



Dorrie Ann Deardorff poses with the Dutch model D.XXI.

FOKKER D.XXI

A unique model of historic interest, this Fokker D.XXI is a suitable project for modelers with moderate experience. Designed for use with .049 to .09 engines and lightweight R/C systems.

other major powers would recognize the merits of such heavily armed ground-attack fighters, and follow the pioneering lead of the Danes by equipping their fighters with similar weapons. Having recognized the threat of attack by a massive armored force, the perceptive Danish military leaders anticipated that, with sufficient strategic warning, their anti-armor Fokkers could thwart such a strike against them.

With Germany and Russia united in an unholy alliance that had already devastated Poland, only tiny Finland actively opposed their military advance throughout the long dark winter of 1939-40. The first aerial victory by the Finnish D. XXI fighters was scored on December 1, 1939, the day after

On March 27, 1936, the prototype of Fokker's model D. XXI fighter took to the air on its maiden flight. An obscure aircraft, the D. XXI nevertheless played a pivotal role in the early days of World War II. In addition to its native Holland, this historic aircraft was also produced under license in both Finland and Denmark.

The Danish Army Air Service procured two machines direct from the Fokker factory, and then built ten more D. XXI's at their Royal Army Aircraft Factory in Copenhagen. Optimized for the close air-support role, the Danish D. XXI's were the most heavily armed aircraft of their era, equipped with twin 20mm Madsen cannon. It would be several years later before the



Danish model D.XXI showing details of the 20mm Madsen cannon gondolas beneath each wing. This particular model was fitted with a Cox Medallion .049 with throttle.



Frontal view of a Fokker D.XXI in Dutch Air Force markings illustrates minor differences in details such as gun sights and wheel pants.

WAR DI

By Ed Miller

hostilities broke out on their own frontier. Aided by Danish "volunteer" pilots who, in some instances, comprised thirty percent of the Fokker squadrons personnel, the Finnish Air Force fought against overwhelming enemy numerical superiority.

Fighting against such massive forces of the combined German-Russian Axis Powers was to typify every campaign in which the Fokker D. XXI's were to be engaged. The strategic warning of impending attack for which the Danish military leaders had hoped for was to be denied them, however: neutral Denmark was overrun by the savage German blitzkrieg on April 9, 1940.

The bitter Danish experience served as



Rose Marie Deardorff displays the Danish Fokker D.XXI.

fair warning to their nearby Dutch neighbors, who learned well the lesson that the ruthless Germans would respect no nation's claim to neutrality. So on May 10, 1940, when the German Luftwaffe launched an armada of almost 1,000 aircraft against them, the determined Dutch were as well prepared as their small country could be. The nimble Dutch D. XXI fighters fell with

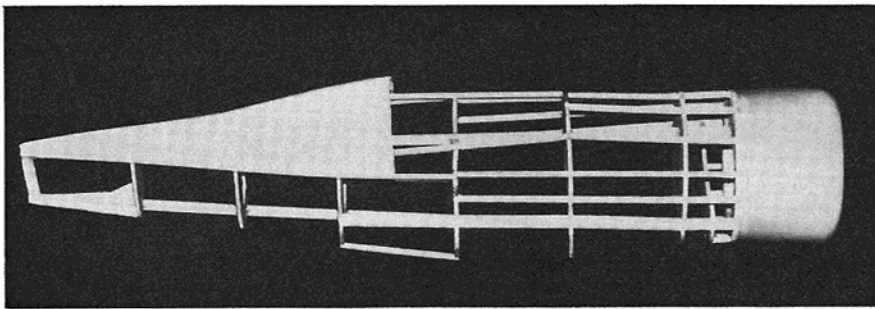
an avenging fury on the attacking Germans. Some Luftwaffe squadrons were almost totally annihilated, losing over ninety percent of their aircraft and crews. In nine days of savage fighting, the dogged Dutch resistance was the first to militarily stalemate the German blitzkrieg. Only after the massive carpetbombing of their civilian centers, however, the Dutch finally



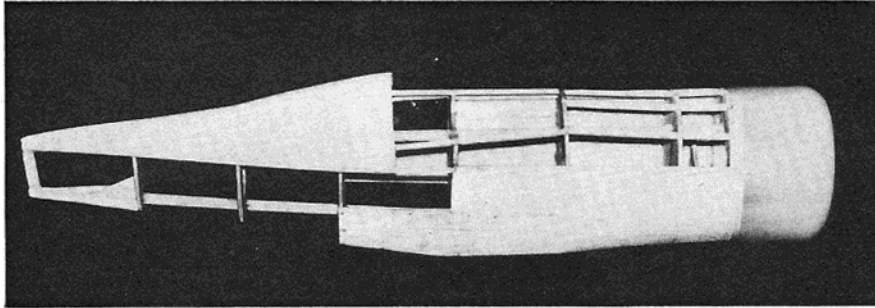
A Dutch Air Force model D.XXI which was equipped with a Cox Medallion .09 engine.



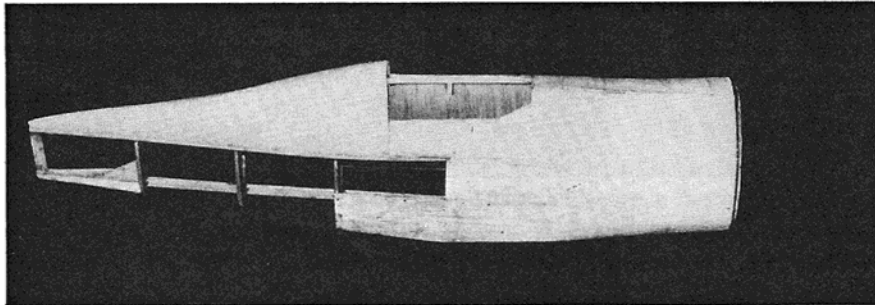
Two of the prototype model Fokker D.XXI's side by side. These models were actually built at various sites in northern Iran during a recent assignment there.



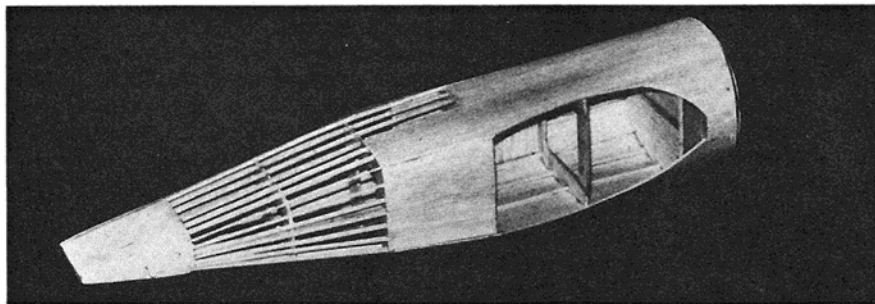
Fuselage Stage One Assembly (completed). All 1/8" square balsa stringers installed, ready for sheeting. Engine cowl temporarily in place.



Fuselage Stage Two Assembly (Step One). Fuselage side sheeting (1/16" hard sheet balsa) installed. Engine cowl temporarily in place.



Fuselage Stage Two Assembly (Step Two). Cockpit flooring (note cross-grain installation) and fuselage top decking added.



Fuselage Stage Two Assembly (completed). Aft sheeting and all 1/16" x 1/8" balsa stringers in place. Bottom center stringer is 1/16" sq. on top of keel. Lower center piece of F5 is still temporarily in place.

surrendered their last military forces on May 19. But in the interim period, the Dutch armed forces, spearheaded by their Fokker D. XXI squadrons, had accounted for the destruction of some 328 Luftwaffe aircraft, an appalling loss for the Germans.

