World War One Aircraft Models

I have always held a fascination with early military aircraft. After serving for 27 years in the Royal Air Force, I became a Military Aerospace Technical Author. Although, as most modelers, I got involved in the world of construction kits at an early age, I stopped for most of my service career and for some years afterwards.

I started modeling again a few years ago and now enjoy the challenge of building aircraft of World War One. Since posting photographs of my completed models online, several people have asked if I would create a 'build log' for future builds.

I don't consider myself a 'master' of this craft, but hope to be able to pass on what I have learned. As such, here is my build log, which covers my build of the 1:32 scale model of the DFW T28 'Floh' from Planet Models.

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Completed: September 2017

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INTRODUCTION

Before I start with the build log, I'd like to show how I've set up my work area. I prefer to keep the work area as clear as I can (I've lost too many small items in the past). I think it's important to have the tools etc you need ready to hand and other, non-essential stuff tucked out of the way until needed. I'm lucky in that I have my 'man cave', which is sorted into a modelling area, airbrush spray booth in addition to my work station PC, games PC and games console.

Sorted 

AFTER MARKET

Figures

Mechanic from Model Kasten Box set (AM-63 F-6 2500).

Civilian Figure from MiniArt Box Set (French Civilians 38004)

Photo-Etch (PE)

JadarHobby Shop - Part No.48087 (1/48)

Rigging accessories

GasPatch Elite Accessories Turnbuckles

Albion Alloy Micro-tube (Brass or Nickel Silver),

'Steelon' Mono-Filament 0.12 mm diameter.

Sundries

Paints (MRP lacquer paints, Tamiya and Humbrol Acrylic, Mr Metal enamels),

Microscale's 'MicroSet', Alclad II Lacquers,

PVA Adhesive, Cyanoacrylate (CA) glue (thin),

Super Fine 'Milliput' putty (white).

'Krylon' acrylic sealer.

PlusModel Lead Wire (0.3 mm diameter).

Weathering mediums

Flory Clay washes, Flory Pigments, AK Interactive engine washes,

Tamiya Weathering Master (Set E).

Display Base

Model Scene Grass Mat, sharp sand, purpose built Acrylic base and cover,

Etched Plaque (name plate).

PREFACE

The pilot:
This aircraft was only ever a prototype and never went into production. The kit instructions state that test flying was carried out by Lt. Hoefig, a pre-war exhibition pilot.

The aircraft:
References: Various on-line data and the Windsock Mini Data file No.18 by Peter M Grosz.

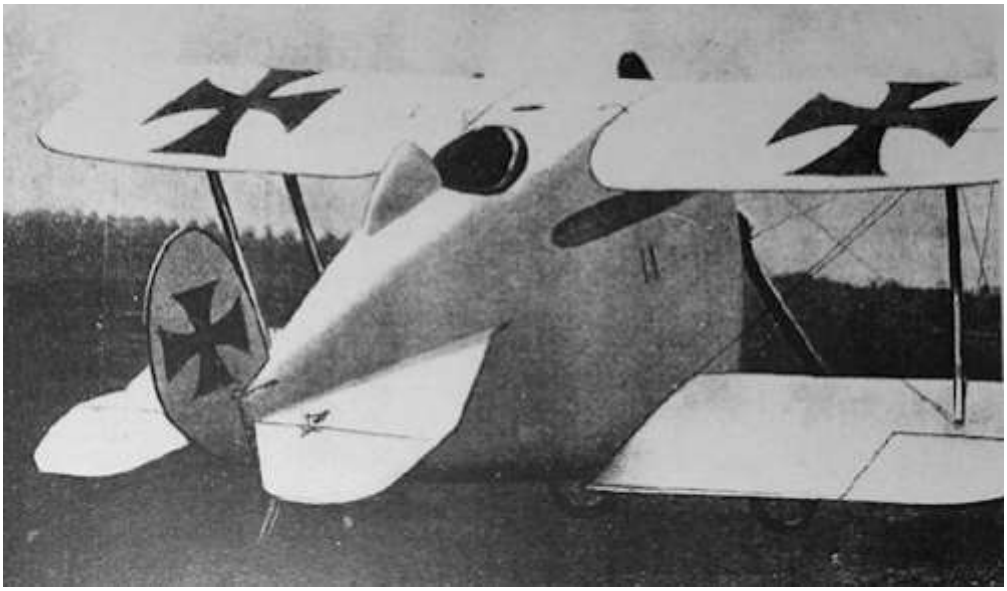
This model represents the Deutsche Flugzeugwerke GmbH (DFW) T28 Floh (Flea), a prototype fighter of late 1915. It was designed by Hermann Dorner, the Chief Engineer of the Flugzeugwert Lübeck Travemünde Company, which was a branch of DFW. The aircraft was intended to be a high speed fighter to replace the current front line fighters. Hermann Dorner later designed several successful Hannover aircraft, including the CL.II two seater aircraft of 1917.
Originally the 'DFW T28 was to achieve high speed by reducing drag through less reliance on rigging and supporting wing struts. The initial design included cantilever wings with no support struts and internal wing fuel tanks and radiators, internal control for ailerons, no engine external exhaust stubs. The engine and a single machine gun were to be fitted inside the fuselage. However, by the time it reached prototype stage, official disapproval meant that it required more standard wing design with rigging and support struts, although less than contemporary aircraft of the period. The nickname 'Flea' came about due to the small size of the aircraft and its general appearance.

Its specifications were:
Length 4.5 m (14ft 9in)
Wingspan 6.5 m (21ft 4in)
Wing Area 15 m² (160 sq ft)
Empty Weight 420 kg (926 lb)
Gross Weight 650 kg (1,442 lb)
Maximum Speed 180k/h (112 mph)
Engine Mercedes D.I water cooled in-line piston 75 kW (100 hp)
Propeller manufactured by 'Behrend & Ruggebrecht' ('Axial' decals used)
Weapon single fixed 7.92 LMG 08/15 Spandau synchronised machine gun.

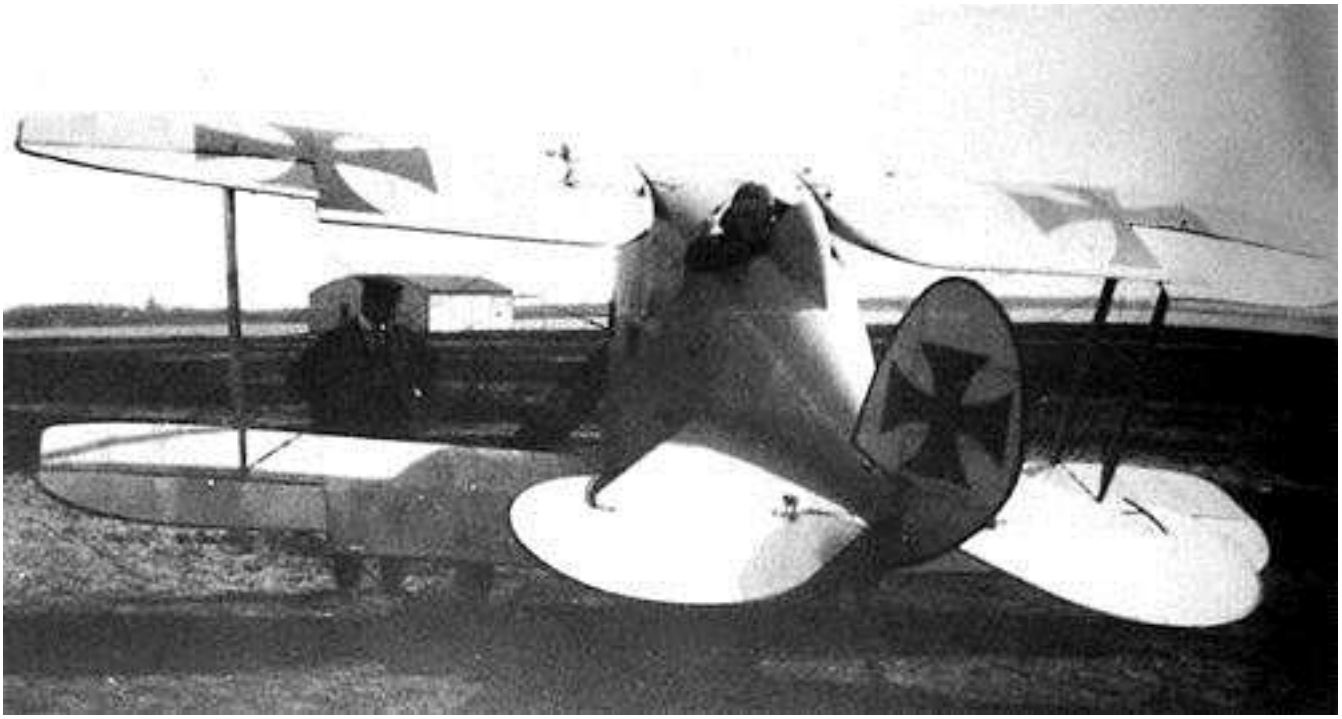
The final construction of the aircraft was as a single bay (parallel struts) bi-plane of linen on wood structure and was fitted with a small, fixed undercarriage. The in-line engine drove a two bladed propeller at the nose of the aircraft (tractor not pusher). Initially the aircraft was fitted with a non-balanced elevator, but initial test flight, was modified with an aerodynamically balanced elevator.
The DFW T28 attained a top speed of 180 k/h (112 mph), which exceed the maximum speed of the front line fighters at the time, such as the Fokker Eindecker series. However it proved difficult to land, due to its small and narrow fixed undercarriage, the height of the thin cross sectioned fuselage and the fact that the pilot was seated high in the fuselage and had bad forwards/downwards visibility. This soon became apparent when, on the first flight, the aircraft was damaged after an extremely hard landing.
Despite achieving its primary aim of high speed flight, unresolved problems, poor pilot visibility and frail undercarriage, resulted in the aircraft not being accepted by the Military Commission for production into service.

The DFW T28 'Floh' remains a curiosity of WW1 aircraft design.

The photograph below is of the initial prototype, as can be deduced by the early non-balanced elevator construction.



The following photographs are of the later prototype, fitted with an aerodynamically balanced elevator.

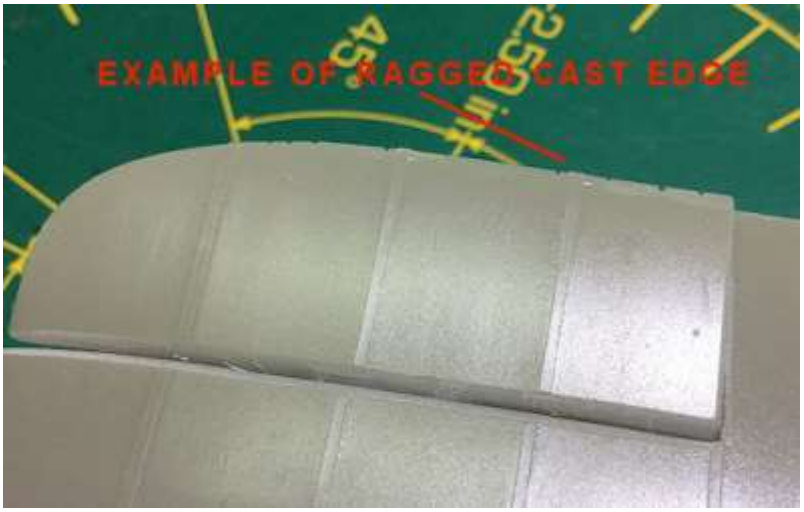


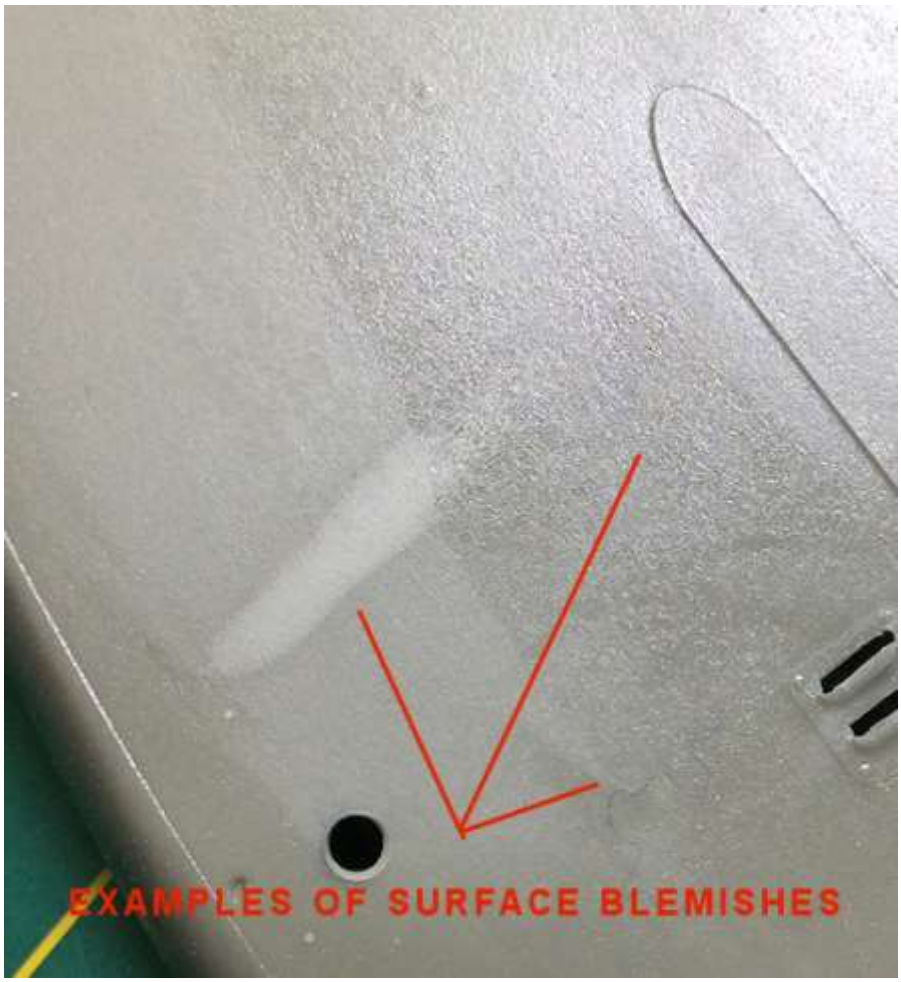
The following photograph illustrates well the lack of forward and downward visibility experienced by the pilot.

