



MANX BEAUTY- LOFTING PROCESS

NOVEMBER 2024



Background

The Manx Beauty was built by the East Fife Boat Building Company, based at Cellardyke Harbour, in 1937.



The yard had two sites, the harbourside known as the Bulwark and a yard east of the harbour with some cutting equipment and steam box.

In the 1930's locally built fishing vessels were not built to plan, but to half model, which was then scaled up on a lofting floor make patterns/ moulds. From this process all the angles, curves and wood needed was worked out to enable the build. The yard Owner commissioned a model of this vessel post build but there is no evidence of the original half models surviving.

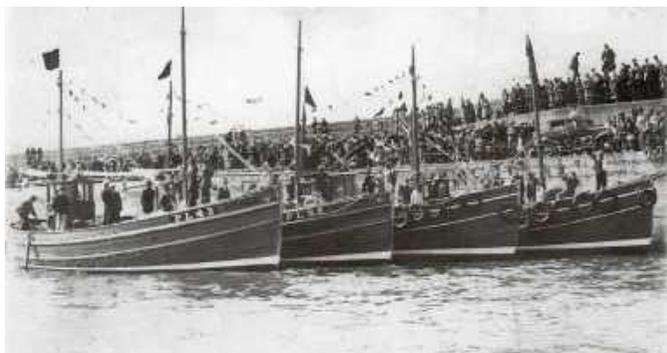
There is no knowledge if this yard ever had its own building where it lofted the 7 vessels built by them (three were identical hulls The Manx Beauty, Manx Fairy and the pilot vessel WR Lister). Where these vessels were originally lofted is currently a mystery.



The East Fife Boat Building Company was owned by Provost WW Carstairs of Cellardyke, he had brought George Forbes of the Forbes boatbuilding family of Sandhaven, near Fraserburgh, down to run the yard. In 1930 Forbes of Sandhaven had built the iconic Gleanaway KY40 the first cruiser sterned motor herring drifter in the UK for Provost Carstairs. They also built the two sister ships for the Manx boats in 1937. It is feasible that they lofted the Manx boats for Carstairs. The Manx Lad and Manx Lass were launched before the two Cellardyke boats.

The only photo we have of all four vessels berthed together is the naming ceremony on the 15th June 1937 at Peel.

There's not enough visual information on this photo to see if there are enough similarities or differences to assume that they were built from the same lofting process. The



Cellardyke built boats are the outside pair of the four and the Sandhaven ones, the inside pair. There are certainly differences in the heavy rubbing strake, and potential differences in the curve of the stem post. The only other evidence of potential differences came from the Late Coull Deas whose father skippered the "Fairy" but he also worked aboard all the vessels as a teenager. He stated that the Cellardyke boats were better sea boats than the Sandhaven ones. We don't know if as a "Dyker" he was just being partisan or if there was any truth in this statement. If it's true then there could have been differences in the hull shapes and then the original lofting may not have been for all four vessels. Hopefully we will find out at some point in the future.

Choice to loft the vessel in full scale

Discussions were held with boatbuilders, the management team and volunteers regarding the best way forward to plan the rebuild. We took into consideration the poor condition of the vessel, the information we had been able to obtain when taking the lines off her in 2020, and the principles of reconstruction as defined by Hannah Cunliffe, Director of National Historic ships and principles in their publication Conserving Historic Ships.

In addition to this as in our original application to the National Lottery Heritage Fund the sharing of Heritage Skills was a key component. The National Lottery Heritage Fund has new investment principles, one of which is “Organisational sustainability”, subsection – “**Support heritage skills development:** collaborate with partners to identify opportunities to build capacity, skills and expertise in heritage, to contribute to thriving communities and economies.” These principles were key to our decision to traditionally loft the boat.

Our choice to loft the vessel full-scale in the traditional way was to provide an authentic experience to a young boatbuilder, to ensure that the skill of full size lofting a vessel was not lost and a new generation of boatbuilder would be enabled to pass on these skills in the future. Over and above this our volunteers would gain new heritage skills and further tie them into the core of the project.

Lofting in this way would enable us to plan more accurately the quantities of wood needed for the rebuild. It would also provide us with moulds or patterns for the frames in the sizes and shapes of the vessel when she was built. Trying to take sizes and shapes off a 90-year-old vessel with all its damage and sagging hull and deck work would be a much longer and complicated process with more potential for mistakes.

