U.S. NAVAL BASE, PEARL HARBOR, DRY DOCK NO. 2
(U.S. Naval Base, Pearl Harbor, Naval Shipyard, Facility No. S780)
On northern shoreline of Shipyard, between Dry Dock Nos. 1 & 3
Pearl Harbor
Honolulu County
Hawaii
Location: On northern shoreline of Shipyard, between Dry Dock Nos. 1 & 3
Pearl Harbor Naval Base
Honolulu County
Hawaii
UTM:
This building falls within the UTM coordinates of the Pearl Harbor
Naval Shipyard as defined in the location section of the overview report
HABS HI-483. The UTM coordinates for Dry Dock No. 2 are:
04.607460.2361620

Dates of Construction: 1940

Engineer: Engineering Service Contractors, P.N.A.B. (Engineers and F.R. Harris,
Inc. (Consulting Engineers)

Builder: Bureau of Yards and Docks, Fourteenth Naval District

Contracting Company: Hawaiian Dredging Company, Ltd., and Pacific Bridge Company

Present Owner: United States Navy

Present Use: Dry Dock

Significance: This dry dock is associated with the expansion of waterfront facilities at
Pearl Harbor in the 1940s, and played an important role in salvage
operations after the December 7, 1941 attack. The dock used a
distinctive method of construction, and untried tremie concrete floor
construction method. It is the only one of four dry docks at Pearl
Harbor that has an intermediate caisson.

Historian: Lorraine M. Palumbo, Architectural Historian with Mason Architects,
Inc.

Project Information: Photo documentation and recordation of this facility by the Navy has
been done in anticipation of future alterations or potential demolition
of the structure. Photo documentation of historic facilities by the Navy
assists in expediting planned undertakings by having the documentation
prepared prior to taking actions. Also, photo documentation assists the
Navy in gaining more information about its historic facilities to assist
in making proactive management decisions. This project was supervised by Jeffrey Dodge, AIA, Historic Preservation Specialist at the Pacific Division, Naval Facilities Engineering Command (NAVFAC EFD Pacific). The photographic documentation was undertaken by David Franzen, photographer. Lorraine M. Palumbo, Architectural Historian, of Mason Architects, Inc. prepared the written documentation. The field work and research was conducted for this report between January 2002 and August 2002. It was edited in 2009 by Anne Mason, HAER Collections Manager, to better comply with HAER standards.

For contextual information about the early dry dock history of Pearl Harbor, refer to the overview that is included in the documentation for Dry Dock No. 1 (HAER HI-65). Dry Dock Nos. 2 and 3 were built under the same contract and, in most documents, the docks were discussed together as one project, making some duplication of information unavoidable. Please refer to the report on Dry Dock No. 3 (HAER HI-67) for more complete information on the change of contract after the war. HAER surveys for the Dry Docks Nos. 1 through 4 have been prepared and can be reviewed for additional information about the individual structures.

<table>
<thead>
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<th>HAER Number</th>
<th>Facility Number</th>
<th>Report Name</th>
<th>Date</th>
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<tr>
<td>HAER HI-65</td>
<td>S779</td>
<td>Dry Dock No. 1</td>
<td>1919</td>
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<td>HAER HI-67</td>
<td>S781</td>
<td>Dry Dock No. 3</td>
<td>1941</td>
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<td>HAER HI-15</td>
<td>S782</td>
<td>Dry Dock No. 4</td>
<td>1943</td>
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**Description:**

Dry Dock No. 2 is a battleship dock, approximately 1,001' x 133' in plan with a 46-foot depth over the sill. It is built with reinforced concrete supported on steel-pile foundations. Four pumps, located in a pump-house between Dry Dock Nos. 2 and 3, control the unwatering. Closures are made by steel caisson-type gates. In building portions of these docks, the tremie\(^1\) method of placing concrete underwater was used in preference to the steel cofferdam method used in the 1910s, for the construction of Dry Dock No. 1.\(^2\)

In building Dry Dock No. 2, after placing a gravel foundation bed, driving steel piles, placing tremie truss floor units, and pouring tremie concrete floor, side-wall cofferdam form units were erected in six opposite pair of an average length of 162' with 90-foot intermediate closure units. The sidewalls were poured in the dry. The steel piling that was imbedded in the floor slabs aided in resisting hydrostatic uplift.\(^3\)

The Pacific Bridge Company submitted a contract completion report entitled "Technical Report and Project History" which discussed the construction of Dry Dock Nos. 2 and 3 under contract.

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\(^2\) U.S. Navy, Bureau of Yards and Docks 1947, 121.

\(^3\) Ibid., p. 124.
The report, 55 pages long, included two sections, Administrative Data and Narration. The Administrative Data section covered contract agreements, progress dates, etc. The narrative portion explains the construction history, interferences, and difficulties specifically related to the design and construction of the dock.

The following is quoted directly from the Pacific Bridge Company's report:

**TABLE OF ADMINISTRATIVE DATA**

**GENERAL**

Contractor: Hawaiian Dredging Company, Limited  
854 Kaahumanu Street  
Honolulu, T.H.  

Pacific Bridge Company  
333 Kearny Street  
San Francisco, California  

Insurance Company: United State Fidelity and Guaranty Co.  
Baltimore  
Maryland  

Plans and Specifications By: Bureau of Yards and Docks  
Fourteenth Naval District  
F.R. Harris, Inc.  
Pacific Bridge Company  

Engineering Service Contractor: Engineering Service Contractors, P.N.A.B.  
Being a joint venture of  
Tuttle, Seelye, Plance & Raymond  
101 Park Avenue, New York  
and  
Fugard, Olsen, Urbain & Neiler  
520 North Michigan Avenue, Chicago  

Inspection of Materials: Inspector of Navy Materials; civilian Navy inspectors, working under Officer-in-Charge of Construction  

Approval of Drawings: Bureau of Yards and Docks  
Fourteenth Naval District  
Officer-in-Charge of Construction
Source of Labor: Key personnel, from continental United States; other personnel, from the islands of Oahu and Hawaii - principally from Honolulu, T.H.

**TIME**

<table>
<thead>
<tr>
<th>Event</th>
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<tr>
<td>Contract Signed</td>
<td>20 December 1939</td>
</tr>
<tr>
<td>Preliminary Plans Issued</td>
<td>None</td>
</tr>
<tr>
<td>Final Plans Issued</td>
<td>22 December 1939</td>
</tr>
<tr>
<td>Field Work Started</td>
<td>27 December 1939 (test piles started 18 March 1940; foundation piles begun 10 June 1940)</td>
</tr>
<tr>
<td>Official Notice to Proceed Issued</td>
<td>23 January 1940</td>
</tr>
<tr>
<td>Field Work Terminated</td>
<td>7 December 1941 (8:00 A.M.)</td>
</tr>
<tr>
<td>Usable Completion</td>
<td></td>
</tr>
<tr>
<td>Dry Dock No. 2</td>
<td>2 November 1941</td>
</tr>
<tr>
<td>Dry Dock No. 3</td>
<td>Number Completed under NOy-5049</td>
</tr>
<tr>
<td>Office Work Terminated</td>
<td>7 December 1941 (8:00 A.M.)</td>
</tr>
<tr>
<td>% Field Work Completed</td>
<td>90%</td>
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<tr>
<td>Total Contract Time</td>
<td>683 days</td>
</tr>
<tr>
<td>Close Out Completed</td>
<td>31 December 1943</td>
</tr>
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**NARRATION**

**GENERAL**

A. Design

1. Organization
   a. Bureau: The constructions of the dry dock were standard construction, in accordance with plans supplied by the Bureau.
   b. Station: Designs were not developed by the station.
   c. Architect and Engineer: Assistance in design was given, as consultants, by F.R. Harris, Inc., of New York, consulting engineers.

