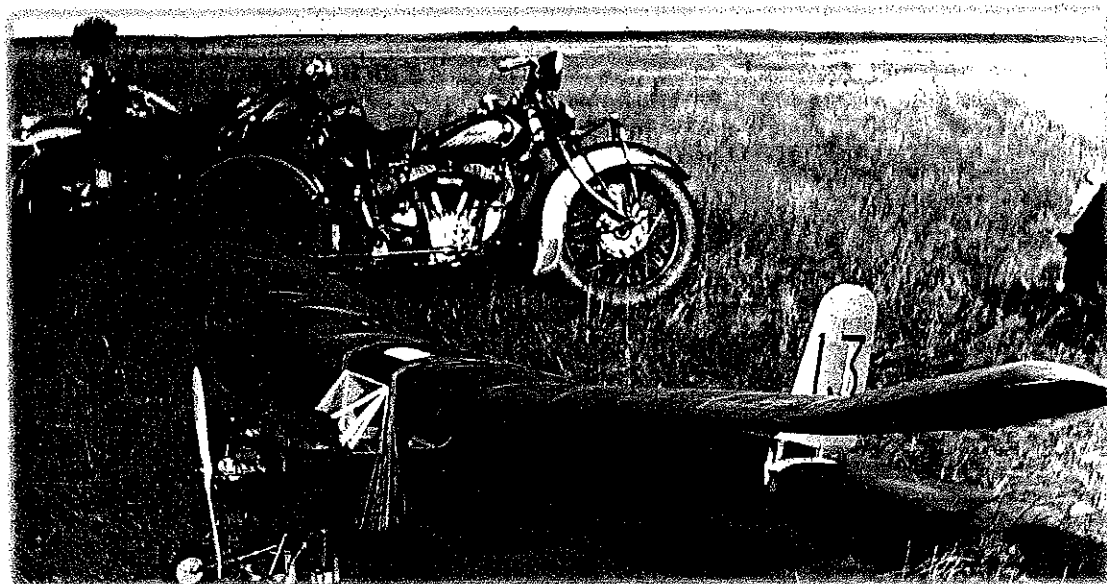


HANGAR 13

for 1/2 A Texaco



The original 1935 Hangar 13 Ten-Footer on the tar-paper takeoff strip at Rock County (WI) Airport.

■ George Niebauer

The scene is Rock County Airport (mostly a mown hayfield) near Beloit, Wisconsin. The date: August 25, 1935. A young fellow stands on the sidelines watching a huge model airplane being launched.

It was the first test flight of a Hangar 13 project, designed by club leader and advisor Conrad Hansen and built by club members. The tension among these present was obvious. Each had peeled glue from his fingertips and patiently fitted bits and pieces to build the 10-foot wing, the bulky fuselage, and the 40-inch-span stabilizer.

With its Brown Jr. engine revving to a scream, the

model lumbered down the runway, each wingtip guided by the launch team members until it outran them. Slowly it wallowed into the air. Once on its way the H-13 Ten-Footer flew with noble grace. Such was the first flight of this now antique model.

The young man watched, and was bitten then and there by the model airplane "bug." I was that young man.

Almost 59 years later, I watched another test flight of an H-13. At 7 a.m. at El Dorado dry lake, the 1/2A Scale H-13 left my hand to fly freely and well. Time had come full circle.

CONSTRUCTION

Begin by making a list of materials. Contest-grade balsa may be used, but there is no weight rule for the Society of Antique Modelers (SAM) 1/2A Texaco event.

Adhesives used were Pacer's Zap cyanoacrylate (CyA), thin and thick; Duco cement; Franklin Home, Shop, and Craft White Glue; Pettit Hobbyoxy; and Wilhold RC-56.

Esaki tissue from Champion Model Products was used to cover the model. Sig clear nitrate dope was used to cover the framework. Sig Lite-Coat butyrate provided the finish.

Fuselage: Build the sides first, using hard balsa for the longerons. Soak the bottom two longerons if you wish, although the curve in front isn't that severe. Use medium-weight wood for the diagonals

and crossmembers on the rest of the fuselage.

Apply the 1/16 sheet and the 1/8 x 1/4 x 3/2 strip at the bottom of the stab slot. Cut the stab slot just wide enough for a tight fit of the leading edge. Cut slots for the stab spar and the stabilizer support (see detail). Fit the landing gear gussets. Remove the

because of the diagonal upright side brace design feature.

When you get to the trailing edge location at the cabin, release the structure from your board and reposition to the flat cabin top. Be sure to glue the 1/8 doublers at the three places as shown. Also note the two 1/8 gussets at the top front of the cabin.

Trim to the radius shown.

After cutting out the 1/8 Lite Ply firewall, install the blind nuts for the engine mount. Fit the firewall in place, noting that the two upper longerons are curved inward as opposed to the lower ones. You may have to resort to soaking these. Use a strong rubber band to pull the longerons in place while epoxying the fire wall and longerons in position.

