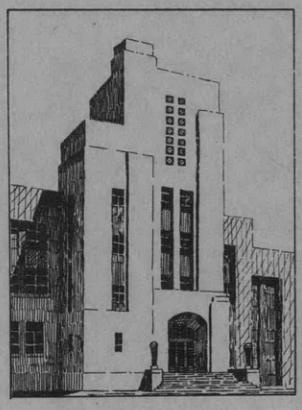
THE DAVID W. TAYLOR MODEL BASIN

UNITED STATES NAVY

LAUNCHING OF THE BATTLESHIP SCHARNHORST

BY F. RIECKE



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LAUNCHING OF THE BATTLESHIP SCHARNHORST

(ABLAUF DES SCHLACHTSCHIFFES SCHARNHORST)

by

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LAUNCHING OF THE BATTLESHIP SCHARNHORST*

The battleship SCHARNHORST was built at the Wilhelmshaven Navy Yard and launched into a basin 376 m (1,233 feet) wide. Part of the width of this basin was taken up by an extension of the launching ways beyond the building slip. The length of the vessel was 226 m (741.46 feet), unprecedented for that slip. This combination of long ship and short launching distance required the application of special precautionary measures almost immediately after free-floating to stop the vessel.

MODEL TESTS

This problem could not be solved by calculation alone, since the effects of water movements and the stern wave could not be numerically expressed. Therefore, the builders instituted model tests in the hydraulics testing institute belonging to the Navy Yard. These tests were probably the first of their kind in which the phenomena during launching were scientifically investigated.**

The slips and portions of the docks surrounding them, including the bottom contour as determined by accurate soundings, were reproduced at a scale ratio of 1 to 30. Having consideration for the laws of similitude and the mass distribution with respect to length, the measurements of the movements made at the launching of the armored pocket-battleship ADMIRAL GRAF SPEE from the same slip were then correlated with those of its model. After this had been achieved by weights to pull and brake the model, analogous tests on a model of the battleship SCHARNHORST were made.

Although these efforts offered no quantitative values which might be considered absolutely reliable, they nevertheless gave a true picture with respect to the orders of magnitudes and qualitative data involved. Hence, the effectiveness of braking devices could be studied in a series of tests. In addition to the usual anchors, these devices included braking masks welded to the hull and floats attached to the hull by cables.

The tests showed that the braking effect of the masks varied sharply with their size and position and especially that a disproportionately smaller effect was produced with masks secured to the after portion of the ship alone than when masks were attached both fore and aft. In addition to a decrease of about 5 per cent in the maximum launching velocity resulting from the immediate effectiveness of the masks, the arrangement shown in Figure 1 proved especially favorable. The reason for this was that the water forced from the slip by the after masks surged back against the forward ones with great velocity. Up to the free-floating point the launching

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* Methods used to obtain data preliminary to the launching of the SCHARNHORST and the TIRPITZ are described in TMB Translation 100, May 1942, "Prediction of the Movements of Large Ships in Launching" (Vorausbestimmung der Bewegungsvorgänge beim Stapellauf groszer Schiffe), by Heinrich Stemmer, Schiffbau, Schiffahrt, und Hafenbau, 1 September 1940.

** Translator's Note: The author has assumed too much, as launching model experiments had previously been undertaken in England and the United States.

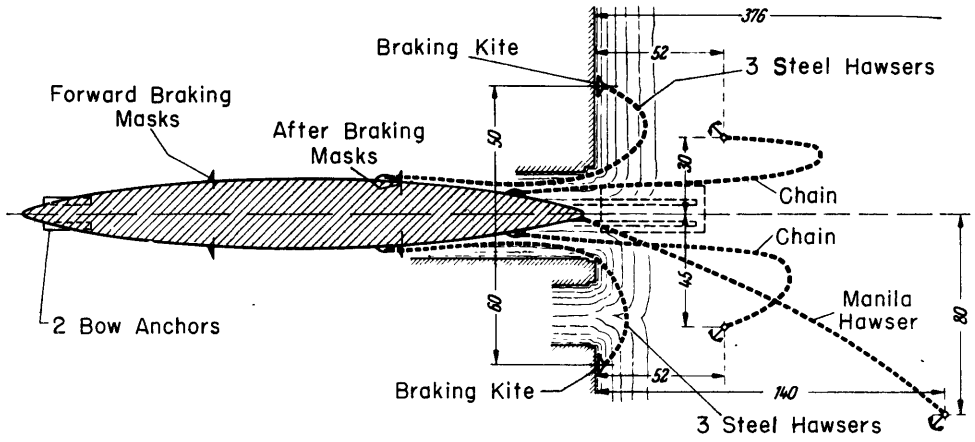

Figure 1 - Arrangement of the Retarding Gear at the Launching of the Battleship SCHARNHORST

velocity had thus been reduced by 28 per cent from its maximum value.

