

Analysis Tools – Imputed Handicaps and their Graphic Display

There are two performance handicap systems in the United States that estimate speed potential by empirical methods for racing sailboats and render numbers (handicaps) for scoring races. These are the North American Portsmouth System and the United States Performance Handicap Fleet.

The latter system, USPHRF, developed an evolving methodology for estimating the handicap sailed for a boat within a given race and a way to visualize the performance in a graphic manner. See the [Graphic Display of Imputed Handicaps](#) spreadsheet for examples.

The methodology is the work of many contributors beginning with Steve Strong and Steve Hill almost twenty years ago and continuing with Mark Mahowald, John Collins, Bob Warnecke, Bruce Bingman and Paul Ansfield during that period.

The methodology relies on the use of a real or phantom boat which is the basis for comparison data used to generate an estimate of the (Imputed) handicap sailed by a boat during a race.

It can be argued that no matter which comparison standard is used, real or phantom, the findings of either are close, relatively and can be used to graphically view how a boat performs in one race or many against its actual handicap or how the boat type performs in a local or regional USPHF affiliated fleet.

A “real” comparison boat should be a boat that sits at the upper twenty fifth percentile rank (E.g. third place in a fleet of 12 boats). Boats finishing in this position have a likelihood of performing well and placing in many of the events they race.

Variants of this do exist that eliminate the super competitive boat and throw out the lower 40% of the fleet. The remaining data is used to pick the comparison boat at the twenty fifth percentile of the remaining fleet, but this really applies best to large sections of racing boats with a narrow range of handicaps. (Contact PHRF Committee Vice Chair [Paul Ansfield](#) for details)

A popular is the technique for specifying a “phantom” comparison boat which is based upon the averaging elapsed time and handicap data from of the top three finishers. An imputed handicap then is a function of these averages, a boat’s actual handicap and the phantom comparison boat’s elapsed finish time divided by the sum of the course length in nautical miles and the phantom boat’s handicap.

Spreadsheets are constructed to compute the imputed handicap and yield data for graphic comparisons of performance. A copy of the [Graphic Display of Imputed Handicaps](#) can be used for such comparisons.

All of this is not immutable. Number crunchers, amateur mathematicians, super statisticians, and sailing scientists are never satisfied with the level of exactitude of these techniques for determining an imputed handicap. Development continues. What is valuable and viable is a simple empirical methodology exists that works, uses easy calculations within spreadsheets, is not difficult to understand and displays a picture of racing performance through presentation of related graphs.