Glue the top cowling in place and sand to blend in with the firewall and longerons. After this part of the fuselage has been finished, dope the interior of the cabin (it can be seen from the outside) with red dope to match the tissue. Do not dope the outside of the side window structure or the 1/32 corner gussets. This will be covered with red tissue, along with the rest of the fuselage sides.

Note that L-1 is not identical to L-2, requiring a different fit.

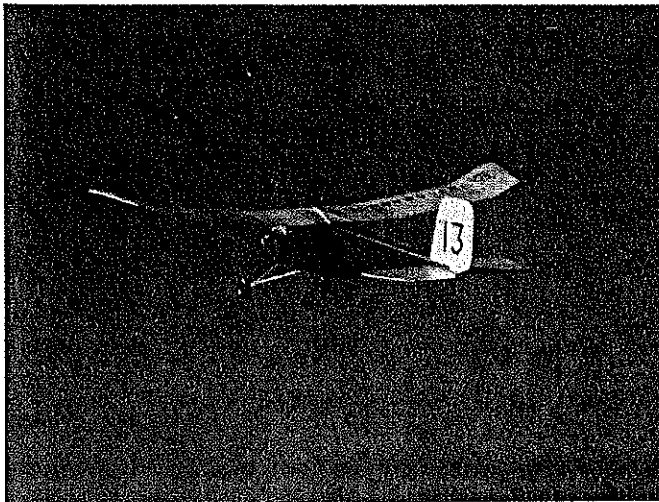
Attach the 3/32 spruce triangle gear locating pieces with epoxy. When dry, epoxy the assemblies in place. After they are set, glue the 1/4 balsa triangular gussets in place against the inner longerons with a liberal amount of white glue.

When was the last time you saw a real Old-Timer for which plans were never published?

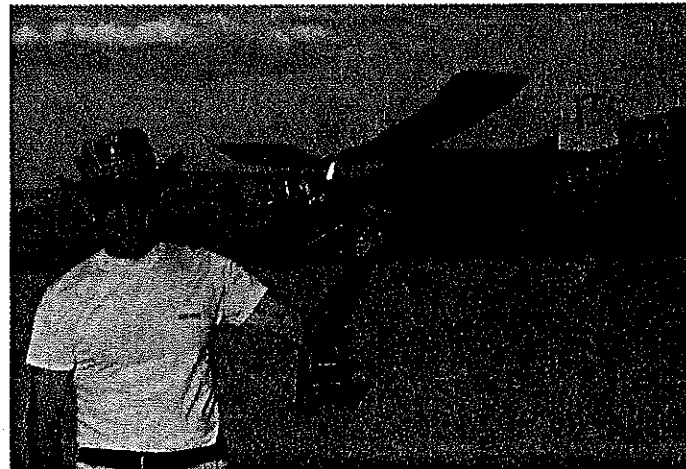
sides from the building board; separate and turn them over onto the flat aft top section.

Put the top crossmembers in first, those shown on the board, noting that they are not the same length nor are they directly across from the bottom crossmembers

gear locating pieces with epoxy. When dry, epoxy the assemblies in place. After they are set, glue the 1/4 balsa triangular gussets in place against the inner longerons with a liberal amount of white glue.

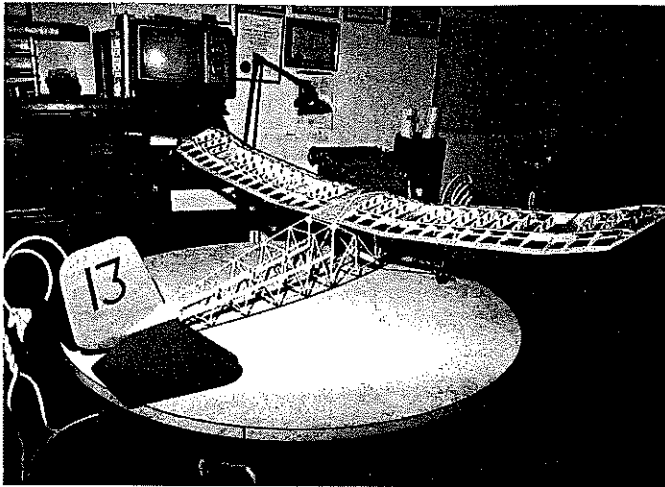


Larry Fair's H-13 on its way to a five-mile chase at the 1995 SAM Champs, where it placed third in 1/2A Texaco.

