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 Wingnut Wings 1:32 scale model of the Hansa-Brandenburg W.29 floatplane.

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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

‘Copper State Models’ 1:32 scale German Naval Crew (F32-034),
‘Copper State Models’ 1:32 scale German Naval Ground Crew (F32-037).

After Market Parts

‘HGW Models’ fabric seat belts (132562)
‘Gaspatch’ 1:32 scale German Airspeed Indicator (13-32013),
‘Gaspatch’ 1:32 scale Parabellum 14/17 machine gun (15-32069),
‘Gaspatch’ 1:32 scale ‘Spandau’ 08/15 machine guns (15-320619)

Decals

‘Aviattic’ Bleached Clear Doped Linen (ATT32044),
‘Aviattic’ German Naval Hex (faded) (ATT32113).
Microscale’s ‘MicroSet/Sol’ setting solutions.

Rigging accessories

‘GasPatch’ Elite Accessories Turnbuckles
Various ‘Albion Alloy’ Micro-tube (Brass or Nickel Silver),
‘Steelon’ Mono-Filament 0.12 mm diameter.

Sundries

‘Araldite’ two part epoxy adhesive, Paints (‘Tamiya’ Acrylic, Humbrol Acrylic, Mr Metal Colour), ‘AK Interactive’ Primer and micro-filler (Grey AK758) and (White AK759), Alclad Lacquers, Mr. Colour Levelling Thinners, PVA Adhesive, Cyanoacrylate (CA) glue (thin), ‘Fleky 5’ CA adhesive, Blue or White Tack, Vallejo Plastic Putty, Sanding and/or Polishing sticks from ‘Flory Models’, ‘PlusModel’ lead wires, ‘Vallejo’ Still Water (26.230), ‘Masilla Plastica (401) putty, ‘Flory’ pigments, ‘RB Motion’ aluminium nut (1279-A), ‘Humbrol’ Maskol, ‘Bostik ‘Blutack, ‘UHU’ White Tack, ‘Johnson’ Pledge Floor Care finish.

Weathering mediums

‘Flory Models’ clay washes and pigments, AK Interactive engine washes,
‘Tamiya’ Weathering Master sets, ‘Abteilung 502’ oil paints,
‘Tamiya’ Enamel Thinners (X20).

Display Base

Purpose built Acrylic base and cover, etched plaque (information plate),
Self adhesive static grass tufts (available online),
‘Coastal Kits’ 1:32 Scale ‘Abandoned Airfield’ display mat.

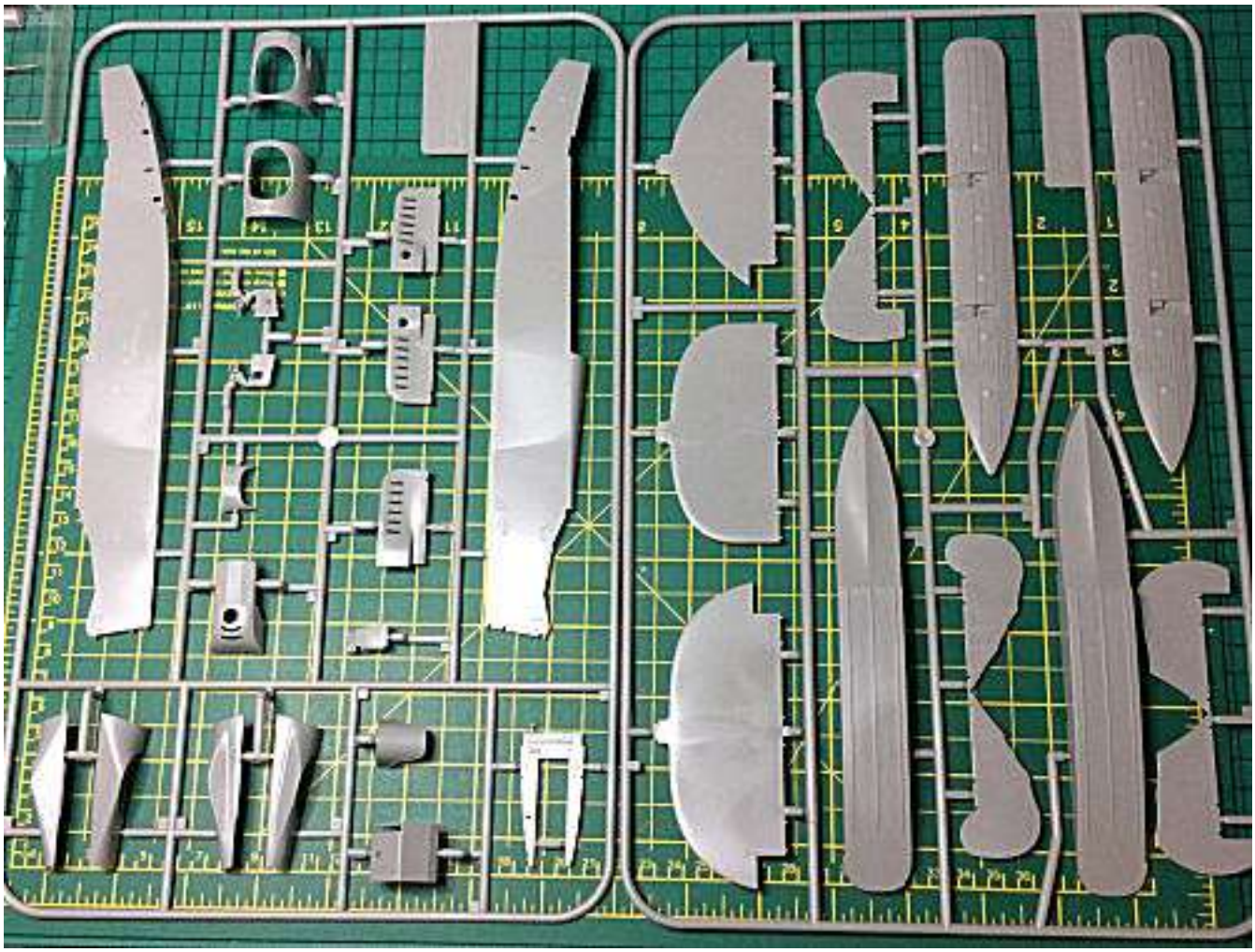
THE MODEL (GENERAL)

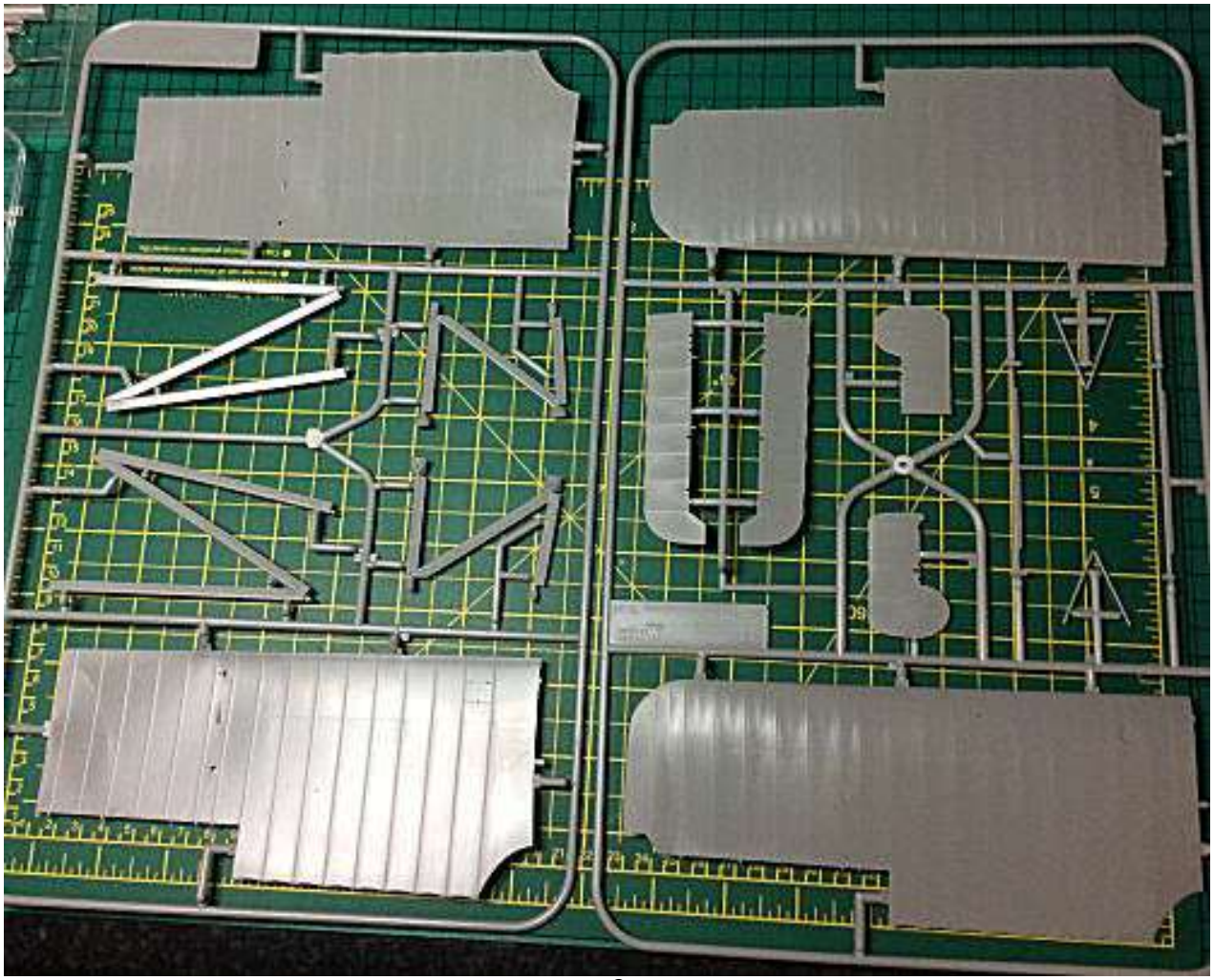
(Wingnut Wings Kit No.32801)

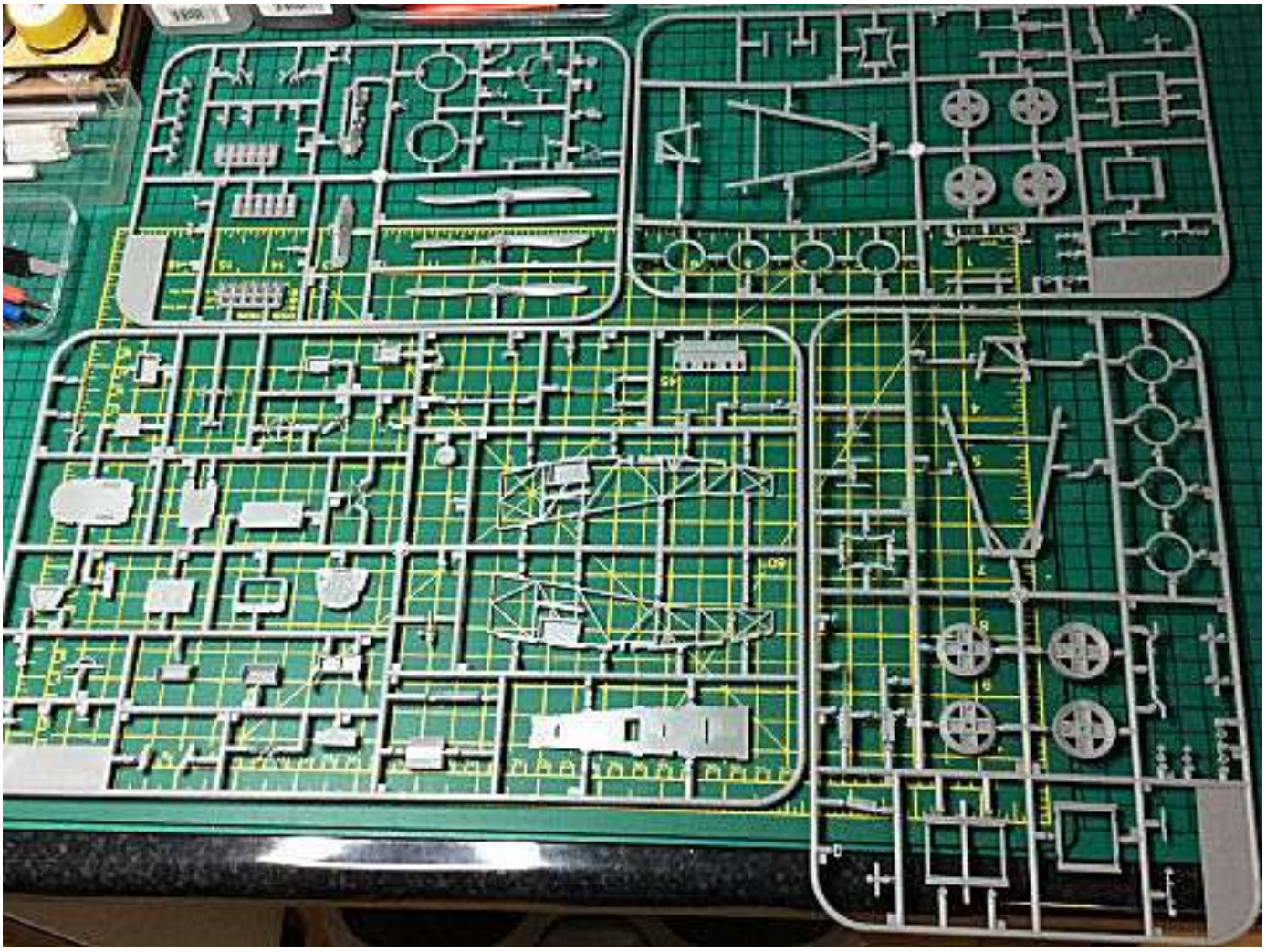
This particular model kit has been released by Wingnut Wings as a single model kit (32010) and as part of the 'Duellist' kit (32801). However the single model kit has been out of production for some time now, so this particular model will be built from that in the duellist kit. As such the model decals only offer one set of markings, that of Friedrich Christian Christiansen, whereas the single model kit offered five other sets of decal markings.

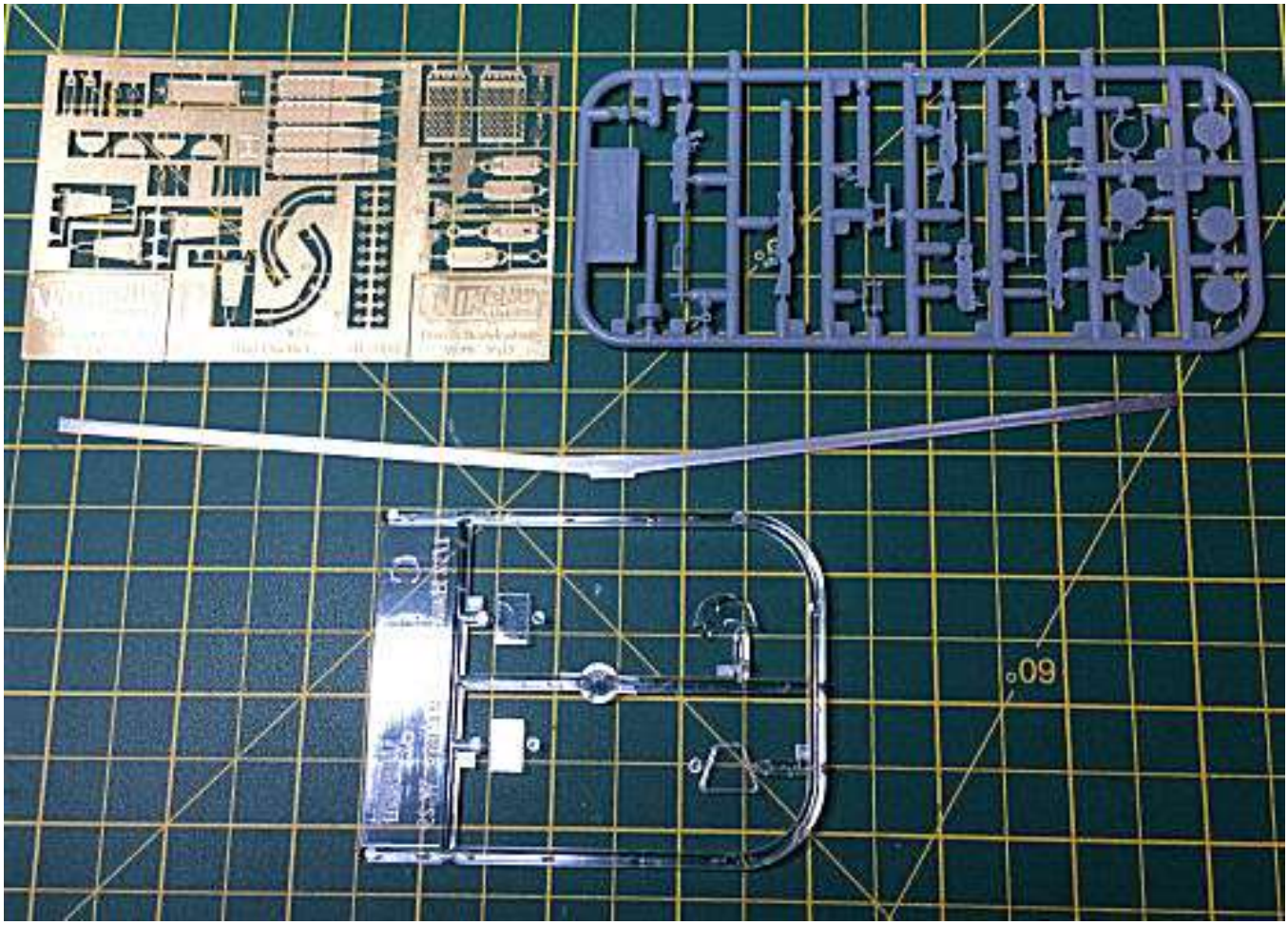
As expected, any model from WingNut Wings (WNW) is at the top of quality and accuracy. The kit components are not a numerous as many of their kits, which is good if you are building a WNW kit for the first time. The parts are manufactured from traditional 'plastic', not resin. There is minimal mould flash that needs to be removed and also virtually no ejection pin marks that need to be filled and sanded away. All of the main sprues, including the transparencies and photo-etch (PE) parts, are sealed in separate plastic bags, which prevents and sprue damaging another. There are nine main sprues, one transparency and one photo-etch for this model. Also there is a metal 'wing spar' to support the weight of the wings. The version of the W.29 modelled is the C3MG type (Type C, 3 machine guns) and there are parts supplied that will not be used. This model only has rigging between the floats so is a good build for those who may struggle rigging a model. NOTE: The Wingnut Wings website has two correction sheets for the instructions.
The decal sheets supplied are by 'Cartograf' so should be of the best quality in both colour and registration. However some modellers have experienced problems with the decals supplied in some recent Wingnut releases and as I will only be using Christiansen's personal and national markings, I could not say if there may be problems applying the hexagonal patterned decals supplied.

The instruction manual is in the well known format that WNW produce and has clear and concise instructions, including coloured illustrations and photos for reference. Also the manual has a lot of information on the aircraft including a colour profile of Wingnut Wings interpretation of the aircraft colour scheme.





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PREFACE

This model represents the Hansa-Bradenburg W.29 (CM3G version), No.2512 as flown by Oberleutnant Friedrich Christian Christiansen of 'Seeflugstation 1', Zeebrugge, Belgium during July 1918.

The pilot:

References:
Osprey Aircraft of the Aces - Naval Aces of World War 1 (Part 2) by Jon Guttman.
Various online resources (e.g. Wikipedia and the Aerodrome forum).

Friedrich Christian Christiansen was born on the 12th of December 1897 in Wyk-auf-Föhr, the second largest of the North Frisian Islands on the German coast of the North Sea. The son of an established sea Captain, he left school in 1894 and joined the Merchant Marines, where he served for 7 years before volunteering for military service in 1901 on motor torpedo boats.
He developed a keen interest in aviation and in 1913 earned a pilot's license (No.707) and was a civilian flight instructor at the outbreak of war. He was 'called up' and joined SFII on the 6th of January 1915 and the following day he flew his first wartime operational sortie in aircraft Friedrichshafen FF 29 No.204. Over the coming years he participated in many sorties, which included raids on the English coastal ports and by the 25th of April 1917 he had claimed four victories. Christiansen attacked not only aircraft but airships and vessels. During September 1917 the Ernst Heinkel designed Hansa-Brandenburg W.12 was entering service. The W.12 was a biplane floatplane with a crew of two (pilot and observer/gunner) and proved to be a good maritime patrol aircraft.

Christiansen claimed many of his combat successes flying the W.12 but by 1918 was urging Heinkel to improve the design, which culminated in the Hansa-Brandenburg W.29, similar to the W.12 but a monoplane. In early 1918 Christiansen test flew the W.29 prototype and was so impressed, insisted that he be allowed to fly the aircraft back to Zeebrugge for operational flying. The W.29 entered service during April 1918 and it was when flying a W.29 on the 4th of June 1918 that he took part in the now very well documented destruction of a Felixstowe F.2a flying boat (probably No.N5433). By the wars end he had a total of 13 victories, had been awarded the 'Pour le Mérite' (Blue Max) and had also attained the rank of Kapitänleutnant and command of the II Seeflugbattalion (13th of October 1918).

He formerly retired from active duty on the 6th of March 1919 and in 1922 returned to the Merchant Marine and eventually served as Captain of the steam ship 'Rio Bravo' from 1924 to 1930. In 1933 he became involved with the rise of Adolf Hitler and during WW2 served in high rank at the Aviation Ministry. However he gained notoriety during the German occupation of the Netherlands and at wars end was arrested and put on trial by the allies for war crimes. He was subsequently sentenced to a total of 12 years imprisonment in Arnhem jail, but he was released prematurely on the 19th of December 1951.

He returned home to West Germany where he eventually died at Aufkrug on the 5th of December 1972, just prior to his 93rd birthday.

10 of Christiansen's 13 confirmed victories were recorded as:

Sopwith Pup - 1st May 1917
Porte F2 'Baby - September 1917
Airship C27
Curtiss H12B flying boat - 14th February 1918
Curtiss H12B flying boat - 24th April 1918
Curtiss H12B flying boat - 25th April 1918
Felixstowe F2A flying boat - June/July 1918
Felixstowe F2A flying boat - June/July 1918
Felixstowe F2A flying boat - June/July 1918
British Submarine C-25

THE AIRCRAFT

References:
Osprey Aircraft of the Aces - Naval Aces of World War 1 (Part 2) by Jon Guttman.
Windsock Data File No.55 - Brandenburg W.29 by Peter M Grosz.
Wingnut Wings kit instruction manual.

The Hansa-Brandenburg W.29 was a direct development of the successful W.12 biplane and was in simple terms, that aircraft but with the upper wing removed. In the January of 1918 three prototypes were constructed, each with a different engine. Prototype No.2204 had a 150hp Benz Bz.III, No.2205 a 185hp BMW IIIa and No.2206 with the 160hp Daimler-Mercedes D.III. Once full production of the W.29 started in April 1918, most of the 199 produced during WW1 were powered by the 150hp Benz Bz.III engine. Of the remaining aircraft 66 were fitted with the 185hp Bz.IIIa and just 11 with the 185hp BMW IIIa engine. The W.29 was produced as two variants - the W.29 C3MG (C Type with 3 machine guns) and the W.29 C2MGHFT (C Type with 2 machine guns and wireless equipment). An area of the aircraft that was modified was the tail plane and elevator, which was re-designed from Serial No.2565 due to buffeting experienced during slow turns.
NOTE: The version of the aircraft built in this build log is that of the earlier elevator design.
Testimony to the success of the W.29 is that it continued in service with the post war 'Deutsche Luft-Reederei' (German Air Carrier). It was also flown in Norway and was built under license in both Demark and Japan.

NOTE: On the 5th of June 1918. the Austro-Hungarian Navy ordered 25 licence built aircraft, powered by the 185hp Austro-Daimler engine, from 'Ungarische Fligzeugfabrik AG' (UFAG). Apart from the obvious difference in engines, these aircraft also had other modifications, such as an entry door for the pilot (left side) and a fairing around the machine gun. This version is not covered by the 'Wingnut Wings' kit.

This particular model depicts the Hansa-Brandenburg W.29 (CM3G version), No.2512 flown by Oberleutnant Friedrich Christian Christiansen of 'Seeflugstation 1', from Zeebrugge in Belgium during July 1918. The aircraft carries his personal marking of the letter 'C' within a black outlined box and on a white background.

The basic aircraft statistics are:

Wingspan - 44' 4" (13.5m)
Length - 30' 8" (9.35m)
Maximum weight - 3225lbs (1463kg)
Maximum speed - 102mph (164kph)
Weapon (observer) - One 7.92mm LMG 14/17 Parabellum machine gun.
Weapons (pilot) - Two 7.92mm IMG08 'Spandau' machine guns.

Friedrich Christian Christiansen seated in the Hansa-Brandenburg W.29,

as modelled in this build log.

PART 1 - THE MODEL

MODIFICATIONS OR CORRECTIONS

General preparation
Control surfaces - animation
Fuselage internal detail:
- Control cable pulleys
- Control lines - access
- Control line attachments
- Pilot's control wheel
- Throttle quadrant
- Crew seat belts

Gun installations
Rigging points

Despite this model being produced by Wingnut Wings, there are still a few minor changes that can be made to the model to enhance the overall effect. Some of the changes I've employed on the model were pioneered by the late 'Des Delatorre' on his web site page:

https://www.ww1aircraftmodels.com/page24.html

General preparation:
Some modellers work the various pieces whilst they are still attached to the main sprue, but I prefer to remove the pieces first so that I can clean they up more easily. However pieces like the cockpit frames are delicate and can easily be damaged when being removed. When parts are cut from the sprues, care should be taken as they can either break or get stressed at the cut point, which causes 'white' stress and/or deforming. For plastic kits, I use fine sprue cutters to cut away the kit part, not too close to the part, then sand off the tag. When I cut resin parts away from their mould blocks, I use a fine cutting saw, which has a more gentle cutting action. Despite being a WNW kit, there are still some fine moulding lines around items such as the cockpit frames, but they are only slight and are easily removed using a sharp blade or sanding stick. I use a new scalpel blade to gently scrape off the mould lines. Some of the model items like the parts for the cockpit are very small and can easily 'fly off'' when being handled, so take care. Remember to drill any holes needed for rigging or control lines by referring to the relevant pages and diagrams in the kit instruction manual.

Once the items have been removed from the sprue and prepared, I normally gently wash them in warm, soapy water, to remove any handling 'grease' or mould release agent remaining on the items. I use an old toothbrush to do this. Once dry they can be primed ready for painting. Primer can be applied by brush, airbrush or from aerosol cans. These days I prefer to use 'AK Interactive' Primer and Micro-filler (Grey AK758) or (White AK759). These have good coverage as the base primer for acrylics. Take care when spraying the primer as if you apply too much it will result in 'pooling' or 'runs', which would then need to be removed once the primer has dried. Make sure you spray in a well ventilated area or preferably, if you have one, use an extractor booth.

To hold items for priming I use self locking tweezers or carefully insert a toothpick into the item or I use a small piece of sticky putty, such as 'Blu Tack' or 'UHU White Tack', on the end of a tooth pick. Once applied the primer dries quickly, one of the main advantages of using acrylic paints rather than enamels or oil paints.

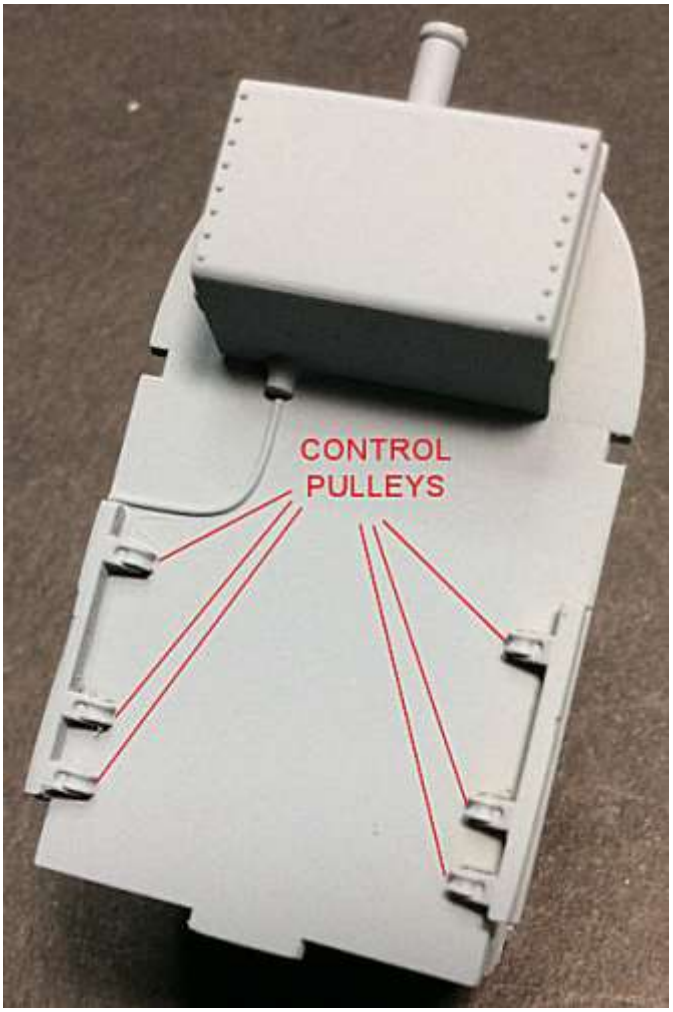
Control surfaces - animation:

The kit parts used are B6/B10 (tail plane), I4/H2/H4 (Starboard wing), I1/H1/H3 (Port wing) and A45 (Rudder). Some models have flimsy control surface attachments or no attachment locations at all. This would normally require the drilling of small holes into both parts and micro-tubes inserted to attach the control surface to it parent part.
However this model does have all of the attachment points moulded onto the parts and these are sufficiently strong to position the control surface at the desired angle then apply cement.
However this needs to be carried out once the parts have been assembled, painted and/or decals applied, which is covered during the construction of the model (refer to Part 12 of this build log).

Fuselage internal detail:

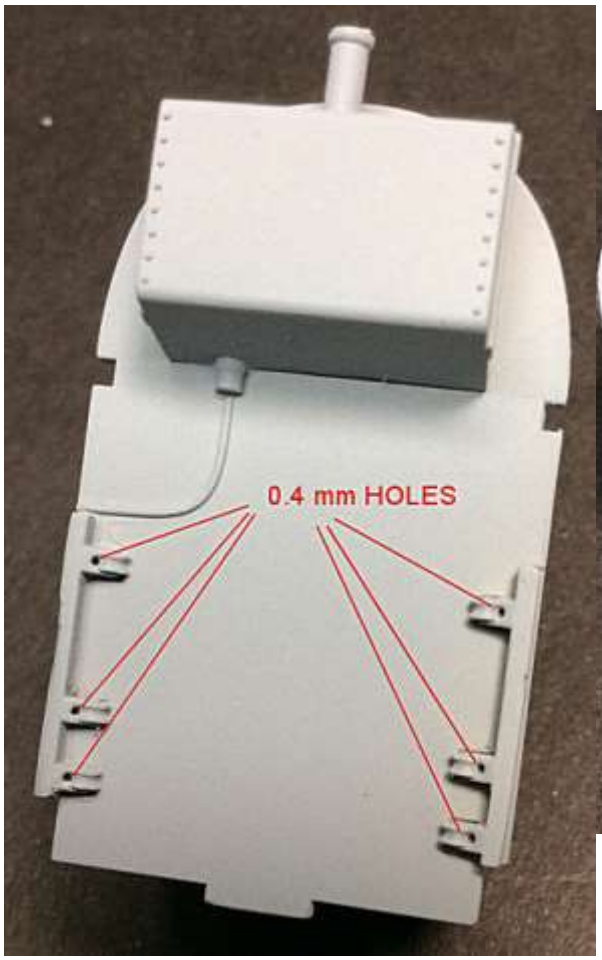
Control Cable Pulleys - Seat Bulkhead Pulleys:

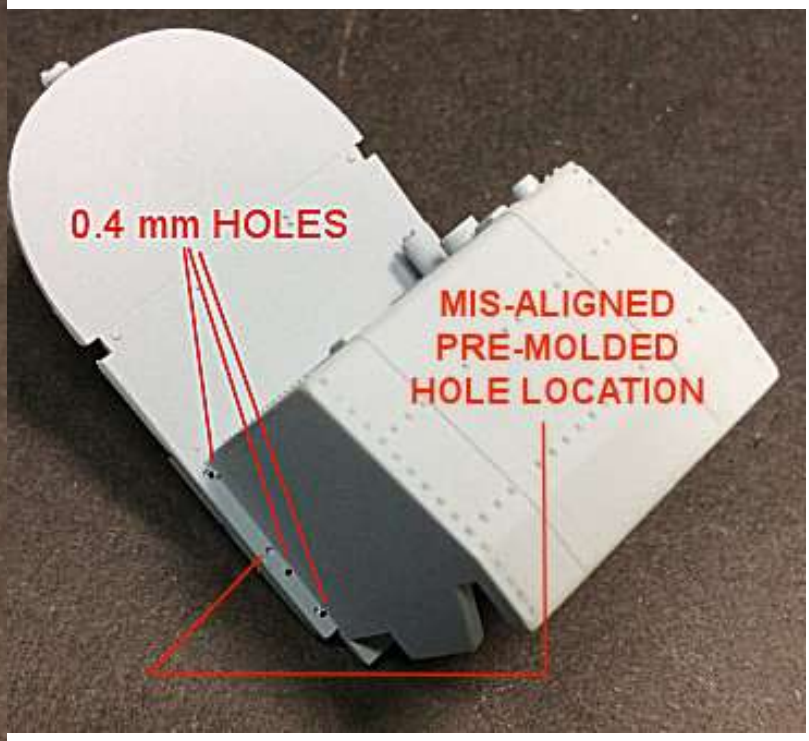
As noted by Des Delatorre, kit part No.D5 (guide pulleys for the control cables) are moulded as a solid piece and therefore to enable the control lines to pass around them, need to be drilled out.



1. The ends of the beams on kit items D5 were squared off.
2. Kit items D5 were then cemented in position of the seat bulkhead (kit item A24).
3. Holes of 0.4mm diameter were drilled, at an angle, between the pulley's and support beam (kit item D5), to ensure the drill exited at the pre-moulded hole locations on the other side of the seat bulkhead (kit item A24).

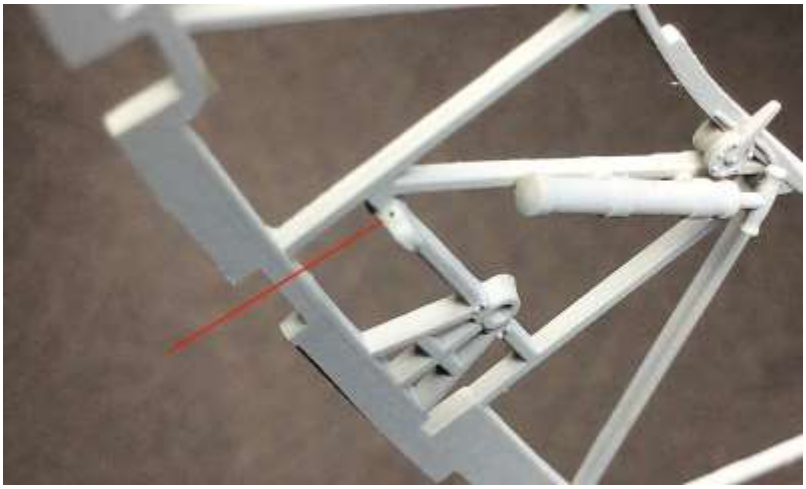
NOTE: The centre pre-moulded hole location does not match the position of the centre pulley.





Control Cable Pulleys - Rudder Side Frame Pulleys:

The rudder control lines are routed from the rudder bar around a pulley located on each cockpit side frame. These 'pulleys' are moulded as solid lugs and need to be drilled through to allow the control lines to pass around them. A hole of 0.3mm diameter was drilled through each pulley.



Control lines - access

Although the guide pulleys for the rudder and elevator control lines have been drilled out, there are still other modifications needed for where the control through the cockpits.

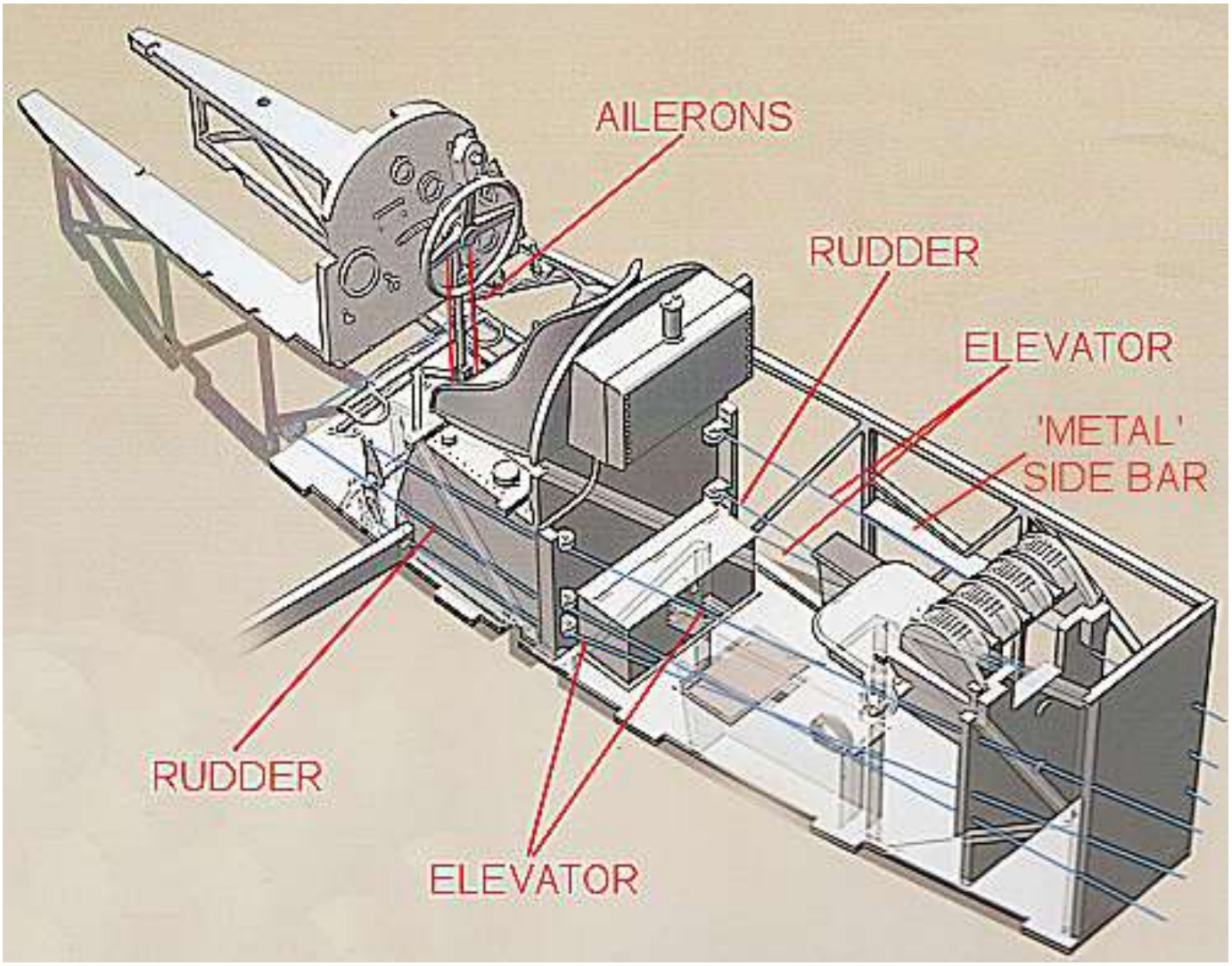
Ailerons - The aileron control lines run down from each side of the pilot's wheel then around pulleys at the base of the control column. The lines are then routed across the cockpit floor and out through the fuselage to each wing mounted aileron control surface. The only lines that will be visible in the cockpit are those from the pilot's wheel, which in the kit are represented by photo-etch (item P17). However for this model these photo-etch control lines will be replaced with mono-filament later during the build (refer to Cockpit and Fuselage - Part 5).

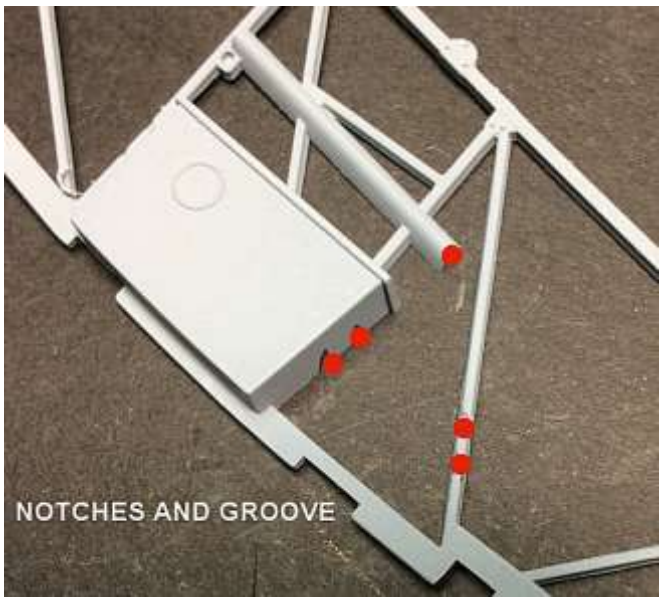
Rudder - The rudder control lines are attached to the rudder bar and are then routed around pulleys located on the cockpit side frames. The lines are then routed back either side of the fuel tank and through the central holes/pulley on the seat bulkhead. The lines then pass behind the storage containers on the cockpit side frames and finally through the lower holes in both of the rear cockpit bulkheads.
Both of the rear cockpit side containers need to be modified to allow the control lines to be able to 'realistically' pass by/through the containers to their holes in the rear cockpit bulkheads.

