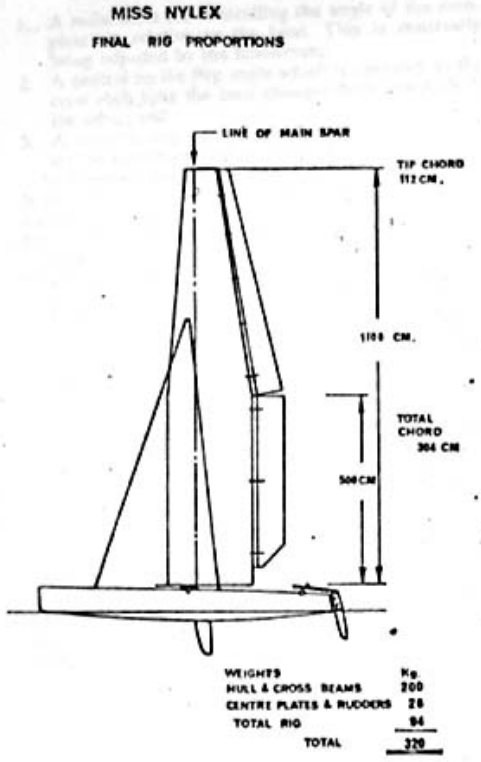

Fig. 10

(.30 of an inch) and has a stiffness factor of 45,000 compared with the maximum stiffness factor that could be obtained from a sheet plywood or moulded ply hull of 10,000 and also compared with solid fibreglass of the same weight of 5,500. As mentioned earlier, we actually made 2 sets of hulls. In the first set the finish was quite poor and required a lot of resurfacing to obtain a good smooth finish and they ended up too heavy to be competitive. A second set of hulls was built last year by Commonwealth Aircraft Corporation in which we were able to reduce the weight much closer to that of our original target. In these, we used the glass/balsa/glass laminate for the decks too, increasing the thickness in between the cross beams to 9.5 mm 3/8ths of an inch).

We have had no trouble whatsoever with the hulls due to structural weakness and we believe that the choice of this medium has been a major factor in the success of Miss Nylex, because it enabled us to concentrate all of our attention on the tuning of the rig.

The hulls are joined by two 100 mm (4 inch) diameter high strength aluminium alloy tubes. The main beam is enclosed by a built up fairing to reduce wind resistance. The use of this fairing reduced air drag by about 6.4 kg (14 lbs) and is considered to be worth the penalty in weight which it incurs. The deck of the boat is fabricated from heavy terylene cloth. This is conventional practice in all high performance catamarans.

Both the centreboards and rudders are made of wood and again hydrofoil sections were selected very carefully to obtain optimum performance. They are 9% thick derived from the 66-series of NASA sections, and are highly polished for minimum drag.

The design and construction of the wing presented us with many challenges, but in its finished form is in fact quite simple. It is an all timber structure with no metal fastenings, built around a main spar of 3 mm (1/8) plywood with 19 mm × 19 mm (3/4 × 3/4) flanges of aircraft quality spruce. The ribs are of 9 mm (3/8) balsa, covered on the leading edge with 1.6 mm (1/16) plywood to the level of the hounds and with 5 mm (3/64) plywood from the hounds to the tip. The after part of the wing is covered with terylene sailcloth adhered to the structure by applying Goodyear Pliobond. The whole of the wing surface is finished with a white durathane paint system. Some plywood ribs were used to carry the concentrated loads at the flap hinge points. There is a heavy concentration of loads at the pivot point, and on the lower part of the after section due to the torsion generated by the flap loads. Structural failures have occurred in both areas, but racing results were not affected. In design we applied a safety factor which varied from 1.5 in non critical areas to 2.5 at major load carrying points. The flap construction is similar.

The whole of the wing structure was designed on the simplest possible basis both to facilitate initial construction and also to enable quick repair in case of damage. This policy has paid off several times in competition. As a result of accidental damage we have had to repair different parts of the wing and since we used readily available materials throughout, repairs were effected simply and quickly.

The flaps are controlled by a simple bell crank attached to the leading edge with control wires leading down to a simple lever system at the base of the wing.

The total weight of the boat is a little over 318 kg (700 lbs). During the 1976 match we were competing with a boat which weighed under 227 kg (500 lbs) largely brought about by the use of a conventional rig. From the lessons learnt with this boat we believe that it is possible to reduce the weight of a boat with a wing mast rig to well under 273 kg (600 lbs). This will be essential for future competition.

OPERATION

In the operation of the boat the crew have very few controls to work. In this respect the initial design concept has been completely satisfactory. The main wing control systems consist of: