The Iambus2 Footy Design – David Wilkinson

Hull Design

Hull Type
Footy racing is a competitive sport where the object is to design a boat within the Footy Class Rules that goes faster than other Footy designs on average over the range of conditions experienced in a series of open events. Since actual weather conditions will vary from a flat calm to a near gale and boat attitude varies from run via reach to beat, there is no unique design condition and the boat design is a compromise intended to work well in most conditions. Use in unpredictable high winds, with gusts, rules out multi-hulls which often capsize and are not seaworthy.

The choice then is between heavy displacement and lighter displacement planing designs. General data in Larsson et al shows that the important parameter determining the ability to plane is the Length to displacement ratio (Lwl/Delta^1/3) which needs to be greater than about 5.7 for planing.

A typical successful Footy design might have a length of 0.305m and hull displacement of 450gm equivalent to 0.45kg or 0.00045 m^3. Then the Length to displacement ratio is 3.98. For the boat to exceed hull speed significantly and plane, this ratio needs to be above about 5.7. Since the length needs to be at or near the maximum allowed, this higher ratio can only be obtained by reducing the hull displacement to (Lwl/5.7)^3 = 1.53x10^-4m^3 = 153gm or less.
Adding on the displacement of the fin, rudder and lead this is still going to give a total weight of not much above 180gm. The lightest Footy designs seen so far have had all-up weights of about 300gm, so a planing design seems unlikely at the moment. Nor, if achieved, would it necessarily be faster. The small lead allowed to meet the total weight target would give very little righting moment in heel so not much sail could be carried on the beat and there would not be drive even though drag would be low. Downwind resistance to diving also would be low due to the small beam so small sails and a low drive would counteract low drag in this case as well. How this would actually come out requires some VPP studies, I have not done.

Since the weight of my hull, electrical gear, battery, rig, etc tends to come to about 200 gm using current methods of construction, leaving nothing over for the lead, some form of much lighter construction and components would be needed and this type of design remains theoretical.