

RMS QUEEN MARY 2

Bridge and Navigation Information.

Overall Length: 1132 ft (345m)

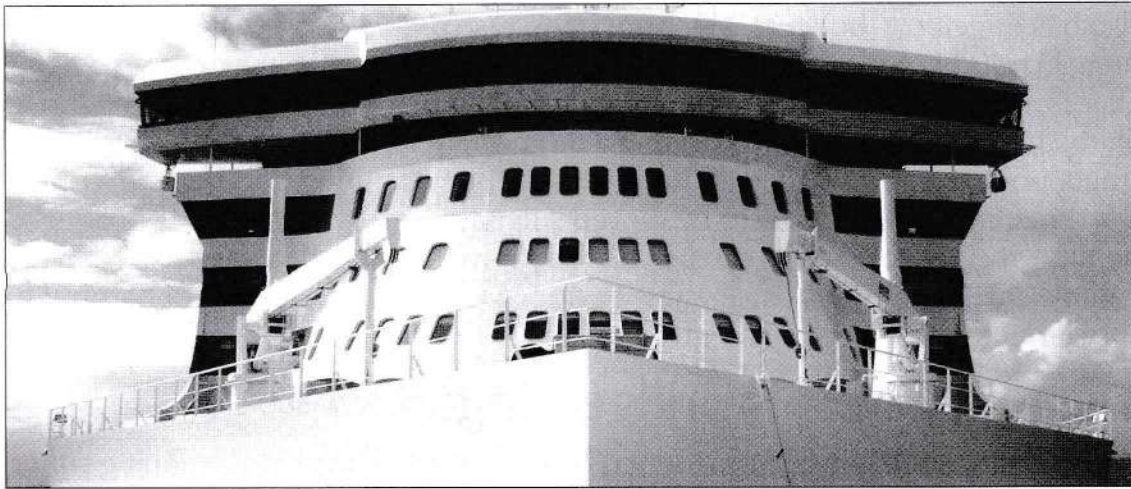
Width: 148 ft (45m)

Loaded Displacement: 79,827 tonnes

Gross Tonnage: 149,215 GRT

Height of Funnel Above Waterline: 204ft (62m)

Maximum Draft: 33ft 10 in (10.3m)



The Bridge Team.

The bridge is located on Deck 12, some 41m (135ft) above the waterline. It is the navigation and safety hub of the ship and comprises a central navigation area, chart room, safety centre and enclosed bridge wings.

The bridge is manned 24 hours a day by two deck officers. The officers are assisted by quartermasters who keep lookout and steer the ship by hand when required. The bridge officers work in watches; four hours on the bridge, followed by eight hours in which to rest and carry out other duties such as passage planning, maintaining the ship's folio of paper and electronic charts and publications, inspection and maintenance of safety equipment and keeping the ship's official log book. The watches are commonly referred to as the '4 to 8', '8 to 12' and '12 to 4', and cover those hours in the morning and evening. For example, the 8 to 12 watch are on the bridge from 8.00am to noon, and from 8.00pm to midnight.

The primary duty of the bridge officers is the navigation of the ship, allowing for the safe and timely arrival of Queen Mary 2 at her destination. This involves knowing the ship's position and being aware of the ship's surroundings at all times, complying with the laws of the sea, the 'rule of the road' and various international and regional environmental regulations. At sea, either officer may take the position of "navigator", responsible for conning (driving) the ship. The other officer, the 'co-navigator', provides support by looking ahead, carrying out additional duties such as fixing the ship's position, keeping the deck logbook and handling internal and external communications. The two officers swap on a regular basis.

In certain situations, such as in areas with very dense shipping traffic or when the visibility is reduced, the bridge team is supplemented by a senior officer; the Captain, Deputy Captain or Safety Officer. Further officers are present for arrivals and departures, allowing the workload to be spread evenly.

Propulsion.

