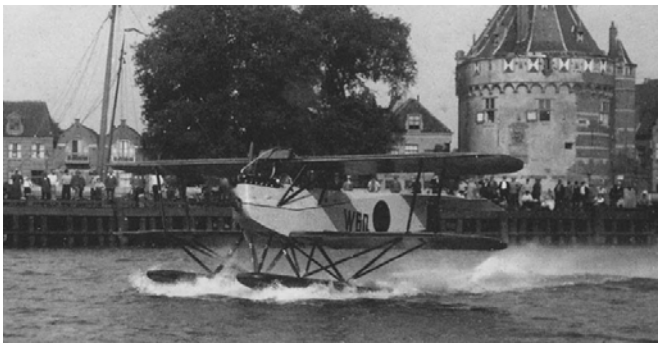
Van Berkel WA Czech Master Resin[1] injection kit[2]

Biplane float plane reconnaissance

Scale 1:72



The story of the Van Berkel WA starts with an forced landing of a German Hansa-Brandenburg W.12 float plane in April 1918 at the "Waddeneilanden" in the North of the neutral Netherlands. As usual, the aircraft was interned. In fact that meant taken over, paid for and incorporated in the Dutch "air force" of that time. The Brandenburg W.12, designed by Ernst Heinkel, maid its maiden flight in Germany in February 1917. The Dutch Naval Air Service selected it on ground of the positive experience with the interned airplane, but the W.12 could not be ordered in Germany due to the neutrality the Dutch observed in World War I. Even if that would have been possible, it is doubtful, whether such an order would get sufficient priority.

So the decision was taken to produce the aircraft in the Netherlands. As Trompenburg, the only Dutch aircraft factory at that time, was busy with the production of Farman, Nieuport and Spijker airplanes, the Van Berkel's Patent company, famous for its meat cutting machines and weighting scales and already engaged in the production of turning and milling machines for military production facilities, was selected for the production of a W12 derived reconnaissance aircraft, and with some support of the Dutch Government, the company created a n aeronautical department specifically for the construction of the W.12. To minimize cost the licensing rights were circumvented by changing the design slightly; for example, the distance between floats and fuselage was increased by 15 centimeters.

Originally the Van Berkel WA as it was designated would be equipped with a 200 hp Hispano-Suiza engine, but license production in the Netherlands of this engine gave severe quality problems. Consequently the WA was equipped with the same 180 hp Mercedes D.III engine as the Hansa-Brandenburg W12. The engines could be directly procured in Germany after the end of the war in the spring of 1919.

In 1924 the Van Berkel WA was modified to accommodate the stronger BMW IIIa engines, as the Mercedes D.III engines were approaching their end of life. At the same time the wooden fuselage was replaced by one of steel tubing covered with linen and the rudder was enlarged. Also, the wing mounted radiator was replaced by a nose mounted one, thus reducing the drag of the airplane.

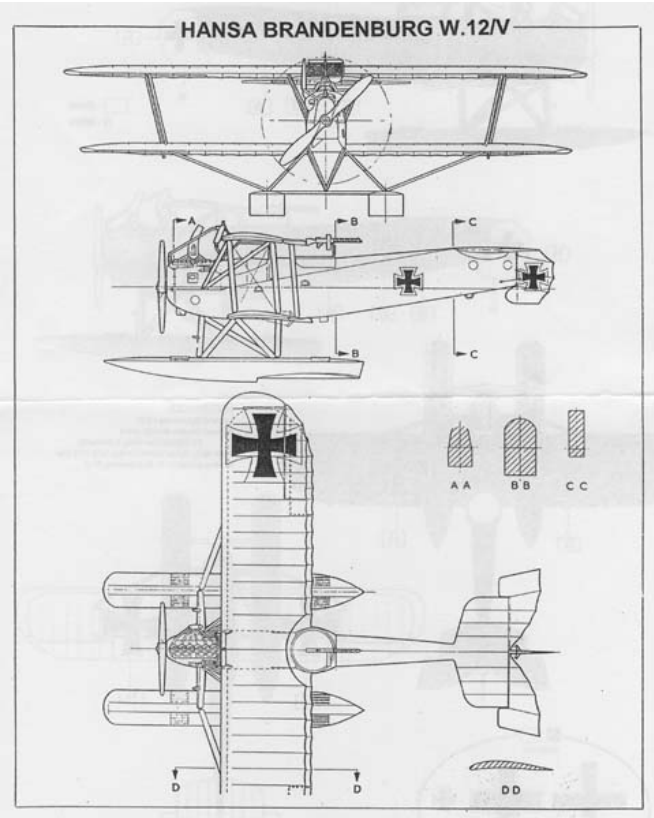
The original W.12 has performed many functions; it was used for reconnaissance duties, but was also used as a two-person fighter, in which function is was rather successful against British flying boats. Before the W.12 got its final shape it has been subjected to many experiments, but when the Dutch put hands on it, it was an easy-to-fly and reliable aircraft.

The differences between the WA and the W.12 are few. Basis for the WA was the W.12 version with the long fuselage (introduced to repair the poor longitudinal stability) and the Mercedes D.III engine. The armament of the WA was much lighter; most of them carried no armament at all and a number of them has been armed in 1922 with a movable Lewis machine gun for the observer. The one or two fixed machineguns of the W.12, which were firing through the propeller, have never been incorporated. Forty WAs have been built, of which 20 served in the Dutch East Indies (registration numbers W.1 through W.21; the last one being an aircraft "reconstructed from two damaged WAs) and 20 in the Netherlands (W.50 through W.69). The first flight took place in September 1919. The aircraft

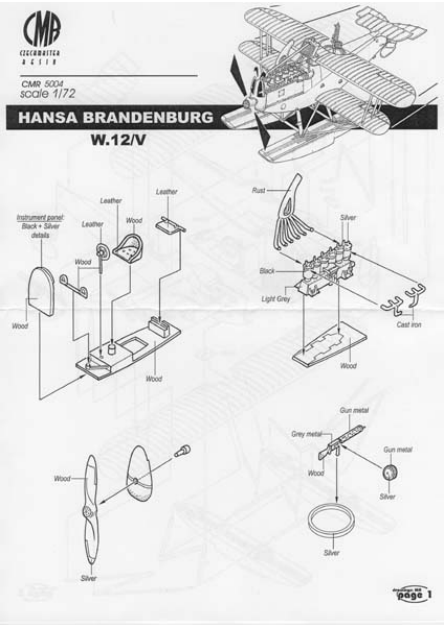
served satisfactory both in Europe and the Dutch East Indies until 1933. As I want to build the WA version with a Lewis machine gun, this rules out the version with the orange balls, as they were abandoned by that time.

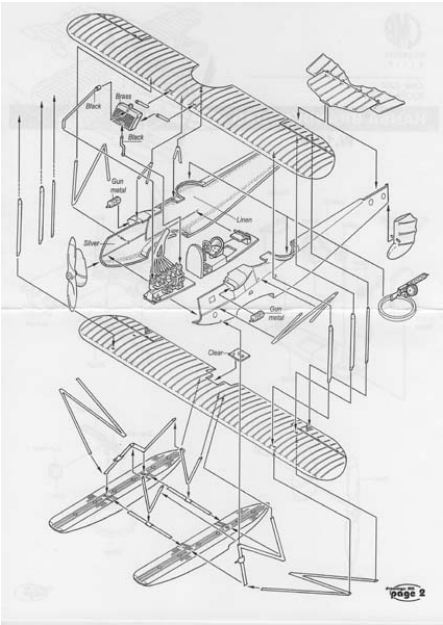
There are two Hansa-Brandenburg W.12 kits available from Czech Master Resin (CMR), one of Series III and one of Series V. The first one has the short fuselage, a Benz engine with front mounted radiator and ailerons in the upper wing; the second one a long fuselage, a Mercedes D.III engine with a wing mounted radiator and ailerons in upper and lower wing. So I will use the Series V kit, but with the wings of the Series III kit.

The box comes in a thin carton box and contains the resin parts, an instruction sheet and decals for the German W.12 version.



The instruction sheet is extensive. It shows several three-view drawings for different German aircraft to be produced and an exploded view indicating the position of the parts.





Geldhof (ref. 1), Hooftman (ref. 2), Casius (ref. 3), and Aarssen (ref. 4) give the dimensions of the Van Berkel WA, while Aarssen also presents a three-view drawing of the airplane. I have used as main supporting reference Grosz (ref. 10). Some details may be obtained from the website of the Neptune Association, where the construction of a Van Berkel WA replica is reported (ref. 11). This is especially useful for interior details. Finally, some very useful material has been received from Vredeling (ref. 12).

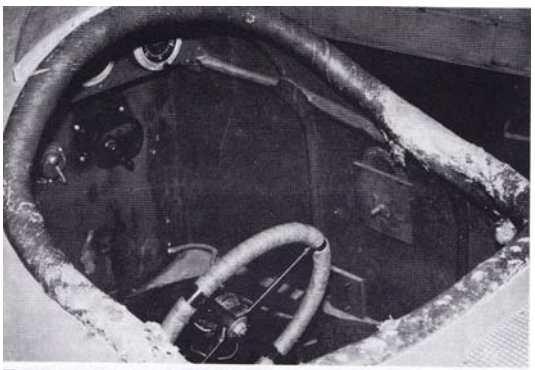
	Ref.	*1:72*	*model*
Span	11.20 m	155.6 mm	156.5mm
Length	9.60 m	133.3 mm	134.0 mm
Height	3.23 m	44.9 mm	47.8^3 mm
Engine	Daimler-Mercedes D.III 160 hp		
Crew	2		
Armament	1 movable Lewsis machine gun		

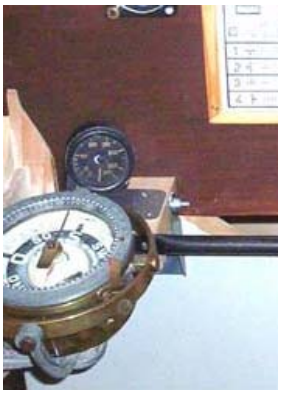
General

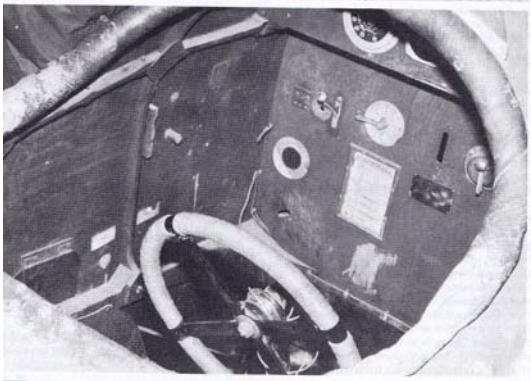
The resin parts are rather badly bent; the fuselage and all of the struts needed to have a hot bath, after which they must be straightened out.

Cockpit and fuselage

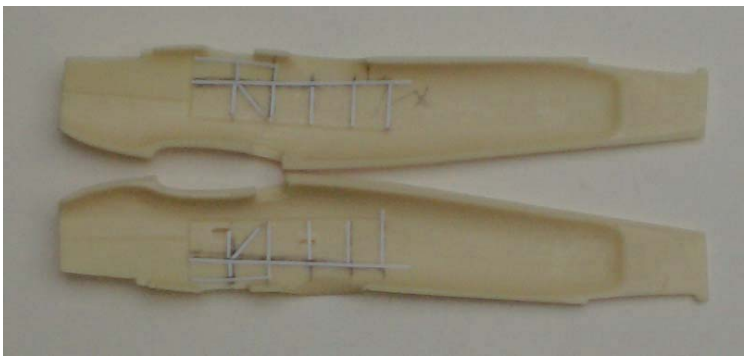
I have removed the machine gun housings at both side of the fuselage, and engraved new panel lines. As an example for the interior I have used the WA replica on the Neptune Association website and one picture of the interior of a Finnish W.12.





