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 modelling again in 2015 and now enjoy the challenge of building aircraft of World War One. Since posting photographs of my completed models online, I've been asked if I would create fully detailed 'build logs' for future builds.

I don't consider myself a 'master' of this hobby, but hope to be able to pass on what I have learned. As such, here is my build log, which covers a model of the 'MDesign Scale Models Studio' 3D printed and 1:32 scale kit of the Armstrong-Whitworth FK.3 (Little Ack).

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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 to the 'carpet monster'). 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 and gaming PC

AFTER MARKET

AFTER MARKET

Figures

'Kellerkind Miniaturen' RFC Pilot (54-056),
'Kellerkind Miniaturen' RFC Pilot with dog (54-104).

Decals:

'Airscale' WW1 generic dial decals (AS32 WW1),
'LF Models' British WW1 propeller labels - part III (3208),
'Xtradecal' RAF letters and numbers (X32021).

Resin

'BarracudaCast' British wicker seat (BR32233),
'ANYZ' cockpit handles (AN030).

Rigging accessories (as required)

'Albion Alloy's' 0.4 and 0.5 mm diameter Brass tube (MBT05),
'Steelon' or 'Stroft GTM' fishing line (0.08 and 0.12 mm diameter),
'Gaspatch' metal 1/32nd scale turnbuckles (Type A),
'Gaspatch' metal 1/48th scale turnbuckles (Type A and C),
'HGW' 1/32nd scale Eyelets (132129).

Paints (as required)

'Tamiya' Acrylic, Humbrol Acrylic, 'Mr. Metal Color', 'Alclad II' Lacquers,
'AK Interactive' Primer (Grey AK758, White AK759) and figure paints (various),
'AK Interactive' 3rd Generation acrylics, 'Tamiya' Fine Surface Primer (Grey/White),
'Tamiya' Paint Retarder, 'AK Interactive' Acrylic Thinner (AK712),
'Mig' A-Stand Aqua Gloss (A.Mig-2503), 'MRP' acrylic lacquers,
'Windsor & Newton' Griffin Alkyd oil paint, 'Citadel' Colour (various),
'Mr. Surfacer' 500/1000/1200/1500, 'Mr. Finishing Surfacer' 1500,
'Mr. Color' Levelling Thinners 400.

Sundries (as required)

PVA Adhesive (e.g. 'MicroScale' Micro Krystal Clear),
'PlusModel' lead wire (various), 'MicroScale' MicroSol/MicroSet decal solutions,
'VMS Fleky' CA adhesive (Slow or Thin or Resin), 'Araldite' two-part epoxy,
'MFH' 0.4 mm diameter flexible black tube (P-961), Copper wire various diameters,
'Tamiya' masking sheet and tapes (various widths), 'Prismacolor' Verithin pencil 'Argent Metallique',
'UHU' White Tack, 'Abteilung 502' Liquid Mask, 'De-Solv-It' Sticky Stuff Remover,
AMMO Mig photoetch Burnishing Fluid (A.MIG-2021), 'Plastruct' styrene strip,
'EZ' heavy stretch line (White or black), 'Signo' uni-ball silver pen (UM-153),
'ANYZ' black braided line 0.5 mm (AN011).

Weathering mediums (as required)

'AK Interactive' (Kerosene AK-2039, Engine Oil AK-2019),
'Tamiya' Weathering Master sets,
'Flory Models' Clay washes or Pigments.

Display Base

'Polak' Wild Meadow variation E grass mat (4705),
'Inperspective' custom made acrylic base and cover,
Information plaque from 'TLS Engraving Ltd'.

PART 1
AIRCRAFT DESCRIPTION

PART 1 - AIRCRAFT DESCRIPTION

References:

‘Windsock’ data file No:13 - AW FK.3 Little Ack (J. M. Bruce).
‘Flying Machines RU’ - https://flyingmachines.ru
‘MDesign’ Instruction notes.

NOTE: *The following is extracted from that given in the ’Flying Machines RU’ web site.*

When Diutch aircraft designer Frederick Koolhoven joined Armstrong-Whitworth in 1914, the works at Gosforth were being prepared for B.E.2c aircraft production. He concluded, after studying the official design, that it was unnecessarily difficult to build. He therefore straightway offered to design an aircraft which, without sacrifice of performance, would be easier to produce. Rather surprisingly, in view of their unshakable faith in the B.E.2c, the authorities agreed and in August 1915, Koolhoven went ahead with the construction of the Armstrong Whitworth version, the FK.3.

Armstrong-Whitworth FK.3

The FK.3 bore an obvious resemblance to the B.E.2c and it’s evident that Koolhoven's ideas about improving the design were concerned mainly with the structural features. Indeed, his aim was, amongst other things, to eliminate welding and intricate metal fittings. The FK.3, like the B.E.2c, had a slender fuselage, high aspect ratio wings, and two-bay bracing. Unlike the B.E, it had more dihedral on the top wing than on the lower wings. The prototype, which was test-flown by Norman Spratt, was fitted with a 70 hp Renault engine, but production aircraft were powered by the RAF 1a of 90 hp. One FK.3, No.5519, was tested in June 1916 with the more powerful RAF 1b engine, but the tests with this aircraft were plagued by constant engine failures due to faulty pistons.

Seating arrangements in the FK.3 prototype followed the B.E.2c precedent of placing the observer in the front in a separate cockpit underneath the upper wing, but this was later changed so that both crew members were accommodated in one large cockpit, with the observer at the back where he could use a Lewis machine gun with much greater effect. The rear portion of the long cockpit opening was shielded by side screens extending forward to the rearmost centre-section struts, giving from the side the appearance of two separate cockpits. All the earlier production aircraft with the observer's seat in front, of which there were twelve, were afterwards modified to reverse the crew positions. The undercarriage was of unusual design in that it employed oleo shock-absorbers mounted vertically on the sides of the fuselage from which struts extended down to the ends of a divided axle. A central skid extended forward from the axle to protect the propeller in the event of a tail-high landing.

No provision was made for a forward-firing gun, but the observer was provided with a Lewis gun mounted on a pillar behind his seat. As was the case with the B.E. aeroplanes, pilots used considerable ingenuity in attempts to equip themselves with some form of gun mounted to fire past the propeller, but none of the methods adopted was noticeably successful. External bomb racks fitted under the lower mainplane were capable of carrying bombs up to the weight of 112 lb but, because of weight limitations, it was usual to fly without the observer when bombs were carried.

FK.3, No.5552, with a 90 hp RAF Ia engine, was tested alongside a B.E.2c at the Central Flying School at Upavon in May 1916. The tests showed that the FK.3 had a slightly better all-round performance and that it was lighter on the controls and more pleasant to handle. The report commented favourably on the crew positions, the roomy rear cockpit, and the ease of communication between the pilot and observer even without the use of a speaking tube: However, it criticized the positioning of control column and rudder bar and mentioned a draught in the cockpit coming from the fuselage openings at the junction of the undercarriage struts. In general the aircraft was considered to be well designed and easy to manufacture. It was simple to control and the oleo undercarriage was adjudged to be very good, although the long shock-absorber travel allowed the wingtips to touch the ground.

Early in the FK.3 production run the RAF 1a engine became temporarily unobtainable and at one time, according to a contemporary account, there were about a hundred complete aircraft awaiting engines. This may have been something of an exaggeration, but there is no doubt that a crisis had arisen and in an endeavour to overcome it, some 120 hp Beardmore engines were sent to Newcastle in the hope that they might provide a satisfactory substitute. The fitting of this engine into the FK.3 presented many problems. The six-cylinder inline water-cooled Beardmore engine was some twenty inches longer than the RAF 1a and even without the radiator, it was at least 90 lb heavier.

To make room for the bigger engine, the fuel tank was removed from the fuselage and a larger, streamlined tank was located under the top centre section, together with a small header tank for the radiator. When installed, the engine sat high on its bearers and virtually blocked the forward view. The all-up weight of the aircraft was increased by about 400 lb, of which about 100 lb was accounted for by the additional fuel. To compensate for this extra load, the wing span of the aircraft was increased by two feet.
The first two Beardmore-powered FK.3s (one of which was numbered 5528) were tested at Upavon in March 1916 and a report issued in May indicated that, although the climb performance was better than that of the RAF 1a version, the speed showed only a marginal improvement. That the Beardmore installation was not considered satisfactory is evident from the fact that all of the twelve aircraft so adapted were re-converted to standard as soon as RAF 1a engines again became available.
Precise production figures for the FK.3 are difficult to ascertain because most of the official records of the time refer indiscriminately to Armstrong Whitworth biplanes, without making any distinction between the FK.3 and the F.K.8 which followed it. It is known that the War Office ordered one hundred and fifty FK.3s from Armstrong Whitworth in 1915 and that the production rate is said to have reached 35 to 45 aircraft a month. In addition, orders for three hundred and fifty FK.3s were placed with Hewlett & Blondeau of Luton, Bedfordshire, a firm formed before the war by Gustav Blondeau, an early French aviator and Mrs Maurice Hewlett, the wife of the author and herself the first British woman pilot.
In spite of the fact that the FK.3 was clearly a better proposition than the B.E.2c, if only because it could defend itself more adequately if attacked from the rear, it seems that the type saw no active service on the Western Front and the only operational unit that used it was No. 47 Squadron (RFC), which served in Salonika from September 1916 until the end of the war. In that theatre the FK.3s gave excellent service, performing a variety of duties, including ground strafing, artillery spotting and bombing.
At home, the FK.3 was used extensively for training, for which role its ease of handling and its ability to perform aerobatics made it eminently suitable and it was probably the best of the British trainers until the arrival of the Avro 504. It was also used for observer training at the observer and air gunnery schools at Dymchurch, Hythe, Stirling and Turnberry. An FK.3 was used as a personal transport by Major-General Sir Sefton Brancker, later to become the first Director General of Civil Aviation. He was a brave and resourceful man but a notoriously poor pilot and his choice of the FK.3 was a tribute to its ease of handling.
At the end of the war, in November 1918, there were sixty-two FK.3s still serving with the RAF, fifty-three at home, mostly based at flying schools and nine in the Middle East. After the war only four found their way on to the civil register: G-EABY (ex B9629) and G-EABZ (ex B9518) which operated from Porthcawl, in South Wales, flown by E. D. C. Heme. Another, G-EAEU (ex B9612), was owned by the Kingsbury Aviation Co Ltd, but was crashed after a few months of civilian life. Finally, there was G-EALK (ex B9603) which was registered in the name of L.G. Lowe and held a certificate of airworthiness until September 1920.
A noticeable feature of the FK.3 was an engine cowling panel carrying the initials 'AW'. These were not merely painted on but heavily embossed into the metal. As a result, perhaps not surprisingly, the aircraft soon became known, in the vernacular of the day, as the 'Armstrong’ or ‘AW'. However, when its larger successor, the F.K.8 appeared with similar embellishment, the two aircraft types became known as the 'Little Ack' (FK.3) and the 'Big Ack' (F.K.8).

Specifications:

Wing span 40 ft (12.19 m).

Length 29 ft (8.84 m).

Height 11 ft 11 in (3.63 m).

Wing area 457 sq ft (42.46 sq m).

Max weight: 2,056 lb (933 kg) to 2,447 lb (1,110 kg)
Empty weight: 1,386 lb (629 kg) to 1,682 lb (763 kg)
Max speed:

At sea level: 89 mph (143 km/hr) to 91 mph (146 km/hr)
At 6,500 ft (1,981 m) 81 mph (130 km/hr) 84 mph (135 km/hr)
Stalling speed: 48 mph (77 km/hr) to 56 mph (90 km/hr).

Climb:
To 6,500 ft (1,981 m) - 26.5 min 19 min.
To 10,000 ft (3.048 m) - 48.9 min 35 min.
Service ceiling: 12,000 ft (3,658 m).
Endurance: 3 hrs.
Engine: 90hp RAF 1A or 120 hp Beardmore.

PART 2
KIT
REVIEW

PART 2 - KIT REVIEW

('MDesign Scale Models Studio' - (Armstrong-Whitworth FK.3)

web site: https://mdesignscalemodels.com/

This limited run model kit is 3D printed by 'MDesign Scale Models Studio', based in Lom, Bulgaria. The kit supplies masks for the main markings of the aircraft, which can be built as either:

No.47 Squadron (RFC), Serial No:6219, operating over Salonika, Macedonia.

The same aircraft after capture and flown in Bulgarian markings.

Metal support rods are supplied to fit into and locate the wings and tailplane.
Being 3D printed means that care must be taken when handling small parts or when drilling, sanding etc, due to the fragility of 3D printed resin. In particular, care should be taken when removing parts from their support trees. Sharp nippers do to cut through the resin support trees. Alternatively, although an expensive option, is to use an ultrasonic blade cutter, but extreme care needs to be taken as the blade move extremely fast and will cut through flesh if care is not taken when in use.

The assembly instructions and colour schemes are supplied with the kit.
Any other marking schemes modelled will require the making of the relevant decals and/or masks.
Any corrections or enhancements carried out on this model are covered in the relevant Parts of this build log.

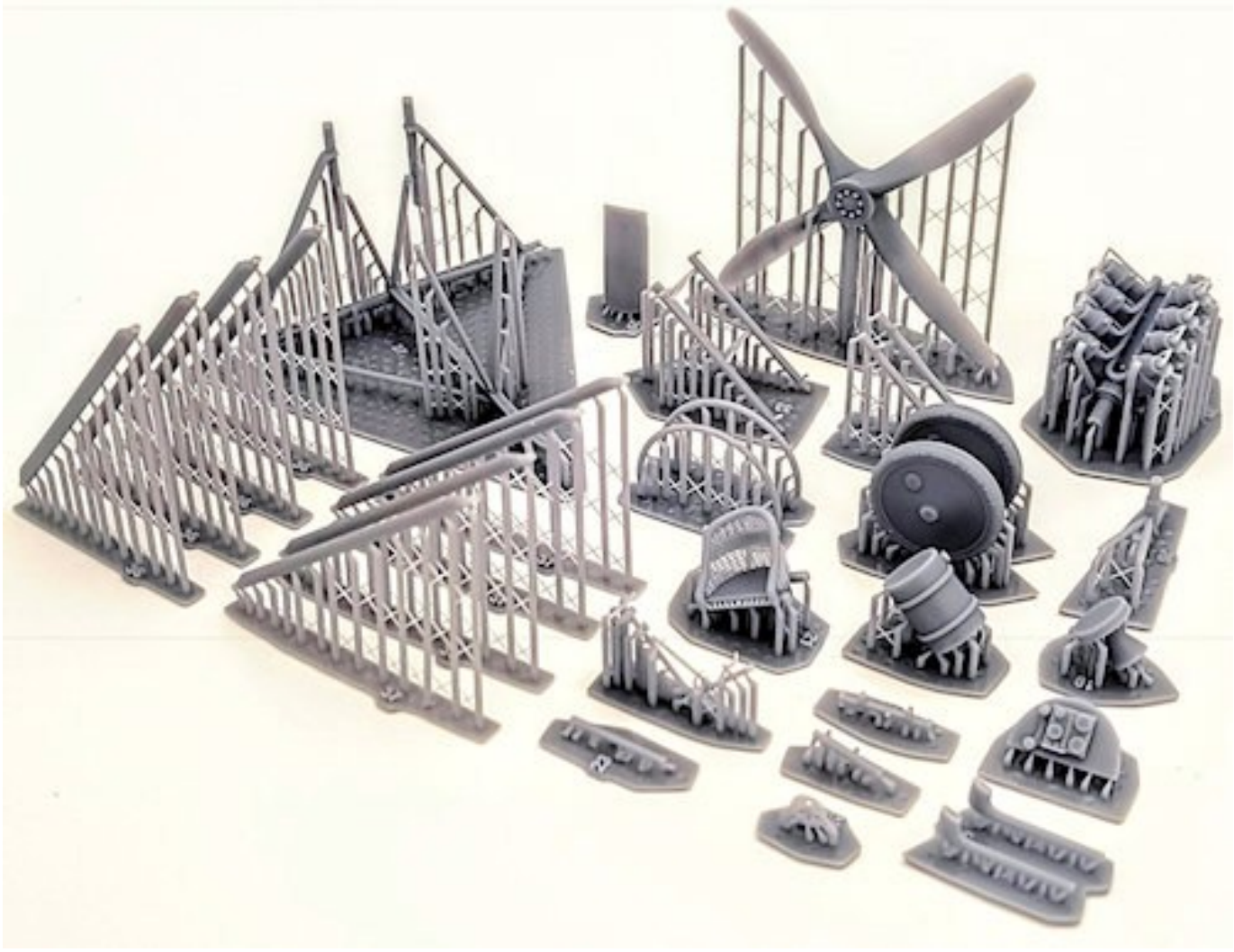
The kit comprises:

Armstrong-Whitworth FK.3 – 3D printed 1/32 Resin Model Kit
Material: Grey ABS-like resin (high strength, excellent surface detail, easy to sand and refine).
Resin parts: 53 finely cast resin parts.
Clear parts: 1 vac-formed transparent windshield.
1.2 mm diameter metal rods for wing strengthening.
0.8 mm diameter metal rods for horizontal stabilizer reinforcement.

Marking Options:
Aircraft of No.47 Squadron (RFC) at the Salonika Front, Macedonia.
OR
The same aircraft, captured and flown with Bulgarian markings.

Decal sheet with technical stencils is included to complete the fine surface details.

Assembly instructions - Provided as a paper and downloadable PDF, accessible via a QR code included in the kit. They contain step-by-step assembly guidance and detailed rigging diagrams.



PART 3
THE MODEL

PART 3 - THE AIRCRAFT MODELLED

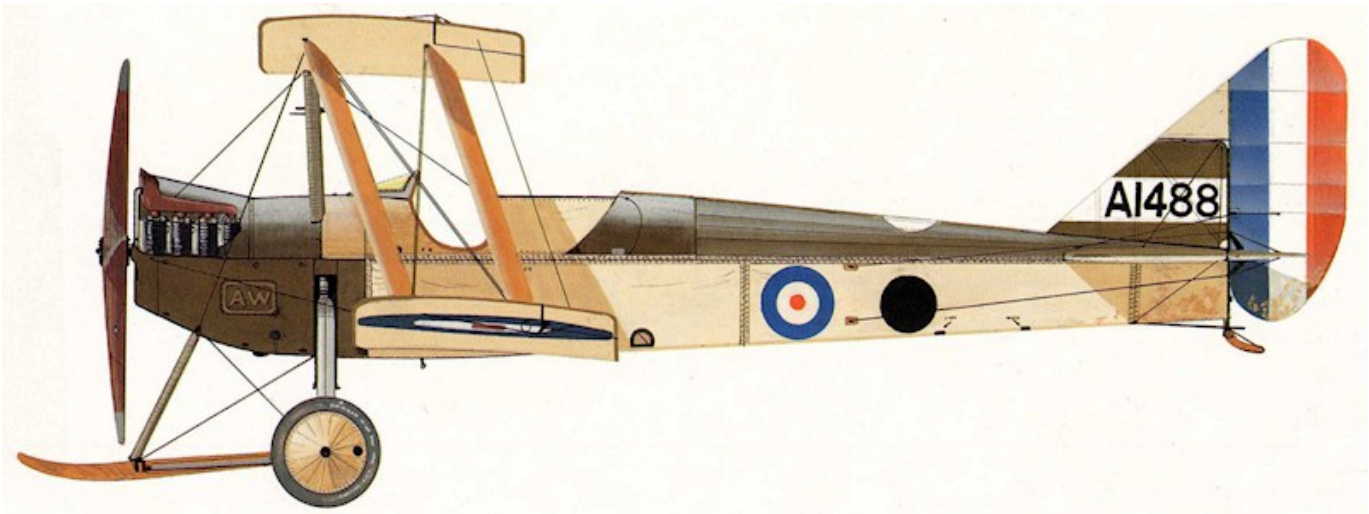
References:

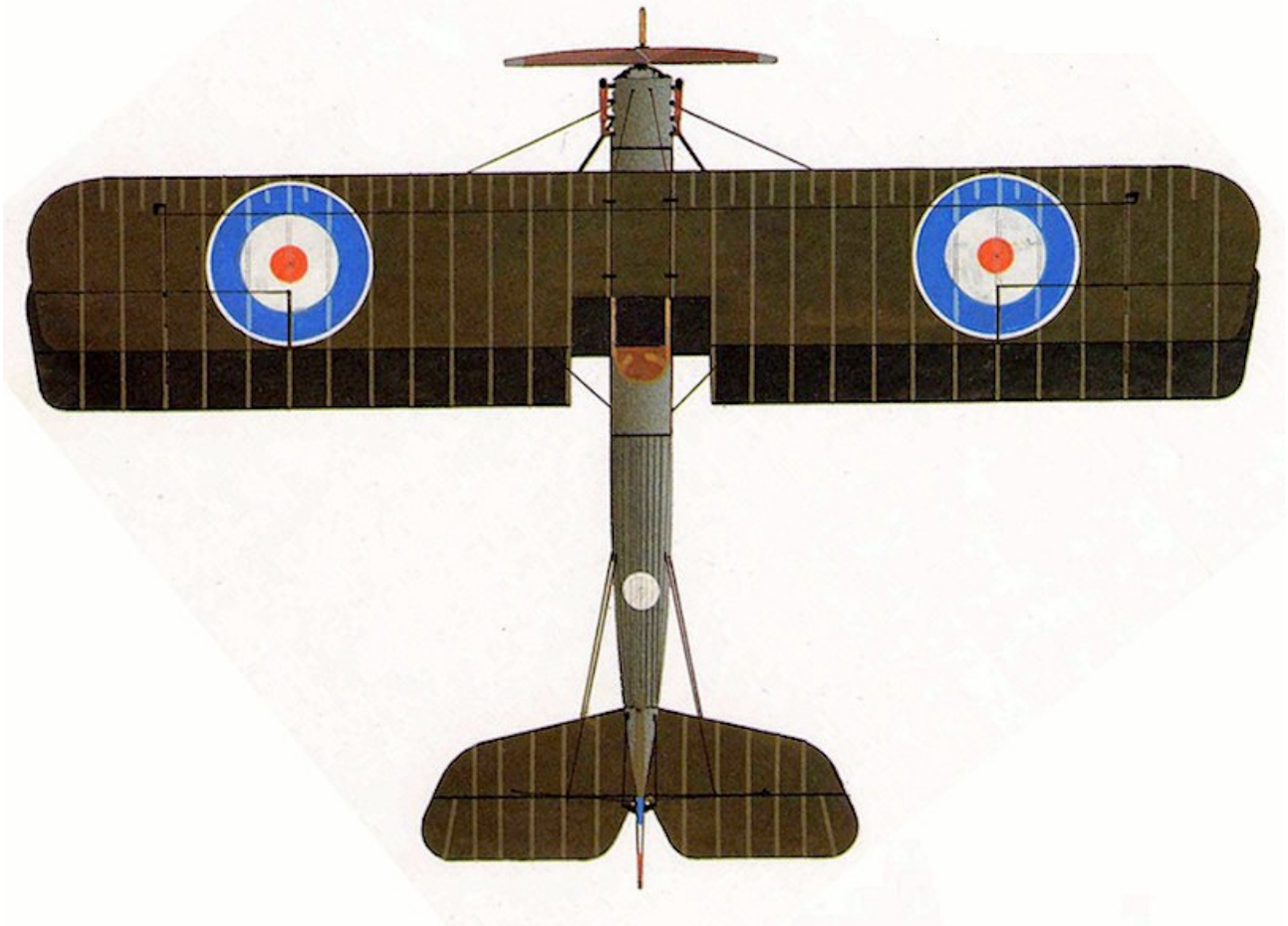
‘Windsock’ data file No:13 - AW FK.3 Little Ack (J. M. Bruce).
‘Flying Machines RU’ - https://flyingmachines.ru
‘MDesign’ Instruction notes.

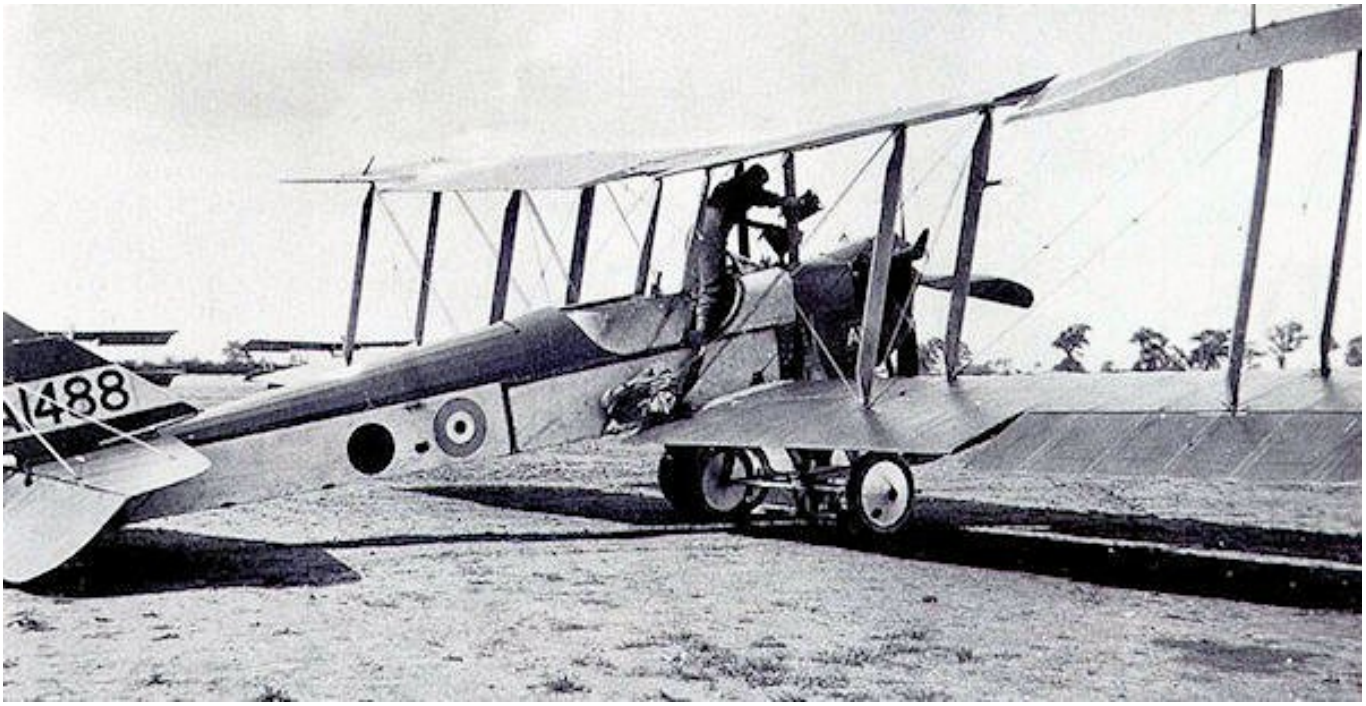
Armstrong-Whitworth FK.3 ‘Little Ack’, Serial No.A1488 of No.50 Training Squadron, based at Narborough, June 1917.

This particular aircraft was one of a contract batch, serial numbers A1461 - A1510, that were contracted out (87/A/475) during 1916 from ‘Armstrong-Whitworth & Co. Ltd’ of Gosforth, Newcastle-upon-Tyne. They were to be built by ’Hewlett & Blondeau Ltd’ of Oak Road, Leagrave, Luton.

The contract required dual controls were to be fitted as these aircraft were intended as trainers and not for service use. As a training aircraft my assumption is that it carried no machine guns or bomb racks.



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A1488

PART 4
WOOD EFFECTS

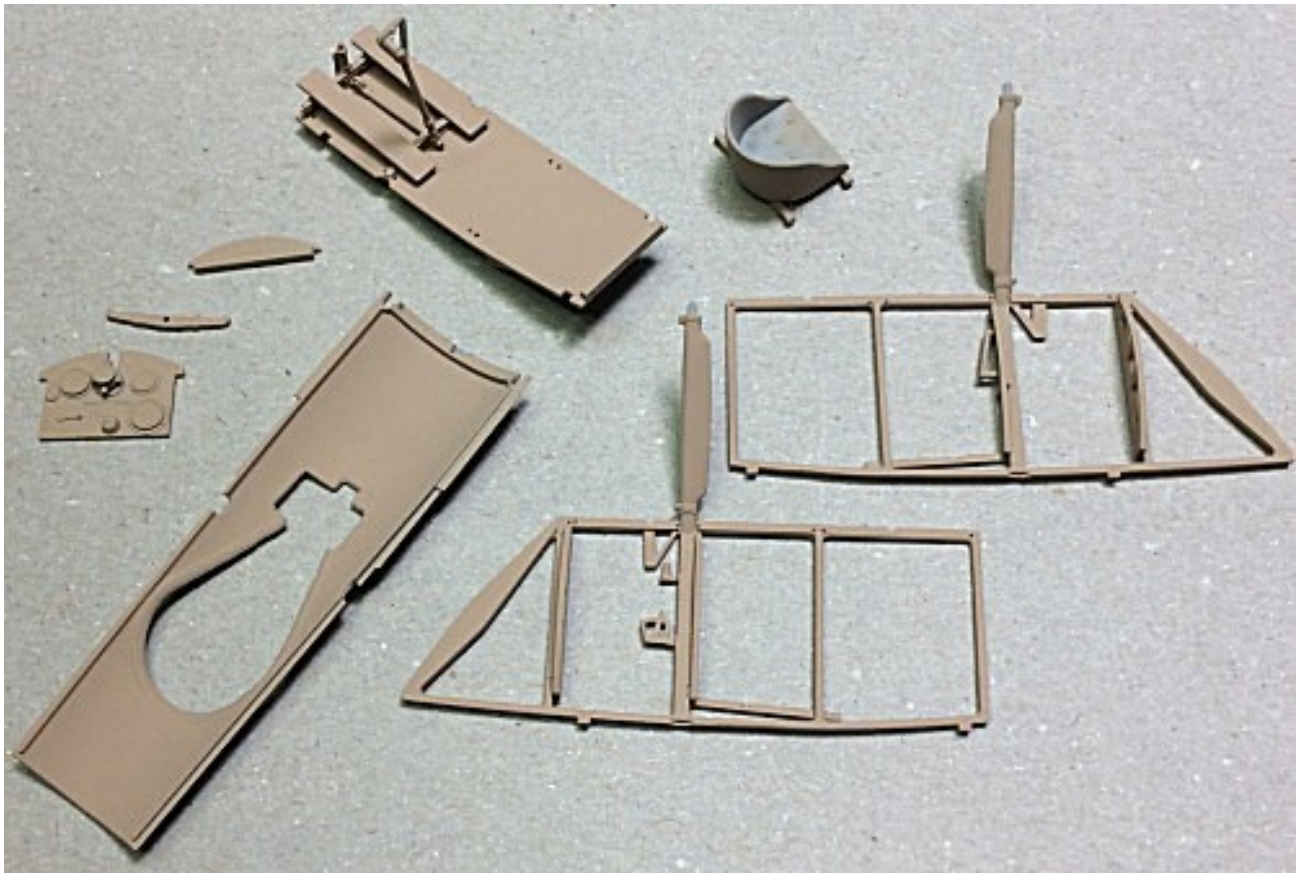
PART 4 - WOOD EFFECTS

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 aftermarket 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 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 'AK Interactive' Grey (AK758) or White (AK759) 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. Color' Levelling Thinner', which aids brush painting. For most wood effect, I airbrush '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).



Wood effect - Method 1:

‘DecoArt Crafters’ acrylic paints:

For the next step I use ‘DecoArt Crafters’ acrylic 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 creamier, 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.

Wood effect - Method 2:

Windsor & Newton' Griffin (Alkyd) oil paints:

Mask off the area as required.

NOTE: *When airbrushing 'Tamiya' acrylic paints, I thin the paints using 'Mr. Color' Self-Levelling Thinners (400), which is commonly referred to as 'unicorn tears' or just 'MLT'.*

Airbrush the areas with 'Tamiya' Dark Yellow (XF60) or similar.

Brush a covering coat of the 'Windsor & Newton' Griffin Alkyd paint , such as Burnt Sienna**,** over the areas.

Leave the oil paint to settle for about ten minutes.

Decant a small amount of White Spirits or 'AMMO Mig' enamel odourless thinners (A.Mig-2019), into a suitable dish.

Dip a broad flat oil brush into the thinners then wipe the brush on a sheet of kitchen roll, which should not deposit any fibres in the oil paint.

Brush the oil paint over the area, in the desired direction of the wood grain, wiping the brush on the sheet of kitchen roll to remove residual oil paint.

Repeat dipping and wiping the brush in the thinners and brushing the oil paint until the desired density and finish is achieved.

Leave the oil paint to fully dry, which normally takes approximately 24 hours.

If desired and once the oil paint is fully dry, airbrush a semi-gloss clear coat, such as 'Tamiya' Semi-Gloss (X35) or similar, with a few drops of 'Tamiya' Clear Orange (X26) to give a varnished look to the finish.

Surface finish:

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.
If using the 'Tamiya' Clear, I normally add 'Mr. Color' Levelling Thinners, which does improve airbrushing and avoids pooling.

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 clear 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 5
WEATHERING

PART 5 - WEATHERING

There are many different types of weathering mediums available now to modellers of aircraft, ships, vehicles and figures, in model of any type. These weathering mediums can be washes based on enamel, clay or ink. Weather pastels, applied by sponge' as well as oil paints of various sorts are also plentiful. Some modellers have even used water colour paints, and pencils. The following are the basic weathering mediums I tend to use on most of my models.

Flory Model clay washes:
The washes I tend to use are the 'Flory Models' Clay Wash 'Grime' and 'Dark Dirt', which come in various shades and consist of a suspended and 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 soft brush 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 an airbrushed semi-gloss clear coat, such as 'Tamiya' Semi-Gloss (X35) or similar. 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 difficult to remove or even to wash it off completely.

NOTE 1: The glossier the applied sealing coat is, the more the chance there is that the applied 'Flory' clay wash will not spread fully, but rather form puddles or beads of wash. If this happens, add a few drops of ordinary **kitchen washing up liquid** to the clay wash. This will break the surface tension of the wash, allowing it spread fully.

NOTE 2: Always decant the amount of clay wash you need, rather than dipping the brush directly into the wash bottle. Dipping into the wash bottle can transfer contaminants from the brush into the wash, will cause the wash to become thick and unusable.

NOTE 3: When a sealing coat is applied over areas treated with clay wash weathering, the intensity of the applied wash tends to darken. This should be considered when removing the clay wash, otherwise the final effect may appear too dark.

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. If you don't achieve your desired effect, you can wash it all off and start again. I use a soft brush, which has been very slightly dampened, to brush off the clay wash. For smearing effects, a very slightly damp brush or absorbent paper should be used, dabbing either onto a dry piece of paper, until it's almost dry. 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're 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 'damp' brush or wipe over the surface to re-activate the clay wash and at the same time, to smear it over areas that had no clay wash. It'll dry more or less straight away. Then I'll very lightly brush and/or use a piece of damp absorbent paper to remove as much as I want until I get the desired effect. If I remove too much, I just reapply clay wash to that area and repeat the removal procedure. Once finished, just run the brush under a tap to rinse out any residual clay pigments. Finally, I usually seal the surface with airbrushed 'Tamiya' Semi-Gloss (X35) or similar, which will seal in the applied clay wash.

NOTE 4: 'Flory' current range of washes are: Dark Dirt, Grime, Black, Light (white), Mud, Sand, Rust and Concrete. All of these washes can be used as-is or mixed to create many colour shades for weathering.

Chipping effects:

To give the effect of chipped and weathered paint/varnish to metal engine cowls and forward fuselage panels etc, chipping fluids can be used. To achieve this effect, first prime the areas with a suitable primer then airbrush the metallic finish desired. Once dry, a chipping fluid, such as 'AK Interactive' Medium Chipping fluid or 'Vallejo' chipping fluid is airbrushed over the painted areas. An alternative is to use a cheap hair spray. This forms a barrier which will allow the top coat to be chipped off. Finally, the required top coat colour is applied.
Once fully dry, moisten 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 'Tamiya' Semi-Gloss (X35).

'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 'homemade' using such as oil paints with a suitable thinning agent. I tend to use 'AK Interactive' products.

Water colour pencils:

Water colour pencils can be used to add weathering detail. The colour s applied to the model part then brushed gently with a brush, slightly dampened with water. This dilutes the pencil marking, allowing it to be faded as desired. 'AK Interactive' produce these 'weathering' pencils, which are marketed specifically for the modeller, although other artist water colour pencils can be used, such as 'Derwent' Inktense 24 ink pencils.

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 an 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 oil paints can be too ‘gritty’ once leached of the oil, so I use ‘Abteilung 502’ oil paints thinned with ‘Tamiya’ Enamel thinners (X20).

PART 6
DECALS

PART 6 - DECALS

Kit supplied decals:

NOTE: *The following is applicable for decals on painted surfaces. 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 a clear gloss coat should be airbrushed over the first applied decals, to provide a barrier against the setting solutions.*

The only decals supplied with the kit are fuselage serial numbers and the Bulgarian legend for this particular model scheme. These decals are not 'cookie' cut, but are part of the decal sheet carrier film. Therefore they need to be cut out from the decal sheet before application.

All other marking are supplied as masks, which are covered later in this build log.

Ensure the painted surface is smooth and free from any surface imperfections.

Airbrush a clear gloss sealing coat, such as 'Mig' A-Stand Aqua Gloss (A.Mig-2503), 'Tamiya' Clear (X22) or similar 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.*

Wet the area using a light coat of 'MicroScale' **MicroSet** solution.

Remove the decal from its backing sheet after it has released in 'warm' water.

Carefully move the decal into the correct position.

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 roll a dry cotton bud (Q-tip) over the decal 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.

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.*

Wet the decal surface with a light coat of 'MicroScale' **MicroSol** solution.

Leave the solution for several hours to fully dry and set the decal.

To 'knock back' the sheen of the decals and painted surfaces for applying weathering effects (refer to Part 5 of this build log), for example 'Flory' clay washes or oil paint, I airbrush a sealing coat 'Tamiya' Semi-Gloss (X35).

PART 7
RESIN

PART 7 - RESIN

This model contains aftermarket 3D printed parts, as opposed to the normal plastic used.

The reason for resin kit/parts is that in the past, using resin made it possible to produce much finer detail on kit parts than the plastic kit equivalents. Today, there are many producers of resin kits, particularly after market replacement parts. However, plastic kit manufacturers have come a long way now and kits, such as those from 'Wingnut Wings' and 'Copper State' are equal to, if not better than resin kits. Manufacturers of resin or 3D printed kits may make kits to order or have 'limited' runs, although aftermarket parts are usually readily available. Working with resin or 3D prints does present different challenges to the modeller, especially if it's the first time of building using resin.

The properties of resin differ radically to those of plastic kits. Below I have listed what I have found to be the primary differences for resin or 3D printed kits/parts from plastic (styrene) kits:

When resin kits are cast in their moulds or 3D printed, a cast release agent or residual print resin may be present on the surface of the kit/parts. These can prevent paint or adhesives from adhering to the surfaces. The easiest way to remove cast release agent is to carefully and fully wash all of the model parts in warm soapy water, using an old, soft tooth brush, then thoroughly rinse all of the parts and leave to dry. Alternatively wipe the parts with such as 'Tamiya' X20A thinners or with a commercially available Isopropyl Alcohol (90% or higher grade).

Cast or 3D printed resin, by its nature, is very brittle and can be damaged or broken easily, especially when handling small parts. This is particularly evident when separating the individual items from the resin cast or from the 3D printed support 'trees'. The best way to remove item is to cut them away with a fine-toothed razor saw or single blade cutters, then clean off any residual stubs on the edges of the parts.

Once parts are removed from resin casts, they may have 'resin flash' around or amongst parts, especially small items. This is easily removed with a sharp scalpel blade. Heavier residue can be scraped, filed or sanded away. Print layer lines may be evident on 3D printed parts, which, if possible, should be sanded away.

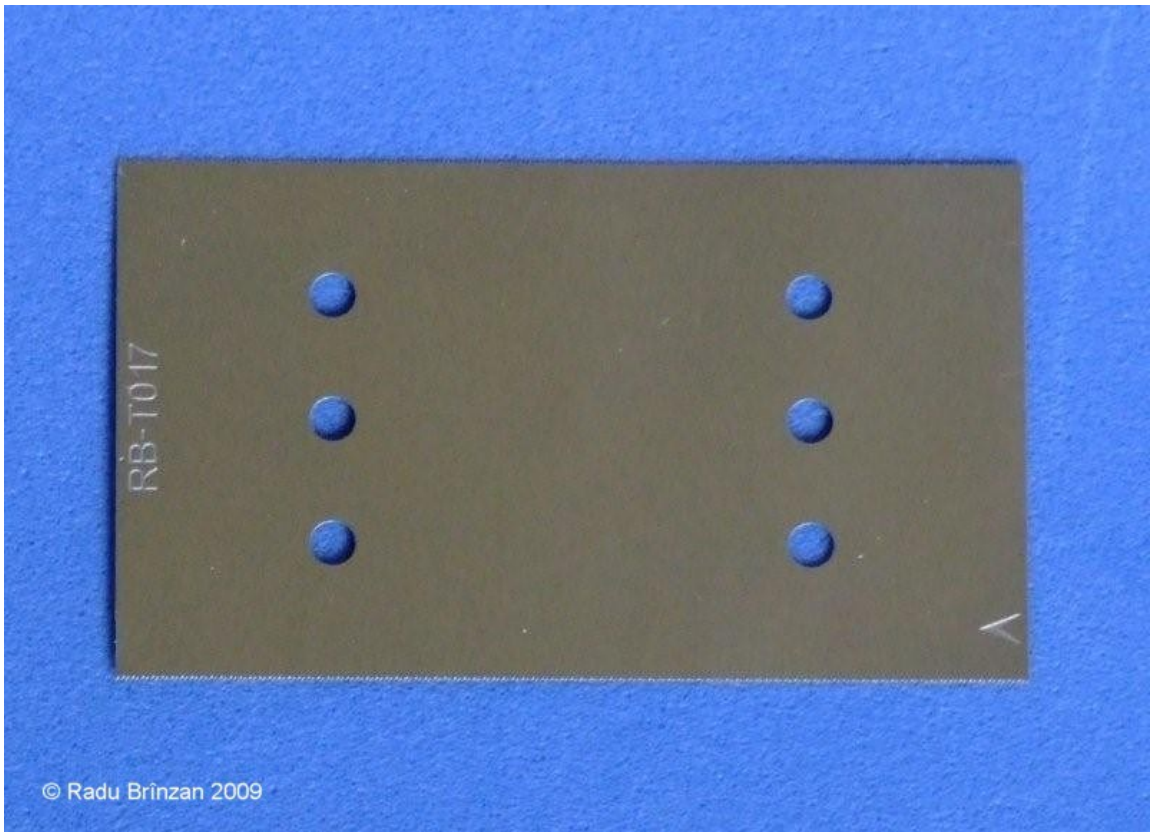
Plastic kits are assembled using solvent adhesives, which melt the surface where it is applied and 'weld' the joint together. Resin cast or 3D prints however will not react to this type of adhesive and can really only be glued using Cyanoacrylate (CA) adhesive. This adhesive reacts to moisture in the air and on the surface to be joined. As most people know, it will also bond skin to whatever it touches, if the skin has CA adhesive on it. Obviously extreme care needs to be exercised when assembling resin kits using CA adhesive. It's always a good idea to have CA release agent available to use if necessary. Good ventilation is also advisable as the fumes from CA adhesive are noticeable and can irritate the eyes and lungs.

