

= Derfflinger @-@ class battlecruiser =

The Derfflinger class was a class of three battlecruisers ( German : Schlachtkreuzer ) of the Imperial German Navy . The ships were ordered for the 1912 ? 13 Naval Building Program of the German Imperial Navy as a reply to the Royal Navy 's three new Lion @-@ class battlecruisers that had been launched a few years earlier . The preceding Moltke class and the incrementally improved Seydlitz represented the end of the evolution of Germany 's first generation of battlecruisers . The Derfflinger class had considerable improvements , including a larger primary armament , all of which was mounted on the centerline , eliminating the restricted arc of the amidships turret . The ships were also larger than the preceding classes . The Derfflinger class used a similar propulsion system , and as a result of the increased displacement were slightly slower .

The class comprised three ships : Derfflinger , Lützow , and Hindenburg . All three of the ships saw active service with the High Seas Fleet during World War I. Derfflinger was commissioned shortly after the outbreak of war , and was present at most of the naval actions in the North Sea , including the battles of Dogger Bank and Jutland . Lützow was commissioned in August 1915 , and only participated in the raid on Yarmouth before being sunk at Jutland . Hindenburg was commissioned into the fleet in May 1917 , and saw no major action . Derfflinger and Hindenburg were interned at Scapa Flow following the armistice in November 1918 . Rear Admiral Ludwig von Reuter , who was in command of the interned High Seas Fleet , ordered the ships to be scuttled in an attempt to prevent their possible seizure by the Royal Navy .

= = Design = =

The Derfflinger @-@ class battlecruisers were a result of the fourth and final Naval Law , which was passed in 1912 . Admiral Alfred von Tirpitz used public outcry over the British involvement in the Agadir Crisis of 1911 to pressure the Reichstag into appropriating additional funds to the Navy . The Fourth Naval Law secured funding for three new dreadnoughts , two light cruisers , and an extra 15 @, @ 000 officers and men in the Navy for 1912 . The three dreadnoughts secured in the bill became Derfflinger , Lützow , and Hindenburg . Design work on the first two ships began in October 1910 and continued until June 1911 ; Hindenburg was built to a slightly modified design , which was created between May and October 1912 .

When design work began , the navy department was asked to submit new requirements to fix deficiencies found in the preceding battlecruiser classes , which primarily covered propulsion systems and the main armament . Previous battlecruisers used a four shaft arrangement for their engines ; reducing the number to three would allow the new ships to equip a diesel engine on the central shaft . This would substantially increase the cruising range , and would ease the transfer of fuel and reduce the number of crew needed to operate the ships ' machinery . The navy department also argued for an increase in the main battery guns , from 28 @-@ centimeter ( 11 in ) guns to 30 @. @ 5 cm ( 12 in ) weapons . This was because the latest British battleships had thicker main belt armor , up to 300 millimeters ( 12 in ) . Since the German battlecruisers were intended to fight in the line of battle , their armament needed to be sufficiently powerful to penetrate the armor of their British opponents . Weight increases were managed by reducing the number of guns , from 10 to 8 ? the increase in gun caliber added only 36 tons to the ships ' displacement . Tirpitz argued against the increase in gun caliber , for he thought the 28 cm gun was powerful enough .

A new construction technique was employed to save weight . Previous battlecruisers were built with a combination of transverse and longitudinal steel frames ; the Derfflinger @-@ class ships dispensed with the transverse frames and used only the longitudinal ones . This enabled the ship to retain structural strength and a lower weight . As with all preceding capital ships , the outer hull spaces between the hull wall and the torpedo bulkhead were used for coal storage .

On 1 September 1910 , the design board chose the 30 @. @ 5 cm , to be mounted in four twin turrets on the centerline of the ship . The armor layout was kept the same as in Seydlitz . In the meantime , pressure from the British public and media had forced the British Parliament to step up ship building . Kaiser Wilhelm II requested that the build time for the new battlecruisers be reduced

to two years each , as opposed to three years . This proved unfeasible , because neither the armor or armament firms could supply the necessary materials according to an expedited schedule .

