

# Titanic

**RMS *Titanic*** was a British ocean liner that sank in the early hours of 15 April 1912 as a result of striking an iceberg on her maiden voyage from Southampton, England, to New York City, United States. Of the estimated 2,224 passengers and crew aboard, approximately 1,500 died (estimates vary), making the incident one of the deadliest peacetime sinkings of a single ship.<sup>[4]</sup> *Titanic*, operated by White Star Line, carried some of the wealthiest people in the world, as well as hundreds of emigrants from the British Isles, Scandinavia, and elsewhere in Europe who were seeking a new life in the United States and Canada. The disaster drew public attention, spurred major changes in maritime safety regulations, and inspired a lasting legacy in popular culture. It was the second time White Star Line had lost a ship on her maiden voyage, the first being RMS *Tayleur* in 1854.

*Titanic* was the largest ship afloat upon entering service and the second of three Olympic-class ocean liners built for White Star Line. The ship was built by the Harland and Wolff shipbuilding company in Belfast. Thomas Andrews Jr., the chief naval architect of the shipyard, died in the disaster. *Titanic* was under the command of Captain Edward John Smith, who went down with the ship. J. Bruce Ismay, White Star Line's chairman, managed to get into a lifeboat and survived.

The first-class accommodations were designed to be the pinnacle of comfort and luxury. They included a gymnasium, swimming pool, smoking rooms, fine restaurants and cafes, a Victorian-style Turkish bath, and hundreds of opulent cabins. A high-powered radiotelegraph transmitter was available to send passenger "marconigrams" and for the ship's operational use. *Titanic* had advanced safety features, such as watertight compartments and remotely activated watertight doors, which contributed to the ship's reputation as "unsinkable".

*Titanic* was equipped with sixteen lifeboat davits, each capable of lowering three lifeboats, for a total capacity of 48 boats. Despite this capacity, the ship was scantily equipped with a total of only twenty lifeboats. Fourteen of these were regular lifeboats, two were cutter lifeboats, and four were collapsible and proved difficult to launch while the ship was sinking. Together, the lifeboats could hold 1,178 people — roughly half the number of passengers on board, and a third of the number of passengers the ship could have carried at full capacity (a number consistent with the maritime safety regulations of the era). The British Board of Trade's regulations required fourteen lifeboats for a ship of 10,000 tonnes. *Titanic* carried six more than required, allowing 338 extra people room in lifeboats. When the ship sank, the lifeboats that had been lowered were only filled up to an average of 60%.

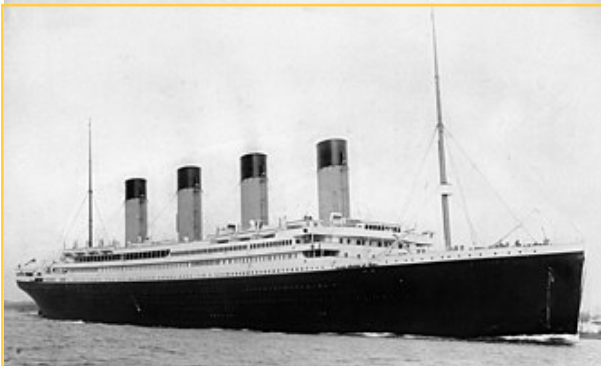
# Background



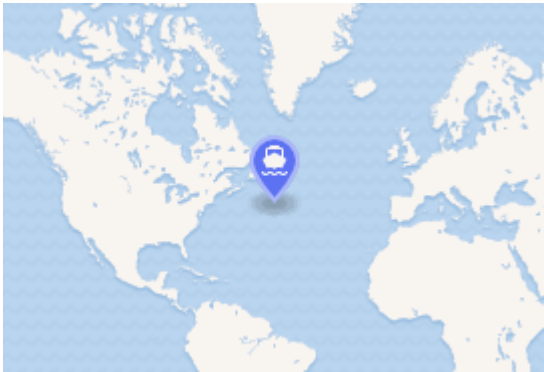
Gaumont newsreel containing the only known footage of *Titanic*, 1912

The name *Titanic* derives from the [Titans](#) of Greek mythology. Built in [Belfast](#), Ireland, in what was then the [United Kingdom of Great Britain and Ireland](#), *RMS Titanic* was the second of the three *Olympic-class ocean liners*—the lead vessel was *RMS Olympic* and the final ship in the class was *HMHS Britannic*.<sup>[5]</sup> They were by far the largest vessels of the British shipping company [White Star Line](#)'s fleet, which comprised 29 steamers and tenders in 1912.<sup>[6]</sup> The three ships had their genesis in a discussion in mid-1907 between the White Star Line's chairman, [J. Bruce Ismay](#), and the American financier [J. P. Morgan](#), who controlled the White Star Line's parent corporation, the [International Mercantile Marine Co.](#) (IMM).