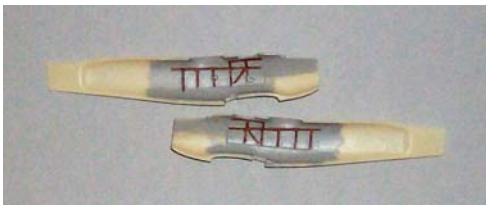


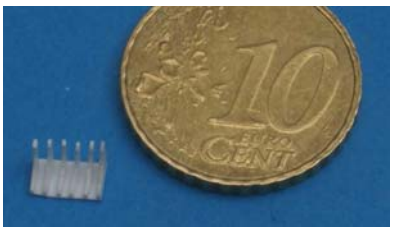

Top, pilot's cockpit is fairly spartan even
firewall are dark mahogany with natural
control wheel. Next, port side of cockpit;
extreme left hand corner. Above left, the
prominent Bosch magneto at right. Abov
cable runs are in close proximity to cont
fittings; navigator's seat can be folded – i
(Courtesy Veikko Timonen)



Based on the picture of the replica's fuselage I have drawn the wooden framework on the inside of the fuselage and constructed it from 0.2 x 0.5 mm strip profile. The inner side of the fuselage has been painted light grey (Humbrol

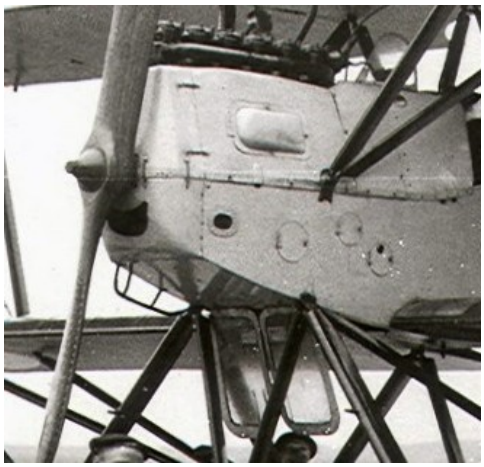
129). The same colour will be applied on wings, tail surfaces and outside of the fuselage. I have repainted the wooden framework with oil paint.



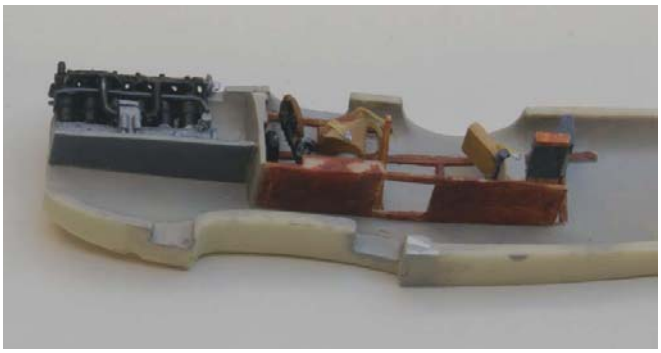


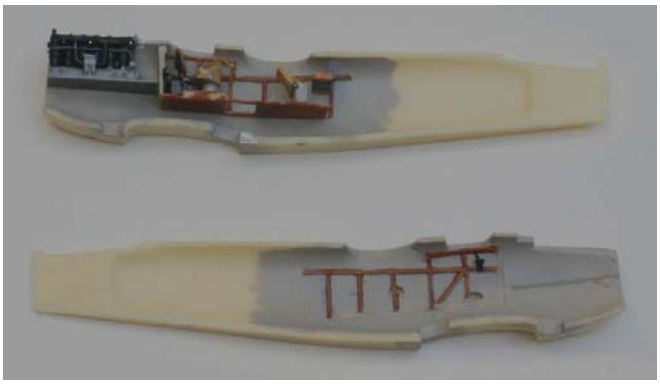
I have built a storage frame for the Lewis machine gun magazines from 0.25 mm plasticard.

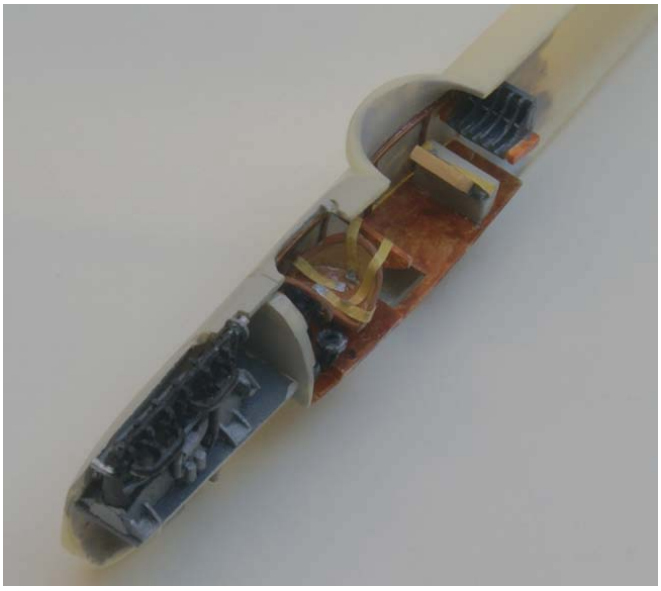
Under the engine the WA has two windows of which the purpose is not clear; they are not present in the H-B W.12. Nevertheless, I have modified the fuselage accordingly. The large window in the floor of the observer's cockpit was standard, as for the H-B W.12. The picture of the original also shows some modifications for the access hatches to be made.

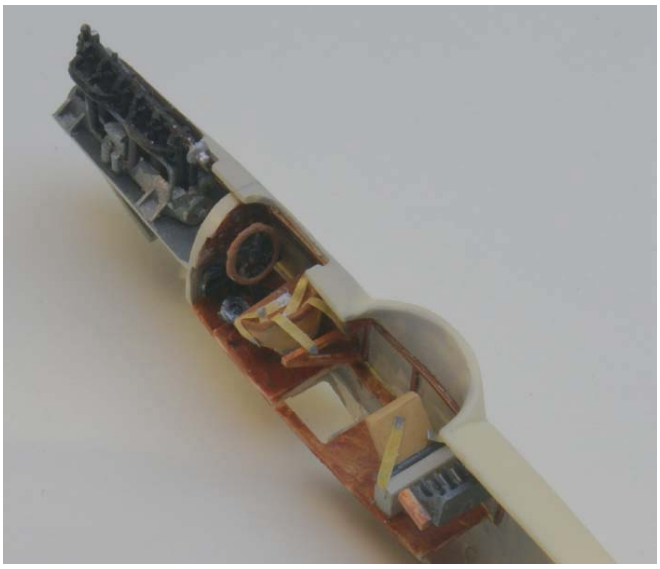


Fitting the engine and the cockpit interior in the fuselage required quite some correction by sanding of the floors, the fuselage wall and the instrument panel, otherwise the fuselage could not be closed. I have modified the instrument panel by removing the left dial. Now it looks most alike the instrument panel of the replica and the Finnish W.12. Seat belts have been produced from Tamiya tape. Other items that I have added are the engine throttle, the compass on the floor in front of the pilot's seat and some framework to attach the pilot's seat belt.

