



SNIPE CLASS

Mahón Word Championship 2026

Comparative Study of Final Classification against Boat, Equipment and Fleet Variables

Technical Report

Dataset: MAHON_CHAMPIONSHIP_2026.xlsx — 88 boats, 21 nations, 22 recorded attributes

Report date: October 2026

Scope: statistical comparison of the championship classification with build year, hull weight, moment of inertia, corrector weights, centreboard and rudder values, hull builder, sailmaker and nationality. Associations reported here are descriptive and do not by themselves establish cause and effect.



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Executive Summary

This report analyses the measurement and equipment records of the 88 boats that completed the Snipe Mahón Championship 2026 and compares each recorded item against the final classification. The objective is to identify which boat and equipment characteristics, if any, are associated with a better or worse placing, and to quantify how strong those associations are once the composition of the fleet is taken into account.

The central finding is that **equipment variables explain only a modest share of the classification**. Taken together, the six technical variables (age, hull weight, moment of inertia, corrector weight, centreboard and rudder) account for about 18.5% of the variance in final rank (adjusted $R^2 = 0.117$). The single strongest predictor in the dataset is not a technical item at all but whether the crew belongs to the **host Spanish fleet**: Spanish boats finished with a median rank of 20 against 53 for visiting boats, and adding this factor almost doubles the explanatory power of the model ($R^2 = 0.334$).

Key findings

- **Boat age** is the only technical variable with a robust, statistically significant association: newer boats tend to finish higher (Spearman $\rho = +0.28$, $p = 0.009$). In the multivariate model each additional year of age is associated with about 0.8 positions lost, holding the other factors constant.
- The effect of age is **not absolute**: a 1993 Persson hull finished 6th and a 2012 DB Marine hull finished 5th, while several 2025–2026 boats finished outside the top 60.
- **Hull weight, moment of inertia, corrector weight, centreboard and rudder** show weak associations that are not statistically significant once a single outlier (a 184 kg hull) is removed. The fleet is tightly clustered near the class minimums, which limits the differences these items can make.
- **Hull builder and sailmaker** do not differ significantly in median classification (Kruskal–Wallis $p = 0.60$ and $p = 0.48$). Mas Marine took first and second place, and DB Marine placed the most boats in the top 20 (seven), largely in proportion to its fleet share.
- Top-ten boats tended to use a **single sailmaker** for all four declared sails (90% versus 61% in the bottom tier), and carried somewhat less corrector weight (median 5.5 kg against 8.0 kg), but neither difference reaches statistical significance.
- **Nationality** differs strongly ($p < 0.001$). Spain placed five boats in the top ten; Italy and Great Britain had no boat inside the top 50. Bow numbers were allocated by nation, which is why bow number appears correlated with rank.

The practical reading for sailors, measurers and class officials is that, within a fleet measured to a tight one-design rule, **crew skill, preparation and local knowledge dominate the outcome**, while the hull, its weight distribution and the choice of builder or sailmaker play a secondary role. A modern, well-prepared boat appears to provide a small but measurable advantage, mostly visible at the extremes of the age range.



1. Introduction and Objectives

The Snipe is a two-person, one-design racing dinghy governed by class rules that control hull shape, weight, weight distribution and equipment. Because the rules are designed to equalise boats, a recurring question among competitors is whether any residual differences in equipment — the age of the hull, how close it sits to minimum weight, where correctors are placed, or which builder and sailmaker are used — still translate into results on the water.

The championship organisers recorded a measurement profile for every entered boat. This document uses that record to carry out a systematic comparative study between the final classification and each of the other items in the file. The study has four specific objectives:

- Describe the fleet and the distribution of every recorded attribute.
- Measure the association between final classification and each numeric attribute, individually and jointly.
- Compare classification outcomes across categorical groups: hull builders, sailmakers, construction periods and nations.
- Identify data quality issues in the source file and propose improvements for future measurement records.

The report is organised so that each section addresses one family of variables. Section 2 describes the data and methodology; Section 3 gives a general overview of the fleet; Sections 4 to 10 present the comparison of the classification with each item; Section 11 integrates the variables in a multivariate model; Section 12 profiles the top ten; and Sections 13 and 14 discuss limitations and conclusions. The full cleaned dataset and the list of data corrections are provided in the annexes.



2. Data and Methodology

2.1 Source file

The source is a single worksheet containing 88 boat records plus a summary row of averages, which was excluded from the analysis. Each record holds 22 fields. The final classification runs from 1 to 88 without ties or gaps, so it can be treated as a complete ordinal ranking of the fleet. Table 1 summarises the fields and how each was used.

Table 1. *Fields in the source file and their treatment.*

Field (original)	Interpretation	Type	Use in this study
CLASIFICACION	Final championship position	Ordinal 1–88	Dependent variable
BOW #	Bow number assigned at registration	Integer	Checked for allocation pattern
SAIL NUMBER	Sail number with nation prefix	Text	Nation derived from first 3 letters
HULL NUMBER	Builder hull number	Integer	Compared with sail number
MC LINK	Link to measurement certificate	URL	Not analysed
SKIPPER / CREW	Crew names	Text	Identification only
AÑO FABRICACION	Year of construction	Year	Age = 2026 – year
PESO CTO	Certified hull weight	kg	Numeric comparison
Momento Inercia	Moment of inertia	As recorded	Numeric comparison
Lastre A–E	Corrector weights by position	kg (sums parsed)	Per position and total
ORZA	Centreboard value	As recorded	Numeric comparison
PESO TIMON	Rudder weight	kg	Numeric comparison
MAYOR 1/2, JIB 1/2	Declared sailmakers	Category	Brand and consistency
BUILDER	Hull builder	Category	Group comparison

2.2 Data preparation

Several fields were stored as text with mixed conventions and had to be normalised before analysis. Decimal commas were converted to points, and corrector entries written as sums of individual weights (for example “2,5+2,6” or “3x(0,5+1)”) were evaluated arithmetically so that each position yields a single total in kilograms. The total corrector weight for each boat is the sum of positions A to E. Sailmaker names were harmonised (“QUAMTUM” was read as Quantum) and builder names were standardised in capitalisation.

Four values were judged inconsistent with the rest of the column and were corrected or excluded as listed in Annex B. Two inertia values lacked the decimal separator (271033 and 271240) and were read as 271.033 and 271.240; one was recorded as “>271” and was treated as 271.0; one corrector entry of 2615 kg is physically implausible and was excluded, leaving that boat without a total corrector figure. Missing values were left as missing; no imputation was performed.

2.3 Statistical approach

Because the classification is an ordinal ranking and several variables are skewed or contain outliers, the primary measure of association is the **Spearman rank correlation coefficient (ρ)**. Pearson coefficients are reported



alongside for completeness. In this report a positive coefficient means that higher values of the variable go with a numerically higher, that is **worse**, finishing position.

Group comparisons use non-parametric tests: the **Kruskal–Wallis** test for three or more groups (only groups with at least three boats enter the test) and the **Mann–Whitney U** test for two groups. To make the results readable, the fleet was also divided into four classification tiers: Top 10, 11–30, 31–60 and 61–88. Finally, an ordinary least squares regression of rank on the technical variables was fitted to estimate the joint explanatory power and the effect of each variable while holding the others constant. The conventional threshold of $p < 0.05$ is used for statistical significance, with 0.05–0.10 described as marginal.



3. Fleet Overview

The championship gathered 88 boats from 21 nations. Spain was the largest delegation with 17 boats, followed by Brazil and Japan (9 each), the United States (8) and Italy (7). The fleet is predominantly modern: the median construction year is 2021 and 39 boats (44%) were built between 2022 and 2026, but it also contains a long tail of older hulls, the oldest dating from 1990.

Table 2. Descriptive statistics of the numeric variables.

Variable	Unit	n	Mean	Median	Std. dev.	Min	Max
Year of construction	year	85	2016.15	2021.00	10.21	1990.00	2026.00
Age in 2026	years	85	9.85	5.00	10.21	0.00	36.00
Hull weight	kg	88	174.48	174.25	1.64	172.60	184.00
Moment of inertia	as recorded	85	277.30	273.73	8.31	271.00	310.00
Total correctors	kg	83	6.63	7.20	3.56	0.00	13.22
Centreboard	as recorded	84	920.86	925.00	15.84	825.00	940.00
Rudder weight	kg	88	3.07	3.01	0.23	2.74	4.40

The technical measurements are tightly concentrated, which is expected in a strict one-design class. Hull weight has a standard deviation of only 1.64 kg around a median of 174.25 kg, and 13 boats sit at or below 173.0 kg. The moment of inertia clusters strongly at around 271–275, with 30 boats at 272 or lower; a handful of hulls show markedly higher values, up to 310. Corrector weights are more variable, from zero to just over 13 kg, reflecting how much ballast each hull needs to reach the required weight and distribution.

Four builders account for most of the fleet: DB Marine (27 boats), Persson and Zeltic (16 each) and Mas Marine (12). On the sail side, North is the most common mainsail maker (30 boats), followed by Olympics (22), Pires (15) and Quantum (11). These proportions matter for interpretation, because a builder or sailmaker with many boats will naturally appear more often in the top positions.

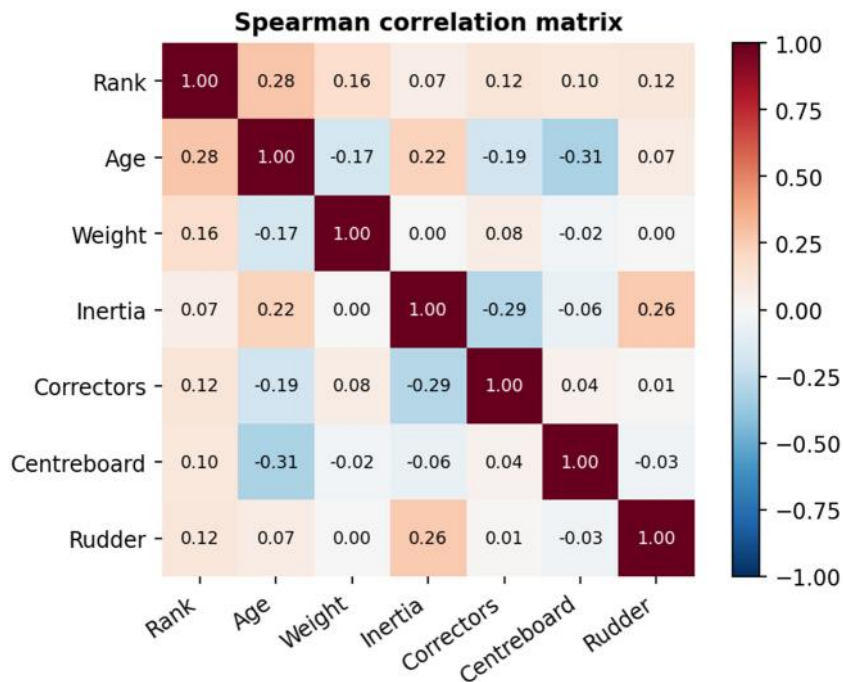


Figure 1. Spearman correlation matrix between classification and the technical variables. Values close to zero indicate little or no monotonic relationship.

Figure 1 shows that the technical variables are only loosely related to one another. The strongest links are between age and centreboard value (older boats tend to have lower centreboard values, $p = -0.31$) and between inertia and corrector weight (boats with higher inertia carry less corrector weight, $p = -0.29$). The low mutual correlations reduce the risk that one variable is simply standing in for another in the multivariate analysis.



4. Overall Association between Classification and Each Item

Before examining each item in detail, Table 3 and Figure 2 summarise the correlation of every numeric field with the final classification. This provides a single view of which items deserve attention and which show essentially no relationship.

Table 3. Correlation of each numeric item with final classification (positive = worse placing).

Item	n	Spearman ρ	p-value	Pearson r	p-value	Significant
Boat age	85	+0.281	0.009	+0.284	0.009	Yes
Hull weight	88	+0.165	0.125	+0.239	0.025	No
Moment of inertia	85	+0.068	0.537	+0.030	0.787	No
Total correctors	83	+0.124	0.265	+0.109	0.328	No
Corrector A	84	-0.024	0.829	-0.033	0.768	No
Corrector B	84	-0.079	0.475	-0.044	0.692	No
Corrector C	83	+0.179	0.106	+0.186	0.092	No
Corrector D	84	-0.071	0.520	-0.015	0.889	No
Corrector E	84	-0.088	0.425	-0.043	0.699	No
No. corrector positions	88	-0.077	0.478	-0.071	0.513	No
Centreboard	84	+0.104	0.345	-0.073	0.511	No
Rudder weight	88	+0.116	0.284	+0.194	0.069	No
Hull number	88	-0.289	0.006	-0.254	0.017	Yes
Bow number	87	+0.393	0.000	+0.393	0.000	Yes

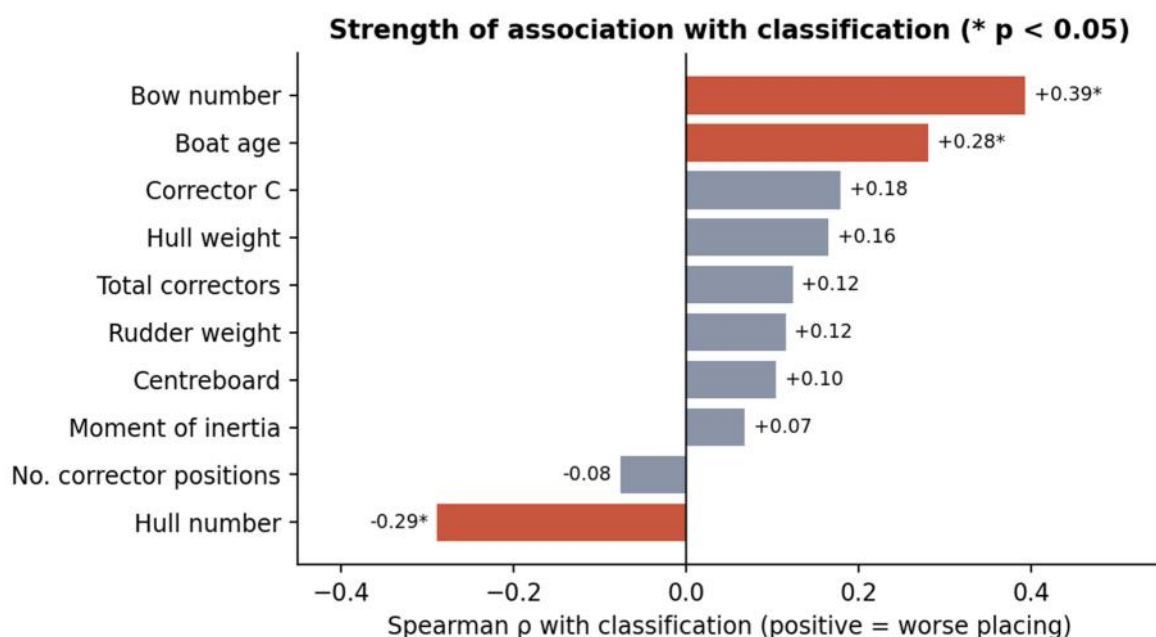


Figure 2. Spearman correlation of each item with final classification. Bars in red are statistically significant at the 5% level.



Only three items reach significance. **Boat age** ($p = +0.28$) and **hull number** ($p = -0.29$) express the same underlying fact, since hull numbers are issued sequentially and higher numbers correspond to newer boats. **Bow number** ($p = +0.39$) is the strongest correlate, but this is an administrative artefact: bow numbers were allocated by nation, with Spain receiving the lowest numbers (bow 1 onwards) and the other nations following in alphabetical order of their country code. Because the Spanish fleet performed strongly, low bow numbers are associated with good results without any causal link. Bow number is therefore excluded from further interpretation.

Hull weight shows a significant Pearson coefficient ($r = +0.24$, $p = 0.025$) but not a significant Spearman coefficient. This discrepancy is caused by a single outlier, a 1990 hull certified at 184 kg that finished 82nd. When that boat is removed, the association weakens to $p = +0.14$ ($p = 0.19$), which indicates that hull weight is not a reliable discriminator across the bulk of the fleet. The remaining items — inertia, correctors, centreboard and rudder — all show coefficients below 0.2 in absolute value and are not significant.

5. Classification versus Boat Age

Boat age is the clearest technical signal in the dataset. Figure 3 plots each boat's construction year against its final position, distinguishing the host Spanish fleet from visiting boats. The trend line slopes upward from left to right in classification terms: on average, newer boats finished higher.

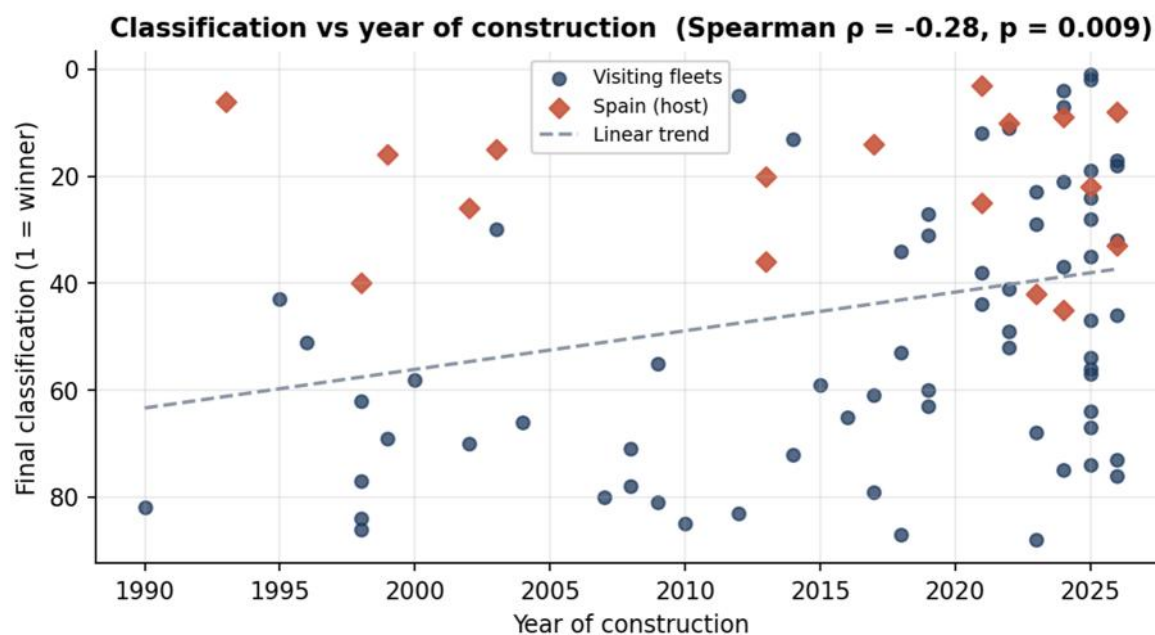


Figure 3. Final classification versus year of construction. The dashed line is the linear trend across the whole fleet.

The trend is real but the scatter around it is wide. Several of the oldest boats achieved excellent results, almost all of them sailed by Spanish crews: ESP28363 (built 1993) finished 6th, ESP29545 (1999) finished 16th and ESP31828 (2003) finished 15th. Conversely, a number of boats built in 2025 and 2026 finished between 70th and 88th. This pattern indicates that a new hull is neither necessary nor sufficient for a good result.

Table 4. Classification by construction period.

Construction period	Boats	Mean rank	Median rank	Best rank	In top 10	In top 20
1990–1999	11	56.0	62.0	6	1	2
2000–2014	18	52.4	62.0	5	1	4
2015–2021	17	44.4	44.0	3	1	3
2022–2026	39	37.5	35.0	1	7	11

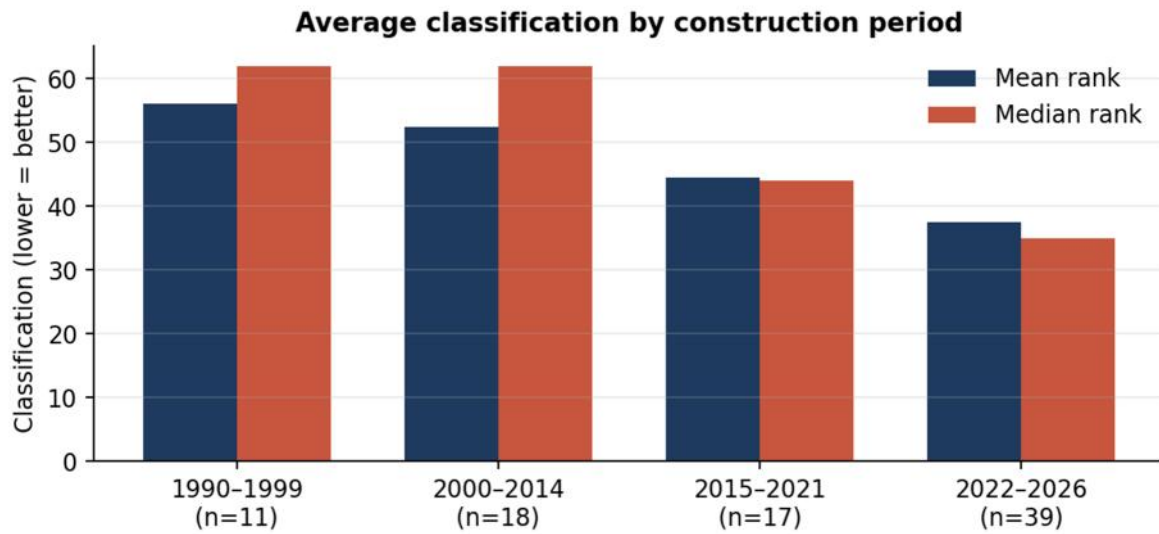


Figure 4. Mean and median classification by construction period.

