



BOAT BUILDING





Navigator's position



Mechanic's position



Cutting-edge technology



Shock absorbing seats



6 seated positions and 17 standing



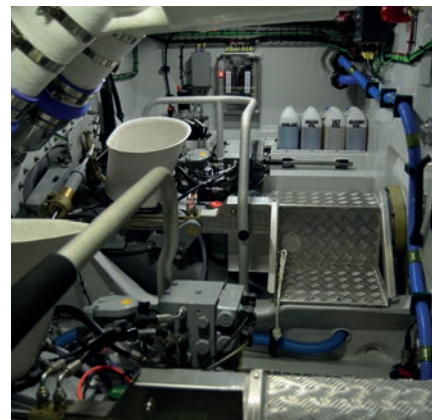
Survival space for 16 survivors



13-litre 650hp Scania D13 engines



Twin Hamilton HJ364 waterjets



Waterjet space



Protected wheelhouse entrance



Upper steering position (USP)



Heavily reinforced coach roof

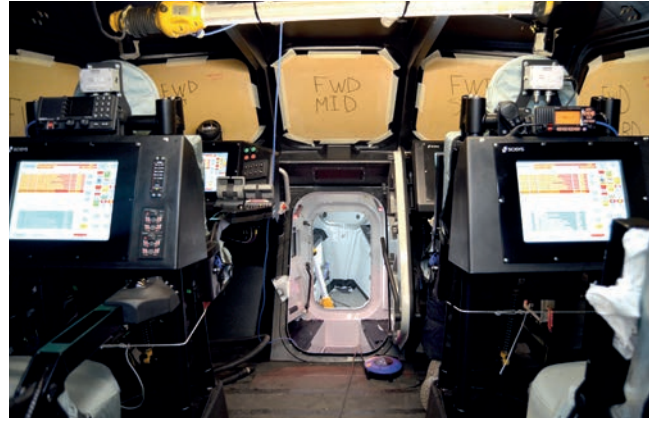


# BOAT BUILDING CAPABILITY

Berthon has been building workboats since 1877. In more recent times, this has included the production of pilot boats, barges and several classes of all-weather lifeboats for the RNLI. Berthon has undertaken work for both private sector and public organisations. Over the last 30 years Berthon has built 36 all-weather lifeboats for the RNLI including the Arun and Severn class lifeboats and, most recently, 12 of the new Shannon class fast lifeboats.

## SHANNON CLASS LIFEBOATS – INNOVATION THAT CUTS PRODUCTION TIME AND COSTS

Berthon developed innovative build and production line strategies that helped optimise build productivity whilst minimising costs for the RNLI. The 'open-sky' hull fit out process enabled the best possible access for engineers and lifting equipment, whilst simultaneously allowing extensive fitting out of the deck and wheelhouse prior to the assembly and finishing of the vessel. This approach helped mitigate the amount of work required to complete the build when the hull and deck were closed up. Being able to assess the state of production easily, and at any point in time, improved both the productivity of the workforce and health and safety aspects of the builds.



Pre-installation fitting out of a Shannon class lifeboat deck and wheelhouse



Open sky fitting out of a Shannon

“ OUTSTANDING  
LEVEL OF SERVICE ”



Production line of Shannon lifeboats





1 Hull and deck moulding 'trial fit'

## BUILDING THE SHANNON CLASS LIFEBOAT

- 1 At this initial stage a 'trial fit' of the hull and deck is undertaken to ensure a good fit and join. The Hull and deck are then separated, and the deck and wheelhouse moulding undergo a period of composite fit out internally and externally before painting. The wheelhouse sole is fitted thereby maximising the amount of fit out that can be carried out before the wheelhouse is fitted to the hull.
- 2 'Open-sky' composite fit out of hull. All of the secondary composite bonding (equipment fixing pads, cable ducts, tapping plates, etc.) is installed during this phase when there is easy access to the hull.
- 3 The inside of the hull is painted before open-sky fit out takes place. The deck and wheelhouse moulding are also painted at this stage.
- 4 Most of the hull equipment and systems are installed during this phase when there is easy access into the hull. This includes an extensive fit out internally and externally, including wheelhouse fittings and windows, before fixing to the hull. Other overhead fit out such as light fittings, cable runs, etc. are also fitted while the deck is supported on the workshop floor.



