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PRINTED PANZER

THE WORLD'S FIRST
1:35 3D PRINTER KIT



WE BUILD THE ETS35 HOTCHKISS H39

GERMAN FLAKPANZER



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GEPARD A1/A2

德国“猎豹” A1/A2 自行防空炮

**1/35
SCALE**



THIS KIT CAN BE BUILT INTO A GEPARD A1 OR A2 MODEL.
THREE DIFFERENT MUZZLE BRAKES ARE PROVIDED FOR THE KDA 35MM AUTOCANNONS.
THE FINELY SCULPTED PACKS ON THE REAR HULL LOOK REALISTIC.
WORKABLE TRACK LINKS AND MOVABLE SUSPENSION ARE PROVIDED.
PE PARTS AND MIRROR FILM ARE INCLUDED.

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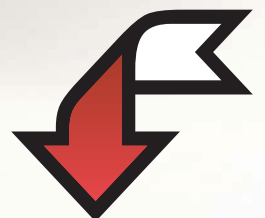
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I must confess that the Abrams is a tank that has completely failed to capture my interest so that this is the first one that I have modelled. As such there is a steep learning curve for the Abrams novice with a confusing variety of sub-variants waiting to catch the unwary modeller. Meng have modelled the most up to date versions of the Abrams and the kit provides the parts to allow you to model either TUSK 1 or TUSK 2 versions of the M1A2 SEP. The good news is that there are indications within the kit that other

versions of the Abrams may also be planned. The kit is typical of Meng's current releases with photoetched fret, clear moulded periscopes and some scary-looking multi-part tracks. It features working torsion bar suspension and some superb crisply moulded detail along with a superb anti-slip texture. It arrives in a deeper than expected box which promises plenty of build to get your teeth into and with two examples on my bench I had double the fun!





Rear grille doors are easier to fit if the hinges are fitted to the doors first rather than to the hull.



I removed the locator pips from the ends of the skirt braces to make it easier to fit the skirts.

TUSK 1

I assembled both versions of the kit using the Tusk 1 kit as a basis for additional detail work with ET Model photoetched details and Live Resin MG upgrades and intended for another project.



Small strips of aluminium foil were used to make the webbing straps for the armour blocks.

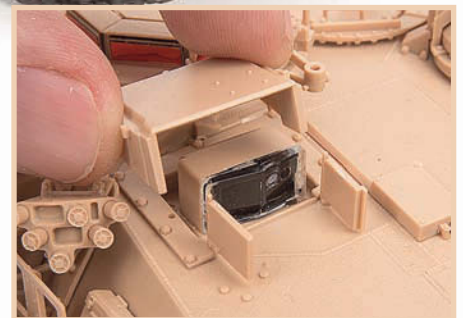
TUSK 2



To make the distinctive coated periscope lenses I used iridescent plastic sequins which I oversprayed with tones of transparent orange and red.



I shaved off the mudflap clip and made a new version from brass rod and I threaded one of the track link connectors onto the clip



Construction

This is by the nature of the vehicle quite a complex build and with two options to be assembled you need to keep your wits about you and I tripped myself up a couple of times by not paying full attention to what the instructions were telling me! The front torsion bar and idler swing arm assembly is certainly quite fiddly and I simply glued mine in a fixed position rather than have a working connector. The road wheels have poly cap fixings and integral hub caps. In reality these are transparent to show the oil levels but they appear a flat dark colour so I was not overly concerned that they were not clear moulded. The lower hull comes together quickly and the hull deck is a single piece moulding with the exception of the battery cover panel. You have to carefully remove two small notches from the hull sidewall to fit the battery panel, a simple procedure. The single piece engine deck was certainly my preference over the multi-panel versions offered by other Abrams kits. The hull rear is dominated by the big exhaust grilles and the instructions direct you to fit the hinges for the grilles to the hull (parts C47, C35, C42 & C53) and then insert the doors. I found it

was much better to fix the hinges to the doors before attaching them to the hull. Side skirts are assembled from multiple panels that cleverly clip together however I would recommend cutting off the locator pins from the ends of the skirt braces (parts A14, A7 & C61) so that the skirts will just rest against the square pads. The skirts, especially on the TUSK 2 assemble in quite a weighty piece when completed! I chose to add the straps along the tops of the reactive armour blocks which I did using self-adhesive aluminium foil.

The Turret comes together without any problems but do check as some holes have to be drilled out for locations of parts specific to one version and not the other, something which caught me out and I then had to fill the holes. The gun barrel is a two piece centreline split design with separate muzzle cap. Something that is ripe for an upgrade you may imagine but I found as long as it is assembled with care it produces a completely acceptable finished gun barrel. To allow me to access the gun sight windows for masking I glued the sight doors in position but left the cover (part D10) separate for the time being. With the same thing in mind I

left all the turret top panels and glazing around the hatches as separate parts to ease their painting. This did result in some frustration when trying dry fit these parts in order to photograph the models before painting!

The daunting-looking tacks are comprised of sections of 6 connector pins onto which you glue a section of 6 track teeth. Once you trim the sprue connector for the teeth you place the lower track pads in the provided jig, drop in the connector pin assembly and place the upper half of the track pad to sandwich the pins. The pads are push fit but I prefer to add a drop of glue in the locator pins for a more secure assembly. I found the tracks relatively painless to assemble, as painless that is as any repetitive process can be! You can also save time by not

assembling the top run of track that is hidden behind the skirts. The kit offers a choice of cupola designs and I would recommend using part K25 simply because I found the fit of the vision blocks impossibly tight on the alternative K24. Because most of the cupola armoured glazing has surrounding frame detail I decided to mask and spray paint these panels in situ which I did using Mr Masking Sol Neo liquid mask. You can see the distinctive green tint on all the windows in the pre-paint images. It was not until I came to remove the masking that I realised that some of the making liquid had run under the lips and was now visible but impossible to remove, so I would recommend using masking tape rather than a liquid mask.



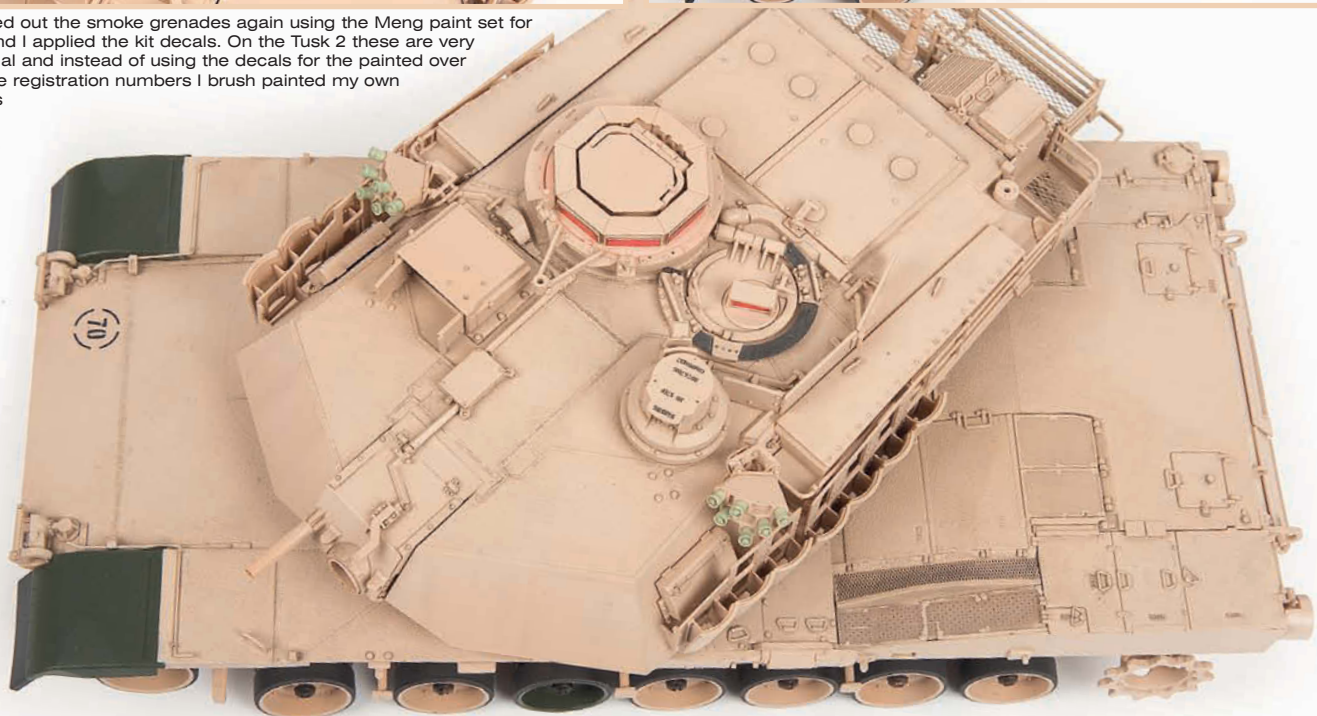
This was my first opportunity to try the new Meng/AK Interactive paint from the dedicated Modern US Vehicles set. I base coated with US Desert Tan and then went over this with the Desert Tan Light and I was really pleased with the look of the colours.



To break up the uniform sand finish I picked out selective parts in the very dark green colour which I mixed using Mr Hobby paints. The gloss finish was unintentional.

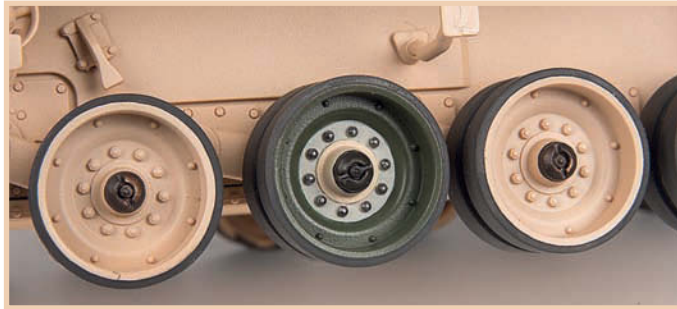


I picked out the smoke grenades again using the Meng paint set for this and I applied the kit decals. On the Tusk 2 these are very minimal and instead of using the decals for the painted over vehicle registration numbers I brush painted my own blocks



Colours

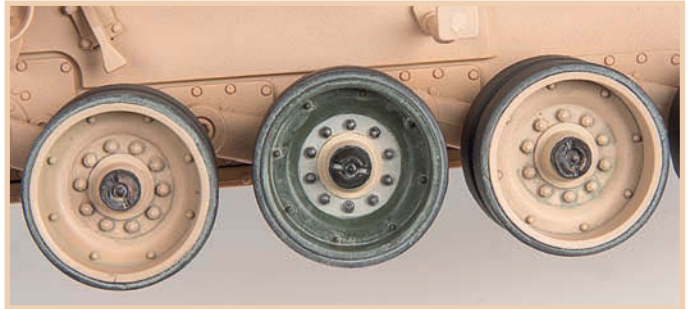
The kit provides a choice of four different vehicles and just one of the three is for TUSK 2. The markings are very minimal and I was unable to find anything more 'colourful' for Tusk 2 so I just stuck with the kit markings. I used the new dedicated Meng paints and I was really pleased with how they looked on the model, spraying perfectly from the bottle without any dilution. The downside is that any brush painting that was required needed a couple of coats at least to get a density of coverage. To add some interest I added some dark green parts that I could see being used in photos of the real vehicle. These stand out spectacularly against the pale sand. With decals applied I moved on to painting the details on the wheels. As well as the tyres I also painted the inner rims



Factory fresh, the wheels are finally detailed and ready to weather. I added unpainted bolts and original sand coloured hub to the replacement wheel.

where the track teeth pass in steel as they are visible. I picked out the hubs in a dark black brown colour which I varied between wheels.

I chose a mix of 502 Abteilung Buff, Light Mud, Shadow Brown and Black to mix a pale grey/brown shade to apply as a pin wash across the sand areas of the vehicle. This worked well in picking out the detail as I did not want a high contrast effect with the wash. On the green areas I switched to a much paler tone from the same palette of oil colours. I did not spend much time treating the lower hull as it is almost entirely hidden behind the skirts. With the first wash applied I moved on to the running gear with the tracks painted in a mid grey and the rubber pads picked out in dark grey.



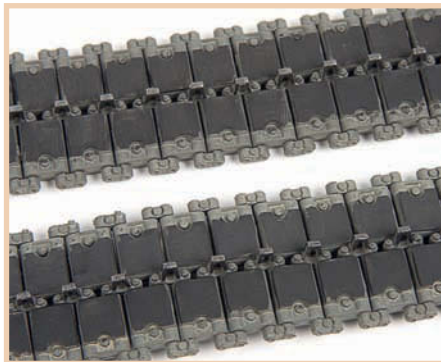
With the pin washes applied the wheel detail is nicely defined. It is more likely that the wheels would be weathered with a sand coloured wash but this would have been imperceptible so a darker tone was selected.



Paler sand coloured oil washes were applied to the dark green parts of the vehicle like this mud flap.



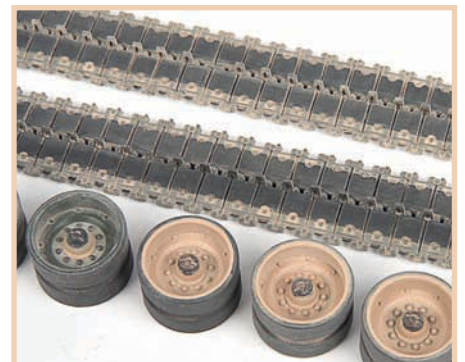
I added some fuel stains around the filler cap with some spills running down the side of the hull.



The base colours applied to the tracks and a pale pin wash over the track connectors.

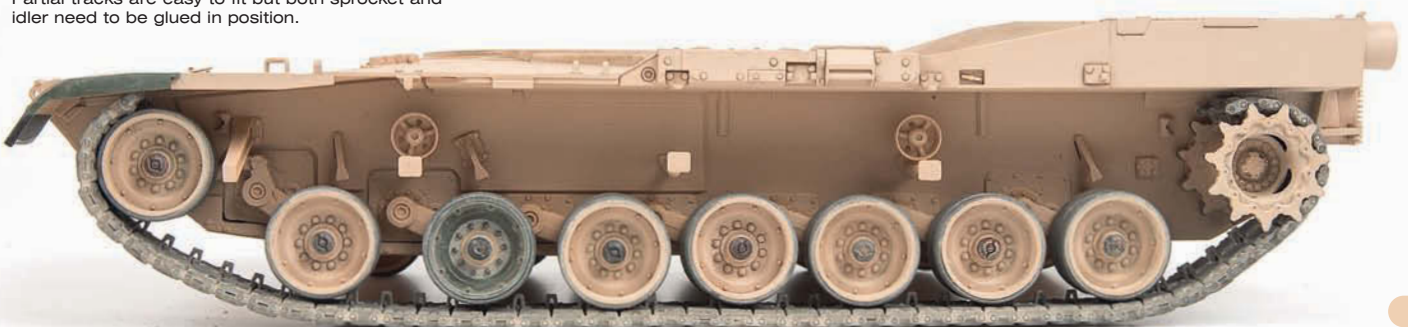


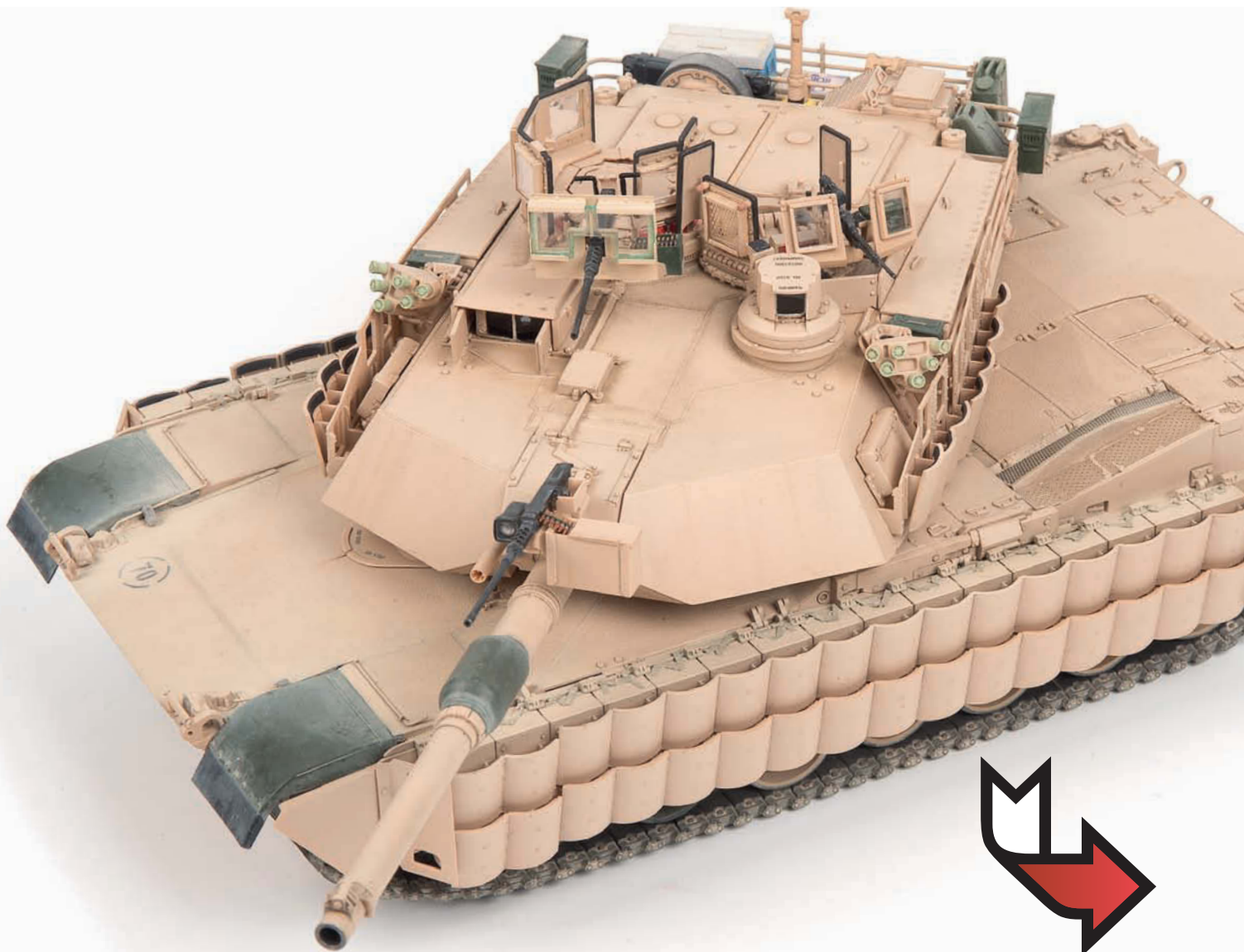
I mixed pigments with white spirits and brushed this wash over the track connectors. Once it had dried I used a big soft brush to blend the pigments over the rest of the track.



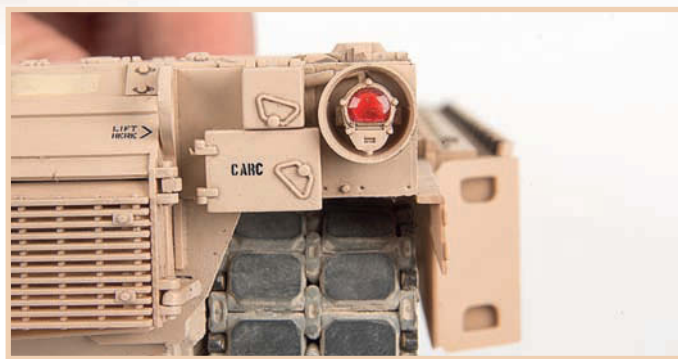
Wheels were also given a quick dusting with pigments in preparation for fitting the tracks.

Partial tracks are easy to fit but both sprocket and idler need to be glued in position.





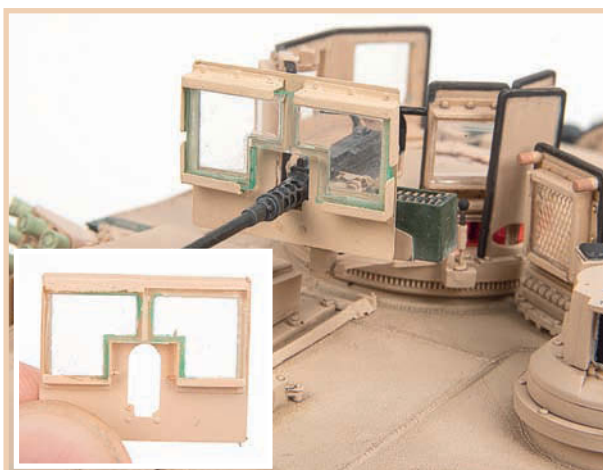
Side skirts are fitted and we have a rolling chassis at last.



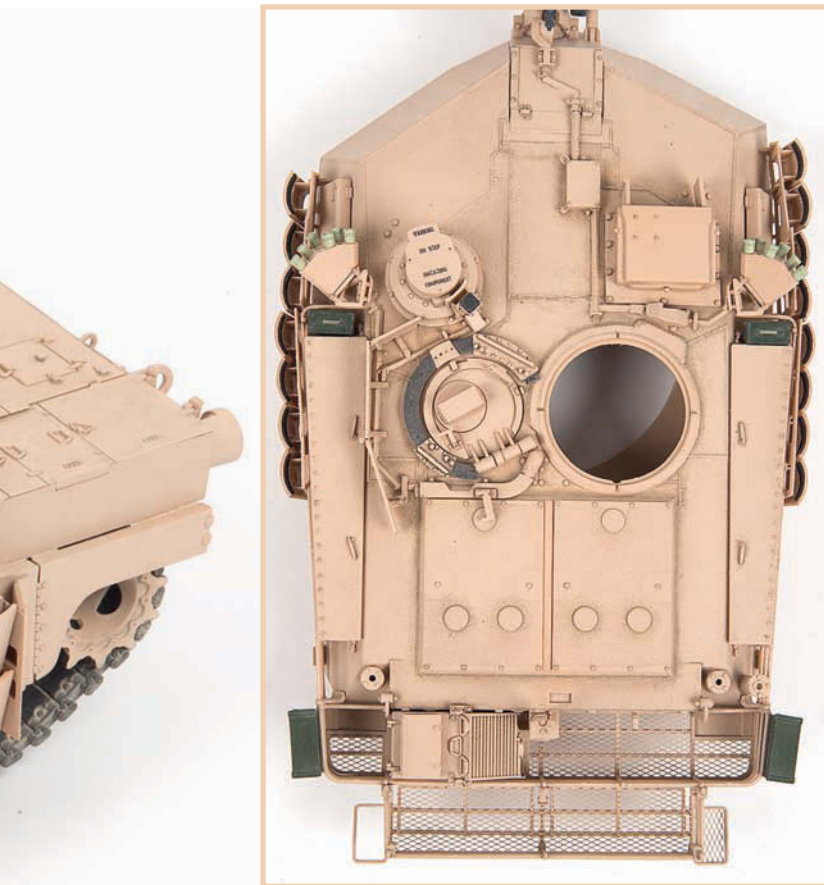
The kit tail lights were painted Mr Metal Color Chrome silver on the reverse and clear red on the outer face.



The turret is festooned with weapons and ballistic glass panels which are best painted individually.



Bleeding masking fluid forced me to replace the .50 Cal shield with a photoetched replacement from ET Models.