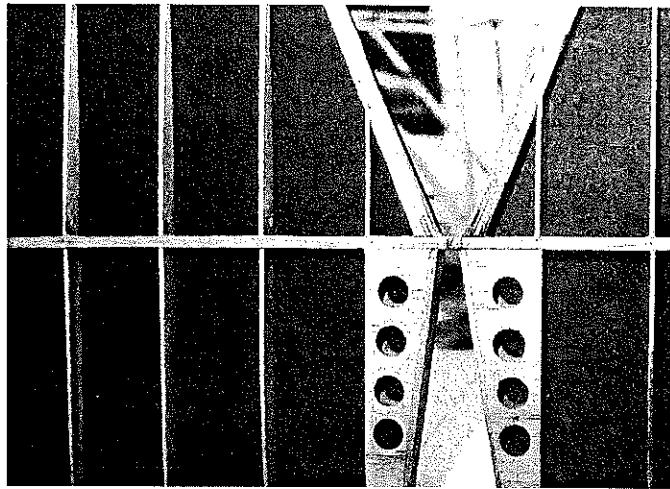


The author with a Medallion-powered version before its first flight on El Dorado (NV) dry lake, July 10, 1994.

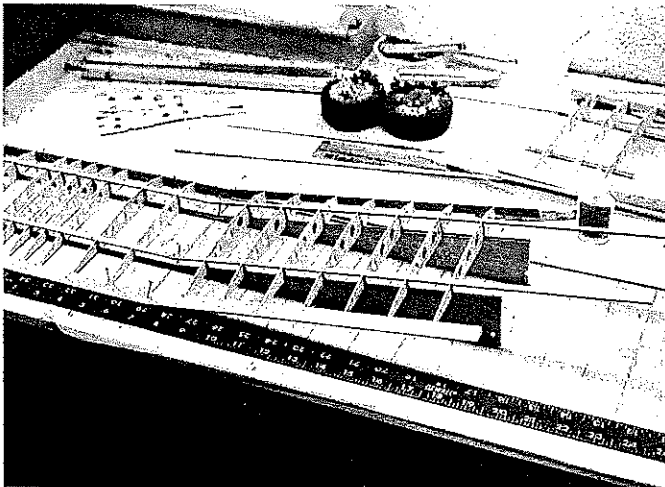
Photos by the author Graphic Design by Bill Thornbro



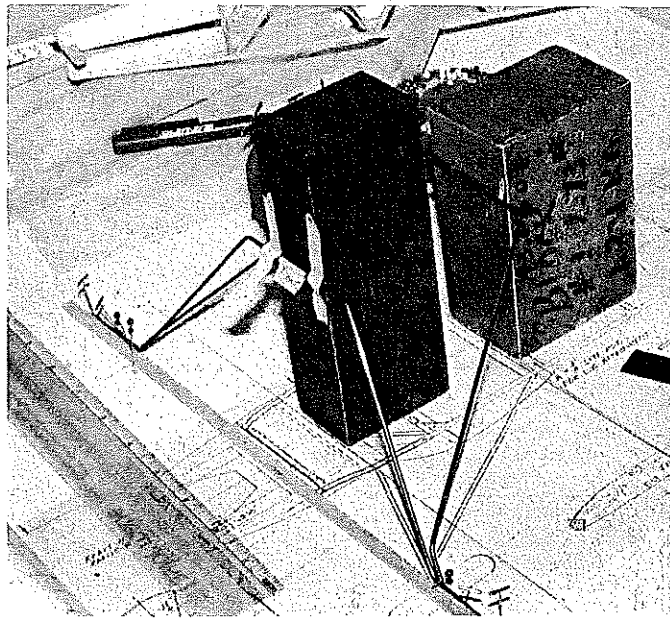
Bare bones shows wing dihedral-joint webs. Strip in rear of fuselage was added for strength, but was unnecessary.



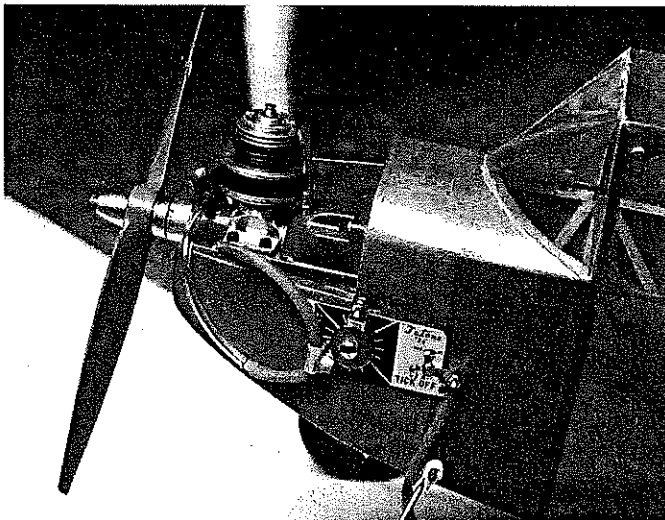
Stabilizer is shown standing on its leading edge. One side has been covered and lightening holes are visible.



Starboard wing panel dry-fitted to dihedral angle. Top spars not yet in place. Note dihedral wedges under spars.



