Chimera Build Guide by Wes Edwards

Introduction

Experienced modellers should have no problems building this model, especially those who built small rubber-powered models in the past.

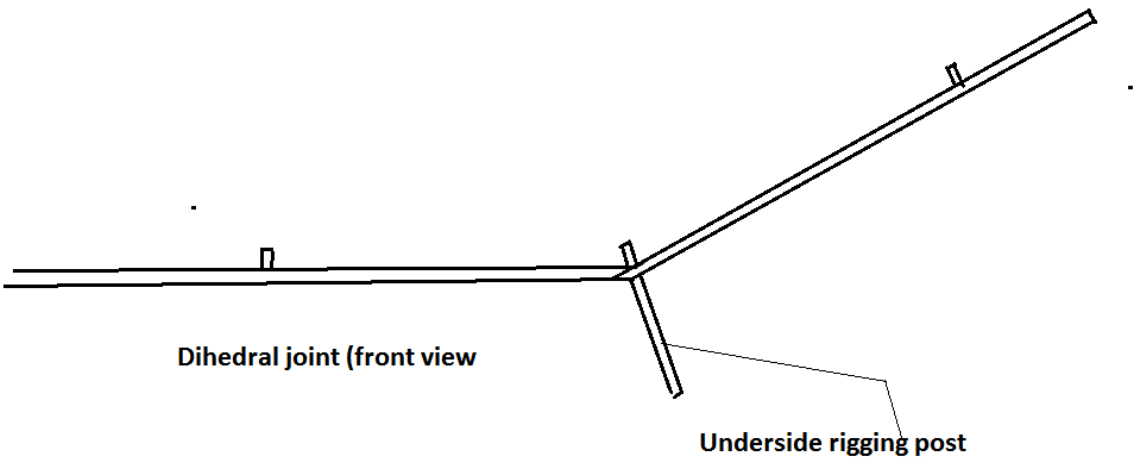
Wings

The wing structure is very simple. The first task is to produce formers for the ribs and tips from 3mm balsa by copying the inside line of the tips and rib upper surfaces from the plan. The upper rib surfaces and wing tips are then constructed from 4 layers of 1/32" (0.8mm) balsa. I found it easiest to cut the strips a few inches over length and then soak them in cold water for a while before layering four together using PVA or Aliphatic glue and then wrapping them round the former (which had previously been coated with soap or similar to stop the laminated section sticking to the former). It is preferable to pin the sections in place using small offcuts of 3mm balsa rather than pinning directly against the laminated component as this will avoid marks from the pins. The same method is used for the tailplane tips and the fin and rudder, in all cases the laminated sections should be made longer than required and cut to fit when dry.

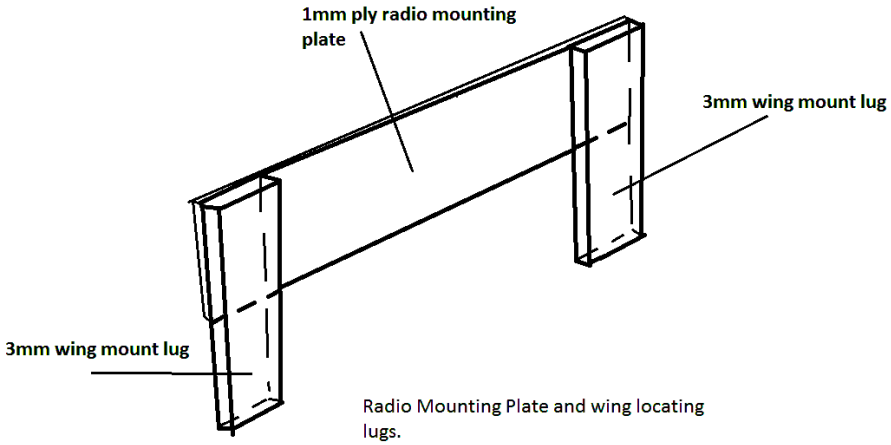
It is advisable to make several formers for the upper rib surfaces as they can then be made in batches.

When assembling the wing, note the direction of the scarf joints where the tips join the leading and trailing edges as these add strength to the structure.

