FLYING SAILS RATINGS STUDY – DRAFT

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The purpose of this study is to develop a method for predicting the change in racing sailboat performance when there is no flying sail (spinnaker). The Offshore Office of US SAILING is executing the project for PHRF Lake Ontario.

A sub-fleet of 30+ boats, all representative of the Lake Ontario fleet, has been created from the US SAILING database of boats measured for any of the various VPP rules administered by US SAILING. The boats in this fleet were selected because their performance characteristics broadly cover those of the PHRF Lake Ontario fleet itself. These characteristics include Sail Area Displacement Ratio, Displacement Length Ratio, etc. The sail dimensions for the boats in the database have been altered to meet the standard values of the Lake Ontario fleet. Figure 1 shows the selected fleet (red circles) as distributed throughout the entire fleet. The horizontal axis is waterline length, the vertical is displacement length ratio.

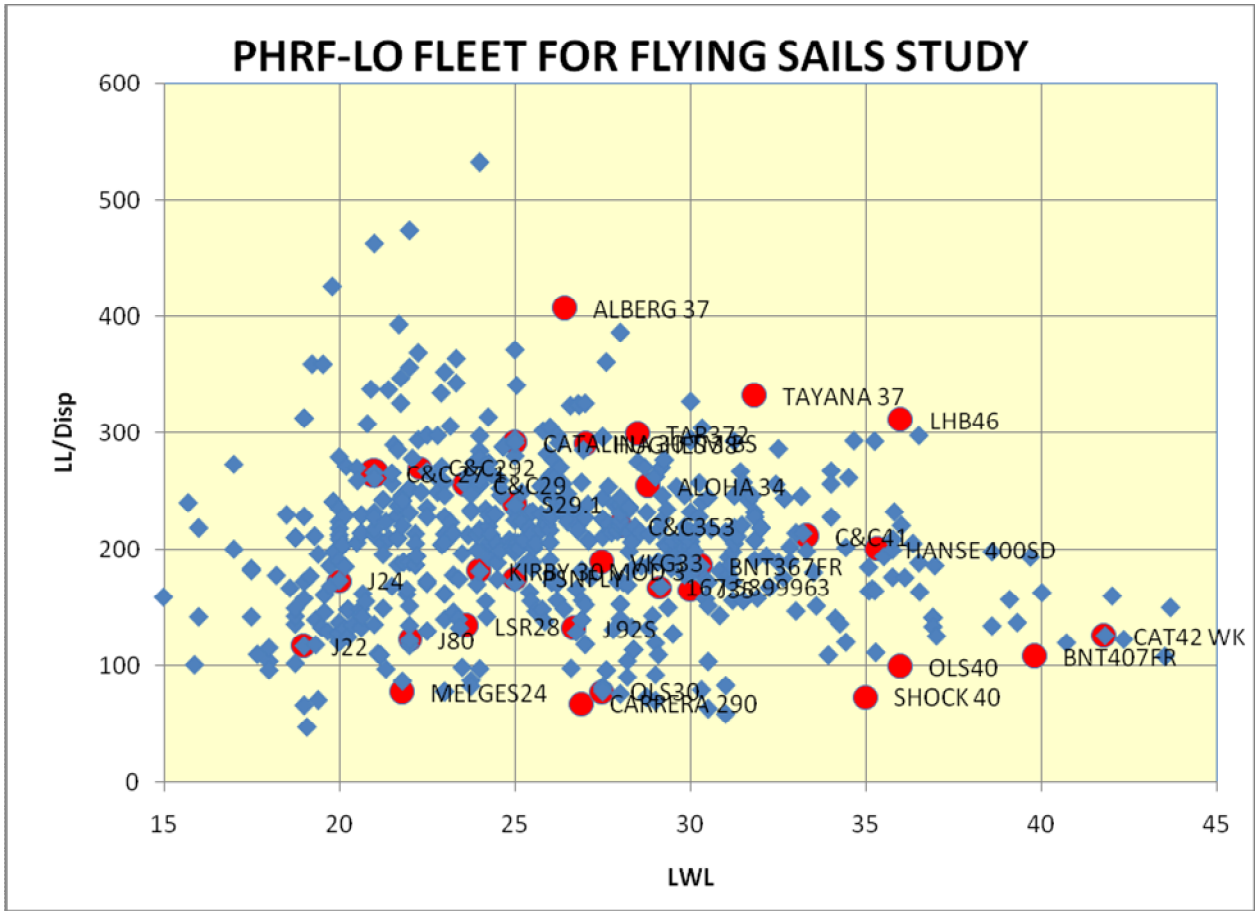

Figure 1.

