

= Brazilian monitor Rio Grande =

The Brazilian monitor Rio Grande was the second ship of the Pará class river monitors built for the Brazilian Navy during the Paraguayan War in the late 1860s . Rio Grande participated in the Passagem de Humaitá in February 1868 and provided fire support for the army for the rest of the war . The ship was assigned to the Upper Uruguay (Portuguese : Alto Uruguai) Flotilla after the war . Rio Grande was scrapped in 1907 .

= Design and description =

The Pará class monitors were designed to meet the need of the Brazilian Navy for small , shallow draft armored ships capable of withstanding heavy fire . The monitor configuration was chosen as a turreted design did not have the same problems engaging enemy ships and fortifications as did the casemate ironclads already in Brazilian service . The oblong gun turret sat on a circular platform that had a central pivot . It was rotated by four men via a system of gears ; 25 minutes were required for a full 360 ° rotation . A bronze ram was fitted to these ships as well . The hull was sheathed with Muntz metal to reduce biofouling .

The ships measured 39 meters (127 ft 11 in) long overall , with a beam of 8.54 meters (28 ft 0 in) . They had a draft between of 1.51 ? 1.54 meters (4 ft 11 in ? 5 ft 1 in) and displaced 500 metric tons (490 long tons) . With only 0.3 meters (1 ft 0 in) of freeboard they had to be towed between Rio de Janeiro and their area of operations . Their crew numbered 43 officers and men .

= = Propulsion = =

The Pará class ships had two direct acting steam engines , each driving a single 1.3 meter (4 ft 3 in) propeller . Their engines were powered by two tubular boilers at a working pressure of 59 psi (407 kPa ; 4 kgf / cm²) . The engines produced a total of 180 indicated horsepower (130 kW) which gave the monitors a maximum speed of 8 knots (15 km / h ; 9 @ 2 mph) in calm waters . The ships carried enough coal for one day 's steaming .

= = Armament = =

Rio Grande carried a single 70 pounder Whitworth rifled muzzle loader (RML) in her gun turret . The 70 pounder gun had a maximum elevation of 15 ° . It had a maximum range of 5,540 meters (6,060 yd) . The 70 pounder gun weighed 8,582 pounds (3,892 @ 7 kg) and fired a 5 @ 5 inch (140 mm) shell that weighed 81 pounds (36 @ 7 kg) . Most unusually the gun 's Brazilian designed iron carriage was designed to pivot vertically at the muzzle ; this was done to minimize the size of the gunport through which splinters and shells could enter .

= = Armor = =

The hull of the Pará class ships was made from three layers of wood that alternated in orientation . It was 457 millimeters (18 @ 0 in) thick and was capped with a 102 millimeter (4 in) layer of peroba hardwood . The ships had a complete wrought iron waterline belt , 0.91 meters (3 @ 0 ft) high . It had a maximum thickness of 102 millimeters amidships , decreasing to 76 millimeters (3 in) and 51 millimeters (2 in) at the ship 's ends . The curved deck was armored with 12 @ 7 millimeters (0 @ 5 in) of wrought iron .

The gun turret was shaped like a rectangle with rounded corners . It was built much like the hull , but the front of the turret was protected by 152 millimeters (6 in) of armor , the sides by 102 millimeters and the rear by 76 millimeters . Its roof and the exposed portions of the platform it rested upon were protected by 12 @ 7 millimeters of armor . The armored pilothouse was positioned

ahead of the turret .

= = Service = =

Rio Grande was laid down at the Arsenal de Marinha da Côrte in Rio de Janeiro on 8 December 1866 , during the Paraguayan War , which saw Argentina and Brazil allied against Paraguay . She was launched on 17 August 1867 and completed on 3 September 1867 . She arrived at Montevideo on 6 January 1868 and steamed up the Paraná River , although her passage further north was barred by the Paraguayan fortifications at Humaitá . On 19 February 1868 six Brazilian ironclads , including Rio Grande , sailed past Humaitá at night . Rio Grande and her two sister ships , Alagoas and Pará , were lashed to the larger ironclads in case any engines were disabled by the Paraguayan guns . Barroso led with Rio Grande , followed by Bahia with Alagoas and Tamandaré with Pará . The latter two ships were damaged as they sailed past the fortifications and had to be beached to prevent them from sinking . Rio Grande continued upstream with the other undamaged ships and they bombarded Asunción on 24 February . On 23 March Rio Grande and Barroso sank the steamer Igurey . Paraguayan soldiers in canoes attempted to board both ships on the evening of 9 July , but were only successful in getting on board Rio Grande where they were able to kill the ship 's captain and some of the crew . The remaining crewmembers locked the monitor 's hatches and Barroso was able to kill or capture almost all of the Paraguayans on deck . On 15 October she bombarded Angostura Fort in company with Brasil , Silvado , Pará and her sister Ceará .

After the war Rio Grande was assigned to the newly formed Alto Uruguai Flotilla , based at Itaquí . She was docked in Ladário for rebuilding in 1899 , but this was never completed and she was scrapped in February 1907 .