Table 4 and Figure 4 show a steady improvement in average classification from older to newer construction periods, from a median of 62 for boats built before 2015 to 35 for boats built from 2022 onwards. Eight of the top ten boats were built in 2021 or later. However, the Kruskal–Wallis test across the four periods is only marginal ($p = 0.085$), because each period contains both very good and very poor results.

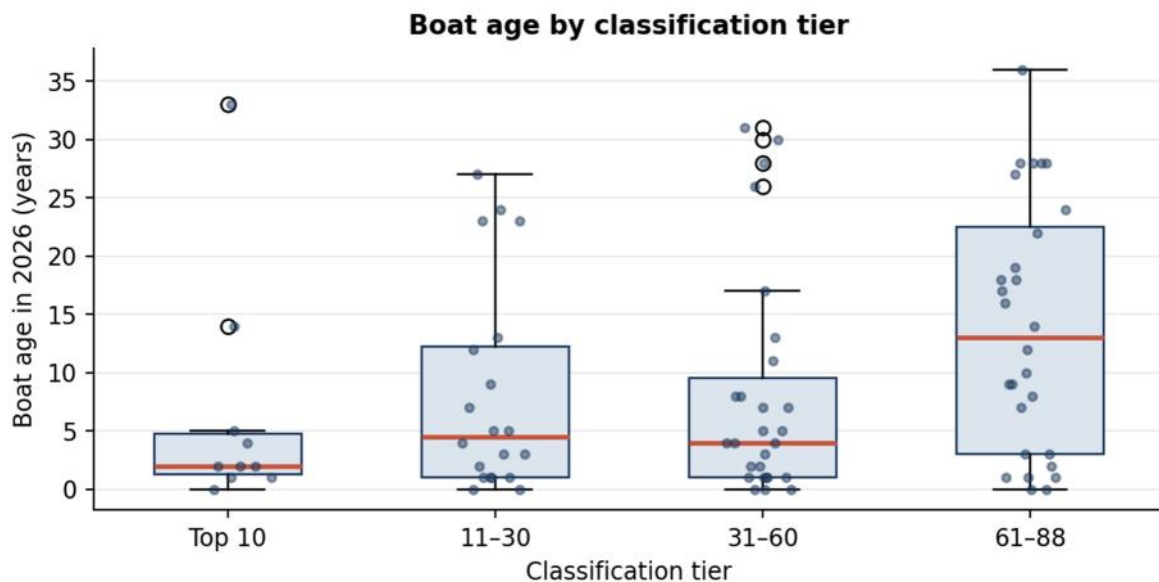


Figure 5. Distribution of boat age within each classification tier.

An important nuance emerges when the host fleet is separated from the visitors. Among visiting boats the association between age and rank is considerably stronger ($p = +0.41$, $p < 0.001$), whereas within the Spanish fleet it disappears entirely ($p = -0.04$, $p = 0.87$). Spanish and visiting boats have the same median age (5 years), so this is not a matter of one group having newer equipment. A plausible interpretation is that experienced local crews extract competitive performance from older, well-known boats on familiar waters, while for visiting crews — who often charter or ship newer boats — the quality of the equipment weighs more heavily.

6. Classification versus Hull Weight

Hull weight is a central measurement item in the Snipe, because a lighter hull requires correctors to reach the minimum, which can then be placed to optimise weight distribution. The recorded weights range from 172.8 kg to 184.0 kg, but three quarters of the fleet weighs 175.0 kg or less.

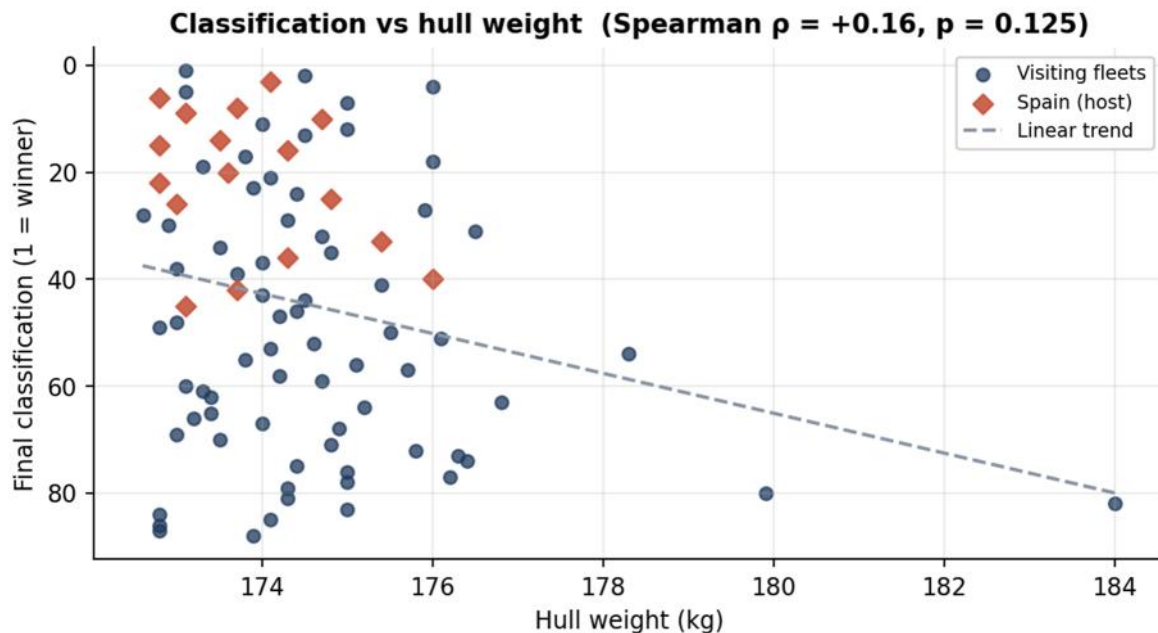


Figure 6. Final classification versus certified hull weight.

Figure 6 shows no clear structure in the main cluster between 172.8 and 176.8 kg: boats at the minimum weight are found throughout the classification. The 13 boats at or below 173.0 kg had a median rank of 38 compared with 45 for heavier boats, a difference that is not statistically significant (Mann–Whitney $p = 0.92$). The top ten boats had a median hull weight of 173.9 kg against 174.3 kg for the rest of the fleet, again not significant ($p = 0.39$).

The only visible effect comes from the four heaviest hulls (176.8 kg to 184.0 kg), which finished 63rd, 54th, 80th and 82nd. Those boats are also among the oldest or least conventional in the fleet, so their position probably reflects a combination of factors rather than weight alone. The conclusion is that, within the normal range of certified weights, hull weight does not discriminate between good and poor results in this championship.

7. Classification versus Moment of Inertia

The moment of inertia describes how the boat's mass is distributed along its length; a lower value means that weight is concentrated near the centre, which in theory helps the boat pitch less in waves. In this dataset the values cluster at approximately 271–275, which appears to be the practical floor, with a tail of 15 boats above 285.

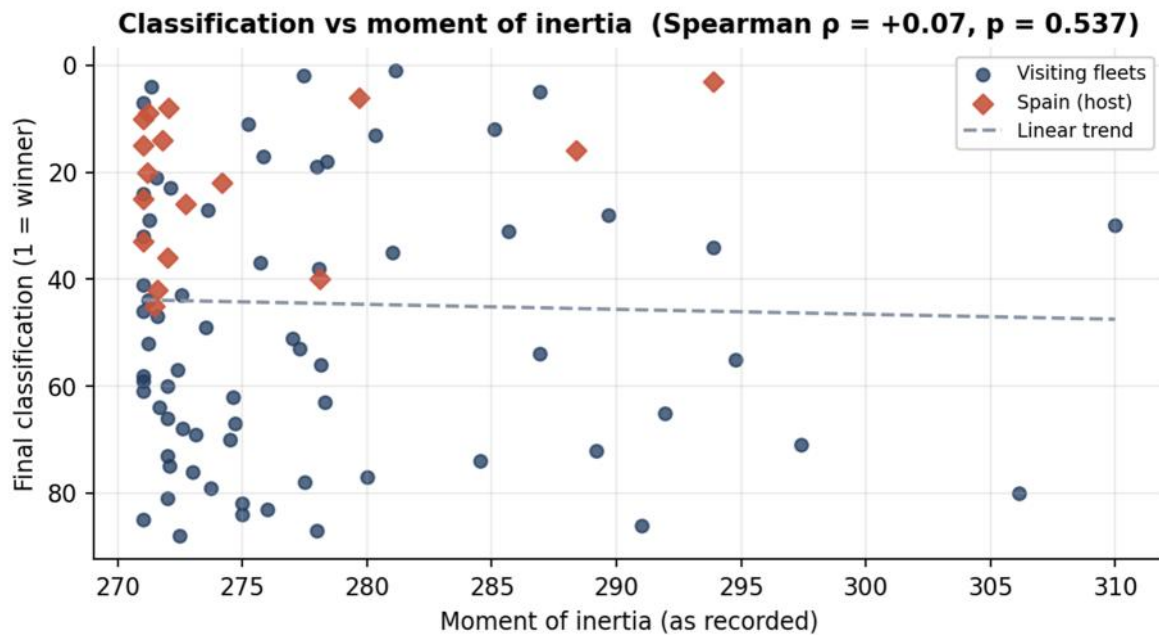


Figure 7. Final classification versus recorded moment of inertia.

The correlation with classification is negligible ($\rho = +0.07$, $p = 0.54$). Boats with high inertia appear across the whole ranking: ESP31721 (293.9) finished 3rd, BRA31425 (286.9) 5th and CHI31864 (285.1) 12th, while ITA32022 (306.2) and BRA31893 (297.4) finished 80th and 71st. The 30 boats at or below 272 had a median rank of 41.5, compared with 49.5 for the remainder; the difference is in the expected direction but not significant ($p = 0.26$).

It should be noted that conditions in the Bay of Mahón, and how the crews used their weight, are not recorded in the file. Any benefit of low inertia may depend on wave conditions and would be diluted when results are aggregated over the whole series.

8. Classification versus Corrector Weights

Correctors are the weights added to a hull to bring it up to the class minimum and to adjust its balance. The file records them in five positions, labelled A to E. The median boat carries 7.1 kg of correctors spread over two positions, with position C being the most used.