Landing gear struts positioned for a proper fit. Coat-hanger wire patterns used as guide for bending music wire.



Port view shows Medallion, Cox red tank mount, Tatone timer, and suggested fuel line routing. Timer not used in Texaco.

HANGAR 13

Type: FF 1/2A Texaco/Old-Timer

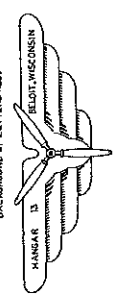
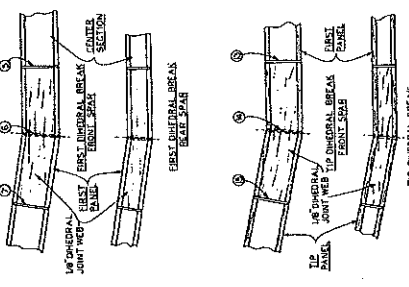
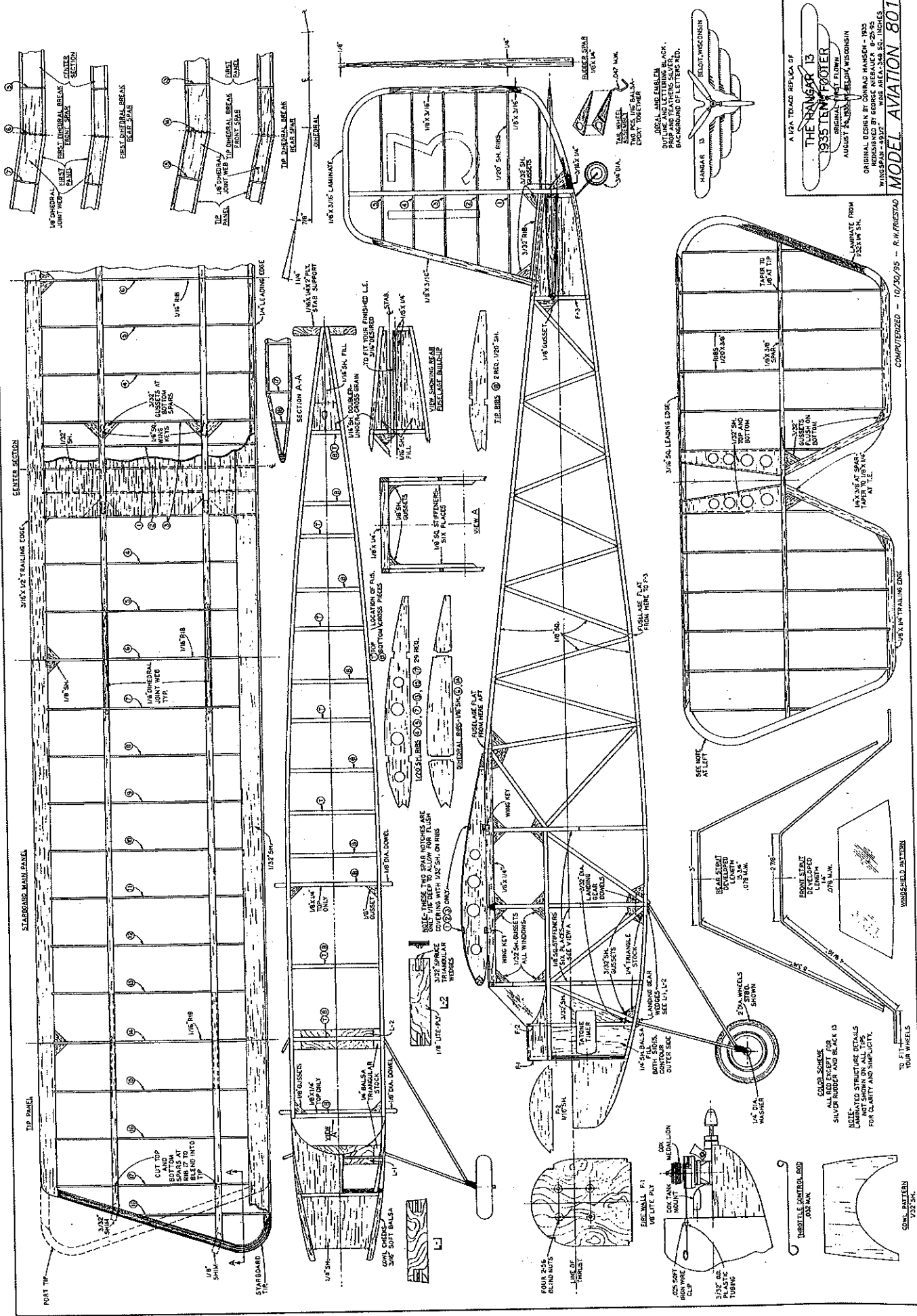
Wingspan: 49 1/2 inches