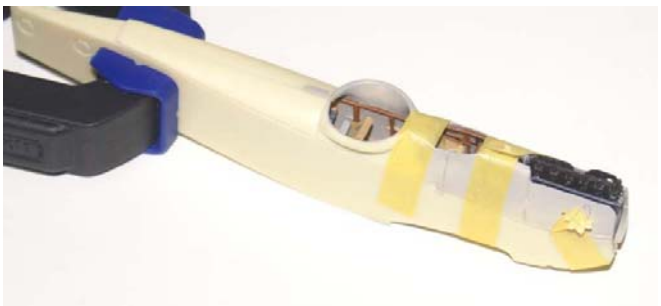


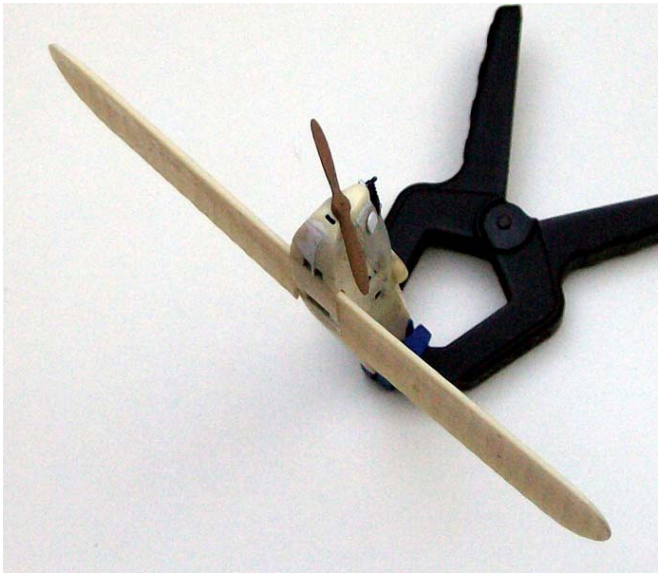






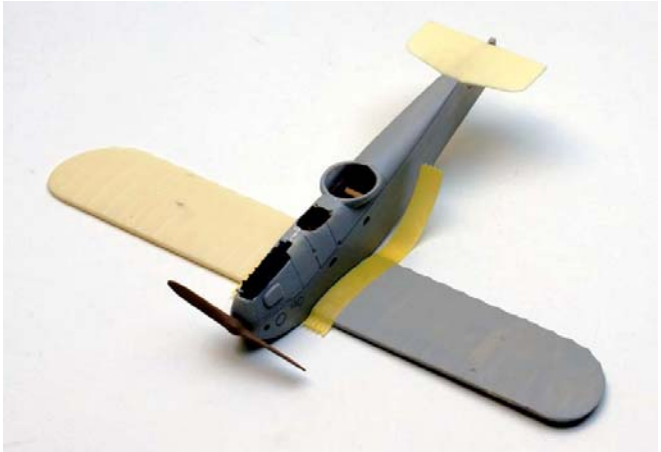
After closing the fuselage, there still was some gapping at top and bottom. Also, as usual with resin kits, the joint needed quite some correction. So I followed the normal sequence of applying putty, sanding, reapplying, until an acceptable result was achieved. Most of the cockpit interior will not be visible any more.

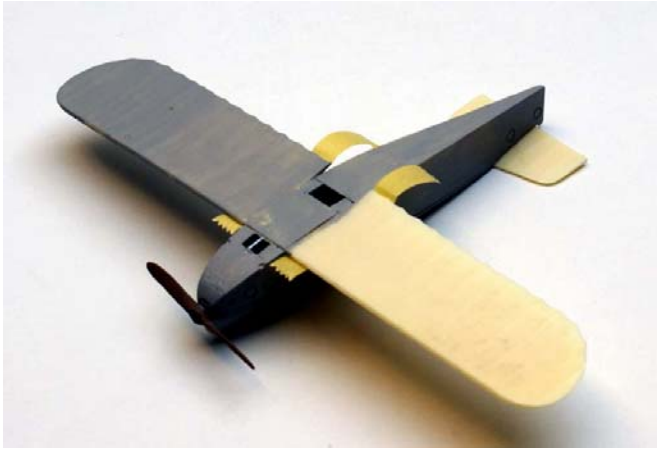




After the first round of putty and sanding I have mounted the front of the fuselage with the propeller, which I had already painted, and the lower wing. Some correction was required to fit it nicely to the fuselage. An air inlet has been made in the nose and a cockpit step added at the right fuselage side. Also the hatches on the nose have been engraved and glued on.

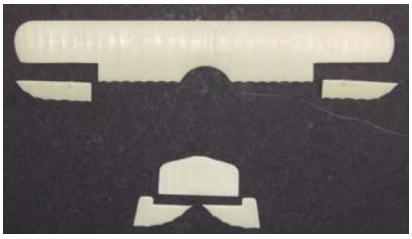
Next I have glued the horizontal tail plane in place and have given the model a first coat of paint and applied tape to finish the joint between wing and fuselage. Also, the lower side will need some more putty.





Wing

I a going to mount the control surfaces individually, so they have to be separated from wing and horizontal tail. A small complication is the presence of control horns; they are easily damaged in this operation. They inter-wing and float struts have been removed from the sprues and cleaned, and got their hot bath.



