The Iambus2 Footy Design – David Wilkinson

Hull lines

HullForm was used to turn the various design dimensions into an actual three-dimensional yacht hull shape. This is a very capable piece of software that can be used to design very complex shapes, if you know how to do it. Basically I did not know how to do it for the more complex things but this was mainly because I did not want to do them. As the American politicians say KISS (Keep it simple, stupid!) All the lines in HullForm are defined by equations and in order to get the final shape as fair and smooth as possible, to allow the water to flow easily and avoid separations, you need to use the minimum of lines and by implication the simplest equations.

The Iambus2 hull was generated using a round bilge and just two longitudinal lines, the gunwale and rocker lines. These are variously defined by the beam, freeboard and stem rake dimensions discussed above. Hullform generates the cross-section lines at a defined number of axial stations using Bezier curves which join the rocker and gunwale lines with the smoothest possible line. In the basic case it produces, the cross-section lines are horizontal at the rocker and vertical at the gunwale. This can easily be changed to give a different slope at each end if desired. Sloping in at the gunwale to give tumblehome could not increase maximum beam but would reduce deck beam. This would not have any obvious benefit but would prevent use of a single piece mould if a carbon or glass fibre hull was used. With tumblehome the mould would have to split on the longitudinal vertical centre plane. Vacuum forming would also be impossible as the plug would not come out of the formed hull. At the rocker sharp edges were to be avoided so horizontal was the way to get a smooth shape. So, the standard section shapes were the best as first generated.

As generated the rocker and gunwale lines were parabolic with uniform curvature along their lengths. Evaluation of statics showed the Cp was low at about 0.525 and the LCB was too far back. The way of changing these was to alter the curvatures at the bow and stern to multiples of the parabolic values. Firstly this meant increasing the curvatures roughly equally at both ends to pull the volume out towards the ends and increase the Cp. Secondly it meant increasing the bow curvatures more than the stern curvatures to pull the draft position forward and move the LCB towards the midship station. Trial and error was needed with these and with factoring the width and draft to get the right beam to fit in the box and displacement to reach the target value.