MARITIME REPORTER
AND
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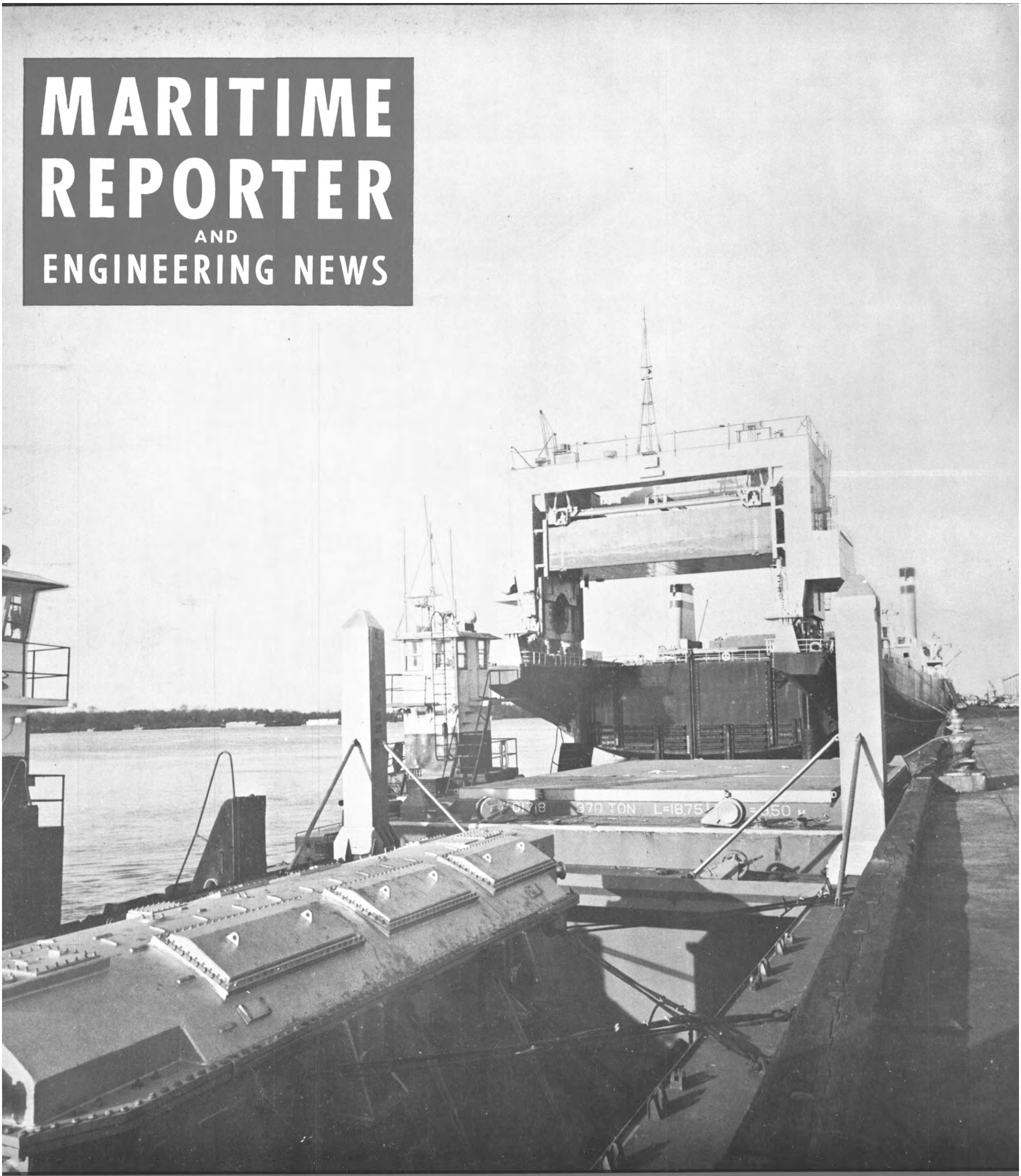


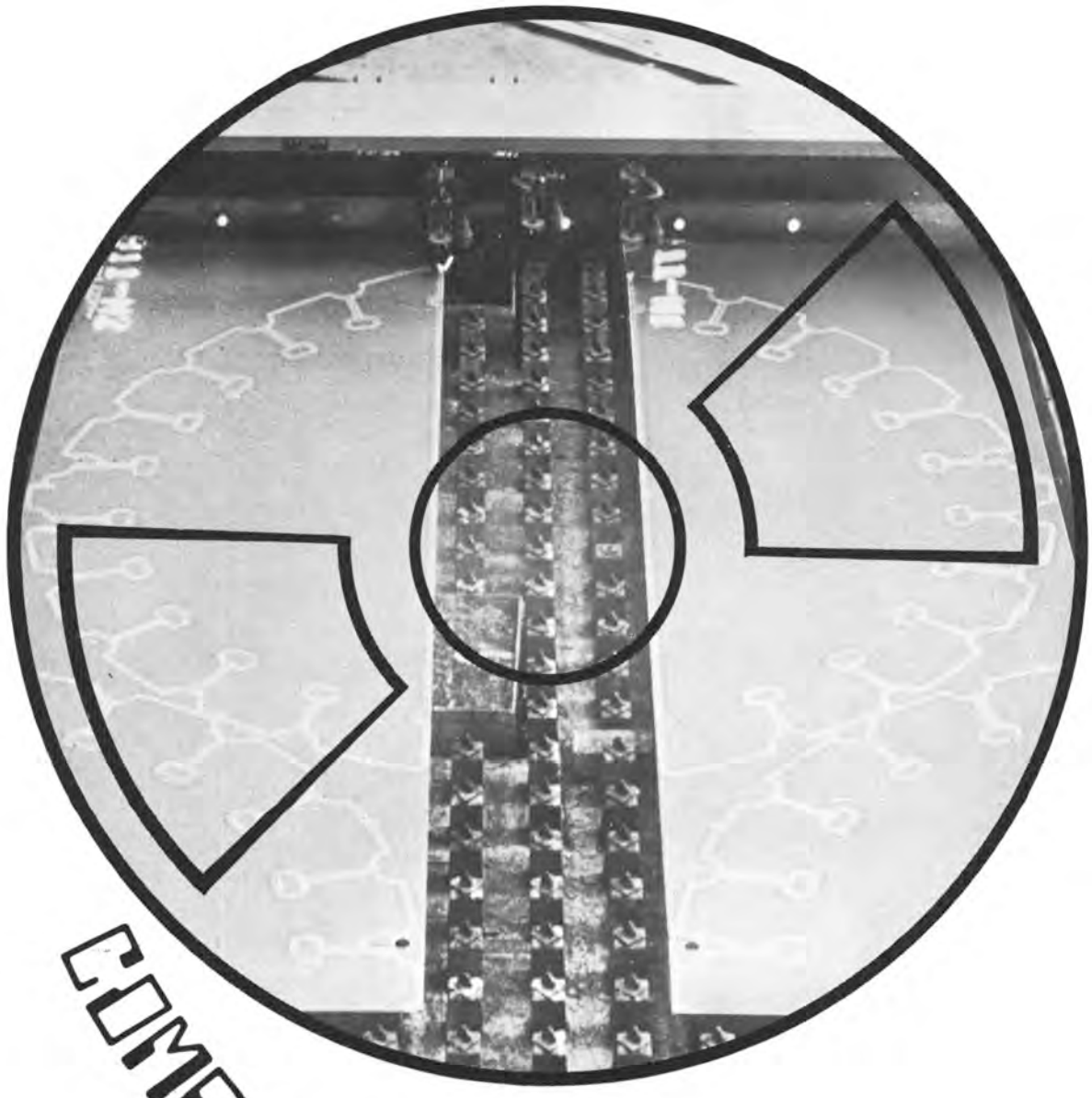
$50-Million Barge Construction Backlog At Equitable Equipment —LASH Barges Carry Heavy Lift Cargoes

(SEE PAGE 6)

Todd And Newport News Receive Letters Of Intent Totaling $760 Million For Ship Construction

(SEE PAGE 10)

JANUARY 15, 1973



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Avondale To Modernize ODECO Jackup Rig Bought From Chevron

Ocean Drilling & Exploration Company, New Orleans, La., has announced that it has purchased a jackup drilling rig from Chevron Oil Co.

The unit, which will be renamed the Ocean 66, is now at Avondale Shipyards, Inc., New Orleans, where it is undergoing an extensive overhaul and modernization program, according to **Alden J. Laborde,** ODECO president, who announced the acquisition.

The Ocean 66 will be the fourth jackup unit to join ODECO's worldwide drilling fleet. A fifth unit, the Ocean King, is presently under construction by Marathon LeTourneau Marine Division at Vicksburg, Miss.

Built by Avondale in 1958, the Ocean 66 has a rated operating depth of 100 to 120 feet and a rated drilling depth of 20,000 feet.

Overall dimensions of the rig are 217 feet by 117 feet by 14 feet. It has modern quarters for 63 men and is slated for service in the Gulf of Mexico in March.

Maintenance Free Pipe For Tankers Described By Kubota

A colorfully illustrated 44-page brochure describing its centrifugally cast steel KCP Cargo Oil Pipe has been published by Kubota, Ltd.

The bulletin discusses some of the problems and expenses involved in the maintenance of cargo oil pipe in tankers.

Several actual installations of Kubota's KCP Cargo Oil Pipe and reports of performance after periodic inspections are described in detail.

Kubota has 70 years of experience in centrifugal casting technology. The accumulation of this technology is based upon Kubota's success, in 1952, in the centrifugal casting of steel for the first time in the world. Centrifugal casting consists of the rapid rotation of a hollow, cylindrical mold into which molten metal is poured. The use of centrifugal force in this manufacturing method at the time that the molten metal hardens, imparts enormous pressure. This makes the composition of the material very fine, resulting in products with a high degree of uniformity and stability.

Inquiries or requests for Bulletin MC 301 can be directed to: Pipe & Casting Products Export Department, Kubota, Ltd., 3-2, 3-chome, Muromachi, Nihonbashi, Chuo-ku, Tokyo, Japan.

MARITIME REPORTER AND ENGINEERING NEWS

No. 2 Volume 35

107 EAST 31st STREET

NEW YORK, N. Y. 10016

MUrray Hill 9-3266, 3267, 3268, 3269

ESTABLISHED 1939

Maritime Reporter/Engineering News is published the 1st and 15th of each month by Maritime Activity Reports, Inc., with executive, advertising and editorial offices at 107 East 31st Street, New York, N. Y. 10016; publishing office at 41 First Street, Hoboken, New Jersey 07030

Controlled Circulation postage paid at Hoboken, New Jersey 07030

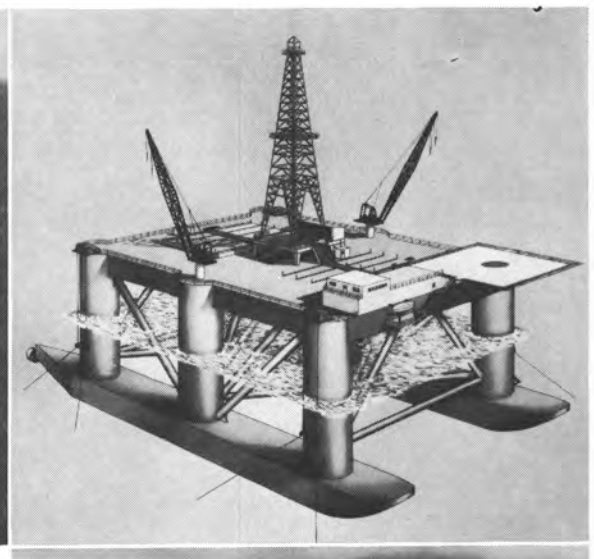
Member BPA Business Publications Audit of Circulation, Inc.

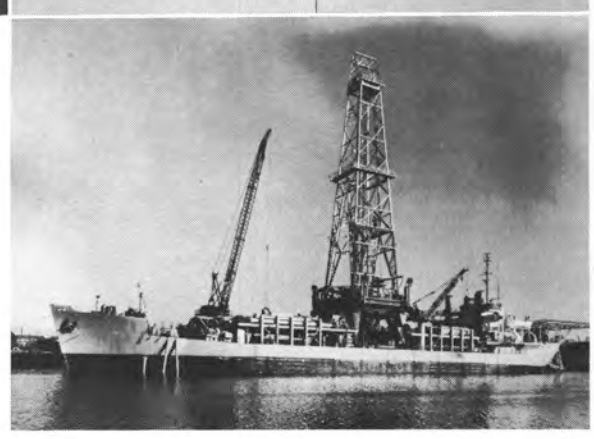
CABLE: BETHSING

for offshore-construction service in the Far East

Bethlehem's Singapore yard is barely two years old, but already it has built and delivered several pieces of equipment—including an offshore drilling rig. This huge mobile, independent-leg jack-up, a tender-assisted drill barge, is now working in waters up to 200-ft deep in the Gulf of Suez. A second rig of this type, but somewhat larger and self-contained, is now under construction here.

Also being built here—and nearly completed—is a mat-supported mobile drilling platform of the familiar Bethlehem design, which was developed and engineered by our Beaumont Yard in Texas. This big platform—plus a sister rig, soon to be on the ways—are scheduled for 1973 delivery. Both rigs will have a drilling capacity of 25,000 ft, and will operate in water depths to 250 ft.





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Our Singapore Yard specializes in equipment for offshore oil drilling, production, and storage operations. We have the facilities and the skills to produce mobile drilling rigs, offshore platforms, drilling tenders, drill-ship conversions, work and crew boats, barges, and miscellaneous fabrications. The yard will continue to draw on the long-term experience of our Beaumont, Texas, yard, a pioneer in offshore equipment. Beaumont also serves as our new yard's United States sales representative.

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Ports along the inland waterways of the world have become seaports as a result of the LASH ship-barge concept. From the heartland agricultural center of the United States at Helena, Arkansas, a large bulk cargo of rice was recently shipped directly to Rotterdam, Netherlands.

Equitable Equipment—

World's Largest LASH/SEABEE Barge Builder

Diversified New Orleans Shipbuilder's Recent Announcement Of A Contract From Waterman Steamship Increases The Equitable Equipment Company LASH/SEABEE Barge Building Backlog To $50 Million

ON THE COVER: The cover photograph shows a LASH operation recently carried out in the Port of New Orleans. The M/V Munchen arrived from Rotterdam on her maiden voyage with a full complement of lighters, among which were five heavy lifts totaling more than 850 long tons with a value for these five lifts in excess of $3,000,000. The M/V Munchen is owned by Combi Line, a joint venture of Holland America Line and Hapag Lloyd. The Munchen on her second voyage was already booked to full lighter complement capacity. The LASH program now stands at 24 LASH ships and 3,296 lighters, with further expansion in view. **Jerome L. Goldman,** president of both Friede & Goldman, Inc. and LASH Systems, is the inventor of the concept.

In 1968, the first LASH (lighter aboard ship) barges in the world were delivered from the production lines of Equitable Equipment Company, Inc., New Orleans, La., diversified shipbuilder. Since that time, the LASH cargo delivery concept has changed the living habits of millions of people throughout the world, and Equitable has become the world's largest builder of LASH and SEABEE barges.

The driving force behind the tremendous growth of Equitable since 1968 has been its president and chief executive officer, **Cecil M. Keeney.** Recently, he announced yet another LASH contract for the company from Waterman Steamship Corporation. Equitable will build 450 LASH barges under a $20-million contract. The company's backlog is now $50-million in orders for the vessels.

The contracts to build the LASH and SEABEE barges have come from major shipping companies in the United States and Europe. These include Central Gulf, 420 barges; Hapag Lloyd, a Hamburg, West Germany, firm, 205 barges; 200 barges for Delta Steamship; the Waterman vessels; and the world's first SEABEE barges, 246 for Lykes.

LASH and SEABEE barge building has been brought to a production line assembly science by Equitable. Two years ago, the company built a production line for the construction of the vessels, and the facility is completing 10 LASH barges each week. One million dollars was invested in a sandblasting and painting facility, the largest of its kind in the nation. The operation is capable of blasting steel surfaces of marine hulls and surfaces—up to 110 feet in length, 50 feet in beam, and total gross weights of up to 200 tons—to any desired surface preparation and applying the most sophisticated coating systems that may be required for marine and industrial construction. Four and a half million dollars was spent to develop the company's Madisonville, La., shipyard on the north side of Lake Pontchartrain for the construction of the barges.

The building and contract acquisition program of Equitable has greatly benefited the City of New Orleans and its surrounding work force areas. In 1970, the company employed approximately 782 people, and its annual payroll was upwards of $5,000,000. In November of 1972, 1,600 people were on Equitable's annual payroll of $12,000,000-plus.

Equitable Equipment entered its 51st year in 1972 as a major shipbuilder for worldwide industry. The company has designed, built, and delivered to thousands of companies marine systems of all descriptions for use in diverse and varied operations on the oceans, inland waterways and in the harbors of the world. Tugs and towboats for inland and ocean use; dredge tenders and workboats for marine construction projects all over the world; barges for dry cargo container delivery in shallow-water ports, and for oil and chemicals transportation on the waterways of America and in foreign countries; water taxis for the movement of men and high-priority cargo to offshore petroleum drilling and production platforms; specialized barges for the shipping industry's containerization program; personnel quarters units and rig tenders; self-propelled drilling vessels for the exploration and production of oil; and unique design and construction projects for all the segments of the maritime industry.

Equitable built the first self-propelled drilling ships and the offshore drilling tender that brought in Louisiana's first offshore oil well, the world's first LASH barges and the prototype for the SEABEE barge, and a 208-foot roll-on/roll-off trailership for shallow-draft operation in areas not accessible to ocean cargoships. And the com-

(Continued on next page)

pany is steadily increasing its capabilities to build a more efficient and profitable maritime industry.

Cecil M. Keeney

The New Orleans shipbuilding facilities of the company and its executive offices are located on that city's Industrial Canal, in the heart of the marine industry on the Gulf Coast. The plant occupies 38 acres of land fronting on the heavily industrialized waterway, with easy access to the Gulf of Mexico and world ports through the Mississippi-Gulf outlet and Intracoastal Waterway.

The plant is completely equipped for the new construction, conversion, and repair of marine floating equipment and for the fabrication of structures for the petroleum industry.

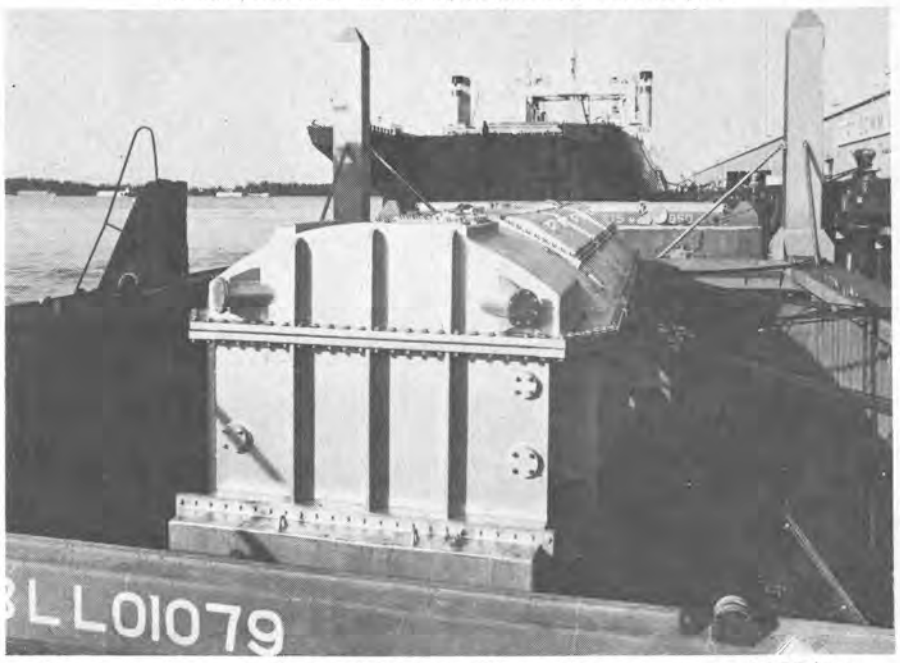
Equitable Equipment Company's facilities contain 170,000 square feet of covered warehouse space, and approximately 241,000 square feet of open, paved yard area. Fabrication of all types of steel floating equipment up to 2,500 tons can be handled, and there are two marine railways docks, one of the Crandall launching and rehaul type of 1,000-ton capacity, and one made up of a series of 12 steel cradles mounted on inclined tracks, permitting side launching of vessels up to 325 feet by 90 feet by 2,500 tons.

Machinery and equipment in use in the plant includes stationary and mobile cranes with capacities to 50 tons, a stiffleg derrick with a 100-ton capacity, gantry unit, crawler, mobile, bridge and locomotive cranes, presses, brakes, plate rolls, shears, air compressors, and the usual complement of heavy machinery necessary for efficient production of the company's products.

The company will spend approximately $2 million in 1973 to develop additional areas of the shipyard for new construction, repairs, and conversion work.

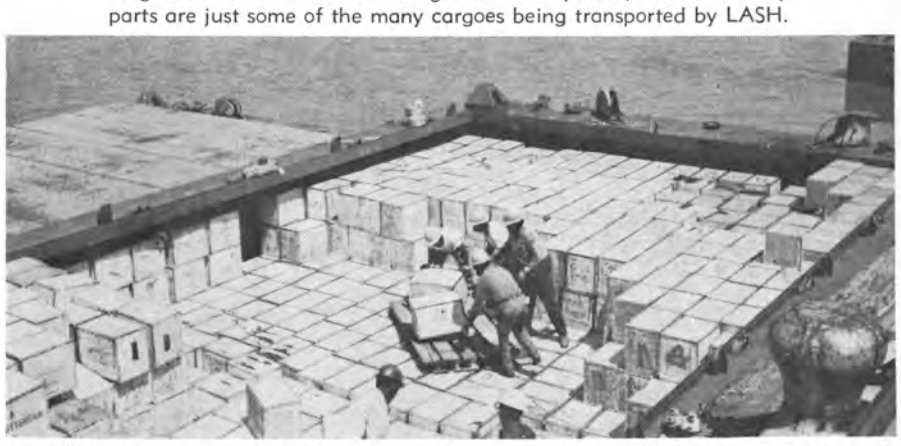
The design and fabrication of heavy and light equipment for industry and marine interests is done at the New Orleans shipyards. Products produced by the company include derricks with capacities up to 10,000 pounds, diving bells, pontoons, decompression chambers, packaged block ice plants, hatch covers, offshore platform quarters, watertight doors, portable dredges, buoys, petrochemical vessels and special process equipment, process pressure tanks, large diameter pipe, and other types of equipment. The company builds to ASME, API, ABS, and USCG requirements.

Ten LASH barges each week are completed, under cover, on this production line at Equitable's New Orleans yard.



Seen in the foreground is one of the heavy lifts which was in excess of 255 long tons. Portable extension posts are shown fitted to the LASH lighter lifting posts which allow for the transport of lifts under deck up to 22 feet in height.

Farm tractors, long hollow steel shapes, 20-foot container, sacked cargo behind which Beefeater's gin was transported, and machinery parts are just some of the many cargoes being transported by LASH.



A LASH lighter stowed out 100 percent with a cargo of tea. Rapid discharge and loading rates are possible by the easy vertical load stow design conditions of the lighter. The cargo is worked from the top down for effective and safe stevedoring operations.

$35.3 Million To Bath To Build Fourth States Steamship Ro/Ro

A contract valued at $35.3 million covering the construction of one of the largest roll-on/roll-off ships to be built in the United States was recently signed in Washington, D.C.

Bath Iron Works Corp. of Bath, Maine, will build the 18,000-dwt ship for States Steamship Co. of San Francisco, Calif., which will use the new vessel—along with three others ordered from Bath last June—in its U.S. Pacific/Far East service.

According to **Robert J. Blackwell,** Assistant Secretary of Commerce for Maritime Affairs, who signed the contract for the Government, the price of the vessel ordered reflects a $2.5-million reduction in the per-ship price for the first three States ships. As contrasted to a $16.2-million subsidy payment on each of the initial ships, the current contract provides for a subsidy of $14.3 million.

"This decline in subsidy graphically illustrates the productivity gains being made by the Bath shipyard in terms of lowering its costs. Because of these gains, the subsidy rate has been lowered from 43 percent to 40 percent of the price of this last ship," Mr. **Blackwell** explained.

The subsidy, he said, is calculated by subtracting the equivalent foreign cost of the ship, which in this case was estimated to be $21 million in a Japanese shipyard, from the domestic price.

Like the first three, which cost $37.8 million each, the latest vessel will be 684 feet long, 102 feet in beam, and 32 feet in draft, with a speed of 23 knots.

Mr. **Blackwell** noted that this contract brings the total value of shipbuilding awards under President **Nixon's** two-year-old maritime program over the $1.7 billion mark, with 37 new vessels and 13 ship conversions ordered to date.

Representing in excess of 3,000 man-years of work for the Bath, Maine, shipyard, the four States ships are scheduled for delivery between 1975 and 1977.

These roll-on/roll-off ships load and discharge their cargoes of truck vans through a stern ramp.

Zapata Corp. Plans To Build Self-Propelled Shipshape Drilling Unit

Zapata Corp., Houston, Texas, has announced that it plans to construct a self-propelled shipshaped drilling vessel for use by one of the company's offshore drilling subsidiaries, Zapata North Sea, Inc.

The ship, to be designed for year-round operations, with quarters for 90 men, will be capable of operating in 600 feet of water, drilling to a depth of 20,000 feet, and remaining moored in 60-foot seas. Additional equipment would render it capable of operating in 1,000 feet of water.

The vessel will be 427 feet long, 75 feet wide, and 32 feet deep.

Merchant Shipbuilding Prospects Listed

Review of documents on file with the Maritime Administration lists the following pending projects involving application of construction differential subsidy (CDS) funds under provisions of the Merchant Marine Act of 1970.

Three 125,000-cubic-meter liquefied natural gas (LNG) tankers to be built by General Dynamics Corporation's Quincy (Mass.) Shipbuilding Division for affiliates of Burmah Oil Co.

Three 125,000-cubic-meter LNG tankers to be built by Tenneco's Newport News Shipbuilding & Dry Dock Co., Newport News, Va., for subsidiaries of El Paso Natural Gas Co. These are in addition to the initial contract for three.

Two 125,000-cubic-meter LNG tankers to be built by Newport News Shipbuilding for subsidiaries of Amoco International Oil Co., and Natural Gas Pipeline Co. of America.

Six 380,000-dwt very large crude carriers (VLCCs) to be built in the new Todd Shipyards Corporation facility at Galveston, Texas, for affiliates of Burmah Oil Co.

Two 25,000-dwt VLCCs to be built by Seatrain Shipbuilding Corporation, Brooklyn, N.Y., for subsidiaries of Seatrain Lines, Inc.

Two oil/bulk/ore vessels to be built by a not yet publicly designated shipbuilder for Moore-McCormack Lines, Inc. to fulfill requirements of the Passenger Ship Sales Act.

One 20,000-dwt roll-on/roll-off ship — add-on to eixsting contract at Bath Iron Works Corporation, Bath, Maine, awarded to the yard on December 21, 1972, for States Steamship Lines, Inc.

Three minor conversions of containerships by Triple A Machine Shop, Inc., San Francisco, Calif., for American President Lines, Ltd.

On the basis of pricing data at hand, these projects would appear to require about $550 million in CDS funding. MarAd has presently available approximately $200 million in uncommitted funds previously appropriated by Congress. The balance could be accommodated as part of Fiscal '74 Budget, which goes to Capitol Hill on January 20, and through multi-year procurement concept authorized by the 1970 Act. FY '74 Budget will signal the Nixon Administration's intentions in these respects.

John J. Brangan Appointed General Mgr. Of Beth-Hoboken Yard

John J. Brangan

The appointment of **John J. Brangan** as general manager of Bethlehem Steel Corporation's Hoboken, N.J. shipyard was announced by **Walter F. Williams,** vice president, shipbuilding.

Mr. **Brangan** is advancing from assistant manager of Bethlehem's San Pedro, Calif., shipyard. He succeeds **Joseph D. Ingham,** whose promotion to general manager of the Bethlehem shipyard in Baltimore, Md., has been announced.

Before being named assistant manager of the San Pedro yard in 1969, Mr. **Brangan** had been general superintendent of the Hoboken yard for eight years. Except for his assignment at San Pedro, he has spent his entire 39-year career with Bethlehem at its ship repair yards in the New York City area.

He joined Bethlehem in 1933 at its former Brooklyn 56th Street yard as an apprentice and advanced to special supervisor at that facility before being named assistant superintendent of the Hoboken yard in 1949. He subsequently served as manager of pierside repairs for Bethlehem's New York yards before being appointed general superintendent of the Hoboken yard in 1961.

A Brooklyn, N.Y., native, Mr. **Brangan** is a member of The Society of Naval Architects and Marine Engineers, Society of Port Engineers, and The Propeller Club.

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Letters Of Intent Totaling $760 Million For 8 Ships To Todd And Newport News

Todd Shipyards Corporation has received a letter of intent to build six oil tankers valued at $570 million for a subsidiary of Burmah Oil Co. of London. Newport News Shipbuilding & Dry Dock Co., a Tenneco Inc. unit, has also received a letter of intent from Natural Gas Pipeline Co. of America, a Peoples Gas Co. unit, to build two liquefied natural gas carriers.

The Todd contracts are subject to approval of applications for Federal shipbuilding subsidies that have been filed by six companies. The companies were established by a Burmah Oil unit especially to carry out the program, a spokesman for the Maritime Administration said.

Natural Gas Pipeline said in a prepared statement that the "best estimate of the price of the two ships is approximately $194 million." The final price will be determined when detailed plans and specifications are completed and construction contracts executed. The cost will also depend on the amount of construction subsidy, if any, granted by the Maritime Administration, the company said.

Each of the new tankers Todd is to build would be 380,000 deadweight tons—too large to serve any present U.S. commercial port. So Burmah said it plans to build a terminal in the Bahamas, from which point smaller tankers could ship oil to the United States.

A new shipbuilding yard would also have to be built by Todd to construct tankers of this size. Todd said it will build the new facility at Galveston, Texas, if the contracts on the tankers are completed.

Federal laws require that only U.S. concerns may order ocean vessels in U.S. yards with U.S. shipbuilding subsidies. Also, such vessels must use U.S. crews.

The six new concerns formed to own the six new proposed tankers are Dundee Shipping Inc., Perth Shipping Inc., Glasgow Transport Inc., Montrose Shipping Inc., Inverness Shipping Inc. and Aberdeen Shipping Inc.

The president of each of these companies, according to the Maritime Administration, is **Hans H. Angermueller,** a New York lawyer. He and three associates listed as principals in the new companies are U.S. citizens.

According to the application, the six companies are subsidiaries of Burmah Oil Inc., a subsidiary of Burmah Oil Co. The tankers would be leased for 25 years to yet another Burmah Oil subsidiary, Burmah Oil Tankers Ltd. Bermuda.

When Natural Gas Pipeline announced last February that it had joined with Amoco International Oil Co., a unit of Standard Oil Co. (Indiana), in a project to ship natural gas from Trinidad, plans called for three liquefied natural gas tankers to be built for about $180 million.

In its release, the company also said that deliveries from the project aren't expected to start before 1977, while in its earlier statement it said deliveries would begin in 1976, with shipments that year reaching an average daily rate of 200 million cubic feet, increasing to 300 million cubic feet in 1977 and 400 million in 1978.

A company spokesman declined comment on the revised prices and schedule, citing restrictions related to registration with the Securities and Exchange Commission on a $50-million stock offering.

The two proposed tankers would have a capacity of 125,000 cubic meters of LNG, the company said. They are intended for use in transporting LNG from Trinidad and Tobago in the West Indies to a terminal port in the Texas Gulf Coast area. There it will be regasified and injected into Natural Gas Pipeline's system for delivery to Chicago and other Midwestern markets, the company said.

NASSCO Awarded Contract For Replenishment Oiler At Cost Of $51 Million

National Steel and Shipbuilding Company (NASSCO), San Diego, Calif., has been awarded a $51,500,000 contract by the United States Navy for the construction of a new replenishment oiler (AOR-7).

The new ship will have an overall length of 658 feet 2 inches; a maximum molded breadth of 96 feet; a draft of 33 feet; a full-load displacement of 37,000 tons, and will be capable of speeds up to 20 knots.

The "Wichita Class" AOR will be fitted with a helicopter platform that can accommodate two helicopters. The ship's mission will be to provide rapid replenishment at sea of petroleum products, ammunition, provisions, and fleet freight to task forces. She will carry a total complement of 402 officers and enlisted personnel.

AOR-7 will also be equipped with a dual channel Nato Seasparrow surface missile system and two 20 mm MK 68 gun mounts.

The keel of AOR-7 will be laid January 26, 1974; launch is scheduled for February 1, 1975, and delivery is scheduled for October 7, 1975.

NASSCO is equally owned by Kaiser Industries Corporation and Morrison-Knudsen Company, Inc., and managed by Kaiser Engineers.

The Blue Diamond Fleet pulls ahead again with three new 3,300 horsepower twin screw tugs. The Cape Charles, Cape Henlopen, Cape May. Three of the most modern, best equipped tugs afloat, designed to offer extra power, maneuverability, efficiency.

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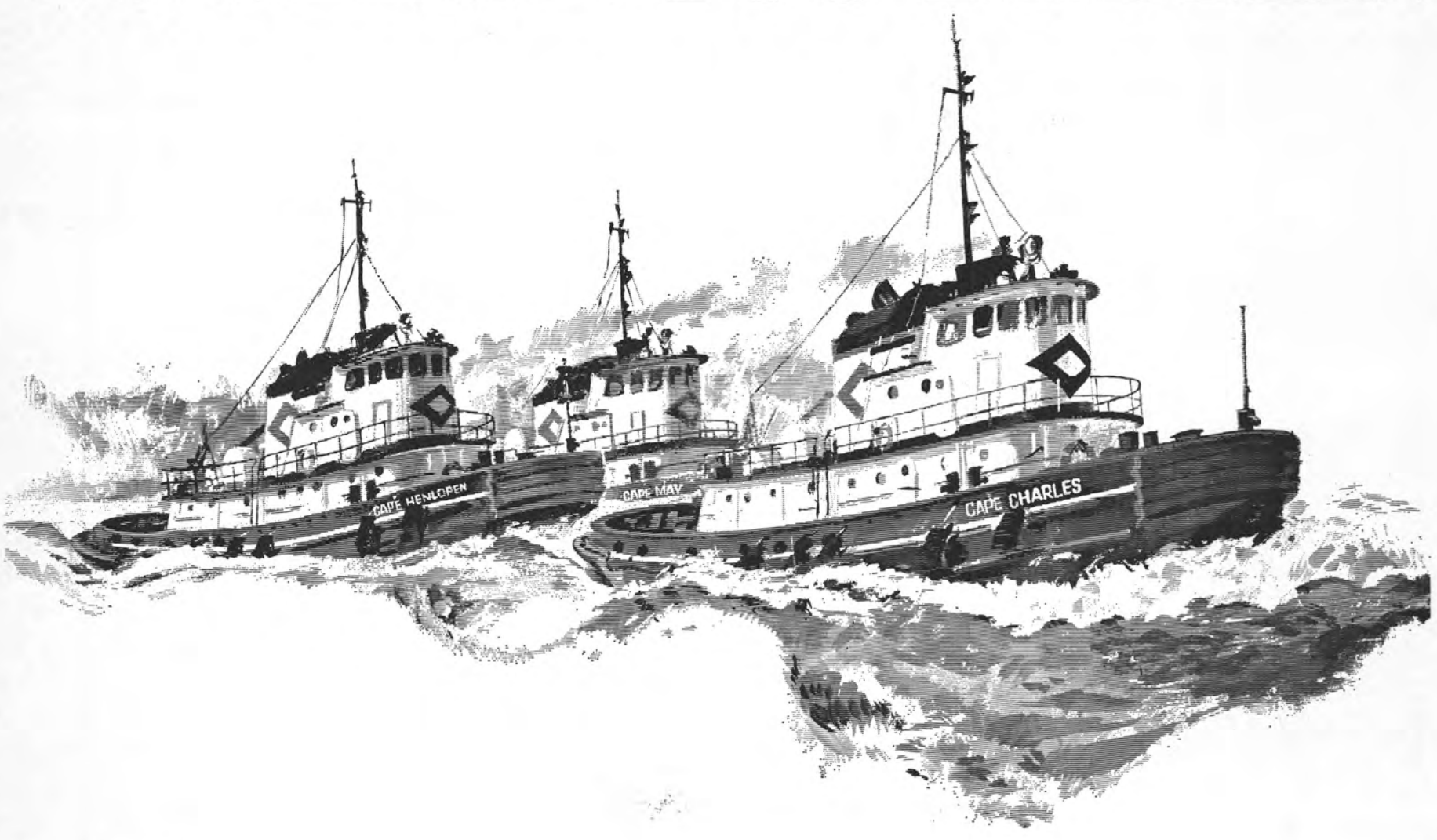

U.S. Shipyard Backlog Reaches Record High

Edwin M. Hood

Substantial gains in the work load for American shipyards during 1972 were reported in the following year-end statement prepared by **Edwin M. Hood,** president of the Shipbuilders Council of America.