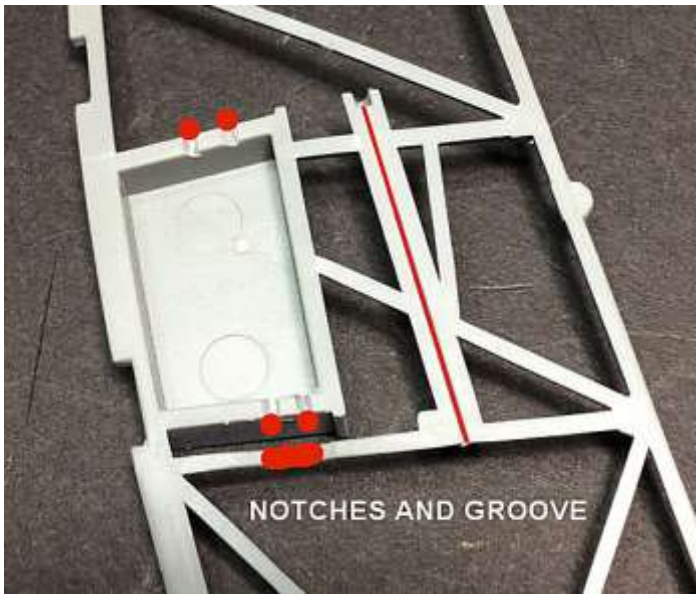
1. Drill out the three pre-moulded control lines holes (at each side) in the forward bulkhead (kit item A25) of the rear cockpit, using a 0.4 mm diameter drill.
2. 'Dry' fit the fuel tank/bulkhead assembly onto the cockpit floor.
3. 'Dry' fit the right cockpit side frame.
4. At the right side, route a length of 0.12 mm 'Steelon' mono-filament through the centre pulley hole in the seat bulkhead (kit item A24) and then rearwards through the lower hole in the rear cockpit's forward bulkhead (kit item A26).
5. Pull the line tight and mark the entry and exit points on the front and rear faces of the side container, such that when the control line is installed it will lay correctly and without any obvious distorted alignment.
6. Remove the side frame and at the marked positions drill and/or cut out the entry and exit points in the outer edge of the front and rear faces of the side container.
7. Refit the side frame and check the control line passes behind the side container and the alignment looks 'natural'.
8. The kit supplied rear bulkhead (kit item A26) has no control lines locations. While the line is in position, dry fit the bulkhead to the rear of the cockpit floor and mark the location of the rudder control line. Drill out the control line hole, using a 0.4 mm diameter drill,
9. Remove the line and disassemble the cockpit assembly.
10. Repeat this process for the left cockpit side frame and control lines.

Elevator - The elevator control lines are attached to the top and bottom of the two bell-cranks attached to the control column cross bar. The lines are then routed back either side of the fuel tank and through the upper and lower holes/pulleys on the seat bulkhead.
The lower elevator control lines then pass behind the storage containers on the cockpit side frames and through the central holes in both of the rear cockpit bulkheads.
The upper lines pass behind the 'metal' side bars in the rear cockpit then through the upper holes in both of the rear cockpit bulkheads.

1. To modify the cockpit elevator control runs, follow the same procedure as detailed for the rudder control lines, except for the following;
2. The ‘metal’ side bars on the cockpit side frames are moulded solid and as such will not allow the elevator upper control line to pass behind. Therefore, lay each cockpit side frame face down on a flat surface, exposing the back of the ’metal’ side bars. Using a sharp, straight edged scalpel blade or scriber, carefully create a groove along the back face of the side bars, sufficient to allow the 0.12 mm diameter line to pass through.

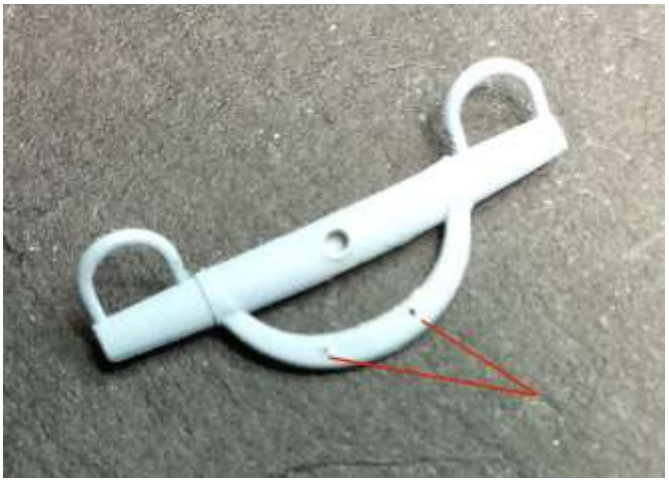






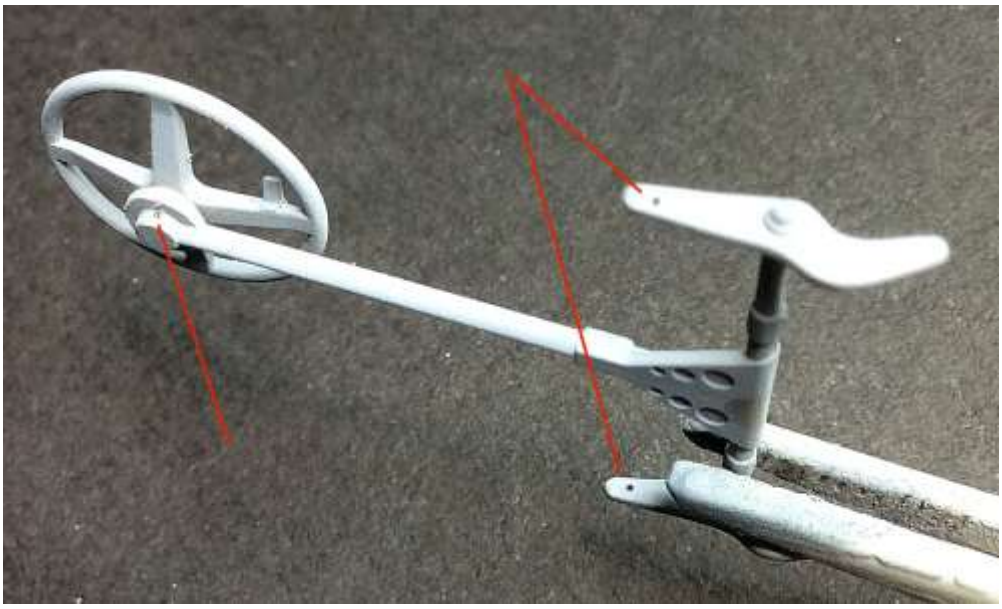
Control line attachments:
The Rudder, Ailerons and Elevator control lines are attached to their control in the cockpit, as follows:

Rudder - The rudder control lines were attached to the front 'hoop' of the rudder bar and were routed across and around the pulleys on the cockpit side frames, then rearwards through the seat bulkhead. Two holes of 0.3mm diameter were drilled one each side of the centre line of the 'hoop' on the rudder bar.



Ailerons - A hole of 0.3mm diameter was drilled horizontally through the boss on the front of the pilot's wheel. This is to allow the aileron control lines to pass through (Refer to Cockpit and Fuselage - Part 5).

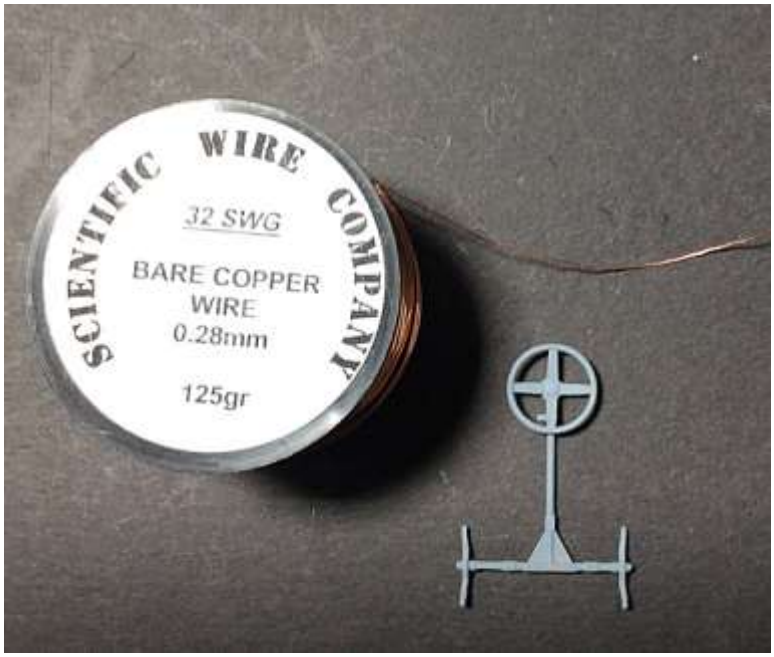
Elevator - The two upper elevator control lines are attached to the top of the bell-cranks at each end on the control column operating bar. The two lower elevator control lines are attached to the bottom of the bell-cranks at each end on the control column
operating bar. To allow for attachment of the upper control lines, a hole of 0.3 mm diameter was drilled through the top end of each bell-crank.
NOTE: The kit supplied metal spar (for supporting the weight of the wings) is fitted across the cockpit floor and in front of the fuel tank. As such it stops an elevator control line from being attached to the bottom of each bell-crank. Instead these particular control runs will start from the rear of seat bulkhead (kit item A24) - Refer to Cockpit and Fuselage - Part 5).

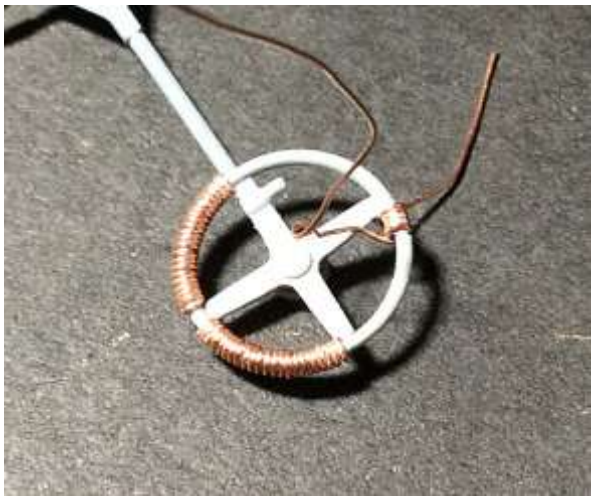


Pilot's control wheel

The kit supplied wheel for the pilot is detailed, but can be enhanced by adding 'wrapping' around the wheel rim.

Based on Des Delatorre's build notes - wrap wire around the separate segments of the wheel rim. I used 0.28 mm copper wire, which was secured at one end to a wheel rim segment, using CA adhesive. The wire is then wrapped around the rim and secured at the other end of the wheel segment using CA adhesive. Before you apply the wire, heat it over a flame to anneal it (soften).





Throttle quadrant:

The throttle and its quadrant, as supplied (kit item A11) is moulded solid. The two 'infills' were first drilled out using a 0.6 mm diameter drill, then carefully scrapped with a flat scalpel blade.

Crew seat belts:
The crew seat belts supplied in the kit are photo-etch. However I prefer to use the 'fabric' seat bet sets from 'HGW Models', which can be tricky to assemble but are more natural looking and are more 'in-scale'. The set used for this model is set 132562, which are assembled following the HGW instructions. The assembled seat belts will be fitted later in the model build (refer to Part 5 of this build guide).

Gun installations:
For this model build I chose not to use the kit supplied weapons, but instead those supplied from 'GasPatch' Models. These will be assembled and fitted later in the model build (refer to Part 12 of this build guide).

The reason I use ‘Gaspatch’ resin weapons is that they are more realistic as they have perforated cooling jackets, whereas the kit supplied weapons are moulded solid. However in order to fit the ‘Gaspatch’ machine guns into the fuselage apertures does require modifying the guns.

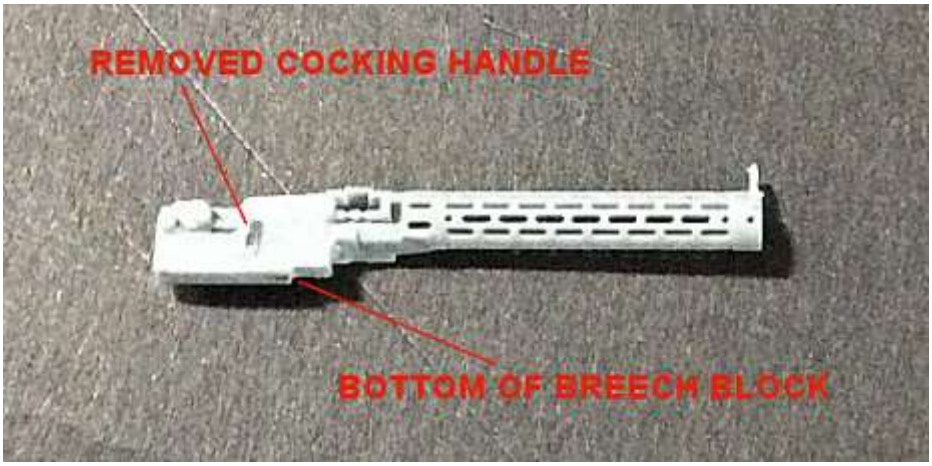
NOTE: Care should be taken when handling the ‘Gaspatch’ weapons, as being made of resin, they are fragile and can be easily broken.

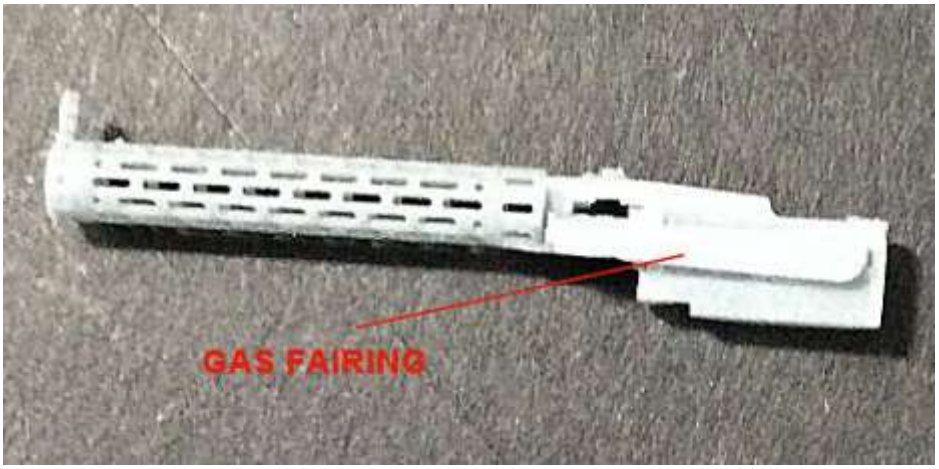
‘Spandau’ machine guns:

1. Dry fit a ‘Gaspatch’ resin machine gun to the **right** position in the fuselage and cut or sand away any areas of the guns breech block that prevent it sitting correctly in the side panel cut out and against the guns **external** ammunition feed chute. Also the pre-moulded cocking handle should be removed as it is not required. The areas of the breech block that need to be reduced are the bottom, including the mounting and operating cable and the gas fairing on the inside of the breech block.

2. Dry fit a ‘Gaspatch’ resin machine gun to the **left** position in the fuselage and cut or sand away any areas of the guns breech block that prevent it sitting correctly in the side panel cut out and against the guns **internal** ammunition feed chute. Also the pre-moulded cocking handle should be removed as it is not required. The area of the breech block that needs to be reduced is the bottom, including the mounting and operating cable.

3. Once you are happy with the fit of the weapons into the fuselage apertures, the barrels can be fitted. The supplied protection pads for the rear of the breech blocks are not required.





‘Parabellum’ machine gun:

The observers Parabellum machine gun supplied in the kit is also to be replaced. The only modification required is to the kit supplied gun swivel mounting.

1. Prepare the gun mounting ring (E20), the swivel support (G9), the gun mounting (G4), grab handle (E21) and the butt support (E25).

2. Carefully cut away the locating stubs on the inside of the bracket on the gun mounting (G4).

NOTE: Care needs to taken when locating the Parabellum gun into the mounting bracket, as the bracket is easily broken.

3. Carefully locate the Parabellum machine gun into the mounting bracket (G4).

4. Locate the gun mounting (G4) onto the swivel support (G9) and locate the assembly into the hole on the gun mounting ring (E20).

5. Locate the butt support (E25) into its hole on the gun mounting ring (E20).

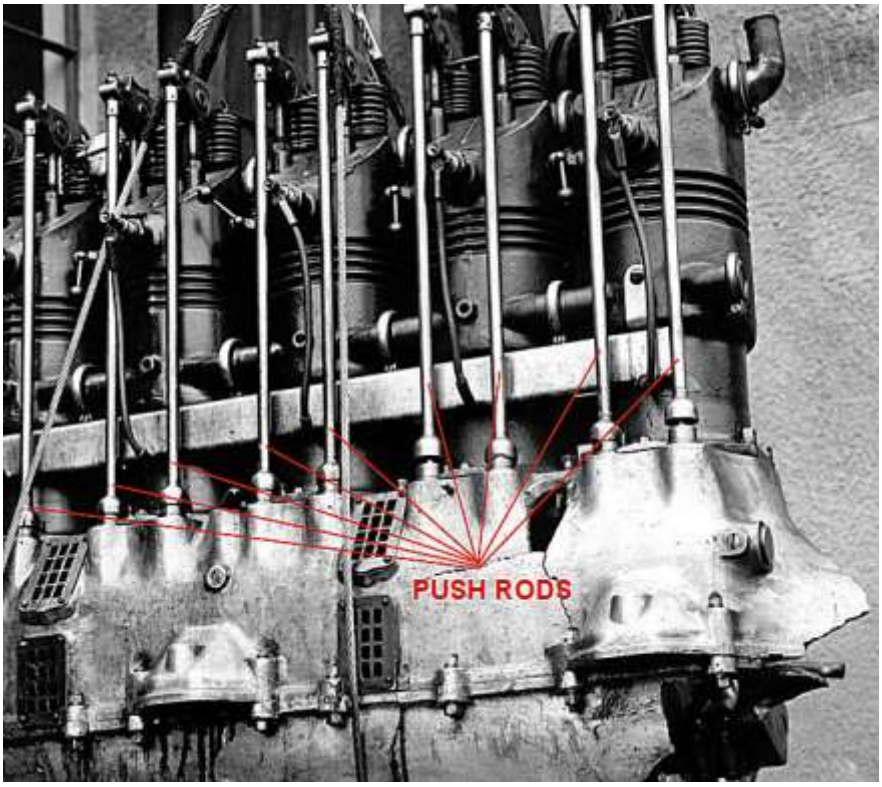
6. Align the gun across both the butt support and gun mounting to achieve correct positioning.

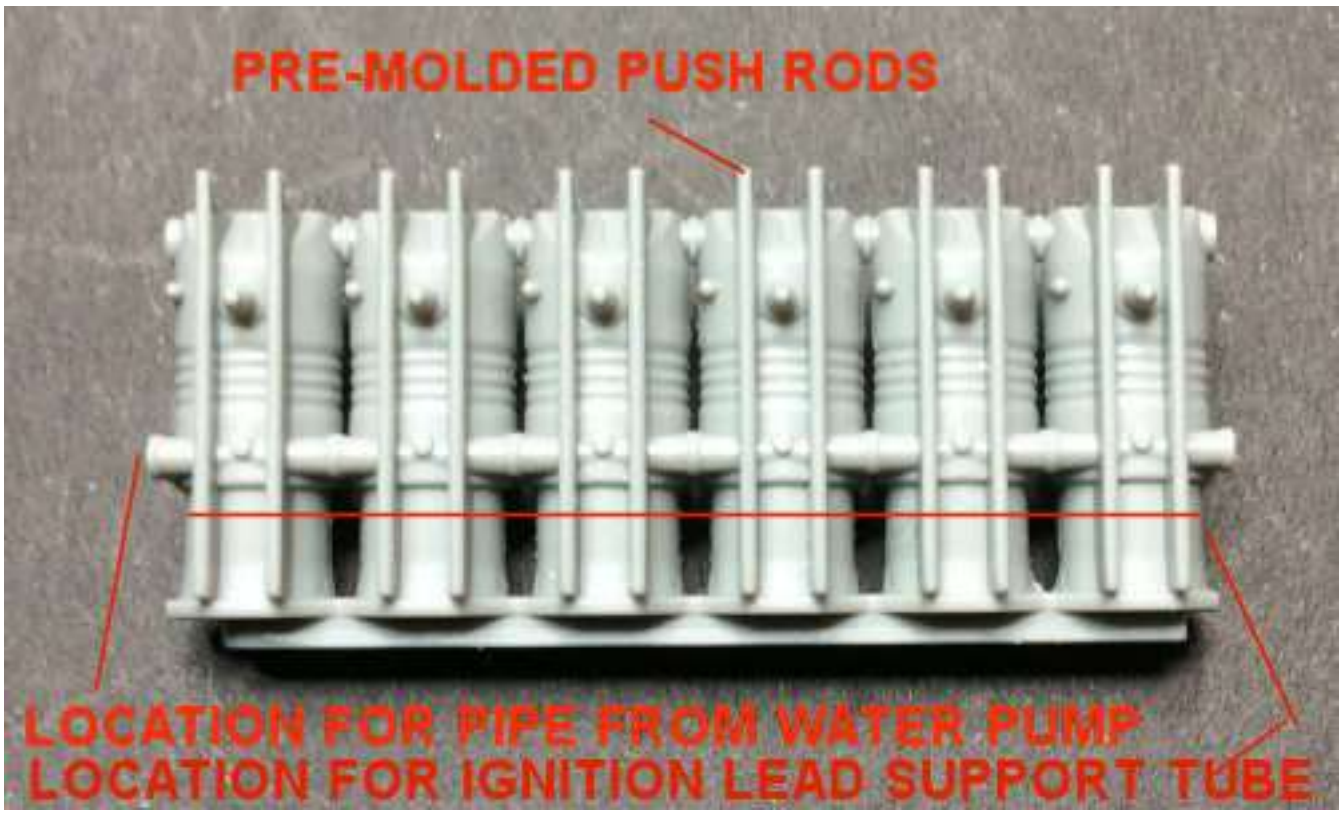
7. Secure the swivel support (G9), gun mounting (G4), butt support (E25) and grab handle (E21) with cement. **Do not cement** the Parabellum gun into the mounting bracket.

8. Once the cement has fully set, carefully remove the Parabellum gun from the mounting bracket.

Engine:
The kit supplied engine, although good, has certain detail pre-moulded into the cylinder head halves which are not what is shown on the engine photo's on the Wingnut Wings web site.

Valve push rods and spark plugs
The left side of the engine has the valve push rods moulded as flat 'bars', which looks unconvincing, as the push rods were just that, rods. Also the pre-moulded spark plugs lack definition.





First assemble the two halve of the cylinder bank (kit items E4 and E6) . This makes it easier to hold whilst working.

NOTE 1: Follow the contour of the cylinders
NOTE 2: Take care to work around the pre-moulded inter-connected coolant pipes between each of the cylinders, as these need to be left on.

Carefully cut/scrape/sand away the pre-moulded 'push rods' including the spark plugs on that side only. They will doubtless get accidently damaged anyway, so scratch built plugs will be created.

Once the 'push rods have been removed, re-scribe the grooves around the top half of the cylinders, as these will have probably been removed with the 'push rods'.

To allow replacement of the pre-moulded 'push rods' with cut to length 'Albion Alloy's' 0.4 mm Nickel-Silver (NST04) micro-tube, the base of each push rod on the top right side of the crank case needs to be drilled out. This is made easier as each location has an indent, which can be used to guide a 0.5 mm diameter drill.

At the locations for removed spark plugs, drill a hole of 0.7 mm diameter.

To create spark plugs, cut a short length of 'Albion Alloys' 06. mm diameter micro-tube (MBT06) and 0.4 mm diameter (MBT04).

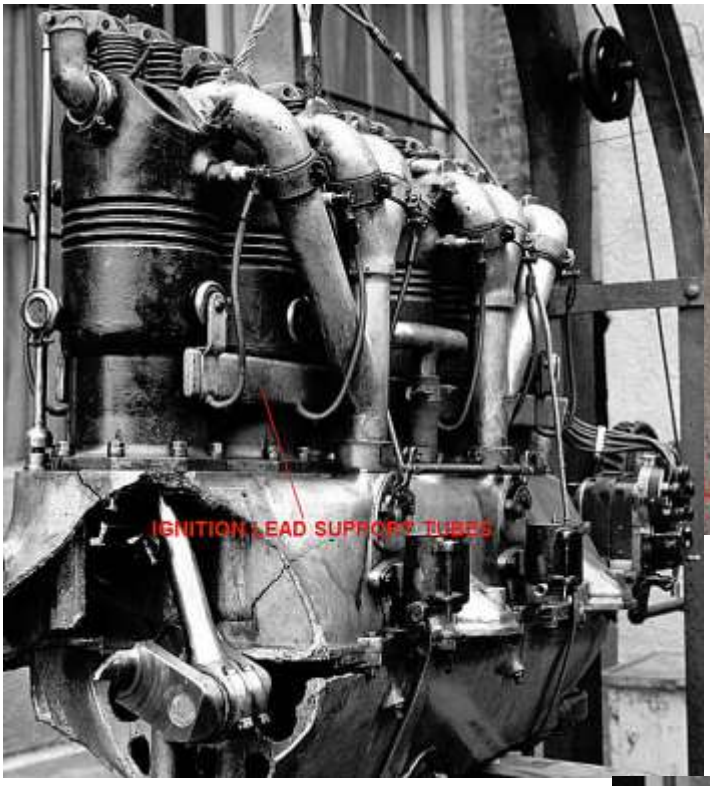
Slide a 0.4mm tube into a 0.6 mm tube so that it extends from the end the same distance as the existing pre-moulded spark plugs. Secure the tube in position using thin CA adhesive.

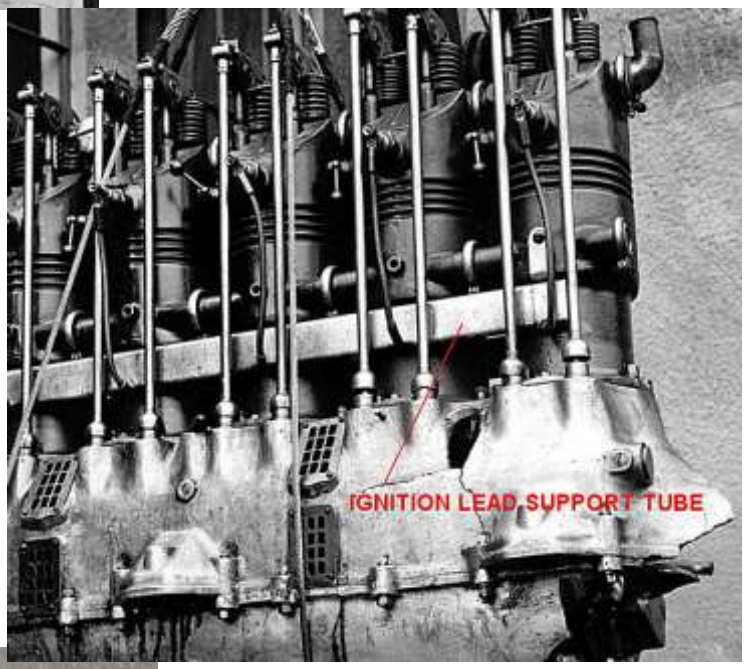
Slide the 0.6 mm tube into the drill hole so it extends the same distance as the existing pre-moulded spark plugs and secure in position using thin CA adhesive.

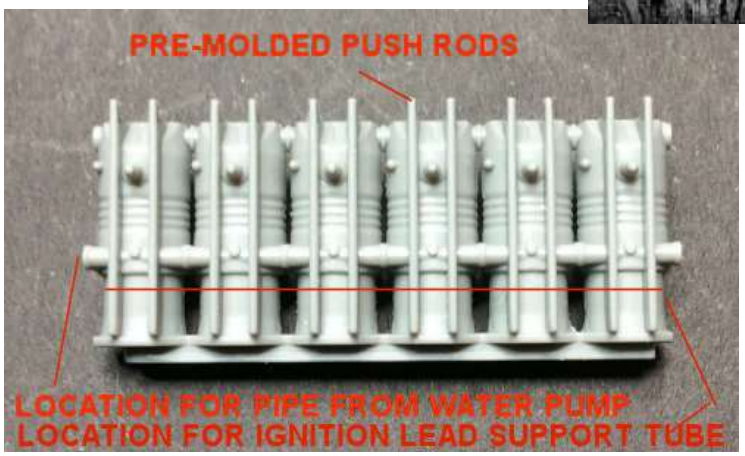
Assemble the crank case halves (kit items E13, 14 and 15) then attach the cylinder bank.

Ignition lead support tubes:

The left and right sides of the engine cylinder bank should have flat support tubes for the ignition leads.







The Benz III engine had two magneto's (one each side of the engine), which connected ignition leads to the sparks plugs on each side of each cylinder. To support the ignition leads along the sides of the engine, flat support tubes were attached on each side of the cylinder bank. These tubes were also tapered from the rear towards the front of the engine, as six ignition leads needed to be routed through the tube, but decreased in number the further forward they travelled as each was routed out of the tube and connected to its spark plug.

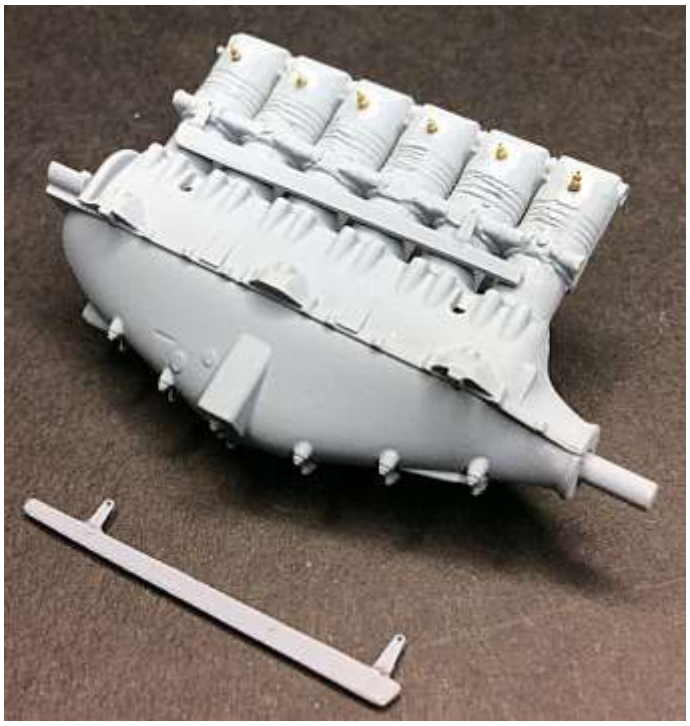
To represent these tubes I used two 'spare' wing cabane struts from my spares box. These were cut to 30 mm length then sanded and scrapped with a flat scalpel blade until they were 0.6 mm thick and with the correct taper. The rear end of each tube was sanded at an angle, as was the actual tubes.

I then made the four attachment brackets that secured the tubes to the cylinder bank. These were photo-etch control horns from the 'Part' Control horns and Turnbuckles set (S48-087). The horns were bent so that could be attached to rear face of the support tubes, but be able to lay against the engine cylinder.

The two support tubes were laid against the engine cylinder block and marked with a pencil at the centre of the rearmost cylinder and the cylinder second back from the front of the engine.

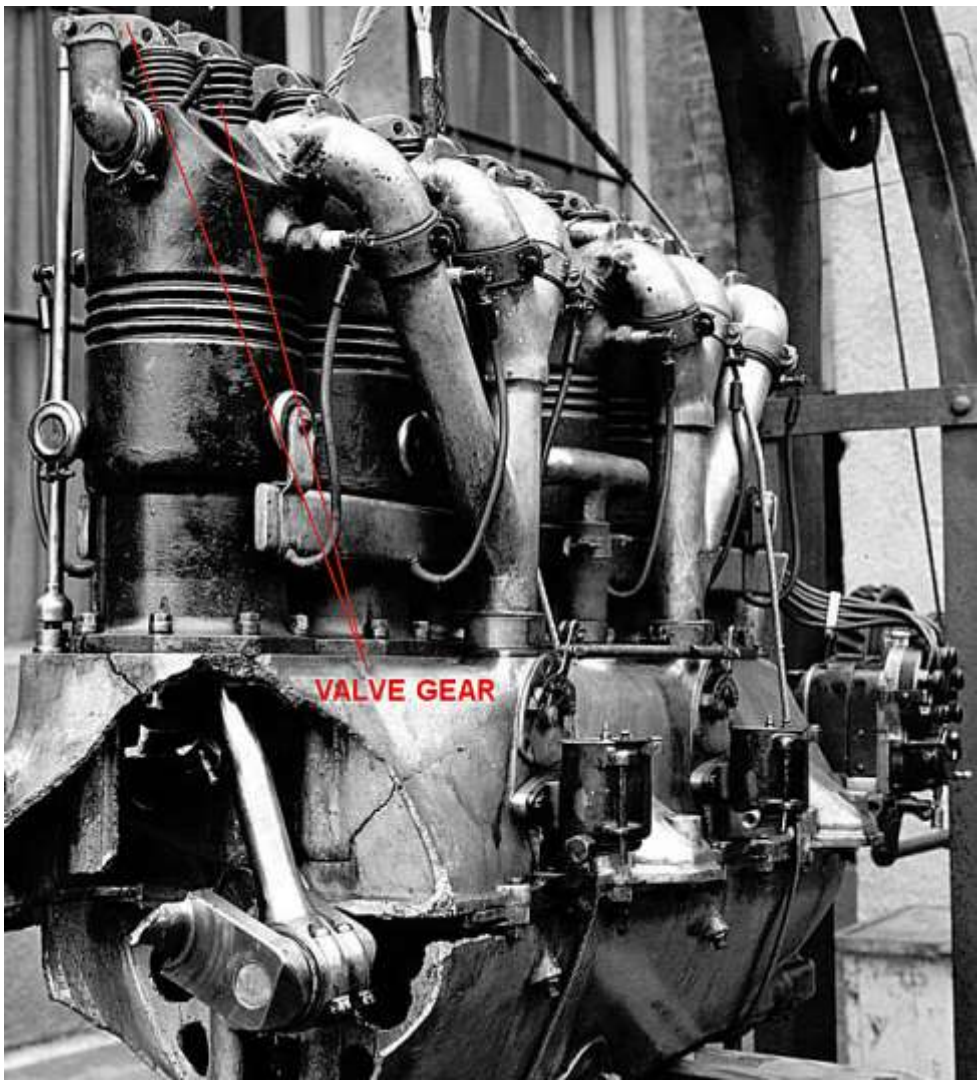
The four brackets were positioned on the rear faces of the ignition lead support tubes at the pencil marks and secured in position using thin CA adhesive.

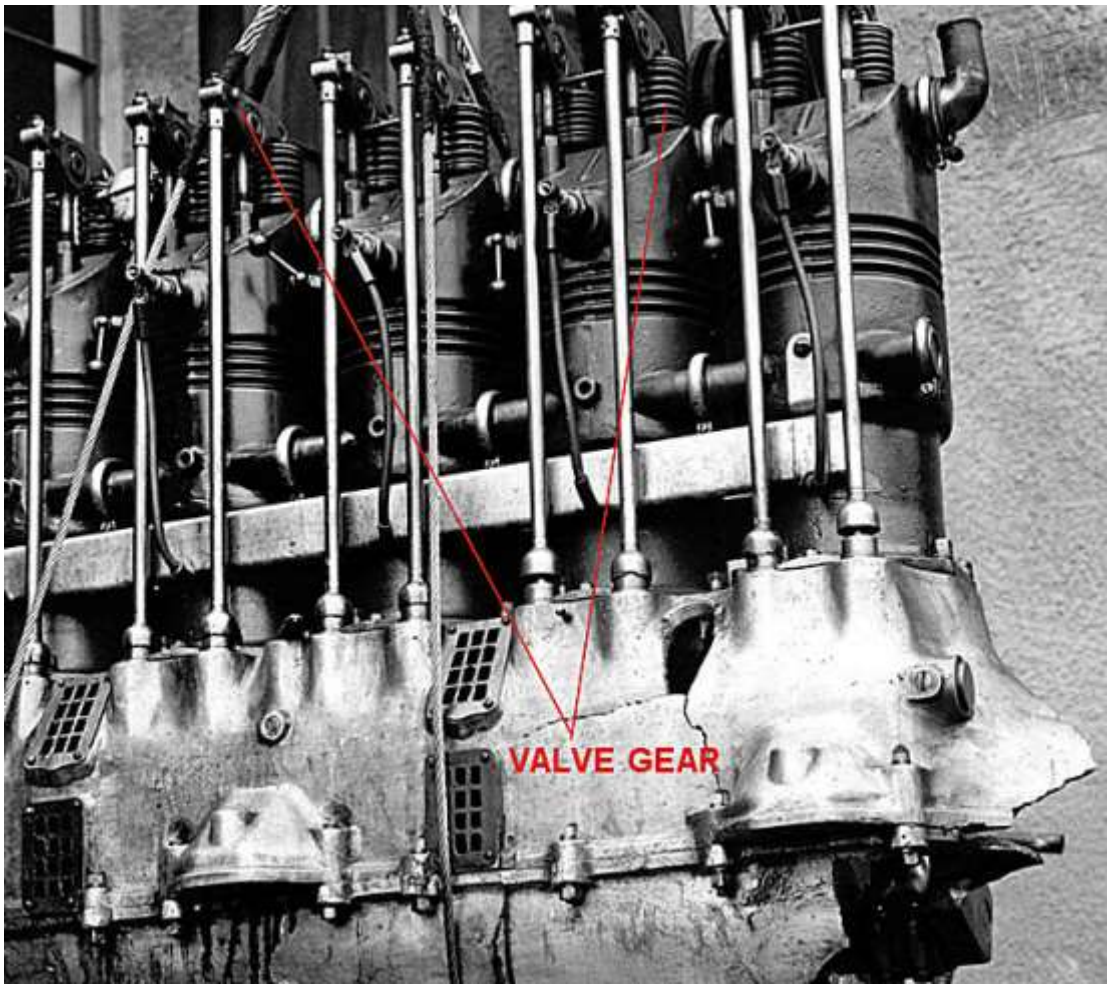
The support bars were the primed using 'AK Interactive' Grey Primer and Micro Filler (AK-758).

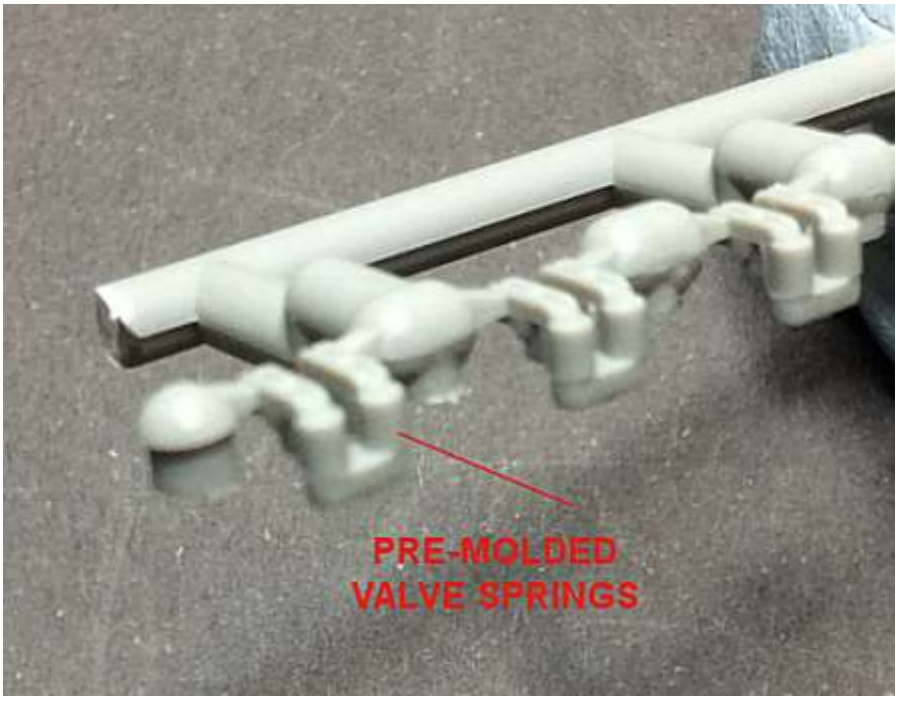


Valve operating gear:

The engine valve gear has pre-moulded valve operating springs and levers, which are moulded as solid pairs and don't look authentic.




VALVE GEAR


PRE-MOLDED
VALVE SPRINGS

I decided to replace the whole of the valve gear, apart from the lever.

I separated the kit supplied valve lever pairs and then cut away everything except the operating lever.

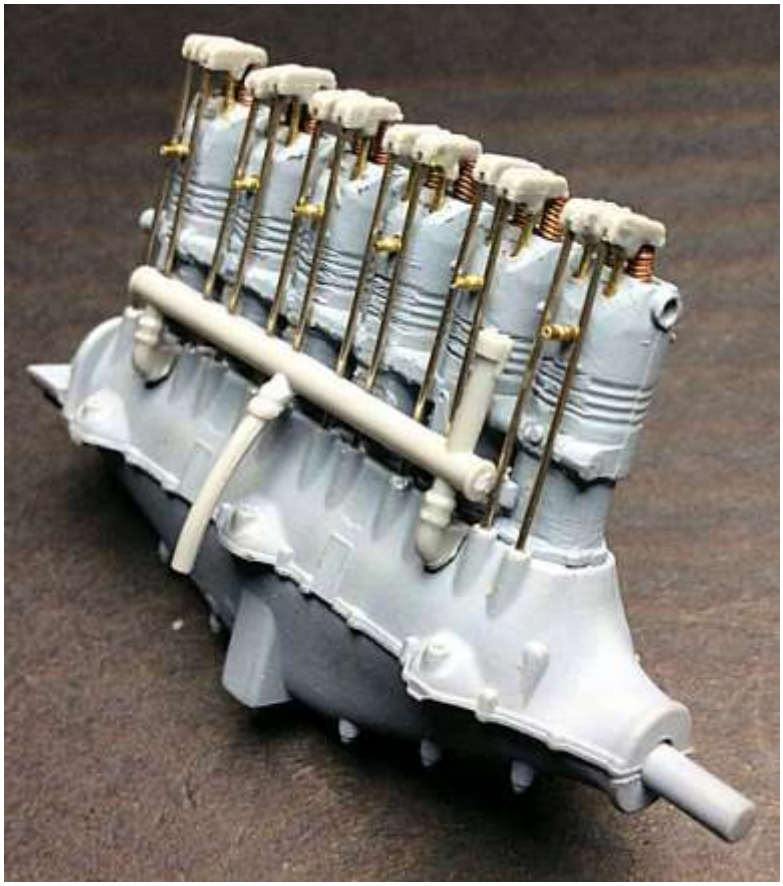
An short length of 'Albion Alloy's' 0.5 mm tube (MBT05) was secured into a 0.6 mm hole, drilled into the bottom centre of each operating lever and also into the top of the cylinder heads, to represent the lever support rods.

