

Koolhoven F.K.49 and F.K.49A HA Models resin masters

Cartography and ambulance plane

Scale 1:72

This building report is slightly different from the usual ones; it addresses primarily the development of a master for a resin kit. The actual building report will be a separate document, addressing the building of the first (pre)production kit of the model.

Koolhoven F.K.49

First a bit of history of the original aircraft is presented. The Koolhoven F.K.49 has been developed on request of the Dutch Ordnance Survey (Topographische Dienst, TD) and the Air Service of the Dutch Army (Luchtvaartafdeling, LVA) and was operated by the LVA. The cooperation between the TD and the LVA existed already longer and for cartography and aerial photography a Fokker F.VIIa/3m or a Fokker C.IV of the LVA was used, for which only the direct operational cost was charged. The last one was not really fit for the task, the observer/photographer was sitting in open air and the available equipment was limited. The LVA used the first aircraft for other missions too -training, transport, bombing flights- so was badly available. The three-engine plane was also relatively expensive in operating. The Royal Dutch Airlines (KLM) had also an aircraft specifically equipped for cartography/aerial photography, the Fokker F.VIII PH-OTO, but this plane was commercially exploited, so even more expensive.

So an alternative was sought, which was less expensive to operate than these aircraft. When the Koolhoven F.K.48 appeared in 1934, a passenger aircraft accommodating six people and motorized by two De Havilland Gipsy Major engines of 135 horsepower, such an alternative seemed available. From the F.K.48 Koolhoven developed in 1934-1935 the F.K.49 equipped an on-board dark room. The aircraft had dual controls, so it could also be used for training. It accommodated a crew of four, a pilot, a navigator or second pilot, a photographer and an assistant photographer. The aircraft with a very characteristic angular forward fuselage was bought by the LVA, made its first flight on September 22, 1935 and was registered as 950. It was used for reconnaissance and photography missions by the LVA and was operated against direct operational cost by the LVA for the Ordnance Survey for cartography missions. It has been scrapped after the German occupation of the Netherlands in 1940.



Koolhoven F.K.49A

The F.K.49 has been developed in three versions with more powerful engines, which were assigned the designation F.K.49A. The first one was an aircraft for cartography and aerial photography for the Turkish Air Force with Ranger V-770 B-4 engines of 305 hp, the second one an ambulance aircraft for the Finnish Coast Guard with Hirth 508C engines of 285 hp, which could be equipped with a wheel or (EDO) float landing gear.

The third F.K.49A version, two aircraft with Argus

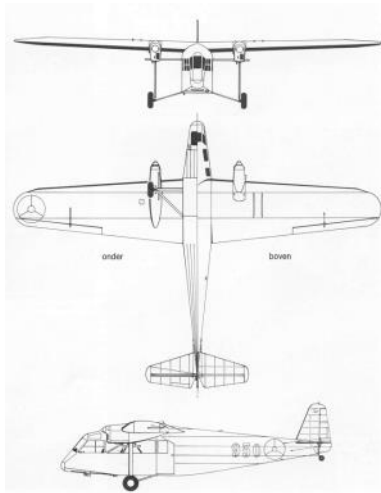


AS-10-C engines of 200 hp, has been ordered by Rumania. They were. The first two F.K.49A's have been delivered to the customers, the last two, built according to the specification for the Turkish aircraft, were under construction, when the Koolhoven factory was destroyed during the German bombing in 1940 of the Waalhaven airport in Rotterdam. The Finnish aircraft made its first flight on November 3, 1939 and has

flown for some time in the Netherlands with floats and orange triangles under the military registration 1001 before it has been delivered to Finland in January 1940.

Drawings

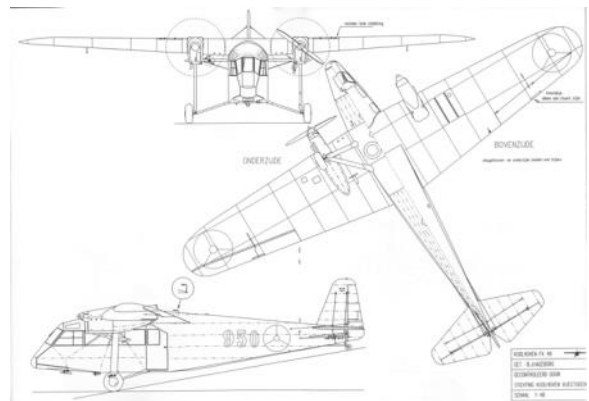
Reference 5, written by Harry van der Meer and published by the now defunct Stichting Koolhoven Vliegtuigen (Foundation Koolhoven Aircraft), contains very good drawings of the F.K.49.



The book about Koolhoven written by Wesselink en Postma (ref. 6) also contains a three view drawing of the LVA F.K.49, which shows only minor differences with the drawings in ref. 5.

The main dimensions of the F.K.49A are the same as those of the F.K.49. However, there are a number of important differences between the two F.K.49A aircraft and the F.K.49 of the LVA. The facsimile edition of the

Koolhoven Brochure of 1940, also published by the same Stichting Koolhoven Vliegtuigen, contains a small three view drawing of the F.K.49A. The drawing had insufficient detail to be used as a reference, but indicates the great differences between the two versions clearly.



From the Aviodrome Museum in Lelystad I have obtained with the help of Harry van der Meer two drawings, one with two options for the cabin arrangement dated April 1, 1939 and one undated three view drawing) of the Finnish aircraft, of which it is, however, not certain in how far they represent the actual realized configuration. A copy of the airworthiness certificate (CoA), dated December 20, 1939, confirms that the wheel version of the F.K.49A aircraft has been certified for a maximum occupation of five persons, a pilot, navigator/radio operator, a cabin attendant/nurse and two patients on stretchers¹. I have reproduced all drawings on a 1:72 scale.

