consists of both the marching boots and the low laced boots. As for equipment, most wear a simple belt with pistol holster. A few sport binoculars, too. The vehicle is a late-model StuG III Ausf G.

Above right we see a couple tired in this detail from a photo taken during the battle of Kursk. Both these soldiers wear coveralls in place of their uniforms. The NCO at left has attached shoulder straps, but no other insignia is worn.

REFERENCES:

The Panzer Divisions by Martin Windrow and illustrated by Richard Hook (Osprey Man At Arms series)

German Soldiers of World War Two by Jean de LeGarde

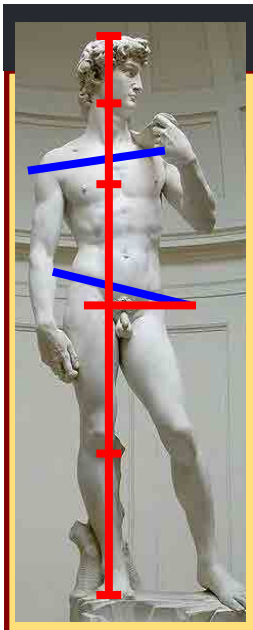
Creating and Painting Figures

I chose to largely create my own figures from scratch for this project. While this is an option, it is far from necessary. There are plenty of figures available on the market for you to use. Tamiya offers several figure sets in 1/48 scale, most of which include vehicle crew members. The Tamiya offerings are a bit small, but not overly so. Their detail can also be a bit soft. However, they are very good in the vital areas of anatomy and pose. They also offer very good value for the money—each set contains 10-15 figures plus plenty of equipment. Their cost is comparable to resin figure sets on the aftermarket which normally only contain two or three figures. These aftermarket figures and sets, mostly in resin, but some in white metal, offer a variety of poses and uniform options. The quality of these (detail, pose, anatomy, etc.) can vary considerably from outstanding to marginal (those from "Figures With Attitude" being exceptionally well done). I wanted poses other than the "standard" vehicle crew offerings. I could have converted Tamiya mini-men or used aftermarket figures, but went this route instead. The choice, as always, is yours.

Putting figures in, on, or with our models does several advantageous things for us. They provide an immediately recognizable sense of scale which allows the viewer to instantly grasp how big or small a vehicle is. Figures catch the eye, so they can 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. The addition of figures bring our models to 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 is the crew and passengers that perform those operations. Finally, figures bring our models to life and provide both human and visual interest.

Figures should be planned from the start; not just added as an afterthought. Their roles and attitudes are portrayed by the actions they are performing and by their posture and facial expressions. In small scales these latter things might have to be exaggerated to be seen and understood. Figures must work with each other and the models. Actions and gestures have to be clear, believable, and exactly aimed - in other words 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 this model, it is the actions of the crew that tell us the vehicle is about to lead an attack.

There are plenty of options for those wanting to pose figures with their vehicles. Tamiya offers several figure sets in this scale. Although slightly small, they are useable. In some instances, figures and gear designed for wargame use can be used. The aftermarket also provides a variety of figures, mostly in resin or metal. The choice is yours. I chose to make my own figures for this project, and that is the process shown in these pages. Modelers wishing information on building and converting Tamiya figures should refer to my series of builds of the Sd.Kfz 251—these vignettes and dioramas include well over 100 figures—stock, minor conversions, and almost total remakes using Tamiya figures almost entirely.

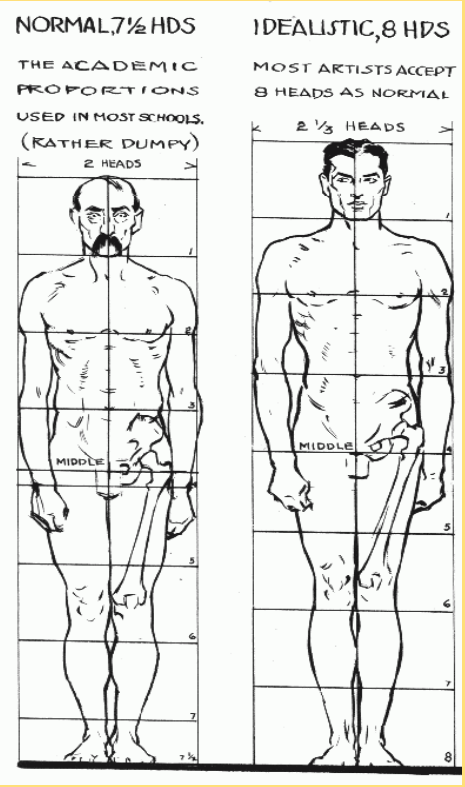


Michelangelo's "David". The figure stands 8 heads high. The bend-point at the waist is at the 4 head height point. Note the counter rotation of the hips and shoulders. The foot supporting the figure's weight is directly under the head, and the hip on that size is higher while the shoulder is lower.

POSE, PROPORTION, AND ANATOMY

The first and most vital step in a conversion or original sculpt is to get the anatomy, proportions, and pose correct. If these are off, no matter how well you do everything else, the figure will not look right. Accurate measurements are important, but the best judge of right or wrong is your "Eyeball, Mark I". If it looks right, it is. I find Andrew Loomis's proportion diagrams useful. These were drawn in the 1950s and can be found online (along with drawings showing female and child proportions). Proportions can vary, but we shouldn't stray too far. The body is a complex form and recreating it is more art than science.

People come in different sizes and shapes, but the size of the head is fairly consistent. Thus, the head makes an ideal unit of measurement. Here we will look at adult male proportions. For women and children, refer to Loomis. For an adult male, the head should be 9 inches from chin to crown. An idealistic proportion where a man stands 8 heads high gives us a figure that stands 6 feet tall. The bottom of the knee is at 2 heads, the crotch is 4 heads, the navel is 5 heads, and the nipples at 6 heads. Shoulders should be 2 heads (8 inches) wide. When the arms hang straight, the finger tips should reach mid-thigh. Our "bend point" is at the center of the body (4 heads). Model a shorter or taller person by keeping the head the same size and making the body and/or legs shorter or longer. The size of the hand is approximately the distance from the hairline to the chin—the hand covers the face. Arms are about 3 1/2 heads long, with the forearm being about 1.7 heads long.



A typical man with "idealistic" proportions will have a head that is 9 inches high from the chin to the crown. Standing 8 heads tall gives him a height of 6 feet. Also shown is a slightly shorter man. The head is still 9 inches, but the man only stands 7 1/2 heads high. People come in different sizes, but head size should remain relatively consistent. Gear and equipment sizes should be absolutely identical.

As you create, ensure arms and legs are the same length, the correct length, and that knees and elbows are in the correct places. As we cut and reposition our figures, joints can "migrate" so we must 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.

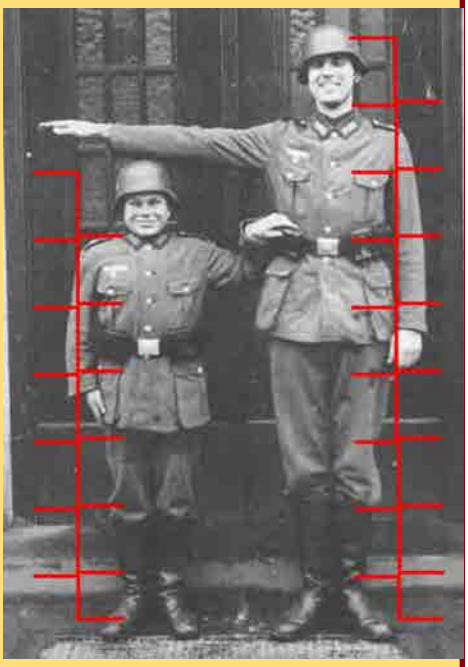
The pose must be believable. Movement of one body part affects other parts. As we move, we shift our limbs, shoulders, and hips in opposition to each other to maintain balance. If an arm is held forward and up, the other arm might be held low and to the rear. Hips tilt in various poses. If one hip is 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 walk, we constantly move our feet to maintain this relationship. We should only violate this rule for a good reason – for example, a figure in mid stride or one that is jumping.

Use all this to create motion in a figure. An off balance figure 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 the figure is doing. 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 helps to have a model (preferable the same sex, age, and build of the figure) assume the pose and copy from life. Photos are another possible source of information. You can also look in a mirror and assume the position yourself. 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. Ignore the laughter of your spouse.

The more time you spend getting these factors right, the better your finished figures will look. Anatomy books or books on how to draw people can be helpful but are not required. Your BEST reference is people. 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.

Size and Compatibility of Commercial Figures



I made my own figures for this piece, but that is not the only option. Many figures and sets are available commercially. However, we must be aware that although they may be listed as 1/48 scale, they can vary widely in actual size and may, or may not, be compatible with each other. Yes, people can be taller or shorter, thinner or fatter, than other people. Still, certain things will be consistent. It is these things that make mixing and matching different figures problematic.

We've seen the adult male head is about 9 inches tall so a man who stands 8 heads high 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 nearly the same height, but one man stands well over six feet tall (about 8.5 heads) while the other is closer to 5 feet (around 6.5 heads).

We are conditioned by seeing figures sculpted in "ideal" proportions of 8 heads high. Most people fall short. Data collected by the US during WWII shows the average height of a US soldier was 5 foot, 8 inches. Average weight was 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.

It is common knowledge that Tamiya figures are too small. But in reality, the only critical dimension in which they are too small is head size! 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 for height they're actually spot on! However, as they are sculpted using ideal proportions their heads are too small! Their gear scales out nearly exactly to 1/48th scale. So, in theory, you could correct the Tamiya figures by replacing heads with correctly scaled 1/48 aftermarket heads. But because we expect ideal proportions, they would then appear as if the heads are too big! They are not far off, and they look fine so the best option is to use them as is. You can increase the height by adding a shim at the waist (most 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.

As of this writing, Tamiya is really the only source for plastic figure sets in 1/48 scale. The aftermarket offers many resin (or metal) figures and sets, but these can vary widely not only in size but also in quality of sculpting, anatomy, pose, and detailing. Most are perfectly acceptable. But if you want to use figures from different sets together, even if they are from the same manufacturer, It's best to compare them before buying to determine compatibility. You can mix and match quarter scale figures and/or wargame figures as long as the differences are not too extreme. But if you do, keep in mind head size should be fairly consistent and mass-produced items such as gear and weapons should be absolutely identical. So, if you mix/match, I would recommend using the same size head on all figures and using the Tamiya gear and weapons. If you do, the scale 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—it is from the Armorama website—I do not know the photographer's identity) shows size differences between Alpine, Gaso.line, Rest Models, and Tamiya. 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. 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. If different figures are used together, make sure gear and weapons are identical!