The dihedral joints may be constructed as wished. I made the tip panels a bit over length and scarf jointed them to the centre section. See the illustration below:



Fuselage
The fuselage consists of 3 layers of 3mm balsa but note the void to allow adjustment of the wing to obtain the correct CG. The illustration below shows the lugs which fit into this void.



Radio Mounting Plate and wing locating lugs.

Once the majority of the airframe is complete these lugs may be inserted into the void and the whole wing assembly moved fore and aft, being pinned into position until a satisfactory balance is achieved (this will vary depending on what motor or radio gear is used) and then glued in place. The original used a GWS geared brushed motor, a Corona scanning 35 mHz mini receiver and 3 gram "Chinese" servos (about £2 each from Ebay)

The wing posts are glued to the wing mount lugs and the radio mounting plate and also fit into the fuselage void. The tailplane and fin and rudder assembly are simply glued direct to the fuselage.

Control system
Control Surface horns are from 1mm paxolin sheet and the pushrods are 1mm welding rods (stainless steel in this case, but only because they were available) and were attached to the servos and control horns with 1mm "swing keepers". Adjustment is by "Z" bends in the pushrods and I found it necessary to add a support about halfway along the pushrods to counter "sag" due to the mass of the rods. Andrew's photographs should make this clear,.but I am sure that builders can find several other solutions. I considered using a closed loop system but was unable to do so on the first version because it used 1.5 gram linear servos.

Covering material
The covering material (again cheaply available on Ebay) is lightweight laminating film. This was used because it was a) available, b) shrinks less than Solarfilm and therefore does not distort the lightweight structure as Solarfilm probably would and c) because it was cheap! The covering is applied to the upper surfaces of the wing and tailplane and to only one surface of the fin and rudder, using a standard Solarfilm iron.

The rigging "A-frame" should be attached after the covering is done, by cutting away as much of the film as is needed to allow a good joint. The control surfaces are hinged with small pieces of"Blenderm" tape.

Power System
The model only requires about 5 watts to achieve a slow but positive climb. Flying in an average hangar it is necessary to throttle back to about 1/3rd power to avoid flying into the ceiling beams. The GWS geared motor originally drove a "Chinese copy" "APC-style" 9x6 propellor, but now uses a GWS 10x4.75. Flights have not been timed but certainly exceed 15 minutes on a 350mAh 2s Lipo when using the 9x6 prop. The 10x 4.75 prop revolved at about 2,700 rpm on full power and drew about 1.3 amps, so if an ungeared brushless motor was to be used it would have to be about 400kV.

It is of course the case that the model only flies on full power while taking off or climbing, so a more realistic power level would be about 0.75 amps, or around 5 watts. Using a 9x6 returned an rpm of about 3,300, on a current of a little under 1 amp (which would of course reduce as the prop "unloaded" in flight) so would require a motor/system of about 600kV. This suggests that geared motors would be the norm as kVs around this value normally only apply to much larger motors. 2s Lipos ranging from 350mAh up to 1,000mAh have been used with little effect on performance, since the battery is attached (by self-adhesive Velcro) directly beneath the CG. Of course a small, high-revving motor with a much smaller prop would probably work just as well, which gives the opportunity to use brushless motors.

Control Surface Movements
Elevator 10 mm each way
Rudder 20mm each way.

Rigging
The rigging is essential! Without it the model structure will fail. I used dental floss. It is very strong and glues easily with cyanoacrylate, yet cuts easily with a scalpel or scissors (and is also easily available and reasonably cheap)...

The best way to rig the model is to assemble the wing, wing posts and A-frame and rig this before fitting the wing to the fuselage. Note that the rigging posts on the underside of the dihedral break (about 45mm long) are not shown on the plan, but are necessary to prevent twisting of the tips. The tail and undercarriage can be rigged later.

Flying
The Chimera is very easy to fly. It flies slowly but can turn very tightly if required. It is loaded with drag and therefore descends quite rapidly "power-off". Take-offs from a hard surface such as a hangar floor are very easy, just open the throttle and steer it!

Attempted take-offs from grass have been less successful so far, bit at only around 4.5 ounces in weight it is easy to hand-launch. It does tend to fly "tail-down" with a fair amount of up trim, so perhaps a slight increase in wing incidence would be beneficial. It has been flown outdoors on a calm evening and reached a considerable height!