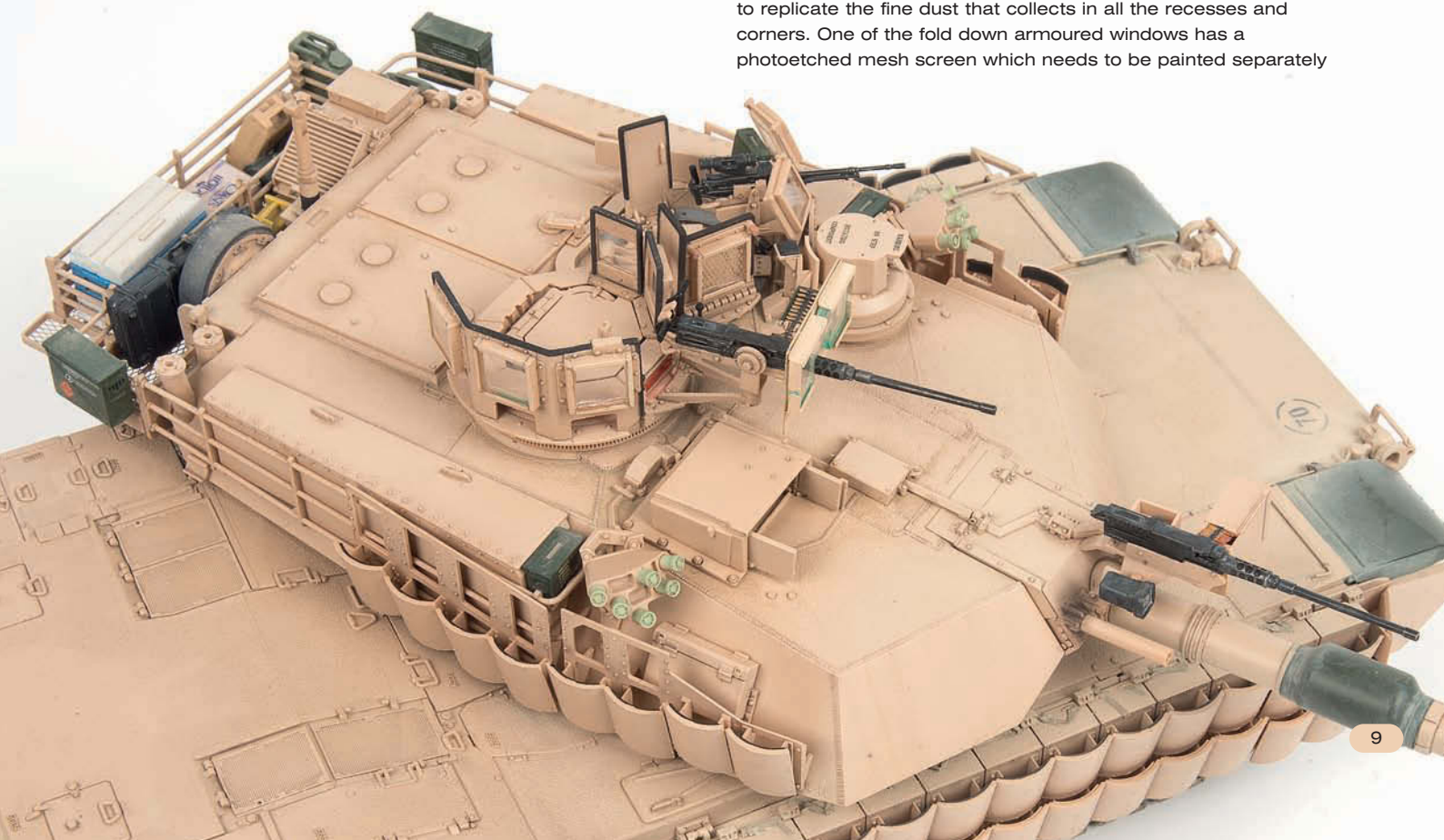
Above The pristine .50 Cal guns are ready to install on the mantlet and cupola and will be finally weathered once in place.

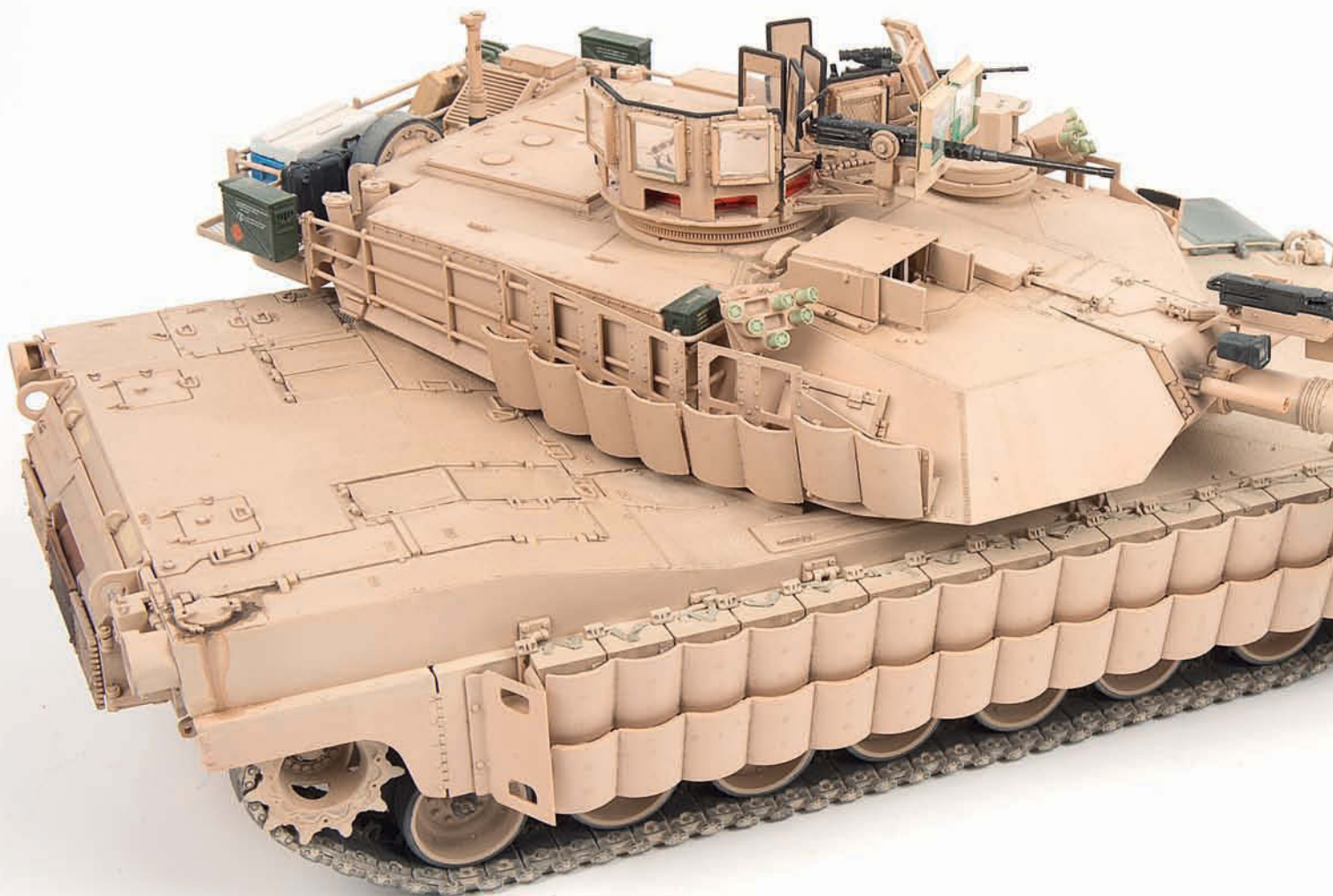
Left I applied more dirty acrylic washes around the two turret hatches but I avoided any chipping effects or other signs of heavy wear.

I applied a slurry mix of pigments mixed with white spirits over the track connectors and once this had dried I used a big soft brush to clean away the dried pigments and to blend the dust this generates over the rest of the track to give a great dusty look to the whole track. Tracks and wheels were then installed on the hull and I was then able to install the skirts. I took the time to enlarge the square openings in the backs of the skirts where they attach to the hull to assist in fitting them and everything went into place without a problem.

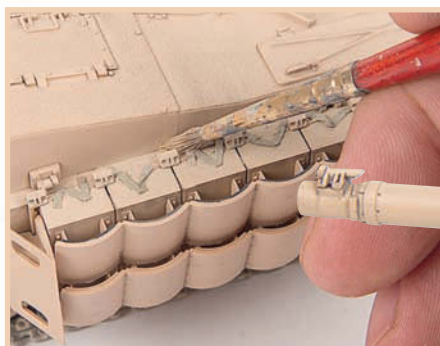
Back to the turret now and it was time to address the assorted armoured windows and weapons which I had left as individual

parts to make painting them easier. I completely underestimated how much time these would demand to complete. The process was not helped by the bleeding masking fluid which was most evident on the cupola 50 Cal shield. I had enthusiastically glued the glazing into the shield so that I destroyed the shield when I removed the glazing and I had to use a replacement photoetched shield from the ET Models detail set. The kit weapons were unmodified and I used Vallejo Acrylic Metal colour Gun Metal to paint them followed by a matt black wash to pick out the detail. At this stage the weapons all look very clean and not matching the rest of the vehicle. I applied a very pale sand pin wash over them to replicate the fine dust that collects in all the recesses and corners. One of the fold down armoured windows has a photoetched mesh screen which needs to be painted separately





I added a hand print in the dust on the mudguard by lifting off the Liquid Pigments with their removal fluid.



Dry pigments were brushed into the recesses along the tops of the skirts and other areas.

and then installed. The rubber stoppers on the top edge of the same screen were picked out in an attractive pink shade like the real thing. Finally I was ready to fit all the weapons and armoured windows, such was my relief that I completely forgot to add the antenna mounts to the back of the turret.

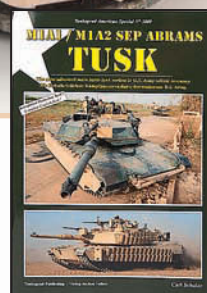
Loading Up

Those huge double stowage racks at the back of the turret could not be left empty. Most of the TUSK 2 images I found showed them with fairly minimal stowage but I liked the big ammo boxes welded to the ends of the racks with their orange labels so I added these using the Archer Fine Transfers decals. The remainder of the stowage comes from the Meng US Equipment set and I included one of the

spare road wheels from the Abrams kit. Final touches were to spray some dust over the hull using Lifecolor Liquid pigments and also brushing some dry pigments along the tops of the skirts and over the stowage.

Having never modelled the Abrams before I have to say that I have now developed a new-found appreciation for the tank which has an undeniable presence on the work bench. Tusk 2 gives it a pumped-up look with all the additional armour dramatically widening the hull. The kit has been designed to be an easy build and in so many ways it is just that, which is good because I have another Tusk 1 to complete!





Tackling your own Tusk? These two reference books are essential companions for your build. The Tankograd Special No.3009 available from Bookworld www.bookworldws.co.uk and the Sabot Publications study.





ETS35 HOTCHKISS H-39 1:35

MODELLED BY DAVID PARKER



1ST PRINTED PANZER

**THE WORLD'S FIRST COMPLETE
TANK KIT PRODUCED BY 3D PRINTER**

As 3D printing technology advances many of us are starting to consider the possibilities and even to dabble with some small printed parts, but how about a complete 1:35 kit? Talented independent designer Niels Henkemans has been working towards producing the World's first 3D printed tank kit with his ETS 35 brand. We are delighted and excited to be able to build this remarkable first in terms of the possible future direction of the hobby.

For anyone unfamiliar with 3D printing technology it works by converting 3D CAD drawings into solid 3D shapes with a variety of different technologies to achieve this and different resolution printers available. The high resolution printers that we modellers are looking for come with a big price tag but there are a number of independent printing services now established. You upload your CAD files and they will then print them for you with the cost being dictated by the size and complexity of the parts and therefore the printing time required. Considerations like the orientation of parts when they print can effect the quality of the results and it is considerably more complex than just pressing the 'Print' button, but this is the technology that has been used to produce this kit. The high resolution print used here uses molten plastic which is deposited onto an aluminium build platform in layers using several nozzles, essentially like a large print that sweeps across the build layer. After

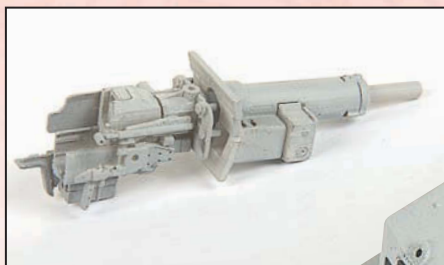
each layer is deposited, it is cured, or polymerized, by a wide area UV lamp. The next layer then applied, and through this repeated process layers of build up into a model. When printing is finished, the model is removed from the tray and put into an oven that melts away the wax support material. Then the models go into an ultrasonic oil bath to remove any remaining wax residues, and then a ultrasonic water bath to remove any oil on the model. The completed translucent parts are then posted out to you. Comprehensive instructions come with the kit and are downloaded from the ETS 35 web page and you can also specify what parts you want in your Hotchkiss kit. You can for example include and interior, tail skid or parts to model the vehicle in German service.

So your 3D printed kit arrives and how does it look? It is printed in a semi-transparent material and most of the parts are laid out

on sprues just like a conventional kit except that the sprue runners are 1mm square sections. Parts are packed together quite tightly to maximise the printer efficiency and if you have chosen the interior you will have a lot of parts! ETS 35 recommend that you use an ultrasonic cleaner to wash the parts to remove and remaining deposits which I did. You may still find to odd corner with a powder deposit but these are easily scraped away. The material handles very much like a conventional plastic and can be shaved, carved and cut with a scalpel blade as you would normally. It can also be sanded and drilled without a problem. It can be brittle so that parts may snap when removing them but I think this only happened to me on two or three occasions throughout the entire project and I actually really enjoyed working with it. I quickly found that the translucent finish was hard to work with in terms of seeing what you are doing so I sprayed a thin coat of Mr Finishing Surfacer over all the sprues.



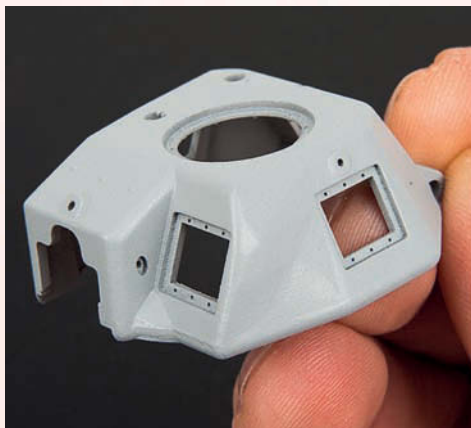
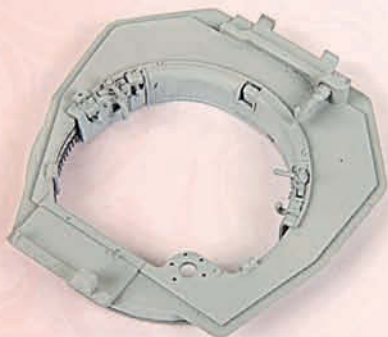
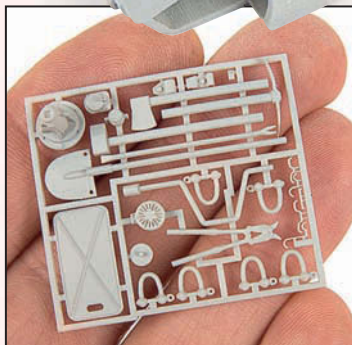
I started by assembling the SA-38 gun but as you can see here the translucent parts are hard to see properly so I gave all the parts a light mist over with Mr Finishing Surfacer 1500. The design of the parts is very precise so it is important not to layer too much primer on the parts.



With some primer applied all the detail suddenly pops out. The gun is another feature that can be specified so that you can choose the SA-38 or the short barrelled SA-18.

Band Wagon

One of the problems with 3D print is banding caused by the layering of the detail during printing and something which very much dictates the quality of your printed parts. As the technology advances this is something that is expected to be eliminated but for now it remains a consideration. Counter-intuitively it was the largest parts of the kit, the hull and turret castings where this was most visible, whereas some of the finest details like for example the fret with the vehicle tools, were ultra-crisp. I was able to remove the banding by gently rubbing down the surfaces and spraying a coat of Mr Surfacer 500. I repeated this process once more and found that the parts were now satisfactory.

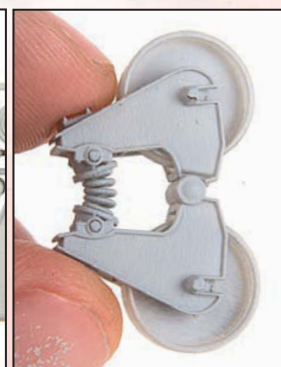
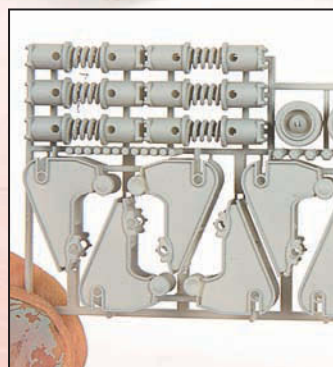
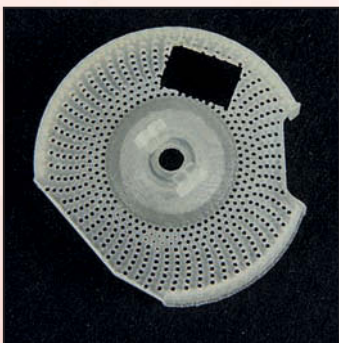


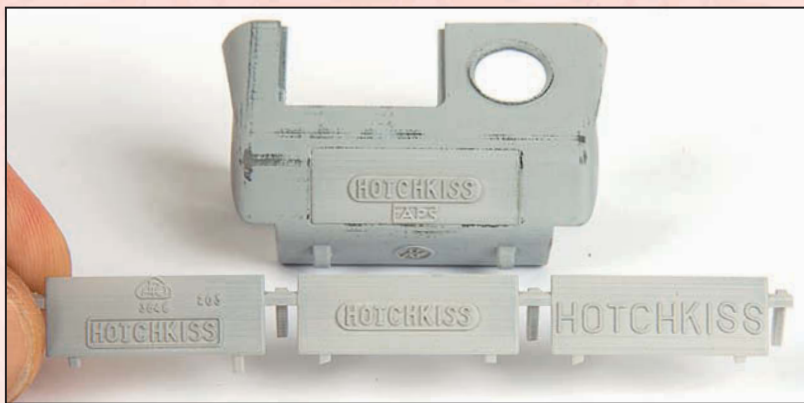
Unique features

The upside of 3D printing is that it allows parts to be designed that would be impossible for injection moulded kits. The working springs on the suspension are a good example of this along with the open sloping louvres on the engine deck. The incredible finesse that is possible is demonstrated by the tiny tool clasps and the miniature casting numbers moulded into the top of the gearbox. Perhaps the most spectacular part in the kit is the perforated cover for the drive shaft which is simply stunning. The kit also provides a choice of four different styles of 'Hotchkiss' cast inserts for the bow allowing you to model any of the manufacturing styles, and both early and late style engine deck hatches are also supplied.

Above The main hull and turret parts after being treated with Mr Surfacer

The running gear is sublime and very simple to assemble. The springs (there is a smaller internal spring printed inside the bigger outer one) are workable allowing you to articulate the suspension if you wish. Open springs like this are impossible to mould conventionally, let alone make them function!





Your choice of castings for the hull nose, just plug in your selection.



You have a choice of early or late engine deck hatch design but both have slanted louvers which are printed with open cooling slots, something that conventional moulding would struggle to replicate.



Another picture of the incredible drive shaft cover just because it deserves another look!

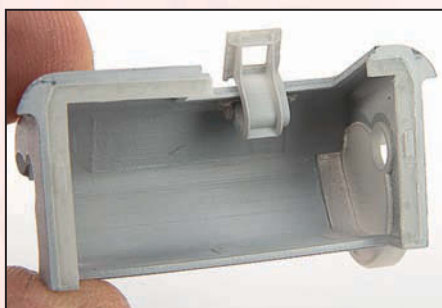


Construction

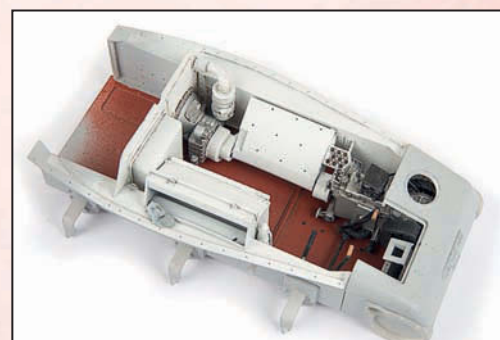
Starting to assemble the kit I was immediately impressed by the clever little design touches, and the high precision fit of the parts. I used an ordinary CA glue throughout the project with excellent results. As my kit was specified with the interior most of my initial work was focussed here with the superbly rendered gearbox and driver's controls. I used some suitably sized Archer Fine Transfer dials to bring the instrument consol to life atop the aluminium gearbox which was painted with Alclad. Pre-painting the interior parts was unavoidable given the complexity of the cramped interior and happily it can easily be broken down into convenient sub-assemblies. In assembling the hull I had concerns about the wafer thin floor plate but when it was eventually glued into place



The engine firewall under construction and then painted. The small dial is a fuel gauge and I used an Archer Fine Transfers dial for this.



The kit is assembled in the same manner as the real vehicle



PRINTED PANZER

ETS35 We speak to Niels Henkemans about his range of 3D printed kits

I think it must have been back in 2008 when we first exchanged information on the Hotchkiss H39? At the time Bronco had just released their injection moulded kit of the Hotchkiss. Was this kit the catalyst for your version?

Niels: That's quite possible. When Bronco released the Hotchkiss in 2006, Stephen Zaloga was quick to point out dimensional issues with the kit. At the time I was primarily concerned with the poor detailing however. The bogies were one of the most obvious problems and one I decided to fix first.

Was it always your intention to design a complete tank kit or was this something that developed along the way?

At first it were just those bogies I wanted to correct. Modifying the Trumpeter bogies was an option, but 3D printing was already on the horizon. In 2011 Shapeways released a new material which finally made 3D printing an option for scale models. The first thing I designed were the bogies. At the time it was only intended as an update set for the injection moulded kits on the market. After that I started work on the turret, which only highlighted the problems of the existing kits. The next step was the complete vehicle.... Because I needed one.

Can you tell us what the driving force was behind the design of this kit?

The main driving force was my own need – as a modeller – for a good Hotchkiss for a project. None of the kits was good enough. They were not even close. Updating them was not an option because the basic dimensions were already problematic and they all required a replacement interior any way. As the project progressed, some other motives became important as well. A lot of people underestimate the potential of 3D printing. This project is also about showing what 3D printing can already do. All that is need is a

little skill and determination.

Normally we would expect a team of people to develop and design a kit, can you tell us how many people have been involved in designing this kit?

Just one, although important information has been provided by Stephen Zaloga and Stephen Tegner. The design and development of the kit however has however been done by a single person on a 8 year old laptop with little or no budget.

The dimensions of your kit are significantly different to any other plastic kit of the vehicle. How did you go about collecting the information required to design the kit and were you able to study the real vehicle?

Well, the kit is fairly close to the 1970s Heller kit, which is arguably still a better base than the Trumpeter and especially the Bronco kit. 'Our' design is directly based on original factory drawings, which have proven to be accurate by several researchers. The interior was another matter. Fortunately I received hundreds of photos of a well preserved vehicle. With some dimensions being known and some technical impossibilities it became a complex but interesting puzzle. Had it been possible to measure the interior in detail, the design would have been much quicker. Fortunately tanks are incredibly cramped so things can usually fit only one way. If you get the design wrong, you'll know it.

How difficult was it to design the kit and were you already confident with 3D design software?

Designing the kit took additional time because much had to be based on photos, rather than measurements. This is not ideal but fortunately you can load photos into your program and trace them in 3D. The technical part of the

design work was not an issue because I've been working with the software for over 10 years now.

During the design process what parts of the vehicle were the most difficult to produce?

The main difficulty was the 'organic' shape of the hull and turret. Since I have an architectural background the software I use is developed for shapes like that. Most tank parts are based on geometric shapes, so those are easy to design. The turret is incredibly complex and it appears original castings do differ and lighting conditions also affect how it looks. There is still an area on the turret I may redo, although sanding it down is just as effective.

You have also designed the kit with an ambitious detailed interior, was this something that you had always intended to do? What was your thinking behind adding this feature.

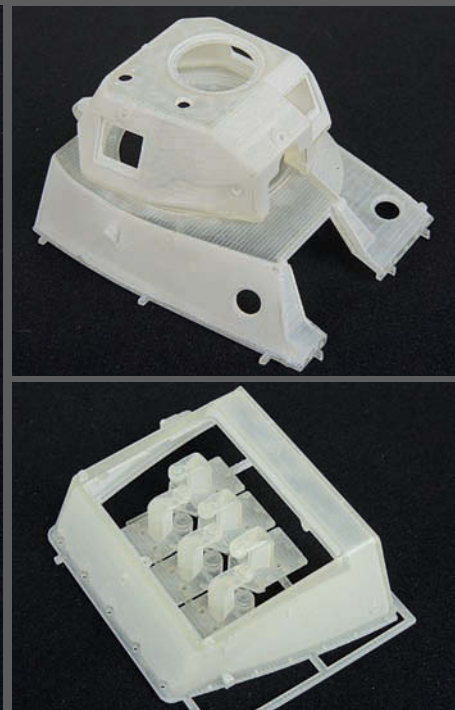
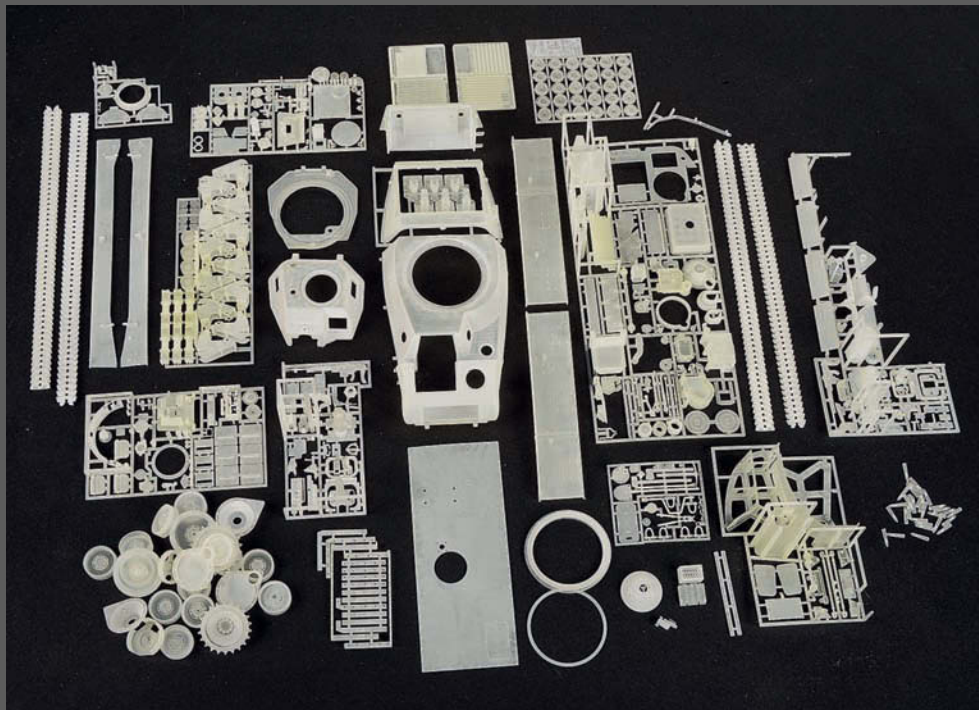
Having an interior was a driving force behind design the complete vehicle, instead of an update set. The photo I was trying to copy has a vehicle with open hatches, so the interior would be visible. Several attempts to scratch-build it were unsuccessful because it would not fit. The reason proved to be simple: the dimensions of the kit. And actually the interior was the most fun to design. It has so many interesting details and it also helped me to understand how the real thing worked. The over-engineered driver's hatch was both frustrating and ultimately very rewarding to design. Only the engine compartment remains to be finished, but this is caused by a lack of information.

You do not actually print the kits, can you explain how the printing operates and what



Comparing the accurate ETS35 kit (left) with the Bronco example.





happens when a customer orders a kit?

The kits can be ordered at Shapeways. Designers upload their work, which is then stored on their systems. When an order is placed, Shapeways handles everything: they print it, ship it and handle customer service and payment. The designer does not get to see the printed results, but is notified when an order is placed. This also means the kit comes in a simple box and instructions not included. They can be downloaded on the Shapeways website however.

When working with a printing service in this way how much testing and development work was required in order to get a product that you were happy with?

Well, the development of this kit took several years because of the amount of work involved and because it essentially was a hobby project. When a stage was finished, the design was printed and tested. At the beginning it was important to frequently order test prints to get a better understanding of how the designs translate into actual prints. Having learnt those 'rules' less prints were needed. In most cases everything was perfect the first time, but some minor improvements could be made. These were made, but usually not printed until the complete kit was finished because it was already clear they would work.

What do you think are the benefits of producing a kit this way?

First of all, it is possible to produce details and parts that cannot be produced in any other way. You can make pre-assembled tracks and incredibly fine details. There is no need for the usual resin casting blocks, no difficult PE and no need for overly thick styrene or filling ejection pin marks. For companies the main advantage is that

it eliminates the need for traditional moulds that are needed for styrene or resin. It reduces costs because the moulds are neither needed nor are there any other restrictions to updating a design or making a different version. A 3D printed kit will never go out of production and will never be outdated as long as the designer is willing to make improvements. If you use a printing service or have your own printer, there also is no need to keep stocks. Everything is just printed on demand.

How important do you think it is that customers can specify the exact type of kit they want by choosing from different options?

It is a useful option for several reasons. The customer can theoretically get the exact vehicle he wants, without the need for aftermarket sets, or waiting until that specific kit gets released. There also is a practical reason. The costs of 3D printing are related to the amount of material required. Getting unnecessary part means paying for them. In styrene the material costs are not an issue, in 3D printing they still are.

We are very impressed by the kit tracks and their snap articulation. Is this something that you could see working with other track designs and is this something you would be interested in developing?

It is entirely possible the pre-assembled tracks will become standard with styrene kits. Until then they are a great addition to the aftermarket options. The system will work for many different types of tracks and it certainly is something we will pursue for other vehicles. With the right information they can be designed quite quickly.

How do you see 3D printed kits developing in the future – are they the future or will they remain a specialist tool?

There is a lot to say about this, too much for this interview. 3D printing is entirely technology dependent. The technology will determine what can and will happen. I am convinced 3D printing will produce the best kits the world will ever see. Not injection moulding, nor resin. Right now the methods to produce high quality prints is restricted to a few rather expensive printers. This also means expensive prints. This needs to change to make 3D printing accessible to all.

The dream of printing a new kit on your own workbench is still in the future. It is not just a matter of printers, it is also a matter of business models. If it is printable, a 3D design is a digital mould. Illegal downloads can destroy a business unless it is compensated by enough legal downloads. However, perhaps it will follow examples from the gaming and music industry: for a yearly fee you have the right to get a certain number of kits. In this scheme individual designers can provide additional 'content', rather than needing a full company of their own. And of course, there will be a rise in 'free content'.

If we take this one step further, it is even possible the major kit companies will shift to producing their own 3D printers and selling/leasing them to their customers. 3D printing will change the world, to understand what it can do for scale modelling we may have to question a lot of business principles take for granted. Hopefully our kit will inspire people to explore 3D printing and make their own contribution to the world of scale modelling.



Above Fitting the ammunition rack in the hull I realised that the shells should be flush in the rack. I removed the shells and added discs of plastic for the shell base plates which were painted with Mr Metal Color Brass.



Some guesswork was needed for the ammunition stowage. The tiny individual shells were pre-painted and loaded into the rack.

my fears were totally unfounded. The kit is broken down in the same way as the real vehicle so that the main cast armour sections have to be 'bolted' together. The kit offers a choice of flanges for the hull connections, bolted and holed versions or flush with alignment blocks to assist in accurate alignment. The rear hull/engine cover section even comes with a set of tiny bolts to allow you to bolt it onto the lower hull just like the real vehicle.

Turret

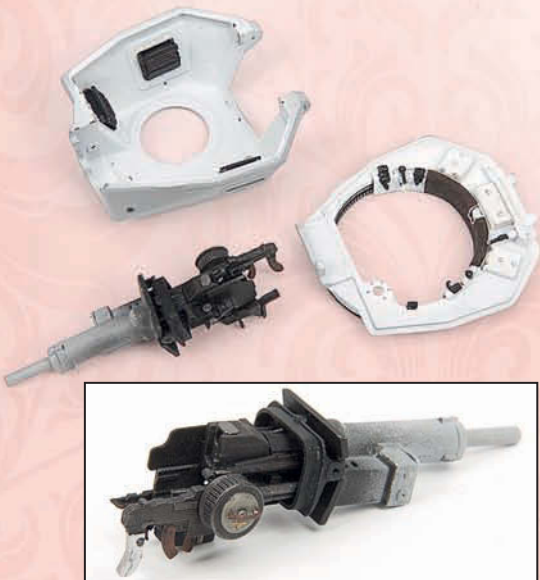
The tiny turret really shows the precision and detail that this kit offers. The only thing that I added was the padded back rest around the edge of the turret ring. The framework is provided so I just applied some Magic Sculp inside the frame. One other element that is not included is the Commander's slung seat which hangs on straps from hooks on the turret ring and simple enough to make from metal foil strips. With the excellent gun assembled it was painted in the dark black brown finish of the real thing. The accurate pivoting gun mount is replicated and two bolts are supplied to pin it into the turret, again just like the real thing. Passing the bolts through the recessed holes on each side of the turret to then align with the holes in the gun cradle was a far from easy procedure but with persistence I did get the cradle fixed in position.



Above The Driver's seat does not come with a cushion so I added one using Magic Sculp putty to make it.



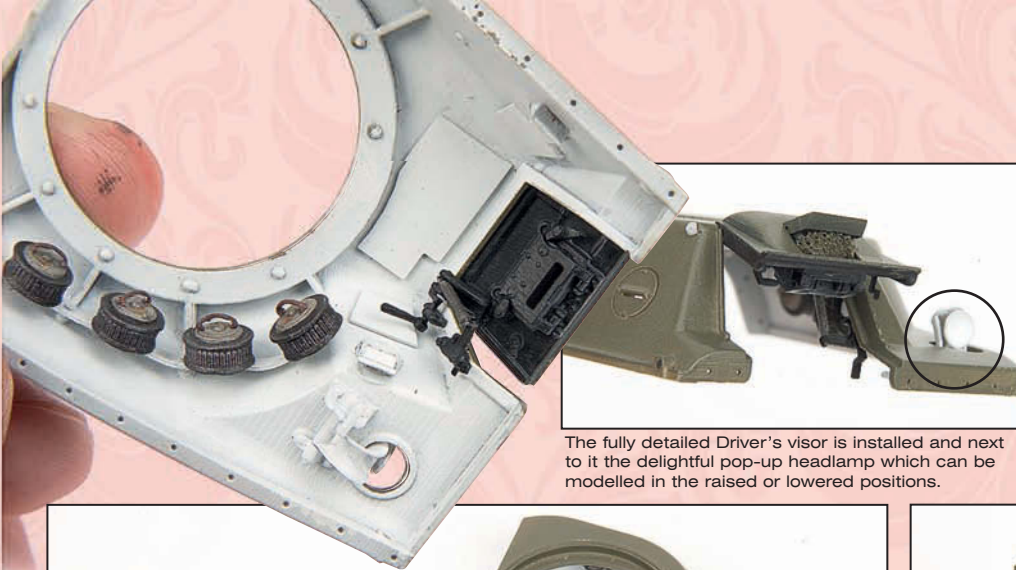
Left I used Lifecolor Liquid Pigments to apply dust to the hull floor which was then lifted off to create the scuffed areas under the crews feet.



Looking into the back of the turret with the SA-38 installed.



Miniature bolts are used to fit the engine cover.



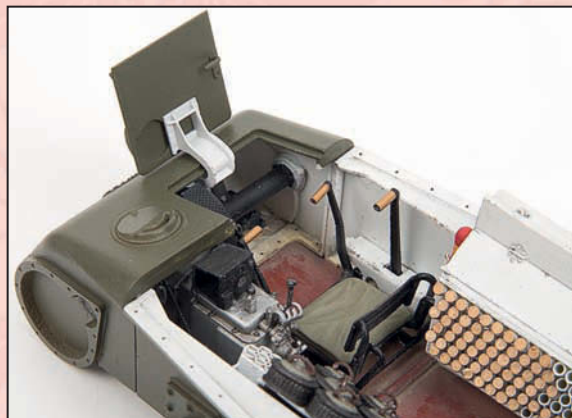
The fully detailed Driver's visor is installed and next to it the delightful pop-up headlamp which can be modelled in the raised or lowered positions.



New improved MG ammunition drums were installed throughout the interior.



One last look at the interior before the hull is sealed up.



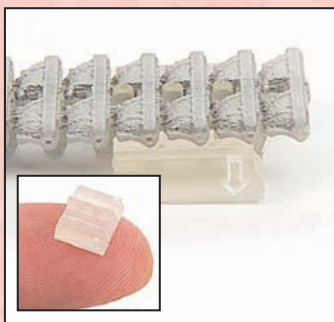
The big Driver's hatch was glued in place onto the hinge for a fully moveable result.



Before I could move on and secure all the upper hull I had to fit the incredibly complex Driver's visor which has been beautifully replicated and can of course be modelled open or closed. Once again scale bolts feed into the hull to secure the hatch. I needed to paint the hatch rims too so I masked off the hull parts and sprayed a Mr Hobby dark green which also served as useful primer. At this time Niels offered me a set of the improved MG ammo drums complete with handles so I stripped out the originals and added these. The hull could now be glued down and I was able to install the

pre-assembled suspension, which clips into place!. The vehicle I had chosen to model featured the fairly rare radio antenna on the turret. I made my own from plastic rod and Magic Sculp to form the bellows. I also added the pair of flush handles on top of the engine deck from brass wire. The track guards simply plug into the mounting points on the hull but my vehicle was missing one of them. The superbly delicate tools and their fittings were then glued in place.



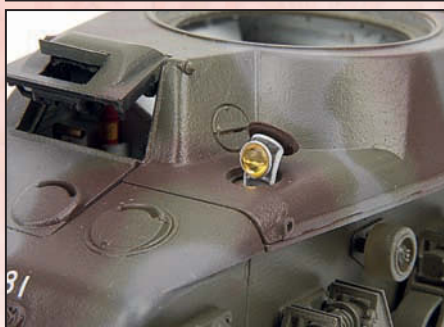


Trackwork

The kit tracks are also 3D printed parts and they are delivered as rigid lengths, two lengths for each track. They come with a small jig which supports them and you then 'snap' each link down to articulate it. You do need to take care as these are small tracks and therefore fragile but it is easy to transform them into proper working tracks without any of the tedium of assembling individual links.

Painting and Presentation

I had consulted the excellent reference book of French camouflage 'Peintures de Guerre' by Pascal Danjou & Thomas Seignon which has categorised Hotchkiss camouflage by production batches and registration number blocks which made it easy to identify my vehicle as carrying a 3 colour scheme. I stuck with the base green Mr Hobby H73 and used H69 (RLM 75 grey) and H84 Mahogany which matched the illustrations in the book.





The main vehicle markings were brush painted over the camouflage and I raided various decal sheets for the registration numbers. I added a Resicast light lens which I tinted with transparent yellow paint. I kept the weathering deliberately light for a vehicle operating in Spring 1940.

To compliment the tank I decided to add some appropriately cutting edge figures. The AFV Modeller mannequins were CAD designed and 3D printed and then copied in resin so I chose these to make my vehicle crew. For the young woman I



Back to the Future

This was one of those kits which firstly and most importantly looks fantastic but provides plenty of entertainment along the way with those moments where two parts fit together with such precision that you almost want to show someone! There are some very small parts which demand your concentration but the pay off is a finely detailed model that surpasses those of the mainstream manufacturers. As 3D print technology improves and costs fall could it be that we will all be building models like this before long?

selected a figure from the French company Reedoak. They have been 3D scanning real people and then 3D printing figures in a variety of scales. As you can see the quality is extremely impressive! I made a simple base using some Miniart cobbled roadway, MK35 Editions gateway and the incredible Limes model's laser cut railings. It took care to sand the cobbles to a smooth finish and once painted with Lifecolor acrylics they were polished with a soft cloth to get a realistic sheen.

ETS 35

<http://www.shapeways.com/shops/ets35>

Reedoak

<http://reedoak.com>

AFV Modeller Mannequins

www.shop.afvmodeller.com



Panzerkampfwagen

David Parker builds Trumpeter's 1:16 kit

Part Seven

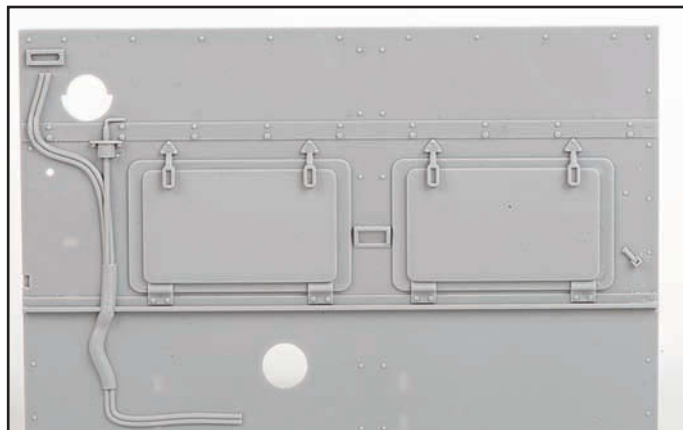
This Issue sees work continue at the back end of the hull starting with additional detail for the engine bulkhead before moving on the engine deck hatches. As these are connected to the bulkhead it was important to ensure that the two connect correctly at this stage. Work also starts on the radiator system which is comprised

of a pair of linked radiators which are mounted at an angle on the left side of the engine bay. The rear hull wall was also worked on as it is supplied without any of the fixings and brackets of the real thing and is also perforated by assorted location peg holes used to position parts on the outside of the kit.

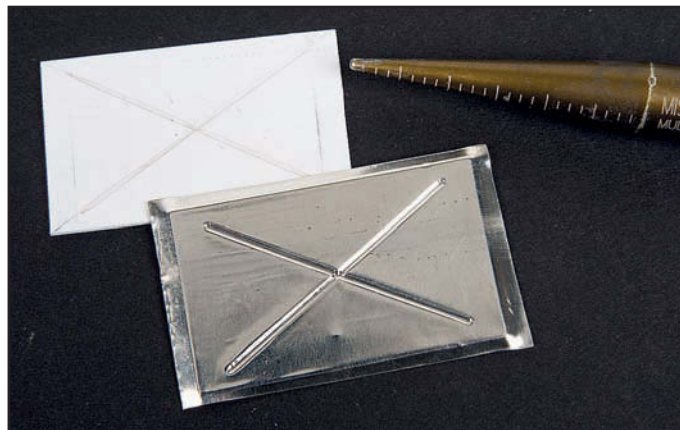


Work continues on improving the engine firewall bulkhead where I needed to make a new set of inspection panels for the bulkhead. Most preserved vehicles no longer have these panels as they are easily removed but I did

manage to track down a Brummbar in Saumur museum where they still remain and these allowed me to reconstruct accurate ones.



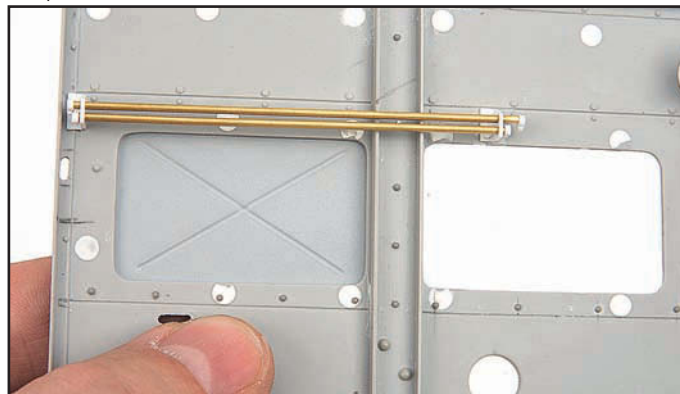
The original kit inspection panels had an inaccurate stepped covers and crude latch details.



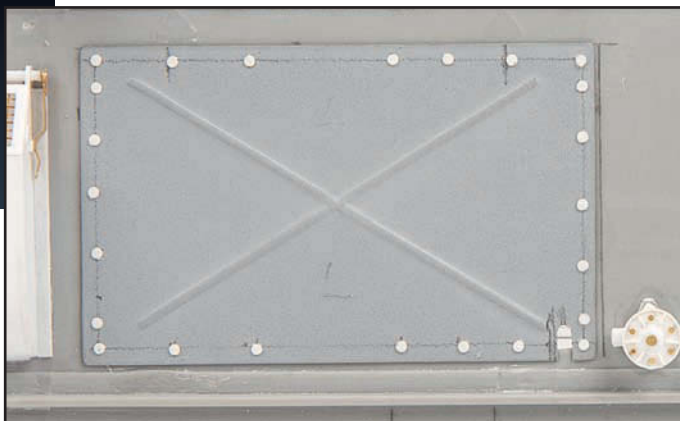
I used pewter sheet to make new covers and I first made a plasticard template with the 'X' embossing cut out of the plastic using a P cutter. I then laid the pewter over this and used a round tipped tool to emboss it into the template.



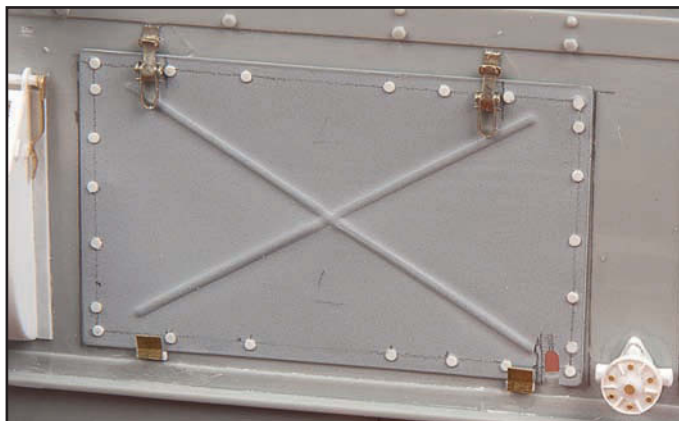
The cover was then trimmed to size and sprayed with 2 coats of Mr Surfacer 500 and very gently polished with a sponge sander.



A quick test fit of the covers shows that they are fitting the holes in the bulkhead as intended.



I used small discs of 5 thou plastic to add the rivet detail around the perimeter of the covers and I also cut out the notch **1** which will allow a fuel line to pass through the cover.