The process

1. Taking the lines off the Manx Beauty

The vessel arrived in March 2020, just before lock down. When restrictions were lifted the team were able to try and lift the lines from the vessel.

The blocks supporting the bilges of the vessel were wedged to ensure that she was sitting plum.

The keel was lying horizontal, parallel to the ground.

We constructed a 4-metre-high set square. Marked it off at 0.25 metre points

The vessel was marked at 0.5 metre points along the gunnel taken at right angles from the centre line of the deck, and 0.5m points along the keel.

The set square was positioned vertically along the hull markings at right angles to the keel.

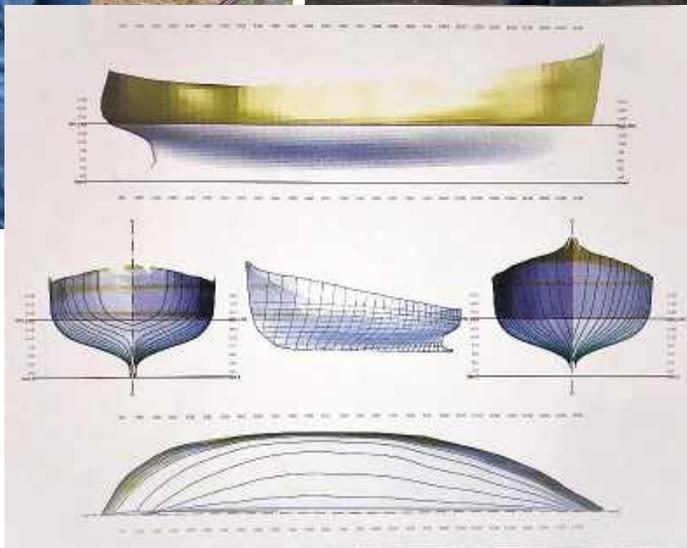
Each time a spirit level was used to ensure the set square was standing true.

With a laser measure we recorded each of the 0.25 m points down the set square and along the hull.

The contours of the bow, stern and sheer line were measured in the same way

This process recorded hundreds of points along the surface of the hull and took four volunteers approximately two full days.