Engine size/type: Cox Medallion or reed-valve .049

Flying weight: 12 ounces or less

Construction: Built-up

Covering/finish: Japanese tissue and dope

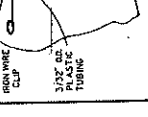
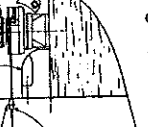
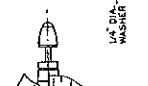
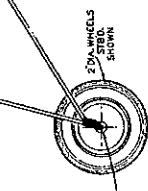
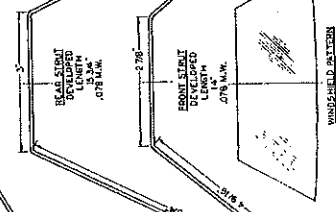
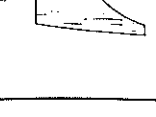
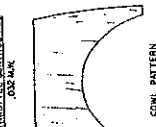


A 1/24 SCALE REPLICA OF
THE HANKAR 13
 1935 TEN FOOTER
 DESIGN BY G. H. HANSEN
 AUGUST 1935 - WISCONSIN
 ORIGINAL DESIGN BY G. H. HANSEN - 1935
 REDESIGNED BY GEORGE HANSEN - 1975-76
 WISCONSIN - 53127 - THE AVIATION MODELERS CLUB

ORIGINAL DESIGN BY G. H. HANSEN - 1935
 REDESIGNED BY GEORGE HANSEN - 1975-76
 WISCONSIN - 53127 - THE AVIATION MODELERS CLUB

MODEL AVIATION 801
 COMPUTERIZED - 10/30/95 - R. W. FRISTAD

EXPER SCHEME
 ALL PARTS TO BE BLACK 13
 SAVE ON GUNMETAL AND BLACK 13
 UNDESIGNATED STRUCTURE DETAILS
 NOT SHOWN ON ALL TIPS
 FOR CLARITY AND SIMPLICITY.



TO FIT YOUR WHEELS

TO FIT YOUR WHEELS

TO FIT YOUR WHEELS

Carefully align the 1/16 x 1/4 x 2 birch plywood stab support with the cabin top, making certain that both surfaces are parallel. Locate and drill the holes for the wing hold-down and landing gear positioning dowels as shown, using a tight fit. Do not glue the dowels in place.

Empennage: The stabilizer forms are 1/4 Masonite. Cut to shape, sand, and apply a generous coat of wax to the form. Cut eight pieces of 1/32 x 1/4 x 9 soft balsa for each tip, soaking the strips thoroughly in water or ammonia.

Mix a small batch of white glue and water, thinned to half normal consistency. Brush on one side of the first piece and proceed with the rest of the strips, remembering to coat only one side of the last piece. Use heavy pins or weights to hold the strips firmly against the form. Let dry for 24 hours. After the tips are dry, sand to the leading edge dimension and taper to the trailing edge thickness.

Positioning the spar and pinning it down, CyA the 1/20 x 3/8 rib strips in place. Position the trailing edge shimming it up with a piece of 3/64 stock. Glue the leading edge in place.

The center ribs must be a tight fit against the fuselage. Using waxed paper, position the stab on to the fuselage and fit the two innermost ribs in place. Note that the top and bottom of the four centermost ribs are reduced in thickness to allow for the 1/32 center-section sheeting.

Rudder construction is similar to that of the stab. The top lamination is formed from six strips of 1/32 x 3/16 x 6 1/2 soft balsa. The bottom lamination is formed from six strips of 1/32 x 1/4 x 4 1/2 soft balsa.

Pin the rudder spar down and shim the top end with 3/32 wood. CyA the rib strips, the leading and trailing edges and the laminated tips. The rudder bottom rib is 3/32 to allow for attaching the silver rudder covering.

With the stab temporarily placed in its slot, hold the rudder spar against the stab spar and the fuselage rear, cutting a hole in the sheet on top of the fuselage to admit the leading edge. Note that it will fall a small amount to the rear of where you

have it positioned, because of the leading edge angle. Do not glue the rudder and stab in place until both have been covered.

Wing: The wing construction deviates from the usual solid-spar type for lightness and strength.

Use 1/20 medium balsa for the wing ribs. You may save some weight by cutting or punching lightening holes in the ribs (except the dihedral ribs). I found that my set of ribs was 15% lighter after the holes were cut. To further strengthen the ribs, run a bead of CyA around the inner edge of the holes. Trim 1/32 from the top only of ribs 1-3 to accept the 1/32 center-section sheeting.

Beginning with the center section, space the two spars with the notches in the rib bottom edge. Place the notched trailing edge and the rough-shaped leading edge at the juncture of the dihedral joints. By shaping the leading edge now, you will only be required to finish-sand at the dihedral joint. Be sure to leave at least 1/32 at the top of the leading edge to allow for the sheeting.