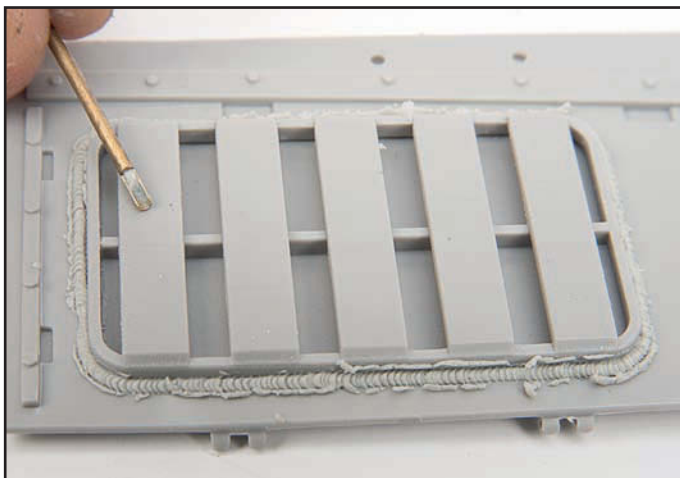
With the covers glued in position I added Aber photoetched latches to the tops of the covers and a pair of scratchbuilt hooks to the bottom edge.



I had already decided that I would make the engine deck hatches functional so the hatch taped into position I drilled through the hinge so that I could run a brass rod through them later.



I fitted the grilles to the undersides of the engine hatches but they lack the weld beads where they are fitted to the hatch, this detail is provided on the outside of the hatches. Rolled out lengths of Magic Sculp have been laid in position around the edge of the grilles.



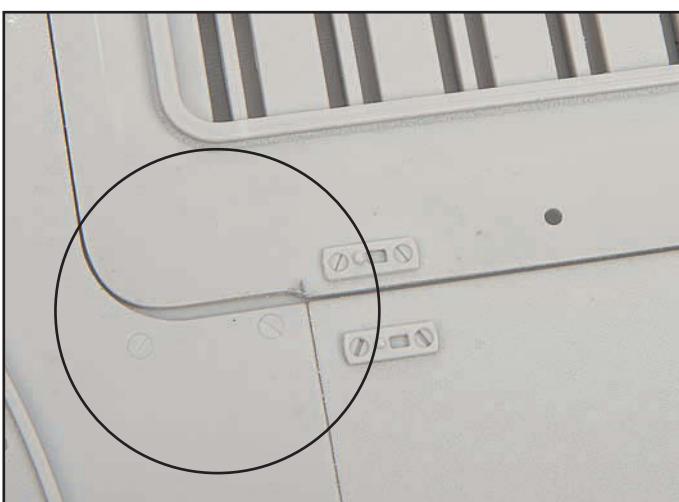
Using a home made tool I textured the putty to create the start of the weld bead effect. The strips of surplus putty were then cleaned away.



I used a damp brush to dull the sharp edges of the welds to create a smoother softer finish and they were then finished with a coat of Mr Surface.



This close up shows the finished weld bead effect around the edge of the grille.



The bigger engine hatch should have a kink in the top corner and the deck plate will have to be extended.



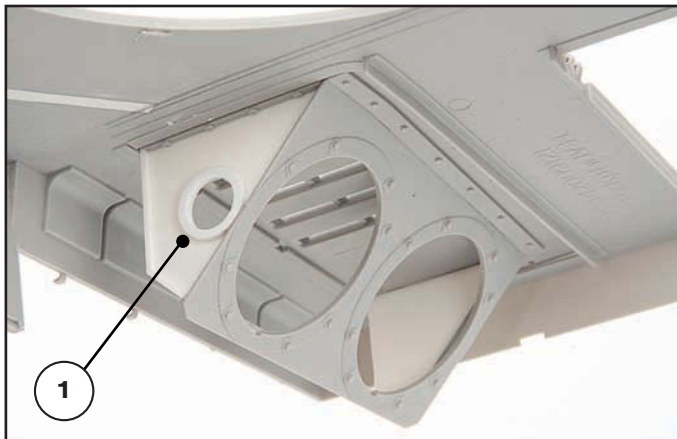
With the hatch adjusted I used a strip of plastic to fill the gap and extend the deck plate.



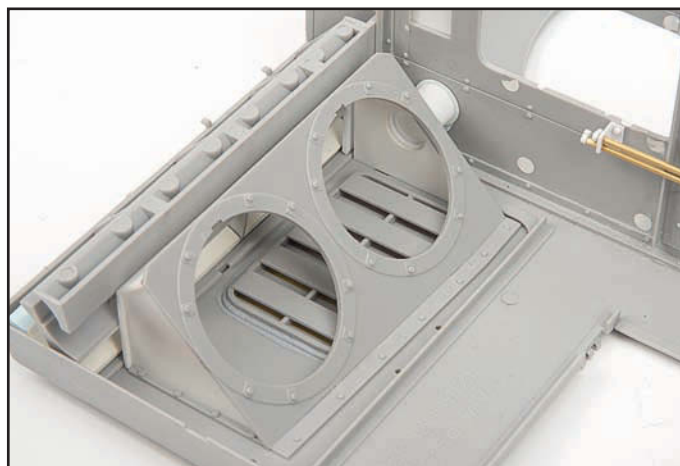
Turning to the underside of the hatch with the twin fan mounting I decided to rebuild the supporting frame for the fans as I was unhappy with the thickness of the kit parts. I needed to ensure that the frame would align with the crew heater duct on the firewall and when dry fitting it all looked good.



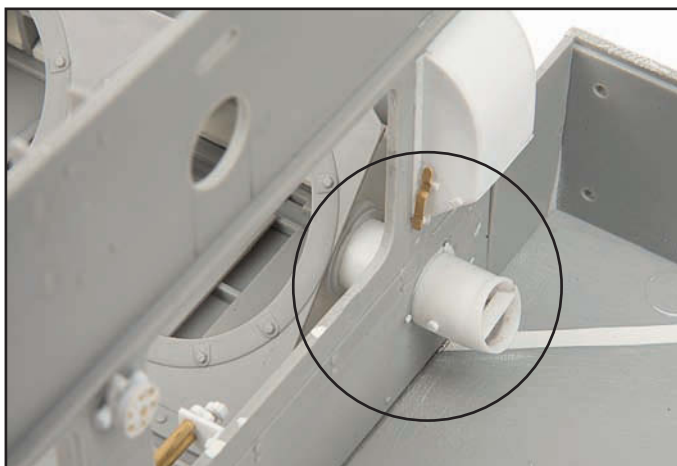
The new support frame was assembled using the original kit parts as a size guide and weld bead details were applied using melted Salter's red plastic rod.



The end panel has a raised ring **1** which forms a seal with the heater duct.



Test fitting is always critical to avoid any unpleasant surprises and especially here where the tolerances are tight because the fan frame has to seal against the hull louvers where the hot air is expelled.



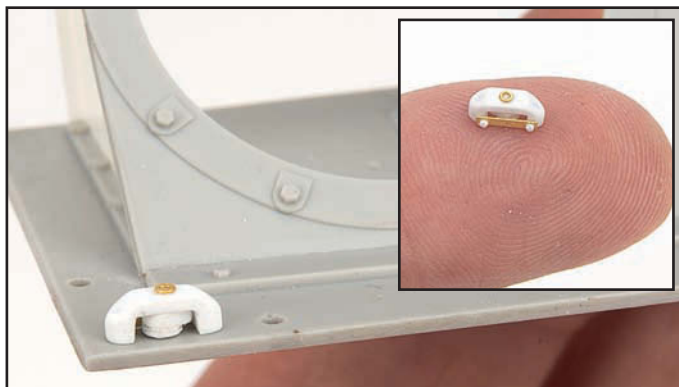
It doesn't always go to plan but when everything lines up as you planned there is no better feeling! The heater vent meets the frame and the hatch will open! Seen here upside down.



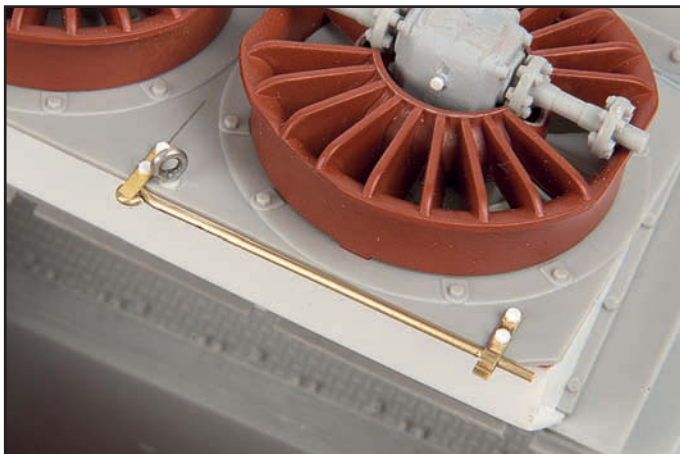
24 Moving on the fan units and although these sit up under the frame they are still visible when the hatch is open. I added a rim around to base of the fan domes and the missing nut and washer to the centre. Spare Archer Fine Transfer's Surface Detail decals were used to add the casting numbers and the modified fans were test fitted in the fan frame.



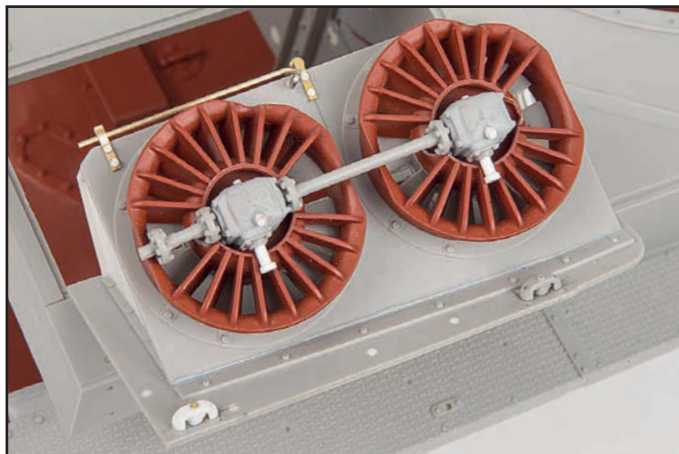
The gear housing for the fans were filled and sanded and I corrected some of the small details on the housings.



Another element that is missing are the hatch locks. These are used to secure all the engine deck hatches and are fitted on the undersides of the hatches. I was able to use the external lock covers as a guide to the size of the locks. The locks were shaped from a solid piece of plastic with the rotating lug added separately and I then arranged to have copies made for the total of seven locks that are required



I added the lifting loop made from lead wire and made the hatch stay from spare photoetch fret and brass rod.



The completed hatch in the opened position.



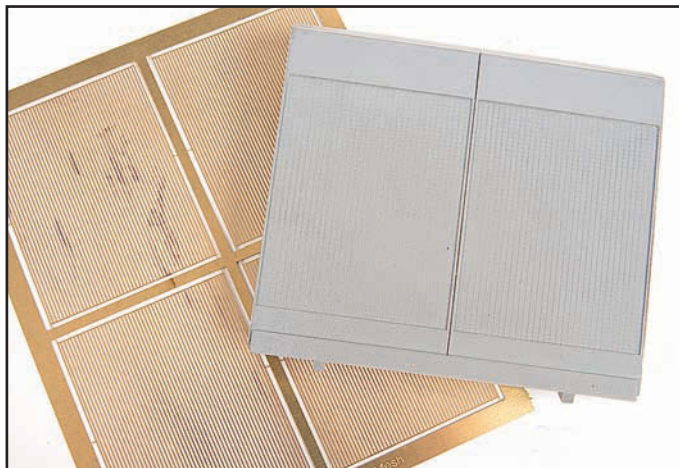
The twin radiator assembly is comprised of two parts but a difference in sizes required a fillet of plastic card to be glued around the edge to eliminate the step.



The twin filler cap arrangement for the radiators is incorrectly modelled by the kit so I started to make my own correct version. Pewter foil was used to make the rubber collar with self-adhesive aluminium foil for the clips.



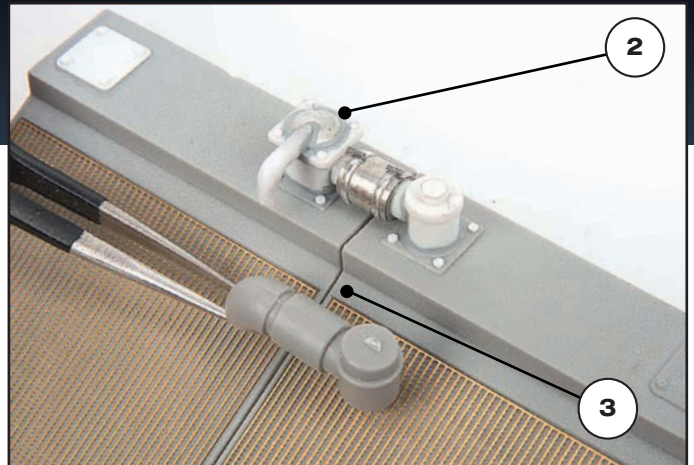
As these parts extend through the engine deck hatch it was important to check that the external cover would fit over them!



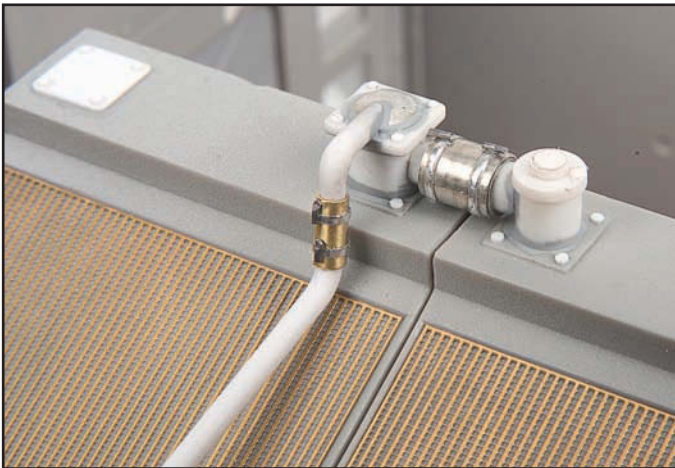
The kit rendition of the radiator grilles was far from accurate so I decided to make my own replacements with photoetching. I drew up artwork to replicate the correct grille spacing and half etched the horizontal bars to create a stepped finish like on the real thing.



I scraped off the moulded grille detail before fitting my new photoetched parts. I found the best way to do this was using AK Interactive Sand and Gravel fixer as a liquid glue which I brushed into the grilles.



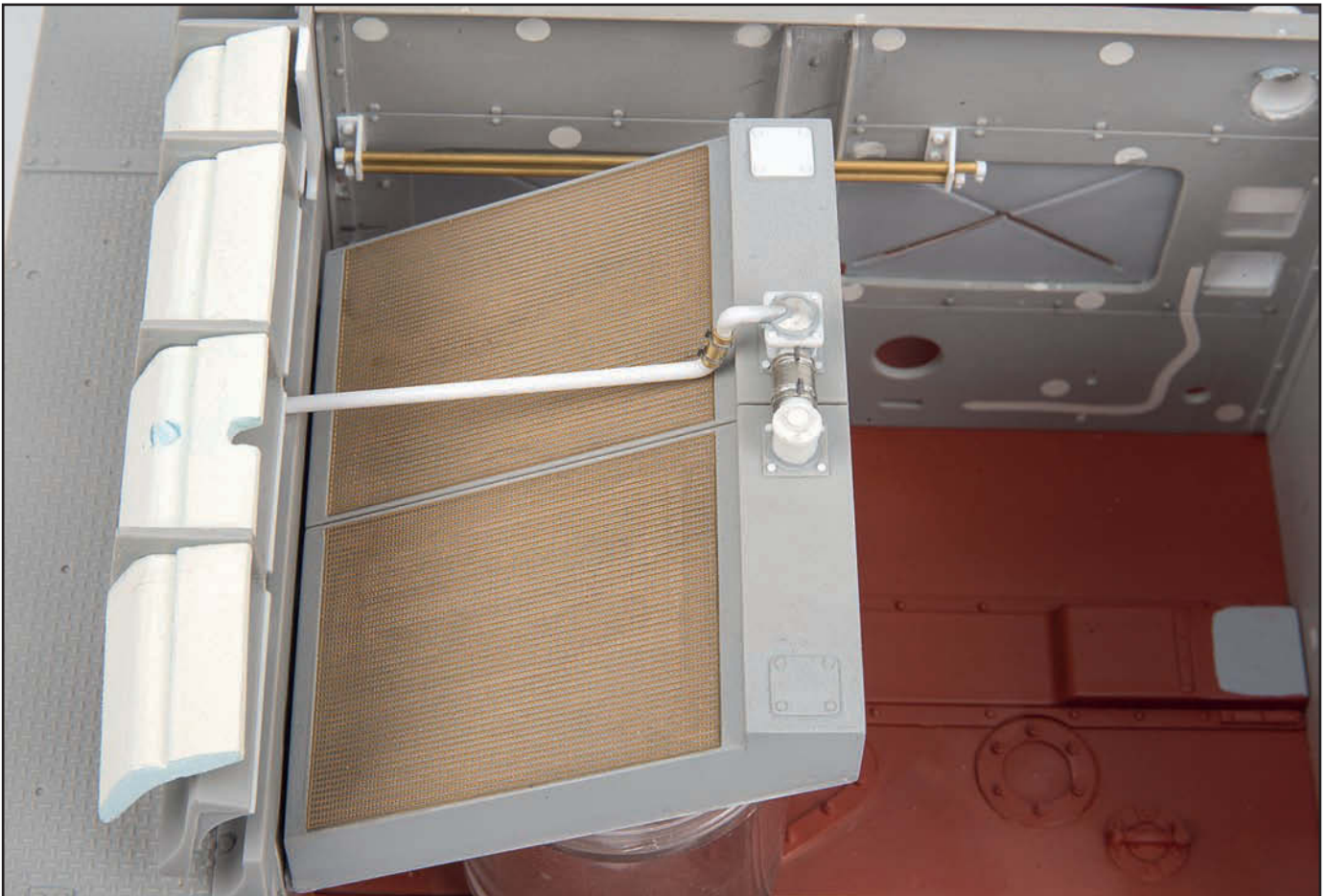
This comparison shows the kit radiator filler cap assembly next to my own replacement. It shows that the square pressure cap arrangement **2** is absent. I used a razor saw to enhance the gap **3** between the two radiators to give the impression that they are two units.



The square cap has some sort of pressure release arrangement with an overflow pipe which vents outside the engine bay. I used Albion Alloys brass tube to make a collar to join the pipe to the cap. This allows me to easily disconnect the pipe and remove the radiator during the rest of the build.



Here the radiator is temporarily fitted in position to test the position of the overflow pipe which exits the engine bay through the air intake grille.

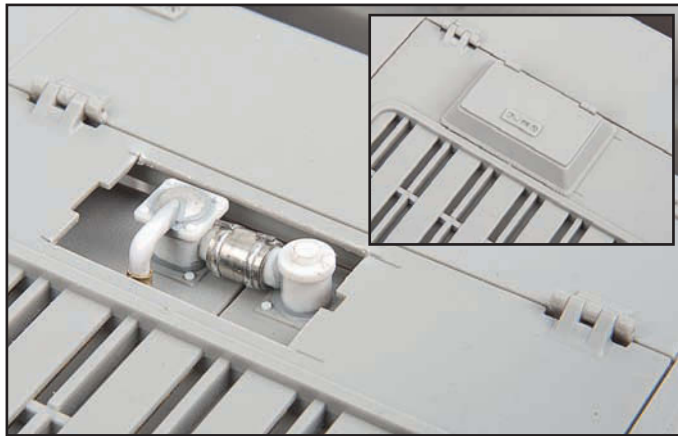


None of these parts are fixed in position yet so testing fit and alignment always requires a certain amount of checking and checking again. In this case the radiators are mounted on the hull wall and will be suspended from the underside of the engine deck. The auxiliary generator also sits beneath

the radiators and the filler caps have to pop out of the engine deck hatch in the correct position and not extend so far that their armoured cover will lie flush with the hatch.



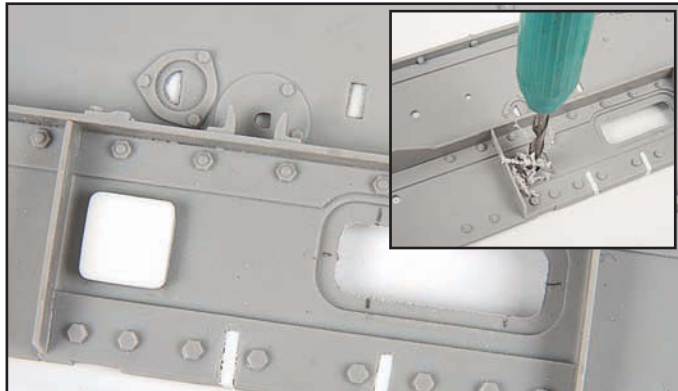
The result of the test fitting was the realisation the opening in the hatch for the filler caps is much narrower than armoured cover so I marked the new width and cut away the strips from each side of the opening.



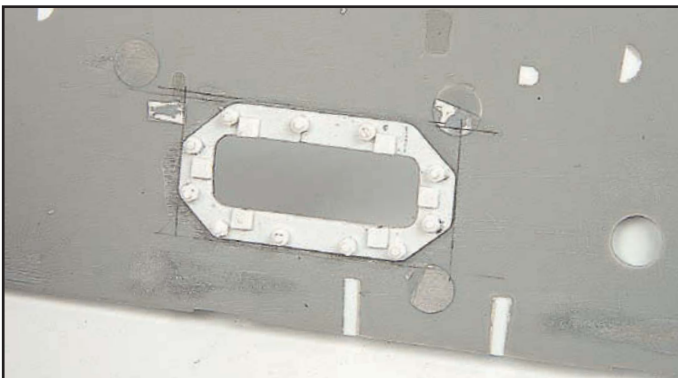
The new enlarged opening allows the filler cap to fit far more comfortably and corresponds to the arrangement on the real vehicle. An additional bonus is that the armoured cover sits over them without a problem.



The rear hull wall had multiple pin marks and location holes for parts to attach to the outside. I used plastic card to blank these off but still allowing some depth to the location points on the outside. I can then shorten the pins on those parts when I fit them.



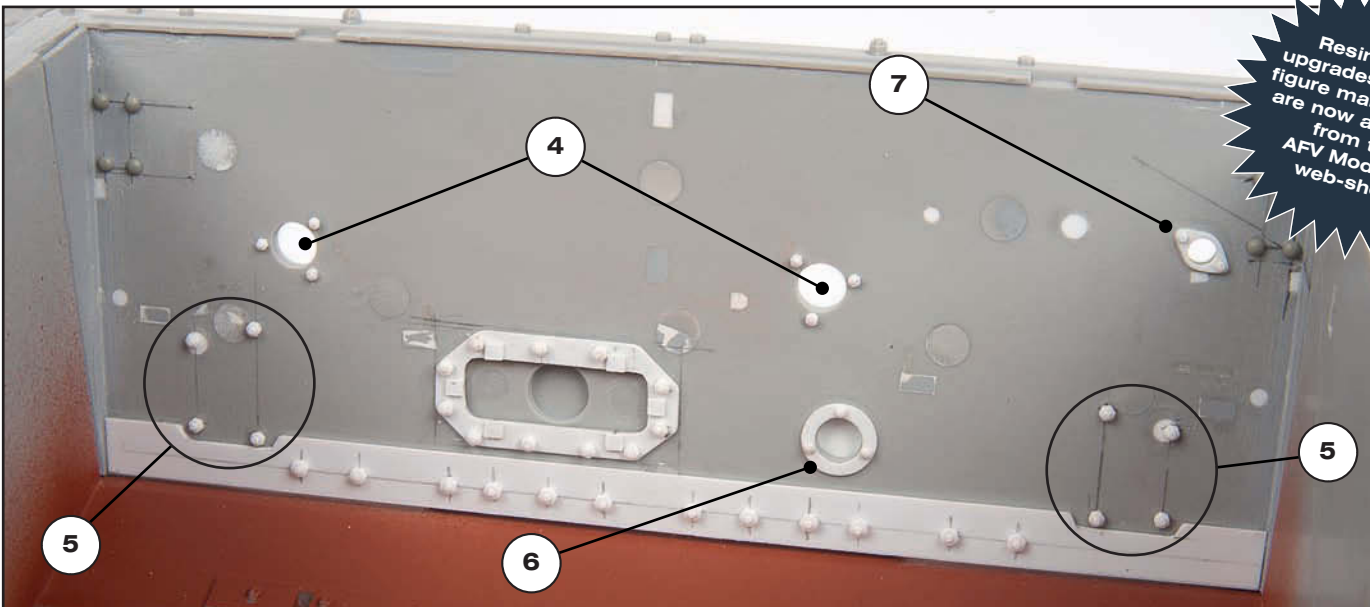
The small port for the pre-heater system is missing from the kit so I drilled open the hole with a 3mm drill. I then fabricated the square cover plate for the exterior which will need conical rivets adding.