2. Criteria (General): Although the Robbins Dry Dock, at Erie Basin, New York, has been designed and constructed using (in part) tremie concrete floor slab (circa 1927), relatively few criteria existed, at the time that the work being discussed was begun, for a structure of the magnitude of Dry Dock No. 2.

   The conventional (circa 1910), braced, sheet-pile cofferdam method, employed in the construction of Dry Dock No. 1, had failed, and thus-necessitated reconstruction, applying the costly laborious floating-caisson design which had consumed some six years. A repetition of the experience was to be avoided.

   Certain data as the "Robbins" and similar structures were available - and were availed of. Briefly, the philosophy of the design assumed that, when the deck was unwatered, the combined weights of (1) the floor slab and sidewalls; (2) a small part of the frictional wedge of the backfill on the sidewalls; and (3)
some 30% of the theoretical uplift value of the H-section steel piles; would resist the hydrostatic upward pressure. The dock floor was designed as a beam to transmit this upward pressure, or thrust, to the under sides of the walls.

As will be elsewhere noted in the text of this report, the construction methods stipulated in the plans and specifications were supplemented, and to some extent modified, by the disclosures reveled by experimental fieldwork.

Several weeks before the Japanese attack of December 7, 1941, (and less than twenty months after its construction was begun), Dry Dock No. 2 had been brought to a stage of completion such that it could be - and was - used to repair Navy craft affected by the "blitz." Criteria developed from this dock's design and construction (and from those of Dry Dock No. 4, Philadelphia Navy Yard, constructed concurrently) were of inestimable value in facilitating (and thus expediting) "rush" completion of eight of the world's largest dry docks, all built by the Navy under war-time pressure; one of them, the recently completed Dry Dock No. 5, at Pearl Harbor.

B. Selection of Contractor:
The contractors, Hawaiian Dredging Company, Limited, and Pacific Bridge Company, were selected from a list of approved bidders, as the lowest bidders qualified to do the work.


C. Scope and Description of Work:
Both dry docks were of reinforced concrete construction, on steel pile foundation, except that wood piles were used for crane-track, capstan, and bollard foundations.

Drawings were produced by the Fourteenth Naval District Navy Yard, Pearl Harbor, T.H. by various draftsman as indicated by the initials: ADJ, HAK, and by "Nelson." Drawings were also produced by the Pacific Bridge Company.

The sidewalls extend 8' above mean low water level; the ends are semicircular. Caisson-type, steel entrance gates seated in both inner and outer sills.

The structures are designed to resist hydrostatic uplift and lateral earth pressure when unwatered. Both docks have a complete system of pump wells, circumferential and cross-drainage ducts, gates, and discharge tunnels. the four pumps controlling the watering and unwatering of both docks are located in the pump-well station of Dry Dock No. 2, are interconnected with Dr Dock No. 3 by means of a (diameter: 6') culvert.
D. Details of Site
The dry docks' (Nos. 2 and 3) location is well suited to the function of docking deep-drift ships. Dry Dock No. 2 is on the northerly water frontage of the Pearl Harbor Navy Yard, adjacent to the site of previously-constructed Dry Dock No. 1; repair and transportation facilities, power and water, were readily accessible, and had been extensively developed for use by Dry Dock No. 1.

Core-boring tests had been made during 1938 and 1939. They showed an overlay of adobe over (successively) volcanic tuff; volcanic sand (loose, strong, hard); limestone, coral-reef formation (hard, coarse, and fine, silty); below the elevation of the floor slab, compact clay (brown and gray); and, still lower, loose, fragmentary limestone formations, extending indefinitely. Tests were run, too, to determine the extent of the abrasive and corrosive effects of coral and salt water on (structural) metal.

With the test results known, it was decided that the site was suitable for the projects construction. Designs were developed and the work begun.