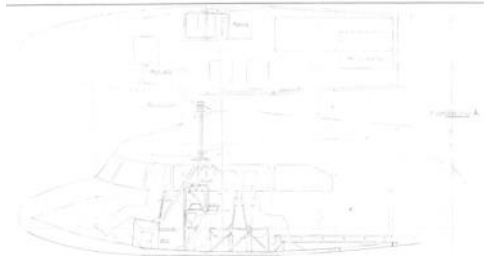
Differences between the versions

The F.K.49A versions, next to different engines, propellers, hence also nacelles and exhausts, a streamlined forward fuselage and a curved cockpit window frame, so the fairing between forward fuselage and wing is also different. The door of the Turkish aircraft has a wider window, the Finnish aircraft has two doors opposite to each other, which are hinged at the bottom and not at the side. The door at the starboard side has no window. The Turkish plane has a large window in the underside of the nose for the pilot and a small, glazed nose, while the nose of the Finnish aircraft is closed. The Finnish aircraft has a large hatch in the underside of the aft fuselage to enable easy loading of stretchers². The tail surfaces, rudder and elevator are larger than those of the F.K.49.

Also the cabin arrangement is different. The F.K.49A had a single pilot position and the pilot had a standard control column and a more usual instrument panel. As there was no second pilot position, the cabin could be arranged more efficiently. The Turkish aircraft had an on-board dark room as had the F.K.49 and accommodated a standard crew of four persons and the large cartography camera. Alternatively it could accommodate in addition to the pilot up to seven persons using folding seats³.

In the Finnish aircraft (see the drawing of this "Configuration B" below, which I have inked anew) the radio operator/navigator was positioned at the right behind the pilot, so approximately at the same place where the second pilot/navigator was seated in the F.K.49. To the left of the radio operator there was room for a stretcher, as well as behind him.

The text in ref. 5 mentions that in both cases a second stretcher could be accommodate above the first one, but this is not shown on the drawing, and the CoA would imply would imply that in this case only the pilot would be present with the patients in the aircraft. The dark room has been deleted; part of the room has been used to provide space for the second stretcher and the cabin attendant.



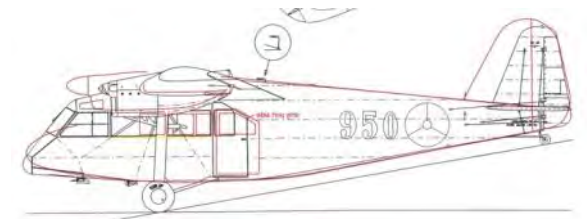
“Configuration A” in this same drawing shows a cabin arrangement for pilot, navigator/radio operator and two other crew members plus one stretcher. A ring antenna is shown on the wing leading edge and the position of the navigator has been moved forward, leaving hardly room for the navigator to do his work. As there are no pictures of the Finnish plane with such an antenna, this

probably is not the actually realized configuration.

One of the photographs shows an almost perfect side view of the Finnish F.K.49A. I have aligned this picture horizontally, enlarged it to 1/72 scale and drawn the outline of fuselage, fin, engine nacelle, door and windows in CorelDraw. Projecting this (red-lined) drawing on the side view of the F.K.49 shows that the aft fuselage of both versions is indeed identical, except may be the part at the tail surfaces, which seems to be shortened to accommodate the larger rudder.



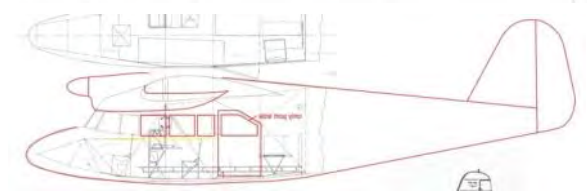
Although the cockpit windows are not visible on the photograph, they are probably located higher than at the LVA aircraft, while the cabin windows are less high. The doors of the Finnish aircraft are wider. I have reconstructed the “nominal” nacelle dimensions by taking the average of the left and right nacelle, as seen on the photograph.



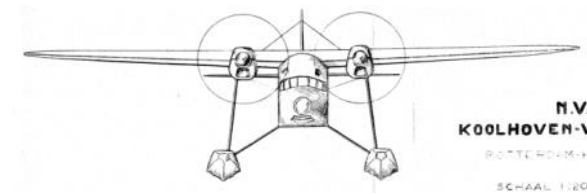
Projection of the outline on the side view of the Koolhoven drawing of the F.K.49A shows an almost perfect fit, with the exception of the window arrangement, the height of the windows and the propeller spinner. For these aspects I have considered the photographs as leading.



Also the coverage on the side view of the cabin arrangement is almost perfect, in this case also the cabin window arrangement.



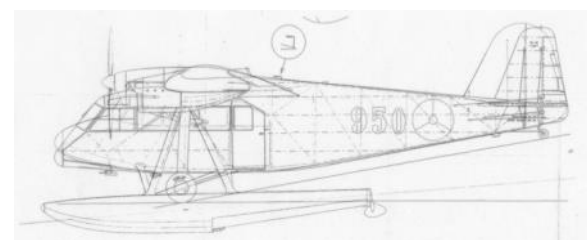
The book *Van Brik tot Starfighter*, by Hugo Hooftman (ref. 2) contains a front view photograph of the float plane. I have enlarged this rather poor quality picture to 1/72 scale and have again produced an outline in CorelDraw, but the picture is not good enough to draw conclusions. The front view in the F.K.49A drawing is, however, very useful.



A last check is the fit between the different views of the F.K.49 and the F.K.49A, where I have printed these last ones on transparent paper. All views have been normalized to within 1% of the span.

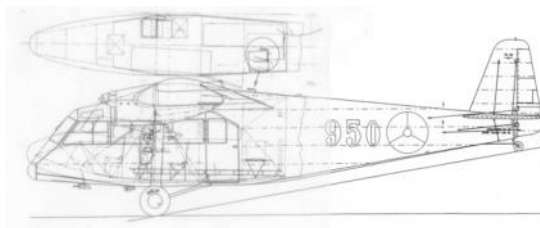
Side view

Both side views have been aligned on the forward wing spar (the attachment point of the main undercarriage strut) and the height of the aft fuselage. The aft fuselage of the



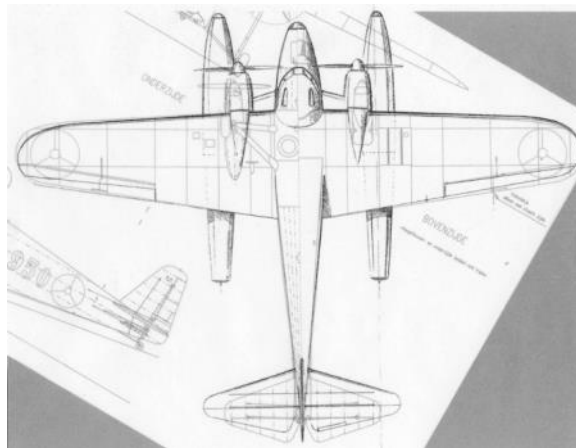
F.K.49A has been shortened relative to the F.K.49 to accommodate the larger rudder. The nose has been kept on the same length, the engines of the 49A are positioned farther before the wing leading edge and the wing chord seems a bit smaller. The door is wider and joins the first frame tube of the aft fuselage. Height of the cabin windows is smaller, height of the fuselage agrees well.

