

The author displays the completed Arado Ar.396. Its cardboard construction is simple and inexpensive.

ARADO AR.396



CL MODEL EMPLOYS CARDBOARD CONSTRUCTION TECHNIQUES

BY CHUCK FELTON

SPECIFICATIONS

TYPE: CL Scale

WINGSPAN: 60 inches

LENGTH: 49 inches

WING AREA: 541 square inches

WEIGHT: 74 ounces

WING LOADING: 19.7 ounces per square foot

POWER SYSTEM: .40- to .50-size slow motor or equivalent

CONSTRUCTION: Primarily cardboard

The Arado Ar.96 was a low-wing, single-engine aircraft of metal construction, which became the Luftwaffe's standard advanced trainer during World War II. However, as the war progressed, it was decided to redesign the Ar.96—the chief goal being to save metal. The result was the Arado Ar.396, which was constructed primarily from wood.

These aircraft were to be built in factories in occupied France, but the subsequent course of the war made that impossible, and production was moved to Czechoslovakia. Only a few aircraft were built by war's end and none were pressed into service. After the war, roughly 200 aircraft were built in France by the SIPA company and were used for training and as counterinsurgency aircraft in North Africa. The latter aircraft were fitted with wing racks for carrying light bombs and rockets.

CONSTRUCTION TIPS

Before you begin building, take a look at these tips for working with cardboard.

ADHESIVE: Water-based glue, such as white glue or Titebond, is recommended. Contact cement is not recommended because parts cannot be shifted when gluing surfaces.

FOLDING: Scoring the fold lines is done with a screening tool available at any hardware store. It consists of a handle with a 1/2-inch radius wheel at one end, which is run along a metal straightedge on the fold line.

FINISHING: Cardboard provides a solid surface with no open areas to cover and is nonporous. The easiest finishing method is to give it two coats of clear dope, sanding lightly between coats using 400-grit sandpaper, followed by two coats of colored dope.

A variety of finishing materials can be used on the cardboard, including coverings such as Solarfilm, MonoKote, and vinyl paper. With any of these, it is recommended that the surface not be doped to result in a better bond.

PAPER TAPE: All seams, joints, and exposed edges of the model are covered with strips of gummed paper tape. Obtain a 1-inch-wide roll from a stationary store. Simply cut a thin strip to length, dip it in water, and smooth it over the seam.