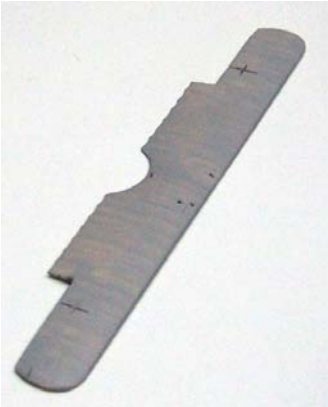
All struts are black, as well as the floats, as was the standard on the WA. In ref. 4 contains a good picture to illustrate their position. It also shows that radiator is mounted different from the instructions in the kit and gives guidance for applying the rest of the plumbing.

Dimensions

The length of both the Van Berkel WA (ref. 4) and the Hansa-Brandenburg W.12 (ref. 10) is reported to be 9.60 m. However, the three-view drawings in both documents show a length of 9.36 m, when scaling for constant span. Only drawing A3340 of the WA in ref. 12 yields a length of 9.60 m. The length difference appears to be in the fuselage only. Drawing A3340 also shows a distance between underside fuselage and top of the floats that is 0.15 m larger than that of the corresponding dimension of the W.12, which corresponds to a statement made in ref. 4. The length of fuselage in the CMR kit is also short (3 mm). I will not correct for it.

The other dimensions (span of upper and lower wing, position and length of inter-wing struts, span of floats) of the kit are correct. The length of then-struts between wing and fuselage is a bit too short. Float strut dimensions are correct but the position of the holes in fiselage and wing is not correct.

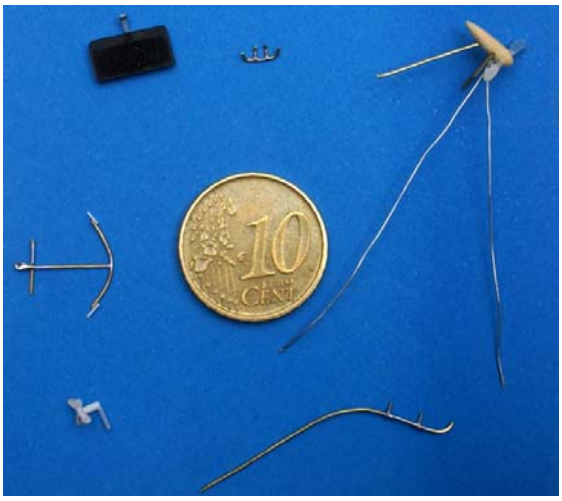
Some WA's were based on ships, and a crane was used move the aircraft from ship to see and vice versa as shown in the picture. For the attachment of the cables three or four attachment points were located on the upper wing. I have reproduced them from 0.25 mm metal strand and mounted them in 0.3 mm holes.



I have also drilled 0.3 mm holes at the place where the aileron cables disappear in the upper wing and holes for the inter-plane strut bracing (incidence bracing wires, the only ones in this kit).

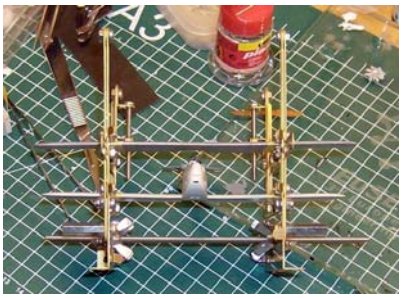
Only at this moment I noticed that the Van Berkel WA has its fuel tank at the left side, and not at the right, as is the case with the CMR Hansa-Brandenburg V.12/III kit. So I have removed the tank from the top of the upper wing, reshaped the wing ribs, flattened the relevant part of the right wing and reconstructed a tank from 0.5 mm Plasticard and some scrap strip.

While the fuselage was drying prior to applying the decals, I have made some small equipment. Almost all WAs had a generator on top of the right upper wing located at the leading edge. Two lines run from the generator, one to the motor compartment, the other to the cockpit decking. I have produced it from a bit of wood, 0.25 and 0.4 mm metal wire and some aluminized plastic (one o'clock in the picture. At the underside of the upper wing runs a fuel line with three or four connections to the fuel tank. This has been soldered from 0,4 mm brass wire (five o'clock).

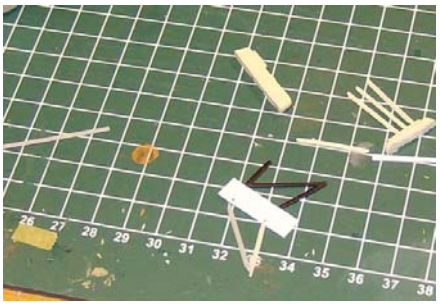


The speed sensor of the WA was an anemometer, attached to the right forward inter-wing bracing strut. The half spheres have been made from 0.6 mm plastic profile of which the end hase been flattened with a set of pliers. The leads to the wing I will produce from fishing line. Being a naval aircraft the WA carried of course an anchor. As the smallest ready-made one was far too big (20 mm) I have soldered one from 0.25 and 0.4 mm wire. The hooks have been made from 0.25 mm plastic strip. I have attached a filling tube and lid made from several sizes of plastic rod for the radiator. At the nose of the aircraft there is a step to reach the engine. I have soldered that from

0.4 mm brass wire.



I have decided to choose the Dutch metropolitan WA variant with orange balls and registration number W.67. and have applied the decals on the fuselage. Fuselage and wing have been finished with satin varnish, and the model is now ready to be placed in the Aerocub Models biplane wing assembly jig. The upper wing has a stagger of 1.5 mm and the distance between the wings is 14.0 mm. The wings have been protected against the sharp edges of the jig with tape.



The N-struts included in the kit were badly bent, so they got their heat treatment to get them flat. The inter-wing struts had the correct length, so they were easily mounted, but the N-struts between fuselage and upper wing were not fitting at all; they are some 2 to 3 mm short, so new N-struts have to be produced. I have drilled a mounting point in the upper wing for the forward strut according to the drawing and have made a small jig for the correct distance between front and rear wing spar. I have used the spare inter-wing struts of the W.12/V kit and plastic streamline profile to produce a correct V-strut. The picture shows the old (black) strut at the top and the longer new one below. The rear strut I will mount after the model has been removed from the jig.

