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Fokker D.XXI

WWII Royal Netherlands Air Force Fighter

Scale: 1/12
Wingspan: 36 in
Area: 178 sq in
Length: 25.5 in
Weight: 18 - 20 oz
Power: 400-Size Brushless



Version 1.2 – 17 January 2014

Materials

This kit contains the following materials:

- This manual (downloadable)
- Plan sheet
- Laser-cut wood pack
- Plastic canopy

To complete this kit, you will need the following additional materials:

- 3/32" Aluminum tubing, 3"
- 1/16" Music wire, 20"
- 1/16" x 4" x 36" Balsa sheet, 4 each
- 3/8" x 1/2" x 36" Balsa stick, 1 each
- 1/8" x 4" Hardwood dowel
- Carbon fiber rod, 1.8mm diameter
- Carbon fiber tube, 2mm internal diameter
- Material for fillets (balsa, pink foam, etc.)
- 1ea Wing mounting bolt
- Hinges (ailerons, elevator)
- Servo mounting materials and pushrods
- Covering materials, paint and glue
- Wheels, 2 each 1.75" diameter, 1 each 0.75" diameter
- Electric power system – Speed 400 or equivalent

NOTE: We recommend that you read this entire manual before beginning construction.

Construction

Wing Skins

- Each wing bottom skin consists of two laser-cut pieces: forward and aft. Gently clean up the mating edges of the pieces with 220 grit paper on a sanding block.
- Lay the pieces of a wing skin on a flat board or table, with the outer surface up. Run a length of masking tape along the join lines. Turn the assembled skin over, bend the joints open, and run a bead of aliphatic resin or wood glue down the joints.
- Lay the assembled skin back down on the board – masking tape side down. Run a damp paper towel over the joints to remove excess glue. Place a sheet of wax paper over the assembled skin. Then weight it down with another board, books or what have you. Keep the weight on the skin until it is completely dry.
- When the skin is dry, remove the masking tape. Lay a skin on a flat board with the outer surface up, and sand it smooth with 120 grit paper on a long sanding block. Be sure to keep your sanding motion at a 45 degree angle to the joints and wood grain. Clean the skin with a tack rag.
Note – it should not be necessary to sand the inner surfaces of the wing skin. Just be sure to remove any excess glue.

- Follow the same steps to assemble two wing top skins, using 1/16" x 4" x 36" balsa sheets.
- Place a bottom skin on a top skin. Trace the shape of the bottom skin onto the top skin, adding a 1/4" margin at the trailing edge. Cut out the top skin.

Wing Panels

- Laminate the dihedral brace to the left wing spar.
- Laminate one 1/8" lite ply rib doubler W3D to rib W3.
- Place the left and right bottom wing skins over the plan. Lightly mark the positions of the ribs and spars.
- Pin the left bottom skin to your building board (over a sheet of wax paper).
- Pin the 1/4x3/4 balsa leading edge against the front edge of the left bottom wing skin.
- Position the left wing spar on the left bottom skin
- Assemble ribs W1, W2 and W4 thru W9 to the spar, but DO NOT GLUE them in place.
- ** Place the 1/16 false leading edge on the wing skin and against the leading edge.
- Push the assembled spar and ribs into position. Glue the spar to the wing bottom skin.
- Glue the rear portions of the ribs (from the spar to the trailing edge) to the wing bottom skin.
- Slip rib W3 into place on the spar. Mark the location of the holes in the bottom skin.
- Remove rib W3 from the spar. Laminate the second 1/8 lite ply rib doubler W3D to rib W3.
- Cut the landing gear rod holes in the bottom skin with a piece of sharpened tubing.
- Glue W3 to the spar and to the bottom skin from the spar to the trailing edge.
- Pack up the bottom skin against the forward ends of the ribs. Glue the forward ends of the ribs to the bottom sheet.
- Glue the 1/16 false leading edge FLE in place.
- Trim the ends of ribs W6 thru W8. Glue the aileron spar in place.
- Glue the aileron leading edge in place, spacing it about 1/32" from the aileron spar.
- Cut and glue aileron rib W5 in place. Trim and glue the ends of ribs W6 thru W8 in place.
- Using a long sanding bar, sand the tops of the aileron spar and leading edge to shape. Also sand a taper into the bottom skin trailing edge so there will be a surface to which you can glue the top skin.
- Install the aileron torque rod.
- Cut a washout shim from scrap 1/8 or 1/4 balsa. The shim fits under the trailing edge of the wing, and tapers from 3/16 height at W8 to 0 height at W1. Pin the shim under the wing trailing edge.
- Cut and fit a washout shim to fit under the tip rib W8.
- Notch the upper wing skin to fit over the aileron torque rod.

