



FOKKER D-VIII

By Henry A. Haffke





This photo of Ed Swearingen's replica Fokker D-VIII was taken at the Chaplin Fighter Museum in Mesa, Arizona, by Bob Banka of Scale Model Research. Bob has a complete photo pack of this aircraft, also 3-views. Order #379/30 photos \$23.00 post paid — 3-views and information, #379-3V \$3.00. Scale Model Research, 2334 Ticonderoga, Costa Mesa, California 92626, (714) 979-8058.

I better start this article with a little explanation for those scale modelers who have been around for more than a couple of years. I know you are wondering — How can this be, that Henry Haffke is doing a model that isn't a Gee Bee? There is a very simple reason for this. I didn't always design Gee Bees. As a matter of fact, I designed the D-VIII 14 years ago, before doing my first Gee Bee. I designed it to fly in the Rhinebeck WWI contest. I chose the

AT LAST . . .

A 1/6 Scale model for WWI enthusiasts that flies as good as it looks.

D-VIII because it only had one wing, and figured I could build this quicker than any other WWI aircraft. Also, I had seen a couple of photos in the EAA Sport Aviation magazine of a beautiful replica that had been built by Ed Swearingen, and felt I could probably get a couple more photos in color of an existing aircraft for my documentation.

I decided on a scale of 2" = 1' for various reasons. I wanted a .40 powered model and the scale was right for that. Williams Bros. makes a 2" = 1' model rotary engine, as well as Spandean machine guns and the required 5" vintage wheels. Also, when the model was designed, Coverite had a 2"

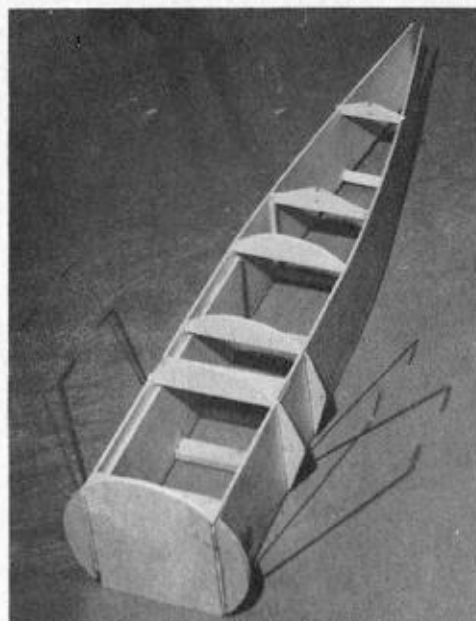
It was Ed Swearingen's beautiful home-built replica that inspired me to build a good model of the Fokker D-VIII for scale competitions. The story of his efforts is an interesting one and I include the following as information on his project:

Ed Swearingen's desire to build a replica Fokker D-VIII was thwarted by an unproductive world search for accurate information on the craft. His search started with the obvious, the Smithsonian Institution, the Air Force Museum, and then in England, France, Germany, and Italy. After many disappointments, an answer came back from the curator of the Munich Museum in West Germany saying that the original designer, Herr Platz, was still alive. In this letter, he sent what he felt was Herr Platz's correct address with the suggestion that he write directly to him.

A subsequent answer to Ed from Herr Platz, telling him that he would be glad to help, under the condition that all future correspondence in both directions be written in German. This problem was solved when Ed found his good friends and neighbors, Dr. and Mrs. Vrla were German and could solve the German language problem. For the next six years, Dr. and Mrs. Vrla received a liberal education in the design and construction of fighter aircraft.

Swearingen constructed his D-VIII from sketches drawn in 1/10th scale and had the privilege of finally measuring an actual D-VIII when he located the only known example still in existence, which belongs to the Caproni family in Milan, Italy. He found Herr Platz's 44 year old memory was fantastic. Ed's replica is exact in all respects of construction and materials except for his power plant which is a 145 hp Warner. From what he can find out about the performance on the 110 hp Oberusall rotary engine powered originals, the Warner comes very close to duplicating that same performance. He reports that the aircraft is very stable and will cruise at just about any speed you want, up to its top of 121 mph. It wants to climb and requires some forward stick at cruise. Interestingly, I found that the model does the same thing, especially in a turn. He also reported that landings are "heart thumping" because of the narrow track gear and high Center of Gravity.

After several years of flying, Ed retired his replica and it can now be seen in the Chaplin Fighter Museum, 4643 Fighter Aces Drive, Mesa, Arizona.