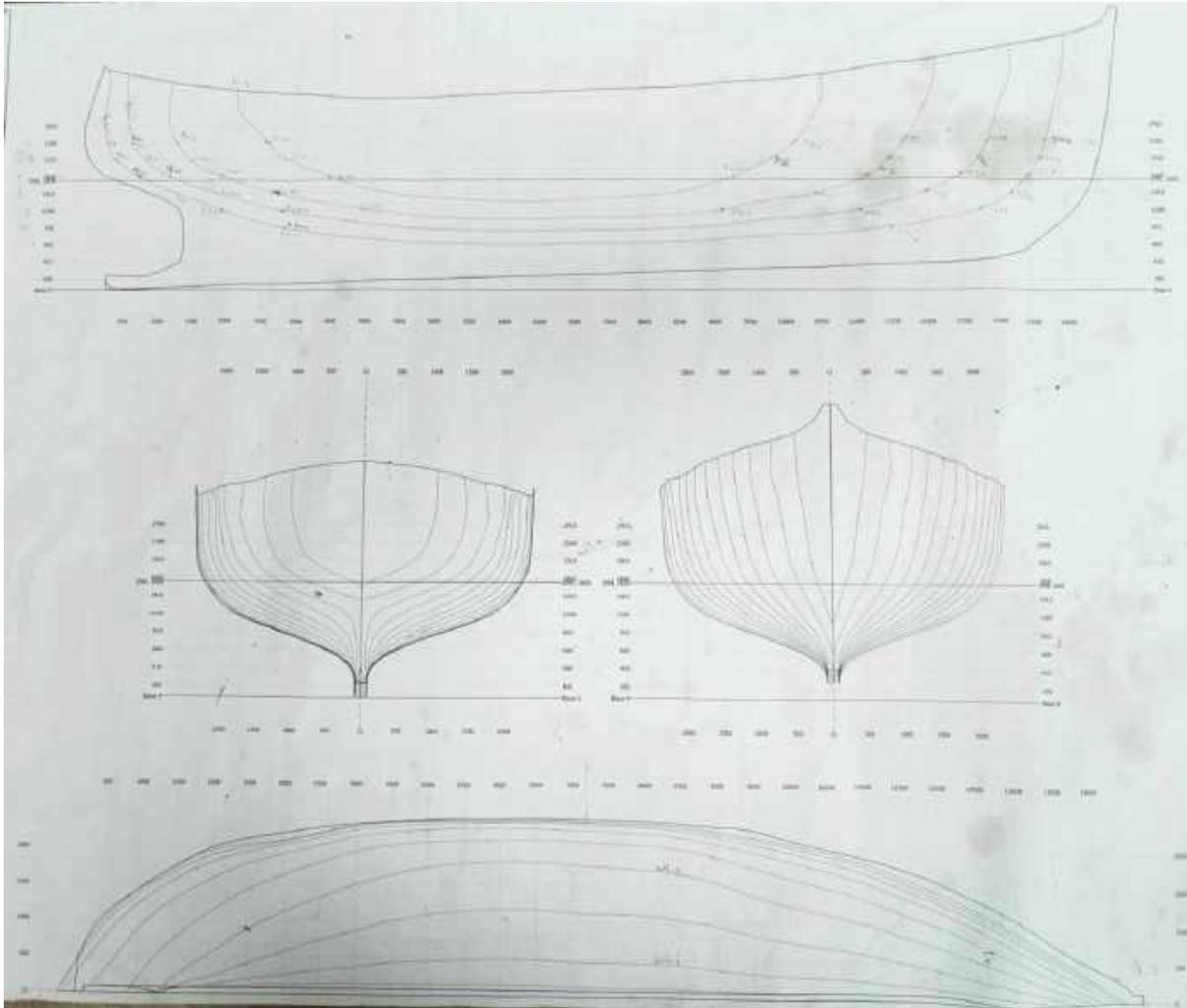


From this Nick Chalmers uploaded the points into a CAD programme and was able to produce these plans.



2. Half Model

It can be seen from these plans the faults and anomalies in what should be smooth curves in the lines. There was however enough information from these plans for volunteer Nick Chalmers to build his first half model, and for boatbuilder Ali Beedie to create a table of offsets to build his half model that was needed to start the lofting process.





*an offset is the distance from the centre plane to the hull's outline at a specific waterline or station. This distance is also known as the "half-breadth distance". Offsets are recorded in a table of offsets, which also lists the heights at different buttocks and stations.

Buttocks are a way to measure how much the bottom sections of a boat deviate from a straight line. Buttocks are represented in different ways depending on the view:

- **Plan view:** Buttocks are shown as parallel straight lines to the keel, usually two or three on each side of the boat.
- **Section view:** Buttocks are shown as parallel straight vertical lines to the centreline.
- **Profile:** Buttocks are shown as curved lines that illustrate the height the buttock crosses the section line.

The profile buttock line and section lines are constantly being adjusted and re-faired

Stations/ sections are equally spaced transverse cross-section slices of the hull as shown in the lines drawing. There may or may not be frames or bulkheads at all or any of the stations.

