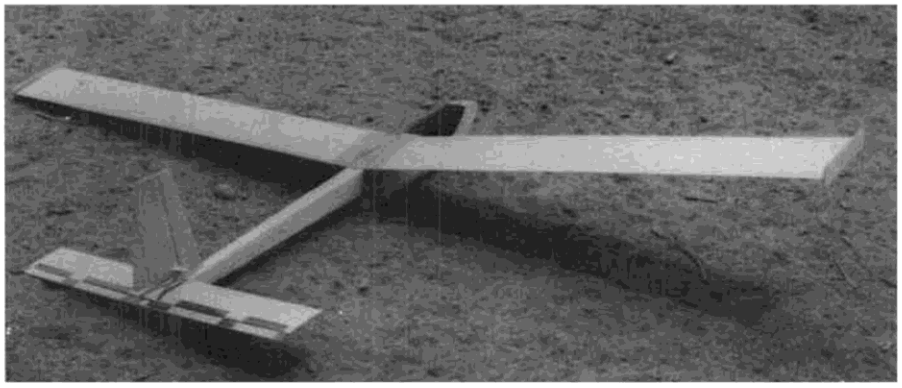
HOLLYWOOD SQUARE

By DAVE THORNBURG . . . Here's a six-foot, all-balsa R/C glider you can build in just one day . . . no full-size plans required. For thermal or slope soaring, or hang an .049 on the nose and make it a motorglider.



A *true* Hollywood Square; look Ma, no Monokote! Not a good idea to leave it raw if you live in an area of high humidity, as she tends to pick up weight (and warps).

• The Hollywood Square is meant to destroy some of the mystique of glider design. It won't win any big contests, beauty or otherwise, but it *will* get you into the air quickly. Six to ten hours of building time is about the most you can squander on the Square, unless you plan to Monokote her. That takes another three to four hours, and doubles the plane's cost. But it will also more than double her lifespan, and up her performance a few notches as well. The choice is yours.

WING

Like all sailplanes, the Square's magic is in her wing. You build the wing from four sheets of balsa and two pieces of Sig Light Celastic . . . nothing more. By using Sig tapered-cut balsa for the trailing edges, most of the carving is done for you; all that's left is the rounding of the leading edge with a block plane or razor plane.

In fact, carving the airfoil is the only tricky step to building the Square, the only step that a rank beginner could possibly botch up. And even then, the plane would probably still fly!

If you're not really expert at selecting balsa, you might want to do as I do: use a set of scales to help you choose, especially for the wing wood. An ideal sheet of 1/4 x 4 x 36 Sig Tapered Balsa weighs about 1.5 ounces. Don't buy it if it's much over two ounces. (They can weigh up to *four!)* The 3/8 x 3 leading edge sheets should weigh about three ounces each. This will give you a total wing weight (after carving and sanding and adding the Celastic) of between seven to ten ounces, without the optional Monokote.

Balancing the left and right panels is important. Try to select your wood so that neither panel outweighs the other by more than 3/4 ounce. You can always correct a bad imbalance on a completed wing by running a nail into the endgrain of the light panel, but no modeler likes to add dead weight to his plane, especially at the wingtip!

Last month's **R/C Model Builder** described the wing construction in detail. You can use white glue or slow-dry cyanoacrylate to join leading edge to trailing edge (hinge them with masking tape on the botton for a neat joint). But when it comes to dihedral and polyhedral joints, use epoxy. These joints take a real beating, and nothing but epoxy will do. No need to use glass or Celastic on the polyhedral breaks, but don't try to skip it on the center break.

Is the fiberglass strapping tape necessary? I only use it on wings that will be launched by electric winch, and even then, I stop it about two inches outside the poly breaks. I add it, in a single piece, after all the epoxy joints are dry and just before applying the Celastic to the center joint.

