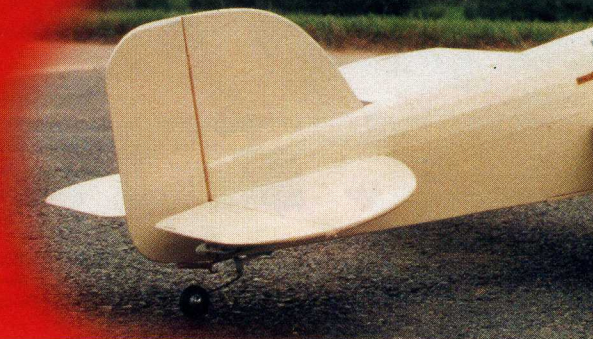


Free time? Try our free plan!

Cheap Jee

*A small fun filled 'hotrod' from
Dereck Woodward*



Some years back, I spent many happy hours with 'Holi' - a small hotrod published in RCMW that keeps re-appearing as folk realise just how much fun you can toss into a small car. Economy was achieved by using 36" long spars; honest handling came from the low aspect ratio wing for good low speed manners, while 'adequate' controls put the snaps and spins back. One thing lacking on 'Holi' was curves - drawn with pencil on paper; the airframe wasn't prone to excessive curviness.

Then I discovered CAD!

Computer Assisted Drafting means never rubbing out lines again! 'Teach myself CAD' involved putting Holi's shape into CAD - then changing it. Snips when the machine tells you the area of, say, the fin. Change the shape, tell FRED (the computer, don't ask!) to calculate the new area. If it matches, fine. If not, fiddle with it some more until it does.

And now for something completely different! Art Chester's 'Jeep' racer has always fascinated me - but he made life difficult for modellers down the road? Though the aircraft is easily recognisable, it's all odd shapes and angles. A week of reading the manual, and I had a 'Holi' sized Jeep-ish plan. Might as well build it now!

Okay - you're still here. Good, let's run through the building sequence - I'll leave you to the details. If I have to spend three paragraphs explaining the best end of a knife to hold, maybe you better come back later. A one-piece airframe means you don't have to fret about drilling for bolts and dowels, but you do need to arrive at a point with the big bits ready to meet socially.

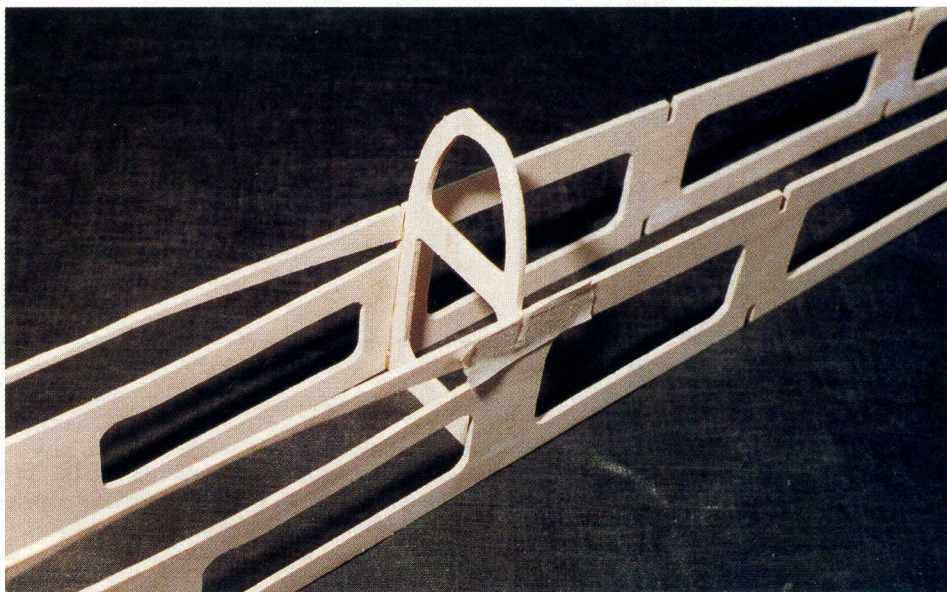
Wing

There is a slight double taper on the LE, while the TE taper is all on the ailerons. This yields a straight aileron hinge line, and all ribs are identical aft of the spar. The rib profile was altered ahead of the spar, to give the forward taper. As there aren't that many ribs, cutting them out is a trivial chore. Steve Kerry and myself developed the surface spar over a lot of e-mails. Steve came up with the idea of putting it on the top of the ribs, reasoning that spars should be as far apart as possible, while I tossed in tapering it. Instead of 1/4 x 1/8 spruce under the LE sheet, by using 1/2 x 1/16th spruce glued