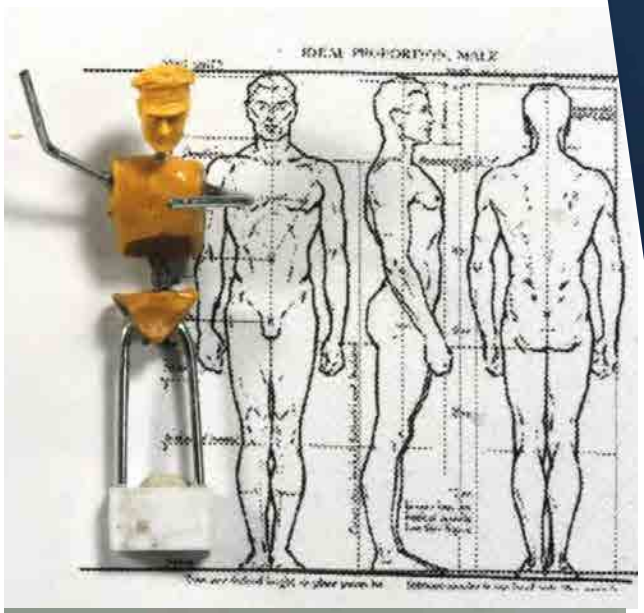
CREATING THE MANNEQUINS

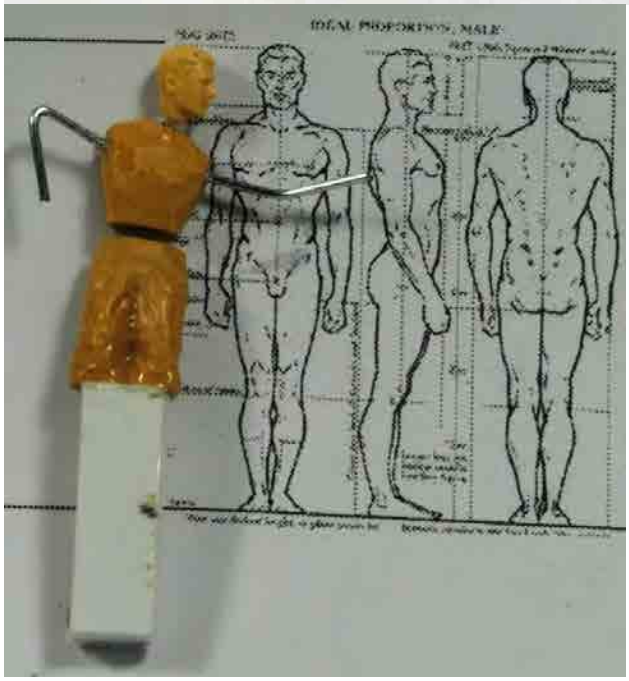
As we saw in the sidebar, the first step to get the pose and anatomy correct. To assist with this, I normally shrink the Loomis diagram to 1/48 scale and used it as my guide. In this instance I used commercial heads. In my "grey army" of unbuilt figures, I had Model Cellar's excellent 1/48 scale set of Manfred and Lothar Richtofen. Each figures comes with two heads—one with cap and one bare. I selected the Manfred head with cap for my vehicle commander and the bare-headed Lothar for my loader.

The mannequin basis for the figures were created using carved hunks of plastic for the ribcage and hips. These were actually made from Tamiya figures with all detail cut away. Arms, legs, and necks are paperclip wire cut to length and glued in place. As both figures stand in the hatches, the legs are not complete. The commander stands on a plastic shelf inside the vehicle hull while the loader will be attached to the vehicle floor using a length of plastic bar stock. The photos show how it was done.

Right: Model Cellar's Manfred and Lothar Richtofen. Heads from this set were used

GETTING THE POSE, ANATOMY, AND FIT CORRECT AT THIS POINT ARE THE MOST IMPORTANT THINGS WE CAN DO TO HAVE A USEABLE FIGURE WHEN WE ARE COMPLETE!





Left: The posed mannequins next to the Loomis diagram. Ribs and hips are cut-down Tamiya figure parts while arms, legs, and necks are paperclip wire. Legs are not complete, but attached to blocks of plastic to ensure the figures stand properly in the hatches. For the loader's legs, I used a Tamiya figure with winter trousers. Although the Tamiya figures are on the small side, using the winter trousers gave my slightly larger figure the correct bulk.

Above: When posing the figures, the built (but unpainted) vehicle was used to ensure everything fit properly. While I plan on adding the machinegun, the figure will be finished and put in place first, and the gun will be fitted wherever.

SCULPTING FIGURES

Often, a scratch-building or sculpting project can look daunting at first, but it's almost never as hard as it seems. The key is to break it down into 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 easier. Some other tips for sculpting figures include the following.

Don't create a few random wrinkles and call it good—it will not look realistic. Look at how material folds and wrinkles. Heavy material will have only a few large folds and wrinkles—lighter weight cloth will have many sharper wrinkles. Material that is being compressed will wrinkle differently than material that is being stretched. 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 "sink" into clothing and/or the soft body tissue underneath.

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 convert 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.

How something is actually made or actually works is completely irrelevant! We are only concerned with how it *looks*! 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 much easier to make).

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 accidently stick my thumb into an area I've already finished, damaging or destroying it. After the legs cure 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.

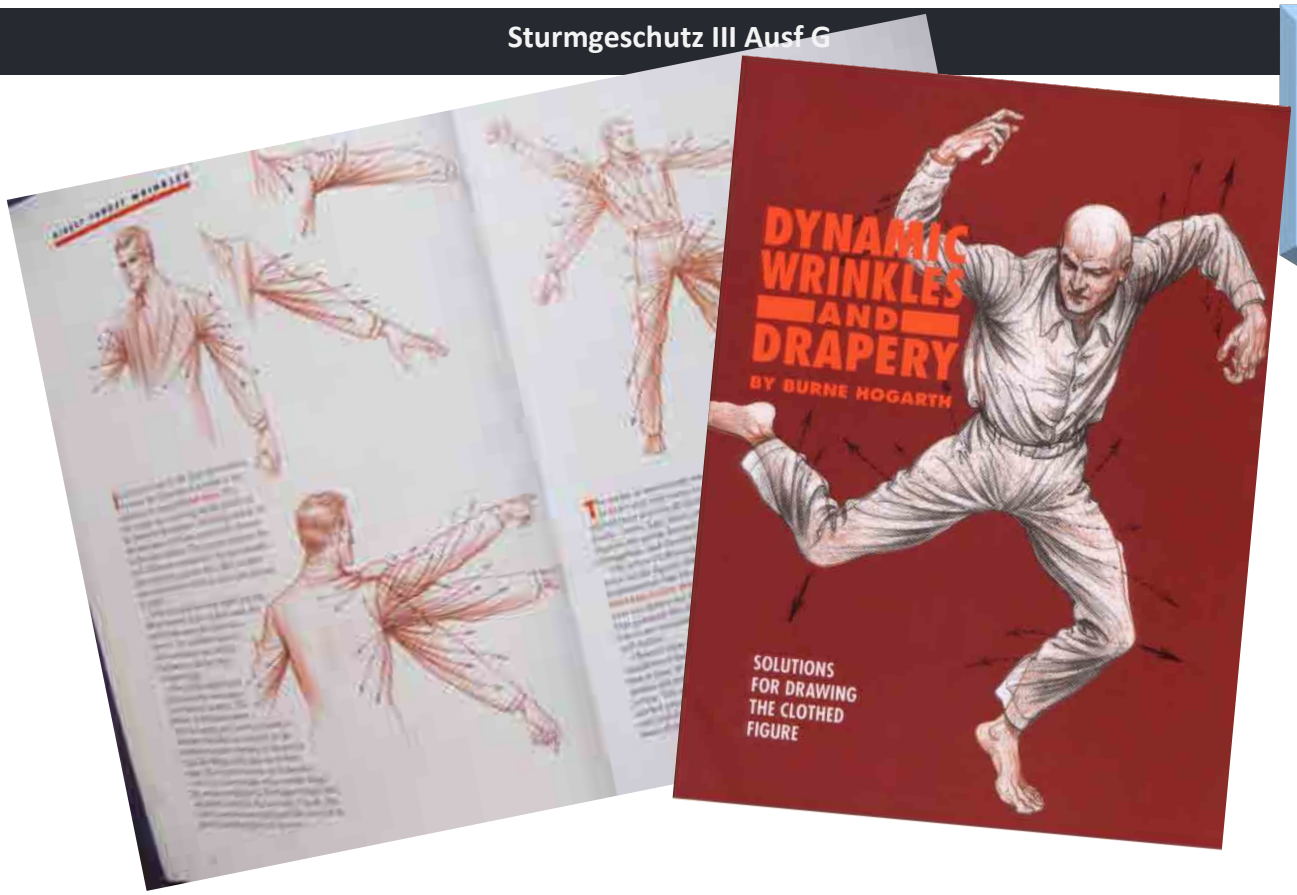
Unless you are sculpting for future production, you do NOT have to make items that can be *convincingly* painted (such as most insignia in this small scale, for example).

With our mannequins complete, our putty and tools to hand, and all the above in mind, we can now sculpt the remainder of our figures. I worked them both at the same time for ease—I could work one while the putty cured on the other.

Top: For my figure sculpting needs, I primarily use the same Magic Sculpt epoxy putty we've already seen in my demonstration on making stowage.

Middle: Also useful is "green stuff" epoxy putty available in similar forms under the brand names of Kneadatite or Duro. Mixing the yellow and blue parts makes a green putty. It's should not be confused with Squadron Green Putty which is an entirely different type of modeling putty. This putty is useful for some tasks. When cured, it remains slightly rubbery. Unlike Magic Sculpt which can be easily carved and sanded once cured, green stuff really must be worked while soft. However, it s slightly rubbery consistency means it's not brittle and it therefore good for small details that could otherwise be easily broken off (such as fingers). It is also quite sticky and even small bits hold together very well while being worked. This makes it ideal for very thin applications and also for tiny things such as insignia.

Bottom: Although a variety of tools can be useful such as dental tools, needle files, putty spoons, and a hobby knife, my primary sculpting tools are the homemade toothpick tool we saw earlier and a damp paintbrush.



For conversion or sculpting, I highly recommend 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 a decades-old book, but is still readily available and inexpensive. It can also be downloaded as a .pdf from the internet.

Working with Resin Parts:

Most kits are made from injection molded plastic. Therefore, many modelers are unsure how to proceed when dealing with resin parts. In this build, I used resin pieces for the figure heads and some of the stowage. Resin offers outstanding detail, but requires different methods. Resin can be cut, sawed, sanded, and drilled. Take care and be safe—and don't breath the dust, it is bad for the lungs.

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 take care not to remove too much. 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.

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). Carefully reshape by hand and "fix" the new shape with a dunk in cold water.

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.

Clean the parts—paint 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 very versatile and will any accept just about 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.

Prior to adding clothing, equipment, and other details, I "flesh out" the mannequins, building the naked forms under the putty. I add these underlying forms so that folds and wrinkles pressed into the putty cannot go too deep—instead they will reveal the body shapes underneath. However, as the putty clothing will be over scale thickness, I keep the naked forms a little on the thin side so the finished figure is not too fat.

I do this in a couple steps. In the first step, putty is added (near right). In this small scale, that is only tiny bits that are difficult to work soft without them coming apart. Therefore, I let the putty cure before proceeding to the second step—cutting, sanding, and filing the forms to the correct size and shapes (far right).

In the photo of the loader below, note the shapes of the shoulders.

The next step is to add the belts. I do this prior to sculpting clothing once again so that the underlying forms show and the figure doesn't end up looking too fat. For belts, numerous materials could be used including sheet plastic or even paper. I like the green Kneadatite putty. It can be rolled-out quite thin and, as we see in the photo above, remains quite flexible even after thoroughly cured. The belts were cut to the proper width, glued onto the figures, and trimmed to shape. The retaining strap on the commander's officer belt was made with a piece of paper.