White Star faced an increasing challenge from its main rivals, [Cunard Line](#)—which, with the aid of the [Admiralty](#), had recently launched the twin sister ships *Lusitania* and *Mauretania*, the fastest passenger ships then in service—and the German lines [Hamburg America](#) and [Norddeutscher Lloyd](#). Ismay preferred to compete on size rather than speed and proposed to commission a new class of liners larger than anything that had come before, which would be the last word in comfort and luxury.<sup>[7]</sup> The new ships would have sufficient speed to maintain a weekly service with only three ships instead of the original four. *Olympic* and *Titanic* would replace *RMS Teutonic* of 1889, *RMS Majestic* of 1890 and *RMS Adriatic* of 1907. *RMS Oceanic*





RMS *Titanic* departing [Southampton](#) for the only time on 10 April 1912



Wikimedia | © OpenStreetMap

Location of *Titanic* wreck


History	
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Name	RMS <i>Titanic</i>
Namesake	<a href="#">Titans</a>
Owner	 <a href="#">White Star Line</a>
Operator	White Star Line
Port of registry	 <a href="#">Liverpool</a> , England
Route	<a href="#">Southampton</a> to <a href="#">New York City</a>
Ordered	17 September 1908
Builder	<a href="#">Harland and Wolff</a> , <a href="#">Belfast</a>
Cost	£1.5 million (£180 million in 2023)
Yard number	401
Way number	400

first departed from a new home port in June 1907 along with the *Teutonic*, *Majestic*, and the new *Adriatic* on the Southampton-New York run.<sup>[8]</sup>

The ships were constructed by the Belfast shipbuilder [Harland & Wolff](#), which had a long-established relationship with the White Star Line dating back to 1867.<sup>[9]</sup> Harland and Wolff were given a great deal of latitude in designing ships for the White Star Line; the usual approach was for [Wilhelm Wolff](#) to sketch a general concept, which [Edward James Harland](#) would turn into a ship design. Cost considerations were a relatively low priority; Harland & Wolff were authorised to spend what it needed on the ships, plus a five per cent profit margin.<sup>[9]</sup> In the case of the *Olympic*-class ships, a cost of £3 million (approximately £370 million in 2023) for the first two ships was agreed, plus "extras to contract" and the usual five per cent fee.<sup>[10]</sup>

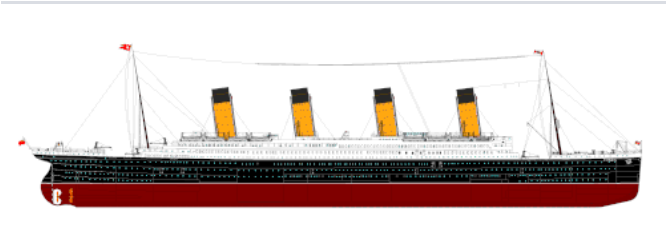
Harland and Wolff put their leading designers to work designing *Olympic*-class vessels. The design was overseen by [Lord Pirrie](#), a director of both Harland and Wolff and the White Star Line; [naval architect Thomas Andrews](#), the managing director of Harland and Wolff's design department; Edward Wilding, Andrews's deputy and responsible for calculating the ship's design, stability and trim; and [Alexander Carlisle](#), the shipyard's chief draughtsman and general manager.<sup>[11]</sup> Carlisle's responsibilities included the decorations, equipment, and all general arrangements, including the implementation of an efficient [lifeboat davit](#) design.<sup>[a]</sup>

On 29 July 1908, Harland and Wolff presented the drawings to J. Bruce Ismay and other White Star Line executives. Ismay approved the design and signed three "letters of agreement" two days later, authorising the start of construction.<sup>[14]</sup> At this point, the first ship—which was later to become *Olympic*—had no name but was referred to simply as "Number 400", as it was Harland and Wolff's