"The shipbuilding industry of the United States will close 1972 with an estimated backlog of pending work valued at $5.7 billion—a record peacetime high. More than $3 billion in new contracts for construction or conversion of commercial and naval vessels were placed over the last 12 months.

"Especially with respect to the construction of merchant ships of 1,000 gross tons and over, American shipyards in 1972 experienced both a strong upsurge in new orders and a spectacular change in the nature of workload. As of October 1, 1972, the order book stood at 87 vessels of 2,974,355 gt, the highest since the end of World War II, compared to the 57 vessels of 1,815,700 gt at the close of 1971. Nineteen yards are engaged in the current effort.

"Awakening recognition of the emerging U.S. energy crisis, coupled with the favorable effects on the industry of the Merchant Marine Act of 1970, contributed to this new high in level of orders. Whereas there were but 14 oil tankers of 847,970 gt (1,588,200 dwt) under construction in American yards on December 31, 1971, there are now 36 of 1,591,070 gt (3,019,700 dwt), and six liquefied natural gas (LNG) carriers of 450,000 gt (381,180 dwt) on order.

"The 1972 experience, however, does not necessarily presage a future pattern. Particularly as to size, tankers remain a question mark. The U.S. faces a multipronged dilemma of rapidly rising need for oil imports; an increase from the present 3,000,000/4,000,000 barrels per day to as much as 18,000,000 per day by 1985 is being forecast. But, there are related problems involving the scope of national energy policy, the character of U.S. ports which are to receive the oil, the consequent size of the vessels to deliver it, questions pertaining to pollution control, and the proportion to be transported in U.S.-flag, U.S.-built tankers.

"Generally, draft limitations of U.S. ports today restrict vessel size, under full load, to 65,000 dwt or less. If larger vessels are to be employed, offshore deepwater terminals must be built, with subsequent mainland delivery to be made either by pipeline or by ship. The question of constructing these terminals is now receiving national consideration.

"Massive imports of LNG, with attendant construction of LNG carriers seems inevitable, and this year's orders for six 125,000-cubic-meter carriers with two U.S. yards are a concrete indication of this probability. A study by the U.S. Federal Power Commission forecasts that as many as 120 may be required by 1985. But the investments required to provide total transportation systems — including the ship link — are enormous, as are the complexities of arranging international agreements for the movement of LNG from wellhead to consumer. In effect, national action is required to consummate all system arrangements, and the U.S. LNG carrier market may mature slower than originally thought.

"During 1972, U.S. yards also continued active in the construction of drill rigs—floating, submersible and jackup—and as of September, some 30 rigs of approximately 150,000 gross tons were on order.

"Consistent with the pattern of the past several years, $3 billion in total value (shipyard value is approximately 60 percent of total) of new and converted naval vessels were approved by the Congress, with construction or conversion to be ordered prior to June 30, 1973. During the past 12 months, existing programs were expanded with orders for seven destroyers of the Spruance class,

bringing the total of this group to 16; five nuclear attack submarines of the Los Angeles class were started, with a total of 12 now under contract; one nuclear-powered frigate of the Virginia class brought the total of this ship type on order to five. Contract for one replenishment oiler (AOR) was awarded in mid-December, and an order for two submarine tenders (AS) is expected soon.

"1972 also witnessed the start of production design for a smaller patrol frigate (PF) and of a new Trident class of ballistic-missile submarine; initial design was undertaken for a prototype 2,200-ton surface effect ship (SES) as follow-on to two 100-ton prototypes now under test, and design was commenced for a new class of sea control ship (SCS)—a vessel of about 15,000 tons displacement carrying about 17 aircraft, including helicopters and vertical or short take-off and landing-type aircraft. Low-key development was continued of a 180-ton guided missile hydrofoil patrol craft, part of a cooperative NATO effort, and six more Polaris / Poseidon submarine conversions were awarded.

"Private employment stood at 134,900 in September 1972, up from a low of 125,200 in June 1971. The preliminary 1972 estimate of the value of work done by the private shipbuilding and repair industry in 1972 is $2.8 billion."

Frank Reynolds Joins Santa Fe International

Frank E. Reynolds

Frank E. Reynolds, a veteran of 16 years in the offshore construction industry, has joined Santa Fe International Corp., Orange, Calif., as a top executive of its construction and pipelaying subsidiaries.

E.L. Shannon Jr., president of Santa Fe International, announced that Mr. **Reynolds** has been named president of Santa Fe-Curran & Co., the pipeline construction subsidiary, and executive vice president of Santa Fe-Pomeroy, Inc., which specializes in worldwide construction for the petroleum industry. Mr. **Reynolds** will be in charge of deepwater offshore operations, including both construction and pipelining, Mr. **Shannon** said.

Formerly of New Orleans, La., Mr. **Reynolds** was a senior vice president of Fluor Ocean Services, Inc. before joining Santa Fe. Earlier, he had been a senior vice president of McDermott International, Inc.

He is a civil engineering graduate of Michigan State University, and has a master's degree in civil engineering from Tulane University.

Mr. **Reynolds'** offshore construction experience dates back to 1956, when he worked as a field engineer on various projects in the Gulf of Mexico. Since then, he has been in charge of construction and pipeline operations in the Gulf of Mexico, South America, Europe, Australia, Asia and Africa.

Zimmite Corporation New Company Name

Zimmite Corporation is the new name for the former W.E. Zimmie, Inc., leading manufacturer of specialty, anti-pollution water treatment chemicals and mechanical systems, marine machinery, pumps, and yacht hardware.

Simultaneously, the company also announced completion of a major expansion of laboratory, engineering, warehousing and office facilities at its Cleveland, Ohio, headquarters.

Concurrent with broadening the line of chemical products, in recent years the company has entered into pumps, marine deck machinery and yacht hardware. One of the most recent products in this area is a marine sewage disposal system, already in use on several Great Lakes vessels for controlling disposal of sanitary waste and garbage. Marine equipment is marketed by the company's Hyde Products Division.

Newport News Sets Up Separate Division For New North Yard

Newport News Shipbuilding is setting up a separate and independent division for the construction of ships in its new North Yard. It is also reorganizing its present production operations. These developments were announced to employees by **John P. Diesel,** president.

"Our company is at the highest point of activity in its peacetime history," Mr. **Diesel** said. "To enable us to meet our commitments to the Navy and to provide for the growth we see ahead, many major changes are being made," he said.

Making the new North Yard into a separate and independent division will "accelerate progress in developing new commercial ship construction, especially for ships to serve the nation's energy needs," Mr. **Diesel** said.

Named to head the new division is **A.E. Cox,** presently senior program manager.

Mr. **Diesel** also announced that "in conjunction with the establishment of the new division, there will be a major reorganization of production operations, which will serve five important objectives."

1. It will shift the emphasis in shipbuilding activities from trade management to project management.

2. It will develop and centralize production, planning, and control activities at the highest level in the company.

3. It will pull together those manufacturing operations that will support both the naval and commercial shipbuilding programs.

4. It will broaden the organization structure and permit more people to use their management skills.

5. It will define more clearly the responsibilities for schedule and budget performance on their programs.

R.S. Plummer, vice president, will have broadened responsibility for both the present and the new yards. He will provide guidance and planning to all shipbuilding operations.

Present waterfront operations will be divided into non-nuclear and nuclear organizations, each of which will have project managers in charge of major programs.

W.R. Phillips Jr. has been appointed director of waterfront operations for non-nuclear construction. Reporting to him will be seven superintendents: **R.J. Baumler, R. B. Wheeler, G.J. Snyders, R.J. Ellis, S.A. Mahler, L.R. Sorenson Jr.,** and **J.M. Branch.**

Also, within this function, **D.T. Van Liere** has been named trades administrator to coordinate and direct the proper trades personnel, and **G.M. Bonnett** will serve as process engineer, insuring that the best and most economical methods of construction are employed.

J.P. Fox has been appointed director of nuclear construction. Superintendents reporting to him will be **F.F. Sanders, J.C. Meredith Jr., D.L. Sweeney, W.G. Corson, G.P. Miller, J.A. Price, B.J. Huff,** and **E.U. Morin.**

Also, **L.C. Robertson Jr.** will serve as nuclear trades administrator.

The manufacturing division under **B.A. Worcester** has been strengthened by the addition of a new function, manufacturing engineering, headed by **T.D. Jennings.** Other superintendents reporting to Mr. **Worcester** are **J.H. Brendle, A.H. Wornom, W.R. Jebson, T.E. Saunders** and **D.L. Stinson Jr.**

The other directors named are **H. Monroe Jr.,** production control and planning, and **F.V. Daly,** who will continue as director of the facilities division.

Messers **Phillips, Fox, Monroe** and **Daly** will report to the office of the president.

Mr. **Diesel** told yard employees: "This reorganization is being made at a time when the yard faces its greatest challenges in history. We are committed to perform more sophisticated and complex naval shipbuilding construction than any other yard in this nation, and we are seeking to become the world's leading builder of high quality ships to help meet the nation's energy demands.

"We need the support of every member of the Newport News shipbuilding team as we enter this new and dynamic era of our growth.

"I know I can count on the dedication and cooperation of every person in our organization," he concluded.

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Marine Section Of NSC Repeats Winning Top Safety Award

The 60th Annual National Safety Congress and Exposition held in Chicago brought together in the common cause of safety deep-sea, inland waterways and Great Lakes vessel operators, shipbuilders, ship repairs, stevedores, labor, Coast Guard and other government leaders to exchange experiences, acquired know-how and to renew a commitment to the cause of marine accident prevention.

Capt. **Robert E. Hart,** executive vice president of the Marine Index Bureau, Inc., and public relations chairman for the Marine Section, in summing up the meetings stated, "This past year was certainly rewarding as the Marine Section which for the second consecutive year was the recipient of the 'Excellence in Safety' award from the National Safety Council." The Marine Section won this coveted award over 27 other industrial sections.

According to the National Safety Council officials, it is most unusual for an industrial section to win the NSC's Cameron Award twice in a row. The award is given to the section which makes the largest contribution to promoting and advancing safety during the preceding 12-month period.

Presentation of the award was made by Safety Council President **Howard Pyle.** Receiving the award was the Section's general chairman for the past year, Capt. **Richard N. LePage** of the Farrell Lines. Captain **LePage,** on receiving the award said: "In the past two years, the U.S. maritime industry has conducted what amounts to a national campaign to promote safety at sea, on the docks and in the shipyards. Safety indeed, has become the watchword of the American merchant marine and the cargo fleets of all nations engaged in domestic and international trade."

Capt. **Hewlett R. Bishop,** newly elected General Chairman of the Marine Section of the National Safety Council for 1972-1973.

He further stated: "We in the marine industry must meet daily the new safety challenges as we put into effect new safety procedures, so essential to the operation and handling of cargo on technically advanced U.S.-flag ships now in service or being built under the 1970 Merchant Marine Act. Our industry's safety directors and their companies, representing both labor and management, will be working closely with the government to meet these challenges to insure that the 'flag-of-safety' that flies over our merchant fleet today, will also wave proudly over our revolutionary new fleet of tomorrow."

The Marine Section's program for 1972 was arranged by **Robert E. Kratzert** of the Columbia Steamship Division of Oglebay Norton.

Captain **LePage** served as the chief executive officer of the 85-member Executive Committee during 1971-72. Capt. **Hewlett R. Bishop,** president of the National Cargo Bureau, Inc., was elected general chairman for the 1972-73 period. **Fred R. Smith,** chairman, Seattle Stevedoring Company; **H.H. Howard,** assistant to vice president for shipbuilding, Bethlehem Steel Corporation; **John D. Geary,** vice president, The Ohio River Company, and **Robert E. Kratzert** were elected vice general chairman for next year.

Best Paper Awards were presented to some of last year's convention speakers. Nine of the 15 guest speakers were recipients of the General Chairman's, Honorable Mention and Citation Awards. The most-honored award, the General Chairman's Award, went to **Hugh M. Douglas,** safety coordinator, Imperial Oil Company, Ltd. for his paper entitled "Total Environment Control." **Bruno J. Augenti,** president of the Marine Index Bureau, Inc., and Rear Adm. **W.A. Jenkins,** USCG, as Best Paper committee chairman, handled the presentations.

Marine Safety Poster Contest winners were Cities Service Tankers Corporation and the U.S. Coast Guard. **J.T. Gerrity,** radio officer aboard Cities Service's Cantigny, was the recipient of the Golden Safety Poster award and Coastguardsman **Ian L. MacCartney** was awarded the Silver Safety Poster award.

The first session of the convention dealt with the inland waterways. **John Kern** of A.L. Simms Brothers Towing Company, and **McVey F. Ward,** southern regional representative of The American Waterways Operators, Inc., served as session chairman. Speakers and subjects included: **John Kern**—"A Fresh Look at the AWO Safety Program"; Capt. **Pierre R. Becker,** superintendent, National River Academy,—"The Two-Year National River Academy Program", and **W.M. Aldridge,** Dixie Carriers, Inc., and **R.L. Fox,** Ingram Corporation,—"Safety Considerations in the Towing and Handling of LASH Barges."

The shipbuilding and ship repairing session chairman were **James R. O'Donnell,** maritime safety consultant, and **H.H. Howard,** Bethlehem Steel Corporation. Speakers and subjects included: **Richard L. Swift,** Mine Safety Appliances Company,—"Portable Instruments and Their Use Under Current Safety Legislation"; **Otis T. Logue,** Land & Marine Applicators, Inc.,—"Safety and Silicosis"; **Horace A. Thompson III** of Jones, Walker, Waechter, Poitevent, Carrere & Denegre,—"An Analysis of the Occupational Safety and Health Act from the Point of View of Labor Relations Counsel."

Rear Adm. **W.A. Jenkins,** USCG, and Capt. **D.H. Clifton,** USCG, served as chairmen for the Coast Guard session. The speakers and subjects included: Capt. **C.T. Newman,** USCG,—"Marine Casualties and Some of the Practical Aspects of Marine Boards of Investigation"; Comdr. **D.F. Smith,** USCG, —"The Regulatory Administrator, A Partner in Safety", and Comdr. **C.S. Loosmore,** USCG, —"Ship Safety Through Damage Analysis; the Ship Structure Committee Approach."

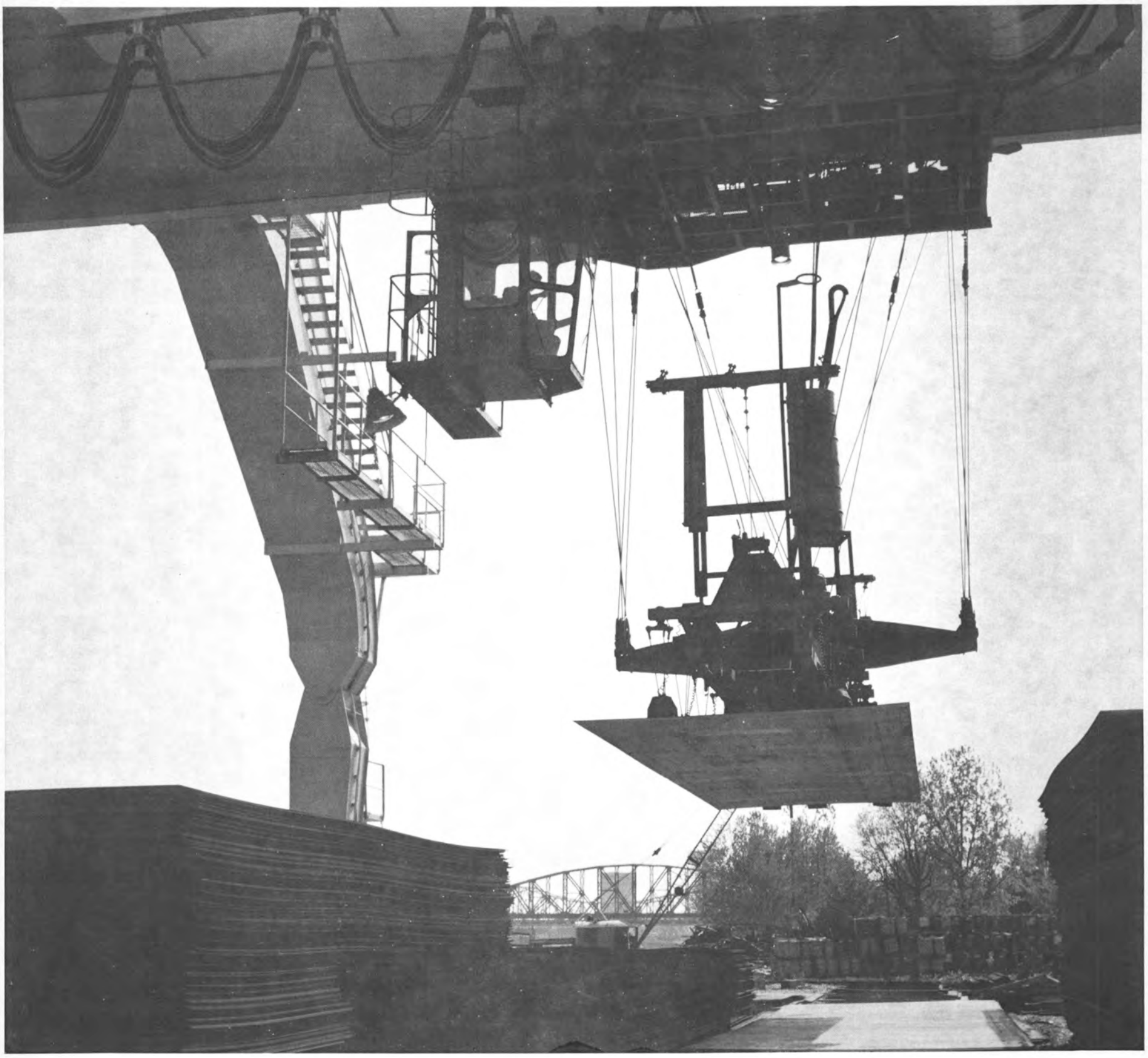
The ship operations session was chaired by **T.R. Alff,** Nacirema Operating Company, and **S.A. Clauss,** Steamship Trade Association. The speakers and subjects included: **Elizabeth Whitaker Tezza,** Palmetto Stevedoring Company,—"Starting from Scratch in Longshore Safety"; **O.W. Uhrhan,** Pacific Maritime Association, —"Safety Training versus Skill Training", and **W.J. Brown,** International Terminal Operating Corporation,—"Matching Stevedore Equipment with Safety Requirements."

The 15th Annual Great Lakes Day Luncheon was presided over by **E.T. Gilmore** of Oglebay Norton Company. The guest of honor was **John L. Horton,** assistant manager, Cleveland Cliffs Iron Company, and the guest speaker was **John D. Lawlor,** executive vice president of the National Safety Council.

The joint marine luncheon with the Propeller Club of the Port of Chicago was presided over by **Charles P. Rayman,** president, Chicago Propeller Club. The guest speaker was Rear Adm. **Albert A. Heckman,** USCG.

Best Papers presentation, left to right: **Bruno J. Augenti** and Rear Adm. **W.A. Jenkins,** Best Paper Award Committee, Capt. **D.H. Clifton,** accepting awards for Comdr. **M.E. Welsh** and **D.J. Kerlin,** USCG, and Capt. **R.N. LePage,** past general chairman.

Official judges of the Marine Safety Poster Contest, left to right: Capt. **Robert E. Hart,** executive vice-president, Marine Index Bureau, and **Elizabeth V. Stephens,** vice-president, Ships' Operational Safety, Inc. The winning posters are on bottom row.



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Hampton Roads Section SNAME Hears Paper On Environmental Control In Shipbuilding And Ship Repair Facilities

Shown at the SNAME Hampton Roads Section December meeting, left to right: **E.E. Jaeger,** Newport News Shipbuilding & Dry Dock Co., papers committee; **T.B. Ray,** speaker; **C.E. Peacock Jr.,** Section vice chairman; **A.K. Woodward,** executive committee, and **R. Broad,** Newport News Shipbuilding & Dry Dock Co., Section representative.

The Hampton Roads Section of The Society of Naval Architects and Marine Engineers held their second meeting of the 1972-73 season at the Fort Monroe Officers Club, Hampton, Va., on December 7, 1972.

Following the social hour and dinner, which were enjoyed by approximately 125 members and guests, chairman **Joseph D. Deal Jr.** opened the meeting by introducing the distinguished guests and welcoming those in attendance.

After disposing with Section business, chairman **Deal** introduced the Section representative, **Richard Broad,** vice president of nuclear operations at Newport News Shipbuilding and Dry Dock Company, who gave a comprehensive report of the Society's annual meeting held at the New York Hilton in November.

T.B. Ray, senior design environmental control engineer at the Newport News Shipbuilding and Dry Dock Company, Newport News, Va., presented a paper on "Environmental Control in Shipbuilding and Ship Repair Facilities." The author is a graduate of Newport News Shipbuilding and Dry Dock Company Apprentice School and received his degree in civil engineering from Purdue University.

The paper dealt first with the prolific regulatory legislation, both Federal and state, relating to environmental control. These include the following: (a) National Environmental Policy Act (NEPA) of 1970; (b) Federal Water Pollution Control Act Amendment (FWPCAA) of 1970; (c) Refuse Action of 1899; (d) Oil Pollution Action of 1961; (e) Clean Air Act Amendments of 1970; (f) Air Pollution Control Law of Virginia of 1966, as amended in 1968 and 1970; (g) Virginia Water Control Legislation, and (h) Proposed Regulation 5 of Virginia's State Water Control Board.

The author noted that while the above legislation covers such areas as decision making affecting the environment, public hearings, issuance of licenses or permits and funding for construction of treatment plants, etc., criminal and civil penalties, there are many areas which are unclear and require interpretation.

With the governing regulations as a background, the varied range of problems confronting shipyards in particular and all industry in general, were discussed. It was noted that environmental problems of shipyards vary in relation to their age, size, timing of growth spurts, proximity of nearby communities, geographical locations, judicial involvement of enforcement agencies and environmental criteria and that some of the problem areas confronting the shipbuilder are solid waste disposal, surface preparation and protective coatings, liquid waste, and oil spillage.

Pollution abatement measures and the economic impact of environmental control were presented in considerable detail as they relate to shipbuilding and ship repair facilities. It was pointed out that shipyard facilities vary and that environmental control programs must be tailored to each activity. The fact that a shipyard must be located on a body of water is a contributing factor to environmental problems.

Written discussers were **Robert C. Strasser,** director of research, **Clifton W. Loveland,** machinery design propulsion section manager, and **W.D. Lyliston Jr.,** materials engineering chemical engineering section manager, all of Newport News Shipbuilding and Dry Dock Company.

From left to right: **J.B. Montgomery,** chairman, papers committee; **T.B. Ray,** speaker; **J.D. Deal Jr.,** chairman of the SNAME Hampton Roads Section; **C.E. Peacock Jr.,** Section vice chairman, and **C.M. Brooks,** secretary-treasurer.

Marine Fraternity Honors Tom Darnell

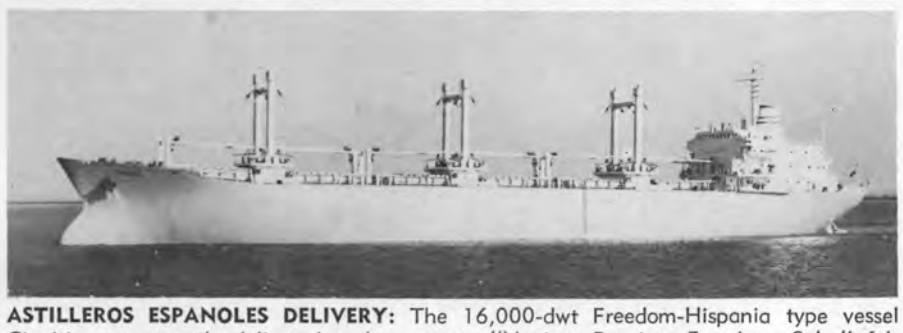
Shown above at the reception, left to right: **Grant L. Johnson,** International Paint Company; **Edwin K. Linen,** Todd Shipyards Corp.; **Thomas E. Darnell,** honored guest; **W.C. Brodhead,** Gulf Oil Corp.; **Harry A. Berke,** Maryland Shipbuilding & Drydock Company; **Thomas M. Reinhardt,** International Paint Co., and Capt. **Warren G. Leback.**

Thomas E. Darnell, vice president of the International Paint Company, was recently honored at a reception in the Downtown Athletic Club, New York City, by his many friends from the ship operating and shipyard fraternity on the occasion of his retirement.

One of the most popular individuals in the maritime industry, Mr. **Darnell** joined International Paint in 1941 and devoted a rewarding career of 31 years to servicing American-flag fleet owners and giving able guidance to the labor department of International Paint when the company employed its own crews working on both American and foreign ships.

An avid golfer, Mr. **Darnell** will spend a good part of his retirement on the links of Long Island and at marine golf outings.

Tom Darnell, guest of honor, is flanked on the left by **Frederick A. Ganter,** Norfolk Shipbuilding & Drydock Corp., and on the right by **Thomas M. Reinhardt,** president of International Paint Company.



ASTILLEROS ESPANOLES DELIVERY: The 16,000-dwt Freedom-Hispania type vessel Cigoitia was recently delivered to her owners "Naviera Ramirez Escudero, S.A.," following her successful sea trials. This is the 10th unit of this type built at the Sevilla Shipyard of Astilleros Espanoles, S.A. and the second one for these owners. The approximate measurements and main particulars are as follows: length overall, 475 feet; breadth, 68 feet; depth, 42 feet; draft, 31 feet, and cargo capacity, 729,267 cubic feet. The propulsion machinery comprises a 6RD68 type AESA-Sulzer engine totaling 8,000 bhp, built at the Sestao Works of Astilleros Espanoles, S.A. The Freedom-Hispania vessel can carry bulk cargo, general cargo, containers, etc., has a "'closed shelter" and the essential characteristics of a bulkcarrier.

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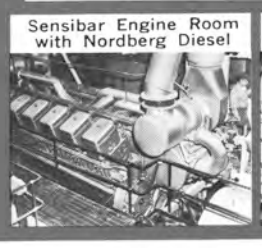
J. R. Sensibar Owned and operated by Columbia Transportation Division of Oglebay Norton Co., the 11,300 ton J. R. Sensibar was repowered May, 1960 with a Nordberg Marine Diesel. This engine is rated 3,200 b.h.p. at 515 r.p.m.—drives through an 800kw. generator to a single Western Reduction Gear with Wichita Clutch to a controllable pitch propeller turning at 155 r.p.m.

Sensibar Engine Room with Nordberg Diesel



Wichita 42" double-plate Clutch on Western Gear

J. R. Sensibar Control Panel

Ocean Crown
Owned and operated by Crown Zellerbach Canada, Ltd., the Ocean Crown in 1962 was repowered with a 13½" x 16½" eight-cylinder inline Diesel Engine rated 2,000 h.p. at 515 r.p.m. Clutches are Wichita ATD-236 Marine.

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Owned and operated by A. L. Mechling Barge Lines, Inc.—the Towboat Daniel Webster is powered by two 2,160 h.p. Nordberg engines through Western Reverse Gears and two Wichita ATD-236 Marine Clutches.

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President-Elect Of SNAME Attends Chesapeake Section Meeting At ARCTEC Ice Model Basin

Pictured at the Chesapeake meeting, left to right: **Phillip Eisenberg,** president of The Society of Naval Architects and Marine Engineers; **James J. Peter,** author, ARCTEC; **Mrs. Levine; George Levine,** author, ARCTEC; **Roderick Edwards Jr.,** moderator, vice president for research, ARCTEC, and **Seth Hawkins,** vice chairman, Chesapeake Section.

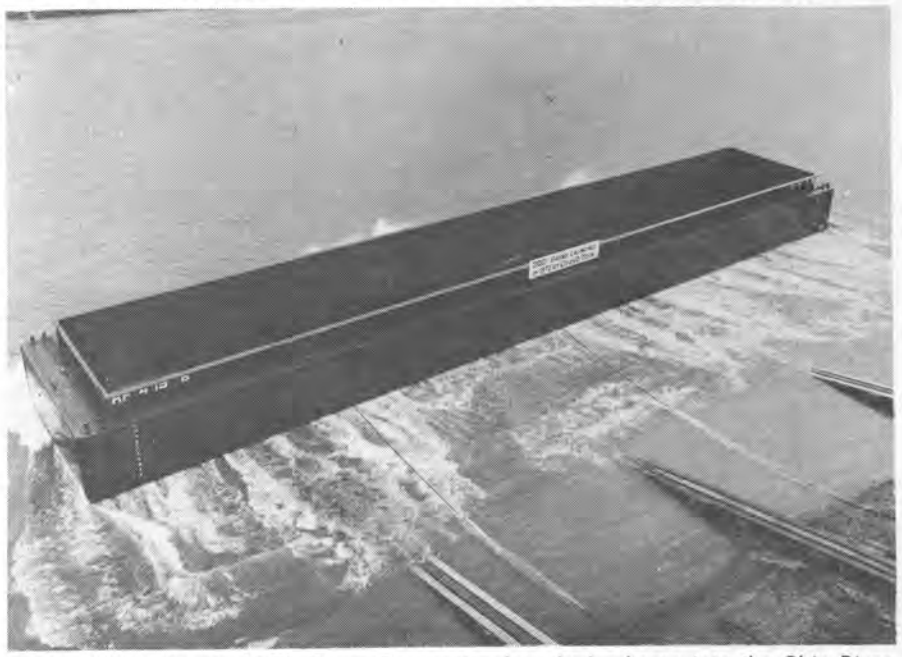
The Chesapeake Section of The Society of Naval Architects and Marine Engineers held the third meeting of its 1972-73 technical program on November 21, 1972, at the Howard Johnson Motor Lodge in Laurel, Md. The program consisted of a dinner and technical presentation of a paper entitled "Design, Construction and Operation of an Ice Model Basin," by **George H. Levine, David Benze,** and **James Peter,** of ARCTEC, Inc. At the conclusion of the technical program, the membership reconvened at the ARCTEC Ice Model Basin (AIMB) in Savage, where an icebreaking model test demonstration was conducted.

This combination of a technical paper followed by a practical icebreaking model test demonstration was attended by approximately 150 members, which indicated the high interest in the paper and the ability to see an ice model basin demonstration.

Roderick Edwards Jr., ARCTEC, served as the moderator of the technical session. Mr. **Peter** presented the verbal discussion of the paper, which highlighted the numerous parameters involved in correlating the results between full scale results and the model scaling requirements with ice conditions. In addition, he discussed the building facilities at ARCTEC, the model basin construction and the thermal efficiency of the system. At the conclusion of the presentation, numerous questions were asked from the floor and answered by one of the co-authors, **George Levine.**

Seth Hawkins, vice chairman, was pleased to report on the recent election of officers held at the annual meeting of SNAME in New York. **Phillip Eisenberg,** past chairman of the Chesapeake Section, was elected president of the Society. Other distinguished members of the Section who will serve in the Society are: **E. Scott Dillon,** Deputy Assistant Administrator for Operations, Maritime Administration, was elected a vice president of the Society, and **John J. Nachtsheim,** Chief, Office of Ship Construction, MarAd, was selected as a member of the executive committee. Each of these members has had a long and active role in the Chesapeake Section.

Dravo Launches Record 300 Barges In 1972



For the 300th time in 1972, Dravo Corporation launched a barge into the Ohio River. The 300th barge (shown above) is one of thirty 200-foot-long covered hopper barges that will be delivered for service with Flowers Transportation Company, Greenville, Miss. With a total cargo capacity in excess of 300,000 tons, the barges built by Dravo in 1972 would stretch more than 11 miles, end to end.

Dravo Corporation on December 27 launched its 300th barge of 1972, setting an all-time barge production record that is more than 50 percent better than the previous high of 184 launchings set in 1971.

Robert Dickey III, president and chief executive officer of the diversified engineering, manufacturing and construction company, said Dravo expects its total 1972 marine equipment bookings to exceed $55 million — some $20 million above 1971's record $35.8 million. At the end of the third quarter of 1972, Dravo had orders for 262 barges and five towboats with a total value of $46.2 million, Mr. **Dickey** said.

The 300th is one of thirty 200-foot-long covered hopper barges that will be delivered for service with Flowers Transportation Company, Greenville, Miss.

During 1972, Dravo carried out a $3.5-million modernization and expansion program at its Neville Island barge and boatbuilding facility near Pittsburgh, Pa., on the Ohio River. It included construction of an enclosed 312-by-92-foot addition to the existing barge shop building and purchase of new production equipment.

"We expanded our manufacturing facilities to keep pace with the growing demand for marine equipment," said Mr. **Dickey.**

Part of the reason for the recent surge in barge manufacturing, according to Mr. **Dickey,** is the ever-growing list of commodities being moved by barge on the nation's 25,000-mile-long inland waterways system.

"There are a number of different factors responsible for the booming barge business," Mr. **Dickey** said. "For example, increased grain export quotas are boosting demand for barges to move large quantities of grain to ocean ports. More barges are needed to transport increased quantities of coal to electric power generating plants. And, the normal barge replacement market has been exceptionally strong since the beginning of 1971."

Mr. **Dickey** said Dravo expects the heavy demand for barges and towboats to continue in 1973.

Dravo entered the marine equipment business nearly 70 years ago and launched its first steel barge in 1915. Today, it is one of the top three barge builders in the country.

Samson Develops New Braided Line For Taut Mooring

A new braided line has been developed by Samson Cordage Works, Boston, Mass., for application where a minimum of elastic and permanent elongation is required.

Designated Samson VLS, the new line uses polyester fibers in a special 12-strand braid construction.

Initially used for the Taut Mooring of Oceanographic equipment, Samson VLS is reported to have elastic elongation of less than 5 percent at 30 percent load. Other features include freedom from torque, extreme flexibility, non-hockling, and easy splicing. Samson VLS braided line comes in a size range from 3/8-inch diameter to 1-inch diameter (3-inch circumference), and with approximate average breaking strengths of up to 40,000 pounds. It is available in minimum quantities of 10,000 feet for a given diameter.

Descriptive information and specifications are available by requesting Bulletin MI-1 from Samson Cordage Works, 470 Atlantic Avenue, Boston, Mass. 02210.

Managerial Change At Mitsui OSK Lines

S. Arii has been named to succeed **T.Wakasugi** as New York chartering manager for Mitsui OSK Lines Ltd. Mr. **Wakasugi** will be transferred to the firm's Tokyo head office effective early this year.

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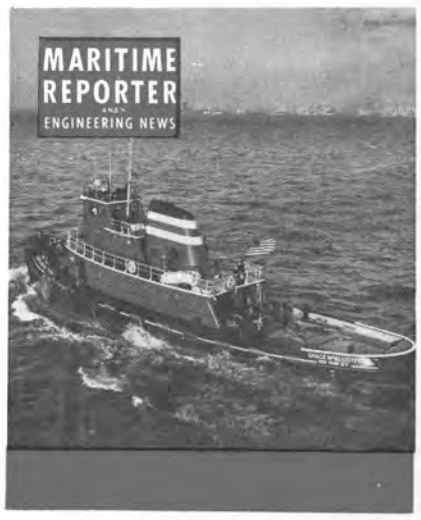

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Mooremack Announces Plans For Purchase Of Great Lakes Firm

James A. Hughes, chairman of the board of Diamond Shamrock Corporation, and **James R. Barker,** chairman and president of Moore and McCormack Co., Inc., have announced that the boards of directors of the two corporations have agreed in principle to the purchase by Moore and McCormack of substantially all of the assets and assumption of substantially all of the liabilities of Pickands Mather & Co., a wholly owned subsidiary of Diamond Shamrock. Payment will be made in the form of cash, short term notes and senior preferred stock of Moore and McCormack in an aggregate amount in excess of $60 million.

Detailed contract terms are being negotiated, looking toward a proposed closing on or before April 1, 1973. Approval by Moore and McCormack stockholders will be requested as soon as possible.

Pickands Mather had operating profits before taxes and corporate overhead allocation of $7,513,000 for the calendar year 1971. Pickands Mather is engaged in exploring for, developing and managing mineral properties, vessel operations on the Great Lakes, limestone production and related activities. It is expected that all Pickands Mather employees will remain in Cleveland in the new Diamond Shamrock building.

Moore and McCormack is in the overseas shipping business, serving primarily the South American and African trades and has plans for future development in which Pickands Mather's capabilities can be utilized. It reported net income of $2,114,000 for the year 1971 on sales of $56,386,000. For the first nine months of 1972, reported net income was $4,044,000 on sales of $40,501,000.

Newport News Ship Elects John R. Kane VP

John R. Kane

John R. Kane, director of engineering at Newport News Shipbuilding, Newport News, Va., has been elected a vice president of the company. The election was announced by **L.C. Ackerman,** chairman of the board and chief executive officer of the Tenneco subsidiary.

Mr. **Kane** continues in his present responsibilities as the yard's top engineer and head of more than 2,600 engineering and design personnel, one of the largest concentrations in industry. His election, according to Mr. **Ackerman,** recognizes the importance of this responsibility and his contribution to the company.

Mr. **Kane** was recently awarded the David W. Taylor Medal of The Society of Naval Architects and Marine Engineers for "notable achievements in marine engineering." The award cited his pioneer efforts in the first major application of high-pressure high-temperature steam systems and boilers for ship propulsion, the design development and testing of nuclear power plants for submarines and aircraft carriers, as well as responsibility for the machinery systems for cargo vessels and tankers.

Mr. **Kane** began his employment with the shipyard in 1936 as a draftsman, and in 1951 was appointed engineer of the engineering technical department. Four years later, he was named assistant chief engineer of the machinery design division and was promoted to chief engineer of that division in 1957. He was appointed director of engineering in 1966.

He received his undergraduate degree in engineering from the University of Michigan and his master's degree from the Massachusetts Institute of Technology.

New Chartering Firm Opens In New York

The opening of a new chartering and ship brokerage firm under the name of H. Meisner Inc., has been announced by the company. The firm is located in Room 227 at 17 Battery Place, New York, N.Y. 10004.

Hongkong United Dockyards Publishes 'All About HUD'

Hongkong United Dockyards Limited, Kowloon Docks, Hung Hom, Hong Kong, recently published an illustrated booklet introducing HUD, a powerful new name on the Hong Kong and international ship repairing scene.

HUD stands for Hongkong United Dockyards Ltd., a joint company set up by the Taikoo Dockyard & Engineering Co. of Hong Kong Ltd. and Hong Kong & Whampoa Dock Co. Ltd. to take over the ship repair activities of these two famous shipyards.

Due to rationalization of equipment, services and staff, HUD can offer a more competitive, efficient and comprehensive ship repair, conversion and general engineering service than could have been provided by either yard operating independently.

HUD operates two dockyards—the Whampoa Dockyard, on the mainland at Kowloon, and the Taikoo Dockyard on Hong Kong Island.

HUD's main office is situated within its Whampoa facility at Kowloon Dock where it houses, in addition to senior management, the bulk of the supporting services required by an organization of this size. These services comprise accounts and finance, computer, drawing offices, estimating, etc., and of course, the operations staff of the Whampoa Dockyard.

A modern PABX telephone system covers both dockyards, and it is planned to link the company's telephone number 3-334111 to a radio paging system and thereby improve communications further.

The Taikoo facility on Hong Kong Island has its own operations staff and all services necessary for its efficient operation.

Both yards are fully equipped to drydock and service vessels up to 35,000 deadweight tons and repair afloat ships in excess of that size.

The chairmanship of HUD will alternate annually between Taikoo & Whampoa, and the first chairman will be **A.G. Hutchinson** of Whampoa.

The managing director will be **J. Cassels,** present managing director of Taikoo.

The burden of rationalizing facilities between Taikoo and Whampoa falls on **T.R. MacLean** and **A. E. Elliott,** who both bring to the board 26 years of experience with Taikoo and Whampoa, respectively.

Mr. **MacLean** transfers to HUD from his position of general manager of Taikoo. Mr. **Elliott** transfers to HUD from his position of executive manager-yard operations of Whampoa.

HUD's director in charge of the commercial, sales and public relations effort is **J.D. Hall.**

Mr. **Hall** joined Whampoa in 1961 and leaves his position of executive manager - commercial of Whampoa to join the HUD team.

Responsibility for financial matters falls on the shoulders of **E.G. Holgate,** HUD's finance director.

Mr. **Holgate** has been with Taikoo since 1966 and was secretary and finance manager there before joining HUD.

Operations at HUD's two dockyards will be controlled by two operations managers — **C.B. Harris** and **D.L. MacRae.**

Mr. **Harris** joined Whampoo in 1964 as ship draftsman, and shortly after transferred to the position of assistant shipyard manager. He now controls operations at Whampoa, HUD's mainland facility.

Mr. **MacRae** joined Taikoo in 1962 as chief ship draftsman, but has spent the last five years as assistant shipyard manager. He now controls operations at Taikoo, HUD's island facility.

Already, joint operations have commenced in the salvage and towage sector, with the two tug fleets previously operated by Taikoo and Whampoa being amalgamated by them into a new joint company, the Hongkong Salvage & Towage Co. Ltd. This company operates, at present, a fleet of 14 harbor tugs, which gives some indication of the magnitude of facilities that will be available to shipowners with the formation of HUD.

HUD, with five drydocks and three marine slipways backed up by extensive machine and repair shop facilities, can provide all shipowners' requirements under one roof.

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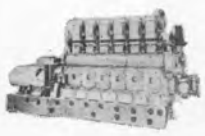
DIESEL GENERATOR SETS

1 **250 KW DIESEL GENERATOR SET**



ENGINE: Enterprise 12 x 15 DSG-6—6 cyl.—450 RPM crank No. 50J. GENERATOR: Westinghouse 250 KW—120/240 DC—1040 amps—450 RPM. Typical serial No. 3S-10P-913. Complete with switch gear.

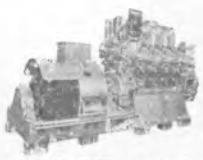
2 **EMERGENCY GENERATOR SUPERIOR 75KW 120/240 VOLT D.C. DIESEL GENERATOR SET**

With switchgear. ENGINE: Radiator cooled Superior GBD-8—6 cylinder—1200 RPM GENERATOR: Electric Machinery Co.—120/240 volts DC—316 amps—1200 RPM—stab. shunt.

3 **UNUSED 10 KW SUPERIOR DIESEL GENERATOR SET**

GENERATOR: Delco 10 KW—120 VDC—83.3 amps—1200 RPM. ENGINE: Superior diesel—2 cyl.—4½x5¾—15 HP—heat exchanger cooled.

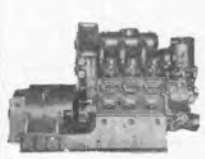
4 **500 KW—120/240 VOLT DC DIESEL GENERATOR SET**



GENERATOR: Allis Chalmers—Compound wound. Has Class "A" insulation. Output 500 KW—120/240 volts DC—2080 amperes—720 RPM—drip-proof—self-cooling. Ambient 50°C—temperature rise 40°C. ENGINE: Model GM 8-278—2-cycle—Vee type—8½"x10½"—air starting—720 RPM. Complete with switchgear. Condition very good. Still aboard naval vessel.

TURBO GENERATOR SETS

5 **300 KW DIESEL GENERATOR SET**



ENGINE: G.M. 6-278—6-cylinder—2 cycle—8¾"x10½"—750 RPM—with oil and water Ross Shell and Tube Heat Exchangers, instrument panel, pyrometer, etc. Vibro Isolators. GENERATOR: G.E. 300 KW—120/240 volts DC—1250 amps—shunt wound—continuous overload rating 375 KW—2 hours—55° Weight of unit approximately 26,000 pounds. Complete with shock mounts. Unit 13' 2" long, 64" wide, 8' high.

6 **UNUSED 300 KW—240 VOLT DC WESTINGHOUSE LOW-PRESSURE TURBO-GENERATOR SET**

GENERATOR: 300 KW—240 VDC—1250 amps—1200 RPM. GEAR: 5286/1200—frame 6x15—serial 10A-2612-4. TURBINE: Frame C-325—225 PSI—397° TT—5286 RPM—Serial 10-A-2611-4. Wt. 16,700 lbs.—complete in original fatcory crate.

7 **WESTINGHOUSE 440/3/60 200 KW UNIT**

GENERATOR: Westinghouse 200 KW—250 KVA—450/3/60—1200 RPM—80% PF—with 40 KW—120 VDC on same shaft. GEAR: 9989/1200 RPM—double helical. TURBINE: Westinghouse—540 PSI—superheat 322°F. Test 930 PSI 800°TT. Also operates 615 PSI—850°TT.

6 EQUAL-TO-NEW LATE TYPE 500 KW SHIPS SERVICE TURBO GENERATORS

8

1962—DeLaval. Very little use. Completely preserved with rotors and diaphragms crated separately. TURBINE: DeLaval—585 PSI—840°TT—6-stage—6391 RPM—class CD—Also suitable 440 lbs.—740°TT—25" vac. GEAR: 6391/1200 RPM. GENERATOR: Allis-Chalmers—450/3/60. Totally enclosed, with static exciter and voltage regulator system. Weight 17,665 lbs. Complete with latest dead front switch gear. Also available are the condensers, circulating and condenser pumps. All very up-to-date, compact construction. Turbines will easily handle 600 KW if up-grading is desired.

9 **UNUSED 300 KW—120/240 VOLT DC G.E. TURBO-GENERATOR SET**

GENERATOR: 300 KW—120/240 VDC—1250 amps—1200 RPM. REDUCTION GEAR: 8.344:1—10012/1200 RPM—type S-182. TURBINE: DOR418N—449 H.P.—10012 RPM—working pressure 180/220 PSIG.

10

1250 KW G.E. 10-STAGE TURBO GENERATOR SET

TURBINE: 525—615 PSI—850°TT—7938 RPM—10-stage—type FSN. GEAR: Single helix—7938/1200. GENERATOR: 1250 KW—450/3/60/3600—.80 PF—type ATB with surface air cooler. Overload 25%—2 hours—1563 KW.

11

AP2 VICTORY WORTHINGTON-MOORE CROCKER-WHEELER 300 KW UNIT

TURBINE: 440 PSI—740°TT—28½" vacuum—type S4—5-stage—6097 RPM—serial 7547 & 7548. GEAR: 6097/1200. GENERATOR: 300 KW—120/240 volts DC—1250 amps—compound wound—973643—999759. Armature flange 8½"; B.C. 7"—12 holes. ALSO NEW ARMATURES IN STOCK & 300 KW SHUNT ARMATURES.

12

VICTORY 300 KW WESTINGHOUSE TURBO GENERATOR SET

440# — 740°F — 5930 RPM — 2A-9794-15-16-17 — coupling non-recessed on steam end of pinion—5¾". GENERATOR: Westinghouse 300 KW—120/240 DC—1250 amps—1200 RPM—C.B. 208.4.

UNUSED

CROCKER-WHEELER

500 KW

GENERATOR ENDS ONLY

120/240 VOLTS D.C.—1200 R.P.M.

FORMERLY USED WITH WORTHINGTON-MOORE TURBINES & GEARS

18 Upgraded by U.S. Navy—rewound in glass. Generator Frame and Armature—Marine 500 KW type 3-1200—dripproof enclosure—base mount. Modified from Crocker-Wheeler generator frame 152HD—240/120 volts DC—2083/521 amps—1200 RPM. Ambient temperature 50°C. APPLICATION: For C-4-SA1;C-4-SA-3;T-AP-134 vessels, using Worthington-Moore Turbine—Form S-6 and generator Form 14 x 10.

TURBINES & ROTORS

MAIN PROPULSION

14

19 STAGE WESTINGHOUSE H.P. ROTOR FOR AP2 VICTORY

Reconditioned—balanced—with ABS. Serial 4A-2079—type B—19 stage reaction blades. Excellent—just out of shop. 13" Flange diameter with 14 bolts.

SPECIAL!

15 **1 WESTINGHOUSE COMPLETE T-2 MAIN TURBINE**

PROFILE (UNSHROUDED)

6600 HP—435 PSI—750°F

28" VAC.—3720 RPM

Instruction Book 6893—Serial #2A-9361-21. The turbine rotor blades, stationary blading, diaphragms and nozzles are all in unusually good condition.

IMMEDIATE DELIVERY—WITH ABS

16 **8500 H.P. G.E. TURBINE**

G.E. Instruction book GEI16263—from ex-Navy Victory. L.P.—8-stage—3509 RPM—77943 H.P.—8-stage—6159 RPM—77942.

WILL INTERCHANGE WITH INGALLS C3 HULL—442 CLASS AND SUN-BUILT C4 VESSELS

17 **NEW L.P. BLADE RINGS**

for large 8500 H.P. Victory

Joshua Hendy Westinghouse

18 **NEW 8500 H.P. G.E. TURBINES**

Large Victory or Ingalls C3

L.P.—8-stage—3509 RPM—#72271
H.P.—8-stage—6159 RPM—#72272

ALSO AVAILABLE

U.S.M.C. RECONDITIONED SET

H.P. & L.P.

L.P.—8-stage—#77987—3509 RPM
H.P.—8-stage—#77994—6159 RPM
Interchange Ingalls C3

19

T2-SE-A1 MAIN PROPULSION ROTOR — G.E.

Large Schenectady — serial 77418—reconditioned Bethlehem Steel 1970—all stages magnafluxed.

20 **2 COMPLETE G.E. TURBINES**

#61818 and #61834—large Lynn—all stages magnafluxed.

WILL INTERCHANGE WITH ELLIOTT MAIN TURBINE

21 **8500 H.P. G.E. — C-3 OR VICTORY**

H.P.—8-stage—6159 RPM—serial 62043
L.P.—8-stage—3509 RPM—serial 62042
G.E.I. 16263

22 **6000 H.P. G.E. — NORTH CAROLINA C-2**

H.P.—8-stage—serial 78040
L.P.—7-stage—serial 78043
G.E.I. 16262

23 **VICTORY SHIP AP2 H.P. & L.P. TURBINES**

NEW — UNUSED — 6000 HP SETS

G.E.—H.P. & L.P.—with throttle valve
Westinghouse—L.P.—with throttle valve
Allis-Chalmers—H.P. & L.P.—with throttle valve

AUX. GEN. ROTORS AND ARMATURES

24 **250 KW & 300 KW ALLIS-CHALMERS ROTORS**

Typical serial No. 3067—will Interchange with most 250 KW & 300 KW Allis-Chalmers as Installed on Victory's and Moore C2-C3 vessels.

25 **300 KW 5965 RPM JOSHUA HENDY**

Turbine—3H-69	Gear—52269
Turbine—3H-52	Gear—52252
Turbine—3H-62	Gear—52262

AUX TURBINE ROTORS AND ARMATURES

26 **UNUSED—4 UNITS AVAILABLE**

T2 AUX. T2 TURBO GEN. ROTORS

DORV — 325M — 5645 RPM—for 525 KW G.E.

27 **ARMATURE**

Allis-Chalmers 300 KW armature — 120/240 volts DC—type MCW-213 (#138511-13819J generators).

28

G.E. 8500 H.P. REDUCTION GEAR FOR LARGE AP3 VICTORY & C3

MD-48A—8500 HP—6159/3509/763/85 RPM.

29 **ALSO 6000 H.P. VICTORY AP2 REDUCTION GEAR**

Westinghouse 4A-1640.

PUMPS

30

WORTHINGTON 16"x14"x18" VERTICAL DUPLEX STRIPPING PUMP

1400 GPM @ 110 PSI—suction lift 11.5 ft.—steam back pressure 15 lbs. 14" Suction — 10" Discharge — 2½" Steam — 4" Exhaust. Overall width 6'8"—Overall height 9'1½"—depth 3'9½"—wt. approx. 10,000 lbs.