The ORR VPP was executed for each boat, both with and without spinnakers. The sec/mile differences in performance were tabulated for several established ratings. An initial predictive algorithm has been developed to provide estimates of these differences in performance. The intent is that this algorithm can then be used for any boat in the Lake Ontario fleet. The inputs to the algorithm are standard measurements found on any PHRF certificate.

Figure 2 shows the differences in rating, expressed in sec/mile, for the sub-fleet. The rating in this example is GPH, the general purpose handicap. This can be considered a random buoy rating as it assumes equal time sailing at all wind directions (the equivalent of sailing in a circle.)

The blue diamonds show the original differences as calculated by the VPP. The red squares are the differences as predicted by the new algorithm. The green triangles display the error defined as the discrepancy between the predictions from the VPP and the algorithm.

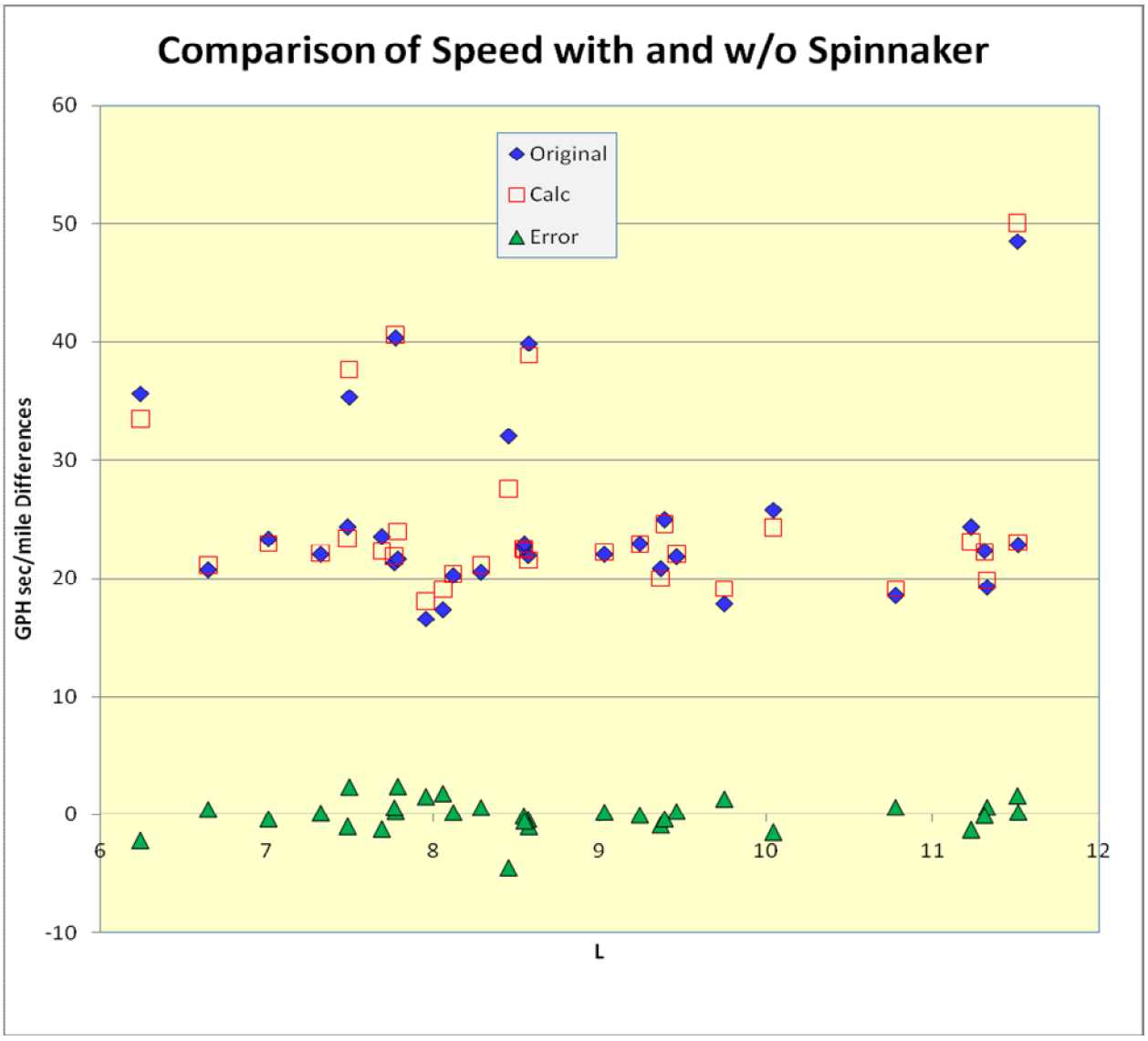

Figure 2. GPH Rating

For the general purpose handicap, the algorithm is working quite well for the sub-fleet. The largest discrepancy is aobut 4.4 sec/mile for the Carrera 290. The standard deviation of the errors is 1.44 sec/mile. This means that almost all the errors are within 2 standard deviations, 2.88 sec mile. This is close to that PHRF minimum rating change of 3 sec/mile, a very encouraging result.