- Apply aliphatic resin to the tops of the ribs, false leading edge, main spar, aileron spar, aileron leading edge, and trailing edge.
- Pin the top skin in place. Let the glue dry thoroughly before unpinning the wing panel from your building board.
- Remove the left wing panel from your building board.
- Laminate the dihedral brace to the right wing spar.
- Pin the right bottom skin to your building board (over a sheet of wax paper).
- Position the left wing panel so that the right bottom skin is firmly seated against the left bottom skin and the right wing spar is in place on the right bottom wing skin.
- Glue rib W1 in place against rib W1 in the left wing panel.
- Assemble ribs W2 and W4 thru W9 to the spar, but DO NOT GLUE them in place.
- Complete assembly of the right wing panel from the step marked **.
- Remove the assembled wing from your building board.
- Glue the wing tips in place.
- Sand the wing leading edge to shape.
- Reinforce the root rib joint by wrapping it with nylon or glass cloth. Saturate the wrap with CA.
- Use a 1/8" drill bit to clear the wing bolt hole and the dowel hole in the leading edge.

- Use a sharp blade to cut the ailerons free from the wings. Use a sanding block to finish the aileron leading edges and the aileron slots in the wing.
- Cover the wing as desired.
- Hinge the ailerons.
- Install the 1/8" dowel in the leading edge. The dowel should project about 1/4" forward of the wing.
- Cut and glue the 2mm ID carbon landing gear tubes in place in W3.

Landing Gear

The landing gear is designed to plug into the wing, with carbon fiber rods and tubes to bear the load. (Thanks to Adrian Britton – RIP - for this mounting method.)

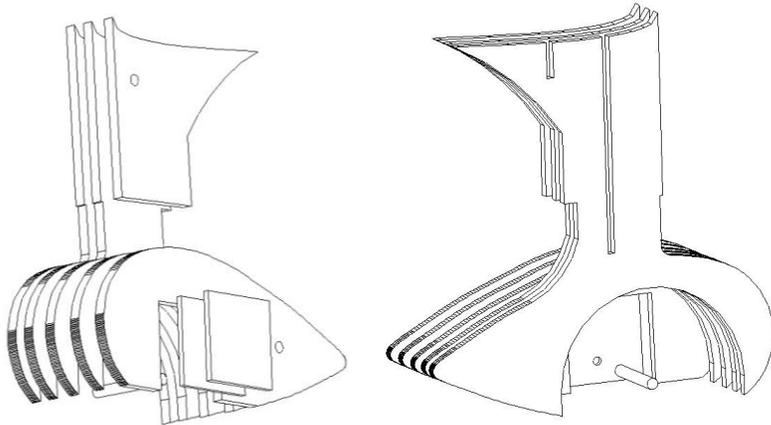
You can adjust the width of the wheel spats to fit your chosen wheels.

The wheel axle is a length of carbon fiber rod or music wire, captured between two squares of 1/16" ply on each side of the strut.

Assemble the parts as shown in the following drawings. Note that the drawings only show half of the landing gear struts. You can use short lengths of 1/8" dowel to align the strut parts.

Cut and insert 2mm ID carbon fiber tubes in the lite ply strut core before gluing the balsa doublers in place. The slots in the lite ply cores are cut slightly narrow. Use a file or sandpaper to adjust the fit of the carbon tubes in the slots.

When you assemble the model, you can use dabs of silicone sealer or white glue to hold the struts to the wings. DO NOT glue the carbon rods to the carbon tubes.