The match with the side view of the cabin arrangement shows a slightly less high fuselage under the wing. The wing chord agrees well. The folding seat for the medical assistant is located in the F.K.49 dark room.



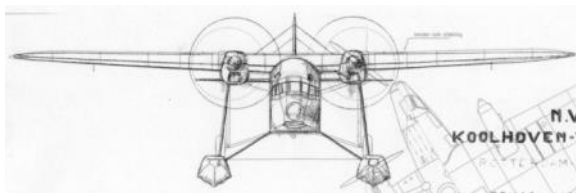
Top view

These views are aligned along the axial line of symmetry and the root wing chords. The first thing that can be noticed is the rotation of the wing. Careful measurements showed that this was a slight inaccuracy in the F.K.49 drawing, amplified by a small difference of the vertical and horizontal scale factors of the reduction from 1/48 to 1/72 scale. The tail surfaces of the F.K.49A are a quite a bit larger and have a different shape as those reproduced in the facsimile publication of the Koolhoven brochure (ref. 1). The engines of the 49A are located more in board than those of the 49. This seems unlikely, because it would have led to a new wing design, while in all references it is stated that the wings of all versions were identical. A comparison with the front view of the F.K.49A in ref. 2 indicates an identical engine position for both versions. Other dimensions of the two versions are rather consistent.

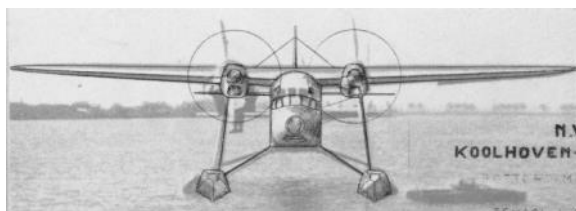


Front view

The front views have been aligned on the centre lines of the vertical and horizontal tail planes. Shape and width of the (maximum) fuselage cross section agree well; the fuselage height seems a bit smaller. Also the wing is slightly thinner. The engine location shows the same difference as in the top view. The larger propellers due to the more powerful engines show up clearly.



A comparison with the photograph in the book of Hooftman (ref. 2) indicates that the location of the engines in the drawing is not correct.



Based on the advice of Harry van de Meer I have used the two original drawings as baseline for the F.K.49A with exception of the engine location. The cabin arrangement is that of the ambulance aircraft with pilot, navigator/radio operator, medical assistant and two stretchers. Where differences between F.K.49 and F.K.49A for parts that should be identical are significant, for example the engine location, shape and dimensions of the aft fuselage (with exception of the shortening for the F.K.49A) and the height of the fuselage, I have taken the F.K.49 drawing as baseline.

Consequences for resin kit

In principle the decision has been taken to produce a kit of the Dutch and Finnish version; it is not expected that there will be much demand for the Turkish version, which can anyhow be adapted rather easily from the Finnish version by the builder.

A number of parts is common to both versions: the aft fuselage (with exception of the rear wall with the dark room sliding door and the hatch in the floor of the ambulance plane) the wing, the wheel undercarriage, although there is some doubt about the tail wheel and possibly a number of parts of the interior.

For the forward fuselage, the cabin walls, the engine nacelles and exhausts, the propellers and tail surfaces two different versions must be made. The most important difference is the forward fuselage, immediately followed by engine nacelles and propellers. A number of interior parts is also different, for example the control sticks, the instrument panel and (of course) the stretchers for the Finnish version.

The Dutch and Finnish version will be separate kits, with each between 50 and 60 parts. The floats will be a modification set for the Finnish kit with wheel undercarriage and is composed of 8 parts, but pending the additional cost they probably will be combined in one kit for the Finnish version

We are aiming for the production of 50 kits in total. The Dutch version will be issued first (target date first quarter of 2019), the Finnish will follow three months later. Distribution over the two versions will depend on demand. Estimated is that 30 kits will be made for the Dutch version and 20 for the Finnish version. Price is estimated to be in the range of 60 to 80 euro.

Aircraft main characteristics are:

	<i>Ref.</i>	<i>1:72</i>	<i>model</i>
<i>Span</i>	16.00 m	222.2 mm	mm
<i>Length</i>	11.70 m	162.5 mm	mm
<i>Height</i>	3.00 m	41.7 mm	mm
<i>Engine</i>	Two De Havilland Gipsy Major I, 130 hp		
<i>Crew/passengers</i>	4 (F.K.49); 5 (F.K.49A)		

Aft fuselage and fuselage bottom

Several tests have been performed to produce the linen-over-stringers appearance of fuselage parts, where the objective was to find an acceptable compromise between likeliness and manufacturability. To simulate the tight linen on the side walls I have made a sidewall the same way I usually do for my scratch models. On a base of 1 mm styrene I have glued 0.3 x 0.5 mm strips on the place of the frame tubes and attached a skin made from 0.25 mm sheet, in which the "stringers" have been carved with a knife. This skin has been lightly bent to form the surface.