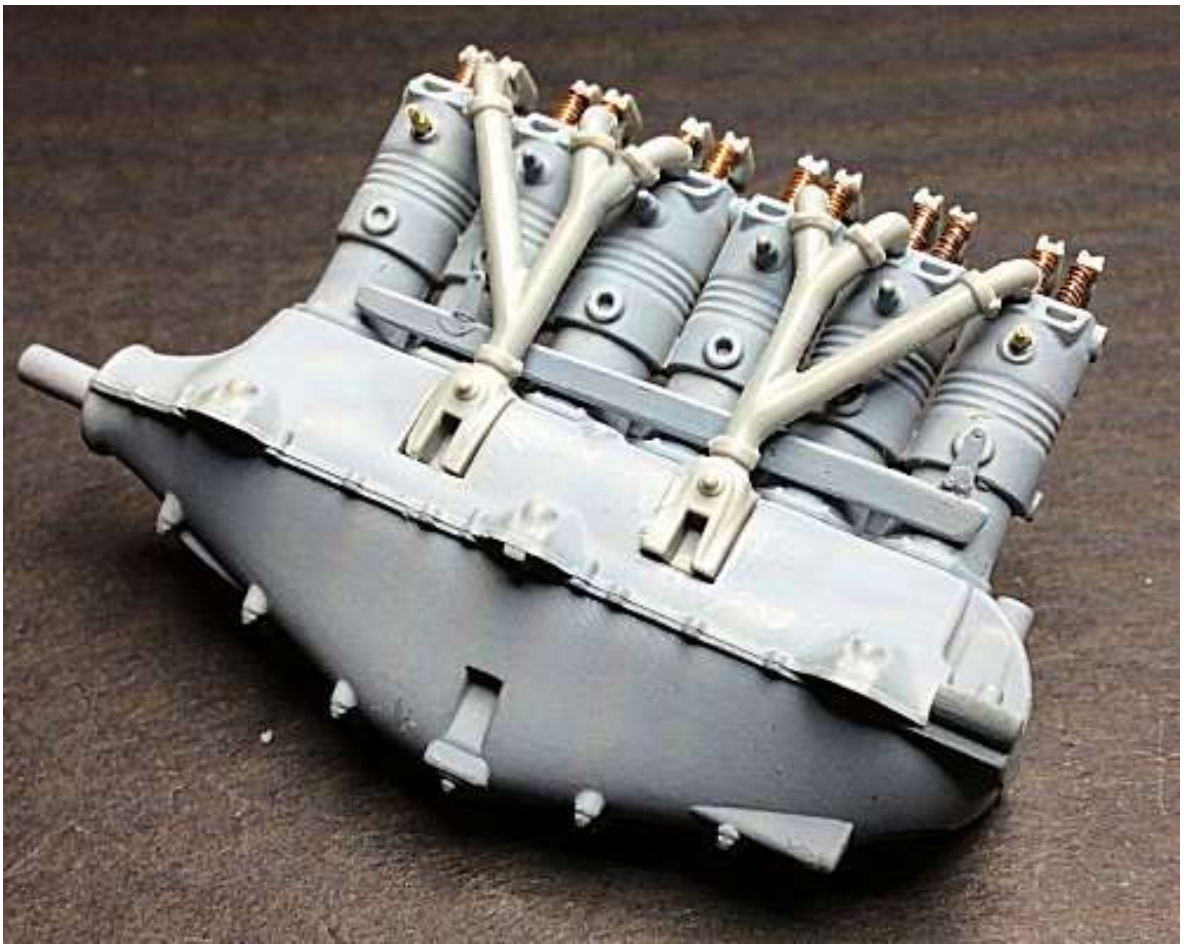
Lengths of 'Albion Alloy's' 0.4 mm Nickel-Silver tube (NST04) were cut for the push rods.

The springs were made by wrapping annealed 0.2 mm diameter copper wire around short lengths of 0.6 mm micro-tube (Albion Alloys MBT06). The springs were secured to the tubes using thin CA adhesive. Then the exposed ends of the rods were secured into 0.6 mm holes drilled into the cylinder head recesses.

NOTE: The length of the push rods and springs can be made slightly different so that the angle of each valve operating lever was different. This would represent the different open and closed valves in the cylinders.

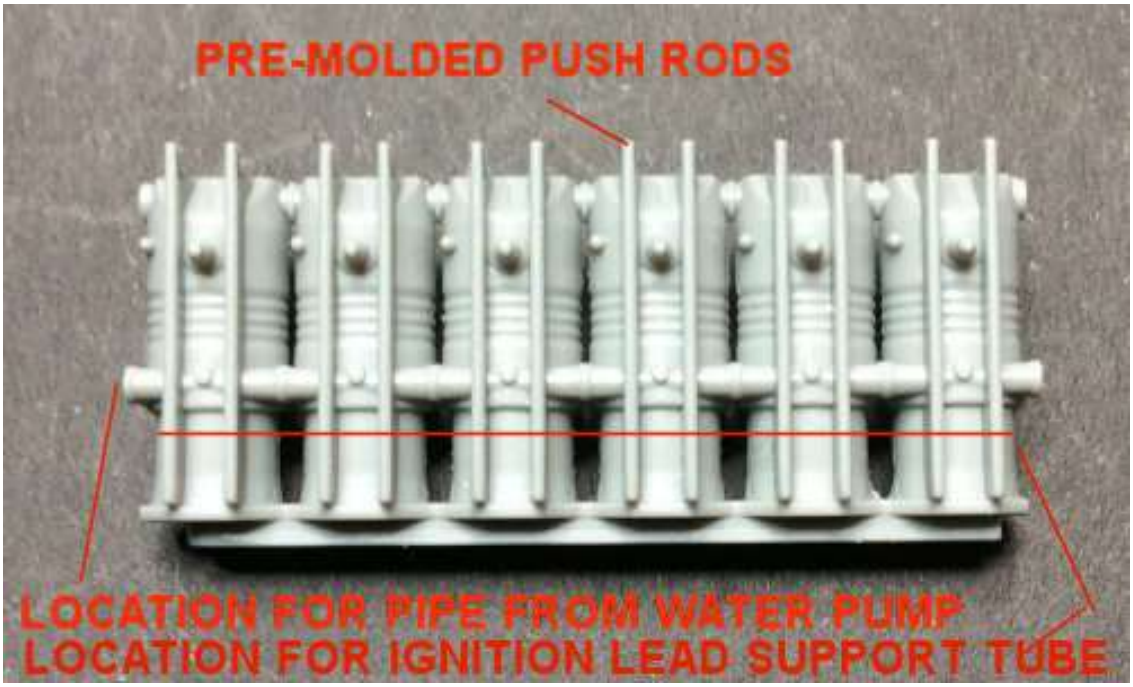
The valve springs, levers and lever support rods were fixed in position using thin CA adhesive. The push rods will be fitted at the end of the engine build, so as not to have them painted and lose their natural metal finish.





Coolant pipe:

There is no cooling pipe to connect between the water pump (on the bottom rear of the sump case) and the inter-connected cooling tube, which runs along the right side of the cylinder bank.



A coolant supply pipe was connected between the engine water pump, located at the rear of the sump, to the cylinder inter-connected supply manifold, on the right side of the cylinder bank. This pipe is not supplied in the kit.

Cut or sand away the pre-moulded pipe section on the kit supplied water pump (E16).

Drill a hole in the bottom face of the water pump, using a 0.8 mm diameter drill.

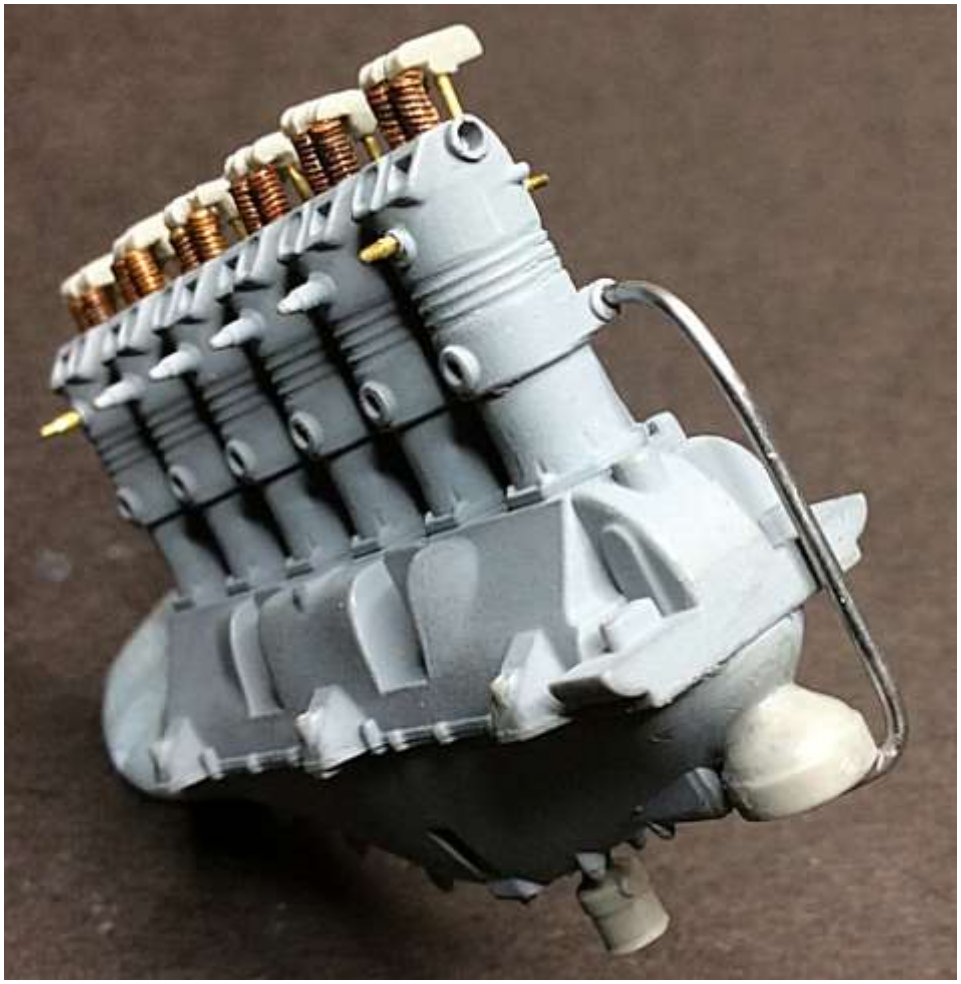
Drill a hole into the end of the cylinder cooling manifold, using a 0.8 mm diameter drill.

Cut a length of 'PlusModel' 0.7 mm diameter lead wire and secure into the hole in the Cooling manifold, using thin CA adhesive.

Carefully bend the lead wire down and close to the magneto mounting frame. Continue to bend the pipe across the lower face of the water pump.

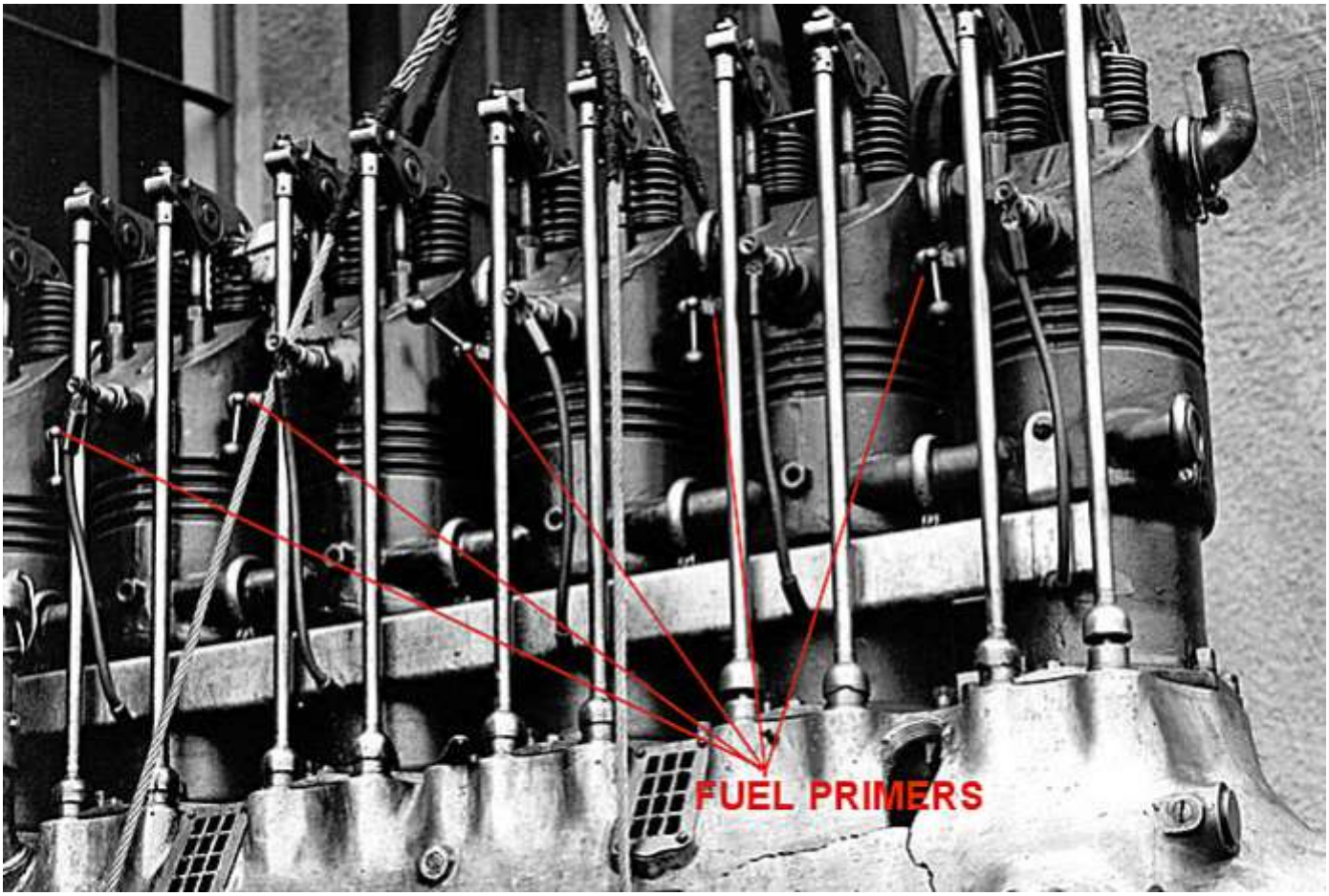
Trim the end of the lead wire so that it can be inserted into the pre-drilled hole in the water pump.

Carefully press the wire against the water pump surface than secure it in position using thin CA adhesive.



Fuel priming valves:

The engine has no fuel priming valves, which were fitted to the right, rear side of the cylinders.



Each cylinder had a fuel priming cup (valve) fitted adjacent to the spark plug but facing towards the rear of the engine.

Six short lengths of 'Albion Alloy's' 0.2 mm diameter Nickel-Silver rod (NSR02) were cut.

Each was bent at a right angle (90 degrees).

A 'RB Motion' aluminium nut (1279-A) was secured on one leg of the bent rod, approximately 2 mm back from the end, using thin CA adhesive.

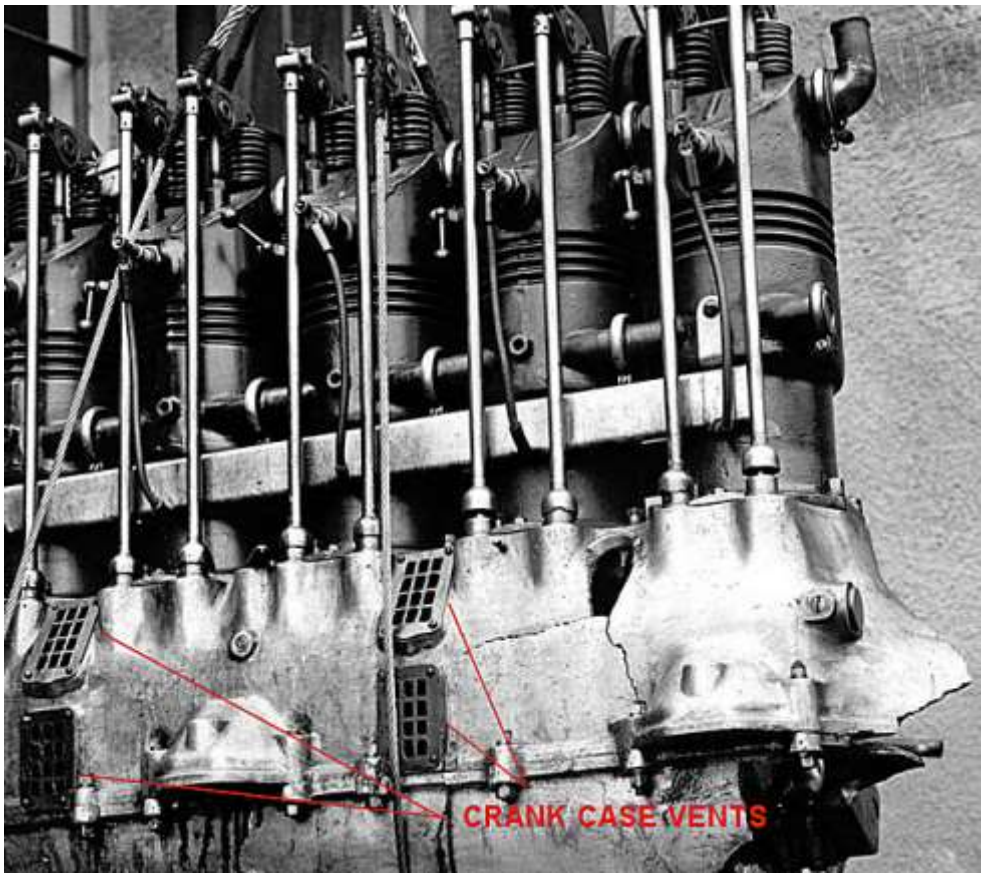
A hole of 0.3 mm diameter was drilled into the rear facing side of each cylinder, inline with the cylinders spark plug.

The end of the bent rod (with the nut attached) was inserted into the hole and secured in position using thin CA adhesive.

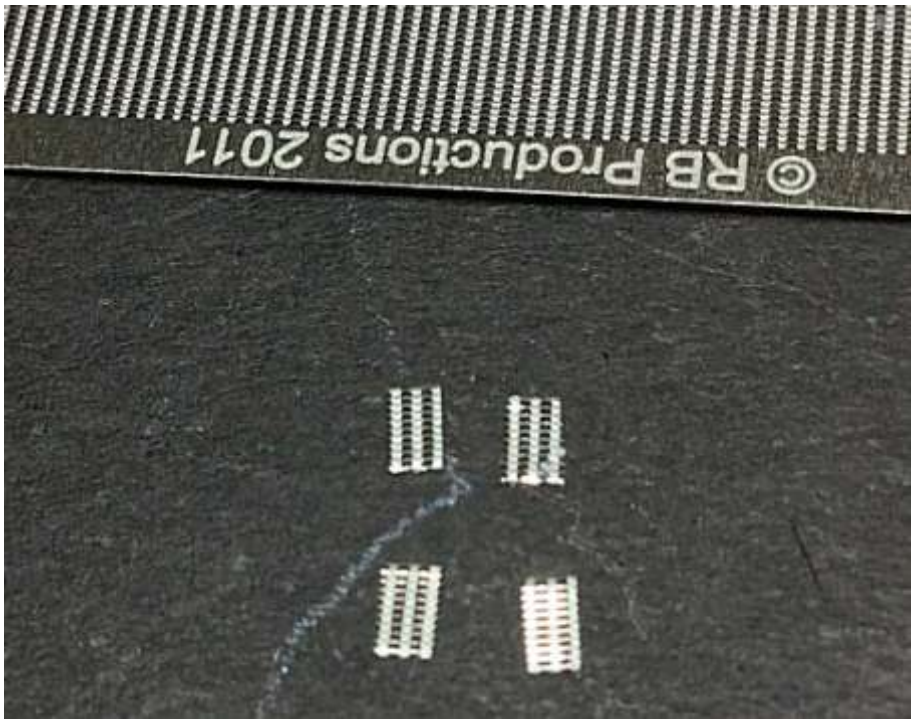
To represent the round 'knob' at the other end of the rod, a small amount of 'Flory' Dark Rust pigments was mixed with 'Tamiya' Hull Red (XF9) and applied by brush.

Crankcase ventilation:

The engine does not have the four crankcase ventilation louvres which are fitted on the right side of the engine block.

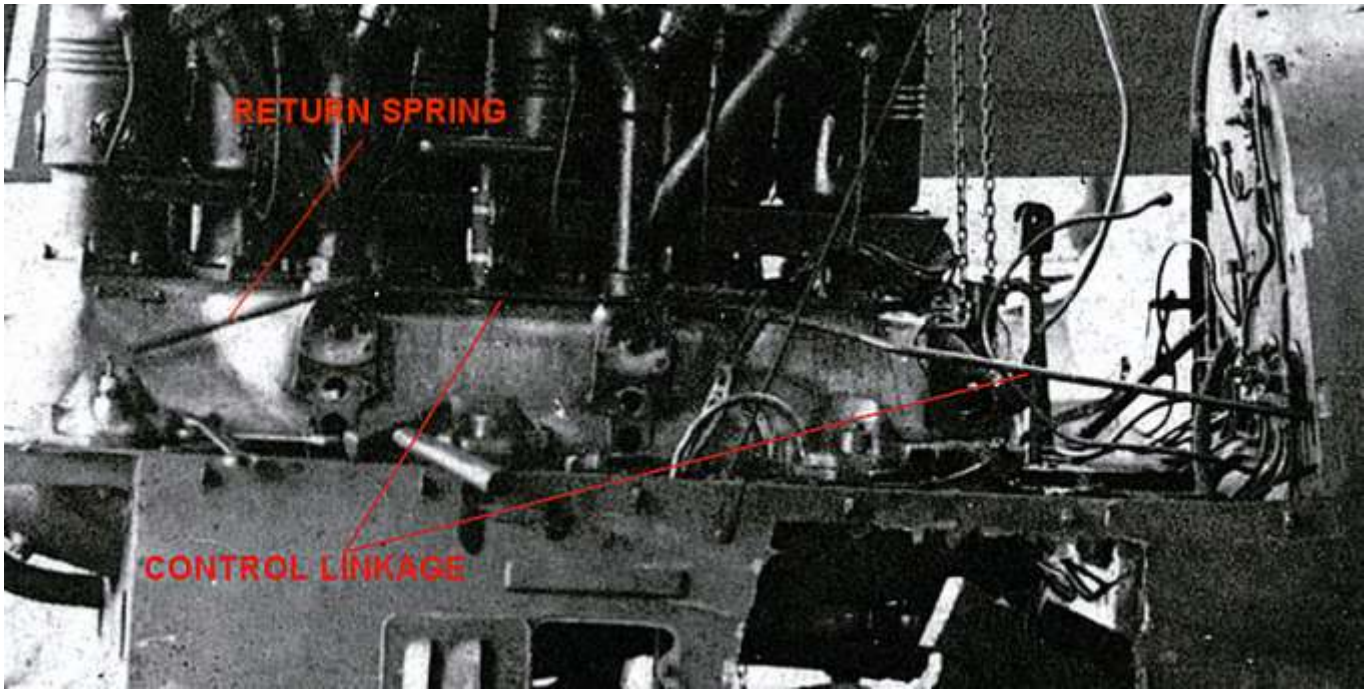


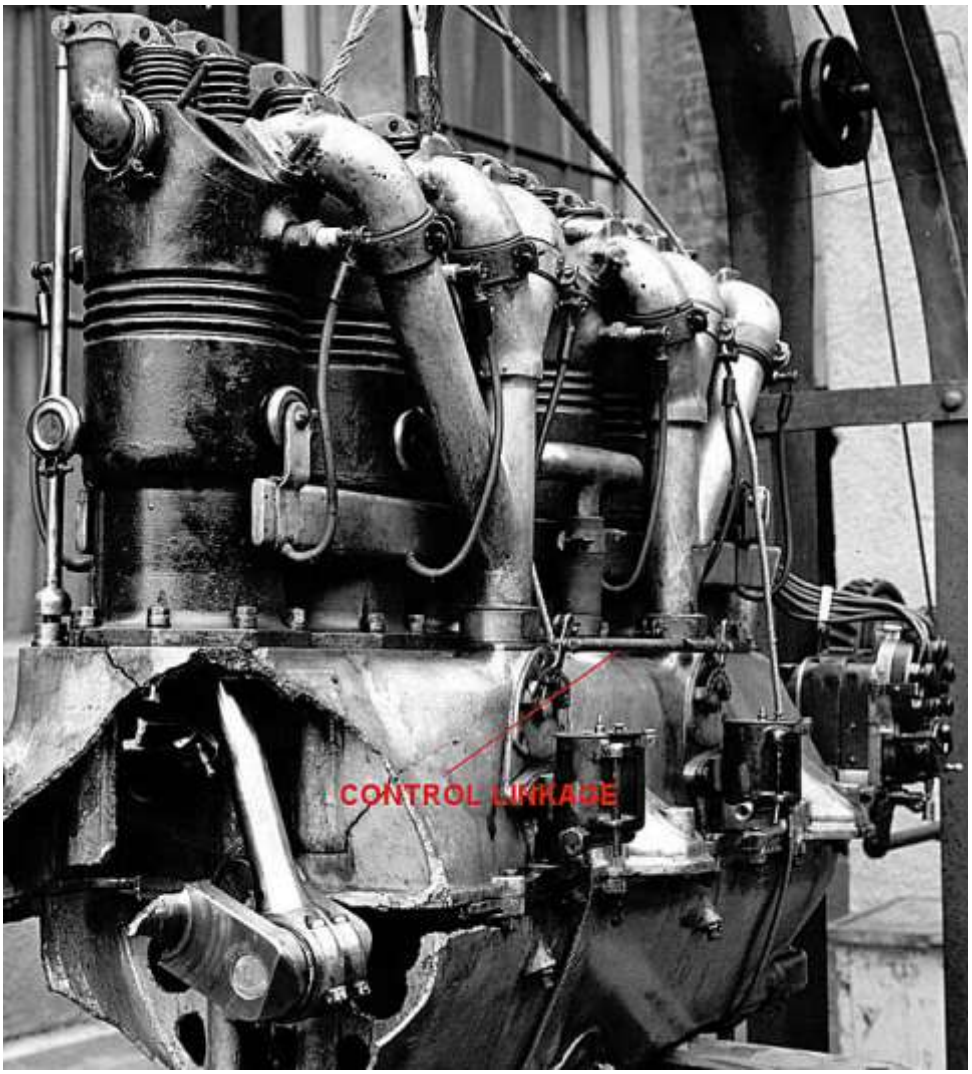
The vents had twelve holes in four rows of three. To try to reproduce these vents in 1:32 scale is not feasible. Therefore to represent the vents, I cut four strips, each three rows wide, from the photo-etch 'RB Productions' Radiator Mesh (RB-T027). These were attached to the engine after it was painted, using thin CA adhesive.



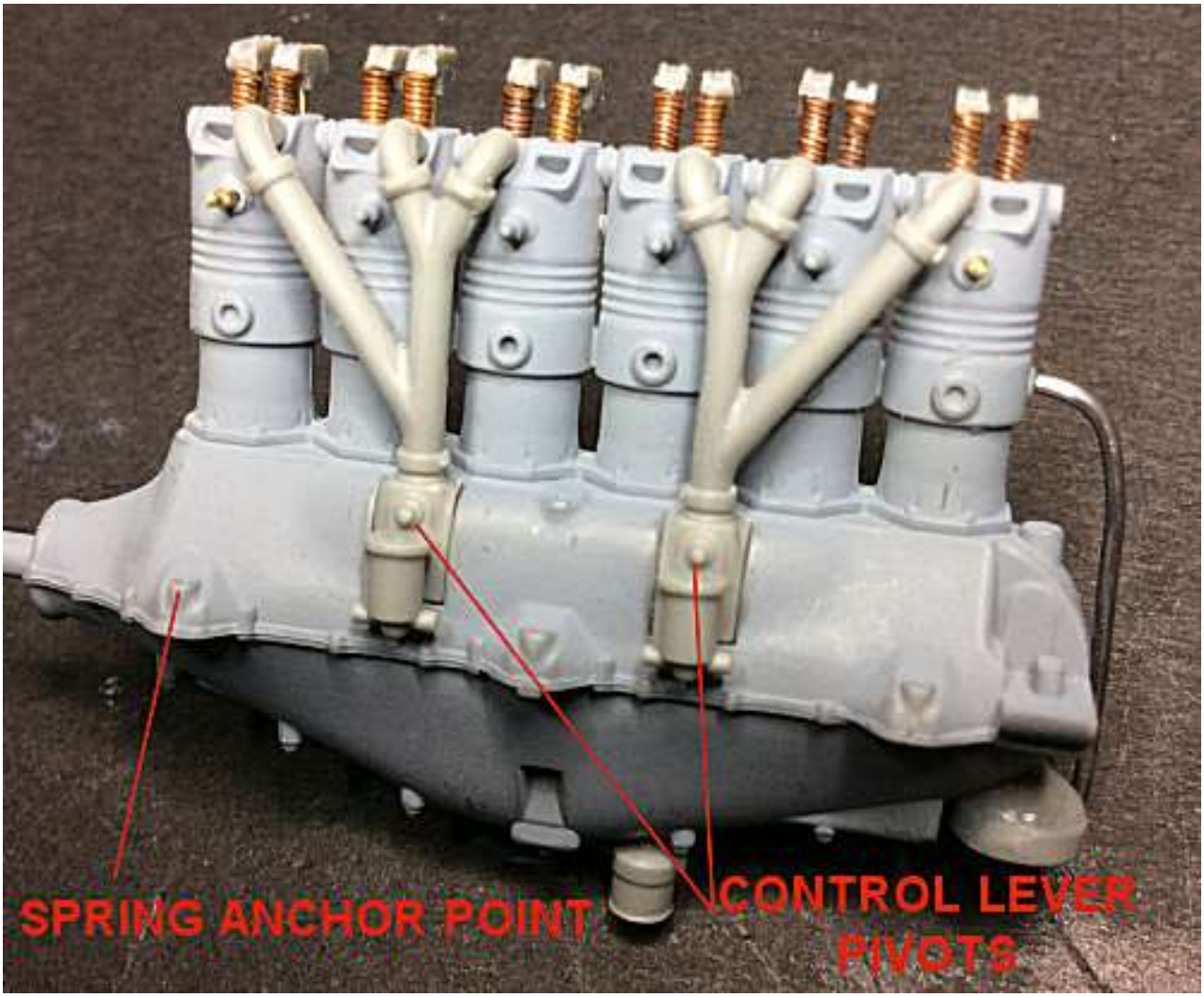
On-engine controls:

The kit does not have the linkage for the speed control of the engine, located at the lower, centre of the left side.





A control rod from the engine bulkhead was attached to the first of two control pivots, which were inter connected by a second control rod. The forward control pivot was connected to the crank case by a long return spring. The kit supplied engine has a location for the return spring anchor and a control lever pivot point on items E11 and E12.

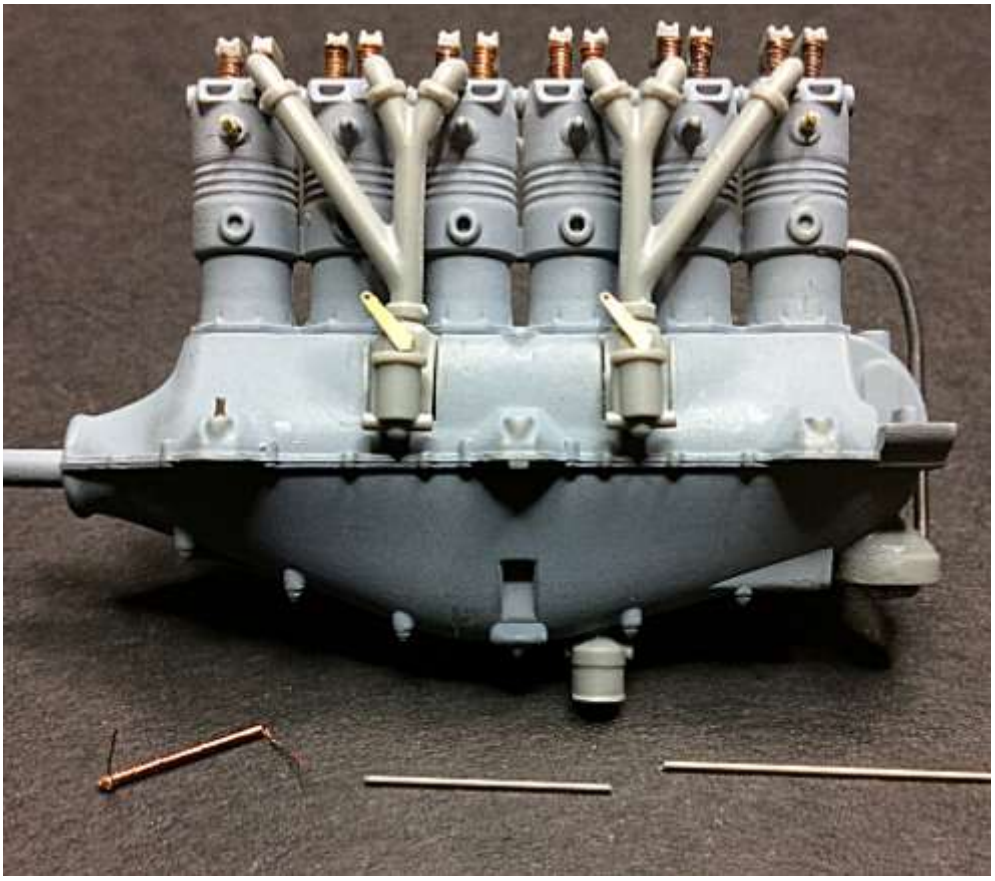


The spring anchor location on the crank case was drilled out using a 0.4 mm diameter drill and a short length of 'Albion Alloy's' 0.4 mm Nickel-Silver tube (NST04) was secured in the hole, using thin CA adhesive.

The control lever pivots on kit items E11 and E12 were cut away flush with the items surface

To represent the two operating levers, I used two control horns from the 'Part' Control Horns and Turnbuckles set (S48-087). The flat ends of each were trimmed then secured at an angle, pointing forwards, on kit items E11 and E12. They were secured using thin CA adhesive.

The return spring was made by winding 0.125 mm copper wire around a length of 'Albion Alloy's' 0.3 mm Brass tube (MBT04). The tube ends were cut away close to the copper windings, leaving lengths of wire free. These will be used to attach the spring to the pivot point and forward control lever.



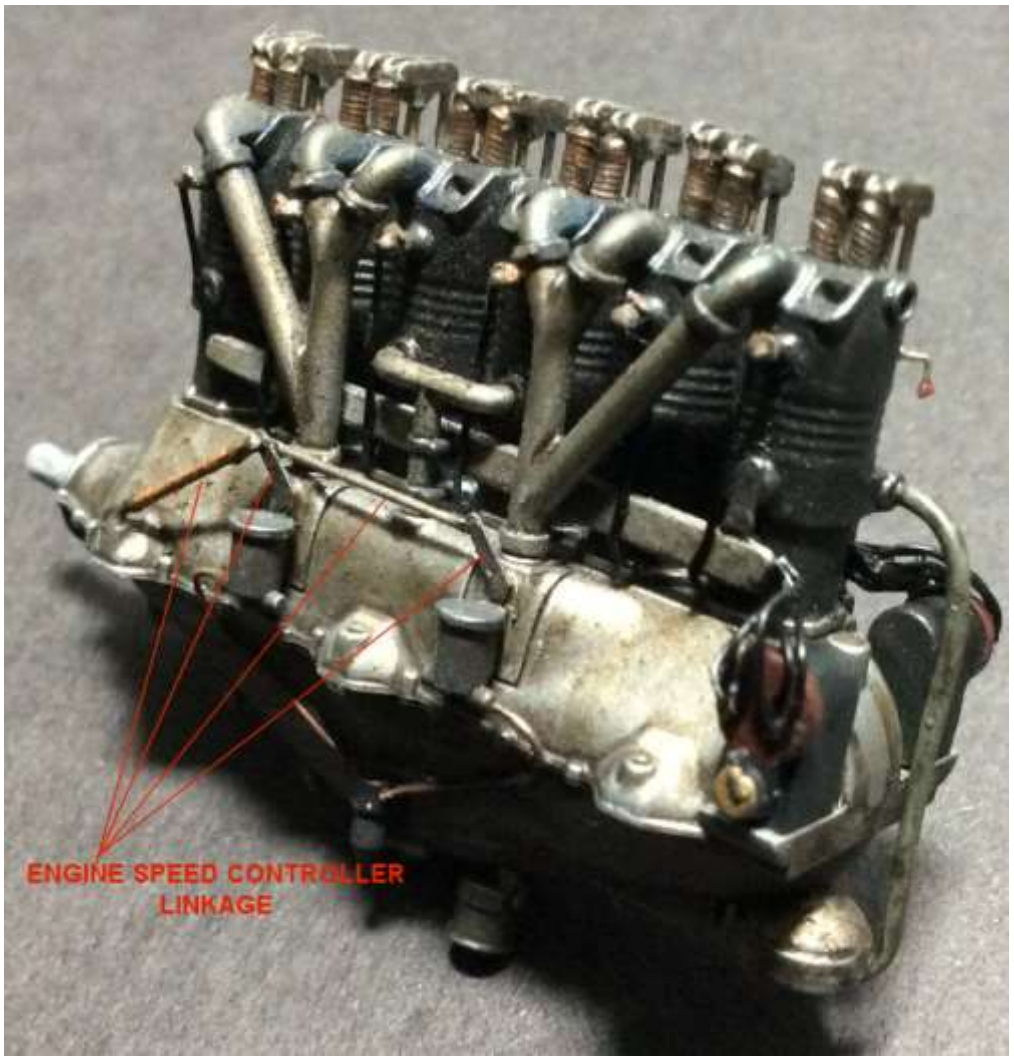
Locate and secure the created micro-tube control rod between the levers of the two fuel controller, using thin CA adhesive

Locate an end wire on the created return spring into the added anchor tube on the crank case.

Locate the other end wire onto the top of the lever on the forward fuel controller.

Secure both ends of the return spring with thin CA adhesive.
NOTE: The longer created control rod will be fitted between the rear fuel controller lever and the engine bulkhead, once the engine is installed.

The short inter-connecting control rod and the longer rod (to engine bulkhead, were cut from 'Albion Alloy's' 0.4 mm Nickel-Silver tube (NST04). These will be fitted after the engine has been painted.



Ignition leads:

Although the kit supplied engine has pre-moulded spark plugs and moulded magneto's, the actual ignition leads from the magneto's, via the support tubes, to the spark plugs, need to be created.

To allow the fittings of the lead wire (which will be used to represent the ignition leads), cut away the six raised lead connection point on the face of both magneto's.

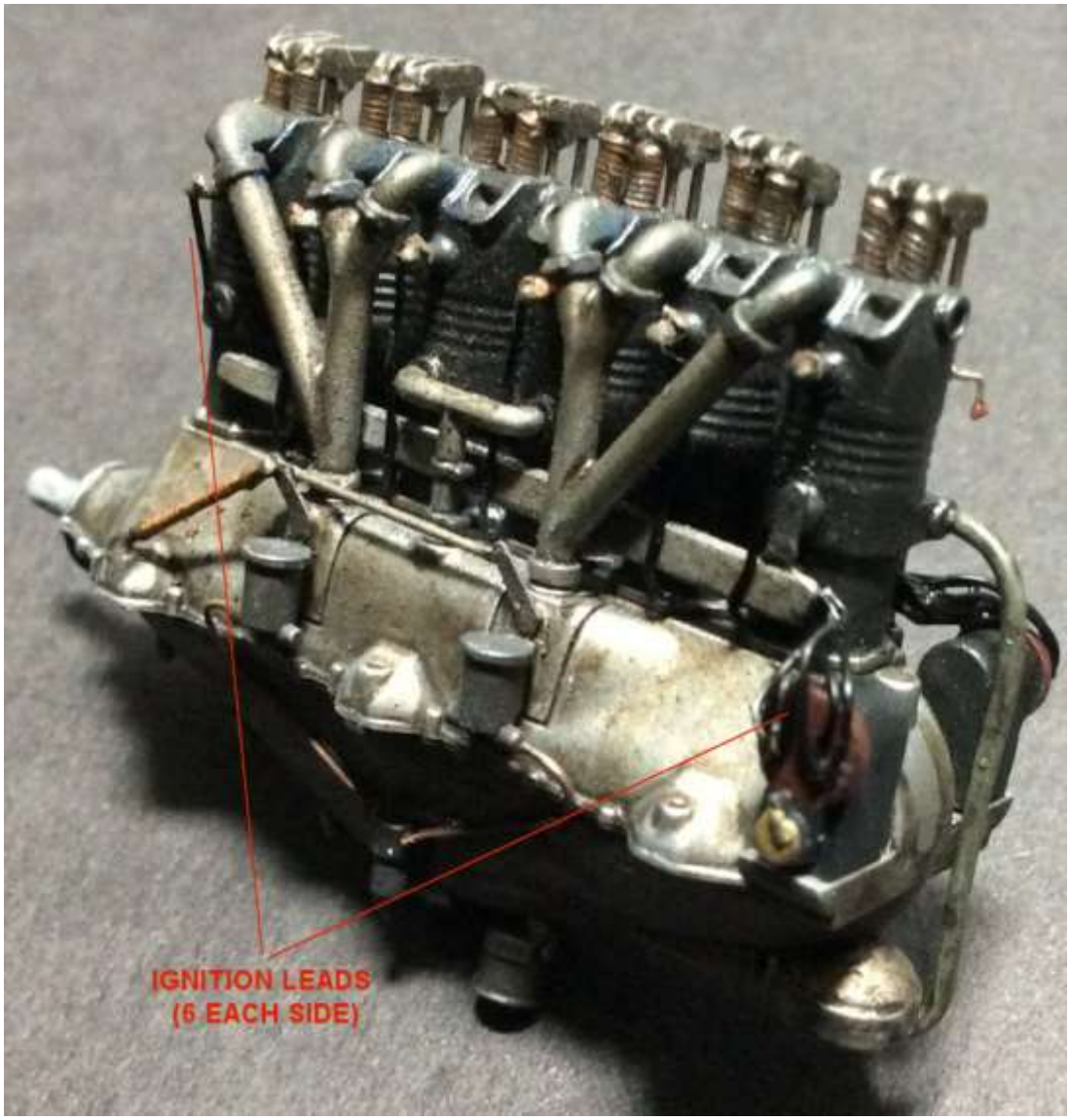
Drill a 0.3 mm diameter hole into each of the previous six connection points on the faces of the magneto's.

