= French battlecruiser proposals =

In the years before the outbreak of World War I in 1914 , the French Navy considered several proposals for battlecruisers . The Navy issued specifications for a battlecruiser design to complete part of the 28 capital ships to be built by 1920 . Three designs , one by P. Gille and two by Lieutenant Durand @-@ Viel , were completed in 1913 . All three designs were similar to contemporary battleship designs , specifically the Normandie class , which introduced a quadruple gun turret for the main battery , which was adopted for all three proposals . The first two called for the same 340 mm (13 in) gun used on all French dreadnoughts , though the third proposed a much more powerful 370 mm (15 in) gun . Though the design studies were complete , the French Navy did not authorize or begin construction of any battlecruisers before the start of the war .

= = Background = =

In the Naval Law of 30 March 1912 , the French Navy called for a total force of 20 capital ships to be built by 1920 . The Technical Branch subsequently issued a set of somewhat vague requirements for battlecruiser designs . The requirements stipulated a displacement of 28 @,@ 000 metric tons (28 @,@ 000 long tons ; 31 @,@ 000 short tons) , a speed of 27 knots (50 km / h ; 31 mph) , an armament of eight 340 mm (13 in) guns , and a crew of not more than 1 @,@ 200 officers and enlisted men . Numerous proposals were submitted to the Technical Branch , but only two were evaluated further . The first was prepared by P. Gille , a naval engineer overseeing the construction of the Normandie @-@ class battleship Flandre , and the second by then @-@ Lieutenant Durand @-@ Viel , a student at the Naval College . As the proposals were only design studies , none were authorized and no ships were built .

= = Gille 's design = =

In 1911 , Gille went to Britain to observe the construction of the new Orion @-@ class battleships and Lion @-@ class battlecruisers . The latter ships prompted Gille to decide the French Navy ought to build battlecruisers as well , since Britain and Germany had already begun acquiring them , and they would prove useful as a fast division of the French fleet . Gille decided that his proposed ship would need a top speed of 28 to 29 kn (52 to 54 km / h ; 32 to 33 mph) to retain an advantage over foreign battleships , the latest of which had estimated speeds of 22 to 23 kn (41 to 43 km / h ; 25 to 26 mph) . They would also need enough armor and a main battery powerful enough to fight in the line of battle . The limitations that weight imposed on the design , however , restricted the amount of armor possible , and so the traditional French practice of armoring the entire side of the ship would be impossible .

= = = Characteristics = = =

Gille 's battlecruiser design called for a displacement of 28 @,@ 247 t (27 @,@ 801 long tons ; 31 @,@ 137 short tons) on a hull that was 205 meters (673 ft) long between perpendiculars , with a beam of 27 m (88 ft 7 in) at the waterline and an average draft of 9 @.@ 03 m (29 ft 8 in) . The freeboard forward was 7 @.@ 15 m (23 ft 5 in) , and aft was 4 @.@ 65 m (15 @.@ 3 ft) . The hull lines of the ships proved to be highly efficient in tank tests during the design process . Due to the extreme weight of the main battery turrets at the bow and stern , the hull had to be strengthened to handle the strain . Very strong longitudinal bracing was incorporated , and the inner and outer skins of the hull was thickened to reinforce the bracings . The ships ' expected metacentric height was 1 @.@ 03 m (3 ft 5 in) , comparable to the British Lion class . Each ship would be crewed by 41 officers and 1 @,@ 258 enlisted men .

The ships would have been equipped with four sets of steam turbines rated at 80 @,@ 000 shaft horsepower (60 @,@ 000 kW) powered by fifty @-@ two coal @-@ fired Belleville boilers . Each propeller shaft was connected to a high @-@ pressure turbine , a medium @-@ pressure geared

turbine , and a low @-@ pressure turbine for forward steaming , and a direct drive turbine for steaming in reverse . The ships ' top speed was to have been 28 knots . The ships would have been supplied with 2 @,@ 833 t (2 @,@ 788 long tons ; 3 @,@ 123 short tons) of coal and 630 t (620 long tons ; 690 short tons) of fuel oil for supplementary oil firing . At maximum speed , the ships could have cruised for 1 @,@ 660 nautical miles (3 @,@ 070 km ; 1 @,@ 910 mi) ; at 20 @.@ 3 kn (37 @.@ 6 km / h ; 23 @.@ 4 mph) , the range increased to 4 @,@ 240 nmi (7 @,@ 850 km ; 4 @,@ 880 mi) , an at a more economical 15 kn (28 km / h ; 17 mph) , the range grew to 6 @,@ 300 nmi (11 @,@ 700 km ; 7 @,@ 200 mi) .

The ships ' main armament was composed of twelve 340mm / 45 Modèle 1912 guns in three quadruple turrets , the same as in the contemporary French battleships of the Normandie class . One turret was placed forward , and the other two were placed in a superfiring pair , all on the centerline . The guns had a range of 16 @,@ 000 m (17 @,@ 000 yd) and had a rate of fire of two rounds per minute . The shells were 540 @-@ kilogram (1 @,@ 190 lb) armor @-@ piercing rounds and were fired with a muzzle velocity of 800 meters per second (2 @,@ 600 ft / s) . A secondary battery of twenty @-@ four 138 @.@ 6 mm / 55 Modèle 1910 guns mounted in casemates was planned for defense against torpedo boats . These guns fired a 36 @.@ 5 kg (80 lb) shell at a muzzle velocity of 830 m / s (2 @,@ 700 ft / s) . The armament was rounded out by six torpedo tubes of undetermined diameter , all submerged in the ships ' hulls .