Tip: Although I am a big fan of the Monroe Perdu Zimmerit, this stuff would be my second choice. I would roll a large sheet it to scale thinness, and then press the pattern into the soft putty. Once cured, I would cut out the individual pieces and glue them to the vehicle. The flexibility of the putty would make this method easier than many others I have seen.

COMMANDER

LOADER

Once the mannequins are complete and belts are in place, we can start sculpting the clothing. This will start with the basic forms and once those are complete we will add the details. I follow the same basic process for all. This is illustrated at left with the commander's trousers. In this case, I worked one leg at a time to avoid accidentally damaging one leg while working the other.

Top Left: The basic form of the pants leg is added with Magic Sculpt. Putty is pressed onto the form and spread out using my fingers and a putty spoon. This is the same process we saw when making the stowage. Once in place, the form is smoothed with a damp brush, removing all took marks and finger prints.

Middle Left: While the putty is still soft, I sculpt in folds and wrinkles. This can be done with a variety of tools, but I mostly use my homemade toothpick sculpting tool. Again, the putty is smoothed with a damp brush.

Bottom Left: Once the first leg is cured, the same process is used to make the second leg.

Above: Once again, the same process was used to sculpt the hip area below the belt on the loader. While the putty was still soft, the pistol holster was pressed in place so that it would have a proper sense of weight—not just resting lightly on the cloth. Many of my reference photos show the coveralls could be quite baggy, and I have tried to represent that on the figure.

LOADER

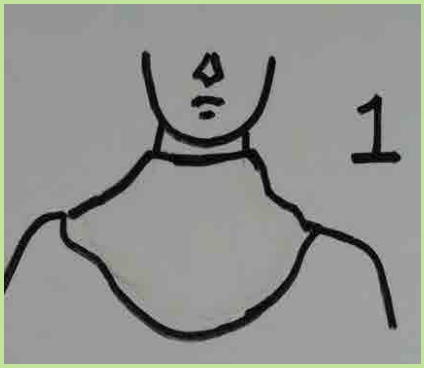
Top: The loader's upper torso was done the same way.

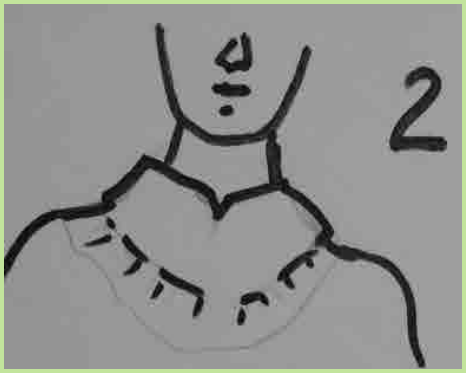
Below: After curing, detailing started with the button opening on the coveralls. Below Left: A blob of putty was mixed, and from this a string of putty was rolled out. Below Right: The string of putty was pressed into place on the figure's torso. Bottom Left: On the figure's left side, this was blended into the torso. Below Right: Using a sharp hobby knife, excess putty was trimmed off the right side, making a clean straight opening. The same was done at the top (collar) and bottom (crotch). Note the slash pocket flaps on the hips were added using the same methods.

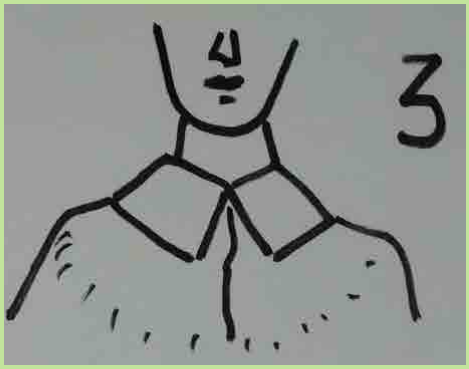


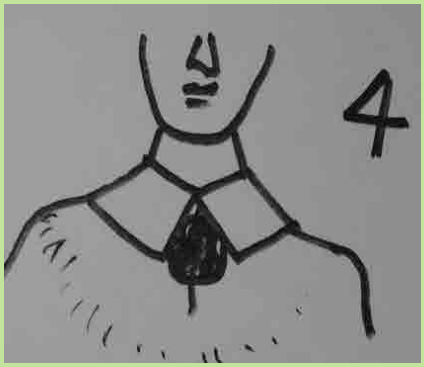
LOADER

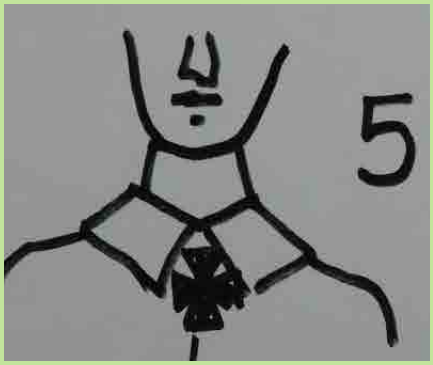
Here the same process is used to add the pockets. A blob of putty was pressed into place, spread out to the desired size and thickness and then cut to shape with a hobby knife. The knife was also used to sculpt in the pocket flaps. Buttons will be added later. .











COMMANDER

His trouser slash pocket flaps were made the same way. The drawings show how the collar and Knight's Cross were made. 1: A blob of putty was put roughly in place. 2-3: This was shaped into the shirt collar and excess was removed—we only want to model underlying clothing that will be visible to avoid making the figure too bulky. 4-5: For the medal, a small blob of putty was put in place, cut into a square, and each corner indented with a hobby knife tip. The result to this point is shown at right. The collar still needs some trimming and thinning, but this will done once the putty cures.




COMMANDER

Work on the commander's Panzer Wrap started below the belt. A sausage of putty was put in place, roughly shaped and smoothed, and then trimmed to the needed size and the front opening flap pressed into the soft putty. Like I did on the loader, the pistol holster will be added before the putty completely cures.


In these photos, we see the shirt collar has been cleaned-up and trimmed to size and the pistol holster added. The portion of the jacket above the belt, minus the collar and front opening has been added.

Shoulder straps for both figures were made from the same sheet of putty the belts were cut from. .

LOADER

The coverall collar was made from three bits of rolled-out putty. A strip was used for the collar and two triangles were used for the lapels. These were blended into the surrounding putty and then "opened" using the point of a hobby knife. Buttons are tiny disks cut from a small length of styrene rod. The enlisted belt buckle is simply a square of sheet plastic.

COMMANDER

The commander's collar was also made from rolled-out bits of putty.

Top Left: A strip formed the collar. A small triangle formed the right lapel.

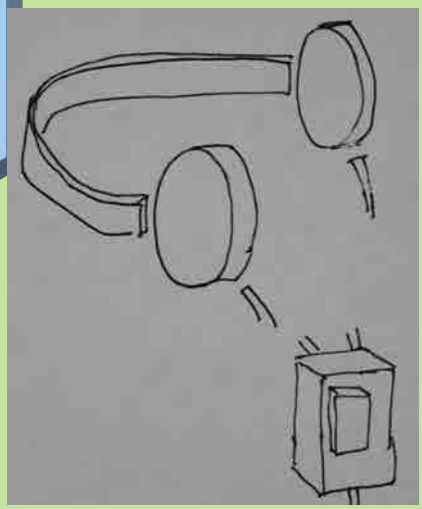
Top Right: Another small piece formed the front opening above the belt. This was blended into the jacket on the left side and cut straight on the right.

Bottom Left: Finally, another triangle formed the left lapel.

Bottom right: In this small scale, it would be possible to simply paint insignia on the figure. I chose to actually model the various bits. This could be done with either Magic Sculpt or Kneadatite. I chose the latter simply due to its stickiness and the fact the contrasting color makes the tiny pieces very easy to see. The pieces of putty were stuck on the figure and then cut to shape using a SHARP hobby knife point. In this fashion I modeled the crest and eagle on the cap. On the jacket were added the collar lutzen, eagle, and three decorations—an iron cross, assault badge, and wound badge.

The belt buckle was made as shown on the next page.

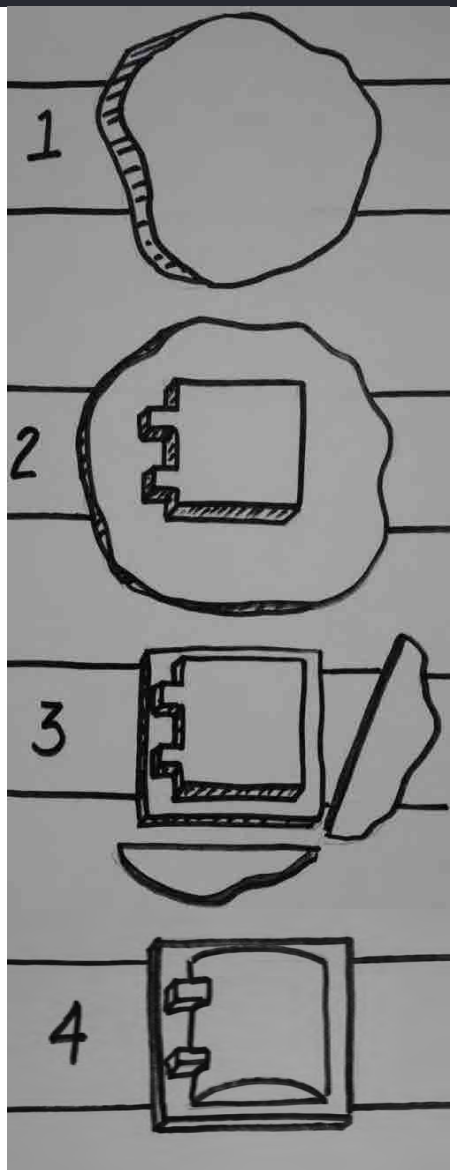
The insignia clearly identify this officer as Heer (army) as opposed to SS.



COMMANDER

The throat mic was made as shown at top. The basic mic is simply two disks of styrene rod joined around the back of the neck by a very thin strip of metal foil. Wires are fine copper wire. After the wiring was superglued in place, the control box was made in the same manner as the insignia using a tiny bit of Kneadatite putty pressed into place and cut to shape.

Headphones are from the Tamiya Infantry Gear sprue—the same one the pistol holsters are from. Again, the wiring is copper wire.



When sculpting, we do not have to recreate reality—only the impression of reality. How something is actually made is irrelevant— it is only how it looks that manners. With that in mind, here is how I made the officer's belt buckle.