31

NEW BLACKMER FUEL OIL TRANSFER PUMP

Rotary—50 GPM—50 lbs.—2"—5 HP—440/3/60—with starter & spares.

32

UNUSED BLACKMER VERTICAL ROTARY PUMP

4"—100 GPM—100 PSI—15 HP — 440/3/60 — gear head.

UNUSED AURORA PUMP

33 300 GPM—37' head—5 HP—120 volts DC Centrifugal Pump. Bronze—size 5x4—flanged. MOTOR: Reliance—super T.D.C. Electric Motor—5 HP—120 VDC—36.8 amps—1750 RPM—Frame L216A—with control by Cutler-Hammer. Excellent condition. Latest USN surplus.

34 **NEW TURBINE DRIVEN FIRE AND GENERAL SERVICE PUMP**

Allis-Chalmers 6x5 pump, type SKH—1200 GPM—125 PSI—3500 RPM. Coppos turbine type TF-22-2½ — 3500 RPM. 273#—50° superheat.

NAVAL VESSEL SECTION

FOR FLETCHER CLASS DESTROYERS

35

UNUSED DELAVAL 24.5 H.P. LUBE OIL PUMP

Turbine-driven main lubricating oil pumps — vertical rotary with horizontal worm geared turbine drive. 575# Steam pressure—5000 RPM—15# back pressure. GEAR: 5000/1035 RPM. PUMP: 550 GPM at 50 PSI—suction lift 10.0". Suitable for Fletcher Class Destroyer.

36

UNUSED SIZE 4 BUFFALO FEED PUMPS

Terry Turbine—BM—273 HP—550 RPM—exhaust 15 lbs—590 PSI—superheat 0°—425 GPM Buffalo Pump—discharge pressure 750 lbs—5" x 4"—built for USN DD destroyers.

37

UNUSED STEERING GEAR FOR ALL TYPES OF DIESEL & STEAM DESTROYER ESCORTS

Mfg by Hyde Windlass Co. Two 10 HP 440/3/60 1750 RPM gear motors driving 1500 PSI hydraulic pumps. TORQUE: 1,005,000 lbs.—7½" diameter plungers—two power units with hand gear attachments—replenishing tank—6-way valve—differential control, etc.

ENGINE ROOM COMPONENTS

SUITABLE FOR BETHLEHEM SPARROWS POINT HULLS SERIES 4400/4500

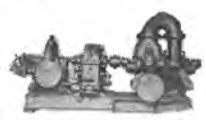
38 **COMPLETE TURBINE OR ROTORS ONLY**

For Sparrows Point Hull 4518 — 29,000 GTDW — 13,600 HP @ 109 RPM; 15,000 HP @ 112 RPM—585 lb. 840°TT—28½" vacuum **H.P. TURBINE**—4688 RPM—Mfg Bethlehem—1630-H-9—**L.P. TURBINE** 2625 RPM—Mfg Bethlehem—#1630-L-9.

39 **WESTINGHOUSE 400 K.W. SHIPS SERVICE GENERATORS**

400 KW (500 KVA)—80% PF—1200 RPM—450/3/60. TURBINE: 585 lbs—840°TT—28½" vacuum—9018 RPM—serial 10A4462-3 & 10A4462-4. GEAR: 9018/1200 RPM. A.C. GENERATOR: 500 KVA—400 KW—450 volts—641 amps—80%PF—3 phase 60 cycle—1200 RPM—CR 40°—excitation amps 41—excitation voltage 120. Instruction book 5442. Switchgear available.

40



2 TURBINE DRIVEN CARGO PUMPS

WESTINGHOUSE C-25 TURBINE—Ingersoll-Rand 10GT pumps—500 HP—single-stage impulse turbine—455 lbs—590°TT—4 PSI exhaust pressure—frame C-25—Westinghouse 4540 RPM. Rotation CC when viewed from governor end. GEAR: 4540/1750 RPM: 4500 GPM at 125 PSI head—type 10 GTM—bronze 2-stage—14" suction—12" discharge.

COFFIN CG-4A FEED PUMPS

41 Max. 325 GPM—1760' head or 750 lbs. Steam inlet 575 lbs.—540°TT—exhaust 20 lbs.—speed 760 RPM.

FIRE & BUTTERWORTH PUMPS

42 Warren Pump—450 gallons Per Minute—449 ft—71 HP—type 3-TL-2. TURBINE: 71 HP—545 PSI—540°TT—15 lbs G exhaust—3500 RPM.

SHARPLESS LUBE OIL PURIFIERS

43 350 GPM—75 ft discharge head—20 ft suction lift—type AE 15 V. 1½ HP—440/3/60—3450 RPM—40°C temperature rise.

44 **ANCHOR WINDLASS**

Hyde 2-11/16" — 12x14 — 100 PSI — steam — 54,100 lbs.

45 **INQUIRE FOR ALL OTHER ITEMS**

Forced draft blowers, reduction gear parts, bilge and ballast pumps, main circulators, general service pumps, F.O. transfer pumps, lube oil service, standby feed pumps, condensate pumps, aux. circulating pumps, feed water heaters, wash water pumps, etc.

46

ALLIS-CHALMERS WINCH CONTROL PANEL

50 HP—230 VDC. Consists of motor control, magnetic breakers and resistor bank.

MISCELLANEOUS

47

3-TON CLYDE DOUBLE DRUM WINCH

3-ton double drum winch—10 HP—115 VDC—declutchable drums—with controls.

48

UNUSED 1135 SQ. FT. C.H. WHEELER CONDENSER

20" Ex. inlet—⅝" Cu-Ni tubes—with or without air ejector.

49

UNUSED 70 HP McKIERNAN-TERRY WINDLASSES

2¾" Chain and two 10640 lb anchor & 30 fathoms chain @ 30 FPM. 70 HP—230 volts—shunt DC motors—233 amps—550 RPM—55°C rise. Wildcat centers 47½". Base 9'5" wide x 11' long. Weight 36,000 lbs.

50

NEW—UNUSED LINK BELT WINDLASS

1⅝" and 7000 lb. anchors. 56" Centers—50 HP—230 VDC—spares.

51

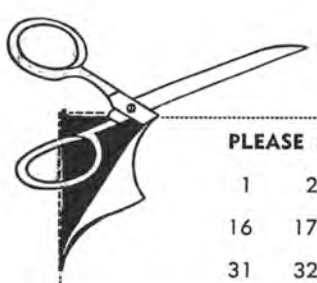
IDEAL WINDLASS—UNUSED

1-5/16" Chain—36" Centers—15 HP—115 VDC—1750 RPM—6000 lb. line pull.

52

DOUBLE INPUT—SINGLE OUTPUT DIESEL REDUCTION GEARS

Farrell-Birmingham — 3200 SHP. Reduction gear: 1.81:1—handles two 1600 HP diesels @ 720 RPM. With hydraulic couplings & Fawick clutch. Port and starboard. Gear output 400 RPM. Suitable for Dredge Pumps.



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46	47	48	49	50	51	52								

NAME..... COMPANY.....

ADDRESS..... POSITION..... PHONE.....

CITY..... ZONE..... STATE.....

24-Ft.-High Aluminum Superstructure Featured On MonArk Towboat

MonArk Shipyard has announced the delivery of their hull No. 4 to Pitmarine Corporation of Pittsburgh, Pa. The vessel, named Betty Lou, is now in service in the Pittsburgh area on river construction and barge switching.

Edward D. Fry, president of MonArk Shipyard, said that the Betty Lou is one of the stock vessels that will be built by the Pine Bluff, Ark., facility, a newly formed subsidiary of MonArk Boat Company of Monticello, Ark.

In order to obtain the desired eye level without sacrificing stability, the superstructure from the main cabin top up was constructed of .125 aluminum 5086 H-32 alloy. Although the operator has a 24-foot eye level, the weight above the main cabin top including double bunks, controls, instruments and operator, is less than 3,000 pounds. Mr. **Fry** explained that this cabin may be purchased as a separate unit for installation on existing vessels. Although other types of boats have used aluminum cabins, principally high-speed offshore vessels, this is believed to be a first such skyscraper version used on an inland river towboat. "The additional cost of the aluminum superstructure is offset quickly by the fact that the exterior was not painted and will never require paint," Mr. **Fry** said.

Aluminum tower on the Betty Lou affords the operator a 24-foot-high eye level for safe navigation when pushing high barges.

The Betty Lou is 41 feet long overall, by 15½ feet wide and 6 feet deep. She is powered by two Cummins NH-250 with 4.5:1 reduction gears turning an extra large blade cast steel 45-inch by 34-inch propellers. The propellers were custom built by Kahlenberg Brothers of Two Rivers, Wis., to MonArk Shipyard's specifications. The cold rolled shafts have stainless steel liners turning in BJ cutless rubber bearings. The engines are keel cooled with Fernstrum coolers and have dry exhaust using Maxim silencers. Special rock guards made of 4-inch O.D. x ½-inch wall pipe are provided under the vessel to protect the running gear and rudders when working around rock dikes and banks. The grounding gear is adequate to support the entire weight of the vessel and should it be necessary in a remote construction site, the owner would be able to simply drag the boat out of the water for any emergency repairs.

Zach McClendon Jr., president of MonArk Boat Company, reported that due to its rapidly expanding subsidiaries, MonArk was seeking additional new business and could offer quick delivery in either aluminum or steel boats. For more information concerning any of MonArk's products, write **Ron K. Echols,** marketing director, MonArk Boat Company, P.O. Box 210, Monticello, Ark. 71655.

Litton Names Warwick Corporate Controller

Grady W. Warwick has been appointed controller of Litton Industries, according to an announcement by **Joseph T. Casey,** Litton senior vice president for finance.

Most recently, Mr. **Warwick** was vice president, finance, for the Defense and Marine Systems Group, a post he has held since 1967. He succeeds **Wayne L. Grosvenor,** who has been named to the newly created position of corporate director of planning and analysis.

Mr. **Warwick** joined Litton in 1962. Prior to serving as group controller for Defense and Marine Systems, he had been director of finance at the Guidance and Control Systems Division. Mr. **Warwick** was graduated from Denver University with a bachelor's degree in business administration. He is a member of the Financial Executives Institute, and the National Association of Accountants.

General Dynamics Quincy Yard Elects Veliotis President

General Dynamics Corporation has announced new appointments for top management positions at its Quincy (Mass.) Shipbuilding Division.

P. Takis Veliotis, until recently president and general manager of Davie Shipbuilding Limited of Quebec, became president and general manager of the Quincy Division, effective January 4, 1973. He has also been elected a vice president of General Dynamics.

Peter J. Gwyn, former assistant general manager of Davie Shipbuilding, was named assistant general manager of the Quincy Division on the same date.

Lloyd Bergeson, a vice president of the corporation and currently general manager of the Quincy Division, has been offered another responsible position with a new division of the company. Mr. **Bergeson** started his career with General Dynamics in 1951 at the company's Electric Boat Division, and has been general manager of the Quincy Division since 1969.

Mr. **Veliotis** had been with Davie since 1953. Under his leadership, the company has become the largest and most profitable shipyard in Canada and a leader in the construction of large high-technology vessels. Davie, which employs about 3,000 people, is currently working on two 400-foot destroyer helicopter escorts for the Canadian Navy, and three 800-foot tankers for Greek shipping interests.

"We are very pleased to have these men with such outstanding records as shipbuilders and businessmen join General Dynamics," said **David S. Lewis,** chairman and chief executive officer, "and we are confident that they will contribute greatly to the growth and profitability of the Quincy Division."

Quincy has recently signed contracts totaling more than $270 million for three giant liquefied natural gas (LNG) tankers.

Mangone Ship Launches Offshore Supply Vessel For Petrobras (Brazil)

The Resplendor, a 185-foot offshore supply vessel under construction for Petrobras (the Petroleum Company of Brazil), is now being completed at Mangone Shipbuilding Company, Houston, Texas. Scheduled for delivery in February 1973, the ship was recently launched at the Braes Bayou Shipyard.

Don Godeau, vice president and general manager of Mangone, said the vessel is one of several now being constructed for foreign countries. The company has existing contracts with a Norwegian firm, as well as with the Brazilian company. Already well-known for ships built for U.S.-based firms operating in foreign waters, Mangone has also constructed a ship for a French company, as well as two vessels for another Norwegian firm.

The Resplendor will immediately go to the Brazilian offshore waters to work as a supply vessel for offshore rig and platform operations, Mr. **Godeau** said.

The ship has a 38-foot beam, a 16-foot depth, and a 13-foot draft. It will be powered by two EMD 16-645 E-5 engines, each with 2,875 horsepower. Two Detroit Diesel generator sets rated at 125 kw each will provide auxiliary power. Electronic equipment will include a radar unit, radiotelephone, recording Fathometer, and direction finder. Westinghouse Air Controls will be located in the pilothouse and aft station.

The Resplendor will have a cruising speed of 15 knots and a cruising range of 10,000 miles, with sleeping accommodations for 21 persons. The working capacity is 30 days.

The vessel has 120 feet of deck space, and is being especially outfitted with a 300-horsepower diesel-driven bow thruster. The stern of the ship is reinforced to accommodate a 60-inch-diameter stern roller. Six 500-cubic-foot cement tanks will be installed below deck.

Although the vessel will be operating in the Southern Hemisphere, Mr. **Godeau** said the Resplendor has been constructed to work under severe weather conditions and in heavy seas. With ships already working in every hemisphere, Mangone Shipbuilding Company is familiar with the specifications necessary for vessels to operate from the extreme cold weather conditions of the North Sea and the Alaskan Gulf to the much warmer seas of the Persian Gulf and Southeast Asia areas.

N.Y. Engineering Groups Discuss The Power Transmission System Installed On Euroliner Class Ships

At the recent joint meeting of the Society of Marine Port Engineers of New York and The Institute of Marine Engineers, Eastern U.S.A. Branch, held in New York City, features of the propulsion system of the Euroliner class of ships, not previously covered in detail, were discussed.

C.C. Schneiders, vice-president of Lips N.V. Propeller Works, described the design of the controllable-pitch propellers and **J.B. Kerpestein,** manager, Marine Gear Engineering, Machinery Division, Royal Schelde, presented details on the gearing and shafting. The four ships—Euroliner, Asialiner, Eurofreighter and Asiafreighter—were designed by John J. McMullen Associates of New York and built by Rheinstahl Nordseewerke of Germany. The four containerships are being operated by Seatrain Lines.

The gas-turbine propulsion plants of the first two ships were designed for 30,000 shp per propeller and the third and fourth ships have 35,000 shp per propeller. Each gas turbine was built by Turbopower and Marine Systems Inc. (formerly Pratt & Whitney Aircraft) and drives a Lips c-p propeller through a De Schelde gearing transmission. A great deal has been published on the ships and the gas-turbine propulsion plant so it was possible at this meeting for the authors to concentrate on the gearing transmission, the controllable-pitch propeller and associated equipment.

C. P. PROPELLER SYSTEM

With the mechanically highly loaded propellers involved, "Euroliner" and her sister ships are only a short step behind similar frigate and destroyer-type propulsion applications. The first series of naval ships equipped with all gas-turbine controllable-pitch-propeller combinations, having been ordered in early 1966, were recently commissioned to the Royal Canadian Navy. Orders for the propellers were given in February and June 1969.

Preliminary hydrodynamic design studies were conducted by the University of Michigan in 1968. The propellers were finally designed and tested by the Netherlands Ship Model Basin in close cooperation with Lips N.V. Several configurations of propeller positions were investigated.

One configuration was seriously considered, i.e. overlapping propellers. It is interesting to note that a ship with overlapping propellers was built in Germany in 1896.

The advantages were considered to be: better efficiency of the propellers; engine room located further aft and shorter in length, and short shafting, enabling the use of c-p propellers with the well-tried system of the push-pull rod.

It was finally decided to select the conventional twin-screw arrangement with long shafts for the following reasons: the gain in efficiency with overlapping propellers for this ship were considered too insignificant to run other risks among which were those connected with novel structural concepts; uneven dynamic loading of shafting and c-p propellers and risk of vibrations and interference phenomena for the overlapping arrangement, and superior steering properties for the conventional arrangement.

As could be expected, it appeared that the propellers were rather susceptible to cavitation. Considerable attention and additional design work and testing were required to ascertain cavitation free operation. Because of the danger for windmilling during crash-stop procedures, special consideration was given to the blade contour, rate of pitch change and propeller characteristics in off-design conditions. The remote-control system was programmed so as to avoid this effect. Simulations were made for various maneuvers with pitch reduction when risk of overspeeding the gas turbine exists.

It is clearly recognized that reliable c-p propeller systems, capable of high levels of performance, are primarily achieved as a result of continuous research and development of advanced component concepts over a period of many years, backed up by operational experience. C-p propeller systems of this power level and with this shaft length had not been built before, requiring extension of component technology. New design work had to be carried out, starting from evaluation of experience with previous systems through the establishment of new design criteria to verify test programs on components, equipment and the complete system. This resulted in a total effort of almost 10,000 manhours, including preparation of production drawings.

Photographed at the meeting, left to right, **C.C. Schneiders** and **J.B. Kerpestein,** authors of the papers; **Louis V. Minett,** chairman of papers and technical committee, Society of Marine Port Engineers, New York, N.Y.; **Joseph Thelgie,** Society chairman; **Philip A. Donahue,** president of the Society; **H.T. Haller,** past president of the Society; **Stanley G. Christensen,** chairman, Eastern U.S.A. Branch, Institute of Marine Engineers, **Robert E. Yohe,** secretary, Eastern U.S.A. Branch, and **Robert H. Imlah,** treasurer, Eastern U.S.A. Branch.