The armor protecting both the main armored belt amidships and the main battery turrets was 270 mm (10 @.@ 6 in) thick . The lower armored deck was 20 mm (0 @.@ 79 in) thick , with 50 mm (2 @.@ 0 in) of armor plating on the sloped sides . The casemate guns were protected with 180 mm (7 @.@ 1 in) of steel armor . The ships were also equipped with a 20 mm thick torpedo bulkhead .

= = Durand @-@ Viel 's designs = =

In 1913 , the Naval College had several of its students submit design studies for a fast capital ship . The class was given a displacement of 27 @,@ 500 t (27 @,@ 100 long tons ; 30 @,@ 300 short tons) as a limit on size ; all of the officers opted to design either fast or slow battleships , with the exception of Lieutenant Durand @-@ Viel , who chose instead to create a design for a battlecruiser . Durand @-@ Viel drew up a pair of designs , which were evaluated by the General Staff in June 1914 . He saw his ships forming a fast division of the battle fleet capable of encircling an enemy squadron ; as with Gille 's design , this required heavy armament and armor to permit the ships to engage battleships .

= = = Project " A " characteristics = = =

Durand @-@ Viel 's first battlecruiser design , " A " , was built on a displacement of 27 @,@ 500 t (27 @,@ 100 long tons ; 30 @,@ 300 short tons) . The hull was 210 meters (690 ft) long at the waterline , with a beam of 27 m (89 ft) at the waterline and an average draft of 8 @.@ 7 m (29 ft) . The ships would have been equipped with four sets of direct drive turbines rated at 74 @,@ 000 shaft horsepower (55 @,@ 000 kW) powered by twenty @-@ four double @-@ ended Belleville boilers that burned both coal and oil . The ships ' top speed was to have been 27 knots (50 km / h ; 31 mph) . The ships would have been supplied with 1 @,@ 810 t (1 @,@ 780 long tons ; 2 @,@ 000 short tons) of coal and 1 @,@ 050 t (1 @,@ 030 long tons ; 1 @,@ 160 short tons) of fuel oil . The ships could have cruised for 3 @,@ 500 nautical miles (6 @,@ 500 km ; 4 @,@ 000 mi) at 16 kn (30 km / h ; 18 mph) , with enough fuel for an additional six hours for combat speeds .

The ships ' main armament was composed of eight 340mm / 45 Modèle 1912 guns in two quadruple turrets , the same as in the contemporary French battleships of the Normandie class . Both turrets were placed on the centerline , on either end of the ship . A secondary battery of twenty @-@ four 138 @.@ 6 mm Modèle 1910 guns mounted in casemates was planned for defense against torpedo boats . Four 47 mm (1 @.@ 9 in) saluting guns were also to be equipped . The armament was rounded out by four 450 mm (18 in) torpedo tubes , all submerged in the ships ' hulls . The main armored belt amidships was 280 mm (11 in) thick , slightly thinner than the belt on

the Normandie @-@ class battleships . The rest of the ship 's armor was very similar to that of the Normandie class .

= = = Project " B " characteristics = = =

Durand @-@ Viel 's second battlecruiser design , " B " , was built on the same displacement as the first design . The heavier weight of the increased main battery was offset by a reduction in the armor protection for the secondary guns and improved performance of the ship 's propulsion system . The hull was 208 meters (682 ft) long at the waterline , with a beam of 27 m at the waterline and an average draft of 8 @.@ 7 m . Two engine systems were considered : four direct drive turbines rated at 63 @,@ 000 shp (47 @,@ 000 kW) or four geared turbines rated at 80 @,@ 000 shp (60 @,@ 000 kW) . Steam was provided by eighteen Belleville boilers , ten of which that burned both coal and oil , and eight that were oil @-@ fired only . The ships ' top speed was to have been 26 knots (48 km / h ; 30 mph) for the first variant and 27 knots for the second . The ships would have been supplied with the same fuel allotment as the " A " design , with the same radius of action as well .

The ships ' main armament was composed of eight 370 mm (15 in) guns in two quadruple turrets . Both turrets were placed on the centerline , on either end of the ship . The gun fired a 880 @-@ kilogram (1 @,@ 940 lb) shell that was capable of penetrating 300 mm (12 in) of armor plate at a range of 12 @,@ 700 m (41 @,@ 700 ft) . A secondary battery for defense against torpedo boats consisted of twenty @-@ eight 138 @.@ 6 mm guns , of a new semi @-@ automatic design , mounted in casemates . Four 47 mm saluting guns were also to be installed . The should would also to have carried four 450 mm torpedo tubes , all submerged in the ships ' hulls . The ships ' armor system was identical to the " A " design .