Normally I glue the skin to the base, but then air pockets would be formed, making the master incompatible with the vacuum during the mould production. To solve this problem I have drilled 2 mm holes in the substrate. The bottom surface of the rear fuselage I have made the same way. The surface

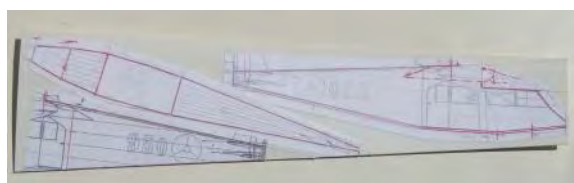


had the right appearance, but the casting expert rejected this solution. In his opinion there still would be air pockets with risk on explosion, while the thin skin could be compressed during casting.

Worst of all, the silicone material would run in the holes, making it impossible to remove the master without damaging the mould.



So I had to devise another method of modeling the outside surfaces. I have produced a second copy of bottom and wall and have at the same time made a rig, shown at the right of the picture, to assemble the floor panels under the right angles. I have cut out the lower surface panels and have reinforced the aft panel with a 2 x 4 mm strip, as it was rather flexible and would not have kept its shape when used as a master.

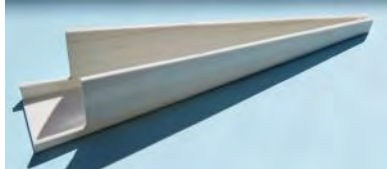


Next I have tried a side wall where I glued 0.3 x 0.5 mm strips in engraved "stringers", sanding them down by hand, hoping that this would give the desired effect, but the result was disappointing. I noticed, however, that it was possible to bend the wall towards the side where the engraved lines were, such that at the opposite side panels appeared between each fold.

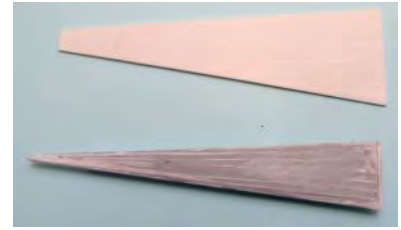


The bottom panel I have modeled the same way I had done for my Fokker F.XX model: gluing strips of 0.5 x 1 mm on the surface and sanding these in a rounded shape at both sides, the front and the rear. Then the room between the strips has been filled with putty and sanded smooth, but preserving the stringer pattern. Finishing has been done with a couple of curved and round files to emphasize the taught linen surface. This worked reasonably well.

I have produced the two aft fuselage side walls and a top side from 1 mm plastic sheet. I have decided to let the aft fuselage into the wing behind the rear spar, so part of the wing has to be removed. Walls and top side have



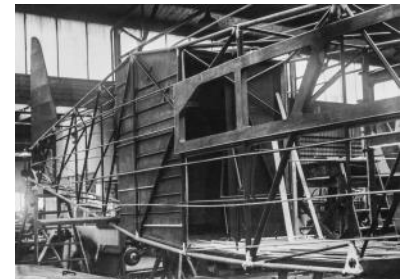
been glued together, and the facets of the sides showed up well. The engraved lines are clearly visible on the inside of the walls. I have also marked the location of the rear fuselage wall on sides and top.



I have made the rear cabin wall from 1 mm thick styrene sheet and have made it fitting to the curved sidewalls. The curvature of the aft fuselage sidewalls is such that they are in the middle two millimeter wider than at top and bottom. As they will have to be joined to almost completely flat cabin sidewalls the width in the middle will have to be adjusted by sanding, which would remove possible all material. So I have added a strip at the front end fitting the wall curvature at one side and being straight at the other side. This way sanding the surface flush should be possible without compromising the structural integrity.

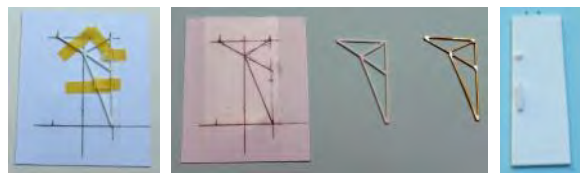


Via Harry van der Meer I have received a picture of the dark room of the F.K.49 from the Aviodrome museum. This shows clearly the ceiling of the room sloping down and the tubes surrounding it. Based on this picture I have shaped the clean room sliding door (clearly at the left) and luggage room above it. Remarkable is also, that the (wooden) window frame shows rather wide separations between the individual rear windows; only the forward tubes have no such cover.

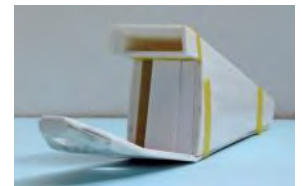


I have modelled the luggage hold above the dark room from 1 mm thick plastic. The shape follows the fuselage tube frame supporting the part of the wing behind the rear spar.

I have made the wall and the sliding door of the dark room from 0.5 mm sheet and have made them fitting between the two vertical posts against the aft fuselage walls. In front of the wall there run a number of fuselage frame tubes. I have taken the measures of the wall opening from the model, made a drawing, covered that with sellotape and



built the frame over it from 0.5 mm styrene rod. However, I found the result not very sturdy and possibly too weak to serve as a master. So I have repeated the exercise with soldered brass rod of 0.5 mm diameter. I have also glued a handle and red light on the door.



The bottom of the fuselage has been built up as one piece. To make the sturdy connection between the three parts I have made a doubler from 0.5 mm plastic, bent at the rear and front section, which will be glued on top of the bottom parts. The doubler is on both sides 0.5 mm smaller than the bottom itself at the location of the cabin, 1.0 mm at the location of the aft fuselage. This way it provides a fitting surface for the cabin walls, which will be made from 0.5 mm plastic sheet, and the aft fuselage walls, which have been made from 1 mm sheet.



The nose section of the fuselage bottom has been doubled by a piece of 2 mm thick plastic, rounded at the sides. Again, this has to be faired to the flat fuselage bottom, and is covered the same way as the rear fuselage bottom. I have used the same technique here: making stringers from strip (this time 0.5 mm wide and 2 mm high),

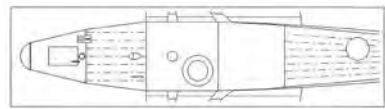


sanding them in the correct shape and filling the space between the stringers, this time with many layers of white glue. The white glue shrinks when drying, this way simulating the tight linen between the stringers. I have also drawn the window in the floor, drilled several holes in it and connected them with a knife.