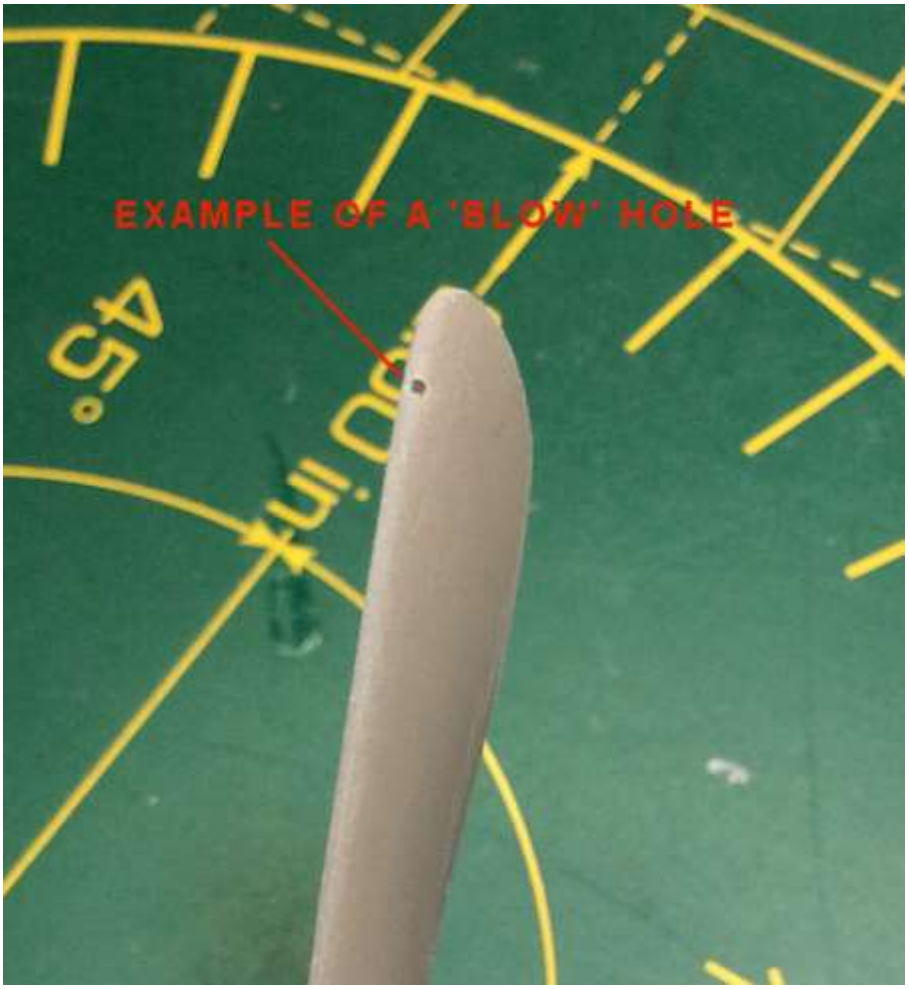
WORKING WITH RESIN

This Model is made from resin, as opposed to the normal plastic used. The reason for creating resin kits is that in years gone by, resin kits were able to produce much finer detail on kit parts than the plastic kit equivalents. Even today, there are many producers of resin kits and particularly after market replacement parts. However, plastic kit manufacturers have come a long way now and kits, such as those from Wingnut Wings, are equal to, if not better than resin kits. Manufacturers of resin kits these days tend to make kits to order or have 'limited' runs, although aftermarket parts are usually readily available. Working with resin does present different challenges to the modeller, especially if it's the first time of building a resin kit. The properties of resin differ radically to those of plastic kits. Below I have listed what I have found to be the primary differences for resin kits from plastic kits:

1. When resin kits are cast in their molds, a release agent is applied to enable the cast resin parts to be more easily removed, which is similar to plastic kit molding. This release agent can leave a film on the surface of the kit parts, which, if not removed, can prevent paint or adhesives from adhering to the surfaces. The easiest way to remove this film is to carefully, but fully wash all of the model parts in warm soapy water, using an old, soft tooth brush. Then rinse all of the parts thoroughly and leave to dry.
2. Resin, by its nature, is very brittle and can be damaged or broken easily, especially when handling small parts. This is particularly evident when separating the individual items from the resin cast. The best way to remove item is to cut them away with a razor saw, then clean them up afterwards.
3. Resin casts will normally create 'resin flash' around or amongst parts, especially small items. Thin flash is easily removed with a sharp scalpel blade. Heavier resin cast can be scraped, filed or sanded away.
4. Plastic kits are assembled using solvent adhesives, which melt the surface where it is applied and 'weld' the joint together. Resin however will not react to this type of adhesive and can really only be glued using CA adhesive. CA adhesive reacts to moisture in the air and on the surface to be joined, and as most people know, will also bond skin to whatever it touches, if the skin has CA adhesive on it. Obviously extreme care needs to be exercised when assembling resin kits.
5. Cutting, sanding and drilling resin will create swarf and more importantly, resin dust. The dust in particular is dangerous, especially if inhaled. Therefore always vacuum the working area, and yourself, regularly. If you have a face mask and find you can wear it whilst working, then do so. Resin can easily be drilled or scraped, but remember how brittle resin is when it is being handled.
6. It is not unusual to find imperfections in resin cast parts, such as surface blemishes, small 'blow' holes or ragged edges. This is common on resin kits. These can be rectified by sanding/ polishing and/or filling with modelling putty, then sanding/polishing.




EXAMPLES OF SURFACE BLEMISHES

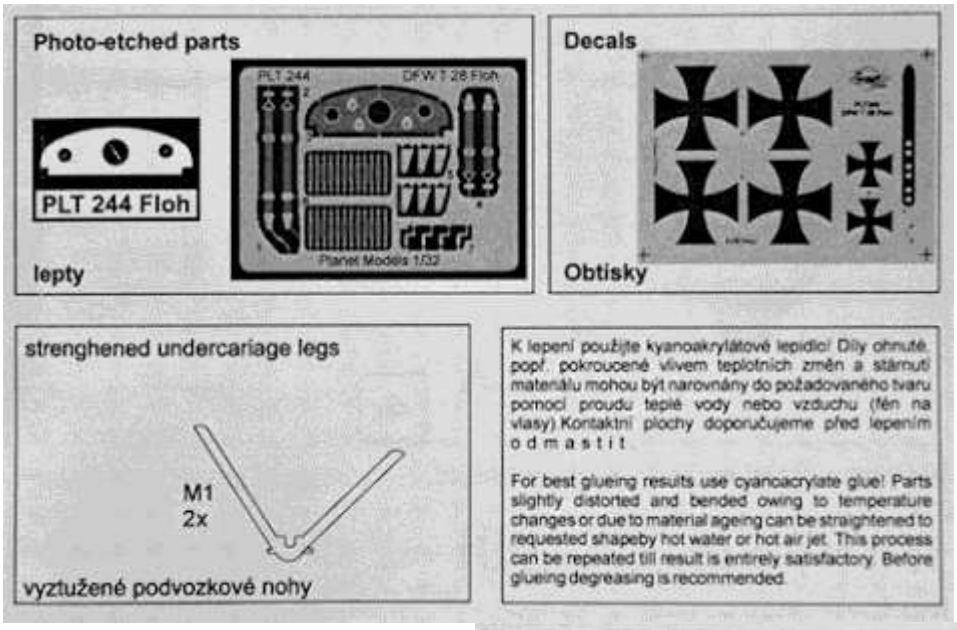

EXAMPLE OF A 'BLOW' HOLE
45°

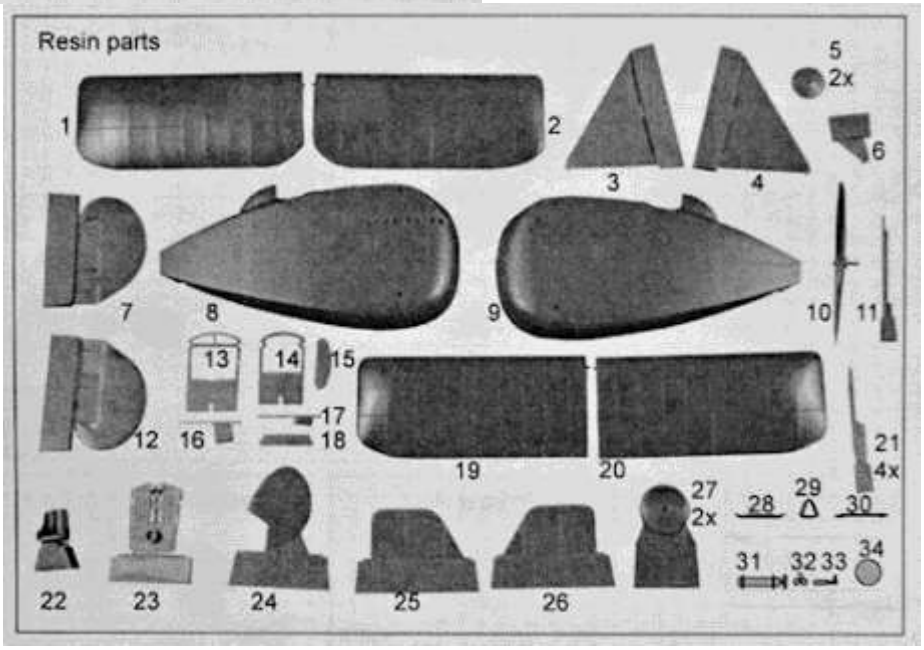
PART 1 - THE MODEL

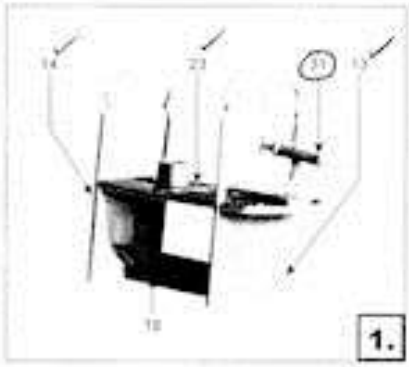
General

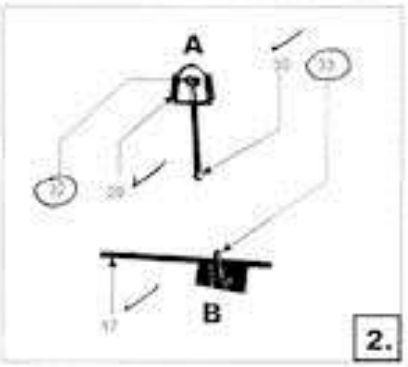
(Planet Models No.244)

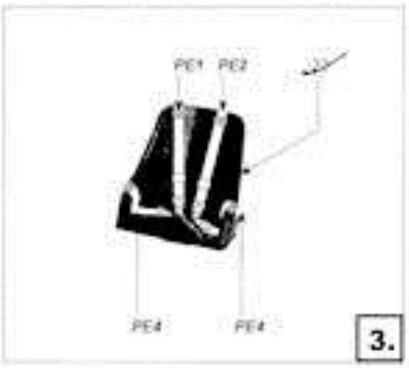
This model is manufactured by the Czech Republic Company Planet Models. The model parts are cast in resin, as opposed to the normally available plastic injection kits. Therefore the modeller must employ different build techniques, such as the use of CA adhesive instead of the normal polystyrene adhesives. Also, being resin, the health risk of inhaling resin dust must be taken into account. At the very minimum, a face mask should be worn and preferably a full face filtered breathing mask. Also cleanliness of the hands and work area are important.
As with most resin kits there is a large amount of 'flash' around the model parts, which must be carefully removed. Resin by its very nature, is brittle as easily broken is mishandled.
The kit provides the very basic components required for the model, all of which are sealed in individual plastic pockets. There is scope to add detail where possible. Also provided are basic external decals, cockpit instruments and photo-etch components. The kit instructions are basic with just two very similar colour schemes provided early and later prototypes.

