# **Scoring Analysis: Worst Score Discarded**

Clark E. Chapin US Sailing National Judge

## **Background**

The default scoring system in the Racing Rules of Sailing (Appendix A) includes the provision that "Each boat's series score shall, subject to rule 90.3(b), be the total of her race scores excluding her worst score..." (RRS A2.1) Most regattas are scored this way after a certain number of races are completed, but that number varies from event to event.

A mid-regatta discussion among judges at a recent event led to a debate whether discarding a boat's worst score led to a fairer or more unequal ranking. A central point of the discussion was whether discarding a boat's worst score, in effect, penalized consistency. A related question was how often the discarded scores affected the results, particularly at the top of the standings.

Whether the "podium finishes" are affected is a particularly important point if the event is a qualifier for a subsequent event, since a goal of the competition is to select an entrant for the next level who has the greatest probability of success.

## **Investigation**

To investigate the effect of discarded scores, fifteen 2019 regattas were selected for analysis. With a single exception, each regatta had at least 20 entrants. The events were in popular classes and in two cases were qualifiers for the World Youth Championships. The fifteen events had a total of 591 entrants and 132 races.

The scores for each event were downloaded into an Excel spreadsheet and the gross (all races counted) and net (worst race score excluded) rankings were determined.

To calculate "consistency" the variance of each boat's scores was calculated. The variance ( $\sigma^2$ ) of a population is the average of the squared distance from the mean:  $\sigma^2 = (\sum (x-\overline{x})^2)/n$  where n is the number of races and  $\overline{x}$  is the boat's mean score.

#### Data

The results for the regattas are shown on the following page and are attached as an embedded Excel workbook:

# **Scoring Analysis: Gross vs. Net Scores**

2019 Regatta	Entrants	Races	Original Scoring	Benefited	Penalized	Unaffected	Podium Affected?
C420 NAC	47	11	Net	19	16	12	Yes
F18 NAC	23	9	Net	3	4	16	Yes
Finn Nat	34	6	Net	8	10	16	Yes
Hobie 16 Nat	35	10	Net	6	6	23	No
1420 NAC	34	8	Net	11	8	15	Yes
I420 Youth Champs	19	11	Net	3	4	12	Yes
1470 NAC	33	9	Net	10	6	17	No
J70 Corinthian Nat	36	8	Net	7	6	23	No
Laser Nat	55	9	Net	20	11	24	Yes
Laser Radial Nat	89	9	Net	31	36	22	Yes
Laser Radial Youth Champs	39	11	Net	6	7	26	Yes
Lightning NAC	35	5	Gross	11	14	10	Yes
Melges 24 NAC	41	6	Net	11	13	17	Yes
New York YC IC	20	12	Gross	2	2	16	Yes
Snipe Nat	51	8	Net	10	12	29	Yes

591 132 158 155 278 15 27% 26% 47%

An image of one of the event spreadsheets (F18 North American Championship) appears below:

Rank Net	Rank Gross	Rank Diff	Sail No.	Race 1	Race 2	Race 3	Race 4	Race 5	Race 6	Race 7	Race 8	Race 9	Gross	Net	Variance
1	1	0	USA 225	3	1	2	1	24	1	1	1	1	35	11	57.36
2	4	-2	USA 7	1	4	1	24	1	3	2	3	6	45	21	53.50
3	2	1	USA 1615	5	5	7	4	2	7	7	2	3	42	35	4.25
4	3	1	CAN 69	4	3	6	3	7	6	5	5	4	43	36	1.94
5	5	0	USA 44	8	9	5	6	5	4	12	4	2	55	43	9.36
6	6	0	USA 192	7	2	14	2	13	11	8	7	11	75	61	19.00
7	7	0	USA 5204	13	11	4	11	4	2	11	8	12	76	63	16.78
8	8	0	USA 37	2	8	20	8	8	9	6	14	8	83	63	25.94
9	9	0	USA 1193	6	10	11	13	12	16	4	11	7	90	74	14.00
10	11	-1	CAN 17	20	15	15	7	3	8	3	12	13	96	76	33.75
11	10	1	USA 137	12	6	8	5	10	15	15	9	15	95	80	15.28
12	12	0	USA 11	16	16	3	12	6	12	10	10	14	99	83	19.00
13	13	0	USA 155	9	7	19	16	14	17	9	13	5	109	90	23.36
14	14	0	USA 232	10	12	9	9	15	21	13	19	24	132	108	30.25
15	15	0	USA 1997	11	19	24	18	19	5	14	21	9	140	116	38.53
16	17	-1	USA 317	21	21	24	15	11	13	17	6	17	145	121	31.36
17	16	1	USA 1700	14	17	10	14	16	18	21	16	18	144	123	9.75
18	18	0	USA 315	19	23	17	10	9	20	16	15	21	150	127	22.75
19	19	0	USA 217	23	22	16	17	17	14	18	18	10	155	132	15.19
20	20	0	USA 218	18	18	12	24	24	10	19	17	16	158	134	22.03
21	21	0	USA 29	15	13	18	19	18	19	20	23	19	164	141	8.19
22	22	0	USA 2576	17	14	13	20	20	22	22	22	20	170	148	11.86
23	23	0	USA 129	22	20	21	24	24	24	24	20	22	201	177	3.00
Source:	Source: https://yachtscoring.com/event_results_cumulative.cfm?eID=6144														
3	3 Teams Benefited														
4 Teams Penalized															
16 Teams Unaffected															

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**Totals:** 

## **Scoring Analysis: Gross vs. Net Scores**

In this case, the second-place finisher in the rankings with the worst race score discarded would have dropped to fourth place if all scores were included. The values in the column "Rank Diff" shows the effect of discarding the worst score. A negative number with a green background indicates a benefit (position improved) while a positive number with a red background indicates that a boat's ranking moved downward when the worst score was discarded.

The 2019 Lightning North American Championship was originally scored without discarding a boat's worst score because only five races were completed, which was an insufficient number. In this analysis, it was re-scored by discarding each boat's worst score.

The 2019 New York YC Invitational Cup was created with the intention of using all scores. Again, in this analysis, it was re-scored by discarding each boat's worst score.

The 2019 Laser Radial Nationals (Lauderdale Yacht Club, January 11-14) was particularly notable:

- The top five finishers (based on net score) all benefitted by an average of more than four places due to the discarded score. The second and third place finishers would have dropped to seventh and eighth, respectively, if all score had been included. The fifth-place finisher would have dropped to twelfth.
- Even though a quarter of the competitors (22 out of 89) did not have their ranking affected, six of those 22 entered the event, but did not compete in a single race and were therefore tied for last place.
- The highest-ranking competitor on gross score dropped to sixth when the worst score was discarded.

Rank Net	Rank Gross	Rank Diff
1	2	-1
2	7	-5
3	8	-5
4	9	-5
5	12	-7
6	1	5
7	5	2
8	3	5
9	14	-5

In none of the other events did the discarded worst score make so large a difference.

## **Analysis**

For roughly half of the 591 entrants in the ten regattas (47%), including all scores or discarding the boat's worst score made no difference in their overall ranking. The remaining competitors are evenly split between those who benefited and those who were penalized (27% and 26%, respectively)

For twelve of the fifteen events, excluding a boat's worst score affected the first through third place finishers. Either the order of ranking or whether a boat achieved one of the first three positions was affected. In other words, whether or not a score was discarded affected the top positions in 80% of the events that were studied.

In twelve of the fifteen events studied, a more consistent team had their final ranking adversely affected by the default practice of discarding a boat's worst score under rule RRS A2.1.

## **Scoring Analysis: Gross vs. Net Scores**

## Recommendation

In those events that serve as qualifiers for the next level of competition and the goal of the Organizing Authority is to select the entrant with the best chance to win or perform well at the next level, consistency should be rewarded and, in those events, a boat's worst score should not be discarded.

## **Attachment:**



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