The retarding effect of two free-floating, wooden braking kites was also very gratifying. These were weighted to float almost vertically. They were placed far enough from the building slip to be clear of the currents produced by the ship, and then were arranged to become effective only after free-floating was achieved. Therefore, after completion of the tests, it could be assumed that the ship could be stopped in time by anchors attached to the hull, even if one of the retarding devices should fail.

RETARDING ARRANGEMENTS

The retarding arrangements and the arrangement of the anchors planted in the basin are shown in Figure 1. The after masks, located on the port and starboard sides of the vessel, each measured 30 m^2 (322.92 square feet); the forward ones had an area of 20 m^2 (215.28 square feet) each. The area of the two braking kites was 54 m^2 (581.25 square feet) each. They were made fast to the hull plating just ahead of the after masks by three steel cables of 14 cm (5.51 inches) circumference.

Two anchors of 9,800 kg (21,605 pounds) each had previously been placed in position in the basin. These were attached to eyes welded to the ship by a stud-link anchor chain of 81 mm (3.19 inches) diameter. A slewing anchor of 4,000 kg (8,814 pounds) was also provided. It was attached on the starboard side of the ship by a manila hawser 30 cm (11.81 inches) in circumference. Two bow anchors of 6,000 kg (13,227 pounds) each, attached with 60-mm (2.36-inch) chains, could not be dropped before the ship was 50 m (164 feet) from the slip because of the interference of the breast of the slipway.

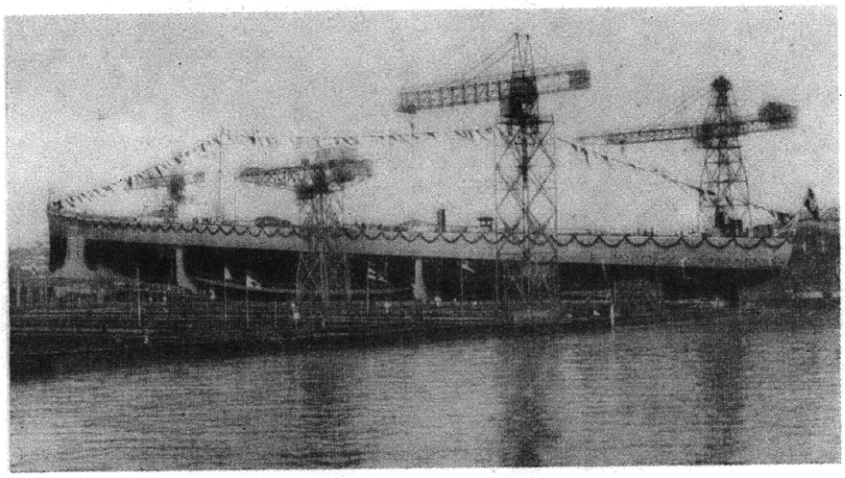

Figure 2 - Battleship SCHARNHORST Shortly before Launching, 3 October 1936

Displacement	- 26,000 tons	Beam, maximum	- 30 m (98.42 feet)
Length, water line	- 226 m (741.46 feet)	Draft, mean	- 7.5 m (24.60 feet)

LAUNCHING

The after brake masks entered the water after 7 m (22.96 feet) of travel, the forward masks after 83 m (272.31 feet). Immediately after free-floating, the port braking kite took hold and after 10 m (32.80 feet) of additional travel, the starboard float became operative. After 6 m (19.68 feet) more had been traversed, the port anchor took hold and 13 m (42.65 feet) farther on, the starboard anchor began to drag; then followed the port and starboard bow anchors and finally the slewing anchor secured by the manila hawser. The port side retarding gear and the anchor attached to the manila hawser were arranged to take hold earlier for the purpose of slewing the ship diagonally in the basin.

The full-scale launching completely verified the model predictions. The ship, seen in Figure 2, had been decelerated to 56 per cent of its maximum velocity at the free-floating point, which occurred after 222 m (728.35 feet) had been traversed in 62 seconds. The maximum speed was decreased 35 per cent 10 seconds after the retarding floats and anchors took hold. At the end of 130 seconds and at a distance of 67 m (219.82 feet) beyond the free-floating point, the ship stopped. The distance from the opposite basin wall to the stern was 92 m (301.84 feet) and the bow was slewed about 6 degrees to starboard.

Thus, by scientific methods, a launching of a type difficult in itself, was successfully concluded even though complicated by adverse water conditions.