The opening for the starter crank needs the frame adding on the inside face along with the bolt head detail.



MAN Models kindly supplied me with some of the excellent Masterclub resin rivets which were perfect to add the fixings for the towing hooks. The small flange next to them is the outlet for the auxiliary generator exhaust.



Resin detail upgrades and the figure mannequins are now available from the AFV Modeller web-shop.

The completed rear panel and you can see how the panel interlocks with the sides, something that will have to be filled and blended. There is also another bracket where the rear and floor meet to be added later. The engine exhaust

ports 4 have bolt detail added and I added the bolts 5 where the Idler tensioners are bolted on. The pre-heater port 6 has the ring and bolt detail added and the auxiliary exhaust port has bolt detail added.

The project continues in the next issue

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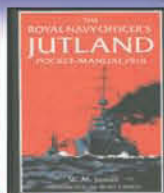
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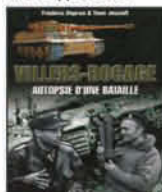
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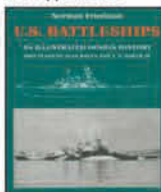
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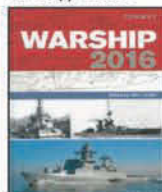
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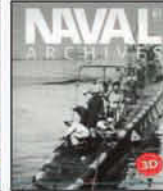
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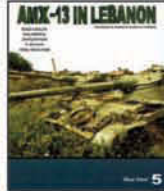
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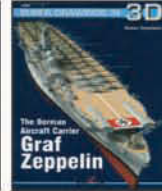
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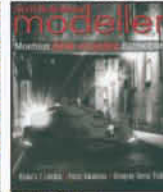
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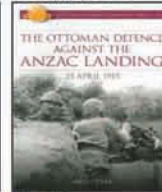
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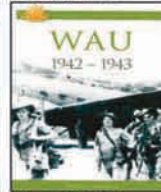
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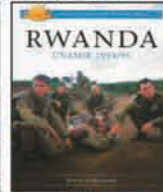
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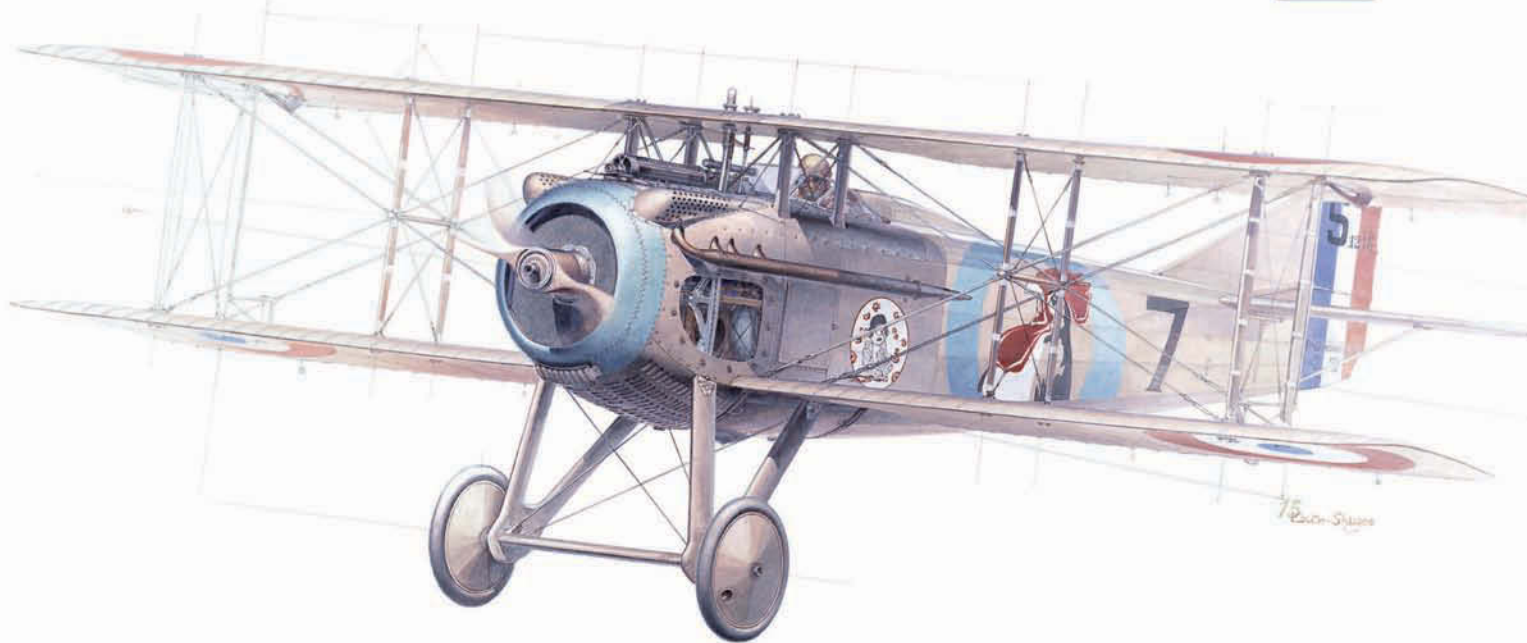
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Wr



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Konrad Dzik creates a real gem from the **Mirror Models** Diamond T 969A Wrecker kit

The Diamond T Wrecker was basically a standard truck with a wrecker body built by the Holmes. Co. of the U.S.A. It was first seen in 1941 and was used by many armed forces around the world, including Great Britain and Canada, serving long after World War II. The purpose was 'To lift and tow disabled vehicles' with a vehicle class of 'Standard'. First with a closed Cab (969) and after 1943 an open Cab was used (969A-969B) One in four were equipped with the Anti-Aircraft Machine gun Mount M36.

Mirror Models kit isn't the best of the modern kits on the market, but, it is the only one of the Diamond T in plastic. The kit has the appearance of a limited-run production, there are some problems with the odd sink mark and you have to take great care removing parts as the sprue gates are huge! Although there are a few niggles some details are very nicely done and the photoetched parts help raise the detail of the finished model.

Building break-down

I started the build with the chassis as per Mirror's instructions. The chassis needs very careful assembly, there are many parts which need constant checks to ensure the cab and body will align correctly. Just to add to the work, I managed to lose one of the radiator mounts and had to scratch-build one! Where I can, I try to solder brass parts. For me it's the best way to connect brass parts, much stronger than CA glue. When

you solder properly it's pretty easy. I use small solder station, flux from Aber and tin. I think the most important thing is to use small amounts of solder, second important thing is to use the solder flux or helper. You only need to "blanch" both parts, connect the parts, put some flux on and heat it. Don't forget to clean the parts of flux, for this I use Wilder Nitro thinner. The next assembly stage was the cab. Because some filling with a small amount

of plasticard and CA glue was needed here and there I decided to attach the cab to the chassis before painting. The rear deck goes together well. On the reverse of the rear fenders there's a noticeable lack of detail. This was easily rectified with some old PE parts and plasticard. RP Toolz punch and die set come very useful here to create bolt heads.

The chassis is very detailed and much is on-show with the finished model. Although I chose not to display the engine, the detail here is also good and would just require the usual wiring and pipework



Cab detail is comprehensive with some nice photoetched parts.

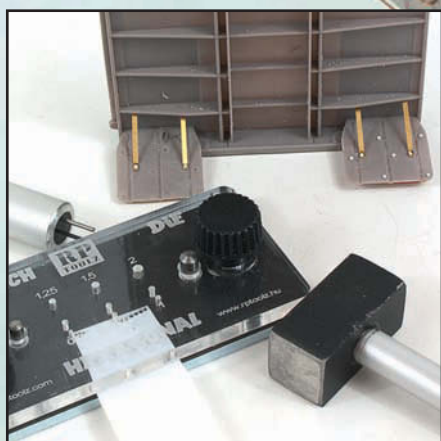
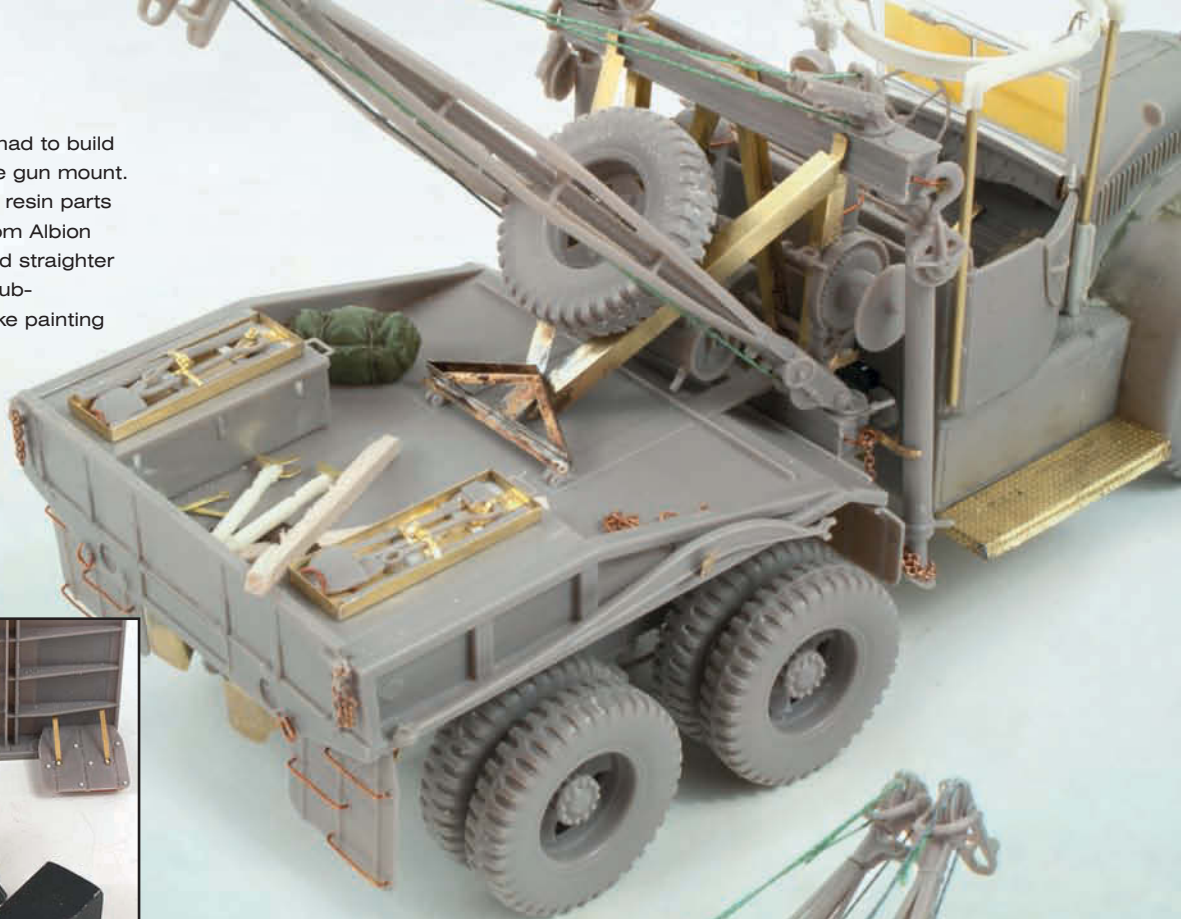


Some gaps required filling between the wings and bonnet (or fenders and hood if you prefer!)

Crane booms can be posed as you wish. Photoetched parts certainly add to the finess of the kit.



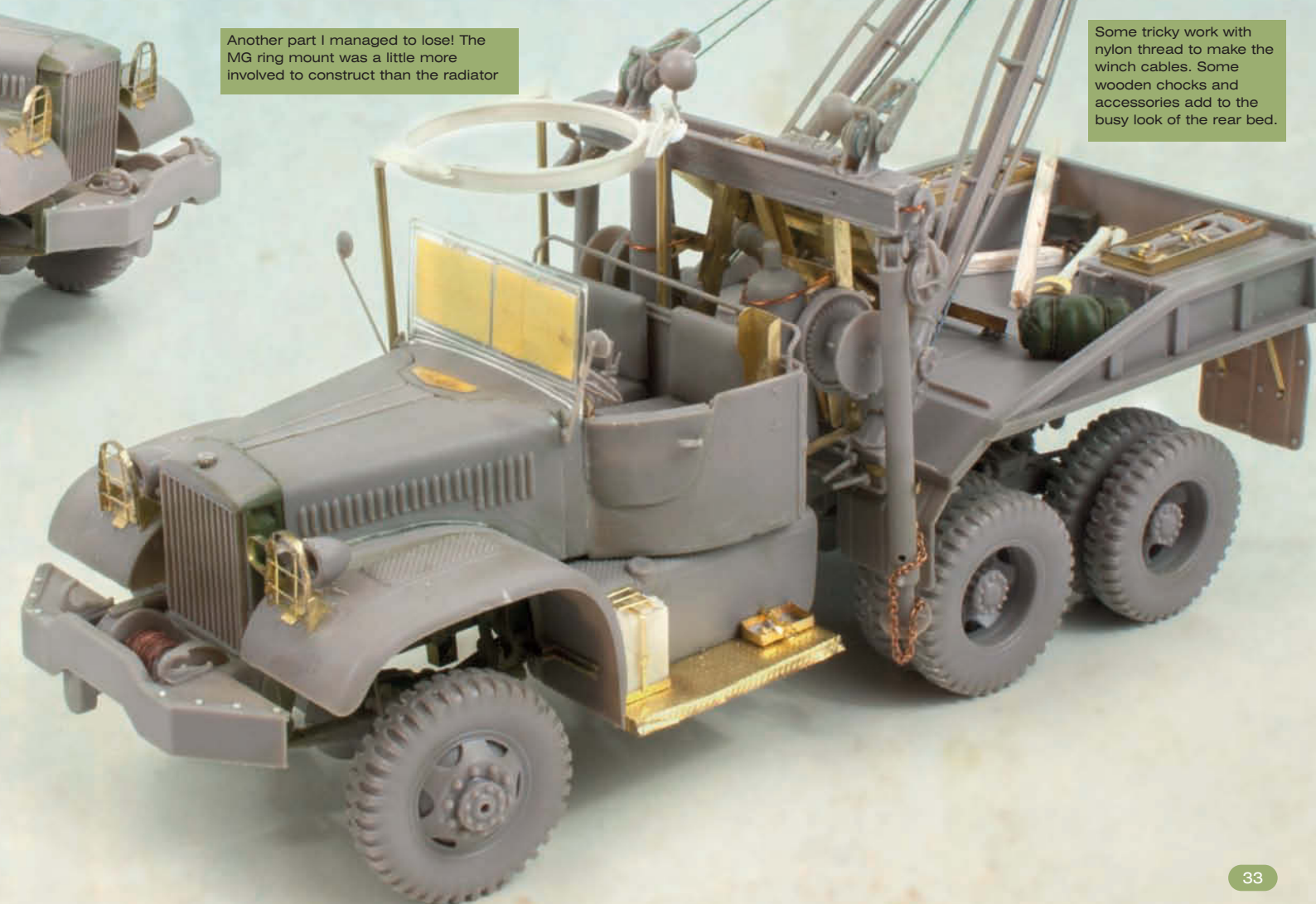
To complete assembly I only had to build the crane mechanism and the gun mount. The booms of the crane have resin parts which I changed for tubing from Albion Alloys to create a stronger and straighter frame. Where possible I left sub-assemblies removable to make painting and weathering easier. The winches and crane have some excellent detail and everything assembles pretty well.



RP Toolz punch and die set is a very worthwhile investment, high quality tools that you will use frequently and will last a lifetime.

Another part I managed to lose! The MG ring mount was a little more involved to construct than the radiator

Some tricky work with nylon thread to make the winch cables. Some wooden chocks and accessories add to the busy look of the rear bed.



Paint break-down

Finally it was time to apply a base coat of colour. I used mix of Tamiya XF-62 with some XF-58 and a little XF-5. The base was a bit too dark for me so I lightened and brightened the base green with XF-3 heavily diluted with Levelling Thinner from Gunze. Tyres were painted also at this stage with XF-1 with few drops of XF-63 to lighten the 'pure' black.

The next step was some colour modulation. I lightened the base colour by adding some XF-55. This was done in several steps, each progressively lighter so I can get the gradual transition. This technique is good to give interest and depth to a monotone colour and will be more subtle after weathering.

After painting I sprayed a layer of gloss varnish (X-22) to protect the paint and prepare it for decals. The decals aren't great with thick carrier film and took some X-35 satin clear to blend them to the surrounding paintwork.



Next up was some detail painting. Tool handles were base-coated with mix of AMMO MIG-011 and Vallejo khaki 70988 (that khaki was also used for seats and straps). When it was dry I applied lines of oil paints Abt.093, Abt.080 and Abt.130. After few minutes the oils were blended with Tamiya thinner for a realistic wood grain.

For dark washes I used AMMO MIG-1000, after few minutes the edges were blended with a brush moistened in X-20 Tamiya thinner.



With the detail washes finished it was time for scratches and chipping. For this I use two colours; first green brighter than the base here it was mix of Vallejo Reflective Green 70890 and White 70951 thinned with water and applied by sponge (you need to get rid most of the paint if you want small scratches) then I add a few with fine brush. Next was deeper chipping done with dark brown here I used Vallejo Chocolate Brown 70872 and Black 70861 using even more water than before. This time applied with a fine brush. Now to kill the shine, matt varnish XF-86 was airbrushed overall.

My next step was some streaks, first rusty ones with AK-013. I painted fine lines with this paint and after 15-20 minutes I blend it with flat brush moistened with X-20 thinner.

After that I added some rain marks. For these I airbrushed enamel Tamiya paints XF-55 and XF-55 diluted with X-20 and applied on low pressure. Be careful not to overdo these marks. When almost dry, the enamel is blended with a brush moist with thinners remembering to keep the movement vertical. This method was also used on the tyres but moving from the wheel rim across the side-wall of the tyre in a radiating pattern.



I didn't want to overdo the weathering so I decided to add a small ammount of thin mud. Tamiya enamel mixed with some pigment was applied by flicking from old brush with a toothpick. First I represented dry mud from a mix of XF-57, XF-55 and



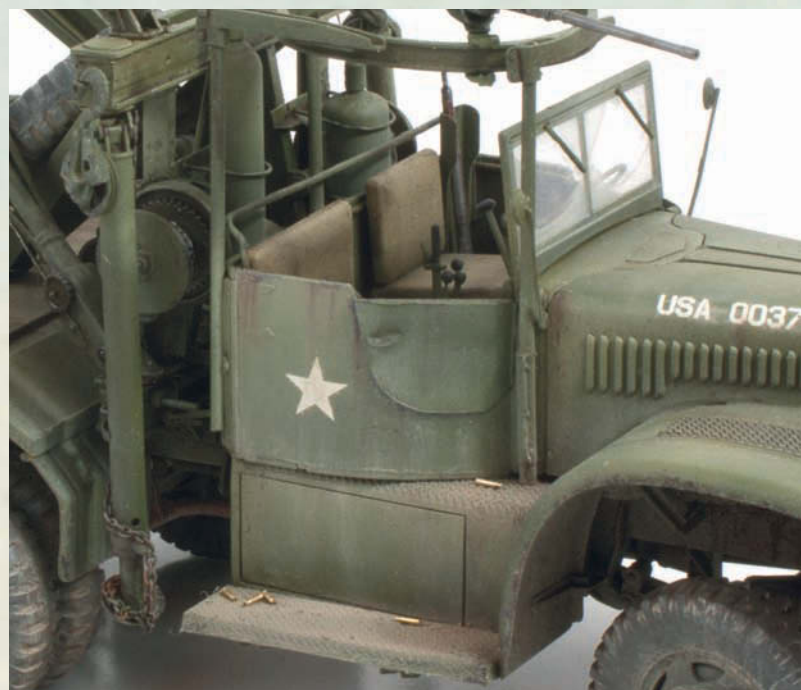
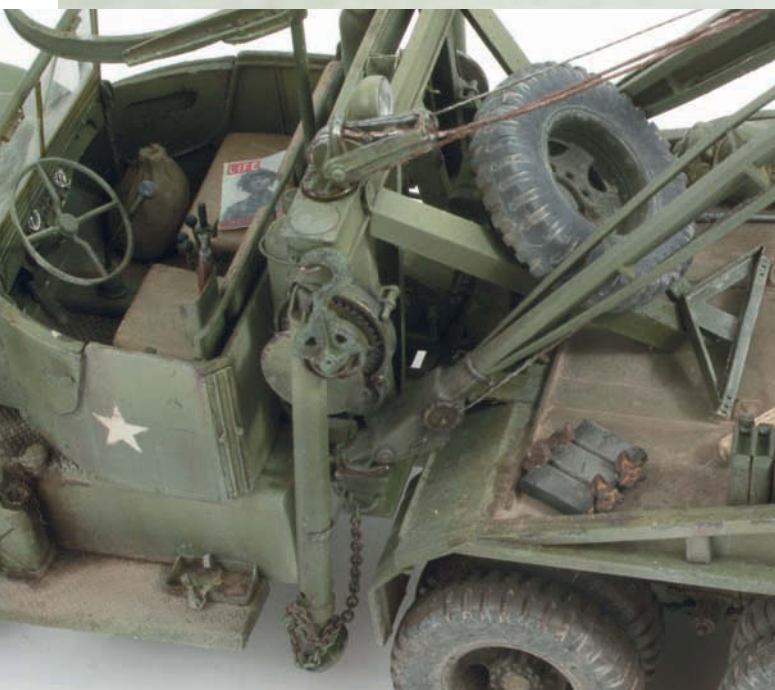
Europe Earth pigment from AMMO. When dry I add some damper, darker tones from AK-076 Damp Earth and AK-081 Dark Earth pigment. This process was made easier by keeping the wheels removable at this stage.



Now it was time for the satisfaction of final assembly and adding some stowage and details. The canister and sleeping bag are from a Tamiya set, M4 wheel is a spare from Asuka (Tasca), track links from Bronco, beams are from balsa wood and the 'Life' magazine was printed by myself. M2 barrel, shells and bucket are from RB model.

The Mirror Models Diamond T is a kit for modellers with some experience requiring a level of skill and patience. I hope you'll agree that the effort is worth the final result.