Insert lengths of 0.3 mm diameter lead wire ('PlusModel') into each of the pre-drilled each of the magneto's wires together and cut to length, such that they curve from the magneto to the rear end of the created ignition lead support tubes. Secure the wires at each end using thin CA adhesive.

Cut short lengths of the same lead wire and secure one of each to the end of the spark plugs, using thin CA adhesive.

Loop the lead wires down and under the created ignition support tubes. Secure the end of each to the underside of the support tube (vertically below the relevant spark plug) using thin CA adhesive.
NOTE: For the front cylinder leads, attach the wires to the front end of the support tubes.

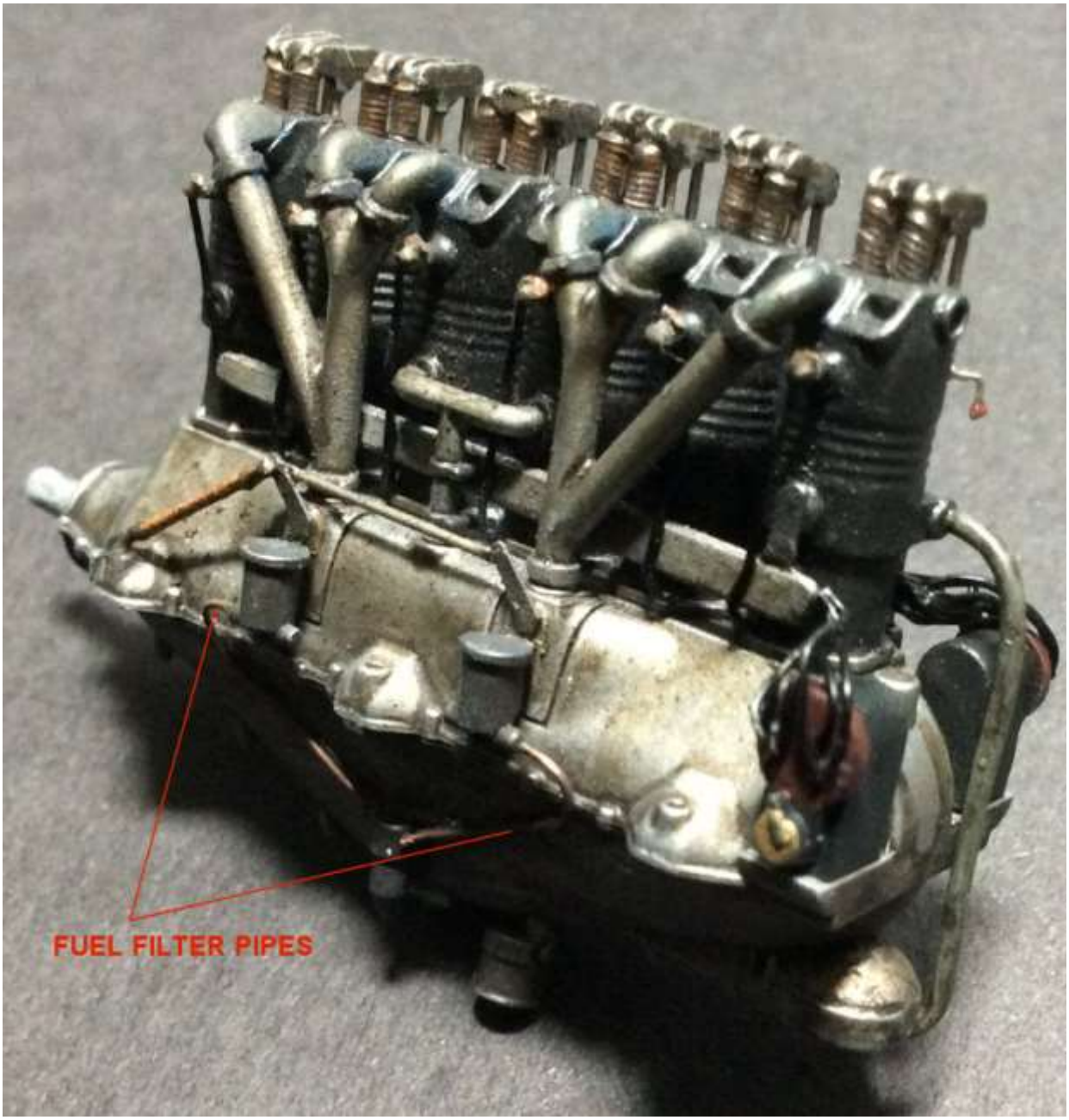
Carefully brush paint the ignition leads with 'Tamiya' Semi-Black (X18).



Fuel filter pipes:

The two speed controllers on the left side of the engine were connected to the fuel filter, which was located on the sump below the controllers. To represent these pipes I used 0.28 mm diameter copper wire, which I annealed over a flame to make the wire more pliable.

A single pipe was connected from the fuel filter (E1) to each of the two fuel controllers (E9). Refer to the engine illustration (left side) in the Wingnut Wings instruction manual.



Exhaust pipes:

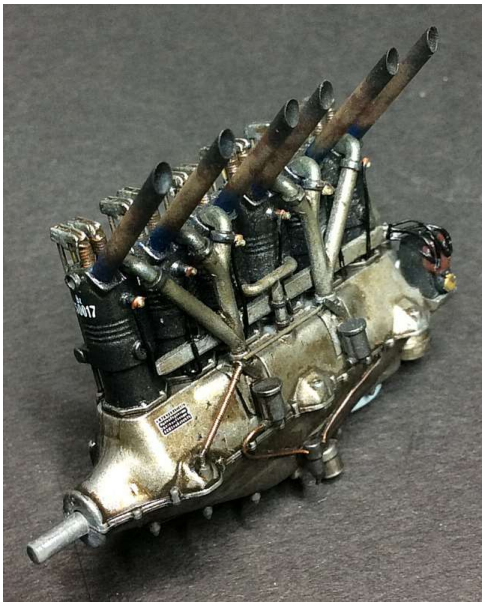
NOTE: The exhaust pipes will be fitted during the model build (refer to Part 12 of this build log).

The kit supplied engine exhaust pipes are moulded as solid, with a pre-moulded 'hollow' in the pipe ends. In order to replicate these exhaust pipes I decided to make them out of micro-tube.
The tubing used was 'Albion Alloy's' 1.6mm diameter Brass tube (MBT16), 1.4 mm diameter tube (MBT14) and 1.0 mm diameter rod (MBR10).

1. Cut a length of 1.6 mm diameter tube to a length of approximately 15 mm.
2. File one end to an angle of 45 degrees.
3. Insert from the opposite end an 8 mm length of 1.4 mm diameter tube.
4. Use the kit supplied 'alignment plate' and a kit exhaust pipe to check the angle of the pipe to the recess in the engine cylinder head.
5. Drill a hole of 1.0 mm diameter into the six pipe recesses in the engine cylinder head and at the same angle checked in the step above.
6. Cut six 1.0 mm diameter rods to a length of 6 mm.

7. Insert a length of the 1.0 mm diameter rod into a length of the cut 1.4 mm tube.
8. Slide the 1.4 mm tube, with the 1.0 mm rod inside, into a 1.6 mm tube (from the non-chamfered end).
9. Make sure the inner 1.4 mm tube is flush with the end of the 1.6 mm tube.
10. Make sure the 1.0 mm rod protrudes by approximately 3 mm so each pipe locates into its hole drilled in the engine cylinder head..

    NOTE: The exhaust pipes are painted and fitted during the final build in Part 12 of this build log.



External air speed indicator:
The kit supplied wing mounted air speed indicator has a wind driven rotor (E27) which is not totally representative of the actual item, which had cups inside a support rail. This part from the 'GasPatch Models' resin version (13-32014) is better defined, so was used instead of the kit part E27.
The small locating stub on the top of the kit item was sanded off and the 'Gaspatch' rotor was secured in position using thin CA adhesive.

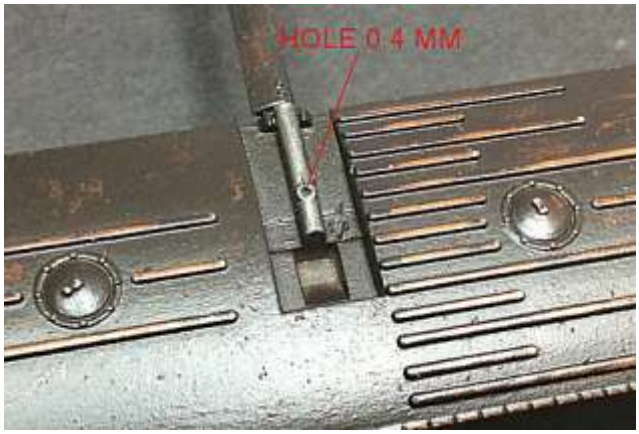
Rigging points:
Fortunately for those modellers who dread rigging models, this particular aircraft has very little external rigging, compared to many of that era. The only external rigging required is:

Cross bracing between the two floats
Aileron control cables (above and below the wing
Rudder control cables (rudder to fuselage openings.

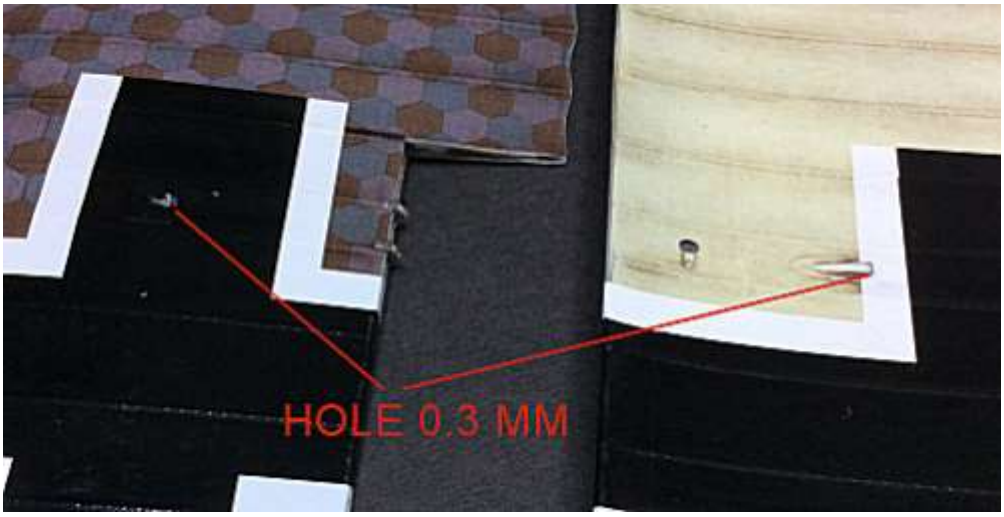
To prepare for rigging during the final build, the following was carried out:

A hole of 0.3 mm diameter was drilled into the outer ends of the two aileron control horns (D6) and the rudder control horn (A45).

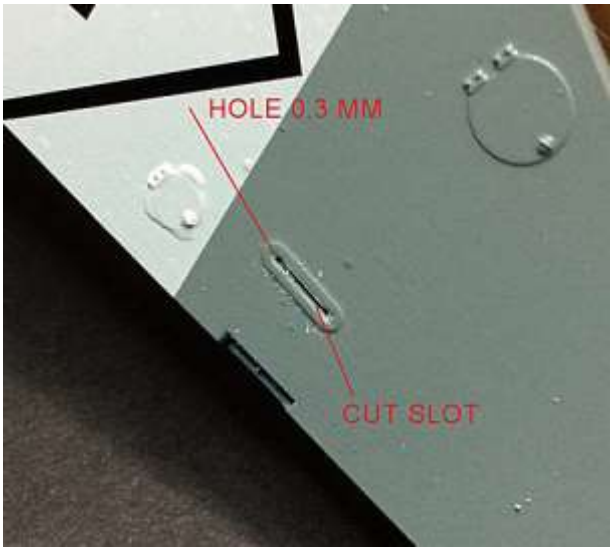
A hole of 0.4 mm diameter was drilled into the pre-moulded locations on the top of the float cross bars at the outer edges.



A hole of 0.3 mm diameter was drilled into the aileron control rigging access points on the upper and underside of both wings.

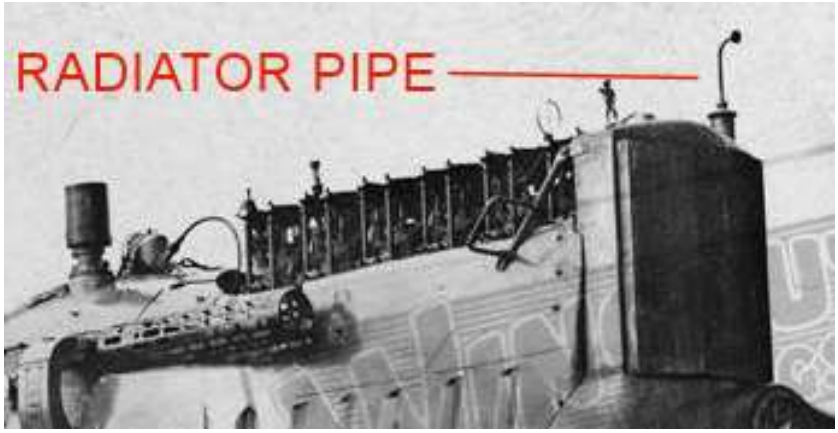


A hole of 0.4 mm diameter was drilled into the forward end of the rudder control rigging slots, on either side of the rear of the fuselage. A sharp plastic scrapper was then used to create a slot along the openings, to represent an open slot.



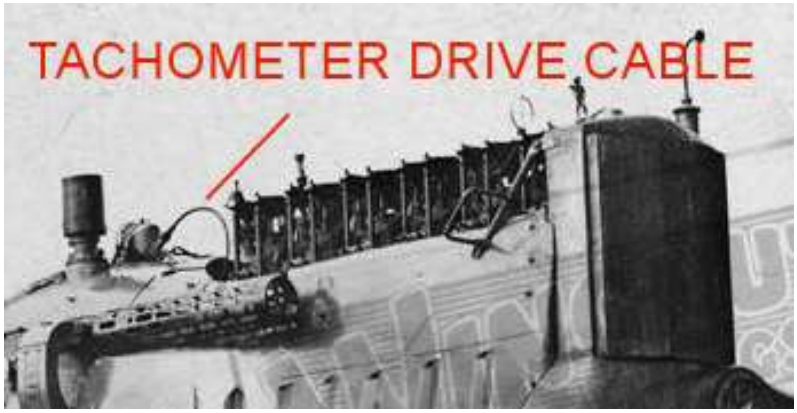
Radiator pipe:

Photographs of this aircraft show that a pipe was fitted to the top of the radiator and was bent at 90 degrees, facing forwards. On the kit supplied radiator, this pipe is moulded as just a vertical pipe. This was created by first cutting away the existing kit pipe and drilling a 0.5 mm diameter hole into the radiator 'boss'. The pipe was made by bending a length of 'Albion Alloy's' 05 mm diameter Brass tube (MBT05) and inserting it into the pre-drilled hole, secured by thin CA adhesive.



Tachometer drive cable:

Photographs of this aircraft shown the drive cable for the externally mounted Tachometer. This will be created during the final build (Part 12 of this build log) by using 'PlusModel' lead wire.



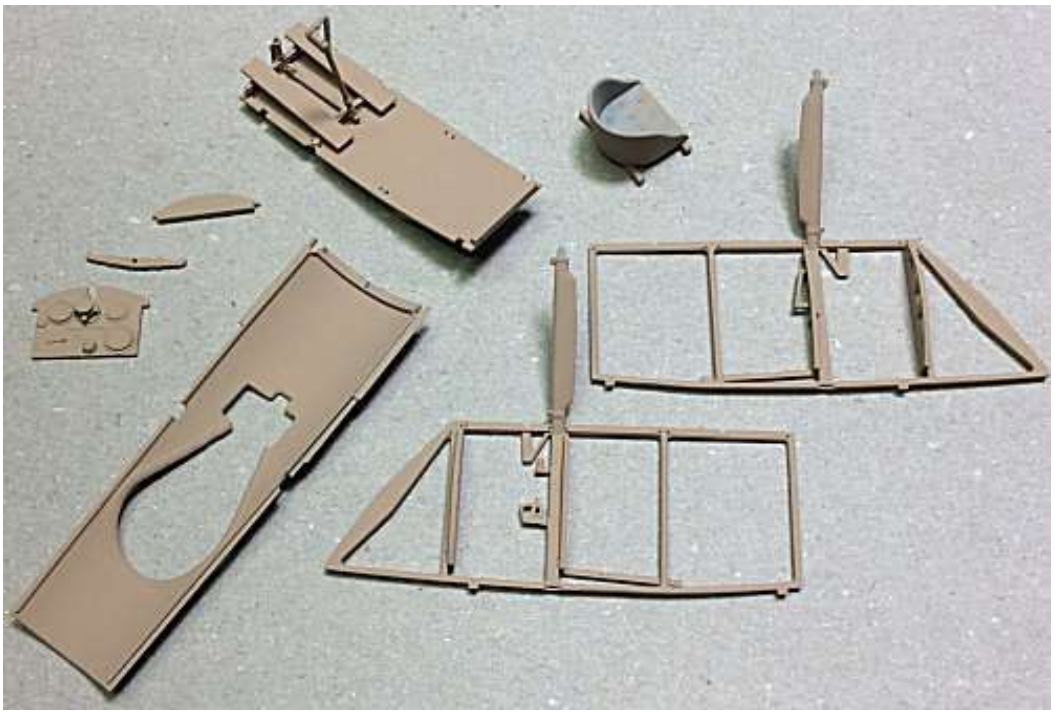
PART 2 - WOOD EFFECTS (General)

A basic technique:

Parts of the model that are supposed to be made of wood can prove to be a challenge to replicate a wood finish to the part. Some after market companies produce accurate wood decals, which can be used to cover larger areas, such as cockpit decking and fuselage panels. However, decals can't easily be used to create realistic wood finish to smaller items or parts that don't lend themselves to having decals applied. To do this requires brush painting, using such as acrylic or oil paints, which can be enhanced with various washes or filters.

The first thing to do is to ensure the model parts are cleaned, normally with warm water with washing up fluid and something like an old tooth brush. Once cleaned and thoroughly dried, the primer coat can be applied. I use 'Tamiya' Aerosol Light Grey (Fine) or White (Fine) acrylic primer. Once the primer is dry, you can start applying the wood effect to the applicable cockpit items, such the cockpit framework, decking, seat supports, rudder bar, instrument panel and of course, the wing struts. With practice, this method can also be used on fuselage panels and propellers.
To start, apply a suitable base colour. For most painting I use an airbrush and only resort to brush painting when dealing with small items, when I add a few drops of 'Mr. Colour Levelling Thinner', which aids brush painting. For most wood effect, I use 'Tamiya' Wooden Deck Tan (XF78) or Dark Yellow (XF60), suitably thinned with 'Tamiya' Thinners (X20A). Allow this base coat to fully dry (if you can't smell the paint, then it's dry).

Example of base coat using 'Tamiya' Wooden Deck Tan (XF78).



For the next step I use 'DecoArt Crafters Acrylic' (water based) oil paints, either Burnt Umber or Burnt Sienna. These are similar to standard acrylic oil paints, but are water based instead of oil based. This paint is not as thick as oil based paint and is more creamy, so can be brushed and controlled more easily. Also, as it is water based, it's easy to clean your brushes, and if really necessary, can be thinned slightly with water. In addition, the paints dry as quickly as normal acrylic paints, avoiding the disadvantage of using true oil paints, which can take days to fully dry.

Place a small amount of the oil paint onto a non-absorbent surface and using a suitable oil paint brush (I use a slightly curved brush), wipe a small amount of the paint onto the brush. For larger areas, such as decking or panels etc I use a small piece of fine sponge to apply the paint.

Apply the paint to the applicable item, using light strokes and in the required direction. Apply the paint along struts and across instrument panels and other smaller items. This gives variation to the wood effect and for the wing struts, is correct for the direction of the wood grain. If you apply too much paint, just brush or sponge it off immediately before it dries. Although the paint is water based, don't try to thin any applied paint with water as it will lift the paint, which builds up into clumps. If required, a second light coat can be applied. Always wait until a first coat has fully dried before applying a second coat, otherwise the first coat will 'drag' and lift from the surface.

Once painting is complete, clean the brush in water.

Below is an example of the Burnt Sienna oil paint applied to a cockpit side frame.

Once the oil paint layers have dried, the final top coats can be applied to give the final effect of varnished wood.

'Tamiya' have 'Clear' coloured Acrylic paints, which are intended to be mixed with either Flat Clear (XF86), Semi-Gloss Clear (X35) or Clear (X22), to give the required finish but with a tint of the added 'Clear' colour. I use the Clear Yellow (X24) or Clear Orange (X26) to add a varnished tint to the clear coat. However, I don't use the 'Tamiya' Clear, but instead use Alclad Light Sheen (ALC-311). Although it's a lacquer, I've found that it will accept 'Tamiya' 'Clear' coloured Acrylics without any separation, which can happen with other paints. The Alclad lacquers dry fast and provide a good sealing layer over the painted surfaces. When using Alclad sealing coats, the golden rule is to allow the various painted surfaces to dry fully before applying Alclad lacquers.

In this instance, I added a few drops of Clear Yellow (X24) into the Alclad Light Sheen (ALC-311) and thoroughly mixed it. Only add small amounts to the Alclad in order to control the amount of tint you desire. I increased my airbrush air pressure to around 20 psi to airbrush the sealing coats over the various cockpit items. The first coat usually dries to a more matte finish, which I assume is due to being sprayed onto the oil paint, rather than onto straight acrylic paint. Once this first coat has dried, I airbrushed several coats of just Alclad Light Sheen (ALC-311), which added not only more sealing coats, but more importantly gave the desired semi-gloss 'varnished' finish I was after.

Below is an **example** of the applied Alclad lacquer/X24 mix on the propeller.

NOTE: Once you are confident using this method of replicating wood finishes, you can vary both the colour of the acrylic base coat and tinting of the sealing coat, to replicate other types of wood used in aircraft construction.

Once the lacquer coats are thoroughly dry, any detail painting, decals or final weathering can be applied to the parts, as required, prior to fitting them to the model.

PART 3 - WEATHERING (General)

Flory Model clay washes: These 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. Once dampened, the dried clay is re-activated and the clay wash can be removed or worked as required.

First I seal the surface with airbrushed Alclad Klear Light Sheen (ALC-311), which dries quickly. A gloss coat tends to stop the clay wash 'gripping' the surface when it is applied and it can run off or just puddle. A matte coat can cause the clay wash to 'grip' too much, making it very difficult to remove or even to wash it off completely.
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 as it can be left on for any period, as it is easily removed without any effect on the surface underneath. The washes I tend to use are Flory Clay Wash 'Grime' and 'Dark Dirt' .

I use a still oil brush to brush off the clay wash, but for smearing effects, an only very slightly damp brush or absorbent paper can be used, but even then I dab them 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. Dry off the surfaces washed and then 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 stiff brush and/or use a piece of damp absorbent paper or brush 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.

Finally I seal the surface with airbrushed Alclad Klear Light Sheen (ALC-311), which will seal in the applied clay wash.

NOTE: Flory washes can be mixed to create other colour blends.

Chipping effects:

I wanted to give the effect of chipped and weathered paint/varnish to the metal engine cowl and forward fuselage panels. To achieve this effect, I first primed the areas with 'Tamiya' Fine Surface primer (Grey) then airbrushed 'Tamiya' Aluminium (XF16). Once dry I airbrushed AK Interactive Medium Chipping fluid (or Vallejo chipping fluid) and when dry, top coated with 'Tamiya' Ocean Grey (XF82). Once fully dry I moistened the top coat with water, which softens the paint. Then with a cut down (stiff) brush and wood cocktail stick, gently teased off the top coat paint. Take care when doing this as 'too much chipping' can't really be covered up. In that event you would have wet the top coat and remove it all with an old toothbrush or similar and then when dry, re-spray the top coat and try again. Once the desired effect was achieved, I sealed the surfaces with an airbrushed coat of Alclad Light Sheen (ALC-311).

'Tamiya' Weathering Master sets: Each of these 'Tamiya' produced weathering sets contain three 'tablets' of different colours and an applicator, which has a brush on one end and a sponge on the other. The tablets have a wax look and feel and can be applied onto painted surfaces to reproduce various finishes. It's best to use these as the final surface treatment, as being a 'Wax', any treated surfaces can't be painted or sealed.

Pigments: Pigments, such as those produced by 'Flory Models' or 'Humbrol' are effectively very fine 'dusts', which can be applied to a model to re-create dust, dirt, stains etc. They can be applied by dry brushing or mixed with other mediums to create paintable solutions.

Washes: Washes can be applied to either enhance panel lines etc or to add a 'filter' of colour onto a painted surface. They can be purchased ready made from various manufacturers or can be 'home made' using such as oil paints with a suitable thinning agent. I tend to use 'AK Interactive' products.

Oil paint: A technique used more frequently now is oil paint ‘dot and drag’. Basically an oil paint of the desired colour is placed onto a piece of cardboard, which over a hour or so, soaks out the oil in the paint, leaving a drier pigment. The pigment is ‘dotted’ onto the painted surface where it is required then dragged with a brush previously wetted with ‘Tamiya’ X20 enamel thinners then wiped virtually dry.
Softly ‘flick’ the brush to drag the pigment in the direction required, which will blend it in a thin layer.
The amount of pigment left showing depends on the effect you require. Always keep the brush wiped clean to avoid a build up of pigment and remoisten and wipe dry often. The more paint you drag, the less pigment is left showing. Blending different coloured pigments can create stains from smoke/gun blast, rain marks/runs, dirt/dust and oil/fuel stains.

A good quality oil paint and thinners are essential to produce a good finish. Some quality oil paints can be too ‘gritty’ when leached of oil, so I use ’Abteilung 502’ oil paints and ‘Tamiya’ Enamel thinners (X20).

PART 4 - ENGINE

The following steps detail the building of the engine prior to it being installed into the fuselage.

NOTE: Make sure the modifications to the engine, detailed in Part 1 of this build log, have been carried out.

1. Using an airbrush, prime all of the engine parts using 'AK Interactive' Primer and Micro-filler (Grey AK-758). Don't prime the valve push rods, engine control return spring and operating rods and the valve springs, as these to retain their metal finish. Use a brush to prime around the valve springs.
2. The various engine parts were airbrush painted as follow:

   'Alclad' Duraluminium (ALC-102) - Engine crank case, Pipes (E5, E11 and E12), water pump (E16), created ignition lead support tubes, pipe (A39) clamps.

   'Tamiya' Rubber Black (XF85) - Engine cylinder head, Pipe (A39), magneto body (E8), controllers (E9).

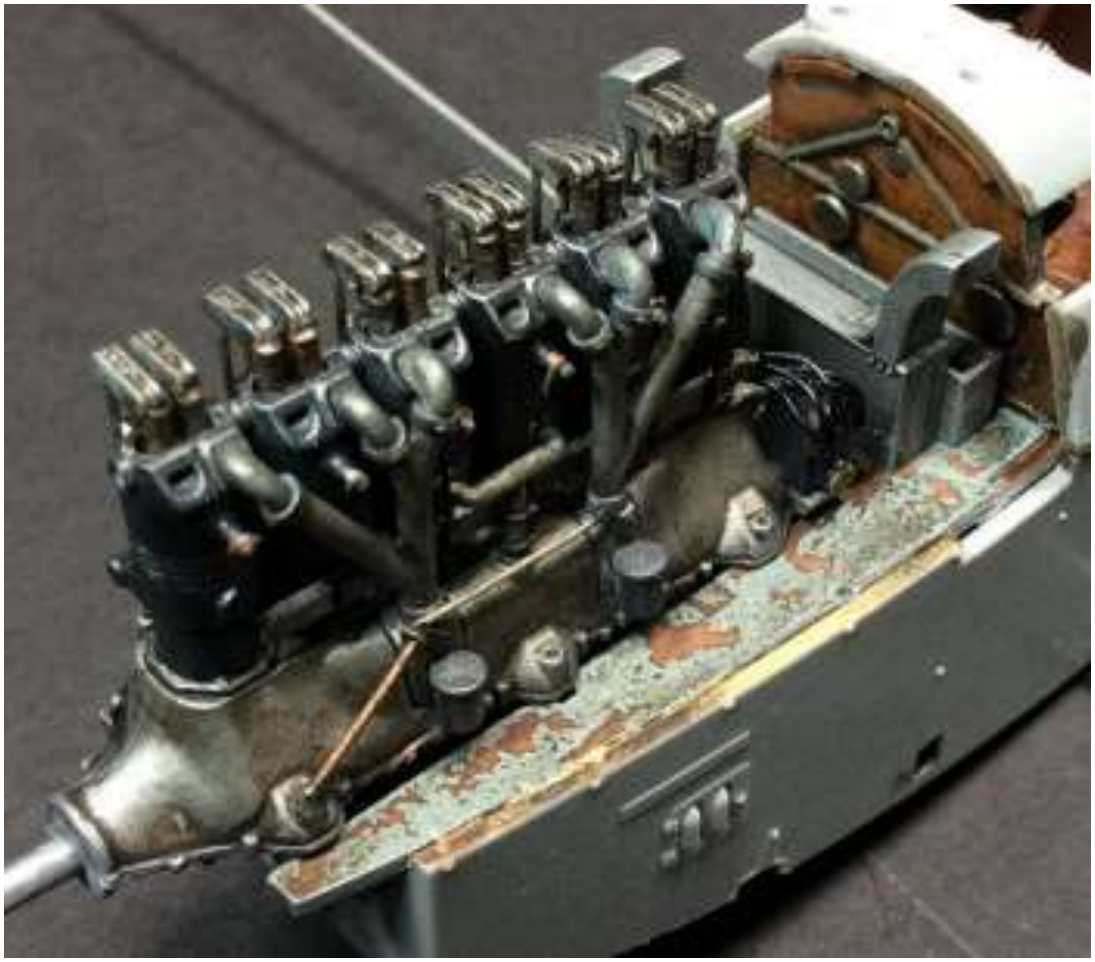
   'Tamiya' RLM Grey (XF22) - Pipe (A31), radiator stays (A34 and A35), frame support (A6), frame (A27), created pipe from water pump to cylinder manifold.

   Mr. Colour Stainless Steel 213) - Fuel filter (E1), valve levers (E3)Oil filter (E10), valve springs (dry brush only).

   'Tamiya' Hull Red (XF9) - Magneto (E8) front faces.

   Mr. Colour Brass (212) - Magneto (E8) switches.

   'Tamiya' White (X2) - Spark pug insulators.
3. Cement in position the fuel filter E1, oil filter E10 and water pump E16.
4. Locate and cement in position created ignition lead support tubes. Support bracket attach to the rear cylinder and the cylinder second back from the front.
5. Cement in position the two magneto's (E8).
6. Cement in position pipe E5 and intake manifolds E11 and E12.
7. Cement in position the fuel controllers (E9).
8. Locate the end of each created push rod into its locating hole in the crank case and under the head of its valve operating lever. Secure using thin CA adhesive.
9. Cement in position oil filling pipe (A39).
10. Weather engine by applying 'Flory' Dark Dirt fine clay wash (refer to Part 3 - Weathering).
11. The engine with modifications (refer to Part 1E - Engine) should now be complete.
12. Airbrush the cylinder head assembly with 'Alclad' Light Sheen (ALC-311) lacquer.
13. Airbrush the aluminium sump with 'Alclad' Flat (ALC-314) lacquer.
14. Apply by brush a small amount of 'AK Interactive' Engine Oil (AK214) down the oil filler pipe (A39).



Engine exhaust pipes.
The engine exhaust were created in Part 1 of this build log.

15. Prime each pipe by airbrushing ‘AK Interactive’ Primer and micro-filler (AK758).

16. Airbrush each pipe using ’Tamiya’ Rubber Black (XF85).

17. Airbrush a light misting coat of ‘Tamiya’ Hull Red Deck Tan (XF9).

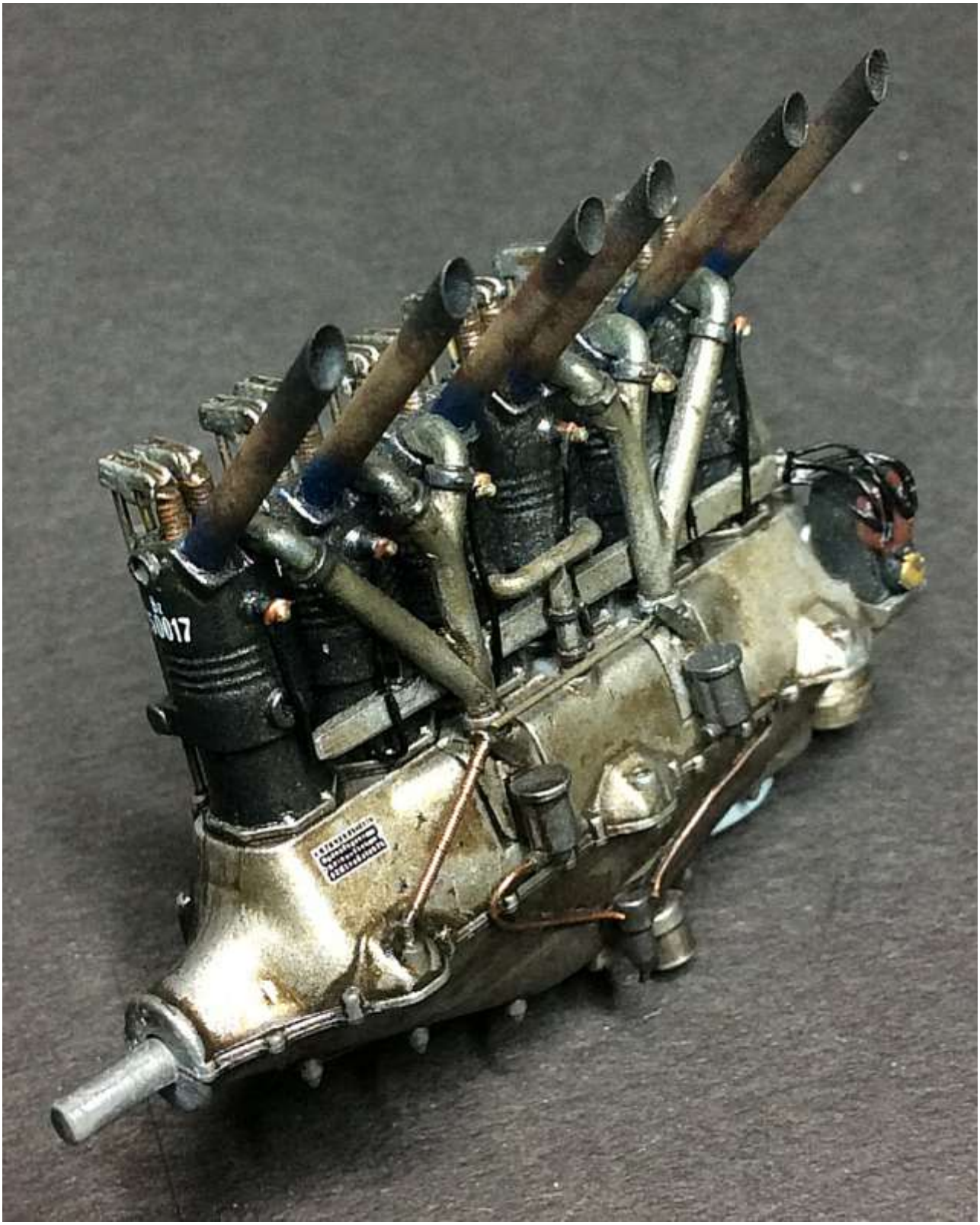
18. Dry sponge ‘Tamiya’ Flat Brown (XF10) sporadically along each pipe.

19. Lightly sponge the pipe open ends with ‘Tamiya’ Weathering Master Set B (Soot).

20. Lightly sponge the base ends of each pipe with ‘Tamiya’ Weathering Master Set D (Burnt Blue).

21. Lightly sponge along the centre areas of each pipe with ‘Tamiya’ Weathering Master Set B (Rust).

22. Locate each pipe into its pre-drilled 1.0 mm hole in the engine cylinder head and make sure the open and chamfered end is correctly orientated. Secure the pipes 9in position using CA adhesive.



PART 5 - COCKPIT AND FUSELAGE

Unlike many aircraft of the period, the Hansa-Brandenburg W.29, being a sea plane, had plywood covering for the fuselage, rather than linen. This simplifies working inside the fuselage as no linen painting or decals are required.
NOTE 1: Follow the basic WNW kit instruction manual for assembly.

Preparation and Partial Assembly:

1. Carry out the modifications to the cockpit items detailed in Part 1 of this build log.

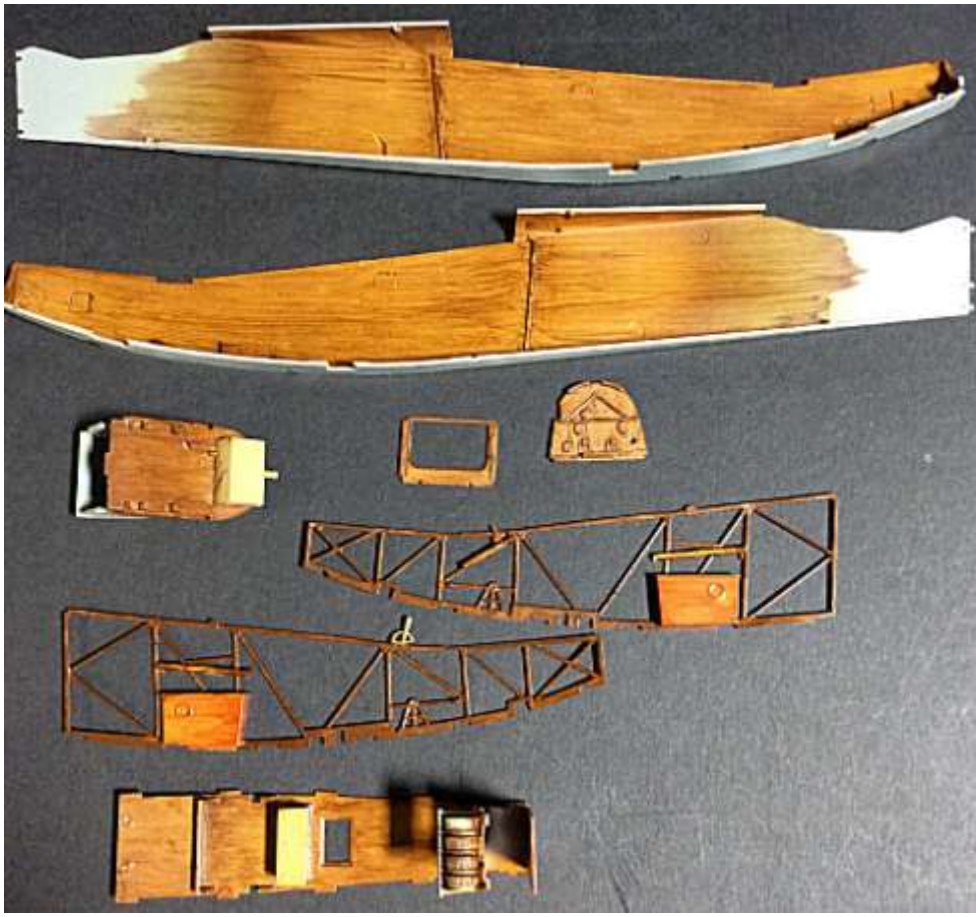
2. Prepare the and assemble the kit parts referenced in page 4 of the WNW manual, but don't fit the metal wing spar (kit item M1). It will be fitted after the fuel tank/seat assembly has been painted.

3. Prepare frame A19 and instrument panel A20.

4. Prime all parts using 'AK Interactive' Primer and Micro-Filler (Grey AK758).

5. Refer to Part 2 of this build log and apply the desired wood finish to all parts, except those in the WNW manual designated otherwise, but include kit part F2 (engine bearer). Different coloured wood finishes can be achieved by using different coloured oil paints over the base coat. For this model I used 'DecoArt' Crafters Acrylic paint (Burnt Umber) for all of the cockpit wood work, except for the two rear cockpit side containers, for which I used their Burnt Sienna paint.

7. Once fully dry I airbrush light coats of Alclad Light Sheen (ALC-311) lacquer, mixed with 'Tamiya' Clear Yellow (X24), then with Orange (X26) to give the effect of varnished wood.



7. The various cockpit parts were brush painted as follows:

   Control column - Assembly ‘Tamiya’ Dark Sea Grey (XF54), pilot’s wheel and hand grips ‘Tamiya’ Flat Aluminium (XF16) and Buff (XF57).

   Rudder bar and frame - ‘Tamiya’ Dark Sea Grey (XF54)

   Pilot’s seat - ‘Tamiya’ Hull Red (XF9), seat cushion mix of ‘Tamiya’ Hull Red (XF9) and Humbrol Leather (62)

   Observer’s seat - ‘Tamiya’ Buff (XF57)

   Metal fittings - Mr. Colour Stainless (213)

   Brass fittings - Mr. Colour Brass (219)

   Lever above pressure pump - mix of ‘Tamiya’ Flat Red (XF7) and NATO black (XF69).

   Auxiliary fuel tank pipe - ‘Tamiya’ White (X2)

8. To create a chipped surface on the two fuel tanks and rear cockpit container I first brush painted the main and auxiliary fuel tanks and the rear cockpit container with a base coat of ‘Tamiya’ Flat Aluminium (XF16). I then applied a thinned ‘Tamiya’ Flat Earth (XF52) in small, random patches. Finally I applied a fine mist of hair spray and dried it off using a hair dryer on low heat setting. Then I over-coated with ‘Tamiya’ RLM Grey (XF22). Once dry I applied water to the surfaces and used a wood cocktail stick and short, stiff brush, to chip and brush off the top coat Grey paint to create chips and scratches, which then allowed the Aluminium and Flat Earth base coats to show through.

9. I then airbrushed Alclad Gloss (ALC-310) lacquer over the front face of the instrument panel, the top right side of the main fuel tank and over the container box at the bottom of each of the two cockpit side frames. This gives a good surface for applying the decals.

