

Shipwreck SS *City of Rio de Janeiro* - First Archaeological Three-Dimensional Sonar Survey



San Francisco Maritime National Historic Park saf_21374_h06-04135_n

SS *City of Rio de Janeiro* at Nagasaki, Japan.



Photo: Robert Schwemmer Maritime Library

Captain William Ward, master of SS *City of Rio de Janeiro* decided to go down with his ship.



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Survivors at Baker's Beach after the sinking of the SS *City of Rio de Janeiro*. Many had clung to floating debris and were saved by the local commercial fishermen.

SS *City of Rio de Janeiro*

History

City of Rio de Janeiro was built in 1878 by John Roach & Son at Chester, Pennsylvania, and launched on March 6, 1878. Along with her sister ship *City of Para*, *City of Rio de Janeiro* was built to connect Brazil with the United States. *City of Rio de Janeiro* was termed 'a first class screw steamer.' "The ship is enclosed with iron from the stern up to the hurricane deck, aft of the fore-hatch, to give her extra strength... The joiner work is... most splendid and elegant... The *Rio de Janeiro* will accommodate 100 first-class passengers and about 500 in the steerage," (Delgado - Haller).

The steam line to Brazil was a failure. *City of Rio de Janeiro* proved too expensive and both steamers were sold in 1881 to the Pacific Mail Steamship Company of New York, and put into immigrant service on the Panama route. *City of Rio* made only one voyage to Panama before going into trans-Pacific Service. In 1891, *City of Rio de Janeiro* went through a major rebuild at Union Iron Works in San Francisco, California

at a cost of more than \$250,000. "Her boilers are to be removed, supplied with a triple expansion engine having three cylinders. She will be refurnished with six boilers. The shafts are being made at the Rollings Mills. The hull is to be replated and overhauled generally," (San Francisco Bulletin). The U.S. Army's Quartermaster Corps chartered *City of Rio* as a troop transport during the Spanish-American War. *City of Rio de Janeiro* returned to immigrant service in 1900.

City of Rio de Janeiro

Nationality: American
Class: Passenger – cargo steamship
Official No: 125640 **Call Sign:** JSWB
Owner: Pacific Mail Steamship Company
Hull Material: Iron **Masts:** 3
Home Port: New York, NY
Registered Length (feet): 345.0
Registered Beam (feet): 38.6
Registered Depth of Hold (feet): 19.9
Gross Tonnage: 3,548
Net Tonnage: 2,275
Machinery: Triple Expansion Steam
Cylinders: 3 @ 28" - 44" - 70" Stroke: 48"
Boilers: 6
Horsepower: 339 Nominal

Stranding and Loss of SS *City of Rio de Janeiro*

Arriving off San Francisco, California on February 21, 1901, with passengers and freight from Hong Kong, Yokohama and Honolulu, *City of Rio de Janeiro* took on Pilot Frederick Jordan. Due to fog, the steamer was anchored offshore. The next morning at 4 a.m., *Rio* was slowly moving through the narrow entrance of the Golden Gate, which was enveloped in fog. Captain Ward and Pilot Jordan made no attempt to retreat back offshore. Without warning, the ship struck Fort Point at 5:30 a.m. At the time of the stranding, an ebbing tide pushed the steamer back from the Golden Gate and off the rocks. The ship's bulkheads were not watertight; it rapidly flooded, and sank within 10 minutes. Many of the passengers, most of them Chinese and Japanese emigrants, were asleep in their cabins and died below. Those who did escape were either in lifeboats or clung to debris before being rescued by the local fishing boats. Of the 210 on board, 128 lives were lost making this shipwreck the highest loss of life at the Golden Gate. The *Rio* is considered by historians as the "Titanic of the Golden Gate." Court proceedings found Captain William Ward, who went down with the ship, and Pilot Frederick Jordan, who survived, both guilty of gross negligence.

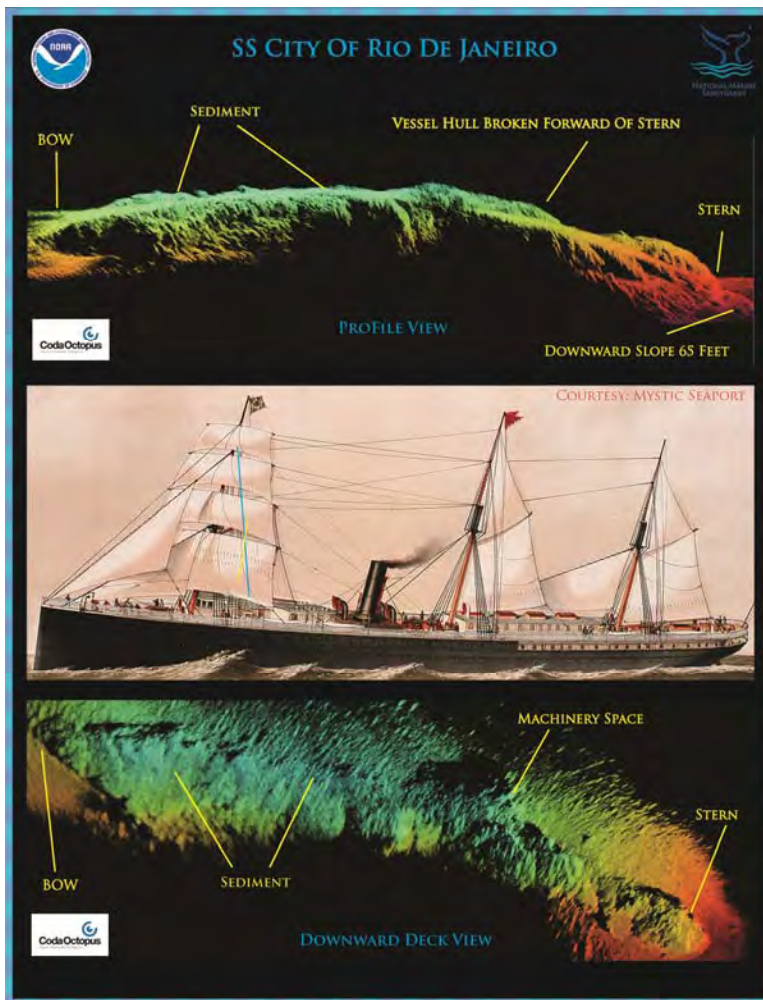


Photo: Robert V. Schwemmer NOAA

Hibbard Inshore LLC's Saab Hybrid ROV/AUV on board the Bay Marine Services LLC research vessel *Eagle*; view of rear thrusters. The Saab weight in air is 1,411 pounds (640 kg), length 12.78 feet (3894 mm.), width 2.30 feet (700 mm.), and operating depth 3,937 feet (1200m). Standard 4 multibeam imaging sonar units (forward looking) and multibeam 360 degree profiling sonar.

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 Rio de Janeiro*. 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.



City of Rio de Janeiro lies at the base of a 300-foot high submerged slope. The 3-D sonar survey reveals 113 years of sediment placement over the wreck site. Little, if any, visual remains of diagnostic artifacts are distinguishable due to the encapsulation of mud, though the symmetrical features of the bow are still visible. The 19th century built steamship, with an estimated overall-length of 360 feet (registered 345 feet), is consistent with the sonar data's estimated length. The stern appears to have detached near the machinery space and slid into deeper water - 65 feet below the elevation of the forward two-thirds of the wreck.



Photo: Robert V. Schwemmer NOAA

Present day photo at the entrance to the Golden Gate looking westward with Fort Point to the left.



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 research vessel *Eaglelet* platform for the archaeological survey.