Next I have glued the doubler to the three parts of the fuselage underside, using the jig produced

from the side view to achieve the right angles and carefully aligning them. I have reinforced the joints between the three parts with thick cyanoacrylate glue. After a dry fit I have still made some minor adjustments to the areas where cabin walls and aft fuselage should be mounted.



In the floor of the cabin there are two more windows, a small one for the drift measurement instrument and a large one for the bulky camera. I have

measured their position from the drawing and drilled the holes in the floor. These windows will have to be closed, when using the part in the F.K.49A kit. Also the front part will have to be removed then, as well as the last 5 mm of the fuselage.



Finally I have dry fitted the four part together. After some small adjustments the parts fitted well, and these first four masters for the kit were finished.



There were still some details to be added to the aft fuselage and the fuselage bottom. On the top surface two small brackets are visible, both on the drawings and on the photographs. Their purpose is not clear, but I have nevertheless modeled them from 0.5 mm plastic sheet. On the forward bottom surface is a navigation light located,



which I have made from a small piece of 1.5 mm thick sheet material. A small, circular 1.6 mm disc has been punched from 0.25 mm plastic and glued behind the rectangular window. Again its purpose is not clear.



When the tail surfaces had been finished, I have drilled 0.5 mm holes in the aft fuselage at the place where the pins of elevator halves and fin had to be placed. I have also drilled slanted holes for the control cables as indicated in the drawing. As the same aft fuselage will be used for F.K.49 and F.K.49A this means that six holes have been drilled. The left and right tail surfaces are not exchangeable, as the pins are in different locations.



Cockpit and cabin

F.K.49

The F.K.49 cabin walls followed the steel tube fuselage frame rather strictly, showing up as sharp "bends" on the outside. This makes it a bit difficult to model them from one flat piece of sheet material and dictated the way the walls have been split up in parts. Also, it is not very clear where separations between the windows were present.



The picture of the dark room gives some information about the design of the rear part of the wall. The vertical and forward downward sloping tube are not covered by a wooden window separation. On the picture at the right there seems to be a separation between the windows above and below the frame tube running from top left to bottom right, but it is less wide than



the separation in the rear part. The wall shows a sharp bend at the place close to the forward vertical window separation, which is confirmed by the floor plan, as reflected in the fuselage bottom part.

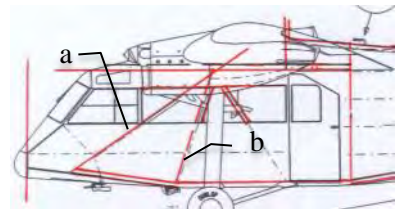


The weak bend along the vertical in the aft part of the cabin wall can be accommodated in a slight bend of that styrene part of wall. It hardly shows up in the pictures, anyhow. Another weak bend follows the tube running from top left to bottom right as shown in the photograph at the right. This bend may be accommodated in the forward part of the side wall. This is the red line **a** in the drawing below.



So I have decided to build up the

side wall in two parts, separated along the line **b**, as indicated in red on the picture. I have glued a copy of this drawing and of its mirror image on 0.5 mm styrene sheet and cut both cabin walls out. After a dry fit on fuselage bottom and aft part I have adjusted the dimensions. The bends in the



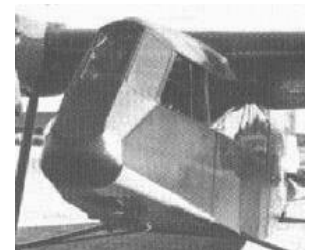
walls I have made by carving the back side lightly with a panel line scriber at the place of the tubes. That way they can be easily bent. I have detailed the inner side of the cabin walls with some strips and with 0.5 and 0.7 mm rod, representing the fuselage frame tubes and I have



doubled the door to make it a bit more stiff. On the forward side of the wall I have glued the rod only half on this part of the side wall; this way it can serve as gluing surface for the forward cabin side wall. Under the windows I have glued a 1 x 1 mm strip, representing the window sill and the cables and rods running under it. The wall is fitting well to the rear fuselage part.



I have modified the configuration of the fuselage tubes in the forward part of the cabin a bit. This seemed to me to reflect the actual configuration better and, may be more important, made the modelling also simpler. Again, I have carved the back side of the wall at the place of the tubing to



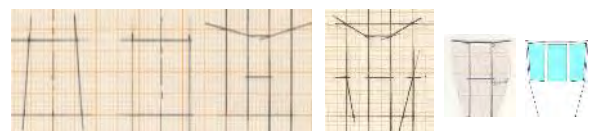
bend the wall panel. I had to find the correct fitting to fuselage bottom and aft cabin wall trial and error; the drawing was not accurate enough.

When the walls were fitting well I have cut out the windows. Also here I had to correct the configuration a bit to ensure that all windows were well aligned. I did not finalize the top of the walls, I want to do that only when the wing is available. Most likely the top will be cut off at the dotted line at the underside of the windows in the cockpit roof.



On first view the nose section seemed rather complicated, but after detailed examination of photographs and drawing it appeared to be made up by three flat panels, assembled under an angle to each other. This could be reproduced, but the exact configuration had to be determined trial-and-error. I have first measured from the drawing and the model the width of the fuselage at the location of the first

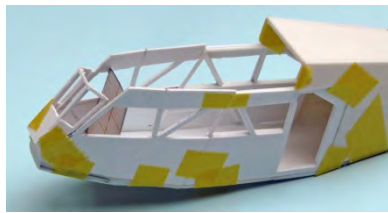
bend in the forward fuselage, as this determines width and fit of the windshield and nose section and has to be kept in the correct configuration when fitting the windshield. And I have measured the windshield/nose dimensions from the drawing and have converted these in a flat drawing. I was not sure of the width at the top width, so I made two templates, one tapered at the top, the other one rectangular. Templates and first version of the windshield



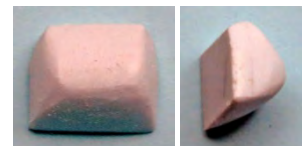
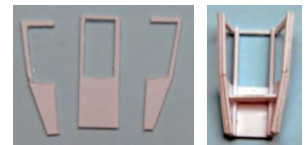
are shown at the left of the picture. I have printed these shapes on carton and have cut them out.