10. The decals were then applied to those areas following the Wingnut instructions. The area for each decal was first moistened with ‘Microscale Micro Set’. Once the decal was in the correct position and any moisture removed (by rolling over a cotton bud or pressing with tissue), I applied ‘Microscale Micro Sol’ over the decals and left them overnight to ‘bed down’ onto the surface. **NOTE:** Some decals will ‘crinkle’ after this setting solution has been applied, but just leave it - don’t touch the decals. The solution softens the decal, which allows it to conform to the surface it’s on. If you attempt to move the decal after the solution has been applied, it will probably tear. Once the solution has dried, the decal surface should be smooth again.

11. The ammunition rounds in each of the drums in the rear cockpit rack were brush painted with Mr. Colour Brass (219).

12. To represent the linen ammunition belts on each drum, I brush painted a thin strip around each, using ‘Tamiya’ Deck Tan (XF55).

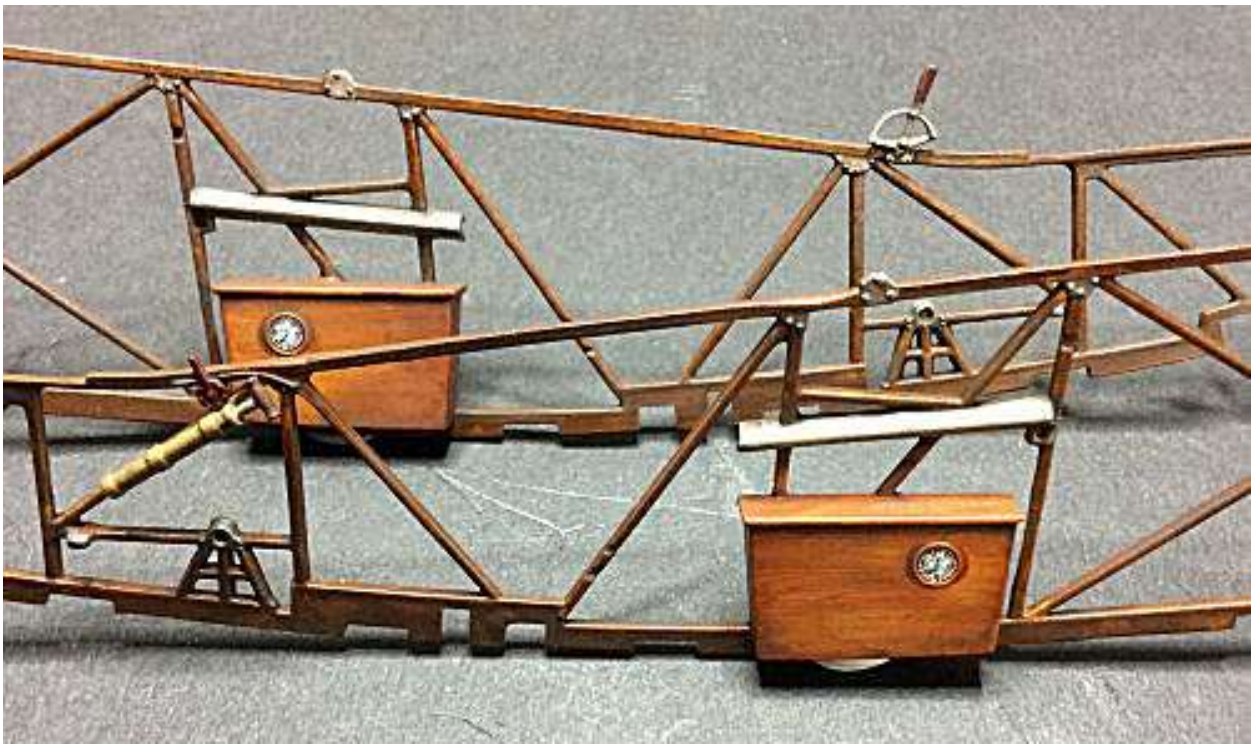
13. All prepared parts were then airbrushed with Alclad Light Sheen (ALC-311) lacquer, which gives a good surface for applying the weathering wash.

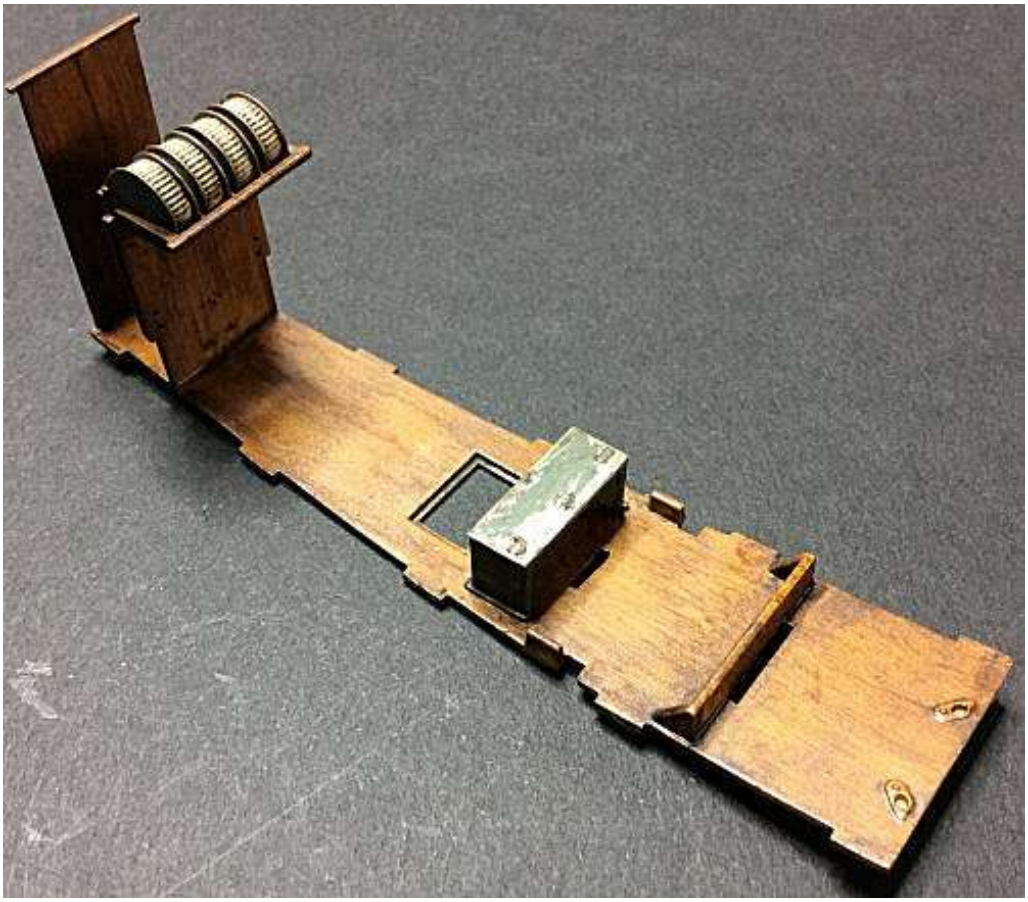
14. I applied by brush ‘Flory Dark Dirt’ fine clay wash over all of the parts and left them to dry fully. Refer to this build log, Part 3 - Weathering.

15. Once I had removed the clay wash to achieve the desired effect, I sealed the surface of the pilot's seat cushion with 'Tamiya' Semi-Gloss (X35).

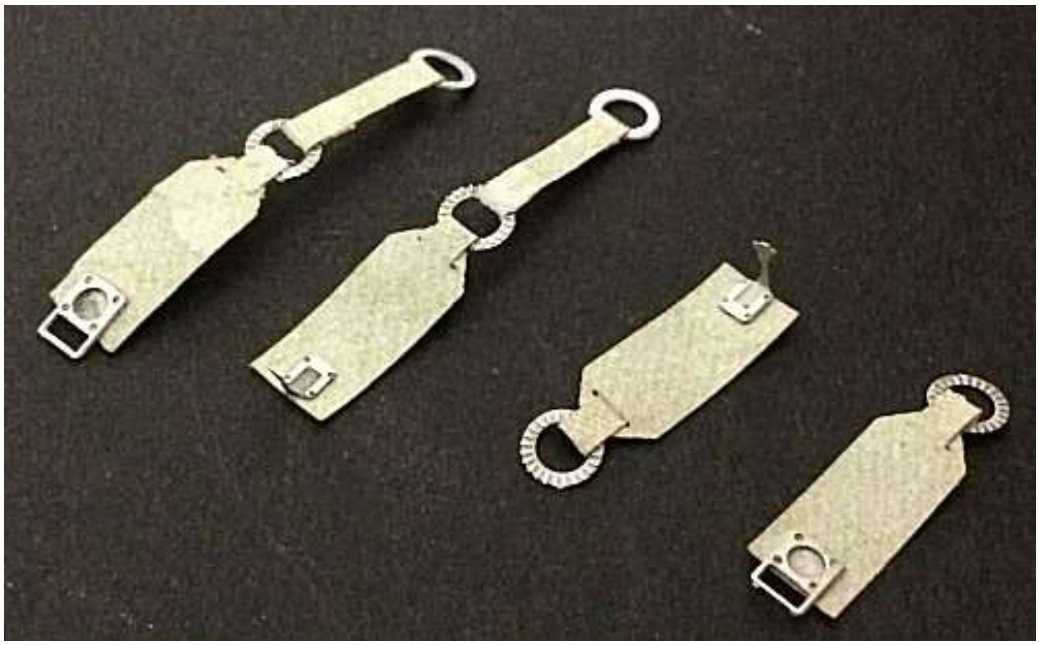
16. To represent instrument glass, I applied a small amount of 'Tamiya' Clear (X22) over each instrument decal.

17. The pilot's seat was attached to the primary fuel tank using 'Tamiya' cement.





18. The fabric seat belts (‘HGW Models 132562) were assembled following their instruction card. These belts can be tricky to assemble but I believe are more convincing than the photo-etch belts supplied in the kit. I used thin CA adhesive to glue together the various parts. These straps are fitted and weathered later in the cockpit build.



19. The observers floor window needs to fitted before building up the cockpit structure. After removing kit item C1 from its sprue, sand off any sprue tags. Paint the outer frame (raised on one side of the window) with Mr. Metal Colour Stainless Steel (213). Once dry, secure the window into the cockpit floor aperture using PVA adhesive (CA adhesive or plastic cement may affect the clear part - PVA adhesive will not).

20. Assemble kit parts A7/A15 and F18/F19.

21. Airbrush the following kit parts with ‘Alclad’ Duraluminium (ALC-102): A2, A6, A9, A42, A43, A7/A15, F11 and F12.

22. Airbrush the inside surfaces of kit parts F9 and F18/F19 with ‘Tamiya’ Flat White (XF2) with a small amount of Desert Yellow (XF59). Adding XF59 reduces the stark white colour giving a more realistic white (scale effect).

23. Apply aerosol hair spray over kit part F2 Already has the wood effect applied) and part A43.

24. Once dry airbrush kit part F2 with ‘Tamiya’ Medium Sea Grey (XF83) and kit part A43 with RLM Grey (XF22).

25. Apply water to the surfaces of kit parts F2 and A43 and use a wood cocktail stick and short, stiff brush, to chip and brush off the top coat, exposing the base coats.

26. Finally I applied by brush ‘Flory Dark Dirt’ fine clay wash over parts F2 and A43 and left them to dry fully. I then removed the clay wash to achieve the desired effect (refer to this build log, Part 3 - Weathering).

Final Assembly and Finish:

27. Secure the metal ‘wing spar’ supplied in the kit into the cockpit floor and against the front face of the floors cross member. Clean off paint/primer from the face of the cross member. As this ‘spar’ is intended to take the weight of the large wings, I chose to secure the ‘spar’ in position, using ‘Araldite’ two part epoxy adhesive. Once secured, leave the assembly for 24 hours to allow the adhesive to set.

28. Secure the pilot seat and fuel tank assembly in position on the cockpit floor and over the metal ‘spar. I used ‘Araldite’ two part epoxy adhesive between the metal spar and fuel tank and ‘Tamiya’ cement between the tank and cockpit floor.

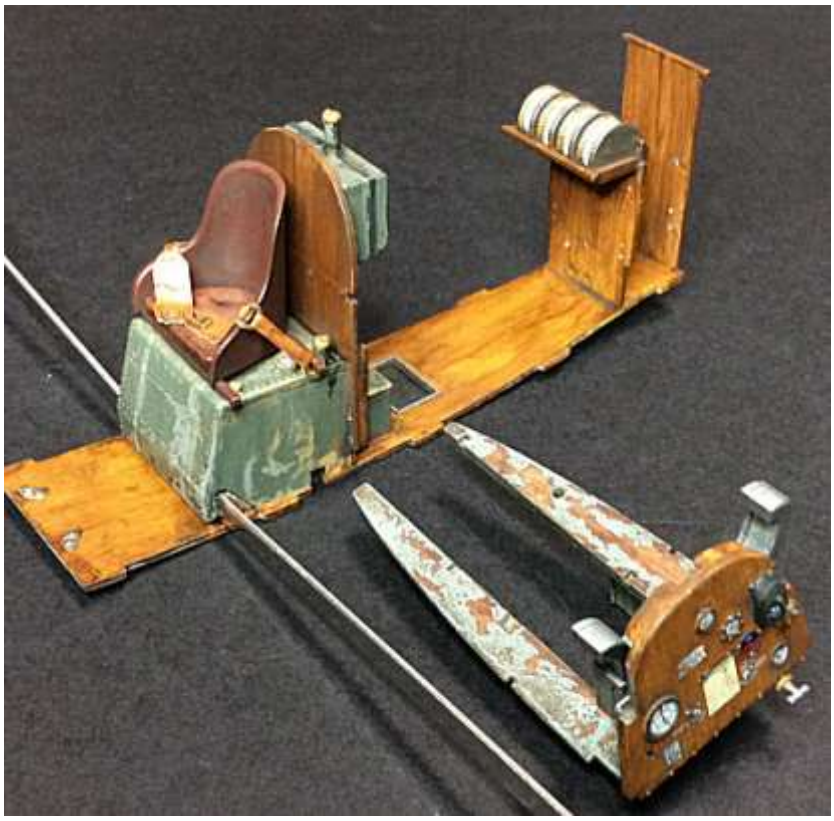
29. The two pilot seat belts were located onto the ends of the rear seat support cross bar and secured using thin CA adhesive. The belts photo-etch serrated rings were slightly bent over the edge of the seat and the belts were then positioned and secured on the seat cushion using thin CA adhesive.

30. The seat belts were brush painted with Humbrol Leather (62) and once dry, were given a light coat of ‘AK Interactive’ Aircraft Engine Oil wash (AK2019).

31. ‘AK Interactive’ Aircraft Leaks and Stains Kerosene (AK 2039) wash was lightly brushed around the fillers of the main and auxiliary fuel tanks, to represent fuel staining.

32. The observers window (kit item C1) was secured in position in the cockpit floor aperture with small drops over PVA adhesive in each corner on the aperture.

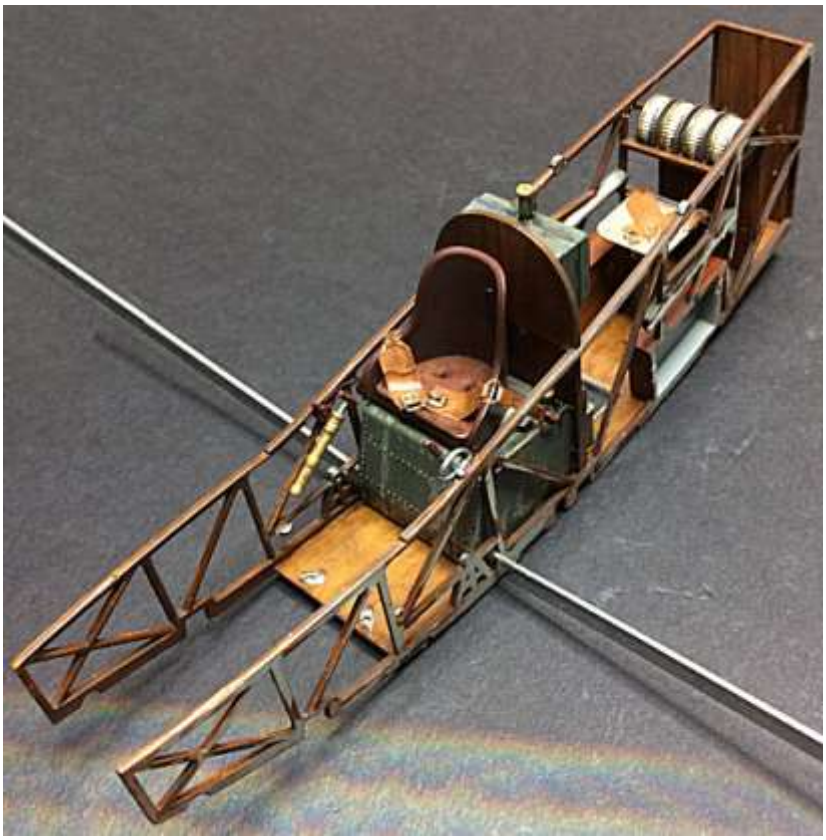
33. Assemble the forward sub-assembly (kit parts A2/A9, A7/A15, A22/A48, A20, A42, A43, F2) using ‘Tamiya’ cement. **NOTE:** Make sure the side portion of the instrument panel (A20) is removed from the left side (refer to Wingnut instruction manual). This is necessary to allow the left machine gun to be fitted.



34. Locate and secure in position the two cockpit side frames, using ‘Tamiya’ cement. Make sure all cockpit floor joints are fully engaged, as well as those at the side frame to pilot seat bulkhead and side frame to rear cockpit bulkhead.

35. Attach the two seat belts to the observers seat support bar using thin CA adhesive.

36. The seat belts were brush painted with Humbrol Leather (62) and once dry, were given a light coat of ‘AK Interactive’ Aircraft Engine Oil wash (AK2019).



NOTE: Ensure all pre-drilled holes for control rigging are clear of paint etc. If needed run the same sized drill through the holes to clear them.

37. Thread a long length of ‘Steelon’ 0.12 mm diameter mono-filament through the two pre-drilled holes in the rudder bar, such that the rudder bar in central on the line.

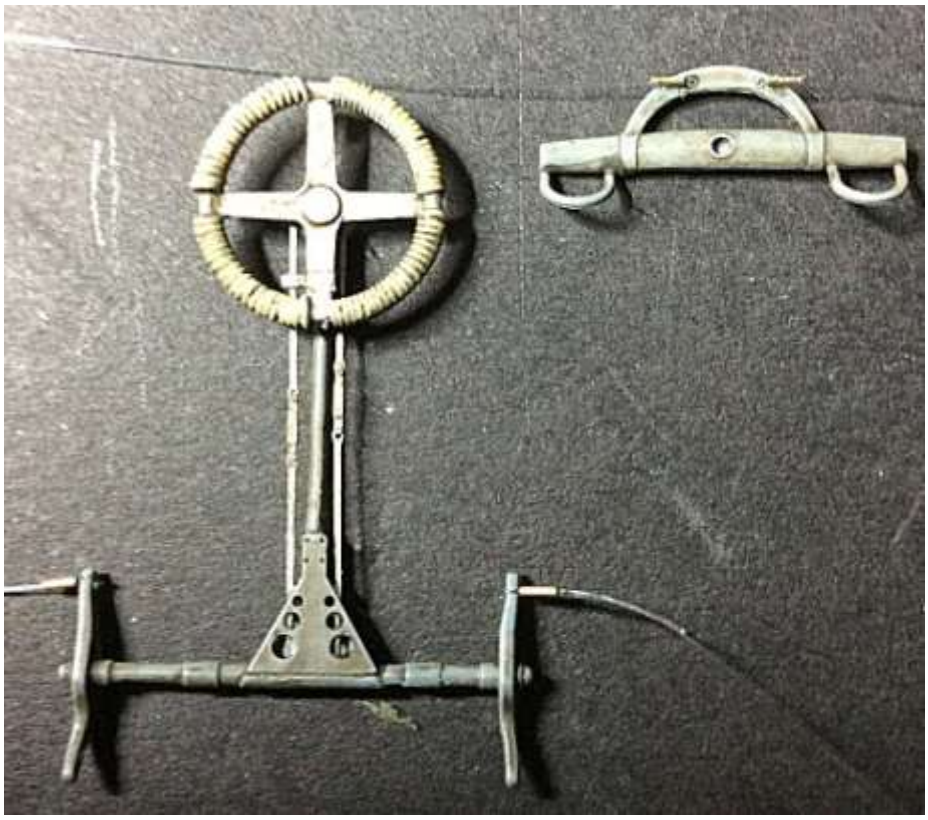
38. Slide onto each end of the line a short length of ‘Albion Alloys’ 0.4 mm diameter micro-tube (NST04).

39. Position these tubes close to the rudder bar and secure them and the line using thin CA adhesive.

40. Thread a long length of ‘Steelon’ 0.12 mm diameter mono-filament through the each of the pre-drilled holes in the tops of the rudder bar bell-cranks.

41. Slide onto each end of the lines a short length of ‘Albion Alloys’ 0.5 mm diameter micro-tube (MBT05).

42. Loop one end of each line back through the tubes and position the tubes close to the bell cranks. Secure the tubes to the lines using thin CA adhesive.



43. Thread each of the two control column cables alongside the main fuel tank and through the top pre-drilled hole in the seat bulkhead (to the top control pulley on the reverse side).

44. Carefully locate the control column cross bar into the locations in the cockpit side frames.

45. Position the front legs of the rudder bar support into the two location points on the cockpit floor and the rear legs onto the rudder cross bar.

46. Position the control column vertically then cement the two cross bar and four rudder bar supports locations. Leave the assembly to set.

During the following steps, refer to the rigging illustration in the Wingnut Wings instruction manual.

47. Elevator control lines:

Route the ends of the elevator control lines from the top of the rudder bar bell cranks rearwards and between the main fuel tank and cockpit frames. Pass the lines through the top pre-drilled holes in the pilot's seat bulkhead and then out through the cockpit side frames.

NOTE: Make sure the turnbuckles are correctly positioned during the next step.

Pass the free end of the lines through a short length of 'Albion Alloys' micro-tube (MBT05) and then through the eye end of a 'Gaspatch' Type 'C' turnbuckle (1:48 scale). Pass the lines back through the micro-tube, slide the tube close to the turnbuckle and secure in position with thin CA adhesive.

Cut a length of line and repeat on the other end of the turnbuckles to create a continuous control line.

Pass the lines through the pre-scrapped slots in the back of the 'metal' side bars on the cockpit side frames and through the top pre-drilled holes in both rear bulk heads.

Carefully pull the lines taught and secure to the back of the rear bulkhead, using thin CA adhesive. Cut away and line ends.

NOTE: The lower elevator control line can't be attached to the bottom of the rudder bar bell cranks as the metal wing support is in the way.

Cut a long length of 'Steelon' 0.12 mm diameter mono-filament. Pass it through a short length of 'Albion Alloys' micro-tube (MBT05) and then through the eye end of a 'Gaspatch' Type 'C' turnbuckle (1:48 scale). Pass the line back through the micro-tube, slide the tube close to the turnbuckle and secure in position with thin CA adhesive. Make sure only the tube/line glues, not the line/turnbuckle, as you need the loop through the turnbuckle to be free to move. Repeat on the other side, so you have a turnbuckle in the centre of a rigging line. Create two such lines.

NOTE: Make sure the turnbuckles are correctly positioned during the next step.

Pass one end of each line, from the observers cockpit and through the bottom pre-drilled hole in the pilot's seat bulk head. Pass the line under then back over the metal wing support. Pass the line out through the cockpit side frame. Secure the line to the metal wing support using thin CA adhesive. Cut away any line ends.

Pass the lines through the pre-scrapped slots in the back of the side containers on the cockpit side frames and through the middle pre-drilled holes in both rear bulk heads.

Carefully pull the lines taught and secure to the back of the rear bulkhead, using thin CA adhesive. Cut away and line ends.

48. Rudder control lines:

Position the rudder bar onto its support frame and cement in position. Allow the cement to fully set.

Pass each line through the pre-drilled holes at the rear of the ‘control pulleys’ on the cockpit side frames. Then pass the lines rearwards, over the rudder bar, between the bell cranks and cockpit side frames.

Pass the lines through the middle pre-drilled hole in the pilot’s seat bulk head then rearwards through the pre-scrapped slots in the back of the side containers on the cockpit side frames.

Pass the lines through the bottom pre-drilled holes in both rear bulk heads.

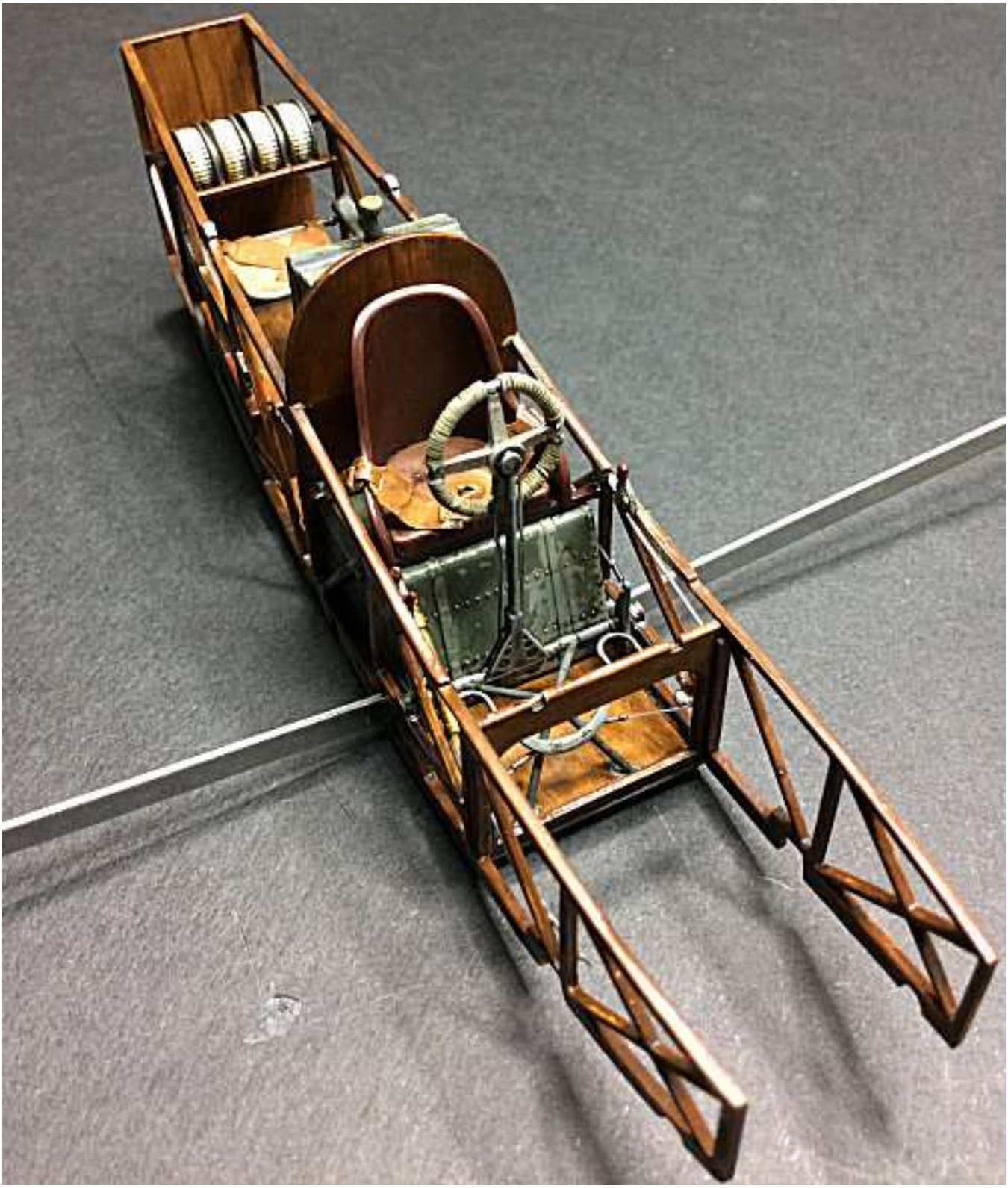
Carefully pull the lines taught and secure to the back of the rear bulkhead, using thin CA adhesive. Cut away and line ends.

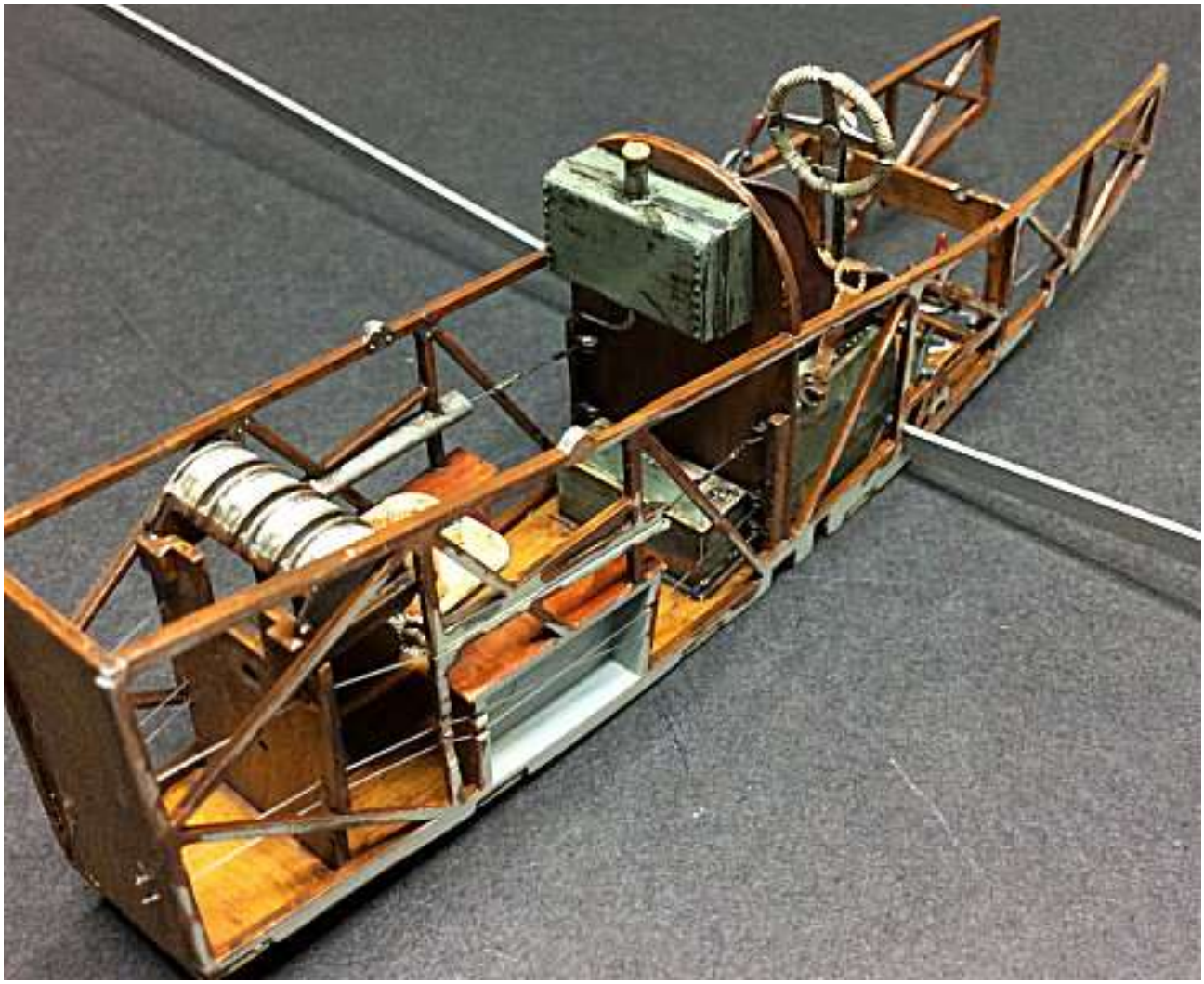
The micro-tubes can be ‘dull down’ by being brushed with ‘AK Interactive’ Kerosene wash (AK 2039).

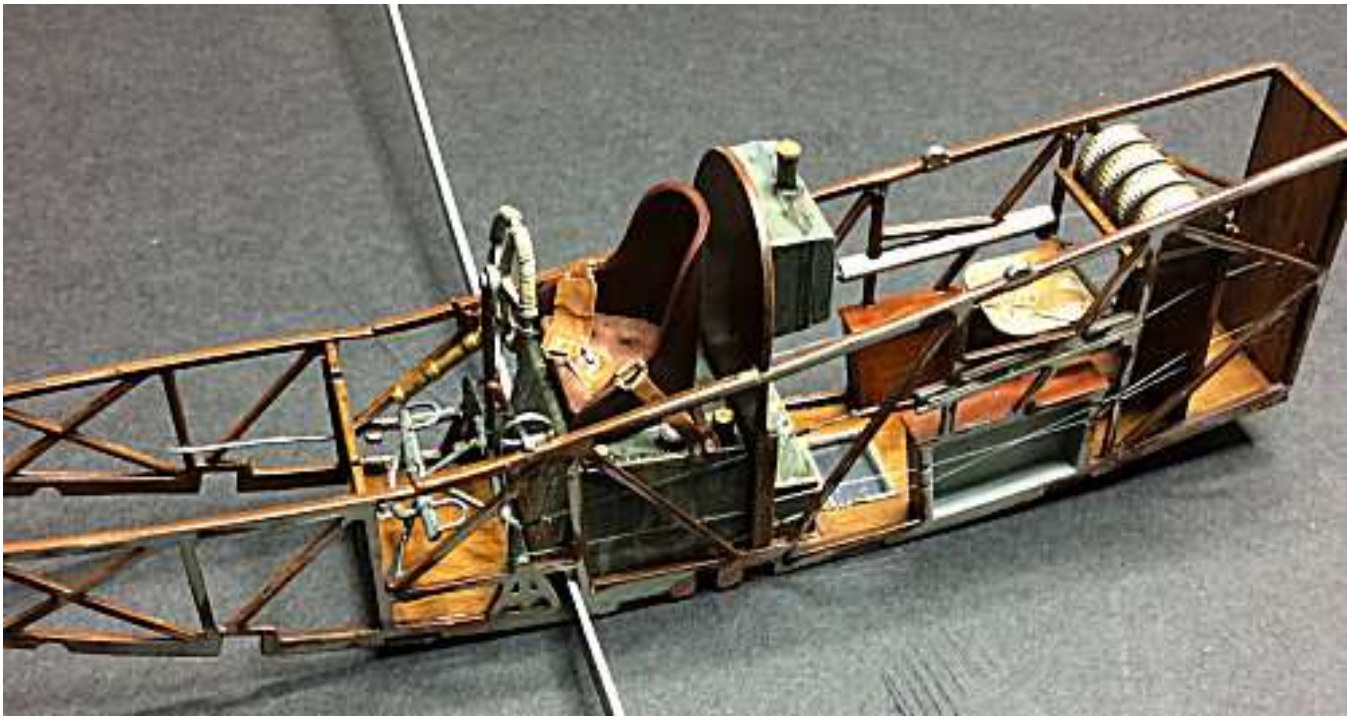
49. Carefully ease the front ends of the two cockpit sides frames apart and cement the frame (kit part A19) into position

50. Throttle control - to represent the throttle lever control rod, secure a short length of ‘Albion Alloys’ Nickel Silver micro-tube (NST04) from the throttle quadrant forwards along the cockpit side frame.

51. To represent the line from the pilot’s pressure pump, secure a length of ’PlusModel’ lead wire (0.4 mm diameter) from the pressure pump forwards along the cockpit side frame.



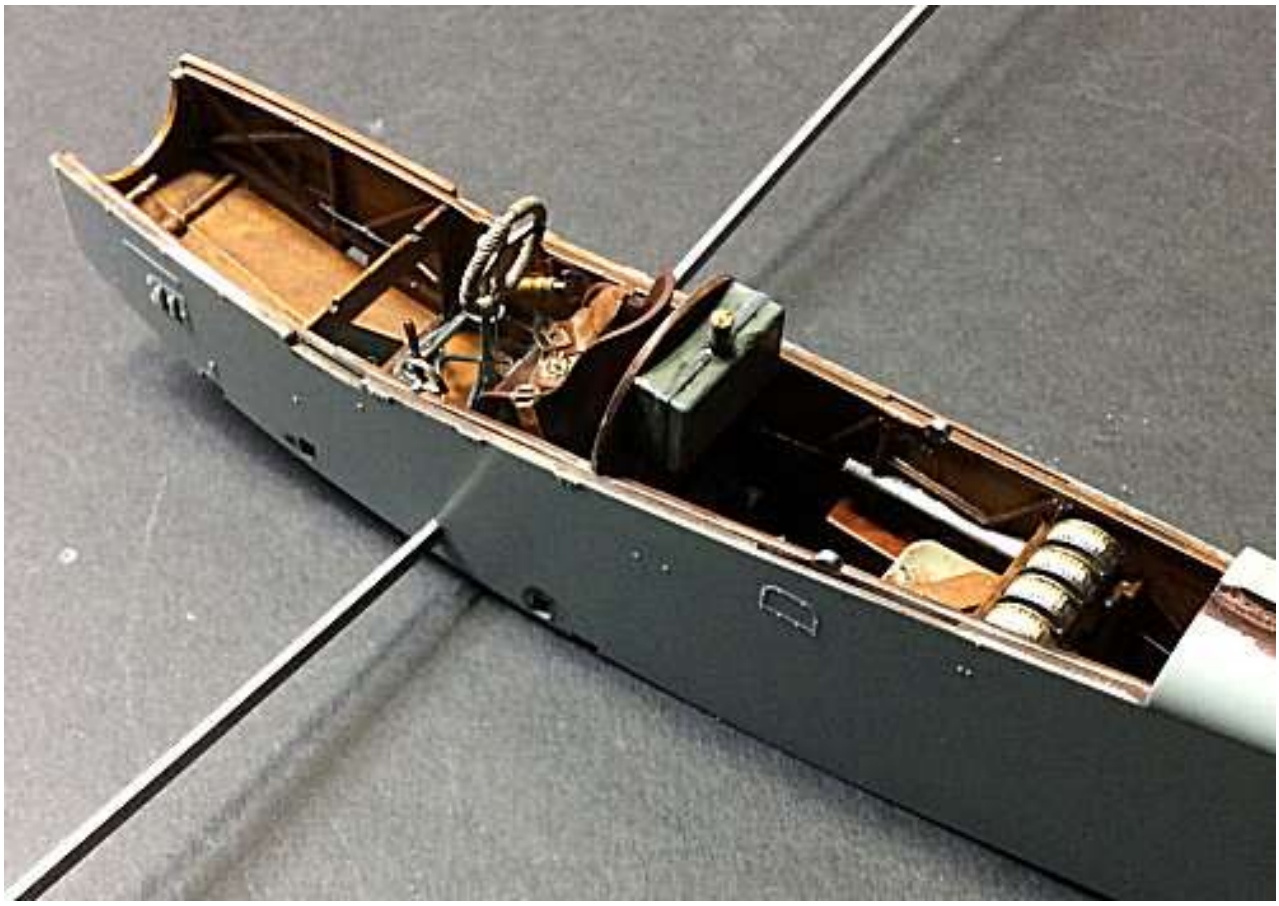




NOTE: Before final assembly, dry fit the fuselage halves to the cockpit assembly to check for a good fit without forcing the assembly together. If resistance is encountered, locate the area and sand away at the outside of the cockpit assembly until a good a free fit is achieved.

52. Assemble the two fuselage halves to the cockpit assembly.

53. Sand off the seam joints along the fuselage. If necessary you can use an ink marker pen to mark the seams, as this will help to see where sanding is required to remove the seam.



54. Once you think the seams are good, apply a primer coat from an airbrush along the seams. This will show any seam areas that need further attention.

55. Dry fit and check the instrument panel/engine support bearers assembly into the forward fuselage. Make sure all joining surfaces are free from primer and paint (back to plastic).

56. Cement the instrument panel/engine bearers assembly into the front fuselage.

    NOTE: It's a good idea to check the fit of components at this stage, due to the build up of primer and paints inside the fuselage.

57. Dry test fit the wings onto the metal spar and into the fuselage locations. Sand or scrape the wing locators, if necessary, to obtain a good fit against the fuselage sides.

58. Dry test fit the two floats support struts into the fuselage locations. Sand or scrape the strut locators or fuselage locations, if necessary, to obtain a good fit in the fuselage.

59. Cement the radiator (A8) into the cowl (F14).

60. Airbrush the inside of the radiator/cowl assembly with 'Alclad' Duraluminium (ALC-102).

61. Seal the painted inner surfaces of the cockpit outer surrounds (F9 and F18/19 with ‘Alclad’ Light Sheen lacquer (ALC-311), giving the desired surface for applying weathering effects.

62. Apply ‘Flory’ Dark Dirt clay wash (refer to Part 3 - Weathering).

63. Dry fit the rear cockpit surround assembly (F18/19) onto the fuselage. Check that the fit is good with no gap. Remove any primer paint from the joint surfaces.

64. Cement the rear cockpit surround (F18/19) in position on the fuselage.

65. Dry fit the side panels (F11 and F12) into the fuselage. Check that the fit is good with no gap. Remove any primer paint from the joint surfaces.

66. Cement the side panels (F11/12) in position on the fuselage.

67. Cement the panel stay frame assembly (A6 and A27) between the side panels. The cross bar of A27 fits into location holes on the inside of the side panels. The support bar A6 fits in location holes in the rear of A27 and the forward face of the engine bulk head.

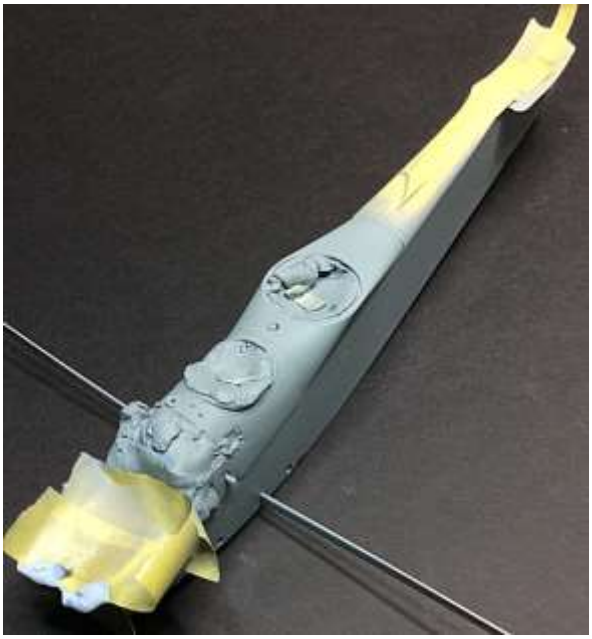
68. Dry fit the front cockpit surround (F9) onto the fuselage. Check that the fit is good with no gap. Remove any primer paint from the joint surfaces.

