= Andrea Doria @-@ class battleship =

The Andrea Doria class (usually called Caio Duilio class in Italian sources) was a pair of dreadnought battleships built for the Royal Italian Navy (Regia Marina) during the early 1910s . The two ships ? Andrea Doria and Caio Duilio ? were completed during World War I. The class was an incremental improvement over the preceding Conte di Cavour class . Like the earlier ships , Andrea Doria and Caio Duilio were armed with a main battery of thirteen 305 @-@ millimeter (12 @.@ 0 in) guns .

The two ships spent World War I based in southern Italy to keep the Austro @-@ Hungarian Navy bottled up in the Adriatic , but neither vessel saw any combat . After the war , they cruised the Mediterranean and were involved in several international incidents , including the Corfu Incident in 1923 . Both ships were placed in reserve a decade later and began a lengthy reconstruction in 1937 . The modifications included removing their center main battery turret and boring out the rest of the guns to 320 mm (12 @.@ 6 in) , strengthening their armor protection , installing new boilers and steam turbines , and lengthening their hulls . The reconstruction work lasted until 1940 , by which time Italy was already engaged in World War II .

The two ships were moored in Taranto on the night of 11 / 12 November 1940 when the British launched a carrier strike on the Italian fleet . In the resulting Battle of Taranto , Caio Duilio was hit by a torpedo and forced to beach to avoid sinking . Andrea Doria was undamaged in the raid ; repairs for Caio Duilio lasted until May 1941 . Both ships escorted convoys to North Africa in late 1941 , including Operation M42 , where Andrea Doria saw action at the inconclusive First Battle of Sirte on 17 December . Fuel shortages curtailed further activity in 1942 and 1943 , and both ships were interned at Malta following Italy 's surrender in September 1943 . Italy was permitted to retain both battleships after the war , and they alternated as fleet flagship until the early 1950s , when they were removed from active service . Both ships were scrapped after 1956 .

= = Design and description = =

The Andrea Doria @-@ class ships were designed by naval architect Vice Admiral (Generale del Genio navale) Giuseppe Valsecchi and were ordered in response to French plans to build the Bretagne @-@ class battleships . The design of the preceding Conte di Cavour @-@ class battleships was generally satisfactory and was adopted with some minor changes . These mostly concerned the reduction of the superstructure by shortening the forecastle deck , the consequent lowering of the amidships gun turret and the upgrading of the secondary armament to sixteen 152 @-@ millimeter (6 in) guns in lieu of the eighteen 120 @-@ millimeter (4 @.@ 7 in) guns of the older ships .

= = = General characteristics = = =

The ships of the Andrea Doria class were 168 @.@ 9 meters (554 ft 2 in) long at the waterline , and 176 meters (577 ft 5 in) overall . They had a beam of 28 meters (91 ft 10 in) , and a draft of 9 @.@ 4 meters (30 ft 10 in) . They displaced 22 @,@ 956 long tons (23 @,@ 324 t) at normal load , and 24 @,@ 729 long tons (25 @,@ 126 t) at deep load . They were provided with a complete double bottom and their hulls were subdivided by 23 longitudinal and transverse bulkheads . The ships had two rudders , both on the centerline . They had a crew of 31 officers and 969 enlisted men .

= = = Propulsion = = =

The ships were fitted with three Parsons steam turbine sets , arranged in three engine rooms . The center engine room housed one set of turbines that drove the two inner propeller shafts . It was flanked by compartments on either side , each housing one turbine set powering the outer shafts . Steam for the turbines was provided by 20 Yarrow boilers , 8 of which burned oil and 12 of which

burned coal sprayed with oil . Designed to reach a maximum speed of 22 knots (41 km / h ; 25 mph) from 32 @,@ 000 shaft horsepower (24 @,@ 000 kW) , neither of the ships reached this goal on their sea trials , only achieving speeds of 21 to 21 @.@ 3 knots (38 @.@ 9 to 39 @.@ 4 km / h ; 24 @.@ 2 to 24 @.@ 5 mph) . The ships could store a maximum of 1 @,@ 488 long tons (1 @,@ 512 t) of coal and 886 long tons (900 t) of fuel oil that gave them a range of 4 @,@ 800 nautical miles (8 @,@ 900 km ; 5 @,@ 500 mi) at 10 knots (19 km / h ; 12 mph) .