Various system concepts were being considered in the preliminary design phase, connected with the different propulsion configurations. The decision to apply the hub version with integrated actuating cylinder, rather than a push-pull rod with inboard cylinder version, was largely influenced by the very long shafting. Push-pull rod versions of similar power, though physically somewhat smaller, have been installed in naval ships. The coupling connecting the tailshaft to the tube shaft then has to transmit thrust, torque and the pitch-control forces in the rod. This would result in a sizable semi-detachable coupling, which could not be housed within the dimensions of the stern tube of the present ships. Consequently, an S.K.F. oil-injection-type muff coupling was selected as a component part of the c-p propeller installation with cylinder in the hub. This coupling only has to transmit thrust and torque. Yet, the S.K.F. coupling required was of a size beyond the existing range at the time and had to be specially developed.

Torsional characteristics were calculated as usual. Extensive elastic line calculations were carried out by Lips to optimize the bearing reactions. Whirling characteristics were calculated by the yard for various configurations. As a result, the aft part of the tailshaft had to be appreciably increased in diameter—five inches and eight inches respectively in excess of A.B.S. rules resulting in about 30 inches and 35 inches diameter respectively.

The servo-unit with follow-up hydraulic value is connected to an A.E.G. remote-control system. There are two modes, i.e.:

1. Sea mode, in which the gas turbine is power-house controlled. Shaft speed is free.

Shaft speed control cannot be accepted because of resulting thermal load variations at full rpm.

2. Maneuvering mode, in which pitch and shaft speed are maintained at present values. Fuel injection now is a dependent parameter.

In the sea mode, the shaft speed depends on temporary values of pitch and gas-turbine load. The dynamic values of pitch and load can result in unacceptable values of shaft speed, e.g. during windmilling.

Under those conditions, safety requirements must over-rule the control system. Therefore it is essential that an extra control loop is foreseen. During a crash-stop maneuver, when windmilling will cause the tendency for the shaft speed to become excessive, this control loop ensures that pitch is reduced stepwise. All critical maneuvers were simulated on the computer. Figure 1 shows results of simulations with various control sequences at two rates of pitch change.

Conclusions

1. C-p propeller systems of this power and size are practical. They perform very well in all circumstances and respond perfectly under maneuvering and under sea conditions.
2. There is every reason to believe that larger units can be designed, built and installed.
3. In order to be able to build larger systems, sufficient know-how, experience and engineering back up must be available.
4. Overall design success of such a venture can only be achieved by cooperation of all principals involved.

TRANSMISSION SYSTEM

The layout of the transmission system can be understood from Figure 2. In the diagram where pinions and gear wheels are shown by circles it can be seen that the gearing transmission is of the single-input double-reduction locked-train type. This implies that the high-speed pinion, which receives its power from the gas turbine, meshes with two high-speed

(Continued on next page)

Power Transmission System On Euroliner Class Ships–

gear wheels, each of these driving a low-speed pinion, meshing with the low-speed gear wheel.

This arrangement of pinions and gear wheels, sometimes referred to as divided-power transmission or dual-torque-path transmission or dual-tandem arrangement, provides for a split up of the input power in two halves, each half being transmitted by its associated high-speed gear wheel and low-speed pinion to the low-speed gear wheel.

The advantage of this is that each tooth engagement has to transmit only half of the gear input power and accordingly pinions and gear wheels can be kept small. Although this arrangement requires one high-speed gear wheel and one low-speed pinion in excess of the number of gearing elements required for single-tooth engagement, the net effect of this division of power on the gearing transmission as a whole is that its size and weight are reduced to a minimum.

Figure 2 also shows the rotating elements of the propulsion system, however without the propeller. The power of the free turbine, this being a two-stage reaction unit, is transmitted to the gearing transmission by a tube shaft, a diaphragm type coupling and the so-called primary gear intermediate shaft. From the forward end of this shaft a fraction of the gear input power is transmitted to the attached generator through a solidly coupled generator drive shaft running through the hollow-bored high-speed pinion and a double-flexing diaphragm-type coupling.

The primary-gear intermediate shaft carries at its forward end a fine tooth-type clutch by means of which the propulsion train can be engaged to and disengaged from this shaft. When engaged, the propulsive power flows through this clutch and the high-speed pinion to the other gearing elements, and ultimately to the propeller. When disengaged the gas-turbine power is transmitted to the generator only. So when the ship is in port, electric power can be generated by the prime mover with the propulsion system at rest. This might be the case when the electric power supply from the shore connection or from the on-board diesel generator should fail. For the sake of clearness in Figure 2, only one of both high-speed gear wheel—low-speed pinion assemblies is shown and drawn out of its true position.

The low-speed gear wheel shaft carries at its forward end the main thrust collar, the main thrust bearing being incorporated in the forward gearbox structure. A shaft brake is installed in the line shafting directly aft of the gearing to assist in an adequate propulsion system response to cover the man overboard and line in the propeller situations.

The design K factors are 160 for the high-speed gearing and 120 for the low-speed gearing. The high-speed gearing and the low-speed

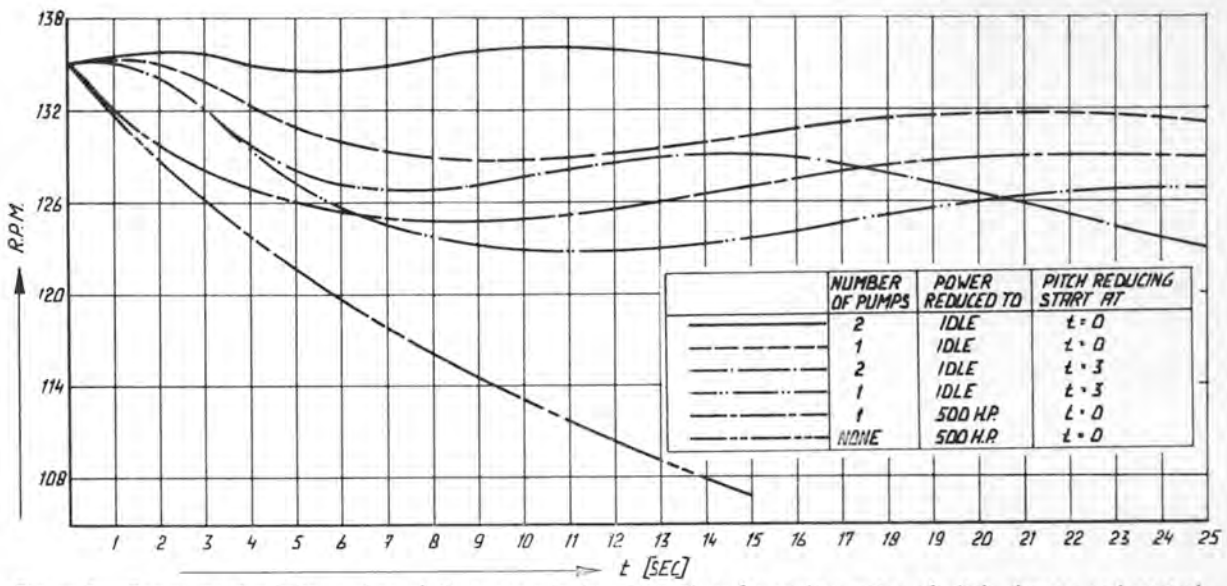

Figure 1—Computer simulations of revolutions per minute versus time for various rates of pitch change and control.

gearing loads under full power being 7918 and 7736 lbs/sq. inch respectively (unit load = tooth load per inch of face times normal diametral pitch). The high-speed and low-speed gear wheels comprise fabricated structures shrunk on their shafts. In addition to the cylindrical shrink-fit dowels have been provided to increase the torque capacity of this connection.

The main thrust bearing incorporated in the forward end of the gearbox structure is designed to withstand a free running thrust load of 150 tons and a bollard pull load of 220 tons.

As shown in Figure 2 the power turbine is connected to the gearing by means of a tube shaft, the coupling between power-turbine rotor and tube shaft being of the diaphragm type and having some degree of flexibility. Between the cold stand-still condition and the hot operating condition the free end of the tube shaft moves through some 0.3 inches due to thermal growth of the turbine components involved. This value dictated largely the type of coupling to be selected for the connection of the tube shaft to the gearing.

Another requirement that meant a severe restriction in the number of suitable coupling types was the fact that under no circumstances could the axial external load on the power-turbine tube shaft, or rather on the power-turbine bearings, be allowed to exceed 1,000 lbs. The turbine-side tube-shaft coupling has some flexibility that works beneficially in this respect but its flexibility value is vastly insufficient to be of any appreciable help and hence the requirements on the gear-side tube-shaft coupling were really severe.

These requirements could be met with by a diaphragm-type coupling of Bendix manufacture. This coupling comprises essentially two diaphragms that are welded together at their inside diameters by electron beam welding. The diaphragms are relatively thin and made of a high tensile steel; they are not allowed to be scratched or dented because of the hazard of the consequent stress raising effect. During cold installation the coupling is stretched through some 0.15 inches and when under full-power operating conditions the coupling is compressed through 0.15 inches relative to the free unloaded condition. In this way the axial elastic reaction force could be kept below 1000 lbs. under all operating conditions, including cold stand still.

The Bendix coupling together with the turbine-side diaphragm-type coupling and the tube shaft constitute an articulated drive which makes this power transmission relatively insensitive to parallel offset shaft misalignments of the power turbine to the gearing.

The generator drive also comprises basically this feature because in this shafting a double-flexing spacer-type diaphragm coupling is provided.

Conclusion

These gearing transmissions have been manufactured at De Schelde to the firm's normal high standard of precision. All tooth generating processes and other final machining operations of critical areas, i.e., gear-case bearing bores, have been performed under constant temperature conditions in a temperature-controlled gear machining shop.

Not only these compact units but also the largest De Schelde gearing transmissions, for instance those for VLCCs, are shipped completely assembled. This means that time consuming, costly and hazardous dismantling and reassembly operations under anything but clean conditions are avoided.

Up to date, the service record of the transmission systems of these vessels has been excellent. This may be attributed to the excellent and close cooperation that existed between the owners, Pratt & Whitney Aircraft (now Turbopower and Marine Systems Inc.), Rheinstahl Nordseewerke and De Shelde during the design and the manufacture of these transmission systems.

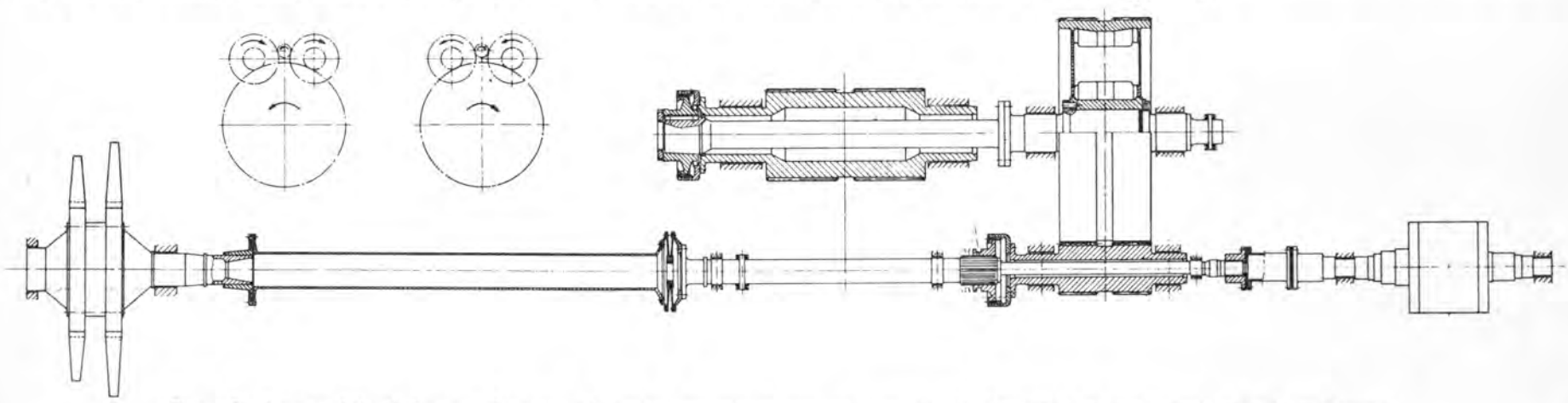

Figure 2—Layout of the high-speed elements and gearing transmission rotating parts for the Euroliner-class containerships built in Germany.

NEW VLCC REPAIR BERTH IN GENOA HARBOR: O.A.R.N. and CNTR Repair Yards of Genoa, Italy, are now completing a new ship repair pier for VLCC tankers. The new pier, shown above, is approximately 984 feet long and 82 feet wide. The pier will be fitted out with two 50-ton gantry cranes and will provide necessary shore services. The pier is unique, as it was constructed ashore in concrete sections and then fitted in place in deep water. The new pier will be able to accommodate three VLCC tankers at one time. The Port Authorities are also building a new floating drydock to accommodate the VLCC tankers.

NKK STANDARD DESIGN: The Spraynes, a 21,000-dwt standard design bulk carrier, has been delivered to Tenax Steamship Co., Ltd. of the U.K. by Shimizu Yard of Nippon Kokan (NKK), Japan's only integrated shipbuilder-steelmaker-fabricator. The vessel is the second of four sister ships ordered from NKK by Tenax. The first, Saltnes, was delivered at the same yard in August 1972. Keel for the third ship was laid at Shimizu in November 1972. NKK has also received orders for two similar vessels from H. Clarkson & Co., Ltd., also of the U.K. The first vessel, Swiftnes, was delivered in May 1972. The second vessel, Sealnes, was launched at Shimizu in November 1972. Construction of the vessels is based on a standard design developed by NKK's Shipbuilding Division. Main particulars are: length overall, 510.33 feet; length between perpendiculars, 478.01 feet; breadth molded, 75 feet; depth molded, 43.96 feet, and a draft of 32.18 feet. Her main engine is a NKK-S.E.M.T. Pielstick 18PC2-2V400, with an output of 8,860 shp at 130 rpm (attend of decelerator). The service speed is 16.3 knots.

Philadelphia Section SNAME H
A New Class Of Coastal Rese

Shown at the presentation of certificates of appreciat left to right: Dr. **William S. Gaither,** meeting coordir **Walter G. Neal Jr.,** co-authors **Jeffrey Derrickson,** and Dr. **Anthony Inderbitzen,** and Section vice chairma

A paper entitled "A New Class of Coastal Research Vessels," co-authored by Dr. **Thomas D. Myers** and Dr. **Anthony L. Inderbitzen,** both of the College of Marine Studies, University of Delaware, and **Jeffrey K. Derrickson,** of Sun Shipbuilding and Dry Dock Company, was presented at a recent meeting of the Philadelphia Section of The Society of Naval Architects and Marine Engineers.

Mr. **Derrickson** presented the paper, which traces the significant developments of oceanographic research vessels over the past 25 years and addresses the problem of finding a worthy, but economical, vessel for coastal operations. Dis-

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Nilo Barge Line Names M.E. Midgley President

Myrle E. Midgley

Myrle E. Midgley has been named president of Nilo Barge Line, Inc. He formerly was executive vice president.

Nilo Barge operates general purpose barges transporting bulk commodities on inland waterways, principally on the Mississippi, Missouri, Illinois, Ohio and Delaware Rivers and in the Gulf of Mexico and the Gulf Intracoastal Waterway. Its headquarters are in the Pierce Building at 112 North Fourth Street, St. Louis, Mo.

Mr. **Midgley** has had many years of experience in the barge transport field. He began his career in 1937 at the terminal of Federal Barge Lines and was the line's assistant operating manager when he moved to Monsanto Company in 1956 as supervisor of water transportation. He joined Nilo in 1963.

Mr. **Midgley** is a graduate of Washington University in St. Louis, with a B.S. degree in mechanical engineering. He holds a chief engineer's license in the U.S. merchant marine. He is a member of The Society of Naval Architects and Marine Engineers, the Scientific Research Society of America, and The Propeller Club of the U.S.

U.S. Merchant Marine Service Organizations Form Working Affiliation

United Seamen's Service, which provides home-away-from-home facilities for seamen in foreign ports, and the American Merchant Marine Library Association have formed a working affiliation.

At an executive committee meeting held recently, **Edward J. Heine Jr.**, president of USS, who also heads up United States Lines Company, said: "This new association would greatly benefit all merchant seamen by providing extensive programs both at home and on board ship."

Mrs. George Emlen Roosevelt, chairman of the board of the American Merchant Marine Library Association, said: "This extension of activities overseas would provide the continuing and invaluable service for the men who sail this country's merchant ships."

AMMLA, sometimes called the "Public Library of the High Seas," which provides ship and shore library service to American-flag vessels, is a nonprofit organization chartered by the New York State Board of Regents in 1921. Since its chartering, AMMLA has provided more than 17,000,000 books and magazines to some 71,000 ships. Its support comes from funds and the contribution of books.

United Seamen's Service, which marked its 30th anniversary this year, is the only voluntary American agency that provides health, welfare and recreational services to American seamen in foreign ports. It is supported by united community funds across the country.

24 Ships Ordered In Three-Week Period From Gotaverken Yards

New orders for 24 ships worth a total of about $600,000,000 have been received by Sweden's Gotaverken shipbuilding group within the last few weeks of 1972. This brings the company's order books to 42 vessels aggregating 5.7-million deadweight tons.

The orders include a series of 15 tankers, each of 140,000 dwt, and three OBO ships of 122,500 dwt. An order for three additional OBO ships may well be confirmed within the near future, Gotaverken says.

The orders came from companies in England, Finland, Norway, and Sweden, it is stated.

All the new ships are to be equipped with Burmeister & Wain diesel engines type K90GF, built at Gotaverken's engine workshops in Goteborg.

Gulf Marine Dept. Transferred To Gulf Oil Trading (GOTCO) —Hoskins And Brodhead Named

The marine department of Gulf Oil Corporation has been transferred to Gulf Oil Trading Company (GOTCO), a wholly owned subsidiary, effective January 1, 1973. Two appointments associated with this shift were also made known.

R.I. Hoskins has been named GOTCO vice president, marine operations, to head the department at its Philadelphia headquarters. Mr. **Hoskins** was GOTCO's vice president, international sales, in Pittsburgh.

