

## **Building instructions for the Crobe<sup>2</sup>**

### **1. Building**

Except special mention, all glueing will be made with fast wood glue (vinyl "white glue"). If you start from balsa and plywood sheets, use a method of transferring or printing copies of the plan to the wood (acetone, iron, pinning), then carefully cut pieces with a scalpel to balsa. Be careful not destroy the profile of ribs! You can also buy a laser kit (contact: [rubnat@free.fr](mailto:rubnat@free.fr) ), which, for a few more money, provide perfect parts while saving some hours of cutting.

#### Fuselage:

- Forming the sidewalls: wet them with warm water at the bend areas, and then clamp (clamps, masses, etc. ...) them flat on a work plan. Using a 6mm hold under the tail, starting at 185mm from the front edge. The clamping of the front must stop at 107mm (just behind the hole for key wing). Let dry for at least one night.
- Paste reinforcements sidewalls with wood glue : first 0.4mm plywood (in two parts, one reinforcing the area of the trapdoor), then re-establish the clamping and 6mm hold, allowing access to the edges for gluing triangular balsa wands. Then put in place these wands (wet them with warm water to facilitate the formatting), and using pins to hold them. The kit is scheduled for 4x4 wands, but 6x6 can be used, with 4mm retailing on the side which will be pasted on the sidewall. Let dry overnight.
- Prepare the location of servos and samba 5x3 wands, cutting triangular wands with a scalpel.
- Paste the two sidewalls on the front former, taking care squareness.
- Put in place the servos, and then paste the samba 5x3 wands. Remove then servos.
- Paste the balsa covering of the fuselage above and below, stopping at the top of the passage of key wing.
- Paste the rear former.
- Refine with scalpel the triangular wands, from about 40mm behind the rear couple, so that the sidewalls can be pinched.
- Paste the rear side of the sidewalls, and then finish the covering of the fuselage, above and below. To facilitate adjustments, covering exceed the sidewalls, the surplus will have to be cut with a scalpel after drying.
- Paste the 0.4mm plywood reinforcement on the front former.
- Paste nose, composed of several layers of 2mm balsa.
- Sand the fuselage, carefully rounded nose and edges. For the edges, do not exceed a radius of 2 to 3mm, one should not reach the triangular wands.
- Make with a scalpel the cavity on the sidewalls, on the front edge of the wings, to paste the two small reinforcement plates in 0.4mm plywood.
- Paster with a drop of cyano 0.4mm plywood reinforcements of the Karman, with the help of a stick pushed along the fuselage to ensure continuity of sidewalls.
- Prepare the filling of Karmans with falls of 2mm balsa, then paste them with wood glue. Still use a stick to perfect alignment.
- Finalize the joints with light balsa putty, and smooth with a wet finger.
- Prepare the 0.4mm plywood bed of stabilizer (angle = 115 °), then make with scalpel the location of this bed in the fuselage. Thent paste it with wood glue.
- Finish the fuselage by a light sanding with fine sandpaper.

#### Wings:

- Clamp slightly (with small masses) on a work plan the lower wing balsa sheet, without disrupting access to ribs.
- Paste ribs with wood glue, with the help of pins if necessary.
- Paste the extra leading edge.

