

# Puzzle building instruction

Puzzle

A simple model for the Control-Line Newcomer.

## Design considerations:

When I started do make the Puzzle I just made my first looping of 360 degree. The aim was to build a model, for learning inverted fly and round figures. It must not only be fast to build, but also easy to repair, so I decided to use not a sheet-fuselage, where in most cases wing and fuselage are badly damaged after a crash. A simple box-fuselage with rubber-band fixed wing and the rest screwed together whit nylon bolts, seem for me to be the better approach. The line length should be 60 to 70 feet, this gives more time per lap, more time to react and more space to fly. I fly the model with an OS-40FP-S or a FOX 35 Stunt engine. An other suitable motor is the British PAW 35. They all can also be used for the next step, an intermediate trainer with flaps.

## Construction:

Before you cut any balsa, please check that all commercial parts you use, will fit and modify the plan when necessary. Use only good balsa, especially the spars leading- and tailing edge must be perfect straight. I recommend three different glues, Satellite City UFO Thick (odorless cyano) for fast binding, Ponal Express (white) for general use and 5 minute Epoxy for strong junctions and glass fiber reinforcements. To make the reinforcements I cut the 20mm glass fiber band to the de- sired length and put it on a sheet of plastic foil, add some drops of epoxy, cover it with a second plastic sheet and press then the epoxy into the glass fiber.

## Wing:

Use the sandwich method to make the wing ribs. Draw the rib-pattern on a large sheet of paper and put it on your building board. Glue the ribs with cyano to the tailing edge (do not forget to put a 1.5mm balsa sheet under the center ribs). Then glue the spars and leading edge on the ribs. cover the front part of the center ribs, then the hole front and the center section of the wing. Keep the wing fix firmly on the building board while drying to prevent a twisted wing. Add wing tips with wire leadout guide at left- and lead in right-tip and positioner.

## Fuselage:

Cut the few parts needed to build the fuselage as precise as possible. First prepare the two fuse- lage sides. Glue on the 1mm ply inside doublers (note that the rear doublers have 3mm distance to the upper and lower boarder), drill the holes for dowels, cut out the wing profile and the leadout holes (inboard side only), then glue the bellcrank support on both sides. Glue with epoxy the nuts on former F5 and the front fuselage bottom ply sheet, the screw to fix the bellcrank on the bellcrank base. To assemble the fusealge, glue the formers F1-F5 on one fuselage side (check that they are fixed at right-angle). Now glue the other fuselage side on the formers F1-3 let them dry and then the formers F4 and F5 (watch for symmetry of fuselage). Glue in bellcrank base. Glue on fuselage top and bottom sheets and outside doublers. Now slide in the motor bearers and drill the fixing holes through fuselage and bearers at once. Make reinforcements as shown on plan and do not forget those at the bellcrank base. Drill holes for tank filling- and vent-pipes.

## Tailplane & Fin

Cut them out of a 6mm balsa sheet and sand the parts to the profile shape. Use your preferred hinge type for the tailplane. Glue F6 on the fin and reinforce with glass fiber bands.

## Finish:

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Sand all parts with 280 or finer sandpaper and remove the dust with a brush. Since we do not want to win a contest for the best finish, I suggest to cover the model with Monocote.

### **Final assembly:**

Install pushrod, bellcrank with leadout wires. The leadout wires should be a bit longer than half wingspan, this prevent damage of the control lines in case of crash. Insert the tank and fix the motor, undercarriage, tailplane and fin.

### **Flying:**

If this is your first CL-model, I suggest you to remove the undercarriage and make your first flights with hand launched start over high grass and take spare and repair material with you. I wish you good luck and a lot of fun flying CL-models.

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