

LRSCA Technical Group

Hull Weighing

1. Preamble

David Linsell's original paper is attached below with comments by the TG in red.

The following summarises this in respect firstly of equipment and then secondly class rules and measurement process.

2. Equipment. For Action in 2025

- 2.1 Currently, the boat builder has no means of weighing a boat in compliance with the class rules and the construction specification. The historic steelyard has now deteriorated sufficiently as to be unusable for accurate weighing and his electronic load cell has failed.

Extensive experience by members of the TG in weighing boats is very clear that reliability, accuracy and confidence are best achieved if the load cell used is owned by the weighing authority, as are all moulds and templates, and is stored in a robust protective case.

Recommendation: As previously agreed, LRSCA will fund the purchase by the class measurer of a load cell and protective case in compliance with the LR Scow Construction Specification. The estimated cost is c£570 including calibration certificate, delivery and VAT.

- 2.2 Formal load cell calibration by a test house is expensive. The sensible alternative is periodic use of test weights to check the load cell in house.

Recommendation: LRSCA should fund the purchase by the class measurer of a 20 kg test weight. The estimated cost is c£55.

- 2.3 For safety, reliability and also consistency of process, LRSCA should own the lifting strops.

Recommendation: LRSCA should fund the purchase by the class measurer of lifting strops. The estimated cost is c£40.

- 2.4 The usable range for accurate weighing with a load cell is around 50% to 100% of the intended maximum. So, in addition to a load cell for hull weighing, the boat builder also needs equipment to weigh boat components, the rudder, centreboard, rig, etc. The arguments for this to be also owned by the LRSCA apply also to this.

Recommendation: LRSCA should fund the purchase by the class measurer of a set of weigh scales for weighing boat components. The estimated cost is c£250 including calibration certificate, delivery and VAT.

- 2.5 The load cell, test weight, lifting strops and component scales will remain the property of LRSCA but will be in the care of the boat builder who may use them for other purposes unless advised otherwise by the class measurer.

3. Changes to the Class Rules and the Hull Weighing Process

- 3.1 The TG considers that the weighing condition defined by class rule 3. j) should be amended to delete the loose fittings, rigging and equipment currently included. It should also be clarified that the centreboard is included in the hull weight.

This 'empty weight' approach is followed by the vast majority of other classes including keelboat classes. It offers the following advantages to boat owners and to the boat builder:

- Reduction in the likelihood of error.
- Improved consistency of hull weighing.
- More logically, hull weighing takes place before any rigging or other loose items are installed.
- Ease of understanding on the part of owners.
- Simple and understandable preparation for weighing by both the boat builder and by owners.
- Removal of potential class rule infringement and inadvertent non-compliance with class rules if equipment is changed.

It is proposed that the centreboard is included so that on the rare occasions when an existing boat is re-weighed, it is not then required to be removed.

The weights of the various loose items (painter, downhaul, kicking strap, rowlocks) will need to be established and an appropriate correction made to the weight in class rule 3. j).

Recommendation: **The TG will establish the weights of loose items and produce an appropriate rule change proposal for consideration at the 2026 AGM.**

- 3.2 Noting the proposed revised weighing condition described by 3.1 above, the TG considers that the continued use of a "Weighing Correction Weight" is not sensible and should be discontinued. While this practice has apparently been satisfactorily followed for a number of years it could cause confusion at a point in the future if a new builder is appointed, It follows that the class rule minimum hull weight should be further corrected.

Recommendation: **The TG will produce an appropriate rule change proposal for consideration at the 2026 AGM.**

- 3.3 Adoption of the above proposals in respect of minimum hull weight will require no physical changes to any existing boat nor any changes in building practice. The technical database completed earlier this year should however be amended to reflect the changes to the class rules.

Recommendation: **The TG will amend the technical database as appropriate to reflect the above.**

John Evans, John Doerr, Mike Urwin.
LRSCA Technical Group.

In consultation with William Newton, LRSCA Class Measurer.

October 2025.

What does a Scow Weigh

The recent discussions about load cells have prompted me to consider how the class would fare if ever there were cause to appoint a new boat builder.