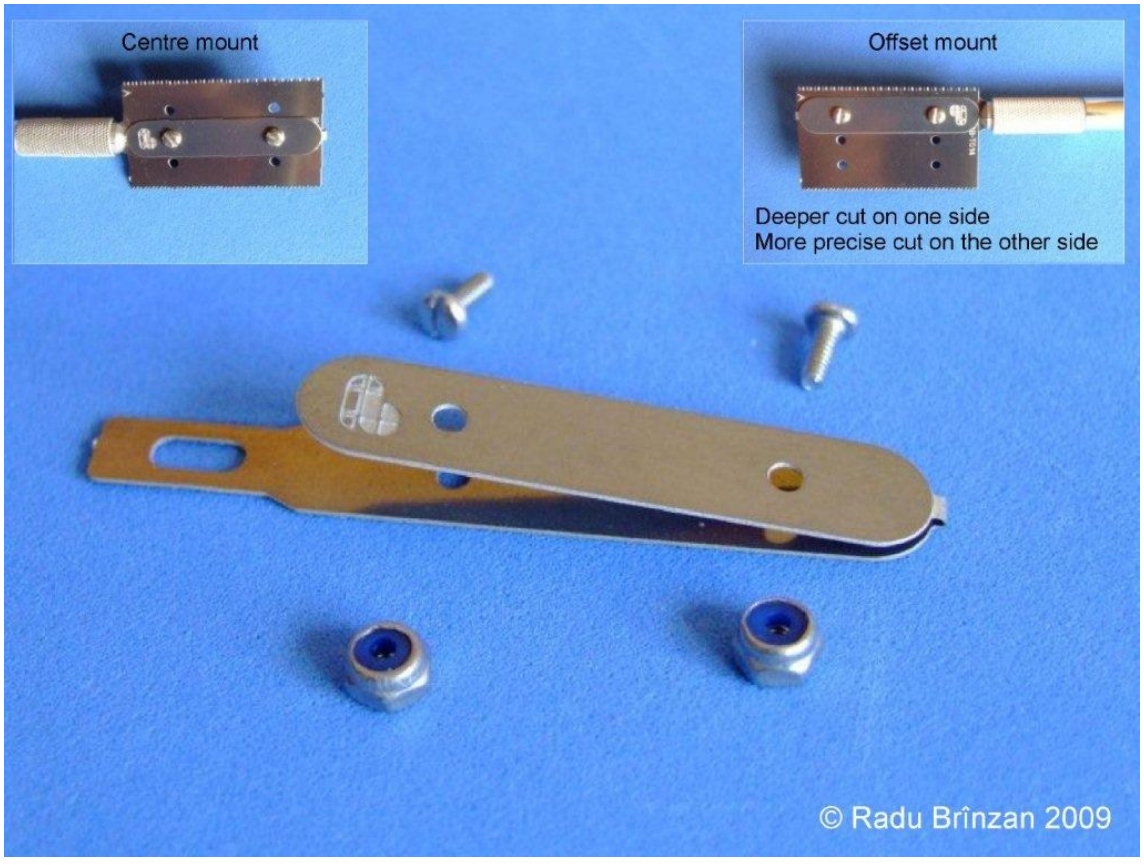
Cutting, sanding and drilling resin will create swarf and more importantly, resin dust. The dust is particular is dangerous, especially if inhaled. Therefore, always vacuum the working area and yourself, regularly. If you have a face mask or filtered respirator and find you can wear it whilst working, then do so. Some modellers wet the working surface to trap dust, although this is a messy method. Resin can easily be drilled or scraped, but remember how brittle resin is when it is being handled.

It is not unusual to find imperfections in resin cast parts, such as surface blemishes, small 'blow' holes or ragged edges. This can be a problem, more so on some cast resin kits/parts. These imperfections can be rectified by sanding/polishing and/or filling with modelling putty, then sanding/ polishing.

Generally, CA adhesive is supplied as 'instant bond' adhesive, but there are some manufacturers, such as 'VMS Fleky', that supply CA adhesive as standard, thin, slow and specific resin adhesive. Whichever adhesive is used you must ensure parts can be correctly positioned and aligned before applying the adhesive. Trying to separate mis-aligned parts once the adhesive sets will prove very difficult and may result in irreparable damage to the parts.

To separate resin parts from the thin moulding backing sheet, use sharp scissors or a scalpel blade. To separate larger parts from the moulding base block, use a fine modeller saw. The saw I use has a double sided and fine ’drag’ saw blade and with its holder, which was available from ’RB Productions’.





PART 8
RIGGING

PART 8 - RIGGING

References:

‘Windsock’ data file No:13 - AW FK.3 Little Ack (J. M. Bruce).
‘Flying Machines RU’ - https://flyingmachines.ru
‘MDesign’ Instruction notes.

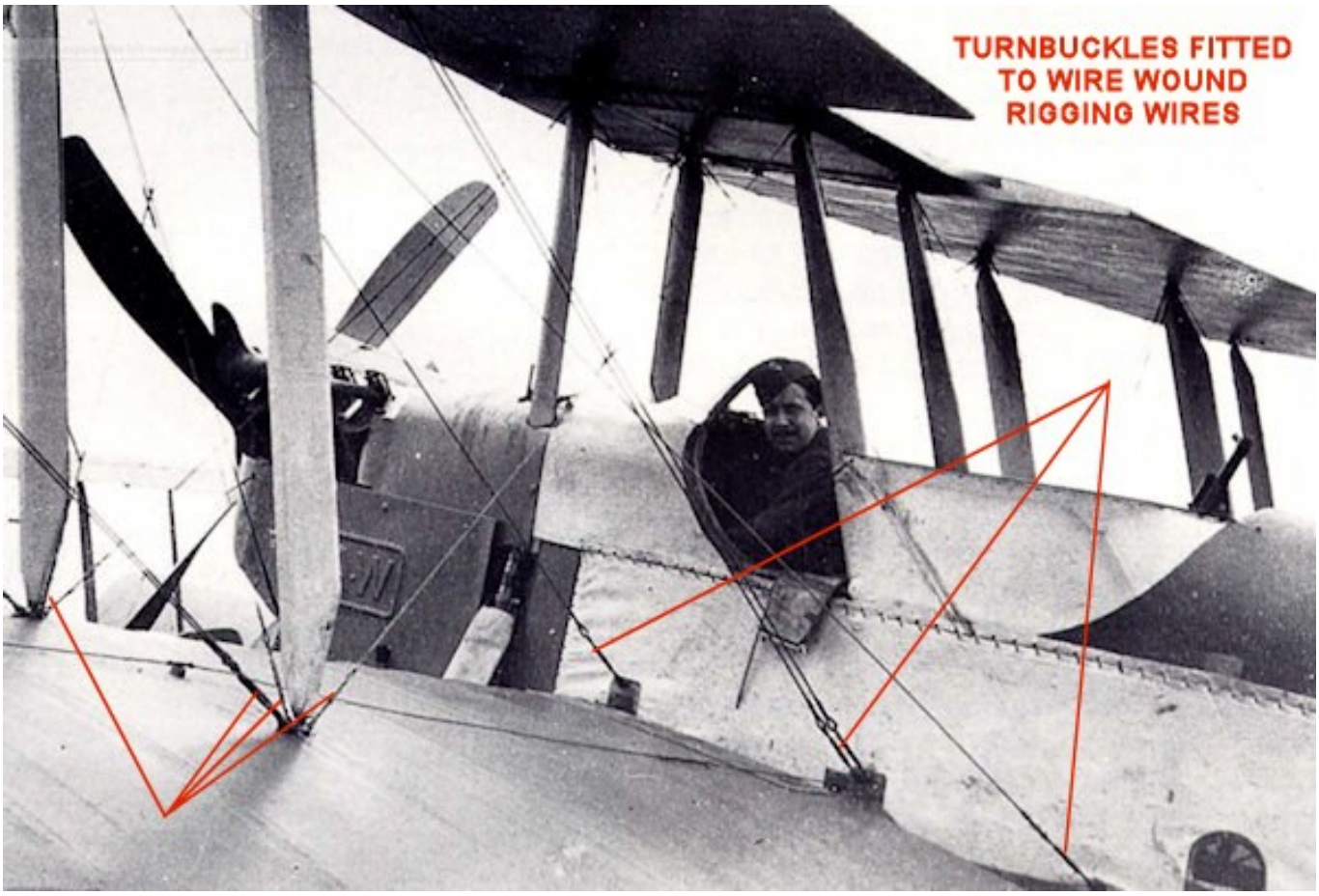
General:

It’s important to check where the various rigging attachment points are for this aircraft. 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 then 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 the rigging can be planned for the model in the subsequent Parts of this build log.

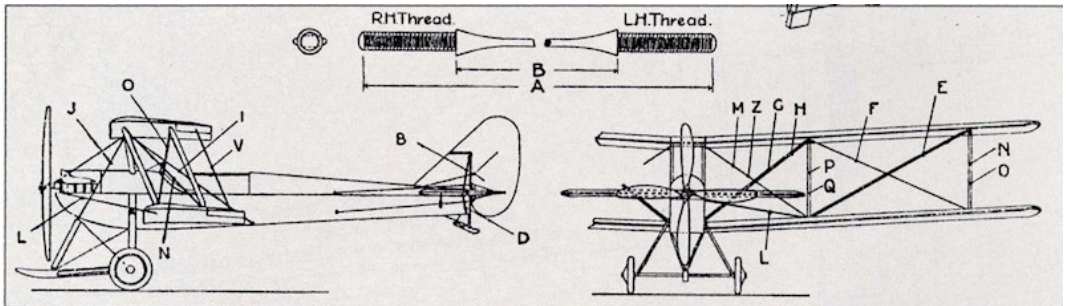
During its service this aircraft was rigged with either standard wire-wound cables or streamlined aero wires. Standard wire-wound cables with adjustable turnbuckles can be seen in the following photograph.



Streamlined aero wires, which had no turnbuckles, but instead adjustable end fittings can be seen in the following photograph. Regardless of the type, control cables were standard wire wound cables with turnbuckles.

I've chosen to **rig this model with standard wire wound wires/cables** as was possibly used on trainer aircraft that were operating from home airfields.

For the primary rigging, such as flying and landing wires and cross bracing wires, I used 'Steelon' or 'Stroft GTM' mono-filament (fishing line) of 0.12 mm diameter and 0.08 mm diameter for flight control cables. The mono-filament is effectively transparent but does give a look of steel, without the need of painting or colouring with a gel pen. Any turnbuckles and tubes used are detailed in the relevant Part of this build log.



Index letter see Diagram	Description	A Length	B	Size	No. off	Part Number	Remarks
A	Tail Plane Bracing Wires (Top Front)	4'-8½"	4'-5⅝"	2 BA.	2	A.G.S. 347	Not on Machines with Tail Plane Actuating Gear
B	" " " " (" Rear)	4'-3¾"	4'-0½"	"	2	" 347	
C	" " " " (Bottom Front)	3'-8½"	3'-4⅞"	"	2	" 347	Not on Machines with Tail Plane Actuating Gear
D	" " " " (" Rear)	4'-1"	3'-10"	"	2	" 347	
E	Outer Flying Wires	10'-6⅛"	10'-3"	¼ B.S.F.	8	" 348	
F	Outer Landing Wire	10'-0⅜"	9'-9⅛"	2 BA.	4	" 347	
G	Inner Flying Wire (Front)	8'-6¼"	8'-1⅜"	9/32 B.S.F.	2	" 349	
H	" " Wires (Rear)	8'-6⅞"	8'-1⅜"	"	4	" 349	
I	Outer Anti Drag Wire	10'-10½	10'-7½	¼ B.S.F.	2	" 348	
J	Top Front Drag Wire	8'-11¼"	8'-7"	9/32 B.S.F.	2	" 349	
~~K~~	~~Bottom Front Drag Wire~~	~~9'-7⅛"~~	~~9'-4¼"~~	~~¼ B.S.F.~~	~~2~~	~~" 348~~	Cancelled
L	Front Drag Wire	8'-3⅝"	8'-0⅛"	2 BA.	2	" 347	
M	Inner Landing Wire (Front)	8'-2⅝"	7'-11⅞"	"	2	" 347	
N	Outer Incidence Wire (long)	7'-2⅜	6'-11⅝"	"	2	" 347	
O	" " " (short)	5'-6⅜"	5'-2½"	"	2	" 347	
P	Inner " " (long)	7'-0⅜"	6'-9⅞"	"	2	" 347	
Q	" " " (short)	5'-4"	5'-0½"	"	2	" 347	
V	Aileron Connecting Wire	6'-1¼"	5'-7⅞"	"	2	" 347	
Z	Inner Landing Wire (Rear)	8 2¾"	7-11¾"	"	2	"	

The following descriptions apply to both sides of the aircraft.

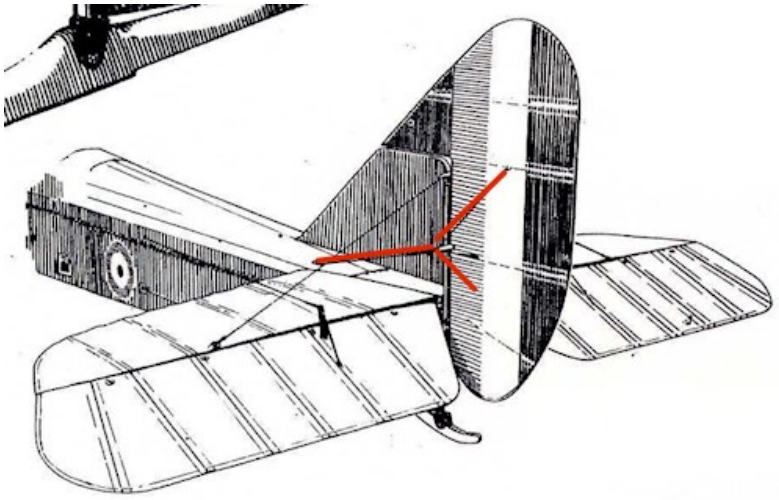
Internal wires and cables:

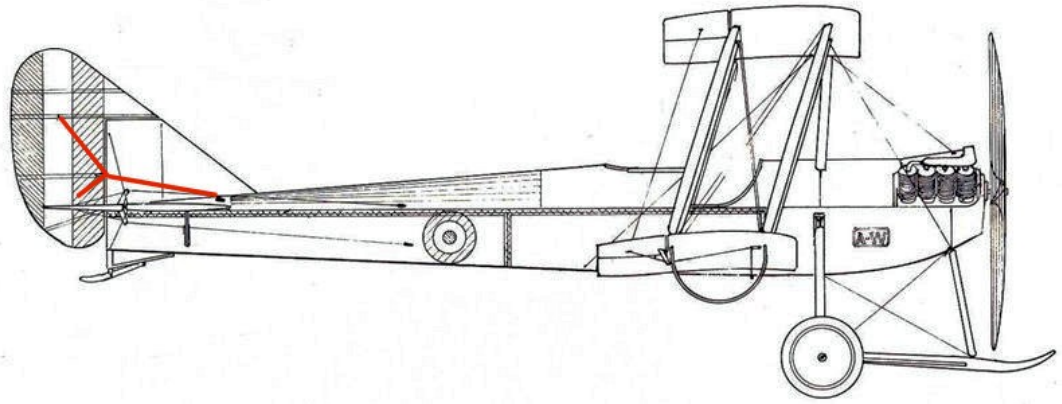
NOTE: *There is little information as to the control cables inside the cockpit and fuselage. Therefore, some guesswork based on similar aircraft has been used. These aircraft had been intended to be used as Trainers, with the pilot in the front cockpit and student in the rear cockpit. Therefore, basic duplicate flight controls were fitted to allow the occupant of the rear cockpit to control the aircraft.*

Rudder control cables:

A single rudder control cables were attached to the outer ends of the pilot's rudder bar. These cables were routed rearwards through the rear cockpit to the rear cockpit rudder bar. From there the cables were routed rearwards through the fuselage. From the following photograph it seems probable that the rudder cables were duplicated within fuselage and exited through openings in the top, rear of the fuselage. The cables were attached to the rudder control horns on each side of the rudder. Two separate cables were attached to the control horns and were routed rearwards and through the rudder. Turnbuckles were fitted in the cables at the rudder control horns and most probably at the pilot's and rear cockpit rudder bars.

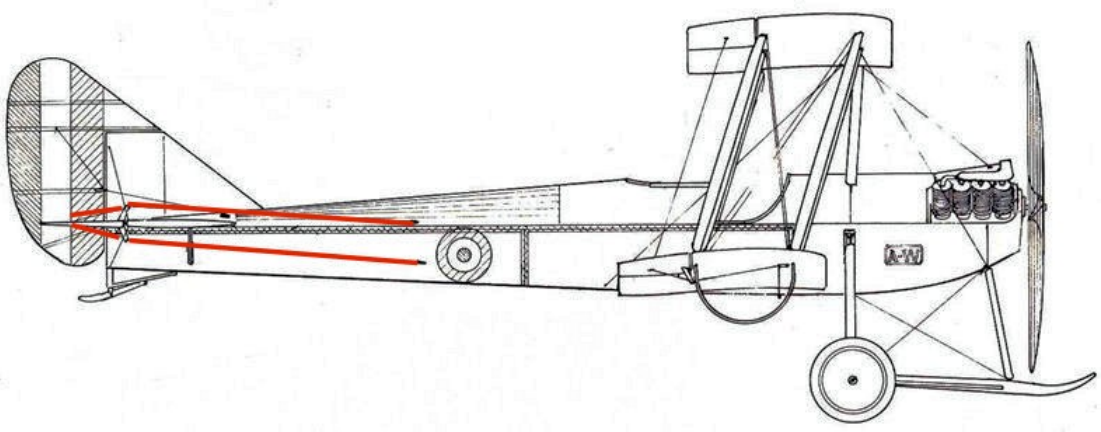
As either rudder bar was pushed left or right, the cables on one side would tension and relax on the opposite side, causing the rudder to be turned in the required direction. This in turn caused the rear of the aircraft to turn (yaw) left or right.

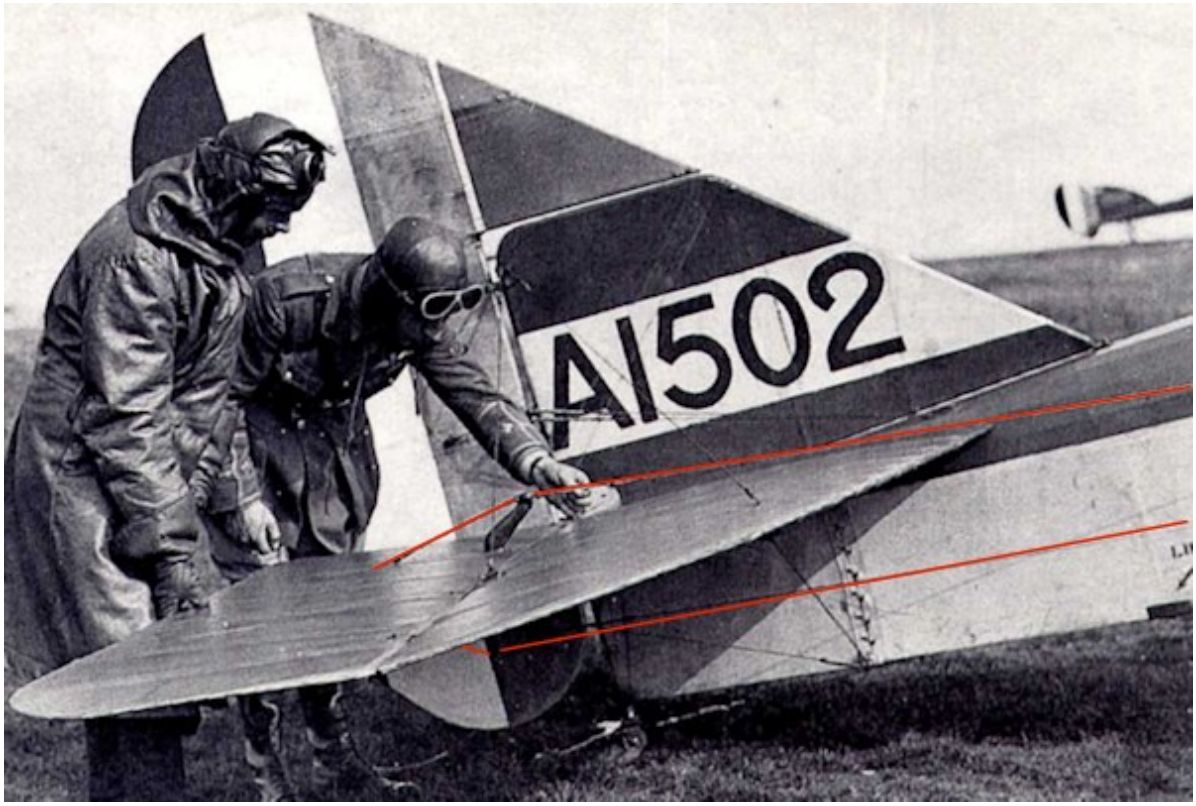


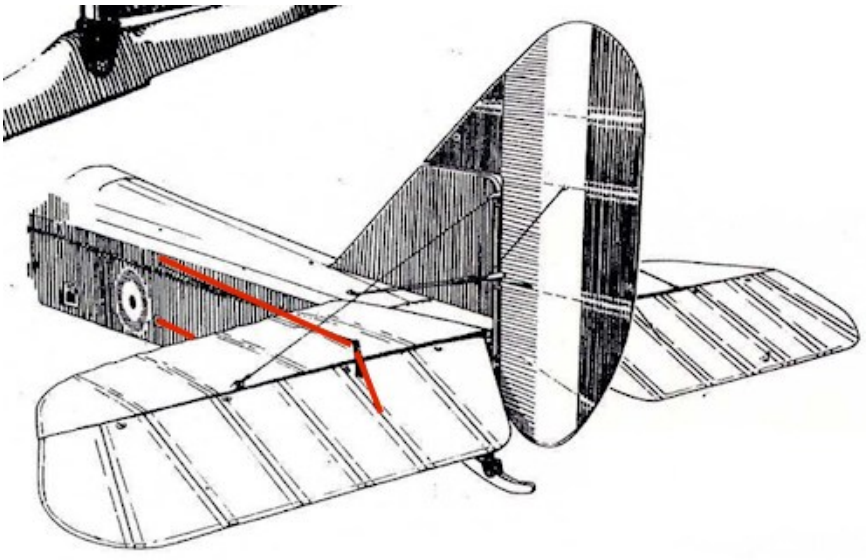


Elevator control cables:

It's probable that a control column would have been fitted in the rear cockpit and connected to the pilot's control column by a torque tube, so that both control columns would move together. Twin elevator control cables were attached midway up the rear of the pilot's control column. These cables were routed rearwards through the rear cockpit and fuselage. A second pair of cables were attached to the bottom of the pilot's control column and was similarly routed rearwards. The upper and lower cables crossed within the fuselage so that the upper cables were routed to the underside if the elevators and the lower cables to the upper side of the elevators. These cables exited through openings in the upper and lower sides of the fuselage rear. The upper cables were attached to the upper elevator control horns and the lower cables to the underside control horns. Separate cables were attached to the control horns and were routed rearwards and through the elevators. Turnbuckles were fitted in the cables at the elevator control horns and most probably at the pilot's control column.
As either control column was pushed forwards, the upper cables would tension and the lower cables relax, causing the elevator to be turned downwards, which in turn caused the aircraft to dive (pitch) downwards. The opposite would occur if either control column was pulled back, causing the aircraft to climb.







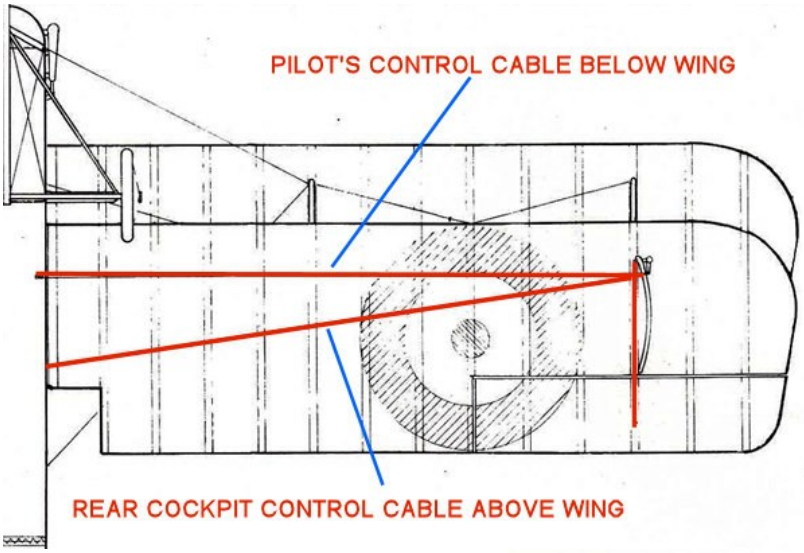
Pilot's aileron control cables:

A cable was attached, most likely, to one side of a double bell crank lever on the front of a torque tube that was fitted to the pilot's control column. This cable was routed outboard from the cockpit and across the underside of the lower wing on that side and attached to a lever on a wing mounted ninety (90) degree bell crank. A second cable was attached to the other lever and was routed rearwards and attached to the aileron control horn on the underside of that aileron. A further cable was attached to the control horn and routed rearwards and up through the aileron the upper wing aileron on that side. The cable was routed through that aileron at forwards to be attached to the upper aileron control horn. A cable attached to that control horn was routed forwards to a lever on the wing mounted ninety (90) degree bell crank. A cable attached to the other lever on the bell crank was routed across the top of the upper wing and attached to a lever on a wing mounted ninety (90) degree bell crank.
From that bell crank the aileron control cables were routed as previously described and back into the cockpit to be attached to the opposite lever on the torque tube bell crank.

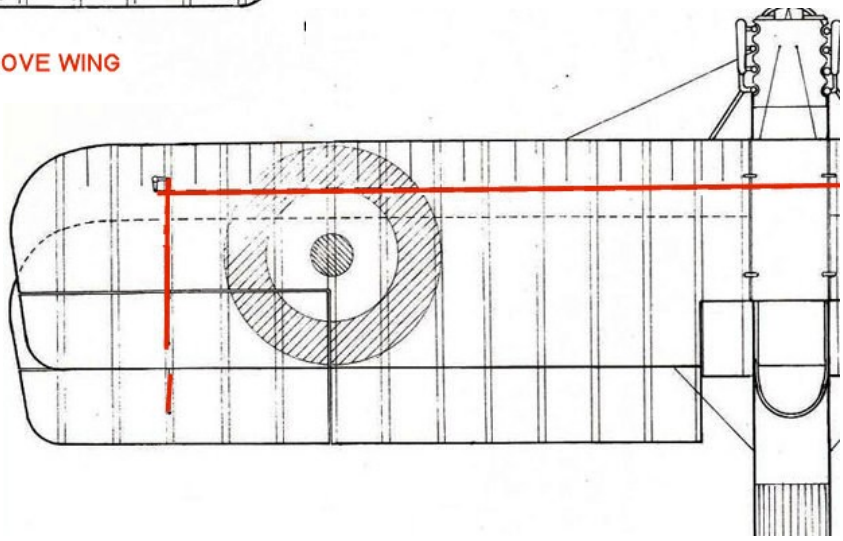
As the pilot pushed the control column left or right, the attached torque tube would rotate causing the aileron cables to tension on one side of the torque tube bell crank and relax on the opposite side. This caused both ailerons on one side of the aircraft to either lift or lower and the ailerons on the other side of the aircraft to react in the opposite direction. The aircraft would roll (bank) either left or right. Turnbuckles were probably fitted in the cables at the wing side of the aileron control horns and midway on the cable across the upper wing and at the levers on the control column torque tube.

Rear cockpit aileron control cables:

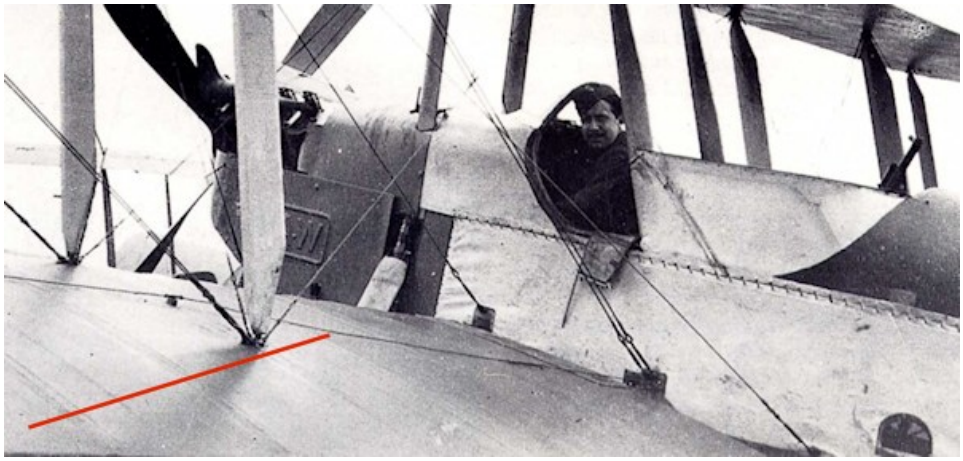
A similar arrangement of control was fitted in the rear cockpit, but the only control cables fitted were routed from the rear cockpit out and over the lower wings to presumably attach to the wing mounted bell crank lever.



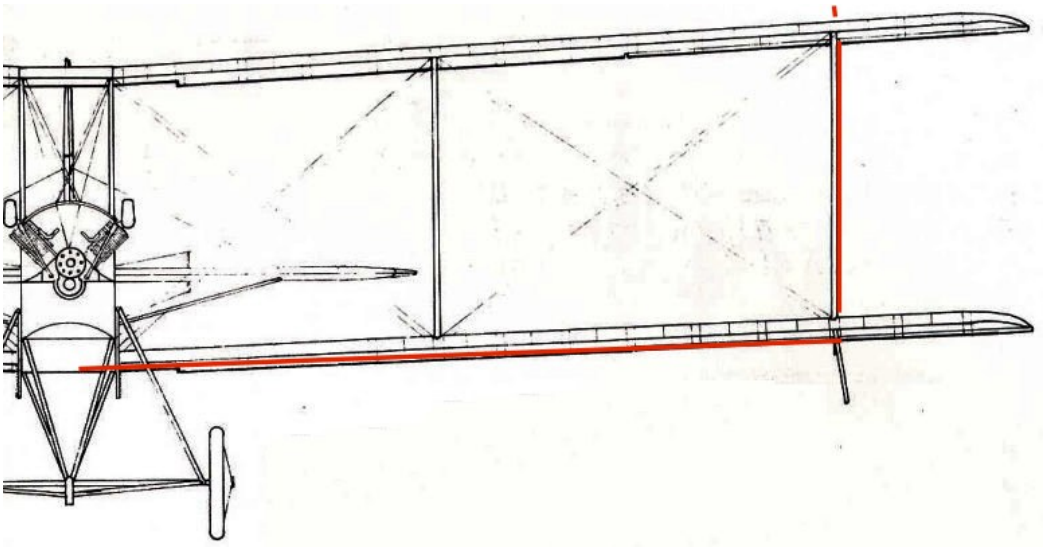
Underside of left lower wing



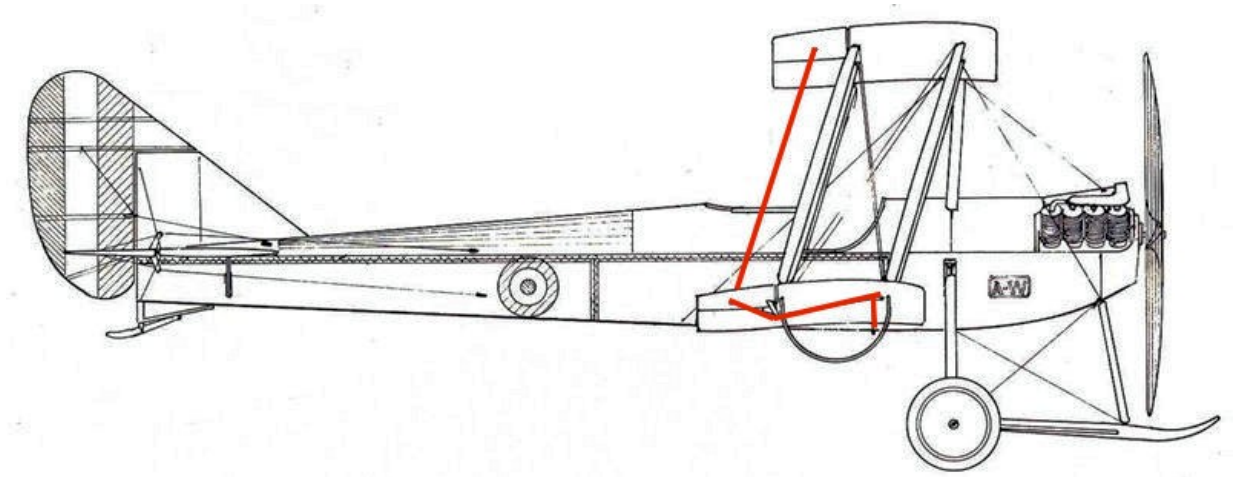
Top of left upper wing



Rear cockpit control cable



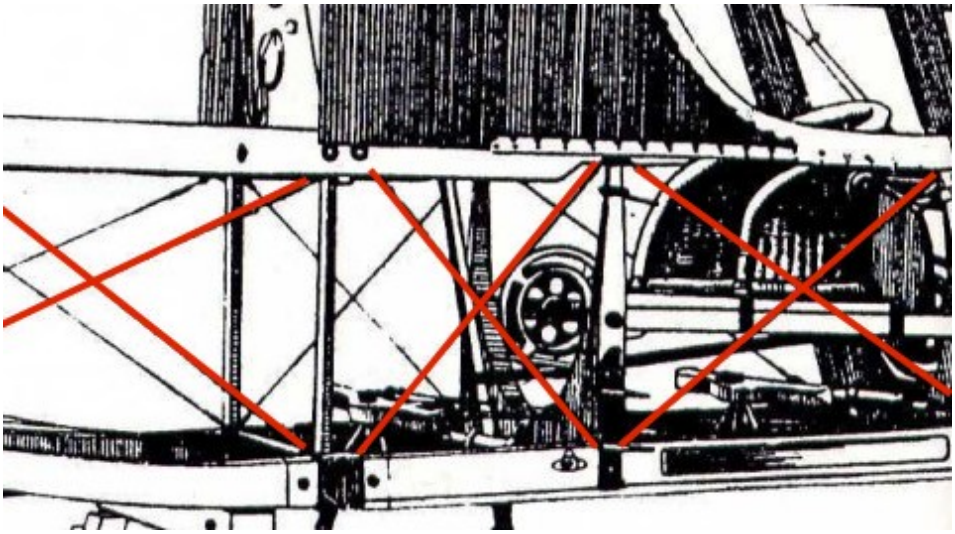
Front view



Fuselage bracing wires:

NOTE: *There is little information as to the bracing wires fitted inside the cockpit and fuselage. Therefore, some guesswork, based on similar aircraft, has been used for the visible cockpit areas of this model.*

Diagonally crossed bracing wires were fitted between the upper and lower corners of the bays in the fuselage side frames. Turnbuckles would probably have been fitted in the top ends of the wires.



External wires:

NOTE: *This aircraft had been intended to be used as a trainer with the pilot in the front cockpit and student in the rear cockpit. Therefore, duplicate flight controls were fitted to allow the occupant of the rear cockpit to control the aircraft. However, the aircraft was allocated to No.47 Squadron (RFC) for operations over Salonika, Macedonia. As such, duplicated flight controls were probably* ***not fitted****.*

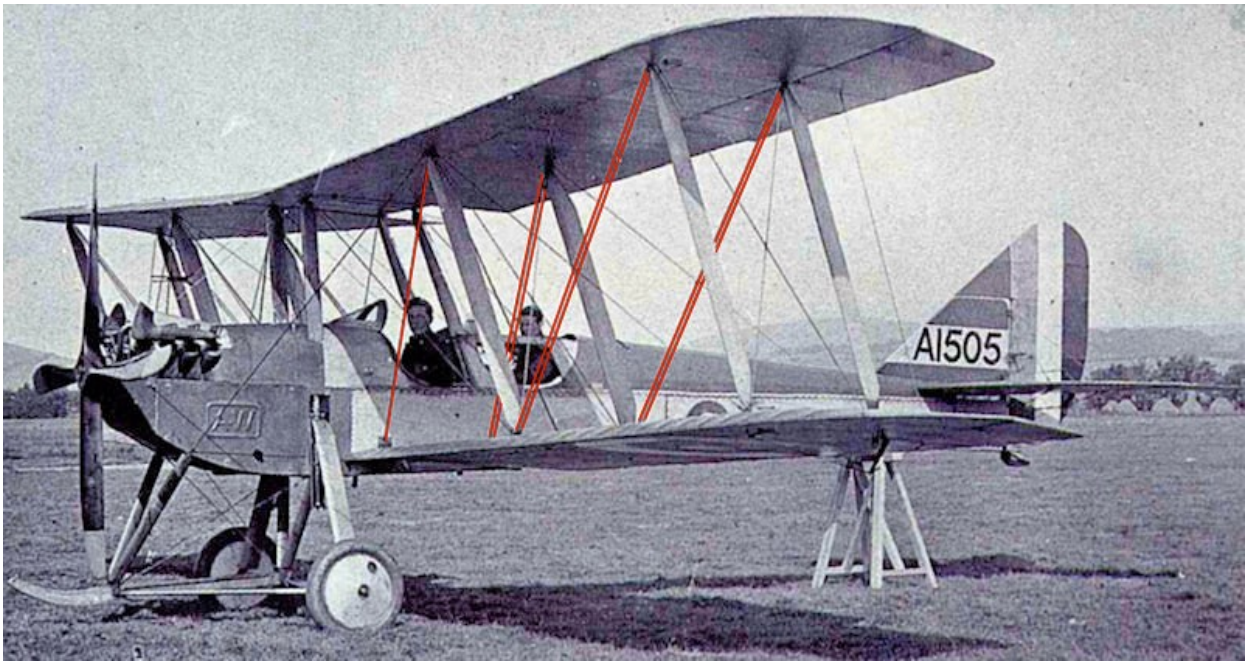
Flying wires:

Two sets of flying wires were fitted between the wings in order to restrain the upper wing during flight.

The inner set of flying wires comprised a single wire fitted between the lower wing root and the underside of the upper wing, inboard from the forward, inner interplane strut. A pair of flying wires were fitted between the lower wing root and the underside of the upper wing, inboard from the rear, inner interplane strut.

The outer set of flying wires comprised a pair of flying wires fitted between the top surface of the lower wing, outboard from the rear, inner interplane strut and the underside of the upper wing, inboard from the rear, outer interplane strut. A second pair of flying wires were fitted between the top surface of the lower wing, outboard from the forward, inner interplane strut and the underside of the upper wing, inboard from the forward, outer interplane strut.

Turnbuckles were fitted at the lower ends of the wires.



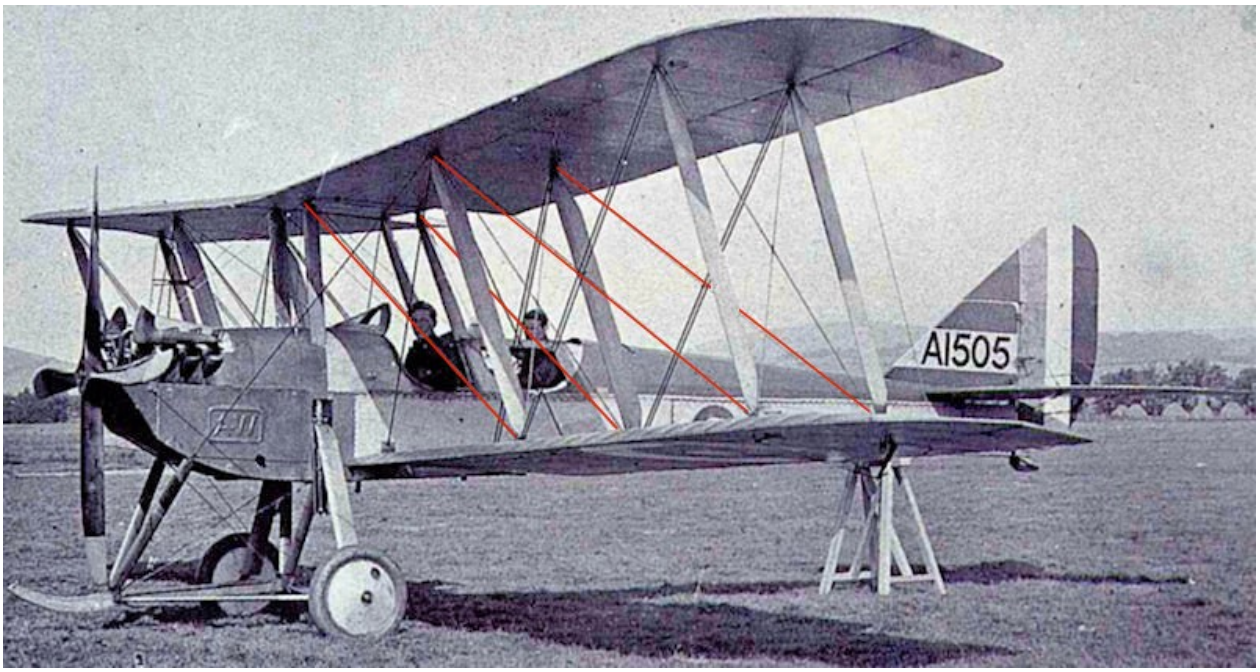
Landing wires:

Two sets of landing wires were fitted between the wings in order to restrain the lower wing during landing.

The inner set of landing wires comprised a single wire fitted between the underside of the upper wing, outboard from the forward fuselage cabane strut and the top surface of the lower wing, inboard from the forward, inner interplane strut. A second landing wire was fitted between the underside of the upper wing, outboard from the rear fuselage cabane strut and the top surface of the lower wing, inboard from the rear, inner interplane strut.

The outer set of landing wires comprised a single wire fitted between the underside of the upper wing, outboard from the inner, forward interplane strut and the top surface of the lower wing, inboard from the forward, outer interplane strut. A second landing wire was fitted between the underside of the upper wing, outboard from the rear, inner interplane strut and the top surface of the lower wing, inboard from the rear, outer interplane strut.

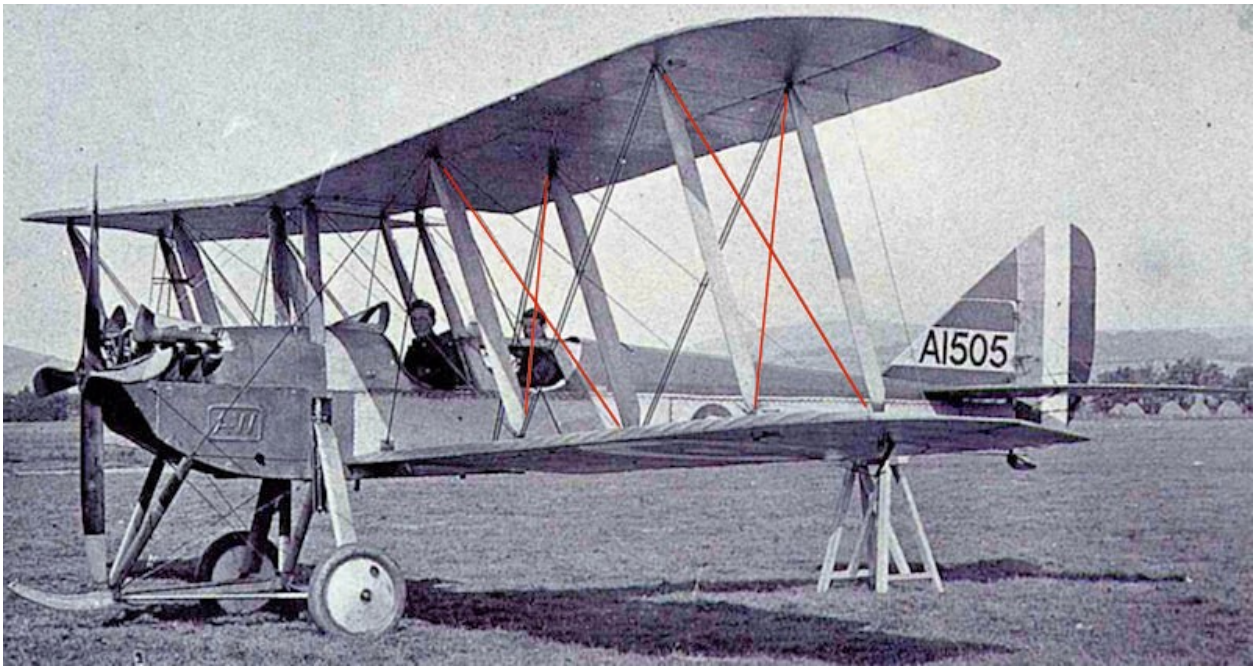
Turnbuckles were fitted at the lower ends of the wires.



Incidence wires:

Two diagonally crossed incidence wires were fitted between the upper and lower wings, between the top and bottom of the inner interplane struts. A second pair of incidence wires were similarly fitted between the outer interplane struts.

Turnbuckles were fitted at the lower ends of the wires.