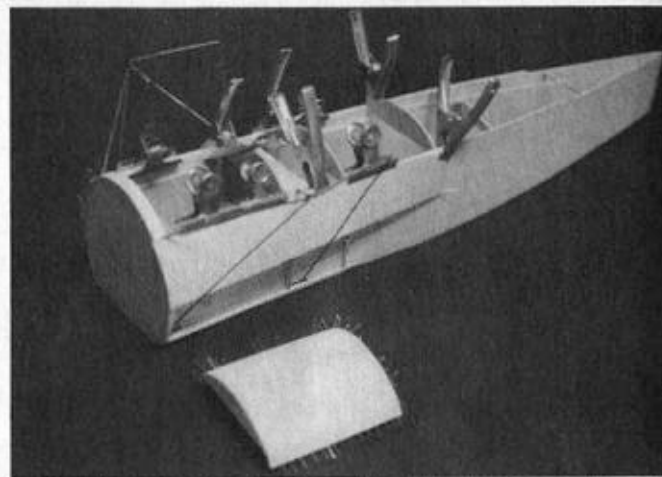
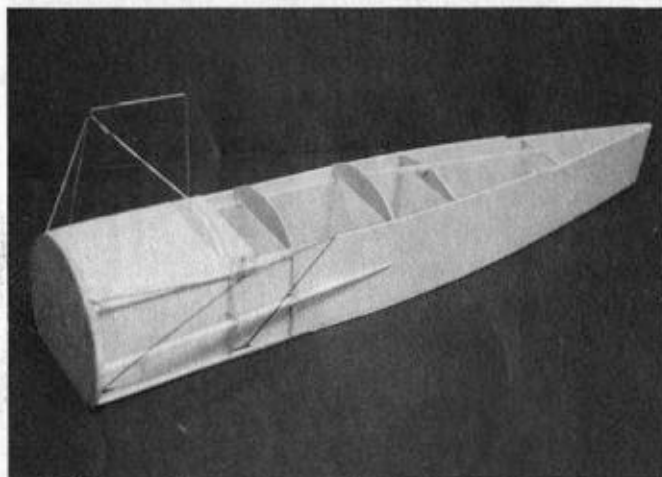


Basic fuselage structure. Note wing strut wires glued between fuselage side and doubler.

With everything I needed on hand, I drew up the plans, cut out all the parts, and started work on the model. I framed up the fuselage and wing, and then the project got put on hold as I got the urge to design and build a Gee Bee. The Gee Bees were built in Springfield, Massachusetts, where I was born, and over the next 13 years I designed and built nothing but Gee Bees and even wrote a book about them. Three years ago, my wife and I bought a motel in Vermont and my modeling ended as the motel took up all my time. Finally this past summer, it looked like I would have time to get back to model building. Rhinebeck was only a 2-hour drive and I thought of attending their 25th Anniversary event in September. I wanted to fly a new model and thought of the Fokker I had started so long ago. I hunted up all the materials I had bought to build the Fokker. When I had located everything I needed, I set up my shop and got back to work on the D-VIII which had been started 14 years ago. If you're ready, let's get started on building a D-VIII.

doublers. Make cutouts for grooved landing gear mount blocks in the doublers. Cut grooved landing gear mount blocks to a length of 4-5/16". Carefully form the 1/16" wire wing struts. (These must be installed with the fuselage doubler.) Cut a 1/16" groove in the doubler (refer to fuselage side view and note broken lines showing location of the strut wires in doubler). Make the groove on the outside of each doubler. Cut out the fire wall and all other fuselage formers. If everything is done to this point, you are now ready to start the fuselage assembly.

Fit the 1/16" wing strut wire into the groove in the doubler without gluing it in, and glue the doubler to the inside of the fuselage side. The doubler should be glued with the front edge on the line drawn on the basic sides (3/16" back from the forward edge). Repeat for the other side. Epoxy the fire wall between the sides and against the front of the doubler. Add the top formers back to, and including, D-T. Epoxy the landing gear mount blocks in place in the



LEFT: Forward hatch is framed up and cabane struts added and soldered. RIGHT: Side sheeting started. Sheetting pinned and clamped while glue dries. Forward hatch also sheeted in this photo.

scale lozenge covering available which I could use. Unfortunately, the covering had been discontinued when I called to order some. However, I had the good fortune to find two rolls of the discontinued material in a hobby shop later on. (Editor's note: RCM has a lozenge stencil available that was drawn for the Fokker D-VII by G. Whitehead, plan #996A — \$5.50.)

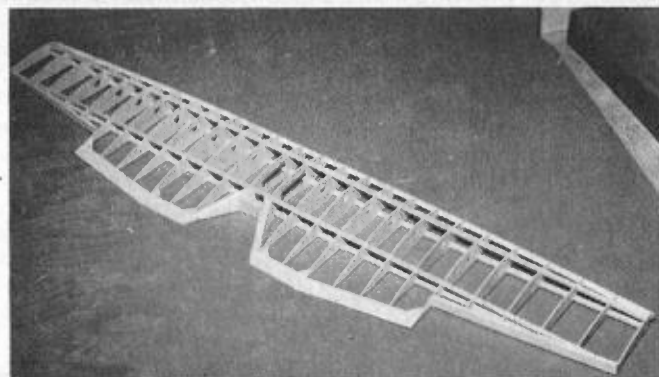
CONSTRUCTION:

Fuselage:

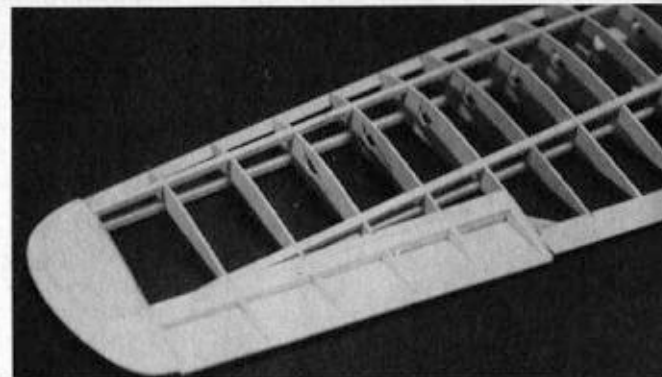
Start by making the basic fuselage sides of 1/8" balsa sheet. If you are using 4" wide sheet as I did, it will be necessary to add a 1/2" strip to the bottom of the 4" sheet. Draw a line 3/16" back from the forward edge on the inside of each basic side. Prepare the 1/4" x 4" fuselage

doublers inside the wing strut wires. Glue in the 1/2" x 1/4" cross member at the bottom below D-T. Make sure everything is squared up and let this part of the structure dry completely before proceeding.

Shave a length of 1/2" x 1/4" to a triangular shape for a tail post, and glue the sides together at the rear. Sight from the rear when finalizing this joint to make sure of a



Basic wing structure framed up.



Tip and aileron added to wing structure.

FOKKER D-VIII

Designed By:

Henry A. Haffke

TYPE AIRCRAFT

WWI Sport Scale

WINGSPAN

56 Inches

WING CHORD

8½ Inches (Avg.)

TOTAL WING AREA

500 Sq. In.

WING LOCATION

Parasol

AIRFOIL

Semi-Symmetrical

WING PLANFORM

Double Taper

DIHEDRAL, EACH TIP

App. 1" from Center to Tip Rib

(Top Surface Flat)

OVERALL FUSELAGE LENGTH

39 Inches

RADIO COMPARTMENT SIZE

(L) 13" x (W) 4" x (H) 4½"

STABILIZER SPAN

17¼ Inches

STABILIZER CHORD (incl. elev.)

7 Inches (Avg.)

STABILIZER AREA

120 Sq. In.

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT (inc. rud.)

7½ Inches

VERTICAL FIN WIDTH (inc. rud.)

5 Inches (Avg.)

ENGINE SIZE

.35-.40 2-stroke

.45-.50 4-stroke

FUEL TANK SIZE

8-10 Oz.

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa & Ply

Wing Balsa, Ply & Spruce

Empennage Balsa

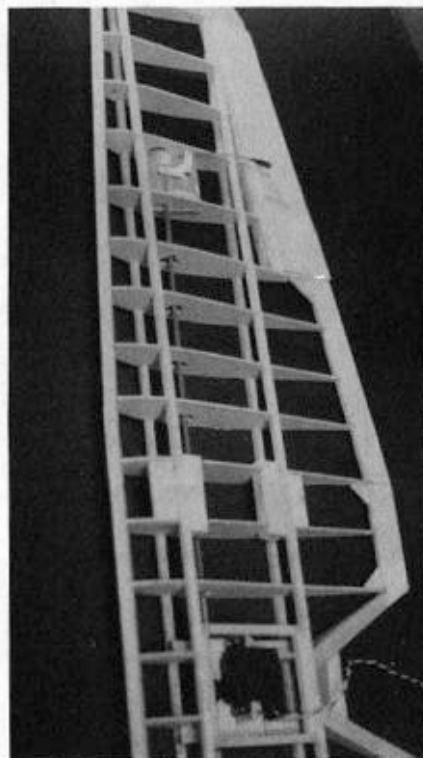
Wt. Ready To Fly 72-96 Ozs. (4¼-6 Lbs.)

Wing Loading 20-27 Oz./Sq. Ft.

symmetrical shape to the rear of the fuselage. Add the remaining top formers, and bottom spacers, except for A-1T, A-1B, and one each of the B-T, C-T and D-T formers. Add the ¼" x ¾" block against the fire wall, and the two lower ¼" x 1" blocks against the rear of B-T. Make sure these are securely glued in place as they form the mount for the remaining wing struts. Add the side formers and the ¼" x 1/8" stringer to each side. Add the top ¼" x 1/8" stringer. Make a 1/2" x 1/4" piece to fit along the bottom side of the forward section of the fuselage between A-S and C-S. Refer to top view of the fuselage for shape of this part. Cut out the 1/8" ply tail skid plate, glue the 1/2" block to the top of it, and epoxy the skid plate to the bottom of the rear fuselage section. Trim the top rear formers and add the triangular 1/16" sheet to the top of the rear deck area. You could cover the entire area, but this is the scale way it was done on the real aircraft.