Queen Mary 2 is the first four propeller ocean liner built since SS France in 1962. Instead of conventional propellers connected through long shafts to the engines, Queen Mary 2's propellers are driven electric motors contained in pods attached to the underside of the hull. Each pod weighs more than an unladen Boeing 747. The forward two pods are located outboard, or away from the centerline of the ship. They are fixed in position and provide only ahead and astern propulsion. The two after pods are slightly closer together and are can be rotated fully through 360°. These pods provide both propulsion and steering, meaning that Queen Mary 2 does not have a conventional rudder.

The ship also has three bow thrusters, which are transverse propellers with an output of approximately 13,500 horsepower. The thrusters start to lose their effectiveness at speeds above five knots. One hinged door on each side of three thruster tunnels, covers the thruster openings in the hull when not in use, providing a more streamlined shape for high speeds. The two azimuthing pods are often placed at 90° angles to the hull during docking and, combined with the bow thrusters, allow the ship to be moved sideways while maintaining the same heading. At the same time, the two fixed pods can be used to move the ship ahead and astern. With such manoeuvrability, Queen Mary 2 is usually able to dock without the assistance of harbour tugs and is able to turn around within her own length.

Bridge wings.

The bridge wings offer a dramatic, unobstructed view along the ship's side, spanning some 53m. This allows the bridge team to watch the ship's hull as it approaches a pier and to judge distances when manoeuvring in harbours. Glass plates are cut into the deck on the wing, allowing the officers to look directly beneath them. The pods and thrusters may be controlled from the bridge wing, and there are various information displays.

Kelvin Hughes MantaDigital.

The Kelvin Hughes MantaDigital system comprises eight independent computer processors, connected to large displays on the bridge consoles. Each screen is multi-purpose and can show electronic charts, a radar display, a conning display or a route planning application. Each system is approved as an ECDIS; an Electronic Chart Display and Information System; meaning that Queen Mary 2 may sail with no paper charts on board. The ship retains a small folio of paper charts covering critical areas.

The electronic charts are produced by various Hydrographic Offices and issued by the British Admiralty. They allow the operator to choose various information layers within the chart and individually tailor the display. The ship's position is continuously plotted, and the ECDIS provides advance warning of any dangers ahead. An entire world folio of electronic charts may now be stored on just one DVD. Updates and corrections to reflect new soundings, changes in buoyage and other similar information are supplied weekly by email.

The ECDIS is not solely reliant on the GPS input for position information. Visual bearings and radar ranges from prominent navigational marks and land features may be plotted manually on the charts, allowing the officers to cross check the electronic system. The system also allows celestial fixes, derived from sextant sights, to be plotted. Celestial navigation remains an essential skill for all deck officers.

Radars.

Queen Mary 2 is fitted with six radar scanners; four on the main mast above the bridge, one on the bow and one on the stern. Four of the radars operate on a wavelength of 3cm which provides good definition and two operate on a wavelength of 10cm which is less susceptible to clutter caused by precipitation.

While the radars provide excellent long range detection, a good lookout by sight and hearing remains the primary means of locating other vessels and navigational marks. The bridge is kept dark at night and all forward facing lights are curtained off so as not to hamper the night vision of the watch keepers.

With the built in automatic radar plotting aid (ARPA), over 40 radar echoes (known as "targets") can be tracked simultaneously. Various important pieces of information are readily accessible, including the target's course and speed, closest point of approach, time to closest point of approach and other collision avoidance information. This may be supplemented using information from the other ship's Automatic Identification System (AIS) which broadcasts information such as the ship's name, destination, dimensions and type using VHF radio signals. Should the officer of the watch wish to alter course, the ARPA can predict both numerically and visually the expected path of targets based upon the ship's intended new course and speed.

With the integration of the bridge equipment, the radar is now commonly displayed overlaid on an electronic chart, giving the operator all pertinent information on one display.

Compasses.

