

# PEYC Rolling Handicap System

## Introduction:

Port Edgar YC has used a Rolling Handicap (RH) system since 1995, applying it to the majority of club races. It tracks the achieved performances of boats and adjusts handicaps after each race to encourage the 'middle-of-fleet' racers, challenge the fast boats and keep the series results closer together. The RH rules are defined in the Sailing Instructions.

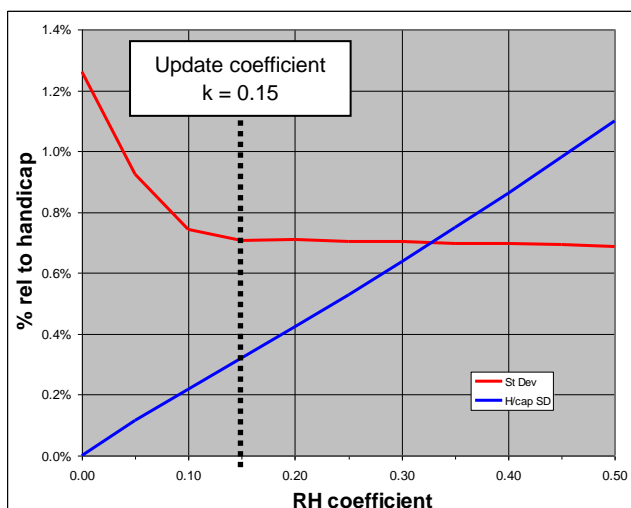
## PEYC 2014 Sailing Instructions 1.16(b):

*The Rolling Handicap (RH) of each boat shall be updated after every race at PEYC. The achieved performance of each boat shall be calculated using the RYA YR2 Standard Corrected Time (SCT) for the race, provided that at least two boats contributed to the SCT. The boat's new RH value shall be shifted 15% from its current RH towards its achieved performance. 'Slow' performances shall be capped at +5% relative to a boat's standard handicap for update purposes but no RH change shall be applied until two or more consecutive slow performances occur. 'Fast' performances shall be capped at -5% relative to a boat's standard handicap for update purposes.*

Hence:  $H' = H + k(P-H)$  where  
H' & H are the revised & current handicaps  
P is the achieved performance in race  
k is the update coefficient (currently 0.15)

The +5% and -5% capping boundaries prevent RH values diverging more than 5% from a boat's standard handicap. The requirement for a boat to have two or more consecutive slow results (i.e. >+5%) before applying an RH change, filters out sporadic atypical performances due to major crew mistakes, 'wind-tide gate' situations or significant wind strength changes after the leading boats have finished. In control engineering terms, the RH algorithm is a bounded Butterworth filter with rejection of intermittent positive spikes.

The RH update coefficient is selected to minimise average performance spread across a fleet for the minimum of handicap variation or 'noise'. That is to minimise how much handicaps jump about for individual boats. The graph below shows the reduction in standard deviation of the average assessable performances (i.e. in range -7.5% to +5%) across a fleet as the update coefficient k is increased. From 1.3% SD at k = 0, it reduces to 0.7% SD at k = 0.15 but shows little further improvement as k increases. Meantime the standard deviation of RH variability (i.e. handicap 'noise') increases linearly from 0% at k = 0. The RH coefficient k was initially set at 0.25 in 1995, reduced to 0.20 in 1996 and to 0.15 in 2001.



This analysis was based on the first seven years of running the RH system at PEYC and the update coefficient of 0.15 appears to be optimal.

Overall, the PEYC RH system is simple enough to understand, subtle enough to generate closer competitive club racing and is well supported by the membership.

*Jim Scott - PEYC Sailing Secretary*