When fitting the struts I still had to make a small adjustment; one of them was still 1 mm short. I have also mounted the custom made inverted V-style behind the pilot's cockpit. I should have done that beforehand; now it can hardly be reached any more.

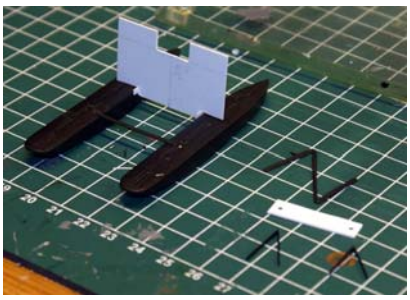
When everything is well dried, the model can be removed from the rig. The rear fuselage-wing struts have been made from the original N-struts and fitted trial and error.

Now the incidence bracing wires can be applied between the inter-wing struts. I used my standard method for that: Drill 0.3 mm holes through the wing in the correct places, feed the 0.06 mm fishing line through it, tighten the line with tape and fix with thin cyano glue.

When the glue is thoroughly dry, the fishing line is cut off flush with a sharp knife and the wing surface is sanded, until no trace of line and hole is visible anymore. Then upper and lower wing can be painted, finished with gloss varnish and the orange decals applied. I have cut the decals for the upper wing in two; the part covering the aileron will be applied only when the ailerons have been mounted. I will do that after mounting the floats.

Two other things to be done now are the mounting of the windshields and producing the windows under the nose with Humbrol Clearfix.

Floats



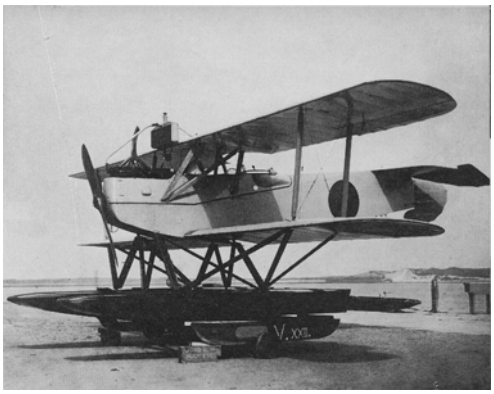
I have measured from the drawing in ref. 12 the dimensions of the N-struts between floats and fuselage and compared them with those supplied in the kit. The average length differnce is 0.4 mm, with one larger deviation of 1.1 mm. This seems sufficient to ensure a reasonable fit.

First I have mounted the struts between the two floats. These struts are very thin, so now the assembly bends under its own weight in almost any orientation. So to mount the floats under the fuselage we will require some tooling. I have made one rig for the correct distance between the two inverted V-struts and a second one to mount the floats under the fuselage.

I have glued the inverted V-struts under the fuselage, fitting their apex in the small rig. When they are well dry, the second rig has been “cut-to-fit” for a position in front of the forward V-strut and can the floats be glued to the V-struts. When the joints are dry, the odel may be inverted, but needs some supports under the wing to adjust it to the proper height. When fitting the N-struts, it appeared that the forward strut, which was 1 mm short, still had to be brought on the correct length. I have used some plasticard for it and determined the correct length by trial and error. The struts have been glued in place. However, it can be seen very clearly now, that the location of the holes for the struts in the fuselage are not in the correct location; they are too far apart; the N-struts do not meet the V-struts. It is too late to correct that now, repair would cause too much damage.

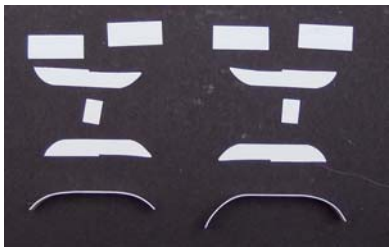
It would have been better to build the complete the float construction separately and then to join it to the fuselage. And the holes in the fuselage should have been corrected according to the drawing for their correct position beforehand. Never assume that something is correct in a kit.

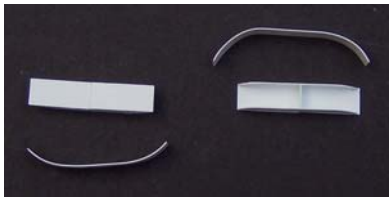
The last set of struts are the N-struts between floats and outer lower wing. These struts are the reason why so few bracing wires are required; it results in a very solid and stiff construction. These struts are the easiest mounted when the model is in a almost vertical position. The N-strut is leaned against wing and float and fixed with small drops of thin cyano glue. Again it shows that the struts are a bit too short; the holes in the wing on the right place relative to the inter-wing struts. I leave them however, unchanged, as I am short on streamlined profile strips, and anyhow, only a purist will remark this error.

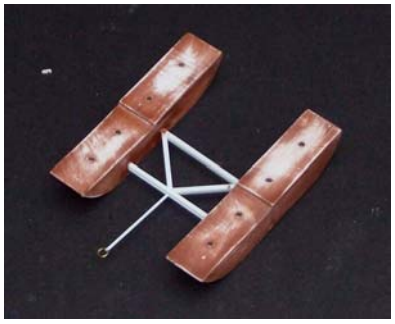


In the mean time I have started to produce the carts, which were used to pull the WA ashore. Everything is made from 0.5 mm Evergreen plastic sheet, and the shape has been copied from a photograph from Hugo Hooftman's book on aircraft of the Dutch Naval Air Service (ref. 2).

The pictures at the right show the building sequence.





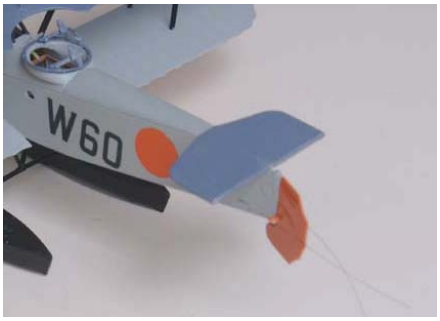


Although there are some pictures, that show the cart being composed form an individual unit for each float, I have produced a more sophisticated version by joining them with a frame made of Evergreen U-profile. The wheels have been made from Evergreen tubes of increasing diameters, mounted on a 0.7 mm axle. The cart has been finished in dark grey, weathered with several Tamyia weathering sets.