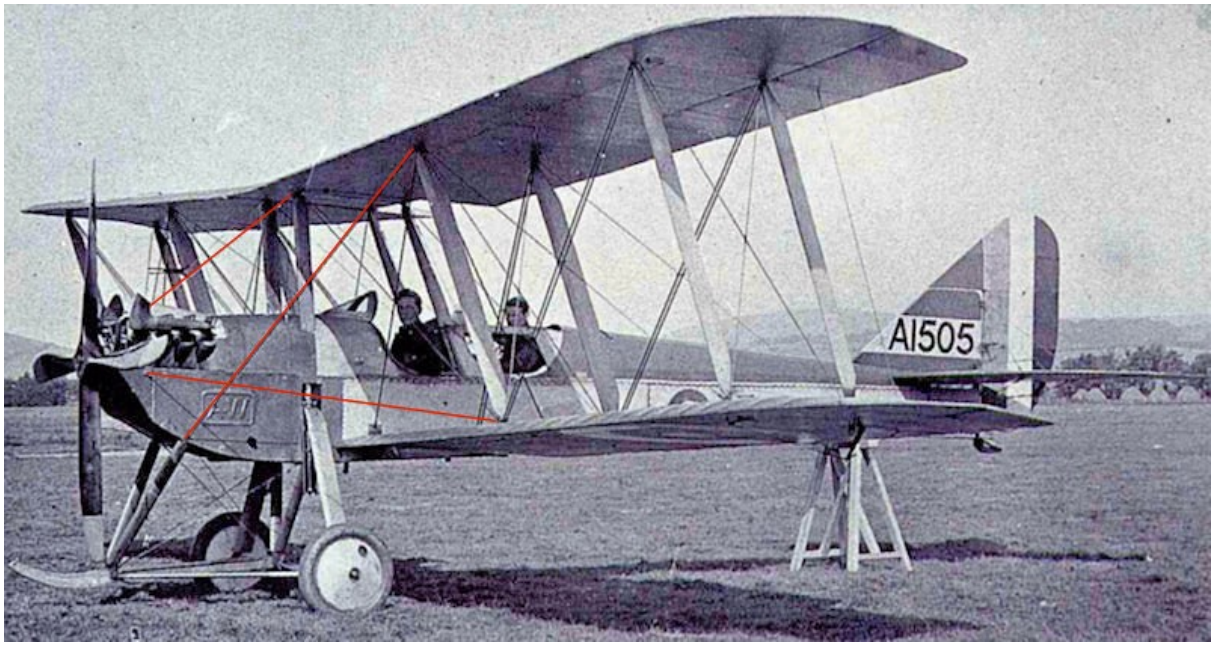
Drag wires:

A forward drag wire was fitted between the top of the forward landing gear strut and the underside of the upper wing at the top of the forward, inner interplane strut.

A second forward drag wire was fitted between the top of the fuselage forward side panel and the top surface of the lower wings at the bottom of the forward, inner interplane strut.

A third forward drag wire was fitted between the forward, top of the engine cover and the underside of the upper wing at the top of the fuselage forward cabane strut.

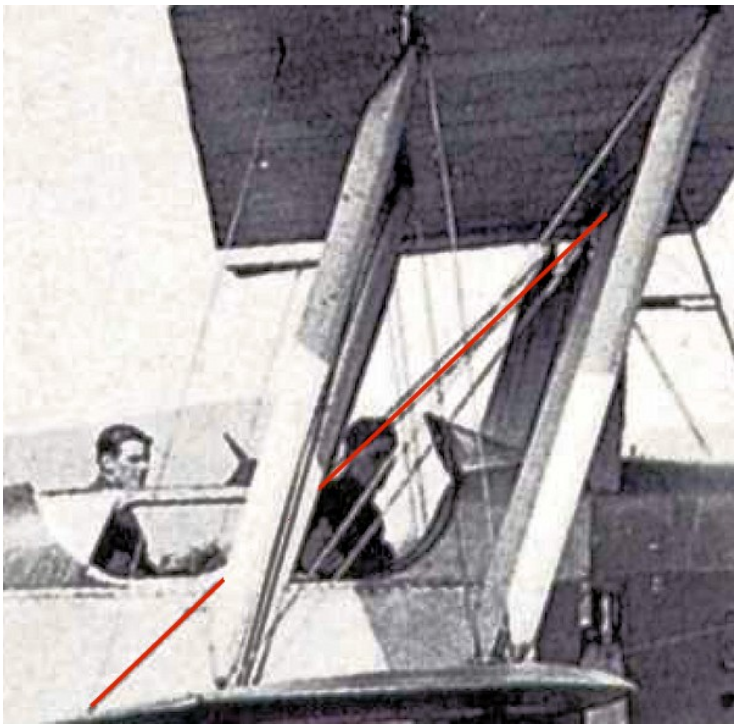
Turnbuckles were fitted at the fuselage ends of the wires.



Anti-drag wire:

An anti-drag wire was fitted between the bottom edge of the fuselage, below the rear cockpit and the underside of the upper wing at the forward, inner interplane strut.

Turnbuckles were fitted at the fuselage ends of the wires.



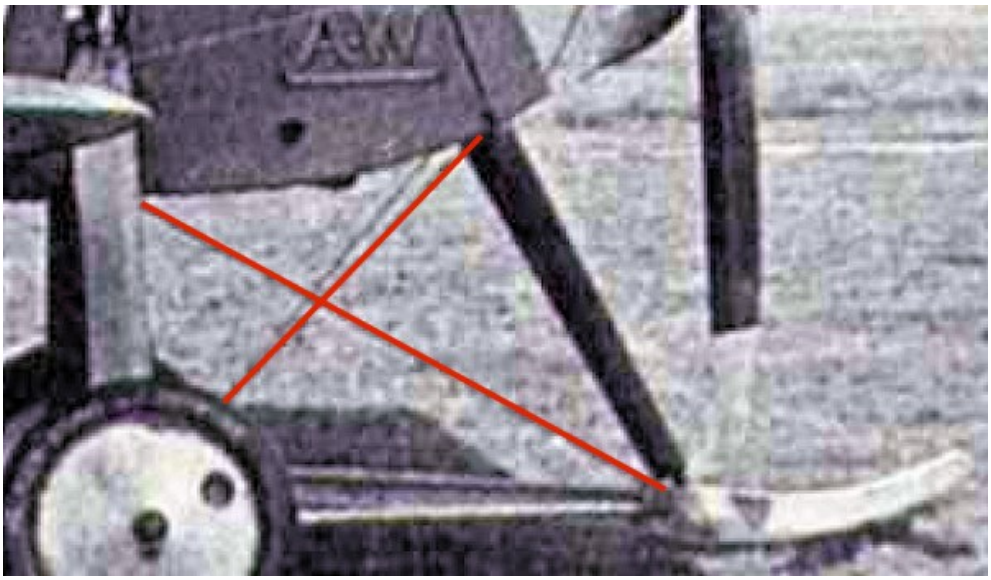
Landing gear bracing wires:

Diagonally crossed bracing wires were fitted to both sides of the landing gear struts.

A bracing wire was fitted diagonally between the underside of the fuselage at the top, rear of the forward landing gear strut and the skid at the bottom of the rear ‘V’ strut.

A second bracing wire was fitted diagonally between the underside of the fuselage at the top of the rear ‘V’ strut and the skid at the bottom of the front ‘V’ strut.

Turnbuckles were likely fitted in the top ends of the wires.

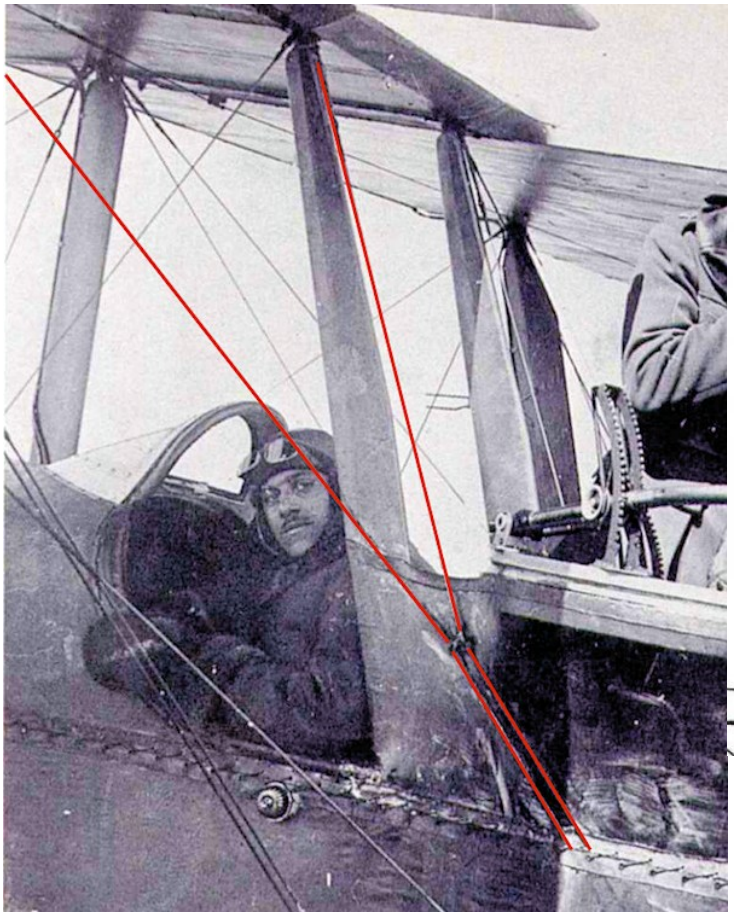


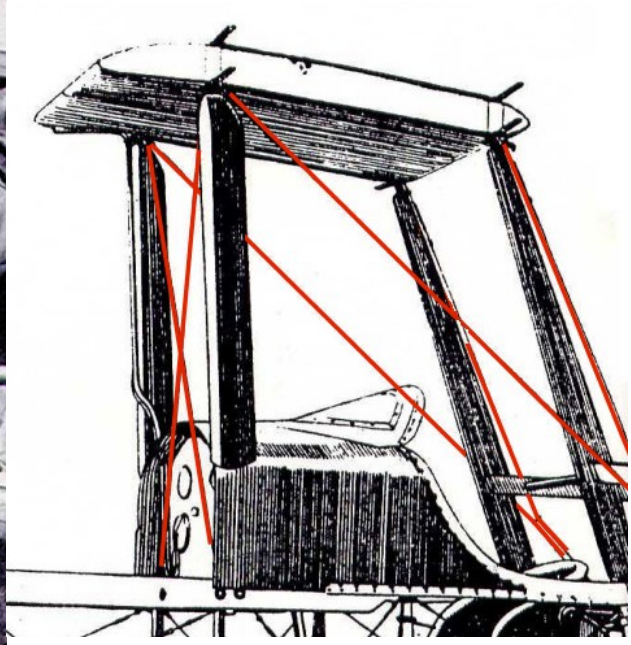
Cabane strut bracing wires:

A pair of diagonally crossed bracing wires were fitted between the underside of the upper wing at the top of the fuselage forward cabane struts and through the forward fuselage panel onto the fuselage upper side longerons.

Two separate bracing wires were fitted between the fuselage side, below the rear cockpit and the underside of the upper wing, at the top of the fuselage forward and rear cabane struts.

Turnbuckles were fitted in the bracing wires at their top ends.





Fin bracing wires:

NOTE: *It seems that some aircraft had bracing wires and a support strut fitted between the underside of the tailplanes and the fuselage. Other aircraft had instead just the bracing wires. This model is not the bracing strut version of the aircraft.*

Bracing wires were fitted between:

The bottom edge of the fuselage rear and up to the forward, centre of the tailplane.

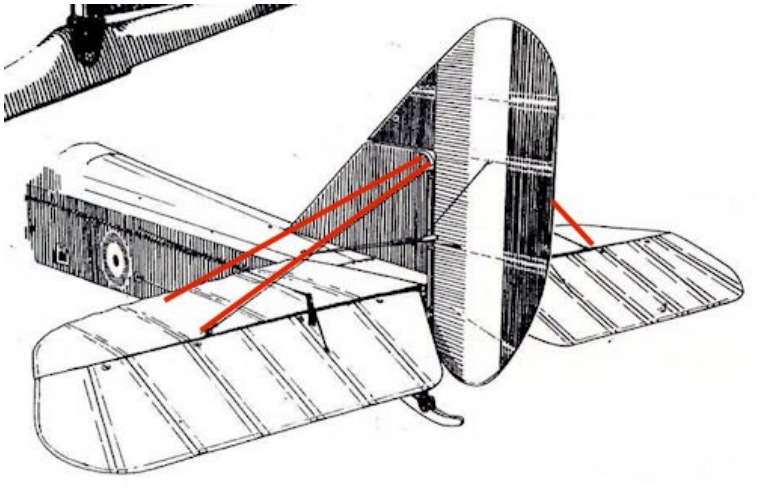
The forward, centre of the tailplane up to the rear, centre edge or the fin.

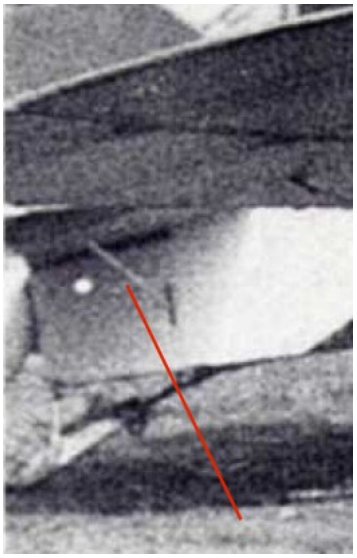
The bottom edge of the fuselage rear and up to the rear, centre edge of the fin.

The rear, centre edge of the tailplane and up to the rear, centre edge of the fin.

The rear, centre edge of the tailplane and down to the bottom rear of the fuselage above the tail skid.

Turnbuckles were fitted at the fin and fuselage ends of the wires.





Bracing strut version

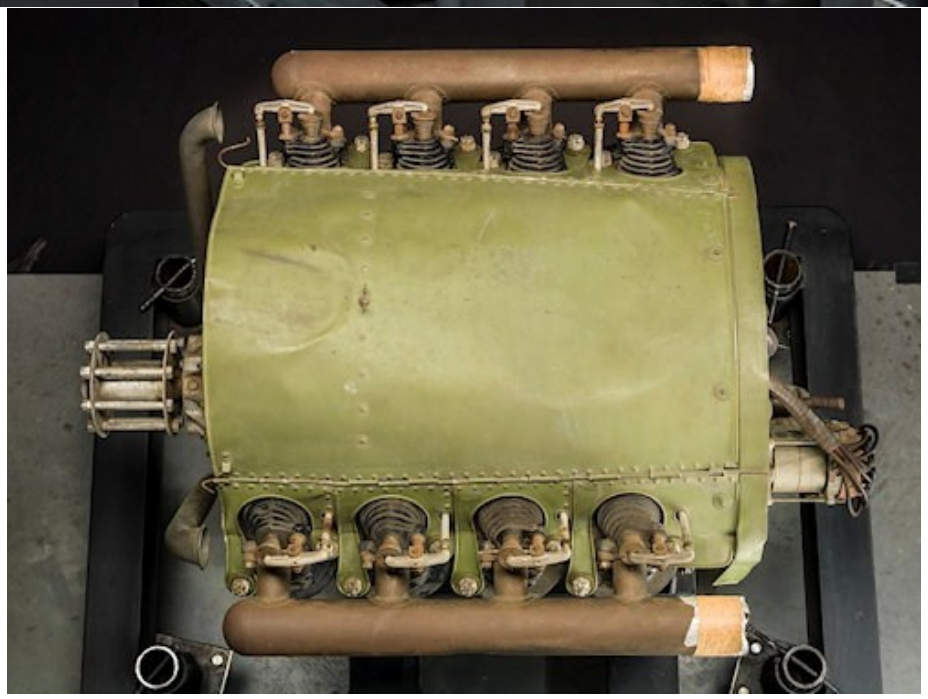
PART 9
ENGINE

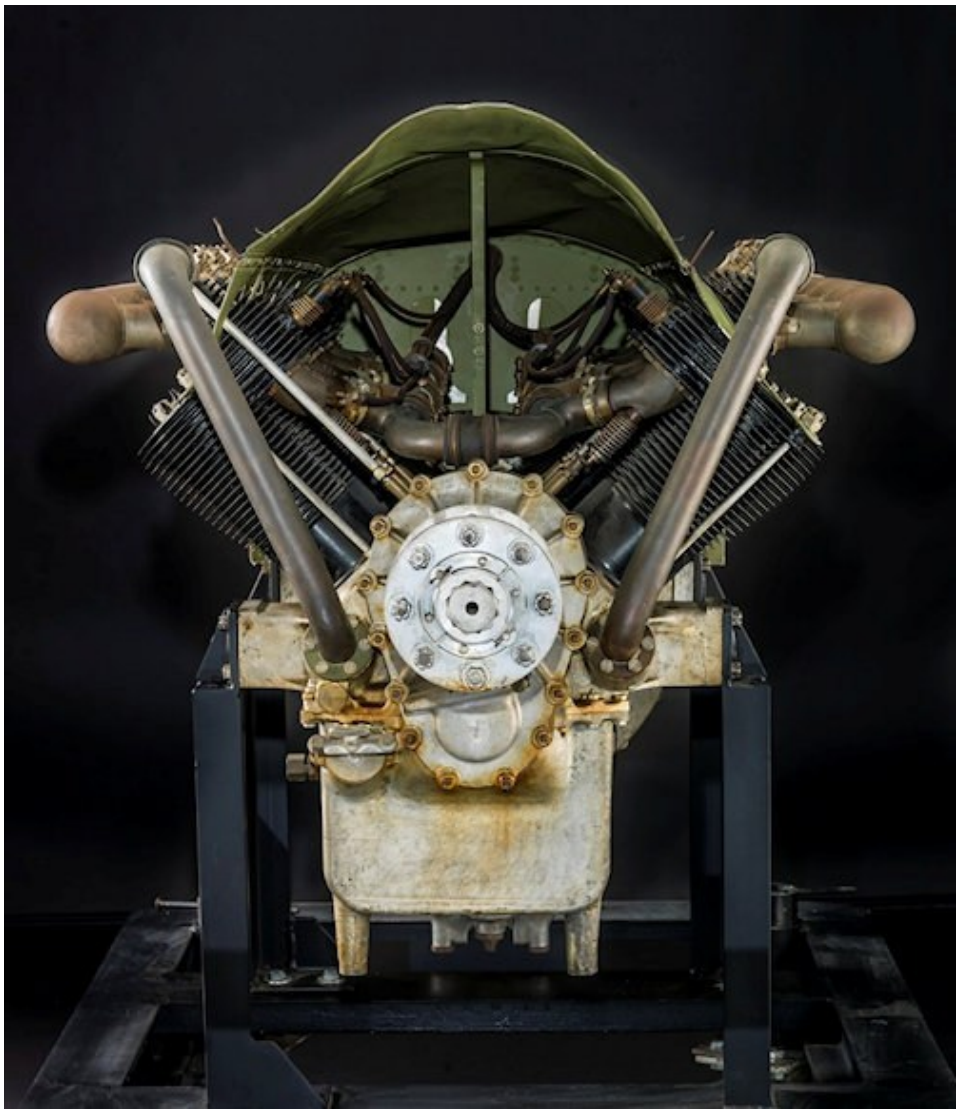
PART 9 - ENGINE

References:

‘Windsock’ data file No:13 - AW FK.3 Little Ack (J. M. Bruce).
‘Flying Machines RU’ - https://flyingmachines.ru
‘MDesign’ Instruction notes.

NOTE: *The engine for this aircraft was the 90hp RAF 1a, an air cooled V-8 engine.*





Preparation:

Carefully remove the engine assembly (30) and two exhaust pipes (31) from their support trees.

Carefully sand away any residual tree stubs from the edges of the engine and exhaust pipes.

Modifications:

NOTE: *Part 10 (Propeller) of this build log refers to the replacement propeller.*

Cut away the propeller shaft from the front of the engine.

Drill a hole of 1.8 mm diameter centrally into the front of the engine where the propeller shaft was.

Cut a short length of 1.8 mm diameter Brass tube, such as ‘Albion Alloy’s’ MBT18 or similar.

Fully insert the tube into the hole drilled into the rear of the propeller hub.

Temporarily join the two fuselage halves and insert the engine inti the open engine bay in the fuselage front.

Insert the tube in the propeller into the hole drilled into the front of the engine.

Note how much of the tube needs to be removed, if any, to allow the propeller to position close to the fuselage/engine.

If necessary, adjust the length of the tube.

Using thin CA adhesive, secure the tube fully into the propeller, making sure it is at 90 degrees to the propeller.

Painting:

Airbrush the engine assembly with a grey primer, such as ‘AK Interactive’ Grey (AK758) or similar.

Airbrush the engine assembly with a gloss black, such as ‘Tamiya’ Gloss Black (X1) or similar.

Brush paint the engine crankcase with ‘Mr. Metal Color’ Stainless Steel (213) or similar.

Brush paint the front pipes and centre supply pipes with ‘Tamiya’ Gun Metal (X10) or similar.

Brush paint the valve tappets and push rods ‘Mr. Metal Color’ Super Metallic Fine Silver (201) or similar.

Brush paint the cylinder top ‘bolt heads’ with ‘Mr. Metal Color’ Copper (215) or similar.

Brush paint the spark plugs with ‘Tamiya’ Deck tan (XF55) or similar.

Airbrush the two exhaust pipes with ‘Alclad’ Exhaust Manifold (ALC-123) or similar.

Airbrush the engine assembly and exhaust pipes with a semi-matte clear coat, such as ‘Tamiya’ Semi-Gloss (X35) or similar

Modifications (continued):

Ignition leads:

NOTE: *The eight spark plug ignition leads were attached between the cylinder spark plugs and the Magneto located at the lower, rear of the engine crankcase. For the model, each lead was routed from the magneto up and over the rear edge of the crankcase and forward to their respective spark plugs. The two sets of four leads were usually bound together along the inner sides of the engine cylinders.*

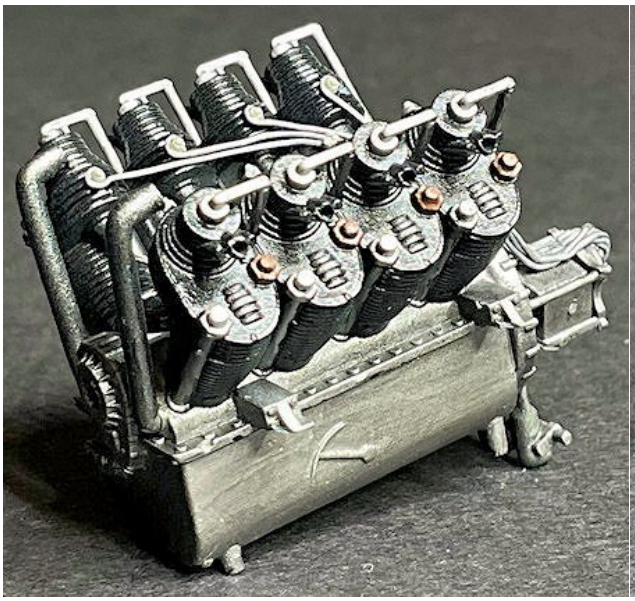
Drill a hole of 1.5 mm diameter centrally into the centre of the magneto.

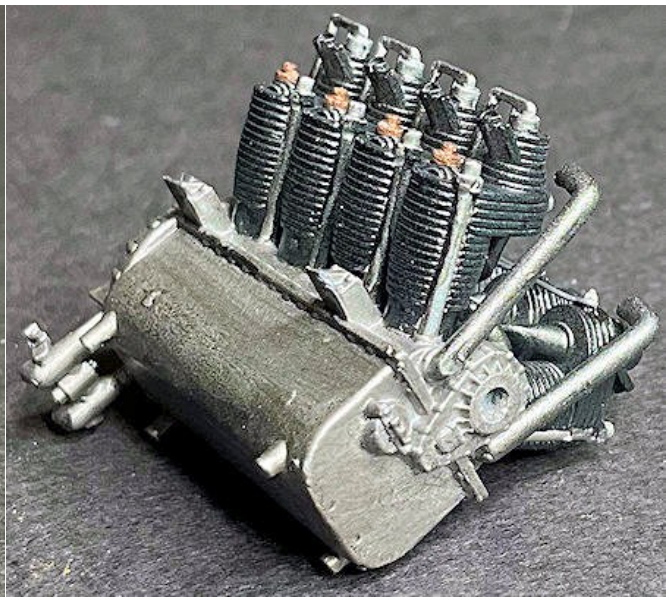
Cut eight long lengths of 0.3 mm diameter lead wire from ‘PlusModel’ or similar.

Twist together one end of all of the wires to form a single ‘cable’ type end.

Insert the wound end of the wires fully into the drilled hole in the magneto.

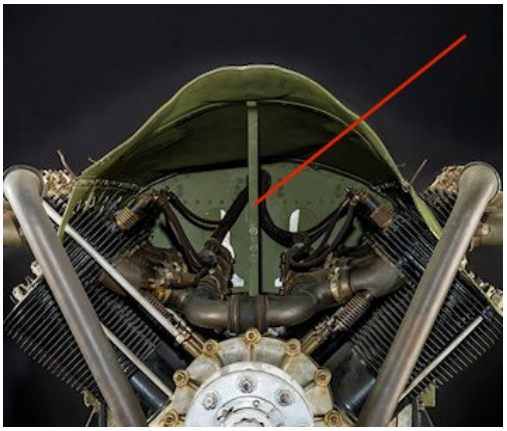
Using thin CA adhesive, secure the wound wires into the drilled hole.





Panel support strut:

NOTE: *The font of the engine cover panel was supported by a vertical strut between the engine crankcase and the underside of the panel.*



Drill a hole of 0.6 mm diameter vertically down into the centre of the top of the engine crankcase and approximately 4 mm rear of the small stub on the crankcase top surface.

NOTE: *The panel support strut and the two engine exhaust pipes will be fitted later in the build.*

PART 10
PROPELLER

PART 10 - PROPELLER

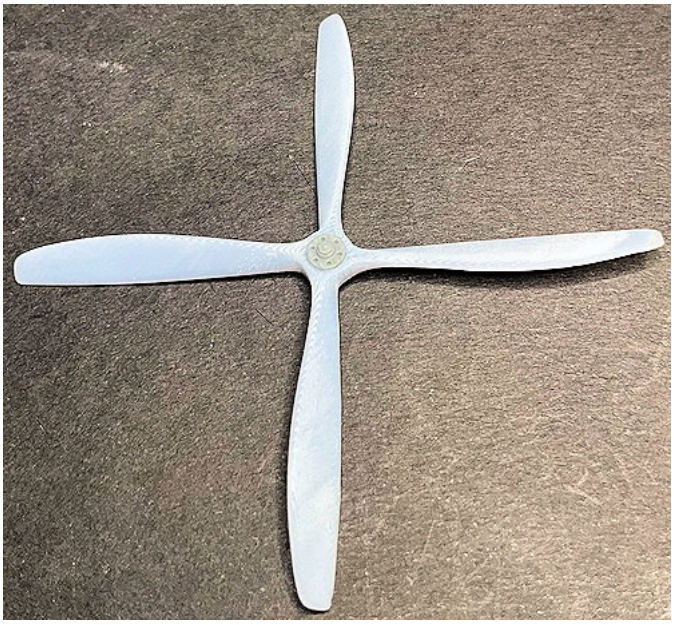
References:

'Windsock' data file No:13 - AWFK.3 Little Ack (J. M. Bruce).

NOTE: *The kit supplied 3D printed propeller is not up to the standard modelers expect. Therefore I chose not to use the kit supplied propeller but instead replace it with a 3D printed propeller from the '**Lukgraph**' BE2C kit. That propeller was not used on that build and is of the same type as fitted to the FK.3.*

Kit supplied propeller

Replacement propeller



Preparation:

NOTE: *Make sure when attaching the propeller crush plates that the propeller is facing the correct way. The straight edge of the blades should be to the left of the blades, when viewed from the front.*

The propeller crush plates were secure to the hub of the propeller using thin CA adhesive.

A hole of 1.8 mm diameter was drilled centrally into the rear of the propeller hub and through the rear crush plate. Make sure not to drill through the front crush plate.

Refer to Part 9 (Engine) of this build log for the modification of the engine to accept this propeller.

Painting:

Airbrush the propeller with a grey primer, such as ‘AK Interactive’ Grey (AK758) or similar.

Airbrush the propeller with ‘Tamiya’ Dark Yellow (XF60).

NOTE: *Refer to **Method 2** in **Part 4 (Wood Effects)** of this build log for more information. I chose to use Windsor & Newton’ **Raw Sienna, Burnt Sienna** and **Burnt Umber** Griffin (Alkyd) oil paints.*

Brush the Burnt Sienna oil paint along the propeller blades and allow to fully dry.

Brush the Raw Sienna oil paint along the propeller blades.

While the Raw Sienna oil paint is still wet, brush the Burnt Sienna oil paint along the propeller blades, to create a mixed colour streaked effect.

Allow the oil paint to fully dry.

Seal and protect the painted propeller by airbrushing it with a semi-matte clear coat, such as ‘Tamiya’ Semi-Gloss (X35) or similar.

Brush paint the front and rear crush plates with ‘Mr. Metal Color’ Stainless Steel (213) or similar.

NOTE: *It was common to wrap linen around the tips of propeller blades to protect them from damage, as can be seen in the following photograph.*

Mask off the each blade to leave the blade tips only exposed.

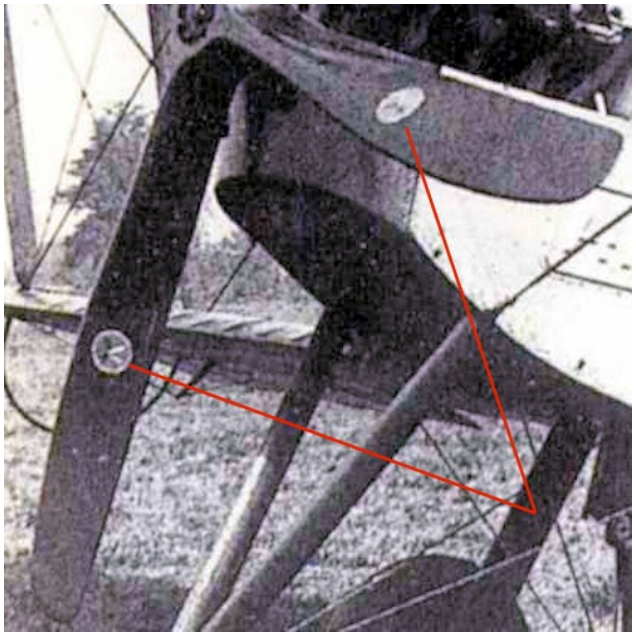
Airbrush the exposed blade tips with ‘Tamiya’ Sky Grey (XF19) or similar.

Remove the masking.

Brush ‘AK Interactive’ Kerosene wash over the front and rear crush plates.

Decals:

Note: *Photographs taken of this aircraft show that the propeller was manufactured by 'F. Tibbenham LTD' of Ipswich. The makers logo was located in the centre of each blade and was a hornet or wasp on a circular green background with yellow/gold border. The makers name of 'F. Tibbenham LTD' was located at the top of the border and 'Ipswich' at the bottom, centre in the border. Thet text was written in black text.*



Decals for this logo are in the 'LF Models' British WW1 propeller labels - part III (3208). These decals are not 'cookie cut' so they need to be cut out from the backing sheet.

Carefully cut out four of the decals from the backing sheet.

NOTE: *If necessary, refer to Part 6 (Decals) of this build log for more information.*

With reference to the previous photograph, apply a decal to each of the four propeller blades, making sure the decals are located midway along the blades with the wings of the insect facing to the right, when the propeller is viewed from the front.

Surface finish:

Seal and protect the propeller by airbrushing it with a semi-matte clear coat, such as 'Tamiya' Semi-Gloss (X35) or similar.

PART 11
PREPARATION AND MODIFICATIONS

PART 11 - PREPARATION AND MODIFICATIONS

References:

'Windsock' data file No:13 - AW FK.3 Little Ack (J. M. Bruce).
'Flying Machines RU' - https://flyingmachines.ru
'MDesign' Instruction notes.

FUSELAGE PREPARATION

NOTE: *Refer to Part 7 (Resin) of this build log.*

Due to the fragility of resins used in 3D printing, printed parts should be handled with care, especially when drilling, sanding etc. In particular, care should be taken when removing parts from their support trees. Sharp nippers do to cut through the resin support trees. Alternatively, although an expensive option, is to use an ultrasonic blade cutter, but extreme care needs to be taken as the blade move extremely fast and will cut through flesh if care is not taken when in use.

Internal preparation:

NOTE: *The model part numbers are printed on the relevant parts and the parts required are shown on the illustrations in the kit instructions. The parts required are as follows:*

Fuselage halves 1 and 2.

Instrument panel 24.

Control column 17.

Hand wheel 20.

Cockpit cross bar 23.

Rudder bar 18.

Hand pump 25.

***Fuel tank 22 not used** - Not visible on completed model.*

***Observers seat 19 not used** - replaced by a 'BarracudaCast' British wicker seat (BR32233).*

***Pilot's seat 21 not used** - replaced by a 'BarracudaCast' British wicker seat (BR32233) that has more realistic seat wicker.*

Carefully remove the 3D printed parts from their support trees.

Carefully sand away any residual tree stubs from the edges of the parts.

Internal modifications:

Pilot's seat:

NOTE: *The pilot's seat (21) was not used and replaced by a resin cast 'BarracudaCast' British wicker seat (BR32233), which has a more realistic seat wicker effect. Seat supports need to be added to the replacement seat to fit into the fuselage sides.*

Cut the resin cast block from the base of the seat.

File or sand the underside of the seat to smooth and flatten the surface.

Cut two 17 mm lengths of 1.5 mm diameter tube or rod, such as from 'Albion Alloy's' or similar.

Position the kit and replacement seats next to each other and mark the underside of the replacement seat the position of the two seat support members ion the kit seat.

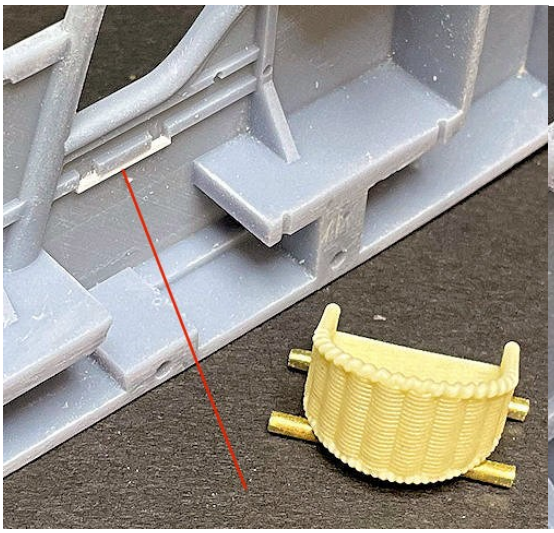
Using the marks as guides, scribe parallel lines across the underside of the seat and aligned with the front edge of the seat.

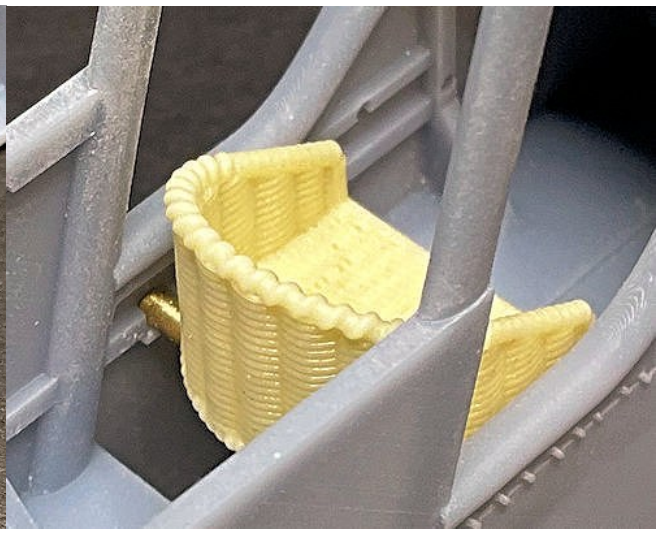
Using the lines as guides, file two grooves into the underside of the seat using a round needle file.

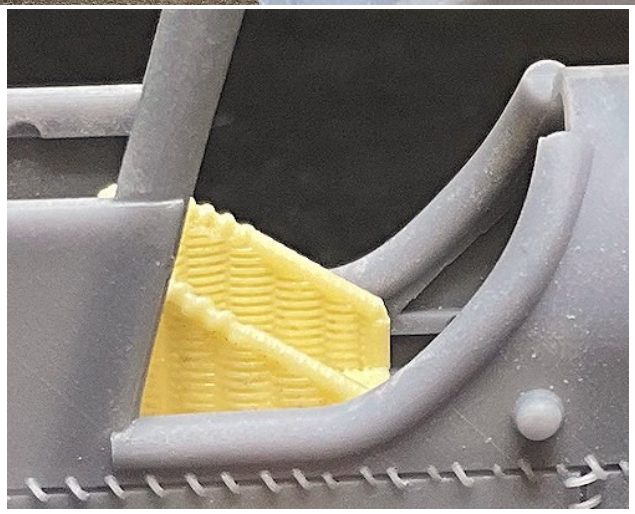
Using thin CA adhesive, secure the two tube/rods centrally into the grooves.

Using thin CA adhesive, secure a thin strip of plastic card or similar across the underside of the seat support locating recesses in the fuselage sides. These will keep the seat supports correctly located when being fitted.

Test fit the seat between the joined fuselage halves, making sure they join together with no gaps.





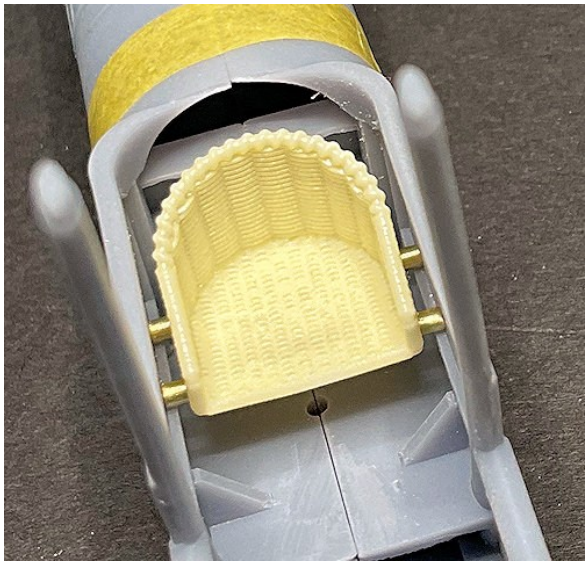


<u>Observers seat:</u>

<u>NOTE:</u> *The observers seat (19) was not used and replaced by a resin cast 'BarracudaCast' British wicker seat (BR32233). This was because as a trainer, not an operational aircraft, the student pilot in the rear cockpit would be seated as for the pilot instructor in the front cockpit.*

Two slots were cut out of the seat supports shoulders in the rear cockpit of the fuselage halves. The slots were cut to match the added supports.

Repeat the previous procedure to create the replacement seat for the rear cockpit.



Pilot's rudder bar:

NOTE: *Refer to Part 8 (Rigging) of this build log for more information. The following steps are preparation for the rigging the pilot's flight control cables later in this build.*

Drill a hole of 0.5 mm diameter vertically through the centre of the pilot's rudder bar.

Cut a short length of 0.5 mm diameter Brass rod, such as that from 'Albion Alloy's' or similar.

Using thin CA adhesive, secure the rod into the pre-drilled hole in the rudder bar.

Drill a hole of 0.3 mm diameter centrally into the end of the two rudder bar inner extensions.

NOTE: *The turnbuckles used are the 'Gaspatch' metal 1/48th scale turnbuckles (Type A).*

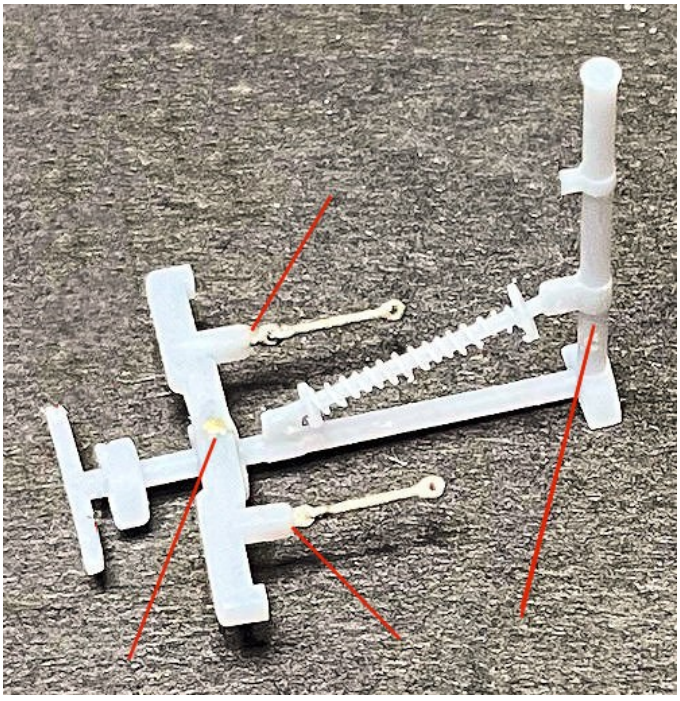
Using thin CA adhesive, secure the 'legs' of two turnbuckles into the pre-drilled holes in the rudder bar.

Pilot's control column:

NOTE: *As a trainer aircraft I assumed that no weapons were fitted, so what looks to be a **gun trigger lever** on the control column was **removed**. The following steps are required for rigging flight controls later in this build.*

Drill a hole of 0.3 mm diameter horizontally through the centre of the control column just below the clamp (refer to the following photograph).

Using thin CA adhesive, secure the rod of the rudder bar into the pre-drilled hole in the control column torque tube.



NOTE: *The following steps are to provide positive locating of the control column into the cockpit floor.*

Drill a hole of 0.3 mm diameter centrally up into the underside of the control column base and the curved clamp in front of the rudder bar.

Cut two short lengths of 0.3 mm diameter Brass rod, such as that from 'Albion Alloy's or similar.

Secure the rods into the previously pre-drilled holes.

Rear cockpit flight controls:

NOTE: *Refer to Part 8 (Rigging) of this build log for more information. As a trainer aircraft, the rear cockpit requires a duplicate control column and rudder bar for flight training. To add duplicate controls in the rear cockpit can't be done if the fuel tank is installed under the pilot's seat, as a false cockpit floor is required to span across both cockpits.*

False floor:

Cut a rectangle of 0.8 mm thick plastic card, 53 mm long and 17 mm wide.

Position the card against the inner side of the fuselage right half.

Mark the position of the two side webs, base of the rear cabane strut and the rear corner piece.

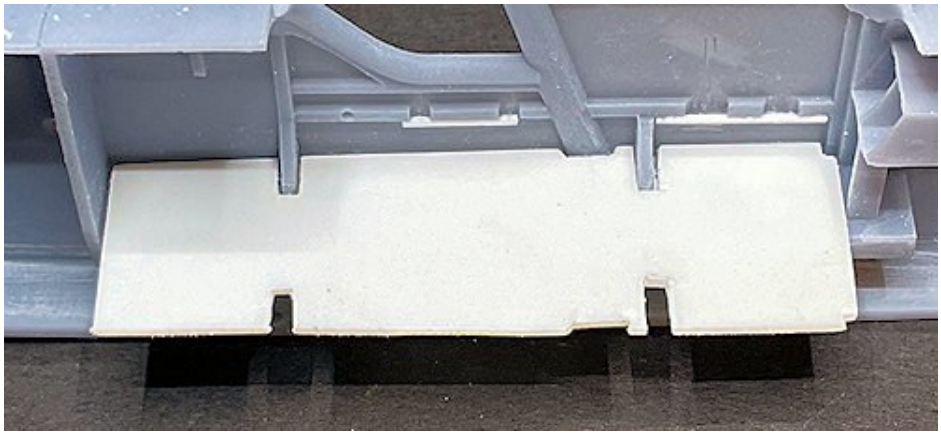
Using the marks as guides, cut out those areas to allow the card to fully contact the fuselage inner side.

Mark the opposite side of the card with the same cut-out areas.

Using the marks as guides, cut out those areas to allow the card to fully contact the inner side of the fuselage left half.

Test fit the card across the cockpit floors with the fuselage halves temporarily joined.

Using thin CA adhesive, secure the false floor fully onto the cockpit floors and against the inner side of the fuselage right half.



Rear control column:

NOTE: *Refer to Part 8 (Rigging) of this build log for more information. As a trainer aircraft, the rear cockpit requires a duplicate control column for flight training. To represent the control column in the rear cockpit, I used a 3D printed part from a previous build that was not required.*

I drilled a hole of 0.2 mm diameter horizontally (front to rear) through the control column at the same location as the hole drilled in the pilot's control column. This is for rigging the upper elevator control cable later in this build.

I extended the length of the bottom torque tube by attaching a length of 1.1 mm diameter Brass tube from 'Albion Alloy's' (MBT11), using thin CA adhesive.