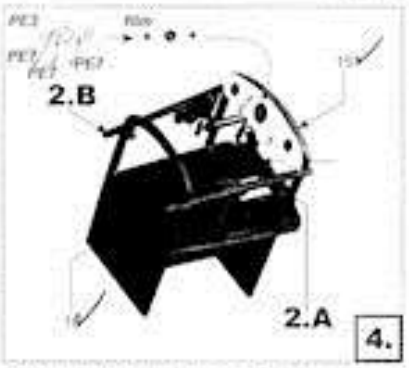


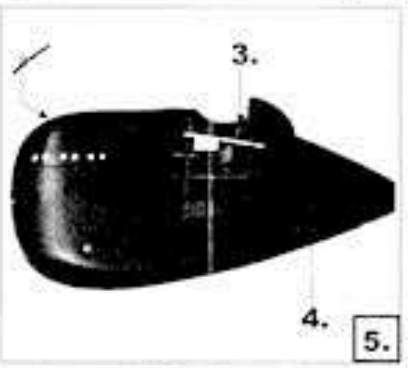


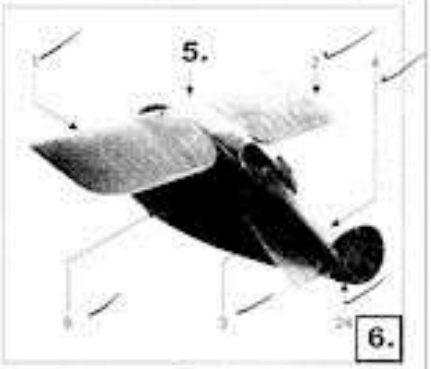












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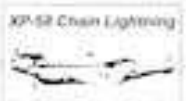

XP-58 Chain Lightning

PLT 163 1/72


GAL-58 Hamilcar X

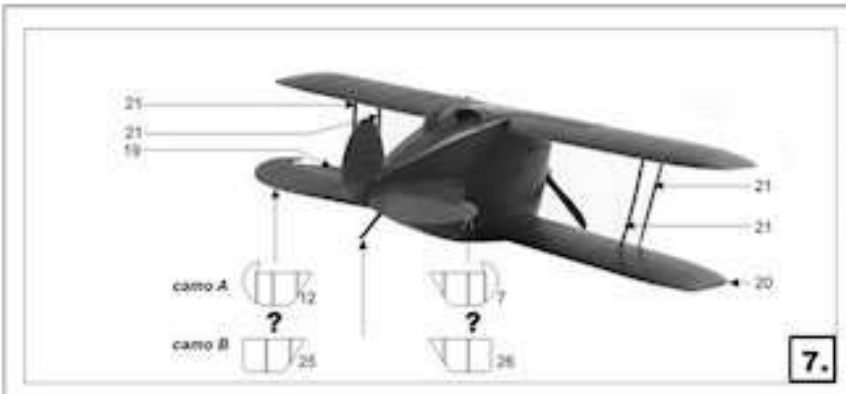
PLT 160 1/72

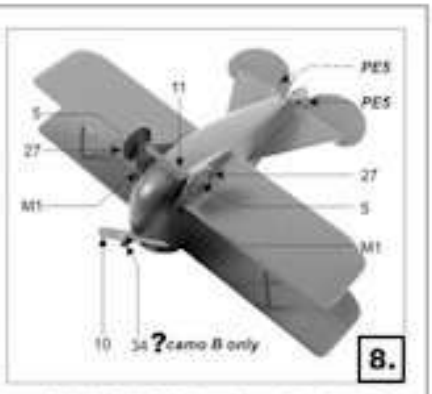

Pilatus Pc-7

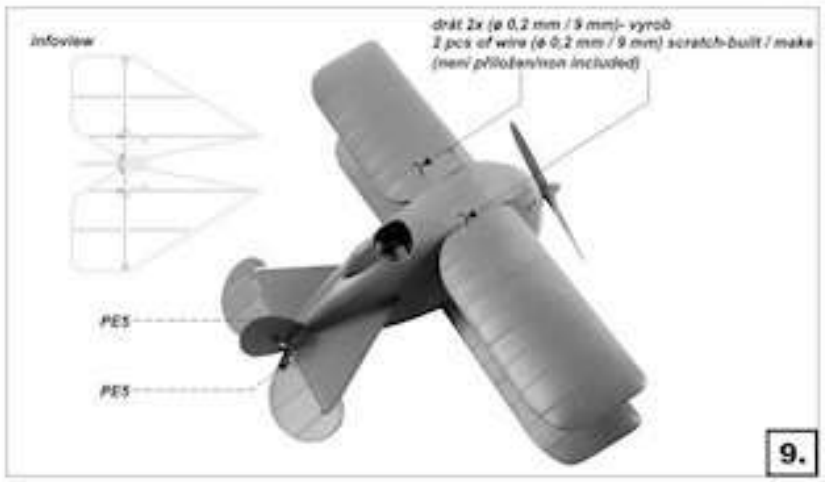
PLT 195 1/72

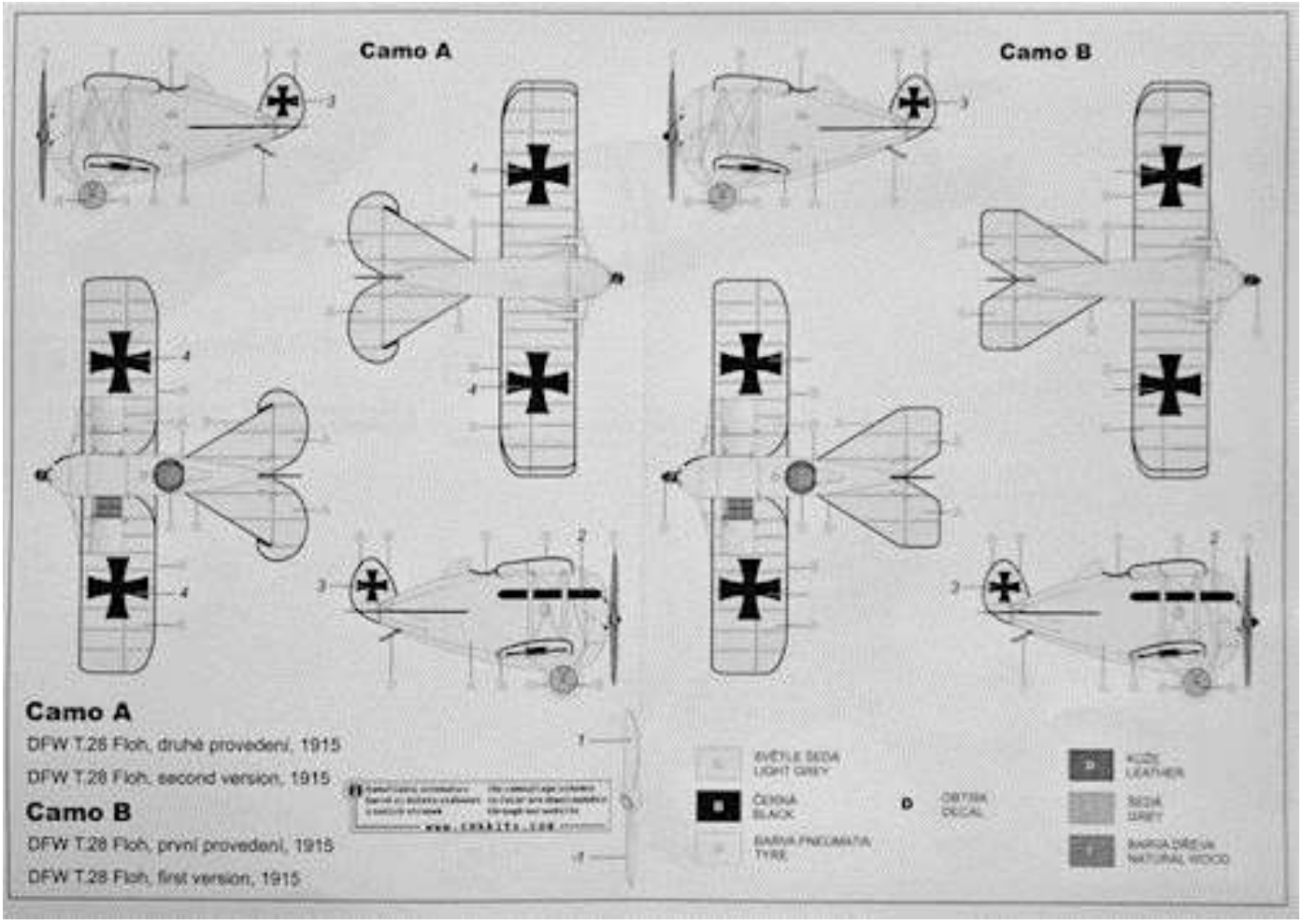

Messerschmitt M.20b-2

PLT 196 1/72









Modifications or Corrections:

Wing attachment;

One area that will give rise to problems is the attachment of the wings to the fuselage. The two fuselage halves are made from very thin and therefore fragile and flexible resin. However, the four wing halves are cast as solid resin and are therefore heavy for their size. A single locating lug is provided forward at the root of the wing halves and locates in a corresponding hole in the fuselage halves. However there is no locator or support for the trailing edge of the wings, meaning the wings may pivot out of position when being fitted. Also the sheer weight of the wings will cause problems against the thin and flexible fuselage halves. The inside of the fuselage will not be visible once assembled. Therefore, in order to give better support to the wings and to strengthen the fuselage halves when assembled, I decided to add a front and rear 'spar' to each wing, which would also pass through the assembled fuselage, keying the assembly together on the spars.

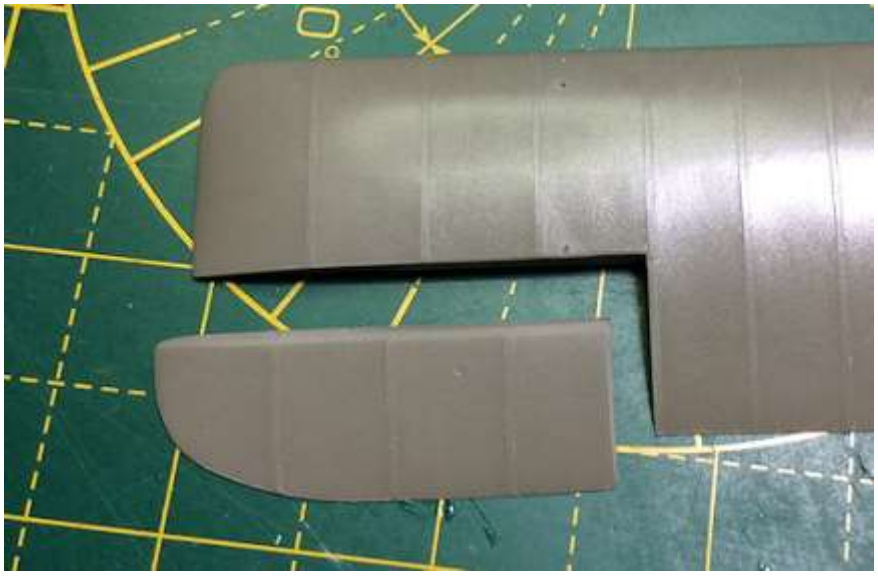
I used 2.0 mm diameter brass rod for the spars, which will support the weight of the wings against and through the fuselage. First I drilled out the existing wing front fuselage location holes, then filed down the wing root locating lugs on each of the four wing halves, just enough to leave an impression of them. Using them as a guide, I drilled a 1.0 mm diameter hole into each wing root, then increased it to 2.4 mm diameter. Then I temporarily joined the two fuselage halves with masking tape. I then inserted a length of 2.0 mm diameter brass rod into the drilled hole in one upper wing half and then passed it through the corresponding fuselage hole and into the same hole in the opposite wing.

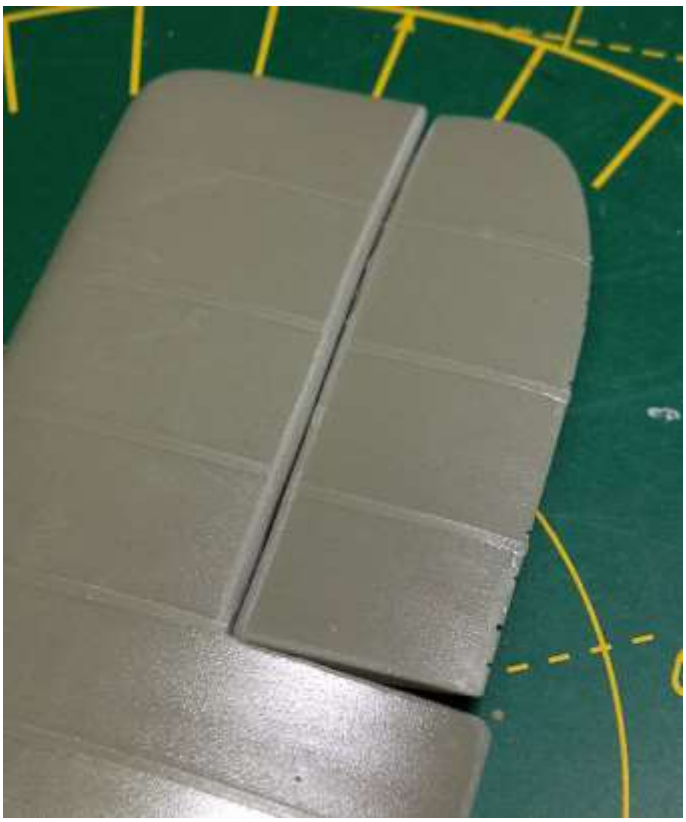
The trailing edges of the two wings were angled down slightly to give the correct ‘angle of attack’ and their outlines marked on the fuselage halves with a pencil. The wing halves were then removed and a hole drilled in each, as before but further towards the rear. I then inserted a short length of brass rod into the new hole on one wing half and inserted the wing into the fuselage half, aligning the pencil outline on the fuselage with the wing profile. I made a pencil mark where the centre of the new hole brass rod was, then removed the wing. I drilled a hole through the fuselage at the marked position. Then I located the wing half, with both brass ‘final’ rod spars inserted through the fuselage and repeated the process for the new hole in the other wing and fuselage.
The same procedure was used for the lower wing halves.
The wings were then temporarily fitted to check for any misalignment, which was rectified by gently bending the brass rod ends to realign the wings correctly. This then gives two brass supporting ‘spars’ through the fuselage to support the wings. As the two kit fuselage halves are cast resin and very thin, they will flex and may be damaged when assembling the model, so when finally assembled, all four wings will have better support and alignment to the fuselage as well as adding slightly more rigidity to the fuselage itself.

Ailerons;

The four wing halves are cast in solid resin, including the ailerons. I prefer to have the ailerons positioned on the wings and this meant cutting the ailerons out of the wings. I first scribed along the pre-molded aileron outlines to provide a good saw line. Then using a fine modelling saw, carefully cut along these lines to separate the ailerons from the wings. Make sure you cut from the wing top side only, as the moulded lines above and below the wings may not align, which can result in two visible cut lines on the separated parts. Once cut, the wing surfaces were scrapped flat using a flat bladed scalpel and the leading edges of the ailerons rounded slightly. Two holes of 1.0 mm diameter were then drilled into the wing trailing edges and ailerons and brass tube inserted to provide support for the ailerons. Using brass tube allows for slight bending to move the ailerons to the desired positions. Finally, using CA adhesive, the tubes were fixed in position in the wing and ailerons.

NOTE: The aircraft had no external control cables or horns for the ailerons, as they were operated by wing internal tubing, in order to cut down on aerodynamic drag.