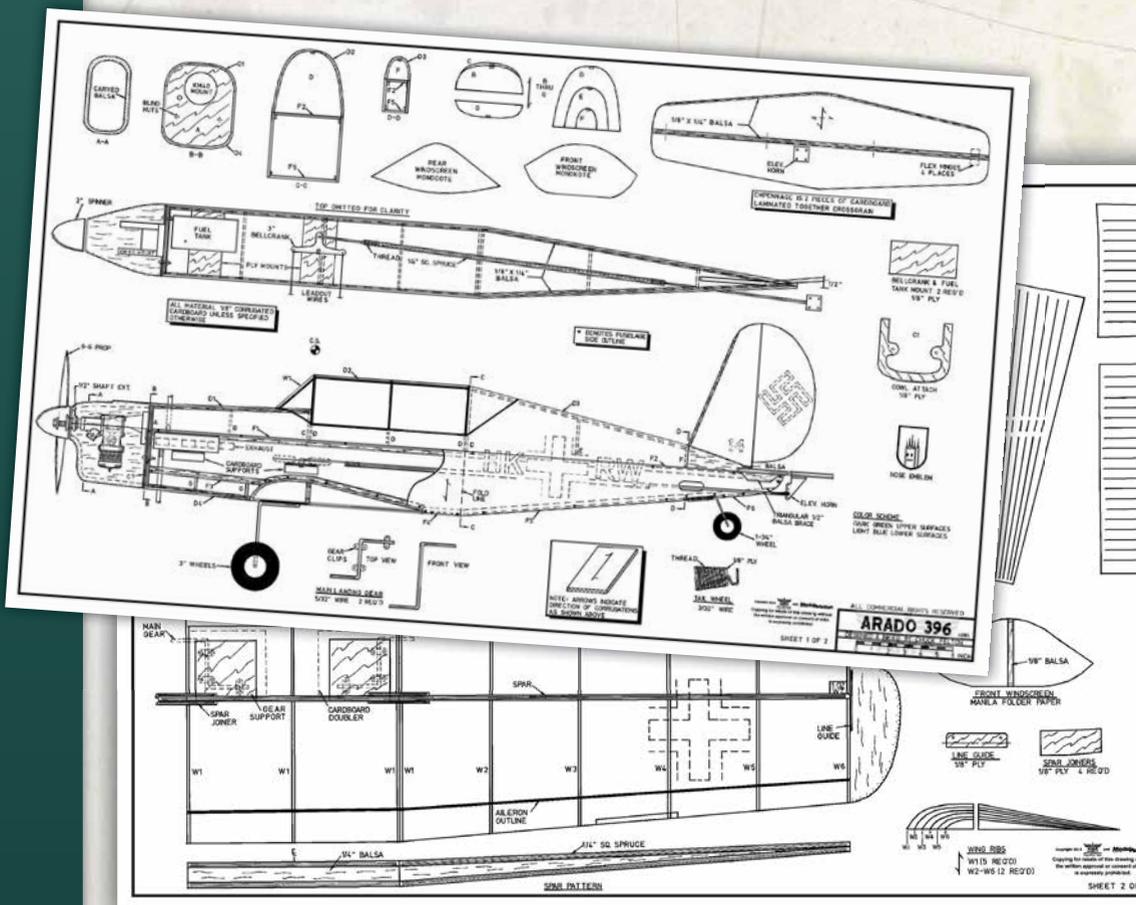
CONSTRUCTION: Be sure to note the direction of the corrugations when cutting out the cardboard parts. Score and fold the parts as indicated on the plans.

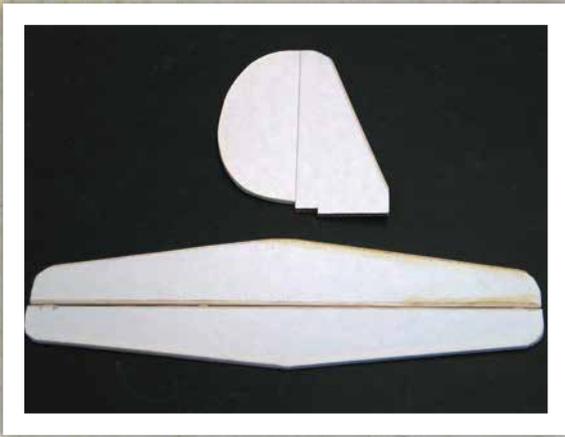
The Arado Ar.396 model presented here is simple in construction and inexpensive. It uses 1/8-inch corrugated cardboard as the primary building material, which greatly reduces building time and cost.

The design makes use of cardboard's unique features in that it can be used in large sections and folded. Each wing panel is built from a single piece of cardboard scored and folded at the LE with cardboard ribs and a single spar.

The tail surfaces and fuselage are primarily cardboard with little internal bracing required. The result is a low-cost, fast-building model that has a good, scalelike appearance and can take plenty of punishment at the flying field.

Cardboard varies in weight, but any 1/8-inch corrugated cardboard will do. Sources of this material include box manufacturers and local shopping centers where you can find stacks of discarded boxes.