TECHNICAL DISCUSSION

A. Construction History
Procedure: The dredging of both dry-dock sites was completed under an earlier contract, NOy-3600. [a short summary listing of the construction procedures for Dry Dock No. 2 under NOy-3825 were given:]

For Dry Dock No. 2:
Preparation grade for tremie slab
Driving foundation piles
Placing tremie truss and form units
Placing tremie concrete
Placing sidewall cofferdam form units (N.B. There units were set up in six opposite pairs of pours; average length: 162' each, with intermediate closure pours of 20' each)
Pouring sidewalls dry; 4 vertical lifts
Pouring concrete at pump wells
Backfilling walls
Setting caisson for construction of entrance sills
Dewatering dock
Pouring concrete floor lining and details
Completing crane track and all accessories
Constructing piles, concrete, anchorage, etc. at entrance quay walls

The caisson gate was supplied, and floated from the mainland to the site, under a separate contract.
Principal Plant items were:

1. Bulk cement storage and handling plant (in Honolulu)
2. Traveling gantry crane
3. Miscellaneous cranes (crawler type)
4. Concrete mixing plant; capacity 175 cu. yds. an hour
5. Batch plant; 200 cu. yds. an hour
6. Floating tremie concrete depositing plant
7. Barges; 2 diving barge
8. Floating pile driver (with underwater leads); 2 hammers
9. Pumps
10. Lumber carrier
11. Four-yard transit-mix trucks
12. Miscellaneous construction, grading, and transportation equipment

The bulk cement plant was situated in Honolulu; it consisted of two concrete silos (total capacity: 60,000 bbls.) equipped with pumping facilities for movements from ships to trucks.

The gantry crane was an interesting and serviceable assembly of two steel trusses, supports on "H" section columns. Its 340-foot distance between legs completely spanned the width of Dry Dock No. 2; a 178-foot cantilever extension spanned Dry Dock No. 3. Two traveling power carriages have a lifting capacity of 30 tons each, at 30 feet a minute. The entire assembly moved (at 250' a minute) on steel rails extending the full length of the dock, supported on wood piling. The crane was used to install the 180-foot tremie trusses; handled cofferdam sections, form panels, reinforcing steel, and deposition of tremie concrete. See HAER HI-68-C for more information on the bridge gantry crane.

The concrete-mixing plants consisted of two 3-compartment bins (total capacity: 500 cu. yds.), and two 2-cu. yd. tilting mixers with 30 h.p. motors - all tower mounted. The aggregates were elevated to the storage bins, from a tunnel under the five stock piles, by means of a belt conveyer. From the storage bins, a short belt conveyer carried them to the weighing hoppers. The elevators from the silos were enclosed in a dust-proof tower, and the materials were delivered to the weighing hopper by a screw conveyer. Concrete was transported on flat-bed trucks to the gantry crane in four cu. yd. bottom-dump buckets.

The concrete batching plant consisted of an elevated octagonal bin and weighing assembly, with a capacity of 200 cu. ft. an hour. [Batches of concrete were delivered via 4 cu. yd.-capacity mixer trucks.]

The tremie concrete depositing plant evolved from a series of twenty-two experiments, extending from July 16, 1940 to August 27, 1940, in which various grades of concrete were deposited under water varying in depth from 51 feet to 67 feet. The tremie plant (finally decided upon) consisted of nine, 17-inch pipes (1/2"-thick shell) spaced 10 feet apart (centers), to service one-half the width of the dry dock slab at a time. The
pipes were raised and lowered, by means of 1" steel cable, to hoisting gear mounted on three steel pontoons. These pontoons, together with two end pontoons, formed an assembly 90 feet long, with connecting walkways on either side of the row of nine pipes - a single floating unit. The gantry crane's bucket deposited the concrete in a bowl, or hopper, of the same size (4 cubic yards), at the head of each pipe, about five feet above the water line.

In the matter of inspection and control of concrete, civilian inspectors (five of whom were divers), operating under the Officer-in-Charge of Construction, constituted the field inspecting force. A test laboratory (under the same jurisdiction) made all required tests of materials, and established the controls of concrete mixes and other features of the work. It is interesting to note that because of the quality of trap rock used for aggregate (Moi'ilii'ili Quarry) the weight per cubic foot of concrete averaged 163.2 pounds, considerably in excess of the 150 pounds per cubic foot estimated in the design.