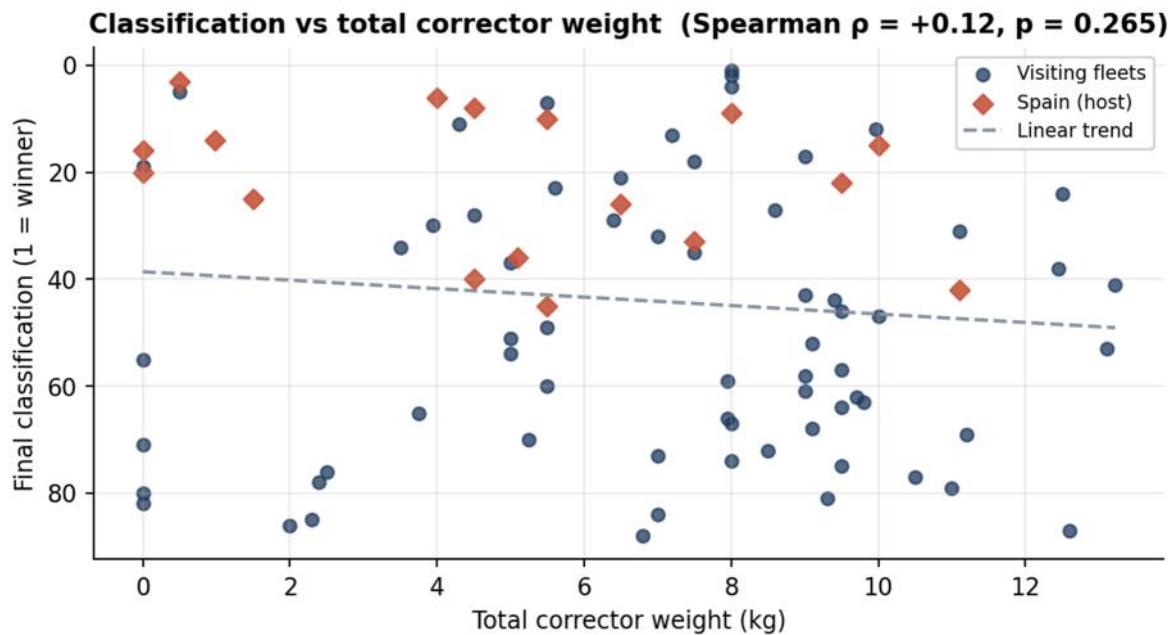


Figure 8. Final classification versus total corrector weight.

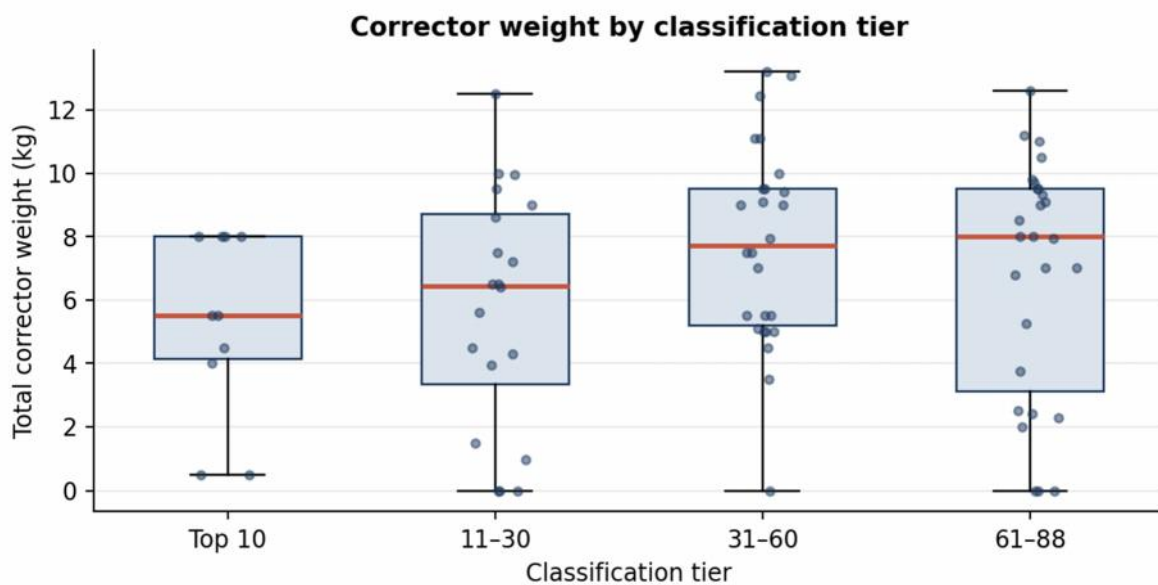


Figure 9. Total corrector weight by classification tier.

Total corrector weight shows a weak positive association with rank ($\rho = +0.12$, $p = 0.27$): the top ten carried a median of 5.5 kg compared with 8.0 kg in the bottom tier. Corrector position C shows the strongest individual link



($p = +0.18$, $p = 0.11$), as illustrated by Figure 9, where the mean weight at position C increases steadily from the top tier to the bottom tier.

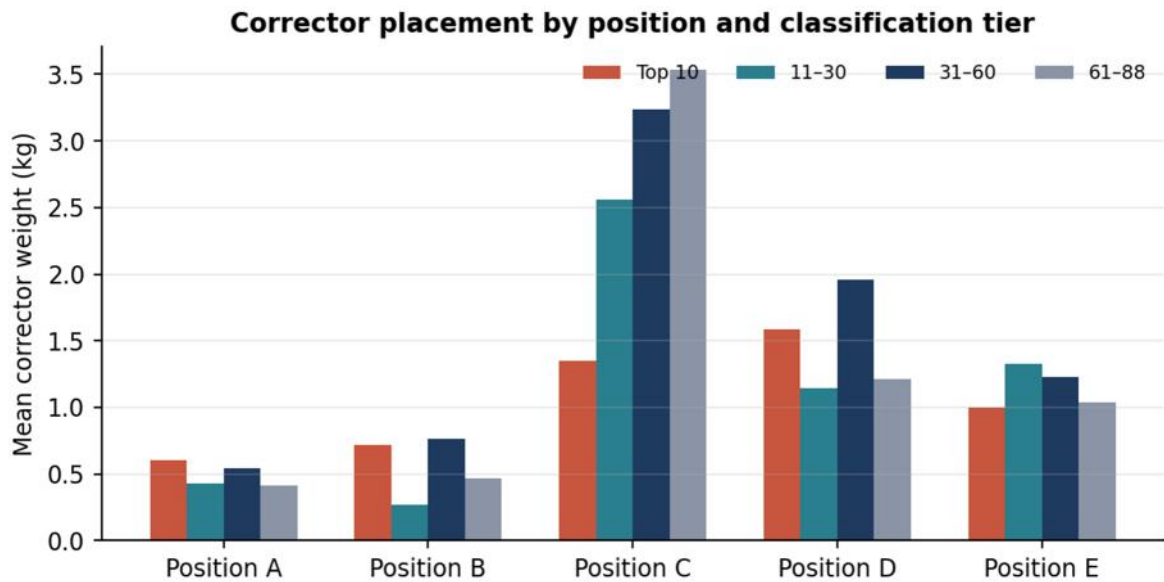


Figure 10. Mean corrector weight at each position by classification tier.

These patterns are suggestive but should be interpreted cautiously. Corrector weight is partly a consequence of hull weight and inertia — lighter hulls need more corrector weight, and boats with high inertia tend to carry less — so it is a derived characteristic rather than an independent choice. The number of positions used shows no relationship at all with classification ($p = -0.08$), which suggests that there is no single winning distribution strategy in the fleet.

9. Classification versus Centreboard and Rudder

The centreboard value (ORZA) and rudder weight complete the record of measured appendages. Most centreboard values lie between 890 and 940, with two clear outliers at 825 and 870; rudder weights range from 2.74 kg to 4.40 kg, with a median of 3.02 kg.

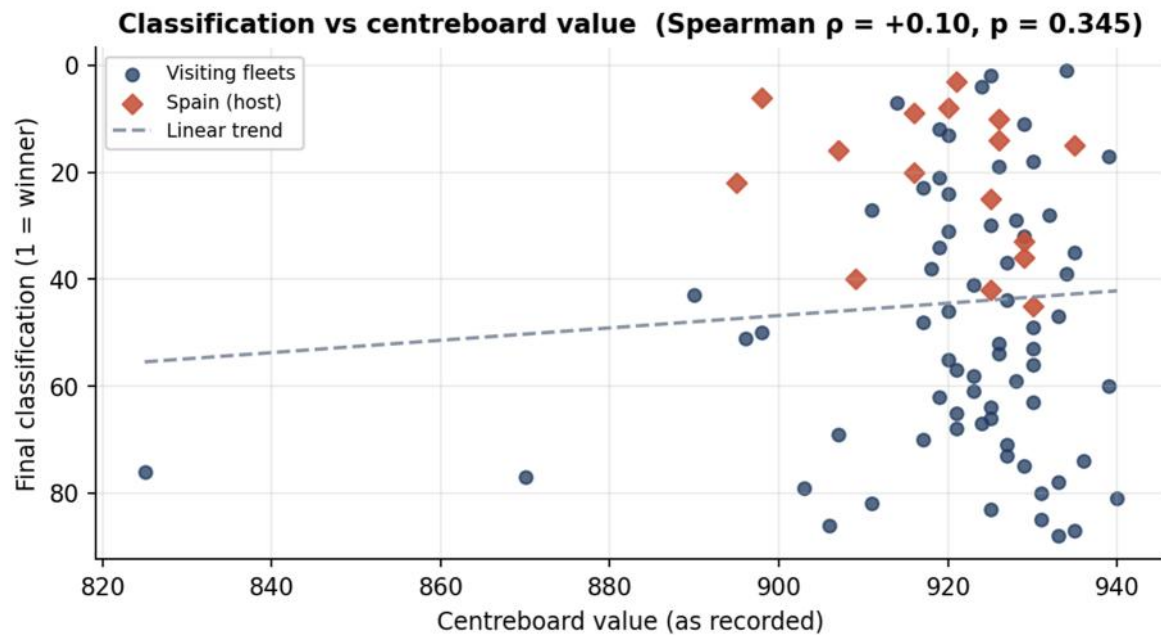


Figure 11. Final classification versus recorded centreboard value.