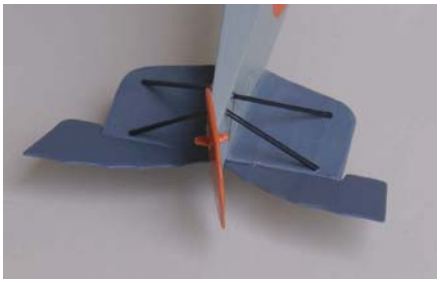
In the mean time also the ailerons have been glued in place and the foot support under the nose. The picture at the left shows the WA on the cart.

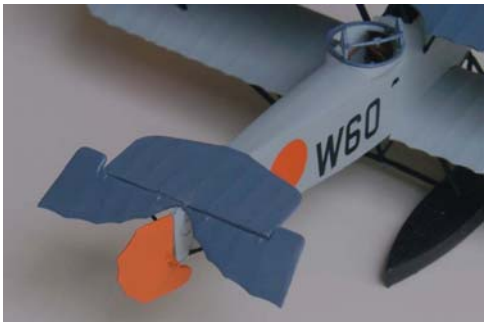
Tail assembly

The rudder has been glued in place having some deflection to port and the control cable, made of 0.06 mm fishing line have been mounted in 0.3 mm holes drilled in the rear lower part of the fuselage. When dry, the other ends have been glued to the control horns of the rudder. I have also glued the Sharff ring in its place. I have used the original resin ring, as the ring of Aeroclub Models white metal Sharff ring had too small a diameter. The Aeroclub mounting frame for the Lewis machine gun has been carefully bent to the correct size to fit the resin ring.



Next I have mounted the struts, made from 0.5 mm diameter Evergreen profile, under the horizontal tail plane. Sources are not clear about the presence of these struts on the wooden WA, which I am modeling. The metal WAs had them all and on many pictures of the wooden version they are absent. However I found a couple of pictures, one of them of the W60, where they were present, so I decided to incorporate them.





I have glued the elevator in its characteristic position: fully down. As the kit has modeled all hinges, this is easily done by applying a drop of thin cyano on each "hinge" and keeping the control surface some 10 seconds in its correct position. I have also finished the ailerons with satin varnish in this stage.

Final assembly and detailing

The fuel line at the underside of the upper wing under the tank and leading to the motor compartment has been cut to size and bent into shape has been glued in place.

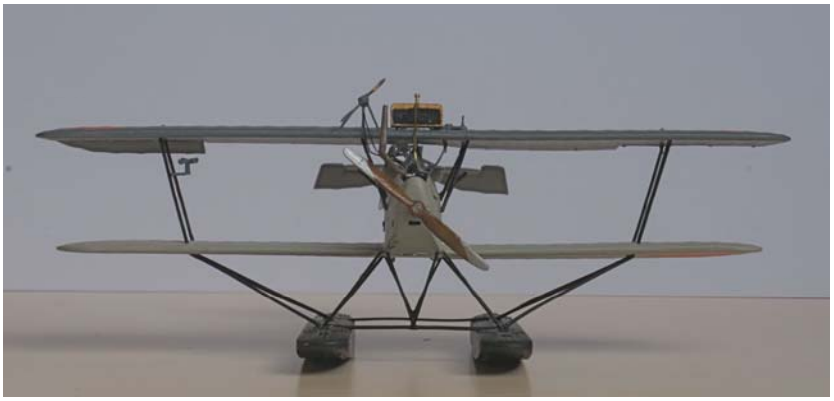
Next I have glued the generator with its propeller in its place on top of the upper wing. This was rater difficult, because the "electrical" leads made of 0.25 mm metal wire were too stiff, and pushed the generator from its place. I finally managed to fix it at the expense of a broken propeller blade and a detached windscreen. Then the radiator and its pipes made of 0.4 mm brass wire. The original resin parts did not fit well (anymore) and were anyhow quite coarse. Finally I have attached the exhaust. I have left the brass wires unpainted; on several photographs of the WA it shows clearly that the radiator tubes were unfinished metal.

At this stage I have also glued the aileron control cables in the holes in the top surface of the upper wing.

The last small items that have to be attached are the anchor, the attachment rings under the rear fuselage, a step at the starboard side, the anemometer and the Aeroclub Models Lewis machine gun. Then the model is finished.

Acknowledgements

The photographs on pages 1, 4 and 6 and the drawing on page 1 have been taken from K. Aarssen (ref. 1), the colour photographs on page 3 from the website of the Stichting Neptune Association (ref. 11), the drawings on page 2 from the CMR kit documentation, and the drawing at the end of this document from W. Vredeling (ref.12). The photograph on page 9 is yaken from H. Hooftman (ref. 2). This documentation has been essential to produce a realistic model of the Van Berkel WA.