In general, Grade F-3 concrete (7 sacks a cu. yd.), 42% fines was used for underwater work. Some test results:
Average slump: 7-3/8"
Average, 7-day compression test: 3,834 lbs.
Average 28-day compression test: 6,309 lbs.
Eight core test (core size: 4"; 2" diameter): 4,400 lbs., at 17 days; 4,600 lbs. at 28 days

On December 7, 1941, approximately 90% of the construction had been completed - in some 70% of the contract-specified construction time.

The construction completion report also included a general summary of the work on the two dry docks:

I. General Summary of Facilities
Dry Dock No. 2 (1,000' 6" x 133' 8-1/4" x 46' 6") was designed for docking battleships and carriers; Dry Dock No. 3 (497' 8-5/8" x 84' x 22' 6"), for docking destroyers, submarines, and Type C-3 merchant ships.
Structural - statistical data of interest:

i. Total concrete placed 230,200 cubic yards
ii. Total backfill used 300,000 cubic yards
iii. Approx. amount of steel employed (not including caisson entrance gates) 23,000 tons
iv. Approx. amount of copper used 30 tons
v. Approx. form-lumber footage 1,000,000 board feet
vi. Approx. field labor 300,000 man days
Historical Context:

The Need for Another Dry Dock

Fleet maneuvers were frequently held in Hawaiian waters in the 1920s and 1930s, and these exercises often led to increased appropriations for improvements at Pearl Harbor. During the 1935 war games, 163 ships were anchored in the Pearl Harbor lochs. The importance of Pearl Harbor as the westernmost repair base in the Pacific was recognized by the Chief of Naval Operations. From early on, the need for an additional dry dock for Pearl Harbor was identified time and again.  

In August 1919, the USS New York arrived in Pearl Harbor with Navy Secretary Joespheus Daniels, Chief of the Bureau of Yards and Docks, C.W. Parks, Rear Admiral J.S. McKean, and Commander J.G. Hilton (SC), as passengers. With the exception of the Secretary, these officers formed a "Special Board of Inspection of Naval Bases, etc., on the Pacific Coast." This Board recommended on 20 October 1919, that a first-class naval base, capable of taking care of the entire U.S. Fleet in time of war, should be immediately developed at Pearl Harbor, as a strategic necessity. Looking toward this end, the Board made several detailed recommendations. Among these recommendations was the construction of another dry dock similar to the then present Dry Dock No. 1, but larger, with a minimum depth of 45' over the sill. They estimated a cost of $7,500,000 for its construction.  

Again, in 1924, Captain Dudley W. Knox, U.S.N., told the naval committee of the House of Representatives that the most vital requirement was a strong fleet to lessen the probability of an attack against the West Coast. Rather than spending the money on the facilities in San Francisco (the Presidio Base), he suggested that large sums of money be spent to modernize our battleships and the building of additional docks at Pearl Harbor. He pointed out that under the terms of the Washington treaty, the U.S. was not allowed to further develop base facilities west of the Hawaiian Islands. He stated, "In other words, if our fleet is forced to proceed to the defense of the Philippines, it would have to operate in those waters, when the nearest dry dock is practically 5,000 miles away; and any dock in San Francisco bay will be about 7,000 miles distant; so far as to practically be of no value to the fleet."  

In 1929, money for the construction of Dry Dock No. 2 was included in a proposed naval appropriation bill: however, it was removed from the approved bill, which suspended the construction of Dry Dock No. 2. It was reported in the February 27, 1929 edition of the Star Bulletin that on that day, the House had approved a bill appropriating $12,370,000 for beginning work on the cruiser construction program, but had "eliminated the senate amendment providing $400,000 for a dry dock at Pearl Harbor, the Hawaiian naval base." It would be another ten years before the construction of another dry dock would become a reality at Pearl Harbor.