- With a Ø3mm drill, make through the ribs the hole for the key housing. If the drill exceed the upper side of the ribs, do not hesitate to slightly crop the lower wing sheet.
- Put in place the housing (Ø2mm x Ø3mm plastic tube), without glueing.
- Align the two wings, root against root, by putting in place the key (Ø2mm piano wire), and check the alignment of the housing. Adjust with the Ø3 drill if necessary.
- Always with the key in place and aligned wings, paste the housing with a drop of cyano glue.
- Paste first two segments spar along housing, always with cyano glue, with minimal quantity of glue. Do not forget the small piece of balsa at the end of the housing.
- Paste other segments spar with wood glue.
- Gently sand spars to put them at the same height as the ribs.
- Gently sand leading edge, about 30 degrees, so as to be in the continuity of ribs. Do the same to the trailing edge, with an angle of 6 °. Be careful, there is very little material to be removed.
- Put wood glue on ribs and leading and trailing edge.
- Put in place the upper wing balsa sheet, and then clamp it to marry all forms. The clamping force should not be too large, but has to be well distributed. It is best to use a sandbag filled half, spreaded on the wing. Let dry at least 24 hours.
- Adjust upper wing balsa sheet on all the edge and tip.
- Paste trailing edge in 10x2mm balsa. In the same time, paste the tips (the 1mm balsa has to be below the 2mm balsa).
- Sand the trailing edge in continuity of the profile, leaving a 0.6mm thickness.
- Gently sand the leading edges and tips.
- If necessary, adjust root tip after having presented on the fuselage, and then paste the root 0.4mm plywood ribs.
- Cut with scalpel the housing for the Ø1xØ2 plastic tube, and then paste the tube with cyano glue.
- Cut with scalpel the passages for the command rods.
- Finish each wing by a light sanding with fine sandpaper.

#### Stabilizers:

- Prepare two textiles hinges (pieces about 15x10mm).
- Delicately slot with scalpel the root of half-stabilizers to put the hinges.
- Assemble at the two half-stabilizers with hinges, and then present on the stabilizer's bed of the fuselage.
- Paste with cyano glue the Ø1xØ2 plastic tube on the bed.
- Put in place the stabilizer keeping in piano wire, and verify the proper holding by adjusting the two half-stabilizers on hinges.
- When everything is perfect, gently put out the stabilizer and then paste hinges with very fluid cyano glue, by infiltration.
- Replace the stabilizer on the bed.
- Use a drop of 6x6 balsa wand, and adjust its angle by sanding to fill the link between the two half-stabilizers. When this part is properly adjusted, then paste it on one of the half-stabilizer (not on both!). So the stabilizer can recover flat when dismantled from the fuselage, which is very convenient for transport.

## 2. Finishing

The best finish in terms of strength, weight and durability, is obtained with japanese paper and nitrate dope. Eventually, the japanese paper can be replaced by tissue paper, then choose 18g/Sq.m and mate quality (not glossy).

#### Wings:

- Prepare a clamping tool for wings (example : chopsticks with rubber bracelets : see pics <http://lecrobe.free.fr> ). Do not forget to protect with tape the chopsticks, to avoid a potential glueing by printer.
- Prepare the paper, with an overcut of about 10mm per side.

- Perfectly remove dust from wings, and then coat glistening with printer, in 3 layers every 15min, in order to saturate the balsa.
- Slightly moisten paper with a mist of water.
- Start the covering by the upper wing : put paper, smooth out without forcing, and then use a brush soaked in acetone, cellulosic thinner or directly with printing, in order to dissolve the printer content in the balsa and fix the paper.
- Fold the paper down to the lower wing, keep an approximately 3mm recovery, and remove the surplus with scissors.
- Do the same to the lower wing, and cut the extra paper at the edge without folding to the upper wing. At the recovery of the upper et lower paper, use some printer to have a better glueing.
- Wait a few minutes (the paper should not accede to the finger), and then clamp the wings on the clamping tool. Let dry overnight in a ventilated place, with some masses to flatten the tool on a work plan.
- The next day, pass on the wing two layers of nitro-cellulosic printer, at 5 min intervals. Wait a few minutes, then clamp it again for a final night of drying.

#### Fuselage:

- Same principle as for the wings, but without complying tool, and starting from the sidewalls. To facilitate the transition bends, for example, on the nose, make a few notches with a scalpel. If possible, make discreet recoveries.
- For the trapdoor, make paper flaps 3mm to the inside, and use printer on all the part to avoid any twisting.
- The stabilizer can just get the printer, without using paper.