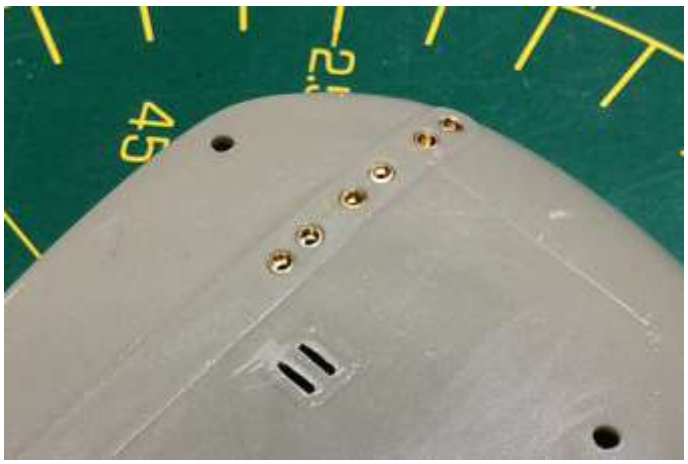
Engine exhaust stubs;

The engine exhaust outlets on the kit starboard fuselage half are filled in with casting flash, which needs to be removed by running through a 3.0 mm diameter drill. I then made basic engine exhaust stubs from 3.0 mm diameter brass tube, hand drilled out to 2.35 mm internal diameter. These were roll cut using a sharp flat edge scalpel. Each was then inserted from inside the fuselage half, through each stub hole and secured using CA adhesive, making sure the stubs were just proud of the fuselage external surface.

Fuselage ventilation panels;

The fuselage sides of the kit have solid cast ventilation louvres. These were carefully drill out at an angle using a 0.4 mm diameter drill and then cut and cleaned up with a flat edged scalpel blade.

Inside fuselage half.



External surface of fuselage half.

Port fuselage side - pilot access steps;

On the port side fuselage half are the pilot access steps, which on the kit part are cast solid. These were drilled inside the step profiles, opened up and then carefully filed to shape.

Upper wing to fuselage fuel pipes;
On the actual aircraft there were fuel supply pipes fitted from the internal wing fuel tanks to the fuselage. Two pipes were located from the wing roots of the top wing upper surfaces to the adjoining fuselage. A third pipe was located a the rear of the port upper wing tank and into the wing (I believe this fed the pipe at the port wing root).
I first drilled three holes of 0.8 mm diameter and into these, secured short lengths of brass 0.8 mm diameter micro-tube. Into these I secured stubs of 0.5 mm brass micro-tube. The pipes themselves will be added later in the build and made from 0.2 mm diameter tinned copper wire. Thin CA adhesive was used to secure these tubes.

Radiator filler;
The filler tube for the radiator in the port upper wing surface is a molded stub on the radiator. I removed this and drilled a 1.0 mm diameter hole into which I fixed a short length of 1.0 mm diameter brass rod.

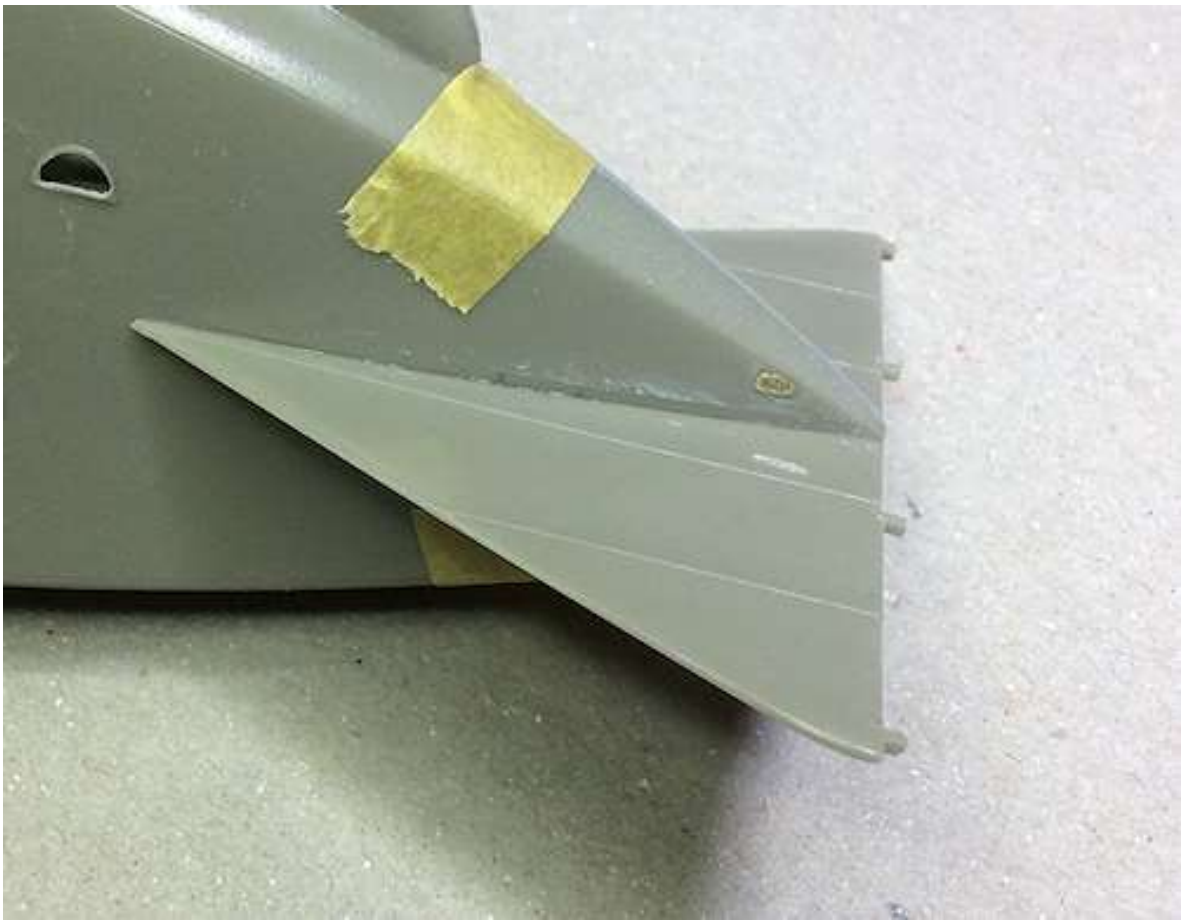
Fuel tanks caps;
There are three fuel caps on the upper wing top surfaces (one on the port wing, two on the starboard wing). The kit parts have these caps moulded virtually flush with the wing surfaces, whereas on the actual aircraft they were slightly raised. To replicate this I used a rotary cutter to created six small discs from 0.2 mm plastic card. The diameter of these discs matched the internal diameter of the pre-molded tank caps. One disc was secured into each fuel cap, using thin CA adhesive. The a second disc was added on top of each, using Tamiya thin adhesive. To replicate the 'turning' head on each cap, I used short lengths of 0.2 mm diameter nickel-silver tube, held in position with PVA adhesive.

Wing Strut locations;
The kit wings are created in solid resin and have only shallow locations for each of the four wing struts (2 each in the lower wing upper surfaces and upper wing under sides). I drilled these out using a 0.8 mm diameter drill as this would provide a more location for the ends of each wing strut.

Missing Control Cable Outlets;
The starboard fuselage half has at the tail, three moulded outlines for the rudder and elevator control cables. However the port fuselage half has only the lower elevator outline and the upper and rudder outlets are missing. Therefore I scraped away all of the outlets on both sides and attached photo-etch outlets from the JadarHobby Shop - Part No.48087 (1/48) set, using thin CA adhesive. Then I drilled holes for the cables into each, at the correct angle, using a 0.4 diameter mm drill.
NOTE: The control cable ports in the two tailplanes also need to be drilled through.

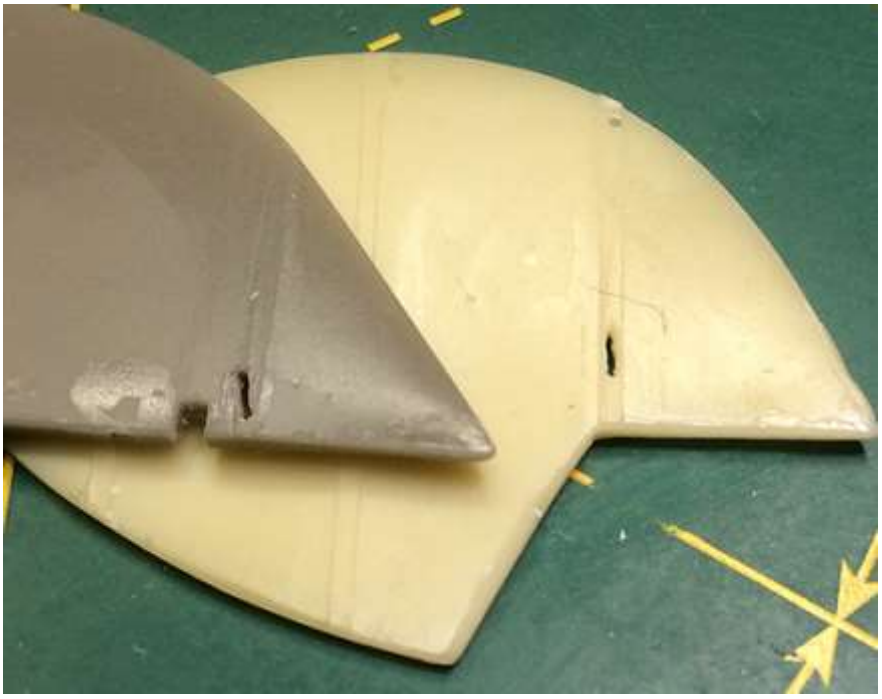
Attachment of the tailplanes:
The kit has the two sides of the tailplane, but neither has any locating lugs etc, to locate and attach them to the fuselage. All there is on the fuselage sides are thin guide lines, pre-moulded into the fuselage sides to indicate where the stabilizers should be fitted.
However there is a central area on each stabilizer that can be seen before the stabilizer is removed from the resin cast. I decided to use this as the location lug into the fuselage half. First I used a modellers saw to cut the stabilizer from the cast block, making sure to leave the central lug intact. Then I lightly scraped the inner edge and central lug, using a flat scalpel blade. I laid the stabilizer on the fuselage half, inline with the pre-molded guide line and with a pencil, marked where the locating lug was located. Using a 0.8 mm drill, I drilled a row of holes along the guide line, aligned to the pencil marks. Then I carefully drilled through the holes at a shallow angle, to join the holes together. After this I used a 1.0 mm drill along the slot to increase its size to allow the lug on the stabilizer to fit. The same procedure is used for the other fuselage half.
NOTE: Care must be taken when creating the slot on the second fuselage half, as although the locations of the pre-molded guide lines appear to be the same on each fuselage half, any slight deviation when drilling along these guide lines will result in the two stabilizers not aligning with each other. Any slight correction can be carried out by altering the size and angle of one or both slots.

The stabilizers are then secured in position in the fuselage halves using thin CA adhesive. Once dry, you can apply a thin bead of modelling putty along the joint to blend each stabilizer into the fuselage. This bead, once dry, can be sanded smooth.



Attachment of control 'horns':

The control cables for the aircrafts rudder and elevators attach to 'control horns' fitted on the flying control surfaces. Although the kit supplies photo-etch control horns, there is no locating hole/slot to fit these horns into. Instead the intention is to presumably just glue them directly onto the control surface. As the photo-etch is only 0.15 mm thick, this will obviously lead to them breaking away at some stage during the build or even after the model is completed.
To provide a more positive 'anchor' for these control horns, I first marked with a pencil where they should be positioned on one side of each elevator and on one side of the rudder. I then drilled a row of four holes of 0.3 mm diameter along the axis of the horn locations. I then created a slot by carefully drilling through at an angle from both ends of each row of holes. Once I was satisfied the horns would fit, I fitted the horns using a very small amount of CA adhesive. Once I was happy with their alignment, I added CA adhesive to finally bond them in position.



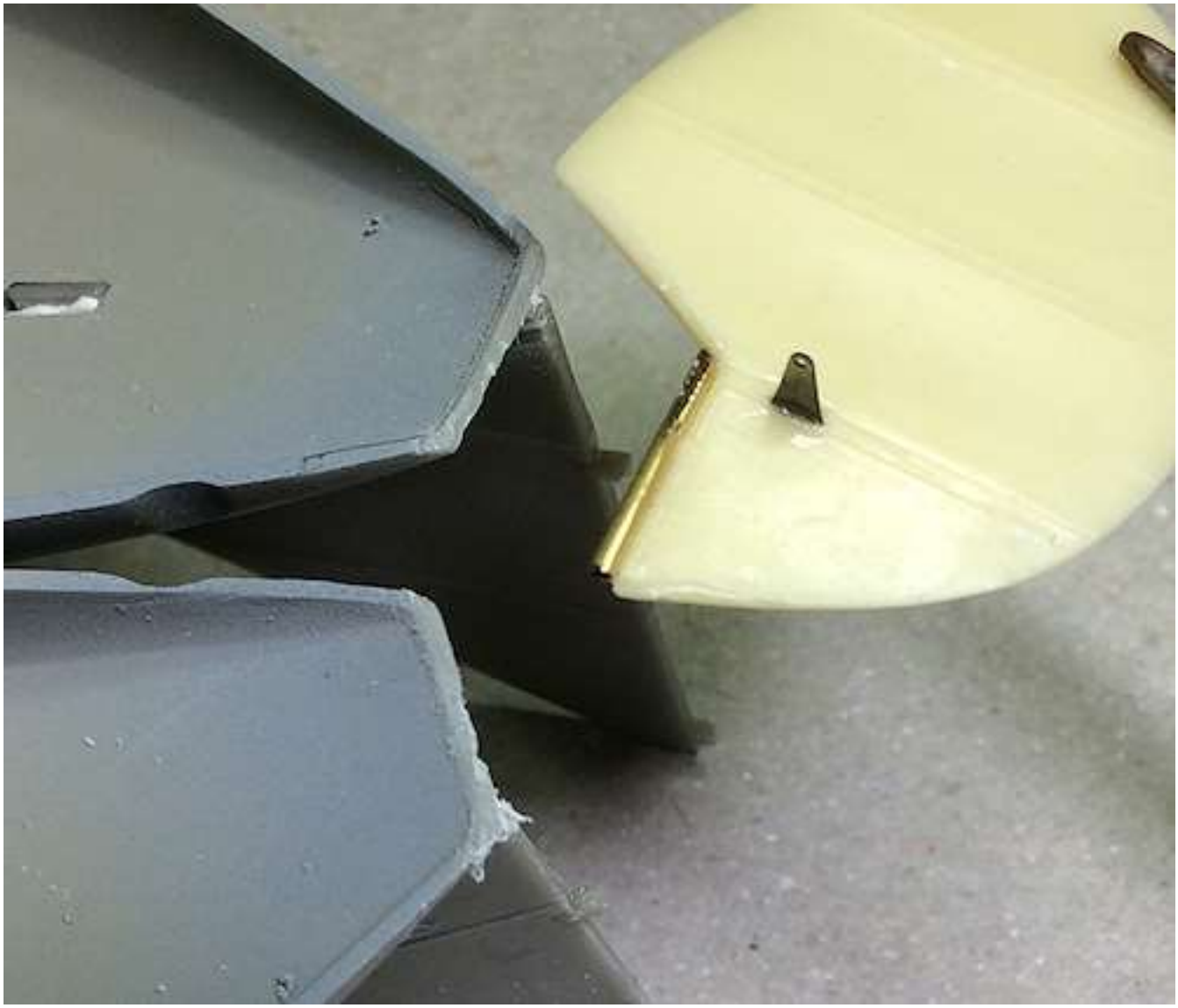
Attachment of the rudder:

The attachment of the rudder, as in the kit instructions, is directly onto the rear end of the assembled fuselage. This method of attachment is flimsy and would probably result in the rudder becoming detached. To create a more positive attachment and to replicate the vertical rudder 'post', I did the following.

Firstly I cut a length of 1.0 mm brass tube and filed a flat on one side. This flat will be the located against the vertical surface of the rudder. I then filed one end of the rod to match the angle of the rudder forward area. This rod was then secured to the rudder using thin CA adhesive.

I then used a needle file to chamfer the inner edges at the rear on the fuselage, to form a 'V' shape for locating the rudder brass rod.

Once the fuselage is 'closed up', the brass rudder post will be located into the 'V' at the fuselage rear and secured in position using thin CA adhesive.



Fuselage alignment:

The two fuselage halves, when joined to close up the fuselage, do not align correctly. Even though most of the join can be more or less aligned, there are two areas that do not, namely the front and rear of the cockpit and the underneath of the tail of the fuselage, as can be seen on the following photos.

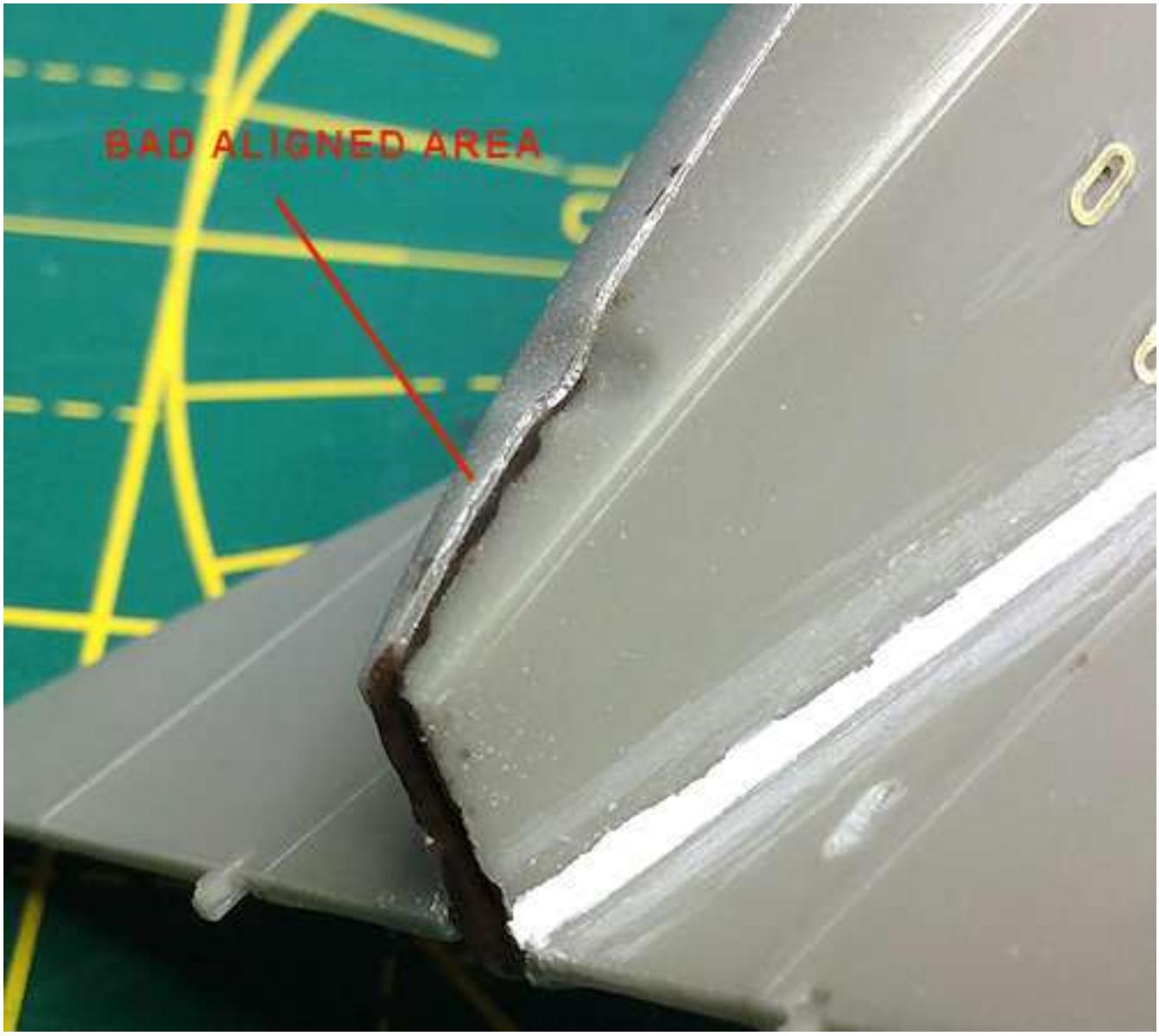
Once the two fuselage halves have been joined, using thin CA adhesive, pronounced steps can be seen, most noticeably where the roll over pylon was fitted to the initial prototype (removed afterwards and not included in this kit version) and the pilot headrest. Also there was a dip from both sides, towards the centre on the top of the fuselage joint forward of the cockpit.. This required sanding and scraping these areas as well as around the total fuselage joint, to blend the two halves together.

The pre-molded base for the circular roll over pylon was totally removed and replaced with circular discs, cut from 0.2 mm thick plastic card.

The headrest was created using super-fine white 'Milliput' putty.

A rectangle of 0.2 mm plastic card was cut and glued over the fuselage top to cover the join dip. The card was secured using thin CA adhesive, between the two pre-molded panel lines. Some panel lines may need to be re-scribed.

NOTE: When sanding or scraping away the resin, remember how thin the fuselage walls are, or you could cut through and create openings.



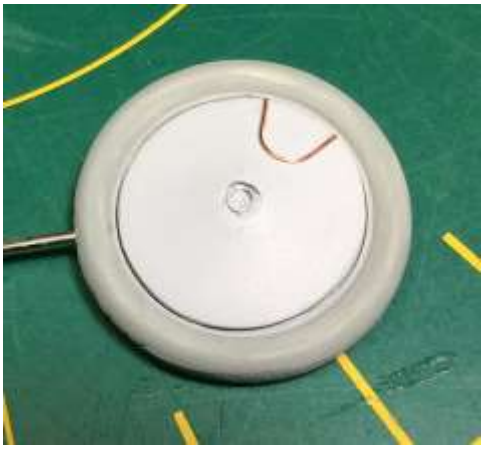

BAD ALIGNED AREAS


DIP AREA WITH THIN WEAK JOINT

After correcting the alignment faults, I airbrushed a primer coat of MRP Fine Surface Primer (MRP-84) and when dry, checked the joins for any faults. A few minor cracks were seen and filled with 'Perfectly Plastic Putty'. Once dry this was sanded smooth then fully primed.

Wheel access patches:

The wheels on this aircraft had access patches stitched into the outboard wheel covers, which is not pre-molded on the kit wheel covers. To replicate this, I attached shaped 0.2 mm diameter copper wire, secured with thin CA adhesive.



Attachment of the undercarriage:

The kit supplies a pair of 'strengthened' undercarriage V-struts. However there are no locating points on these struts and only dimples in the fuselage sides to act as a guide. Given the model is resin with wings of solid resin, the model is heavy for its size. I felt that even these 'strengthened' struts would still be too weak to adequately support the weight of the completed model. Therefore I decided to add stronger attachments for the struts.

First I drilled 0.5 mm diameter holes through the rear undercarriage dimples in the fuselage. Then I drilled 0.5 mm diameter holes through the top of the rear and front struts. I passed a short length of 0.5 mm diameter Albion Alloys brass micro-tube through each rear strut hole then into the associated fuselage holes. This temporarily held the undercarriage and allowed it to pivot.

NOTE: Do not glue these at this point.

I then positioned, at the correct locations, the front undercarriage struts against the front fuselage (with the axle in position between the struts), making sure the front struts were positioned correctly and that the undercarriage assembly 'sat correctly' to the fuselage. I then drilled 0.5 mm diameter holes through the front fuselage sides, using the front strut holes as a guide, then inserted short lengths of 0.5 mm brass micro-tube, to hold the struts in position. Once I was happy the undercarriage assembly sat correctly, I secured the four struts to the fuselage and the axle to the struts with thin CA adhesive. Once dry, I snipped away the surplus brass tube from each strut attachment point and carefully filed/sanded the tube ends flush. Finally I airbrush primer over the worked areas.

NOTE: As there is very little reference material for this aircraft, and given it was built in 1915, I have supposed it was fitted with 'bungee' cord suspension. This was created by wrapping PlusModel Lead Wire (0.3 mm diameter) around the axle between the struts and wheels.

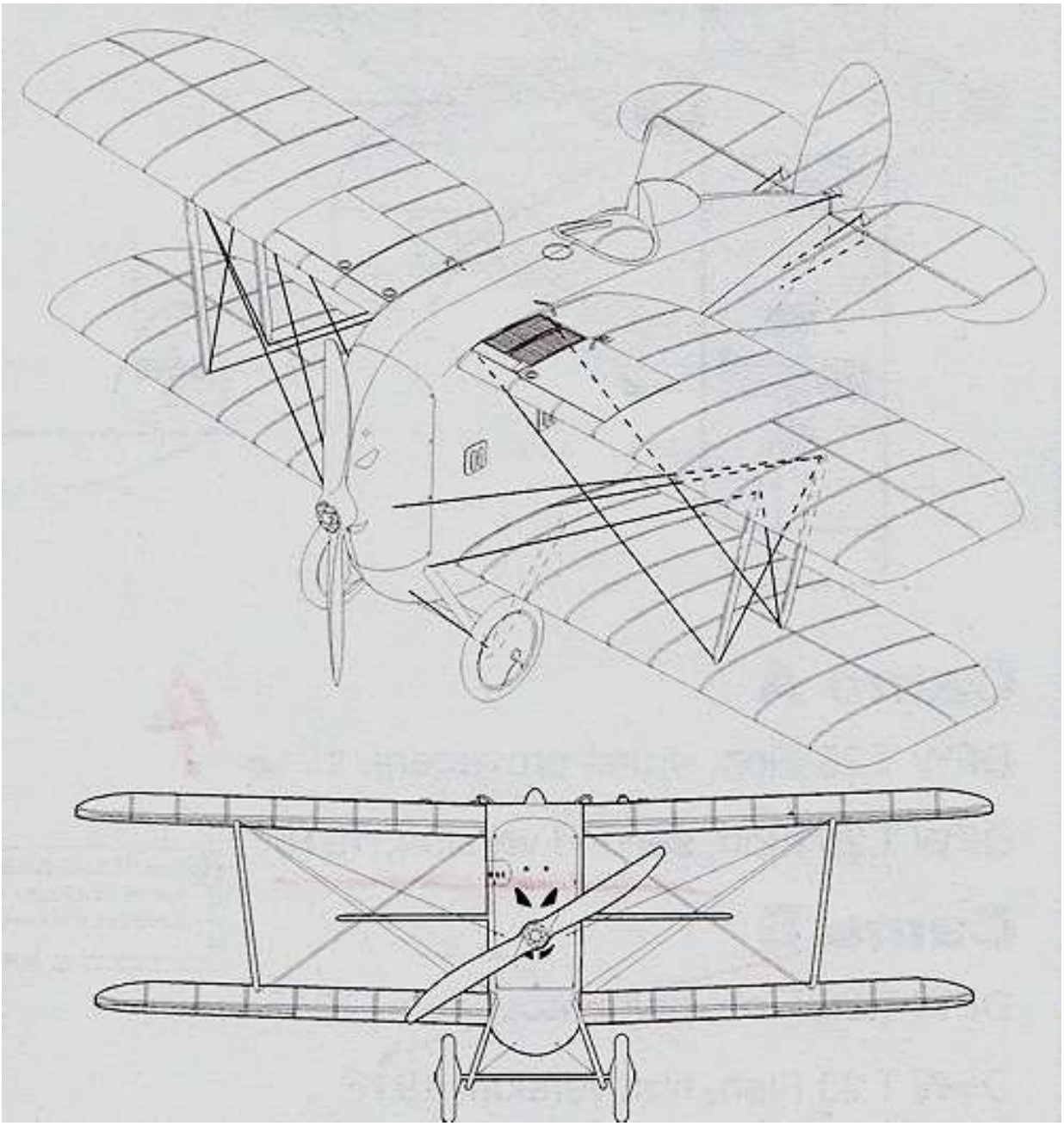
Rigging points:

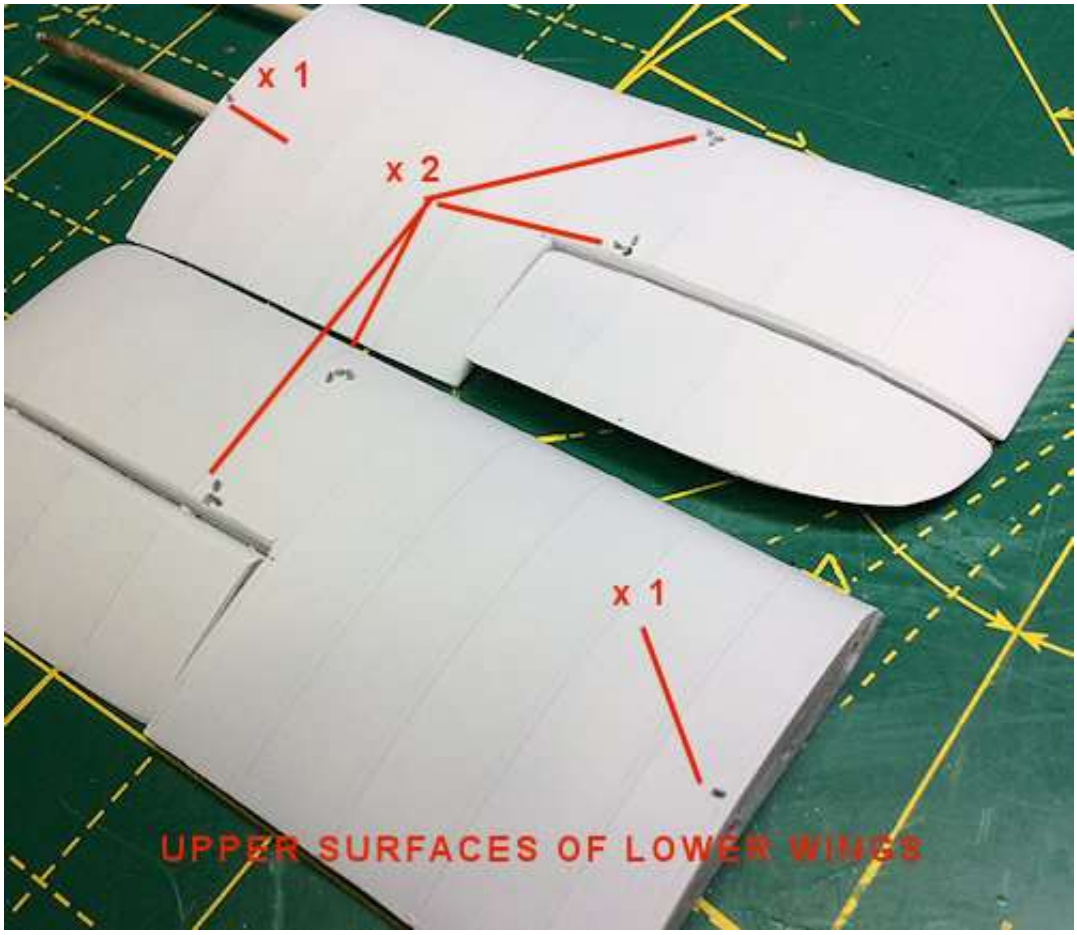
The aircraft had convention cable rigging where it was fitted, as well as cable operated rudder and elevators. Before assembly and painting, the anchor points for these need to be drilled. I use turnbuckles from 'GasPatch Elite Accessories' in both 1:32 and 1:48 scale, dependant on the type of rigging required. As cab be seen from the kit instructions, the only external control cable are to the rudder and elevators. The structural flying and landing wire rigging is between the upper and lower wing and across the undercarriage.

I drilled hoes of 0.4 mm diameter at each rigging point and also through the fuselage for the rudder and elevator control cables. When drilling the holes, try to angle the drill to the direction the rigging cable runs, in order that the completed rigging run is straight from one point to the other. There's nothing worse than a model that has rigging where the rigid turnbuckle is attached at a different angle to the rigging it's attached to.

The holes through the fuselage for the rudder and elevator cables also need to be at the right angle to align with the control horns on the control surfaces. In this case the angle to drill at is necessarily shallow.

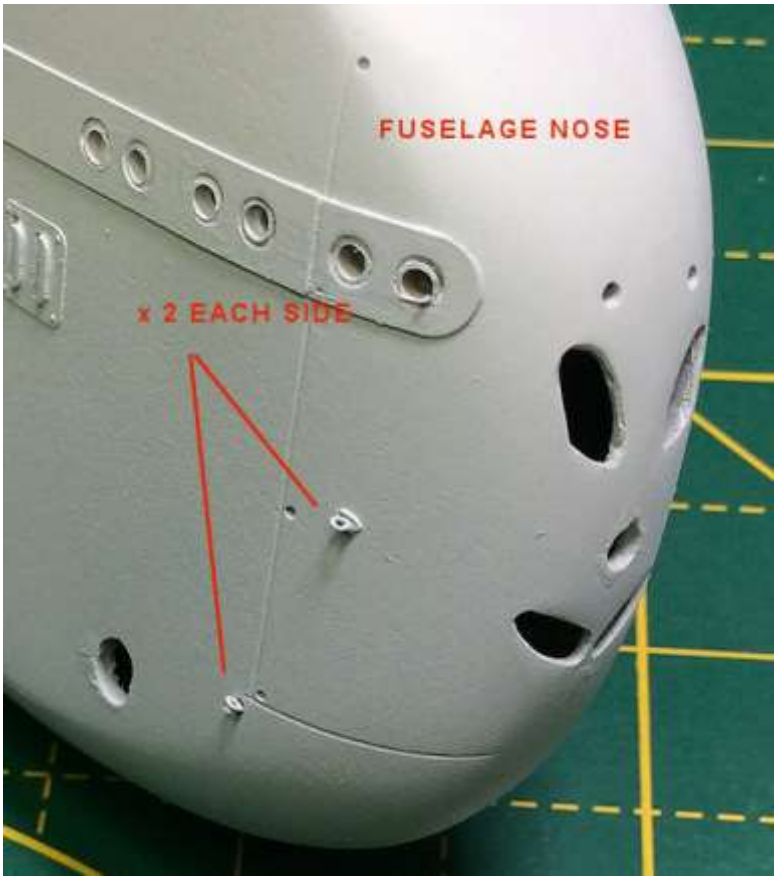
NOTE: Part 10 of this build details installation of the rigging.




x 1
x 2
x 1
UPPER SURFACES OF LOWER WINGS


x 3
x 2
x 2
x 2
UNDERSIDE OF UPPER WINGS

After the fuselage preparation was completed and it was fully primed, I added ‘GasPatch Elite Accessories’ rigging anchors, which are basically a round loop on a stem. The stem of each was positioned in a pre-drilled hole (not on the kit parts) and to align with that rigging cable’s other end fitting (judge the angle given the run of that rigging on the finished model). I used thin CA adhesive to secure the anchors in their holes.



Black edges:

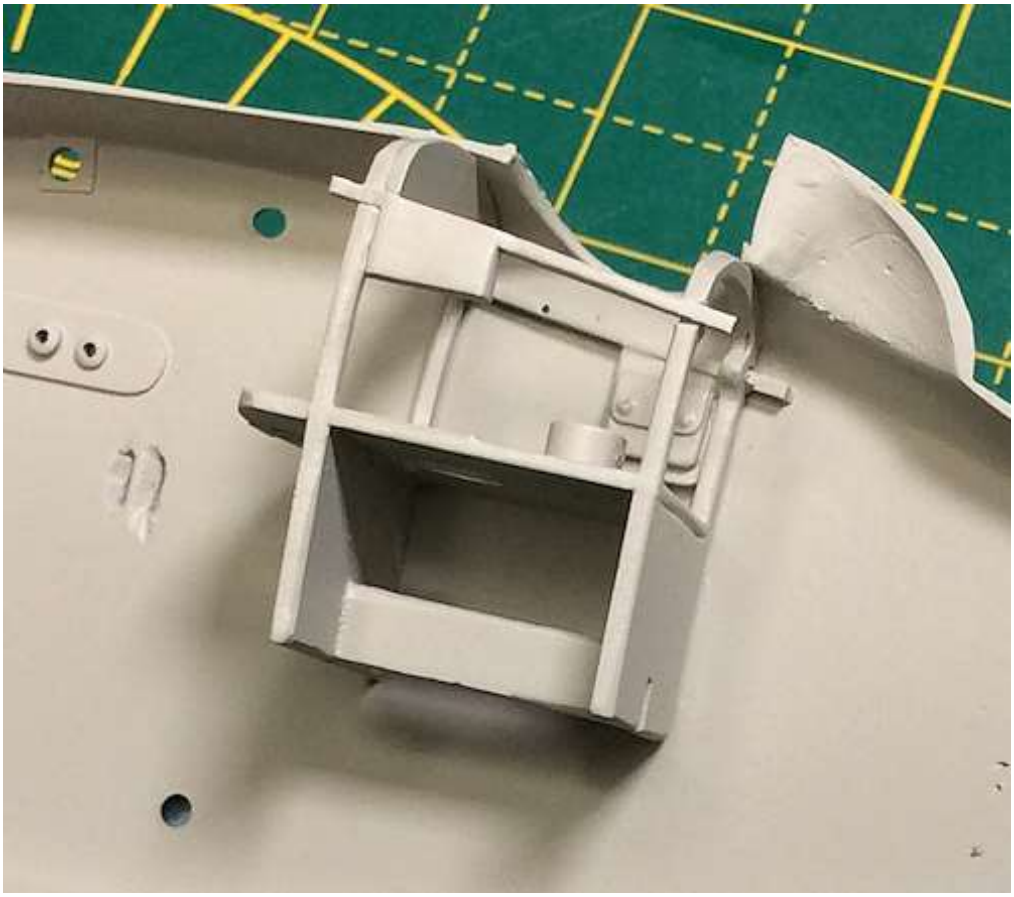
The aircraft had black dope applied around the wings, ailerons, tailplanes, elevators and the rudder. Normally this can be achieved by masking off the areas and then either hand painting or airbrushing the black. However there are numerous 'rib tapes' molded into these parts, which are raised from the surfaces. Applying masking tape over these leaves tiny gaps where the tape lays over the rib tapes. These gaps will allow paint to seep in, leaving unsightly and unwanted paint seep against the rib tapes. If you apply too much pressure on the masking tape at these points, to pressurize the masking tape against the rib tapes, there is the chance that when removing the tape, the painted top coat will be pulled off as well.

In this case I improvised by using a black 'dustbin/refuse' polythene bag. I cut thin strips of the polythene bag and tacked one end across the centre line of the edge to be worked, using thin CA adhesive. Then I applied adhesive in stages along the edge, smoothing the plastic strip over the edges to bond it to the surfaces. Slightly stretching the plastic strip allows it to be pulled around curves, without 'wrinkling' the edges of the strip.

This is a tedious and time consuming exercise, but results in an even and clean black outline and because of how thin the polythene is, it conforms easily to the surface detail.

PART 2 - THE COCKPIT

The cockpit itself is fairly basic in construction, although care must be taken when assembling, to avoid breaking the cockpit frames. At this stage I did not fit the hand pump, control column assembly, port side control handle or the seat and straps. This was to allow for painting the wood effect to the cockpit assembly first. Normally I would complete the painting of the cockpit assembly before fitting it to the fuselage half, but in this instance and due to the flexibility of the resin fuselage halves, I decided to fit it to the starboard side first, securing it in position with thin CA adhesive. This allowed me to dry fit the two fuselage halves to ensure they mated fully (some scraping away of the port sides of the cockpit
assembly was required).
Once this was done I primed the insides of both fuselage halves with Tamiya Fine Grey Surface Primer and when dry, I over coated with airbrushed Tamiya Deck Tan (XF55).



Unlike most other aircraft of the period, which had external surfaces of linen over a wood or metal frame, this aircraft had plywood external surfaces. These were a thickness of 2.5 mm around the front fuselage and 1.5 mm for the remainder. The upper and lower curved surfaces were made from 'Fournier Strips', which were thin strips of plywood, curved and layered to form the curves. As such there is no linen covering on the fuselage, so the internal surfaces of the fuselage need to represent plywood, with wood for the cockpit frames.

The internal sides of the fuselage and cockpit framework were primed then sponge brushed with Crafters Acrylic Burnt Umber (water soluble) to darken the surfaces. Once dry I airbrushed a sealing coat of Alclad Semi-Matte (ALC-312) lacquer.

The cockpit details were then hand painted as follows:
Pilot Seat - Mr. Metal Aluminium (218), cushion mix of Tamiya Hull Red (XF9) and Humbrol Leather (62).
Control Column - Tamiya NATO Black (XF69), Hull Red (XF9).
Fuel Pressure Pump - Tamiya Hull Red (XF9) and Mr. Metal Brass (219), Stainless Steel (213).
Throttle Handle and Instrument Panel Handles - Mr. Metal Stainless Steel (213) and Tamiya Hull Red (XF9).
Map Case - Mix of Tamiya Hull Red (XF9) and Humbrol Leather (62).
Seat Straps - Tamiya Dark Yellow (XF60) and Mr. Metal Stainless Steel (213).
The cockpit was then given a wash of AK Interactive Kerosene Leaks and Stains.

Albion Alloy Nickel Silver micro-tube was fitted to the throttle, rudder bar and fuel pressure pump to represent control cables.
The representation of the cockpit colours and detail was not based on factual data, as there is none for this aircraft. Therefore I used the kit instructions with a little poetic license.