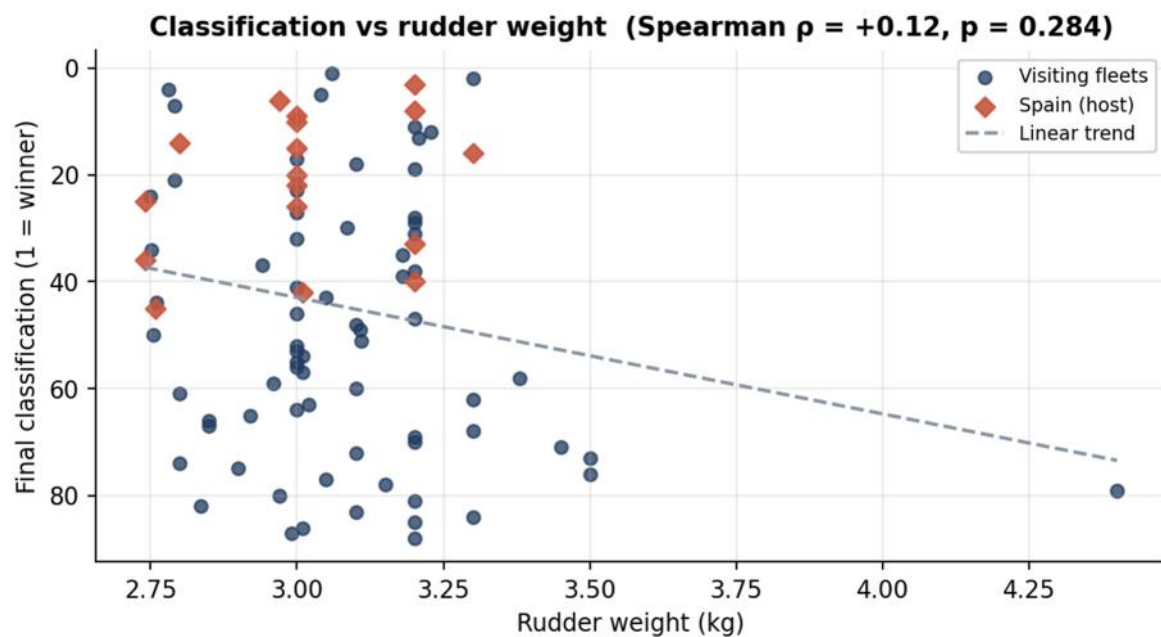


Figure 12. Final classification versus rudder weight.



Neither variable is significantly associated with classification (centreboard $p = +0.10$, $p = 0.35$; rudder $p = +0.12$, $p = 0.28$). The heaviest rudder in the fleet (4.40 kg, GER31409) and the two lowest centreboard values (URU30782 and FRA20894) all correspond to boats in the bottom quarter, but these are isolated cases. Rudder weight shows a marginal Pearson correlation ($p = 0.07$) that is driven largely by that single 4.40 kg value. For the large majority of boats the appendages fall in a narrow band and do not separate good from poor results.



10. Classification by Hull Builder

Thirteen builder labels appear in the file, including six boats with no builder recorded. Table 5 compares the classification of each builder group, ordered by median rank, and includes the number of boats each builder placed in the top 20.

Table 5. *Classification by hull builder.*

Builder	Boats	Mean rank	Median rank	Best	Worst	In top 20
Volcan	1	3.0	3.0	3	3	1
Jibe Tech	1	7.0	7.0	7	7	1
Sinergia	1	10.0	10.0	10	10	1
Tsujido	4	28.2	25.5	21	41	0
Persson (Japan)	1	32.0	32.0	32	32	0
Zeltic	16	41.4	34.5	8	83	3
DB Marine	27	46.2	49.0	4	88	7
Not recorded	6	50.7	49.0	22	87	0
Mas Marine	12	40.9	50.0	1	74	4
Persson	16	50.7	56.5	6	86	3
Skipper	1	77.0	77.0	77	77	0
J2 Snipe	1	79.0	79.0	79	79	0
Starmarine	1	80.0	80.0	80	80	0

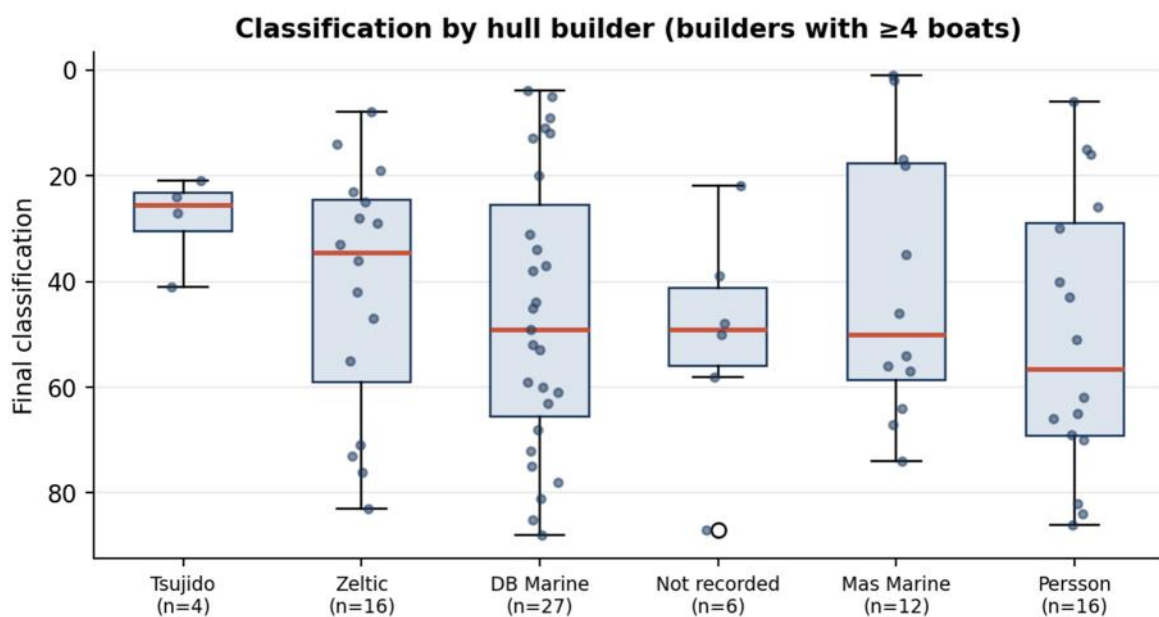


Figure 13. *Distribution of classification for builders with at least four boats.*

The headline result belongs to **Mas Marine**, whose boats finished first and second. However, the remaining ten Mas Marine boats were spread between 17th and 74th, giving a median of 50 — no better than the fleet as a



whole. **DB Marine**, with the largest representation (27 boats), placed seven in the top 20 and three in the top ten, again broadly in proportion to its share of the fleet. **Zeltic** had a median rank of 34.5, and the four **Tsujido** boats, all sailed by Japanese crews, finished in a compact band between 21st and 41st. **Persson** hulls show the weakest median (56.5), which is consistent with their age: Persson boats in this fleet have a median age of 27.5 years, against 1 to 7 years for the other main builders.

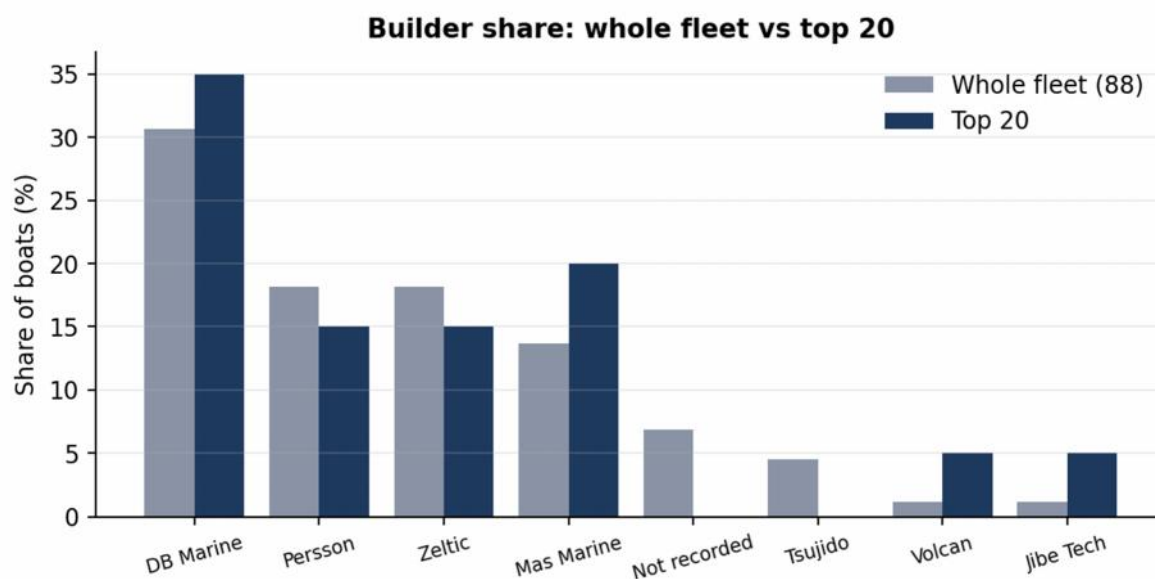


Figure 14. Share of each builder in the whole fleet compared with its share of the top 20.

Figure 13 compares fleet share and top-20 share. DB Marine and Mas Marine are slightly over-represented in the top 20, while Zeltic and Persson are slightly under-represented, but the Kruskal–Wallis test across builders with three or more boats finds no significant difference ($p = 0.60$). In other words, once the spread within each builder group is considered, the choice of builder does not explain the classification.

Table 6. Technical profile of each builder group.

Builder	Boats	Median age	Median weight (kg)	Median inertia	Median correctors (kg)
DB Marine	27	7.0	174.10	272.59	8.00
Zeltic	16	3.0	174.25	272.01	4.50
Persson	16	27.5	173.30	275.00	5.12
Mas Marine	12	1.0	174.95	277.82	8.00
Not recorded	6	8.0	173.35	274.16	9.50
Tsujido	4	3.0	174.90	271.26	10.55
Jibe Tech	1	2.0	175.00	271.00	5.50
J2 Snipe	1	9.0	174.30	273.73	11.00
Persson (Japan)	1	0.0	174.70	271.00	7.00
Skipper	1	28.0	176.20	280.00	10.50
Sinergia	1	4.0	174.70	271.00	5.50
Starmarine	1	19.0	179.90	306.16	0.00
Volcan	1	5.0	174.10	293.90	0.50



Table 6 shows the technical profile of each builder group. Builder differences in weight and inertia are small; the clearest difference is age, which again points to boat age, rather than the builder as such, as the more relevant factor.

11. Classification by Sailmaker

Each boat declared two mainsails and two jibs. Analysis is based primarily on the first declared mainsail, which is the sail most likely to have been used in the majority of races. Table 7 summarises the results by mainsail maker.

Table 7. Classification by first declared mainsail maker.