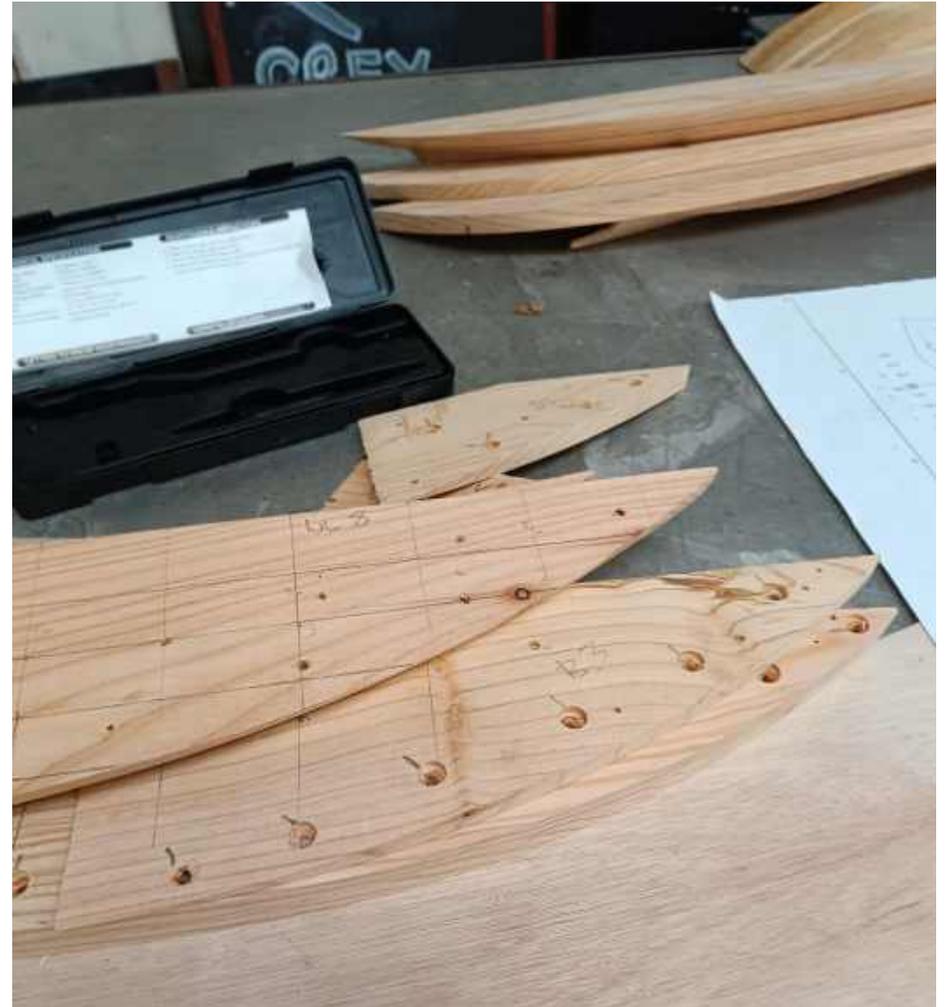
3. The shed and preparation.

We were very lucky to get access to the old Ovenstone engineering works, which has latterly been used as a brewery, just outside Pittenweem, to loft the vessel. 19 sheets of 67mm plywood were painted white and laid on the floor, fixed together this would ensure that we had the full plan for our 14.2m vessel. We set up two slow stop motion cameras to try and capture the full 3-week process.



4. Lofting

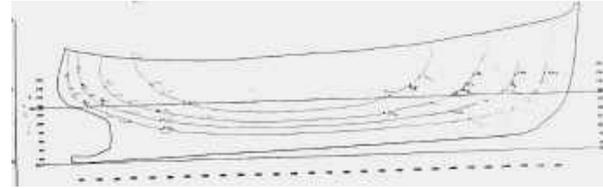
On the first day the half model was separated up and the boards were marked with water lines and buttocks to give the grid to work from, the scale is 1:20