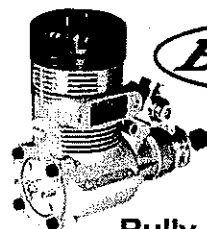
Do not cement the top spars in place at this point. The 1/8 dihedral-joint web and 1/16 ribs must be positioned first.

Proceed with the starboard main panel and the tip section, again leaving out the top spars and dihedral ribs. Using the instructions for building the stab and rudder, form the wingtips using 1/32 x 1/4 x 8 1/2 soft balsa. Complete an outboard panel and tip section at this time. After shaping the laminated tips, block the wing tip up 1 1/4 inches with the main panel pinned down to the board.

Join the trailing edge, leading edge, and bottom spars after cutting to the proper dihedral angle. Insert the dihedral-joint webs and ribs, using white glue. Now add the two top spars joining at the dihedral ribs. Remove this starboard assembly from your board.

Build the left panels over the half-wing plan you were using; reverse the LE and TE position, using the ribs for spar spacing. Use the dotted lines for positioning the laminated tip. Attach the panels to the center section. With a flat-bottomed airfoil this is easy.

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Model	114D	115D	116D	110D	111D
Cells	1-8	1-8	1-8	1-18	1-18
12 VDC	Yes	Yes	Yes	Yes	Yes
110V AC	Yes	Yes	No	No	Yes
Trickle Charge	400ma	400ma	400ma	400ma	400ma
Trickle limit	5hrs	5hrs	5hrs	5 hrs	5hrs
Fast Charge	4 1/2A	1-5A	2-8A	1-5A	1-5A
Fast limit	45min	45 min	45 min	45 min	45 min
Ammeter	No	Yes	Yes	Yes	Yes
Voltmeter	No	No	No	Yes	Yes
Stopwatch	No	No	No	Yes	Yes
Mahr Meter	No	No	No	Yes	Yes
Retail Price	\$89.95	\$109.95	\$89.95	\$159.95	\$199.95

Astro Flight Inc. 13311 Beach Ave. Marina Del Rey, CA. 90292

Using clothespins, clamp a piece of scrap wood onto the dihedral rib at the dihedral dimension.

Insert the top spars into the center section, noting that they fit only 1/16 deep into the five center ribs. This will allow the sheet wood to be flush with the spar top. If you are considering flying the model in RC events, add some 1/32 vertical-grain webs between the spars in the center section and main panels.

The top and bottom spars at rib #17 should be cracked or cut to blend into rib #18 and the tip. Using the shims as shown will align the laminated tip at the leading and trailing edge. As with the fuselage, give all joints a coat (or two) of glue.

Sand the top and bottom of the wing with medium-to-fine sandpaper, and add the 1/32 sheet covering to the center section and the leading edge. Blend the leading edge into the 1/32 sheet. Wings with spars of this type are able to absorb tension and compression stresses well.

All surfaces that will be covered with tissue should receive two coats of nitrate dope thinned no more than 50%.

Landing Gear: It may be removed during repairs, it is quite crash resistant, and it makes the model easier to transport. Before I committed myself to bending the .078 music wire, I made patterns from coat hangers, giving me an idea of the correct angles to bend.

To line up and dry-fit the two struts, I used a few pieces of heavy iron and aluminum blocks. Placing these over the plan and using the patterns made the initial job easy. Use the same method when you are bending the music wire. Put a bit of camber and toe-in into the axles for better tracking during takeoff and landing.

Dave Brown Products has light wheels called Lectra Lite, which can be shaped to the rounded-tire look of the original wooden wheels. They can be formed in no time after being placed in a freezer. Insert a bolt of the proper diameter and about 1 1/2 inches long into the axle hole with a washer at each side of the wheel and two jam nuts. Tighten enough to prevent the

wheel from turning on the bolt. Put into your electric hand drill or drill press, shaping while still frozen, with coarse sandpaper over a block of wood. Refreezing may be necessary before you are finished.

Secure the wheels on to the axle with a fastener of your choice. I was able to use 1/16 Du-Bro Dura-Collars drilled out to fit the axle diameter. A #46 (.081) drill will do the trick. Du-Bro straps may be used to fasten the gear to the fuselage with small wood screws in lieu of the rubber bands.

Covering: Before attempting to cover the model, reglue all of the joints. Apply at least two coats of nitrate dope and sand with 280 or 320 paper.

I used Esaki tissue and was pleased with the results. Applied wet and using thinner for adhesion, it went on as slick as you can imagine. There are no sharp, tricky curves except perhaps the wingtips, and they were covered in one piece. A little patience helps.

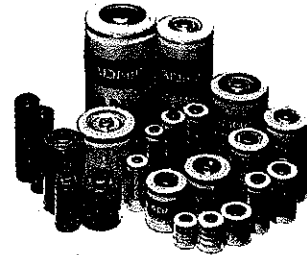
Cover the fuselage sides, attaching the tissue to the side window uprights and corner gussets. When dry, cut the window area away. Doesn't that look nicer than red dope beneath the acetate?