1. *A blob of putty (Kneadatite Green Stuff) was pressed in place.*

2. *Using the edge of a putty spatula, the shape of the center portion was pressed into the putty.*

3: *The buckle shaped was cut into the flattened putty.*

4. *Using a damp brush, the central section was rounded off.*

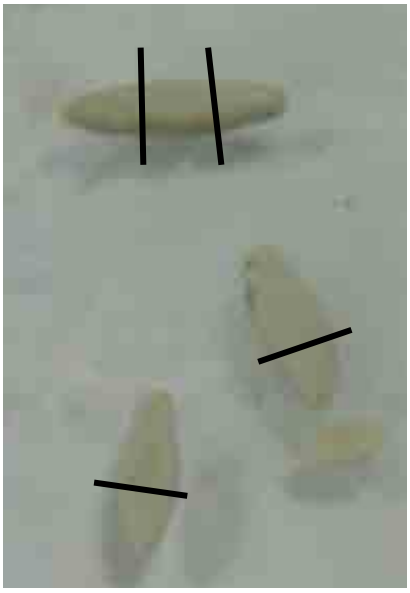
Modeling "Nazi" Subjects:

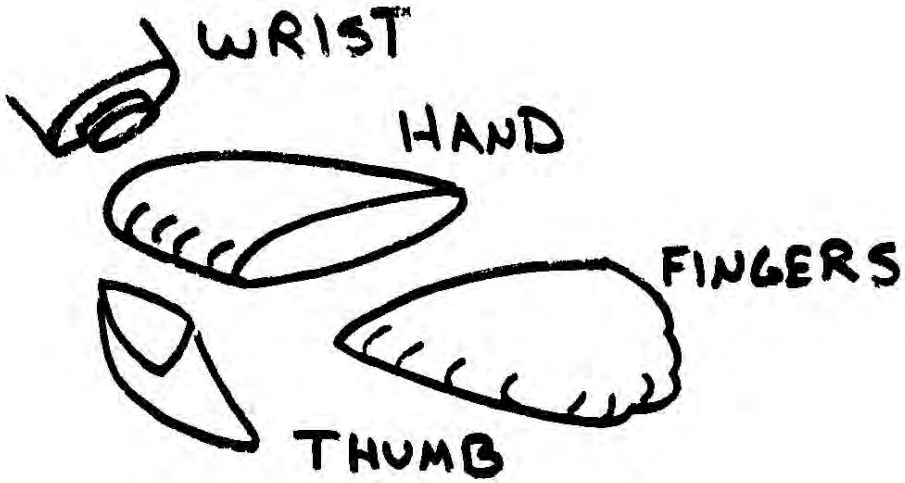
There are those who object to WWII German (especially SS) models based on what the German government – and by extension, its military – stood for during the period and the brutality/inhumanity of its treatment of what it considered "sub-human" races. This raises the valid question - Is it ethical/moral to model these subjects (again, especially the Waffen SS)? It is history; I see no issue with it – with some exceptions.

I would not make or approve of a model glorifying the SS or Nazi doctrines. When I have a choice, I normally model a figure/vehicle as army instead of SS, as I have done here. I am leery of SS apologists who claim the Waffen SS 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 many German units—again especially the SS. Such behavior was often encouraged and rewarded and only rarely punished.

We also must be aware of the feelings of others. This is simply common courtesy. Unlike many of the "evil empires" of the past long buried in the pages of history, the Nazi regime is still within living memory. I would display anything at a model show. But for a public display (at a library, for example) I would not show anything with swastikas or SS runes. To us it may be just a model with no deeper political meaning, but to a Holocaust survivor who lost everything and everyone, it is 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?"

Sleeves for both figures were sculpted using the method we've already seen—a layer of putty was put into place, smoothed, wrinkled using my toothpick tool, and smoothed again. The loader's right sleeve has a flat spot where it presses against the MG shield—it is important to do constant test-fits to discover these issues during the sculpting process rather than find out, too late, that the figure does not fit in the hatch.





In this photo, the commander's right hand blank has been attached to his arm and the joint repaired. The flare pistol (Model LP42) has been made of various bits of weapon and styrene and glued in place.

Sculpting the hands: After the face, the hands are probably the most important parts of our sculpt. They are second only to the face in portraying both action and emotion. And, like the face, it can be challenging to make them look natural. The good news is that, in this small scale, many fine details such as wrinkling, knuckles, fingernails, etc., do not necessarily have to be sculpted—many of these type things can be convincingly painted if they need addressed at all. I use a simple method to make hands. The basic body of the hand—from the wrist to the fingers minus the thumb is made from a putty "blank". Above left: I make these blanks by rolling out small putty "sausages" and then slightly flattening them. Once cured, they are cut at the lines. The drawing above show how this "hand" becomes a model hand.

-A hole is drilled into the hand blank and it is attached to the metal arm pin protruding from the figure's wrist. The joint is repaired with another putty application. Anything the figure will be holding is glued onto the "palm" of the hand at this point.
-Now we switch to the green Kneadatite putty. A small "mitten-like" finger section is superglued to the end of the hand blank. It is shaped as needed. Remember that fingers do not curve—they are straight sections that bend at joints! The individual fingers are either scribed into the soft putty (if they are together), or cut and positioned as needed (if they are apart).
-Once the fingers are cured the thumb is added using the same technique.

Above left: A mitten-like set of fingers shaped from green stuff has been glued onto the hand blank. The trigger finger has been cut free from the others. Above Center: The trigger finger has been put in place alongside the trigger guard and the other fingers wrapped around the pistol grip. Note the fingers do NOT curve around the grip like a length of spaghetti, but have flat segments that bend only at the knuckles. Above Right: The thumb has been added from another piece of green stuff.

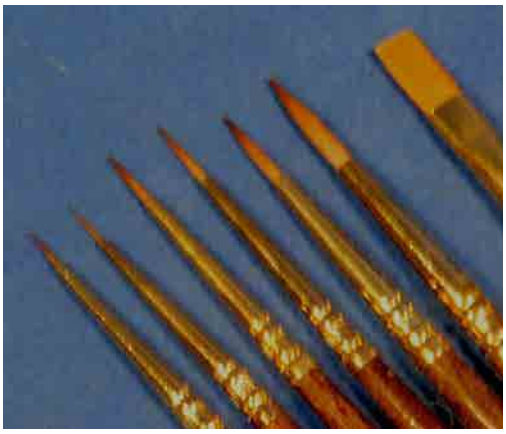
Below: The finished figures, both by themselves and in a final test-fit in the vehicle. The commander's watch is a slice of styrene rod with a metal foil strap. The loader's traffic control disk is from the Tamiya "German Infantry on Maneuvers" set.

THE REAL THING

One of the German flare pistols used during the latter part of the Second World War—the LP42. I chose this model as it appeared quite simple to make.

Once all the assembly is complete, the figures can be cleaned-up by lighting rubbing any rough areas with a bit of fine steel wool. Files, sanding sticks, and/or a hobby knife can be used to address any other imperfections or rough areas as needed. Any gaps, cracks, and pin holes can be fixed with more applications of putty.

PAINTING THE FIGURES



Your work will only be as good as your brushes! The first six brushes seen above 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 for figures in this small scale.

The style and methods you use for figure painting are entirely up to you but should complement your 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 minimum. Figures are a focal point of any composition, so they should be painted to at least the same standard as the vehicle. Good brushes and lighting are important, but the main ingredient for successful figure painting is simply attention to detail – be neat. The same painting concepts we've already discussed (the concept of scale light and painting using the Stop Sign Rule) apply to figures as well. The information on color theory and color mixing apply here, too.

To paint effectively, good lighting is a must. The lights on and around my painting desk are daylight-balanced so my colors appear true. For fine detail work, I have a large magnifying glass with a light ring on an articulated arm. I mount the figure on a temporary painting base that is a comfortable size and weight to hold while I paint. I have support for my painting hand to avoid the shakes.

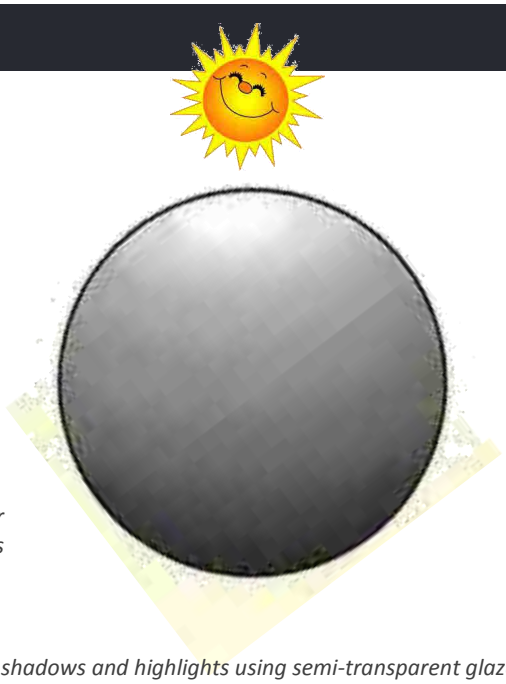
Without quality brushes, we cannot achieve quality work. Good sable brushes can be expensive, but get the best you can. Synthetics are acceptable for many basic painting chores, but I've found they do not hold paint well and they tend to (permanently) bend double after painting into recesses. Brush size is indicated by a number – the larger the number, the larger the brush. A number 4 brush is larger than a number 2 brush. Small brushes are identified by zeros, the more zeros the smaller the brush—a 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 regularly use: 2/0, 0, 1, and 2 round brushes, and 2 and 4 flat brushes. A size 0 brush with a good point will handle nearly all fine detail applications, and I rarely use anything smaller than a 2/0. 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. It is not the size of the brush, but the fineness of the point that counts—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 conditioning brush cleaner will help to keep them supple and preserve the point.

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.

I paint figures with acrylic paints almost exclusively, primarily craft acrylics such as Delta Ceramcoat, Apple Barrel, and Folk Art. I have also used Vellejo, Andrea, Reaper, Jo Sonja, and other brands. The craft paints are at least as good (if not better), and much less expensive. The Vellejo Model Air colors I use for airbrushing can also be applied by brush. For metals, I use the excellent metallic paints by Liquitex, Vellejo, and/or Andrea. When it comes to metallic paints, the craft paints are inferior and grainy. All these various acyclic paints mix well together.

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.

My normal process consists of applying an opaque base color, and then adding semi-transparent glazes of lighter and darker colors to create highlights and shadows. This process, and the concepts behind it, were shown in detail on page 96 and 97. Information on color theory and color mixing can be found on page 73.



Back on page 97 we discussed my "Concept of Scale Light" which explained why painted highlights and shadows often look more convincing than letting the room light provide them. The amount of painted highlights and shadows you add is a matter of personal preference. I have no magic formula. After painting the base color (my mid tone, marked with a "B" in the value graphic above), I add lighter highlights followed by darker shadows. Depending on the color and the effect I am trying to achieve, I add normally anywhere from two to four highlights and two to three shadows. As the graphic at the right shows, I usually paint objects as if lit from above. Highest highlights are thus on top surfaces and deepest shadows in unlit areas and lower surfaces. It is possible to paint the highlights and shadows as if light is coming from another direction, but this is difficult to effectively pull off, especially as the painted effect usually has to compete with the natural light in the room.

I paint these shadows and highlights using semi-transparent glazes of color. My base color is usually solid and opaque. To ensure the paint flows smoothly with no brush marks, I normally thin the paint enough (I use tap water) that it takes two or three coats to get a good opaque surface. For the highlighting and shading glazes, the paint is a bit thinner so that the underlying color shows through. The painted layer thus serves to lighten or darken the underlying color, not change it.

I use a basic plastic pallet (above left). These can be inexpensively purchased from any department, craft, art, or hobby store. The small mixing cups are very handy. If I want to save a paint mix for later use, I just put a piece of packing tape over the individual cup to seal the paint so it doesn't dry out. Above Right: To easily hold the figure during the painting process, I use the mounting pins to fiction fit the figure onto a painting base—simply a conveniently sized chunk of wood. Although not pictured, I prime the figures in Black, the same as I did the vehicle—and for the exact same reasons.