Establishing the line of the keel on the boards

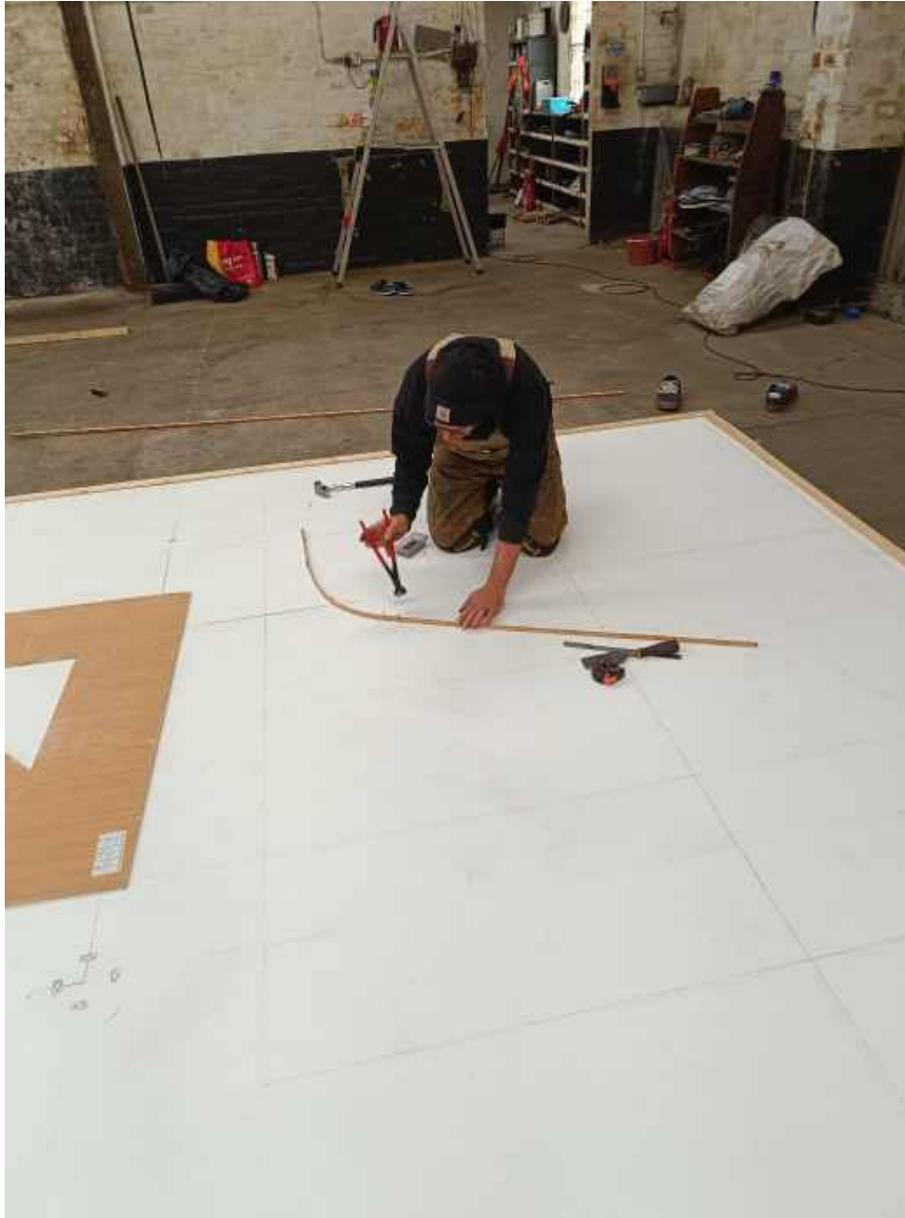
5. Transferring all points



First the **SHEER PLAN**
(side on view)



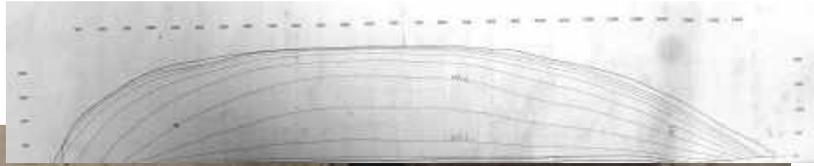
Stern section - Nails are pinned into to the board at the relative points and a flexible piece of wood bent round to ensure a smooth/ fair curve



Bow Section



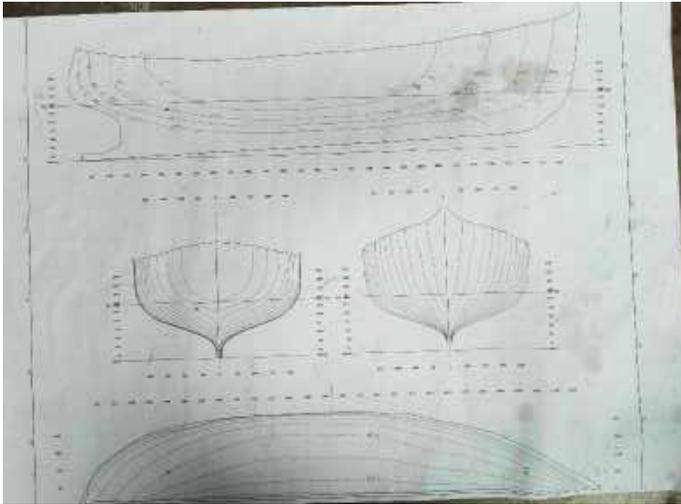
The **HALF BREADTH PLAN**.