When you are certain that all tissue edges are tight to the frame, spray the part with water but don't soak it. Pin or block the part down, allowing to dry at least overnight. The more time you allow for this, the straighter frame you will have. If there is any loosened tissue, spray again and reposition. Additional dope may be necessary on the frame.

When all of the tissue has been adhered, apply a coat of clear nitrate dope thinned 50%. Block and pin the structure to prevent warps. Sand this down with a piece of worn or used #600 wet-or-dry paper (using your hand, not a block), taking care not to sand through.

Two or three coats of butyrate clear dope thinned 50% may now be applied. I used non-tautening butyrate exclusively, which will render a slight, pleasing sheen. To further fuelproof or if you live in a damp climate, an extra coat or two won't hurt.

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N-600AA	600	14.2 x 50.0	24	2.20
KR-800AAE	800	14.2 x 50.0	23	3.30
N-225AE	225	17.0 x 17.0	20	3.30
KR-600AE	600	17.0 x 28.0	21	2.75
N-800AR	800	17.0 x 50.0	34	3.98
KR-1200AE	1200	17.0 x 50.0	29	4.29
N-1000SCR	1000	23.0 x 34.0	42	4.95
KR-1300SC	1300	23.0 x 43.0	46	3.03
N-1400SCR	1400	23.0 x 43.0	52	4.95
N-1700SCRC	1700	23.0 x 43.0	53	7.15
KR-2000C	2000	26.0 x 50.0	75	5.23
KR-4400D	4400	34.0 x 58.0	150	10.95
KR-5000DEL	5000	34.0 x 59.0	155	12.65

Please add \$0.20 per single cell with Solder Tabs

Power Packs (Flat or Hump)

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6N-600AE	7.2V/600	102 x 28 x 18	26.40
7N-800AR	8.4V/800	68 x 48 x 32	31.90
7KR-1200AE	8.4V/1200	68 x 48 x 32	34.49
6N-1000SCR	7.2V/600	102 x 46 x 23	31.68
7N-1000SCR	8.4V/1000	125 x 46 x 23	36.41
6N-1500SC(Sports Pack)	7.2V/1500	135 x 46 x 23	17.50
6N-1400SCR	7.2V/1400	135 x 46 x 23	31.68
7N-1400SCR	8.4V/1400	150 x 46 x 23	36.41
6N-1700SCRC	7.2V/1700	135 x 46 x 23	47.52
7N-1700SCRC	8.4V/1700	150 x 46 x 23	54.89
6KR-2000C	7.2V/2000	157 x 50 x 26	36.52

Tamiya Conn. comes standard with all Power Packs

Packs For Radio (Flat or Sq.)

Model #	VIMAH	LxWxT(mm)	Sale
4N-270AA	4.8V/270	57 x 30 x 14	12.10
4N-600AA	4.8V/600	57 x 50 x 14	11.00
4N-700AAAC	4.8V/700	57 x 50 x 14	13.20
4KR-600AE	4.8V/600	68 x 28 x 17	13.20
4KR-1000AE	4.8V/1000	68 x 43 x 17	18.15
4KR-1200AE	4.8V/1200	68 x 50 x 17	19.20
4N-650SC	4.8V/650	46 x 46 x 26	19.80
4KR-1300SC	4.8V/1300	92 x 43 x 23	13.20
5N-50AAA	6.0V/50	53 x 16 x 11	14.30
5N-600AA	6.0V/600	73 x 50 x 15	13.20
5KR-1000AE	6.0V/1000	84 x 43 x 17	20.90
5KR-1200AE	6.0V/1200	84 x 50 x 17	23.10
5KR-1300SCE	6.0V/1300	115 x 50 x 23	16.50
8N-600AA-1	9.6V/600	100 x 29 x 29	19.80
8N-600AA-2	9.6V/600	150 x 40 x 15	20.90
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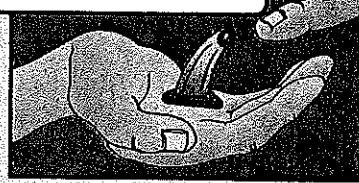
NO BOBBY! IT'S THE ELEVATOR CONTROL ROD FOR MY SPORT FLYER. IT NEEDS THESE BENDS TO OPERATE RIGHT.

RON, HAVE YOU EVER TRIED ROBART BALL LINK CONTROL HORNS?



NO. WHY? WILL THEY HELP ME BEND THIS WIRE?

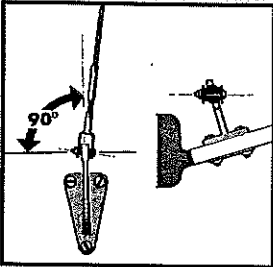
ROBART BALL LINK CONTROL HORNS ALLOW YOU TO ATTACH CONTROL RODS AND LINKAGES FROM JUST ABOUT ANY ANGLE WITHOUT BENDS.



