

# Moulding Foils

**Moulding foils** is comparatively easy and quick compared to making them out of timber. Just a few minutes work can make a beautifully finished moulding that needs no painting, won't warp or de-laminate. It is an ideal club activity where moulds can be used over and over again.

**Moulding a rudder** - Assuming that you have made or borrowed a mould, the first thing is to wax the mould with a release agent such as 'Mirror Glaze'. Mix a small quantity of polyester gelcoat resin and carefully paint onto the polished surfaces of the mould. If any resin gets onto the flat edge surfaces, wipe it off with a cloth wrapped around your finger. Whilst allowing that to cure, cut two fabric panels around a plywood pattern, one for each side, from carbon reinforcing cloth and a Cormat panel to form a solid section at the top. When the gel coat is cured, paint the rudder surfaces with polyester laminating resin and lay in the carbon fibre, carefully aligning the cloth with front and top of the rudder. Carefully stipple/paint the surface with a brush to bring up the resin from below and add more resin where it looks dry. Repeat on the other side. Wet out the small single Cormat panel and 'stitch in' a waxed 1.6 mm diameter wire pin along the line on that pattern and lay into one half of the mould. This will form a hole for the pintle. Add a little resin all round edges of both halves. Don't worry about resin getting onto centreline surfaces this time because when these are carefully placed together and bolted up resin will be squeezed out and will appear as 'flash', easily sanded off. Add a few clamps to ensure that the halves are in good contact.

**Finishing** - After curing, remove rudder from mould. Start by twisting, bending and distorting the mould with some force. Cracking sounds will let you know that the moulding is being released. Opening up the mould is the most exciting and satisfying part. After this relatively crude messy process a beautifully light, polished product appears. One 'new moulder' recently described this as "like giving birth". Clean the flash from the edges with a pair of snips and finally a sanding block.

**Moulds** - Some clubs have moulds that can be borrowed, but if your club has no moulding expert ask around, as there is sure to be someone in another club who can help you enjoy the pleasures of moulding.

## Design and building of moulds for foils

If you want a special shape, making a mould is not that difficult, just time consuming. The design drawing is the starting point for making a plug. This example is a relatively basic process using 1/16" plywood. Each ply is 0.53mm thick, so as well as drawing the profile, 'buttock' lines are drawn 0.53mm apart from the centreline; thin vertical slices through the rudder to coincide with glue lines. This example is NACA 0006 section shape drawn on a 100mm length chord, but with the vertical scale drawn 10 times the true scale, giving an exaggerated curve. This is photocopied down to various chord lengths to suit your rudder widths. Over these section copies draw lines 5.3mm apart parallel to the centreline. Where these cut the curve they set points, which form the buttock lines.

**Making the plug** - Cut 2 ply parts to the rudder profile. The grain of the centreline ply MUST be across the rudder. Most important for later exact registration of the two halves is drilling two 1.5mm holes, as in the photos. Make a support block the same profile shape as the rudder and drill this too with registration holes. Use 1.6mm stainless steel wire to pin the ply down to the support block. Sand the ply until the glue lines match the buttock lines on the drawing. Glue the plug halves to a flat 1.5mm Formica baseplate projecting 25mm beyond the plug. Make sure that the very flexible tapered ply edges are stuck down flat to the baseplate. Drill registration holes in the baseplates through into a chipboard moulding board below. Push the pins down just below the plug surface. Fill these 'big' holes with plastercine and finish flush. Make sure that there are NO bumps or projections on the plug.

**Making the mould** - Wax the plug and baseplate surfaces 5 times with an old-fashioned bees wax, like 'Simoniz Wax for Cars'. Repeat the moulding process already described, but with two thin polyester gel coats and two layers of carbon, one either side of a 2mm Cormat layer. After curing, remove the Formica from the moulding board, remove the pins and cut one set down in length just to fit the Formica/plug parts. Clamp up and drill 2 holes for bolts that will hold and locate the mould parts together. Remove Formica and plug. Bend, twist and distort the mould until some part of the plug releases. Slide a thin flexible piece of plastic under this released bit and gently work it under the remaining parts of the plug. It won't look a good surface, but the finish is achieved by sanding with progressively finer wet and dry sandpaper up to at least 1200 grade and polishing the surfaces asap with T-cut.