Handicap Recalculations

After each seasonal series race day the personal handicaps for each race participant are recalculated for the next race day of the series. Each member in is in one of three divisions: A, B or C, and each has a personal handicap that is a multiple of 10 seconds between 0 and 70 for C division, 0 to 50 for B division, or 0 to 30 for A division. The allocation of members to divisions is done after two seasonal series.

There are six races on a race day alternating between scratch races and handicap races. The first two handicap races use the personal handicap allocated to the member, the final race uses a divisional handicap where all boats in a particular division are given the same start time handicap, usually 70, 40 and zero for divisions C, B and A respectively.

The scoring of each race is that the member is given a score that is their finishing place, the winner getting a score of 1. There is a maximum score of 10 which also applies to DNF. If fewer than 10 boats have raced on the day then a DNF will be given a score of the number of boats. DNS or DSQ are given a score of 11. One race can be discarded to give the final score for the day. If fewer than six races are sailed due to weather then the scores are scaled upwards.

The results for the final, divisional start, race count towards the seasonal series and also to another score which is effectively a separate scratch race series for each division.

The recalculation of the personal handicaps is done for those members that raced on the day using the scratch race results only. These are added together and will be in the range 3 to 30 if one member has won all three scratch races and another has finished 10th or worse. More likely the range will be, say, 8 to 28.

The spread of the handicaps among the boats that competed on the day will be 0 to 70 if at least one C division boat has competed, 0 to 50 if just A and B boats have raced or 0 to 30 if there were only A division boats.

Each boat's score in the scratch races will be scaled to fit the spread. In the example of scores 8 to 28 with all divisions racing the calculation would be:

$$(score - 8) * (70 / (28 - 8))$$

This is rounded to the nearest 10 seconds. Each result is then compared to the member's current handicap. If there is a difference then the new handicap is moved towards the result by 10 seconds.

However, it takes two adverse results to get an increase in handicap so a '+' is recorded on the first occasion and the increase is only done if the '+' had been previously marked. A result less than the current handicap will give a decrease in handicap immediately and will remove any '+' mark. An equal result will remove a '+' mark but will not change the handicap.

Actual example: With 15 boats racing the scratch race scores varied from 6 (two wins and a 4th) to 30. The scale factor is 2.91666666667. The score has 6 subtracted then multiplied by factor.

```
MinMax 6 30 24 2.91666666667
Boat Score Hcap result round newHcap
   1    10    20  11.67    10     *10
   3    21    10  43.75    40     10+
   4    30    60  70.00    70     60+
   6    28   20+  64.17    60     *30
  12     9    50   8.75    10     *40
  15    19    30  37.92    40     30+
  24    28    60  64.17    60      60
  30    10   10+  11.67    10      10
  33    18     0  35.00    40      0+
  37    29   50+  67.08    70     *60
  70    22    20  46.67    50     20+
  85    24    40  52.50    50     40+
  99    29    50  67.08    70     50+
 104    18   30+  35.00    40     *40
 196     6     0   0.00     0       0
```

This calculation is done by a Python program that reads: a file of boats holding the number, active status, name and division; a file of current handicaps; and a result file of the boats that raced with their scratch race score. It prints out a new complete handicap list of all active members and writes a new handicap file to be used for the next racing day's recalculation.

For most seasonal series race days, referees are assigned for each race. These get an average score of their other races after discarding one. They are required to alternate between refereeing a scratch race and a handicap race to ensure that these are fairly distributed.

The program maintains these refereeing positions, entered into the results file, and recorded on the new handicap file and listing.