When fitting the templates in the fuselage, the tapered one resulted in the right fuselage shape. To keep it in place I had to temporarily fix the template with Kristal Klear. Fitting the windshield led to some modifications, which I have drawn again, printed on carton and fitted on the fuselage. Again some modification was needed, before a satisfactory fit could be achieved.

Next I have copied that last version of the front panel on graph paper in CorelDRAW, redrawn it and placed the windows in it, checking carefully for symmetry, and have glued a print on paper on 0.25 and 0.5 mm thick styrene sheet. For a last check on the size and fitting I have cut out the 0.25 mm copy, bent it and fitted it on the fuselage.



Feasibility being shown, I have cut the 0.5 mm thick copy, which is the thinnest material fit to serve as a master. However, as it is impossible to bend the 0.5 mm wide window styles, which are 0.5 mm thick, I have built the front panel up from three parts. After gluing the three parts together and dry fitting it to the fuselage to determine the correct angles, I have glued 0.5 mm rods and a small shelf to the inner side. The final product fits sufficiently well on the fuselage. The small nose I have made from three pieces of 1.5 mm thick styrene glued on each other. It has been sanded to the final shape by trial and error. All masters of tail planes and the fuselage (minus the cockpit roof) are shown in the picture at the left. The part with the two slits in it at the left is a template to keep the sidewalls on the correct distance, when gluing the front panel in place.



As the cabin roof of the F.K.49 was streamlined and contained four windows, that part could not be made from resin (transparent resin is anyhow notoriously crude and badly transparent), so it has been made in vacform. For this a master has been produced. The lower edge of the roof under the windows is part of the cabin side walls.



F.K.49A



The cabin side walls of the Finnish F.K.49A have been constructed the same way as those for the F.K.49, but according to the drawings the configuration of the fuselage tubes, the windows and the doors is slightly different. I have drawn them in a copy of the F.K.49 drawing, as the walls have to fit on the same bottom and aft fuselage.



The original drawings show windows in the doors. However, these are missing in the photographs. The doors on both sides were hinged at the bottom, serving at a gangway to enter the plane. On two photographs there is evidence of horizontal enforcements on the outside and steps on the inside. This is clearly illustrated in the photographs of the aircraft. So I have modified the doors accordingly by carving horizontal lines on the interior, bending the doors slightly and gluing steps made from a tapered strip on the inside.





I have cut the cabin wall to size and fitting to the aft fuselage. The inside of the wall has been finished the same way as for the F.K.49 with rods of 0.8 and 0.5 mm and strip of

1 x 0.5 mm. Again, the lower edge of the wall has been kept free to provide a gluing surface to the bottom.

The forward part of the bottom must be cut off when building a F.K.49A, as well as 5 mm of the rear fuselage end and the holes in the bottom must be closed. The commonality between the two models could ensure a lower cost, but this also depends of the number of kits produced⁴.

In its current state the master has been used as an interface template for the F.K.49A forward fuselage. To model this part I have first printed copies of the top, side and front view drawings on carton. I have cut out the side view and top views on the nose level and the level under and above the cockpit windows. I have cut the top views on the line of symmetry and glued them on the side view. The assembly has been completed with the from view and fitted to the aft fuselage, F.K.49A side walls and fuselage bottom. This showed a good correspondence in length and cabin and cockpit window alignment.



I have repeated the process with paper copies of the drawings glued on 1 mm (side view and top and bottom top view) and 0.5 mm (top view under the cockpit windows) plastic sheet, taking into account the thickness of the material. The 0.5 mm copies have been produced twice; the forward fuselage master will be cut in two on this level, the lower part to serve as a basis for the resin nose section, the upper part as a mould for the vacform cockpit windshield and roof. The pieces have been cut out and glued on the side view, and the connections reinforced with pieces of strip.



I have filled the room between the plastic parts with Milliput putty, a rather dirty job. After the material had hardened, I have cut and sanded the nose section in the correct shape and have fitted it to a side wall. The top forward corner of the side wall had to be bent a little bit more inwards to get a good fit; the remainder can be sanded off when assembling the model.



I have also engraved lines in the nose where the steel tube “stiffeners” are located, four in each quarter circle as far as I could derive from the photographs (they are not indicated in the drawings).

The next job was to separate the windshield-cockpit roof part from the nose section. I have marked a beginning of the exterior of the cut between the two layers of 0.5 mm styrene sheet with a razor blade saw and have completed the separation with the good old jigsaw. This worked reasonably well; only on the forward part of the top section I missed the separation plane, but the damage to the Milliput filling was only marginal.



I have removed the plastic sheeting from both parts. That was relatively easy, because Milliput hardly adheres to a smooth styrene surface. After cleaning and sanding the surfaces I have covered them again with 0.5 mm sheet to arrive at the correct height of both parts. The excess plastic at the edges has been removed and were finished with putty.



Wing

A wooden model of the wing has been made by JohnH as master for six copies, of which two have been detailed to serve as final masters. The first copy has been used for the F.K.49 master production, the second has served as a template to produce the engine nacelles of the F.K.49A.



I have cleaned the wing and have copied the interface with the aft fuselage as shown in the drawing on it. I have also drawn the position of the front and rear spar on it.

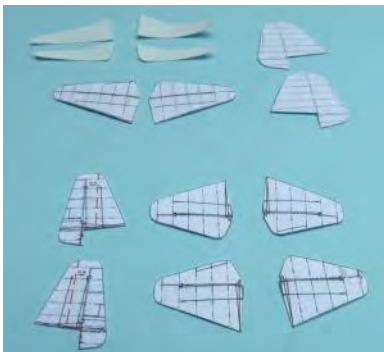


With saw, knife, file and sanding tools I have made the cut-out, trial and error fitting wing and fuselage together. A dry fit showed

that the cut-out was correct; it reflected the drawing well and the frame tubes of the sidewalls were well aligned with the spars. Also, the luggage compartment ended up on the right spot. The only thing to be corrected was a small gap between the wing trailing edge and the aft fuselage. I achieved that by gluing pieces of thin sheet material to the wing and sanding these until fitting well.



