

## Checking the Immersion of Six Metres Using Flotation Sticks

### *Background*

The International Six Metre Class Rule is designed to assess the sailing length and hence speed potential) of our Sixes by measuring them when afloat. All of the length hull marks in the Rule are referenced to the plane of flotation.

This is the "LWL" in rated condition which means with all the specified equipment on board. The Rule assesses the length at 90mm above the LWL ( this is the L1 plane) because such is more representative of the sailing length but it also looks at the LWL to determine the minimum hull volume for a particular waterline length.

The primary reason for this Technical Note is that a Six Metre was purchased by an English owner last season and when its Rating was briefly checked by the RYA ( the British National Authority, who are the agency that have to issue a certificate for a British boat) some real and disturbing discrepancies were revealed.

Time did not permit the sorting out of this problem before the Cowes Regatta and I advised the owner to "throw himself at the mercy of the measurer" in order that he could take part in that event. Since that time I have tried to guide that owner as to how to assess the real floatation of his yacht and have now gone on to advise the changes that will be necessary for the boat to rate correctly.

To illustrate the degree of error this boat would currently rate around 6.17m ***without all the required gear on board***. This would require a Sail Area reduction of some 5m<sup>2</sup> in order to rate 6.00m which would mean a reduction of the mainsail foot of some 800mm - which is clearly an unacceptable solution.

It is the sheer scale of this deviation that is rather shocking - a few millimetres here and there might be put down to experimental error but in this instance we have far more than such.

A group of Members of the Technical Committee are currently trying to work out just how this lapse has occurred and p[revent future errors but in the meantime it seemed prudent to remind owners of their responsibilities under the Class Rule – **Rule 29**

***" It is the responsibility of the owner or his representative, to ascertain from time to time, by inspection of the marks, whether the immersion of the yacht has from any cause whatever become such as to render the certificate invalid."***

## ***The Problem***

With any Six or Twelve (which both have very flat overhangs), it is very difficult indeed to check flotation by looking at just the marks on the hull, so since the middle 1980s all my Six and Twelve Designs have been fitted when new with flotation sticks as drawn.

These might be simply made of say four bits of 10mm by 100mm by 1000mm plywood with a bolt hinge at stem and stern - or use metal rules for the verticals as previously suggested. The set up may be very simply affixed to the bow and stern by PVC sticky tape.

There are two ways these may be employed:-

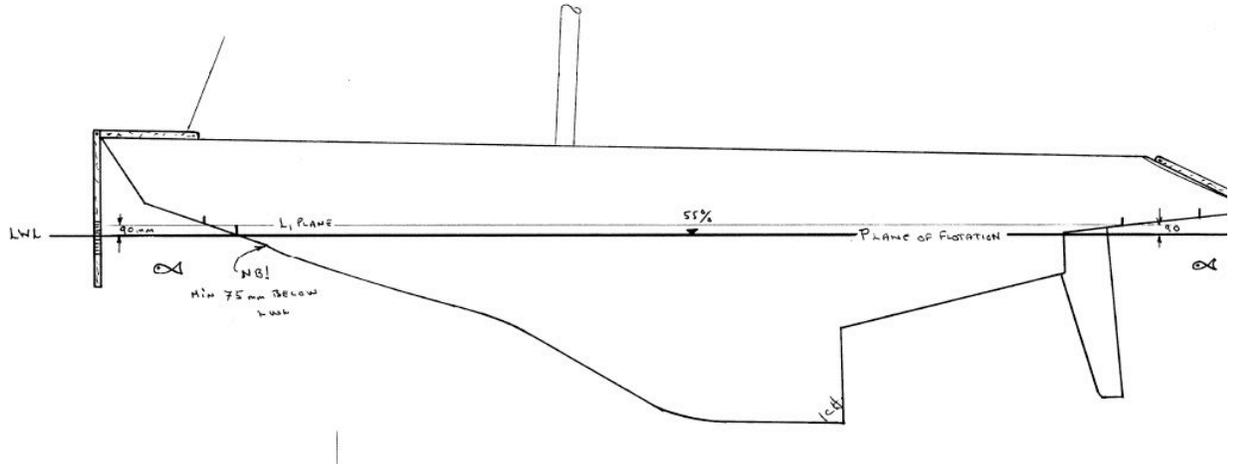
**1.** Put the boat in the water ( must be very smooth and should be salt water - SG 1.025) with all the required gear and mark the sticks ( a tape on the side can be viewed through binoculars). If in fresh water allow 11mm deeper flotation. Check that the sticks are sitting vertically in the water.

When the boat is next lifted, level the boat to the flotation marks and then sweep in the LWL marks - all the hull length measurers then follow from here.

A theodolite is generally thought to be the best instrument for pacing marks but an accurate laser level or even a carefully used water level can be made to work.

**2.** For a boat that already has marks on the hull. On the dock, level the boat exactly (within 1mm) fore and aft and athwartships to the marks on the hull. Project the LWL and L1 marks out to the flotation sticks. When next back in the water check that the end flotation marks are not immersed.

If the marks are at the waterline as would be expected then all is well and the owner can be confident that the boat floats correctly. If not, action needs to be taken as the rating is invalid. In this instance mark the sticks and perhaps ask for help in making adjustments.



The diagram that accompanies these notes also shows an "N.B." just below the LWL. If a boat has an inflexion in its profile below the LWL but within 75mm of the LWL plane then the LWL that is to be taken for Rule purposes ( calculation of minimum volume) must be the LWL derived from a bridging as per Measurement Rule M18. If there is an inflexion then the Certificate should contain a noted addition to the LWL and associated displacement.

It may well be that for major Regattas, a procedure involving flotation sticks may have to be introduced for the checking of Modern Sixes, so please ensure that your boats are correct before such takes place. We would much appreciate any feedback regarding any discrepancies that come to light so that other owners of similar boats can be notified of a possible problem. Fixing most problems should not be too difficult but as in the case above may well involve plastic surgery in the region of the nose!

Have a good new season  
 Ian Howlett  
 Chairman of the ISMA Technical Committee  
 April 2008  
 Oxford