Awright, suppose you live out in Speed, Kansas, and your local shop doesn't stock Sig Tapered Balsa? You have three choices. You can make your own, using regular 1/4 x 4 balsa and a razor plane. (This isn't so tough; I've done it dozens of times. Before I owned a good German block plane, I used to carve these wings with a No. 64 X-Acto blade!) Your second choice is to write

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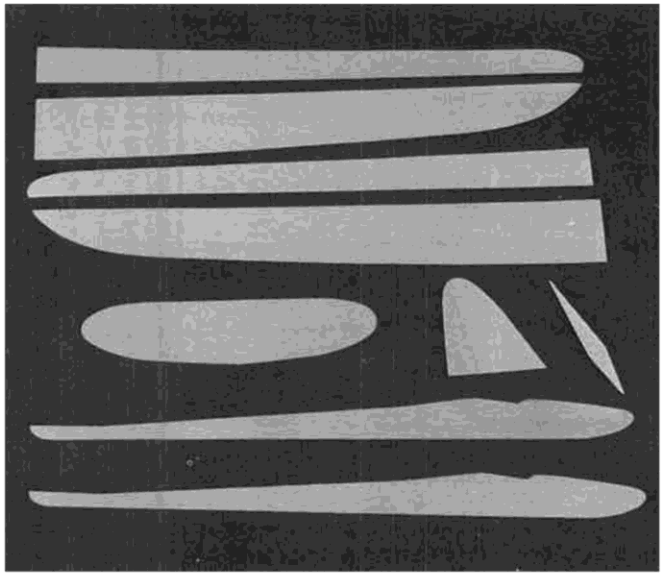

An early (1967) ancestor of the Hollywood Square, called the Zephyr and published in American Modeler. Note the tapered wings and rounded tips. Too much work, sez Dave.

Readers of old RCM's may recall this Square. It came apart for carrying on motorcycles, and was used to soar the Colorado Rockies two summers running.

directly to Sig, in Montezuma, Iowa. Or, send me twelve bucks and I'll ship you two matched 36-inch wing panels and the Celastic to join them; I'm at 3635 Mt. Vernon, Sebastopol, CA 95472. (Sorry, but my wings aren't hand-carved any more . . . I've got a big, noisy machine that cuts the upper surface of the airfoil. All I do is round the leading edges and hit 'em a few licks with a sanding block. Laziness strikes again!)

FUSELAGE

As everyone knows, fuselages don't fly; all they do is hold the tailfeathers in place to stabilize the wing. So if the fuselage shown on the drawings doesn't suit you, draw another one. Copy an Aquila, or a Schweizer 1-26. Or a shark, or your Aunt Gertrude's nose. Designing fuselages is harmless fun. It'll take your mind off sex for a few minutes.

On this size glider, I suggest medium 3/16 or hard 1/8 sheet for the sides, and 1/8 sheet for the top and bottom aft of the wing. Up front, use the hardest 3/16 or 1/4-inch balsa you can find; gliders almost always crash on their nose.

Note the dual function of the hatch; it also serves as a wing incidence block, raising the leading edge of the wing 1/16 inch higher than the trailing edge. This should be about right for the rearward CG shown. If you decide to move the CG further forward, you'll probably need more shim under the leading edge. Ditto if your ship comes out heavy, i.e., over 30 ounces total weight (a well-built Square weighs around 26 ounces).

The fuselage in the drawings is "bare bones," designed to get a reasonably experienced modeler into the air quickly. Choose your wood with care and it will be reasonably durable just as drawn. To toughen it up you can do three things: add bulkheads, add triangle stock to the corners, or Monokote it. Personally, I like the triangle stock (see optional fuselage cross-section A-A) plus Monokote. Also, a strip of Celastic or fiberglass along the bottom from the wing forward makes a dandy landing skid.

Note the absence of a rear wing dowel. Just slip half a dozen No. 64 rubber bands over the fuselage before putting the wing in place, then stretch them forward to the front dowel. One less dowel equals that much less drag, and drag is all that keeps small airplanes from flying as well as big ones.