My key concern is Hull weight.

A History

When the Lymington River Scow was conceived the original definition of weight was not less than 220 Lbs. Later, the specification was changed to not less than 100kg. This change was associated with bringing Class Rules in to line with Metric measurements.

Note, $100\text{kg} = 220.46244202\text{Lbs}$, difference of approximately 0.21% **Irrelevant. Not sensibly detectable.**

Originally the weight was defined as being measured on the Class Scales, which at the time was a butcher's steelyard owned, and still held, by John Claridge. I do not know whether this device had any Weights & Measures certification or other calibration details, probably not. **It still exists but is not in a useable condition. The TG has attempted without success to use it to track back and cross check against it.**

Later, John Claridge purchased a Scalix load cell, stated as capable of measuring up to 150kg and a discrimination of 0.1kg. This unit is still available retailing at a little under £60.00. **I am unable to find this online.** There are no calibration details.

By way of verification of the new load cell, a number of Scows were weighed using both the steelyard and load cell. This exercise was witnessed by Andrew Tyrrell, the then Class Measurer.

The load cell results of Scows previously measured on the steelyard were consistently lower, by just over 1kg.

To achieve comparability with the Scows weighed using the steelyard, all new Scows were measured using the load cell but a 1.057kg pack of lead weight (measured by me on a set of kitchen scales) was put into the Hull being measured. **The TG were unaware of this until recently when advised by the class measurer William Newton.** The presence/use of the lead weight pack is not recorded in the Measurement spreadsheet. This is the process for weighing Scow hulls today. **Noted.**

Notwithstanding the Class Rules (Rule 3j), Hull weight Minimum 100kg, clearly if a 1kg+ lead pack is being added into each hull, to achieve compatibility with the old steelyard measurements, then the actual minimum weight of all Scows is 99kg, not 100kg. **This presumes that the steelyard was underreading by c1 kg as opposed to the new load cell overreading. That is not now possible to prove beyond doubt because neither the steelyard nor the load cell which replaced it are now serviceable. Noting however that it was assumed by the builder and the then measurer that this was the case and that a 'correction' weight of c1 kg was included in the weight of all subsequent hulls, we see no reason to change this now.**

John Claridge has recently purchased a new load cell. The load cell is a :

[Crane Scale OCS-P1.](#)

The device purchased has a maximum load of 1000kg and, as I read it, a load discrimination of 0.5kg, i.e. it will not read any more accurately than 0.5kg. There are other variants of the device, with lower, but ample, maximum load and smaller discrimination, but these did not seem to be available at the time of purchase. There are no calibration details. **This is not suitable for weighing LR Scows. There is no stated level of accuracy. We require a quoted accuracy of +/- 0.2% of full scale (FSD). 0.2% of 1000kg is 2 kg. We should at worst be weighing to an accuracy of better than 1 kg. The Measurement Manual suggests a figure of 0.3 kg.**

It is important to understand the difference between discrimination and accuracy. Discrimination is the number of digits in the display read out. Based on pictures on Amazon, this is to 1 place, ie 0.1 kg. Accuracy is exactly what it says. Assuming an accuracy of 0.2% of FSD and discrimination of 0.1, the best we could guarantee from this unit is +/-2.05 kg. Which is not good enough.

The new unit uses a rechargeable battery and has a handheld remote control and display. The advertised price on Amazon is circa £75.00.

In discussion with John Claridge, the option of doing some comparison weighing using the old and new load cells was discussed. **See above. The old load cell is no longer serviceable.** John Claridge has also purchased new Kitchen Scales for weighing the lighter components in the Scow.

The Measurement Manual specifies the maximum load, accuracy and discrimination of any load cell used, (with which the new load cell will not comply). The manual is silent on any requirements for load cell calibration. **Deliberately. Calibration is expensive. The alternative which we propose is the use of test weights and other items of known weight, tested against the certified test weights. See below.**

The Measurement Manual, Section 2.1, call for hull measurement to be carried out using equipment with the following characteristics:

- Maximum load 200kg
- Accuracy +/- 0.2kg
- Discrimination +/-0.1kg

The Measurement Manual calls for the load cell to be formally calibrated or checked against an appropriately sized known weight at least once per year.