This determined resistance by the Fokker D. XXI fighters in the skies over Holland was to be the first ill portent for the previously uncontested aerial supremacy of the Luftwaffe. Indeed, if the 328 aircraft lost in the Dutch campaign had still been

available during the Battle of Britain in the Autumn of 1940, they may well have provided the extra impetus needed to overwhelm the already hard-pressed Spitfire and Hurricane squadrons of the Royal Air Force.

But of even more significance, perhaps, was that many of the German pilots lost during the fighting in Holland were instructor pilots, temporarily withdrawn from Luftwaffe flight schools for what they considered to be an easy assignment to

FOKKER D. XXI

Designed By: Ed Miller

TYPE AIRCRAFT

1/2A Stand-Off Scale

WINGSPAN

36 Inches

WING CHORD

5 1/4" (Avg.)

TOTAL WING AREA

190 Sq. In.

WING LOCATION

Low Wing

AIRFOIL

Semi-Flat Bottom

WING PLANFORM

Double Taper

DIHEDRAL EACH TIP

1 3/8 Inch

O.A. FUSELAGE LENGTH

24 Inches

RADIO COMPARTMENT AREA

(L) 7" x (W) 3" x (H) 2"

STABILIZER SPAN

12 Inches

STABILIZER CHORD (incl. elev.)

3" (Avg.)

STABILIZER AREA

36 Sq. In.

STAB. AIRFOIL SECTION

Flat

STABILIZER LOCATION

Mid-Upper Fuselage

VERTICAL FIN HEIGHT

3 1/2 Inches

VERTICAL FIN WIDTH (incl. rudder)

3 1/2" (Avg.)

REC. ENGINE SIZE

.049-.09 Cu. In.

FUEL TANK SIZE

1-2 Oz.

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

3-4

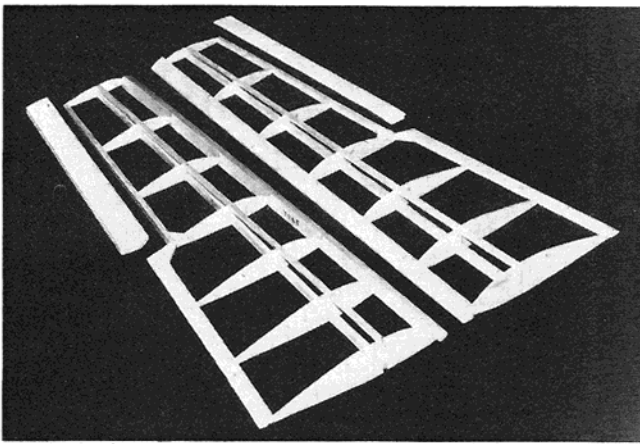
CONTROL FUNCTIONS

Elev., & Throt., Ail., Rud., (optional)

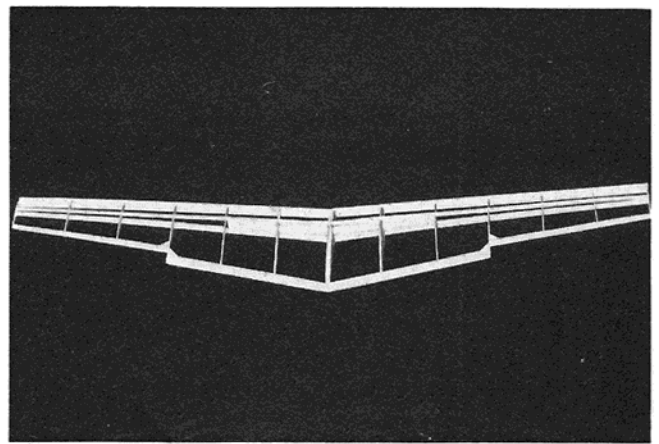
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa and Ply
Empennage	Balsa
Wt. Ready To Fly	27 Oz.
Wing Loading	20.5 Oz./Sq. Ft.