Tail surfaces



To build the tail surfaces I have used the same method as I had done for the fin of the Koolhoven F.K.43 and the Fokker D.XIII and F.XX: a core of (this time) 0.5 mm thick and face sheets of 0.25 mm thick.

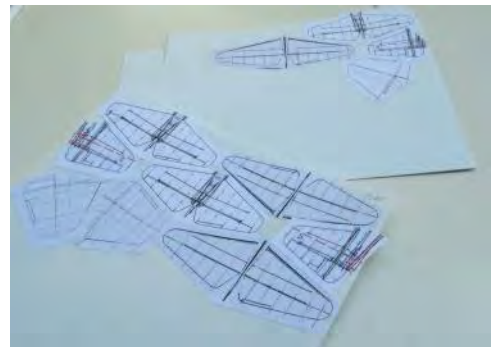
The face sheets have been superficially carved at the location of the ribs with the knife. After cutting out the parts, I have redone the cuts with three passes of a panel scriber,

have separated rudder and elevator halve and have bent the face sheets on the carved lines, as shown in the picture top left.

I have inserted a 0.5 mm brass pin in the core of the fin and the stabilizer halves and for the fin I have drilled a hole on the corresponding place on the fuselage top surface. As the fin for the F.K.49A is placed further forward on the shortened fuselage, there is a different hole for each fin. The picture shows clearly the different configuration. The holes will be reproduced as a small dimple in the resin copy; the pin will indicate the place where a new metal pin should be mounted in the fin.

Next came the most tedious job: gluing pieces of 0.2 metal wire in each of the engraved "rib" locations of the skins. The wire serves to prevent the skins to glue to the core, creating this way the effect of linen tight over the metal tube frame. As there are 24 of them this takes some time. Next the skins have been glued to the core, starting with the leading edge and using Revell Contacta sparingly. When that had set, I have glued the remainder of the skin to the core by applying Tamiya Ultra Thin Cement between the skin and the core, pressing the skin firmly to the core to eliminate as much as possible air enclosures.

When the glue had dried well, I have performed a last check on the adherence of the face sheets and have sanded the edges of the surfaces round, except for the trailing



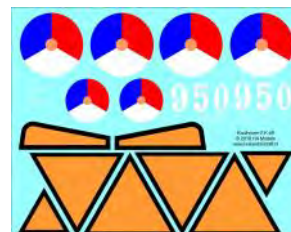
edge of elevator and rudder, which have been sanded as thin as possible. I have then used them to locate the fixation holes for the pins in the fuselage. I have also drilled holes in the fin and stabilizer halves of each of the two versions to accommodate the rigging wires.

As the cost of the moulds and parts -next to the volume of the part- is determined also by the number of parts, I have glued elevator halves and rudder to fin and stabilizer halves. This will save approximately 5% on the cost of the resin parts.



Decals

The Koolhoven F.K.49 as has flown with the LVA registered as "950" with the standard Dutch roundels and with the black edged orange triangles and rudder shortly before the Second World War. I have copied the "950" in a CorelDraw sheet and redrawn the numbers. I have also redrawn the rudder outline and modified it in the orange rudder. Small print on fin and aft fuselage has also been produced, as well as the text "DUNLOP" on the tyres. Size of the roundels I have copied from the drawing in ref. 5. The size of the triangles has been deduced from the photographs of F.K.49 and F.K.49A. The triangles have been provided with the regulation 10 cm wide black edge, scaled down to 1/72.



The F.K.49A has flown with the registration 1001 and black edged orange triangles and rudder in the Netherlands. The triangles were identical to those of the F.K.49, but the rudder was of course different. When it was transferred to Finland it carried the registration OH-MVE. With the coast guard in Finland it had the same registration and carried a red cross on the fin. As there are only the triangles common to F.K.49 and F.K.49A I have drawn a separate set of decals. I have not identified any small print on the pictures of the F.K.49A. Size of the registrations has been derived from the photographs. There is one picture of the aircraft, taken after the 18th of June 1941 with a yellow (German RLM 04, or British/US insignia yellow) band (7 mm wide in 1/72) around the aft fuselage and yellow painted lower side of the wing tips with a width of 1/6 of the span (37 mm in 1/72). I have made no decals for this, as it is easy to paint.



Propellers, nacelles and exhausts

F.K.49

As the F.K.49 and the F.K.49A had different engines, propellers, nacelles and exhausts were also different. I have used as masters for the F.K.49 a cowling front⁵ and propeller by Aeroclub Models, that I still had in a collection of Aeroclub white metal parts I had once bought. I have first ordered six resin copies of them, as I will need two to incorporate in the final nacelle masters, and some spares are always welcome.

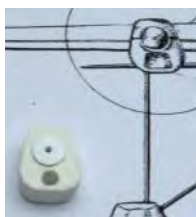


Replace picture

F.K.49A

The cowlings for the Hirth engines of the F.K.49A are quite different. Searching the internet for donor kits did not yield a result, the cowling of the Messerschmitt Bf 109 Taifun does not have the same

form. So I had to make a cowling from scratch. I have glued three pieces of 2 mm plastic sheet on top of each other and have left them to dry 24 hours. I have glued a copy of the cowling front view on it, indicated the place of the propeller shaft and the center of the air inlet and have sawn and sanded the front outline. I have drilled a 1.2 mm hole for the shaft and a 3 mm hole in the inlet. I have glued a 0.5 mm disc with a diameter of 6 mm, the diameter of the propeller spinner, on the front. Next I have spent an hour or so in sanding the shape of the cowling and the air inlet according to top, side and front view from the drawing and the panel lines have been engraved in it. This cowling will serve as a master for six resin copies.



Replace picture

Wing-fuselage assembly

Wheel undercarriage

A master for the main wheels has been made from a modified 1:100 scale Fokker Friendship model main wheel and six resin copies have been ordered. Two main wheel copies and one tail wheel copy will be used as masters for each of the F.K.49 versions.



Tail wheel?

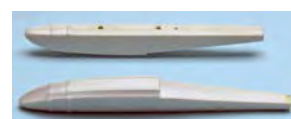
Floats

A search for existing Edo float models did not deliver the 120 mm long versions that were needed for the F.K.49A. However, two models were identified that had the right shape and the correct 12 mm width. Both could possibly be modified to come to the right length.