69. Dry fit the resin Spandau machine guns (modified in Part 1 of this build log - replacing the kit items) and make sure the guns fit correctly in their kit locations. Remove the guns.

70. Cement the front cockpit surround (F9) onto the fuselage.

71. Check all fuselage and panel joints and seams for any gaps or anomalies. If necessary fill these with an appropriate filler and allow to fully set. Fillers can be either a putty or liquid plastic (off cuts of plastic sheet dissolved in liquid cement to form a thick, liquid plastic). An alternative is to use CA adhesive, although this will dry really hard and will need much more sanding off than putty or liquid plastic.

72. Once the filler used in the joints/seams has fully set, sand the joints to obtain a gap free joint or seam. Mask off the fuselage openings, including the window apertures on the bottom of the fuselage, and airbrush the joints/seams with primer. When dry check for any gaps still showing. If so, repeat the filling, sanding and priming until gap free joints/seams are achieved.



PART 6 - EXTERNAL SURFACES (REFERENCE)

As with most colouring for World War One aircraft, it's debatable as to the exact colours and tints. New aircraft colours would differ from those that have 'seen service' and age and the ambient conditions would have altered these colours. In addition, the chemical mixture of the various dopes changed throughout the war, due to short supplies of some of the ingredients and the particular aircraft manufacturers take on a particular colour specification. Most colour photographs are of museum aircraft and modern replicas, which may or may not be accurate depictions of the actual colour at the time. The best we as modellers can achieve is what we, as individuals, consider is 'accurate'.

When researching the colour schemes and finish of the Hansa-Brandenburg W.29 I found that as usual, there are different interpretations available. The official standards laid down during WW1 for the finishes to be applied to aircraft of the German Naval Air Service were dependent on the time of issue.

General Colour Schemes

Order 'B Nr F5952' dated 28th March 1917:

Printed hexagonal linen (hexagonal grey-brown, grey-blue and grey-violet) was to be applied to all upper surfaces (wing, fuselage, floats, tailplane and elevator). All side surfaces (fuselage, floats, rudder, tail fin and struts) were to be painted Grey-Blue. The underside surfaces to be a light Grey colour, but the underside surfaces of the wing (and presumably tail plane) were to be left as Clear Doped Linen (CDL). The painted surfaces were to be of a matt (flat) finish.

Later orders dated April 1918:

Printed hexagonal linen (hexagonal grey-violet) was to be applied to all upper surfaces (wing, fuselage, floats, tailplane and elevator). All side surfaces (fuselage, floats, rudder, tail fin and struts) were to be painted Grey-Blue. The underside surfaces to be a light Blue or left as Clear Doped Linen (CDL). The painted surfaces were to be of a matt (flat) finish. There were caveats that stated for the duration of the war, aircraft surfaces (not those linen covered) could be painted with acid free tar based varnish. Additionally all naval G- and R– types should either be painted or have printed linen applied, both of which should be three colour hexagonal.

References:

Osprey Aircraft of the Aces - Naval Aces of World War 1 (Part 2) by Jon Guttman:

The colour profiles shown for this aircraft have all upper surfaces (except engine/cockpit areas) and including the two floats, in three colour hexagonal, undersides of the wing, fuselage, tail-plane and elevator as CDL and white on the rudder/fin. All side surfaces, including the two floats as being Grey-Blue.

Windsock Data File No.55 - Brandenburg W.29 by Peter M Grosz:

The colour profiles shown for this aircraft, particularly W.29 No.2532, appear to have all upper surfaces (except engine/cockpit areas) and including the two floats, in three colour hexagonal, undersides of the wing and tailplane as CDL and white on the rudder/fin. All the side surfaces as being Grey-Blue.

Wingnut Wings kit instruction manual:
The colour profile and instructions shown for this aircraft have the upper surfaces of the wing, tail plane and elevator in a three colour hexagonal lozenge scheme. The top, rear of the fuselage is also shown with this scheme. The undersides of the wing and elevator are shown as Clear Doped Linen (CDL). The rudder is shown as white. The fuselage, apart from the rear top lozenge scheme, is shown as being light grey, apart from the underside, which is a light blue colour, as is the underside of the tail plane. The floats and struts however are painted as Black/Rubber (depicting the 1918 'Tar' finish). These instructions also specify certain areas as being either a matt, semi-gloss or gloss finish.

Whilst generally the various interpretations are similar, the main differences are with the schemes applied to the two floats and associated struts, and the fuselage underside. The only choices seem to be either:
Floats and struts 'tar' coloured or Blue-Grey with hexagonal top surfaces.
Fuselage underside either CDL or light Blue.

Reference to models of this aircraft built by notable modellers, such as the late Des Delatorre, show the floats and struts as being painted in the 'tar' colour. There again other modellers have chosen the blue-grey and even bare wood schemes.
However it would seem sensible to protect the floats and struts from the effects of salt water by applying a resilient coating and therefore I have chosen to use the 'tar' finish on this model, as can be seen on the following photograph of that period.

Linen application.
Generally the patterned linen was applied to the various surfaces as follows:
Wings - Length of the bolt of linen applied chord wise (leading edge to trailing edge).
Ailerons and elevator - Length of the bolt of linen applied span wise (left to right).
Tailplane - Length of the bolt of linen applied span wise (left to right) although the Wingnut decals have it as for the wings (chord wise).
Fuselage - Length of the bolt of linen applied chord wise (front to rear).

Wing rib tapes.
Reference:
Windsock Data File No.55 - Brandenburg W.29 by Peter M Grosz.

Linen covered surfaces, particularly those on the wings and tailplane, were either applied from a continuous bolt of cloth or applied in sections. Care was taken to match the separate linen sections. To strengthen the joins of linen, ‘rib tapes’ of linen were stitched and/or glued over the rib joins. These tapes could be either of the same colour or of a contrasting colour, including hexagonal and lozenge patterns. Photographs of that period are generally of a poor quality and make it difficult to make out such things as rib tapes.

Rib tapes were either coloured blue (over the lighter coloured linen) or pink (over darker linen). Rib tapes were also cut from the same bolts of linen.

PART 7 - DECALS

The personal and national decals supplied in the kit will be used, but for the hexagonal linen and Clear Doped Linen (CDL) surfaces, I chose to use linen effect decals from 'Aviattic' - bleached Clear Doped Linen (ATT32044) and German Naval Hex (faded) (ATT32113). Due to the size of the model I took the precaution of ordering two sheets of each decal type. **NOTE:** These particular decal sheets are not 'cookie cut' to the required shapes and therefore require you to cut the shapes from the sheets. This is covered in the build (Part 12 of this build log).

Aviattic decals:

The 'Aviattic' decals are different in both production techniques and application to those of the more traditional decal manufacturers. Traditional decals are normally created using processes such as silk screen printing and are pre-shaped for the particular model markings. When placed in warm water they will detach from the backing sheet and can then be slid onto the model surface and when they are correctly positioned, wiped with a semi-dry brush or cotton bud etc, to expel any water from under the decal. Once fully dry, decal softeners, such as 'MicroSol' and/or 'MicroSet' can be applied, if necessary, to 'weld' the decal to the model surface. Finally a sealing coat of acrylic or lacquer gloss, semi-matt or flat is applied over the decal, to seal and protect the seal and protect the decal.
However, 'Aviattic' decals are laser printed onto a very fine carrier film and although this film is thin, the decals are remarkably resilient and somewhat 'stretchy' when being applied. This allows them to be more easily moved and positioned before being finally applied. Also with most other decals, I've used softeners to help the decals conform to surface irregularities and contours, which is something I've found is not really required for 'Aviattic' decals, due to the nature of the carrier film. In addition, the decals need to be cut out from the sheet, so care is required to cut the decals accurately to avoid leaving gaps, especially at the edges, where the white base colour will show. That said, minor gaps may be able to be covered with weathering. For more information, refer to the 'Aviattic' instruction sheet supplied with the decals.

Aviattic' decals are laser printed onto either 'clear' or 'white' backing, the 'clear' being dependent on the base coat you apply and the finished effect you desire. The decals are supplied with very clear instructions on their application, including when to add pre-shading to the base coat, where desired, before you apply the decals. For this model I chose to use the 'clear' decals, in order to show the linen effect more visibly.

First I airbrushed a primer coat of 'AK Interactive' Primer and micro-filler (White - AK759) on all of the surfaces to have the decals applied and once dry, the surfaces were checked for any Imperfections, such a trapped dust or raised areas of paint, which will cause 'silvering' under the decals. Any found were carefully polished out. I then airbrushed two light sealing coats of either Alclad Clear Coat Gloss (ALC-310) lacquer, 'Tamiya' Clear (X22) or 'Johnson' Pledge Floor Care finish (similar to 'Future'), which forms a gloss surface for applying the decals. 'Silvering' is caused by air being trapped in the rough surface of the paint, such as on a matte finish, which after the decal is applied and dries, causes the 'silvering'. I the apply the decals following the supplied 'Aviattic' instruction sheet. I pre-wet the model surface with like warm water with a few drops of 'Microscale' MicroSet. Care needs to be taken when you slide the decal from the backing sheet and onto the model surface, as the thin decal can fold over on itself.

Applying ‘standard’ decals to painted surfaces:

NOTE: The following is applicable only for decals on a painted surface. If decals are to be placed on top of previously applied decals, the decal setting solutions may ’eat’ into the previous decals. In this case a sealing coat of either ’Alclad’ Gloss (ALC-310), ‘Tamiya’ Clear (X22) or ‘Johnson’ Pledge Floor Care finish should be airbrushed over the first decals, to provide a barrier against the setting solutions.

Applying ‘standard’ water slide decals to a painted surface is different to that for ‘Aviattic’ decals.

1. Ensure the painted surface is smooth and free from any surface imperfections.
2. Airbrush a sealing coat of ’Alclad’ Gloss (ALC-310), ‘Tamiya’ Clear (X22) or ‘Johnson’ Pledge Floor Care finish, to provide a smooth surface.

   NOTE: ‘MicroSet’ solution softens the decal to allow it to conform to the painted surface. Do not attempt to move the decal too much or it may tear.

3. Wet the area using a light coat of ‘MicroScale’ **MicroSet** solution.
4. Apply the decal after it has soaked in ‘warm’ water enough to start to loosen the decals from its carrier backing.
5. Carefully move the decal into the correct position.
6. Carefully press out any residual water from the decal by either pressing with a tissue or by gently rolling over the decal with a cotton bud.

   NOTE: ‘MicroSol’ solution will soften the decal to allow it to conform fully to the painted surface. The solution usually causes the decal to wrinkle, but this is normal as the decal semi-dissolves to the surface. Once the solution has been applied, never try to disturb the decal as it will tear. Leave the solution for several hours to do its job, after which the decal will return to a smooth surface, but conformed fully to the painted surface.

7. Wet the decal surface with a light coat of ‘MicroScale’ **MicroSol** solution.
8. Leave the solution for several hours to fully dry and set the decal.
9. Once fully dry and set, airbrush a sealing coat over the decal, dependant of your desired finish. I tend to use either ‘Alclad’ Light Sheen (ALC-311) lacquer or ‘Tamiya’ Semi Gloss (X35).

Once the decal is correctly positioned, use a flat brush to brush the water out from under the decal, working from the centre of the decal out towards the edges. I then use a dry cotton bud in the same manner. Finally, wearing cotton gloves, I apply slight pressure and slide my fingers across the decal to finally push the decal onto the surface.

For this model the decal sheets had to be cut to match the profiles of the surfaces that required decals. Care is needed to ensure the cut decals are the correct size and shape, otherwise gaps between decals can occur. I trace and cut paper templates or use the kit supplied decals to trace the outline onto the ‘Aviattic’ sheet before cutting out the shape.

Once the decals have been applied I airbrush a sealing coat of either Alclad Clear Coat Gloss (ALC-310) lacquer), ‘Tamiya’ Clear (X22) or ‘Johnson’ Pledge Floor Care finish over areas where more decals are to be applied. Once the decals have been applied and are dry I airbrush a final sealing coat of Alclad Light Sheen (ALC-311) or ‘Tamiya’ Semi-Matt (XF35) over the decals.

To ‘knock back’ the sheen for applying further weather effects (‘Flory’ clay washes or oil paint) I airbrush a sealing coat ‘Alclad’ Light Sheen (ALC-311) mixed with Flat (ALC-314) at a 3 to 2 ratio.

PART 8 - RIGGING (General)

The first thing to check is that you have already drilled out the rigging attachment points. Most models have these located on the model, but it's best to carry out research in reference books or research on line before drilling.
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 care needs to be taken when using these drills, as they are 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. An alternative is to use High Speed Steel (HSS) drill bits, which are cheaper and have less 'bite' when in use, although again, they are very fragile and can very easily be broken.
Some modellers drill through the wings etc of the model and rig by pulling through the rigging line/EZ thread etc, gluing in position and then rubbing down the exposed line '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.

With your research complete and all necessary holes pre-drilled (refer to Part 1 of this build log), the rigging can start. For structural strength I used 'Steelon' mono-filament (fishing line) of various diameters. This is effectively transparent but does give a look of steel, without the need of painting or colouring with a gel pen.

NOTE: 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.

Flight controls cables:
A long length of 0.12 mm diameter 'Steelon' line is inserted into its pre-drilled rigging point and secured with thin CA adhesive. An Albion Alloy's micro-tube of either Brass (MBT05) or Nickel-Silver (NST05) is slid onto the line and then the free end of the line was passed through the associated flight control horn and looped back to the free tube. Using two pairs of tweezers, the free end of the line is inserted into the tube and pushed through until the line could be gripped from the other side. Then holding the tube with one pair of tweezers, the free end on the line is gently pulled to tighten the line and cause the free tube to slide up against the control horn etc. Hold the tube in position and apply thin CA adhesive to secure the line and tube in position. Once dry the exposed free end of the line can be cut away, as close to the control horn as possible, using a shielded razor blade.

This method can be used for attaching control cables from rigging holes to control horns etc, and when using after market turnbuckles. For turnbuckles fitted part way along a control cable, the lines and micro-tubes would attach to both ends of the turnbuckle. Where a single end turnbuckle is used, such as directly from the model part, the line and micro-tube would only be attached to the 'loop' end, as the other end of the turnbuckle would be attached to the model part.

PART 9 - WEAPONS

The kit supplied machine guns were replaced by:

'Gaspatch' 1:32 scale Parabellum 14/17 machine gun (15-32069),
'Gaspatch' 1:32 scale 'Spandau' 08/15 machine guns (15-320619)

The two Spandau machine guns (modified in Part 1 of this build log) and the observers single Parabellum machine gun were painted as follows:

Spandau and Parabellum machine guns:

1. Prime the two Spandau and one Parabellum machine guns with 'AK Interactive' Primer and micro-filler (AK758).
2. Prime the ammunition drum for Parabellum machine gun and the thin brass stabilizer rod with 'AK Interactive' Primer and micro-filler (AK758).
3. Airbrush the machine guns, ammunition drum and rod with 'Tamiya' Rubber Black (XF85).
4. Brush paint the shoulder butt and trigger grip of the Parabellum machine gun with 'Tamiya' Deck Tan (XF78).
5. Apply wood effect to the Parabellum shoulder butt and trigger grip (refer to Part 2).
6. Brush paint the ammunition rounds on the ammunition drum of the Parabellum machine gun, using 'Mr. Colour' Brass (219).
7. Brush paint the linen strap holding the ammunition on the Parabellum ammunition drum, using 'Tamiya' Dark Yellow (XF60).
8. Brush paint the ammunition retaining plate with 'Mr. Colour' Stainless Steel (213).
9. Airbrush a sealing coat 'Alclad' Light Sheen (ALC-311) mixed with Flat (ALC-314).

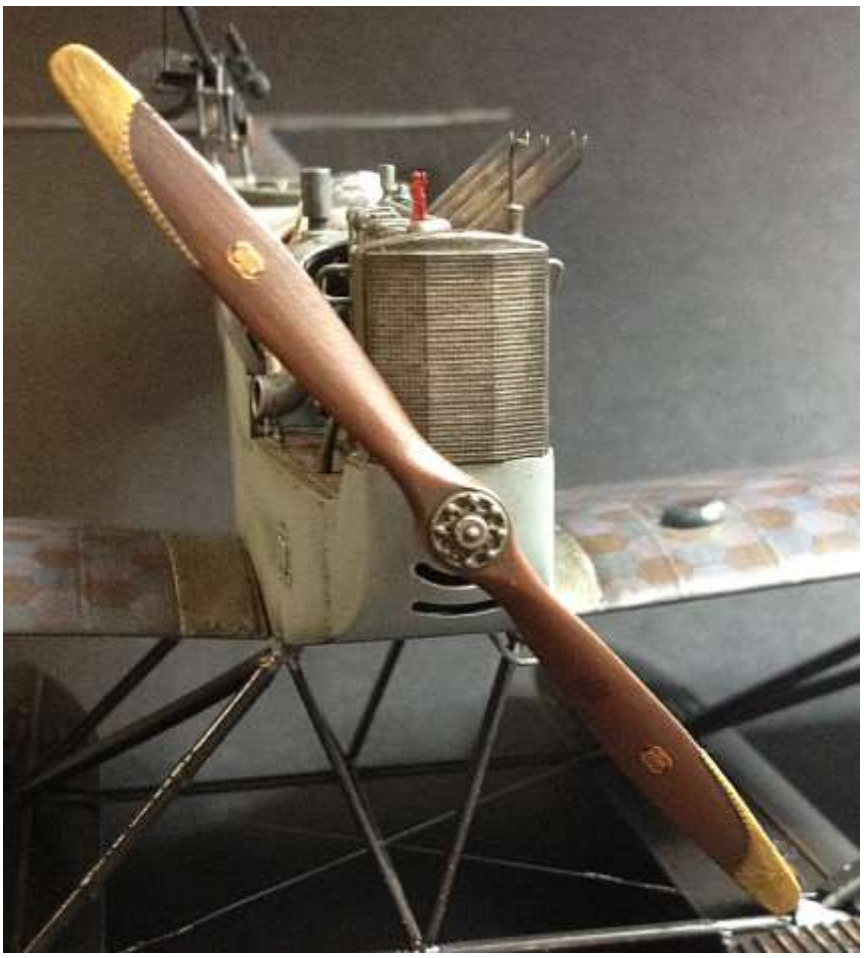
10. Lightly sponge ‘Tamiya’ Weathering Master (Set C - Gunmetal) around each machine gun and the Parabellum ammunition drum.
11. Lightly sponge ‘Tamiya’ Weathering Master (Set C - Silver) around each machine gun and the Parabellum ammunition drum as edge high lights.
12. Lightly sponge ‘Tamiya’ Weathering Master (Set B - Soot) around each machine gun muzzle.
13. Apply the kit supplied decal G1 to the shoulder butt.
14. Brush the Parabellum shoulder but and hand grip with ‘Alclad’ Light Sheen (ALC-311).

15. Secure the ammunition drum and stay rod to the Parabellum machine gun following the ‘GasPatch’ instructions supplied with the gun, using CA adhesive.

PART 10 - PROPELLER

The kit supplies three different propellers for this model, each of which are moulded with protection plates at the propeller tips. These were fitted to protect the tips from damage.

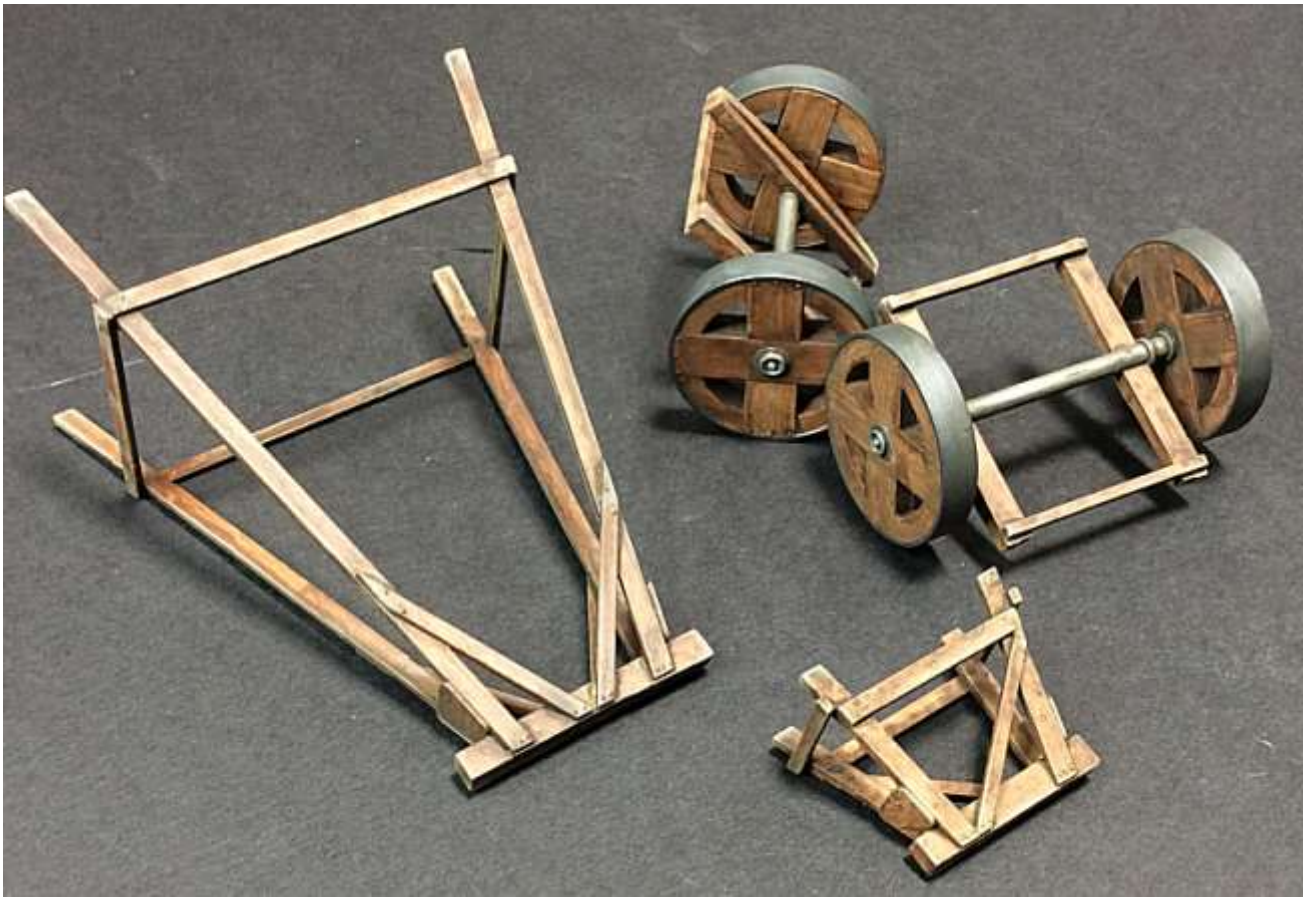
1. Cement the rear propeller boss () into the recess in the rear face of your chosen propeller.
2. Remove any seam lines by sanding or scrapping with a sharp scalpel blade.
3. Prime the propeller by airbrushing with 'AK Interactive' primer and micro-filler (Grey - AK758).
4. Airbrush the propeller with a base coat of 'Tamiya' Wooden Deck Tan (XF78).
5. Apply the wood effect using 'DecoArt' water based oil paints - Burnt Umber base with light brushing of Burnt Sienna - brush from the boss to the tips (refer to Part 2 of this build log).
6. Brush paint the 'metal' protection plates with 'Mr. Colour Brass (219).
7. Brush paint the propeller front and rear bosses with 'Mr. Colour Stainless Steel (213).
8. Airbrush a sealing coat of either 'Alclad' Gloss lacquer (AK-310), 'Tamiya' Clear (X22) or 'Johnson' Pledge Floor Care finish.
9. Apply the kit supplied decals to the propeller.
10. Airbrush a sealing coat of 'Alclad' Light Sheen lacquer (AK-311) mixed with a few drops of 'Tamiya' Clear Orange (X26) to give a hint of a varnished surface .
11. Apply 'Flory Models' Clay Wash (Dark Dirt) (refer to Part 3 of this build log).



PART 11 - BEACHING DOLLY'S AND TRESTLES

If you intend to display the model resting on the tail trestle, float trestle and beach dolly's, assemble the parts following the Wingnut Wings instruction manual. Assembly is simple and straight forward.

1. Assemble the tall tail trestle, the two wheeled dolly's and the single float trestle following the Wingnut Wing instruction manual.
2. Prime the assemblies using 'AK Interactive' Primer and Micro-filler (AK-758).
3. Airbrush the parts with a base coat of 'Tamiya' Wooden Deck Tan (XF78).
4. Apply the wood effect to the parts - use 'DecoArt' water based oil paint (Burnt Umber) and add a drop of water to thin the paint. Brush around the wheel rims and across the centre sections. (refer to Part 2 of this build log).
5. Brush paint the dolly's axles with 'Mr. Colour Stainless Steel (213).
6. Brush paint the wheel rims 'Mr. Colour Iron (212).
7. Apply 'Flory Models' Clay Wash (Dark Dirt) (refer to Part 3 of this build log).
8. Fit the wheels to the beaching dolly's.
9. Lightly sponge 'Tamiya' Weathering Master (SET A - Sand) to the edges to represent chipped/damaged wood.



PART 12 - MODEL CONSTRUCTION

NOTE: At this stage the modifications in Part 1 of this build log should have been completed and the fuselage assembly should have been completed in Part 5 of this build log.

Fuselage assembly and wings preparation:

1. Fit the pilots observation window (C3) into the aperture in the bottom of the fuselage. Use PVA adhesive in the corners of the aperture. Any excess PVA can be removed with a water damped cotton bud.
2. Mask off all openings in the assembled fuselage, including all of the locations for the float support struts. Due to the complex assembly at the engine bulkhead, I used 'Blutack' to fill in that area. 'Blutack' or scrap sponge can be used to fill in the two cockpit openings.
3. Mask the two observation windows in the bottom of the fuselage. For this I used 'Humbrol' Maskol, which is easily applied and removed.
4. Mask off the top of the fuselage to the rear of the observers cockpit, as this will need to be primed separately with white primer, as that is required for the 'Aviattic' linen effect lozenge decals.
5. Assemble the wing halves together (H4 and I4) (H1 and I1).
6. Temporarily fit the ailerons (H2 and H3) to the assembled wings.

   NOTE: Make sure any clear parts are masked to prevent being over sprayed.

7. Airbrush a primer coat of 'AK Interactive' Primer and Micro-filler (Grey - AK758) over:

   All of the fuselage

   The underside of the tailplane (B10)

   The outside of the nose fairing (F14)

   The rudder (A45)

   The outside of fuselage panel (F13)

   The outside of engine side panels (F3 and F4).

8. Once the primer is dry, airbrush the top and sides only of the fuselage and also the out side surfaces of fuselage panel F13 and the two engine side panels F3 and F4, using 'Tamiya' Medium Sea Grey 2 (XF83).
9. Remove the masking from the top rear of the fuselage.
10. Mask off the fuselage sides and rear cockpit to leave the top rear fuselage exposed. The masking should be placed at the rear cockpit to fuselage joint.
11. Airbrush a primer coat of 'AK Interactive' Primer and Micro-filler (White - AK759) over:

    The top rear of the fuselage

    The upper and lower surfaces of the wings and ailerons

    The upper surface of the tail plane

    The upper and lower surface of the elevator.

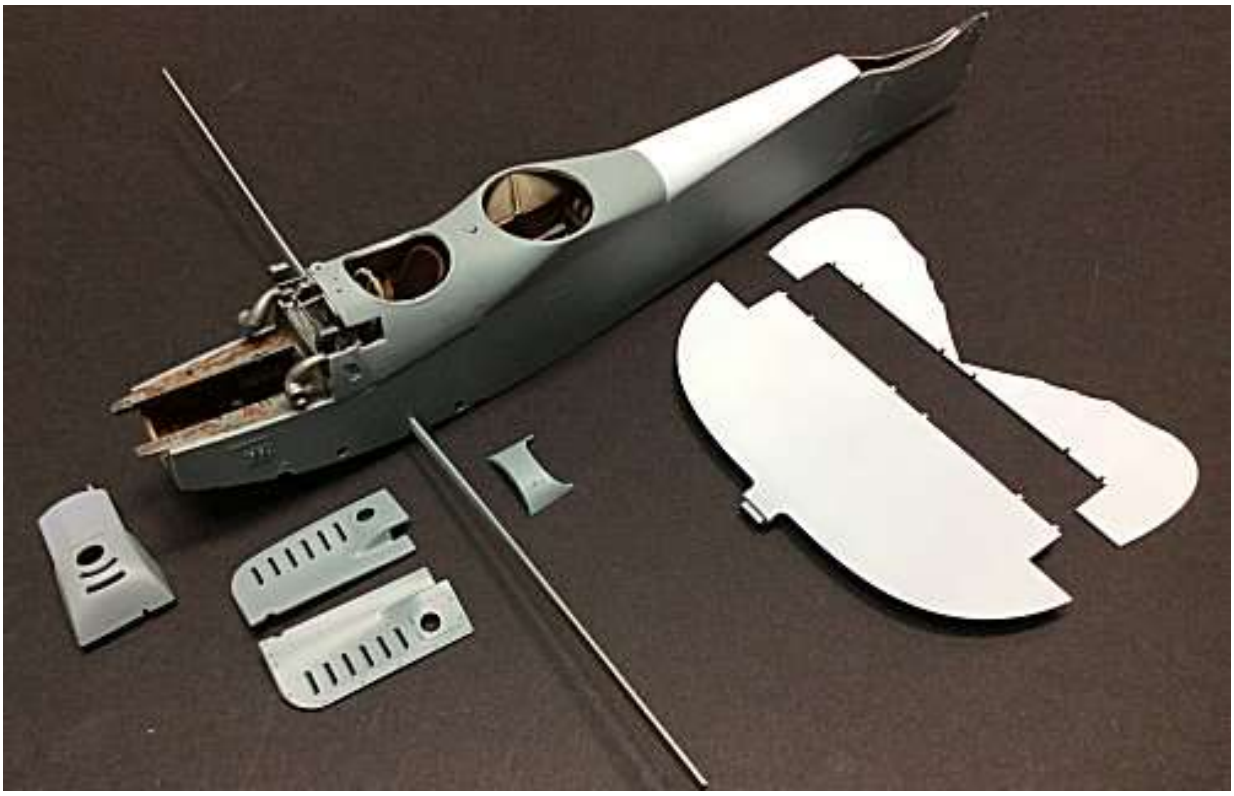
12. Remove the masking from the fuselage sides and rear cockpit.

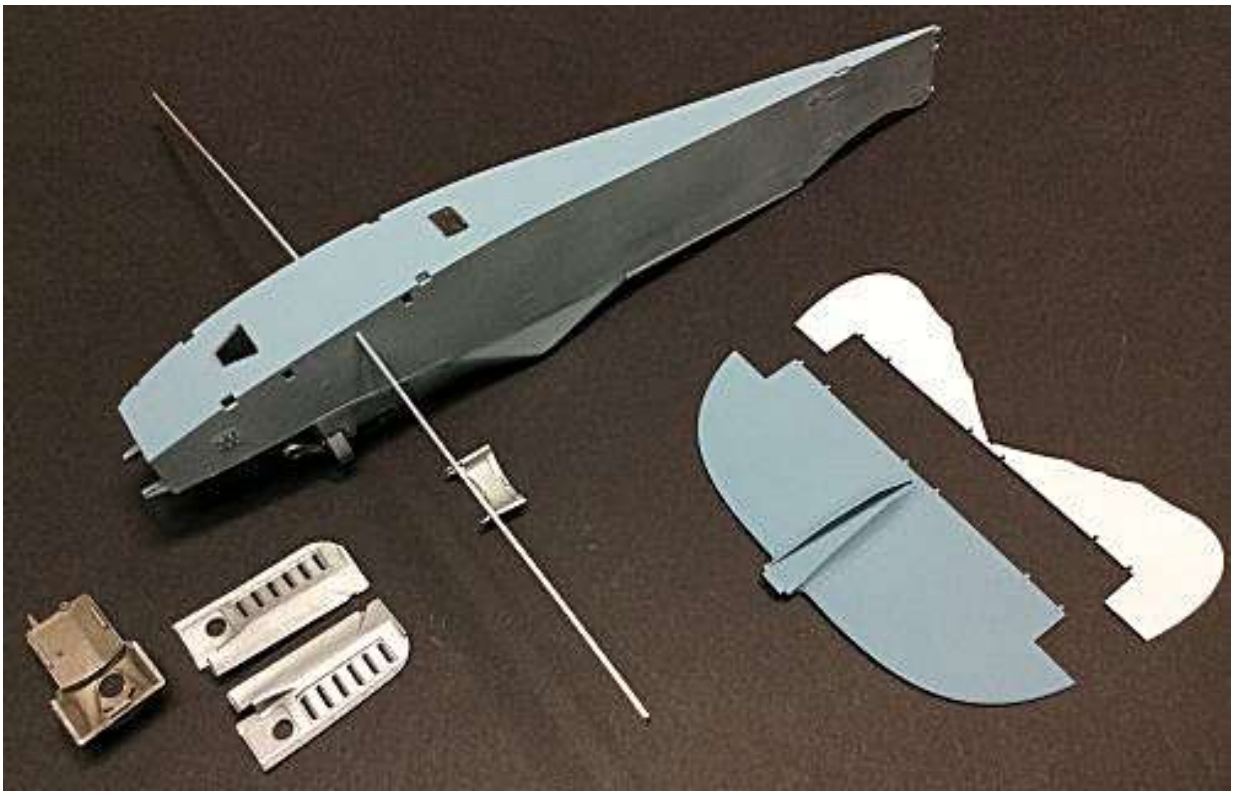
13. Airbrush the inner surfaces of fuselage panel F13 and the engine side panels F3 and F4, using ‘Alclad’ Duraluminium (ALC-102).

14. Mask off the bottom of the fuselage sides and airbrush the bottom of the fuselage and the underside of the tail plane, using mixture of ‘Tamiya’ Flat White (XF2) and Medium Blue (XF18) to a ratio of 2 to 1. The resultant colour should be a light blue.

15. Remove all remaining masking from the fuselage.

16. Airbrush the rudder with ‘Tamiya’ Flat White (XF2) with a drop of ‘Tamiya’ Buff (XF57) added.





Pre-shading:
When using the ‘Aviattic’ semi-transparent linen decals, I try to represent the internal structures and grime showing through the linen covered elevator, wings and ailerons. Also to shown joints in panels etc. To achieve this effect I pre-shade the primed parts before applying the decals, as follows:

17. Make sure the white primed surface is smooth and free from any imperfections. I use ‘Flory Models’ Weather/Polish sticks (Green/White). Lightly rubbing the green coloured side first across the surface removes minor imperfections. Then using the white coloured side will polish the surface smooth.

    NOTE: The amount of pre-shading depends on the type of ‘Aviattic’ decals used. Light decals, such as CDL only require ‘light’ pre-shading. More dense coloured decals, such as Lozenge require more pre-shading to show through the decal.

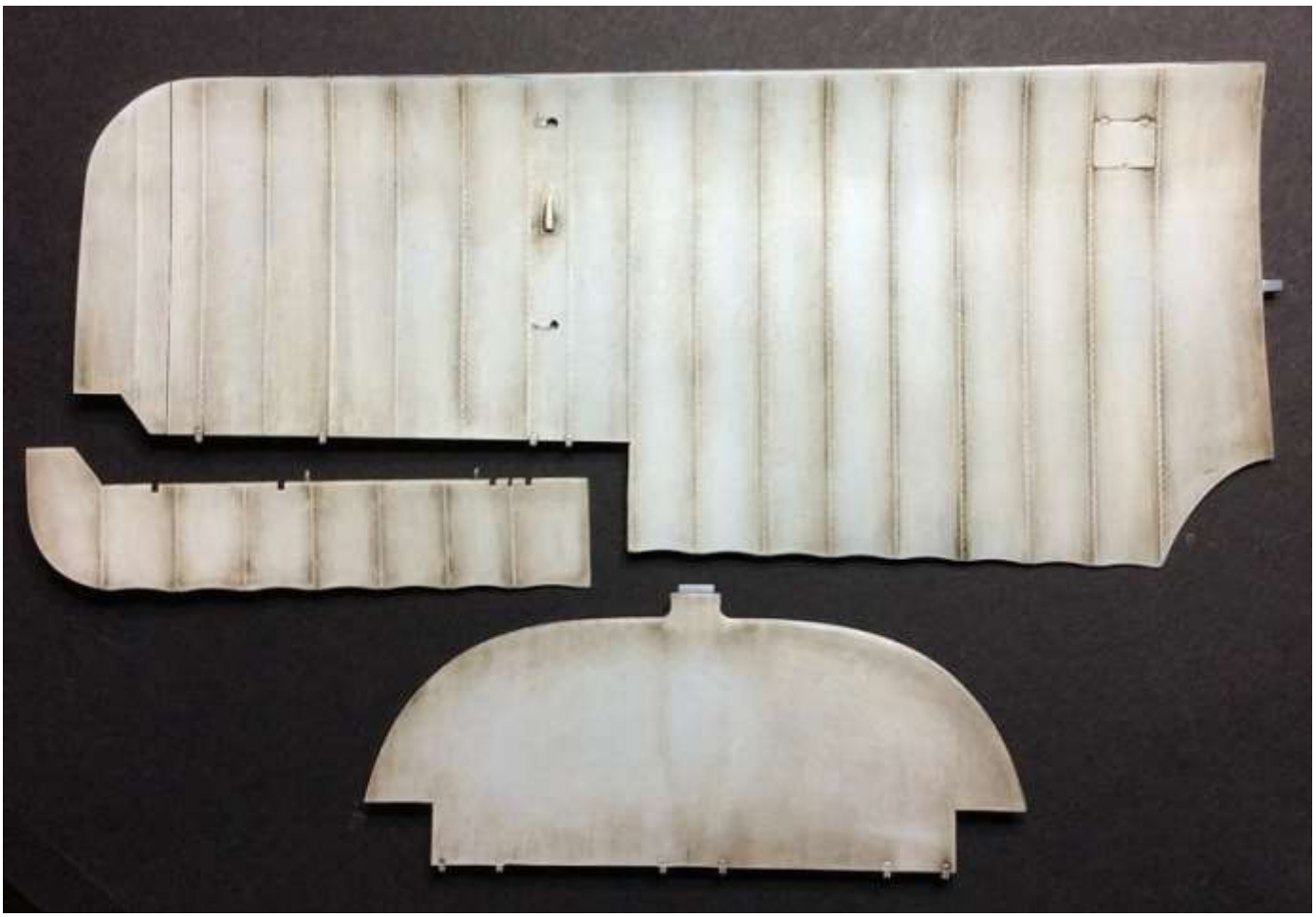
18. Apply by brush ‘Flory Model’ fine clay wash (Grime) across the entire surface. Once this has dried, use a soft tissue dampened with water, to rub off most of the clay wash from between the ribs. The more water used, the more clay wash will be removed. Only a light density of colour is necessary as the intention is for this to show through the applied ‘Aviattic’ Lozenge and CDL decals.

19. Airbrush those areas of the model that require decals You can use either:

    ’Alclad’ Gloss (ALC-310) lacquer

    ‘Tamiya’ Clear (X22).

    ‘Johnson’ Pledge Floor Care finish (a clear floor acrylic polish solution).



Floats and struts:

The float support struts has were covered with wood fairings, which like the two floats, were often painted with painted with acid free tar based varnish. The painting will show a chipped surface to the varnish showing the wood surface.

20. Assemble the two floats (B3 and B4 (B1 and B7).

21. Airbrush a primer coat of 'AK Interactive' Primer and Micro-filler (Grey - AK758) over the assembled floats and the float support struts (H8, I2, I3, I5, I6, H7 and H9).

22. Airbrush a base coat of 'Tamiya' Wooden Deck Tan (XF78) over the assembled floats and the float support struts.

23. Refer to Part 2 of this build log and apply the wood effects, using 'DecoArt' water based acrylic oil paint.

The photo below shows the floats and struts primed then brush painted with the oil paint (Burnt Umber' to create the wood effect base coat. The sealing coat is yet to be applied.

24. Airbrush the assembled floats and all of the struts with 'Alclad' Light Sheen (ALC-311) lacquer or 'Tamiya' Semi Gloss (X35), as a sealing coat and base for weathering.

25. Apply several 'light' coats of aerosol hair lacquer (any brand) over the assembled floats and the float support struts.

26. Airbrush a top coat of 'Tamiya' Rubber Black (XF85) mixed with Hull Red (XF9) at 3:1 ratio over the assembled floats and the float support struts.

27. Once the top coat is dry, apply water to the surfaces and used a wood cocktail stick or short, stiff brush, to chip and brush small areas of the top coat to create wear through the 'tar' coating.