#### = = = General characteristics = = =

Derfflinger and Lützow were 210 m ( 689 ft 0 in ) long at the waterline and 210 @. @ 40 m ( 690 ft 3 in ) long overall . Hindenburg was slightly longer , at 212 @. @ 50 m ( 697 ft 2 in ) at the waterline and 212 @. @ 80 m ( 698 ft 2 in ) overall . All three ships had a beam of 29 m ( 95 ft 2 in ) , and a draft of between 9 @. @ 20 m ( 30 ft 2 in ) forward and 9 @. @ 57 m ( 31 ft 5 in ) aft . The first two ships were designed to displace 26 @, @ 600 tonnes ( 26 @, @ 200 long tons ) with a standard load , and up to 31 @, @ 200 tonnes ( 30 @, @ 700 long tons ) at combat weight . Hindenburg displaced slightly more , at 26 @, @ 947 tonnes ( 26 @, @ 521 long tons ) standard and 31 @, @ 500 tonnes ( 31 @, @ 000 long tons ) fully laden . The ships ' hulls were constructed from longitudinal steel frames , over which the outer hull plates were riveted . Derfflinger 's hull contained 16 watertight compartments , though Lützow and Hindenburg had an additional seventeenth compartment . All three ships had a double bottom that ran for 65 % of the length of the hull . This was a decrease from preceding German battlecruisers , which had a double bottom for at least 75 % of the hull .

The ships were regarded as excellent sea boats by the German navy . The Derfflinger @-@ class ships were described as having had gentle motion , though they were " wet " at the casemate deck . The ships lost up to 65 % speed with the twin rudders hard over , and heeled up to 11 degrees . This was greater than any of the preceding battlecruiser designs , and as a result , anti @-@ roll tanks were fitted to Derfflinger . The three ships had a metacentric height of 2 @. @ 60 m ( 8 ft 6 in ) . The standard crew for one of the vessels was 44 officers and 1 @, @ 068 men ; when serving as the flagship for the I Scouting Group , the ships carried an additional 14 officers and 62 men . The Derfflingers carried smaller craft , including one picket boat , three barges , two launches , two yawls , and two dinghies .

#### = = = Machinery = = =

By the time construction work on Derfflinger began , it was determined that the diesel engine was not ready for use . Instead , the plan to use a three @-@ shaft system was abandoned and the ships reverted to the standard four @-@ shaft arrangement . Each of the three ships were equipped with two sets of marine @-@ type turbines ; each set drove a pair of 3 @-@ bladed screws that were 3 @. @ 90 m ( 12 ft 10 in ) in diameter on Derfflinger and Lützow and 4 m ( 13 ft 1 in ) in diameter on Hindenburg . Each set consisted of a high- and low @-@ pressure turbine ? the high @-@ pressure machines drove the outer shafts while the low @-@ pressure turbines turned the inner pair . Steam was supplied to the turbines from 14 coal @-@ fired marine @-@ type double boilers and eight oil @-@ fired marine @-@ type double @-@ ended boilers . Each ship was equipped with a pair of turbo @-@ electric generators and a pair of diesel @-@ electric generators that provided a total of 1 @, @ 660 kilowatts at 220 volts . Each ship was equipped with two rudders