The first one came from a DHC-2 Beaver kit. Besides having to be lengthened, these also had to be filled to get a solid master for producing a mould under vacuum.

The second candidate was a Edo **xxx** resin model of Khee Kha Models.

The **yy** has been selected as the basis for the masters.



Final assembly

Below some pictures of the completed model are shown.

References

1. Anon., *Koolhoven Vliegtuigen, 1910-1940*, Facsimile uitgave, 1940
2. H. Hooftman, *Van Brik tot Starfighter, Deel I: Met stofbril en leren vliegkap*, La Rivière & Voorhoeve, Zwolle, 1962
3. Koolhoven, *Tekening no. 1103 S, Type F.K.49, No. 4903, Ausstattung der Kabine*, N.V. Koolhoven-Vliegtuigen, 1939
4. Koolhoven, *FK-49*, N.V. Koolhoven-Vliegtuigen
5. H. Van der Meer, *F.K.49*, Stichting Koolhoven Vliegtuigen, 1999
6. T. Wesselink & T. Postma, *Koolhoven, Nederlands vliegtuigbouwer in de schaduw van Fokker*, ISBN 90 228 3890 0, 1981
7. H. van der Meer/Aviodrome, *Personal communication, Drawings of F.K.49A*, 2018

Appendix F.K.49 and F.K.49A documentation

Photographs

If no reference is given, the pictures have been taken from the Internet/Wikipedia.

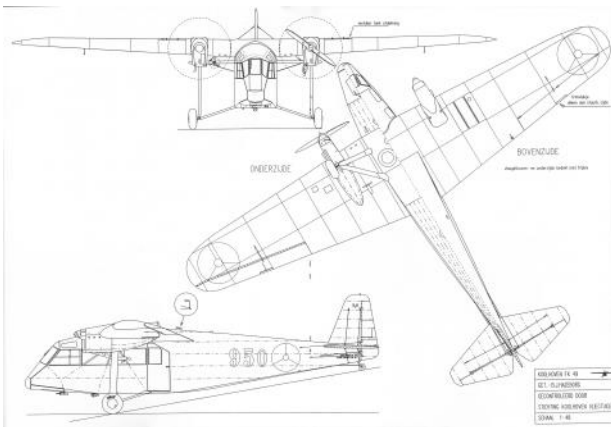


[Source: ref. 5]

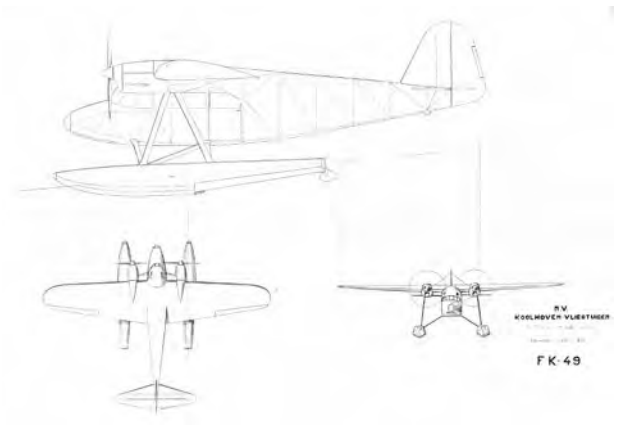


[Source: ref. 5]

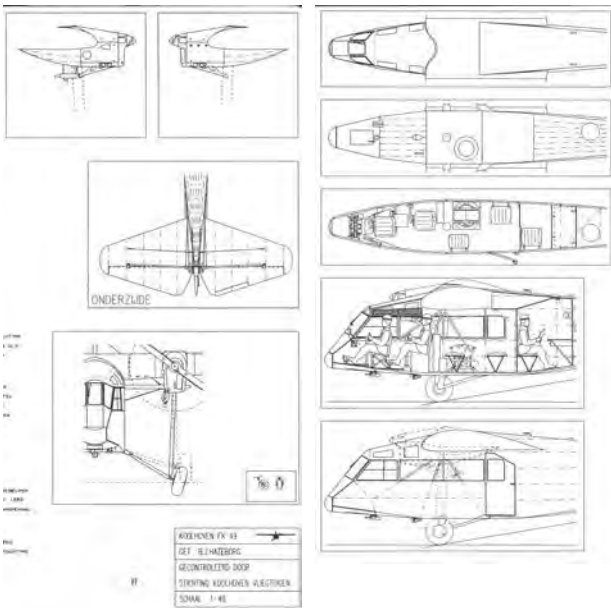
Drawings



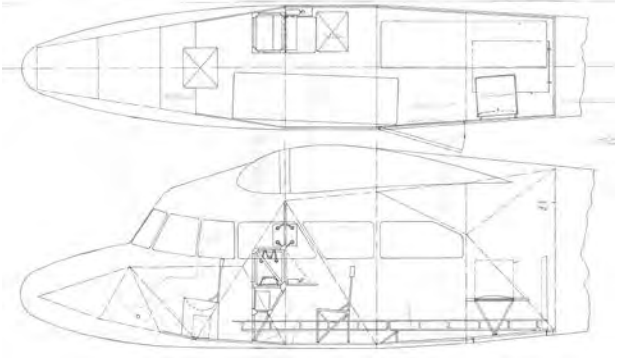
[Source: ref. 5]



[Source: ref. 7]



[Source: ref. 5]



[Source: ref. 7]

¹ The text of ref. 5 mentions capacity for four stretchers. According to the certificate of airworthiness this would not be allowed and the drawing shows only two.

² The door at the starboard side is not present on the F.K.49A drawing; presence of both the hatch and two doors seems a bit overdone.

³ No proof could be found that the aircraft was certified for this capacity.

⁴ After discussion with the retailer it has been decided to produce 50 kits for the F.K.49 and 30 kits for the F.K.49A. As only 30 to 50 copies can be produced from a mould, the commonality issue disappeared, and both versions will have their own set of moulds.

⁵ The De Havilland Gipsy Major cowling front had first been used in the master for the Koolhoven F.K.43, but could easily be removed from the (wooden) master, which anyhow had been replaced by a resin master and was not needed any more.