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Thulin-K

So, I had a pair of very nice WWI era spoked wheels I bought at a WRAM show years ago. I rediscovered them while rummaging through my "box o' wheels", looking for a tailwheel for my new Storch. I never did find one, however I felt I should really build something around the spokies. "Eindecker" immediately came to mind, but it has been modeled to death and it didn't have ailerons. Wing warping was not in the plan. Calling my "usual suspect", Thayer Syme, along with an internet search, yielded an obscure 1916 airplane designed by Dr. Enoch Thulin, of AB Thulinverken, at least one version of which had ailerons. It looked very Eindecker-ish to me. Game on.

Since I was now interrupting a project that had been interrupted by another, I felt the "TK" had to be simple. No fiberglass or vacuum formed parts, no intricate construction craziness or difficult schemes. I found a three-view, pics and color renderings of the model, along with plans for a peanut job designed by Walt Mooney, and these helped me design a 36" wingspan model, the size needed to fit the wheels. The only complication was the spinner which a fellow flier, Tom Droege, printed in 3D. I asked the AMA to list the STL file on its site.

The model deviates from scale in a few areas: I deleted the aft cockpit skinning due to its compound curvature, I added the intermediate leading edge ("LE") wing ribs, I changed the landing gear ("LG") slightly and I enlarged the tail surfaces. While I employed pull-pull controls for my prototype, including such for the ailerons, I felt this to be too fiddly for a small model. My plans therefore show more conventional arrangements which are heavier, but the model can handle the weight.

My TK is mostly balsa with a few plywood parts, although I did use some carbon tube for the LG, the upper rigging post and the spars in the empennage. Don't be afraid to use firm balsa throughout, but use contest sheet for the fuselage and cowl skinning. I laminated balsa outlines for the empennage on the prototype, however I changed this to cut pieces for simplicity's sake.

The model was covered with Polyspan affixed with Sig "Stix-It" and the finish is nitrate dope tinted with powdered pigments, with spray cans for the markings and cowling. I didn't want to see white balsa showing through the covering, so I applied pigmented dope inside and out. For more on how I finished this model, see the Summer, 2023 issue of Park Pilot.

Since I feel plans should "stand on their own", providing a careful modeler with enough information for a successful build, I will note herein only the idiosyncratic construction "features". By "features" I mean those things you really want to get right the first time so you don't have a mess.

The fuselage sides are built over the plans using firm 1/8" square balsa with a few parts cut from sheet to accommodate the rounded bulkheads. The sides must be identical. Pin the assemblies inverted over the plans, add bulkheads #3 and 4, and shim up the tail while keeping the sides aligned with the plans. Shim and pin the fuselage along the way to avoid building in a twist. The crossing strips may then be glued in, but be careful not to distort the sides in or out. I did this on mine, and it's really annoying to fix!

The empennage is odd in that there are no fixed flying surfaces. The real one had something of a universal joint to accommodate this, but I separated the pivots with the rudder's aft of the elevator's. 1/16" carbon rod doubles as the spar and pivot axle in each, but carbon is not a good material for pivots. I bushed them with sections of nyrod CA'd into plywood mounts. This is the fiddliest part of the model, since the bushings and mounts must be installed onto the carbon rod while each surface is being constructed.

I build undercambered wings on a jig, with the spars resting on the verticals and the ribs slotted into the horizontals. I made a single jig and did not glue it together, simply reversing it for the other panel. The jig is not shown on the plans, but Manzano includes it with the laser cut short kit. I used hard balsa for the spars, but spruce or basswood may be substituted.

The aileron LE's are comprised of 1/16" sheet strips glued up at a 90 and then applied to the LE's of the aileron ribs. A little weird, but it's light and it works. Backfill the LE at the hinge locations.

The cowl was surprisingly easy to make and is attached to the motor mount, all of which may be removed from the model as a unit, allowing easy access to the internals. A ply hatch covers the bottom of the fuselage between the LG legs for battery and servo access. Cut off the back end of the motor shaft to prevent any interference with the battery.

I used a combination of wire and carbon tube for the LG, but an all-wire structure may be used. I found it helpful to print a copy of the LG and prop it on the bottom of the fuselage while fiddling with the LG fabrication and install.

Rig the model with Kevlar thread, aluminum tube ferrules and a dot of medium CA, all threaded into electric lugs on the wings.

Covering the underside of an undercambered wing can be tricky; always work from the center out. Apply a couple coats of thinned (with nitrate thinner) "Stix-It" to the framework, pull the covering tight on center, root to tip, and tack it with a warm iron. Then work each rib out from center. Apply "Stix-It" through the covering to the framework. Trim, slit and roll your edges with the iron and apply more "Stix-It". Then lightly shrink the covering overall. Overdoing the adhesive and dope is OK here.

Amazingly, the prototype required no nose weight, a first for me. You'll need rudder for take-off but, with an 8.0 oz wing loading and plenty of power, it's not on the ground for long. It was a little twitchy on the elevator, so set up the radio with dual rates and about 40% expo. Maybe it needs some nose weight! Thayer had it floating along pretty well at the NEAT Fair, but with a

new, out of trim model, he confined the excitement to the landing. Windy days and grass fields are the natural enemies of small models. They simply don't get along and the other side always wins. Wait for a nice summer evening, and mow your grass extra short. Of all the models I have built, this one provoked more than the usual "that's nice" from my wife. It's an airplane having tons of vintage character and charm. And it's probably the easiest one I have ever built.

Model Specifications:

Wingspan:	36"
Flying Weight:	13.2 oz
Wing Loading:	8.0 oz/sq ft
Wing Area:	238 sq in
Motor:	Innov8tive 2305-1050
ESC:	Innov8tive 12 amp
Battery:	800 mAh 2S lipo
Prop:	APC 9x4.7
Rx:	Spectrum Park Flyer
Servos:	(3) Hitec HS-40
Channels:	(4) Rudder, elevator, ailerons, throttle