The BODY PLAN



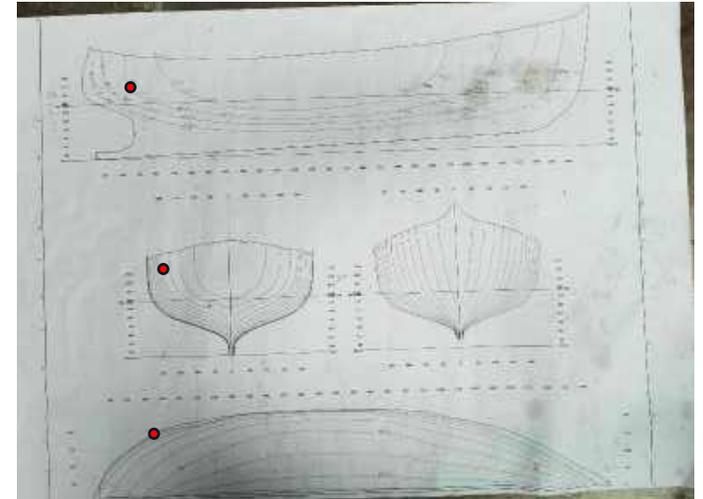
On the lofted floor the left hand side of the centre line is the stern section of the boat and the right hand side bow section

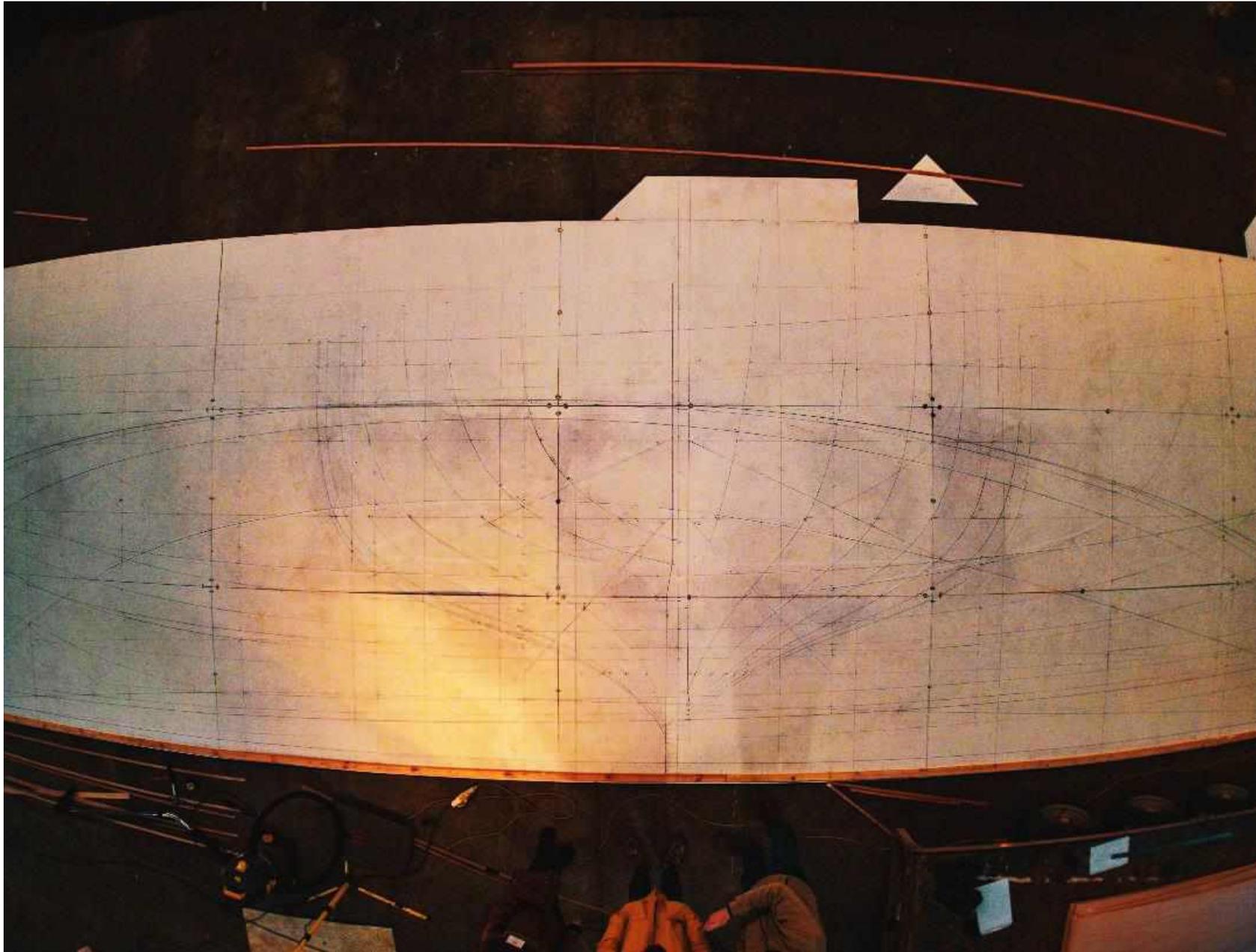


To correct the anomalies in the original lines lifted in 2020, points had to be continually adjusted to ensure that they all matched. A moved point on the sheer plan would then make a point in both the half breadth and body plans incorrect.