Queen Mary 2 is fitted with two fibre optic gyrocompasses, which are electronic compasses that align themselves with true north. This information is sent to various repeaters throughout the ship, and is used by the helmsman when steering. The gyrocompass also provides an input into the radars, ECDIS and various other pieces of navigational equipment. The officers check the accuracy of the gyrocompass several times a day by taking bearings of celestial bodies and comparing their gyro bearing with a calculated true bearing. Queen Mary 2 also carries a magnetic compass, located directly above the bridge, which reads slightly differently from true north due to variations in magnetic fields around the world as well as the influence of the magnetic field surrounding the ship. The magnetic field surrounding the ship is influenced by the ship's steel and electrical equipment and changes depending on the ship's heading.

GPS.

Queen Mary 2 is fitted with three GPS receivers. The Global Positioning System uses 24 satellites circling the Earth to pinpoint Queen Mary 2's position. The GPS also receives differential signals from shore stations which correct for any errors and increase the accuracy of the GPS to within one metre. Like the compasses, the GPS provides an input to various bridge equipment including the radars, ECDIS and communications equipment. The bridge team.

Steering.

At sea, Queen Mary 2 is mostly steered by an autopilot integrated with the ECDIS which sends signals to the pods to keep the ship on a set heading. The steering may also be controlled using the ship's wheel, the pod controls, backup tillers or locally from the pod rooms. A helmsman is on the wheel for all arrivals and departures, major course alterations and in areas with dense shipping traffic.

Echo sounders.

There are two echo sounder transducers located in the ship's bottom plating; one forward and one aft. These transducers emit a sound signal towards the sea bed, and measure the time taken for the signal to return, similar in principle to radar. The depth beneath the keel may then be determined and displayed on the bridge both numerically and graphically.

Speed logs.

While GPS provides speed over the ground, the ship is fitted with Doppler and electromagnetic logs which show the ship's speed through the water.

Stabilisers.

The ship is fitted with four stabilisers that extend approximately 5m (15ft) from the ship's hull when in use. They are similar in form to an aircraft wing, and act to reduce the rolling motion by changing their angle of attack. They are less effective at slow speeds as they require a good flow of water to generate the necessary thrust.

Global Maritime Distress and Safety System.

GMDSS is a worldwide system that allows ships to quickly transmit distress messages to both shore based rescue centres as well as to nearby ships. The equipment includes radio transceivers operating on the VHF, MF and HF bands, two radiotelex terminals, two INMARSAT-C satellite terminals and a NAVTEX unit. The system is also used to promulgate navigational warnings, weather information and can be used for commercial communication.

Whistles.

Queen Mary 2 has five whistles; two on the funnel, one on the main mast above the bridge and two on the bow. Of the two whistles on the funnel, the starboard whistle was originally fitted on Queen Mary. It was originally powered by steam, but was converted by its original manufacturer to work on compressed air. The port whistle is an accurate but modern replica. The forward whistles can be heard for over ten miles and are used for manoeuvring signals to other vessels and during periods of reduced visibility. The whistles are tested every day at noon when at sea.

Safety Management and Control System.

The Safety Management and Control System (SMCS) allows the officer of the watch to monitor all safety systems throughout the ship and, with the detailed deck plans covering the entire ship, have a visual indication of any developing situation. All watertight doors, fire screen doors, ventilation, low level lighting and other safety systems can be operated through this system on the bridge and in the safety centre.

Ancillary equipment.

The Valmarine automation system allows for monitoring of engine performance and adjusting the levels in the heeling tanks to keep the ship upright. The NAPA stability computer calculates the ship's stability condition, and is connected to sensors in every fuel, fresh water and sea water ballast tank on board. Various panels allow control of the ship's external lighting, as well as navigation and signalling lights. The bridge is fitted with a public address system console.

Queen Mary 2 is a Voluntary Observing Ship for the United Kingdom Met Office. The bridge officers send regular weather observations, including atmospheric pressure, air and sea temperatures and wind and wave information to the Met Office. This information is fed into the Met Office supercomputer and is used to assist in generating weather forecasts. The ship is supplied with precision observing instruments and specialist computer software for this purpose.