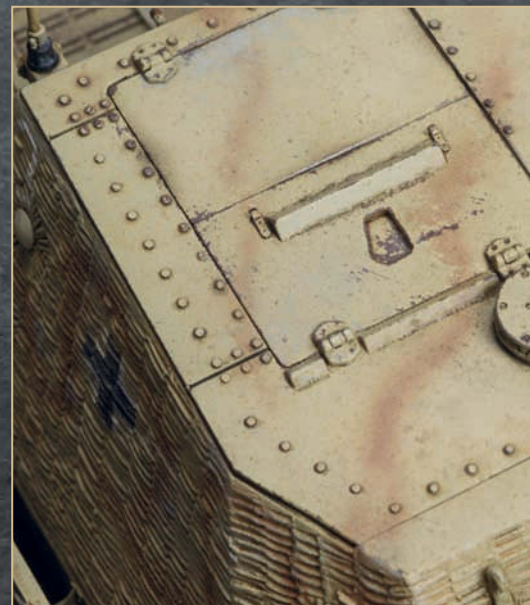
Diamond T 969A





weather forecast

Polish modeller **Sergiusz Pęczek** gives us an insight to his inspiring weathering techniques



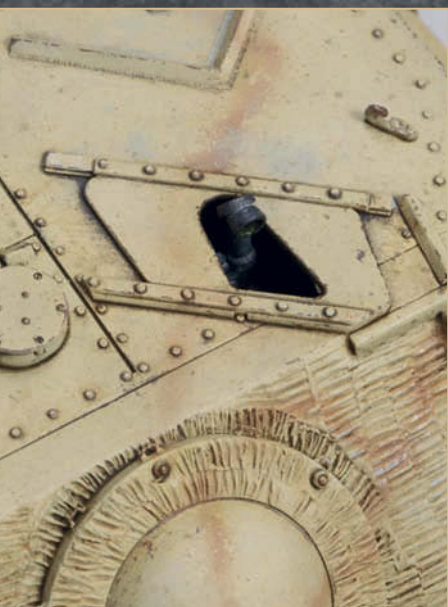
1:35

The Heavy Assault Gun Sturmpanzer 43 is a vehicle you either love or hate. One thing is certain, it can't be mistaken with any other vehicle, instantly recognizable by any fan of armoured vehicles from WWII. This German infantry support gun based on the Panzer IV chassis, also known as "Brummbär" was at the Battles of Kursk, Anzio, Normandy, and was deployed in the Warsaw Uprising. Just over 300 vehicles were built which makes it an unusually popular subject for modellers when Tamiya released the first 1:35 Brummbär in the 70's. The default choice these days is one of the Dragon 'Smart Kit's, upgraded with 'Part.pl' photo etch and Friulmodel tracks.

I also decided to make my own Zimmerit coating to suit to the vehicle from in my reference photographs. The vehicle appears in a typical German yellow colour with a thin waves of red brown field camouflage roughly applied by the crew.

What fascinates me most with modelling is to achieve maximum realism with scale painting and weathering effects. I try to be faithful to one basic rule - less is more. I try to avoid overdone chipping, half-metre rust streaks coming from anywhere or blackened gun muzzles. Of course, there is nothing wrong in being creative, but keep in mind that we're producing a scale creation of reality rather than a contemporary painting. When I prepare for the next project, I always look through dozens of photographs from the era, but also observe weathering effects on construction vehicles, trucks, etc around me day-to-day. Sometimes I use a variety of effects from several pictures but try not to overdo it, as in this case. Due to the fact that the Brummbär was produced in a small quantity only a few interesting period pictures depicting this vehicle are readily available, I had to help with photographs of similar vehicles.

Dragon 1:35 Sturmpanzer 'Brummbär'



base coats



After priming the whole model with a Mr. Surfacer 1000, I applied the first layer of paint simulating the color of the Zimmerit coating. In this case I mixed XF-19 with a touch of flat white, and airbrushed only surfaces coated with Zimmerit.



I carefully masked all the Zimmerit using Tamiya masking tape and masking fluid in areas where application of a tape was tricky.



Then I airbrushed the second layer of paint simulating the rust in chipped areas. I made a mix of Tamiya paints diluted with Gunze Mr. Leveling thinner, my favorite thinner for Tamiya paints.



When all the Zimmerit masking was removed I applied two even coats of Chipping Medium, and then the first layer of the main base colour - German Dunkelgelb RAL 7028 created by a mixture of Tamiya paints diluted with tap water for easier paint removal during the chipping stage.



I decided to make some panel highlighting, for that I added more white to the base mixture, and covered the top surfaces with a mist of the lighter shade of Dunkelgelb.



Immediately after the base color was applied I started to make chips, scuffs and scratches. I wet small sections at a time, wait for a few seconds until the water activates the chipping medium and gently scrub the paint with different shaped old brushes.

upper hull



A classic weathering step is always a wash application. To avoid any monotony I used three different colours from the Ammo range, two browns and a black.



Using a fine brush I applied the pin washes around the details like bolts, hinges, and into the panel lines.



I let the washes dry for a few minutes, and then cleaned all excess with a sponge brush moistened in odorless thinner.



Damaged Zimmerit areas were painted with a grey acrylic paint...



I tried to paint this in a logical manner reproducing the horizontal pattern of the coating.



Although I achieved some grey chips on the Zimmerit during the chipping fluid stage, I wasn't completely happy with the result, so I added some more with a sponge, especially where the camouflage was applied.



When all chipping and washes were applied, it's time to bring it all together with filters (tinted thinners). I applied the different colours in multiple thin layers.



Fine sand mixed with pigments (for colour) are laid on the specific areas where dirt and soil could accumulate.



In the next step I secured the particles in place using Sand & Gravel fixer. Some glossy outlines can occur which require an airbrushed coat of flat varnish.

shurtzen



Different approaches were used while painting the side armour 'Shurtzen' - in this case I used the salt technique to achieve the more random and shattered surface imitating the shrapnel scars. At first I airbrushed the surface with a coat of water, and then sprinkled on the sea salt grains.



When it was touch dry I painted the shurtzen with the base color mix and let it dry for a couple of minutes.



As with the chipping fluid technique I wet the surface with a tap water and started to remove the salt. Flaking pieces of salt began to appear as rust coloured chips.



Another interesting effect are the vertical scratches made with sharp tweezers in the still soft Tamiya paint.



An indispensable complement is the rust wash in chipped areas. I used rust enamels from the Ammo range A.MIG-1204 Streaking rust and A.MIG-1004 Light Rust Wash



Splashes from the running tracks were added using a stiff brush with earth tones enamels.



The thin camouflage stripes were airbrushed on a simple palette made of cardboard and wide masking tape for easier and more controlled spraying. A thin coat of chipping medium was applied prior, and some chips were made in the camouflage.

To diversify the surface I used oil paints and a few brushes for blending the subtle tones.



Here you can observe the oil paint rendering to enhance the effect of rust. I added a dot of oil paint and then blended it with a brush moistened in odorless thinner.

lower hull



To quickly add large areas of mud and dirt I use pigments. First we need to moisten the surface with some fixing agent - in this example acrylic thinner from Mr. Hobby.



Then I applied the mix of few earth colour pigments with a large soft brush, sprinkled onto the wet surface.



Wanting to add another layer of pigment I again moistened the underside of the hull, but this time using a pipette to avoid touching the pigments directly.



Heavy mud build-up was created with local applications of the mixture to create the desired texture.



Another useful tool for 'mud work' are Tamiya Weathering Sticks. Once applied you can add some texture with a short bristle, stiff brush.



The same procedure was repeated underneath the fenders. During the application you can speed up the drying time with a hair dryer.



When all pigments are dry and you're happy with the result you can secure the layer of mud with a enamel pigment fixer which is stronger than acrylic thinner.



In this picture you can see the longitudinal scuffs made with a hard cotton stick from Tamiya.



Piles of mud collected on the bogies were made from a mixture of sand, pigments and plaster combined with acrylic paint and 'crackle' medium. This mixture gives a very realistic effect of dry, cracked mud. When it dries, you can make corrections with a sharp tool.

wheels



As in the case of the hull, the first step was to make chipping using the fluid prior to applying the top coat.



Tyres are from a Tristar set. After painting with A.MIG-033 Rubber & Tires colour, grey filter A.MIG-1501 was applied.



To attach the rubber tires, just push them to the wheels without the use of glue. The thickness of the paint on the elements is sufficient to keep them in place.



Another step was to apply the dry mud mixture in a random way...



... and to paint some fluid leaks from the wheel hubs. I used A.MIG-1408 Fresh Engine Oil and A.MIG-1407 Engine grime enamels for this purpose.



The last step was to paint the contact areas on the sprockets, return rollers and idler wheels. I used Mr. Hobby Super Fine Silver for this purpose which is very thick paint suitable for brush applications. I use a little Mr. Leveling thinner to dilute it.

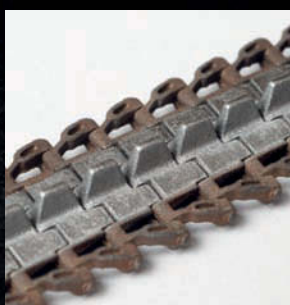
tracks



After assembling the Friul tracks, I applied a decent coat of Track primer A.MIG-2007.



After masking I painted the wheels and track contact area.



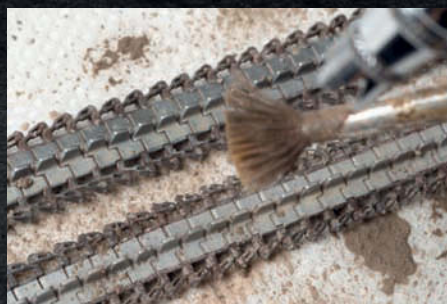
The closeup view after removing the masking tape.



Then I made a rusty wash using highly diluted acrylic paints. I made it in a random way with three shades of rust.



By using acrylic paint for the rust wash, I could immediately proceed in making the earth-coloured washes with enamels.



I enhanced the effects by using mixture of pigments and earth tones enamels, speckled by blowing air from my airbrush.



Last step was to polish the tracks outer contact area using a polishing cloth.



exhaust system



Using the Ammo 7106 Rust Effects Colours set I proceeded to paint the rusty muffler. I started with the lightest colour.



When first layer was still wet I added another darker layer concentrating on the top of the muffler.



I continued to build up the rust tones layers with darker shades of rust, keeping them transparent. Some glazing fluids as a Ammo 'Transparator' or Vallejo Glazing Medium could be useful with this task.



The final layer was the darkest rust color added with a sponge and some rust patches were painted with a fine brush.



Using the speckling technique and Track Wash enamel I added tiny dots simulating the finest rust chips.



In the last step I applied two coats of chipping medium, and painted the muffler with Ammo acrylic similar to my base dunkelgelb.

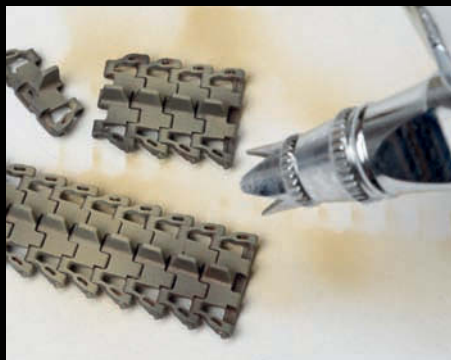


Vinyl-type acrylic paint dries to a 'shell / skin' this means that you can achieve bigger, more flaked looking paint effects than with Tamiya paint which is better for small, more controlled chipping.

Final touches included the sooty tip of the muffler outlet and rusty washes made with oil paints.



spare track



As before I started with the chipping of the dunkelgelb colour. Using a stiff brush and a tapping motion made the random and realistic appearance. You can just see the brown remains of the camouflage stripes.

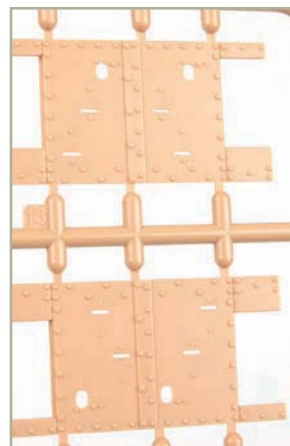
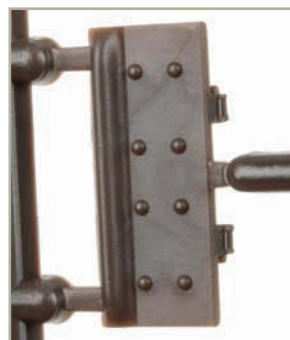
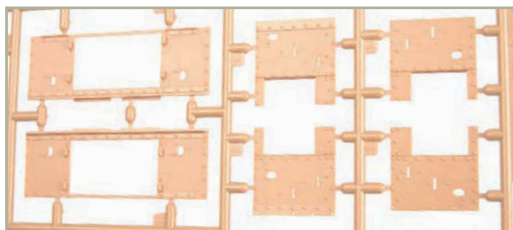
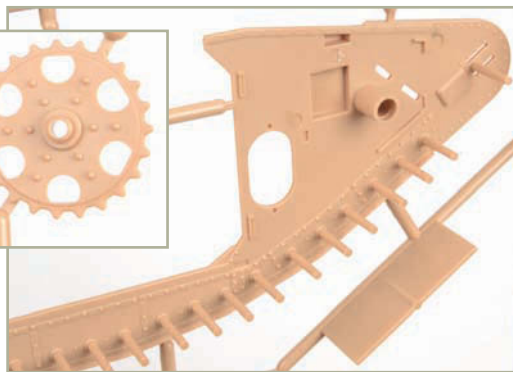
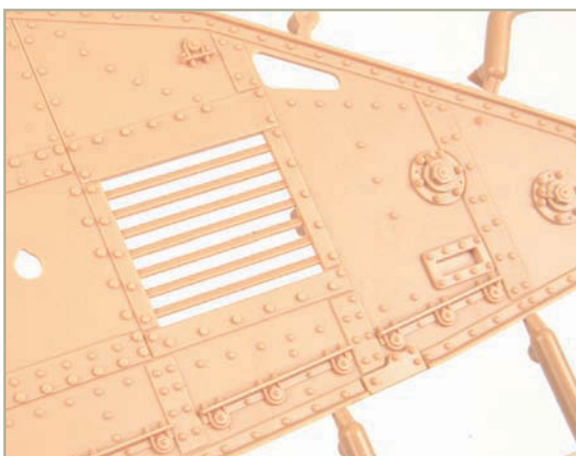
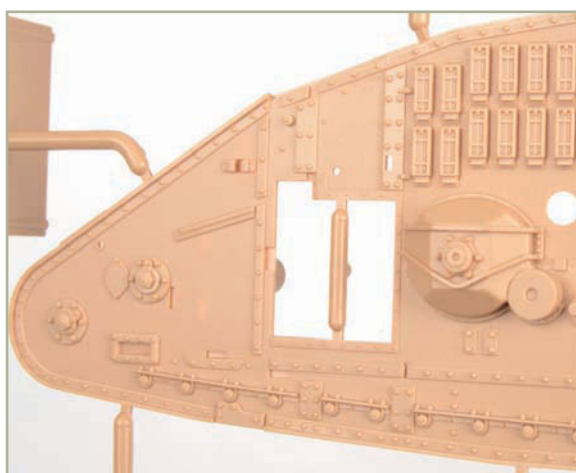
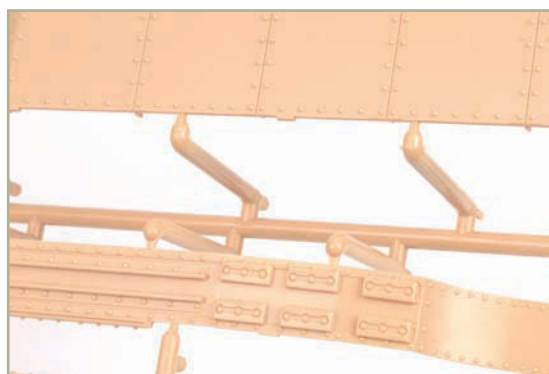
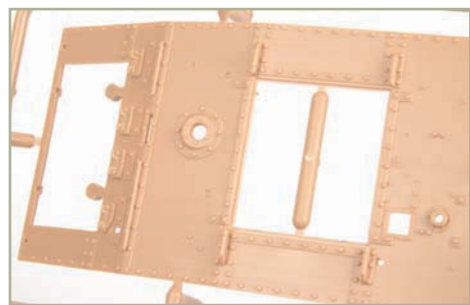
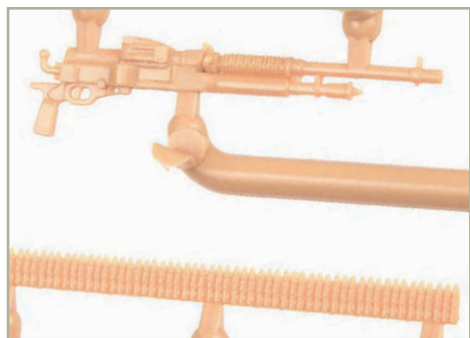
Speckling the rust enamels in two or three different shades is always a good choice for a more natural and random look.

The last step with the spare tracks was adding the grey, dusty filter on the horizontal surfaces simulating the dust accumulation.



With so many ready-to-use finishing products on the market today it's easier for modellers to achieve the look they desire with consistency and a lesser risk of ruining a beautifully applied base colour!





British Heavy Tank Mk.V Female

If you cast your mind back to our previous issue you'll remember how impressed we were with the Meng 'Male' Mk.V, a superb kit in all respects straight out-of-the-box. This new release of the Female shares much of that kit as expected with the exception of the gun sponson parts. The Female wasn't fitted with the 57mm guns of the Male, only Hotchkiss M1 MGs designed to support the Male by suppressing enemy infantry. This version doesn't include the full interior, so obviously a less involved build and reflected in the kit's retail price. Even without the full interior the impressive box is still packed with tan sprues showing some superb detail. The tracks are moulded in dark grey with a simple click-together assembly and a beautiful thin profile. Photoetched parts are included, a length of metal chain and small decal sheet. Three

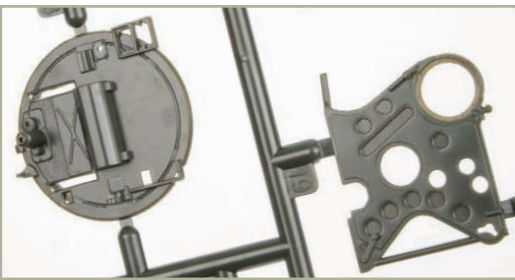
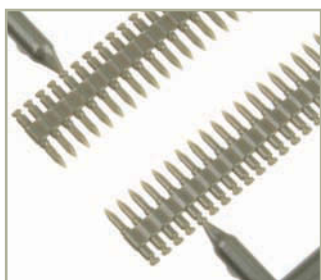
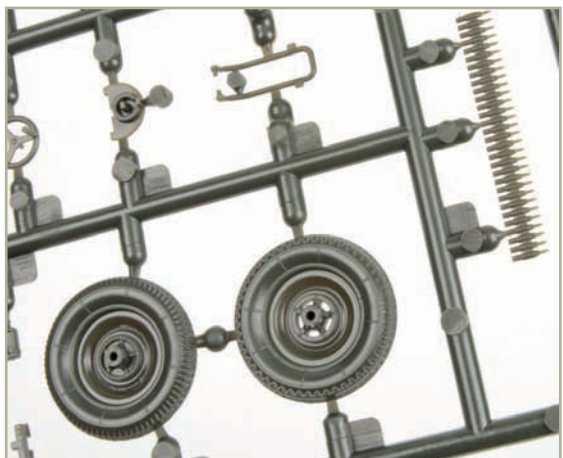
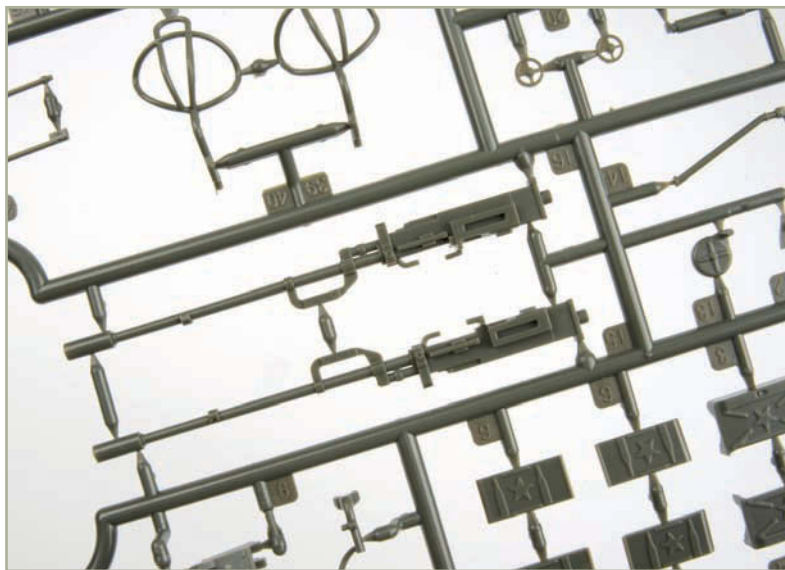
versions of the tank can be built with further options of transport or combat set-ups with unditching beam and trench-crossing device. An interesting option, which would make an impressive diorama, is the Mk.V as displayed in Berlin in 1945 as a captured war trophy outside the Berliner Dom. It was reported that some Soviet troops encountered resistance from a 'rhomboid' tank in the battle for Berlin but the vehicle was destroyed eventually by Allied bombing. Meng's WWI kits are produced with full access and cooperation with the Bovington Tank Museum to ensure complete accuracy, this is another welcome addition to the range which is sure to please Great War modellers.



Meng 1:35 Gaz-233014 STS 'Tiger' sagged wheel set

Meng make a wise move of offering the popular resin wheel upgrades for their own kits, following on from the Smerch and Cougar is a set of four 'sagged' tyre wheels and an un-sagged spare tyre on a wheel rim. The weighted look is captured perfectly with some fine spruing points being easy to remove. The detail is

as good as it gets with beautiful tyre-wall detail and defined tread pattern which even the best injection moulders cant replicate. The rear face of the wheels carry the same level of detail and they're designed to fit as per the kit parts. A superb upgrade.



Meng 1:35 Russian Light AA Gun Set

A new release in Meng's 'Supplies' series is a set of four post-war Russian anti-aircraft guns, cheap, light and effective these guns have been used Worldwide for many years both towed and mounted to a wide array of vehicles. I was a little confused at the first glance at the packaging, so to simplify the contents:

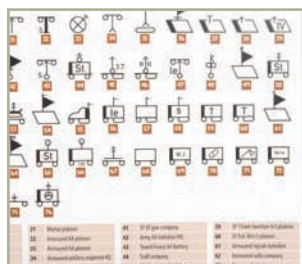
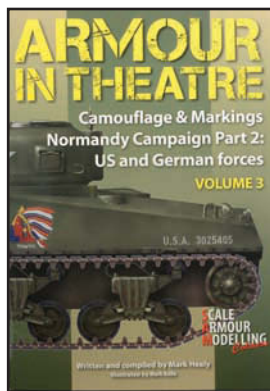
The ZU-23-2 can be built mounted to a vehicle, firing position on the ground (on carriage) or being towed on carriage, a choice of three firing positions are offered.

The ZPU-2 can also be built mounted to a vehicle, firing position on the ground (on carriage) or being towed on carriage but the barrels are free to move along with the sights. A choice of barrels and wheels are included to produce a Chinese made version.

The simple ZPU-1 can be built with Russian or Chinese type barrels and posed in various elevations on it's tripod base.