THE REAL THING

This photo, of various German Tunics from all phases of the Second World War, shows there is no one correct version of Field Grey. Within a diorama or vignette—and even on the same figure—I will often vary the color of supposedly same color items. That adds visual interest and can, as this photo clearly shows, add realism, too (the photo is a from a military collectors website).

PAINTING EXAMPLE

As the photo above shows, "field grey" covers a wide range of colors. I varied the color on each field grey item I painted. In this example, we will paint the vehicle commander's jacket. The base color was a mix of the paints shown at left: 2 parts charcoal, 2 parts Olive Drab, and 1 part Green Grey.

1: The base color in place. 2: The first highlight was created by adding more Green Grey to the base color. 3: The second highlight is straight Green Grey.

4: The third highlight was created by adding Wedgewood Green (above left) to the Green Grey. 5: A final highlight, used only as edging around the collar, cuffs, jacket opening, and bottom hem, was created by adding USAF Light Grey to the above mix.

6: The first shadow was made by adding more Olive Drab and Black to the Base Color. 7: Black was added to create the second shadow. 8: Outlining was done with straight Black.

The field grey cap and trousers were also painted field grey, but used slightly different mixtures. For example, the cap was painted using a mix of German Green and Light Grey Green (far right) lightened with Light Grey Green and shaded with Black. For information on the trousers, see the "Colors and Color Mixes" sidebar at the end of this section.

In this photo, we see the stark contrasts on the jacket have been slightly toned down. This was accomplished by what I call a "blending wash". This is basically a very thin wash (sort of like the filters we applied to the model) of the base color. This serves to "visually blend" the various color values and reduce the stark contrasts between dark and light.

PAINTING CAMOUFLAGE

I decided to paint the loader's coveralls in Italian Camouflage material. We saw, back on page 116, one method to paint camouflage. This was to block in all the colors, and then add highlights using glazes of flesh and shadows using glazes of dark grey or dark brown. In larger scales (54mm and above), when I paint camouflage I generally base coat, highlight, and shade each individual color. In this instance, I used a combination of those two methods. Let's see how it was done.

1: I stared with Green. The base color was a 2/1 mix of English Ivy Green and Timberline Green. Two levels of highlights were created by adding progressively more IAF Sand. Two levels of shadow were also added. The first was English Ivy Green. The second shadow was German Green.

2: Brown was next. The base color was a 1/1 mix of Tank Brown and Sandy Brown. Again, two levels of highlight were added. The first was created by adding more Sandy Brown to the base. The second was made by adding IAF Sand. Two levels of shadow were also put in place. The first layer was Tank Brown, and the second was Dark Burnt Umber.

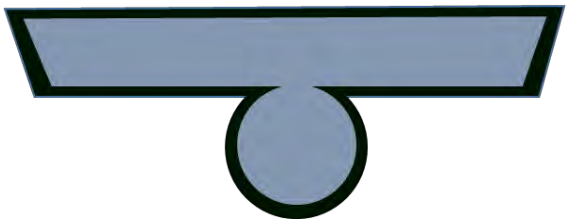
3. Finally, the yellow was added. The base color was U.K. Light Stone. Highlights were added with IAF Sand. Shadows were added first by adding Sandy Brown to the base and second with straight Sandy Brown.

Above: The additional colors used to finish the camouflage. 4: To "visually blend" the various colors and tone down the brightness, a blending wash was put in place. Unlike the commander's jacket where a blending wash of the base color was added, Khaki was used in this instance.

5: After the blending wash, some overall highlighting and shading were added. This was done to further tie the colors together. The first highlight was Dark Flesh added in a very thin glaze only to areas of the highest highlight. Finally, edging (along the collar, cuffs, pocket flaps, coverall opening, etc.) was added using a mix of Medium Flesh and Khaki. Darkest shadows were added with a thin glaze of Dark Burnt Umber mixed with Black. Finally, outlining was accomplished using straight black. The buttons have been painted (using Green Grey), but no other details have been added.

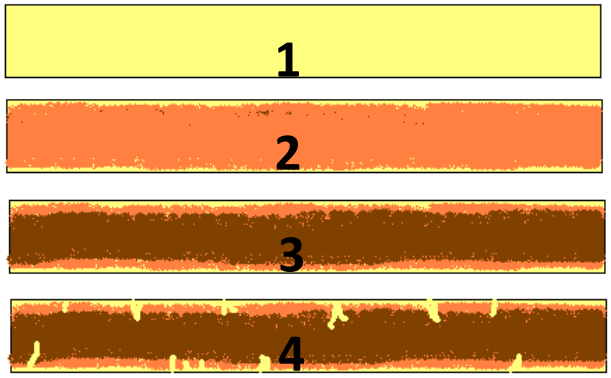
PAINTING DETAILS

With the basic clothing colors laid in the various details can be added. For these figures that consists primarily of insignia and the leather belts and holsters. In this small scale, it's very difficult to paint exact details of insignia. Fortunately, it's also not necessary. To be effective in this small scale, we need only imply detail. A couple examples can be seen at right. Other details, such as the officer's cap band, were painted using the same methods we've already seen.



Implied detail: Above is a breast eagle. It is simply a line and dot of pale blue grey over the top of a line and dot of dark green. At left we see a wound badge. The base is dark gold, with a top highlight and a couple dots of light gold (or other appropriate color). Considering that on the figure it is only about a millimeter in size this amount of detail is more than sufficient. Other insignia, medals, ribbons, shoulder straps, etc., were painted using the same concept.

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, where appropriate I add scuffs and scratches and often edging by using my first color or even a color somewhat lighter color. Below, a sample of some of the colors and the sequence of application I used to create black leather. The colors, all acrylic craft paints, are from left to right: Golden Brown, Autumn Brown, Burnt Umber, Dark Burnt Umber and finally Dark Burn Umber + Black. Pure black was used for shadow edging and Golden Brown plus a bit of lighter Khaki (not shown) for edging on the highest edges. Obviously, different colors would be used to create different colors of leather.

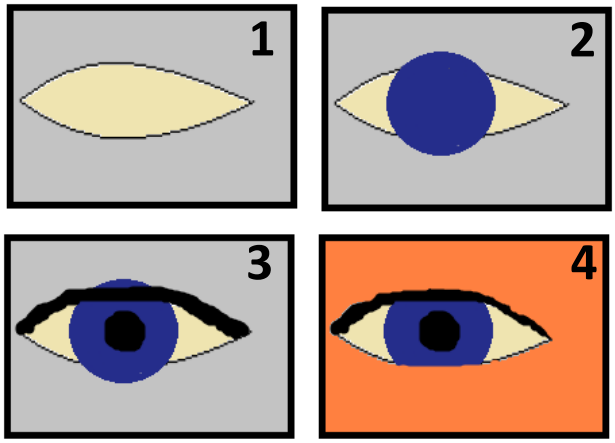


As an example of different colors, I use the above to create the commander's reddish leather. I started with the Golden Brown and Autumn Brown as normal, but the main color is a mix of Burnt Umber of Chocolate Bar. Outlining was then done in Black.

The figures as they appear at this point. See the "Colors and Color Mixes" sidebar at the end of this section for a discussion of all the colors used. Note the various leather colors and the appearance of the details. Even in this photo, well over twice life-sized on a full printed page, the "suggested" detail is more than sufficient.

PAINTING FLESH

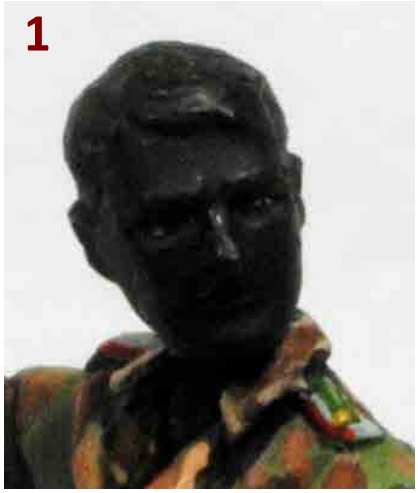
Whether painted first or last, the face is the most important painting task. It is generally what viewers look at most closely. It's the feature that makes a figure "human". The face will often, quite literally, make or break a figure. It's the face – and its expression – that gives the figure character and conveys, more than anything else, its "attitude". In second place, just behind the face, are the hands. 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 usually be more gradual and smooth. I normally use more highlights and shadows on the face than on any other area, and with more contrast between the highest highlight and deepest shadow. Consider the figure itself - obviously, a child's face is smoother than a weathered warrior. Let's look at my technique using the loader as an example. I generally paint all areas of exposed flesh at the same time using the same colors.

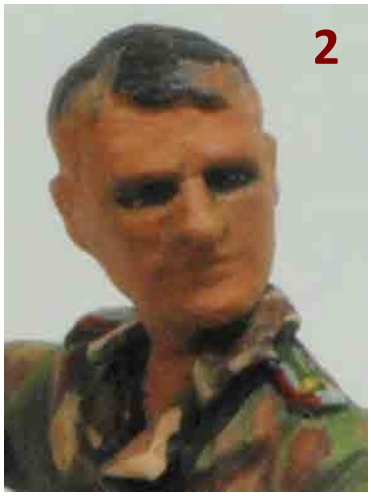


When painting faces, I begin with the eyes. Both eyes should be the same size and looking in the same direction. I use the method shown at left for small-scale figures. I start by painting the whites. I do NOT use pure white as it can help create a "bug-eyed" effect—I use a very pale flesh tone. I add a dot for the iris followed by a Black dot for the pupil and a Black line for the upper lid. Rather than paint a "catchlight", I coat the eye with Clear Gloss to let the natural light provide a bit of highlight. For a figure this size, where a six-foot man would stand example 1.5 inches tall, this is more than enough detail.

As an option, in this small scale, considering that in the sunlight our figures may be squinting, 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.

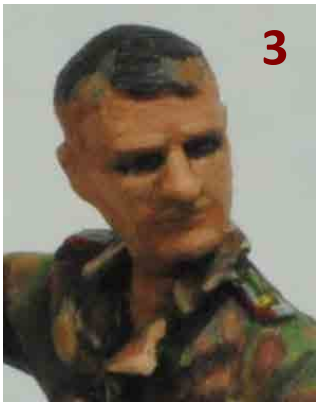


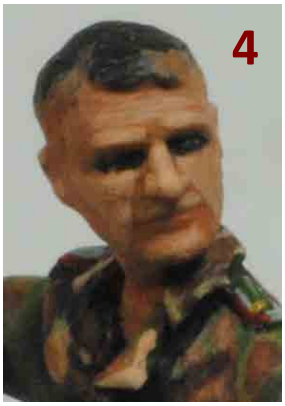


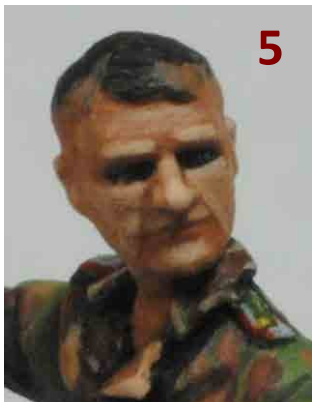
Above: 1: Here we see the eyes painted and 2: the basic flesh color (Delta Ceramcoat's "Dark Flesh") put in place.