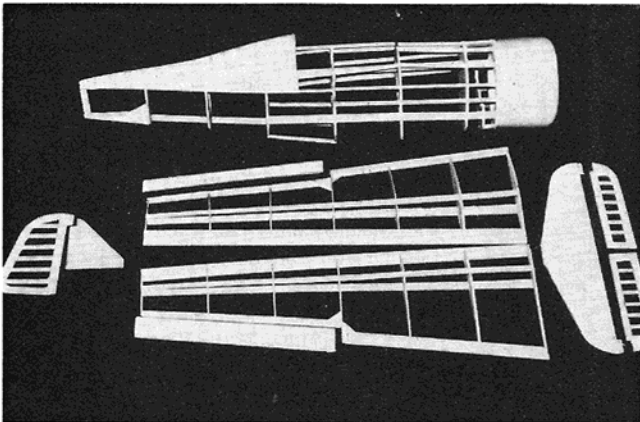
conquer the Dutch. As a direct result of the loss of so many of their experienced instructor pilots at that time, the avenging Allied bomber forces that finally attacked Germany itself during the period 1943 through 1945 were opposed by poorly trained Luftwaffe fighter pilots: pilots who as students had been denied the wisdom to be derived from an experienced staff of instructors. Such was the heritage bequeathed to the Luftwaffe by the valiant Fokker D. XXI's from their own Valhalla.



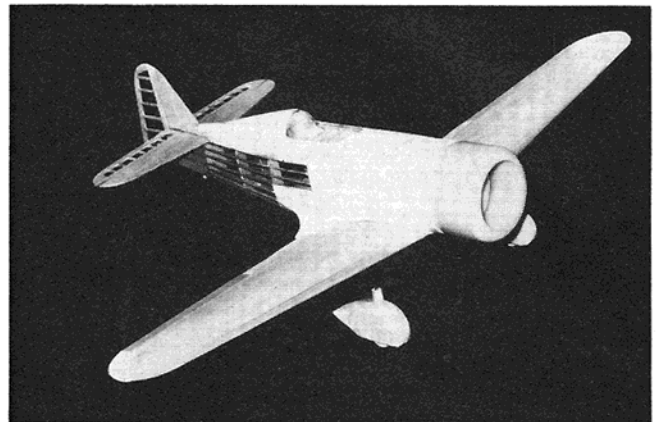
Basic wing panel assemblies.



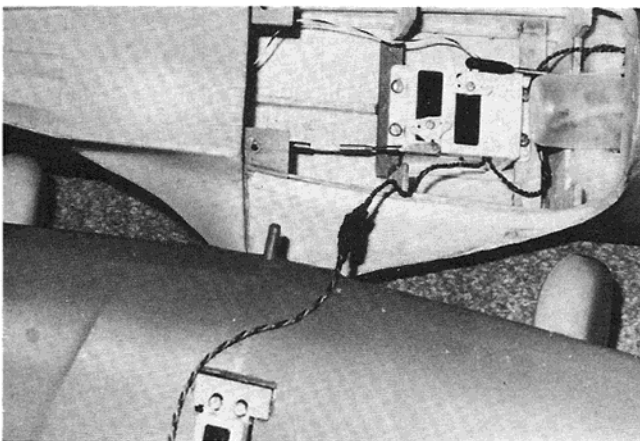
Assembled wing panel assemblies joined by epoxied 1/8" ply dihedral brace (aft view).



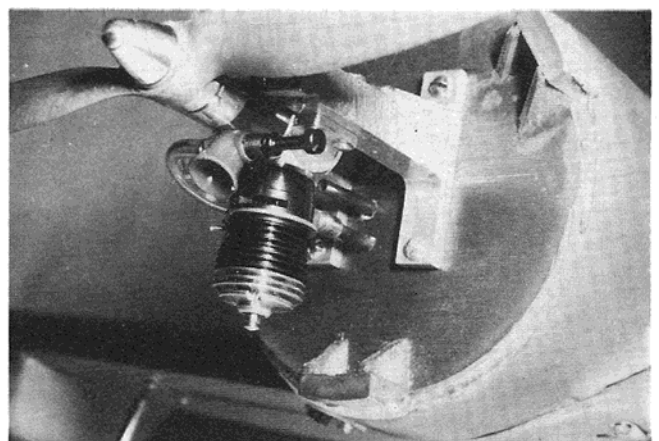
Basic airframe sub-assemblies, with fuselage shown at completion of its Stage One Assembly.