Fuselage

- Lay a sheet of wax paper on your building board and pin the two halves of the crutch over it. Glue the crutch halves together.
- Glue formers F2 through F8 to the crutch. Make sure the formers are perpendicular to the crutch.
- Glue the wing saddle doubler WS in place between formers F2 and F5B.
- Cut two pieces of 1/2" balsa triangle stock to length as shown in the plan top view. Taper the two triangle pieces at the aft end. Glue the 1/2" balsa triangle pieces to the fuselage sides as shown in the fuselage side view.
- Glue two lengths of scrap 1/8" balsa to the horizontal stabilizer support on the fuselage sides.
- Glue the fuselage sides to formers F2 through F8.
- Sheet the fuselage from F5B to the aft end with 1/16" balsa, grain perpendicular to the fuselage center line.
- Remove the assembly from your building board.
- Bend the tail wheel strut 3/32" music wire. Glue it firmly to the 1/16" ply tail wheel mount TWM.
- Glue the tail wheel strut and mount assembly in the fuselage.
- Glue the upper portions of formers F2 through F8 to the fuselage. Use part F5J to establish the correct angle for F5.
- Glue cockpit floor CF in place between formers F4 and F5.
- Glue 1/8" stringers between formers F5 and F6. Add a 1/16" balsa scrap shelf between formers F5 and F6.
- Glue 1/8" balsa stringers between formers F2 and F4, and between formers F6 and F8.
- Sheet or plank the upper fuselage with 1/16" balsa.
- Glue part F10 in place.
- Glue parts F0 and F1 in place.
- Fit and glue the wing mount WB in place.
- Glue the horizontal stab spacer HSS in place.
- Sand the fuselage to shape.
- Cover the fuselage with your choice of covering materials. We recommend 1/2-ounce fiberglass cloth and finishing resin.

- Fit the wing in place on the fuselage. Drill and tap the mounting bolt hole.
- Construct the wing fillets using your favorite method.

Cowling

- Laminate the forward cowl ring FCR parts together with aliphatic resin or carpenter's glue. Repeat with the rear cowl ring RCR parts.
- Cut 8 each 2-1/8" lengths of 1/8" square balsa sticks.
- Assemble the cowl ring by gluing the 1/8" square balsa sticks between the forward and rear cowl rings.
- Sheet the cowl ring with 1/16" balsa.
- Laminate the two C0 balsa rings to the C1 balsa ring.
- Glue the C0-C1 assembly to the forward cowl ring using short lengths of 1/8" wood dowel as locating pins.
- Laminate three pieces of 1/16" plywood part MMB.
- Glue the MMB assembly to the face of the C0-C1 assembly, using the 1/8" dowels as locating pins.
- Sand the cowl to shape.
- Cover the cowl as desired. We recommend 1/2-ounce fiberglass cloth and finishing resin.
- Glue the cowl to the fuselage with epoxy.
- Mount your choice of motor to the 1/16" ply motor mount MM. Install the motor mount and motor using two wood screws to hold it to the fuselage.

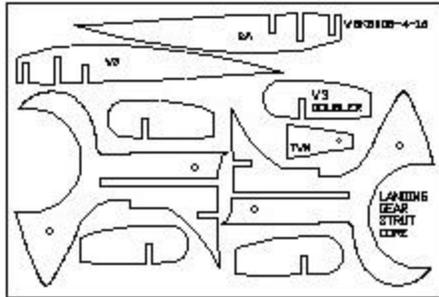
Empennage

- Join the two elevators together with a 1/16 music wire joiner.
- Cover the fin, rudder, stabilizer and elevators as desired.
- Hinge the elevators to the stabilizer, and the rudder to the fin.
- Glue the stabilizer assembly in place on the fuselage.
- Glue the fin and rudder assembly in place on the stabilizer.
- Shape and glue tail blocks TB in place.
- Install the 3/32" x 1/16" spruce stabilizer braces in place.
- Glue the canopy in place.

Flying Setup

- Keep the model as light as possible for best performance.
- The D.XXI should balance at 1.8" behind the leading edge at the center chord. This is approximately 25% of the mean aerodynamic chord (MAC). For the first few flights, you may want to move the balance point slightly forward.
- Set the high-rate control throws to:
Elevator: 1/2" up – 1/2" down
Ailerons: 3/8" up – 1/4" down

Parts Identification



Parts Identification