The engines for first two ships were designed to provide 62 @, @ 138 shaft horsepower ( 46 @, @ 336 kW ) , at 280 revolutions per minute . This would have given the two ships a top speed of 26 @. @ 5 knots ( 49 @. @ 1 km / h ; 30 @. @ 5 mph ) . During trials , Derfflinger 's engines achieved 75 @, @ 586 shp ( 56 @, @ 364 kW ) , but a top speed of 25 @. @ 5 knots ( 47 @. @ 2 km / h ; 29 @. @ 3 mph ) . Lützow 's engines reached 79 @, @ 880 shp ( 59 @, @ 570 kW ) and a top speed of 26 @. @ 4 knots ( 48 @. @ 9 km / h ; 30 @. @ 4 mph ) . Hindenburg 's power plant was rated at 71 @, @ 015 shp ( 52 @, @ 956 kW ) at 290 rpm , for a top speed of 27 knots ( 50 km / h ; 31 mph ) . On trials she reached 94 @, @ 467 shp ( 70 @, @ 444 kW ) and 26 @. @ 6 knots ( 49 @. @ 3 km / h ; 30 @. @ 6 mph ) . Derfflinger could carry 3 @, @ 500 t ( 3 @, @ 400 long tons ) of coal and 1 @, @ 000 t ( 980 long tons ) of oil ; at a cruising speed of 14 knots ( 26 km / h ; 16 mph ) , she had a range of 5 @, @ 600 nautical miles ( 10 @, @ 400 km ; 6 @, @ 400 mi ) . Lützow carried 3 @, @ 700 t ( 3 @, @ 600 long tons ) of coal and 1 @, @ 000 tons of oil , though she had no advantage in range

over her sister Derfflinger . Hindenburg also stored 3 @, @ 700 tons of coal , as well as 1 @, @ 200 t ( 1 @, @ 200 long tons ) of oil ; her range at 14 knots was rated at 6 @, @ 100 nautical miles ( 11 @, @ 300 km ; 7 @, @ 000 mi ) .

= = = Armament = = =

The Derfflinger @-@ class ships were armed with eight 30 @. @ 5 cm ( 12 in ) SK L / 50 guns in four twin gun turrets , two forward of the main superstructure in a superfiring pair and two to the rear of the ship , in a similar arrangement . The guns were housed in Drh.L C / 1912 mounts on the first two ships , and in Drh.L C / 1913 mounts on Hindenburg . The turrets were trained with electric motors , while the guns were elevated hydraulically , up to 13 @. @ 5 degrees . The guns fired 405 @. @ 5 @-@ kilogram ( 894 lb ) armor @-@ piercing shells at a muzzle velocity of 855 meters per second ( 2 @, @ 805 ft / s ) . At 13 @. @ 5 degrees , the shells could hit targets out to 18 @, @ 000 m ( 20 @, @ 000 yd ) . The turrets were modified in 1916 to increase the elevation maximum to 16 degrees . This correspondingly increased the range to 20 @, @ 400 m ( 22 @, @ 300 yd ) . The ships carried 720 shells , or 90 per gun ; each gun was supplied with 65 armor @-@ piercing ( AP ) shells and 25 semi @-@ AP shells for use against targets with less armor protection . The 30 @. @ 5 cm gun had a rate of fire of between 2 ? 3 shells per minute , and was expected to fire 200 shells before replacement was necessary . The guns were also capable of firing 405 @. @ 9 kg ( 894 @. @ 8 lb ) high explosive shells . The shells were loaded with two RP C / 12 propellant charges : a main charge in a brass cartridge that weighed 91 kg ( 201 lb ) and a fore charge in a silk bag that weighed 34 @. @ 5 kg ( 76 lb ) . The propellant magazines were located underneath the shell rooms for the two forward turrets as well as the rear superfiring turret ; the arrangement was reversed for the rearmost turret .

The ships were designed to carry fourteen 15 cm ( 5 @. @ 9 in ) SK L / 45 guns , mounted in casemates along the superstructure . Because Derfflinger had to be fitted with anti @-@ roll tanks , two of the casemated guns had to be removed , to allow enough room in the hull . Lützow and Hindenburg were equipped with the designed number of guns . Each gun was supplied with 160 rounds , and had a maximum range of 13 @, @ 500 m ( 14 @, @ 800 yd ) , though this was later extended to 16 @, @ 800 m ( 18 @, @ 400 yd ) . The guns had a sustained rate of fire of five to seven rounds per minute . The shells were 45 @. @ 3 kg ( 99 @. @ 8 lb ) , and were loaded with a 13 @. @ 7 kg ( 31 @. @ 2 lb ) RPC / 12 propellant charge in a brass cartridge . The guns fired at a muzzle velocity of 835 meters per second ( 2 @, @ 740 ft / s ) . The guns were expected to fire around 1 @, @ 400 shells before they needed to be replaced .

The three ships carried a variety of 8 @. @ 8 cm ( 3 @. @ 5 in ) SK L / 45 guns in several configurations . The Derfflinger @-@ class ships were initially equipped with eight of these weapons , all in single mounts ; four were placed in the forward superstructure and four in the aft superstructure . The ships also carried four 8 @. @ 8 cm Flak L / 45 anti @-@ aircraft guns , which were emplaced around the forward funnel , with the exception of Lützow , which carried the Flak guns around the rear funnel . After 1916 , the four 8 @. @ 8 cm guns in the forward superstructure were removed . The Flak guns were emplaced in MPL C / 13 mountings , which allowed depression to ? 10 degrees and elevation to 70 degrees . These guns fired 9 kg ( 19 @. @ 8 lb ) shells , and had an effective ceiling of 9 @, @ 150 m ( 30 @, @ 019 ft 8 in ) at 70 degrees .

The ships were also armed with submerged torpedo tubes in their hulls . Derfflinger was equipped with four 50 cm tubes ; the later ships were armed with more powerful 60 cm weapons . The tubes were arranged with one in the bow , one in the stern , and two on the broadside . Derfflinger 's 50 cm torpedoes were the G7 type , 7 @. @ 02 m ( 276 in ) long and armed with a 195 kg ( 430 lb ) Hexanite warhead . The torpedo had a range of 4 @, @ 000 m ( 4 @, @ 370 yd ) when set at a speed of 37 knots , and up to 9 @, @ 300 m ( 10 @, @ 170 yd ) at 27 knots . The 60 cm torpedoes were the H8 type , which were 8 m long and carried a 210 kg ( 463 lb ) Hexanite warhead . The torpedoes had a range of 6 @, @ 000 m ( 6 @, @ 550 yd ) when set at a speed of 36 knots ; at a reduced speed of 30 knots , the range increased significantly to 14 @, @ 000 m ( 15 @, @ 310 yd ) .

== Armor ==

The Derfflinger class ships were protected with Krupp cemented steel armor , as was the standard for German warships of the period . They had an armor belt that was 300 mm ( 12 in ) thick in the central citadel of the ship , where the most important parts of the ship were . This included the ammunition magazines and the machinery spaces . The belt was reduced in less critical areas , to 120 mm ( 4 @ 7 in ) forward and 100 mm ( 3 @ 9 in ) aft . The belt tapered down to 30 mm ( 1 @ 2 in ) at the bow , though the stern was not protected by armor at all . A 45 mm ( 1 @ 8 in ) thick torpedo bulkhead ran the length of the hull , several meters behind the main belt . The main armored deck ranged in thickness from 30 mm thick in less important areas , to 80 mm ( 3 @ 1 in ) in the sections that covered the more critical areas of the ship .

The forward conning tower was protected with heavy armor : the sides were 300 mm thick and the roof was 130 mm ( 5 @ 1 in ) thick . The rear conning tower was less well armored ; its sides were only 200 mm ( 7 @ 9 in ) thick and the roof was covered with 50 mm ( 2 @ 0 in ) of armor plate . The main battery gun turrets were also heavily armored : the turret sides were 270 mm ( 11 in ) thick and the roofs were 110 mm ( 4 @ 3 in ) thick . On Hindenburg , the thickness of the turret roofs was increased to 150 mm ( 5 @ 9 in ) . The 15 cm guns had 150 mm @-@ worth of armor plating in the casemates ; the guns themselves had 70 mm ( 2 @ 8 in ) thick shields to protect their crews from shell splinters .

== Construction ==

Of the three ships in its class , only Derfflinger was ordered as an addition to the fleet , under the provisional name " K " . The other two ships were to intended to replace obsolete vessels ; Lützow was ordered as Ersatz Kaiserin Augusta for the elderly protected cruiser Kaiserin Augusta and the contract for Hindenburg was issued under the provisional name Ersatz Hertha , to replace the protected cruiser Hertha .