PART 3 - THE ENGINE

The engine of this aircraft was installed inside the front fuselage and behind a removable nose cowling. The only part of the engine that was visible from outside the aircraft would have been the six engine exhaust stubs on the starboard side of the fuselage. These exhaust stubs have been represented on this model.
As the kit has no engine, the only visible indication on the model is the exhaust stubs

PART 4 - EXTERNAL SURFACES

Painting:
The paint used for this model were MRP Paints, which are labelled as 'Acrylic Lacquer', but in reality are essentially lacquer paints. The paints are very thin and need to be airbrushed at low air pressure and closer to the model surface than standard acrylic paints, which tend to be thicker and in most cases need to be thinned. Several light coats airbrushed is better than single heavy coats. The pigment in MRP paints are very fine and do settle quickly in the bottom of the bottles, so these need to be thoroughly shaken before use, to ensure a good mix of pigments and lacquer.
Once the model parts were ready to be painted, they were first checked for any blemishes, flashing, blow holes etc and cleaned up as required. The parts were then primed by airbrush, using MRP Fine Surface Primer (Grey) (MRP-84). After priming, any surface defects or bad joins can be easily seen and rectified. A second primer coat was then applied.

NOTE: The covering applied to this aircraft was linen on all of the control surfaces and wings, but the fuselage was covered in plywood. I assumed therefore that the same colour applied overall would look slightly lighter of the 'solid' fuselage. To create this effect, I airbrushed the external surfaces as follows:

A. Two light coats of MRP Light Grey Blue (MRP-73) was applied to the wings, tailplane, elevators and rudder.
B. The fuselage colour was lightened by adding a small amount of MRP Clear Doped Linen (MRP-256) to MRP Light Grey Blue (MRP-73).

Apart from small detail and the black edge surrounds (see page 28), this is the only external painting required.

1. The rigging anchors (see page 25) and upper wing radiator (top and underneath) were painted with Mr. Metal Stainless Steel (213).
2. The cockpit surround padding with Humbrol Leather (62 and Tamiya Hull Red (XF9).
3. The axle centre with Tamiya Semi-Gloss Black (X18).
4. The Tail skid was painted using Tamiya Deck Tan (XF55), sponge wiped with Burnt Sienna water based Acrylic Oil paint.
5. The upper wing fuel, radiator and fuel pipe connections were painted with Mr. Metal Brass (219).
6. The axle 'bungee' suspension cords were painted with Tamiya Deck Tan (XF55).
7. The wheel tyres were painted with Tamiya Royal Light Grey (XF80) and wheel covers with MRP Silk Grey (MRP-283) (see page 33).

After painting the decals were applied (see page 34) then the entire model was airbrushed with Alclad Semi-Matte (312) lacquer, to seal the paint and decals ready for surface weathering.

Weathering:

Weathering was achieved by using Flory Clay washes and AK Interactive washes.
Flory Model clay washes come in various shades and consist of a very fine clay pigment. They are brushed over the surface to be weathered and dry in around 30 minutes. When dry, use either a piece of good, absorbent kitchen roll or a brush used for oil paint (as the bristles are harder than normal painting brushes) to remove as much of the clay wash as you need to achieve the desired effect. The damp re-activates the clay wash and allows it to be removed or worked as required.
To apply the clay wash is just a matter of brushing all over the surface to be weathered. It doesn't matter really how much is applied and it can be left on for any period, as it is easily removed without any effect on the surface underneath. The wash I used was a mix of Flory Clay Wash 'Grime' and 'Dark Dirt'.
Whatever you use to remove the clay wash, make sure it is only very slightly damp. I dab the brush or absorbent paper onto my tongue, but even then I dab it onto a dry piece of the paper. That's how 'damp' it needs to be. Any wetter and you'll find that you are removing too much of the clay wash. If that happens you would have to re-apply the wash and start again.
That said, if you not happy with the final effect, you can easily remove the clay wash by brushing with a wet brush or even airbrush water over the surface. Then you can dry the surface and re-apply the clay wash and try again until you are satisfied.
The technique is to brush over the surface to re-activate the clay wash and at the same time, to smear it over areas that had no clay wash. It'll dry more or less straight away.
Then I'll very lightly brush and/or use a piece of damp absorbent paper to remove as much as I want until I get the desired effect. If I remove too much I just reapply clay wash to that area and repeat the removal procedure.
Once finished, just run the brush under a tap to rinse out any residual clay pigments.
If you've not used Flory Clay Washes before, the best thing to do is to experiment first on a test piece. You'll soon get the hang of it.

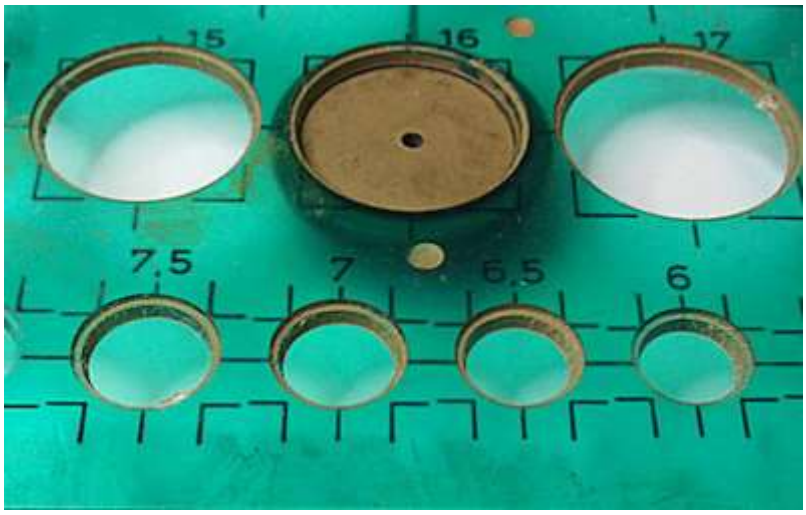
PART 5 - WHEELS

The assembly of the two wheels is straight forward. The outside wheel covers are fitted into the wheel recess and secured with thin CA adhesive. A 0.8mm hole was drilled into the wheel and a length of paper clip secured into the hole using thin CA adhesive. These [ins will be used to secure the completed model to the display base.

After priming with MRP Fine Surface Primer (Grey) (MRP-84), the wheels were airbrushed with the colour for the tyres, which was Tamiya Royal Light Blue (XF80).

To airbrush the faces of the wheels without over spraying the surrounding tyres, I use a circle drawing tool (Linex 1217 T). I selected the correct size of hole, which in this case was 14 mm diameter, and positioned the wheel face under the hole. Then I airbrushed MRP Silk Grey (MRP-283) through the hole onto the wheel face. This leaves the tyre colour intact (tyres of that period were not black). AK Interactive 'Kerosene (Leaks and Stains) was applied heavily around the tyres and once dry, the tyres were sponged with Tamiya Weather Master (Set E) grey, to recreate the look of a period tyre. Then I applied Flory Grime clay wash and when dry, wiped off to get the desired weathered look, making sure to remove most from the tyres.

EXAMPLE OF WHEEL AIRBRUSHING



PART 6 - WEAPONS

This aircraft was to be fitted with a single LMG 08/15Spandau machine gun, which was intended to be installed inside the fuselage. However, the aircraft never got passed the prototype stage and there is no information as to whether a weapon was actually installed and if so where and how. To that end this model has no weapon shown.

PART 7 - DECALS

The decals supplied in this kit are very thin and need to be handled with care, to avoid tears or other damage.
First the areas to have decals was airbrushed with MRP Super Clear (MRP-48) lacquer, to form a smooth surface and reduce the likelihood of 'slivering' under the applied decals. This is caused by air being trapped in the rough surface of the paint, which after the decal is applied and dries, causes the 'silvering'.
As the model is displayed with the ailerons in the up or down positions, the wing decals need to be cut where the decals on the wing overlap the ailerons. Essentially one quarter of each of the four wing decals was cut out to form two piece decals.
The decals were loosened in mildly warm water and carefully slid into position. Cotton buds and soft tissue paper, such as toilet paper, was used to squeeze out surplus water. Then I applied a coating of 'Micro Sol' setting solution all over the decals, including the parts of the decal standing away from the surface they needed to be tucked around. The setting solution softens the decal and allows it to seat down fully on the surface.
NOTE:
1. As the setting solution softens the decal, care must be taken when touching the decal or damage can be caused.
2. The setting solution causes the surface of the decal to wrinkle, but this is normal and the decal, when dry, will be flat. If there are any visible bubbles under a decal, use a sharp pin to prick the bubble then apply more setting solution.

Once the decals have been applied, any minor damage or gaps can be 'filled' using thinned Tamiya Semi-Gloss Black (X18).

PART 8 - PROPELLER

The actual aircraft was fitted with a two blade propeller from the 'Behrend & Ruggebrecht' Company of Berlin. The kit supplied propeller can be primed and either hand or airbrushed, to achieve the desired laminated wood effect. To do this effectively can be difficult and a bad propeller can ruin the look of an otherwise good model. In this instance the propeller was airbrushed with the laminated effect created by using the RB Productions photo-etched 'Laminated Propeller Mask', which you need to initially assemble.

Once primed and dry, the propeller is clamped onto the mask and thinned Tamiya paints are sprayed through the mask slots onto the propeller, which is then reversed in the mask to spray the other sides. Although not true laminations, the effect produced is a good representation.
A base coat of Tamiya NATO Brown (XF 68) was applied. The lighter laminations were created using Tamiya Wooden Deck Tan (XF78). Then an airbrushed sealing coat was applied using Tamiya Clear (X22), mixed with a small amount of Tamiya Clear Orange (X26) and thinned with Tamiya X20A, to seal and give a varnished effect and to provided a good surface for the application of the decals.

The propeller was manufactured by 'Behrend & Ruggebrecht', for which there are no decals that I could find. To create such small decals in detail, using decal paper and PC printers was not really achievable. Therefore I used the kit supplied 'Axial' decals instead. A final and light coat of Alclad Semi-Matte (ALC-312) lacquer was airbrushed over the decals to seal them.

The propeller boss was brush painted with Mr. Metal Stainless Steel (213).

The adjacent shows the 'Behrend & Ruggebrecht' logo on the actual propeller.

PART 9 - FIGURES

The figure I chose to use are:
Mechanic from Model Kasten Box set (AM-63 F-6 2500).
'Hermann Dorner' - Figure used was from MiniArt Box Set (French Civilians 38004).

NOTE: When brush painting with Acrylics, I always add a small amount of thinner in order to keep the paint fluid, otherwise I find it doesn't brush well onto the primed surface.

Mechanic:

Once assembled, using Tamiya Thin adhesive, the figure was primed using Tamiya Fine Grey primer. The paints used were:

1. Shoes - Tamiya Semi-Gloss Black (X18)
2. Uniform - Tamiya NATO Black (XF69) - Highlights mixed with Neutral Grey (XF53)
3. Cap - Tamiya Neutral Grey (XF53)
4. Uniform Piping - Tamiya Red (X7)
5. Flesh - Model Colour Skin Tone (70.815), Beige Red (70.804)
6. Hair - Tamiya Red Brown (XF64) with White (X2)
7. Buttons/Lapels - Mr. Metal Colour Stainless Steel (213).

The shadows and highlights were brushed on while the base coat was still wet, which allows you to blend the paint, rather than ending up with stark contrasts.

An airbrushed coat of Alclad Klear Kote Flat (ALC 314) lacquer was applied to seal the paints (Alclad Semi-Matte (ALC 312 on the boots).

Hermann Dorner:

Once assembled, using Tamiya Thin adhesive, the figure was primed using Tamiya Fine Grey primer. The paints used were:

1. Shoes - Tamiya Semi-Gloss Black (X18)
2. Suit - Tamiya Red Brown (XF64) mixed with NATO Black (XF69)
3. Hat - Tamiya Red Brown (XF64) with more NATO Black (XF69)
4. Shirt - Tamiya White (X2)
5. Flesh - Model Colour Skin Tone (70.815), Beige Red (70.804)
6. Hair - Tamiya Neutral Grey (XF53)
7. Buttons - Mr. Metal Colour Brass (219).

The shadows and highlights were brushed on while the base coat was still wet, which allows you to blend the paint, rather than ending up with stark contrasts.

An airbrushed coat of Alclad Klear Kote Flat (ALC 314) lacquer was applied to seal the paints (Alclad Semi-Matte (ALC 312 on the boots).

PART 10 - RIGGING

The first rigging to do, as part of the rigging preparation, is to fit the rigging 'anchors' (see page 25).

This aircraft had minimal external rigging by comparison to its contemporaries. These were:

1. Fuselage to elevator control horns (upper and lower).
2. Fuselage to rudder control horns (both sides).
3. Cross-bracing from lower fuselage to undercarriage axle.
4. Cross-bracing between wing support struts.
5. Top of forward undercarriage struts to top of forward wing support struts.
6. Mid-nose to top of rear wing support struts.
7. Lower wing root to top of rear wing support struts.
8. Upper wing root to bottom of both wing support struts.

The relevant 'anchors' (see page 25) were already fitted. Clear the holes in the fitted control horns using a 0.3 mm diameter. Some modellers use micro drills manufactured for drilling printed circuit boards etc and these drill bits sometimes have identifying coloured collars fitted to the drill shanks. I have found that these drills are too sharp and instead of easing their way into the plastic of the model, they tend to bite in and effectively 'cork screw' their way in, which causes jamming and lots of broken drills. This is not only expensive but can leave broken drill bits in the model, which are virtually impossible to extract. I prefer to use High Speed Steel (HSS) drill bits, which are cheaper and have less 'bite' when in use. Some modellers drill through the wings etc of the model and rig by pulling through the rigging line/thread, gluing in position and then rubbing down the exposed rigging 'tag' and re-painting that area. I prefer to drill only part way into the plastic and attach the applicable rigging fixture with CA adhesive.