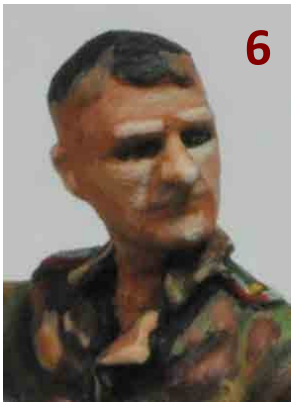
Right: This is a photo of a "Planes of the Head" art mannequin by John Asaro. More photos, and information on ordering a mannequin if you wish can be found at "planes of the head.com" I find this or similar photos of heads with angular features (do a Google Image Search for "Planes of the Face") very helpful in determining where to add highlights and shadows to my painted faces.

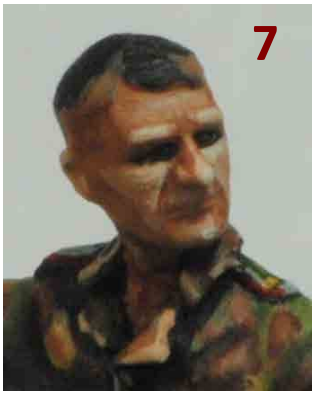
The colors I used to create flesh. Remember that persons who spend a lot of time outside tend to be darker. Not everyone has the same complexion. There is no one correct flesh mix. In dioramas, I often several different flesh colors. Highlights are applied to the forehead, ridge of the nose and nostrils, 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 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.

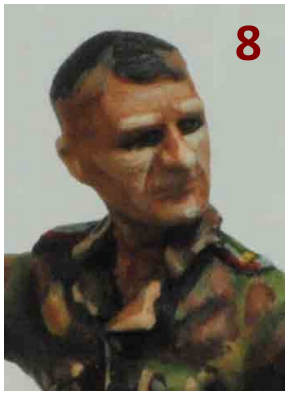


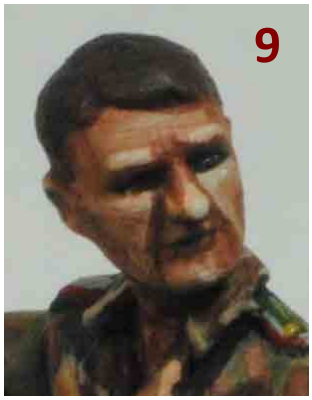


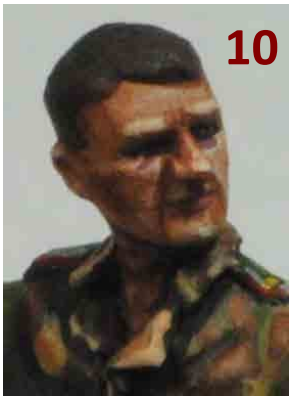












3: The first highlight is added by mixing Medium Flesh with Dark Flesh. 4: The second level of highlight is Medium Flesh. Note it is applied in smaller areas. 5: Medium Flesh plus Antique White provides the third highlight. 6: The final highlight is Antique White. 7: The first shade is the base plus Candy Bar Brown. 8: For the second shade I add Chocolate Bar to the mix. 9: Black is added for the final shade. 10: 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 checks and just under the tip of the nose. The lower lip is painted in a mix of Medium Flesh and Burgundy Rose and given a highlight glaze of Dusty Rose. Teeth, if visible, would be "dotted" in with Antique White. While it may look somewhat "rough" in the photos, keep in mind the entire head is just under 1/4 inch tall. The tiny photo at far right is approximately life-sized on a full printed page.

11: The hair is next. 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. Highest highlights are picked out with careful applications of glazes. Eyebrows are added at the same time using the same color.

For painting different races of individuals, I use the same methods. Only the colors used are changed.

Right: The Commander

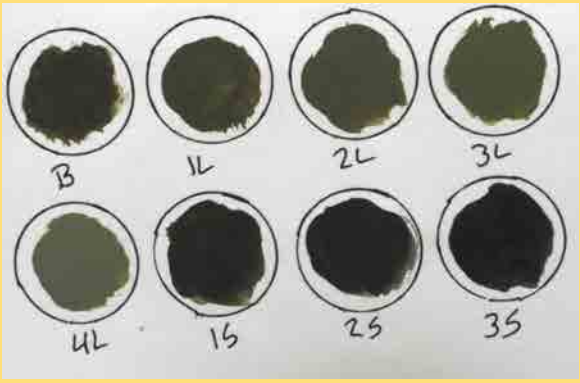
Figure nails are also painted at this point. I coat the nail with the medium shadow color, then paint the nail in a highlight color, leaving a border of the shadow color.

If you desire, you can add a five-o'clock shadow. I rarely do so in this small and then only on figures with very dark hair. 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.

Below: The finished figures.

COLORS and COLOR MIXES USED:

Unless specified otherwise, colors are Delta Ceramcoat craft paint. Apple Barrel paints are identified with (AB), Folk Art (FA), Vellejo (V), Vellejo Model Air (VA), Andrea is (A). Key: B = Base Color, L = highlight (1L, 2L = 1st highlight and 2nd highlight), S = Shadow. For color mixes, if no ratio is listed, the colors were mixed "by eye" until they looked right! The colors for each item are generally listed in the order they were applied.



The color mixes used on the commander's jacket

THE REAL THING

Two Photos of StuG Commanders, both wearing the field grey Assault Gun uniform. The man on the left wears the same crush cap my officer wears.

COMMANDER'S JACKET (Field Grey Sample #1)
B: Green Grey (V)/Olive Drab (VA)/Charcoal 1/2/2
1L: B + Green Grey (VA)
2L: Green Grey (V)
3L: 2L + Wedgewood Green
4L: (Edging only) 3L + Light Grey (VA)
1S: B + Olive Drab (VA) and Black
2S: 1S + Black
3S: Black

COMMANDER'S TROUSERS (Field Grey Sample #2
B: Same as jacket with more Olive Drab and Charcoal added
1L: B + Light Grey Green (VA)
2L: Light Grey Green (VA)
1S: B + Black
2S: Black

FIELD GREY SAMPE #3 (Commander's Cap)
B: German Green/Light Grey Green 2/1
1L: B + Light Grey Green
2L: Light Grey Green
1S: B + Black
2S: Black
Cap Band: Cam Green (VA) shaded by adding Black

ITALIAN CAMO MATERIAL: (Loader's Coveralls)
GREEN B: Timberline Green/English Ivy Green (AB) 1/2
1L: B + IAF Sand (VA)
2L: 1L + IAF Sand (VA)
1S: English Ivy Green (AB)
2S: German Green (VA)
BROWN B: Sandy Brown (VA)/Tank Brown (VA) 1/1
1L: B + Sandy Brown (VA)
2L: 1L + IAF Sand (VA)
1S: Tank Brown (VA)
2S: Dark Burnt Umber
YELLOW B: U.K. Light Stone (VA)
1L: AIF Sand (VA)
1S: B + Sandy Brown (VA)
2S; Sandy Brown (VA)
Blending Wash Overall: Khaki (AB)
1L Overall: Dark Flesh
2L Overall: Medium Flesh + Khaki (AB)
1S Overall: Dark Burnt Umber + Black
2S Overall: Black

OFFICER'S SHIRT: (Visible only at collar and cuffs)
B: Black Primer
1L: Hippo Grey
2L: 1L + Sandstone

THE REAL THING

Reproduction Panzer Coveralls (from "Hessian Antique") made using Italian Camouflage material. There was no one standard design for the coveralls—many different patterns and colors can be found.

LEATHER BELTS AND STRAPS:
--Red Brown Leather: In order: Golden Brown (AB), Autumn Brown, Burnt Umber + Chocolate Bar (AB). Edging in Golden Brown + Khaki. Outlining in Black.
--Black Leather: In order: Autumn Brown, Burnt Umber, Dark Burnt Umber + Black. Edging in Golden Brown (AB). Outlining in Black.
--Commander's Cap Visor and Ear Pieces: Base color was the black primer. Highlights were created by adding Dark Flesh.

INSIGNIA and MINOR DETAILS:
--Artillery Red Piping: Fire Red (VA)
--Breast Eagle: Backing color of Cam Green (VA) + Black. Eagle color is Pale Grey Blue (VA)
--Silver Insignia: Cloth insignia was painted Pale Grey Blue (VA). Metal insignia were painted Lead (A) with highlights in Steel (A).
--Gold Insignia: Gold insignia were painted Dark Gold (A) and highlighted with Bright Gold (A).
--Belt Buckles: The officer's belt buckle was painted Lead with Steel highlights (both A). The loader's buckle was painted German Green with Green Grey highlights and details.
--Shoulder Straps: The officer's straps were base-coated in Fire Red (VA). The enlisted straps were Cam Green (VA). Lace was Pale Grey Blue (VA). Piping Fire Red (VA).

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: Touches of red were added to the cheeks and the tip of the nose. Lips are a mix of Medium Flesh and Burgundy Rose highlighted by adding a bit of dark pink.

The various mixes used to paint the figures' faces. Note the amount of contrast between the highest highlight and deepest shadow.

THE REAL THING

A good study of the officer's "Crusher Cap". Many officers added cords. Piping is in branch of service color, in this case white for infantry. My figure wears the red of the artillery arm.

In this particular composition, the groundwork is only a supporting element—it does not materially aid in telling the story. It is just a basic, simple piece of ground with various grasses and shrubs mounted on a small but attractive base. On higher elevations, the ground is hard and dry while in lower areas it is soft and muddy. Shrubs and bushes match those on the vehicle. Earth colors also match those on the vehicle. This is important as it makes the vehicle look as if it belongs. In fact, when working with camouflaged vehicles, I often use similar colors and patterns on the groundwork—after all, blending in is what camouflage is all about. The nameplate was designed on my computer, printed on quality paper, coated with clear flat paint, and attached using double-sided tape. For more information on complex groundwork forms (trees, buildings, snow, water, rubble, etc.) readers are referred to my other works.

THE BASE

Let's start by making clear what bases and groundwork are not. They are NOT an afterthought. The are NOT unimportant. What they ARE is an integral part of your piece, and their quality (or lack thereof) will go a long way toward determining its success (or failure) as a whole.

Bases are—quite literally—the base that everything is built upon. But they are more than just things to mount your pieces on or to use as a handle, even though they are these things. The base forms a big part of the overall effect and impression your finished piece makes on a viewer. You spend valuable time and hard earned money to make your piece as nice as you can, why stick it on a poorly finished scrap of wood? A nice base can improve the look of a mediocre model, just as a poor base can lessen an otherwise outstanding piece.

If you have the inclination, tools, and talents, you can fashion your own base. Decoupage plaques are available at most art and craft shops, but they come unfinished. Finished nicely, they can work well. Your local trophy shop is another source for bases that look presentable and are not too expensive. You can get finer, but more expensive, bases as well. These are what I mount most of my stand-alone figures on. I do my base shopping at figure shows, but there are also several online sources. Be sure to select a base that compliments your piece in color, finish, and design. A vertically oriented piece may look best on a tall base, while a squat piece may be best on a low base. A piece meant to be viewed only from one side may be placed on a square or rectangle base, but one which can be viewed from all angles may be best served by a round base. These are just examples. The base also allows you to hold the piece, so make sure it lets you to do that! You can have bits and pieces of your finished work overhang the base, but you must always be careful to avoid breakage. Be careful also with a tall base—make sure it is stable and not prone to falling over! In a crowded display case or display table that could be catastrophic. Allow your figures/models to control the size of the base, not vice versa. Select your base only after you have figured out how much space you need for the effect you wish to achieve.