NOTE: *The following steps are to provide positive locating of the control column into the cockpit floor.*

Drill a hole of 0.3 mm diameter centrally up into the underside of the control column base.

Cut a short length of 0.3 mm diameter Brass rod, such as that from 'Albion Alloy's or similar.

Secure the rod into the previously pre-drilled hole.

Control columns locations:

Using as guides the two pre-molded control column locations in the underside of the printed floor for the pilots cockpit, drill hole of 0.3 mm diameter vertically up through the added false floor.

Temporarily locate the rear cockpit seat into its recesses in the fuselage right half.

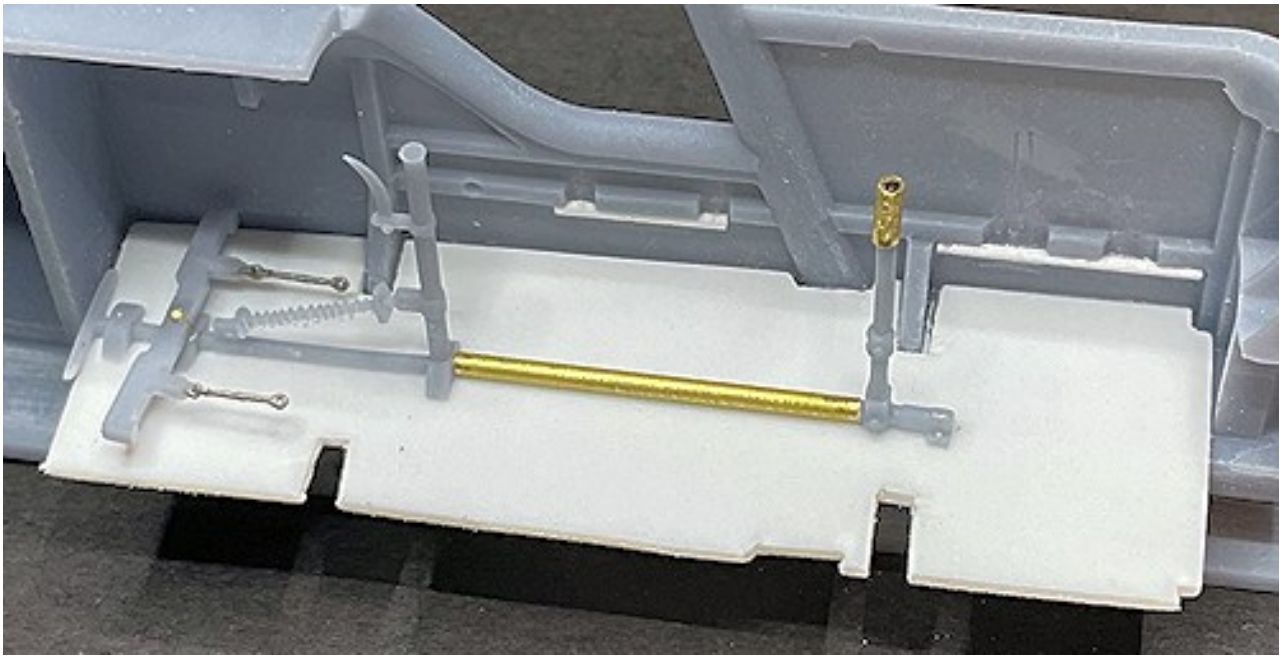
Mark the position of the base for the rear control column onto the added false floor.

Using the mark as a guide, drill a hole of 0.3 mm diameter vertically through the added false floor.

Remove the two seats.

Fit the added rods in the pilot's control column assembly fully into the previously drilled locating holes in the false floor of the pilot's cockpit.

Cut the added Brass tube on the rear control column such that when its fitted into its previously drill locating hole in the false floor, the front end of the tube contacts the rear of the pilots control column.

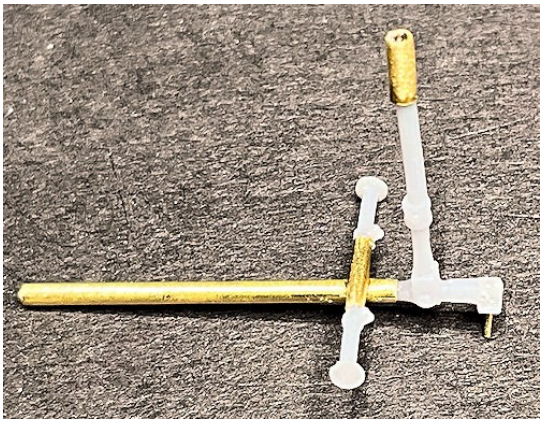


Rear rudder bar:

NOTE: *Refer to Part 8 (Rigging) of this build log for more information. As a trainer aircraft, the rear cockpit requires a duplicate rudder bar for flight training. To represent the rudder bar in the rear cockpit, I used a 3D printed parts from a previous build that was not required, and 1.1 mm diameter Brass tube.*

Using a round needle file, file a shallow recess across the top of the bottom torque tube, approximately 3 mm forward from the base of the control column.

Using thin CA adhesive, secure the rudder bar centrally onto the recess and at 90 degrees to the control column when viewed from the front or rear.



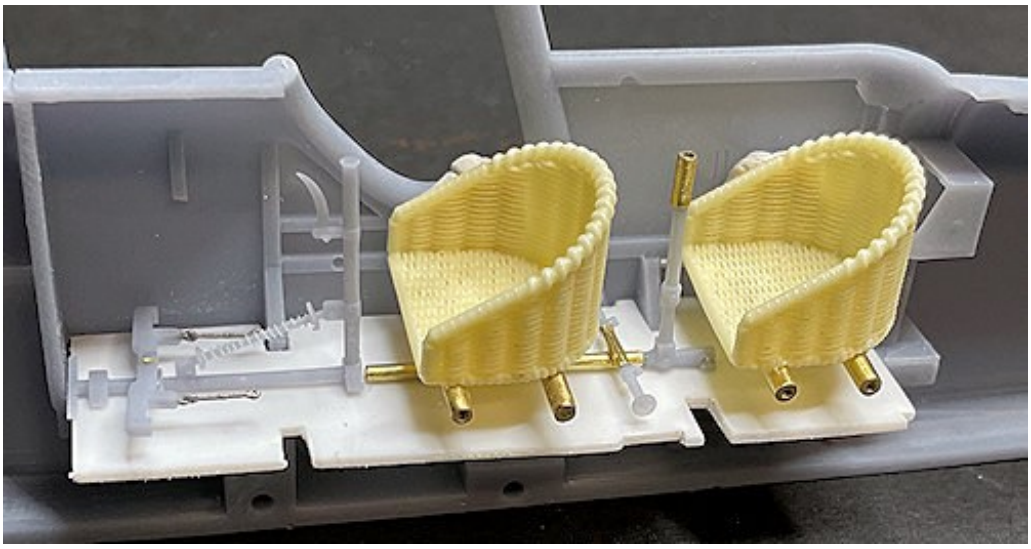
Temporarily test fit the various cockpit parts as follows:

Pilot's control column assembly onto the false floor for the front cockpit.

Rear cockpit control column assembly onto the false floor for the rear cockpit.

Pilot's seat into its locating recesses in the fuselage right half.

Rear cockpit seat into its locating recesses in the fuselage right half.

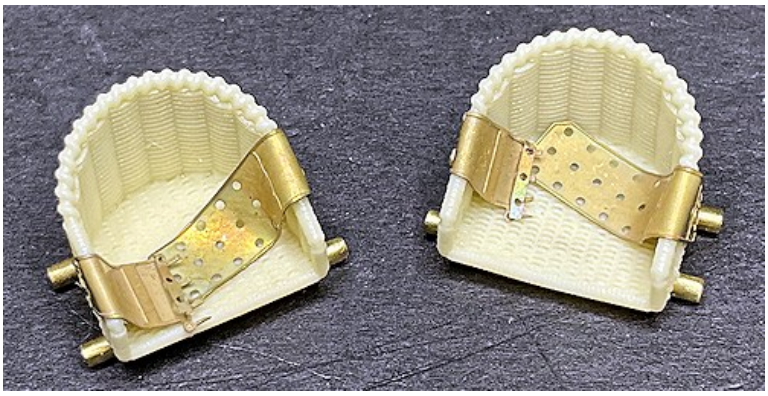


Seat lap straps:

NOTE: *The kit does not supply lap straps for either seat. Therefore, I used spare photo-etch lap straps not used in previous builds.*

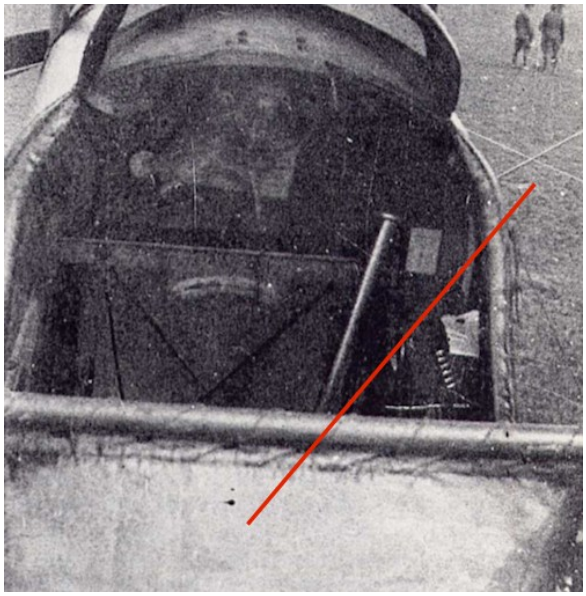
To anneal (soften) the photo-etch lap straps they were heated over a flame, keeping them moving until the colour changed to a light grey.

The lap straps were then formed over the resin seats to create a natural look.



Cockpit screen:

NOTE: *A linen screen was fitted to the cockpit cross bar (kit part 23) behind the pilot's seat, presumably to reduce the air flow into the rear cockpit during flight. As duplicate flight controls are fitted, I assumed that the screen did not go down to the cockpit floor, but left room at the bottom for the students legs to reach the rudder bar for the rear cockpit.*



A 14 mm x 9 mm piece of 0.2 mm thick plastic card was cut.

NOTE: *The cockpit cross bar locates into recesses in the top frames of the fuselage sides.*

The plastic card (14 mm side) was laid centrally against the cockpit cross bar and secure in place using thin CA adhesive.

A length of 1.2 mm diameter Brass tube, such as 'Albion Alloy's' MBT12 or similar, was cut to the same length as the cockpit cross bar.

Using thin CA adhesive, the Brass tube was secured centrally onto the opposite edge of the plastic card.

The fuselage halves were temporarily joined together and the screen positioned with the ends of the cockpit cross bar located into its two fuselage recesses. The lower cross bar should rest on the top of the lower fuselage frames.

EXTERNAL PREPARATION

NOTE: *Refer to Part 7 (Resin) of this build log.*

Due to the fragility of resins used in 3D printing, printed parts should be handled with care, especially when drilling, sanding etc. In particular, care should be taken when removing parts from their support trees. Sharp nippers do to cut through the resin support trees. Alternatively, although an expensive option, is to use an ultrasonic blade cutter, but extreme care needs to be taken as the blade move extremely fast and will cut through flesh if care is not taken when in use.

External - preparation:

NOTE: *The model part numbers are printed on the relevant parts and the remaining parts required are shown on the illustrations in the kit instructions. The parts required are as follows:*

Engine cover panel 29.
Upper wing centre section 14.
Tailplanes 15 and 16.
Tail skid 26.
Lower wings 3 and 4.
Elevators 11 and 12.
Rudder 13.
Landing gear 27.
Inner interplane struts 36 (x 4).
Outer interplane struts 37 (x 4).
Upper wing outer sections 5 and 6.
Upper wing ailerons 7 and 8.

Lower wing ailerons 9 and 10.
Wheels 28 (x 2).
Lower wing hoops 35 (x 2).
Centre bomb rack 33.
Outer bomb racks 34 (x 2).

Carefully remove the 3D printed parts from their support trees.

Carefully sand away any residual tree stubs from the edges of the parts.

Vac-formed windscreen:

NOTE: *The pilot's windscreen is supplied as a vac-formed parts and will need to be carefully cut out from the mold. This will be carried out later in this build.*

External - modifications:

Upper wing (5, 6 and 14):

Make sure the kit supplied metal support rods can be passed through their holes in the wing outer and centre sections of the wing.

Pass the two rods through their holes in one wing outer section, making sure the ends do not protrude from the holes in the wing tip.

Apply thin CA adhesive to the holes in the wing tip and wing root, to secure the rods in the wing.

Slide the centre section onto the two rods and against the wing root.

Make sure the centre section fully contacts the wing root, leaving no obvious gaps.

Secure the centre section to the wing root and support rods using thin CA adhesive.

Slide the opposite wing outer section onto the two support rods and against the centre section.

Make sure the wing outer section fully contacts the centre section, leaving no obvious gaps.

Cut away any support rod ends that protrude from the holes in the wing tip.

Secure the wing outer section to the centre section and support rods using thin CA adhesive.

Fill the support rods holes in both wing tips using a modelling filler or similar. I used UV clear resin as a filler.

File or sand away residual filler to blend the filled holes with the surrounding surfaces.

Upper ailerons (7 and 8):

NOTE: *The following steps are only necessary if the ailerons are to be angled up/down and not aligned to the wing. From this point in the build, make sure to keep the ailerons matched to the upper wing.*

Position an aileron in its cut-out in the upper wing.

Pencil mark three (3) positions across the wing trailing and aileron leading edge.

Using the marks as guides, point mark the centre of the wing trailing and aileron leading edges.

Using the point marks as guides, drill holes of 0.6 mm diameter into the wing trailing and aileron leading edges, keeping the drill centred as you drill the holes.

Cut three (3) lengths of 0.5 mm diameter Brass rod, such as that from 'Albion Alloy's' or similar.

Secure the rods into the pre-drilled holes in the wing trailing edge, using thin CA adhesive.

Fully locate the aileron onto the rods in the upper wing.

Bend the aileron to be angled slightly up.

Repeat the procedure to add the aileron to the opposite side of the wing, making sure the aileron is bent to be angled slightly down.

Rib tapes:

NOTE: *The rib tapes on the underside of the upper wing and ailerons are too thick, especially the shorter, intermediate rib tapes at the leading edge.*

Sand away the rib tapes on the underside of the upper wing and ailerons, leaving just a witness mark where they were.

Lower wings (3 and 4):

Temporarily join the two fuselage halves.

Make sure the kit supplied metal support rods can be passed through their holes in the lower wings and fuselage.

Pass the two rods through their holes in one lower wing, making sure the ends do not protrude from the holes in the wing tip.

Apply thin CA adhesive to the holes in the wing tip and wing root, to secure the rods in the wing.

Pass the two rods through their holes in the fuselage.

Make sure the lower wing fully contacts the fuselage, leaving no obvious gaps.

Slide the opposite lower wing onto the two support rods and against the fuselage.

Make sure the lower wing fully contacts the fuselage, leaving no obvious gaps.

Cut away any support rod ends that protrude from the holes in that wing tip.

Remove the wings from the fuselage.

Fill the support rods holes in both lower wing tips using a modelling filler or similar. I used UV clear resin as a filler.

File or sand away residual filler to blend the filled holes with the surrounding surfaces.

Lower ailerons (9 and 10):

NOTE: *The following steps are only necessary if the ailerons are to be angled up/down and not aligned to the wings. From this point in the build, make sure to keep the ailerons matched to the lower wings.*

To attach the lower wing ailerons, repeat the procedure used for the upper wing ailerons, making sure the two left and two right ailerons are angled to match those on the upper wing.

Rib tapes:

NOTE: *The rib tapes on the underside of the lower wing and ailerons are too thick, especially the shorter, intermediate rib tapes at the leading edge.*

Sand away the rib tapes on the underside of the lower wing and ailerons, leaving just a witness mark where they were.

Tailplanes (15 and 16):

Temporarily join the two fuselage halves.

Make sure the kit supplied metal support rods can be passed through their holes in the tailplanes and the fuselage.

Pass the two rods through their holes in one tailplane, making sure the ends do not protrude from the holes at the tailplane tip.

Apply thin CA adhesive to the holes in the tailplane tip and at the opposite end, to secure the rods in the tailplane.

Pass the two rods through their holes in the rear of the fuselage.

Make sure the tailplane contacts the fuselage, leaving no obvious gaps.

Slide the opposite tailplane onto the two support rods and against the fuselage.

Make sure the tailplane fully contacts the fuselage, leaving no obvious gaps.

Cut away any support rod ends that protrude from the holes at the tip of that tailplane.

Remove the tailplane from the fuselage.

Fill the support rods holes in both tailplane tips using a modelling filler or similar. I used UV clear resin as a filler.

File or sand away residual filler to blend the filled holes with the surrounding surfaces.

Elevators (11 and 12):

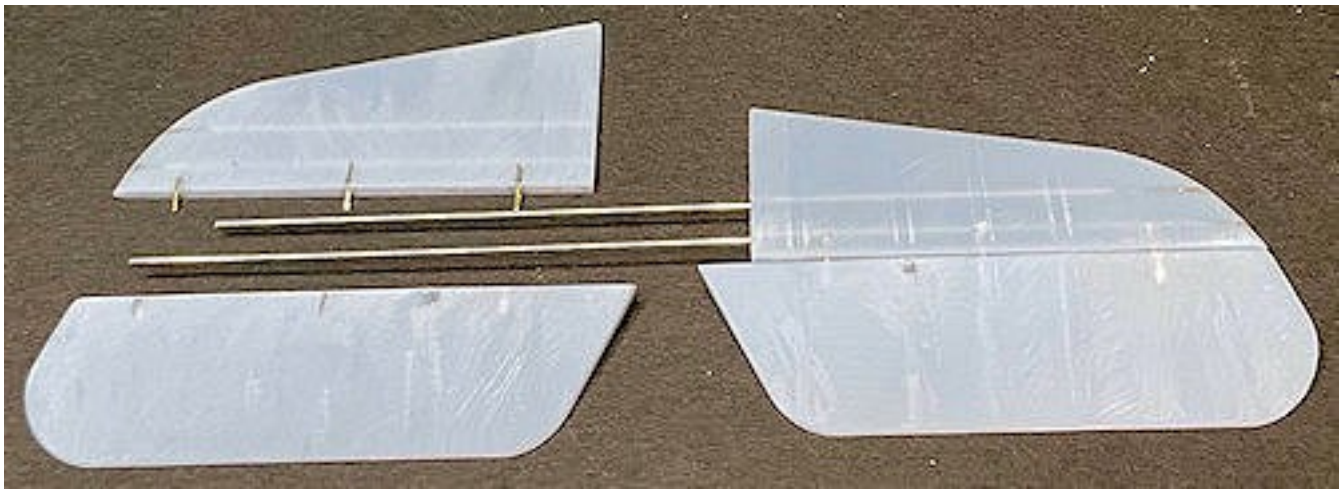
NOTE: *The following steps are only necessary if the elevators are to be angled down and not aligned to the tailplanes. From this point in the build, make sure to keep the elevators matched to their tailplane.*

To attach the elevators, repeat the procedure used for the upper or lower wing ailerons, making sure the two elevators are angled down the same.

Rib tapes:

NOTE: *The rib tapes on the tailplanes and elevators are too thick.*

Sand away the rib tapes on the upper surface and underside of the tailplanes and elevators, leaving just a witness mark where they were.



Rudder:

NOTE: *The rudder will be pinned to the fin only after the fuselage halves have been joined.*

Aileron control horns:

NOTE: *The aileron control horns have been printed on the ailerons such that when the ailerons are fitted to the wings, the control horns are directly behind the outer interplane struts. This means the struts will obstruct the aileron control cables when they are added to the wings.*

Cut off the control horns, at the base, from the ailerons.

Drill a hole of 0.3 mm diameter into, **but not through**, the ailerons, 2.5 mm inboard from where the control horns were located.

File or sand away from the ailerons the residual stub from the control horns.

Drill a hole of 0.3 mm diameter centrally up into the control horns at the cut end.

Cut four short lengths of 0.3 mm Brass rod, such as that from 'Albion Alloy's' or similar.

Using thin CA adhesive, secure the rods fully into the drilled holes in the control horns.

NOTE: *In the following step, make sure the control horns are located on the correct side of the ailerons. Top of the upper wing ailerons and underside of the lower wing ailerons.*

Using thin CA adhesive, secure the control horns into the holes drilled in the ailerons.

Rigging points:

NOTE: ***Refer to Part 7 (Resin) of this build log.***

Due to the fragility of resins used in 3D printing, printed parts should be handled with care, especially when drilling, sanding etc. In particular, care should be taken when removing parts from their support trees.

Refer to Part 8 (Rigging) of this build log for rigging information.

Rudder:

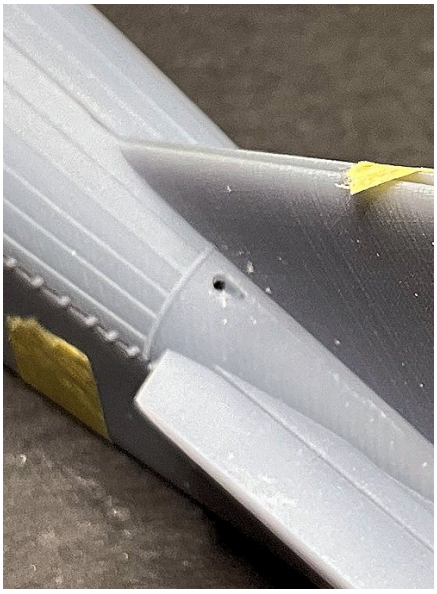
NOTE: *Refer to the following photographs.*

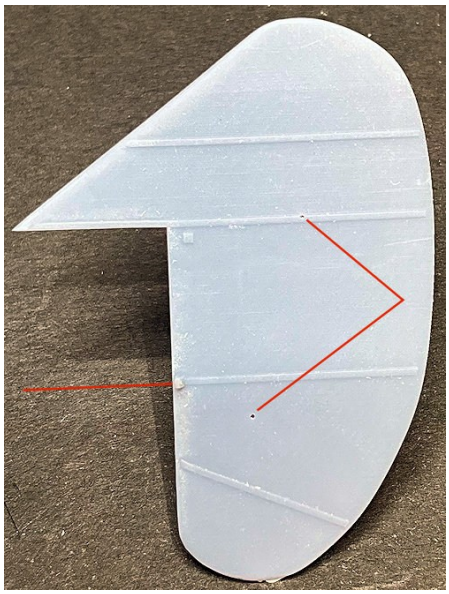
Drill a hole of 0.6 mm diameter into, **but not through**, both sides of the fuselage.

Cut a slight rearward trough at the holes for the rigging lines.

Drill two holes of 0.4 mm diameter through the rudder.

Drill a hole of 0.3 mm diameter through the two rudder control horns. Drill the holes centrally and front to rear.





Elevators:

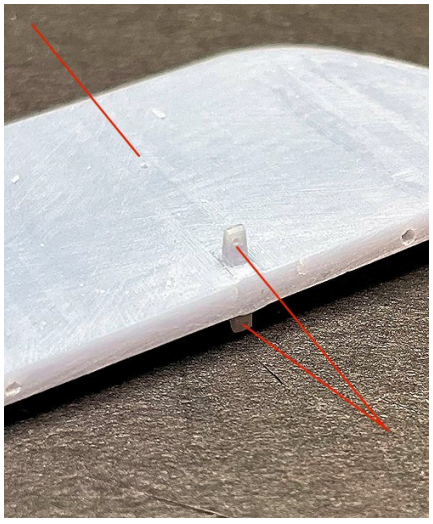
NOTE: *Refer to the following photographs.*

Drill two holes of 0.6 mm diameter through both sides of the fuselage at the pre-molded location recesses. The holes should be drilled angled slightly rearwards.

Cut a slight rearward trough at the holes for the rigging lines.

Drill a hole of 0.4 mm diameter through both elevators midway between the control horns and trailing edge of the elevators.

Drill a hole of 0.3 mm diameter through the top and underside elevator control horns. Drill the holes centrally and front to rear.



Ailerons control:

NOTE: *Refer to the following photographs.*

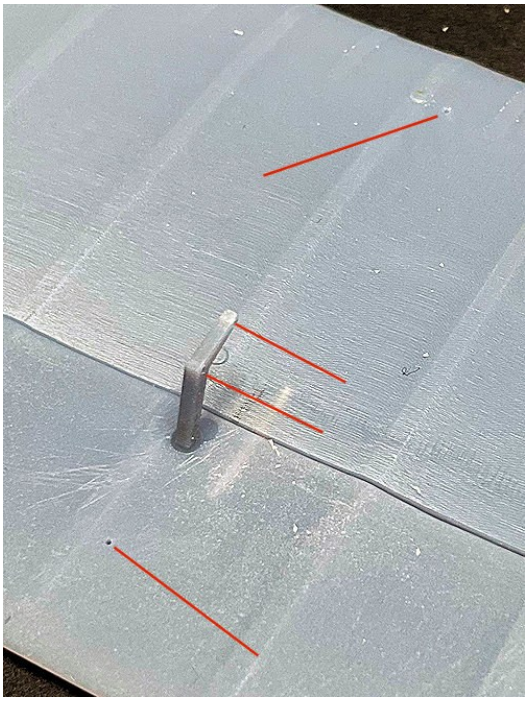
Upper wing:

Drill holes of 0.3 mm diameter:

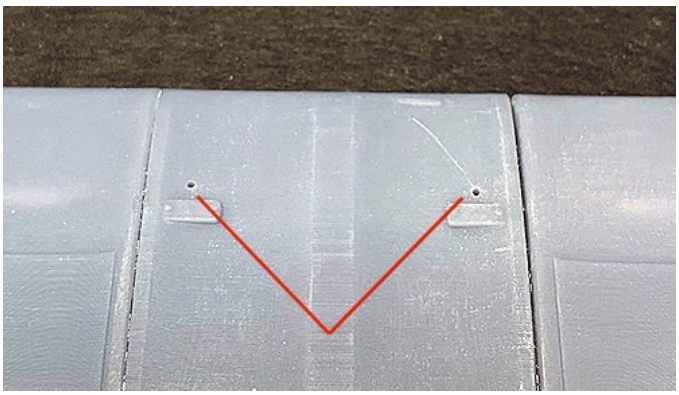
Through both ailerons (x 1).

Through both aileron control horns (x 2).

Into, **but not through**, the top surface of the upper wing (x 2).

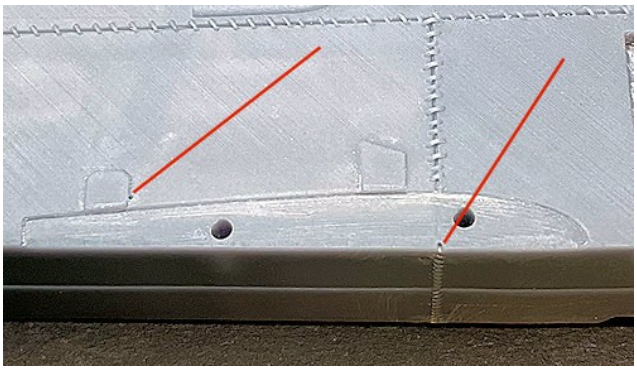


Drill two holes of 0.3 mm diameter into, **but not through**, the top surface of the upper wing centre section.



Fuselage:

Drill a hole of 0.3 mm diameter at an upward angle through both sides of the fuselage, at the bottom edge of the fuselage at the fuselage stitching.



Lower wings:

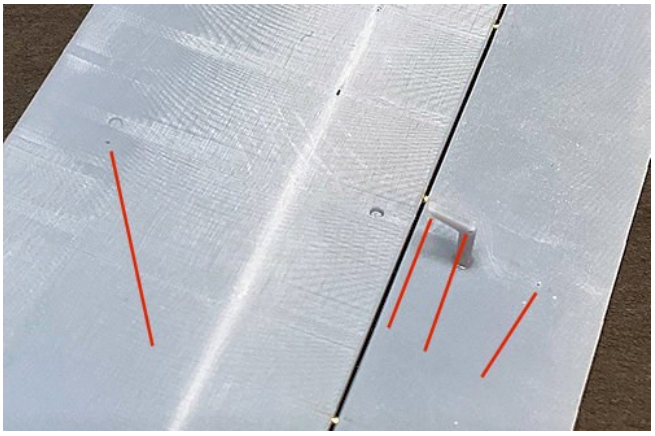
Drill holes of 0.3 mm diameter:

Through both ailerons (x 1).

Through both aileron control horns (x 2).

Into, **but not through**, the underside of both lower wings towards the leading edge (x 2).

NOTE: ***Drill a second hole*** *between the hole as shown in the underside of the lower wing and the wing root.*

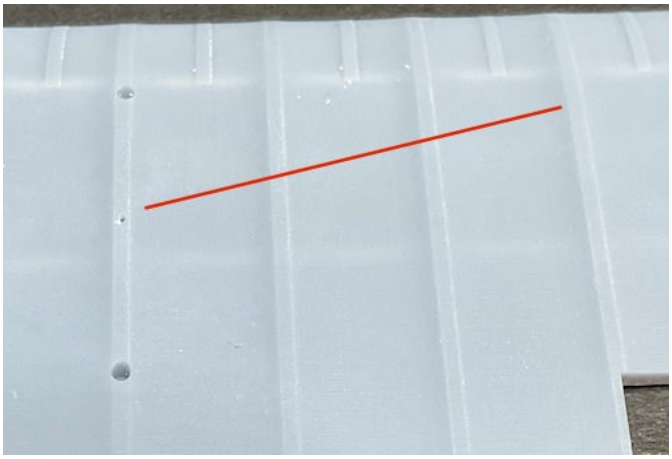


Rear cockpit aileron control cables:

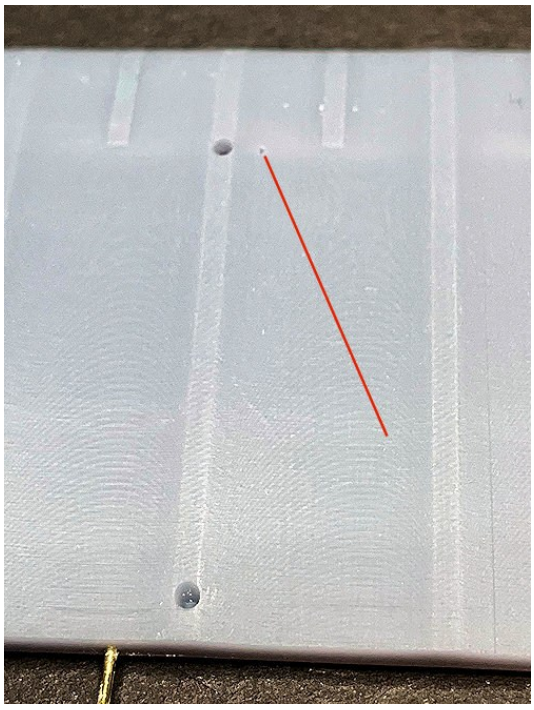
NOTE: *Refer to the following photographs.*

Lower wings:

Drill a hole of 0.3 mm diameter into, **but not through**, the top surface of both lower wings, midway between the locating recesses for the inner interplane struts (x 1).

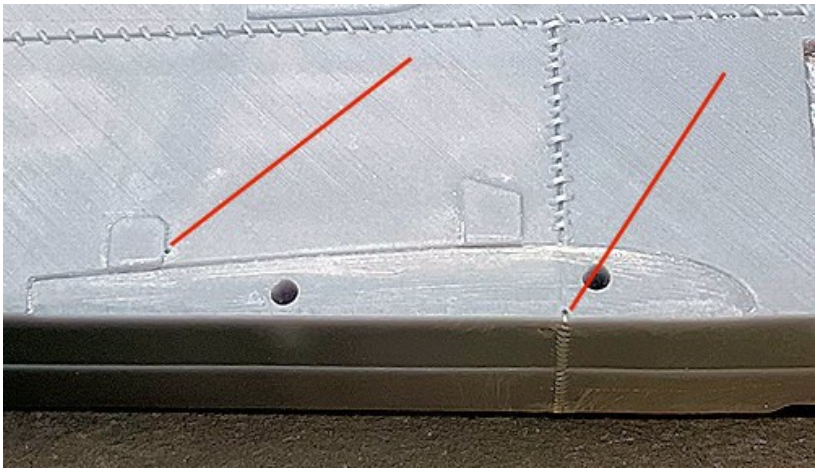


Drill a hole of 0.3 mm diameter into, **but not through**, the top surface of both lower wings, inboard from the forward, outer inner interplane struts (x 1).



Fuselage:

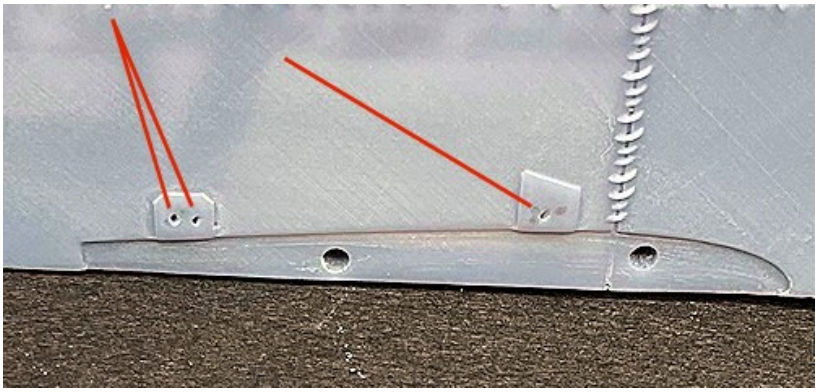
Drill holes of 0.3 mm diameter through both sides of the fuselage at the lower, front of the rear plate.



Flying wires:

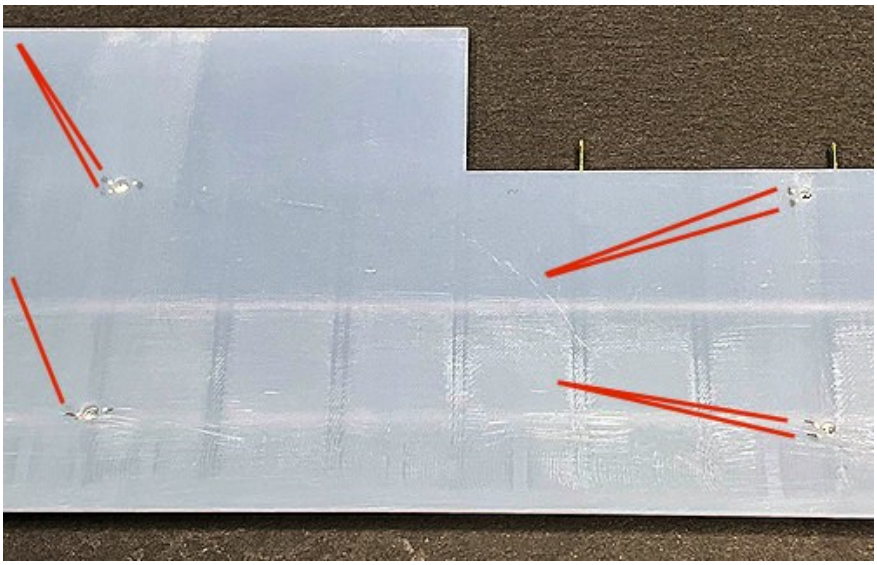
NOTE: *Refer to the following photographs.*

Drill holes of 0.4 mm diameter through both sides of the fuselage at the rear and forward plates. Drill the holes at 45 degrees from the fuselage sides and angled slightly forward.

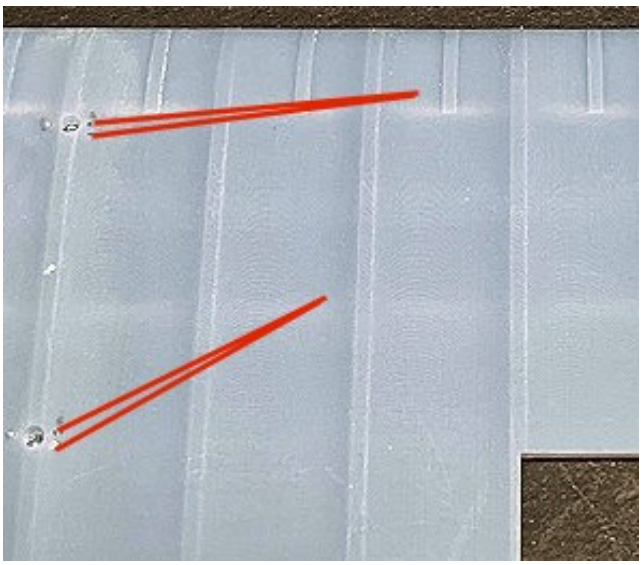


Drill a pair of holes of 0.3 mm diameter into, **but not through**, the undersides of the upper wing inboard from the inner rear interplane struts and inboard from the two outer interplane struts.

Drill a hole of 0.3 mm diameter into, **but not through**, the undersides of the upper wing inboard from the forward, inner interplane struts.



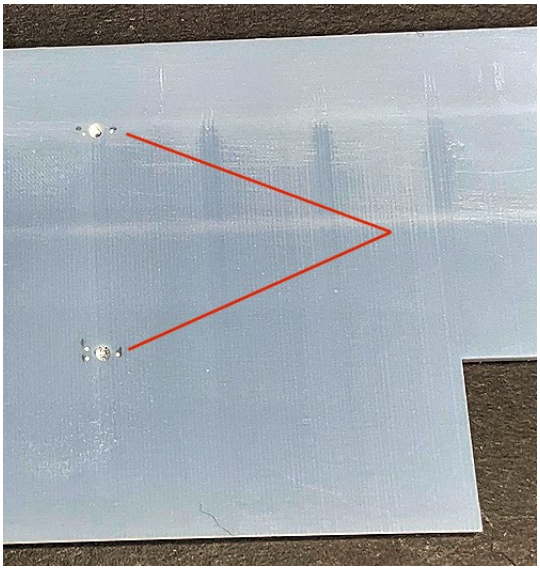
Drill a pair of holes of 0.4 mm diameter into, **but not through**, the top surface of the lower wings, outboard from the inner rear interplane struts. Angle the holes to the top of the outboard interplane struts (when fitted).



Landing wires:

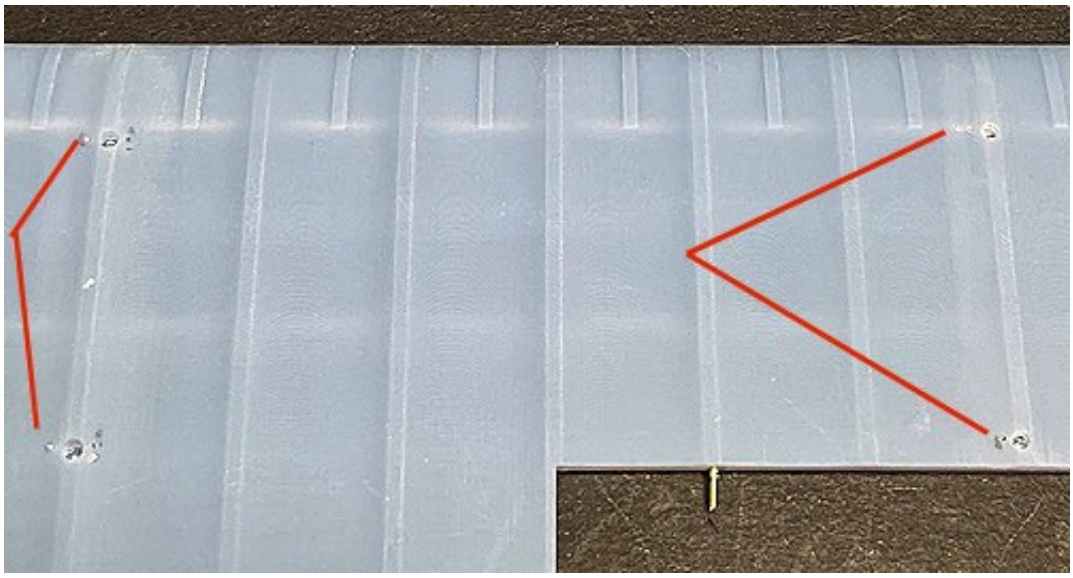
NOTE: *Refer to the following photographs.*

Drill holes of 0.3 mm diameter into, **but not through**, the underside of the upper wing, outboard from the inner interplane struts. Angle the holes to the bottom of the outboard interplane struts (when fitted).



Drill holes of 0.3 mm diameter into, **but not through**, the underside of the upper wing centre section.

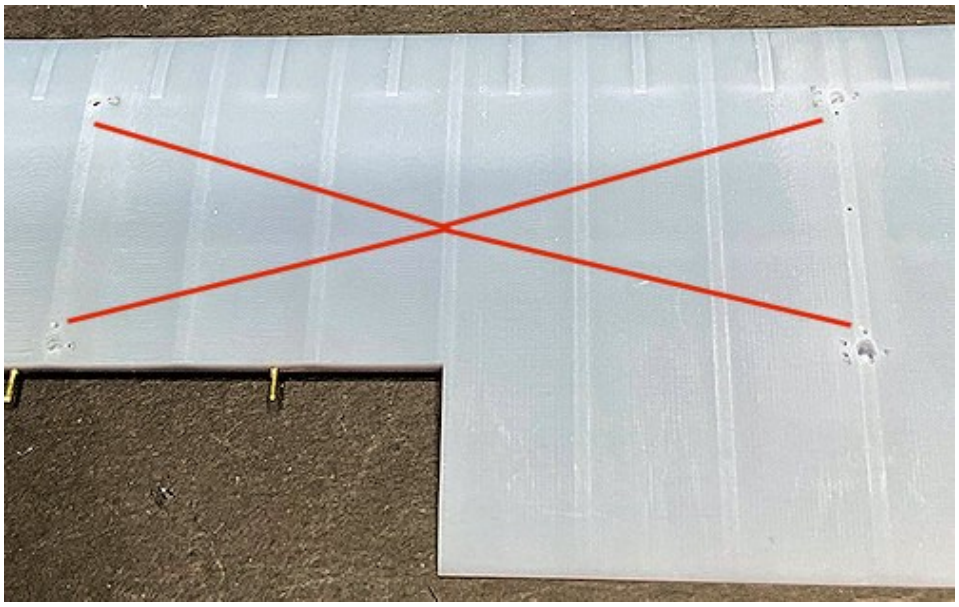
Drill holes of 0.4 mm diameter into, **but not through**, the top surface of the lower wings, inboard from the inner and outer interplane struts. Angle the holes to the tops of the fuselage cabane struts and inner interplane struts (when fitted).



Incidence wires:

Drill holes of 0.3 mm diameter into, **but not through**, the underside of the upper wing forward from the location recesses for the rear interplane struts and rear of the forward interplane struts.

Drill holes of 0.4 mm diameter into the top surface of the lower wings, forward from the location recesses for the rear interplane struts and rear of the forward interplane struts. Angle the holes to the top of the interplane struts (when fitted).

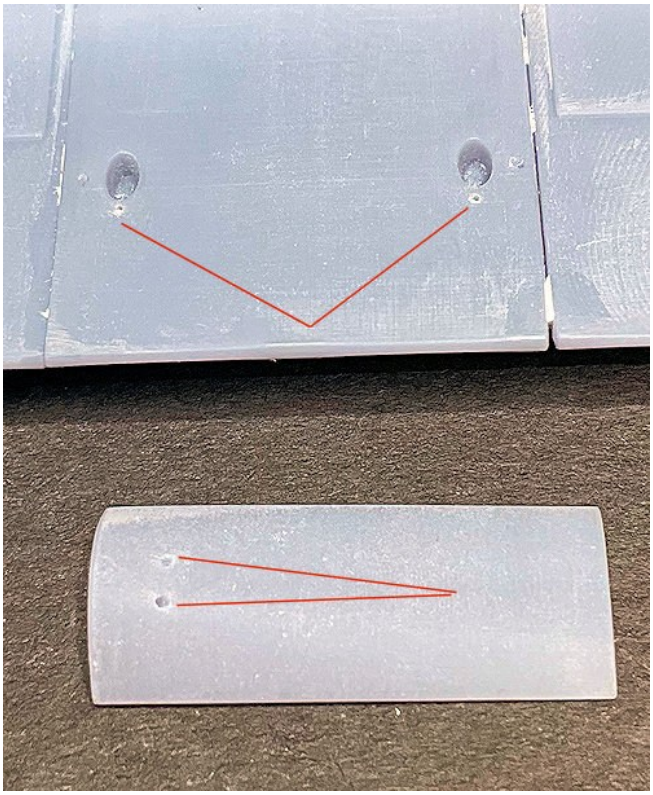


Drag wires:

NOTE: *Refer to the following photographs.*

Drill holes of 0.3 mm diameter into, **but not through**, the underside of the upper wing centre section, forward from the front cabane strut locating recesses.

