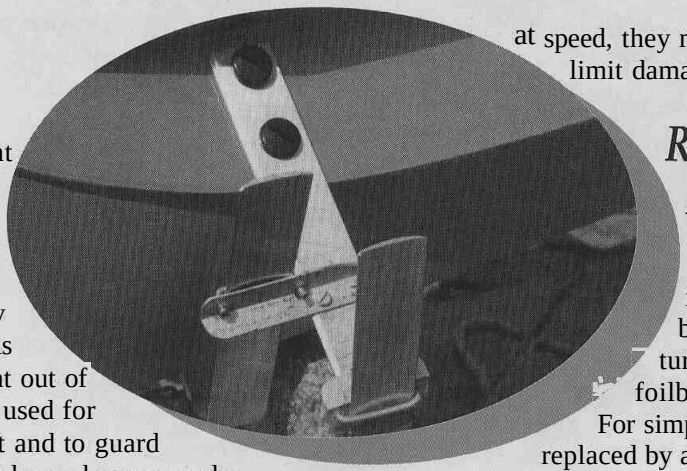
Foil Design



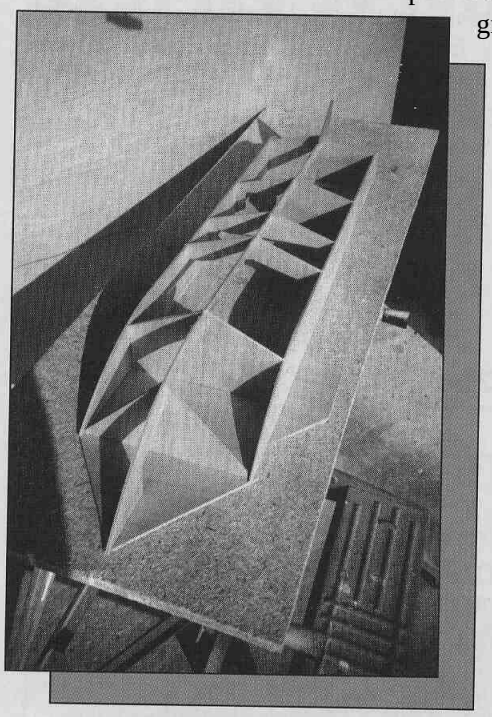
Right, front foil attachment in close up

The model employs surface piercing configuration on front and rear foils. The front foil is of biplane/ladder design where the upper foil, which is set to a fairly high angle of attack, is designed to come right out of the water. This foil is used for additional take-off lift and to guard against sea-crash, which can happen under certain extreme wave conditions.

The "W" shaped lower front foil is designed to give greater roll stability at high speed than a conventional "V" shape.

The proportions of weight carried on the front and rear foil are 55% and 45% respectively. On my model, the actual weight on the foils is 1.77kg and 1.4kg.

The foils themselves are made from 1" 'half-round' aluminium strip (used for edging work tops) obtainable in 3m lengths from good builders merchants/DIY stores. Note that this strip is available in two thicknesses, 1/8" and, 3/16" which has too much curvature, so you want the thinner one. This strip, as luck would have it, has almost the ideal section shape for high speed sub-cavitation foils. I bought the 1" by 1/8" aluminium strut material from Payless.



The main box structureof the hull.

Foil Construction

Building the foil assembly requires a little care, but is by no means a high precision job. The foils themselves are best bent to shape around a former made from wooden blocks, to ensure that no twists are introduced.

Photo far right, laminating the skeg from layers o|ply, epoxied together.

The foils are attached to the struts via aluminium "L" section strip "brackets", bent to fit the angle between the strut and the foil, and M3 threaded rod 'clamps'. While these "foilbrackets" look like they would create a lot of drag they are actually clear of the water surface when foilborne.

As in the earlier experimental model the foil assembly is attached to the hull with the sort of nylon nuts and bolts sold for joining kitchen cabinets together. These have the advantage that, if the foils strike an obstacle at speed, they may shear off and so limit damage to the hull.

Rear Foil Linkage

The variable split rear foil enables the boat to bank into turns, giving a tight foilborne turning circle. For simplicity this could be replaced by a single strip, as per the front foil, but would sacrifice some manoeuvrability.

The foils are linked to the rudder tiller via push-rods and bellcranks. It is important that there is no slack in this mechanism which will cause the foils to wobble about. For this reason I used ball and socket links. A turn-buckle is fitted in both rudder-to-bellcrank links to allow for individual adjustment. Only a few degrees of foil throw is needed for full rudder throw.

As the foils tip in opposite directions, like ailerons, at most times the forces are in balance and there is little additional load on the rudder servo.

Deck and Superstructure

The superstructure is built in a similar manner to the hull, around location strips glued to the deck. Assemble the bulkheads and sides first, then the roof skins. To avoid