= = = Armament = = =

As built , the ships ' main armament comprised thirteen 46 @-@ caliber 305 @-@ millimeter guns , designed by Armstrong Whitworth and Vickers , in five gun turrets . The turrets were all on the centerline , with a twin @-@ gun turret superfiring over a triple @-@ gun turret in fore and aft pairs , and a third triple turret amidships , designated ' A ' , ' B ' , ' Q ' , ' X ' , and ' Y ' from front to rear . The turrets had an elevation capability of ? 5 to + 20 degrees and the ships could carry 88 rounds for each gun . Sources disagree regarding these guns ' performance , but naval historian Giorgio Giorgerini says that they fired 452 @-@ kilogram (996 lb) armor @-@ piercing (AP) projectiles at the rate of one round per minute and that they had a muzzle velocity of 840 m / s (2 @,@ 800 ft / s) , which gave a maximum range of 24 @,@ 000 meters (26 @,@ 000 yd) .

The secondary armament on the two ships consisted of sixteen 45 @-@ caliber 152 @-@ millimeter (6 in) guns , also designed by Armstrong Whitworth , mounted in casemates on the sides of the hull underneath the main guns . Their positions tended to be wet in heavy seas , especially the rear guns . These guns could depress to ? 5 degrees and had a maximum elevation of + 20 degrees ; they had a rate of fire of six shots per minute . They could fire a 22 @.@ 1 @-@ kilogram (49 lb) high @-@ explosive projectile with a muzzle velocity of 830 meters per second (2 @,@ 700 ft / s) to a maximum distance of 16 @,@ 000 meters (17 @,@ 000 yd) . The ships carried 3 @,@ 440 rounds for them . For defense against torpedo boats , the ships carried nineteen 50 @-@ caliber 76 mm (3 @.@ 0 in) guns ; they could be mounted in 39 different positions , including on the turret roofs and upper decks . These guns had the same range of elevation as the secondary guns , and their rate of fire was higher at 10 rounds per minute . They fired a 6 @-@ kilogram (13 lb) AP projectile with a muzzle velocity of 815 meters per second (2 @,@ 670 ft / s) to a maximum distance of 9 @,@ 100 meters (10 @,@ 000 yd) . The ships were also fitted with three submerged 45 @-@ centimeter (17 @.@ 7 in) torpedo tubes , one on each broadside and the third in the stern .

= = = Armor = = =

The Andrea Doria @-@ class ships had a complete waterline armor belt with a maximum thickness of 250 millimeters (9 @.@ 8 in) that reduced to 130 millimeters (5 @.@ 1 in) towards the stern and 80 millimeters (3 @.@ 1 in) towards the bow . Above the main belt was a strake of armor 220 millimeters (8 @.@ 7 in) thick that extended up to the lower edge of the main deck . Above this strake was a thinner one , 130 millimeters thick , that protected the casemates . The ships had two armored decks : the main deck was 24 mm (0 @.@ 94 in) thick in two layers on the flat that increased to 40 millimeters (1 @.@ 6 in) on the slopes that connected it to the main belt . The second deck was 29 millimeters (1 @.@ 1 in) thick , also in two layers . Fore and aft transverse bulkheads connected the belt to the decks .

The frontal protection of the gun turrets was 280 millimeters (11 @.@ 0 in) in thickness with 240 @-@ millimeter (9 @.@ 4 in) thick sides , and an 85 @-@ millimeter (3 @.@ 3 in) roof and rear . Their barbettes had 230 @-@ millimeter (9 @.@ 1 in) armor above the deck that reduced to 180 millimeters (7 @.@ 1 in) between the forecastle and upper decks and 130 millimeters below the upper deck . The forward conning tower had walls 320 millimeters (12 @.@ 6 in) thick ; those of the aft conning tower were 160 millimeters (6 @.@ 3 in) thick .

= = Modifications and reconstruction = =

During World War I , a pair of 50 @-@ caliber 76 @-@ millimeter guns on high @-@ angle mounts were fitted as anti @-@ aircraft (AA) guns , one gun at the bow and the other on top of ' X ' turret . In 1925 the number of 50 @-@ caliber 76 @-@ millimeter guns was reduced to 13 , all mounted on the turret tops , and six new 40 @-@ caliber 76 @-@ millimeter guns were installed abreast the aft funnel . Two license @-@ built 2 @-@ pounder AA guns were also fitted . In 1926 the rangefinders were upgraded and a fixed aircraft catapult was mounted on the port side of the forecastle for a Macchi M.18 seaplane .