Completed airframe prior to covering and installation of canopy frame.



Wing removed to show typical R/C installation. Modified Cannon 3 channel equipment used for aileron, elevator and throttle.



Cowling removed to reveal the engine mount details. This is the .049 equipped Danish model D.XXI.

As a Stand-Off Scale R/C model, the historic Fokker D. XXI fighter makes an interesting and unique subject which can be finished in the colorful markings of either of the three countries that operated it. For reference material, consult the Profile Publication Number 63, or see Air Combat magazine's September and November 1975 issues (Challenge Publications, 7950 Deering Avenue, Canoga Park, California 91304).

Modeled to a scale of one inch to the foot

(1/12), the Fokker D. XXI is an ideal size for .049 to .09 R/C, a size range that is rapidly growing in popularity. The only major deviation in scale was to increase the wing chord to provide greater wing area (190 square inches, rather than 174 square inches that would have been exact scale).

Since it is the most complex structure in the airframe, the fuselage should be the first item on the agenda. Patterned after the full-size D. XXI's own actual construction technique, the fuselage builds into a strong

but amazingly lightweight structure.

Start by fabricating the nine fuselage formers: F-1 from 1/8" plywood; F-2 to F-6 inclusive from 1/8" sheet balsa; and F-7, F-8, and F-9 from 3/32" sheet balsa. Note that the lower center piece of F-5 is tack-glued in place, to be removed at the completion of the fuselage assembly, thereby allowing unimpeded access to the spacious fuselage radio/servo compartment.

Stage One Assembly:

Select very hard 1/8" x 1/4" balsa for the main top keel that runs from F-2 all the way aft, and the aft bottom keel that runs from F-6 all the way aft to the end of the fuselage. Also use very hard 1/8" x 1/2" balsa for the sub-keels that run along the fuselage sides from F-2 to F-7.

Using a jig to insure accurate alignment, assemble the fuselage formers F-2 through F-9 around these four main keel pieces. To this basic structure add the vertical aft 1/8" x 1/4" balsa rudder post at the end of the fuselage; all the 1/8" square balsa stringers that run from F-2 to F-6; the two 1/8" square stringers that run along the outer bottom between F-6 and F-7; and finally the two 1/16" x 1/8" stringers that run along the outer top between F-6 and F-9.

Next, add the triangular 1/8" sheet balsa fairings that form the fuselage bottom aft of former F-9, as well as the vertical gusset (also from 1/8" balsa) behind F-9. The 2" x 3" soft balsa block that forms the aft turtle deck can be tack-glued in at this time. Due to the double-compound curves in this area, it was decided that it would be far simpler to use a balsa block rather than lofting the turtle deck in with a series of sub-formers, stringers, sheeting, and fillets.

Finally, epoxy in the 1/8" plywood firewall (F-1), and carve the aft turtle deck to shape using templates, as illustrated on the plans, above formers F-7, F-8 and F-9. When the turtle deck is shaped to the correct outline, remove and hollow out to an approximate 3/32" wall thickness, and then permanently glue it back in position. This completes the Stage One Assembly.

Stage Two Assembly:

Using 1/16" hard sheet balsa, sheet over the forward fuselage sides as shown on the plans. Add the cockpit flooring (note cross-grain), the fuselage forward top decking, and then the bottom sheeting between formers F-6 and F-7. The last sheeting to be applied is the area between former F-9 and the aft end of the fuselage.

With all the sheeting completed, add the 1/16" x 1/8" balsa stringers that run along the fuselage sides and bottom. Note that the center bottom stringer between F-7 and F-9 is actually of 1/16" square balsa since it is situated directly along the bottom keel. This completes the Stage Two Assembly.