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4 Coletta, 1985: 448. This reference is not included in the bibliography and this citation appears as it did in the original report submitted to HAER in 2009.
6 Paradise of the Pacific 1924, 23
7 Honolulu Star Bulletin February 27, 1929, 1.
Build-Up of World War II

With the outbreak of World War II in Europe in 1939, the possibility of the war spreading to the Pacific was recognized by the Navy. A Hawaiian Detachment, consisting of eight cruisers, one carrier, and sixteen destroyers was stationed at Pearl Harbor in August 1939, and "quickly showed up the deficiencies of the base." In order to strengthen the main fleet base, a large contract was signed with a group of construction firms known as Contractors Pacific Naval Air Bases (CPNAB) on August 5, 1939. The contract covered the construction of a new naval air station at Kaneohe, a major expansion of the existing air base on Ford Island, and the development of air facilities on Midway, Johnston, and Palmyra Islands.

An article published in the Honolulu Advertiser, dated August 5, 1939, announced that the funds for two new docks was included in the Federal $200 million deficiency bill that had been passed the previous day. According to the article, construction of the new dry docks was expected to take three years to complete. One new dock was to be designed to handle even larger ships that were being planned by the Navy Department. The smaller dock was to be designed to handle destroyer vessels. In 1939, Congress appropriated funds for both docks; $8,485,000 was allocated for the large dry dock (No. 2) and $2,000,000 was allocated for the destroyer dock (No. 3). Core drillings to determine the type of earth at the site of the new dry docks had already been completed, as had other exploratory work in connection with the huge project. Commander H.F. Bruns, district public works officer had already directed preliminary work in connection with plans for building the docks. It was also noted that the Chief of the Bureau of Yards and Docks, Rear Admiral Ben Moreell, went to his Navy department post after serving as a public works officer at Pearl Harbor. Therefore, he had close personal knowledge of the Oahu naval base.

The contract to build the two dry docks was signed with the Pacific Naval Air Base Contractors (a combination of five construction companies, each a specialist in its own field, of which Hawaiian Dredging was a part) on December 22, 1939. This contract included the construction of two new graving docks, adjacent to the existing Dry Dock No. 1. Dry Dock No. 2 was to be a 1,000-foot battleship dock and Dry Dock No. 3 was to be a smaller structure, 497 feet long, to service destroyers and submarines. A Honolulu Advertiser article dated August 24, 1939, publicized that Hawaiian Dredging would begin work immediately on the excavation for the foundations of two huge naval dry docks. The cost of the contract for the two docks was said to be $10,485,000.

The Role of Dry Dock No. 2 During World War II

Relatively few of the facilities at the shipyard were damaged in the December 7, 1941 attack, since the Japanese aviators focused on ships and planes, rather than buildings. The fires and explosions from the three ships in Dry Dock No. 1 caused damage to that facility, to the substation between Dry Dock Nos. 1 and 2, and to adjacent equipment such as cranes and power cables. Although bombs hit both the USS Shaw and the floating dry dock it was in, the repair

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8 Coletta 1985, 451
9 Honolulu Advertiser August 5, 1939, 1
10 Honolulu Advertiser August 24, 1939, 1
craft stayed afloat until it was deliberately lowered to douse the uncontrollable fire in it. Attacks on ships alongside 1010 Wharf (Fac. B-2) and in the repair basin (Fac. B-21) also caused minor damage to those and nearby facilities. The Shipyard personnel had its share of work, dousing fires and assisting injured sailors, as well as a direct view of the devastation on Battleship Row and Ford Island.

Particularly noteworthy was the completion of Dry Dock No. 2 during the week prior to the Japanese attack, to a stage that permitted the emergency docking of the cruiser *Helena*, which was torpedoed during the attack.