Carefully form the 3/32" wire front and rear upper wing struts, leaving the end bends straight. Make sure that your bends are right so that the formed part will lay over the printed pattern accurately. Place the forward strut on top of the block and against the fire wall. Groove the bottom forward edge of A-1T to hold the strut in place and pin it in place. Now, by tilting the strut back to the previously mounted strut, you can get the exact angle of the bend of the ends to be bound and soldered to the other strut. The forward strut ends should be bent downward so that it will fit against the upright part of the lower strut. Do the same with the rear top strut, making a groove in the bottom of the ¼" x 1" block. Pin this in place and make the appropriate bend rearward so that the end of this strut will fit alongside of the rearward bend on the bottom 1/16" strut end. Cut two lengths of 1/16" ID brass tubing 3" long and fit it over the ends of the 1/16" wing struts, joining the ends together. When the struts fit properly together, glue A-1T and the ¼" x 1" block in place securing the lower ends of the struts to the fuselage structure.

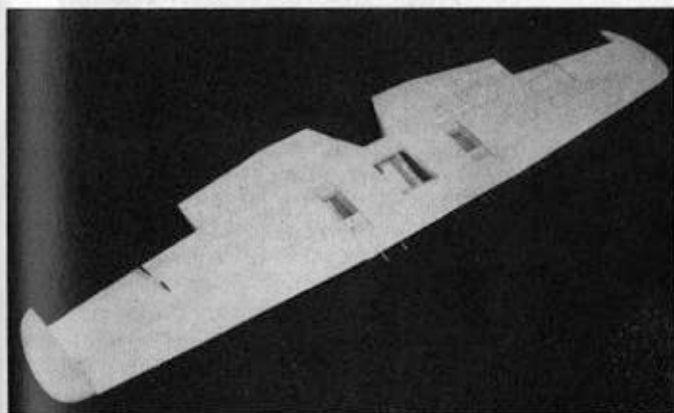
Now you can bind and solder the three forward strut parts together and the brass tube in place between the front and rear



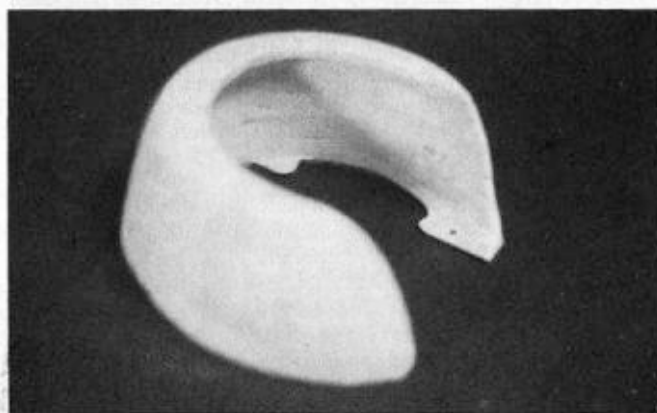
Servo and aileron linkage completed. Note wing mount blocks also added.

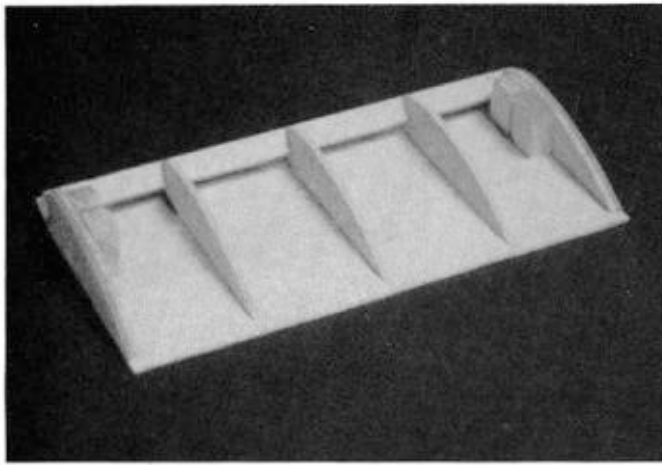
struts. This may sound a little complex, but, as you go, you should find that this all goes together quite easily one part at a time. Now you can add the 1/16" sheet over the forward side formers fitting the covering around the strut wires. Cover the area between B-T and C-T with 1/16" sheet. Cut out the 1/8" ply wing mount plates (two needed) and trim the opening in the part to fit around the soldered strut ends. The opening shown on the part should be close to what you will need. When satisfied with fit of the plates, epoxy them in place around the wire structure. Keep them level with each other by using a straight piece of material clamped across the tops of the two mount plates while the glue cures. This completes the basic fuselage structure.

Make a removable hatch between A-1T and B-T, using remaining parts A-1B and B-T, and 1/8" balsa sheet. Make another removable hatch between C-T and D-T, using remaining parts C-T and D-T, and 1/8" sheet balsa. These hatches will permit

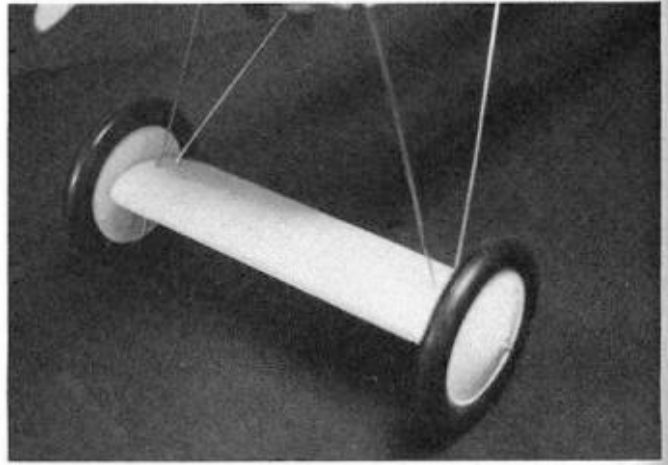


LEFT: Wing sheeting on underside completed. Note wing mount openings and servo box. RIGHT: Balsa cowl roughly shaped and sanded. Note mounting tabs in ply base.