You may choose not to put any nameplate on your base, and this is perfectly acceptable. If you want a nameplate, there are all kind of things you can do. Make sure whatever you use compliments your finished piece and does not detract from it. Your local trophy shop is a good source of etched plates in metal or plastic. Size, wording, fonts, and designs are pretty much unlimited, although the more you put on them, the more they will cost. If you are computer savvy, you can make your own using programs such as Photoshop or PowerPoint. Print them on nice cardstock or fancy paper, seal them with a clear flat or clear gloss spray, and attach them to your base. I use Scotch brand double-sided tape.

I considered several bases (above) before I selected the one I used for this project (top left). While all these bases have advantages and disadvantages, I chose the low rectangle for its size, shape, and attractiveness. It was large enough to hold the vehicle without a lot of excess space, and its colors were a nice complement to the vehicle and the planned groundwork.

GROUNDWORK

Doing proper research is vital—dirt, mud, rocks, grasses, plants, and water from one place may not look like those from another. Color, texture 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.

Not only must your groundwork allow for proper fit of your vehicles, figures, and 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". While this includes making my base as small as possible and tightly framing the scene, is also has other implications. 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 smaller trees, a couple stumps, a fallen log, and lots of forest litter. That's enough to give context.

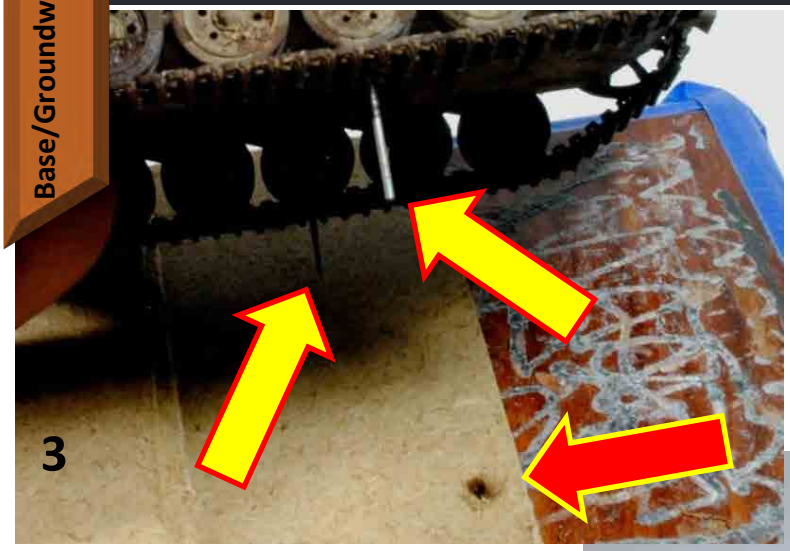
As you construct your groundwork test fit your elements as necessary to make sure everything fits together. After everything is completed and painted is not the time to find they simply don't fit!

For the groundwork itself I normally use Celluclay. This instant paper-mache product is easy to work with and gives good results. Similar products such as Sculpt-A-Mold can also be used as can various other commercial putties. Rocks and sand can be purchased at model railroad shops, but there is no need to do so—a few minutes in a gravel driveway or the gutter along your street will give you enough to last a lifetime. For vegetation, there is a wealth of commercial groundwork products on the market. A lot of these are preserved natural materials. Many of these preserved natural materials can also be purchased at floral and craft shops. In fact, these are quite often the exact same things sold by model groundwork suppliers except for price—you generally get more for less at the floral or craft store! Mother Nature has a great way of miniaturizing herself and these natural products are usually superior to synthetic ones. For man-made items (streets, buildings, etc.) you can use the many commercially available pieces or you can make your own. It's not difficult.

This little display only required a small patch of basic groundwork. Let's take a look at the products used and how it was done.

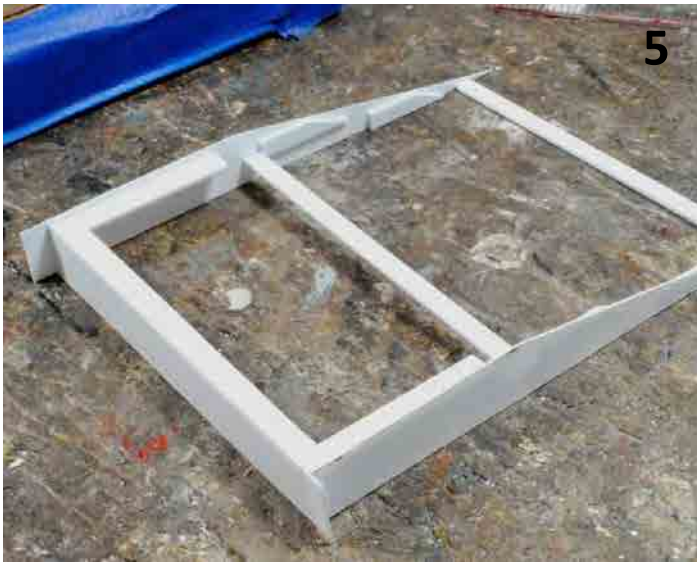
Above: For basic groundwork we need only basic materials. I make groundwork from Celluclay—an instant paper mache. It's easy to work and has a long working time. Mother Nature provides sand, gravel, and rocks. Kitty litter (clean) works well, too—it is realistic looking, lightweight, easily glued, and takes paint well. For grass, I use Woodland Scenics "Static Grass" as my basis. This comes in various lengths and colors. Woodland Scenics also offers packs of longer "Field Grass" in various colors. While I often use this project, I did not use it here. Premade static grass clumps (I use Greenline) are very useful. These also come in various lengths and colors. Unraveled rope or twine also makes good grass and weeds. Balls of natural seaweed can be pulled apart to make groundcover. Natural materials such as dried plants, roots, and sticks are very useful, as are the same materials from which we made the vehicle's foliage camouflage.

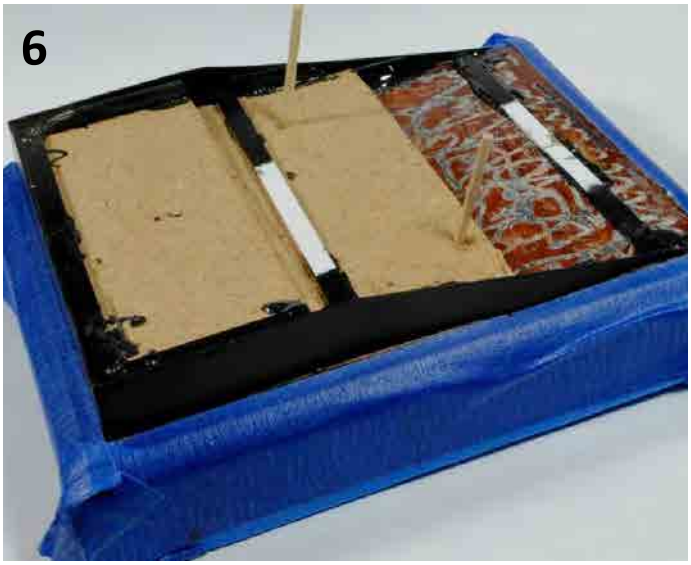
1: Prior to beginning the groundwork, I rough up the surface of the base with a Dremel Tool so the glue and groundwork stick better.
2: I build up contours with scrap wood or Styrofoam. The painter's tape protects the base from the work to follow.



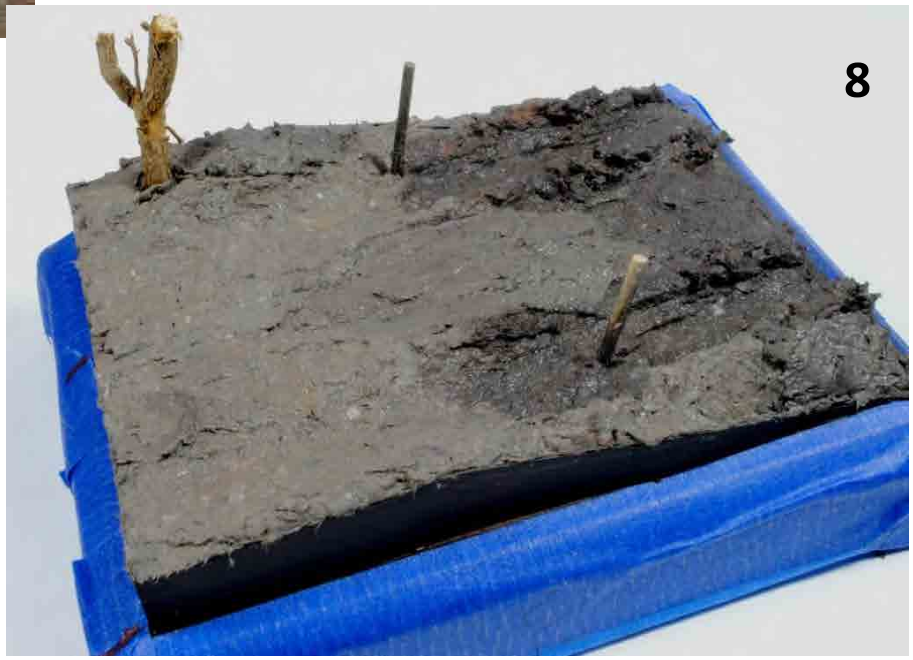
3: To mount the vehicle, I drill holes up through the tracks into a road wheel on each side and glue a paperclip wire pin in each (yellow arrows). I drill matching holes in the base for the pins to fit into (red arrow). This will ensure a strong joint between the vehicle and the base rather than just gluing the vehicle to the fragile groundwork. 4: A test-fit ensures everything works and plays nicely together.

5-6: To provide an attractive edging around the elevated groundwork, I made a sheet plastic frame. Tip: when making a square shape from plastic, don't try to cut the pieces to exact shape—cut them long as we see in photo #5. Then after the glue cures, they can be cut to final shape and sanded smooth. This was sprayed with a black semi-gloss and epoxied in place.





7: According to the instructions, all you need do is mix the Celluclay with water. I add a dollop of white glue to help it adhere to the base, especially where it is spread thinly at the edge.. I also pre-color my mixture with acrylic colors to get close to my desired earth tone. I have a selection of very inexpensive earth tones for this task.



8: The Celluclay is applied. Don't put it on too thickly or it will take forever to dry—that's why I build up contours beforehand. The material can be applied and shaped with fingers, spatulas or other suitable tools. Keeping the tools wet prevents the material from sticking. The Celluclay was applied in a fairly flat layer, indented slightly where the wheel ruts in the country track would be. The ruts were made deeper in the lowest area of the base where the ground will appear slightly softer and muddier. Note I used a couple different colors—the ground is darker in lower, wetter areas. All further groundwork construction is done before the Celluclay dries.

9: The stump (a length of stick) was 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. Larger rocks are bits of kitty litter. The toothpicks mark the locations of the holes for the vehicle mounting pins, and prevents them being clogged with Celluclay.

10: The vehicle is pressed into the putty (I dampen the tracks with a bit of water to prevent the material from sticking to them) to make an impression of the tracks the vehicle can be glued into later. The small rocks were put in place first and the vehicle pressed in so that when the StuG is permanently fitted later it will have a sense of weight—sitting slightly sunk into the ground rather than perching weightlessly on a few small pebbles.