Derfflinger was constructed at Blohm & Voss in Hamburg under construction number 213 . She was the least expensive of the three ships , at a cost of 56 million gold marks . The ship was ready to be launched on 14 June 1913 , but during the ceremony , one of the wooden sledges upon which the hull rested became jammed . It took until 12 July for her to enter the water . She was commissioned into the High Seas Fleet on 1 September 1914 , shortly after the outbreak of World War I. Lützow was built at the Schichau dockyard in Danzig under construction number 885 , at the cost of 58 million gold marks . The ship was launched on 29 November 1913 , and after lengthy trials , commissioned on 8 August 1915 . Hindenburg , the final member of the class , was built at the Imperial Dockyard in Wilhelmshaven , under construction number 34 . The ship was built at a cost of 59 million gold marks , the most expensive of the three vessels . She was launched on 1 August 1915 and commissioned on 10 May 1917 .

== Units ==

== SMS Derfflinger ==

Named after Georg von Derfflinger , a German field marshal during the Thirty Years ' War , Derfflinger was commissioned on 1 September 1914 . A dockyard crew transferred the ship from Hamburg to Kiel , via the Skagen . The ship was assigned to the I Scouting Group at the end of October . Damage to the ship 's turbines sustained during trials prevented the ship from seeing active service until 16 November . On 15 December , the ship took part in the raid on Scarborough , Hartlepool and Whitby . She was also present during the battle of Dogger Bank on 24 January 1915 . The ship was hit once by a 13 @ 5 @-@ inch shell from one of the British battlecruisers ; in response , she heavily damaged HMS Lion . Repair work was completed by 16 February , but Derfflinger 's starboard turbine was accidentally damaged on 28 June , and the ship was again in

the dockyard until August . On 24 April 1916 , Derfflinger took part in the bombardment of Yarmouth .

On 31 May , Derfflinger was heavily engaged during the Battle of Jutland , as the second ship in the German battlecruiser line . She sustained 21 major hits during the battle , but dealt considerable damage to the British battlecruiser force as well . At 16 : 26 , HMS Queen Mary sank after a magazine explosion that tore the ship apart ; she had been targeted with a hail of heavy @-@ caliber gunfire from Derfflinger and Seydlitz . Two hours later , at 18 : 30 , HMS Invincible suffered a similar fate , though Derfflinger was assisted by her sister Lützow . During the engagement , Derfflinger had both of her rear turrets knocked out by British gunfire . Her crew suffered 157 men killed and 26 wounded , which was the highest casualty figure for any German ship not sunk . The resilience of the vessel earned her the nickname " Iron Dog " from her British adversaries . Repair work lasted until 15 October , during which the ship had her pole mast removed and replaced with a tripod mast . The ship conducted training operations until November , at which point she returned to active duty with the fleet .

Following the German capitulation in November 1918 , Derfflinger was interned with a significant portion of the High Seas Fleet in Scapa Flow . On 21 June 1919 , with the guard ships of the Royal Navy out on maneuvers , Rear Admiral Ludwig von Reuter ordered that the fleet be scuttled . The resulting scuttling of the German fleet saw some 66 vessels of various types sunk . Among those was Derfflinger , which sank at 14 : 45 . The ship was raised in 1939 to be broken up for scrap metal , but the outbreak of World War II intervened . The ship , which remained capsized , was anchored off the island of Risa until 1946 , at which point she was sent to Faslane Port , where she was broken up . The ship 's bell was delivered to the German Federal Navy on 30 August 1965 .