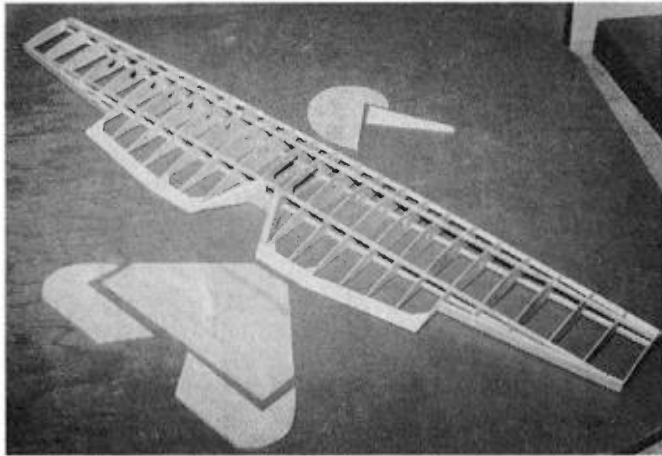




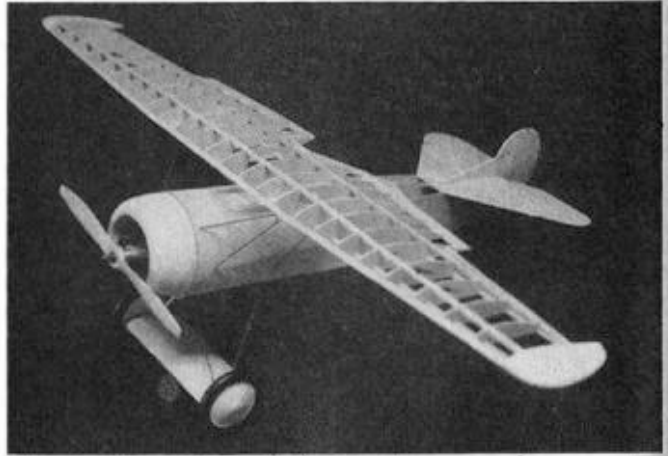
Sub wing structure ready for top sheeting.



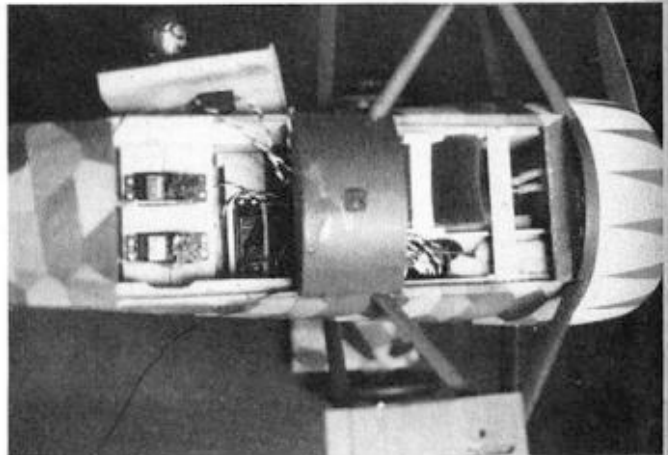
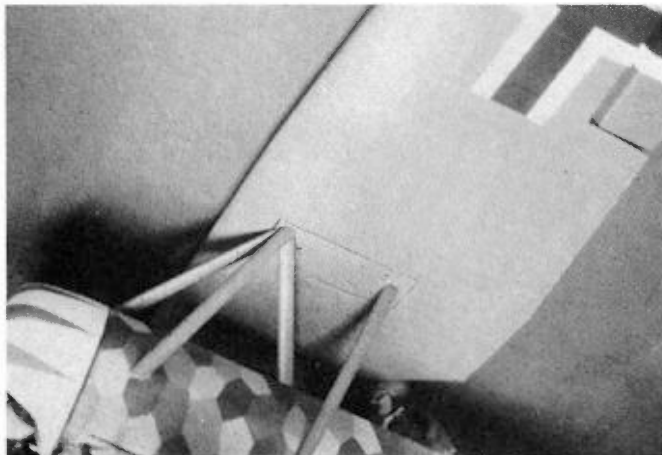
Sub wing fitted to wire L.G. struts.



Basic wing structure and tail surface parts.



Completed structure ready for covering.