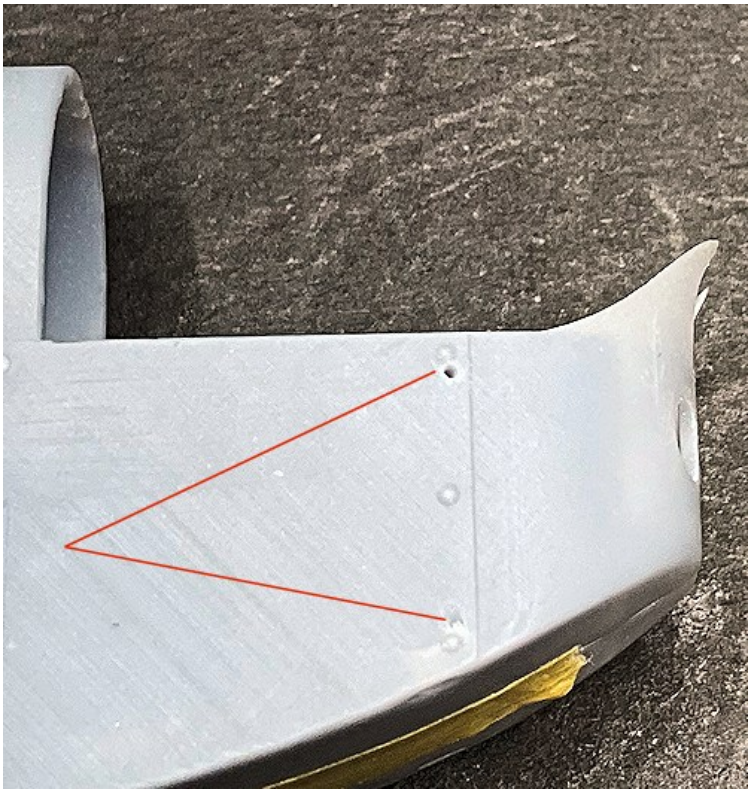
Drill holes of 0.4 mm diameter through the top, front of the engine top cover panel. Angle the holes to the top of the front cabane struts (when the cover is fitted).



Drill holes of 0.3 mm diameter into, **but not through**, the underside of the upper wing, forward from the front, inner interplane strut.

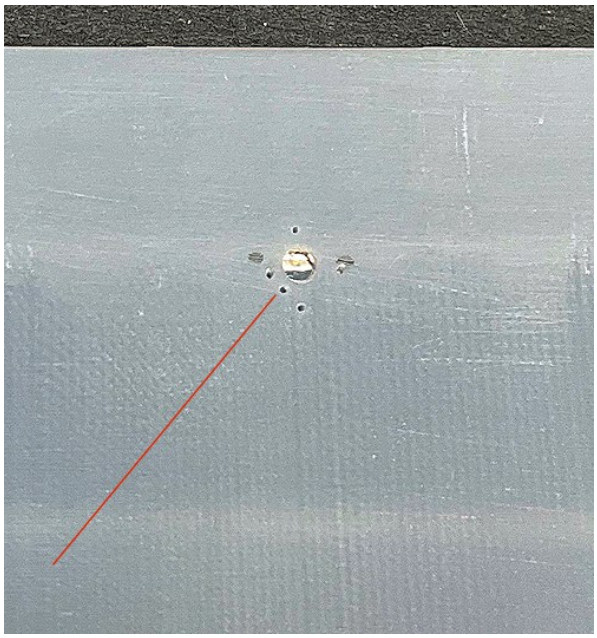
Drill holes of 0.3 mm diameter into, **but not through**, the top surface of the lower wings, forward from the front, inner interplane strut.

Drill holes of 0.3 mm diameter through the forward sides of the fuselage engine bay area.

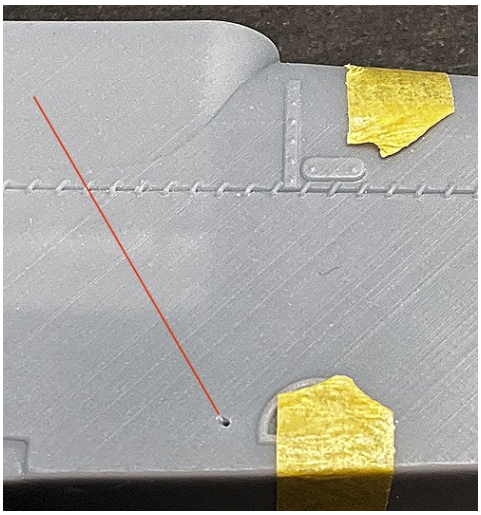


Anti-drag wires:

NOTE: *Refer to the following photographs.*



Drill holes of 0.3 mm diameter into, **but not through**, the underside of the upper wing at the forward, inner interplane strut.

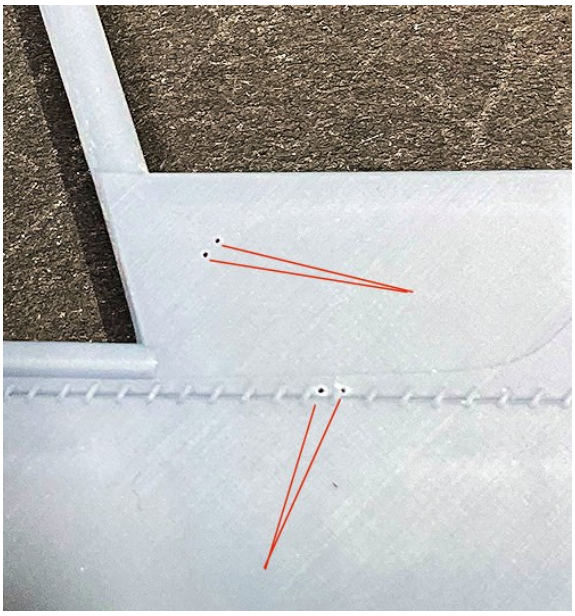


Drill holes of 0.3 mm diameter through the lower sides of the fuselage.

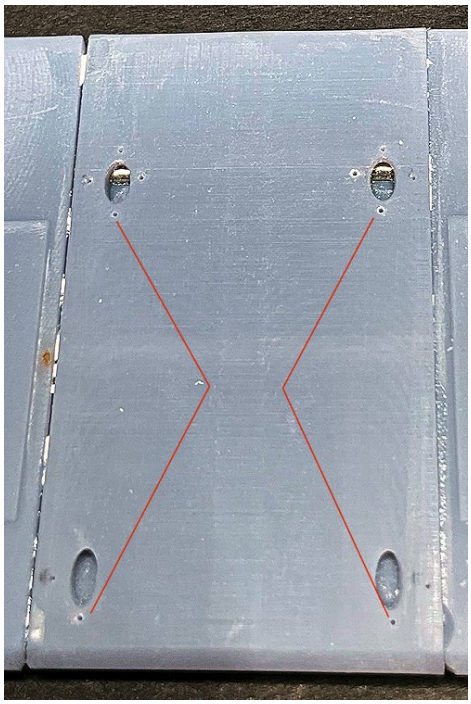
Cabane strut bracing wires:

NOTE: *Refer to the following photographs.*

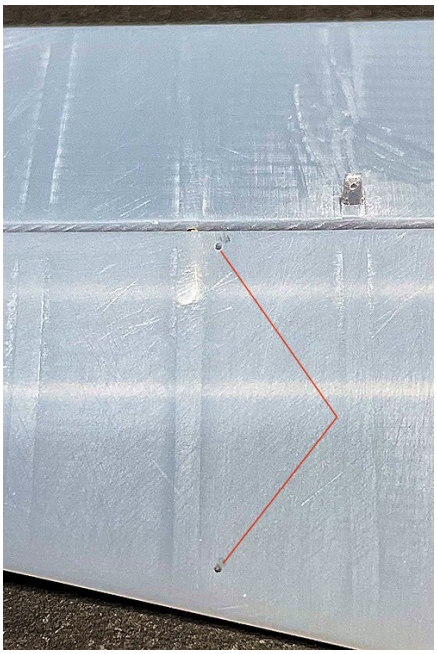
Drill two pairs of holes of 0.3 mm diameter through the sides of the fuselage.



Drill holes of 0.3 mm diameter into, **but not through**, the underside of the upper wing centre section.



Drill holes of 0.4 mm diameter through the top of the fuselage and aligned to the top, centre of the forward cabane struts.



Fin bracing wires:

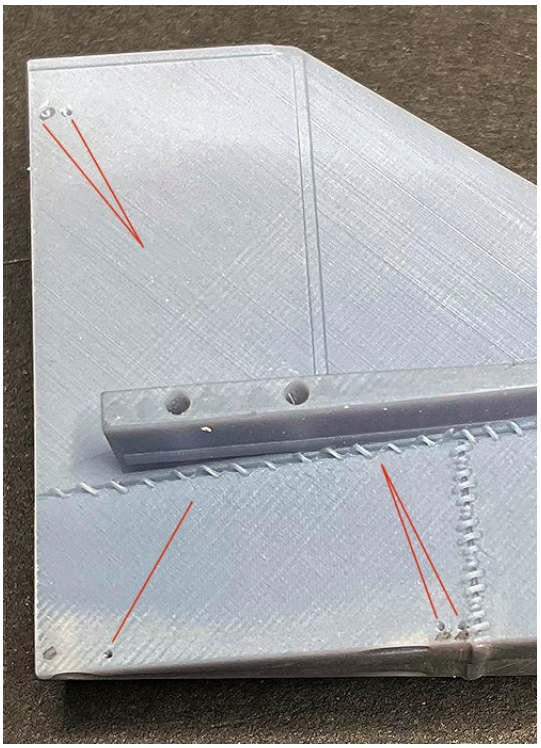
NOTE: *Refer to the following photographs.*

Drill two holes of 0.4 mm diameter through the tailplane leading and trailing edges.

Drill two holes of 0.4 mm diameter through the top, rear of the fin.

Drill a hole of 0.4 mm diameter through the bottom, rear of the fuselage.

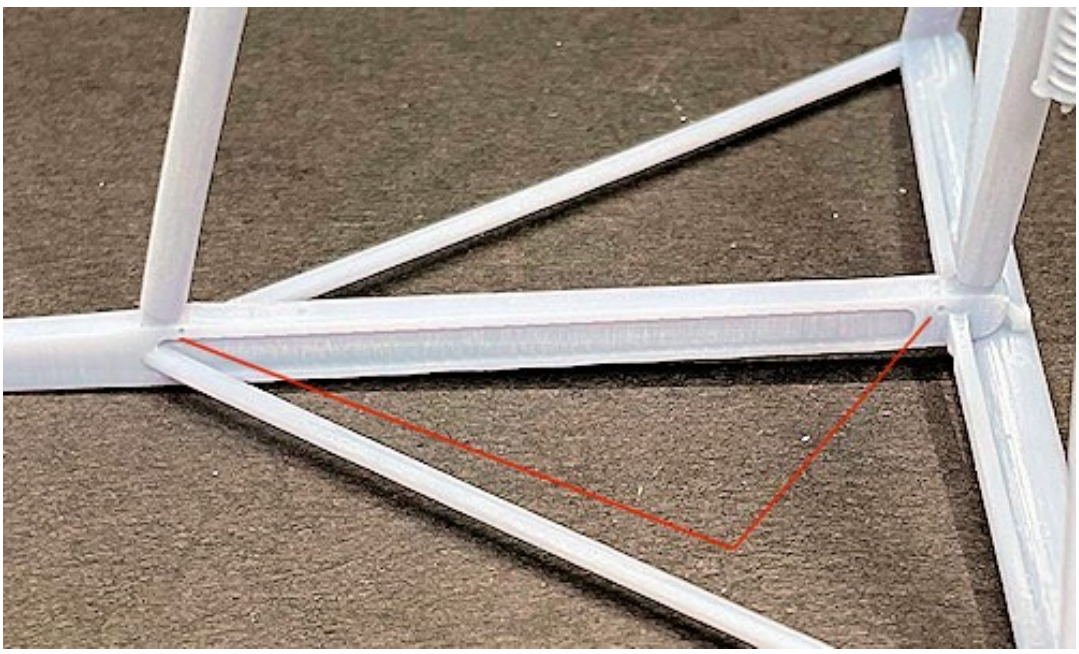
Drill two holes of 0.4 mm diameter into the bottom, rear of the fuselage. Angle the forward holes to the hole drilled through the leading edge of the tailplane (when fitted). Angle the rear holes to the hole drilled through the trailing edge of the tailplane (when fitted).



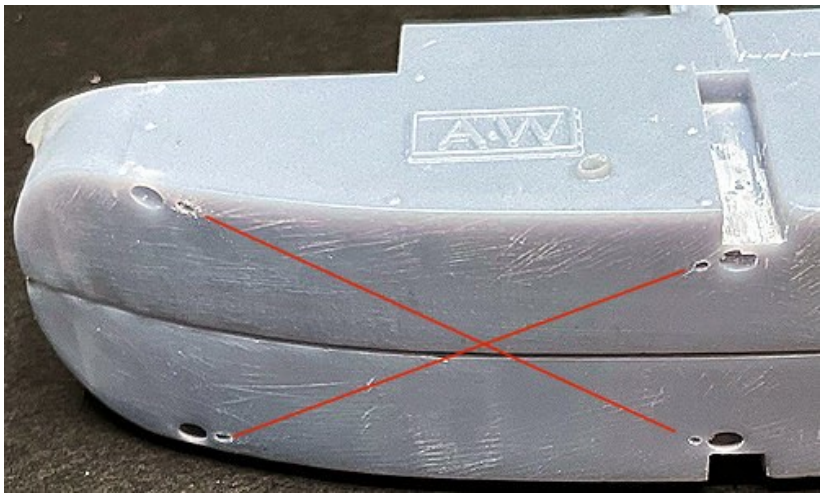
Landing gear bracing wires:

NOTE: *Refer to the following photographs.*

Drill holes of 0.4 mm diameter horizontally through the front and rear of the landing gear skid.



Drill four holes of 0.4 mm diameter into the forward, underside of the fuselage. Angle the forward holes to the hole drilled through the rear of the landing gear skid (when landing gear is fitted). Angle the rear holes to the hole drilled through the front of the landing gear skid (when landing gear is fitted).



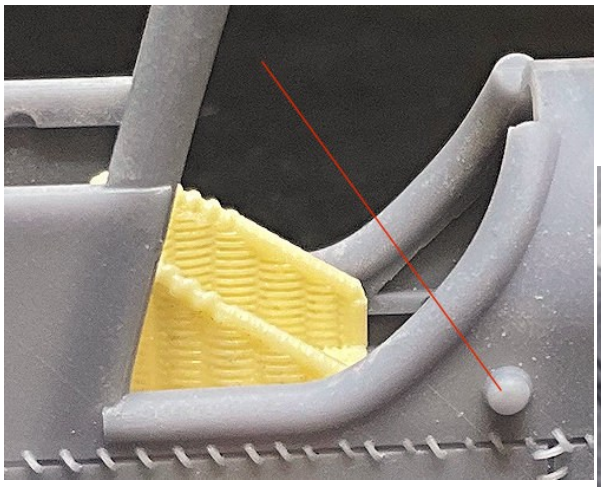
Fuselage bracing wires:

Although bracing wires were fitted between the internal fuselage frames, the way the model has been designed prevents these wires from being correctly added. Therefore, representations of some bracing wires will be added later in this build.

Starter switch:

NOTE: *On most WW1 aircraft, a single magneto starter switch was located either inside the pilot's cockpit or externally. This aircraft has been modelled with a starter switch located externally on both sides of the fuselage at the pilot's cockpit. Photographs show this switch to be located on the left fuselage side only.*

Remove the magneto starter switch from the fuselage right side at the pilot's cockpit.



PART 12
FUSELAGE

PART 12 - FUSELAGE

References:

'Windsock' data file No:13 - AW FK.3 Little Ack (J. M. Bruce).
'Flying Machines RU' - https://flyingmachines.ru
'MDesign' Instruction notes.

Painting

General:

NOTE: *The following kit parts were not used, as stated in Part 11 (Preparation and Modifications) of this build log.*

Pilot's seat (21).

Observers seat (19).

Fuel tank (22).

Airbrush the following parts with a grey primer, such as 'AK Interactive' Grey (AK758) or similar:

Fuselage halves (internal surfaces) including the rear cabane struts.
Replacement pilot seat and cushion.
Replacement rear cockpit seat and cushion.
Pilot's lap straps (photo-etch).
Rear cockpit lap straps (photo-etch).
Pilot's control column assembly.
Rear cockpit control column assembly.
Instrument panel.
Hand wheel.
Cockpit screen assembly.
Hand pump.

Airbrush the following parts with 'MRP' Clear Doped Linen (MRP-256) or similar:

Fuselage halves (internal surfaces) including the rear cabane struts.
Instrument panel.
Cockpit screen assembly.

Airbrush the following parts with 'Tamiya' Dark Yellow (XF60) or similar:

Replacement pilot seat and cushion.
Replacement rear cockpit seat and cushion.

Airbrush the pilot's and rear cockpit lap straps with 'Tamiya' Buff (XF57) or similar.

Wood effects:

NOTE: *Refer to **Method 2** in **Part 4 (Wood Effects)** of this build log for more information.*

Refer to the following photograph for the dark and lighter wood painted areas of the fuselage.
Also, refer to the kit instructions for information on where the 'A' and 'C' coloured areas are located.

Mask off the 'A' (linen covered) areas of the fuselage halves or carefully brush paint.

NOTE: *For the dark shade wood areas of the fuselage, I chose to use Windsor & Newton' **Burnt Umber** Griffin (Alkyd) oil paints. To remove any oil paint smudges, lightly wet a cotton bud (Q-tip) or similar with White Spirits and wipe away the smudged oil paint.*

*As the added cockpit floor covers some of the fuselage lower areas, **only the visible wood** areas need to be painted.*

Apply the oil paint to the dark shaded areas, except:

The added cockpit floor.

Bars of the cockpit screen assembly.

Rear cabane struts.

The front face of the engine bulkhead halves (this would have been metal).

Remove oil paint to create the desired wood effect.

Once the oil paint starts to dry, remove any previously applied masking from the fuselage sides.

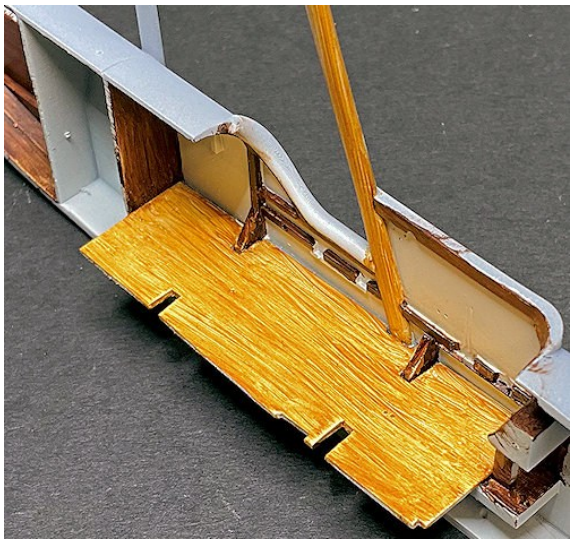
NOTE: *For the lighter shade wood areas of the fuselage, I chose to use Windsor & Newton' **Raw Sienna** Griffin (Alkyd) oil paints.*

Apply the oil paint to the following areas of the fuselage halves:

The added cockpit floor.

Bars of the cockpit screen assembly.

Rear cabane strut.



Leather effects:

NOTE *For the leather effect on the two seat cushions, I chose to use Windsor & Newton' **Raw Sienna** and **Burnt Umber** Griffin (Alkyd) oil paints.*

Brush a covering coat of the **Raw Sienna** oil pant first, followed by stippled on **Burnt Umber** then leave the paint to fully dry:

Details:

NOTE: *Brush paint with detailed colours or similar.*

Seat support bars - Brush paint with 'Tamiya' NATO Brown (XF68).

Hand pump - Body brush paint with 'Tamiya' IJN Grey (XF75), handle with 'Tamiya' Hull Red (XF9).

Hand wheel - Brush paint with 'Mr Metal Color' Stainless Steel (213).

Lap straps - Brush paint end leather with 'Tamiya' 'Tamiya' NATO Brown (XF68), metal fittings with 'Mr Metal Color' Stainless Steel (213).

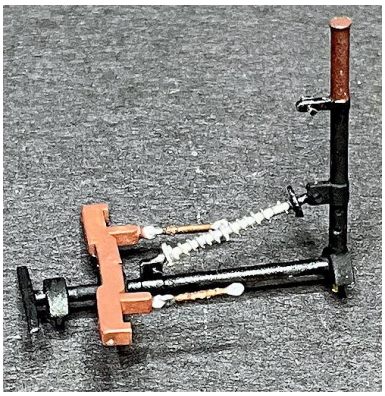
Pilot's control column assembly - Brush paint with 'Tamiya' Semi-Gloss Black (XF18), handle with 'Tamiya' Hull Red (XF9), rudder bar with 'Tamiya' NATO Brown (XF68), turnbuckles and return spring with 'Mr Metal Color' Stainless Steel (213), centre barrels of turnbuckles with 'Mr Metal Color' Copper (215).

Rear cockpit control column assembly - Brush paint with 'Tamiya' Semi-Gloss Black (XF18), handle with 'Tamiya' Hull Red (XF9), rudder bar with 'Tamiya' NATO Brown (XF68).

Cockpit surround padding - Brush paint with 'Humbrol' Leather (62).

Engine bulkhead halves - front face - 'Mr Metal Color' Stainless Steel (213).

Instrument panel - Brush paint the top, left switch with ‘Mr. Metal Color’ Brass (215), pillar to its right and two bottom buttons with ‘Mr. Metal Color’ Stainless Steel (213).



Decals:

NOTE: *Refer to Part 6 (Decals) for more information. As no decals for the instrument panel are provided in the kit, I applied suitable decals from the ‘Airscale’ WW1 generic dial decals (AS32 WW1) set.*

Brush ‘Tamiya’ Clear (X22) over the dial faces of the instrument panel to aid decal adhesion.

Apply the relevant decals onto the instrument panel.

Brush ‘Tamiya’ Clear (X22) over the dial faces of the instrument panel to represent instrument glass.

Modifications:

NOTE: *To enhance the pilot’s instrument panel, I added two switch levers from the ‘ANYZ’ cockpit handles (AN030) set.*

Drill a hole of 0.4 mm diameter into the centre of the Brass switch and Stainless Steel pillar on the pilot’s instrument panel.

Using thin CA adhesive, secure a suitable handle into the drilled holes.

Brush paint ‘Mr. Metal Color’ Brass (215) and Stainless Steel (213) on the handles.

Drill four holes of 0.4 mm diameter through the rear end of the added floor. Drill through the added and printed floor in the fuselage right half and just the added floor in the fuselage left half. These holes are for rigging control cables.

Assembly:

NOTE: *Make sure all mating surfaces and recesses are clear of primer, paint etc.*

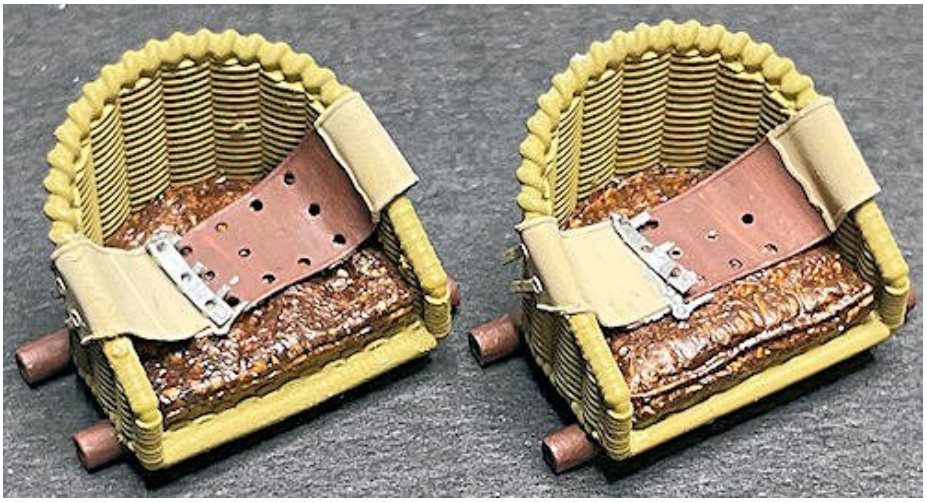
Using thin CA adhesive, secure:

The seat cushion into the pilot’s seat.

The seat cushion into the rear cockpit seat.

The two lap straps onto the pilot’s seat.

The two lap straps onto the rear cockpit seat.



Weathering:

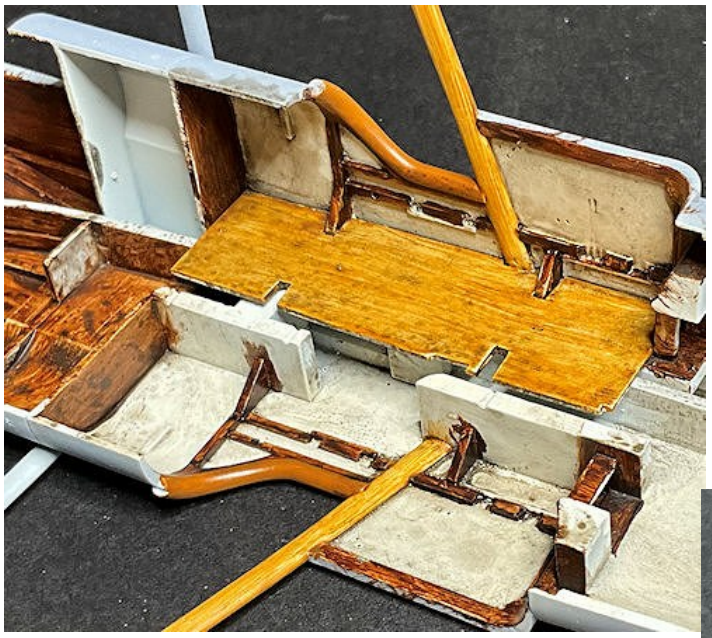
NOTE: *Refer to Part 5 (Weathering) for more information. For general internal weathering I chose to use the 'Flory Models' Dark Dirt fine clay washes.*

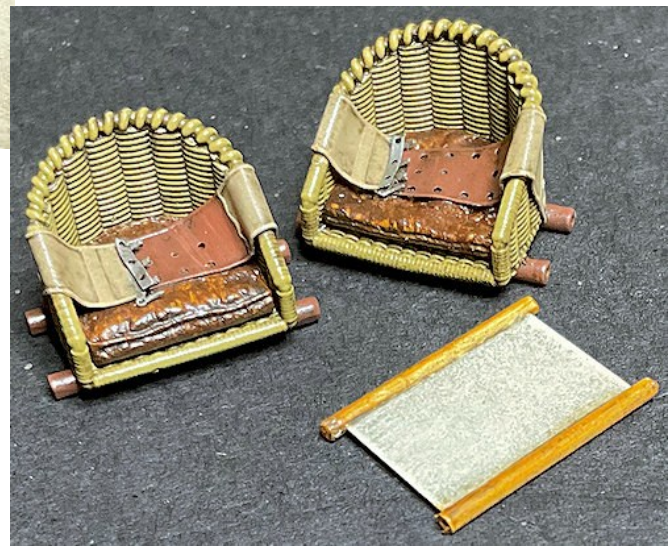
To provide a suitable surface for weathering, airbrush a coat of 'Tamiya' Semi-Gloss Clear (X35) over the internal surfaces of the fuselage halves and all of the prepared fuselage parts.

Brush 'Flory Models' Dark Dirt wash over the insides of the fuselage halves, cockpit seat and the cockpit screen assembly.

Remove the wash to achieve the desired weathering effect.

Seal and protect the applied weathering by airbrushing with a coat of 'Tamiya' Semi-Gloss Clear (X35).





Rigging:

NOTE: *Refer to Part 8 (Rigging) for more information. The materials used for rigging the rudder and elevator control cables were:*

'Albion Alloy's' 0.4 diameter Brass tube (MBT05).

'Steelon' or 'Stroft GTM' fishing line (0.08 mm diameter).

'Gaspatch' metal 1/48th scale turnbuckles (Type A).

Pilot's control column:

NOTE: *The aileron control cables in the pilot's cockpit will not be visible on the completed model, so were not fitted.*

Cut a long length of line.

NOTE: *Nickel-Silver or Brass tube can be chemically blackened by immersion in solutions such as AMMO Mig photoetch Burnishing Fluid (A.MIG-2021) or similar then rinse and dry the blackened tubes to prevent powdering of the surfaces.*

Cut a short length of blackened tube.

Pass the line through the tube then through the 'eye' end of a rudder turnbuckle on the rudder bar.

Loop the line back through the tube then slide the tube up to, **but not touching**, the turnbuckle.

Secure the lines in the tube using thin CA adhesive.

Cut away any residual end tag of line at the tube end.

Repeat the procedure to add a line to the other turnbuckle.

Cut a long length of line.

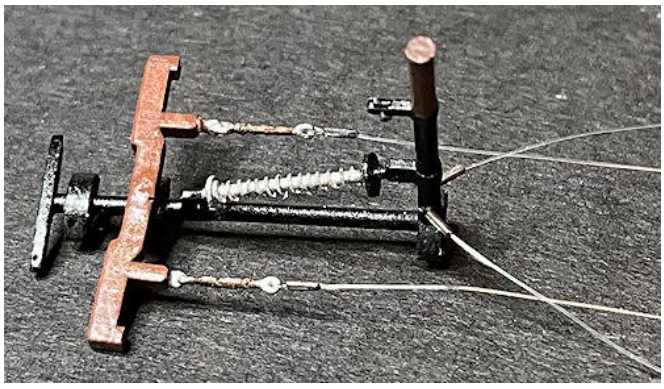
Cut two short lengths of blackened tube.

Pass the line through a tube then through the pre-drilled hole in the control column.

Slide the second tube onto the free line.

Keeping the two lines taut and equal lengths, slide the tubes up to, **but not touching**, the control column

Secure the lines in the tubes using thin CA adhesive.



Assembly (continued):

NOTE: *Make sure all mating surfaces and recesses are clear of primer, paint etc.*

Fit the pilot's control column onto the cockpit floor in the fuselage right half, with the two added locating rods fully into the pre-drilled holes in the cockpit floor.

Secure the control column in position, applying thin CA adhesive to the rods at the underside of the floor.

Fit the rear cockpit control column onto the cockpit floor in the fuselage right half, with the added locating rod fully into the pre-drilled hole in the cockpit floor and the front of the torque tube centrally behind the pilot's control column.

Secure the control column in position, applying thin CA adhesive to the rod at the underside of the floor.

Rigging (continued):

Rear cockpit control column:

NOTE: *The aileron control cables in the rear cockpit will not be visible on the completed model, so were not fitted.*

Cut a long length of line.

Cut two short lengths of blackened tube.

Pass the line through a tube then through the pre-drilled hole in the control column.

Slide the second tube onto the free line.

Keeping the two lines taut and equal lengths, slide the tubes up to, **but not touching**, the control column

Secure the lines in the tubes using thin CA adhesive.

Pass a line from the pilot's rudder bar rearwards and loop it around the rear cockpit rudder bar at the foot bar.

Keeping the line taut, secure the line to the rudder bar using thin CA adhesive.

Repeat the procedure to add the opposite rudder line to the rear cockpit rudder bar.

Pass the two control column lines rearwards and down through the two inner pre-drilled holes at the rear end of the added floor.

Keeping the lines taut, secure the lines to the underside of the cockpit floor, using thin CA adhesive.

Cut two short lengths of blackened tube.

Pass the two rudder bar lines through the tubes then down through the two outer pre-drilled holes at the rear end of the added floor.

Keeping the lines taut, secure the lines to the underside of the cockpit floor, using thin CA adhesive.

Slide the tubes up to, **but not touching**, the rudder bar.

Secure the lines in the tubes using thin CA adhesive.

Cut away any residual end tags of line at the underside of the cockpit floor.

To reduce the sheen of the rigging lines, airbrush the lines with 'Tamiya' Semi-Gloss Clear (X35).

Assembly (continued):

NOTE: *Make sure all mating surfaces and recesses are clear of primer, paint etc.*

Using thin CA adhesive, secure the handwheel into its locating recess in the fuselage right half.

Using thin CA adhesive, secure the hand pump into its two locating recesses in the fuselage left half.

Drill a hole of 0.8 mm diameter through the cockpit forward bulkhead in the fuselage left half. Drill the hole to align with the bottom end of the hand pump.

Cut a length of 0.5 mm diameter 'PlusModel' lead wire.

Pass the wire through the drilled hole with its end in contact with the bottom end of the hand pump.

Using thin CA adhesive, secure the wire in the hole and onto the hand pump.

NOTE: *During the following steps I used a slower setting, thicker CA adhesive. This allows time to position and align parts in the fuselage before the adhesive sets.*

Using slow CA adhesive, secure the pilot's instrument panel into the fuselage right half and against its locating shoulder.

Make sure the panel is fully in contact with the fuselage and locating shoulder and the bottom edge of the panel is horizontal in the fuselage half.

If necessary, reinforce the joint by applying thin CA adhesive.

Temporarily join the two fuselage halves together and make sure they join fully. If not, check if the left side of the instrument panel is stopping full joining and if so, file or sand the left edge and recheck.

Apply slow CA adhesive into the two fuselage recesses for the pilot's seat support bars.

Locate the pilot's seat into the recesses.

Temporarily join the two fuselage halves together and make sure they join fully. If not, check if the left side of the seat support bars are fully located into their recesses in the fuselage left half. If not, adjust the seat position to allow the seat support bars to fully locate.

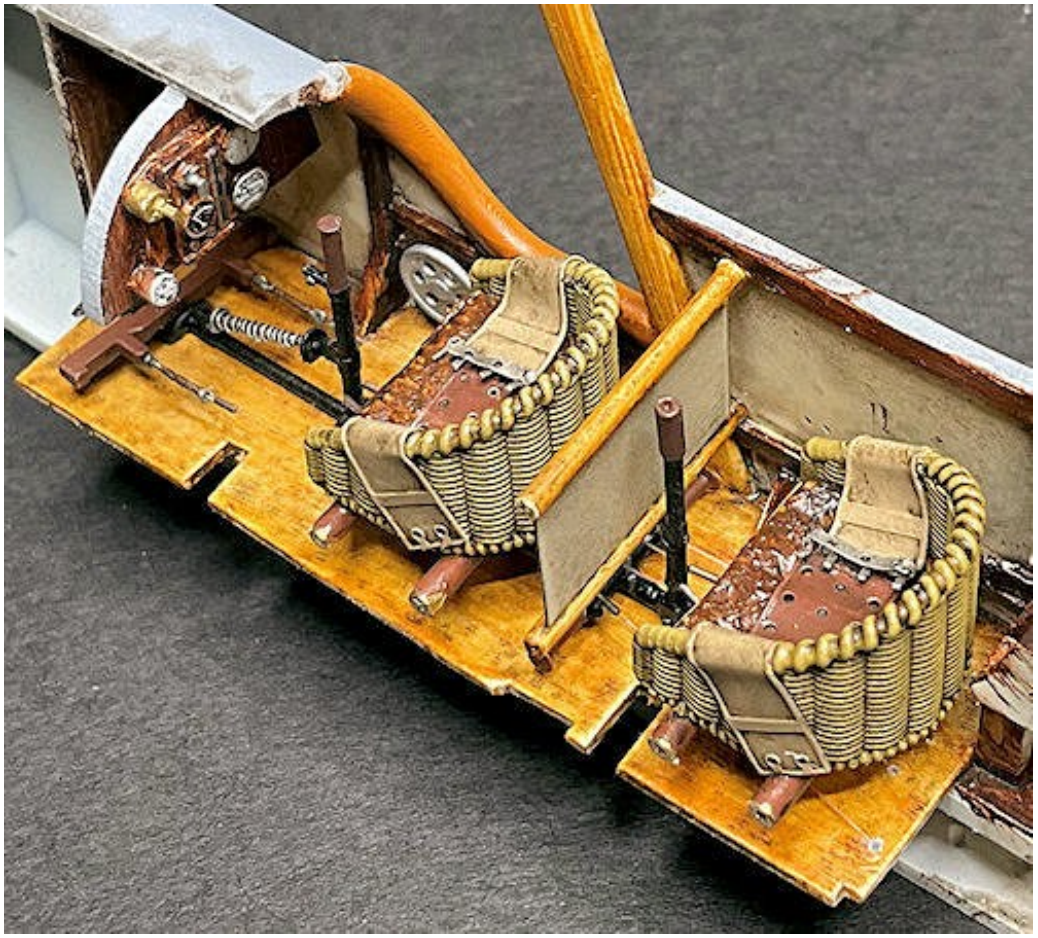
Once the adhesive has set, separate the fuselage halves and reinforce the seat supports in the fuselage right half using thin CA adhesive.

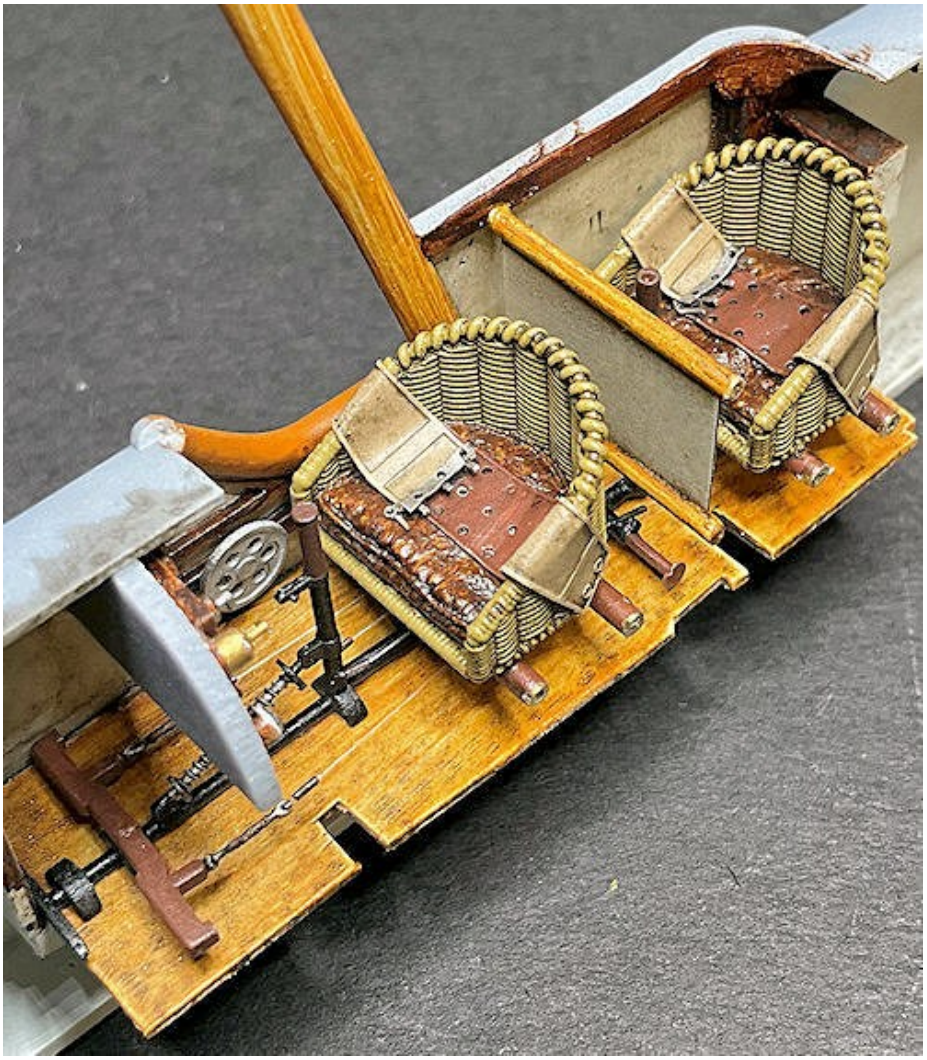
Repeat the procedure to fit the rear cockpit seat into the fuselage right half.

Repeat the procedure to fit the cockpit screen assembly into its locating recess in the inner top of the fuselage right half. When fitted, the bottom cross bar of the assembly should rest against the bottom, rear of the rear cabane strut.

Thin CA adhesive can be applied at that point to reinforce the fit of the screen assembly.

Carry out a final fit check of the fuselage parts by temporarily joining the two fuselage halves together, making sure all internal parts locate correctly into their locations in the fuselage left half and the fuselage halves are in full contact with each other.





NOTE: *Make sure all mating surfaces and recesses are clear of primer, paint etc. Make sure the fuselage halves are **aligned correctly** when joining as there are **no locating pegs/holes** around the fuselage edges.*

Apply slow CA adhesive to the internal mating edges and the outer fuselage edges on one fuselage half.

Join the fuselage halves fully together, making sure all edges are aligned. If necessary, clamp or masking tape the halves together until the adhesive has set.

Remove any clamp or applied masking tape from the fuselage.

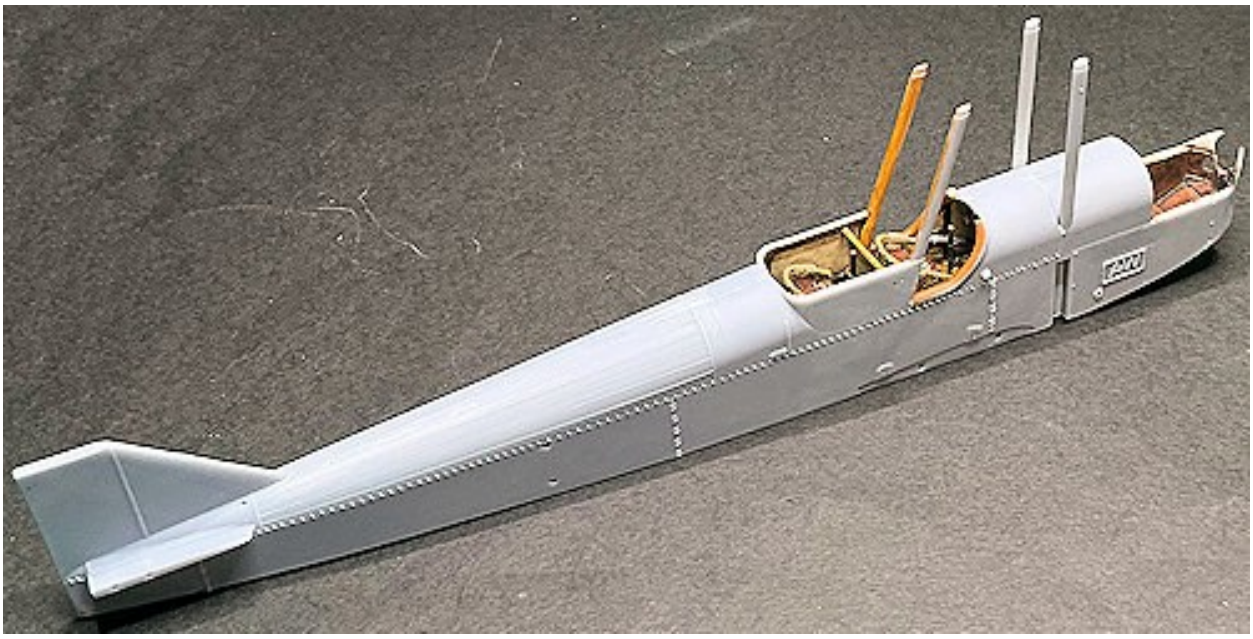
File or sand the fuselage joint seams to blend them with the surrounding surfaces and to remove any slight steps or gaps in the joint seams.