On December 7, 1941, Dock No. 2 was usably complete. After the blocking of Dock No. 1 by the burning of the destroyers *Cassin* and *Downes* and the sinking of the only floating dry dock in the harbor, Dock No. 2 was the only dry dock available. It was not yet finished, but the caisson gate was in place and emergency use was practicable, a fact of the utmost importance to all subsequent salvage operations. The cruiser *Helena* was docked here on December 10 and remained until the 21st. The dock was unwatered by pumpwell drainage pumps and the contractor's construction pumps. Temporary connections provided the ship with air, fresh water, and salt water. The dock was completed while in use.¹¹

A letter dated January 30, 1942, from the Commandant, Fourteenth Naval District to the Chief of the Bureau of Yards and Docks, details the level of completion of the dry dock as of December 7, 1941 and is the source of information for the *Technical Report and Project History, Contracts NOy-5049, for Construction of Dry Dock and Power Plant, Moorings and Additional Facilities* published by Pacific Bridge Company.

The dock's sidewalls had been completed, except for stripping formwork from the tunnels and culverts; caisson gate was in place, the dock unwatered. Finished floor lining had been completed for a distance of 685 feet from the dock entrance; 400 keel blocks were in place on finished floor. The crane-girder structure was complete along the east side of the dock, around its "head" end, and the inshore half of the west side to the pumpwell. Installation of crane rails had begun, had advanced perhaps 10%; the pumpwell structure was complete, except for stairs; about 20% of the bombproof roof. Installation of main pump impellers and shafting was well advanced; motors for the pumps were being prepared for installation in the new power plant. Installation of drainage pumps and motors was about 75% complete. The intake and discharge gates were set—but not electrically connected. Salt water, fresh water, air, and steam lines, in the tunnels of the dry dock's sidewall, were about 50% installed, were not yet connected to outside services. The substation building, on the east side of the dry dock (No. 2) was nearly complete—one motor-generator set, transformers, and primary switch-gear installed; electric manholes, and duct lines around the dry dock; approximately 40% complete.¹²

¹¹ U.S. Navy, Bureau of Yards and Docks 1947, 124
¹² Pacific Bridge Co. 1944, 73
Several ships were repaired at Dock No. 2 following the attack. Two of the most notable ships are the California and the Oglala. The California was damaged by torpedoes during the attack and sank to the bottom. It was floated on March 24, 1942 and was dry docked at Dock No. 2.

Underwater damage had been barely enough to make her sink. As a matter of fact, she stayed afloat for three days - but continued to settle in the mud until the water reached the port deck. Refloating seemed an unpromising project because of the deep submergence of the quarterdeck - and the fact that the mud bottom was not such as to permit the use of a sheet-pile cofferdam around the ship. It was finally decided to occlude water from the quarterdeck openings by building a fence-type cofferdam around its edge - and then pump out the vessel without patching. It worked: the ship floated. Yard forces made permanent repairs of all underwater damage, except to some of the bottom plates that had been in the path of torpedoes, etc. The ship was undocked June 7, 1942. The Oglala was also salvaged and placed in Dry Dock No. 2 on July 3, 1942.13

To achieve flexible control of the contract with CPFF, under emergency conditions following the attack, it was imperative to establish the cost-plus-fee relationship. The lump-sum contract was therefore terminated on December 7, 1941, and Dock Nos. 2 and 3 were finished under CPFF contract number NOy-5049.14

All operations toward completion of Dry Dock Nos. 1, 2, and 3 were to an extent handicapped by the continuing use of Dock Nos. 1 and 2 for repair of salvaged ships; and new work - specialized in nature - further complicated operations. Work in the vicinity of Dry Dock Nos. 2 and 3 impeded progress: work on railroad connections; electrical, salt water, compressed air, and steam lines; paving; drainage; work on the connecting culvert between Dry Dock Nos. 1 and 2; crane erection; bombproofing the pump-well of Dry Dock No. 1 (Project No. 16); a crane track extension from Dry Dock No. 1 to the repair basin; spare caissons constructed for Dry Dock Nos. 2 and 3, and an emergency closure for Dry Dock No. 1.

