

NAVAL BASE PHILADELPHIA-PHILADELPHIA NAVAL SHIPYARD,
350-TON HAMMERHEAD CRANE
League Island
Philadelphia
Philadelphia County
Pennsylvania

HAER No. PA-387-F

HAER
PA
51-PHILA,
709F-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
P.O. Box 37127
Washington, D.C. 20013-7127

HISTORIC AMERICAN ENGINEERING RECORD

NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD,
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Location: Fitting-out pier (Pier #4) of the Philadelphia Naval Shipyard, League Island at the confluence of the Delaware and Schuylkill Rivers, in the City of Philadelphia, County of Philadelphia, Pennsylvania.

UTM Coordinates: Zone Easting Northing
18 483690 4414830
Quad: Philadelphia, PA. - N.J. 1:24000

Construction Dates: 1918 - January 13, 1920

Builder: McMyler Interstate Company, Cleveland, Ohio

Present Owner: Commander, Naval Base Philadelphia - Department of the Navy

Present Use: Currently disused and inoperative.

Significance: The 350-ton hammerhead crane was the largest in the world when it was completed and is a landmark in American engineering. Roller bearings support a large circular gear mechanism located on top of the portal and allow the crane boom to rotate. The boom and cantilevered trolley ways of the crane are supported by an external framework of steel girders anchored to the circular gear. The crane hoists can be racked in or out along these trolley ways. A stationary, tapered steel girder structure within the outer rotating framework provides additional support for the boom. The crane pivots around a pintle at the top of this tapered support frame. A two story sheet metal sheathed equipment house is located over the boom counter-weight. This accommodates motors, the main cable winding drums and an equipment hoist used for crane maintenance and repair. The control cab is located under the right side of the boom.

The crane was used for lifting large naval guns, their carriages and turrets into position on naval vessels. As Naval weaponry changed in the 1960s, large guns were replaced by lighter missile launchers which could be moved and mounted with smaller cranes. The changing nature of naval armament led to disuse and abandonment

NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD,
350-TON HAMMERHEAD CRANE
HAER No. PA-387-F
(Page 2)

of the crane. As military needs diminished, the hammerhead crane was occasionally used to lift and mount complete deck house assemblies on civilian cargo vessels.

Historian: Robert C. Stewart, July 1994

Project Information: This documentation project is part of the Historic American Engineering Record (HAER), a long range program to document historically significant engineering and industrial works in the United States. The HAER program is administered by the Historic American Buildings Survey/Historic American Engineering Record Division (HABS/HAER) of the National Park Service, U.S. Department of the Interior. The Naval Base Philadelphia - Philadelphia Naval Shipyard recording project was cosponsored during the summer of 1994 by HABS/HAER under the general direction of Dr. Robert J. Kapsch, Chief, and by Naval Base Philadelphia, under the command of Rear Admiral Louise C. Wilmot.

The field work, historical reports and photographs were prepared under the direction of project leader Dean Herrin, HAER Historian and Craig Strong, HAER Architect. The recording team consisted of Robert C. Stewart, Historical Archaeologist, West Suffield, CT. The historical section of the report was produced by John Bacon, Philadelphia Maritime Museum and Robert C. Stewart. Jet Lowe, HAER, was responsible for formal photography. The interpretive drawings were delineated by Doug Anderson.

Others who contributed their time, advice, documents and help were: Jane Allen (Philadelphia Maritime Museum), Dan Cashin (Chief, Rigger Apprentice Training), Alfred Cavallero (Manager Design Branch-Public Works Engineering), Rich Chlan (Public Affairs Officer-PNSY), Ed Delany (Fire Administration), Ralph Edelman (Quality Assurance), John Fedak (coppersmith), Robert Gorgone (Deputy Business and Strategic Planning Officer-PNSY), John Hilliard (upholsterer), Ed Jones (Boilermakers), Frank Matusik (Foreman - Lofting), Frank Mellert (Architect - Public Works Engineering), Rosalie Moschella Pinto (Tacker - retired, 26 shop), Paul Niessner (Equipment Specialist - Cranes), Ed Ochmanowicz (Superintendent 31 Shop - Inside Machining), Steve

NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD,
350-TON HAMMERHEAD CRANE
HAER No. PA-387-F
(Page 3)

Pandur (Leadingman - Fabric Workers - Sail Loft), Elaine Pelagruto (Beacon Editor), Tom Pierson (Loftsmen), Cece Saunders (Historical Perspectives), Richard Scardino (Leadingman -11 shop - ship fitting), Martin Sheeron (Superintendent - Boilermakers), Commander Walter T. Talunas, USNR (Human Resources Transition Coordinator).

For additional information, see the following HAER documentation:

HAER No. PA-387	NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD (Overview, includes bibliography)
HAER No. PA-387-A	NBP-PNSY, DRYDOCK No. 1
HAER No. PA-387-B	NBP-PNSY, DRYDOCK No. 2
HAER No. PA-387-C	NBP-PNSY, DRYDOCK No. 3
HAER No. PA-387-D	NBP-PNSY, DRYDOCK No. 4
HAER No. PA-387-E	NBP-PNSY, DRYDOCK No. 5
HAER No. PA-387-G	NBP-PNSY, 3,000-POUND CRANE
HAER No. PA-387-H	NBP-PNSY, MANAGEMENT ENGINEERING (Bldg. No. 4)
HAER No. PA-387-I	NBP-PNSY, SUPPLY DEPT. STOREHOUSE (Bldg. No. 5)
HAER No. PA-387-J	NBP-PNSY, COMMANDER'S OFFICE-NAVAL BASE (Bldg. No. 6)
HAER No. PA-387-K	NBP-PNSY, STEEL STOREHOUSE (Bldg. No. 8)
HAER No. PA-387-L	NBP-PNSY, CARPENTRY SHOP (Bldg. No. 14)
HAER No. PA-387-M	NBP-PNSY, MACHINE SHOPS (Bldgs. No. 16 & 18)
HAER No. PA-387-N	NBP-PNSY, MACHINE SHOPS (Bldgs. No. 17 & 19)
HAER No. PA-387-O	NBP-PNSY, FOUNDRY/PROPELLER SHOP (Bldg. No. 20)
HAER No. PA-387-P	NBP-PNSY, STRUCTURAL SHOP (Bldg. No. 57)
HAER No. PA-387-Q	NBP-PNSY, AIRCRAFT STOREHOUSE (Bldg. No. 76)
HAER No. PA-387-R	NBP-PNSY, AIRCRAFT ASSEMBLY SHOP PLANT No. 2 (Bldg. No. 77H)
HAER No. PA-387-S	NBP-PNSY, STRUCTURAL ASSEMBLY SHOP (Bldg. No. 541)
HAER No. PA-387-T	NBP-PNSY, PIPE COPPERSMITH SHOP (Bldg. No. 543)
HAER No. PA-387-U	NBP-PNSY, MATERIAL ASSEMBLY SHOP (Bldg. No. 592)
HAER No. PA-387-V	NBP-PNSY, MAIN SUPPLY WAREHOUSE (Bldg. No. 624)
HAER No. PA-387-W	NBP-PNSY, RESERVE BASIN AND MARINE RAILWAY

NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD,
350-TON HAMMERHEAD CRANE
HAER No. PA-387-F
(Page 4)

350-TON HAMMERHEAD CRANE: SPECIFICATIONS

Costs: Acquisition Cost \$733,365
Installed Cost \$885,508

Hoist Rating: Main Hoist - 350 Tons @ 115' radius
Auxiliary Hoist - 50 Tons @ 190' radius

Maximum/Minimum Radius: Main Hoist - 115' max.; 41' min.
Auxiliary Hoist - 190' max.; 41' min.

Hoist Lift (above pier): Main hoists 141' above - 29' below
Auxiliary hoist 141' above - 39' below

Hoisting Speed: Main hoist - 2.5' per minute
Auxiliary hoist - 15' per minute

Rotating (Slewing) Speed: 10 minutes per revolution

Racking Speed: Main Hoist - 20' per minute
Auxiliary Hoist - 100' per minute

Base of Crane: 56' 0" center to center of legs

Dimensions of Portal: 25' 0" high; 50' 0" wide

Tail Swing: 110' 0"

Controls: Electrical with electrical brakes and mechanical auxiliary brakes

Winding Drums: Cast steel, no lap drums

Drum Diameter: Main hoist - (2) 10' 0"
Auxiliary hoist - 84"
Main Rack Drum - (2) 48"
Auxiliary rack - 36"

Trolleys: Two main trolleys, steel plate and shape construction mounted on
paired 30" double flanged steel wheels in equalizer trucks.

NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD,
350-TON HAMMERHEAD CRANE
HAER No. PA-387-F
(Page 5)

One auxiliary trolley - constructed of steel plates and shapes mounted on 4' 23" diameter double flanged steel wheels.

All trolleys are fitted with cast steel sheaves, horizontal steel rollers running on a cast steel path.

Motor Data:

All motors manufactured by General Electric Company, Schenectady, New York.

Hoisting: #1 Main Hoist: 87 HP, 230 VDC series wound, Type MDS, #107 frame; Operating speed - 500 rpm.

#2 Main Hoist: 87 HP, 230 VDC series wound, Type MDS, #107 frame; Operating speed - 500 rpm.

Aux. Hoist: 87 HP, 230 VDC series wound, Type MDS, #107 frame; Operating speed - 500 rpm.

Racking: #1 Main Rack: 27.5 HP, 230 VDC series wound, Type MDS, #104 frame; operating speed 625 rpm.

#2 Main Rack: 27.5 HP, 230 VDC series wound, Type MDS, #104 frame; operating speed 625 rpm.

Aux. Racking: 27.5 HP, 230 VDC series wound, Type MDS, #104 frame; operating speed 625 rpm.

Rotating: 87 HP, 230 VDC series wound, Type MDS, #107 frame; operating speed 500 rpm.

Spare: 87 HP, 230 VDC series wound, Type MDS, #107 frame; operating speed 500 rpm.

General:

Both main hoists can be operated singly or in unison by means of a coupling arrangement and gearing on both main hoists which provides high and low speed. A lifting beam is provided for hoisting a single load using both main hoists. Radius indicators indicate rotational position. Limit switches restrict rack extension. The crane is equipped with an elevator to ease access to the control and machinery houses. The machinery house is equipped with a crane

NAVAL BASE PHILADELPHIA - PHILADELPHIA NAVAL SHIPYARD,
350-TON HAMMERHEAD CRANE
HAER No. PA-387-F
(Page 6)

for servicing and moving hoisting machinery. The crane is used for fitting-out and repairing ships.

Sources: Test Report 350 Ton Hammerhead Crane - Fitting-Out Pier United States Navy Yard - December 1, 1919 to December 18, 1919 by J. N. Laycock CEC Officer-in-charge; E.M. Bredin, Inspector-in-charge.

Crane Engineering Department - Inventory (n.d.)

For a list of related sources, see the bibliography at the end of the written report for HAER No. PA-387, Naval Base Philadelphia - Philadelphia Naval Shipyard.