By the early 1930s , the Regia Marina had begun design work on the new Littorio @-@ class battleships , but it recognized that they would not be complete for some time . As a stop @-@ gap measure in response to the new French Dunkerque @-@ class battleships , the navy decided to modernize its old battleships ; work on the two surviving Conte di Cavours began in 1933 and the two Andrea Dorias followed in 1937 . The work lasted until July 1940 for Duilio and October 1940 for Andrea Doria . The existing bow was dismantled and a new , longer , bow section was built , which increased their overall length by 10 @.@ 91 meters (35 ft 10 in) to 186 @.@ 9 meters (613 ft 2 in) (on the Cavour @-@ class the new bow had been grafted over the existing one , instead) . Their beam increased to 28 @.@ 03 meters (92 ft 0 in) and their draft at deep load increased to 10 @.@ 3 meters (33 ft 10 in) . The changes made during their reconstruction increased their displacement to 28 @,@ 882 long tons (29 @,@ 345 t) for Andrea Doria and 29 @,@ 391 long tons (29 @,@ 863 t) for Duilio at deep load . The ships ' crews increased to 70 officers and 1 @,@ 450 enlisted men .

Two of the propeller shafts were removed and the existing turbines were replaced by two sets of Belluzzo geared steam turbines rated at 75 @,@ 000 shp (56 @,@ 000 kW) . The boilers were replaced by eight superheated Yarrow boilers . On their sea trials the ships reached a speed of 26 @.@ 9 ? 27 knots (49 @.@ 8 ? 50 @.@ 0 km / h ; 31 @.@ 0 ? 31 @.@ 1 mph) , although their maximum speed was about 26 knots (48 km / h ; 30 mph) in service . The ships now carried 2 @,@ 530 long tons (2 @,@ 570 t) of fuel oil , which provided them with a range of 4 @,@ 000 nautical miles (7 @,@ 400 km ; 4 @,@ 600 mi) at a speed of 18 knots (33 km / h ; 21 mph) .

The center turret and the torpedo tubes were removed and all of the existing secondary armament and AA guns were replaced by a dozen 135 @-@ millimeter (5 @.@ 3 in) guns in four triple @-@ gun turrets and ten 90 @-@ millimeter (3 @.@ 5 in) AA guns in single turrets . In addition the ships were fitted with fifteen 54 @-@ caliber Breda 37 @-@ millimeter (1 @.@ 5 in) light AA guns in six twin @-@ gun and three single mounts and sixteen 20 @-@ millimeter (0 @.@ 8 in) Breda Model 35 AA guns , also in twin mounts . The 305 @-@ millimeter guns were bored out to 320 millimeters (13 in) and their turrets were modified to use electric power . They had a fixed loading angle of + 12 degrees , but there is uncertainty on their new maximum elevation , with some sources citing a maximum value of + 27 degrees , while others claim one of + 30 degrees . The 320 @-@ millimeter AP shells weighed 525 kilograms (1 @,@ 157 lb) and had a maximum range of 28 @,@ 600 meters (31 @,@ 300 yd) with a muzzle velocity of 830 m / s (2 @,@ 700 ft / s) . In early 1942 the rearmost 20 @-@ millimeter mounts were replaced by twin 37 @-@ millimeter gun mounts and the 20 @-@ millimeter guns were moved to the roof of Turret ' B ' , while the RPC motors from the stabilized mounts of the 90 mm guns were removed The forward superstructure was rebuilt with a new forward conning tower , protected with 260 @-@ millimeter (10 @.@ 2 in) thick armor . Atop the conning tower there was a fire @-@ control director fitted with three large rangefinders .

The deck armor was increased during reconstruction to a total of 135 millimeters (5 @.@ 3 in) . The armor protecting the secondary turrets was 120 millimeters (4 @.@ 7 in) thick . The existing underwater protection was replaced by the Pugliese system that consisted of a large cylinder surrounded by fuel oil or water that was intended to absorb the blast of a torpedo warhead .

These modernizations have been criticized by some naval historians , given that not only these ships would eventually prove to be inferior to the British battleships they were meant to face (namely the Queen Elizabeth @-@ class) , since by the time the decision to proceed was taken a war between Italy and the United Kingdom seemed more likely , but also because the cost of the reconstruction would be not much less than the cost of building a brand new Littorio @-@ class

battleship ; moreover , the reconstruction work caused bottlenecks in the providing of steel plates , that caused substantial delays in the construction of the modern battleships , which otherwise might have been completed at an earlier date .