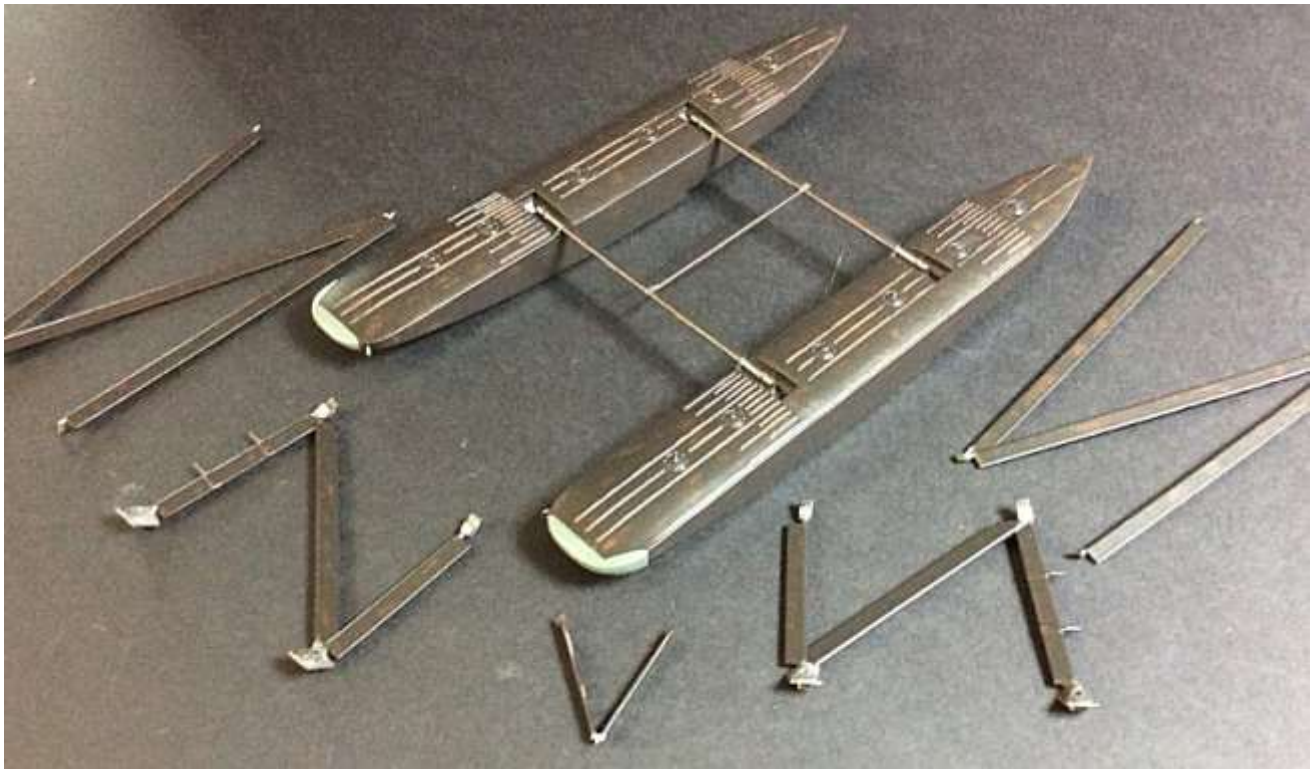
28. If necessary, tone down the stark contrast by airbrushing a thinned and light misting coat of the top coat colour over the floats and struts.

29. Brush paint bump plates on the front of the two floats with ‘Tamiya’ RLM Grey (XF22) and the metal fittings on the floats, struts and centre bar with ‘Mr. Colour’ Stainless Steel (213).

30. Very lightly sand the top of the raised runners (bars) on the two floats, including the raised top edge surrounds of the floats.

31. Airbrush the assembled floats and all of the struts with one or two light coats of ’Alclad’ Light Sheen (ALC-311) lacquer or ‘Tamiya’ Semi Gloss (X35), as a sealing coat.

32. Lightly ‘sponge’ ‘Tamiya’ Metallic Grey (XF56) onto the bump plates on the front of the floats to represent chipped paint.



Applying the decals:

NOTE 1: Applying decals to the fuselage and tail plane assembly will require two methods, one for the kit supplied decals and a second for applying the 'Aviattic' decals of Lozenge and Clear Doped Linen (CDL).

NOTE 2: Refer to Part 7 of this build log for 'Aviattic' decal and other decals application and the Wingnut Wings instruction manual for placement of the decals.

NOTE 3: The 'Aviattic' decals will need to be cut from the A4 decal sheets. Either use the kit supplied decals as templates for cutting out the decals shapes from the sheet or cut paper templates to the sizes required then use them as templates. Make sure that any protrusions are cut around or air may get trapped under the decal causing 'silvering'.

NOTE 4: Be aware that the ailerons are 'handed' right and left side, as they are shaped and not flat. Also the direction of the applied Lozenge decals are either 'Span wise' or 'Chord wise' (refer to Part 6 of this build log).

NOTE 5: Due to the large size of some of the kits decals, they are necessarily thicker and therefore care needs to be taken when positioning them, as they can be easily broken or tear.

NOTE 6: The large German cross decals for the underside of the wings (11 and 13) have holes in them, which should align with the strut location hole in the wing. Apply these two decals first to align the decals with the holes. The other cross decals can then be applied to align with them.

33. Once the sealing coat is fully dry, apply the decals as follows:

1. 'Aviattic' Bleached Clear Doped Linen (ATT32044) to the undersides of the elevator, wings and the ailerons.
2. 'Aviattic' German Naval Hex (faded) (ATT32113) to the upper surfaces of the tail plane, elevator, wings, ailerons and the top rear of the fuselage.

NOTE: Make sure any clear parts are masked to prevent being over sprayed.

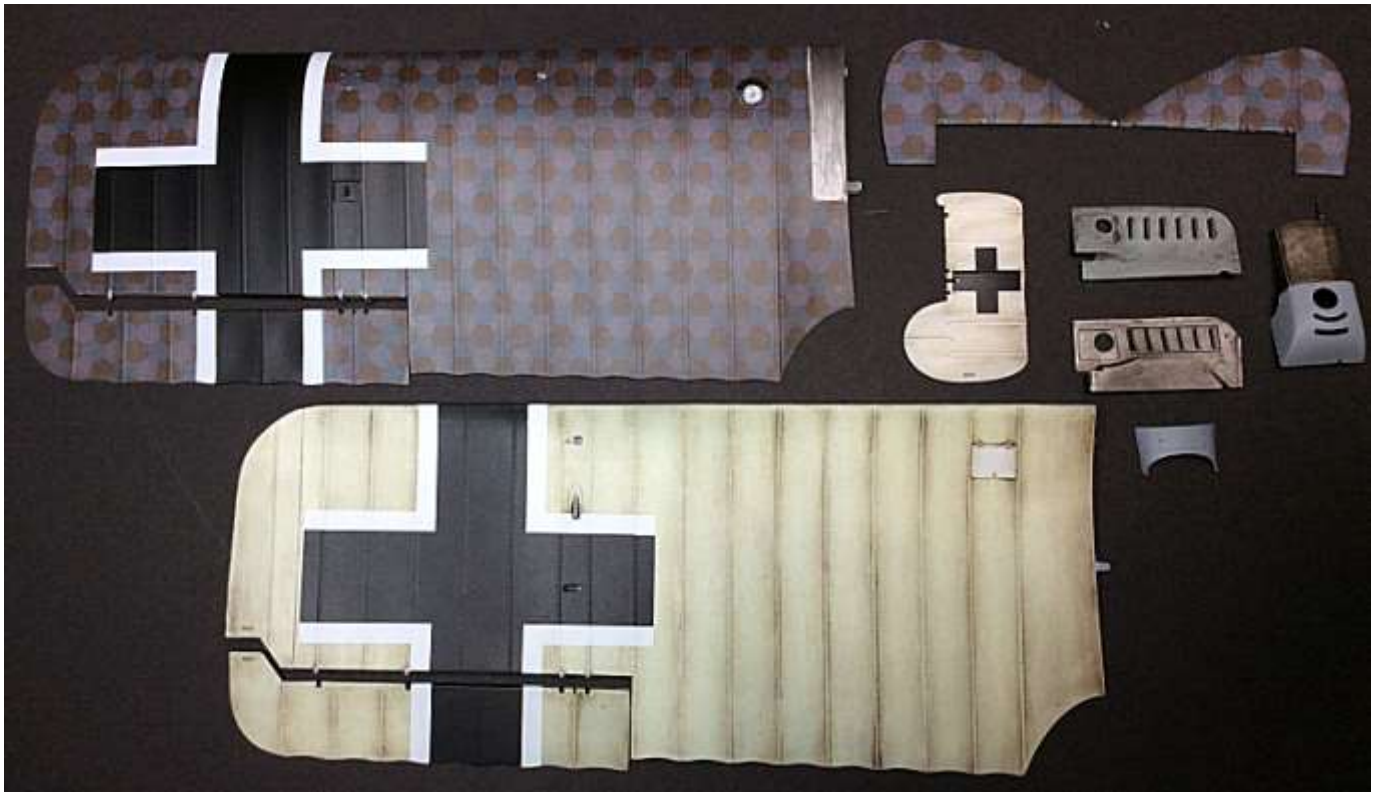
34. Once the 'Aviattic' decals are fully set, refer to the Wingnut Wings instruction manual and airbrush a light coat (with your chosen clear gloss sealing coat) those areas that require application of kit supplied and other decals (e.g. rib tapes).

35. Apply the kit supplied and any other decals over the 'Aviattic' decals and in their correct locations.

36. Rib tapes - refer to Part 6 External Surfaces. The references found indicate that rib tapes were used over the wings, ailerons and elevator surfaces. Cut thin strips from the 'Aviattic' Lozenge sheet the width of the ribs on the wings and elevator. You can also cut strips from an 'Aviattic' CDL Light linen sheet (ATT32045) for using on the CDL decaled surfaces of the wings, ailerons and elevator. The are 'white' backed decals shown as a lighter shade of CDL. *I chose not to apply rib tapes as I felt the colour contrast was much too obvious and that operational weathering would have faded them anyway.*

37. Any edges of the dried decals that need to be removed can be done by lightly sanding the edges off. Care is needed to ensure you don't sand through into the painted surface under the decals. Edges that may lift can be conformed back onto the models surface by brushing 'Tamiya' X20A thinners along the edges. This will soften the lifted decals and allow them to settle back.

38. For a sheen finish, seal the decals by airbrushing a coat of either 'Alclad' Light Sheen (ALC-311) lacquer or 'Tamiya' Semi-Gloss Clear (X35). To 'knock back' the sheen for applying further weather effects ('Flory' clay washes or oil paint) I airbrush a sealing coat 'Alclad' Light Sheen (ALC-311) mixed with Flat (ALC-314) at a 3 to 2 ratio.



Preparation of remaining kit parts:

39. Prepare and prime the remaining kit parts:
    Radiator front grill (E14)
    Fuselage lifting handles (D19)
    External ammunition rack (D16)
    Left machine gun ammunition chute (A1)
    Wing compass shroud (A46)
    Aileron and elevator control horns (A45, D6)
    External Tachometer (A47)
    Canister (A4)
    Crew step (A38)
    Observers gun mounting assembly (E20, E21, G4, G9)
    Pilots windshield (C2)
    External air speed indicator (modified A21)

40. Once the primer was dry, the various parts were painted as follows:
    Radiator front grill - 'Mr. Colour' Stainless Steel (213)
    Fuselage lifting handles - 'Tamiya' Medium Sea Grey (XF83)
    External ammunition rack - 'Tamiya' Red (X7), Flat White (XF2), Dark Yellow (XF60) and 'Mr. Colour' Brass (219).
    Left machine gun ammunition chute - 'Mr. Colour' Stainless Steel (213)
    Wing compass shroud - 'Tamiya' Rubber Black (XF85)
    Aileron and elevator control horns - 'Tamiya' RLM Grey (XF22)
    External Tachometer - 'Tamiya' Rubber Black (XF85)
    Canister - 'Tamiya' Rubber Black (XF85)
    Crew step - 'Tamiya' Medium Sea Grey (XF83)
    Observers gun mounting assembly -
        'Tamiya' RLM Grey (XF22) over wood effect (refer to Part 2 of this build log),
        'Mr Colour' Stainless Steel (213)
    Pilots windshield frame - 'Mr. Colour' Stainless Steel (213)
    External air speed indicator - 'Tamiya' Medium Sea Grey (XF83)
    Rotor for Air Speed Indicator - 'Alclad' Gold (ALC-108) lacquer over Black lacquer base.

Rigging:

Before further construct work is carried out, it's best to pre-install the various rigging lines to the model parts. These are:

Rudder control - each side of the rudder to the rear fuselage openings.
Aileron control - ailerons to upper lower sides of the wings
Cross bracing - corner to corner between the two floats.

41. Check that the 'rigging' holes pre-drilled (in Part 1 of this build log) into the aileron and the rudder control horns, the upper and lower sides of the wings and the floats are clear of any primer and paint. If necessary carefully clean the holes using either a 0.3 mm or 0.4 mm drill as necessary.

    NOTE: The following step should be carried out to the two aileron control horns and the rudder control horn.

42. Cut a length of 0.12 mm diameter ‘Steelon’ mono-filament and a short length of 0.5 mm diameter Nickle-Silver micro-tube (‘Albion Alloy’s NST05). Thread one end of the line through the tube, then through one of the holes in a control horn. Loop the line back through the tube then slide the tube close to, but not touching, the control horn. Secure the tube to the line, using thin CA adhesive, but make sure the line is free to move and not stuck to the control horn. Cut away the excess ’tag’ of line at the tube. Then repeat this to create an attached line to each end of the two aileron control horns and the rudder control horn.

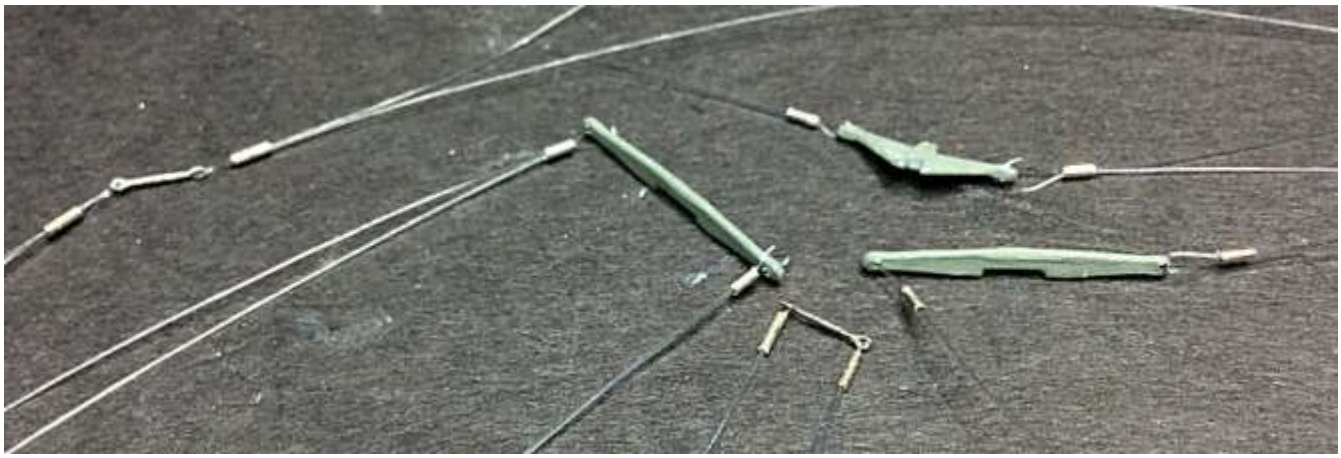
43. Cement the aileron control horns in position on the ailerons.

44. Cement the rudder control horn in position on the rudder.

NOTE: I could not find evidence that the cross bracing lines between the two floats had turn-buckles fitted to adjust the tension in the lines. Therefore I’ve assumed these would have been fitted.

45. Cut a length of 0.12 mm diameter ‘Steelon’ mono-filament and a short length of 0.5 mm diameter micro-tube (‘Albion Alloy’s NST05). Thread one end of the line through the tube, then through one end of a ‘Gaspatch’ type ‘C’ turnbuckle (1:48 scale). Loop the line back through the tube then slide the tube close to, but not touching, the turnbuckle. Secure the tube to the line using thin CA adhesive, but make sure the line is free to move and not stuck to the turnbuckle. Cut away the excess ’tag’ of line at the tube. Repeat this at the opposite end of the turnbuckle to create an attached line to each end. Create two such lines, which will be attached to the pre-drilled holes either side of the front cross bar between the two floats.

46. Apply the kit decals to the external Tachometer and the wing mounted air speed indicator.



47. Cement the external Tachometer (A47) and canister (A4) into their locations forward of the pilots cockpit.

48. Assemble and cement the observers gun mounting ring assembly into the fuselage aperture.

49. Cement the tail plane onto the top rear of the fuselage.

50. Brush paint the pilots windscreen outer frame and the two under fuselage windows with ‘Mr. Colour’ Stainless Steel (213).

51. Cement the two lifting handles in their recesses at the bottom edge, rear fuselage.

52. Cement the crew step onto its locations on the lower, left front of the fuselage. Use the nose/radiator to align where the leg of the step locates under the fuselage.

53. If they are to be fitted, cement one or both flare cartridge racks to the left fuselage, below the observers cockpit.

Weathering:

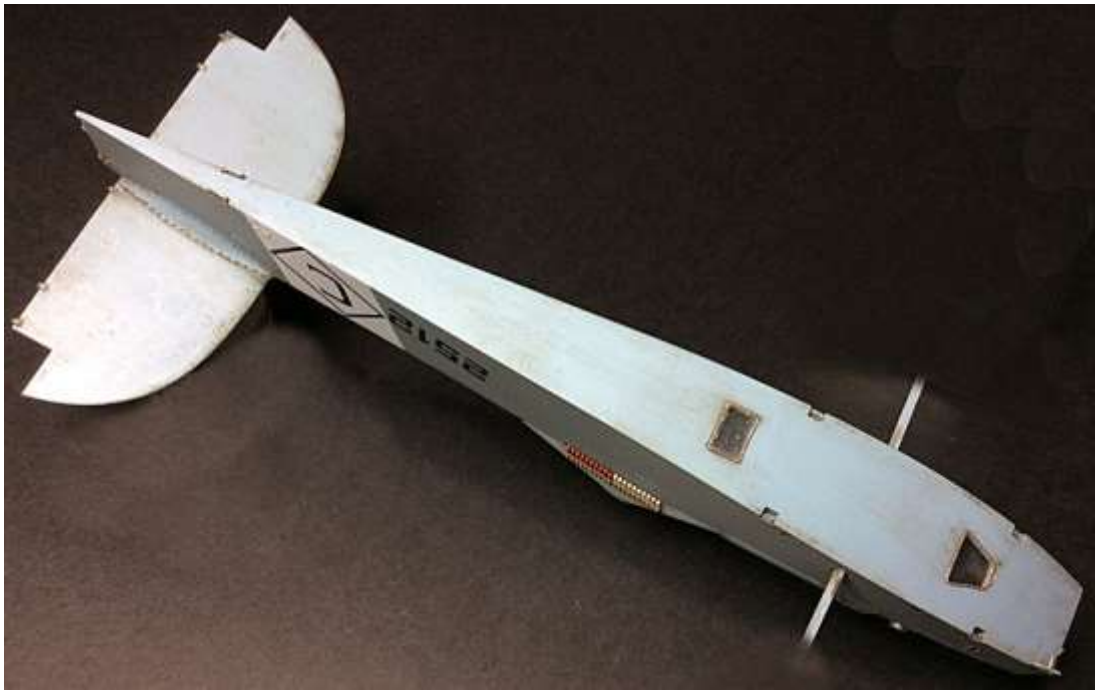
Normally it is easier to apply the weathering effects to the external surfaces of a smaller model, such as a single seat fighter, once the model has been finally assembled. However this aircraft model is larger and could prove difficult to handle once assembled. Therefore I chose to weather the external surfaces before final assembly.

> **NOTE:** Applying weathering mediums, such as clay washes and oil paints, to the model should not affect the painted surfaces as these were sealed previously with a coat of 'Alclad' lacquer.

54. Brush over the fuselage and tail plane, wings, ailerons, elevator, rudder, the nose/radiator fairing and the engine access panels, using 'Flory Models' Dark Dirt fine clay wash (refer to Part 3 - Weathering for more information).

55. Allow the clay wash to dry, usually within an hour dependent on the ambient temperature.

56. Using standard kitchen roll absorbent tissue, very slightly dampen with water and rub away the clay wash as required to achieve the grimy look you are after. If the clay wash does not wipe out easily, moisten the tissue more. As the parts were pre-shaded the effects of this wash are very subtle, just to add slightly to the pre-shading and to add weathering to leading edges, behind panels etc.



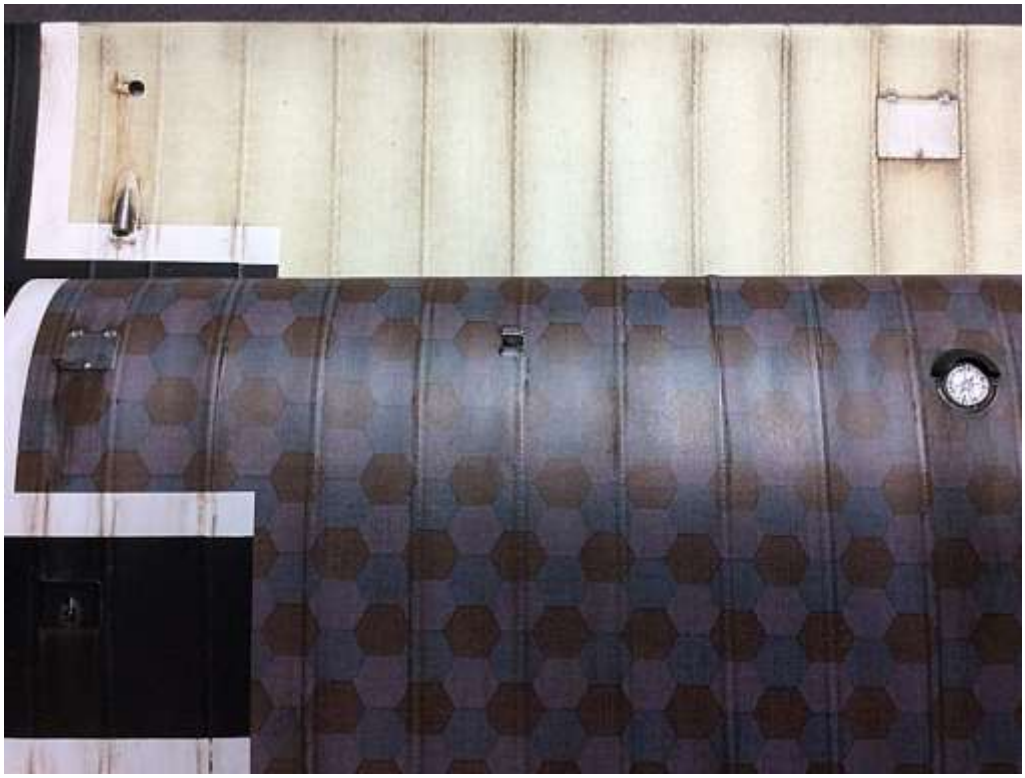
Post shading:

To add further weathering to the applied clay wash, I use the oil paint ‘dot and drag’ method (refer to Part 3 - Weathering for more information).

57. The oil paints used were:

‘Abteilung 502’ Smoke (ABT005 - behind wing and fuselage panels etc, wing compass and along rib tapes on the wing crosses (wing upper and lower).

‘Abteilung 502’ Burnt Umber (ABT006) - behind wing panels etc, on the CDL under side of the wings.



58. Secure the pilots wind screen onto the fuselage location using a small amount of PVA (white glue) adhesive.

59. Dry fit the ammunition ejection chute (A2) with the right Spandau machine gun and panel F13. Make the parts align correctly.

60. Cement the ejection chute (A2) and right machine gun in position.

61. Dry fit the ammunition left Spandau machine gun and panel F13. Make the gun parts align correctly.

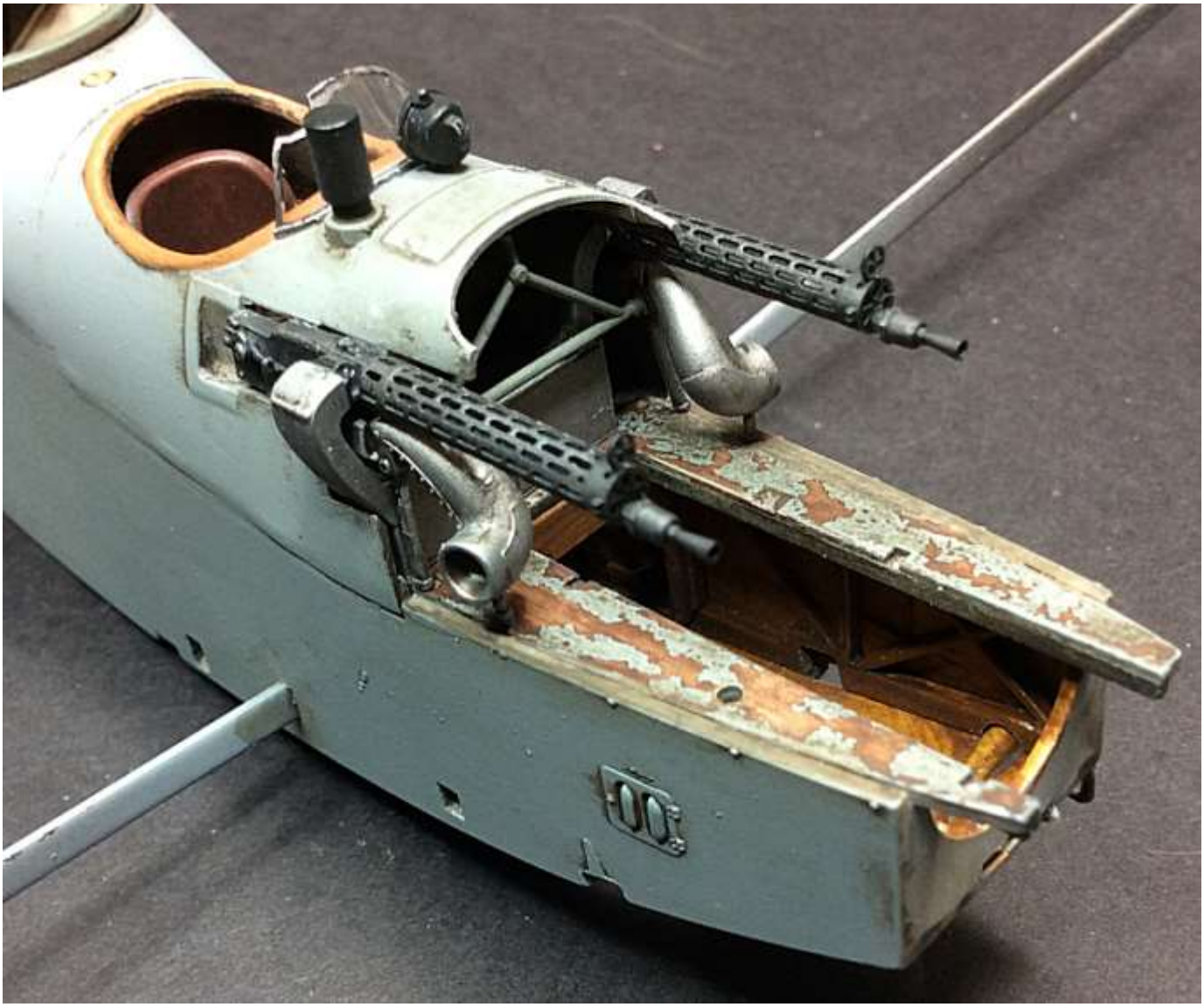
62. Cement the left machine gun in position.

63. Cement the left ejection chute A1 in position on panel F11.

64. Cement panel F13 in position. Make sure it locates onto the support frame (A27).

65. Apply the kit supplied decals (2) to the left and right ammunition chutes (A1 and A2).

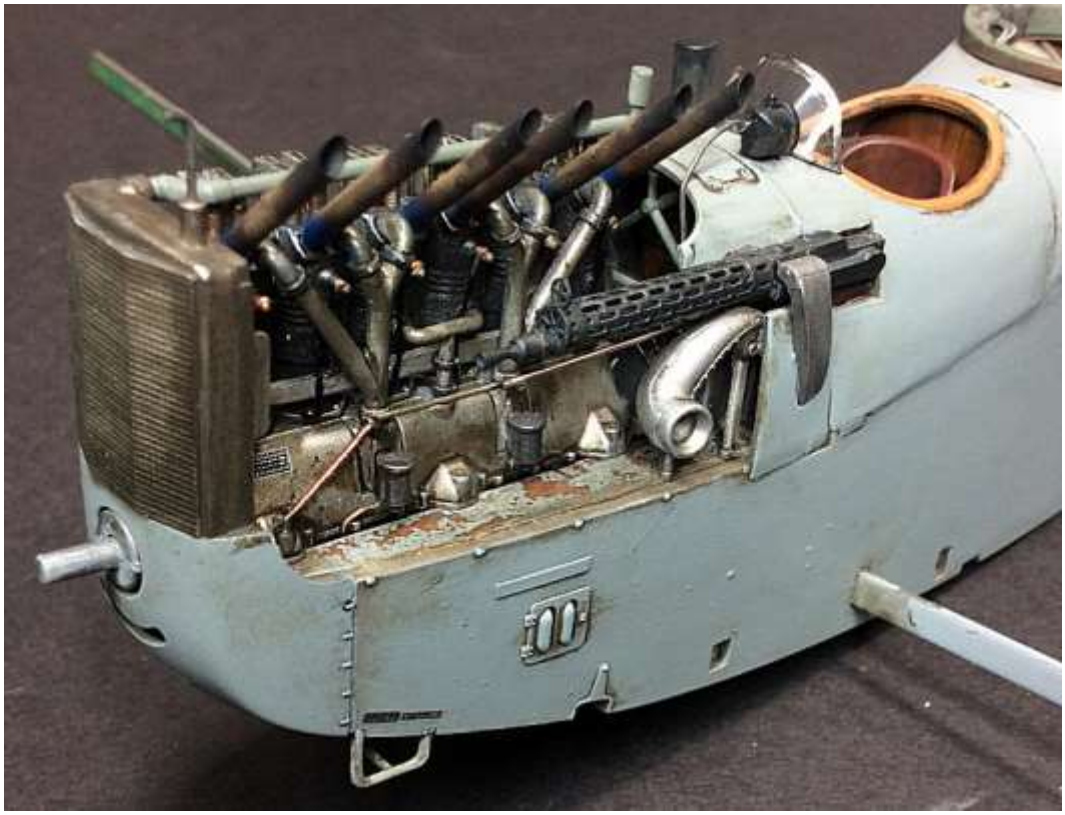
66. Cement the engine onto the engine bearers.

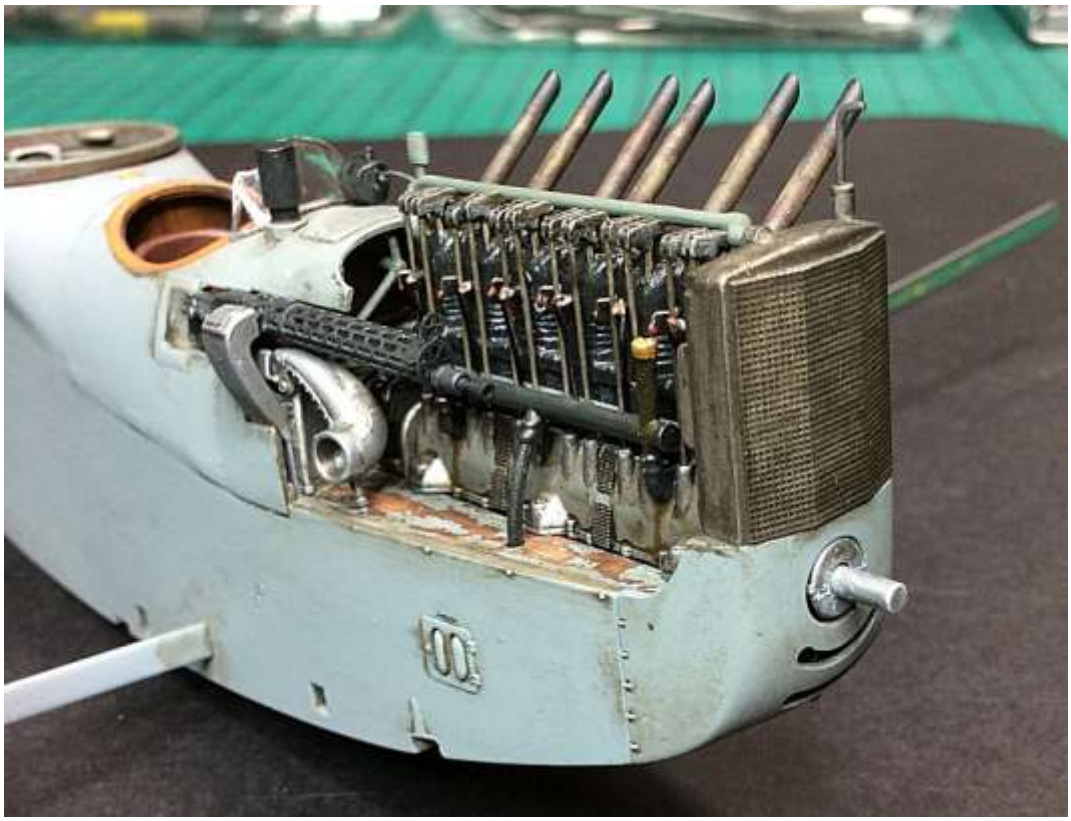


67. Cement the radiator/nose faring onto the front of the fuselage.

68. Cement the radiator coolant pipe (A31) to the rear of the engine and rear of the radiator.

69. Position the speed control operating rod (previously cut from micro-tube) from behind the instrument panel and secure it to the rear speed selector lever, using CA adhesive.





70. Cut a length of 'PlusModel' 0.4 mm diameter lead wire and attach one end to the back of the externally mounted Tachometer (mounted on the decking in front of the pilot), using thin CA adhesive. Curve the wire over panel F13 and into the engine bay at the rear of the engine mounting bearers.

71. Cement the two side stays (A34 and A35) in position between the engine crankcase location and the top outer corner of the radiator header tank.

72. Locate the elevator onto its hinges on the trailing edge of the tail plane and cement in position. Angle the elevator slightly down at the trailing edge, if desired, to position it in a 'relaxed' position.

73. Dry (test) fit the two wings onto the metal spar and make sure they slide up to and into the fuselage locations, without undue force.

NOTE: To ensure the wings did not move away from the fuselage when being fitted, I decided to smear a light layer of 'Araldite' 2-part epoxy resin to the outer third of each metal spar, to secure it inside the wing. This is not strictly necessary so doesn't have to done.

74. If required, spread a thin layer of 'Araldite' 2-Part Epoxy resin onto the outer third of each metal wing spar.

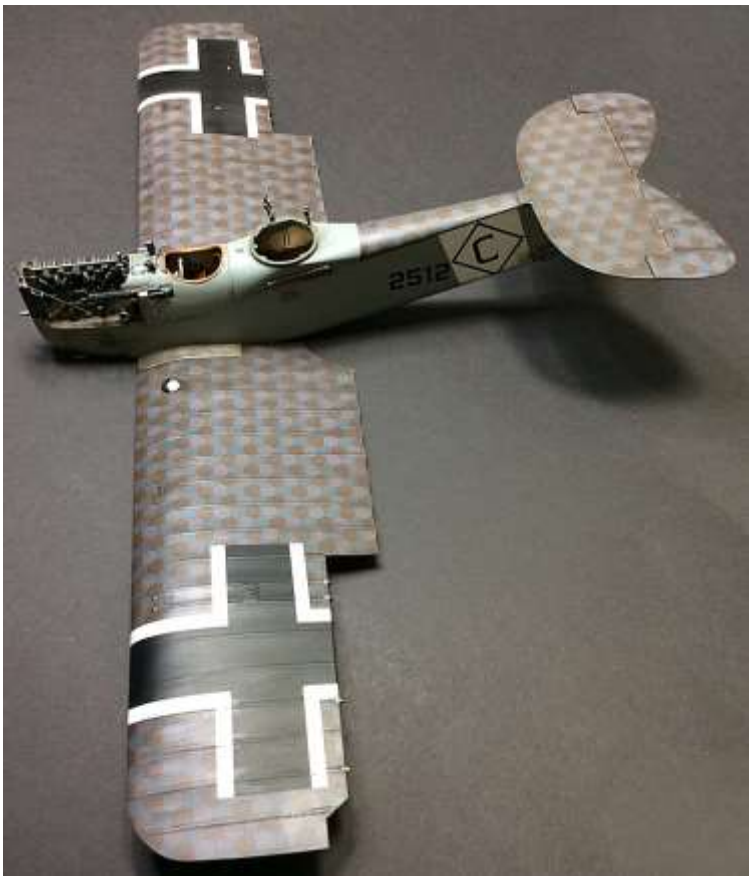
75. Apply cement into the two wing location holes on each side of the fuselage.

76. Apply cement to the wing locating lugs on each wing.

NOTE: During the next step, do not apply too much force against the fuselage sides, as you may damage the internal parts or break open the fuselage joint seam.

77. Slide the wings up to and into the fuselage location holes. Make sure the wings are up against the fuselage.

78. Apply more cement to the wings/fuselage joint and from under the wing (to avoid any damage the upper surface).



79. Test (dry) fit the float support struts into the floats and aircraft locations. Remove any paint of primer that prevents the parts fitting correctly.

80. Locate and cement the float struts (I2 and I3) in position on their float locations.

81. Using the pre-made cross bracing rigging lines - cut one end of each line such that when inserted into the pre-drilled location holes in the outer ends of the forward floats cross bar, the turnbuckles are close to but clear of the floats inner edges.

82. Secure the lines into the holes using thin CA adhesive.

83. Check the length of each line to its opposite pre-drilled location holes in the outer ends of the rear floats cross bar. Cut the lines to leave enough line to be inserted into the holes.

84. Insert the lines into the holes and gently pull the line taught. Secure the lines in the holes using thin CA adhesive.

85. Locate and cement the floats assembly into the fuselage locations.

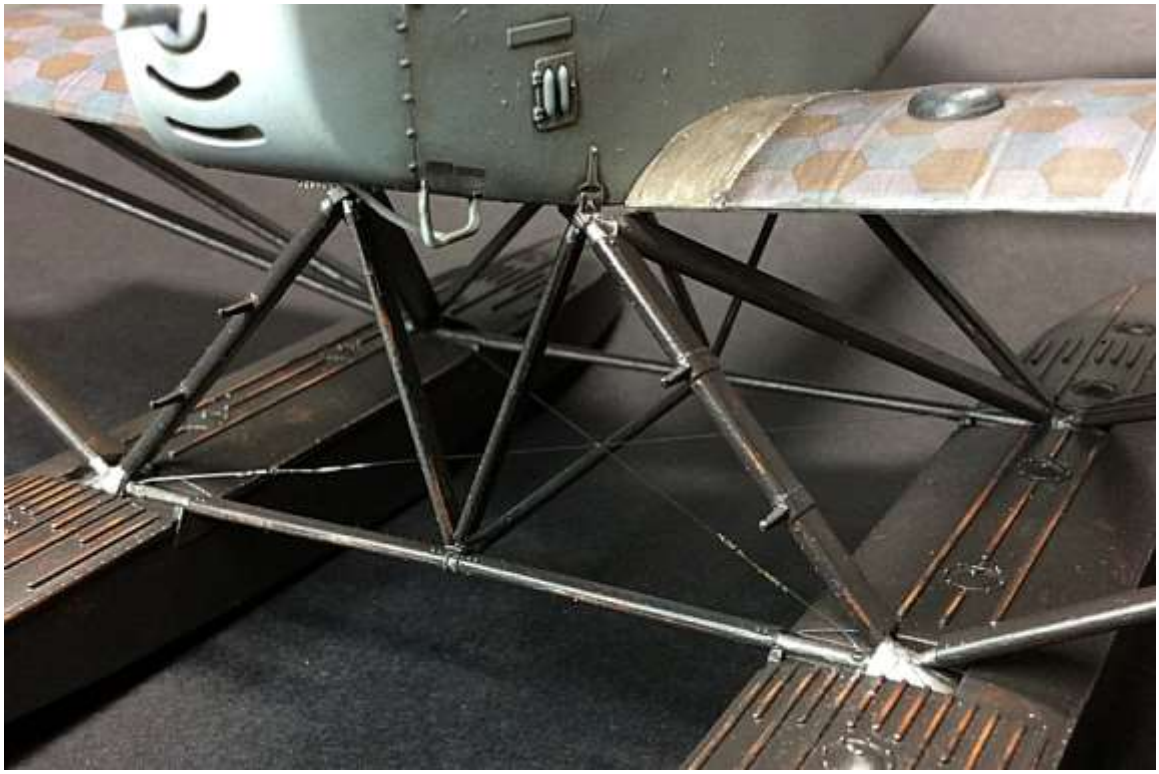
86. Locate and cement the outboard support struts (I5 and I6) to the floats and wing locations.

87. Locate and cement the two 'V' support struts (H7 and H9) to the floats cross bars and to the fuselage.

NOTE: If heat needs to be applied in the following step, take care to not get too close to either the model parts or the rigging lines, otherwise the model could get melt damage or the rigging lines could melt and snap.

88. Once the joints for the floats assembly have set, check the tightness of the cross bracing rigging lines. If the lines are too slack, apply heat along the lines, using a heat source such as a small soldering iron. This will tighten the lines.

89. Brush 'AK Interactive' Kerosene (AK2039) over the turnbuckles to 'knock back' the shine from the metal parts.



90. Apply ‘Flory Models’ Dark Dirt clay wash to the fuselage/wing roots areas. Brush from the leading edge to the trailing edge on both the top and underside of the fuselage/wing root areas.

91. Remove as much of the dried clay wash as required to achieve the effect desired, which is a look of airflow grime.

92. Cement the two ailerons to the wings. Make sure the pre-installed rigging lines are laying correctly and not trapped in the joints.

93. Cement the rudder to the rear fuselage. Make sure the pre-installed rigging lines are laying correctly and not trapped in the joint.

94. Cut the rigging lines for the ailerons such that they can be inserted into the pre-drilled entry holes in the upper and undersides of the wings.