<b>Laid down</b>	31 March 1909
<b>Launched</b>	31 May 1911
<b>Completed</b>	2 April 1912
<b>Maiden voyage</b>	10 April 1912
<b>In service</b>	10 April 1912
<b>Out of service</b>	15 April 1912
<b>Identification</b>	<div>UK <a href="#">official number</a> 131428<sup>[1]</sup></div> <div><a href="#">Code letters</a> HVMP<sup>[2]</sup></div> <div></div> <div><a href="#">Wireless call sign</a> MGY</div>
<b>Fate</b>	<a href="#">Foundered</a> April 15, 1912 after striking an iceberg
<b>Status</b>	<a href="#">Wreck</a>
<b>General characteristics</b>	
<b>Class and type</b>	<i>Olympic</i> -class <a href="#">ocean liner</a>
<b>Tonnage</b>	46,329 <a href="#">GRT</a> , 21,831 <a href="#">NRT</a>
<b>Displacement</b>	52,310 tonnes
<b>Length</b>	882 ft 9 in (269.1 m) <a href="#">overall</a>
<b>Beam</b>	92 ft 6 in (28.2 m)
<b>Height</b>	175 ft (53.3 m) (keel to top of funnels)
<b>Draught</b>	34 ft 7 in (10.5 m)
<b>Depth</b>	64 ft 6 in (19.7 m)
<b>Decks</b>	9 (A–G)
<b>Installed power</b>	24 double-ended and five single-ended <a href="#">boilers</a> feeding two

400th hull. *Titanic* was based on a revised version of the same design and was given the number 401.<sup>[15]</sup>

## Dimensions and layout



Starboard view drawing of *Titanic*

*Titanic* was 882 feet 9 inches (269.06 m) long with a maximum breadth of 92 feet 6 inches (28.19 m).

The ship's total height, measured from the base of the keel to the top of the bridge, was 104 feet (32 m).<sup>[16]</sup> *Titanic* measured 46,329 GRT and 21,831 NRT<sup>[17]</sup> and with a draught of 34 feet 7 inches (10.54 m) and displaced 52,310 tonnes.<sup>[5]</sup>

All three of the *Olympic*-class ships had ten decks (excluding the top of the officers' quarters), eight of which were for passenger use. From top to bottom, the decks were:

- The **boat deck**, on which the lifeboats were housed. It was from here during the early hours of 15 April 1912 that *Titanic*'s lifeboats were lowered into the North Atlantic. The bridge and wheelhouse were at the forward end, in front of the captain's and officers' quarters. The bridge stood 8 feet (2.4 m) above the deck, extending out to either side so that the ship could be controlled while docking. The wheelhouse stood within the bridge. The entrance to the First Class [Grand Staircase](#) and gymnasium were located midships along with the raised roof of the First Class lounge, while at the rear of the deck were the roof of the First Class smoke room and the Second Class entrance. Just forward of the Second Class entrance sat the kennels, where the First Class passengers' dogs would stay. The wood-covered deck was divided into four segregated promenades: for officers, First Class passengers, engineers, and Second Class passengers respectively. Lifeboats lined the side of the deck except in the First Class area, where there was a gap so that the view would not be spoiled.<sup>[18][19]</sup>
- **A Deck**, also called the **promenade deck**, extended along the entire 546 feet (166 m) length of the [superstructure](#). It was reserved exclusively for First Class passengers and contained First Class cabins, the First Class reading and writing room, lounge, smoke room, and Palm Court.<sup>[18]</sup>
- **B Deck**, the **bridge deck**, was the top weight-bearing deck and the uppermost level of the hull. More First Class passenger accommodations were located here with six palatial staterooms (cabins) featuring their own private promenades. On *Titanic*, the à la carte restaurant and the Café Parisien provided luxury dining facilities to First Class passengers. Both were run by subcontracted chefs and their staff; all were lost in the disaster. The Second Class smoking room and entrance hall were both located on this deck. The raised forecastle of the ship was forward of the bridge deck, accommodating Number 1 hatch (the main