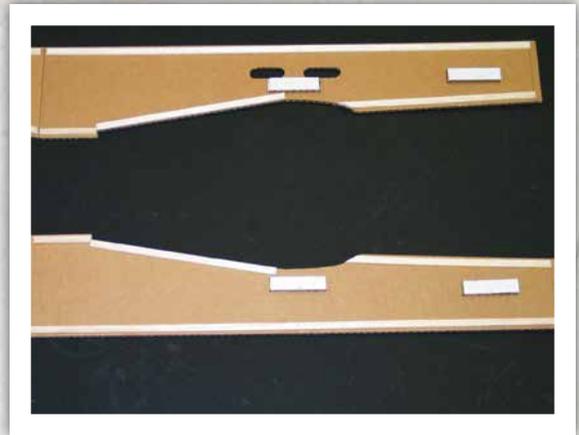
The empennage and elevator hinge line LEs are capped with 1/8 x 1/4 balsa strips and rounded off. The elevator is joined to the stabilizer with flexible nylon hinges in four locations.



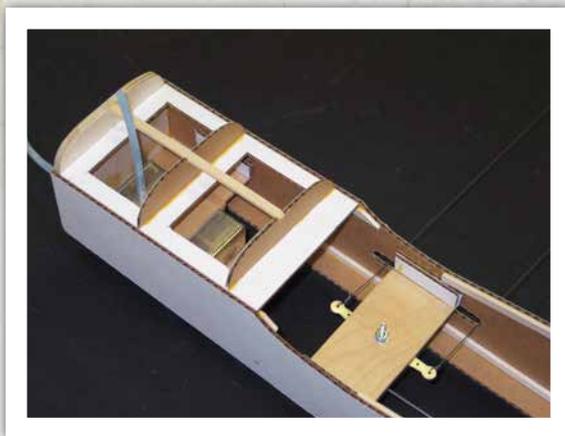
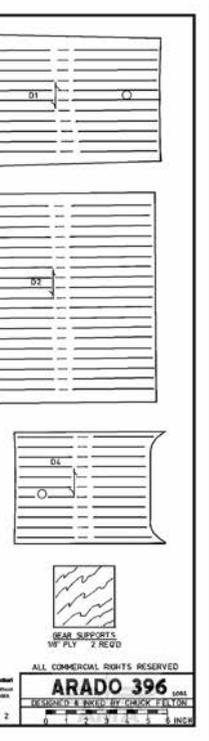
The top wing surfaces are folded down and glued in place. The balsa wingtip is made from 1/2-inch sheet with 1/8 plywood line guide. Paper tape covers the seam between the balsa wingtip and cardboard wing.



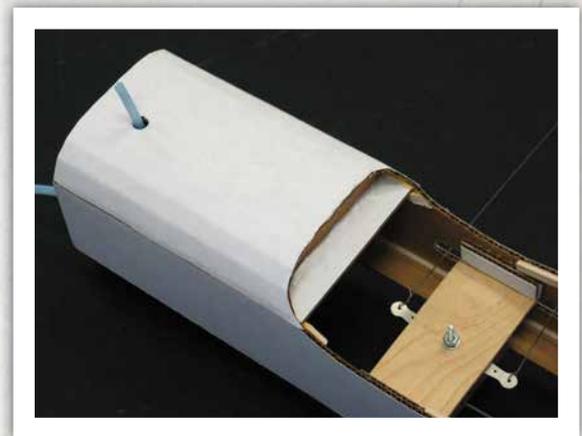
The spar is glued to the bottom center section and cardboard ribs are added. Note the 1/8-plywood spar joiners at dihedral breaks and plywood gear-mount inserts.



Flat fuselage sides are lined with balsa strips recessed 1/8 inch and have cardboard supports for the bellcrank and fuel tank plywood mounts. There are cutouts for flying wires.



The fuselage's forward bottom section has formers and a centerline balsa stringer ready for deck covering. Cutouts help reduce weight. The pushrod is made from 1/4-inch-square spruce.



The completed forward bottom section is shown. Uneven seams are later cleaned up with strips of gummed paper tape.

Read the entire article

in the digital edition or visit www.ModelAviation.com and search for Arado.

