

## Shipwreck SS *City of Chester* - First Archaeological Three-Dimensional Sonar Survey



Photo: San Francisco Maritime National Historic Park K01.2.571PL

SS *City of Chester*.



Photo: Painting by William Lionel Wyllie (cropped)

RMS *Oceanic*.



Illustration: San Francisco Chronicle

Newspaper illustration of the collision between RMS *Oceanic* and SS *City of Chester*.



Photo: San Francisco Maritime National Historic Park SAFR 3753

Robert Gilbert painting of SS *City of Chester* sinking after collision with RMS *Oceanic*.

## SS *City of Chester*

### History

*City of Chester* was built in 1875 by John Roach & Son in Chester, Pennsylvania, likely at the Delaware River Iron Shipbuilding & Engine Works shipyard. Under the ownership of the Oregon Steamship Company, *Chester*, in command of Captain Frederick C. Bolles, left New York on December 29, 1876, for San Francisco through the Strait of Magellan. The steamship was the first to pass through Hell Gate on the East River in New York, which had been cleared by the Army Corps a month earlier utilizing 50,000 lbs. of explosives.

Oregon Steamship Company had purchased the *City of Chester* in October of 1876 to replace the steamship *John L. Stephnes* on their Portland and San Francisco route. The steamer had accommodations for 114 first class and 200 steerage passengers. After rounding Cape Horn, the vessel arrived in San Francisco where some minor repairs were completed before sailing for Portland, Oregon on March 24, 1877.

In 1879, Oregon Steamship Company merged with the Oregon Steam Navigation Company to form the Oregon Railway and Navigation Company. *City of Chester* was used in the coasting trade and at the time of her loss, was chartered to the Pacific Coast Steamship Company and put into service on the San Francisco and Eureka route.

### *City of Chester*

**Nationality:** American  
**Class:** Passenger – cargo steamship  
**Official No:** 125473 **Call Sign:** JRNK  
**Owner:** Oregon Railway & Navigation Co.  
**Charter:** Pacific Coast Steamship Co.  
**Hull Material:** Iron **Masts:** 2  
**Home Port:** Portland, Oregon  
**Registered Length (feet):** 202.0  
**Registered Beam (feet):** 33.2  
**Registered Depth of Hold (feet):** 15.9  
**Gross Tonnage:** 1106.21  
**Net Tonnage:** 785.33  
**Machinery:** Compound Steam  
**Cylinders:** 2 @ 24" & 44" Stroke: 45"  
**Boilers:** 2 Dia. 9' 6" & 12' 6" Length: 11' 6"  
**Propeller:** Hirsch 10 feet  
**Horsepower:** 600 Nominal **Speed:** 11 knots  
**Coal Consumption:** 950 lbs. per hour

### Collision and Loss of SS *City of Chester*

Arriving from Asia, the RMS *Oceanic*, while entering the harbor of San Francisco, California, collided with the steamship SS *City of Chester* that was en-route to Eureka, California. The collision took place on the foggy morning of August 22, 1888, at the inner entrance to San Francisco between Fort Point and the land opposite Lime Point. The sea was calm and a flood tide had been running in for approximately four hours with a rip tide off Fort Point. *Oceanic's* crew first spotted the *City of Chester* on a collision course through the fog off their starboard bow about a half mile away. During this early stage, neither vessel reversed engines. An attempt was made to pass port-to-port, and *Oceanic* steered hard to starboard. *City of Chester's* course change was slow due to the flood and rip tides. By the time both vessels reversed engines it was too late, *Oceanic's* bow plunged 10 feet into the *Chester's* forward port quarter, 30 feet aft of the bow. *Oceanic's* bow remained in the breach in an attempt to keep *City of Chester* afloat, but with hull damage below the waterline, she sank six minutes later, taking the lives of 16 men, women and children.



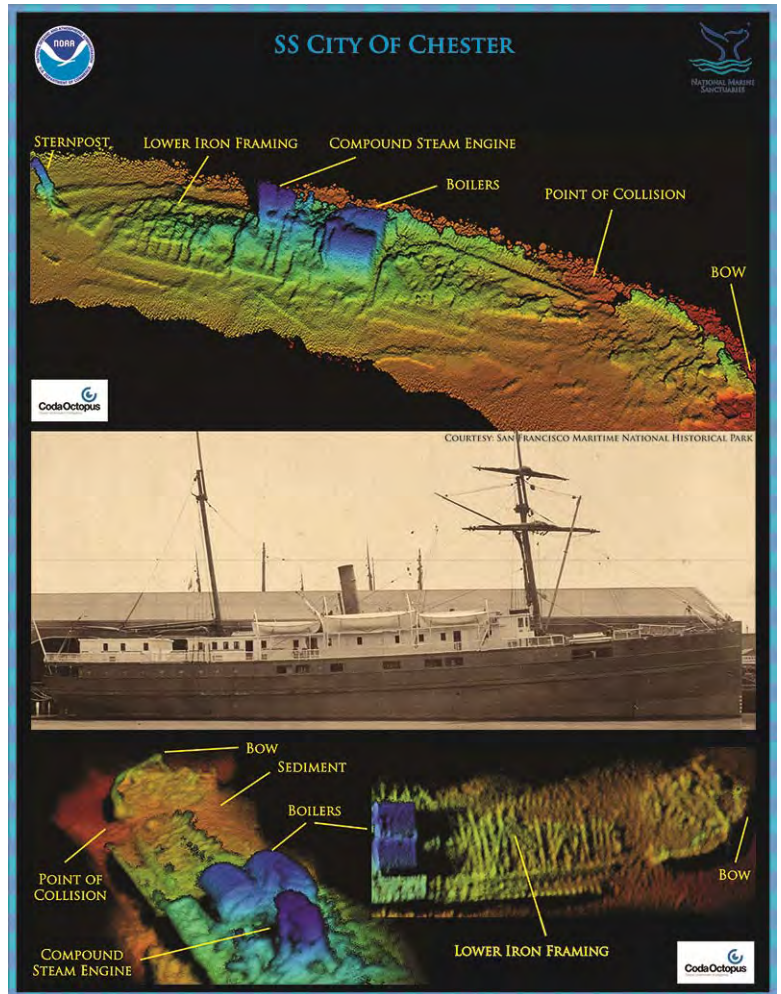


Photo: Kevin Tweed Bay Marine Services LLC

Science team on board Bay Marine Services LLC' research vessel *Eaglet* preparing to launch the Hibbard Inshore LLS' Saab ROV-AUV. Equipped with the Coda Octopus 3-D Echoscope sonar the Saab surveyed the shipwreck site of the SS *City of Chester* off the Golden Gate.

### First 3-D Archaeological Survey

Hibbard Inshore LLC's Saab Hybrid can operate fully robotic as an Autonomous Underwater Vehicle (AUV) with no tether, or as a Remotely Operated Vehicle (ROV) via a thin fiber optic tether. For this mission, the Saab was setup in ROV mode and equipped with a Coda Octopus Echoscope sonar. The Echoscope is volumetric sonar producing real-time 3-D imaging. The patented technology generates a complete 3-D model composed of more than 16,000 data points from each acoustic transmission in real-time. The 3-D image volume is entirely refreshed up to twelve times per second with each new transmission. Real time, 3-D imaging was produced during the survey and mapping of the shipwreck SS *City of Chester*. Echoscope ping geometry allowed the science team to study the archaeological remains of the shipwreck from different angles in real-time and guide the ROV pilot as data was collected keeping a safe distance from the wreck so not to impact the historic remains.



The 3-D archaeological survey revealed in greater detail the *City of Chester's* steam propulsion machinery that includes a single compound steam engine sitting upright and two boilers positioned forward of the steam engine. The severe bow separation on the portside of the hull indicates where *Oceanic's* bow almost cut the *Chester* in half. Although there is sediment build-up on the site, as expected at this dynamic location that experiences strong tidal currents, the lower iron frames are remarkably still visible 126 years after the loss.



Photo: Robert V. Schwemmer, NOAA

Hibbard Inshore LLC's Saab Hybrid rigged in ROV mode with thin yellow fiber optic tether.



Photo: Robert V. Schwemmer, NOAA

Coda Octopus Echoscope 3-D sonar mounted on the forward end of the Saab ROV.



Photo: Robert V. Schwemmer, NOAA

Bay Marine Services LLC R/V *Eaglet*, the platform used in the archaeological survey.