Figure 3 shows the results for WL10, a windward leeward course in 10 knots of wind. Note that the speeds here are VMG sec/mile, not actual boat speed. The coefficients for WL10 are entirely different from GPH. The algorithm does not predict the VPP differences as well as for the GPH rating, but still works reasonably well.

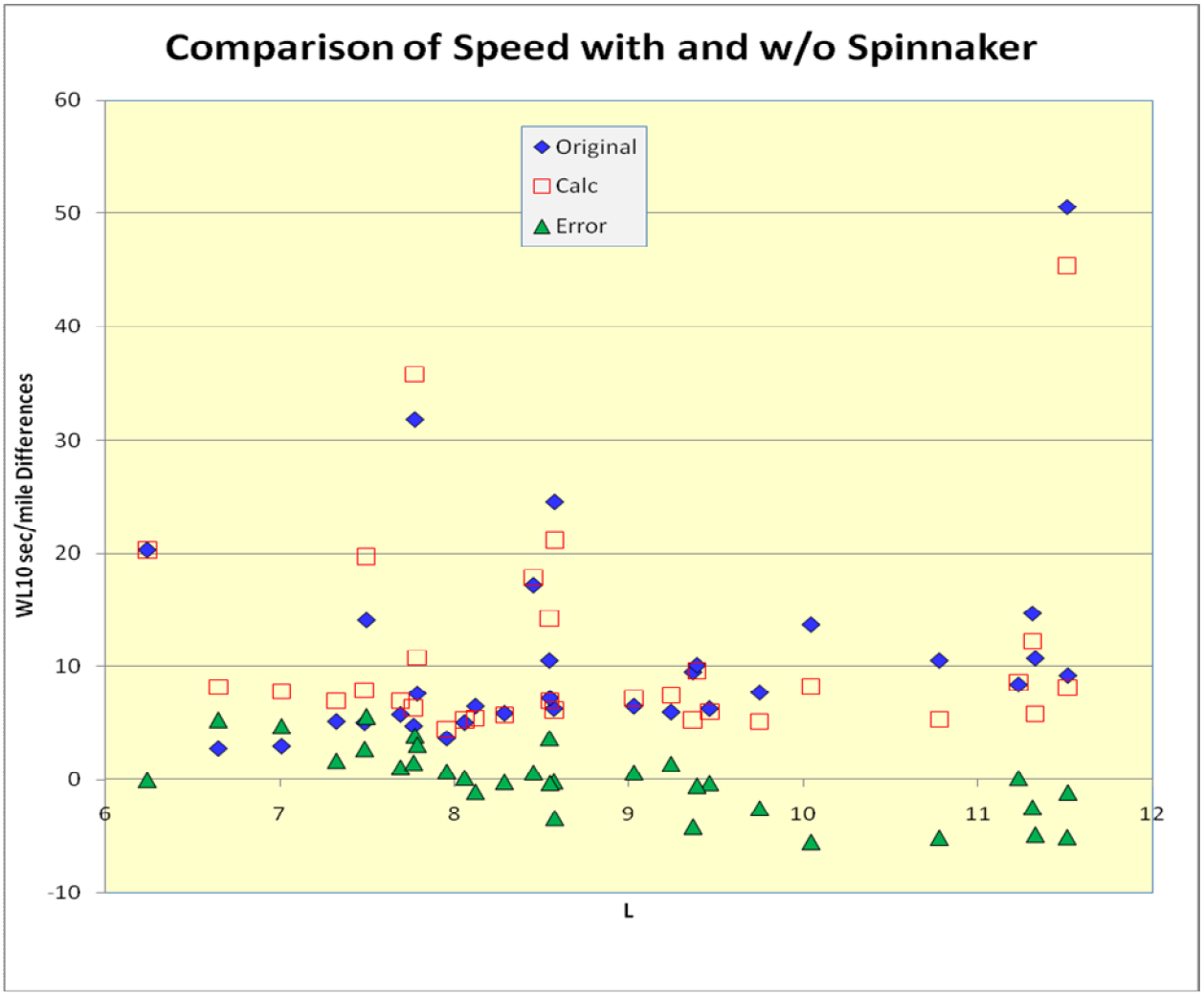

Figure 3.

A separate Excel spreadsheet with sample calculations will be sent along with this report. The spreadsheet allows you to input your own PHRF differences for any boat you wish for the two current ratings: GPH and WL10.