Look for cardboard with brown paper on one side and white-finished Kraft paper on the other side. The white paper on the outside of the model results in a smooth finish and a neat appearance. The method of folding the cardboard and using gummed paper tape to seal the joints and exposed corrugation is explained in the construction hints.

The model has a 60-inch wingspan and a length of 49 inches. The bottom of the airfoil is flat with a curved upper surface, created by the scoring and folding technique employed.

A .40- to .50-size engine can be used. My model is powered by a .40 engine and has a fully fueled flying weight of 74 ounces. This weight, combined with the 541-square-inch wing area, results in a wing loading of 19.7 ounces per square foot.

The accompanying pictures should generally describe this build. 🛩️

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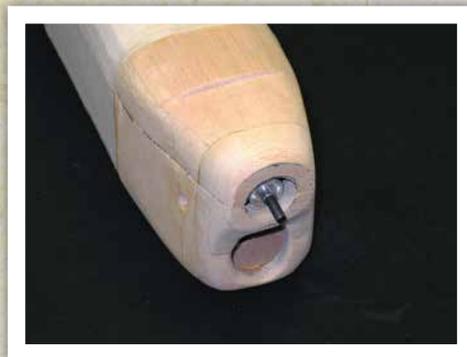
SOURCES:

AMA Plans Service
(800) 435-9262, ext. 507
www.modelaircraft.org/plans.aspx

Chuck Felton's website
www.feltondesignanddata.com



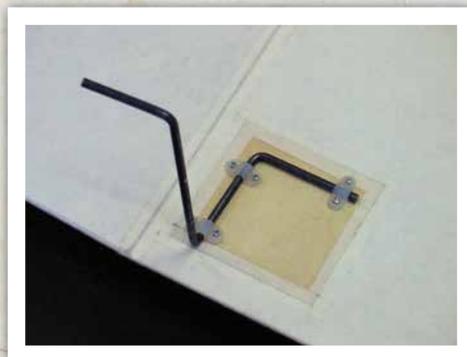
Cardboard bulkheads, held with a single centerline balsa stringer, are added to the top of the fuselage. Be sure to bring the fuel tubing lines out during all covering operations.



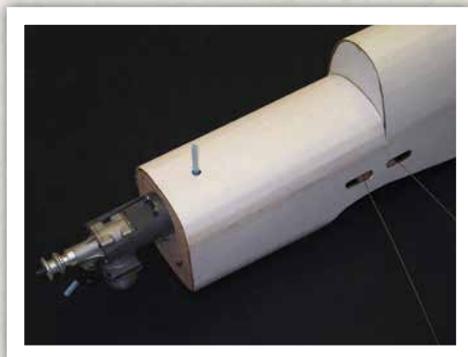
The cowl's front nose block has one circular and one oblong cutout. I always use a 1/2-inch engine-shaft extension for more clearance between my fingers and the propeller.



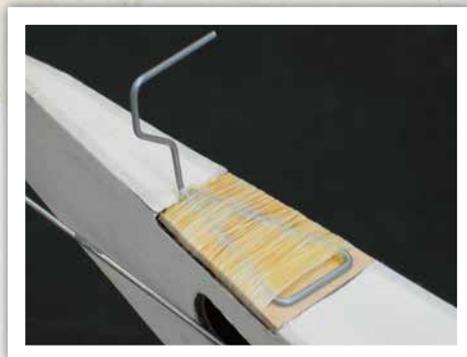
Scored and folded top decking pieces are glued over the cardboard formers. The seams have already been covered with gummed paper tape.



The main landing gear is 5/32-inch wire attached to plywood mounting plates in the wing bottom using three nylon gear clips.



The forward fuselage is ready for the balsa cowl. The front windshield, piece W1, is made from thin, manila folder cardboard.



The tail gear strut is bent to shape from 3/32-inch wire, laid on its 1/8-plywood mounting plate, wrapped with nylon thread, smeared with glue, and glued into the fuselage cutout.