= = = SMS Lützow = = =

Lützow was named after Ludwig Adolf Wilhelm von Lützow , a Prussian lieutenant @-@ general who fought during the Napoleonic Wars . The ship was commissioned on 8 August 1915 , and then underwent trials . On 25 October , while still running sea trials , Lützow 's port low pressure turbine were severely damaged . She was sent to Kiel for repairs , which lasted until late January 1916 . The ship went on additional trials that lasted until 19 February . Lützow was by then fully operational , and assigned to the I Scouting Group on 20 March 1916 . She took part in two fleet advances , on 25 March and 21 ? 22 April , without any major incidents . The following day , on 23 April , Lützow , along with her sister Derfflinger and the battlecruisers Seydlitz , Moltke , and Von der Tann , bombarded Yarmouth . While en route to the target , Vice Admiral Franz von Hipper 's flagship Seydlitz was heavily damaged by mines . As a result , Lützow was transferred to the role of squadron flagship . During the operation , the German battlecruisers encountered British light forces , and a running battle ensued . Lützow engaged the light cruiser HMS Conquest and hit her several times .

At the Battle of Jutland , she was the first ship in the German line , and Hipper 's flagship , and drew fire from the British battlecruisers which included hits below her waterline . Shortly after the start of the battlecruiser action , Lützow hit her opponent Lion several times ; one hit knocked out Lion 's " Q " turret , and the resulting magazine fire nearly destroyed the ship . Shortly after 19 : 00 , the armored cruisers Defence and Warrior inadvertently ran into the German line ; Lützow opened fire immediately , followed by several German dreadnoughts . In a hail of shells , Defence 's ammunition magazines detonated and the ship was sunk . At around the same time , the fresh battlecruisers of the 3rd Battlecruiser Squadron engaged their German opposites . Between 19 : 26 and 19 : 34 , Lützow sustained four 12 @-@ inch shell hits in her bow from the British battlecruisers ; these eventually proved to be fatal . Despite this , at 19 : 30 , the combined fire of Lützow and her sister Derfflinger destroyed the battlecruiser Invincible . By 20 : 15 , Lützow had been hit five more times , including hits on her two forward turrets .

By 22 : 15 , Lützow had shipped nearly 2 @, @ 400 tons of water , and the ship was dangerously down by the bows . After midnight , attempts were made to steer the ship in reverse . This failed when the bow became submerged enough to bring the stern out of the water ; by 02 : 20 , the

screws and both rudders were coming out of the water and the ship was no longer able to steer . The order to abandon ship was given , and at 02 : 47 , Lützow was sunk by the torpedo boat G38 . The ship was lost because the flooding in the bow could not be controlled ; the forward pump system failed and the central system could not keep up with the rising water . The crew was picked up by four torpedo boats that had been escorting the crippled battlecruiser ; during the battle the ship suffered 116 men killed .

= = = SMS Hindenburg = = =

Hindenburg was the last battlecruiser completed for the Imperial German Navy , and as such had a very short career . She was commissioned 10 May 1917 , and was fully operational by 20 October 1917 , too late to see any major action in World War I. On 17 November Hindenburg and Moltke , along with the light cruisers of the II Scouting Group , were acting as distant support for German minesweepers off the German coast when they were attacked by British battlecruisers . The raid was brief ; by the time Hindenburg and Moltke arrived on the scene , the British ships had broken off the attack and withdrawn . Six days later , Hindenburg replaced Seydlitz as flagship of the I Scouting Group . On 23 April 1918 , the ship took part in an abortive fleet advance into the North Sea that attempted to intercept an Allied convoy . Moltke sustained mechanical damage while en route , and as a result , Vice Admiral Hipper decided to cancel the operation . On 11 August , Hipper was promoted to Admiral and given command of the entire High Seas Fleet . Rear Admiral Ludwig von Reuter replaced Hipper as the commander of the I Scouting Group ; he raised his flag on Hindenburg the following day .

Hindenburg was interned at Scapa Flow , along with her sister Derfflinger and the rest of the German battlecruisers . She was scuttled on 21 June 1919 , and sank at 17 : 00 . Several unsuccessful attempts to raise her were made ; on 23 July 1930 the ship was finally raised . From 1930 to 1932 she was scrapped at Rosyth . Her bell was presented to the German Federal Navy on 28 May 1959 .