2 'Open-sky' composite fit out of hull



3 Deck and Wheelhouse mould ready for painting



4 Fitting the hull electronics

"Berthon has proven to be one of the best organisations with which we've worked, to be able to deliver such a complex product as the Shannon Lifeboat."

Charles Hunter-Pease,  
Chairman RNLI



**5** The deck and wheelhouse are then lifted onto the hull. The underside of the wheelhouse sole forms the engine compartment deckhead and has already been insulated. Once the deck and wheelhouse are bonded to the hull the final fitting out takes place including the installation of the fender, and other fittings that rely on the hull/deck joint being complete.

**6** The completed boat is later returned to Berthon's paint oven for post-cure of the structural adhesive which bonds the hull and deck together.

**7** Once launched, each boat undergoes a comprehensive period of commissioning and trialing. The sea trials are split into several different areas to maintain testing focus, from machinery and vibration, electronics and SIMs, to speed and endurance trials. These are carried out by Berthon and the RNLI before the boat is presented for acceptance and handed over.



**5** Deck and wheelhouse lifted onto the hull



**6** Post-cure bonding of the hull and deck together in Berthon's paint oven



**7** Shannon undergoing comprehensive period of commissioning and sea trials



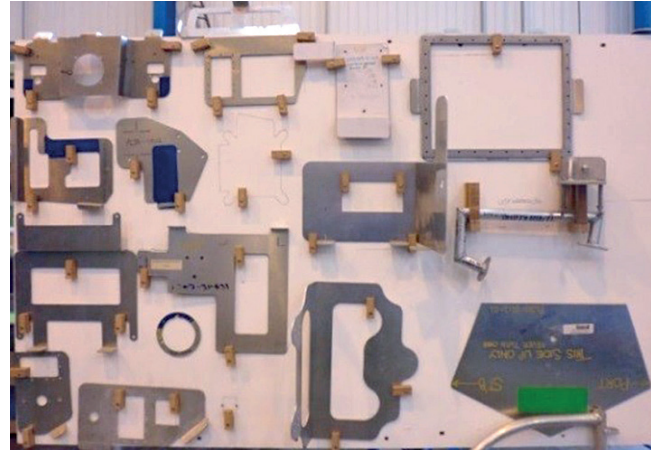
# CONTINUOUS IMPROVEMENT AND LEAN MANAGEMENT

## HOW DESIGN AND PRODUCTION ARE LINKED

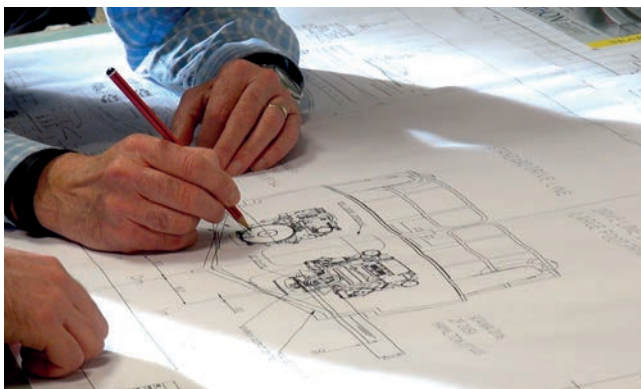
Berthon understands the fundamental link between design and production, particularly the huge impact that design information has on productivity. Drawing packs and parts lists are structured to match the build processes, thereby ensuring that our skilled boat builders have the right information, and the right parts at the right time to complete the job effectively. Furthermore, all the parts, adhesives, fasteners, consumables and PPE for each job are pre-delivered to the lineside workplace this increasing efficiency.

The Shannons were highly complex boat builds and, as well as working closely with the RNLI, Berthon production engineered the design and project managed the build process effectively to deliver significant cost savings. Berthon implemented continuous improvement processes and will apply the best practices developed during the build of the Shannon class vessels, to future boat building programmes.

A shadow board of templates and jigs were developed by Berthon for the Shannon project under Berthon's lean manufacturing continuous improvement process.