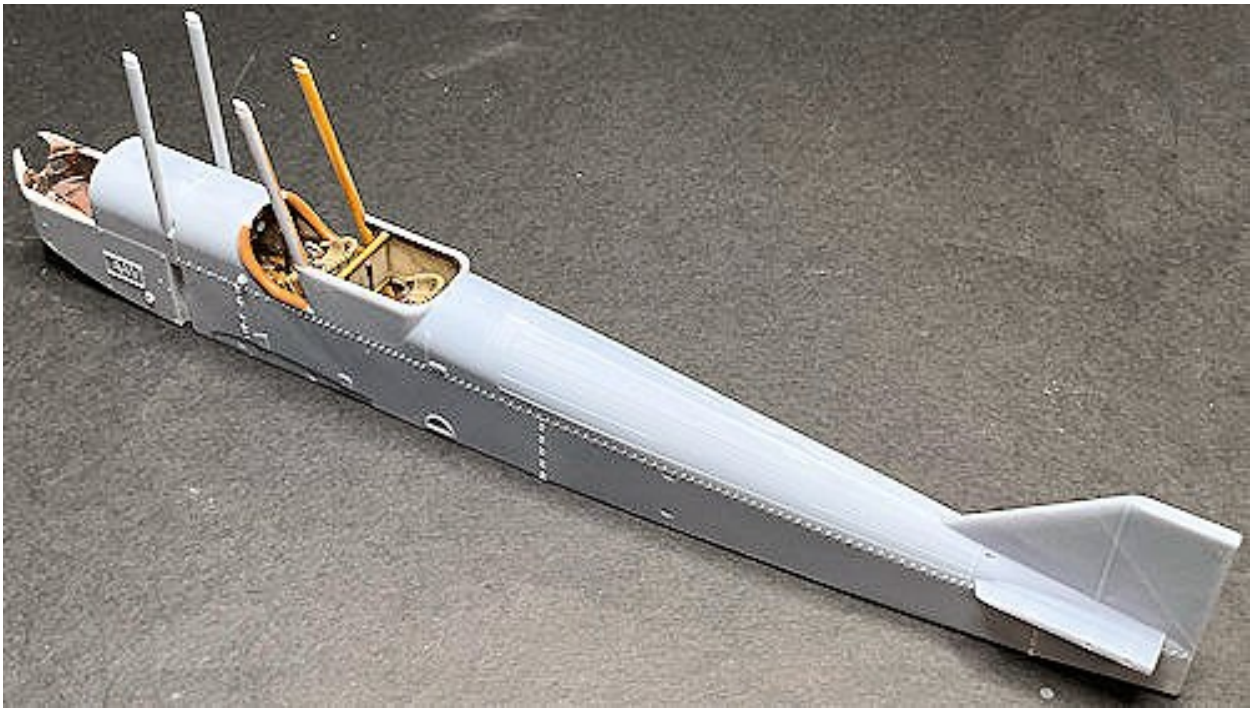
NOTE: *The engine can be fitted into the fuselage later in the build.*

Blank off the open engine bay area and the cockpits.

Airbrush the fuselage with a grey primer, such as ‘AK Interactive’ Grey (AK758) or similar.

Check the fuselage for any surface imperfections or gaps/steps in the fuselage joints. Is necessary, fill and re-sand the areas then re-prime and check again.





PART 13
EXTERNAL

PART 13 - EXTERNAL

References:

‘Windsock’ data file No:13 - AW FK.3 Little Ack (J. M. Bruce).
‘Flying Machines RU’ - https://flyingmachines.ru
‘MDesign’ Instruction notes.

Rigging:

NOTE: *Refer to Part 11 (Preparation and Modifications) of this build for the location of the pre-drilled rigging points. The photo-etch rigging* ***anchor points*** *are ‘HGW’ 1/32nd scale Spoke Eyelets (132129). After adding the anchor points,* ***take care handling*** *the model parts as being resin, they are heavier than plastic and the anchor points* ***can be crushed*** *if the model part is laid on a hard surface.*

Using thin CA adhesive, secure an anchor point into each of the pre-drilled holes in the underside of the upper wing. Make sure the anchor points are positioned to align with their opposite ends of their rigging lines.

Using thin CA adhesive, secure an anchor point into the four pre-drilled holes in the top surface of upper wing.

Using thin CA adhesive, secure an anchor point into the pre-drilled hole in the underside of both lower wings.

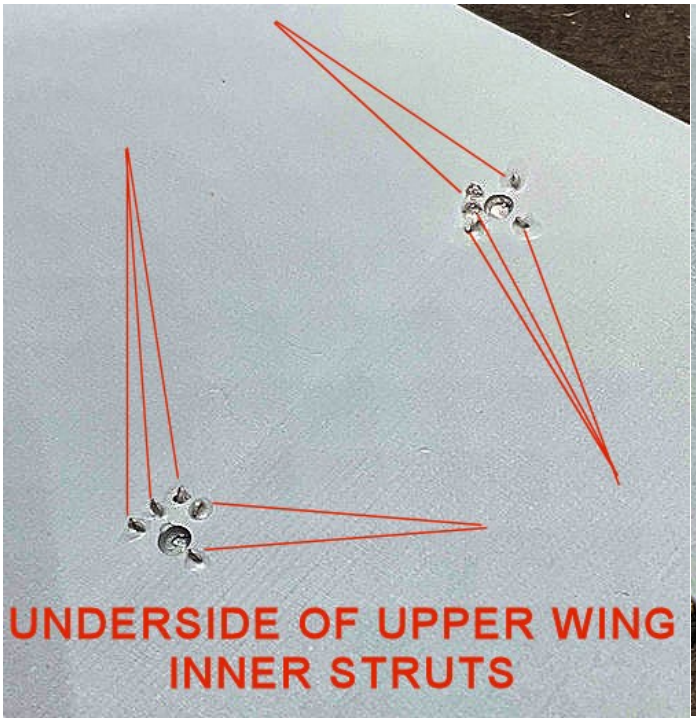
Using thin CA adhesive, secure an anchor point into the pre-drilled hole in the top surface of both lower wings between the inner interplane struts.

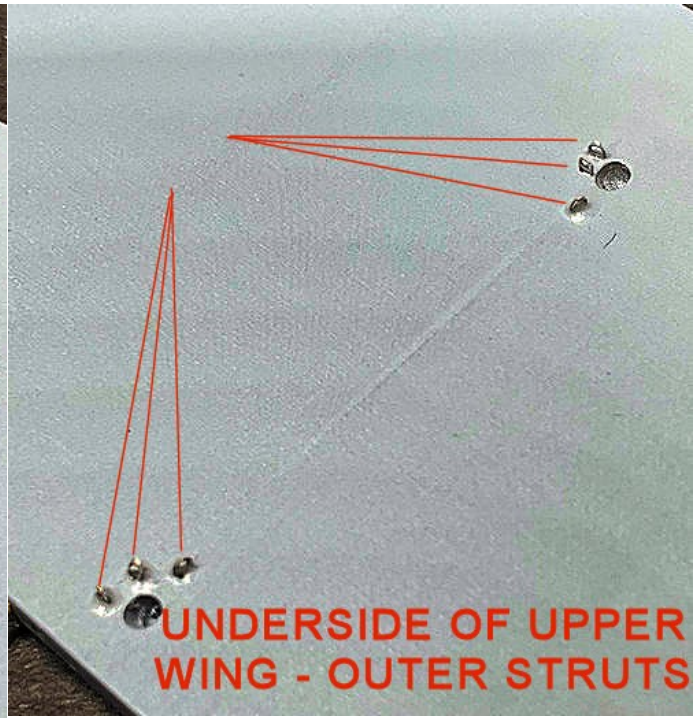
Using thin CA adhesive, secure an anchor point into both of the pre-drilled holes in the fuselage sides below the rear cockpit.

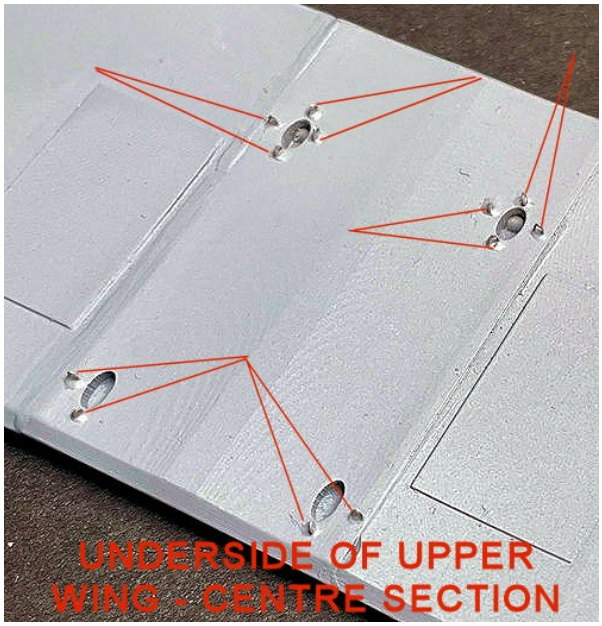
Using thin CA adhesive, secure an anchor point into the pre-drilled hole in the top surface of both lower wings forward from the front, inner interplane struts.

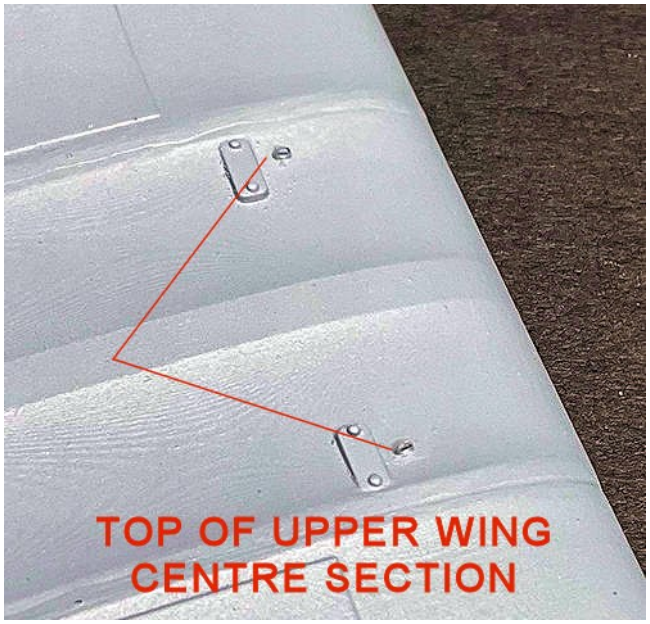
Lightly airbrush all of the fitted anchor points with a grey primer, such as ‘AK Interactive’ Grey (AK758) or similar.

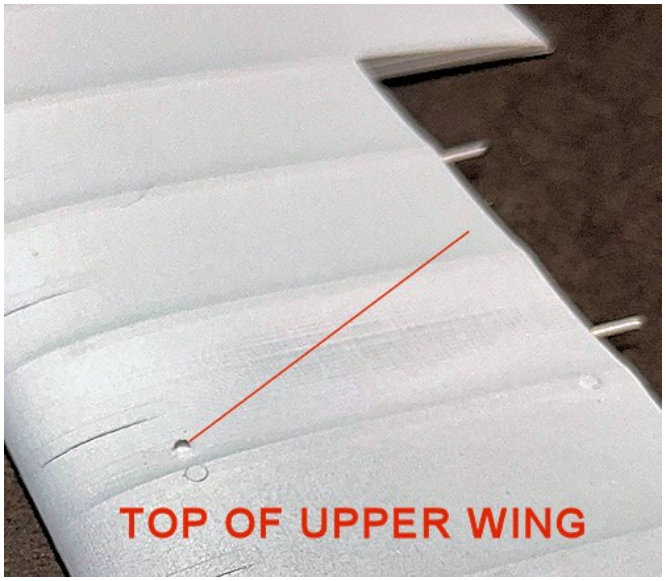
Using a 0.3 mm diameter drill, make sure the holes in the anchor points are clear of any adhesive and paint.

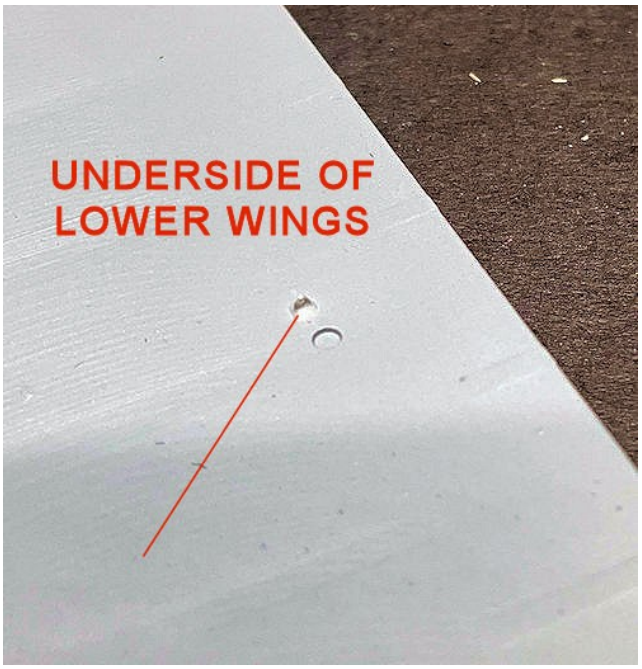


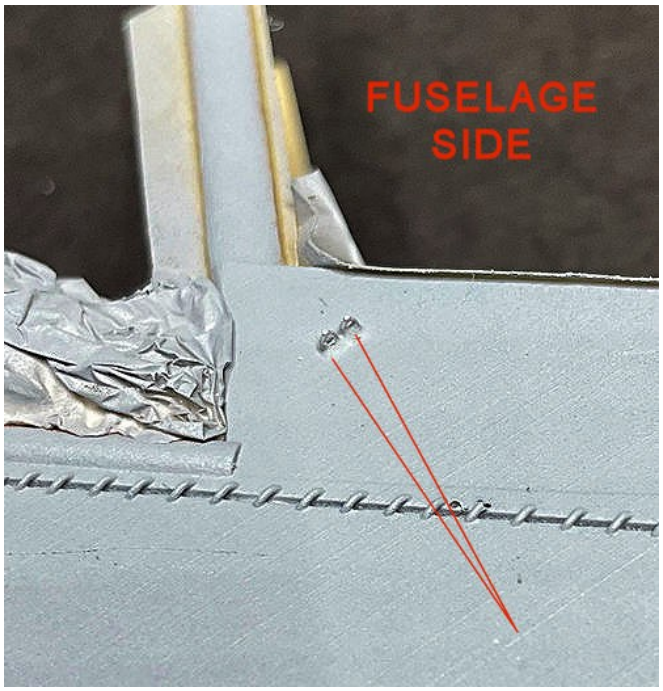


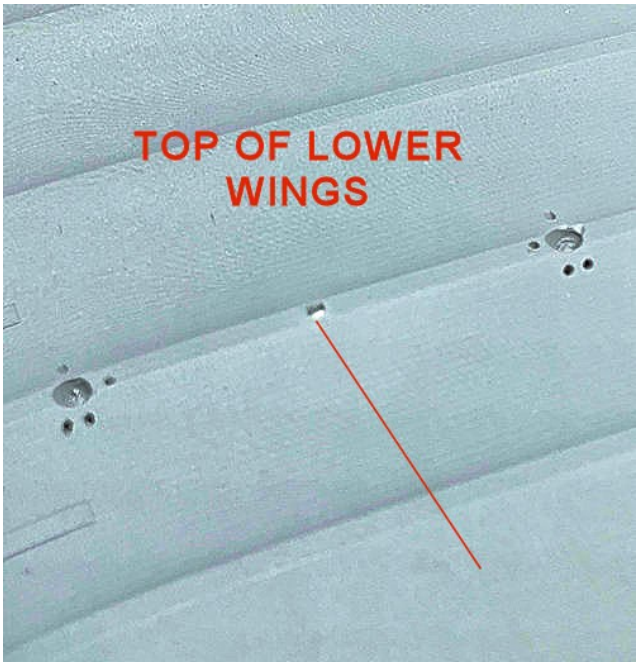

UNDERSIDE OF UPPER
WING - CENTRE SECTION


TOP OF UPPER WING
CENTRE SECTION


TOP OF UPPER WING


UNDERSIDE OF
LOWER WINGS


FUSELAGE
SIDE


TOP OF LOWER
WINGS

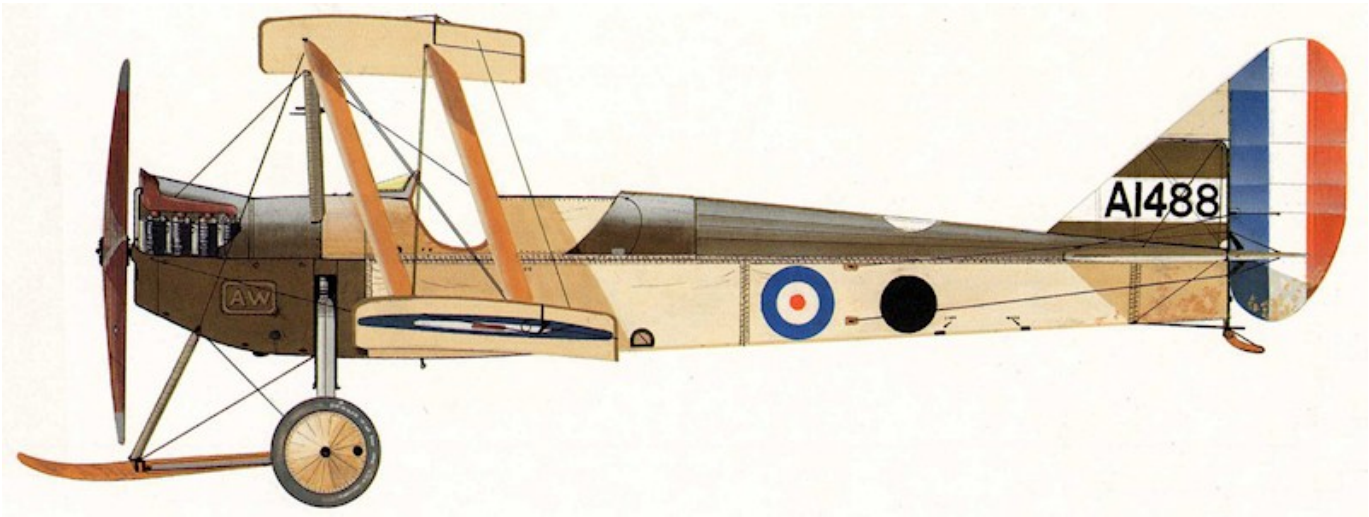
Painting

General:

NOTE: *The external parts of the model are as follows:*

Upper wing.
Lower wings.
Ailerons (x 4)
Tailplanes (x 2).
Elevators (x 2).
Rudder.
Inner interplane struts (x 4).
Outer interplane struts (x 4).
Landing gear assembly.
Wheels (x 2).
Engine top cover panel.
Lower wing hoops (x 2).
Tail skid.
***Centre bomb rack not used** - training aircraft only.*
***Outer bomb racks (x 2) not used** - training aircraft only.*

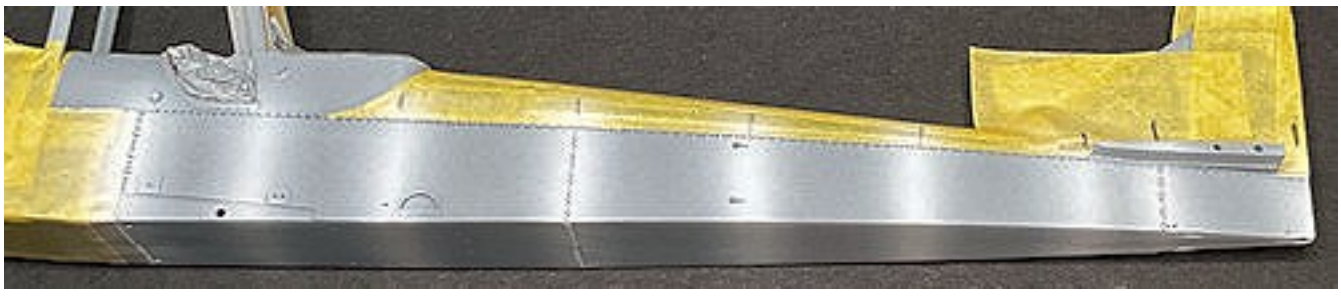
Airbrush the parts with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.



Fuselage:

Refer to the previous illustration and mask off all of the dark green/brown areas to leave just the Clear Doped Linen (CDL) areas exposed.

Refer to the following photograph and airbrush the location of the fuselage frames with 'MRP' White (MRP -004).

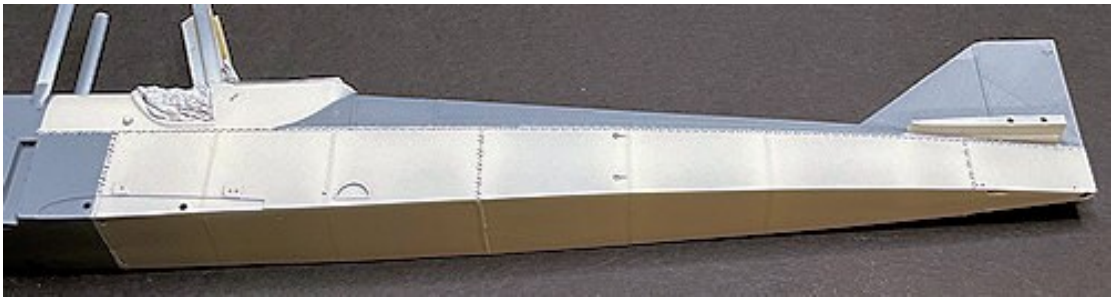


Using 2.0 mm wide strips of masking tape, mask off the fuselage frames.

Airbrush the fuselage with ‘MRP’ CDL (MRP-256).

Remove the masking tape strips.

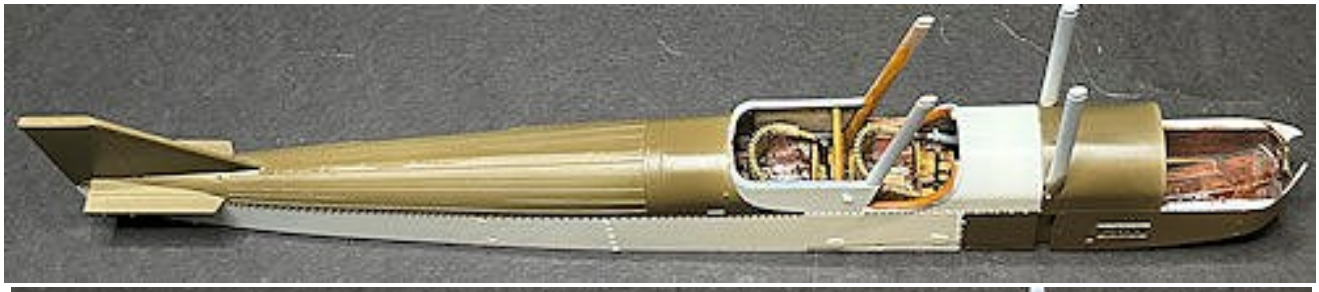
Airbrush light coat over the fuselage with ‘MRP’ CDL (MRP-256) to fade back the fuselage frames. The intention is to create faint shadows of the fuselage frames.

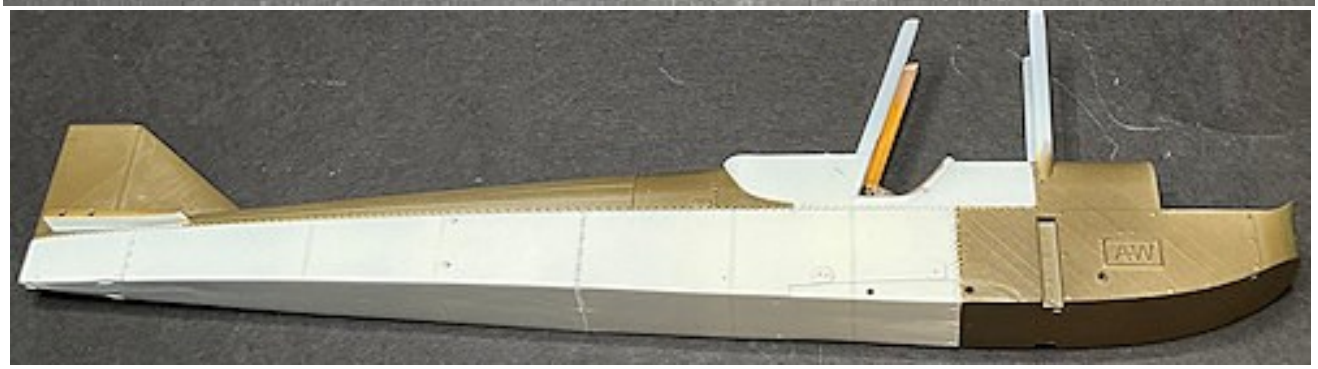


Mask off the painted CDL surfaces and the four fuselage cabane struts.

Airbrush the exposed areas of the fuselage with ‘MRP’ Khaki Green No.3/63 (MRP-333) or similar.

Remove all masking including from the engine bay and cockpits.





Brush paint the wood edges around the cockpit and engine bay with Windsor & Newton’ **Burnt Umber** Griffin (Alkyd) oil paints.

Brush paint the cockpit surround with ‘Humbrol’ Leather (62).

Brush paint the inside top of the engine bay panel with ‘Mr. Metal Color’ Stainless Steel (213).

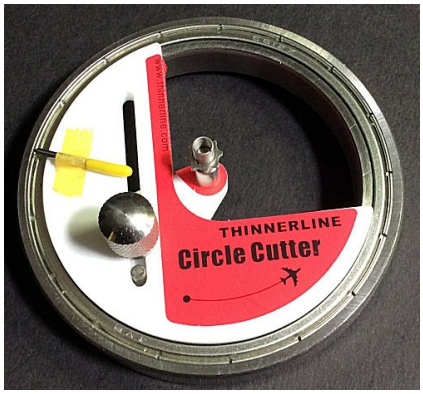
Refer to the previous illustration and mask off the fin/fuselage to leave the white band exposed.

Airbrush the band with ‘MRP’ Bianco Neve (MRP-308) or similar.

Remove all masking.

Brush paint the magneto starter switch (fuselage left side at pilot’s cockpit) left with ’Mr. Metal Color’ Brass (219) or similar.

NOTE: *To cut circles I use a 'Thinnerline' cutter, although other makes of cutters are available, such as that from 'DSPIAE'.*



From 'Tamiya' masking sheet, cut three masks with a 10.0 mm diameter disc cut out.

Refer to the previous illustration and position one of the masks onto the top, rear of the fuselage (white disc).

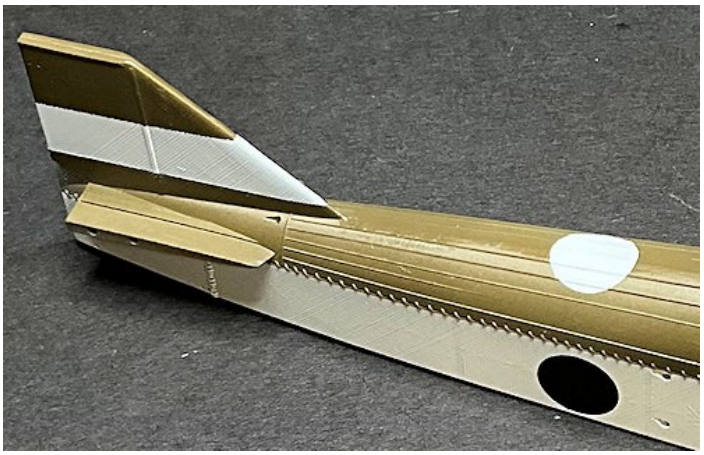
Airbrush the disc with 'MRP' Bianco Neve (MRP-308) or similar.

Remove the mask.

Refer to the previous illustration and position the remaining masks onto the fuselage sides (black discs).

Airbrush the discs with 'Tamiya' Flat Black (XF1) or similar.

Remove the masks.



Brush paint the fuselage foot step surround and the two rigging plates at the bottom of the fuselage at the lower wing roots with 'Tamiya' Flat Black (XF1) or similar.

Mask around the two exit ports on the fuselage sides for the elevator control cables.

Brush paint the four exit ports with 'Humbrol' Leather (62).

Remove the masking.

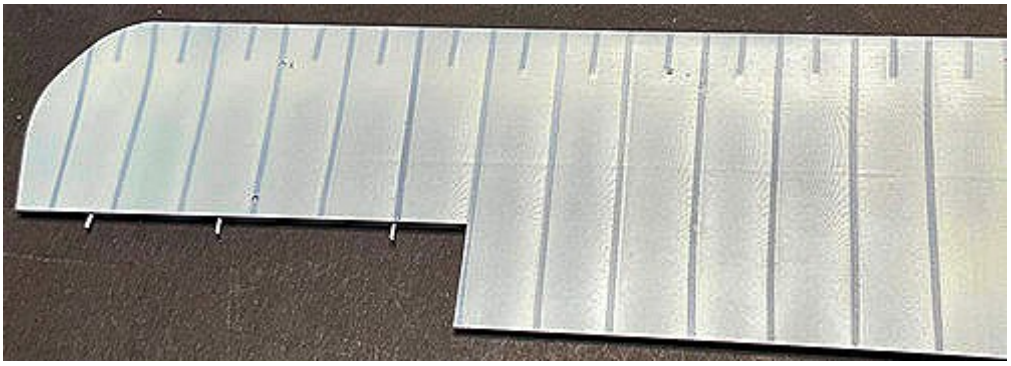
Upper wing and ailerons - undersides:

Airbrush the underwing rib tapes and the shorter leading edge ribs tapes with ‘MRP’ White (MRP-004).

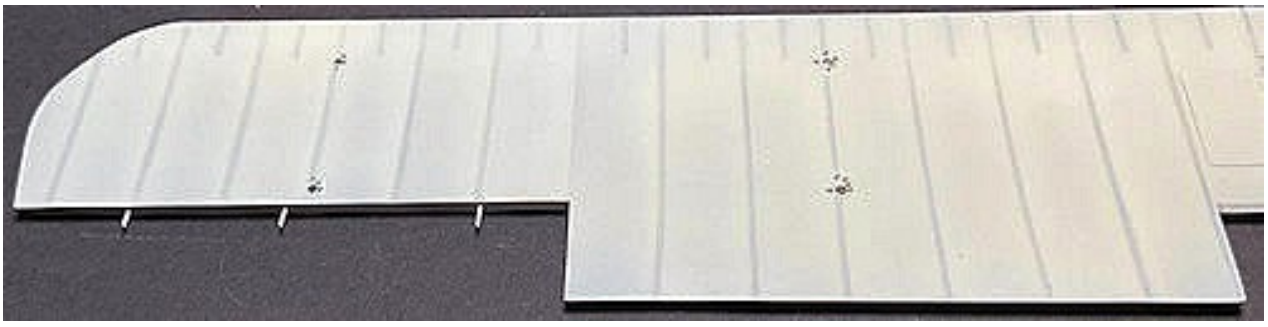
Using 2.0 mm wide strips of masking tape, mask off the underwing rib tapes and the shorter leading edge ribs tapes.

Airbrush across the underside of the upper wing with ‘MRP’ CDL (MRP-256).

Remove the masking tape strips.



Airbrush light coat across the underside of the upper wing with ‘MRP’ CDL (MRP-256) to fade back the obvious rib taps. The intention is to create faint shadows of the rib tapes.



Lower wings and ailerons - undersides:

Repeat the previous procedure on the underside of the lower wings and ailerons.

Tailplanes - undersides:

Repeat the previous procedure on the underside of the tailplanes.

Elevators - undersides:

Repeat the previous procedure on the underside of the elevators.

Clearing the anchor points:

Using a 0.3 mm diameter drill, make sure the holes in the fitted anchor points are **clear of paint**.

NOTE: *The kit colour profiles show the upper surfaces to be of a slightly browner shade the that of the fuselage. As there is no information to contradict this colour difference, I chose to apply a slightly browner shade to the upper surfaces.*

Airbrush 'MRP' Dark Green BS641(MRP-110) over the top surfaces of the following:

Upper wing and ailerons.
Lower wings and ailerons.
Tailplanes.
Elevators.

Clearing the anchor points:

Using a 0.3 mm diameter drill, make sure the holes in the fitted anchor points are **clear of paint**.

Assembly:

NOTE: *Make sure all mating surfaces and recesses are clear of primer, paint etc.*

Pass the two metal reinforcing rods in the lower right wing into their locating holes in the fuselage.

Apply CA adhesive (slow) onto the rods at the wing root and on the wing root mating surface.

Fully locate the wing into and onto the fuselage.

Slide the lower left wing onto the two metal reinforcing rods.

Apply CA adhesive (slow) onto the rods at the wing root and on the wing root mating surface.

Fully locate the wing into and onto the fuselage.

Once the adhesive has set and if necessary, apply thin CA adhesive into the wing to fuselage joints.

Repeat the procedure to attach the two tailplanes to the fuselage rear.

Decals:

NOTE: *Refer to Part 6 (Decals) of this build log for more information. The kit supplies masks for the wing and fuselage roundels. However, I chose to instead use decal from my spares collection, including the required decals not supplied as masks in the kit.*

The following decals from my spares collection were applied:

Roundels on the top surface of the upper wing and ailerons.

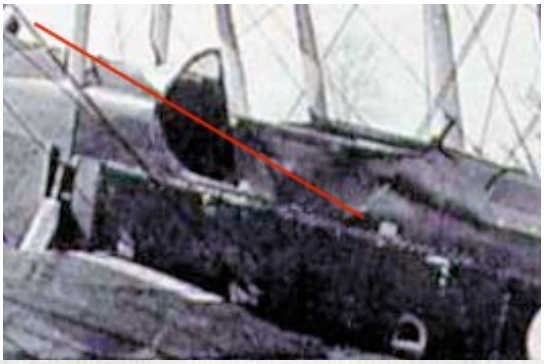
Roundels on the underside of the lower wings and ailerons.

Roundels on the fuselage sides.

'Lift Here' arrows on the fuselage rear sides.

A1488 serial number to the fin ('Xtradecal' RAF letters and numbers (X32021).

Data plates to the fuselage sides to the rear of the rear cockpit.



Weathering:

General:

NOTE: *Refer to Part 5 (Weathering) for more information. For general internal weathering I chose to use the 'Flory Models' Dark Dirt fine clay washes.*

To provide a suitable surface for weathering, airbrush a coat of 'Tamiya' Semi-Gloss Clear (X35) over the upper wing, fuselage/lower wings assembly, ailerons and elevators.

Brush ‘Flory Models’ Dark Dirt wash over the surfaces of the upper wing, fuselage/lower wings assembly, ailerons and elevators.

Remove the wash to achieve the desired weathering effect.

Seal and protect the applied weathering by airbrushing with a coat of ‘Tamiya’ Semi-Gloss Clear (X35).

Assembly (continued):

NOTE: *Make sure all mating surfaces and recesses are clear of primer, paint etc.*

Partially fit the two ailerons onto their locating rods on the upper wing.

Apply thin CA adhesive to the locating rods.

Fully fit the ailerons onto the upper wing. If the ailerons are to be positioned, slightly bend one aileron up and the other slightly down at the same angle.

Repeat the procedure to fit the ailerons to the lower wings. If the ailerons are to be positioned, make sure they match the angles of the upper wing ailerons.

Repeat the procedure to fit the two elevators to their tailplanes. If the elevators are to be positioned, bend both down at a matching slight angle.

Painting (continued:

Control horns:

Brush paint the control horns on the four ailerons and two elevators with ‘Tamiya’ Flat Black (X1) or similar.

Engine cover panel:

Airbrush the top surface of the engine cover panel with ‘MRP’ Khaki Green No.3/63 (MRP-333) or similar.

Brush paint the underside of the engine cover panel with ‘Mr. Metal Color’ Stainless Steel (213) or similar.

Upper wing panels:

Mask off the two panels on the top surface and underside of the upper wing.

Airbrush the panels with ’Alclad’ Steel (ALC-112) or similar.

Remove the masking.

Lower wing hoops:

NOTE: *Refer to **Method 2** in **Part 4 (Wood Effects)** of this build log for more information. I chose to use Windsor & Newton’ **Raw Sienna** Griffin (Alkyd) oil paints.*

Airbrush the two lower wing hoops with ‘Tamiya’ Dark Yellow (XF60).

Brush the oil paint over the hoops and then remove to achieve the wood effect.

Interplane and cabane struts:

NOTE: *Refer to **Method 2** in **Part 4 (Wood Effects)** of this build log for more information. I chose to use Windsor & Newton’ **Raw Sienna** Griffin (Alkyd) oil paints.*

Airbrush the eight interplane struts with ‘Tamiya’ Dark Yellow (XF60).

Brush the oil paint along the struts and then remove to achieve the wood effect.

Brush the four fuselage cabane struts with ‘Tamiya’ Dark Yellow (XF60).

Brush the oil paint along the struts and then remove to achieve the wood effect.

Landing gear:

Airbrush the all struts/bars of the landing gear with ‘MRP’ Khaki Green No.3/63 (MRP-333) or similar.

Brush paint the main skid of the landing gear with ‘Tamiya’ Dark Yellow (XF60).

NOTE: *Refer to **Method 2** in **Part 4 (Wood Effects)** of this build log for more information. I chose to use Windsor & Newton’ **Raw Sienna** Griffin (Alkyd) oil paints.*

Brush the oil paint over the skid and then remove to achieve the wood effect.

Brush paint the springs of the landing gear main struts with ‘Mr. Metal Color’ Stainless Steel (213) or similar.

Brush ‘AK Interactive’ Kerosene wash into the springs.

Tail skid:

Brush paint the skid of the landing gear with ‘Tamiya’ Dark Yellow (XF60).

NOTE: *Refer to **Method 2** in **Part 4 (Wood Effects)** of this build log for more information. I chose to use Windsor & Newton’ **Raw Sienna** Griffin (Alkyd) oil paints.*

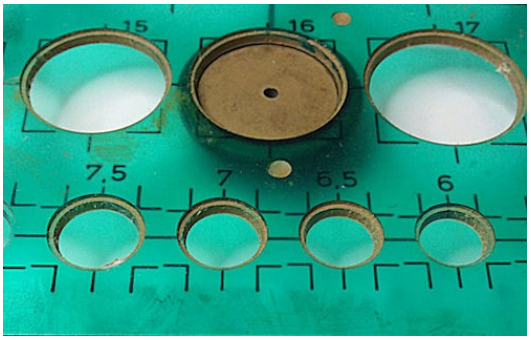
Brush the oil paint over the skid and then remove to achieve the wood effect.

Brush paint the support struts and tail skid post with ‘Tamiya’ Flat Black (X1) or similar.

Wheels:

Airbrush the tyres on the wheels with ’Tamiya’ Flat Black (X1) or similar.

NOTE: *To airbrush the wheel covers without over spraying the surrounding tyres, I used a circle drawing tool (Linex 1217 T). I selected the correct size of hole and positioned the wheel face under the hole.*



Airbrush the wheels covers on both sides of the wheels with ‘MRP’ CDL (MRP-256).

Airbrush the axle ends in the centre of the outer wheel covers with ’Tamiya’ Flat Black (X1) or similar.

Brush ‘Flory Models’ Dark Dirt wash over the wheels.

Remove the wash to achieve the desired weathering effect.

Sponge ’Tamiya’ Weathering Master set A (Mud) around the tyres.

Use a silver pencil or similar to highlight the ’Parmer Cord Aero Tyre’ text on the outer side of the tyres.

Rudder:

Mask off the rudder to leave the top ‘over the fin’ section exposed.

Airbrush the exposed area with ‘MRP’ CDL (MRP-256).

Mask off the CDL section of the rudder.

Airbrush the rudder with ‘MRP’ Bianco Neve (MRP-308) or similar.

Measure three equal width vertical stripes across the rudder.

Mask off the centre and rear stripe areas.

Mix ‘Tamiya’ Flat Blue (XF8) with Medium Blue (XF18) to approximately 60/40% to match the blue of the roundels.

Airbrush the mixed colour over the exposed stripe of the rudder.

Remove the masking.

Mask off the centre and blue stripe areas.

Mix ‘Tamiya’ Red (X7) with Flat Black (X1) to approximately 85/15% to match the red of the roundels.

Airbrush the mixed colour over the exposed stripe of the rudder.

Remove the masking.

Brush paint the two control horns on the rudder with ‘Tamiya’ Flat Black (X1) or similar.

To provide a suitable surface for weathering, airbrush the rudder with a coat of ‘Tamiya’ Semi-Gloss Clear (X35).

Modifications:

Rudder:

NOTE: *The following steps are necessary to provide a more positive attachment of the rudder to the fin.*

Pencil mark two positions on the leading edge of the rudder.

Using the marks as guides, point mark the centre of the leading edge of the rudder.

Using the point marks as guides, drill holes of 0.6 mm diameter into the leading edge of the rudder.

Cut two lengths of 0.5 mm diameter Brass rod, such as that from ’Albion Alloy’s’ or similar.

Secure the rods into the pre-drilled holes in the leading edge of the rudder, using thin CA adhesive.

Position the rudder against the trailing edge of the fin.

Pencil mark the position of the rods in the rudder on the fin trailing edge.

Using the marks as guides, point mark the centre of the fin trailing edge.

Using the point marks as guides, drill holes of 0.6 mm diameter into the fin trailing edge.

Check that the rudder can be fully located onto the fin.

Weathering (continued):

Dry brushing:

NOTE: *Dry brush by using a domed and soft brush, which has been dipped in the paint. Dab the brush on an absorbent paper to remove the liquid paint, leaving paint pigment on the brush.*

Dry brush around forward fuselage metal panels and across the ‘AW’ embossed panels with ‘Mr. Color’ Super Iron 2 (203) or similar, to create a worn away paint surface.

Dirt and spatter effects:

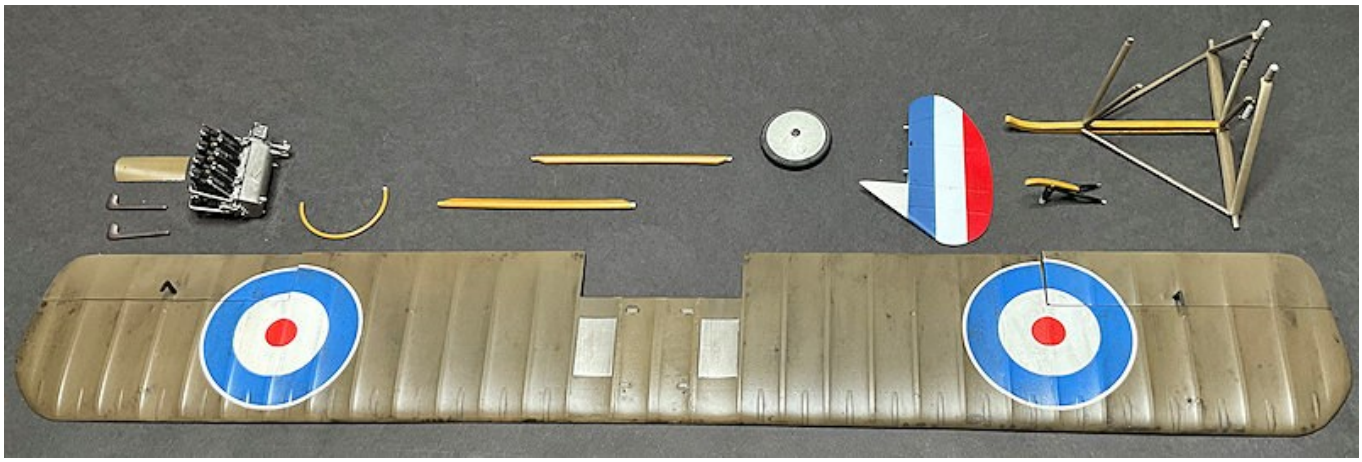
Sponge ‘Tamiya’ Weathering Master set A (Mud) along the underside edges of the fuselage.

Flick ‘Flory Models’ Grime wash over the underside of the lower wings to represent splatter from the landing gear wheels. Make sure the splatter is applied to the wings above and rearwards from the wheels, when fitted. Allow the wash to fully dry.

NOTE: *Refer to Part 5 (Weathering) for more information. For general internal weathering I chose to use the ‘Flory Models’ Dark Dirt fine clay washes.*

Brush ‘Flory Models’ Dark Dirt wash over the rudder and Grime wash over the lower area of the rudder (dirt from tail skid).

Remove the wash to achieve the desired weathering effect.



Assembly (continued):

NOTE: *Make sure all mating surfaces and recesses are clear of primer, paint etc.*

Engine:

Locate the engine assembly into the engine bay at the front of the fuselage, making sure the four engine base supports are in full contact with the engine bearers.

Using thin CA adhesive, secure the engine into the engine bearers.

Cut a length of 0.5 mm diameter Nickel-Silver tube, such as ’Albion Alloy’s’ NST05 or similar.

Insert the tube into the drilled hole in the top of the engine crankcase.

Position the engine top cover panel over the centre line of the engine with its rear edge against the front edge of the fuselage at the rear of the engine bay.