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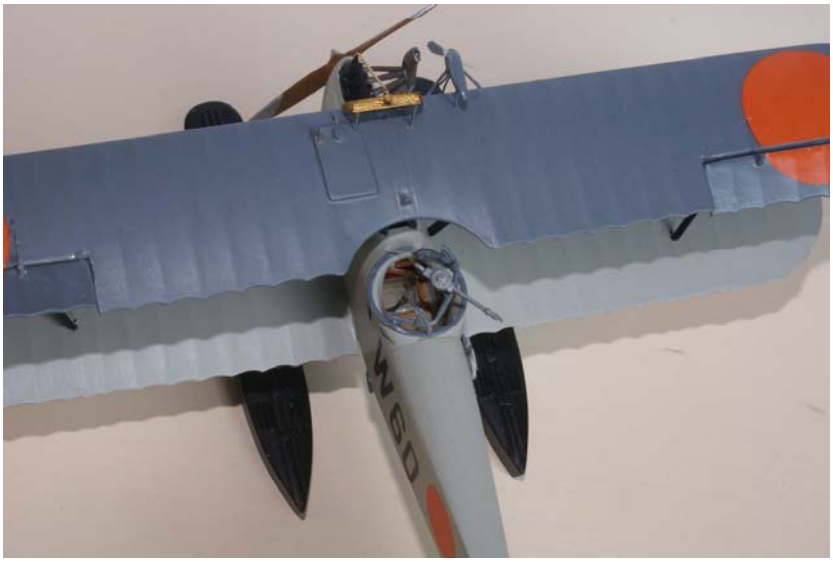
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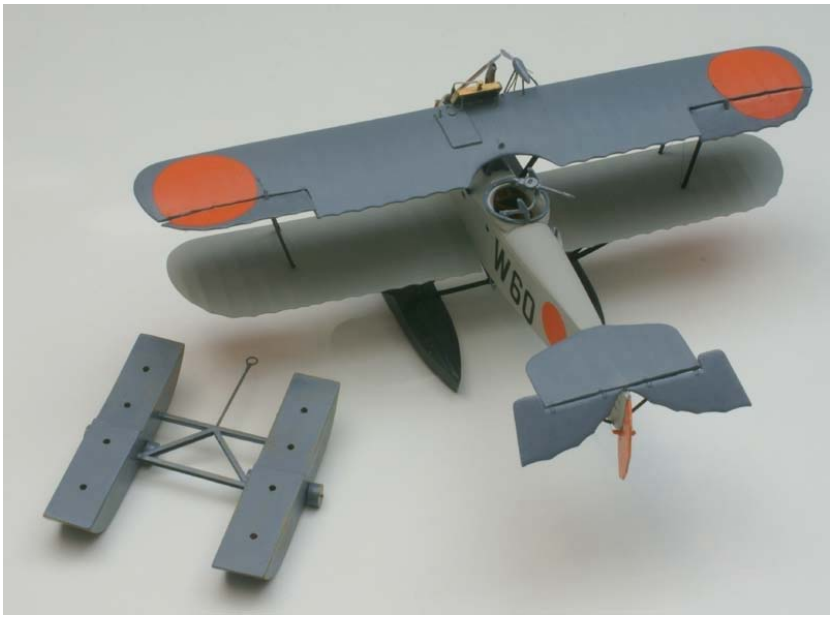
W60


W60

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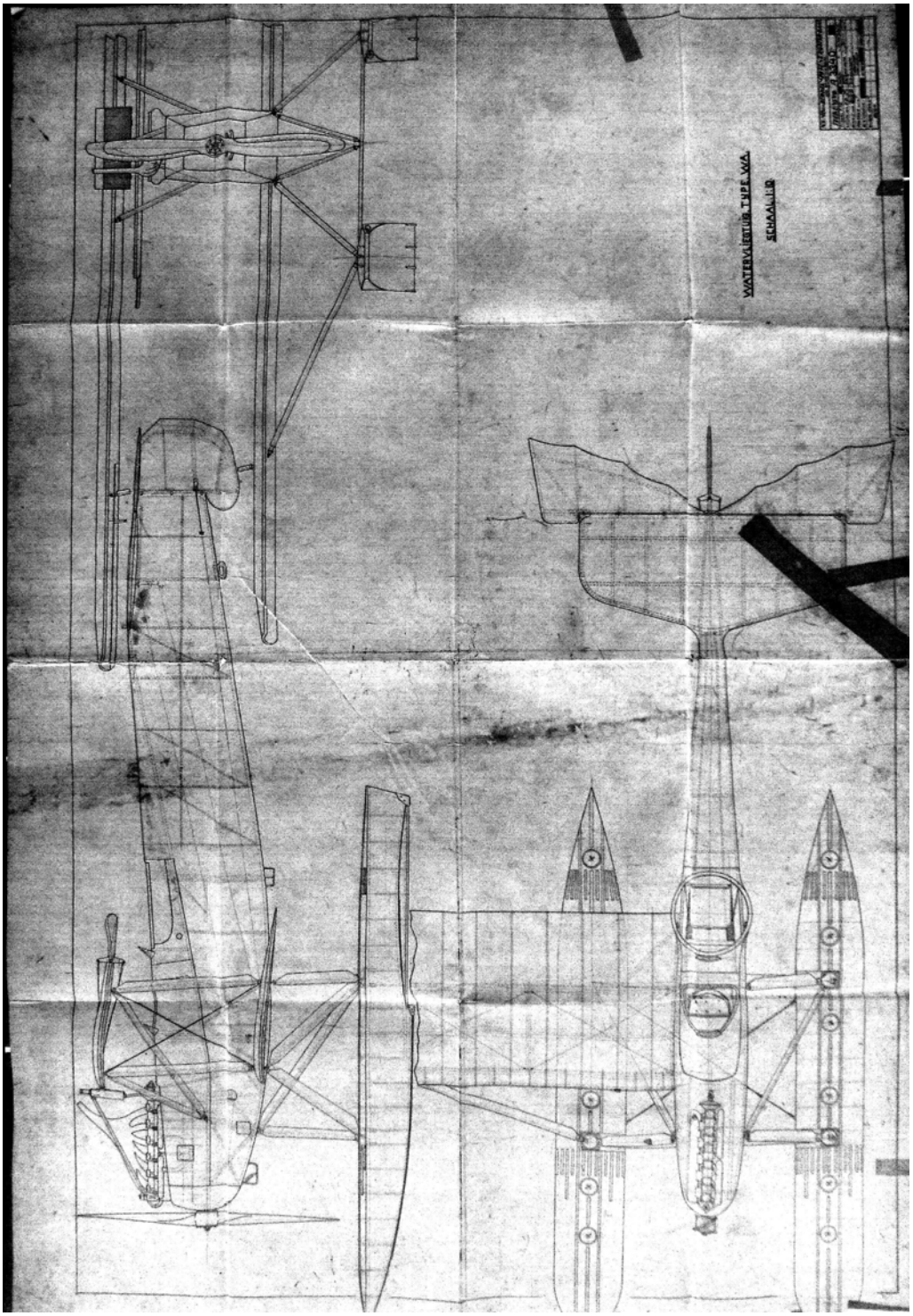

[1] www.cmrmodels.cz

[2] The Czech Master Resin Hansa-Brandenburg W12 Series V and III kits have been used as a basis for this model. CMR has announced a specific kit for the Van Berkel WA. It will be interesting to see in how far it will represent the original and errors in the Hansa-Brandenburg kits have been corrected.

[3] Excluding radiator.