Shadow board of templates



New boat designs are reviewed in detail



Project managers at Berthon



Shannon undergoing sea trials – note dry decks!

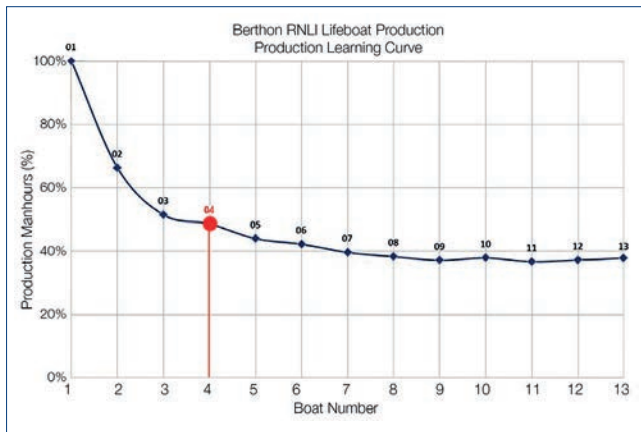
Berthon continuously reviews its manufacturing and refit processes, adopting modern series-production techniques required for similar size and type boat production passing on the benefits to clients.

As well as a skilled and motivated workforce, Berthon have modern facilities that benefit from regular and continuous investment and a multitude of project managers with many years of knowledge and experience.

For each project we adapt and develop a build strategy based upon our familiarity with different types of workboat, building on our refit experience to ensure ease of maintenance and serviceability. We confidently expect to achieve similar significant cost and time savings as proven in the Shannon programme.



Some of the 12 Shannon lifeboats built in only 3 years at berthon

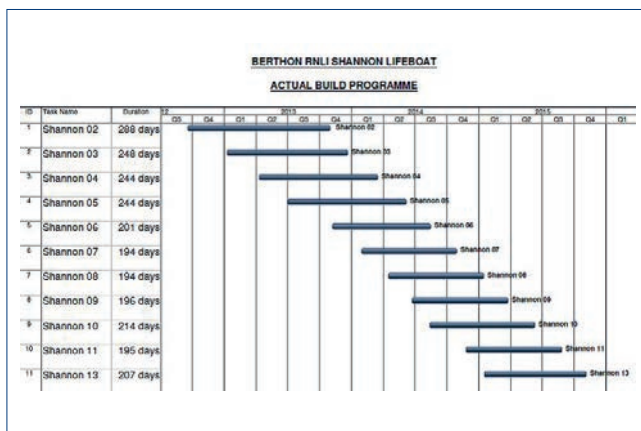


Production learning curve

By the production of the 4th boat, the man hours taken to produce the Shannon had been reduced to approximately half of those spent on the first boat.



Charles Hunter-Pease, chairman of the RNLI, and Dominic May exchange gifts following the acceptance of the final Shannon Lifeboat



Build programme

Berthon built 12 Shannon Lifeboats in 3 years. At the peak of production a new boat was delivered every 6 to 8 weeks.

“Berthon has built 36 lifeboats: Arun, Severn and Shannon and indeed they’ve built all the Shannon’s so far, that we have had. Berthon has displayed amazing qualities during the build and I think this is down to the teamwork within the organisation. Every single person in Berthon gets involved and discharges their responsibility to ensure that we receive a world class product. It’s proof because the crews are very proud of the boats that they get and, so far, in the last 30 years, Berthon lifeboats have saved 584 lives.”

Charles Hunter-Pease,  
Chairman RNLI



## Certificate of Recognition and Appreciation

3 ARUN CLASS, 21 SEVERN CLASS AND 12 SHANNON CLASS ALL-WEATHER LIFEBOATS



This certificate celebrates the long and successful partnership between BERTHON Boat Company and the Royal National Lifeboat Institution (RNLI). This partnership has played a key part in equipping the RNLI in its mission to save lives around the coasts of the UK, Republic of Ireland, Isle of Man and Channel Islands.

Between 1986 and 2015, the RNLI and BERTHON worked together to build 3 Arun class, 21 Severn class and 12 Shannon class lifeboats.

**Total lives saved between 1986 and 2015: 584**

Charles Hunter-Pease, RNLI Chairman



**BERTHON**