The sequence of the completion of the work is difficult to follow. Albeit, the operations were efficiently coordinated and successfully concluded in the face of difficulties. For example, the contractor's progress chart indicates completion of Project No. 28 (completion of Dry Dock Nos. 2 and 3) about the middle of July, 1942 - yet the services for these two docks (Project 16) was completed in August 1942 - the culvert connecting Dock Nos. 1 and 2 (begun in June 1942) were not completed until the middle of September, 1942.15

Later Improvements to Dry Dock No. 2

In 1971, by MCON Project P-047, "Drydock No. 2 Improvements," Dry Dock No. 2 underwent a major alteration and improvement. An intermediate caisson and seat were added to divide the dry dock into two sections, thereby increasing the capability of the dry dock. The extra pumps in a

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13 Pacific Bridge Co. 1944, 94-95
14 U.S. Navy Bureau of Yards and Docks 1947, 122
15 p. 76. The source for this citation is unclear, it appears as cited in the report submitted to HAER in 2009.
small room on the side of Fac. 170 and the tunnel under Dry Dock No. 2 were added around 1970 when it was decided to add the intermediate caisson dividing Dry Dock No. 2 in half.\textsuperscript{16} In 1977, repairs were made to the concrete sidewalls.

\textsuperscript{16} Borges, Paul 1998
Sources of Information

The original drawings for this structure are on digitally scanned images or microfilm at Pacific Division, Naval Facilities Engineering Command (NAVFAC EFD Pacific) Plan Files.


[article title unknown]. Honolulu Advertiser. Fleet edition, 30 April 1925, Sec. 3, p. 8, c. 1.

"Thousands to Get Jobs Building Huge Drydocks." Honolulu Advertiser. 5 August 1939, 1.

"Excavating at P.H. to Start Soon." Honolulu Advertiser. 24 August 1939, 1.

"Pearl Harbor Drydock out of Navy Bill." Honolulu Star Bulletin. 27 February 1929, 1.

Nakahara, Kenneth. Historic Resources Inventory Form, Dry Dock No. 2. Pearl Harbor Naval Shipyard. Pearl Harbor, HI, 1981.


"Here on Oahu, in the Hawaiian Islands, We Need Fleet Facilities More than Anywhere Else in the Pacific." Paradise of the Pacific 37 (June 1924).


———. Dry Dock Data. Unpublished data records of the dry docks of Pearl Harbor Naval Shipyard. On file with Frank Mondik (Mechanical Engineer) of the Crane Division at Pearl Harbor Naval Shipyard, Facility 327.


Shipyard Map
Enlarged Area Map (reduced, not to scale)
Dry Dock Nos. 2 and 3, Dredging, Topography and Layout (Drawing No. B-N22-226, dated 11/3/39) (reduced, not to scale)
U.S. NAVAL BASE, PEARL HARBOR, DRY DOCK NO. 2
(U.S. Naval Base, Pearl Harbor, Naval Shipyard)
(Facility No. S780)
HAER No. HI-65A (Page 19)

Dry Dock No. 2, 8 Inch Sewer Lines Plans and Details (Drawing No. 5903, dated 7/31/41)
(reduced, not to scale)
Dry Dock No. 2, Typical Cross Section (Partial drawing) (Drawing No. I-N16-216, dated 6/29/39) (reduced, not to scale)
Dry Dock No. 2, Transverse Section (Part of Dry Dock Data document, undated) (reduced, not to scale)
Dry Dock No. 2, Entrance Quay Wall Sections (Berth GD-2), (Drawing No. B-N22-379, dated 3/19/1943) (reduced, not to scale)
Dry Dock No. 2 Caisson (Part of Dry Dock Data document, undated) (reduced, not to scale)
Keel Blocks for Dry Dock Nos. 1 and 2 (Part of Dry Dock Data document, undated) (reduced, not to scale)
Dry Dock No. 2, Layout of dock showing pump system and dewatering tunnels (Drawing No. 14921, dated 8/5/88) (reduced, not to scale)