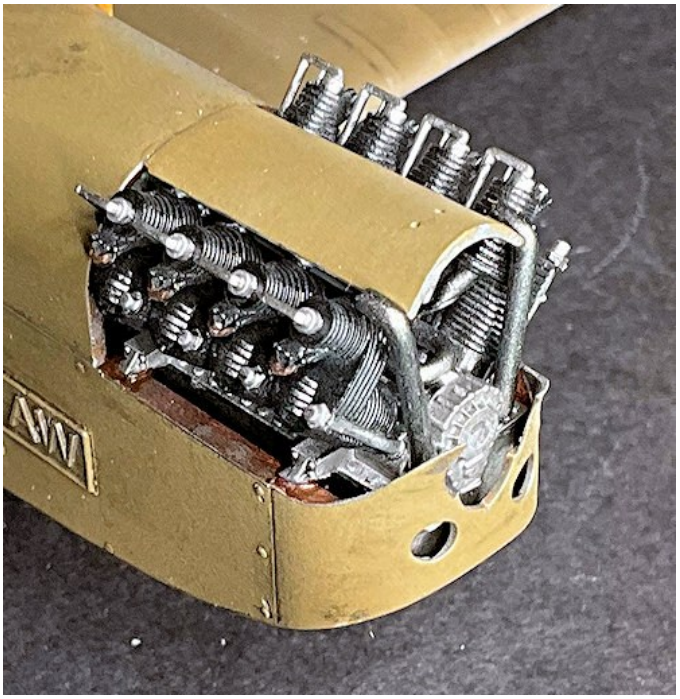
Make a note of how much shorter the inserted tube needs to be to allow the front of the cover panel to rest on the tube and between the two engine front pipe. The panel should be angled up at its front end.

Cut the required amount from the tube.

Using thin CA adhesive, secure the tube into the drilled hole in the top of the engine crankcase.

Position the engine top cover panel over the centre line of the engine with its rear edge against the front edge of the fuselage and its front end resting on the tube and between the two engine front pipe.

Secure the panel to the fuselage front edge and the top of the tube.



Windscreen:

NOTE: *The supplied pilot's windscreen is a vacuum formed in clear acrylic. Therefore, it needs to be carefully cut out from the acrylic sheet.*

Carefully cut the windscreen from the sheet, making sure to cut away from the canopy edges in order to remove most of the acrylic sheet.

Carefully trim away the acrylic from the formed edges of the windscreen.

If necessary, use a sharp straight edged scalpel blade or similar to scrape clean the cut edges.

NOTE: *I found that the windscreen was slightly to wide to fit between the cockpit padding, causing it to lift off the fuselage. I cut away the ends of the cockpit padding to achieve a better fit.*

Check that the windscreen fits on the top of the fuselage with its bottom, rear corners in the shoulders of the forward surround padding of the cockpit. Make sure there are no obvious gaps between the windscreen and fuselage.

Carefully brush paint the bottom/rear frame of the windscreen, inside and outside, with 'Mr. metal Color' Stainless Steel (213) or similar.

Apply a small amount of PVA adhesive, such as 'MicroScale' Micro Krystal Clear or similar, along the bottom edge of the windscreen.

Place the windscreen in position on the fuselage.

Pre-rigging:

NOTE: *Refer to Part 8 (Rigging) of this build log for more information. At this stage of the build it's easier to pre-rig the model before final fitting of the upper wing. When a line has been pre-rigged, it should be longer than required to reach the opposite end rigging point on the completed model. This allows the opposite end turnbuckles to be added and the line tightened.*

The rigging materials used are:

'Albion Alloy's' micro-tube of 0.5 mm diameter (Brass MBT05 or Nickel Silver NST05).

0.12 mm diameter mono-filament, such as that from 'Steelon' or 'Stroft GTM'.

Nickel-Silver or Brass tube can be chemically blackened by immersion in solutions such as 'Blacken-It' or similar.

Pre-rigging example:

NOTE: *The length of the wires should be much longer than required as this make it easier to attach to the opposite ends of the wires later in this build.*

Cut a longer than required length of mono-filament line, such as that from ‘Steelon’ or ‘Stroft GTM’.

Cut a short length of blackened tube.

De-burr the bore of the tube with 0.3 mm diameter drill.

Pass the line through the tube then through ‘eye’ of the fitted anchor point eyelet.

Loop the line back and through the tube.

Slide the tube up to, **but not touching**, the ‘eye’ of the eyelet.

Secure the wires in the tube, using thin CA adhesive applied to the tube end farthest from the eyelet.

Cut away any residual end tag of line at the tube end.

Check that the line is free to move in the anchor point eyelet.

Underside of the upper wing:

NOTE: *Refer to ‘Rigging Points’ in Part 11 (Preparation and Modifications) of this build log for anchor point locations. The following applies to* ***all*** *of the pre-fitted anchor points in the underside of the upper wing,* ***except for the six bracing wire anchor points for the fuselage cabane struts.***

Using the previous example, pre-rig the anchor points in the underside of the upper wing.

Top surface of lower wings:

Using the previous example, pre-rig the anchor points in the top of the lower wings, forward of the inner, front interplane struts.

Fuselage cabane struts:

NOTE: *The following applies to the six pre-fitted anchor points in the underside of the upper wing, for the fuselage cabane struts.*

The rigging materials used are:

‘Albion Alloy’s’ micro-tube of 0.5 mm diameter (Brass MBT05 or Nickel Silver NST05).

0.12 mm diameter mono-filament, such as that from ‘Steelon’ or ‘Stroft GTM’.

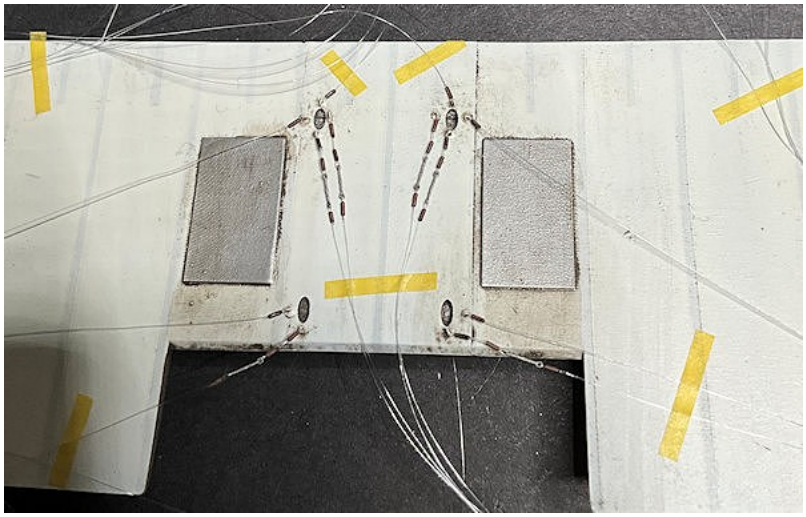
‘Gaspatch’ 1:48th scale turnbuckles (Type C).

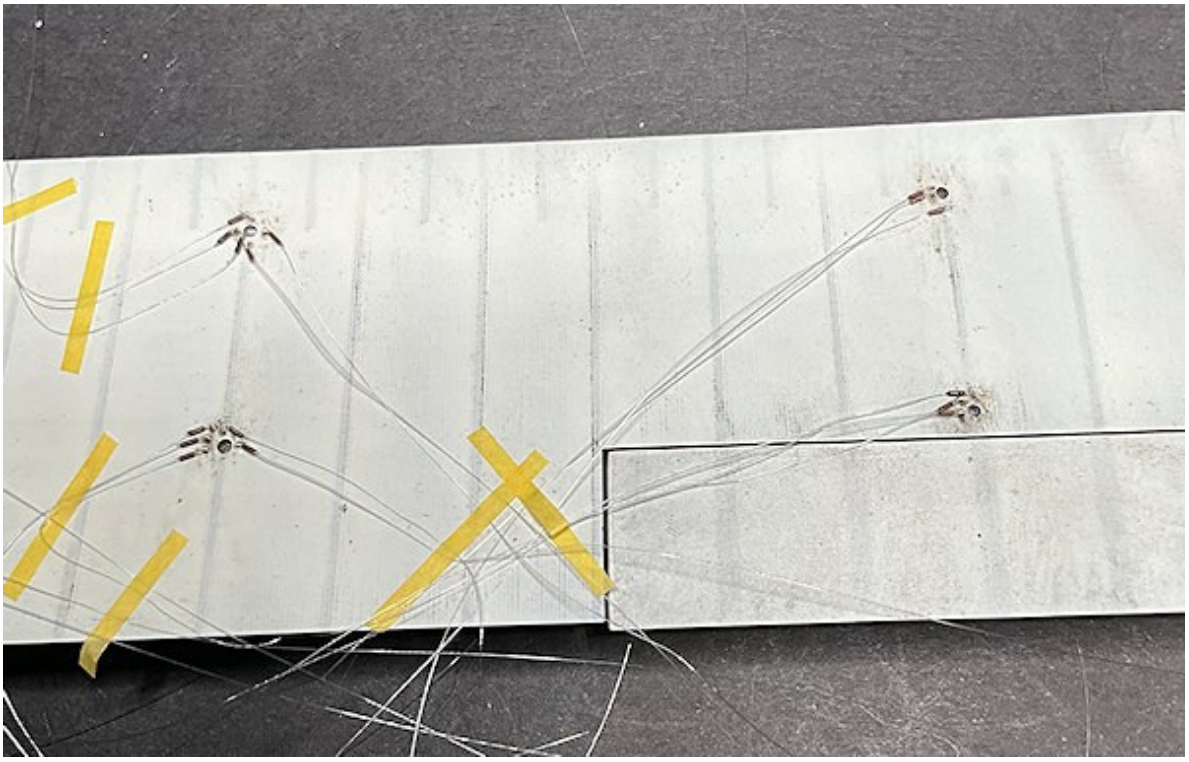
Brush the centre barrel of six turnbuckles with ‘Mr. Metal Color’ Copper (215) or similar.

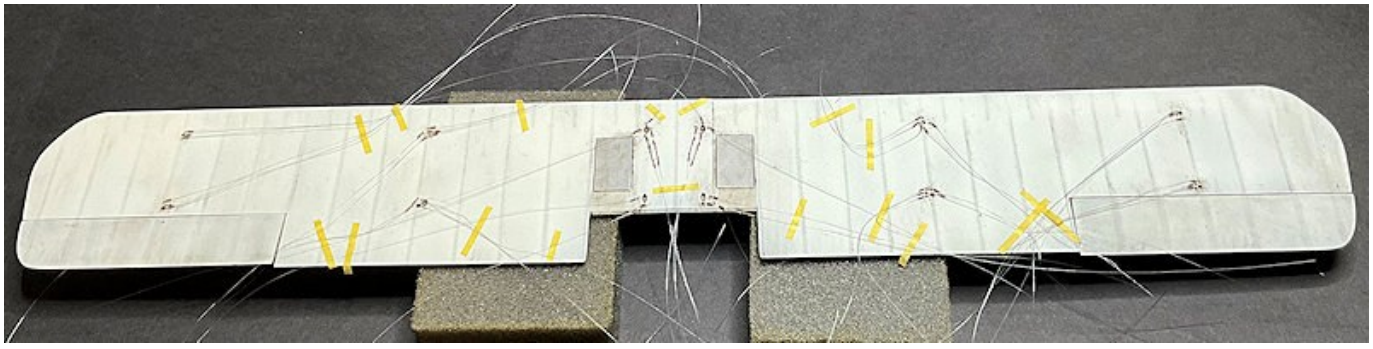
Using the previous example, attach a line to both ‘eye’ ends of a turnbuckle.

Using the previous example, use one line of each turnbuckle to be pre-rigged to an anchor point for a fuselage cabane strut. Keep the line short between the turnbuckle and the anchor point (refer to the following photograph.

Use thin strips of masking tape to hold the lines clear of the location recesses for the interplane and fuselage cabane struts.







Rudder:

The rigging materials used are:

'Albion Alloy's' micro-tube of 0.4 mm diameter (Brass MBT04 or Nickel Silver NST04).

0.08 mm diameter mono-filament, such as that from 'Steelon' or 'Stroft GTM'.

'Gaspatch' 1:48th scale turnbuckles (Type C).

Brush the centre barrel of two turnbuckles with 'Mr. Metal Color' Copper (215) or similar.

Using the previous example, attach a line to both 'eye' ends of one turnbuckle.

Pass one of the lines through the pre-drilled hole in one of the rudder control horns.

Using the previous example, attach a line to one 'eye' end of the second turnbuckle.

Cut a short length of blackened tube.

Slide the tube onto the line that was passed through the control horn.

Using the previous example, attach the line to the free 'eye' end of the second turnbuckle. Make sure the line is drawn close to the control horn but with both turnbuckles/tubes just clear of the control horn.

Repeat the procedure to attach two turnbuckles to the other rudder control horn.

Cut a long length of line.

Pass the line through the pre-drilled hole in the control horn.

Pass the ends of the line rearwards and through the pre-drilled holes in the rudder.

Pass the ends of the line forwards and through the pre-drilled hole in the other control horn.

Keeping both ends of the line taut, secure the lines in the control horn using thin CA adhesive.

Carefully cut away residual lines tags at the control horn.

Elevators:

NOTE: *The rigging materials used are:*

'Albion Alloy's' micro-tube of 0.4 mm diameter (Brass MBT04 or Nickel Silver NST04).

0.08 mm diameter mono-filament, such as that from 'Steelon' or 'Stroft GTM'.

'Gaspatch' 1:48th scale turnbuckles (Type A).

Brush the centre barrel of two turnbuckles with 'Mr. Metal Color' Copper (215) or similar.

Using the previous example, attach a line to the 'eye' ends of both turnbuckles.

Insert the 'leg' of the turnbuckle into the pre-drilled holes at the front of the elevator control horns.

Cut a long length of line.

Cut two short lengths of tube.

Insert one end of the line into the pre-drilled hole at the rear of the top elevator control horn and past the 'leg' of the inserted turnbuckle.

Using thin CA adhesive, secure the 'leg' of the turnbuckle and the line into the pre-drilled hole in the control horn.

Slide a tube onto the line.

Pass the free end of the line rearwards and down through the pre-drilled hole in the elevator.

Slide the second tube onto the free end of the line.

Insert the free end of the line into the pre-drilled hole at the rear of the underside elevator control horn and past the 'leg' of the inserted turnbuckle.

Keeping the line taut, use thin CA adhesive to secure the 'leg' of the turnbuckle and the line into the pre-drilled holes in the underside control horn.

Cut away any residual end tag of line at the control horns.

Repeat the procedure to attach two turnbuckles and line to the other elevator.

Fin bracing:

The rigging materials used are:

'Albion Alloy's' micro-tube of 0.5 mm diameter (Brass MBT04 or Nickel Silver NST04).

0.12 mm diameter mono-filament, such as that from 'Steelon' or 'Stroft GTM'.

Forward bracing wires:

Cut a long length of line.

Cut eight short lengths of tube.

Insert one end of the line into the forward, pre-drilled hole at the bottom edge of the fuselage.

Secure the line in the hole using thin CA adhesive.

Slide two tubes onto the line.

Pass the line across and up through the pre-drilled hole through the tailplane leading edge.

Slide two tubes onto the line.

Pass the line across and through the forward pre-drilled hole in the top of the fin.

Slide two tubes onto the line.

Pass the line across and down through the pre-drilled hole through the opposite tailplane leading edge.

Slide two tubes onto the line.

Insert the free end of the line into the forward, pre-drilled hole at the bottom edge of the fuselage. Trim the length of the line if necessary.

Keeping the line taut, use thin CA adhesive to secure the line in the hole.

Slide the tubes on the lines up to the fin, tailplanes and fuselage and secure in position using thin CA adhesive.

Rear bracing wires:

Cut three long lengths of line.

Cut eight short lengths of tube.

Insert the end of one line into the rear, pre-drilled hole at the bottom edge of the fuselage.

Insert the end of the other two into the rear, pre-drilled holes at the bottom edge of the fuselage rear.

Secure the lines in the holes using thin CA adhesive.

Slide two tubes onto the three lines.

Pass the lines across and up through the pre-drilled holes through the tailplane trailing edges.

Slide two tubes onto one of the lines.

Pass that line across and through the rear pre-drilled hole in the top of the fin.

Slide two tubes onto the line.

Pass the line across and down through the pre-drilled hole through the opposite tailplane trailing edge.

Slide two tubes onto the line.

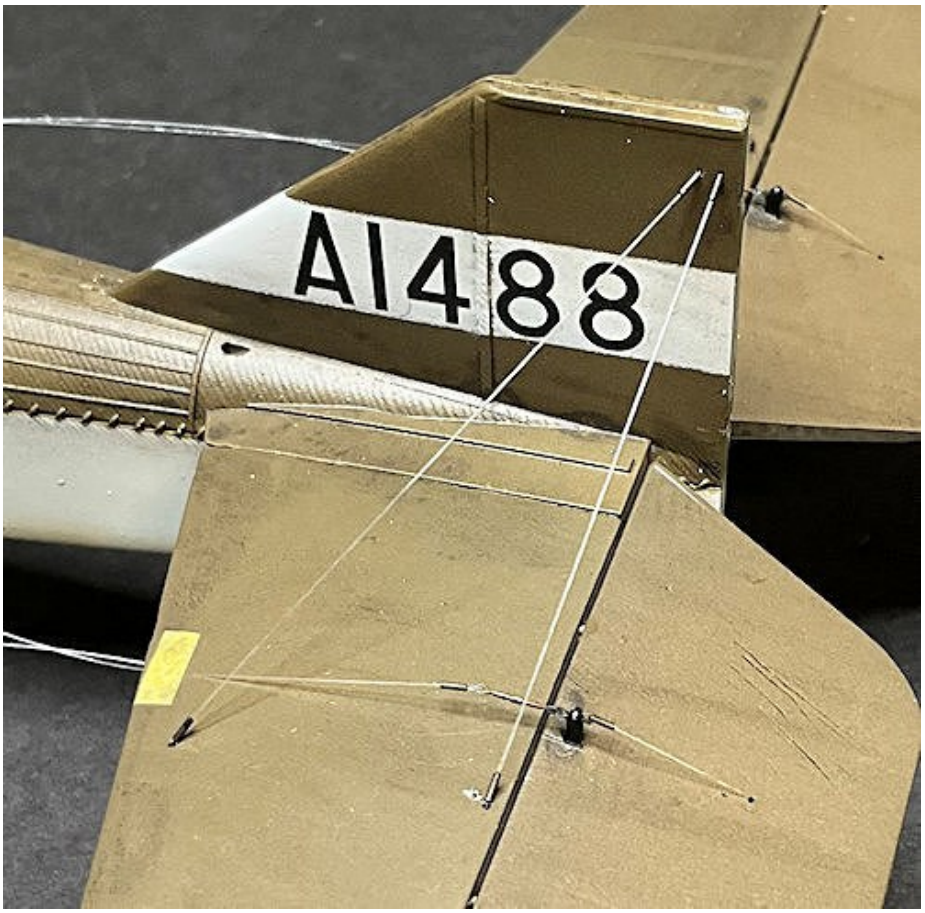
Insert the free end of the line into the rear, pre-drilled hole at the bottom edge of the fuselage. Trim the length of the line if necessary.

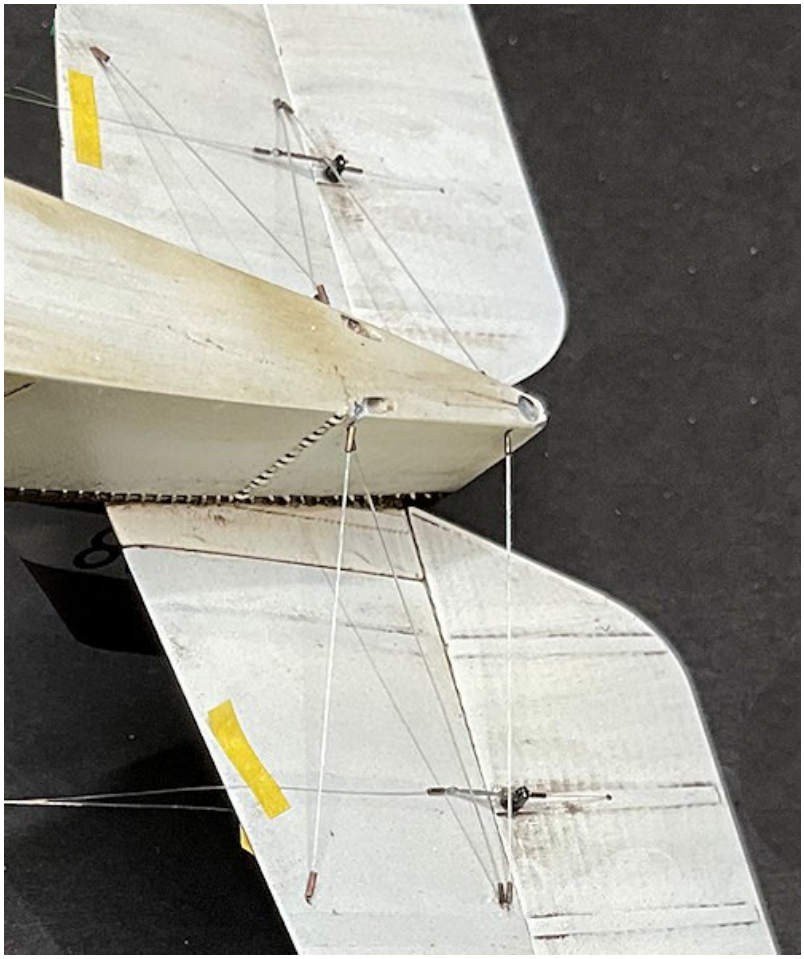
Keeping the line taut, use thin CA adhesive to secure the line in the hole.

Keeping the lines from the fuselage rear taut, use thin CA adhesive to secure the lines in the holes in the tailplanes.

Cut away any residual end tag of lines at the tailplane top surfaces.

Slide the tubes on the lines up to the fin, tailplanes and fuselage and secure in position using thin CA adhesive.



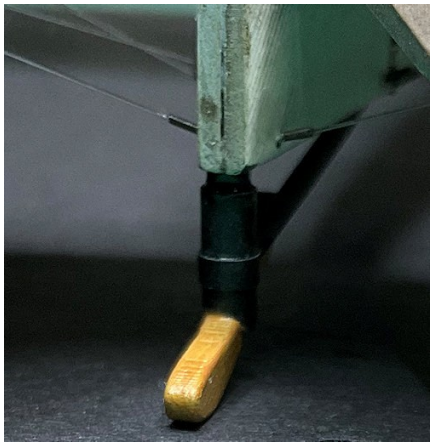


Assembly (continued):

NOTE: *Make sure all mating surfaces and recesses are clear of primer, paint etc.*

Landing gear assembly:

Using thin CA adhesive, secure the landing gear assembly fully into its four under fuselage locating recesses and the two side struts into their fuselage side recesses and the tail skid fully into its locating hole and strut locations in the rear, underside of the fuselage.



Rudder:

Using thin CA adhesive applied to the two added support rods, secure the rudder fully onto the rear of the fin.

Upper wing:

NOTE: *Make sure all strut ends and strut recesses in the upper and lower wings are clear of primer, paint etc.*

Test fit the four fuselage cabane struts into their locating recesses in the upper wing. If necessary, reduce the strut ends so allow the struts to fully locate into their locating recesses in the wing.

Test fit each interplane strut into its locating recesses in the upper and lower wings. If necessary, reduce the strut ends so allow the struts to fully locate into their locating recesses in the wings.

NOTE: *The pre-rigged lines on the underside of the upper wing are close to the interplane strut locating recesses. Applying cement to secure the strut into the wing may cause cement to contaminate the pre-rigging. Therefore, using a thicker adhesive, such as 'Araldite Rapid' two part epoxy resin, to fit the fuselage cabane struts reduces the chances of contamination.*

Mix a small amount of 'Araldite Rapid' epoxy resin adhesive to a 50/50% ratio.

Apply a small amount of adhesive into the bottom of the four locating recesses in the upper wing for the fuselage cabane struts.

Locate the upper wing onto the four fuselage cabane struts, making sure the wing is fully located onto the struts.

Allow the adhesive to fully set.

NOTE: *To hold the wing in place on the stuts, I use elastic bands around the wings.*

Locate each strut into its locating recesses in the underside of the upper wing and top surface of the lower wings.

NOTE: *During the following step, do not apply too much adhesive that may contaminate the pre-rigged lines.*

Apply a small amount of thin CA adhesive at all of the interplane struts to wings joints.

Allow the adhesive to set then remove any elastic bands from the wings, if used.

Remove any masking tape used to hold the pre-rigged lines clear of the strut to wing locations.

Check that all pre-rigged lines on the underside of the upper wing are free to move.

Check all pre-drilled rigging holes in the top surface of the lower wings to make sure they are not blocked with adhesive. If necessary, use a drill of 0.3 mm diameter to clear any blocked holes.

Rigging - final tensioning:

Invariably after rigging has been completed, some wires may be slack. This can be remedied by careful application of heat along the line.

WARNING: *Care needs to be taken when using this method to tension line, as using a heat source is required.*

NOTE: *Take care not to linger at one area of a line with the heat source as this will melt the mono-filament causing the line to break. Also take care not to touch any part of the model or any other rigging, as this will also cause damage through melting.*

Carefully move a suitable heat source (I use a small electrical soldering iron) close to and along the slack line, keeping the heat source always moving. You will see the line tension as the applied heat takes effect, shrinking the line.

Final rigging:

NOTE: *Refer to Part 8 (Rigging) and Part 11 (Preparation and Modifications) of this build log for more information.*

Fuselage cabane strut bracing wires:

Pass the free ends of the two pre-rigged lines that are inboard from the tops of the front fuselage cabane struts, down and diagonally crossed to their pre-drilled holes in the top of the fuselage, between the base of the struts.

Cut away enough of the lines that they can be fully inserted into their fuselage holes.

Insert the lines into their fuselage holes and keeping the lines taut, secure them in the holes using thin CA adhesive.

Pass the free ends of the two pre-rigged lines that are forward from the tops of the front fuselage cabane struts, forwards to their pre-drilled holes in the engine top cover panel.

Insert the lines into their holes in the panel and keeping the lines taut, secure them in the holes using thin CA adhesive.

Cut away residual line from the underside of the panel.

Pass the pre-rigged line at the rear of the top of the front fuselage cabane strut down, outside the cabane struts and through the forward anchor point fitted in the fuselage side.

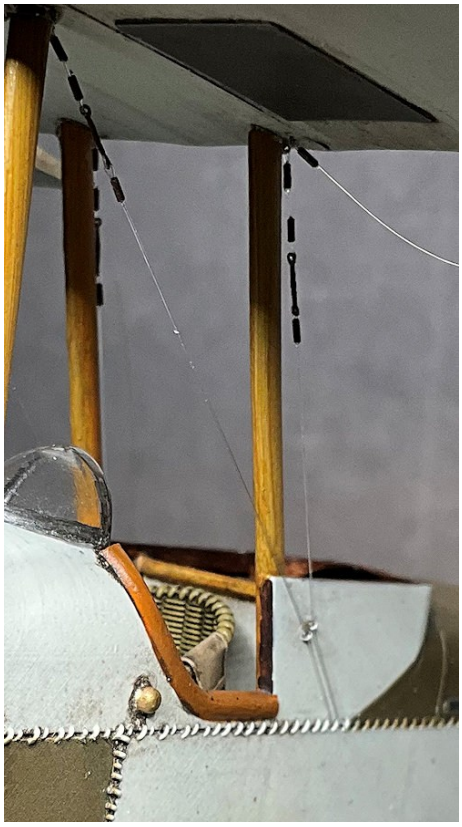
Pass the line through the forward pre-drilled hole at the fuselage side stitching.

Keeping the line taut, secure it into its anchor point and the fuselage hole, using thin CA adhesive.

Repeat the procedure to the pre-rigged line at the rear of the fuselage rear fuselage cabane strut, passing it through the rear anchor point fitted in the fuselage and the rear pre-drilled hole at the fuselage side stitching.

Repeat the previous procedure for the two pre-rigged lines on the opposite fuselage cabane struts.

Carefully cut away residual line from the inner sides of the rear cockpit.



Rear cockpit aileron control cables:

NOTE: *The rigging material used is 0.12 mm diameter mono-filament, such as that from 'Steelon' or 'Stroft GTM'.*

Cut a long length of 0.12 mm diameter mono-filament.

Pass the line through the pre-fitted anchor point on the top surface of the lower wing between the inboard interplane struts.

Insert the line into the pre-drilled hole in the top surface of the upper wing, inboard from the outer, forward interplane strut.

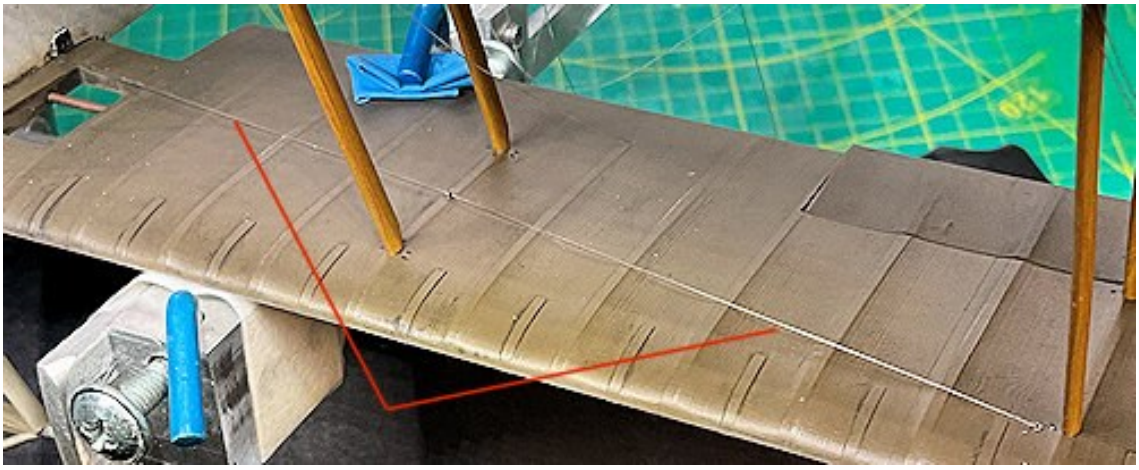
Secure the line in the hole using thin CA adhesive.

Trim the length of the other end of the line so it can be fully inserted into the pre-drilled hole in the bottom edge of the fuselage side, forward of the rear flying wire rigging holes.

Insert the line into the hole in the fuselage.

Keeping the line taut, secure the line in the hole using thin CA adhesive.

Repeat the procedure at the opposite lower wing.



Fitting turnbuckles example:

NOTE: *The rigging materials used are:*

'Albion Alloy's' micro-tube of 0.5 mm diameter (Brass MBT05 or Nickel Silver NST05).

'Gaspatch' metal 1/32nd scale turnbuckles (Type A).

Cut a short length of blackened tube.

De-burr the bore of the tube with 0.3 mm diameter drill.

Pass the pre-rigged line through the tube then through 'eye' of the turnbuckle.

Loop the line back and through the tube.

Slide the tube up towards the 'eye' of the turnbuckle, leaving the loop of line loose.

Insert the turnbuckle into its pre-drilled locating hole.

Slide the tube up to, **but not touching**, the 'eye' of the turnbuckle

Secure the wires in the tube, using thin CA adhesive applied to the tube end farthest from the turnbuckle.

Cut away any residual end tag of line at the tube end.

Check that the line is free to move in the 'eye' end of the turnbuckle.

Interplane strut incidence wires:

NOTE: *Each pre-rigged interplane incidence wire should be fitted into the diagonally opposite pre-drilled rigging hole in the lower wing.*

Using the previous example add a turnbuckle onto a pre-rigged interplane incidence wire and secure it into its pre-drilled locating hole.

Repeat to secure the opposite interplane incidence wire into its pre-drilled locating hole.

Repeat the procedure to fit the remaining six interplane incidence wires.

Flying wires:

NOTE: *Each pre-rigged flying wire should be fitted into its into the diagonally opposite pre-drilled rigging hole in the lower wing.*

Using the previous example, add a turnbuckle onto the single forward, inner flying wires and secure them into their pre-drilled locating holes in the forward rigging plate on the bottom edge of the fuselage.

Using the previous example, add a turnbuckle onto the rear pair of inner flying wires and secure them into their pre-drilled locating holes in the forward rear plate on the bottom edge of the fuselage.

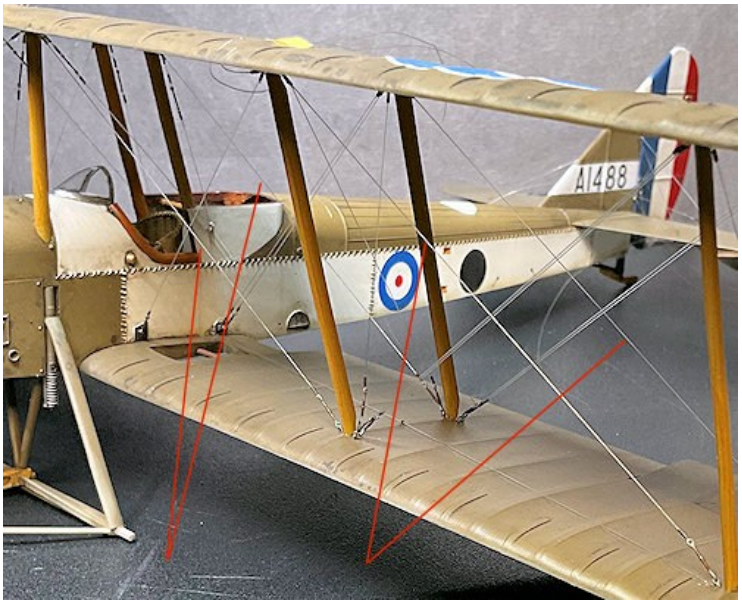
Using the previous example, add a turnbuckle onto the rear pair of outer flying wires and secure them into their pre-drilled locating holes in the lower wings.

Using the previous example, add a turnbuckle onto the forward pair of outer flying wires and secure them into their pre-drilled locating holes in the lower wings.

Landing wires:

NOTE: *Each pre-rigged landing wire should be fitted into its into the diagonally opposite pre-drilled rigging hole in the lower wing.*

Using the previous example, add a turnbuckle onto the single landing wires (four each side) and secure them into their pre-drilled locating holes in the lower wings.



Anti-drag wires:

NOTE: *Each pre-rigged anti-drag wire should be fitted into its pre-drilled rigging hole in the bottom edge of the fuselage sides, below the rear cockpit.*

Pass the free end of the lines fully into the pre-drilled hole in the bottom edge of the fuselage sides, below the rear cockpit.

Keeping the lines taut, secure them into the holes using thin CA adhesive.

Drag wires:

NOTE: *Each pre-rigged drag wire should be fitted into its pre-drilled rigging hole in the underside of the upper wing and top surface of the lower wings.*

The rigging materials used are:

'Albion Alloy's' micro-tube of 0.5 mm diameter (Brass MBT05 or Nickel Silver NST05).

'Gaspatch' 1:32nd scale turnbuckles (Type A).

Upper drag wire:

Brush the centre barrel of a turnbuckle with 'Mr. Metal Color' Copper (215) or similar.

Using the previous example, attach an upper drag wire from the underside of the upper wing to the 'eye' end of the turnbuckle, but do not secure the line in the turnbuckle and tube and leave the loop of line loose.

Insert the leg of the turnbuckle into the pre-drilled hole at the bottom edge in the forward fuselage.

Secure the turnbuckle in the hole using thin CA adhesive.

Keeping the line taut, slide the tube up to the 'eye' of the turnbuckle.

Secure the line in the tube using thin CA adhesive.

Cut away residual end tag of line at the tube end.

Repeat the procedure for the opposite upper drag line.

Lower drag wire:

Brush the centre barrel of a turnbuckle with 'Mr. Metal Color' Copper (215) or similar.

Using the previous example, attach an lower drag wire from the top surface of the lower wing to the 'eye' end of the turnbuckle, but do not secure the line in the turnbuckle and tube and leave the loop of line loose.

Insert the leg of the turnbuckle into the pre-drilled hole at the top edge in the forward fuselage.

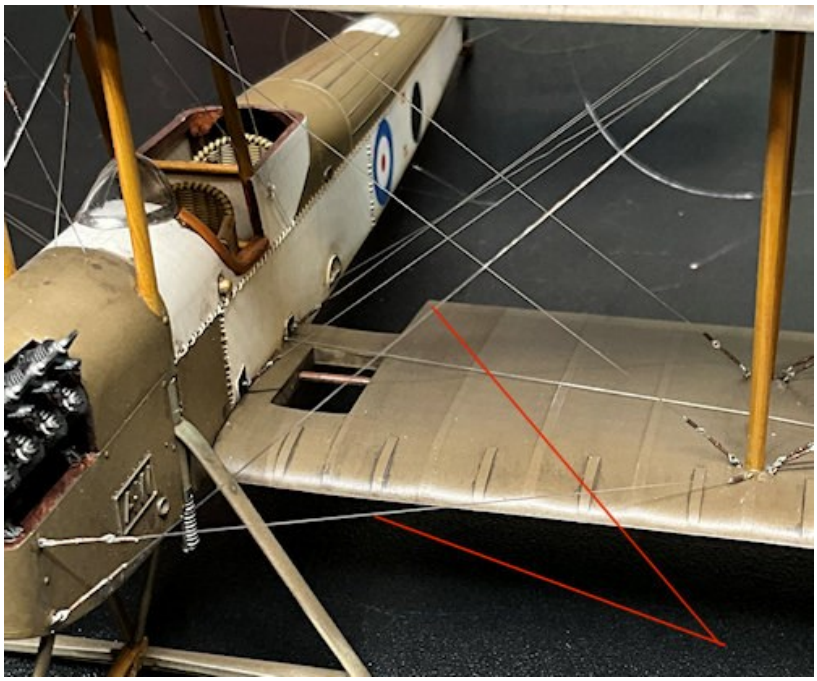
Secure the turnbuckle in the hole using thin CA adhesive.

Keeping the line taut, slide the tube up to the ‘eye’ of the turnbuckle.

Secure the line in the tube using thin CA adhesive.

Cut away residual end tag of line at the tube end.

Repeat the procedure for the opposite lower drag line.



Landing gear bracing wires:

NOTE: *The rigging materials used are:*

‘Albion Alloy’s’ micro-tube of 0.4 and 0.5 mm diameter (Brass MBT04/05 or Nickel Silver NST04/05).

0.12 mm diameter mono-filament, such as that from ‘Steelon’ or ‘Stroft GTM’.

‘Gaspatch’ 1:32nd scale turnbuckles (Type A).

Cut two long lengths of line.

Cut four short lengths of blackened 0.4 mm diameter tube.

Cut four short lengths of blackened 0.5 mm diameter tube.

Brush the centre barrel of four turnbuckles with ‘Mr. Metal Color’ Copper (215) or similar.

Bracing wire 1:

Brush the centre barrel of two turnbuckles with ‘Mr. Metal Color’ Copper (215) or similar.

Using the previous example, attach one end of a line to the ‘eye’ end of a turnbuckle.

Insert the leg of the turnbuckle into one of the pre-drilled holes on the underside of the fuselage, forward from the top of the landing gear rear ‘V’ strut.

Secure the turnbuckle in the hole using thin CA adhesive.

Slide a 0.4 mm diameter tube onto the line.

Pass the free end of the line through the pre-drilled hole in the landing gear skid at the bottom of the landing gear forward ‘V’ strut.

Slide a 0.4 mm diameter tube onto the line.

Using the previous example, attach the free end of the line to the second turnbuckle, but do not secure the line in the turnbuckle and tube and leave the loop of line loose.

Insert the leg of the turnbuckle into the opposite pre-drilled hole on the underside of the fuselage, forward from the top of the landing gear rear ‘V’ strut.

Secure the turnbuckle in the hole using thin CA adhesive.

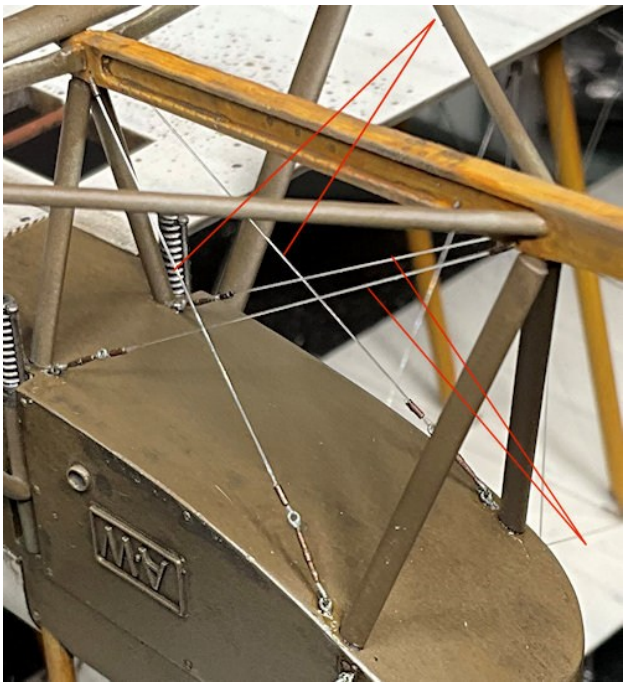
Keeping the line taut, slide the tube up to the ‘eye’ of the turnbuckle.

Secure the line in the tube using thin CA adhesive.

Cut away residual end tag of line at the tube end.

Bracing wire 2:

Repeat the previous procedure to rig the second bracing wire to the landing, but using the pre-drilled holes in the underside of the fuselage, rear of the top of the landing gear forward ’V’ strut and the pre-drilled hole in the landing gear skid at the bottom of the landing gear rear ‘V’ strut.



Pilot’s aileron control cables:

NOTE: *The rigging materials used are:*

‘Albion Alloy’s’ micro-tube of 0.5 diameter (Brass MBT05 or Nickel Silver NST05).
0.08 mm diameter mono-filament, such as that from ‘Steelon’ or ‘Stroft GTM’.
‘Gaspatch’ 1:48th scale turnbuckles (Type C).

Rear aileron cables:

Cut four short lengths of blackened tube.

Cut one long length of line.

Pass the line through a tube then through the pre-drilled hole at the top, rear of the upper wing aileron control horn.

Loop the line back and through the tube.

Slide the tube up to the control horn and secure the lines in the tube using thin CA adhesive.

Cut away residual end tag of line at the tube end.

Pass the free end of the line rearwards and through the pre-drilled hole in the aileron to between the wings.

Slide two tubes onto the line.

Pass the free end of the line through the pre-drilled hole in the lower wing aileron.

Pass the line through the last tube then through the pre-drilled hole at the top, rear of the lower wing aileron control horn.

Loop the line back and through the tube.

Keeping the line taut, slide the tube up to the control horn and secure the lines in the tube using thin CA adhesive.

Cut away residual end tag of line at the tube end.

Repeat the procedure to the ailerons fitted in the wings on the opposite side of the aircraft.

Upper wing - forward aileron cable:

Brush the centre barrel of five turnbuckles with ‘Mr. Metal Color’ Copper (215) or similar.

Cut eight short lengths of blackened tube.

Cut four long lengths of line.

Pass a line through a tube then through the ‘eye’ end of a Type C turnbuckle.

Loop the line back and through the tube.

Slide the tube up to, **but not touching**, the turnbuckle.

Secure the lines in the tube using thin CA adhesive.

Cut away residual end tag of line at the tube end.

Repeat the procedure to attach a second line to the opposite ‘eye’ end of the turnbuckle.

Repeat the procedure to the other three aileron control horns.

Pass one of the lines through a tube then through the pre-drilled hole in the top, front of an aileron control horn.

Slide the tube up to the control horn, leaving a gap in the lines between the fitted tubes.

Secure the lines in the tube using thin CA adhesive.

Cut away residual end tag of line at the tube end.

Pass the free end of the other line forwards and through the previously fitted anchor point at the wing leading edge.

Pass the line inboard across the wing and through the previously fitted anchor point at the wing centre section.

Attached a Type C turnbuckle as before, but leave the loop of line loose.

Repeat the procedure to the opposite side of the wing.

Attach the line to the free ‘eye’ end of the turnbuckle at the wing centre section.

Keeping the two lines taut, slide the tubes up to, **but not touching**, the turnbuckle ends, making sure the turnbuckle is positioned centrally over the wing centre section.

Secure the lines in the tube using thin CA adhesive.

Cut away residual end tag of line at the tube ends.

Lower wing - forward aileron cable:

Cut two short lengths of blackened tube.

Cut two long lengths of line.

Secure one end of the lines in the pre-drilled holes in the bottom edge of the fuselage side at the fuselage stitching, using thin CA adhesive.

Pass the free ends of the lines outboard across the underside of the lower wings and through the two previously fitted anchor points, then rearwards to towards the underside aileron control horns.