The largest of the guns, the four-barrel ZPU-4, can be built towed or in a firing position (free-moving traverse and elevation) and also has the Chinese-made barrel options. Phew, a packed box then! If you've picked-up any Meng Pick-Ups you'll have potentially have seen three of these guns already (the ZPU-4 is brand new) and know how beautifully detailed they are. Moulding is crisp and delicate with open gun muzzles, fine tyre tread patterns and also photoetched parts for increased finesse. This is a great set for diorama builders or converters which has enough choice for several projects...my mind's already wandering...

new releases



Armour in Theatre Volume 3 Normandy Campaign Part 2: U.S. and German Forces

Mark Healy

Published by Guideline Publications

Softback format, 64 pages

ISBN 9781 9085 65181

www.guidelinepublications.co.uk



The previous two volumes of this series came under the main header of 'Camouflage and Markings' which has now been tweaked to a more accurate description (as quoted by the publishers) of 'Armour in Theatre'. So much has been published on the Normandy campaign, with some very in-depth historical and tactical studies, this book takes a more 'modelling' approach with a good collation of some of the better known images of armour in sharp quality presented in a large format with detailed captions. The period images are accompanied by some nice colour profiles

for modelling inspiration (though we did spot the age-old error of the Panzer Lehr Division's shield represented as a diamond shape on a Panzer IV). A well layed-out section on the U.S. markings used and the Panzer Divisions markings and tactical symbols will be a great help to modellers new to the subjects. If you're looking for a good value, general reference for modelling this famous period of WWII this is a good start with some great images, if you have a selection of Normandy books already most will be familiar.



Illustrated History of the Sturmgeschütz-Abteilung 202

Norbert Számvéber

Published by PeKo Publishing Kft.

Hardback, small format, 395 pages

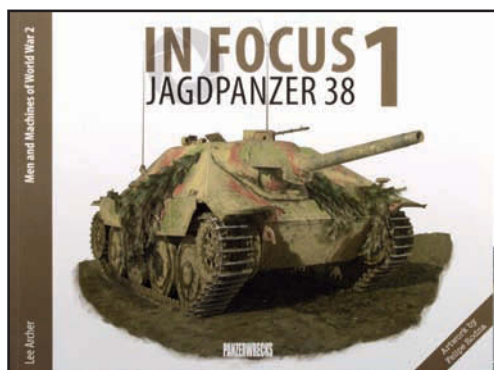
ISBN 978 615 80072 6 9

www.pekobooks.com

www.panzerwrecks.com

This is a very in-depth look at the actions of Abt. 202 on the Eastern Front from its formation in 1941 to demise at the end of WWII. The chapters are split into day-by-day accounts in a combat diary style format with some first-hand accounts of the action providing the personal touch throughout with an excellent insight to the stress of operating the StuGs and their constant maintenance. A great selection of appendix covers in detail original documents, maps and tactics with an inventory of the

assault guns used in action. The real jewel for StuG modellers is the sixty or so pages of period photographs, with the exception of a few, these look to be fresh images from private sources with some very interesting features on display and some unusual markings. The book rounds-off with more for the modeller in the form of some colour profiles of vehicles featured in the photographs. Recommended to any StuG enthusiast. Thanks to Lee Archer of Panzerwrecks (stockists of the PeKo range of titles)



In Focus 1- Jagdpanzer 38

Lee Archer

Published by Panzerwrecks

Softback format, 113 pages

ISBN 9781 90803 2133

www.panzerwrecks.com

This is the first release in a new series from Panzerwrecks and follows their attractive house-style of landscape format to show the large format images at their best. These guys must spend in incredible amount of time (this volume combining no less than 20 years of research) hunting down the original images and it never ceases to amaze with what turns up. Not something that there is a huge amount of period images of is the 'Hetzer' (baiter) based on the Czech '38' vehicles, look no further than this fascinating compilation of 117 images. As well as the photographs there are

colour illustrations based on some of the images which have a lovely style working directly with the photos they provide great colour and weathering reference. Some first hand accounts from veterans are a nice touch and as with the Panzerwrecks series there are some very detailed and interesting captions pointing out particular features of the vehicles, excellent for modellers wanting to add their own personal details. An excellent format, we look forward to seeing what No.2 brings. www.panzerwrecks.com

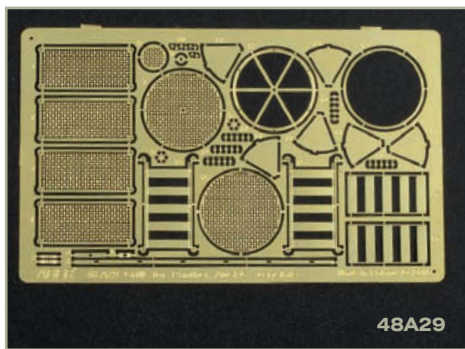


Quick Wheel

Designed to make the tedious task of painting tyres on roadwheels a breeze, the guys at Quick Wheel have produced a stencil set for the Trumpeter Panzer IV in 1:16. Simply airbrush the tyre and pop the soft-grip mask (eight wheels at a time) around the wheel rim and you're ready to spray the base colour. There's a huge range of these unique, handy masks at www.quickwheelstore.com

Bitskrieg

Right on time for our ongoing project, Bitskrieg have produced some 1:16 highly detailed and accurate resin bump-stops and housings for the Trumpeter Panzer IV. These are highly visible on the hull sides and are a huge improvement on the kit parts. To ensure accurate and easy positioning, a set of laser-cut templates are included. Very high quality and worthwhile additions which we'll certainly be using in the near future. www.quickwheelstore.com is again the place for secure on-line shopping.



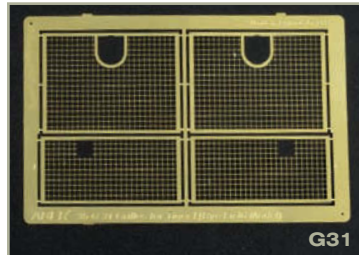
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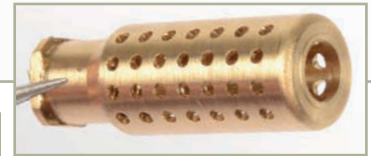
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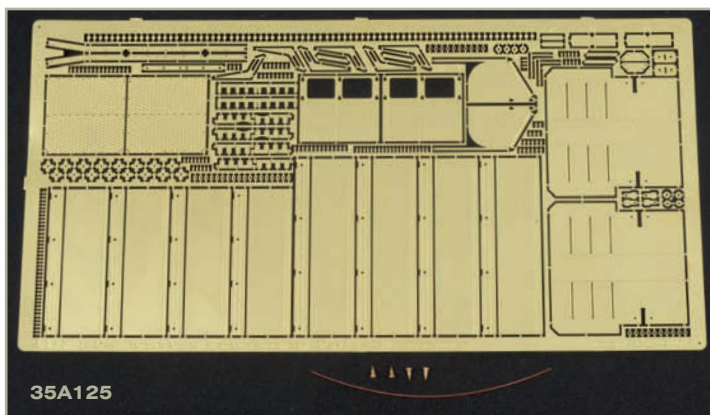
G31



16L14



35L176



35A125

Aber

Aber show they're still at the forefront of upgrade sets with a batch of new releases to whet our appetites. In 1:48 is 48 A29 to kit-out Tamiya's late Panther Ausf.G with engine deck grilles and fan detail. More grilles in 1:35 for Rye Field's Tiger I with set G31 and set 35 A125 which provides fenders and fittings for the early Africa versions of Rye Field's recent release. The characteristic exhaust covers are also included complete with turned brass fittings. For the Hobby Boss T-35 multi-turreted monster is set 35L 176 containing a full quota of six MG barrels (with superb drum ammo magazines) and three main guns. More barrels in 1:35 are 35L 179 for the Trumpeter JS-7 with the long muzzle 130mm, two 14.5 MG barrels and seven 7.62mm barrels and two massive 12.8 Flak 40 barrels for the Takom 'Zwilling' provided as two parts each, 35L 188 is the product code. Finally in 1:16, 16L 14 is a beautiful addition to the recent Classy Hobby 'Luchs' in the form of the 2cm barrel and muzzle. Aber quality is as superb as ever, www.aber.net.pl is the place for more details of their range and distributors.



AK Interactive

A new AKI set featuring the famous Waffen SS camo colours gives you all five colours you need to re-create this tricky colour scheme in-scale. A visual step-by-step on the package is handy. AK 3060 is the set's code. Another German set is AK3110 for Afrika Korps uniforms containing base colour, highlight and shadow for both the green and brown shades of DAK cloth. The Figure Series of colours have a different formula of paint specially designed for finer brush application with highly concentrated pigments which dry to a very flat-matt finish. The colours can still be airbrushed if thinned accordingly. A new collated set in AKI's AFV Series is

AK4190 featuring six colours suitable for vehicles in the Spanish Civil War of the late 1930s which is a mix of German, Russian and British shades all of which have in mind a scale reduction factor where AKI state that a reduction in scale equals a lightening of the tone to look correct on a model. www.ak-interactive.com has more details of the massive range of finishing products, their printed catalogue is also a very worthwhile collection of products and step-by-step features on their use by some of the World's most renowned modellers.



Firing Now!

Tank, Anti-Tank and Self-Propelled Artillery Ammunition, UK and USA 1939-45

Dick Taylor

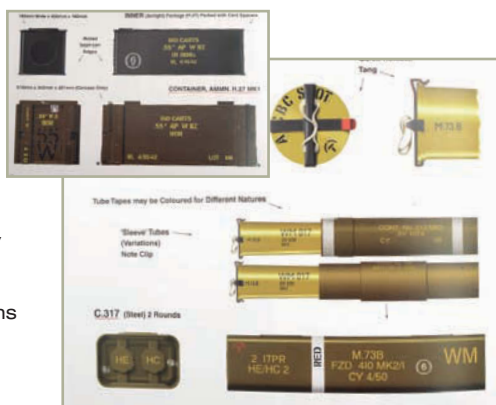
Published by Mushroom Model Publications

Softback format, 136 pages

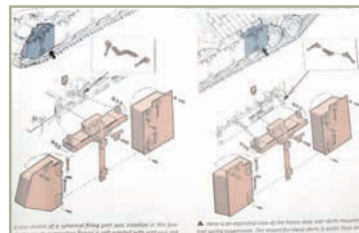
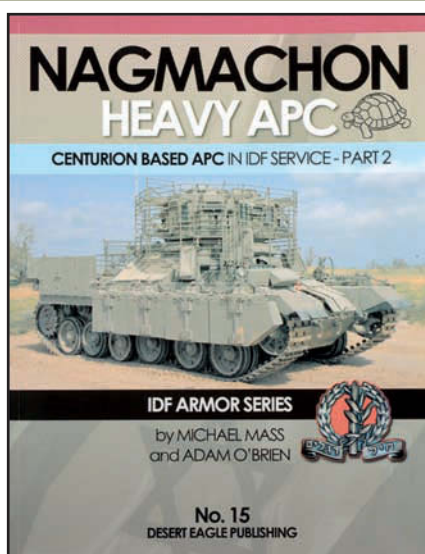
ISBN 978 8363 6789 13

www.mmpbooks.biz

The ammunition is undoubtedly the most important part of any gun, this book looks to educate in a very accessible and visual way, all you might need to know about U.S. and British shells of WWII. Starting with a lesson in the components, terms and technology the reader is led step-by-step through the sizes of British ammo starting with the .55 Boys Rifle and 3 Pounder all the way through to the 32 Pounder, PIAT and even the 290mm Petard. The U.S. section follows the same format and all are beautifully



illustrated in great detail featuring the projectiles, storage containers and transportation, colours and markings with a good selection of period images of the artillery and armoured vehicles. If you've ever scratched around for storage or colour reference on Allied ammunition, it's all here and presented in a high quality fashion. An excellent one-stop reference which will be called on time and time again by modellers of Allied subjects.



Nagmachon Heavy APC- Part 2

Michael Mass, Adam O'Brien

Published by Desert Eagle

Softback format, 83 pages

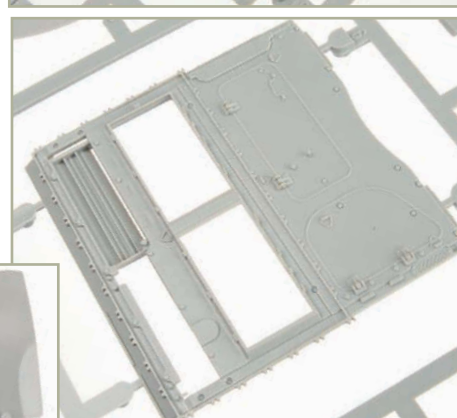
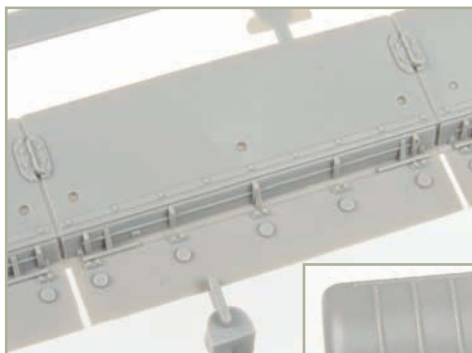
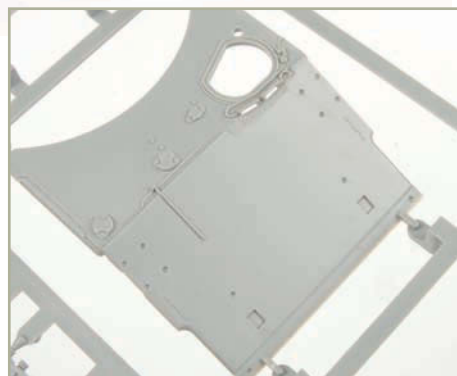
ISBN 978 965 7700 01 3

www.deserteagle-publishing.com

If you were inspired by our feature on the new Tiger Models kit in issue 88, here's the perfect reference with over 200 quality photographs in Desert Eagle's tried and tested format. An introduction explains the Nagmachon family of vehicles with easily understood visual reference with detailed captions. A great compilation of 'In Action' shots shows just how hard worked (and dirty!) these workhorses get with a fantastic potential diorama in a series of images of a Nagmachon being recovered after losing a



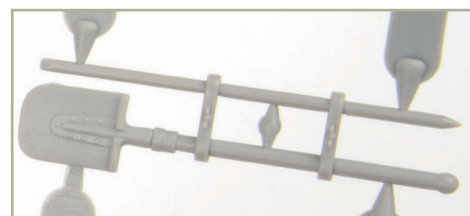
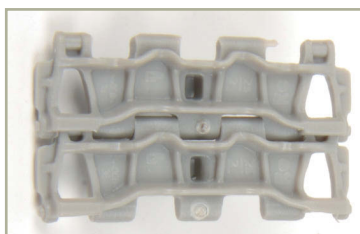
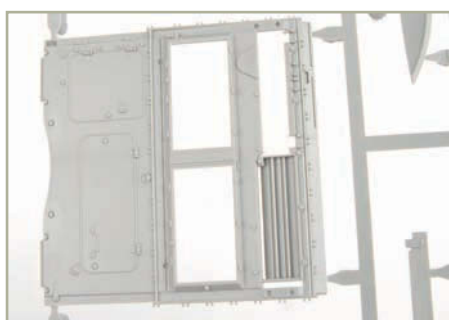
track. The 'In Detail' section is a superb selection of images and diagrams covering everything the modeller might want to add some detailing to, including a full coverage of the interiors and a great section on an engine removal and wheel maintenance. A final section covers the fitting of Nochri mine roller systems which would make a superb modelling project. Top marks again to Desert Eagle, superb reference for the IDF modeller.



Takom 1:35 T-55 AMV and T-55 AM

We'll look at these two brand new T-55 based kits together as many of the main parts and features are essentially the same. Takom have really latched-on to the popularity of the T-55 family, the Tamiya kit has long been the default choice, it was time a new tooled kit hit the market. First impressions are very good with the neatly bagged grey sprues, a bag of track links (ready de-sprued which is always welcome) a small photoetched fret, metal tow cable, clear sprue and decals. A good, clear instruction book and colour booklet of no less than twelve marking and colour scheme options for the AMV (four for the AM) which is produced in cooperation with Ammo. The sprues are all very cleanly and crisply moulded with some excellent detail and features although we do notice Takom use quite distinctive flat-profiled sprue frames and heavy joining gates on some parts. Assembly as expected starts with the lower hull and running gear, the multi-part suspension arms and links are nicely done and could be set to place the vehicle on uneven ground without too much surgery. Tyres, for some reason which baffles us, are separate to the wheel rims (maybe useful if you're modelling damaged or destroyed vehicles?) but look to be a decent fit albeit with more cleanup time with four sprue points per tyre and wheel! Wheels do look very

nice indeed with full hub detail and the caps added later with the leading road wheel appearing to have the larger hub arrangement. The RMSH track links are really nice with only the tinniest of pin marks to clean off. The upper hull comes in three sections (obviously to allow multiple versions) and separate mudguards with the ERA blocks of the AMV kit designed as sections of blocks to ease assembly. Nice touches from Takom are the full plumbing for the fuel tanks and the neat design of the rear fuel drums. The AMV turret looks a complex affair with it's individual ERA blocks each complete with photo etched brackets which fit into locating holes in the turret, if you want to build a 'plain Jane' T-55 or T-55A best wait until Takom's inevitable release or you've a lot of work to do on the turret filling all those holes! The AM version has a simpler turret with cheek armour and both kits have the option of early or late hatch and SGMt MG mount and a flexible vinyl mantlet cover to allow the main gun to move in theory. The possibilities are endless with these Russian workhorses, they've been used Worldwide for decades with constant upgrades and still see combat to this day, great that Takom look like they're poised to exploit this with a whole family of T-55s



Takom 1:35 T-54B

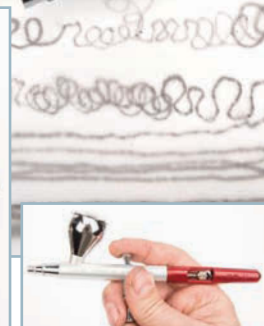
Providing a more basic, stripped-down appearance is the T-54 from Takom with the classic post-war Soviet design in it's purest form. Sharing some of the T-55 kit's sprues, Takom seem to have made sure they've captured the differences well with correct engine deck and choice of road-wheel style. As with the T-55s some modellers may be niggled by the separate tyres and pronounced 'ribs', a minor gripe and easily dealt with. The OMSH track links are again de-sprued and ready to use offering great out of the box build potential with great details. The photoetch fret contains the 'sensible' additions for the T54-55 series, notably the

fender supports and engine deck mesh. A different turret is supplied with the same superb weld detail and subtle cast textures. Take care with the part numbers and stick to the plans as some parts will not be applicable to the T-54 (turret hatches are a good example of this) With the finishing options, again the choice seems almost endless from PAVN, Saigon 1975, Syria and Egypt in the 1970s, Pakistan...it's amazing to think for such a widely used tank this is the first injection-moulded kit in 1:35, and thankfully it looks a cracker! www.takom-world.com



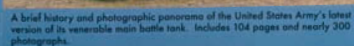
Meng Vermilion Bird MTS-001 Airbrush

To go along with the new Meng range of modelling paints they have now released this stylish-looking airbrush. We have had to opportunity to take this one for a test drive to see how it performs which is really what counts rather than looks. First impressions are that this is a lightweight design, noticeably lighter than my usual brushes as a result of an anodised aluminium alloy body. The brush comes with a generously sized paint cup which can be unscrewed to assist in cleaning and also has a clip-on lid to prevent accidental spillage, something that I never bother with but always wish I did when paint slops over the edge! The brush is fitted with a 0.3mm needle which allows for some extremely fine



line work when used with a suitable paint mix. The needle cap can be unscrewed in the normal way for those who like me prefer to work with the needle exposed and there is a cut out in the handle to allow the needle to be easily retracted to reset a blockage. The trigger action has a little less resistance than I personally like to pull against but this may well suit other users. I ran some MR Paint through the brush to test its performance and as you can see it was happy to produce some very consistent fine lines and of course it will also cover larger areas quite happily! Price wise it sits at around £80.00 according to the UK distributor making it an attractive proposition as a useful general purpose airbrush.

In Detail



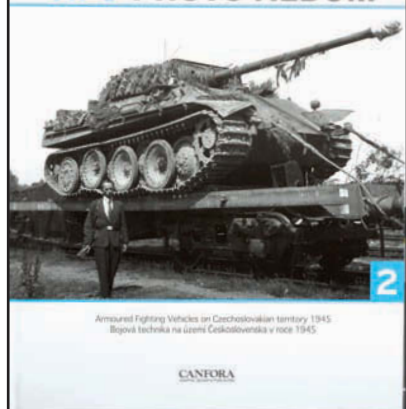
SABOT Publications



A soldier wearing a helmet and camouflage uniform is operating a mounted machine gun on a vehicle. The vehicle is a light-colored, possibly armored, truck or jeep. The background shows a desert landscape with some structures and other vehicles in the distance.



captions with a great selection of M1A2s in service offering excellent weathering reference. Many of the details highlighted in the photo captions, including crew maintenance and stowage, are very informative and will be great features to include on an Abrams project. A concise development history and colour profiles with scale drawings (done in collaboration with Meng) complete this very worthwhile reference which we'd recommend to anyone planning an Abrams build or with an interest in modern U.S. armour.



Petr Dolezal, Marek Solar, Vladimír Kos
Published by Canfora
Hardback format, 176 pages, English / Czech text.
ISBN 978 91 98232523
www.canfora.se



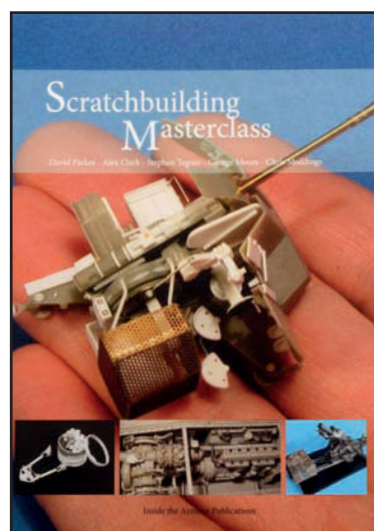
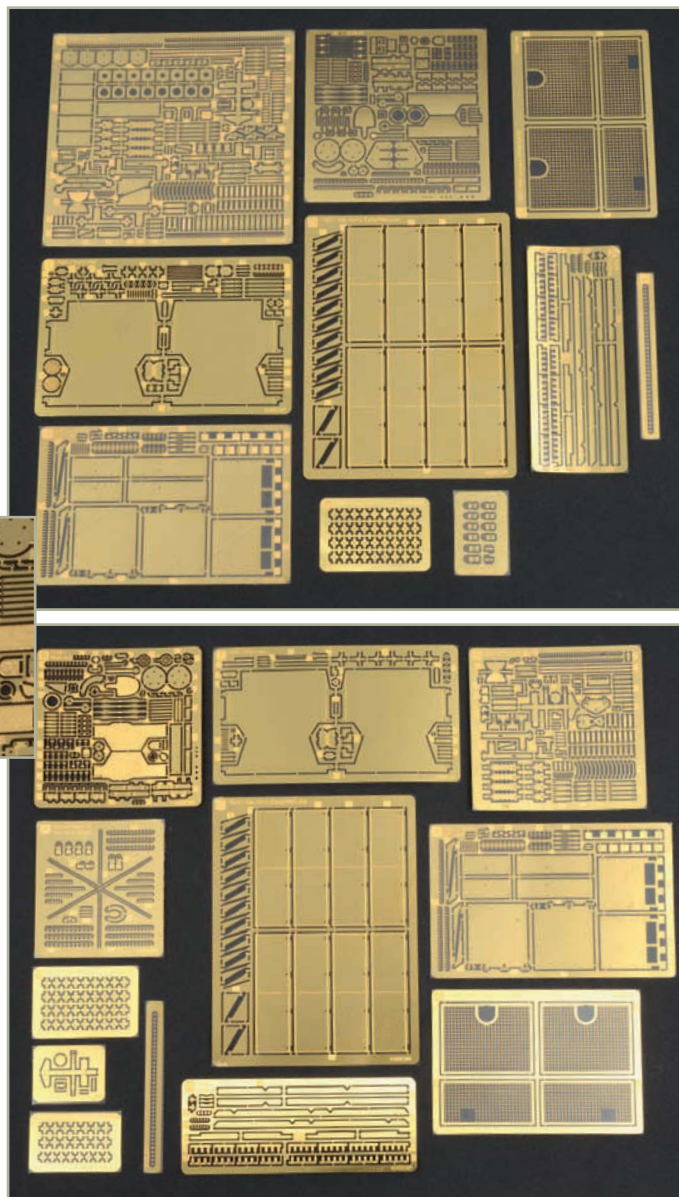
text. The photographic quality varies but every shot has a story and reason for inclusion with some very deep research evident throughout presenting fascinating incidents and the obvious desperate struggle of the German forces retreating in the final weeks of the war with some very unexpected vehicles being pressed into use providing great modelling subjects. For further inspiration, a selection of beautifully rendered colour profiles are presented of some of the more interesting subjects from the photographs. A very interesting and nicely presented book, as was volume one.