These would then have to be adjusted and the points either side of them checked before any curve was adjusted.

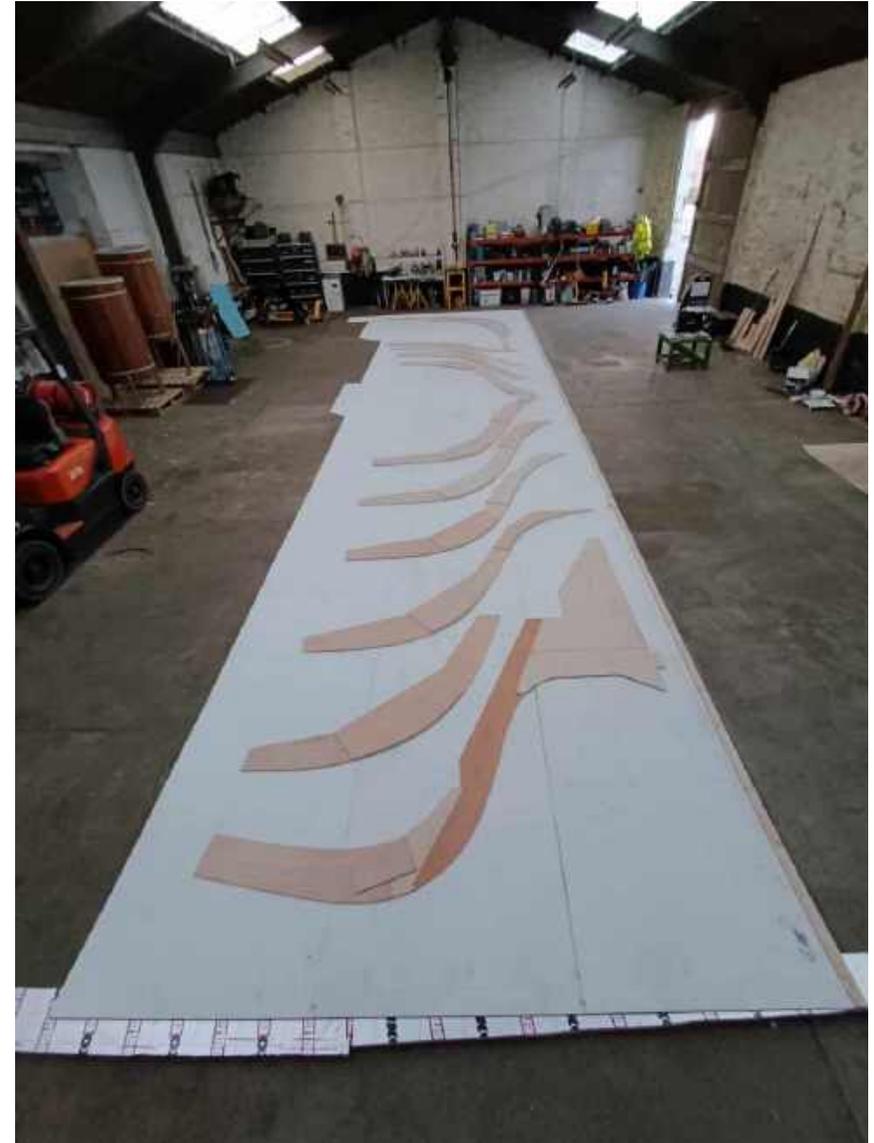
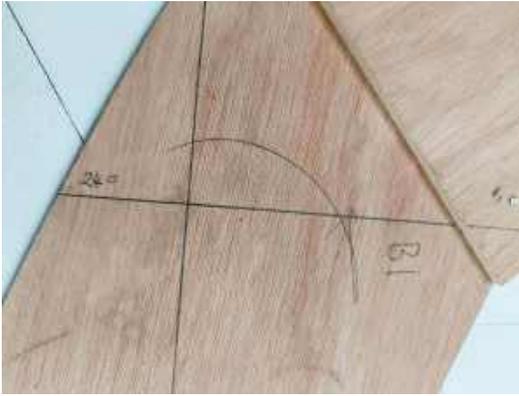
Many points were measured, remeasured, pencil lines added and then corrected. This ensured that on the final lofted floor drawings all shapes and angles of the hull of the boat were continuous and smooth and the hull faired off correctly