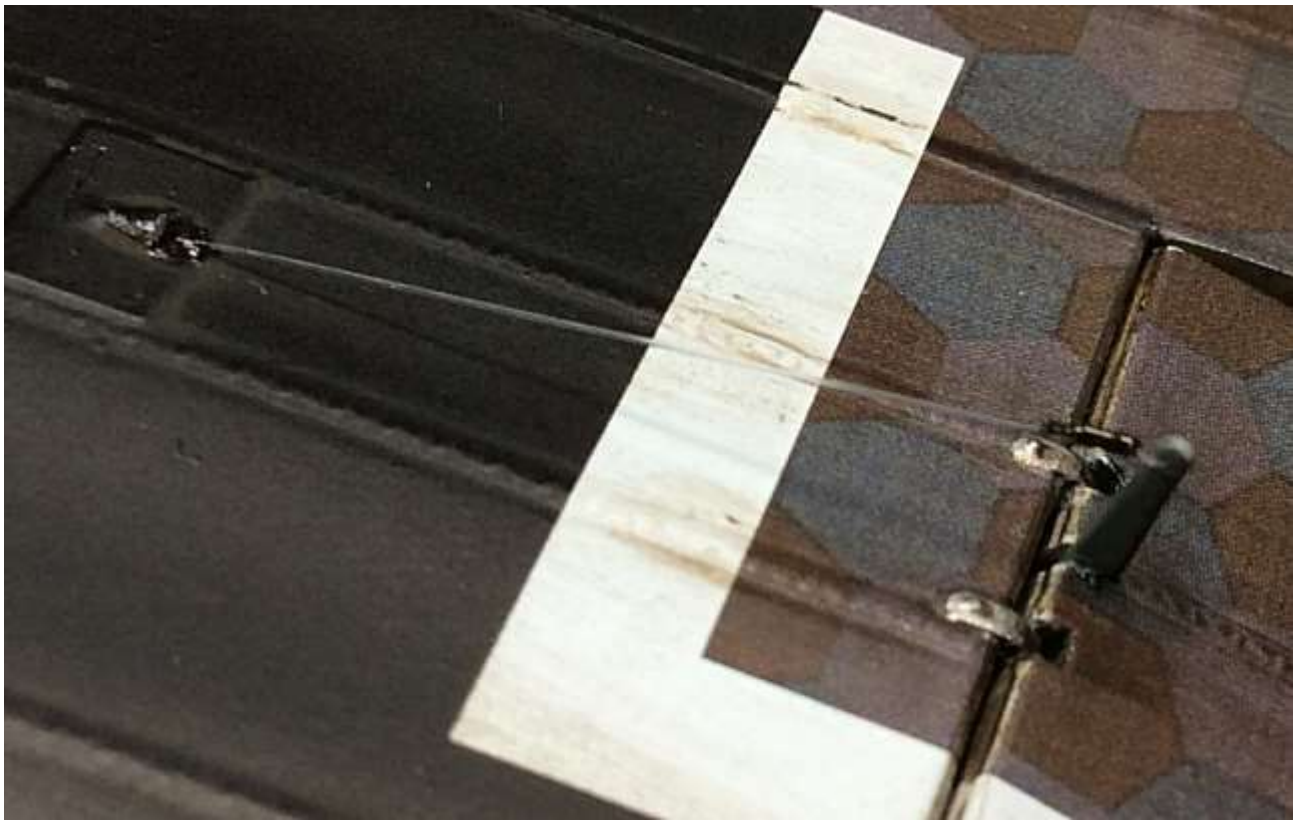
95. Cut the rigging lines for the rudder such that they can be inserted into the pre-drilled entry holes in the slots on the lower rear sides of fuselage.

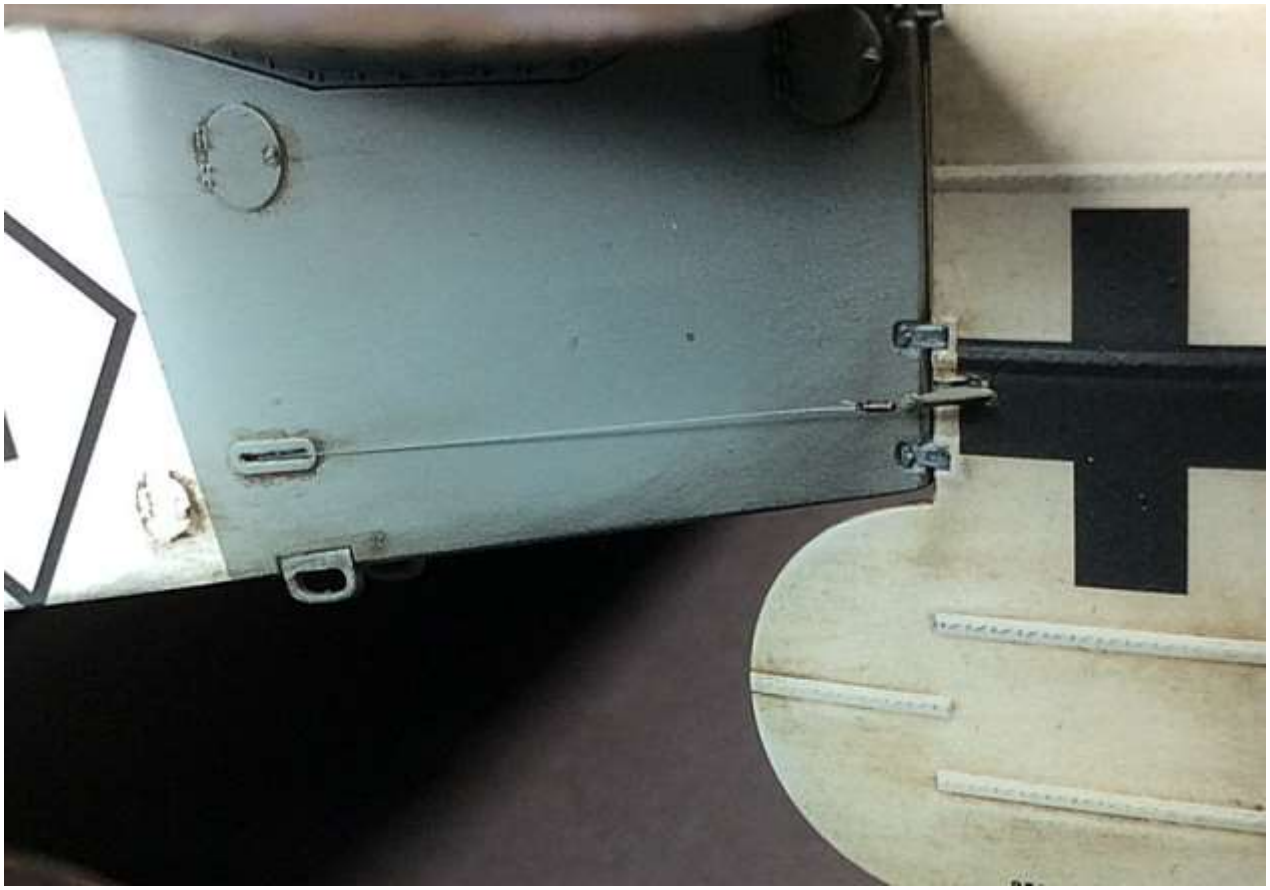
96. Gently pull each rigging line taught and secure in the location holes using thin CA adhesive.

NOTE: If heat needs to be applied in the following step, take care to not get too close to either the model parts or the rigging lines, otherwise the model could get melt damage or the rigging lines could melt and snap.

97. Check the tightness of the rigging lines. If the lines are too slack, apply heat along the lines, using a heat source such as a small soldering iron. This will tighten the lines.

98. Brush ‘AK Interactive’ Kerosene (AK2039) over the turnbuckles to ‘knock back’ the shine.





99. Locate and cement in position the external airspeed indicator onto the left wing.

100. Locate and cement in position the observers Parabellum machine gun, which fits into the gun mounting (G4) and the butt rest (E25).

101. Locate and cement in position the propeller.

NOTE: The kit supplied photo-etch 'lucky charm statue' (P14) is intended to be fitted onto the front of the coolant pipe (A31) which is located over the engine cylinder head. I chose to fit this last in the model build as it could easily be damaged whilst working on the model.

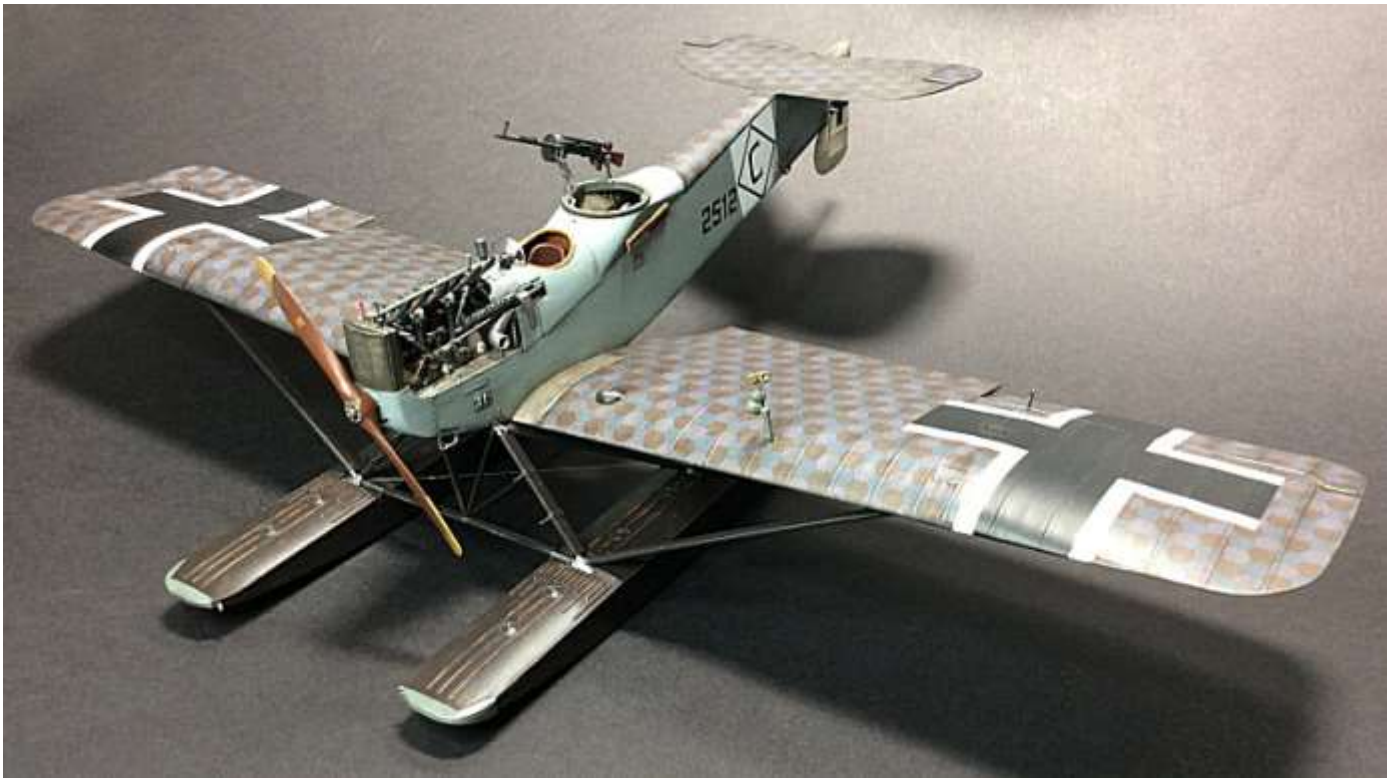
102. Remove the 'lucky charm statue' from the photo-etch sheet and carefully sand off and tags.

103. Cut out the bottom of the circular ring at the base of the 'lucky charm statue'.

104. Prime the 'lucky charm statue' with an light airbrushed coat of 'AK Interactive' primer and micro-filler (Grey - AK758).

105. Carefully brush paint the 'lucky charm statue' with 'Tamiya Flat Red (XF7).

106. Locate and secure in position the 'lucky charm statue' onto the coolant pipe (A31) where it connects to the radiator, using CA adhesive.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PART 13 - FIGURES

The three figures I chose to use for this model were the 'Copper State Models' 1:32 scale German Naval Crew (F32-034) and Ground Crew (F32-037). These figures are very detailed as they are cast in resin.

NOTE: Take care when handling resin parts as resin is brittle and small or thin parts can easily be broken.
NOTE: Be careful when working with resin as resin dust or particles are harmful if they are inhaled or ingested.

1. Before assembly, cut away the resin casting blocks and remove imperfections and seam lines by scraping with a sharp scalpel blade.
2. Wash the figure parts in warm water with washing up liquid added and thoroughly dry the parts. This will remove any residual 'release agent' used during casting of the figures, which if not removed, may cause problems when applying paint to the figures.
3. Assemble the figures, which consist of the body, head and arms. As they are cast in resin they need to be assembled using CA adhesive, as normal plastic model cement will not bond the parts together.
4. Prime the two assembled figures by airbrushing with 'AK Interactive' Primer and micro-filler (Grey - AK758).
5. Carefully drill a hole of 0.8 mm diameter up into one leg of each figure.
6. Cut a length of 0.8 mm diameter rod from a standard paper clip, which normally that diameter.

7. Insert the cut rod into the holes drilled in the figure legs and secure in place using thin CA adhesive. These rods will serve to hold the figure in a pin vice whilst being painted and also to secure the figures to the finished display base.

Flesh tones:

The flesh tones were painted following the AK guide below.

Pilot:
The figure of the pilot was painted as follows:

1. Boots/Gaiters - ‘Tamiya’ Semi-Gloss (X18).
2. Trousers - ‘Tamiya’ Medium Blue (XF18) mixed with Flat Blue (XF8). Shadows with ‘AK Interactive’ German Uniform Shadow (AK3039).
3. Under Jacket - ‘Tamiya’ Neutral Grey (XF53).). Shadows with ‘AK Interactive’ German Uniform Shadow (AK3039).
4. Flying Jacket/cap - ‘AK Interactive’ Brown Leather (AK3031). Shadows British Uniform (AK3081). Highlights British Uniform Light (AK3082). Buttons ‘Mr. Colour’ Brass (219).
5. Life Jacket - ‘Tamiya’ Deck Tan (XF55). Shadows ‘Tamiya’ Buff (XF57).
6. Goggles - ‘AK Interactive’ British Uniform (AK3081). ‘Mr Colour’ Stainless Steel (213). ‘Tamiya’ Semi Gloss Clear (X35).
7. Gloves - ‘AK Interactive’ Brown Leather (AK3031). Shadows with ‘AK Interactive’ German Uniform Shadow (AK3039).
8. Scarf - ‘AK Interactive’ Faded White (AK3029).
   After painting the figure was dusted with ‘Humbrol’ Weather Powder (Smoke).

Observer:
The figure of the observer was painted as follows:

1. Shoes - ‘Tamiya’ Semi-Gloss (X18).
2. Puttees - ‘Tamiya’ RLM Grey (XF22). Wash of ‘AK Interactive’ Kerosene (AK2039).
3. Trousers - ‘Tamiya’ Green (XF13) mixed with Rubber Black (XF85). Shadows add more XF85. Highlights XF13 mixed with drop of White (X2).
4. Flying Coat - ‘Tamiya’ Medium Blue (XF18) mixed with Flat Blue (XF8). Shadows with ‘AK Interactive’ German Uniform Shadow (AK3039). Buttons ‘Mr Colour’ Brass (219).
5. Life Jacket - ‘Tamiya’ Deck Tan (XF55). Shadows ‘Tamiya’ Buff (XF57).
6. Goggles - ‘AK Interactive’ British Uniform (AK3081). ‘Mr Colour’ Stainless Steel (213). ‘Tamiya’ Semi Gloss Clear (X35).
7. Helmet - ‘AK Interactive’ Brown Leather (AK3031). Shadows British Uniform (AK3081). Highlights British Uniform Light (AK3082).
   After painting the figure was dusted with ‘Humbrol’ Weather Powder (Smoke).

Mechanic:
The figure of the mechanic was painted as follows:

1. Shoes - ‘Tamiya’ Semi-Gloss (X18).
2. Overalls - ‘Tamiya’ Green (XF13) mixed with Rubber Black (XF85). Shadows add more XF85. Highlights XF13 mixed with drop of White (X2).
3. Spanner - ‘Mr Colour’ Stainless Steel (213).
4. Oil Stains - ’Tamiya’ Weathering Master Set B (Soot).
5. Headband - ‘Tamiya’ Rubber Black (XF85).
6. Hair - ‘Tamiya’
7. Scarf - ‘Tamiya’ Deck Tan (XF55). Highlights ‘Tamiya’ Buff (XF57). Wash of ‘AK Interactive’ Kerosene (AK2039).
   After painting the figure was dusted with ‘Humbrol’ Weather Powder (Smoke).

PART 14 - DISPLAY BASE

The display case in made from piano black and clear acrylic sheet of 3mm thickness. The base shoulder, for locating the clear cover, is a second thickness on top of the base plate. This case was purpose built by Paul Moss, who has a retail outlet on Ebay.

www.inperspextive.com

For this display I chose to use the 'Abandoned Airfield' display mat (1:32 scale), supplied from 'Coastal Kits'.

http://www.coastalkits.co.uk/newstore

The display mat consist of a photograph, taken from above and at a slight angle, then printed with odourless latex ink onto laminated matt vinyl over a 3mm thick 'Foamex' base board. These mats, when viewed from above, give a good representation of the chosen terrain, but when viewed from 'ground level' are obviously flat and featureless. Therefore I decided to add a touch of 3D relief to the mat in an attempt to 'bring it to life'.

NOTE: If you are not sure about apply these effects, cut a small piece off the main mat and experiment until you're happy to proceed.

1. Using light pressure with a pencil, draw the outline of the desired shape for the mat, on the top surface. When drawing the outline. do not use excessive pressure or the mat will retain the pencil mark, which may not be easy to remove afterwards.
2. Use small strips of masking tape on the inside of the marked outline. This makes it easier to see the outline against the sheen from the mat surface.
3. Using a sharp, sturdy blade, such as a 'Stanley Knife' or similar, carefully cut around the outline. Do not try to cut entirely through the mat in one pass. Instead, take three cuts to separate the outlined mat from the rest of the mat.
4. Clean the cut edge of the mat by sanding. Sand downwards from the photographed side of the mat, to prevent upwards sanding possibly lifting the photographed edge.
5. If required, mask the top surfaces around the edge of the cut out mat and brush paint with a suitable acrylic coloured paint.
6. The vinyl surface of the mat can be easily cut through, as if the 'Foamex' base underneath. Using a sharp edge tool, such as a modellers chisel, scrape away the vinyl surface where the photograph shows distressed surfaces, such as broken concrete and cracks. If deeper damaged surface is preferred, use the tool to gouge out more of the 'Foamex' base below, but be careful not to cut right through the base.
7. Seal inside the opened up areas with PVA adhesive (white glue).
8. Once the paint has dried, apply PVA adhesive (white Glue) into the areas and slightly around the edges.
9. Onto the PVA adhesive sprinkle sharp sand.
10. Once the PVA adhesive has dried, paint inside the opened up areas with 'AK Interactive' Kerosene(AK2039).
11. Once dry, lightly dry brush the sharp sand with 'Tamiya' Neutral Grey (XF53) then lightly with Buff (XF57).

12. Add self adhesive grass tufts sparingly around the opened up areas and onto the sand effect to the rear of the concrete effect. To give the effect of dry grass, dry brush the tufts with ‘Tamiya’ Desert Yellow (XF59).
13. Apply PVA adhesive onto the sand effect of the mat and between any added grass tufts and immediately sprinkle sharp sand onto the adhesive. This needs doing immediately as the vinyl surface of the mat causes the adhesive to separate, which would cause a patchy appearance to the applied sand.
14. Small stones and twigs can be added using PVA adhesive to secure them in position.

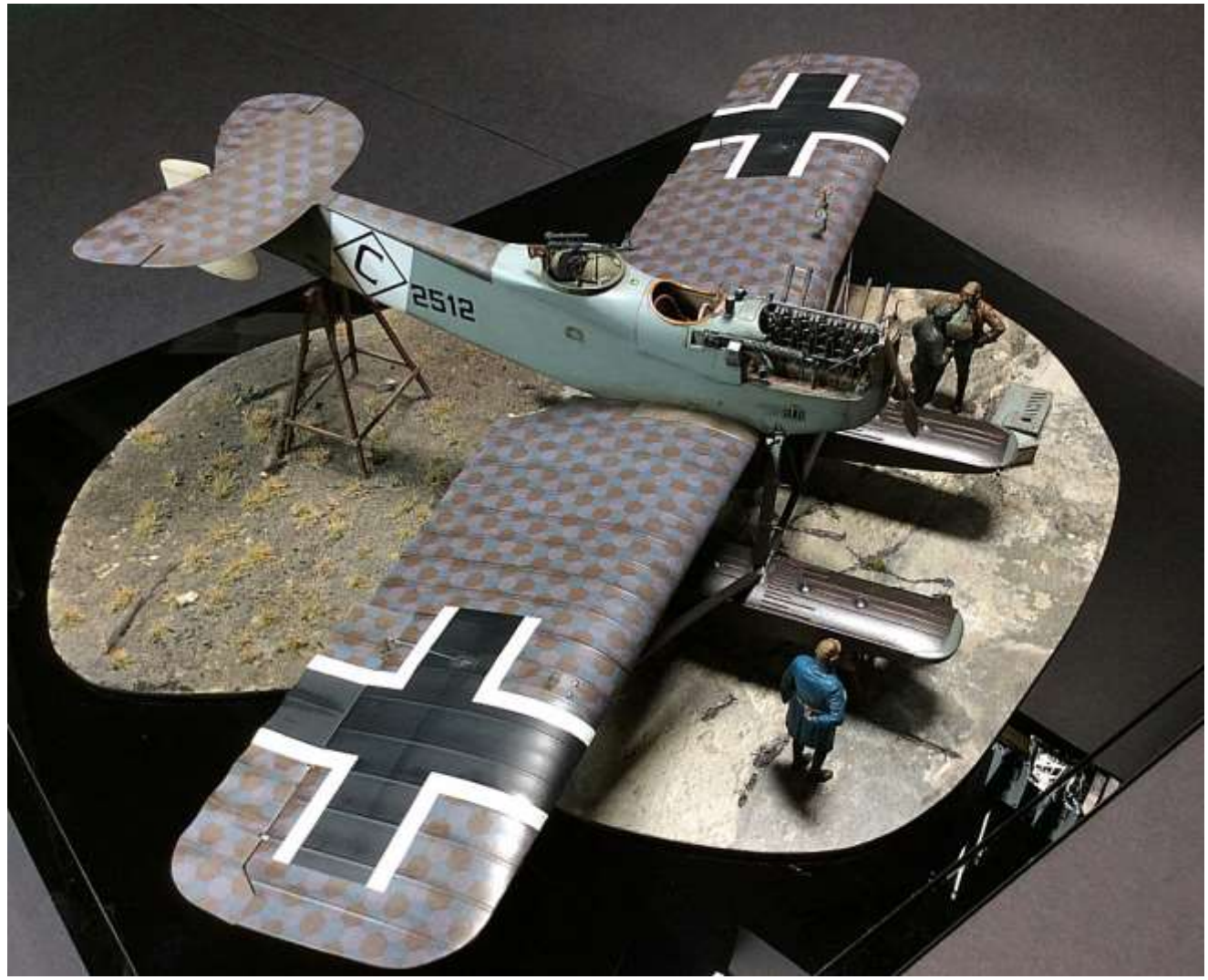
Below is a shot of a test piece I used before applying the effects to the actual display mat.

15. Position the completed model with the figures and ground equipment and mark all of the locations of the two dolly’s, ladder, trestle and figures.

16. Apply PVA adhesive to the underside of the mat and position it onto the display base. Apply pressure on the mat, such as books or similar, until the adhesive dries.

17. Drill a 0.8 mm diameter hole into the centre bottom of each of the beaching dolly's wheels.
18. Secure 0.8 mm pins (cut from paper clips) into the holes using thin CA adhesive.
19. Drill holes of 1.0 mm diameter into the display mat and base in the positions of the pins in the beaching dolly wheels.
20. Secure the beaching dolly's into the drilled holes using CA adhesive or PVA adhesive (white glue).
21. Locate the rear ladder trestle in position and secure in using CA adhesive. Make sure it's in contact with the vinyl display mat not just resting on the sand.
22. Add mixed two part epoxy resin adhesive, such as Araldite, onto the top centre of the ladder trestle and the two side rails of the beaching dolly's that support the aircrafts floats.
23. Locate the aircraft in position on the two beaching dolly's and the ladder tail trestle.
24. Apply the two part epoxy resin adhesive to the top centre of the float trestle and carefully locate it under either the left or right float.
25. Drill three 1.0 mm holes for locating the three figures on the display base.
26. Add CA adhesive to the pins in each of the figures legs and fit them into their respective location holes.
27. Position the two engine panels and any other ground equipment desired and secure with CA adhesive.

THE COMPLETED MODEL PHOTOGRAPHS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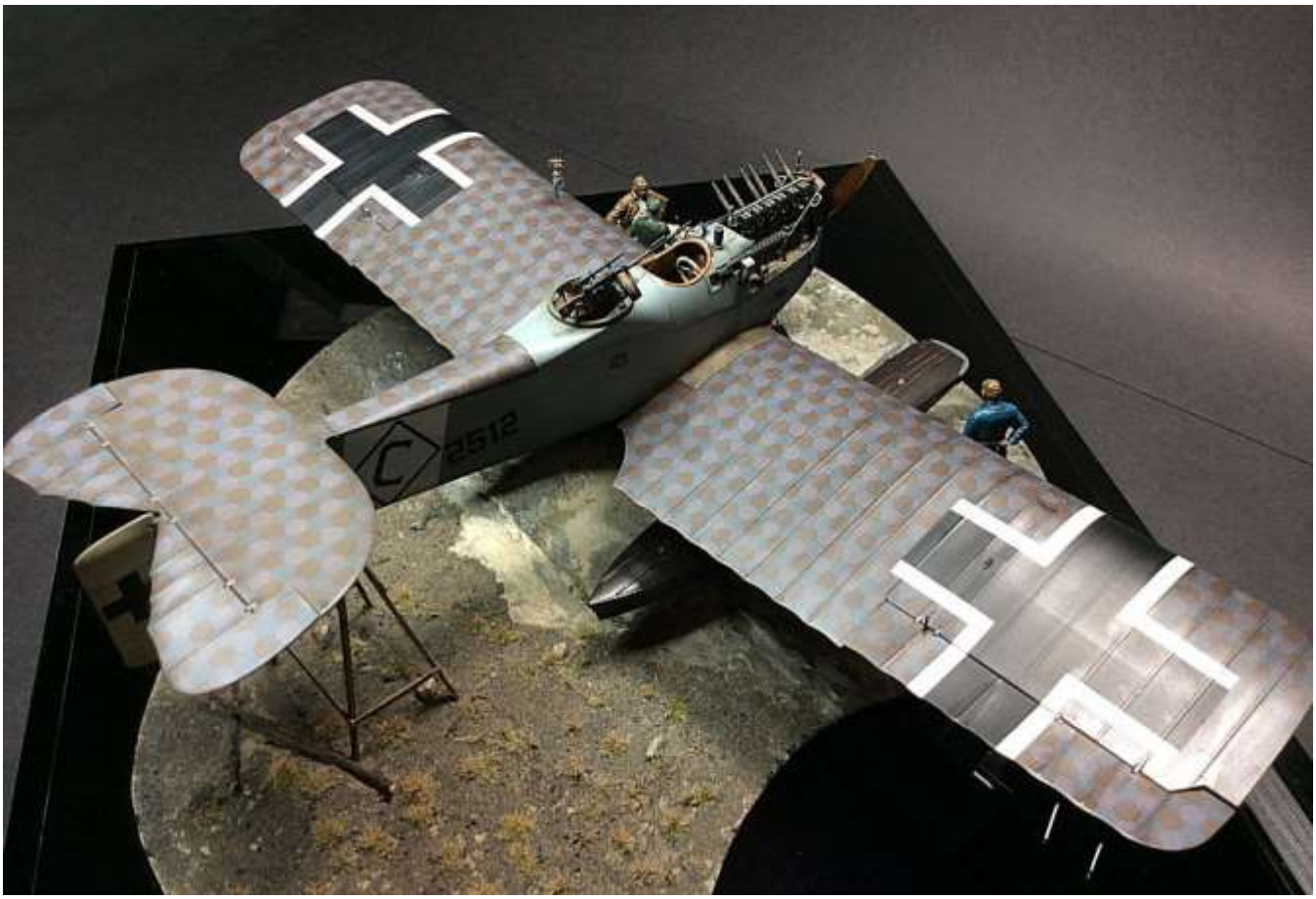
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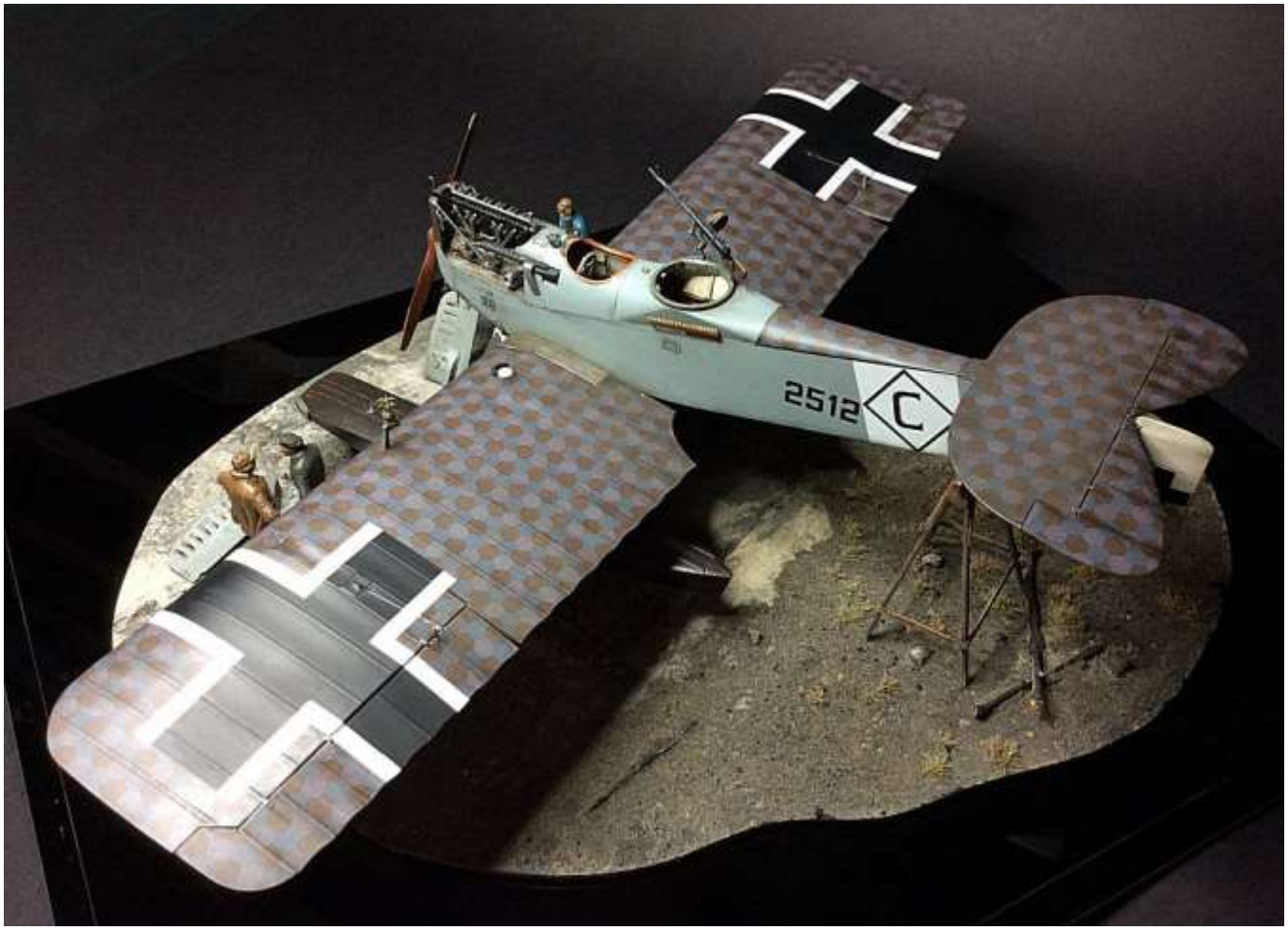
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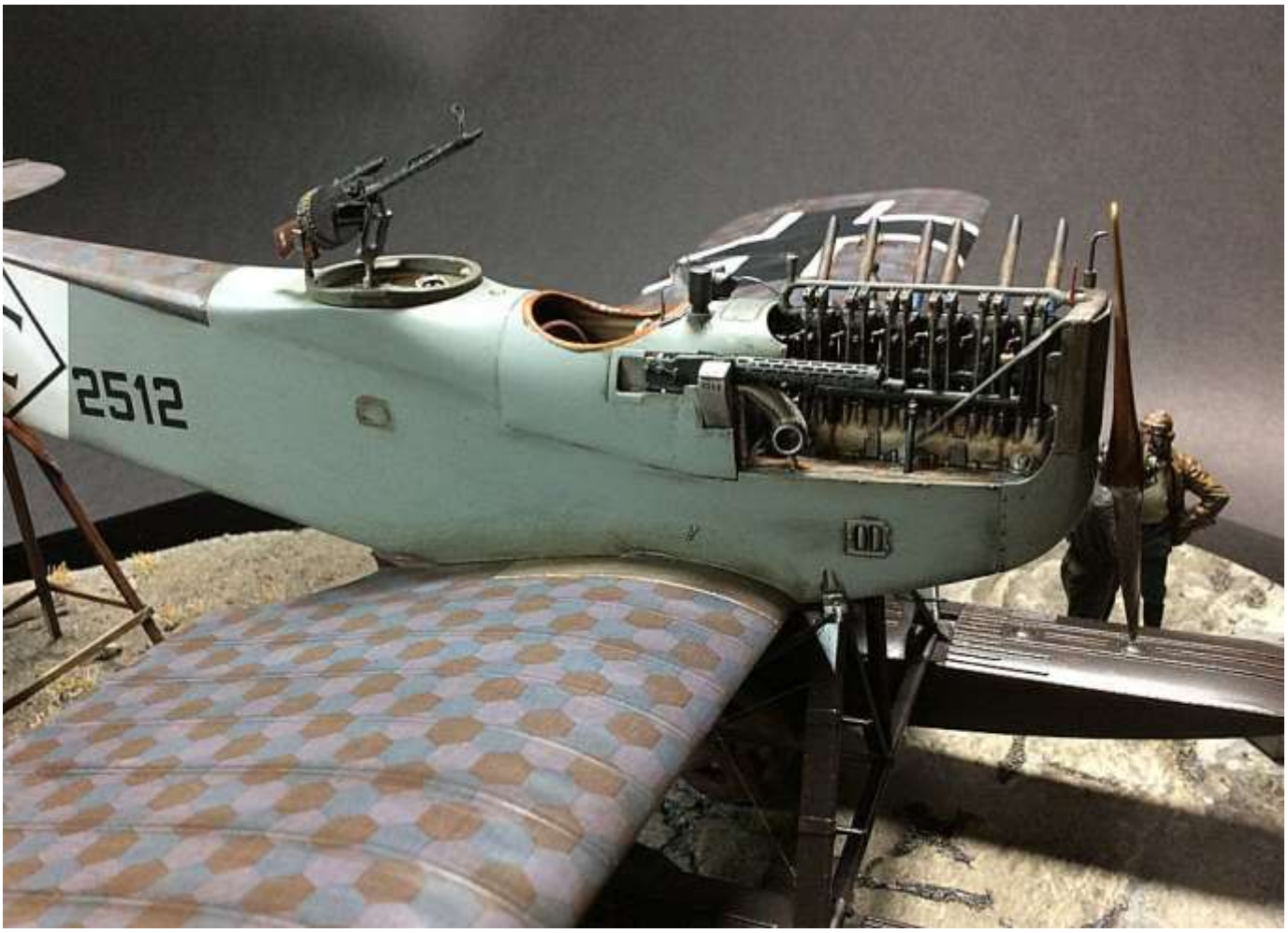
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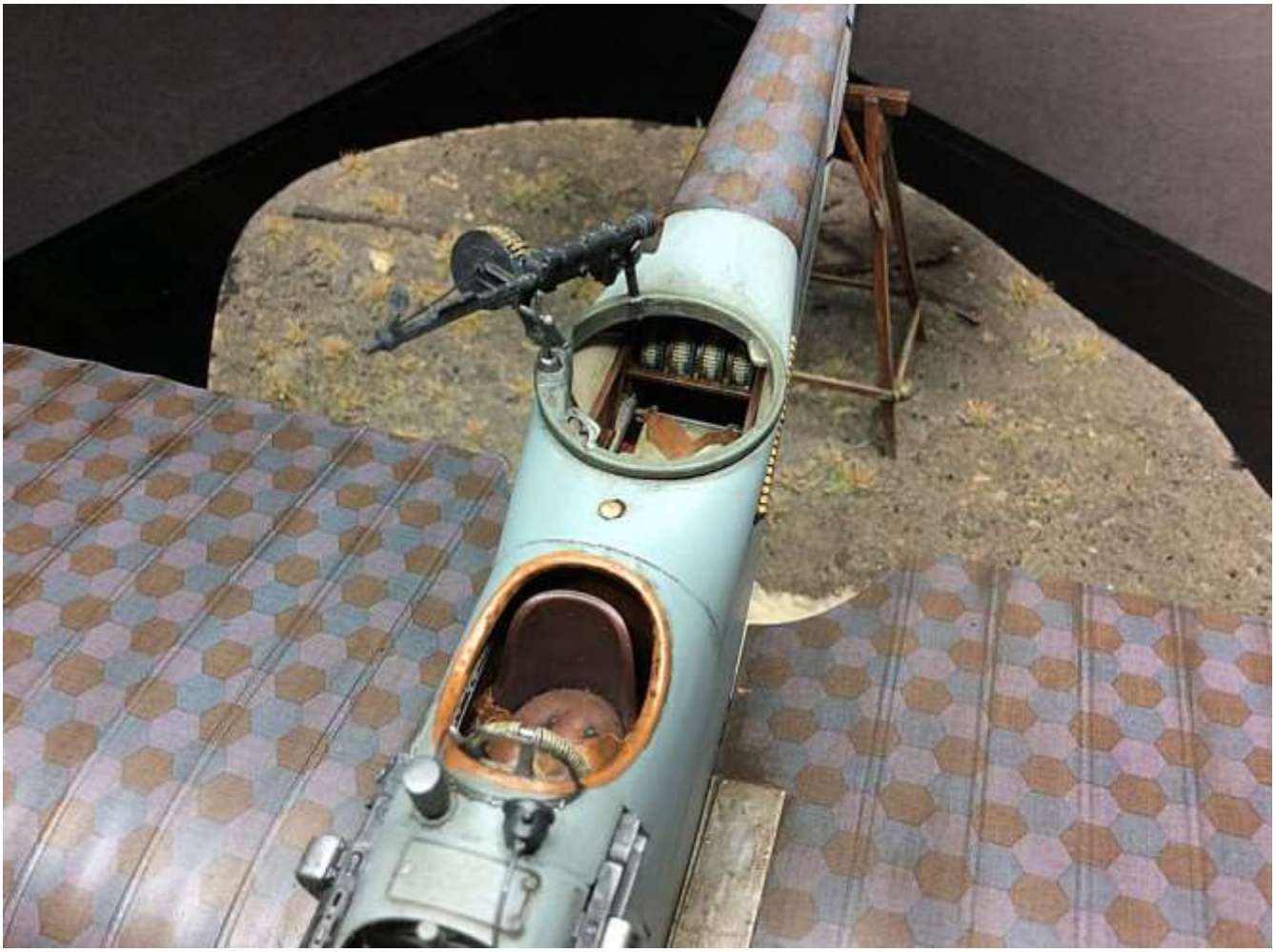

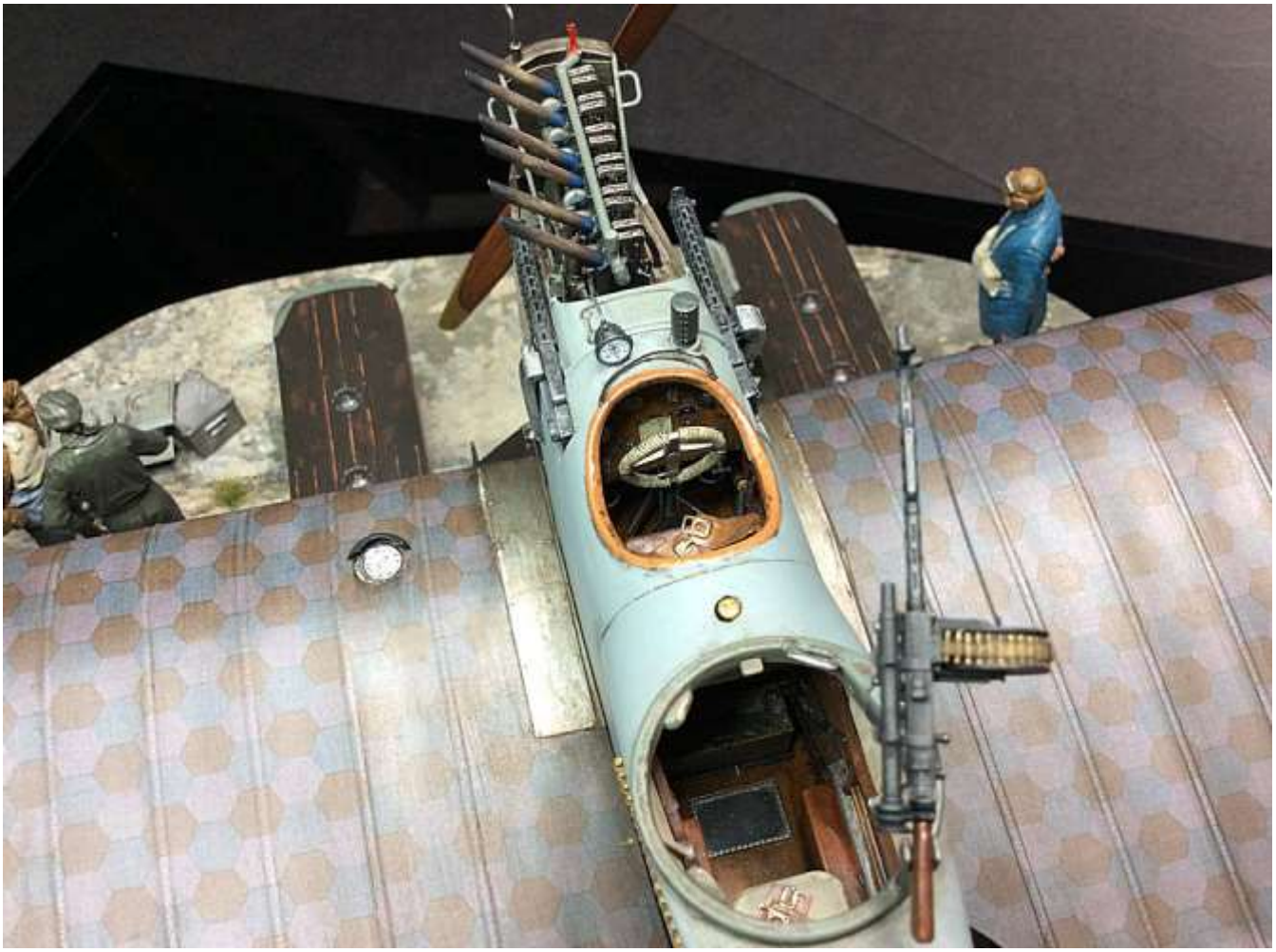

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