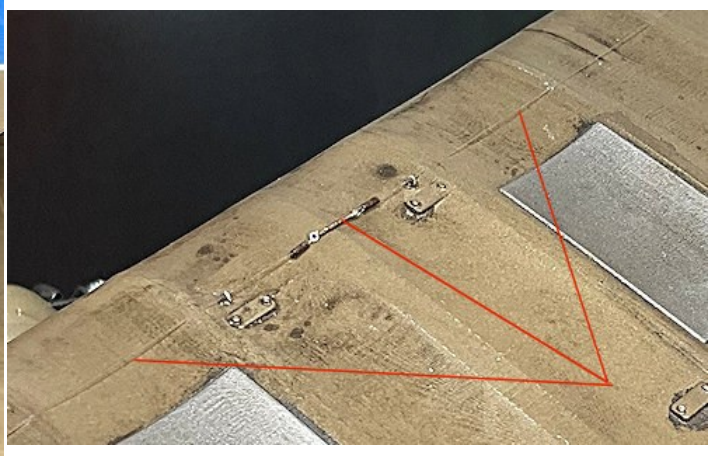
Pass the lines through a tube then through the free ‘eye’ end of the fitted turnbuckle.

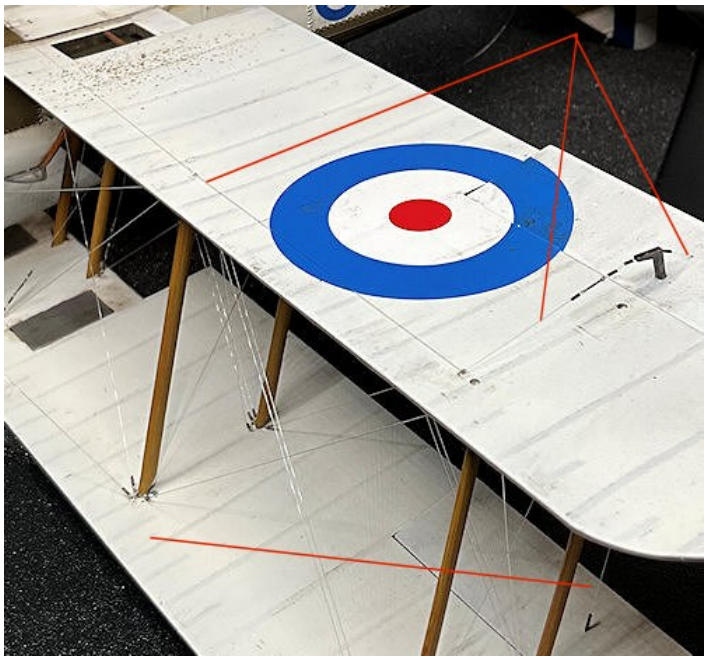
Loop the line back and through the tube.

Keeping the lines taut, slide the tubes up to, **but not touching**, the turnbuckle.

Secure the lines in the tubes using thin CA adhesive.

Cut away residual end tag of line at the tube ends.





Rudder control cables:

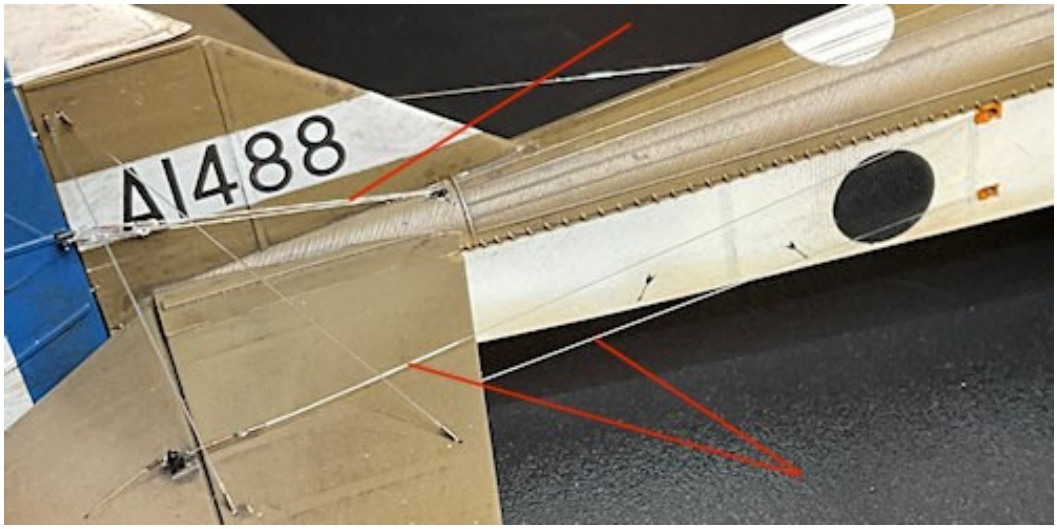
Keeping the pair of lines taut, secure them into the rudder cable exit port on the top, rear of the fuselage using thin CA adhesive.

Repeat to secure the pair of lines on the other side of the rudder.

Elevator control cables:

Keeping the pair of lines taut, secure them into their elevator cable exit ports on the side of the fuselage using thin CA adhesive.

Repeat to secure the pair of lines on the other side of the fuselage.

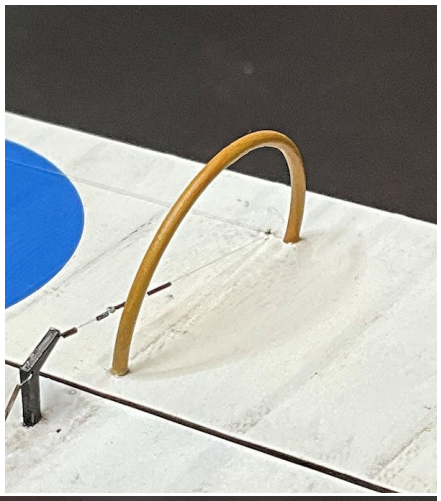


Assembly (continued):

NOTE: *Make sure all strut ends and strut recesses in the upper and lower wings are clear of primer, paint etc.*

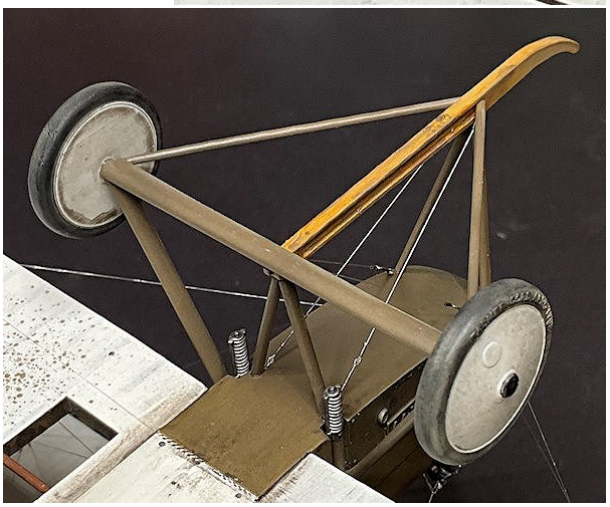
Wing hoops:

Using thin CA adhesive, secure the two wing hoops into their locating recesses in the outer, underside of the lower wings. The hoops should be angled slightly towards the wing tips.



Wheels:

Using a thicker, slow setting CA adhesive, secure the two wheels fully onto the ends of the axle.

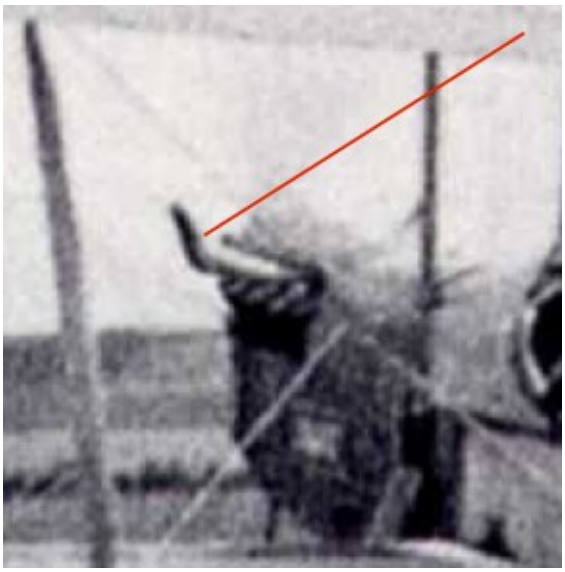


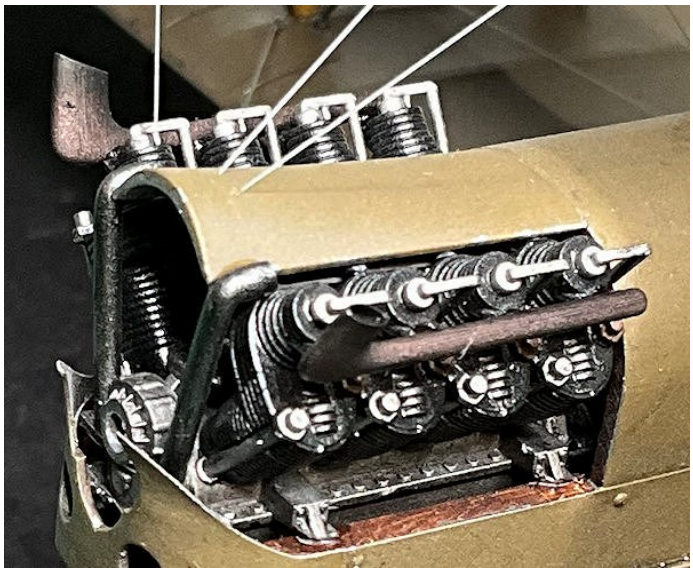
Engine exhaust pipes:

NOTE: *The engine and two engine exhaust pipes do not have any locating holes or pegs, but are printed to be 'butt' joined. Various exhaust pipe version were fitted to the FK.3 and the kit supplied version, on this particular aircraft, were angled slightly outboard.*

Make sure any paint etc is removed from the four exhaust outlets at the top, outboard side of the engine cylinders.

Using a thin CA adhesive, secure the exhaust pipes in position on the engine, making sure the pipes are angles out slightly, when viewed from the front.





Propeller:

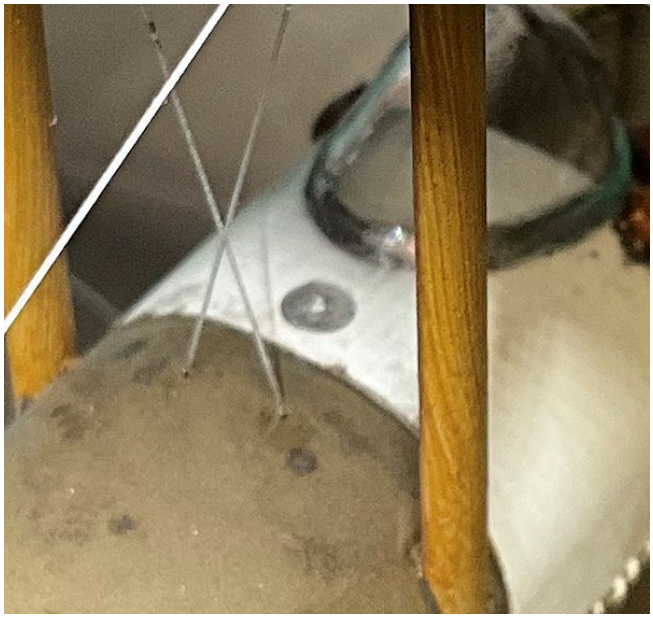
Using a thin CA adhesive, secure the propeller into the pre-drilled hole in the front of the installed engine.

Modifications:

Tank filler cap:

NOTE: *Photographs of this particular aircraft show a tank, presumably fuel tank, being filled through a filler located in the fuselage top, forward from the pilot's cockpit.*

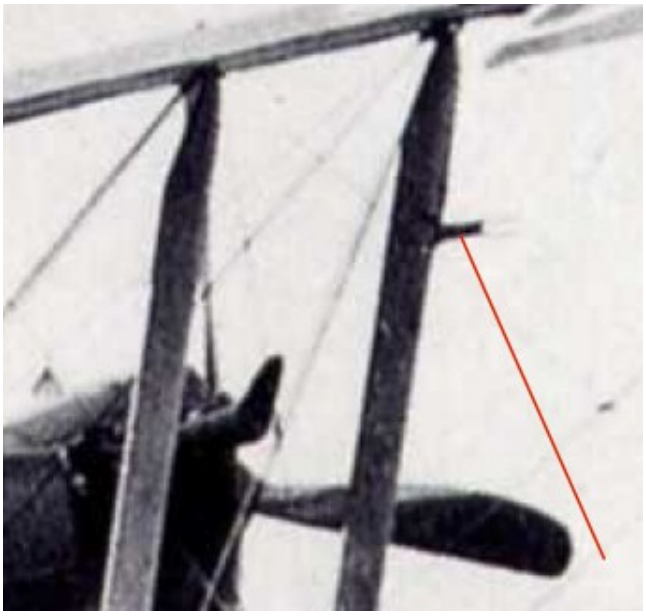
I cut a 2.5 mm diameter disc of 0.3 mm thick plastic card, which was then brush painted with 'Mr. Metal Color' Stainless Steel (213) and secured in position using thin CA adhesive.



Pitot static pipes:

NOTE: *Photographs of this particular aircraft show dual pitot static pipes fitted to the right side, inner forward interplane strut.*

I cut and shaped a piece of 1.0 mm thick plastic card. The front edge was drilled with two holes of 0.3 mm diameter, into which I secured 0.3 mm diameter Brass rod from 'Albion Alloy's' (MBT03). The rear edge was drilled with a hole of 0.3 mm diameter, into which I secured a 0.3 mm diameter Brass rod. The body of the assembly was brush painted with 'Tamiya' Flat Black (XF1).The front edge of the right side, inner forward interplane strut was drilled with a hole of 0.3 mm diameter. Using thin CA adhesive, the assembly was secured in position centrally on the interplane strut. A length of 'ANYZ' black braided line 0.5 mm (AN011) was cut and secured onto the strut using thin CA adhesive.



PART 14
FIGURES

PART 14 - FIGURES

The figures I chose to use with this model are the **'Kellerkind Miniaturen' RFC Pilot (54-056)** and the **RFC Pilot with dog (54-104)**.

RFC pilot:

NOTE: *This figure is supplied as the body, two arms and a Lewis machine gun, which will not be used on this model.*

Preparation:

Cut away any mold base blocks from the parts and sand or file off any residual mold block to blend with the surrounding surfaces.

Drill a hole of 0.8 mm diameter up into either the right or left leg of the body, making sure to keep the drill central to avoid breaking through the sides of the leg.

Cut a length of 0.8 mm diameter Brass rod, such as that from 'Albion Alloy's' or similar.

Using thin CA adhesive, secure the rod into the pre-drilled hole in the leg.

NOTE: *The fit of the arms into the body may need some adjustment to achieve a seamless fit.*

Using thin CA adhesive, secure the left and right arms into their socket locations in the body of the figure.

If necessary, fill any obvious gaps with a modelling putty, such as 'Perfect Plastic Putty' or similar, then sand or file to blend with the surrounding surfaces.

Sand or scrape away any mold seam lines or surface artifacts.

Painting:

Airbrush the figure with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.

Brush paint the figure as follows:

'Fug Boots' (leggings)**, Gloves, Flying Helmet** - 'AK Interactive' 3rd Generation acrylics British Khaki Brown (AK11301).

'Sidcot Suit', 'Fug Boots' strapping - 'Tamiya' Dark Yellow (XF60) with Desert Yellow (XF59) highlights.

Collar, glove/ legging linings - 'AK Interactive' Faded White (AK3029) or similar.

Scarf - 'AK Interactive' French Uniform Base (AK3101) or similar.

Goggles and lenses - 'Tamiya' Gun Metal (X10) and Clear Yellow (X24) or similar.

Buttons, buckles - 'Mr. Metal Colour' Stainless Steel (213).

Shoes - 'Tamiya' Red Brown (XF64) or similar.

Flesh, moustache - 'AK Interactive' Base Flesh (AK3011) then Light Flesh (AK3012) with High light Flesh (AK3013). Moustache colour as desired.

Weathering:

Lightly sponge 'Tamiya' Weathering Master set A (mud) over the shoes.

Lightly sponge 'Tamiya' Weathering Master set D (oil stain) as desired, around such as elbows, pockets etc.

Lightly brush 'AK Interactive' (Kerosene AK-2039) over the white painted collar, glove and legging linings to give a dirty effect.

RFC pilot with dog:

NOTE: *This figure is supplied as the full body, dog head and tail and a pair of fur boots.*

Preparation:

Cut away any mold base blocks from the parts and sand or file off any residual mold block to blend with the surrounding surfaces.

Drill a hole of 0.8 mm diameter up into the right leg of the body, making sure to keep the drill central to avoid breaking through the sides of the leg.

Cut a length of 0.8 mm diameter Brass rod, such as that from ‘Albion Alloy’s’ or similar.

Using thin CA adhesive, secure the rod into the pre-drilled hole in the leg.

If necessary, fill any obvious gaps with a modelling putty, such as ‘Perfect Plastic Putty’ or similar, then sand or file to blend with the surrounding surfaces.

Sand or scrape away any mold seam lines or surface artifacts.

Modifications:

NOTE: *The tail of the dog is intended to be just a butt joint, but this is not a secure way as the tail is easily knocked off.*

Drill a hole of 0.3 mm diameter into the base of the dog tail and into the body of the dog.

Cut a length of 0.3 mm diameter Brass rod, such as that from ‘Albion Alloy’s’ or similar.

Using thin CA adhesive, secure the rod into the pre-drilled hole in the dog tail.

Test fit the tail into the dog body and if necessary, carefully bend it to the desired angle.

Painting:

Figure:

Airbrush the figure, dog head and tail with a grey primer, such as 'AK Interactive' Grey (AK758) or similar.

Brush paint the figure as follows:

'Sidcot Suit' - 'Tamiya' Dark Yellow (XF60) with Desert Yellow (XF59) highlights.

Gloves, Flying Helmet - 'AK Interactive' 3rd Generation acrylics British Khaki Brown (AK11301).

Collar, helmet, gloves linings - 'AK Interactive' Faded White (AK3029) or similar.

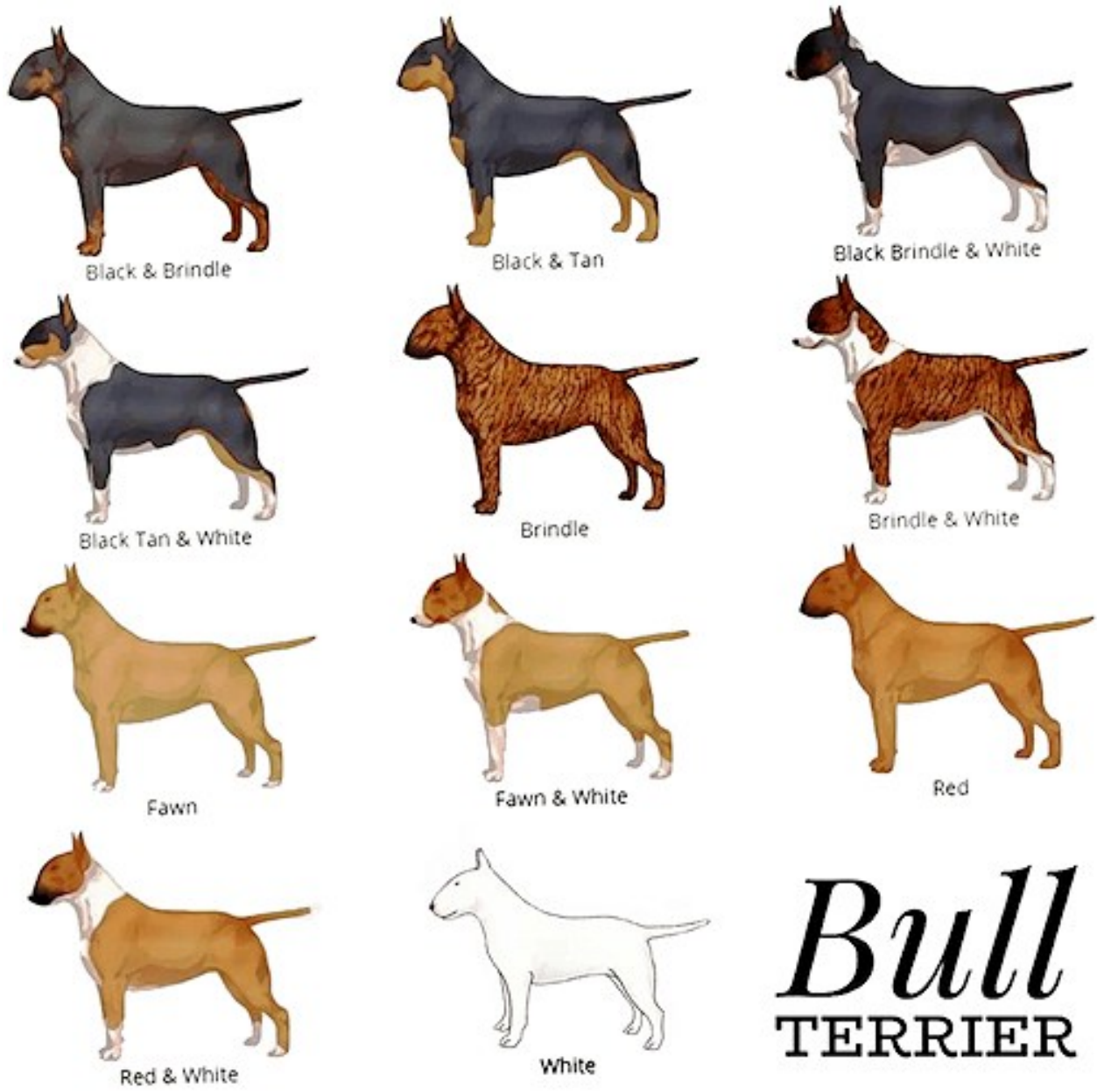
Buttons - 'Mr. Metal Colour' Stainless Steel (213).

Shoes - 'Tamiya' Red Brown (XF64) or similar.

Flesh and features - Paint as for the previous figure.

Dog:

NOTE: *The supplied dog is intended to represent a Bull Terrier and the following illustration shows typical Bull Terrier colourings.*



I chose to paint the dog as a 'Black and Tan' colouring.

Brush paint the dog body, head and tail as follows:

Body, head (tan areas) - 'Tamiya' Dark Yellow (XF60) with Desert Yellow (XF59).

Body, head, tail (black areas) - 'Tamiya' Flat Black (XF1).

Dog collar - ' Humbrol' Leather (62) or similar.

Tongue - 'AK Interactive' Shadow Flesh (AK3015) mixed with Highlight Flesh (AK3013).

Assembly:

Using thin CA adhesive, secure the dog head in position on the body.

Using thin CA adhesive, secure the dog tail into the body.

Weathering:

Lightly sponge 'Tamiya' Weathering Master set A (mud) over the shoes.

Lightly sponge 'Tamiya' Weathering Master set D (oil stain) as desired, around such as elbows, pockets etc.

Lightly brush 'AK Interactive' (Kerosene AK-2039) over the white painted collar, glove and legging linings to give a dirty effect.

PART 15
DISPLAY BASE

PART 15 - DISPLAY BASE

The display case in made from piano black and clear acrylic sheet of 3mm thickness. The Base plinth is 5 mm thick. The shoulder around the plinth is for locating the clear cover and 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

The grass mat used was the 'Polak' Wild Meadow variation E grass mat (4705).

The information plaque was engraved by 'TLS Engraving Ltd'.

Grass mat:

The grass mat was cut to the desired shape. The clear plastic backing was removed from the grass mat, which was then positioned on the base. The mat was laid onto the display base and positioned to ensure the model would clear the display top when located. A soft pencil was used to lightly trace the outline of the mat on the display base. PVA adhesive was then applied to the backing (underside) of the mat, which was then laid back onto the base, aligned to the pencil outline and gently pushed down to make proper contact. The grass mat was covered with a sheet of kitchen 'Cling Film' and several heavy books were then stacked onto the cling film, to press the grass mat fully in contact with the display base. The books and cling film were removed after two hours, when the edges of the grass mat were checked for contact (apply PVA adhesive if not). The grass tufts were gently brushed to remove any flatness.

Aircraft model:

The aircraft was not fixed to the display base, but left as 'free standing'. Although this may not be as secure as fixing the model to the display base, it does mean the model will not be subjected to shock loading when being moved around, as it might be if fixed on the display. However, the location of the wheels and tail skids were scored through the grass mat to give the model a firmer location.

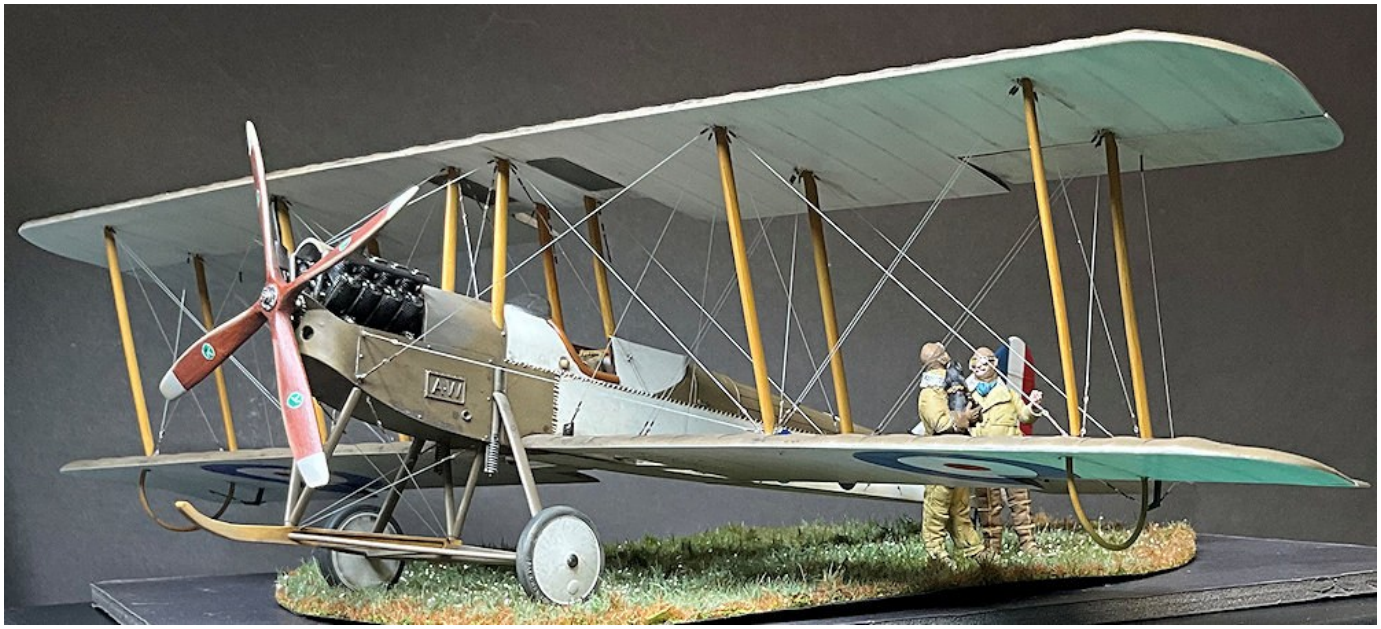
Figures:

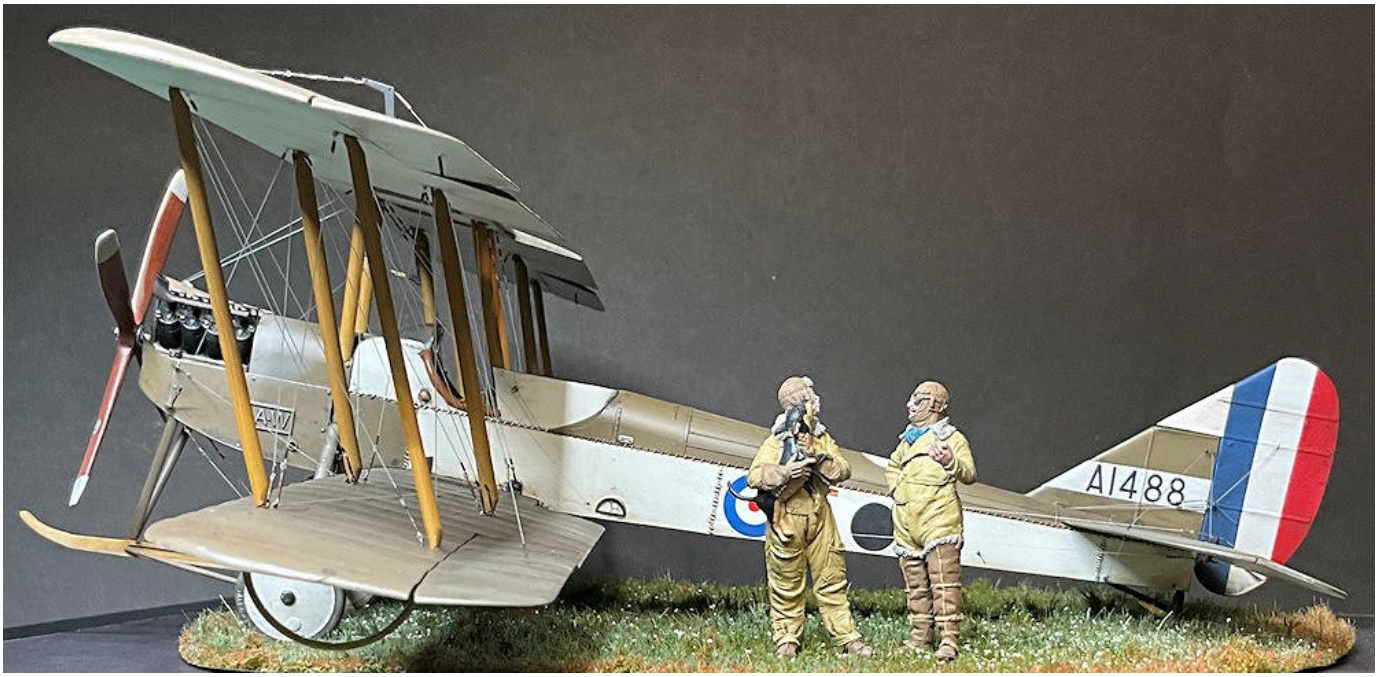
With the model positioned on the grass mat, the figures were positioned on the base in their final positions and the location of the pins in the legs of the figures was marked on the grass mat. Holes of 1.0 mm were drilled through the grass mat and into (not through) the base plinth. PVA or thin CA adhesive was then applied to the pins of the figures, which were then carefully seated into their drilled holes. Light pressure was applied to the figures to ensure they were fully located into the base.

Information plaque:

The acrylic stand for the information plaque was scuffed with sand paper on its bottom surface. It was then position in the left corner of the display base and its outline lightly scored with a pointed scriber. The area inside the scribed outline was scuffed with sand paper. An adhesive, such as a contact or two-part epoxy adhesive was applied to the scuffed surfaces and the stand positioned onto the scribed outline on the display base. Once the adhesive had fully set, the information plaque was secured onto the stand, using the self-adhesive tape on the rear face of the plaque.

PART 16
COMPLETED MODEL PHOTOGRAPHS

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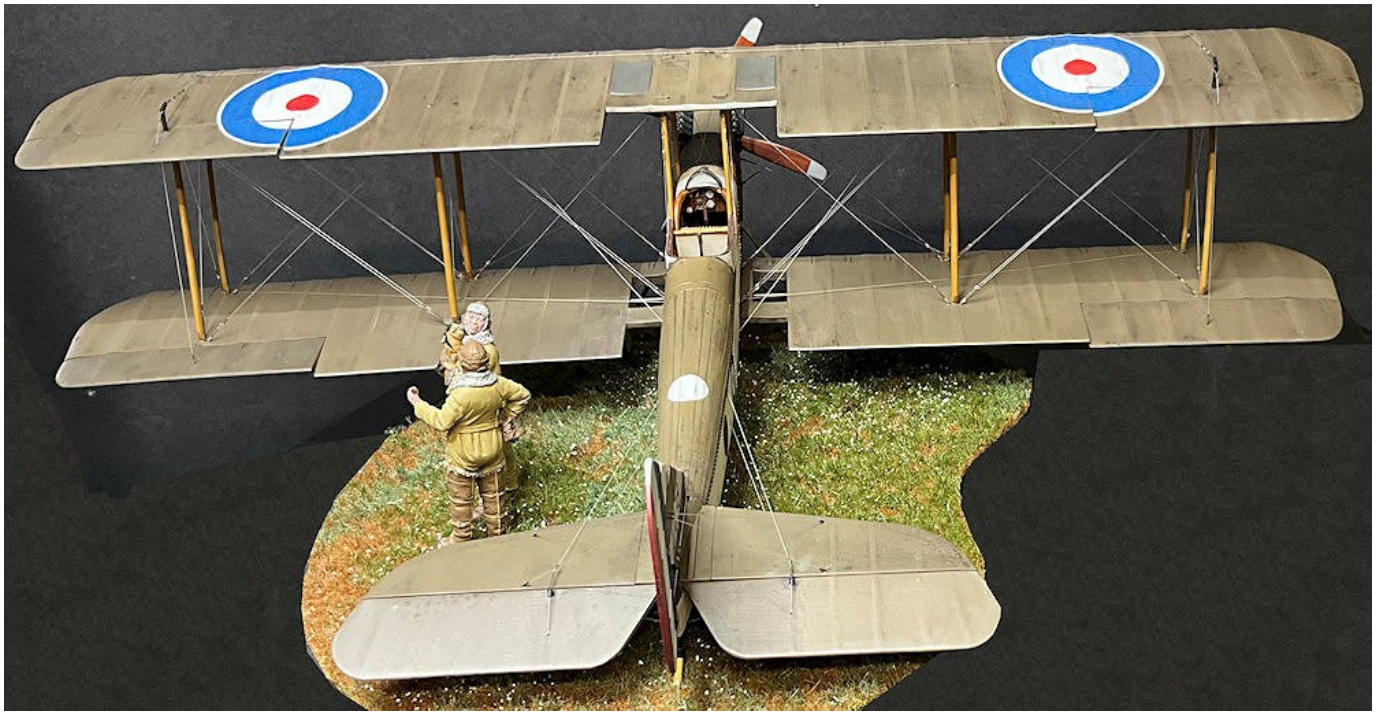


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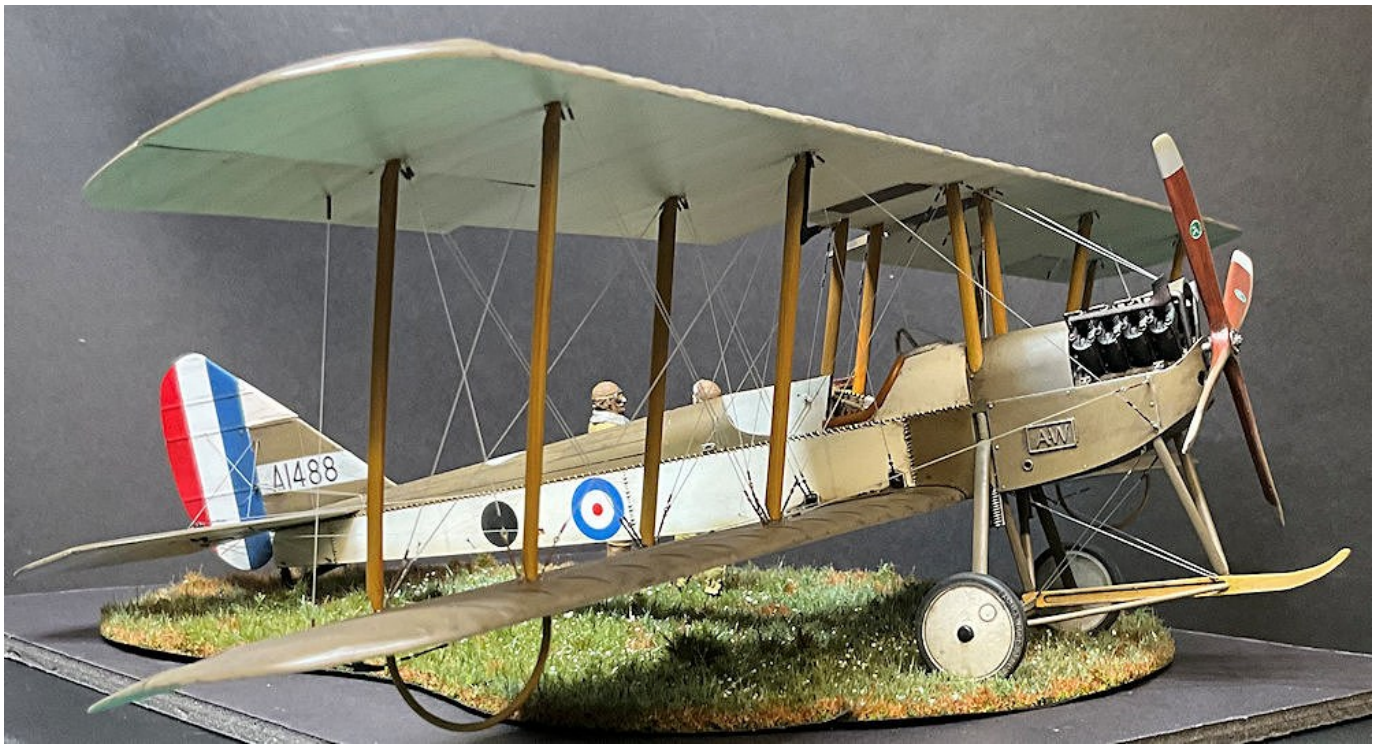
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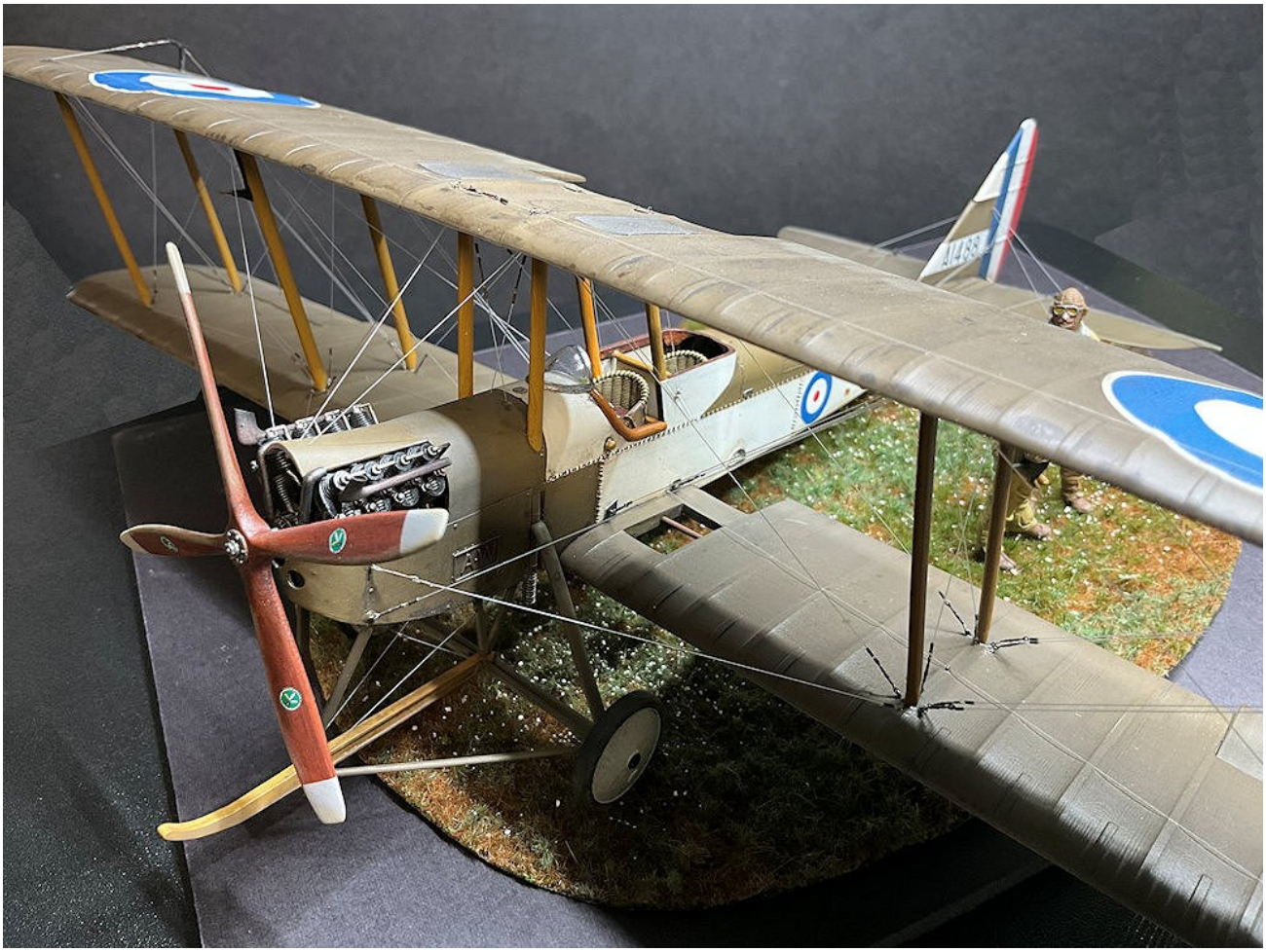

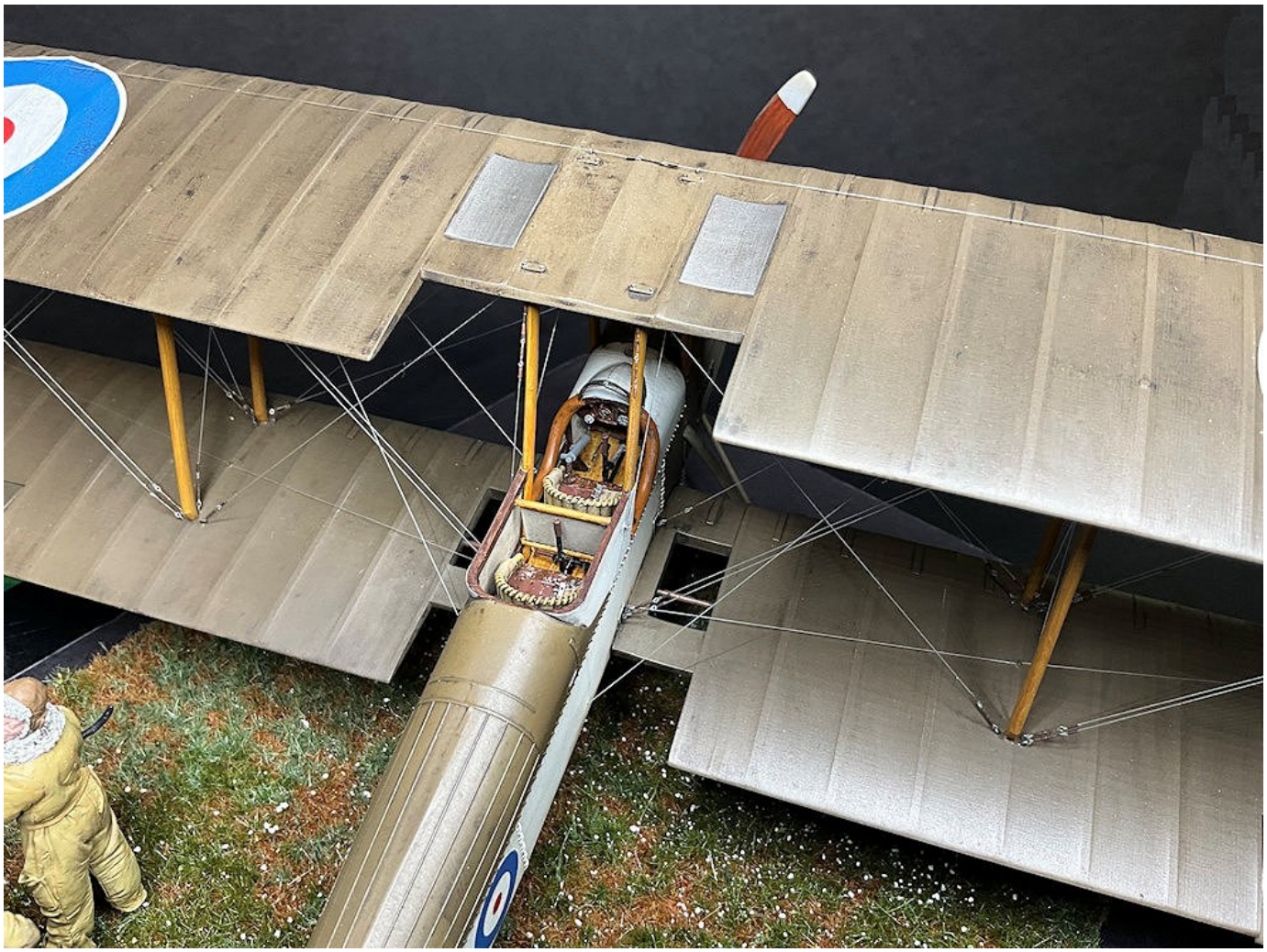

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