Mainsail maker	Boats	Mean rank	Median rank	Best	Worst	In top 20
Sailing Sur	1	9.0	9.0	9	9	1
Kundaka	1	10.0	10.0	10	10	1
Zaoli	1	25.0	25.0	25	25	0
Quantum	11	38.5	39.0	5	84	4
North	30	41.2	42.5	1	88	6
UK Sailmakers	2	42.5	42.5	35	50	0
Olimpics	22	48.2	50.0	4	87	5
VB Voiles	4	45.5	51.0	14	66	1
Pires	15	53.3	58.0	6	83	2
Elvstrom	1	85.0	85.0	85	85	0

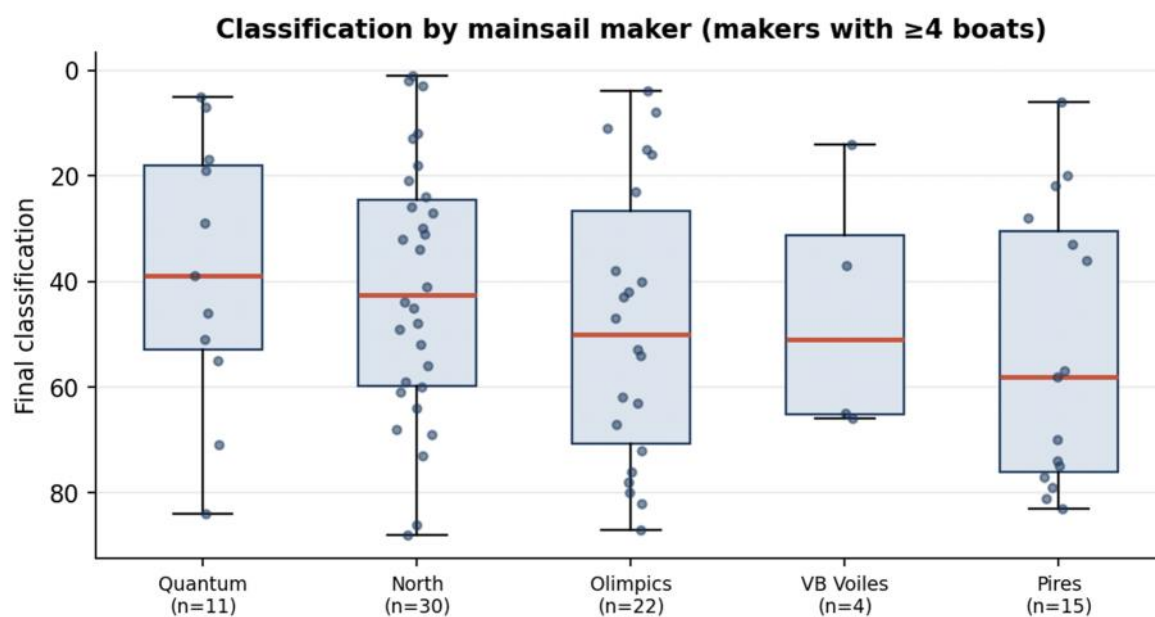


Figure 15. Distribution of classification for mainsail makers with at least four boats.

North sails were the most common and also produced the winner, with six boats in the top 20 and a median rank of 42.5. **Quantum** had the lowest median among the major makers (39) with four boats in the top 20, and **Olimpics** placed five boats in the top 20 including 4th and 8th. **Pires**, popular among Spanish and Portuguese crews, had a higher median (58) but still produced 6th place. Three smaller makers — Sailing Sur, Kundaka and Zaoli — appear only once each, with two of them in the top ten; single observations of this kind cannot be generalised. The

difference between the major sailmakers is not statistically significant (Kruskal–Wallis $p = 0.48$); the same conclusion holds for the first declared jib ($p = 0.66$).

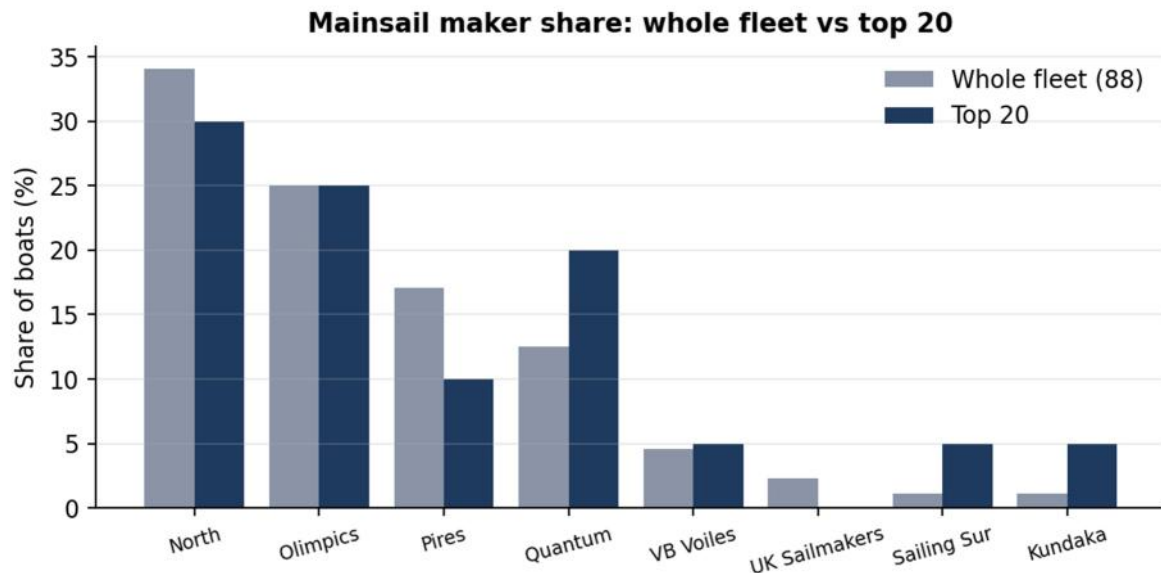


Figure 16. Share of each mainsail maker in the whole fleet compared with its share of the top 20.

11.1 Consistency of the sail inventory

A secondary question is whether crews that commit to one sailmaker for all four declared sails perform differently from those who mix brands. Sixty boats (68%) used a single maker across their whole inventory.

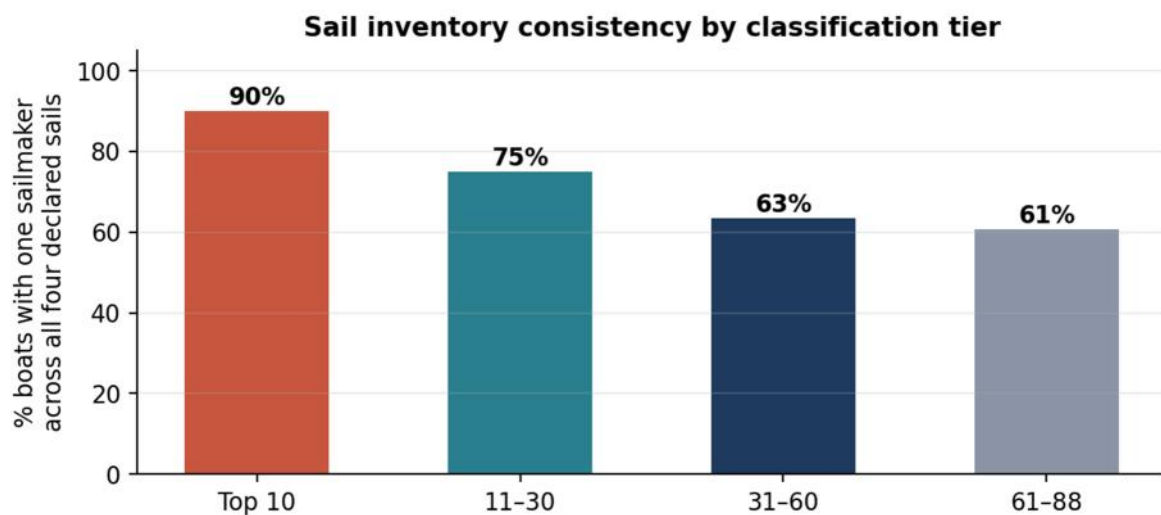


Figure 17. Percentage of boats with a single sailmaker across all four declared sails, by classification tier.

The share of single-brand inventories decreases steadily from the top tier (90%) to the bottom tier (61%). Single-brand boats had a median rank of 42.5 compared with 52 for mixed inventories. The difference is consistent in direction but not statistically significant (Mann–Whitney $p = 0.24$). One reasonable reading is that a coherent, matched inventory reflects a more focused campaign rather than giving an advantage in itself.



12. Classification by Nation

Although nationality is not an equipment variable, it proved to be the strongest grouping factor in the dataset and must be considered in order to interpret the technical results correctly.

Table 8. *Classification by nation (from sail number prefix).*

Nation	Boats	Mean rank	Median rank	Best	Worst	In top 20
ESP	17	21.8	20.0	3	45	9
USA	8	37.4	28.5	1	88	4
CHI	2	32.0	32.0	12	52	1
JPN	9	34.2	32.0	21	50	0
BRA	9	37.9	34.0	5	73	3
BEL	5	33.4	37.0	4	72	2
ARG	5	41.6	44.0	2	87	1
POR	3	51.0	49.0	23	81	0
GUA	1	55.0	55.0	55	55	0
ITA	7	63.9	59.0	53	80	0
CUB	1	61.0	61.0	61	61	0
PER	1	63.0	63.0	63	63	0
GBR	5	65.6	64.0	57	83	0
POL	3	70.7	68.0	62	82	0
NOR	5	59.6	70.0	31	85	0
FRA	2	71.0	71.0	65	77	0
SWE	1	75.0	75.0	75	75	0
URU	1	76.0	76.0	76	76	0
GER	1	79.0	79.0	79	79	0
CAN	1	84.0	84.0	84	84	0
CRO	1	86.0	86.0	86	86	0

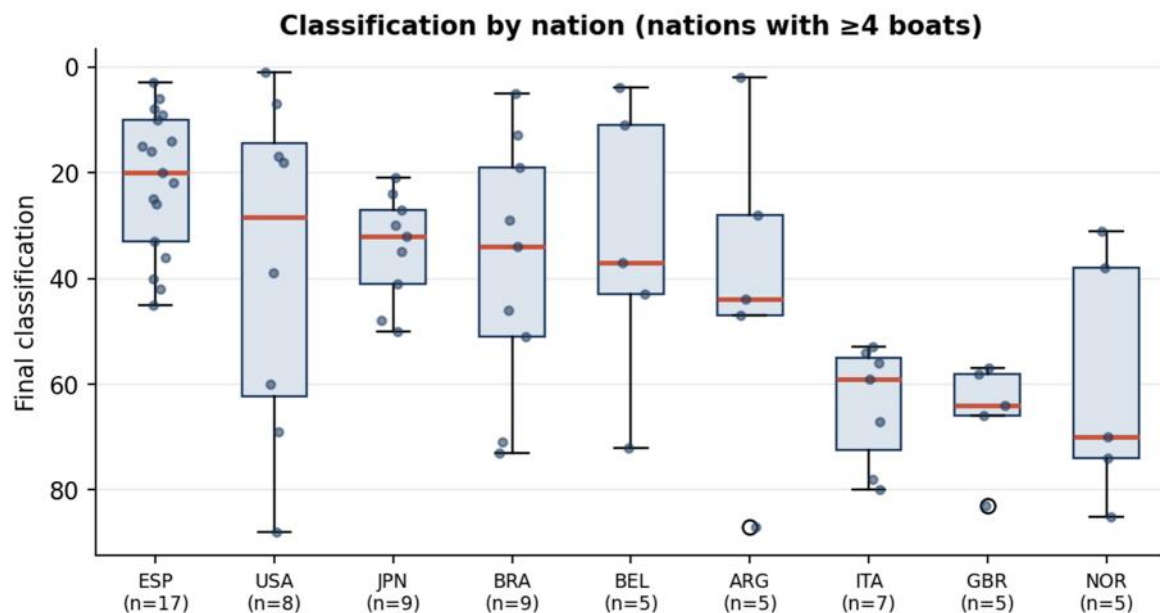


Figure 18. Distribution of classification for nations with at least four boats.