11: When the vehicle is removed, the toothpicks marking the locations of the mounting holes are put back in place. We have nice impressions of the tracks—sunk deeper where the ground is soft and only lightly marking the surface on the highest, hardest ground.

12: The first grass I put in place is the layer of static grass. To get the best effect from this grass (i.e. all blades standing up) you can purchase or make a static grass applicator. For the small areas I cover, I find this impractical. My method gives a good-enough result in my opinion. I start as seen here—areas were I want grass are given a coat of a white glue/water mix.

13: A heavy layer of the static grass is sprinkled on the glue areas and very lightly pressed into mix with my fingers.

14: I let it set for 5 or 10 minutes then remove the excess by gently blowing across the surface. This not only removes excess, but will cause many of the remaining blades of grass to stand upright.

15: Next, I added some of the pre-made static grass clumps. I used a couple different lengths and colors. To apply these, I pick up a clump with tweezers, dip it in a puddle of white glue, and press it into the soft groundwork.

COMPOSITION

Many of my models are placed in vignettes or dioramas. In these instances the story these compositions tell is as important—if not more so—than the models and figures. When planning these pieces, I use a compositional tool I call my "Ten Commandments of Effective Composition". Far from carved in stone (merely etched in soft Jello), they provide a good guide, making sure I consider all vital points. A brief description is included at right. For a more in-depth discussion, refer to my works detailing my Sd.Kfz 251 project.

In a small composition such as this one, the vehicle is really the only main point. The figures primarily provide human interest and a sense of scale. The small patch of groundwork provides setting only, and the base simply holds everything. The story, such as it is, is secondary to the model itself, thus this description is included as a sidebar rather than given detailed attention. Still, many of my "commandments" are applicable. Several—such as using a tight composition, minimizing dead space, and having a single main point—are simply inherent in the small size of the piece and need no further consideration. Let's look at how some of the other commandments are used here.

There is a story. The two antenna clearly indicate this is a command vehicle. The officer—a captain if you look closely—looks at his watch while holding a flare pistol in the air. He is clearly waiting for the proper time to launch a signal. His sergeant, the loader, looks behind signaling to following vehicles not actually present in the scene but their presence is implied by his action. Perhaps an attack or counterattack is about to be launched.

The vehicle moves from right to left—against the grain of the way we view items. This causes the eye to pause. The vehicle is also turned slightly toward the viewer. In this regard, it does not sit parallel to any edge of the base and thus looks more spontaneous. This viewing angle was planned from the start of the project and influenced which fenders were removed, where stowage was located, and which Schurzen plates were missing. The slight up angle of the vehicle provides a bit of visual interest and perhaps indicates it is moving, or about to move, from a reverse crest hull-down position into the attack.

I chose to make the unit and location anonymous. There are no unit markings on the vehicle and no signs or architectural elements which would point to a certain geographic location.

The base, while attractive, is small and does not draw attention to itself. The nameplate contains only the vehicle nomenclature.

Thus, my simple story and minimal groundwork serve to keep attention focused on my main point—the vehicle model itself.

THE TEN COMMANDMENTS OF EFFECTIVE COMPOSITION

Composition is key to story telling, but effective composition is more than placing elements on a base. It requires careful planning. The viewer should quickly grasp what is going on. If not, the work has failed at some level. I use a tool I call my "Ten Commandments of Effective Composition". These are not carved in stone and do not all apply to every situation. They simply help transfer what I see in my mind's eye into the finished work. I don't consider them individually, but use them all in conjunction. They are not restrictive and do not take the place of imagination.

HAVE A SINGLE MAIN POINT. There can be several things going on at once, but like scenes in a movie, they should all work toward the main point. In a diorama or vignette, this is absolutely critical.

DIRECT THE VIEWER'S EYE. Large or prominent items are noticed first. Other things are generally viewed just as we read—from left to right. Things moving against the grain (right to left) will cause the viewer to pause. Viewers will naturally follow the glances and gestures of the figures. Arrange elements so viewers read the story in the proper order.

SHOW ACTION AND INTERACTION. Action is more appealing than static, but must be purposeful. Elements should interact in a meaningful way.

USE A TIGHT COMPOSITION. Tight compositions are visually more appealing than loose, open ones. They are better at conveying drama and stress.

HAVE BALANCE. Balanced compositions look better. Elements or action on one side of the composition should be or balanced by elements or action on the other side. A large item on one side could be balanced by several smaller ones on the other side for example. Note that balance and symmetry are NOT the same thing! Symmetrical work can look contrived.

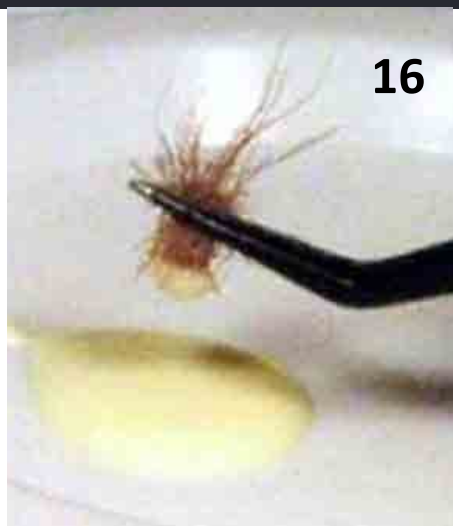
USE ALL THE ELEMENTS. All elements such as models, figures, base, nameplate, groundwork, and method of display are important. These things should compliment, and not contradict, the main story.

MINIMIZE DEAD SPACE. Empty unoccupied space is boring and detracts from – or deadens – the final result. Use a smaller base or put something relevant in the space. Dead space should only be used if it helps tell the story.

USE SHAPES AND ELEVATIONS. The size and shape of the base, groundwork, and composition can compliment and enhance the composition, help direct the viewers' eye, and provide balance. It's also usually best not to align elements parallel with the edges of the base.

ARTISTIC LICENSE IS OK. Use artistic license to fill gaps in knowledge, create a more visually appealing piece, or simply due to style. Use it to assist in recreating the feel, emotion, and drama of an event – to capture the impression rather than just look.

PLAY WITH IT. I usually try different arrangements and various bases before I settle on a final composition.



Other grasses and plants are applied as desired. Unraveled rope or "Field Grass" can be cut to length, one end dipped in white glue, and then stuck into the Celluclay. They can be further trimmed and shaped with scissors after the glue dries. I did not use these on this base. I did use some of the natural seaweed. 16: To use this material, simply pull clumps from it with tweezers, dip the clump in glue, and stick it to the base (these photos are from a tutorial on the "Military Miniature Warehouse" website as I did not think to take my own photos while applying it).

Finally, a couple bits of tree root were glued into the soft groundwork. These will later serve as the basis for a few shrubs. Some weeds (another dried floral product) were also put in place. At this point, the base was set aside for the Celluclay to cure. Once cured, it can be painted. Although I pre-colored the Celluclay, the static grass comes in various green colors, and the natural materials are natural colors, I will still paint the groundwork. The various materials are too uniform in color, the static grass is a bit to "garish", and there is no shading and highlighting in place. As the vehicle, figures, and ground will be part of a unified whole, they should be finished to the same standard using many of the same methods and colors so they look as if they belong together.

Sturmgeschutz III Ausf G

Painting was done with craft paints and pigments using a variety of dry-brushing, glazes, and washes.

I started by dry-brushing the dry ground. This was done with a scrubbing motion using a flat brush. I used progressively lighter colors over the relatively dark base, using a lighter touch with each color. First was a mix of Burnt Umber, Pewter Grey, and Khaki. Next was the same mix with more Khaki added (shown in the photo at right). Finally, I added White and hit only the high points.

Muddy areas were given glazes on the high points, just like the highlights I added to the figures. First was Autumn Brown, and this was followed with Raw Sienna.

Grass areas were dry-brushed with a mix of Trail Tan and Straw.

After all dry-brushing was complete, earth areas were given a thin wash of color to blend everything together. Dry ground areas were washed with a mix of Burnt Umber and Charcoal. Muddy areas were washed with a mix of Dark Burnt Umber and Black. In wettest areas, a glaze of Future Floor Polish was randomly added. The photo shows the base at this point. With the washes and dry-brushing, don't worry if there is a bit of overlap between ground and grass areas—this is actually desirable.

The next step was a dusting with pigments. I used the same colors as I applied to the vehicle. These were only applied to areas of dry earth. I picket up the various colors (a yellow color, grey color, and sand color), with an old brush. I deposited them on the base by holding it over where I wanted the pigments and tapping the brush with my finger.

Using a soft, flat brush, the pigments were blended into the base. With this step, painting of the groundwork was complete. Note that while some of the methods may have varied from those I used on the model, I still built up to the final result using several layers of color.

Sturmgeschutz III Ausf G

As a final step, a couple vines and small shrubs were added. The vines, on the old stump, were added using the MiniNatur product shown at right—Beech Foliage. This is listed as 1/45 scale and up, but it still works well with our slightly smaller size. A suitably-sized piece was removed, spread out and pulled apart, and glued in place on the stump using Tacky Glue. The other shrubs were made using the same materials and methods we used to create the foliage on the vehicle.

Once the groundwork was dry, the toothpicks protecting the holes for the vehicle mounting pins were removed and the vehicle was fixed in placed using JB Kwik Weld five minute epoxy. With that, the model was complete and ready for the display case.

THE FINISHED VIGNETTE

I sincerely hope this work has been useful to you, be you a novice or a pro. I believe anyone can take this hobby as far as they wish. I recommend you go to model/miniature shows whenever possible, join a club if you have access to one, visit online modeling forums if you're into social medial, study the work of others, ask questions – but most importantly, make friends and have fun. All of us, from the newest newbie to the leading professionals, gain from this interaction. Don't be disappointed if your first works aren't masterpieces. Do your best, and be happy with that. Don't be discouraged if you make a mistake and have to fix it. We all do. As long as you give each project your best effort, you will be able to proudly live with any flaws. But don't rest on your laurels - use those flaws as motivation to improve with your next effort. Develop your own style, and build/paint whatever YOU like however YOU wish. Anyone who tells you you're wrong is…wrong. There are truly no rules in this hobby – give your imagination and your talent free reign. When I visit shows, to me the most memorable pieces – and the most inspiring ones – are the unique and imaginative ones, even if they are "technically" not the best works present.

I would like to thank all those whose work has inspired me over the years, those whose feedback to my pieces and articles have improved both, and all those from whom I've learned something over the years. You are too many to list, but if I've ever talked modeling with you, you are probably among those to whom I owe a debt of gratitude.

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 the late 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 34 years, Arden, and their two incredibly spoiled little dogs, Daisy Grace and Precious.

Kevin makes no claim that the methods used in this booklet are the only ones—or even the best ones. They are simply the ones he used to make this model. 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 (Summer of 2017), Kevin can be reached for comment or questions at:

kevin_townsend1961@yahoo.com

Building and Painting a

STURMGESCHUTZ III AUSF G

in 1/48 Scale

Demonstrating all the techniques used to create and paint the vehicle, stowage, crew figures, and groundwork

by Kevin Townsend

Featuring:

Tamiya's 1/48 Sturmgeschutz III Ausf G (Early)

OKB Resin Tracks

Monroe Perdu MIAG Pattern StuG III Zimmerit