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OH! I SEE! THEN I DON'T HAVE TO BEND MY CONTROL RODS! AND THEY'LL WORK BETTER IF I JUST KEEP THEM STRAIGHT?

YEAH, BUT THEN AGAIN, A STRAIGHT PART MIGHT LOOK A LITTLE STRANGE ON YOUR PLANE!



THE SWIVELING BALL LINK THAT'S INCORPORATED INTO THE HORN OF EACH ROBART CONTROL HORN ASSURES FLAWLESS, KINK-FREE OPERATION AND MAKES INSTALLATION OF ALL CONTROL SURFACES A LOT EASIER TOO!



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Windows: Cut a paper pattern first to ensure a proper fit without wasting acetate. Use RC-56 thinned 50%, and use tape to position the acetate to the structure. Apply thinned RC-56 with a tiny round-section brush of about 1/16 diameter.

Engine: If you will be competing in SAM 1/2A Texaco events with the authorized .049 engine and fuel tank combination, the Cox red tank mount is not for you. An alternate mounting will have to be built because of its radial mount.

If the Medallion is your choice, and you wish to use the throttle-control ring, you will need to devise a way to hold it in position if yours is as loose as mine. The rpm range I chose came in when the throttle ear was above the front engine mount bolt.

Key the wing by aligning it with the fuselage centerline, wingtips, and the stab. Make a mark where the wing spars come up to the fuselage. Take the wing off and measure 1/8 inside from the four marks. Score the tissue on the spar and CyA a 3/8 piece of hard balsa inward from this new mark.

The tissue and fuselage will not show scuff marks left from outside-mounted keys, but the inside keys can still shear off during a hard landing.

Fit the stab leading edge as far forward as possible, making sure the stab spar is

flush at the rear of the fuselage, seated on the stab support and parallel with the cabin top.

If the stab spar is a tight fit in its slot, and the two inner stab ribs are tight against the fuselage, there is no reason to glue the spar in place. Remember, you will be making incidence adjustments and the stab ribs may separate from the spar. Besides, the tissue on the spar will create a weak joint, unless you anticipated that and trimmed the tissue off before assembly.

Don't glue the two inner ribs or leading edge to the fuselage now, but glue the rudder spar against the fuselage and stab spar. Glue the rudder leading edge into the 1/16 sheet fill but do not glue the 3/32 bottom rib until you are sure of the right-turn capability.

Flying: The center of gravity should be close to 35% of the wing chord (the second upright window post on the fuselage).

Check all surfaces for warps and alignment, then glide the model. If any incidence adjustment is required, shim the stab leading edge first. Do this by cutting a small portion (1/32) from either the 1/16 or 1/8 sheet above or below the stab leading edge with a #11 X-Acto blade. Fill the void with a piece of like-thickness balsa, making it tight again. If you wish to glue this in place now, use model cement sparingly. Glide again, and again, making sure

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you've made safe adjustments one at a time.

Don't add any additional weight to the model unless it is absolutely necessary; use heavier or lighter wheels. Try to establish a wide turn to the left. Adjust the rudder if necessary, using the same instructions as for the stab.

When you are satisfied with the glide, try a short, low-power hand-launched flight. Don't fly with the prop on backwards; this will prove nothing. If the first flight looked good, try another with a longer engine run. After that, let it get off on a Rise-Off-Ground (ROG) flight.

For the record, my H-13 has +1° wing incidence and -1° stab incidence, 2° downthrust, and 1/4 right thrust in the engine. Both wing tips are washed out slightly. I also had to put in another 1/4 left turn into the rudder. It is a bit touchy, so be careful.

Be sure to set the timer each time you fly, and get in the habit of not topping the fuel tank off after each flight. Make a few engine test runs to determine just how much fuel your engine consumes per flight, and fill your tank accordingly.

I will mail the first 12 persons who build the Hangar 13 1/2A Texaco model (and send me a photo of the model and builder) a rare Hangar 13 decal that can be attached to the finished model.

Acknowledgement: Credit Jean, my wife of 49 years, for her patience and understanding during this long, drawn-out project; Conrad Hansen, for his original design of the Hangar 13 Ten-Footer; Elwin Lindsley, for his vast knowledge of the writing, publishing, and photographic arts, and for having passed some of that knowledge on to me; Ralph Beck, for building a full-size RC Hangar 13 in 1987, which renewed my interest and rekindled my inspiration.

Thanks also to Jim Alaback, Richard Brown, Hal deBolt, Larry Fair, Bill and Phyllis Hanmer, D.B. Mathews, Jim Noonan, and Bob Oslan. My apologies to anyone who may have been overlooked. →

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