LEFT: Wing fitted to wing mount plate on struts. RIGHT: Both hatches removed showing radio and tank installation. Note tank on left side with battery and receiver alongside in forward compartment. Rudder, elevator, and throttle servos in aft compartment. Note switch mounted in cockpit hatch and aileron extension, also through rear hatch.

easy access to tank and radio installation at any time when the model is complete. Cover both hatches with 1/16" sheet and also add 1/16" sheet to the top of the fire wall and A-1T. With this work completed, the entire top and sides of the fuselage can be sanded smooth.

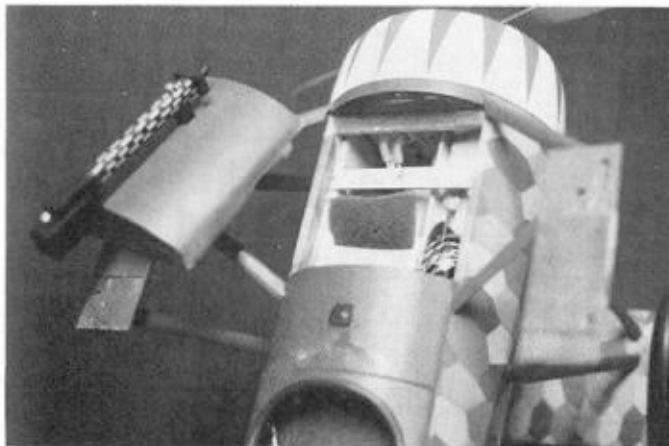
Landing Gear:

Build the landing gear sub wing after cutting out the required ribs. Make sure the 1/8" wire landing gear axle will slide up and

down in rib cutouts before assembly. This would be difficult to change after assembly. Make the 3/32" balsa base to outline on plan, and mark the position of each rib. Glue each rib in place and then glue 1/2" x 1/2" leading edge into notches in rib front. Add the 3/8" x 3/4" hardwood blocks against the inside of the outboard ribs, making sure the axle will slide between them. When this has dried completely, you can bend the forward edge of the base up

and glue it to each rib and the 1/2" sq. leading edge. Drill a 3/32" hole straight down through each of the four hardwood blocks and bottom sheeting. Shave the rear of the base so that the top sheeting will blend into it. Sheet the top of the sub wing with 3/32" balsa sheet.

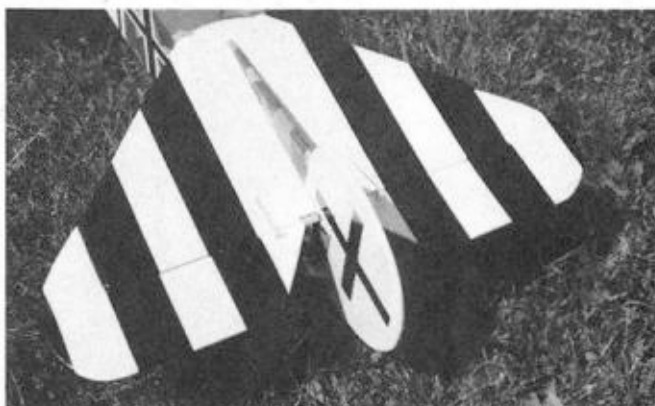
At this point, you must decide whether you will finish your model as a standard D-VIII, or as Ed Swearingin's replica. The difference in the rear strut is noted on the



LEFT: Forward hatch removed. Hold-down is by long bolt through dummy machine gun mount which screws into blind nut in cross member above fuel tank. **RIGHT:** Both hatches in place. Note dummy machine gun as on Sweringen's replica. Twin Spandau guns were used on standard D-VIII's, and are available from William Bros.



LEFT: Close-up of wing top detail. Note reinforcing tape and dummy aileron horn and rods. **RIGHT:** Close-up of tail surfaces, showing dummy horns and cables.



drawings. For a standard D-VIII (using 3/32" music wire), you will make a 65° bend 8 5/8" for the first leg, then another 65° bend 4 3/4", and cut the second leg off at 8 5/8". Make a second identical to the first. Using a wrap of masking tape, mark each strut at 7 1/8" from the fuselage bend. Mount the struts in the L.G. mount blocks with screws and straps. The short bends you will make on the end of each strut, will go through the blocks in the sub wing. Using the sub wing, you can hold the struts in their approximate position against the outside of the wing and use this as a guide to make the end bends at 7 1/8". These end bends will go through the sub wing blocks, and a 3/32" wheel collar placed tightly under the wing on each wire will secure everything in its proper place.

Note the location of the shock absorber screws on the drawings and install the two screws on each end of the sub wing, 1/2" each side of the axle slot. To complete the main landing gear, make a 1/8" wire axle 13" long. Use a wheel collar on one end, then install a 5" Williams Bros. Vintage wheel and another wheel collar. Then add two washers before sliding the other end of the axle through the sub wing slots. Now add the two washers, a wheel collar, the 5" wheel, and finally the outer wheel collar. Use short rubber bands as shock cords around the screws and over the axle. Now you can bend the tail skid from 3/32" wire

and mount it on the tail skid plate. Finish the skid by adding the ply fairings to each side and fill in-between them, top and bottom, with strips of 3/32" balsa.