= = Ships = =

= = Service history = =

Both battleships were completed after Italy entered World War I on the side of the Triple Entente , though neither saw action , since Italy 's principal naval opponent , the Austro @-@ Hungarian Navy , largely remained in port for the duration of the war . Admiral Paolo Thaon di Revel , the Italian naval chief of staff , believed that Austro @-@ Hungarian submarines and minelayers could operate effectively in the narrow waters of the Adriatic . The threat from these underwater weapons to his capital ships was too serious for him to use the fleet in an active way . Instead , Revel decided to implement a blockade at the relatively safer southern end of the Adriatic with the battle fleet , while smaller vessels , such as the MAS torpedo boats , conducted raids on Austro @-@ Hungarian ships and installations . Meanwhile , Revel 's battleships would be preserved to confront the Austro @-@ Hungarian battle fleet in the event that it sought a decisive engagement .

Andrea Doria and Caio Duilio both cruised in the eastern Mediterranean after the war , and both were involved in postwar disputes over control of various cities . Caio Duilio was sent to provide a show of force during a dispute over control of ?zmir in April 1919 and Andrea Doria assisted in the suppression of Gabriele D 'Annunzio 's seizure of Fiume in November 1920 . Caio Duilio cruised the Black Sea after the ?zmir affair until she was replaced in 1920 by the battleship Giulio Cesare . Andrea Doria and Caio Duilio were present during the Corfu incident in 1923 as part of the naval demonstration protesting the murder of General Enrico Tellini and four other Italians . In January 1925 , Andrea Doria visited Lisbon , Portugal , to represent Italy during the celebration marking the 400th anniversary of the death of explorer Vasco da Gama . The two ships performed the normal routine of peacetime cruises and goodwill visits throughout the 1920s and early 1930s ; both were placed in reserve in 1933 .

Both Andrea Doria and Caio Duilio went into drydock in the late 1930s for extensive modernizations ; this work lasted until October and April 1940 , respectively . By that time , Italy had entered World War II on the side of the Axis powers . The two ships joined the 5th Division based at Taranto . Caio Duilio participated in a patrol intended to catch the British battleship HMS Valiant and a convoy bound for Malta , but neither target was found . She and Andrea Doria were present during the British attack on Taranto on the night of 11 / 12 November 1940 . A force of twenty @-@ one Fairey Swordfish torpedo @-@ bombers , launched from HMS Illustrious , attacked the ships moored in the harbor . Andrea Doria was undamaged in the raid , but Caio Duilio was hit by a torpedo on her starboard side . She was grounded to prevent her from sinking in the harbor and temporary repairs were effected to allow her to travel to Genoa for permanent repairs , which began in January 1941 . In February , she was attacked by the British Force H ; several warships attempted to shell Caio Duilio while she was in dock , but they scored no hits . Repair work lasted until May 1941 , when she rejoined the fleet at Taranto .

In the meantime , Andrea Doria participated in several operations intended to catch British convoys in the Mediterranean , including the Operation Excess convoys in January 1941 . By the end of the year , both battleships were tasked with escorting convoys from Italy to North Africa to support the Italian and German forces fighting there . These convoys included Operation M41 on 13 December and Operation M42 on 17 ? 19 December . During the latter , Andrea Doria and Giulio Cesare engaged British cruisers and destroyers in the First Battle of Sirte on the first day of the operation . Neither the Italians nor the British pressed their attacks and the battle ended inconclusively . Caio Duilio was assigned to distant support for the operation , and was too far away to actively participate in the battle . Convoy escort work continued into early 1942 , but thereafter the fleet began to suffer from a severe shortage of fuel , which kept the ships in port for the next two years . Caio Duilio

sailed away from Taranto on 14 February with a pair of light cruisers and seven destroyers in order to intercept the British convoy MW 9 , bounded from Alexandria to Malta , but the force could not locate the British ships , and so returned to port . After learning of Caio Duilio departure , however , British escorts scuttled the transport Rowallan Castle , previously disabled by German aircraft .

Both ships were interned at Malta following Italy 's surrender on 3 September 1943 . They remained there until 1944 , when the Allies allowed them to return to Italian ports ; Andrea Doria went to Syracuse , Sicily , and Caio Duilio returned to Taranto before joining her sister at Syracuse . Italy was allowed to retain the two ships after the end of the war , and they alternated in the role of fleet flagship until 1953 , when they were both removed from service . Andrea Doria carried on as a gunnery training ship , but Caio Duilio was simply placed in reserve . Both battleships were stricken from the naval register in September 1956 and were subsequently broken up for scrap .

= = See Also = =

List of ships of the Second World War
List of ship classes of the Second World War