The Kruskal–Wallis test shows highly significant differences between nations ($p < 0.001$). **Spain** is outstanding: all 17 Spanish boats finished in the top 45, with a median of 20 and five boats in the top ten. **Japan** shows remarkable consistency, with all nine boats between 21st and 50th. **Brazil**, the **United States**, **Argentina** and **Belgium** combine top-five results with wider spreads, while **Italy** (best result 53rd) and **Great Britain** (best 57th) did not place any boat in the top 50.

The host-fleet effect is relevant for two reasons. First, it confirms that factors not recorded in the file — local knowledge, preparation, crew experience, logistics — have a large influence on results. Second, it acts as a confounding factor: because Spanish crews performed well regardless of their boat's age, comparisons that ignore nationality can understate the role of equipment for visiting crews and overstate it for the fleet as a whole.

Thirty-eight boats sail under a number different from their hull number, typically because the boat has changed owner or nation. These boats show no meaningful difference in classification (median 48.5 against 43.5), so re-numbered or second-hand boats are not at a disadvantage per se.



13. Multivariate Analysis

To assess the technical variables jointly, two linear regression models were fitted to the 79 boats with complete data. Model A includes only the six technical variables; Model B adds an indicator for the host Spanish fleet. The coefficient of each variable represents the estimated change in finishing position for a one-unit change in that variable, holding the others constant. Positive coefficients indicate a worse placing.

Table 9. Model A (technical only): $R^2 = 0.185$, adjusted $R^2 = 0.117$, $n = 79$, model $p = 0.0192$.

Variable	Coefficient	Std. error	p-value
Age (per year)	0.763	0.292	0.011
Hull weight (per kg)	3.564	1.644	0.033
Inertia (per unit)	-0.020	0.365	0.956
Correctors (per kg)	1.163	0.857	0.179
Centreboard (per unit)	0.089	0.183	0.628
Rudder (per kg)	19.597	11.930	0.105

Table 10. Model B (technical + host fleet): $R^2 = 0.334$, adjusted $R^2 = 0.268$, $n = 79$, model $p = 0.0001$.

Variable	Coefficient	Std. error	p-value
Age (per year)	0.819	0.266	0.003
Hull weight (per kg)	2.113	1.540	0.174
Inertia (per unit)	-0.369	0.343	0.286
Correctors (per kg)	0.010	0.832	0.991
Centreboard (per unit)	0.058	0.167	0.729
Rudder (per kg)	13.814	10.957	0.212
Spanish host fleet (yes = 1)	-27.120	6.805	0.000

In **Model A**, only age (+0.76 positions per year, $p = 0.011$) and hull weight (+3.6 positions per kg, $p = 0.033$) are significant, and together the six variables explain 18.5% of the variance in rank. The hull weight effect, however, is heavily influenced by the 184 kg outlier described in Section 6 and should not be read as a general rule.

In **Model B**, the Spanish fleet indicator is by far the most important term: Spanish boats finished, on average, about 27 positions higher than visiting boats with otherwise identical measurements ($p < 0.001$). Explained variance rises to 33.4%. Age remains significant (+0.82 positions per year, $p = 0.003$), while hull weight is no longer significant ($p = 0.17$). This confirms that **boat age is the only technical factor with a robust independent association with the classification**. Expressed practically, a boat ten years older than an otherwise identical boat finished around eight places lower on average.

Even in the better model, two thirds of the variation in classification remains unexplained. This residual corresponds to everything that is not recorded in the measurement file: crew skill, physical condition, tactical decisions, boat handling, sail trim, preparation and luck.



14. Profile of the Top Ten

Table 11. Equipment profile of the ten best-placed boats.

Pos.	Sail no.	Skipper	Year	Builder	Weight	Inertia	Corr. (kg)	Mainsail
1	USA31337	Ernesto Rodriguez	2025	Mas Marine	173.1	281.1	8.0	North
2	ARG32046	Julio Alsogaray	2025	Mas Marine	174.5	277.5	8.0	North
3	ESP31721	Alfredo González	2021	Volcan	174.1	293.9	0.5	North
4	BEL31974	Manu Hens	2024	DB Marine	176.0	271.3	8.0	Olimpics
5	BRA31425	Felipe Rondina	2012	DB Marine	173.1	286.9	0.5	Quantum
6	ESP28363	Jose M. Guerrero Macías	1993	Persson	172.8	279.7	4.0	Pires
7	USA31391	Justin Callahan	2024	Jibe Tech	175.0	271.0	5.5	Quantum
8	ESP32082	Gustavo Del Castillo Palop	2026	Zeltic	173.7	272.0	4.5	Olimpics
9	ESP31904	Raúl De Valenzuela Santaella	2024	DB Marine	173.1	271.2	8.0	Sailing Sur
10	ESP31822	Francisco Sánchez Ferrer	2022	Sinergia	174.7	271.0	5.5	Kundaka

The top ten is varied in terms of equipment. It includes seven builders (Mas Marine, Volcan, DB Marine, Persson, Jibe Tech, Zeltic and Sinergia) and six mainsail makers. Eight boats were built in 2021 or later, but the list also includes boats from 1993 and 2012. Hull weights range from the class minimum of 172.8 kg to 176.0 kg, and inertia from 271 to almost 294. Corrector weights range from 0.5 to 8 kg.

Table 12. Median values of each item by classification tier.

Indicator	Top 10	11–30	31–60	61–88
Median age (years)	2.0	4.5	4.0	13.0
Median build year	2024	2022	2022	2013
Median hull weight (kg)	173.90	173.95	174.35	174.35
Median inertia	274.75	273.88	272.39	274.66
Median correctors (kg)	5.50	6.45	7.72	8.00
Median centreboard	921	925	926	925
Median rudder (kg)	3.02	3.00	3.01	3.10
Single sailmaker (%)	90	75	63	61
Spanish boats (n)	5	7	5	0

Table 11 consolidates the comparison by tier. The clearest gradient is in age: the median age goes from 2 years in the top ten to 13 years in the bottom tier. Corrector weight and single-sailmaker share also follow a consistent gradient. Hull weight, inertia, centreboard and rudder values are practically identical across tiers. The Spanish fleet is concentrated in the top 30 (12 of 17 boats) and is absent from the bottom tier.



15. Discussion and Limitations

The results are consistent with what would be expected from a mature one-design class: measurement rules successfully narrow the differences between boats, so that recorded technical attributes have only a modest relationship with results. Within that context, boat age stands out as the most relevant equipment factor, probably because it summarises several unmeasured aspects such as hull stiffness, surface condition, fittings and the overall standard of construction over time.

Several limitations should be taken into account when using these findings:

- **Association, not causation.** The study is observational. Better crews may choose newer boats and better sails, so part of the apparent equipment effect may in fact be a crew effect.
- **Unrecorded variables.** Crew experience, ranking history, crew weight, sail age and race-by-race conditions are not in the file and are likely to be more influential than any recorded item.
- **Final classification only.** The analysis uses the overall result. Race-by-race scores would allow conditions-specific effects, such as the role of inertia in waves, to be tested.
- **Small groups.** Many builders, sailmakers and nations are represented by one or two boats; their results are reported for completeness but cannot be generalised.
- **Data quality.** Units for inertia and centreboard are not stated, several fields were stored as free text, and four values required correction. Nine boats are missing at least one technical value.

15.1 Recommendations for future measurement records

To make future comparisons more reliable, the following improvements to the data capture template are suggested:

- Record all numeric measurements as numbers with a single decimal convention, and state the unit in the column header.
- Record each corrector as a single total per position, with any breakdown in a separate comment field.
- Add validation ranges (for example, hull weight between 172.8 and 190 kg) to flag entry errors at the time of measurement.
- Complete the builder and construction year for every boat; six boats lack a builder and three lack a year.
- Store race-by-race results alongside the measurement record so that performance under different conditions can be analysed.



16. Conclusions

The comparative study of the Mahón Championship 2026 classification against the recorded items leads to the following conclusions:

- **Boat age is the only technical item with a robust, significant association with classification.** Newer boats finished higher on average (about 0.8 places per year of age), and this effect persists when nationality is controlled for. It is stronger for visiting crews than for the host fleet.
- **Hull weight, moment of inertia, corrector weights, centreboard and rudder do not discriminate between good and poor results** within the normal certified range. The fleet is tightly grouped around the class minimums.
- **No builder or sailmaker has a statistically superior record.** Mas Marine won the championship and took second place, and DB Marine placed the most boats in the top 20, but both groups also have many boats in the lower half.
- **Nationality is the strongest grouping factor**, led by the Spanish host fleet. This points to crew-related and local factors, which are not in the measurement file, as the main determinants of the result.
- Top-ten boats showed **tendencies** towards lower corrector weight and a single-brand sail inventory; these are worth monitoring in future events with a larger dataset, but they are not statistically conclusive here.

In summary, the measurement data show a fleet that is technically very even. A modern, well-prepared boat gives a measurable but limited advantage; beyond that, the classification at Mahón 2026 was decided by the crews.



Annex A. Cleaned Dataset

The following table lists all 88 boats in classification order with the cleaned values used in the analysis. Corrector totals are the sum of positions A to E. A dash indicates a missing or excluded value.