One last word on the fuselage: be sure to fillet the top of the towhook with epoxy, if you build the fuselage shape shown. Otherwise the tow ring will wedge itself into that crack and you'll never get off the towline!

EMPENNAGE

Use medium-weight C-grain balsa for the rudder and stab. (C-grain, remember, is the stuff that doesn't bend crossgrain.) I like Monokote hinges . . . they're easy to make, very tough, and perfectly airtight. Cloth or figure-eight thread hinges will also work. Stay away from commercial nylon hinges for the Square. They're heavy, and too difficult to install in such thin surfaces.

RADIO INSTALLATION

If you've built R/C models before, what can I tell you? And if you haven't, you'll need help from someone who has, or one of the how-to books published by the various model mags. Put all of the components as far forward as humanly possible. Even then, you may need an ounce or so of lead in the nose; be prepared to slip a piece of tire weight alongside the batteries. Don't put the lead back with the servos, or under the receiver, etc. Takes twice as much lead that way. Put it all the way up front, even if you have to smash it flat with a hammer and slip it in with a ramrod.

In sailplanes, I always mount my servos with 1/16-inch thick double-stick foam tape. If the hobby shop is out of it, try the hardware store. They sell it for mounting pictures on the (landlord's) walls. I like cablerods for hooking up the control surfaces. It you use conventional pushrods, make them from 1/4-inch square hard balsa. Don't use dowels or arrowshafts, they're too heavy.

FINISH

There are two schools of thought here. One of them says, *Before you finish a model, fly it. If it doesn't fly, it doesn't need a finish. If it does fly, it's finished!*

I like that.

The other school says, *No matter how quickly you toss a model together, you can double its performance by putting some care and attention into its finish.*

I like that, too. It probably describes best how I build most of my models, or at least most of my *sport* models, like this one. I toss the basic structure together very quickly, using quick epoxies and Hot Stuff, and then spend about half the time I've saved putting a good finish on the model. On sailplanes particularly, I pay a lot of attention to cleaning up the exterior and reducing drag. Reducing drag on a glider is exactly equivalent to increasing horsepower on an engine-powered model. As a result, my models fly better than most, and I get a reputation for being a good pilot. And I like that.

For example, suppose my club is having a one-design competition for Hollywood Squares. I'd clean up that fuselage by about 50%. Use triangle stock in every corner, then round the corners off with a plane and a sanding block. If the rules permitted, I'd narrow the fuselage to one servo wide, stand my receiver on edge, and rebuild my battery pack to fit. If not, I'd at least streamline the nose and fill that big gaping hole at the tail. And bolt the wing in place, or move the front dowel inside, to get rid of all that dowel-and-rubber business hanging out in the breeze. And, oh yes, plug that gap between the wing undercamber and the top of the fuselage. It'll not only reduce drag, but keep the wing from rocking.

On the empennage, I'd sand everything to symmetrical airfoil shapes. That means rounding all the leading edges and tips, and feathering the trailing edges exactly as the cross-section drawing indicates. (Incidentally, Skip Miller says he's feathering the empennage *leading edges* on his new Saggitas, just like the Europeans do. And Skip Miller's Saggitas are FAST!) I'd Monokote everything, and use Monokote hinges for sure. I'd move that rudder horn down inside the fuselage by bending a simple yoke out of 1/16 piano wire.

As to the wing, I'd build polyhedral, and use much lighter balsa for the tips than for the center sections. I'd experiment with wingtips . . . NASA winglets, flat plates, vortex tips. I'd build the lowest permissible undercamber, and take quite a bit of wood off the bottom when carving the leading edges (i.e., give her a healthy dose of Phillips entry). I'd definitely use the strapping tape. By contest time I'd probably have 20 hours in the model, including covering and radio installation, but it would hold its own with any two-meter ship on the market, by then. And outlast my enthusiasm for it by years! •