Strut Fairings:

The strut fairings for both the wings and landing gear are made of 1/2" x 1/4" spruce. If you or a friend have a Dremel table saw, these will be very easy to make. Make a groove by setting your fence at 1/8" from the blade, with the blade set above the table 5/32". Depending on the width of the blade, you may have to move the fence for a second cut. The groove should be 3/32" wide. Groove enough of the material so that you can end up with six 8" lengths, two each of 7 1/4", 6", and 5 1/2". You can now trim the ends as necessary for each strut fairing and then sand to a streamline shape.

When ready to install, run a bead of epoxy into the groove and fit it to the wire strut. Fill the void in the groove with a length of 3/32" sq. balsa and clamp in place. When dry, the excess balsa filler may be trimmed away and sanded to final shape. Repeat this for each wire strut. All that remains to be done to completely finish the fuselage structure is to cover the bottom of the forward section of the fuselage with 1/8" cross-grained balsa back to station D.

Tail Surfaces:

The tail surfaces are simply cut from 1/4" sheet balsa. Round all edges of each of the tail surface parts. Use an elevator joiner,

with horn attached, to join the two elevator parts together. Hinge the elevators to the stab and the rudder to the fin. Make installation of the bottom rudder hinges, but glue only to the rudder at this time. I would suggest covering the tail surfaces before final hinging and gluing to fuselage.

Wing:

Build the wing upside down over the plans so that the top of the wing will be straight across, while the taper of the outer panels will create dihedral from the center section to the tips. Lay out the 1/4" sq. top spars with a shim under them to allow for clearance of the top curve of the ribs. Glue each rib in place on the top spars. When this is dry, you can add the bottom 1/4" sq. spars. Fit a 1/4" x 1" block between W-6 and W-11 to form the aileron cutout. Taper the bottom of this part to fit wing shape. Fit 1/2" sq. leading edge into notches in wing ribs, with joints at outermost W-2A ribs to give taper to leading edge. Add 1/4" x 1" trailing edge stock to rear of wing. Fit 1/2" x 1 3/8" blocks to form cutout in the trailing edge of the center section. Build ailerons by tack gluing the 3/8" leading edge to the aileron cutouts. Add the 3/32" aileron base to the bottom of aileron LE, then add aileron ribs to the top of the base. Add the wing mount blocks and the 1/8" ply aileron bellcrank plates. Set up the wing servo box in the center section and add the linkage for aileron hook-up at this time.



laminating four layers (five layers if doing Swearengen's replica) of 1/2" balsa (C-2) to a 1/8" ply backing (C-1). Add the 1/4" balsa front (C-3). For a standard D-VIII, the front is a sheet with holes shown in broken lines on plan pattern. Swearengen's replica was powered with a Warner radial engine and required an open front cowl as on my model. When the laminated parts have dried completely, the cowl can be carved and sanded to final shape. The cowl is mounted to the fire wall with four screws through the ply cowl backing tabs. Now is the time to install the engine, fuel tank, and radio components. The plans show where my

Coverite's Silkspun. This is a spun fiber fabric and has no woven grain, so gives a smooth finish to a sheeted surface. Silkspun is about the easiest material there is to cover with. I also covered the cowl with Silkspun before painting.

The fuselage and sub wing were covered with Coverite's lozenge pattern covering (no longer available unless you can find a roll as I did). My choice for an alternate covering would be to use Super Coverite, a woven fabric covering that goes on as easy as Silkspun. This can be painted in the lozenge pattern if desired. The tail surfaces were covered with Coverite's new 20th

This completes the basic wing structure.

The wing can now be set up for mounting to the wing mount plates on the wing struts. Set the wing (bottom up) on a flat surface. Lay the tops of the wing mount plates in place over the mount blocks. Carefully align the wing by measuring from each tip to the tail post, so as to have an equal measurement on each side. When satisfied with this location, drill the mount blocks, and thread them for the nylon bolts.

Finishing the wing can be done in several ways. If building a serious scale project for competition flying, you should sheet the entire wing with 1/16" balsa. This is what I did, but a much lighter model can result by not sheeting the wing. A third method would be to sheet only the top for a more scale appearance. The weight of the wing will be greatly affected by the way it is finished. My finished model weighed over 6 lbs., but flew very well. With a high wing and long landing gear as on the Fokker, the ground handling will be greatly improved with a lighter wing. I would suggest not sheeting the wing unless you are building the model for serious scale competition. The wingtips are built up of hollowed blocks and are added after sheeting, if that is what you decide on, or can be added as the wing is now. In any event, sand the wing smooth and finish with fine sanding.

Engine Cowl:

The engine cowl is easily built by



installation was made. Complete this installation to the manufacturer's specs, and install all linkages before covering.