Wing Assembly:

Start by fabricating the ribs, W-1 and W-2 from 3/32" sheet balsa, and W-3 through W-7 from 1/16" sheet balsa. Make two of each. Build directly over the plans or use a wing jig for correct alignment. The wing spars are of hard 3/16" x 1/4" balsa (bottom spar) and hard 3/16" x 1/8" balsa top spar. Use soft 3/8" x 1/2" balsa leading edge stock, and 1/2" balsa trailing edge stock. Note that both ribs W-1 are canted slightly outward to facilitate dihedral assembly of the two panels.

The landing gear mounts are of 1/8" plywood. Laminate a double thickness between W-1 and W-2. Also, fill-in along the trailing edge between W-1 and W-2 with scrap 1/4" balsa to serve as butt-blocks for

the wing mounting bolts. Add 1/8" sheet gussets at W-4, and wing tips from soft balsa blocks.

Join both wing panels with epoxy the entire length of the 1/8" plywood dihedral brace. There is 1/8" dihedral beneath each wing (measure below W-7). Finally, sheet the completed wing assembly with 1/16" sheet balsa.

Empennage:

Both the vertical fin and horizontal stabilizer are cut from 1/8" sheet balsa. The rudder and elevator are of built-up construction as illustrated on the plans.

Airframe Final Assembly:

Mate the completed wing assembly to the fuselage and secure with the traditional wing dowel/wing mounting bolts of your personal preference. Next add the wing fillets, which are carved from soft balsa blocks, to form a smooth wing/fuselage junction.

After careful inspection to insure an accurate alignment (imperative!), the tail surfaces can now be glued permanently in place. Add the 1/8" x 1/4" hard balsa struts (sanded to an airfoil section) that serve to brace the stabilizer.

Build the canopy frame from 3/32" square balsa. Use hardwood (spruce or pine) for the radio mast which, when hollowed out, serves as a scale functional item.

The engine cowlings on the prototype series of models were made from plastic formings (ala Formicator). If this manufacturing process is not available, the cowls can also be fabricated from balsa blocks.

The wheel pants were fabricated from 1/4" sheet balsa laminations. Note that the Danish variant omitted the fairing on the upper strut (Ref: Air Warfare, page 82). This is a functional application for model use from grass strips. In fact, during spring rains when muddy fields clogged the wheel pants, it became common practice to remove them altogether on aircraft so equipped. Also, during winter operations, the Finnish simply replaced the wheeled undercarriage with skis. Use Williams Brothers 1 7/8" diameter "Golden Age" wheels.

Finishing:

After sanding and prepping the airframe with Epoxolite, as required, apply two coats of clear dope, sanding lightly after each coat. Then silk the fuselage, wings, rudder and elevator. Finish doping with three coats of thinned clear dope, again sanding after each.

The final camouflage pattern was sprayed in with an air brush. Not only does this achieve the realism of the original aircraft, it also is amazingly frugal in the actual amount of dope used, with a resultant savings in weight.

For insignia and markings, use Super MonoKote. Again, this has been proven to be the easiest solution for fabricating unique "one-off" aircraft markings.

The prototype models were fitted with a modified Cannon 3 channel radio systems installation for aileron, elevator and throttle

control. Engines used ranged from .049 to .09 size, with the latter recommended for lively performance. Keep weight to a minimum.

The cavernous fuselage will accept any suitable lightweight R/C system, including four channel. The thick airfoil center root section easily accommodates the aileron servo mounted just behind the spar and, utilizing torque-rod linkages, it provides a fully enclosed aileron control.

Since most small models of this type do not fly well off of grass fields anyway, a hand-launch procedure should be employed, releasing the model in a level flight attitude. Allow it to accelerate briefly to preclude the inevitable departure stall/half-snap roll-in so often witnessed with small high-performance models such as these.

Wearing the colorful livery of either of the three nations that operated it, the Fokker D. XXI certainly makes an interesting and attractive model. With its significant contribution to the ultimate outcome of World War II, it is indeed a most unique model of unusual historic merit! □

**Editing By Hlsat.
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