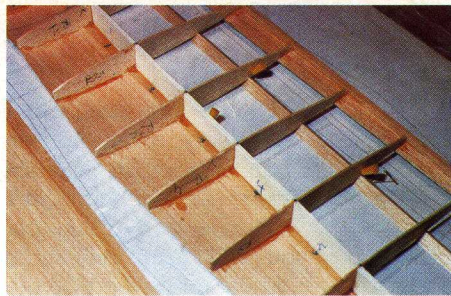
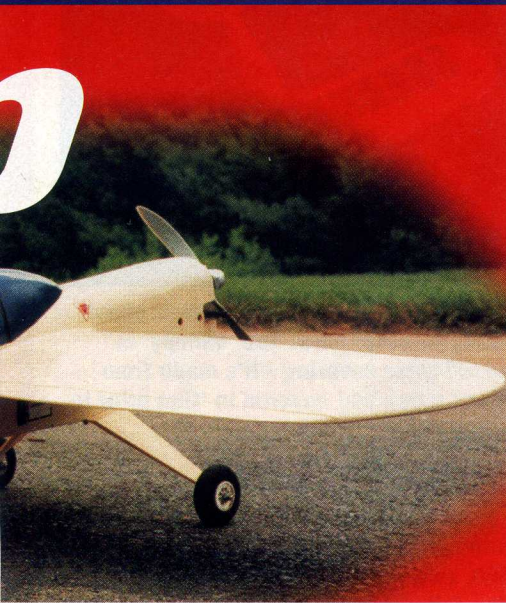
to the back of the LE sheet all the spar material is as close to the surface as it is ever going to be

There's a lot of wood in the tips; hence the thin core to give the shape and a couple of laminations to give some edge thickness. With CA glue, it is hardly a long job and weighs much less, while being stronger, lighter and more stable than thick sheet.

Once you get that far, remember that the aileron servo is offset to starboard, so fit the torque rods accordingly. Carving the ailerons requires a little attention to making sure you get the changing taper correct, but it is nothing that care and skill can't take care of.



Take sides! I glued paper copies to the Liteply and cut both sides together - and join them. Tabs on formers lock into slots in sides. Okay, it takes a little extra cutting out time, but means the fuselage assembles faster and easier. I've already cut out the side pieces above the wing and held them back in place with tape (to save losing them in the chaos that is my bench!).



Into the wing - here I've got the ribs glued onto the lower spar and LE sheet. Remember that the lower spar is 1/16" thick and glued straight onto the back edge of the LE sheeting. The lower TE is in place and the wing is pinned to a length of 1/4" strip as a jig. The spar webs are from my old favourite alternative material - 1/8" artists' foamboard, though 1/16" vertical grain balsa is more conventional.

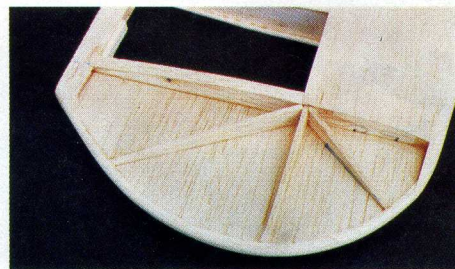
glue before applying glue to the outline of the core and the rib ends. Now just pin the outline down and tight against the core. Do the tailplane and elevators as a unit, ditto with the fin and rudder.

When it is all dry - overnight is good - you can taper off the moving parts, separate from the fixed parts and fit the elevator joiner wire. Nice, light and not much carving/sanding, which compensates for the building time.

Fuselage

Litely sides and formers produce the box part under the wing to hold the rest in order. The sides extend forwards to form part of a 'cheat' cowling. The wing sits down into the sides - cut the sides out in one piece, remove the portions over the wing and replace after the wing is glued in. Build in your side thrust.

As the model is in one piece, there are two hatches. The forward one is for the tank. I use a six-ounce tank with the 36, check that your tank will fit and adjust to suit. The UC mount next, as long as the wheels are just ahead of the LE and the prop is out of the grass, it will serve you



A finished wing tip - much lighter than a solid sheet version and better resistant to hangar rash. Core is 1/16" balsa; edge is two laminations of 1/16" x 1/4" and the gussets gave meaning to the life of some 1/8" oddments from my scrap box.

well. The longer hatch allows an easy radio fit - there's no reason a small model should need a shoehorn to fit the black boxes.

Above the wing is a mixture of cosmetic structure, to give a little shape and class to the box under it. From the nose aft, first is a little block for the cowl top. This is a good place to root through your scrap box and use up all those odd pieces of balsa.

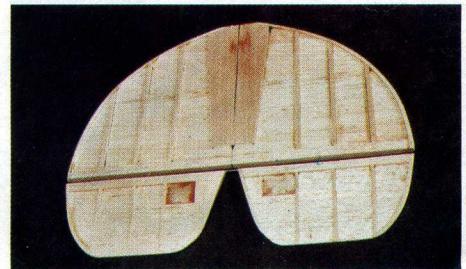
Next, the ply top deck. This goes on after the wing is glued in and is light and resistant to heavy handling. For the 'canopy', I cheated and used block balsa, hollowed out after shaping and covered in 'film' before fixing after the model was covered. That leaves the rear spruce stringers - far more strength for weight than if you'd used balsa. Once the stringers are in place, a little scrap balsa at the stringer front ends and around the tailplane topside give somewhere for the covering to be secured to.

D'tails, d'tails

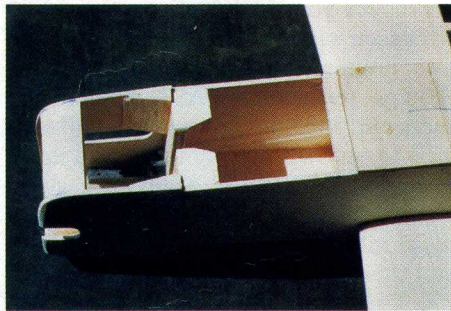
I used a set of standard servos, a big Futaba Rx and 'added lightness' with a 250 mA nicad - a formula I've used for years. Having the rudder and elevator servos behind the wing frees up valuable overwing space and saves having to wrestle the gear into place. Nowadays, I would use two mini servos on the ailerons, two on the fuselage controls and a micro for throttle - the weight would be much the same. However, this set-up works fine and has logged many hours in a variety of my models around this size.

Under the bonnet - 'hood' if reading in dollars - the OS25 FP fitted easily while the slightly bulkier Magnum 36 is a little tighter, though still easy to get at. The slot in F1 is to allow ease of fitting the fuel tank from below without having to tilt the tank to get the feed pipes in.

The wire UC with balsa fairings, as drawn, looked and worked fine. The tail wheel is a commercial steerable coupled to the rudder with a field replaceable, fragmental link - a small rubber band!



The tailplane in all its finished glory. The old scale technique of a 1/16" core with strip 'ribs' and a laminated outline is not hard to do, fairly fast in these days of instant glues and 'adds lightness' over solid sheet.



Here you can see the slot in F1 that allows the tank to fit gracefully, rather than having to be wrestled into place.

Tailfeathers

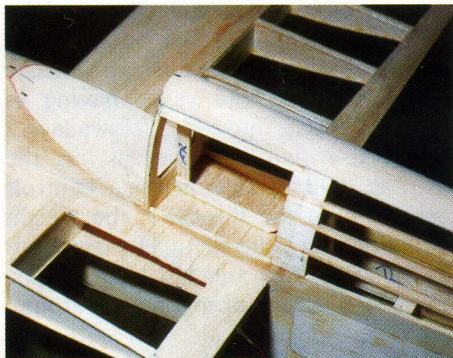
They are big! Changing the shapes around the 'Holi' numbers didn't work too well; the surfaces on the plan are to the size they ended up at after some interesting flights with inadequate direction stability and interesting pitch habits. I recommend that you stick with the core and outline structure, unless you fancy finding and joining really light 3/16" sheet. There's plenty of square inches back there...

It's easy to do as per plan. Cut out the 'core' from light 1/16" sheet, and fit the strip 'ribs' to one side - this works for both vertical and horizontal surfaces. Mark the location of the other side's ribs by poking a pin through the core at each rib end and glue the ribs into place. Now pin the unit onto your board, atop some clear plastic sheet. Strip two bendy lengths of 1/16" balsa to go around the outline - you can do the tailplane one half at a time from tailplane centre LE around to the TE of that elevator in one go.