A drone view of the lofted vessel, courtesy of Bill Bruce

Patterns or Moulds were made for every 4th frame. On each of these are precise measurements and angles to cut the frames





LOFTING PROCESS November 2024



Conclusion

We are delighted by the three-week process which resulted in the lofting plans for the Manx Beauty and some public involvement in this Development Phase.

This has provided us with full scale plans for the hull of the vessel in the exact format that the original builders would have worked from to build the vessel in 1937.

This detailed information will ensure that in the reconstruction of the Manx Beauty that we are able to build her to her original shape having corrected all the issues and damage that a poorly maintained vessel of 90 years has suffered.

The moulds for the frames will enable us not only to cut the new / replacement/strengthening frames correctly but will save significant time in the measuring and working out of required wood. Mike Griffin, ex Millers boat yard and Rosyth Dockyard contracts manager, our member of the team, who drew up the original materials and requirements and budgets has worked with boatbuilder Ali Beedie and volunteer Nick Chalmers on the lofting. This will enable us to update requirements and costs more effectively and accurately.

Had we not carried out this process, as we dismantled and recorded each individual frame that was needing replaced or strengthened, we would have had to work out how each one related to the overall shape of the hull. Individually we would have to take into consideration the damage the hull had suffered, sagging due to deck beams not holding the hull together, and many other anomalies. Doing this individually could have added months onto the reconstruction phase. We have through the lofting phase corrected the whole hull and given us a true shape to work from.

Other Benefits

We lifted the boards that the lofting was carried out on and have relocated them into our shed in the yard. We now have a fully lofted 1930's Ring net fishing vessel. We do not know if such a thing exists elsewhere. When lofting was done in boatyards originally this work was done directly onto a loft floor and then painted over as a new design was required. Therefore we believe that this full scale lofting is the only one in existence.

We have provided a learning experience for our boatbuilder Ali Beedie who was taught lofting by the man who lofted the original Concorde. Ali however had not full scale lofted a vessel, his knowledge was in smaller scale. During this phase Ali occasionally referred back to his old tutor and also has been in contact with John Watt of Macduff Shipyards, the last Scottish yard to build a large wooden fishing vessel. This experience means that there is now a young boatbuilder who has the skills and experience should this be required again in the future in the maritime heritage industry.

Five volunteers worked on the lofting, two spent significant time, learning the process and working out the angles and points from the half model and offsets to creating the moulds. Volunteer Nick Chalmers has already completed the National Historic Ship Conserving Historic Ships Course (<https://www.nationalhistoricships.org.uk/resources/historic-vessel-conservation-qualification>) and this has significantly added to his learning and skills base. Nick is also the Secretary for the Scottish Fisheries Museum Boats Club, this additional knowledge will be of benefit to the club and the Scottish Fisheries Museum.

We had a small number of visitors to the project who were all enthusiastic, for example - a high School pupil who is going on to study engineering and aeronautics, was impressed by the way three dimensional bodies were developed prior to computers and CAD design. An 86-year-old local joiner/ undertaker and ex-coxswain of the lifeboat



whose grandfather and ancestors had all been fisherfolk was delighted to see this, he had once lofted a very small vessel when younger, he could remember the boatyards doing this for the fishing boats.

The new board of trustees visited lofting and the Manx Beauty and stated that it was important to see all these stages which helped them understand the processes and the development of the project that they were making decisions on.

A talk on the lofting was given to 45 people at a Cellardyke Lunch Club, older people who could not visit the yard. Many of these are locals who pride themselves on the heritage of the area, others have moved in and are interested in what happened here in the past, the group were fascinated in the process and delighted that skills are being passed on based round such an iconic locally built vessel.

As an organisation this process has allowed us to experience some forward movement with has helped Trustees more deeply engage with the project. More importantly for us we have approached the whole process in the spirit of a pilot for each of the investment principles and for the overall evaluation. This has been a challenge for us as we unpick decisions whilst prioritising our values

Richard Wemyss

Chair 9/12/24