Rochm

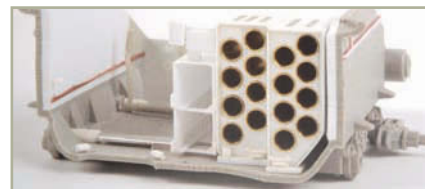
New to us are Rochm Models, specifically their very impressive photoetched sets. Beautifully presented in a CD type wallet, the frets are a nice manageable size in various weights of brass to suit the parts in question. The quality and details of the etch are superb with a quite different approach to some elements (for example fold-up padlocks look to have a better dimension than we've seen before). The instructions are based on sharp photography of the assembled parts and are very clear and well designed. Our two sample sets are for Dragon Tiger I, AF35A03 for the late production and AF35A04 for the early. No less than ten sets for the Tiger I are available, some just covering certain items such as side skirts. These two sets give you all of the finer brackets, handles and smaller fittings plus full mudguards and skirts, exhaust covers and engine deck mesh with some obvious in-depth and accurate research.

There's a lot on offer to please photoetch fans at www.rochmmodel.com



Scratchbuilding Masterclass

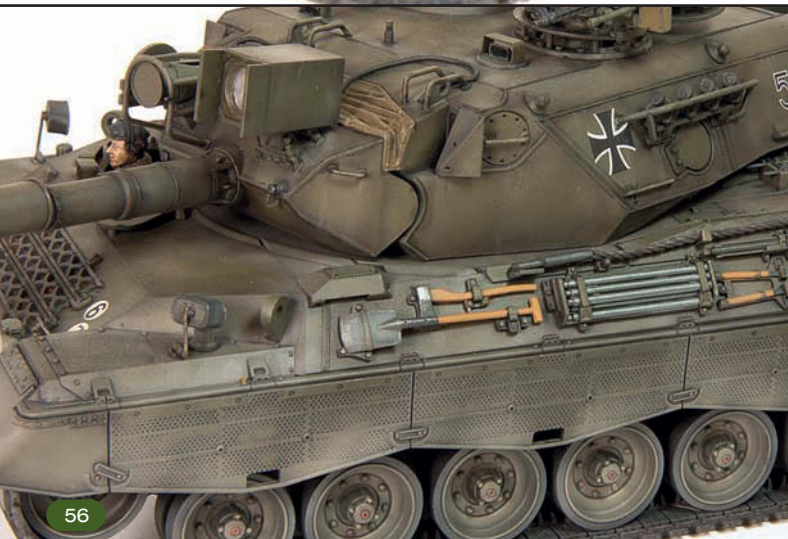
David Parker, Alex Clark, Stephen Tegner, George Moore, Chris Meddings
Published by Inside The Armour
Softback format, 94 pages
ISBN 9780 9932 5881 7
www.insidethearmour.com



With the quality of injection moulded kits on the market these days, scratchbuilding may have been in decline over the last decade but it still remains one of the most admired and satisfying aspects of our hobby. ITA's Chris Meddings is a great advocate of the art of modelling from plastic stock, metal tubing, brass and your own intuition and reference which has led him to collate the work of four of the most admired scratchbuilders at work in modelling (including our esteemed Editor!). With scales from 1:72 to 1:15 covered and everything from tool basics to the most complicated constructions and resin casting there is a wealth of knowledge and skill to draw on if you want to enrich your modelling by super-detailing or create something bespoke. If you only get as far as admiring and marvelling at the work within this book, it's very much worth a read as I'm sure even the authors have learned something from each other; it's packed with tips and tricks throughout and covers everything you might want to know to create your own bespoke masterpiece (or even just add some rivets!) Purchase direct from www.insidethearmour.com

COLD WAR CAT

SEAN M. LYNCH



GETS ALL NOSTALGIC BUILDING MENG'S LEOPARD 1 A3

Like most of the readers I started building models when I was a kid. I of course remember reading Shepard Paine's books and marvelled at the incredible techniques of washes and dry brushing and actually painting the whole tank with an airbrush, an expensive luxury in the early 1980's for a kid. One Christmas when I was somewhere around 12 years old my parents gave me an airbrush, and air compressor and the 1/35th scale Tamiya Leopard 1A4. Needless to say I went to work building and painting the, kit, my first one with the airbrush. In addition to using an airbrush, this was the first time I performed dry brushing (washes wouldn't happen until much later in life) on a model. The feeling of finally being able to do something like one of my inspirations had done was

overwhelming. Although that kit would get lost in the course of life, I still think of it to this day.

Meng decided to release a current standard version of the Leopard 1 A4 in 2013, though they offered the option of building either the 1A3/A4 versions since they share the same platform.

Remembering my joy with building the Tamiya Leopard 1A4 I quickly bought the Meng offering and then promptly put it in the stash with too many other hastily purchased kits.

I built a few other armour kits from Meng after buying the Leopard 1A3/A4 and was very satisfied with detail, quality and the engineering of the kits. When going through the stash after a complex build I was drawn to the Leopard 1A3/A4 and began work.

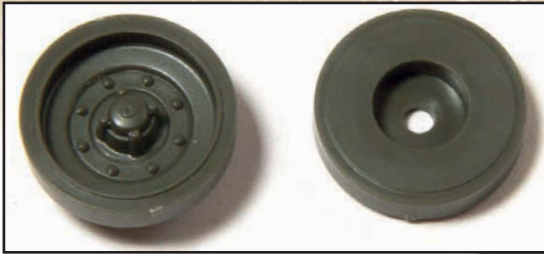
The modeller will need to quickly decide which variant of the Leopard 1A3/A4 to build. The kit instructions have the builder choose from 4 options if building from the box; and A3 without the PZB200 sight from the mid 1980's, an A3 from the 1970's/early 1980's, an A4 or a Greek Army A4. I eventually decided upon the A3 variant from the late 70's/early 80's. I found the A3 version with the PZB200 sight visually interesting and decided that would be my choice.

There has been some criticism of certain aspects of the Meng Leopard 1A3/A4. These criticisms are correct, though some are very nitpicky for the average builder and some may or may not matter. I will take a look at the biggest issues.



BIG CAT KIT

The first issue that will be the most visible and not easily fixed without spending more money is the road wheels. The rear of the road wheels have no detail but these will be hidden for most applications with just a bit showing on the idler wheel. On the front of the road wheels the hub is a bit oversized and the cut from the rim to the disc of the wheel is a bit too sharp. The latter will be hard to notice, but once you look at pictures it will be fairly obvious the hub is too large. There are replacements from aftermarket companies. Meng responded to this criticism as well and fixed the hub size on the Leopard 1 kits released after the A3/A4. I decided early on though that I would fix any minor items with the kit and not buy any aftermarket to save some money. I also felt that while they are incorrect, unless you specifically know what you are looking at, the kit provided wheels are adequate.



The suspension is simplified, especially the shock absorbers which are moulded in place and never actually touch the corresponding suspension arms. The swing arms are also simplified and are missing the central axle connection detail. However, unless you plan to leave off the side skirts these issues will be hidden from view. There are some tabs toward the back under where the grills will be located. These are to help in attaching the side skirts but only need to be removed if the skirts are left off. Also, a bilge port is missing under the exhausts, but these are

hidden by the skirts as well. A final issue that I feel worthy of mention is missing welds on the hull. These occur where the upper and lower hull meet as well as some around items such as the grills and tail light covers. The welds where the upper and lower hull meet are quite prominent and should be simulated. In addition I encountered a bit of a gap on the rear that need filling. All welds were simulated using Archer Fine Transfers resin weld fine details which are applied like decals.

While it may appear like a fair amount wrong with the kit, as discussed most of this is easily addressed. What is good about the kit is very good and there is a lot more of the good versus the bad. Meng has chosen to use torsion bars to attach the swing arms. While these are fixed in position, they are flexible enough to allow the suspension to be workable. This allows for easy dynamic positioning on terrain if desired. The engineering of the parts ensures that there will be no "floaters" on level surfaces.



The kit provides the option of using vinyl tracks or plastic link and length style tracks. The detail on both is excellent, but cleanup will be needed on each of the plastic links. Also, the link and lengths are not workable and a jig is not provided so care will be needed when assembling each track run. The vinyl tracks are a bit tight and will pull the flexible suspension front arm and last arm up due to the tension. There are two solutions to this. The first is to glue the arms in position. The other is to cut the track length down so that it goes around the idler and sprocket only and then glue (the tracks can be glued with Tamiya Thin Cement) the track in place. This is what I

did and works as long as you have the side skirt installed.

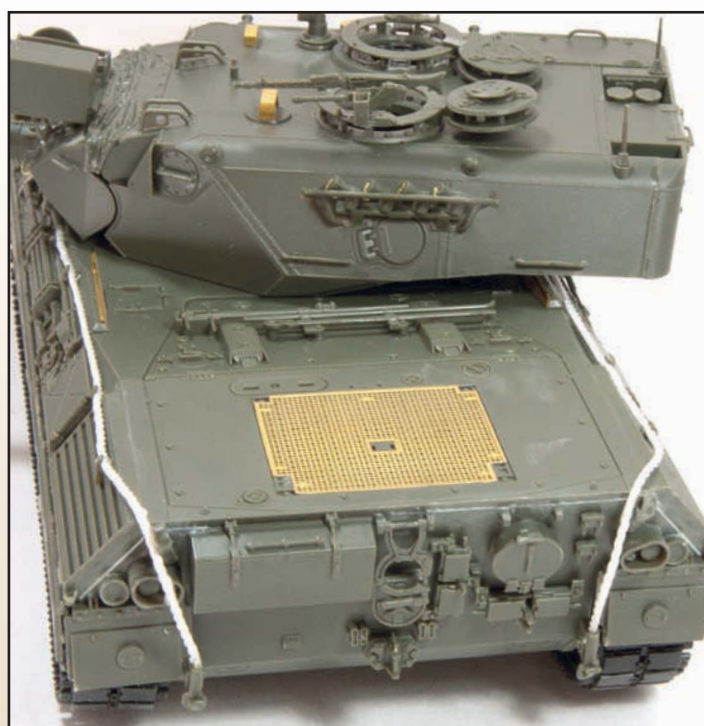
The detail on the remainder of the kit is excellent. The build itself is quick OOB once you decide on which version to build. The tools really stand out and are just gorgeous plastic engineering. This is very important on the Leopard 1 as there are a lot of tools on the sides of the hull as well as on the engine deck.

While the kit is missing the welds at the front and the rear of the hull, the welds on the remainder of the hull are included. The turret is a welded hull and all of the welds are there as well. Some of the welds may need to be touched up to more closely replicate the real vehicle, but this will be up

to the individual on how exact in their detailing they wish to go.

Clear plastic is provided for periscopes and lights. The searchlight can be displayed open or closed (the kit provides separate pieces for the option). The searchlight lens is faithful to the real thing as well. The light lenses were painted prior to installing the plastic covers and these were masked prior to painting.

The 105mm detail is spot on, and even though it is a traditional two part barrel (plus the muzzle) the engineering is near perfect with little clean-up of the seam needed. While aftermarket barrels are available, they are not needed.



The smoke mortars are very nicely done for 1:35 plastic, though the attachment point to the sprue is in the center of the barrel so careful removal and clean-up is required. I did add PE chain (not included) to dress up the smoke mortars. PE chain was also added to some mantlet plugs.

Meng has accurately captured the dimples on the side skirts. The depth of the moulding of the dimples appears spot on. These add a very nice touch to the model. The skirts will need some filling where they meet the front mud guards.

An option for the Greek style engine air intake is provided along with the standard style of air intake. PE is provided for either version of the air intake screen as well as periscope covers and some miscellaneous items. A string is included for the tow cables. This is an improvement over moulded tow cables, but a wire tow cable may look more the part.

The cage for the PZB200 is one piece. The moulding of the cage is just exquisite and is one piece. The PERI R12 parts look nice as well and while the cage for that is multi-part it just builds up easily. You will need to remove guide pins from the turret for parts to the option not used on your build. The cables for the searchlight and the PZB 200 (if used) are not provided. Lead solder (0.032 inch diameter) was used for the cables.



COLD-WAR COLOUR

The enjoyable challenge I found with building this kit was trying to replicate the West German Army Gelboliv (yellow olive) found on their equipment from the inception of the West Germany Army until the introduction of the NATO 3-tone camouflage. Photos of vehicles in service show them to range from more olive brown to a very dark green. This is due to lighting, exposure and processing of the film from the time. Indeed I would have trouble getting my digital camera from not seeing the tone to be too green in my photo both lighting versus what is seen with the naked eye in normal lighting. However, based on the majority of photos, articles and first hand feedback on forums the olive brown tone would be correct. My first attempt at matching the West

German Gelboliv was to use Vallejo Model Air Yellow Olive (71013). This was too green and was close to Tamiya Khaki Drab. The instructions call for the use Vallejo Dark Green, which would be farther off the mark. I returned to my paints and trialled several colours to get a match to the Gelboliv. I finally settled on a mix of Ammo of Mig Green Khaki (KHS-5146) and Black (MS-17) in a 10:4. I like to add shadows and highlights to the base paint colour using oil paints. This is not in the usual manner of liquid filters or the oil dot technique. Instead I prefer to paint them onto a semi-gloss surface with a brush and then use a dry brush to blend them in with the paint. I find this creates nice variations in the model and creates a bit more character to the model. This is

usual done prior to performing washes but I may do this before or after the decals are applied. I also mapped lightened variations of the base colour to items such as bolt heads, handles and other various details with acrylics to start to build contrast on the vehicle. Certain items such as the PZB200 and searchlight were painted different shades of green while small details such as bolts were painted a lighter shade of the base colour. This begins my process of adding visual variation and interest to a solid coloured vehicle. The vehicle was given a semi-gloss coat and the decals applied. Note that the power cable for the searchlight has been added, though I wouldn't catch the need to add the cable for the PZB200 until almost the end.

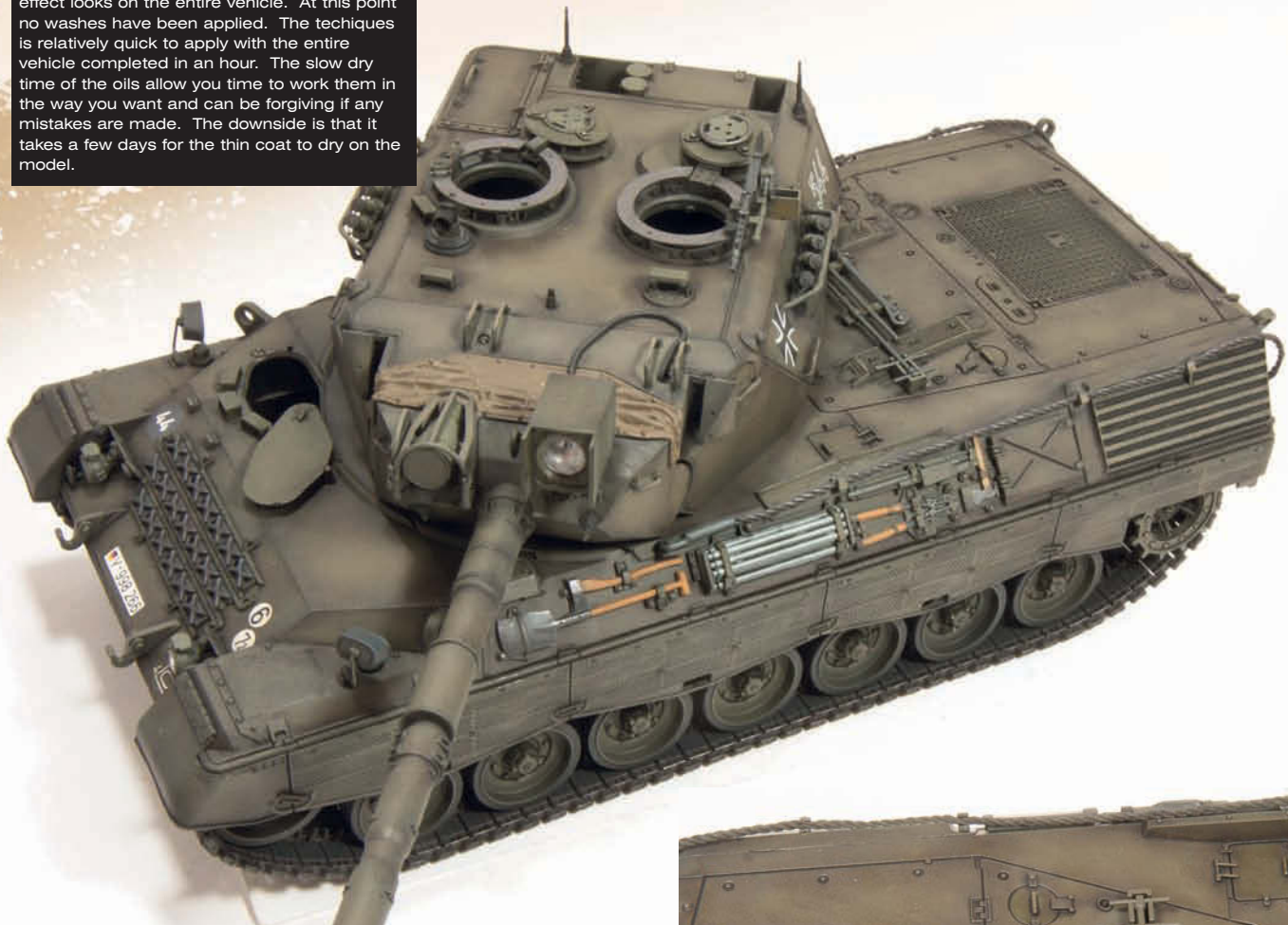


Dark brown oil paint has been roughly painted into areas of shadow.

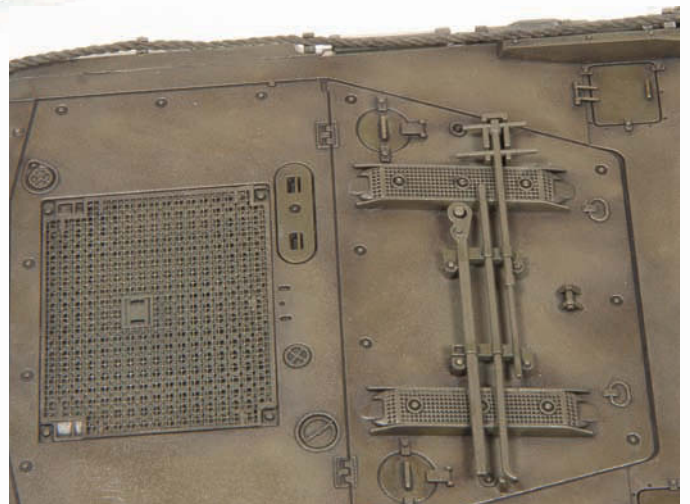


The excess dark brown oil paint has been removed with cotton swabs and the remaining paint blended in with a dry brush to create shadows and panel borders.

An overall view of the vehicle shows how the effect looks on the entire vehicle. At this point no washes have been applied. The technique is relatively quick to apply with the entire vehicle completed in an hour. The slow dry time of the oils allow you time to work them in the way you want and can be forgiving if any mistakes are made. The downside is that it takes a few days for the thin coat to dry on the model.



I wanted to lighten up the highlights of the vehicle while still maintaining the brownish-yellow tint but not drastically alter the underlying base colour. I decided on using a dark yellow oil paint painted in very small amounts randomly in the highlights.



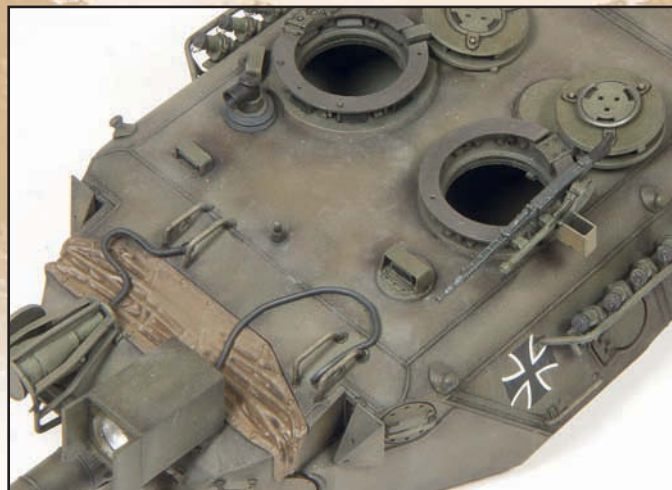
Once dry the oils were sealed in with satin varnish. A black pin was applied to the details and recesses to add one more layer of depth to the vehicle.



I decided to be very restrained on the dirt accumulation based on a Tankograd reference from the REFOREGER exercises. I also wanted to keep it as simple as possible in the application of the dirt. I started by airbrushing a thin mix of Tamiya Flat Earth (XF-52), Buff (XF-57) and a bit of Deck Tan (XF-55) in the areas of accumulation seen in the reference.



I wanted to add just a touch of dust to the upper surfaces that would be randomly accumulated. While I already airbrushed the prior dust mix to the some areas, I find it too easy to overdue the dust accumulation randomly in this manner. Since it is acrylic it is also difficult to remove if a mistake is made. I therefore used similarly dirt colored enamel paint, in this case Wilder Brown Mud Spatter (NL29). This was randomly painted in spots on the upper surfaces as well as some streaks on the sides



After drying for a few minutes, the enamel is stippled and blended with a brush lightly dampened with mineral spirits. This created a slightly dusty effect that doesn't overwhelm the underlying paint.

With the painting of the vehicle done it was time to add dirt and grime. The question became how much. I was relying heavily on the Tankograd Militarfahrzeug Special #5020, "Vehicles of the Modern German Army-Bundeswehr - during the REFORGER Exercises 1969 to 1993". Most of the Leopards were relatively clean, even considering that they were in field exercises. If they did have mud it was concentrated to the running gear and rear of the hull with a bit on the side skirts. Having put a fair amount of effort into

trying to match the Gelboliv, I decided I would be very restrained with the dirt accumulation. I modelled this after one particular vehicle in the Tankograd title. Since I had modelled the vehicle with the hatches open, I wanted to add some figures to the vehicle. Unfortunately, there are not many options for Cold War Era West German tankers. Most of what is available are figures from

kits such as the 1970's era Tamiya German vehicles, and these are not exactly great. I did have some the older vintage West German kits with figures in the stash. These could be modified to current standards, but I honestly didn't feel comfortable in my ability to sculpt the needed modifications to the existing figures. Luckily I was able to find a company called Valkyrie Miniatures that has a set called "West German Army Tank Crew (Duestches Heer, 1970-80 Era, VM35006)".





While there are a few issues with the kit, those that are visible can easily be addressed. I did leave the kit wheels installed and feel that the errors they show really aren't a distraction. I found that the few issues do not detract at all from what is a very nicely detailed and a fun to build kit. With a few tweaks this kit makes an excellent Leopard.





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