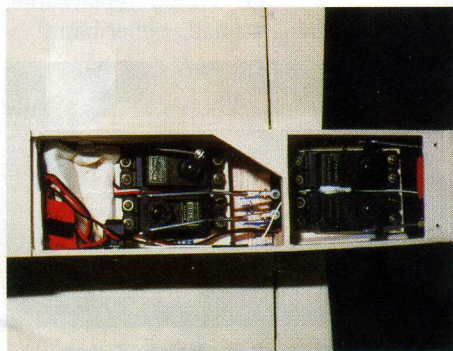
Moisten the strips and glue together using 'white' glue, cleaning off surplus

Covering, well, the airframe is immensely rigid, so keep it light. Mine is done in 'Econokote', which is both lighter and cheaper than America's ubiquitous 'Monokote', so whatever takes your fancy should do you good. Make sure you use plenty of 'this way up' clues, as she is small, very fast and can soon become a little dot.

Make sure you seal all the woodwork around the front end, I never have stopped oil seeping into nooks and crannies. If you look at the photos of mine, you might ponder on where the aerial is. Well, it is inside! I use the 'Deans' short whip antenna (they're American!) and lay it in the back fuselage. Deans say vertical, but my models are seldom that far away and 'straight and level' is something she transitions through sometimes. So, I did some exhaustive and highly scientific tests, and am more than happy it works for me.



Together at last! I've got the wing in, the overwing sides back in for good and have started adding fuselage top formers. Top rear deck is fitted and the stringers are in. The scrap wood between the stringers is for somewhere to fasten the covering to. That gap will be covered by 1/64" ply. Love that thin ply - the front decking is made from it too.



Radio bay, with the Rx atop the nicad inside the front of the radio bay area. Moving the rudder and elevator servos to aft of the wing means the fit is easy, not diabolical.



Come on, let's fly

I know you guys, won't be many using bottom end engines, so let's discuss flying with the Magnum 36. For take off, you will need rudder to hold the torque on take off.

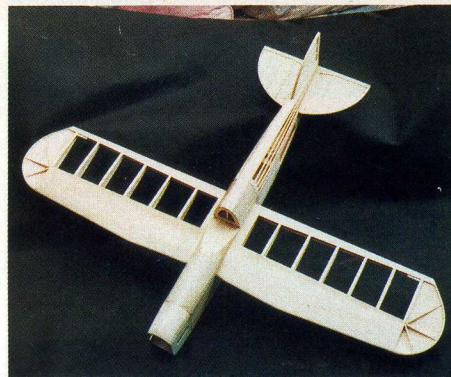
Apply power smoothly, get her running straight, off the ground and resist all temptation to go vertical until the second flight. Mostly because engines tend to quit on test flights and you'd rather learn about deadstick later than sooner...

All controls are powerful, there is some yaw/roll coupling, that's the shoulder wing at work. The control power available allows you to easily fine tune responses to your liking.

At the low speed end of the envelope, she is pretty docile. Back the power, put in some up trim to peg the speed and she will maintain her good manners right down to the classic and drama free stall. Ailerons are effective down to the stall, but if I am going to play around there, I might start to use the rudder and stay off the ailerons.

Landings - coming in, tail down, a good descent rate and holding off into a three pointer looks real pretty and is easy to do. Don't use both aileron and rudder together near the stall - she might think you want to play spinning! Going fast - well, she looks like a racer.

Loops - well, fly a couple of huge ones using so little elevator that it is hard to keep track of. Square loops are a snip; vertical with this much power is a matter



And in all her naked glory! She's about ready to cover here. The 'canopy' is added after covering - it's made from block balsa and covered in 'film' prior to being glued in place.

of eyesight and boredom.

Rolls - have fun. Do 'em fast or slow, four or eight point. Two points, a fast 360, two more points. Do them straight up; followed by the same one straight down. It's your imagination, exercise it. Ever seen a half reverse Cuban eight with a six point roll to inverted? It's B-I-G!

Snaps and spins - FAST! Hit full up, rudder and aileron for two and a half snap rolls to inverted and fly off upside down like nothing happened. Spins are easy. I'll start from the deck, pull up into a half loop, roll out, repeat until she's as high, and then spin off the end of the last half roll. One advantage of a low aspect ratio wing is that the spin is fast and it's easy to change direction. But, pull out at the bottom, and she'll let you haul out into level with a square corner without fussing.

Don't just sit there, build one!

Dereck Woodward



Here's the low-down on as much fun as I could pack between tips 40" apart. Not a model for the faint-hearted, this is what 'C J' looks like with the wheels on the bottom. I get away with those tiny wheels on grass because that 36 doesn't argue on take off - it dictates!