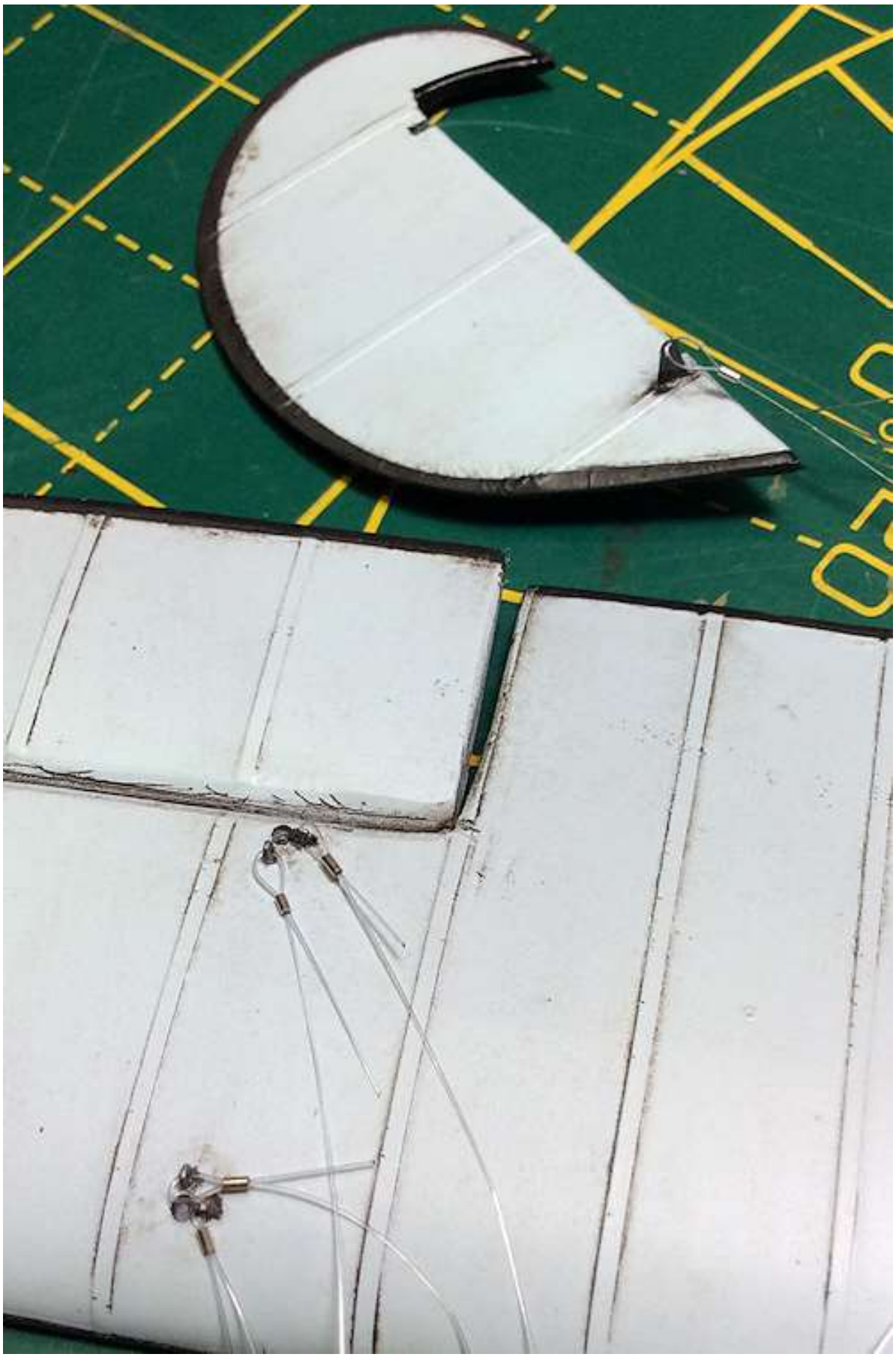
For structural strength I used 'Steelon' mono-filament (fishing line) of 0.12 mm diameter. This is effectively transparent but does give a look of steel, without the need of painting or colouring with a gel pen. Typically for many German aircraft, the DFW t28 'Floh' has only cables for rigging and controls.

To represent the tie-backs of the cables, I used 0.4 mm Nickel silver tube (Albion Alloys). This was cut to appropriate lengths by rolling a shielded razor blade across the tube whilst applying light pressure. This will easily cut the tube without leaving burrs or blocking the cut end of the tube, which would stop the rigging from passing through.

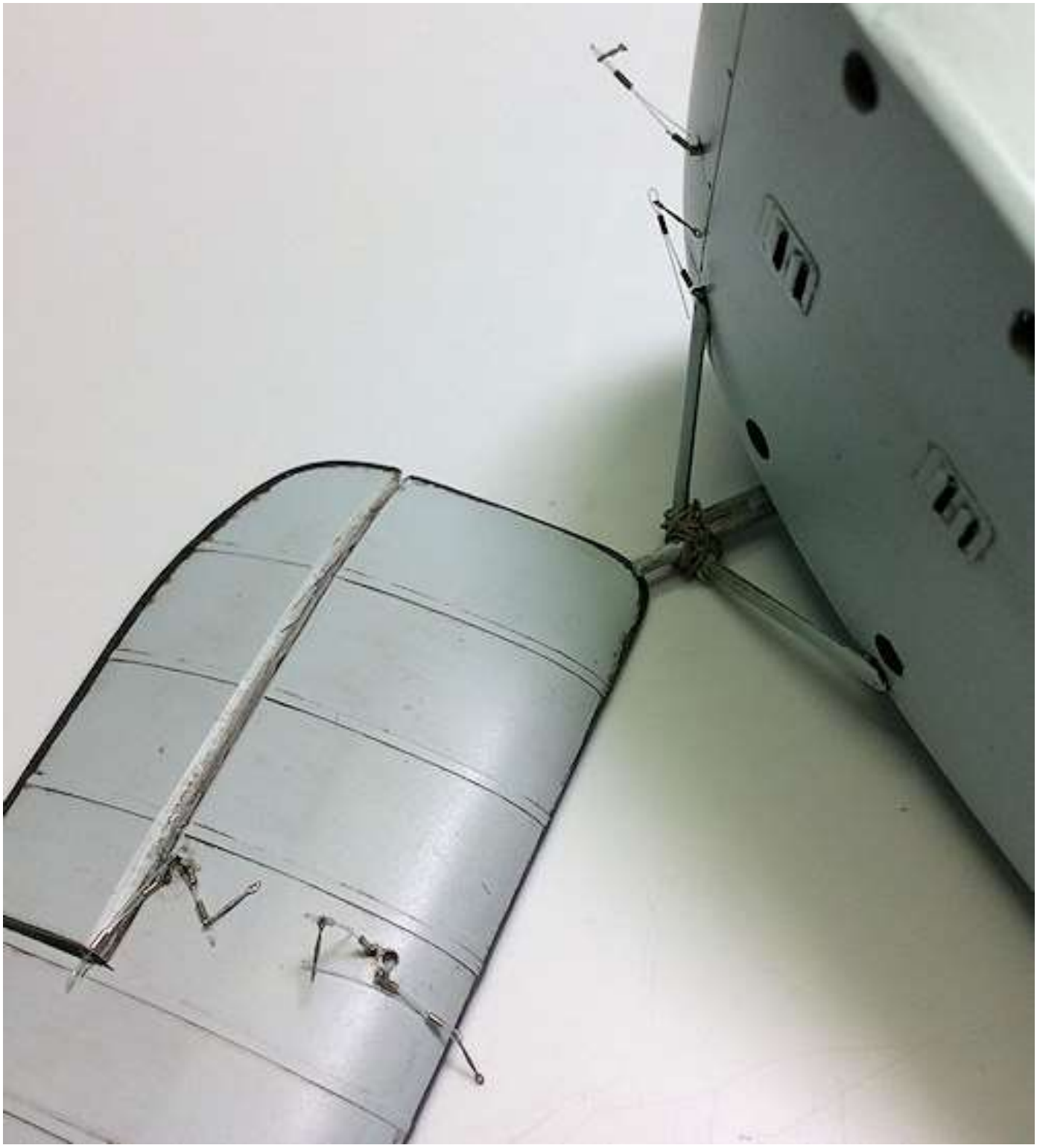
Typically, a long length of line was inserted through the tube and then through the Gaspatch 'anchors' and then back through the tube and secured with CA adhesive at the tube. Any ends of line can be cut close to the control horn etc with a razor blade. The free end of the line is then passed through another tube, through the Gaspatch turnbuckle and back through the tube and again. The same was done from the other side of the turnbuckle to the other 'anchor'. You need to end up with both 'anchor' ends tightened and secured, but with both turnbuckle connections loose. Both turnbuckle ends can now be gently pulled through the turnbuckle and associated tube to tighten the line and with the turnbuckle in the correct position along the rigging. These connections can then be secured using thin CA adhesive.

Repeat this procedure for rigging line, both with turnbuckles or without.

The following photo shows the rigging line, passed through the ‘anchor’ and back through a tube. The line was then tightened and secured in the tube using thin CA adhesive. The free ‘tail’ of line was cut away, at the tube, using a sharp and shielded razor blade.



The following photo shows rigging lines, passed through tubes, the Gaspatch 1:48 scale turnbuckles and then back through the tubes. The line was then tightened and secured in the tube using thin CA adhesive. The free ‘tail’ of line was cut away, at the tube, using a sharp and shielded razor blade.



Once completed, any ‘slack’ in rigging can be rectified by using a small, heated soldering iron or similar. By moving the heat source close to and along the length of the line, the heat will cause the line to tighten. Obviously, care needs to be exercised as getting too close or touching the line or model surface will result in melt marks on the model or melted and separated rigging line!!
The ‘anchors’ and turnbuckles were ’toned down’ by applying a light coat of AK Interactive wash (Leaks and Stains), then dry brushed with Mr. Metal Colour Stainless Steel (213). The rigging was sealed with a light airbrushing of Alclad Light Sheen (ALC-311) lacquer, which also gives a shine to the mono-filament and gives it a look of steel.

As you work your way through the rigging it is always good to check the rigging attachment points for any damaged paint. This can be rectified before continuing with the rigging, just in case access will be limited once all of the rigging is completed.

PART 11 - CONSTRUCTION

The basic sequence of construction is as follows:

PART 1 - THE MODEL (GENERAL)

Modifications or Corrections:

PART 2 - THE COCKPIT

PART 4 - EXTERNAL SURFACES

PART 5 - WHEELS

PART 7 - DECALS

PART 8 - PROPELLER

PART 10 - RIGGING

PART 11 - CONSTRUCTION

1. Do the PART 1 prep first.
2. Do PART 2.
3. Close up the fuselage.
4. Do PART 4
5. Do PART 7.
6. Do PART5.
7. Fit lower wings using CA adhesive (fill any wing fuselage gaps with PVA adhesive).
8. Complete rigging prep including turnbuckles.
9. Fit upper wings and wing support struts, using CA adhesive (fill any wing fuselage gaps with PVA adhesive).
10. If required, airbrush thinned (50/50) Tamiya Smoke (X19) with Tamiya X20A and air-brush along the wing roots and under horizontal stabilizer to recreate join shadow for wing to fuselage.
11. If required, use Flory pigments to add dirt stains along fuselage bottom edge and under lower wings for wheel dirt spray.
12. Apply Alclad Semi-Matte (312) lacquer to seal new worked areas.
13. Complete rigging.
14. Do PART 5 - if required, use Flory pigments to add dirt stains.
15. Do PART 8.

PART 12 - DISPLAY BASE

The display case is made from 6mm thick Piano Black Acrylic sheet and the transparent top is fabricated from 3mm thick Clear Acrylic sheet. This was made for me by an on-line manufacturer. The name plaque was also made by an on-line retailer and was attached to its mount.

The model and pilot figure were positioned on the base in their final positions and the pin locations were marked on the base. Three 1.0 mm holes were drilled into the base to correspond to the paper clip pins in the two wheels and the one in the leg of the pilot figure. Three lengths of paper clip were cut and temporarily located into the three holes.

The grass mat was cut to shape from a sheet of 'Model Scene Grass Mats'. The cut mat was then positioned on the base and with the three pins protruding through the mat. The outline of the grass mat was then lightly scored into the base surface. The grass mat was then removed and the black base was scuffed inside the mat outline with a medium grade glass paper in order to give a key for adhesive. The back of the grass mat was then lightly sprayed with water.

NOTE: If too much water is sprayed onto the grass mat and/or too much adhesive is applied to the base, the result will be that adhesive will show through the grass mat and possibly still be visible once the adhesive has fully dried.

A coat of PVA adhesive (wood glue) was applied the base over the scuffed area and slightly outside the outline of the grass mat (for applying a sand border) The grass mat was then laid onto the PVA adhesive and positioned correctly, again with the temporary pins protruding through. Light pressure was applied to ensure the mat was in contact with the adhesive. While the PVA adhesive was still wet, dry sharp sand was sprinkled around the edges of the grass mat and lightly pressed into the PVA adhesive. Once the PVA adhesive was dry, the excess sharp sand was 'knocked' off the base. Don't brush off the excess sharp sand or you may scratch the exposed base surface, which is acrylic sheet and easily marked.

Kitchen 'Cling-Film' was positioned around the grass mat (slightly away to leave the applied sharp sand exposed) and held in position with thin modelling masking tape, following the outline shape of the grass mat (maintain the curved edges of the outline by avoiding straight or sharp edges of the tape). This sand border was then airbrushed with Tamiya Flat Brown (XF10) and once dry was lightly dry-brushed by hand with Tamiya Dark Yellow (XF60) to add colour variation. This border effect can also be achieved by hand brushing, in which case the Cling Film and masking tape would probably not be needed.

To add variation to the grass mat, small clumps of 'Mini-Nature' two colour grass tufts (737-22S) can be secured in place with PVA adhesive. Although slightly two tone in colour, these grass tufts can be lightly dry-brushed with Tamiya Dark Yellow (XF60) to enhance the effect of dry grass.

The three temporary paper clip pins were then removed and the three holes 'cleared out' with a 1.0 mm drill to ensure the model pins would fully seat into the holes. CA thin adhesive was then applied to the two wheel pins and the model was carefully seated into the two previously drilled holes. Light pressure was applied to the wheels and rear fuselage to ensure the model 'sat' naturally on the grass mat. The same was applied for any figures. Any light weight accessories were secured in position using PVA adhesive only.

EXAMPLE OF DISPLAY BASE


DFW T28 'Floh' (Flea)of 1915,
which never entered service.
Second version prototype, as
designed by Hermann Dorner.