The Measurement Manual is silent on whether the load cell ownership and weight measurement are a boatbuilder responsibility with the Class measurer merely witnessing, or whether the entire weight weighing process, including ownership and calibration of load cells is a Class Measurer responsibility. The latter case may demand a higher level of insurance cover from the LRSCA.

Experience with the RORC Rating Office is that when weighing with an 'owned' load cell, reliability is c98%+. When using load cells owned by others, reliability is of the order of 50%. We therefore consider that it is of very high importance that the Class owns its own load cell which is kept by the boat builder. We see no reason why insurance should be different; the load cell is just another tool used by the builder.

Discussion

When weighing anything, by any weighing device, one may need to consider Accuracy, Repeatability, Reliability. **We want all three.**

When using a set of scales at home to measure one's own weight, repeatability is probably more important than absolute accuracy. Is my weight going up, down or steady?

With Scows, the need is for confidence that Scows weigh the same, within whatever levels of accuracy are required.

That confidence will arise from:

- Definition of weight within the Class Rules
- Using a sufficiently accurate weighing device
- Using a repeatable standard measurement method
- Witnessing weight by the Class Measurer.

One may argue that the present methods favour Repeatability more than absolute Accuracy.

Under the present situation, while all Scows are being weighed in a consistent manner, the actual weight of all Scows is arguably 99kg+, not the 100kg+ recorded in the Measurement spread sheet.

How, under these conditions, will any other boat builder be able to operate?

Will he/she, with their own calibrated load cell or similar build, Scows to Class Rules 100kg, only to find that the hulls are heavier and potentially less competitive than older Scows?

We could (should?) review the measurement process and accuracy. If, as I suspect, the Scows are being recorded as 100kg+ whereas the actual weight is 99kg+ then the following may be considered:

- Revise the Class Rules to specify a minimum hull weight of not less than 99kg. **We agree that we should assume this to be the case and amend the class rules appropriately.**
- Adjusting the recorded weights of all Scows in the Measurement Register, to remove the 1.057kg of weight (or other agreed value) placed in the boat at weigh-in. **Agreed.**
- Define/revise the measurement requirements:
 - Load cell maximum load **Already defined. See above.**
 - Load cell discrimination **Already defined. See above.**
 - Load cell accuracy **Already defined. See above.**
 - Calibration/certification requirements **Already defined. See above.**
- Revising the standard process for weighing Scows. **This is already in hand. We propose to change the weighing condition to 'empty'. ie, remove the loose items currently defined in the class rules. This is the approach taken by IRC for weighing keelboats for the last 35 years. It is reliable, not subject to error and easy to understand. If something is not permanently (ie screwed/bolted or bonded) attached to the boat, it is removed for weighing. "Turn it upside down and shake it. If anything falls out it stays out." Thousands (literally!) of boat owners have had this quoted to them over the years and without**

exception have understood. Adopting this weighing procedure will require a further change to the class rules to compensate for the weight of the loose items no longer included.

NO CHANGES will be required to any existing boats by adopting the above.

There will be schools of thought that say:

- Scows are not like other classes **Not so. All sailing boats are governed by the same physical laws.**
- We do not need super accuracy in measuring weight **Weight is a fundamental driver of speed. We also need to retain the confidence of the class members.**
- What has been done in the past works OK **Yes. But.....**
- What is being done now works OK. **Yes. But.....**

I do not doubt that the way things are now was seen as an easy way of comparing and correcting hull weight measurements between the old steelyard and the original Load Cell, but it may create in a bigger problem in the future.

A decision is needed.

Even if the decision now is, "Do nothing.", then I recommend that; the points raised above, the final decisions and the reasons behind the decisions are carefully recorded and retained in LRSCA records for the benefit of future generations.

Notwithstanding that I have raised this issue, I do not have a preferred outcome, save that the issues are discussed and the outcome documented and retained in LRSCA records.

Regards

David Linsell

Honorary Treasurer

Lymington River Scow Class Association

LR 508

25 July 2025