Table 13. *Cleaned dataset, all boats.*

Pos.	Sail no.	Skipper	Year	Builder	Weight	Inertia	Corr.	Board	Rudder	Mainsail
1	USA31337	Ernesto Rodriguez	2025	Mas Marine	173.1	281.1	8.00	934	3.06	North
2	ARG32046	Julio Alsogaray	2025	Mas Marine	174.5	277.5	8.00	925	3.30	North
3	ESP31721	Alfredo González	2021	Volcan	174.1	293.9	0.50	921	3.20	North
4	BEL31974	Manu Hens	2024	DB Marine	176.0	271.3	8.00	924	2.78	Olimpics
5	BRA31425	Felipe Rondina	2012	DB Marine	173.1	286.9	0.50	—	3.04	Quantum
6	ESP28363	Jose M. Guerrero Macías	1993	Persson	172.8	279.7	4.00	898	2.97	Pires
7	USA31391	Justin Callahan	2024	Jibe Tech	175.0	271.0	5.50	914	2.79	Quantum
8	ESP32082	Gustavo Del Castillo Palop	2026	Zeltic	173.7	272.0	4.50	920	3.20	Olimpics
9	ESP31904	Raúl De Valenzuela Santaella	2024	DB Marine	173.1	271.2	8.00	916	3.00	Sailing Sur
10	ESP31822	Francisco Sánchez Ferrer	2022	Sinergia	174.7	271.0	5.50	926	3.00	Kundaka
11	BEL31748	Sam Vandormael	2022	DB Marine	174.0	275.2	4.30	929	3.20	Olimpics
12	CHI31864	Matías Seguel	2021	DB Marine	175.0	285.1	9.96	919	3.23	North
13	BRA31368	Nick Pellicano Grael	2014	DB Marine	174.5	280.3	7.20	920	3.21	North
14	ESP31455	Roberto Bermudez De Castro	2017	Zeltic	173.5	271.8	0.98	926	2.80	VB Voiles
15	ESP31828	Jordi Triay Pons	2003	Persson	172.8	271.0	10.00	935	3.00	Olimpics
16	ESP29545	Pedro Fernando De Leon	1999	Persson	174.3	288.4	0.00	907	3.30	Olimpics
17	USA28225	Diego Escobar	2026	Mas Marine	173.8	275.8	9.00	939	3.00	Quantum
18	USA31640	Enrique Quintero	2026	Mas Marine	176.0	278.4	7.50	930	3.10	North
19	BRA31093	Alexandre Paradedda	2025	Zeltic	173.3	278.0	0.00	926	3.20	Quantum
20	ESP31174	Victor Iñigo Perez Campos	2013	DB Marine	173.6	271.2	0.00	916	3.00	Pires
21	JPN31927	Issa Kakuta	2024	Tsujido	174.1	271.5	6.50	919	2.79	North
22	ESP32055	Damian Borrás Camps	2025	Not recorded	172.8	274.2	9.50	895	3.00	Pires
23	POR31890	Pedro Barreto	2023	Zeltic	173.9	272.1	5.60	917	3.00	Olimpics
24	JPN32037	Junichiro Shiraishi	2025	Tsujido	174.4	271.0	12.50	920	2.75	North
25	ESP31747	Agustin Zabalua	2021	Zeltic	174.8	271.0	1.50	925	2.74	Zaoli
26	ESP29181	Marta Torner Rubies	2002	Persson	173.0	272.7	6.50	—	3.00	North
27	JPN31917	Masakazu Sasai	2019	Tsujido	175.9	273.6	8.60	911	3.00	North
28	ARG32000	Mariano Ulpiano Arroyo	2025	Zeltic	172.6	289.7	4.50	932	3.20	Pires
29	BRA31277	José Roberto De Jesus	2023	Zeltic	174.3	271.3	6.40	928	3.20	Quantum
30	JPN32010	Ayaka Yamazaki	2003	Persson	172.9	310.0	3.95	925	3.08	North
31	NOR28689	Kristoffer Spone	2019	DB Marine	176.5	285.7	11.10	920	3.20	North
32	JPN32122	Tetsuo Watanabe	2026	Persson (Japan)	174.7	271.0	7.00	929	3.00	North
33	ESP32116	Martín Bermúdez De La Puente Gallego	2026	Zeltic	175.4	271.0	7.50	929	3.20	Pires
34	BRA32121	Felipe Linhares	2018	DB Marine	173.5	293.9	3.50	919	2.75	North
35	JPN31871	Yuta Irie	2025	Mas Marine	174.8	281.0	7.50	935	3.18	UK Sailmakers
36	ESP31141	Tomas Trueba	2013	Zeltic	174.3	272.0	5.10	929	2.74	Pires
37	BEL31912	Jan Peeters	2024	DB Marine	174.0	275.7	5.00	927	2.94	VB Voiles
38	NOR31314	Guillermo Garcia De La Concha	2021	DB Marine	173.0	278.1	12.45	918	3.20	Olimpics



Luis M Gonzalez Alvarez
Chief Measurer Snipe Class

Pos.	Sail no.	Skipper	Year	Builder	Weight	Inertia	Corr.	Board	Rudder	Mainsail
39	USA31298	Randy Lake	—	Not recorded	173.7	—	—	934	3.18	Quantum
40	ESP29514	Leonardo Armas Lasso	1998	Persson	176.0	278.1	4.50	909	3.20	Olimpics
41	JPN31811	Nishio Masaki	2022	Tsujido	175.4	271.0	13.22	923	3.00	North
42	ESP31842	Jorge Tábara	2023	Zeltic	173.7	271.6	11.10	925	3.01	Olimpics
43	BEL28855	Yannick Laumans	1995	Persson	174.0	272.6	9.00	890	3.05	Olimpics
44	ARG31710	Alejandro Triggiano	2021	DB Marine	174.5	271.2	9.40	927	2.76	North
45	ESP31984	Fernando Rita Larrucea	2024	DB Marine	173.1	271.5	5.50	930	2.76	North
46	BRA31393	Alexandre Kronenberger	2026	Mas Marine	174.4	271.0	9.50	920	3.00	Quantum
47	ARG32050	Leandro Antoliche	2025	Zeltic	174.2	271.6	10.00	933	3.20	Olimpics
48	JPN31929	Yasushi Kondo	—	Not recorded	173.0	—	—	917	3.10	North
49	POR31831	Miguel Graça	2022	DB Marine	172.8	273.5	5.50	930	3.11	North
50	JPN31415	Tsuyoshi Yamada	—	Not recorded	175.5	—	—	898	2.75	UK Sailmakers
51	BRA30797	Iago Whately	1996	Persson	176.1	277.0	5.00	896	3.11	Quantum
52	CHI31967	Antonio Poncell	2022	DB Marine	174.6	271.2	9.10	926	3.00	North
53	ITA31477	Dario Bruni	2018	DB Marine	174.1	277.3	13.10	930	3.00	Olimpics
54	ITA32009	Paolo Lambertenghi	2025	Mas Marine	178.3	286.9	5.00	926	3.01	Olimpics
55	GUA31564	Juan Carlos Canizales Manuel	2009	Zeltic	173.8	294.8	0.00	920	3.00	Quantum
56	ITA32005	Fabrizio Angelini	2025	Mas Marine	175.1	278.2	—	930	3.00	North
57	GBR30228	Yohei Koso	2025	Mas Marine	175.7	272.4	9.50	921	3.01	Pires
58	GBR29794	Joseph Warwicker	2000	Not recorded	174.2	271.0	9.00	923	3.38	Pires
59	ITA31294	Alberto Schiaffino	2015	DB Marine	174.7	271.0	7.95	928	2.96	North
60	USA31297	Doug Hart	2019	DB Marine	173.1	272.0	5.50	939	3.10	North
61	CUB31038	Darien Martinez Pimentel	2017	DB Marine	173.3	271.0	9.00	923	2.80	North
62	POL29531	Jan Sibilski	1998	Persson	173.4	274.6	9.70	919	3.30	Olimpics
63	PER31150	Alain Ramirez Rivero	2019	DB Marine	176.8	278.3	9.80	930	3.02	Olimpics
64	GBR32003	Tim Tavinor	2025	Mas Marine	175.2	271.6	9.50	925	3.00	North
65	FRA31362	Jean Jacques Frebault	2016	Persson	173.4	291.9	3.75	921	2.92	VB Voiles
66	GBR31905	Peter Wolstenholme	2004	Persson	173.2	272.0	7.95	925	2.85	VB Voiles
67	ITA32004	Gioele Toffolo	2025	Mas Marine	174.0	274.7	8.00	924	2.85	Olimpics
68	POL31861	Karol Maciejewski	2023	DB Marine	174.9	272.6	9.10	921	3.30	North
69	USA29248	Aine Mclean Fretwell	1999	Persson	173.0	273.1	11.20	907	3.20	North
70	NOR29982	Reidar Berthelsen	2002	Persson	173.5	274.5	5.25	917	3.20	Pires
71	BRA31893	Johann Fenselau De Felippes	2008	Zeltic	174.8	297.4	0.00	927	3.45	Quantum
72	BEL31274	Mathias Brands	2014	DB Marine	175.8	289.2	8.50	—	3.10	Olimpics
73	BRA32112	Eric Lineburger	2026	Zeltic	176.3	272.0	7.00	927	3.50	North
74	NOR32054	Totto Hartmann	2025	Mas Marine	176.4	284.5	8.00	936	2.80	Pires
75	SWE31920	Per Edwall	2024	DB Marine	174.4	272.1	9.50	929	2.90	Pires
76	URU30782	Maximiliano Mannise	2026	Zeltic	175.0	273.0	2.50	825	3.50	Olimpics
77	FRA20894	Floriane Le Floch	1998	Skipper	176.2	280.0	10.50	870	3.05	Pires
78	ITA30673	Federico Cerimele	2008	DB Marine	175.0	277.5	2.40	933	3.15	Olimpics
79	GER31409	Christian Fleury	2017	J2 Snipe	174.3	273.7	11.00	903	4.40	Pires
80	ITA32022	Alessandro Balzani	2007	Starmarine	179.9	306.2	0.00	931	2.97	Olimpics
81	POR30758	Martim Cascais De Freitas	2009	DB Marine	174.3	272.0	9.30	940	3.20	Pires
82	POL28035	Dawid Marczak	1990	Persson	184.0	275.0	0.00	911	2.83	Olimpics
83	GBR31016	Lloyd Roberts	2012	Zeltic	175.0	276.0	—	925	3.10	Pires



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Pos.	Sail no.	Skipper	Year	Builder	Weight	Inertia	Corr.	Board	Rudder	Mainsail
84	CAN29324	Emilie Leung	1998	Persson	172.8	275.0	7.00	—	3.30	Quantum
85	NOR29088	Carl-Fredrik Eckbo Røøk	2010	DB Marine	174.1	271.0	2.30	931	3.20	Elvstrom
86	CRO30938	Milko Volari	1998	Persson	172.8	291.0	2.00	906	3.01	North
87	ARG12733	Miguel Costa	2018	Not recorded	172.8	278.0	12.60	935	2.99	Olimpics
88	USA30288	Augie Diaz	2023	DB Marine	173.9	272.5	6.80	933	3.20	North



Annex B. Data Corrections and Missing Values

Table 14. *Values corrected or excluded during data preparation.*

Sail no.	Field	Original value	Treatment
BRA31393	Momento Inercia	271033	decimal separator missing, read as 271.033
CHI31967	Momento Inercia	271240	decimal separator missing, read as 271.240
NOR29088	Momento Inercia	>271	recorded as lower bound, read as 271.0
GBR31016	Lastre C	2615	implausible value, excluded

Missing values not listed above: bow number for ESP29514; construction year for JPN31415, JPN31929 and USA31298; corrector data for those three boats and ITA32005; centreboard value for ESP29181, BEL31274, BRA31425 and CAN29324; second mainsail and jib for GER31409; builder for six boats. All analyses use the available data for each variable (pairwise deletion), and the regression models use the 79 boats with complete technical records.