

= Japanese aircraft carrier H<sub>2</sub>S<sub>2</sub> =

H<sub>2</sub>S<sub>2</sub> ( 鳳 , literally " phoenix in flight " ) was the world 's first commissioned ship that was designed and built as an aircraft carrier , and the first aircraft carrier of the Imperial Japanese Navy ( IJN ) . Commissioned in 1922 , the ship was used for testing carrier aircraft operations equipment , techniques , such as take @-@ offs and landings , and carrier aircraft operational methods and tactics . The ship provided valuable lessons and experience for the IJN in early carrier air operations . H<sub>2</sub>S<sub>2</sub> 's superstructure and other obstructions to the flight deck were removed in 1924 on the advice of experienced aircrews .

H<sub>2</sub>S<sub>2</sub> and her aircraft group participated in the Shanghai Incident in 1932 and in the opening stages of the Sino @-@ Japanese War in late 1937 . During those two conflicts , the carrier 's aircraft supported Imperial Japanese Army ground operations and engaged in aerial combat with aircraft of the Nationalist Chinese Air Force . The small size of the ship and her assigned airgroups ( usually around 15 aircraft ) limited the effectiveness of her contributions to combat operations . As a result , the carrier was placed in reserve after her return to Japan from China and she became a training carrier in 1939 .

During World War II , H<sub>2</sub>S<sub>2</sub> participated in the Battle of Midway in June 1942 in a secondary role . After the battle , the carrier resumed her training role in Japanese home waters for the duration of the conflict and survived the war with only minor damage from air attacks . She was used as a repatriation transport after the war , making nine trips to bring some 40 @,@ 000 Japanese soldiers and civilians to Japan from overseas locations . H<sub>2</sub>S<sub>2</sub> was scrapped in Japan beginning in 1946 .

= = Design and description = =

Construction of a seaplane carrier was authorized by the Japanese government in its " eight @-@ six " fleet program of 1918 . A planned sister ship , named Shokaku , was cancelled in 1922 before any construction started . H<sub>2</sub>S<sub>2</sub> was the second warship , after the British HMS Hermes , to be designed from the keel up as an aircraft carrier , but was launched and completed earlier than Hermes .

H<sub>2</sub>S<sub>2</sub> was planned as a seaplane carrier like the British HMS Campania with a forward flying @-@ off deck , 32 aircraft , four low @-@ angle 14 @-@ centimeter ( 5 @.@ 5 in ) guns , and four anti @-@ aircraft ( AA ) guns . The plan was revised after reports were received from Japanese observers with the Royal Navy in Europe about the desirability to be able to land aircraft on the ship . The new requirements were modeled on HMS Furious after she received her rear flight deck in 1918 . The ship was to be capable of 30 knots ( 56 km / h ; 35 mph ) and fitted with a forward flight deck , superstructure and funnels amidships , and a large hangar aft . Shortly thereafter based on observations of landing trials on Furious and HMS Argus , the world 's first flush @-@ decked aircraft carrier , H<sub>2</sub>S<sub>2</sub> 's flight deck design was revised in April 1919 . The superstructure was removed and the funnels were moved to one side to create an unobstructed , full @-@ length flight deck , and the ship was reclassified as an aircraft carrier . The ship 's hull was based on that of a large cruiser and she was given a small island . Her three funnels were mounted on the starboard side and swiveled to lie horizontal during flight operations . H<sub>2</sub>S<sub>2</sub> 's designed speed was reduced to 25 knots ( 46 km / h ; 29 mph ) , based on British experiences during World War I.

= = = General characteristics = = =

H<sub>2</sub>S<sub>2</sub> was completed with an overall length of 168 @.@ 25 meters ( 552 ft 0 in ) . She had a beam of 17 @.@ 98 meters ( 59 ft 0 in ) and a mean draft of 6 @.@ 17 meters ( 20 ft 3 in ) . The ship displaced 7 @,@ 470 long tons ( 7 @,@ 590 t ) at standard load , and 9 @,@ 494 long tons ( 9 @,@ 646 t ) at normal load . Her crew totaled 512 officers and men . The ship was almost completely unarmored .

= = = Propulsion = = =

H<sup>?</sup>sh<sup>?</sup> had two Parsons geared turbine sets with a total of 30 @, @ 000 shaft horsepower ( 22 @, @ 000 kW ) driving two propeller shafts . Eight Kampon Type B water @-@ tube boilers with a working pressure of 18 @. @ 3 kg / cm<sup>2</sup> ( 1 @, @ 790 kPa ; 260 psi ) and a temperature of 138 ° C ( 280 ° F ) provided steam to the turbines , although only four were oil @-@ fired . The other four used a mix of oil and coal . The ship 's designed speed was 25 knots , but she made 26 @. @ 66 knots ( 49 @. @ 37 km / h ; 30 @. @ 68 mph ) from 31 @, @ 117 shaft horsepower ( 23 @, @ 204 kW ) on her sea trials on 30 November 1922 . She carried 2 @, @ 700 long tons ( 2 @, @ 700 t ) of fuel oil and 940 long tons ( 960 t ) of coal , an extraordinary total for such a small ship , to give her a range of 8 @, @ 680 nautical miles ( 16 @, @ 080 km ; 9 @, @ 990 mi ) at 12 knots ( 22 km / h ; 14 mph ) .

To reduce rolling and increase stability for aircraft operations , a gyrostabilizer produced by the American Sperry Gyroscope Company was installed . The installation initially proved unreliable as the Japanese technicians were badly trained by Sperry , but eventually the system proved its worth as the technicians gained experience .

= = = Flight deck arrangements = = =

H<sup>?</sup>sh<sup>?</sup> 's flight deck was 168 @. @ 25 meters ( 552 ft 0 in ) long and 22 @. @ 62 meters ( 74 ft 3 in ) wide . The forward end sloped down at an angle of ? 5 ° to help aircraft accelerate during takeoff . A small island was mounted well forward on the starboard side and contained the ship 's bridge and air operations control center . The island was fitted with a small tripod mast intended to mount the ship 's fire @-@ control system . Fifteen different types of landing equipment were evaluated before the British longitudinal wire system was adopted . Low landing speeds of the time meant that aircraft had little difficulty in stopping , but their light weight made them vulnerable to wind gusts that could blow them over the side of the carrier , and the longitudinal wires helped to prevent that . Forward of the island was a collapsible crane for loading aircraft into the forward hangar .

The flight deck , unlike those on Royal Navy carriers , was superimposed on the ship 's hull rather than constructed as a strength deck supporting the carrier 's hull structure . A system of lights and mirrors along the flight deck assisted pilots in landing on the carrier .

H<sup>?</sup>sh<sup>?</sup> was the only Japanese aircraft carrier with two hangars . The forward hangar was 67 @. @ 2 by 9 @. @ 5 meters ( 220 ft 6 in by 31 ft 2 in ) and only one deck in height as it was intended to house nine small aircraft , such as fighters . The two @-@ story rear hangar measured 16 @. @ 5 by 14 meters ( 54 ft 2 in by 45 ft 11 in ) at the forward end and 29 @. @ 4 by 12 meters ( 96 ft 5 in by 39 ft 4 in ) at the rear end . It was designed to house six large aircraft , such as torpedo bombers , as well as six reserve aircraft . Each hangar was served by an aircraft elevator . The forward elevator was 10 @. @ 35 by 7 @. @ 86 meters ( 34 @. @ 0 by 25 @. @ 8 ft ) and the aft elevator measured 13 @. @ 71 by 6 @. @ 34 meters ( 45 ft 0 in by 20 ft 10 in ) .

= = = Air group = = =

H<sup>?</sup>sh<sup>?</sup> had a normal capacity of fifteen aircraft , subject to the limitations of her hangars . She was first commissioned with an air group of nine Mitsubishi 1MF ( Type 10 ) fighters and three to six Mitsubishi B1M3 ( Type 13 ) torpedo bombers . In 1928 , the fighters were replaced by the A1N1 ( Type 3 ) . Three years later the air group consisted of Nakajima A2N ( Type 90 ) fighters and Mitsubishi B2M ( Type 89 ) torpedo bombers . In 1938 Nakajima A4N ( Type 95 ) fighters and Yokosuka B3Y ( Type 92 ) bombers flew from the ship . In 1940 the air group was modernized with Mitsubishi A5M ( Type 96 ) " Claude " fighters and Yokosuka B4Y1 ( Type 96 ) " Jean " bombers .

= = = Armament = = =

H<sup>?</sup>sh<sup>?</sup> was armed with four 50 @-@ caliber 14 cm / 50 3rd Year Type guns , two on each side . The two forward guns had a firing arc of 150 ° , including straight ahead , while the rear guns could fire 120 ° on either side . They fired 38 @-@ kilogram ( 84 lb ) projectiles at a rate of six to ten

rounds per minute with a muzzle velocity of about 850 m / s ( 2 @, @ 800 ft / s ) ; at 35 ° , they had a maximum range of 19 @, @ 750 m ( 21 @, @ 600 yd ) . A heavy gun armament was provided for H?sh? ; as carrier doctrine was just evolving at this time , the impracticability of carriers engaging in gun duels had not yet been realized . Her large flight deck and lack of armor made her a vulnerable target in surface battles .

A pair of 40 @-@ caliber 8 cm / 40 3rd Year Type guns on disappearing mounts provided H?sh? 's only anti @-@ aircraft defense . They were positioned on the flight deck , just forward of the rear elevator . These guns fired 5 @. @ 67 ? 5 @. @ 99 @-@ kilogram ( 12 @. @ 5 ? 13 @. @ 2 lb ) projectiles at a muzzle velocity of about 680 m / s ( 2 @, @ 231 ft / s ) ; at 45 ° , this provided a maximum range of 10 @, @ 800 meters ( 11 @, @ 800 yd ) , and they had a maximum ceiling of 7 @, @ 200 meters ( 23 @, @ 600 ft ) at 75 ° elevation . Their effective rate of fire was 13 to 20 rounds per minute .

= = Service = =

= = = Early career = = =

H?sh? 's keel was laid down by the Asano Shipbuilding Company in Tsurumi @-@ ku , Yokohama , on 16 December 1920 . She was launched on 13 November 1921 and towed to Yokosuka Naval Arsenal for completion on 10 January 1922 . H?sh? was delayed by repeated design changes and late deliveries of equipment , pushing the commissioning date from March to 27 December 1922 . She was commissioned lacking much of her aviation equipment , and did not begin landing trials until 22 February 1923 . The first landings were made by British pilots under contract , who were quickly replaced by Japanese pilots trained by the British Aviation Mission .

After H?sh? was commissioned , experienced aircrews requested changes , and the ship was modified by the Yokosuka Navy Arsenal from 6 June to 20 August 1924 . The island , tripod mast , and aircraft crane were removed since they partially obstructed the flight deck and obscured pilot visibility . The forward part of the flight deck was made horizontal , and the 8 cm AA guns were moved forward , close to the position of the former island and out of the way of landing operations . After the island was removed , the carrier 's flight operations were controlled from a platform extending from the side of the flight deck , a design that would be repeated in subsequent Japanese aircraft carriers . The ship was then assigned to the 1st Fleet until 15 November 1924 .

H?sh? was fitted with a net used as a crash barrier aft of the forward elevator between 10 March and 2 July 1925 . The barrier was intended to prevent landing aircraft from colliding with aircraft preparing to take off , and stop them from falling into the open elevator well . The barrier was hydraulically operated and could be erected in three seconds .

As the first of her kind , H?sh? provided valuable experience and insight into carrier air operations for the IJN . The ship was used for testing aircraft and equipment , particularly various types of arresting gear and optical landing aids . The lessons learned influenced the design and construction of Ry?j? and the subsequent conversions of Akagi and Kaga into aircraft carriers . H?sh? was actively used to develop carrier operational methods and tactics for the IJN during the 1920s . She was assigned to the First Carrier Division with Akagi on 1 April 1928 . During the 1930s H?sh? was fitted with three different types of transverse arresting gear for trials .

= = = Shanghai = = =

Along with Kaga , H?sh? was assigned to the First Carrier Division and sent to China during the Shanghai Incident that began in January 1932 . Operating with the Third Fleet , H?sh? arrived at the mouth of the Yangtze River on 1 February . Her aircraft participated in the IJN 's first aerial combat on 5 February when three fighters , escorting two attack aircraft , were engaged by nine Chinese fighters ; one Chinese fighter was damaged . Two days later , the two carriers sent some of their aircraft to Kunda Airfield where they flew ground attack missions in support of the Imperial Japanese

Army . Between 23 and 26 February , Kaga and H<sup>?</sup>sh<sup>?</sup> bombers attacked Chinese airfields at Hangzhou and Suzhou , destroying a number of Chinese aircraft on the ground . On 26 February , six fighters from H<sup>?</sup>sh<sup>?</sup> , escorting nine attack aircraft from Kaga on one of the bombing raids , shot down two of five Chinese fighters that engaged them . The First Carrier Division rejoined the Combined Fleet on 20 March , after a ceasefire had been declared on 3 March .

= = = Fourth Fleet Incident = = =

H<sup>?</sup>sh<sup>?</sup> participated in the Combined Fleet Maneuvers of 1935 where she was attached to the IJN Fourth Fleet . The fleet was caught out in a typhoon on 23 September . The carrier and a number of other Japanese ships were badly damaged in what was referred to as the " Fourth Fleet Incident . " The ship 's forward flight deck collapsed and part had to be cut away before the carrier could proceed to Yokosuka for repairs . The Fourth Fleet Incident and the Tomozuru Incident of 1934 , in which a top @-@ heavy torpedo boat capsized in heavy weather , caused the Japanese command to investigate the stability of all their ships , resulting in a number of design changes to improve stability and increase hull strength .

While the H<sup>?</sup>sh<sup>?</sup> was at the dockyard between 22 November 1935 and 31 March 1936 , her stability was improved ; the forward flight deck 's supports were reinforced and increased in number ; the ship 's AA guns , aircraft crane and upper deck aviation fuel tanks were removed ; the funnels were fixed in the horizontal position with their mouths angled slightly downwards ; the front sides of H<sup>?</sup>sh<sup>?</sup> 's forward hangar and bridge were reinforced ; and the ship 's hull was reinforced in the vicinity of her rear hangar to increase her longitudinal strength . At full load , her metacentric height after these changes was 1 @.@ 11 meters ( 3 ft 8 in ) . Six twin 13 @.@ 2 mm Type 93 Hotchkiss machine guns were also fitted .

= = = Sino @-@ Japanese War = = =

During the Sino @-@ Japanese War , H<sup>?</sup>sh<sup>?</sup> returned to the Third Fleet and supported land operations of the army in China around August or October 1937 with Ry<sup>?</sup>j<sup>?</sup> , later joined by Kaga . H<sup>?</sup>sh<sup>?</sup> 's air unit began flying ground support missions in the Shanghai area on 16 July . Three of the ship 's Nakajima A2N fighters engaged two Martin B @-@ 10 heavy bombers on 25 July , shooting down one of them .

The ship departed on 1 September to refuel , but did not return to the Shanghai area . Accompanied by Ry<sup>?</sup>j<sup>?</sup> , she sailed to the South China coast and began operations against Chinese forces near Canton on 21 September . On that day , H<sup>?</sup>sh<sup>?</sup> contributed six fighters to escort bombers attacking airfields at Tienho and Paiyun . They claimed six enemy aircraft shot down , but the range proved to be too long . Five of the fighters ran out of fuel and had to ditch in the sea , although the aircrews were rescued . H<sup>?</sup>sh<sup>?</sup> and Ry<sup>?</sup>j<sup>?</sup> bombers continued with almost daily attack missions until the end of September . H<sup>?</sup>sh<sup>?</sup> and Ry<sup>?</sup>j<sup>?</sup> returned to the Shanghai area on 3 October and H<sup>?</sup>sh<sup>?</sup> 's aircraft were temporarily transferred to Kunda airfield to support ground operations . On 17 October , H<sup>?</sup>sh<sup>?</sup> transferred all of her aircraft to Ry<sup>?</sup>j<sup>?</sup> and returned to Japan .

H<sup>?</sup>sh<sup>?</sup> was placed in reserve on 1 December 1937 . Her aircraft elevators were enlarged in 1939 : the forward elevator to 12 @.@ 8 by 8 @.@ 5 meters ( 42 by 28 ft ) and the rear elevator to 13 @.@ 7 by 7 meters ( 45 by 23 ft ) . On 12 August 1939 H<sup>?</sup>sh<sup>?</sup> was deemed useful as a training carrier and , in critical battles , as a platform for A4N1 ( Type 95 ) fighters and B4Y1 ( Type 96 ) torpedo bombers , for as long as those planes remained serviceable . A later investigation determined on 23 December 1940 that she could not operate the latest aircraft types like the Mitsubishi A6M Zero , the Aichi D3A " Val " , or the Nakajima B5N " Kate " in combat . Also , the small size of the carrier 's airgroup limited the ship 's potential value to the fleet in any future conflicts .

= = = World War II = = =

== == Pearl Harbor and Midway == ==

H<sup>2</sup>sh<sup>2</sup> began the Pacific War in the Third Carrier Division assigned to the 1st Fleet under Vice Admiral Shirō Takasu . The carrier , captained by Karou Umetani , was tasked along with Zuikō to provide air support , including scouting , anti @-@ submarine patrols , and combat air patrol for the Combined Fleet 's " Main Body " battle @-@ line of six battleships : Nagato , Mutsu , Fusō , Yamashiro , Ise , and Hyōga . With the Main Body , H<sup>2</sup>sh<sup>2</sup> sortied from the Inland Sea on 7 December 1941 to provide distant cover for the carrier forces under Chōichi Nagumo which were attacking Pearl Harbor . The battleship force turned back 300 nautical miles ( 556 km ) east of Japan , but H<sup>2</sup>sh<sup>2</sup> became separated on 10 December due to radio silence restrictions while conducting anti @-@ submarine air operations . The carrier was located by scout aircraft the next day 500 nautical miles ( 926 km ) east of the Main Body and returned to port at Kure on 12 December .

On 29 May 1942 , H<sup>2</sup>sh<sup>2</sup> sortied from Japan with the rest of the fleet for the operation which resulted in the Battle of Midway , providing modest air protection , scouting , and anti @-@ submarine support for the Main Body , now consisting of the battleships Yamato , Nagato , and Mutsu . Her aircraft complement for the operation consisted of eight obsolete Yokosuka B4Y carrier attack aircraft ( torpedo bombers ) .

With the Main Body trailing 300 nautical miles ( 556 km ) behind the carrier striking force , H<sup>2</sup>sh<sup>2</sup> missed the major portion of the battle in which Nagumo 's four fleet carriers were ambushed and fatally damaged by US carrier aircraft on 4 June . The next day , H<sup>2</sup>sh<sup>2</sup> aircraft helped guide the remnants of Nagumo 's force to a rendezvous with the Main Body . Around the same time , one of H<sup>2</sup>sh<sup>2</sup> 's aircraft , crewed by pilot Shigeo Nakamura and observer Kiyoshi Ōniwa , discovered the burning , sinking Hiryū . Photographs of the abandoned carrier taken by Ōniwa have been described as " among the most dramatic of the war in the Pacific " . With the battle lost , a significant strategic defeat for Japan , the carrier returned to Japan with the rest of the fleet , arriving at the Hashirajima anchorage on 14 June .

== == Training ship == ==

After her return to Japan , H<sup>2</sup>sh<sup>2</sup> was transferred to the Third Fleet , unofficially assigned to the training fleet ( later called the Mobile Force Training Force ) , and officially assigned in October . She conducted flight training in the Inland Sea for aircraft that flew in from shore bases , since no aircraft were based on board H<sup>2</sup>sh<sup>2</sup> . On 15 January 1943 , the 50th Air Flotilla was created for carrier aircrew training and both H<sup>2</sup>sh<sup>2</sup> and Ryūhō were assigned to the new unit . The two ships provided carrier landing training and served as target ships for torpedo training . In January 1944 , H<sup>2</sup>sh<sup>2</sup> was reassigned to the 12th Air Fleet , then to the Combined Fleet , but continued to perform the same mission of training fleet carrier pilots in the Inland Sea . In this role , H<sup>2</sup>sh<sup>2</sup> shuttled back and forth between Kure and the Western Inland Sea , spending equal amounts of time at each location .

In order to service new and larger aircraft like the Nakajima B6N " Jill " torpedo bomber and the Yokosuka D4Y " Judy " dive bomber , the flight deck was extended over 6 meters ( 19 ft 8 in ) at each end to a total length of 180 @. @ 8 meters ( 593 ft 2 in ) from 27 March to 26 April 1944 . H<sup>2</sup>sh<sup>2</sup> also received new arresting gear and a new crash barrier . The additional weight high up in the ship adversely affected her stability and she was restricted from operations in bad weather lest she capsize . At some point during the war the ship 's 14 cm guns were removed and she received about twenty 25 @-@ millimeter Type 96 autocannons in single mounts . They fired .25 @-@ kilogram ( 0 @. @ 55 lb ) projectiles at a muzzle velocity of 900 m / s ( 3 @, @ 000 ft / s ) ; at 50 ° , this provided a maximum range of 7 @, @ 500 meters ( 8 @, @ 202 yd ) , and an effective ceiling of 5 @, @ 500 meters ( 18 @, @ 000 ft ) . The 15 @-@ round magazines needed to be changed frequently , and the maximum effective rate of fire was only between 110 and 120 rounds per minute .

After the modifications , H<sup>2</sup>sh<sup>2</sup> continued to provide training to navy pilots in the Inland Sea , including acting as a target ship for torpedo training . At 05 : 30 on 19 March 1945 , possibly while

berthed at Kure , the carrier was caught in an air raid by carrier aircraft from the United States Task Force 58 . H<sup>?</sup>sh<sup>?</sup> 's flight deck was damaged by three bomb hits which killed six crewmen . Emergency repairs were made and her captain was ordered to keep her in readiness on 10 April . However , this order was revoked two days later and the carrier became a " 4th reserve ship " with most of her crew transferred elsewhere . H<sup>?</sup>sh<sup>?</sup> was taken out of reserve as a " special guard ship " on 1 June and many of her crew were transferred back . During this time , the ship remained moored and camouflaged off Nishinomishima at Kure .

H<sup>?</sup>sh<sup>?</sup> was slightly damaged by a single bomb or aerial rocket hit when the Allies attacked Kure again in July 1945 . Information is scarce on the extent of the ship 's involvement in the action , but it appears the carrier 's participation was minimal , as it embarked no aircraft at the time . H<sup>?</sup>sh<sup>?</sup> was repaired within 15 days , but the termination of hostilities in September 1945 found the carrier still docked at Kure .

= = Post @-@ war = =

After the war , H<sup>?</sup>sh<sup>?</sup> served as a repatriation transport to retrieve Japanese servicemen and civilians stationed overseas and return them to Japan . In October and November 1945 , accompanied by the cruiser Kashima , she carried 700 passengers from Wotje Atoll , 311 from Jaluit Atoll , and an undocumented number from Enewetak Atoll to Uraga , Kanagawa .

In December 1945 , H<sup>?</sup>sh<sup>?</sup> 's overhanging flight deck at the bow was cut off and her hangars were modified to carry more passengers . Thereafter , she undertook more repatriation missions beginning with one to Wewak on 5 January 1946 and subsequent trips to China . In total , the carrier made nine repatriation trips before 15 August 1946 and transported about 40 @,@ 000 passengers .

H<sup>?</sup>sh<sup>?</sup> was transferred to the Ministry of the Interior on 31 August for disposal . She was scrapped in Osaka from 2 September 1946 to 1 May 1947 by the Kyôwa Shipbuilding Company .