Covering:

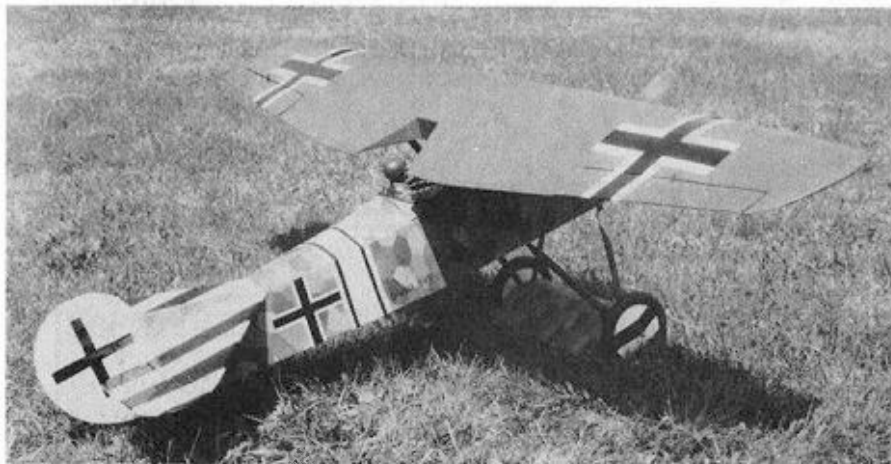
There are many ways to cover a model. My preference is to use fabric covering for this type of scale model for a more durable and realistic appearance. Give the entire structure a coat of Coverite's Balsarite which makes any covering job easier. It is a material that prepares the wood for covering and greatly enhances the adhesion of the covering. I used three different coverings on the model. The wing was covered with

Left side view showing missing part of 4 and 5 which is covered by white band.

Century Fabric. This is a prefinished woven material that needs no additional finishing after application. I could have covered the tail surfaces with Super Coverite and painted them white, but by using the new prefinished material, I saved the work and some weight.

Finishing:

After covering is completed, you should give the Silkspun and Super Coverite covered areas three coats of Coverite's Primex which has been thinned 50-50 with Primex thinner. This should be brushed on (not sprayed), so as to allow penetration into the fabric, creating a mechanical bond. Do not sand between coats. Sanding fabric before enough paint build-up will cause fraying of the fibers which will require more paint, work, and weight. I used a dark green auto enamel on the wing and struts. When everything was painted, I used Coverite's Black Baron flat clear on all of the painted surfaces; two very light coats were applied. All trim was done with Coverite's Graphic trim sheet material, which I have used for years on all of my contest winning scale models. It is a very easy material to use and can be cut to any shape desired. The instructions give many ideas for its use and show a layout for regulation aircraft numbers in both straight and slant patterns. I



Right rear view of completed model. Note FoK is missing before DVIII 545. This is the way the markings appear on Swearengen's replica, as white band was apparently added after markings were put on.

used black for the crosses, and white for the cross outlines and the white band around the fuselage. Black was used for the horizontal tail surface markings and the wheel stripes. The red cowl trim was cut from Graphic trim sheet material. As this is a vinyl material, it can be easily stretched around compound curves. My model was completed with the addition of a dummy Warner radial engine and a scale propeller. If building a standard D-VIII, you can use a Williams Bros. Le Rhone engine.

Flying:

With the model now completed, I headed to the flying field for a test flight. I had not flown a model in three years and now I'm

about to try out a new design and a very different configuration from anything I had ever flown before. Needless to say, I wasn't too comfortable about the situation. After checking everything out and getting the engine running good, I headed it down the grass runway. It got into the air much quicker than I had anticipated and climbed like a homesick angel. I had to hold a little down elevator, and, when I tried the first turn, it climbed more than in level flight. This was strange, as models usually require a little up in a turn. The flight was very erratic due to my rusty fingers and the bad trim situation. I finally calmed down enough to get to the trim levers and work in some down trim and a little left aileron which was also needed. The rest of the flight was considerably smoother than the first few minutes.

When it was time for landing, I backed off on the throttle and set up for the landing, which was very smooth except for being unfamiliar with the field. I had come in at a slight angle to the runway, causing the model to run off into the high grass before the tail had come down, which caused the model to tip up on its nose --- a common maneuver for a WWI ship. I made a few trim adjustments and a second flight was much smoother than the first.

The Rhinebeck meet was only a week

away and I only got one more chance to fly it before the meet. I had decreased the wing incidence since the first flights and found the model to be much smoother with a little less incidence. I decided no further changes were necessary and it was ready for Rhinebeck.

The model was taken to the meet and a late arrival and static judging caused me to lose two rounds of flying, so I only got in one flight the first day. The flight was quite good and when static scores were posted, the Fokker had a 91.5 and was in second place. My next flight had to be aborted after four maneuvers when the engine quit. Fortunately, I was in the right place headed in the right direction when the engine quit,

and was able to make a smooth turn onto final, and a beautiful landing right in the middle of the landing circle. Two more flights were made, but a balky engine prevented a complete flight in both cases. As the average of the two best flights were used for scoring, and I had made only one complete flight, the Fokker ended up out of the money. I expect it will do better next time, as it really flies very well and does well in static. The engine problem was solved after the meet when I found the tank had shifted forward enough to partially pinch the fuel line.

We hope you enjoy building and flying your Fokker, it's a very nice model and flies well. Good luck with yours. □