	<a href="#">reciprocating steam engines</a> for the wing propellers, and a low-pressure turbine for the centre propeller; <sup>[3]</sup> output: 46,000 <a href="#">HP</a>
Propulsion	Two three-blade wing propellers and one centre propeller
Speed	Service: 21 <a href="#">kn</a> (39 km/h; 24 mph)  Max: 23 kn (43 km/h; 26 mph)
Capacity	2,453 passengers and 874 crew (3,327 in total)
Notes	Lifeboats: 20 (sufficient for 1,178 people)

hatch through to the cargo holds), numerous pieces of machinery and the anchor housings.<sup>[b]</sup> Aft of the bridge deck was the raised [poop deck](#), 106 feet (32 m) long, used as a promenade by Third Class passengers. It was where many of *Titanic*'s passengers and crew made their last stand as the ship sank. The forecastle and poop deck were separated from the bridge deck by [well decks](#).<sup>[20][21]</sup>

- **C Deck**, the **shelter deck**, was the highest deck to run uninterrupted from stem to stern. It included both well decks; the aft one served as part of the Third-Class promenade. Crew cabins were housed below the forecastle and Third-Class public rooms were housed below the poop deck. In between were the majority of First Class cabins and the Second-Class library.<sup>[20][22]</sup>
- **D Deck**, the **saloon deck**, was dominated by three public rooms—the First-Class reception room, the First-Class dining saloon and the Second-Class dining saloon. The first- and second-class galleys were also located on this deck. An open space was provided for Third Class passengers. First, Second- and Third-Class passengers had cabins on this deck, with berths for firemen located in the bow. It was the highest level reached by the ship's watertight bulkheads (though only by eight of the fifteen bulkheads).<sup>[20][23]</sup>
- **E Deck**, the **upper deck**, was predominantly used for passenger accommodation for all three classes plus berths for cooks, seamen, stewards and [trimmers](#). Along its length ran a long passageway nicknamed 'Scotland Road', in reference to [a famous street in Liverpool](#). Scotland Road was used by Third Class passengers and crew members.<sup>[20][24]</sup>
- **F Deck**, the **middle deck**, mainly accommodated Second- and Third-Class passengers and several departments of the crew. The Third Class dining saloon was located here, as was the First Class bath complex, containing the swimming pool and the [Turkish bath](#).<sup>[20][24][25]</sup>
- **G Deck**, the **lower deck**, had the lowest portholes, just above the waterline. The first-class squash court was located here along with the travelling post office where letters and parcels were sorted ready for delivery when the ship docked. Food was also stored here. The deck was interrupted at several points by [orlop](#) (partial) decks over the boiler, engine and turbine rooms.<sup>[20][26]</sup>
- The **orlop decks**, and the **tank top** below that, were on the lowest level of the ship, below the waterline. The orlop decks were used as cargo spaces, while the tank top—the inner bottom of the ship's hull—provided the platform on which the ship's boilers, engines, turbines and electrical generators were housed. This area of the ship was occupied by the engine and boiler rooms, areas which passengers would have been prohibited from seeing. They were connected with higher levels of the ship by two flights of stairs in the fireman's passage; twin spiral stairways near the bow provided access up to D Deck.<sup>[20][26]</sup> Ladders in the boiler, turbine, and engine rooms provided access to higher decks in those compartments.



# Features

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## Power



RMS *Olympic*'s rudder with central and port wing propellers;<sup>[27]</sup> the man at the bottom shows scale.<sup>[28]</sup>

*Titanic* propulsion was supplied by three main engines—two **reciprocating four-cylinder, triple-expansion steam engines** and one centrally placed low-pressure **Parsons turbine**—each driving a **propeller**. The two reciprocating engines had a combined output of 30,000 **horsepower** (22,000 kW). The output of the steam turbine was 16,000 horsepower (12,000 kW).<sup>[16]</sup> The White Star Line had used the same combination of engines on an earlier liner, *Laurentic*, where it had been a great success.<sup>[29]</sup> It provided a good combination of performance and speed; reciprocating engines by themselves were not powerful enough to propel an *Olympic*-class liner at the desired speeds, while turbines were sufficiently powerful but caused uncomfortable vibrations, a problem that affected the all-turbine Cunard liners *Lusitania* and *Mauretania*.<sup>[30]</sup> By combining reciprocating engines with a turbine, fuel usage could be reduced and motive power increased, while using the same amount of steam.<sup>[31]</sup>

The two reciprocating engines were each 63 feet (19 m) long and weighed 720 tonnes, with their bedplates contributing a further 195 tonnes.<sup>[30]</sup> They were powered by steam produced in 29 boilers, 24 of which were double-ended and five single-ended, which contained a total of 159 furnaces.<sup>[32]</sup> The boilers were 15 feet 9 inches (4.80 m) in diameter and 20 feet (6.1 m) long, each weighing 91.5 tonnes and capable of holding 48.5 tonnes of water.<sup>[33]</sup>

They were fuelled by burning coal, 6,611 tonnes of which could be carried in *Titanic*'s **bunkers**, with a further 1,092 tonnes in Hold 3. The furnaces required over 600 tonnes of coal a day to be shovelled into them by hand, requiring the services of 176 **firemen** working around the clock.<sup>[34]</sup> 100 tonnes of ash a day had to be disposed of by ejecting it into the sea.<sup>[35]</sup> The work was relentless, dirty and dangerous, and although firemen were paid relatively well,<sup>[34]</sup> there was a high suicide rate among those who worked in that capacity.<sup>[36]</sup>

Exhaust steam leaving the reciprocating engines was fed into the turbine, which was situated aft. From there it passed into a **surface condenser**, to increase the efficiency of the turbine and so that the steam

could be condensed back into water and reused.<sup>[37]</sup> The engines were attached directly to long shafts which drove the propellers. There were three, one for each engine; the outer (or wing) propellers were the largest, each carrying three blades of manganese-bronze alloy with a total diameter of 23.5 feet (7.2 m).<sup>[33]</sup> The middle propeller was slightly smaller at 17 feet (5.2 m) in diameter,<sup>[38]</sup> and could be stopped but not reversed.

*Titanic*'s electrical plant was capable of producing more power than an average city power station of the time.<sup>[39]</sup> Immediately aft of the turbine engine were four 400 kW steam-driven electric generators, used to provide electrical power to the ship, plus two 30 kW auxiliary generators for emergency use.<sup>[40]</sup> Their location in the stern of the ship meant they remained operational until the last few minutes before the ship sank.<sup>[41]</sup>

*Titanic* lacked a searchlight, in accordance with the ban on the use of searchlights in the merchant navy.<sup>[42][43]</sup>



## Technology

### Compartments and funnels

The interiors of the *Olympic*-class ships were subdivided into 16 primary [compartments](#) divided by 15 bulkheads that extended above the waterline. The eleven vertically closing watertight doors on the orlop deck could be closed automatically via a switch on the bridge, by a lever next to the door itself, or by an automatic buoyancy mechanism that would activate in the event water reached six feet high in the compartment.<sup>[44]</sup> There were also several other horizontally closing watertight doors along Scotland Road, and various crew and third class passenger spaces on the G, F, and E decks. These doors required a small key to be placed into a slot on the deck above. Once the key was turned, the watertight door would close. The ship's exposed decking was made of pine and [teak](#), while interior ceilings were covered in painted granulated [cork](#) to combat condensation.<sup>[45]</sup> Standing above the decks were four funnels, each painted in the White Star [buff](#) with black tops; only three were functional—the aftmost one was a dummy, installed for aesthetic purposes, and used for providing ventilation to the kitchen, as well as for the First and Second Class smoking rooms. Two masts, each 155 ft (47 m) high, supported [derricks](#) for working cargo.

### Rudder and steering engines

*Titanic*'s rudder was 78 feet 8 inches (23.98 m) high and 15 feet 3 inches (4.65 m) long, weighing over 100 tonnes. Its size was such that it required [steering engines](#) to move it. Two steam-powered steering engines were installed, though only one was used at any given time, with the other one kept in reserve. They were connected to the short [tiller](#) through stiff springs, to isolate the steering engines from any shocks in heavy seas or during fast changes of direction.<sup>[46]</sup> As a last resort, the tiller could be moved by ropes connected to two steam [capstans](#).<sup>[47]</sup> The capstans were also used to raise and lower the ship's five anchors (one port, one starboard, one in the centreline and two [kedging anchors](#)).<sup>[47]</sup>

### Water, ventilation and heating

The ship was equipped with waterworks capable of heating and pumping water to all parts of the vessel via a complex network of pipes and valves. The main water supply was taken aboard while *Titanic* was in port,