W.C. Brodhead was also named a GOTCO vice president, responsible for marine industry and Government relations, while concurrently continuing as vice president of Gulf Oil Corporation and marine advisor to the corporation.

Mr. **Hoskins** became a marine design engineer for the corporation in New York City in 1955 and later held a variety of marine management positions in New York and in the Pittsburgh executive offices. He was assigned to Gulf Oil Trading Company in 1968, and became vice president, international sales, for GOTCO earlier last year.

Mr. **Hoskins** is a native of New Orleans, La. He received a bachelor of science degree in mechanical engineering from Louisiana State University in 1944, and a master of science degree in mechanical engineering from Massachusetts Institute of Technology in 1948.

R.I. Hoskins

W.C. Brodhead

Mr. **Brodhead** joined the New York marine department in 1929 and was named manager of costs and economics there in 1955. In 1958, he was appointed marine performance coordinator and in 1960, was transferred to the Pittsburgh executive offices as departmental coordinator in the transportation department. He returned to New York in 1961 as manager of the marine department, and in 1967 was elected a vice president of the corporation.

Mr. **Brodhead** is a native of New York City and a graduate of the Mechanics Institute of New York.

Conoco Elects Nicandros VP Transportation And Supplies

Constantine S. Nicandros has been elected a vice president of Continental Oil Company, Stamford, Conn., with responsibilities for transportation and supplies in the company's Eastern Hemisphere Petroleum Division, it was announced by **John E. Kircher,** division president. He succeeds **Jarvis B. Cecil,** who has been elected an executive vice president of Consolidation Coal Company, a wholly owned subsidiary of Conoco.

At the time of his election, Mr. **Nicandros** was general manager of transportation and supplies, a position he held since May 1971. He joined Conoco in 1957 as a research associate in the coordinating and planning department in Houston. In 1961, he was transferred to New York and in 1965, was named acquisitions representative in exploration and production for Conoco's international operations. In 1966, he became director of economic planning for the division.

Born in Port Said, Egypt, Mr. **Nicandros** is a graduate of the University of Paris (France) Law School, and Ecole des Hautes Etudes Commerciales, also in Paris. In addition, he holds an M.B.A. degree from Harvard School of Business Administration.

New York SNAME Discusses Integrated Tug-Barge Systems At Joint Meeting With Society Of Marine Port Engineers

Shown at the joint meeting, left to right: **Edward F. McCann II,** Westinghouse Electric Corp., discusser; **I. Hilary Rolih,** George G. Sharp Co.; **Nicola F. Pergola,** executive committee, New York Metropolitan Section SNAME; **Charles W. Wilson,** Section chairman, **Robert J. Tapscott** and **Robert P. Giblon,** authors; **Edward English, Louis V. Minett,** and **Philip A. Donahue,** N.Y. Port Engineers; and **Donald B. Carpenter, vice chairman,** N.Y. Section.

The annual joint meeting of the New York Metropolitan Section of The Society of Naval Architects and Marine Engineers and The Society of Marine Port Engineers New York, N.Y., Inc. was held on December 12, 1972, at the New York Times Building in New York City.

After a social hour and buffet in the Executive Dining Room, the technical session was held in the WQXR Auditorium, where a paper was presented entitled "Design and Economics of Integrated Tug-Barge Systems," by **Robert P. Giblon** and **Robert J. Tapscott** of George G. Sharp Co.

The paper discusses the reason for the current interest in integrated tug-barge and outlines their history leading up to current developments in such designs, citing specific examples. Propulsion plants are discussed and single-screw and twin-screw propulsion systems are compared.

The paper discusses a number of applications, both commercial and military, for which integrated tug-barge systems would be particularly suitable because of the flexibility offered by the detachable, interchangeable power plant (tug), and the relative lower first cost and operating cost as compared to a ship; the relative economics of tug-barge tankers operating under U.S. flag on two services—one, an international route and the other, a domestic service.

Radiomarine Floating Exhibit Embarks On Year-Long Tour

The converted 43-foot houseboat is outfitted with more than $50,000 worth of new radar systems and other communications and navigation aids made at Radiomarine's Red Bank, N.J. plant.

An unusual floating demonstration laboratory has been outfitted by Radiomarine Corporation to show off its new line of radar and communications systems.

The vessel, a converted 43-foot houseboat, recently departed Red Bank, N.J., on a year-long tour of some 20 seaports along the Atlantic and Gulf Coasts.

During the port visits, scores of shipowners and captains and other marine industry figures will be invited aboard to inspect the new equipment and observe it in actual operation.

Radiomarine technicians have installed aboard the vessel more than $50,000 worth of new radar systems, communications units and navigation instruments which the company produces at its Red Bank plant. A subsidiary of Electronic Assistance Corporation, Radiomarine—founded in 1927—is one of the nation's oldest manufacturers of marine navigation and communications equipment. It is also the only American company which supplies large screen radar to oceangoing vessels in the merchant marine.

Richard D. Durrett, Radiomarine sales manager, will be in command of the demonstration ship, and will be assisted by company electronic specialists and by regional sales and service personnel.

C. Webber Parrish, Radiomarine vice president and general manager, will also be present at a number of the port visits. Mr. **Parrish** himself conceived the idea for the novel demonstration and tour.

"We believed the most dramatic and practical way to present our new radar units and other marine equipment was to take it out and show it in action," Mr. **Parrish** explained.

He said that prospective customers at each port would be taken on short cruises so they could inspect the equipment and try it out under actual operating conditions.

New Radiomarine products on display aboard the floating exhibit are a 16-inch radar system for the world's largest oceangoing vessels, a smaller radar unit suitable for tugs, fishing boats, river freighters and similar commercial vessels, several types of radio telephones, short wave, single sideband radio transceivers, automatic loran navigation equipment and hand-held two-way radios.

E. Scott Dillon, John J. Nachtsheim To New MarAd Posts

E. Scott Dillon, former Chief of the Maritime Administration's Office of Ship Construction, has been named Assistant Administrator for Operations.

According to Assistant Secretary of Commerce for Maritime Affairs **Robert J. Blackwell,** who heads the agency, the Silver Spring, Md., resident replaces **Ludwig C. Hoffmann,** who is retiring after 40 years of Federal service.

A veteran of 34 years with the Maritime Administration and its predecessor agencies, Mr. **Dillon** headed up the agency's ship construction office for the last two years. That position will now be filled by **John J. Nachtsheim,** who has been involved in the agency's research and development program for the last three years.

Mr. **Dillon,** who joined Maritime as an Associate Naval Architect in 1938, was graduated from the University of Illinois in 1932, with a degree in civil engineering. In the intervening years, he worked for the Pusey and Jones Shipbuilding Corp., Wilmington, Del., and the Philadelphia Navy Yard.

He was awarded a law degree by George Washington University in 1948.

In his new position, Mr. **Dillon** will be responsible for overseeing the agency's programs concerning ship construction, the development of U.S. ports and intermodal transport capabilities, the promotion of the American domestic shipping industry, and emergency shipping operations.

Mr. **Nachtsheim** joined the Maritime Administration in 1970 as Deputy Assistant Administrator for Research and Development, following a 22-year civilian career as a naval architect with the U.S. Navy.

During his Navy career, Mr. **Nachtsheim,** who also lives in Silver Spring, rose to become Chief Naval Architect of the Naval Ship Engineering Center.

He went to work for the Navy in 1947, following graduation from the Webb Institute of Naval Architecture. Like Mr. **Dillon,** he holds a law degree from George Washington University.

His new duties as Chief of the Office of Ship Construction focus on supervising merchant ship construction in U.S. shipyards under the agency's construction-differential subsidy and ship mortgage insurance programs.

The personnel changes, Mr. **Blackwell** pointed out, were necessitated by the retirement of Assistant Administrator for Operations **Hoffmann.**

A McLean, Va., resident, Mr. **Hoffmann** is a graduate of the Massachusetts Institute of Technology. He joined the Maritime Administration in 1938, after having worked for the Navy as a marine engineer for four years, and was appointed Chief of the Office of Ship Construction in 1957. He was named Assistant Administrator in 1969, when that position was created in an agency reorganization.

In announcing Mr. **Hoffmann's** retirement, Mr. **Blackwell** noted that he was instrumental in achieving the shipbuilding gains that have been made in the last two years under President **Nixon's** maritime program.

"As head of the agency's ship construction program, **Lud Hoffmann** played a pivotal role in arranging the $1.7 billion in shipbuilding contracts that have been awarded so far under the program, and these contracts are largely responsible for the fact that U.S. shipyards today have the greatest backlog of merchant ship orders in their peacetime history," Mr. **Blackwell** said.

Marconi International Appoints K. Pope— R.A.H. Penny Retires

Marconi International Marine Co., Ltd. has announced the retirement of **R.A.H. Penny** as London sales manager, effective December 31, 1972.

Mr. **Penny** has been succeeded by **K. Pope,** who was appointed deputy London sales manager in October of 1972.

Hisashi Shinto Elected New President Of IHI

Hisashi Shinto

IHI (Ishikawajima-Harima Heavy Industries Co., Ltd.), Japan, has elected a new president. According to the announcment made by IHI, **Renzo Taguchi,** president, and Dr. **Hisashi Shinto,** executive vice president, were promoted to chairman of the board of directors and president, respectively.

The new president, Dr. **Shinto,** is a graduate of the naval architecture department of Kyushu Imperial University, and joined the Harima Shipbuilding & Engineering Co., one of the predecessors of the present IHI, in April 1934. In August 1951, he resigned from the company to assume a post at National Bulk Carriers, Inc. (NBC) of the United States, and five years later returned to the Harima Shipbuilding & Engineering Co. Dr. **Shinto** was named managing director of IHI in November 1960, when the Harima Shipbuilding & Engineering Co. merged into IHI, and was then appointed to the post of representative director and executive vice president of IHI in November 1964.

Dr. **Shinto** is well-known as the developer of an economical ship hull form known as "Keizai Senkei" in Japanese shipping and shipbuilding circles. He also introduced the idea of the ready-made system into the field of shipbuilding long monopolized by specific orders. The IHI mass-produced Freedom and Fortune ships are the fruits of his own unique ideas. Dr. **Shinto** has made great contributions to the establishment of IHI's leading position among the world's shipbuilders.

IHI has recorded one of the most spectacular growth rates of all Japanese firms in the past 20 years. Dr. **Shinto** is expected to achieve a period of stabilized growth for IHI by bringing to full fruition the company's spectacular performance in the past.

Brown & Root Charters Vessels From Acadian For North Sea Service

Acadian Marine Service, Inc., New Orleans, La., has recently been awarded a charter for two of its Freedom Class tug/supply vessels by Brown & Root S.A. These vessels will operate in the North Sea, being used primarily to haul pipe for Brown & Root's pipelaying operations in the Forty's Field in the United Kingdom Sector of the North Sea.

Powered by Nohab Polar F engines, the 170-foot Freedom Class vessels have exceptional power, speed and seakeeping ability. Four additional Freedom Class vessels will be built in 1973.

Acadian Marine is an international marine transportation company which owns approximately 50 vessels that serve the international oil field and construction industries.

A.G. 'Weser' To Build 380,000-Ton Tankers For Colocotronis Group

Two 380,000-ton tankers costing some $100 million have been ordered from the A.G. "Weser" yard at Bremen, Germany, by the fast-expanding Greek-based Colocotronis group.

Minos Colocotronis, announcing the order, said: "We selected this size of vessel very carefully, believing it to be the right size for this decade. Being limited by draft, we chose the optimum deadweight which would give maximum earning capacity and more flexibility for both charterers and operators."

The two 16-knot VLCCs (very large crude carriers) are to be known as "Europe-Tankers," and will be the largest such vessels ever built outside Japan. They are scheduled for delivery in 1975.

Arnessen To Represent Skuteng Oil Skimmer In The U.S.

Skuteng A/S of Norway has appointed Arnessen Marine Systems, Inc. New York as United States agents for their self-propelled oil skimmer, as well as the oil booms also manufactured by Skuteng.

The Skuteng Oil Skimmer is specially designed for collecting oil from the water surface. The vessel, however, is also capable of cleaning up debris in harbor areas and can also be used as a fireboat. The vessel has four wing tanks having a total capacity of 10,000 liters. The oil is pumped from the collecting sump to the wing tanks by means of two pumps. The pumps are driven by the main engine via a central transmission unit, which enables the pumps to be engaged and disengaged as required when the engine is running. The hydraulically operated bow gate increases the width of the skimming inlet to approximately 4.8 meters when in fully open position.

The hydraulically controlled skimming gate behind the bow adjusts the thickness of the layer of water and oil that is drawn into the vessel.

Two weirs in front of the oil sump prevent larger solid bodies from being drawn into the oil sump. The oil sump has two outlets, one for each pump, in front of which there are two weirs to prevent solid particles being drawn into the pump. Furthermore, there is a suction strainer in front of each pump in the engine room. The pilothouse has been made gas tight because of the gas danger when skimming crude oil. It is, however, detachable from the oil skimmer for transport by helicopter.

All instruments and control arrangements are located on a panel forming an extension of the engine room bulkhead. The bow gate and skimming gate can be operated from the steering house. It is possible to equip the engine room with a pressurizing system to maintain a slight pressure. The fresh air is drawn into the engine room and pilothouse through a telescopic inlet 3.6 meters above water surface. Exhaust is discharged at the same level. Two floating tanks in front of the vessel, together with the engine room and the hollow keel, give satisfactory updraft.

The oil skimmer has proved its capability by cleaning up a large oil spill in a Norwegian refinery when 170 tons of crude oil were collected in six working hours.

Detailed information on the Skuteng Oil Skimmer, as well as the Skuteng Oil Booms, can be obtained from Arnessen Marine Systems, Inc., 55 West 39th Street, New York, N.Y. 10018.

Vessel Management Firm Opened In Philadelphia

Capt. **J.A. Engelbrecht,** formerly vice president of Mathiasen's Tanker Industries, Inc., has announced the formation of Integrity Shipping Company, specializing in the ocean transportation of liquid natural gas, petroleum products, chemicals, and grain. The firm has established offices at 817 Mall Building, Philadelphia, Pa. 19106, and commenced operations this month.

TMT Shipping & Chartering Appoints F.L. Jordan Manager Operations/Agency Department

TMT Shipping & Chartering, Inc., headquartered in Houston, Texas, has announced the appointment of **Freddie L. Jordan** as manager of the company's Operations/Agency Department. Mr. **Jordan** has been in the shipping business for over 20 years, and in his new capacity will be responsible for all of the company's operations, agency and consignment vessel activities.

TMT's subsidiary company, TMT Marine Equipment Sales, Inc., specialize in the sale and purchase of all types of commercial marine equipment ranging from inland/offshore tugs, barges, floating contractors equipment to dry cargo vessels and tankers, both American and foreign-flag. The parent company are worldwide marine transportation consultants, shipbrokers/chartering agents and steamship agents.

Mowbray Marine Enterprises in New York are Eastern representative for both companies.

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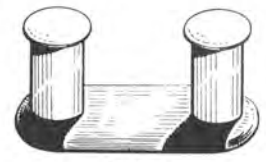
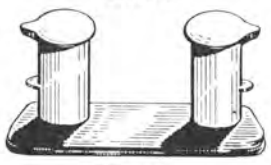


STYLE A



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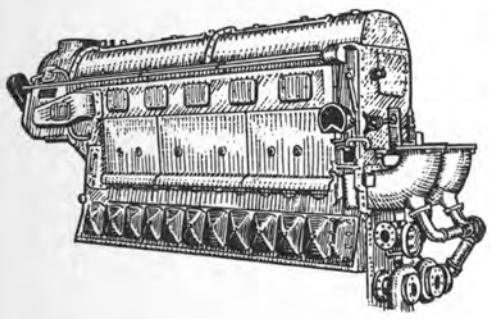

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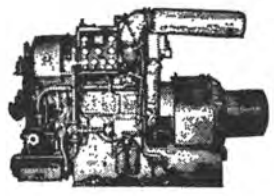
MARINE DIESEL GENERATORS



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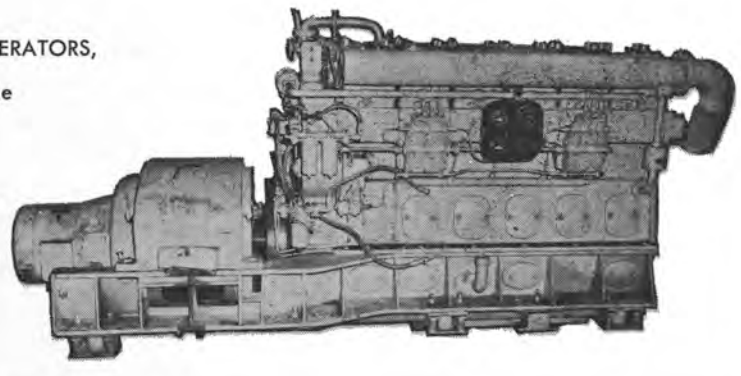
For TURBINE GENERATORS,
See Following Page



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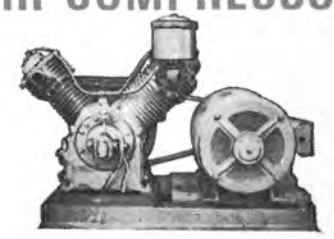

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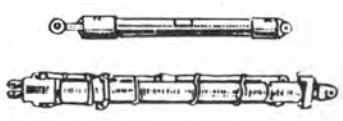
HYDRAULIC CYLINDERS



Bore	Overall Stroke	Rod Diameter	retracted length	Action
10"	12"	3.75"	45½"	double
10"	26"	3.75"	58½"	single
2"	8"	1½"	20"	double
2.5"	15"	1.12"	25½"	double
3"	8"	1.37"	1-5½"	double
6"	8'	4"	144"	double

SPERRY GYRO COMPASSES

SPERRY MARK 14, Model 1 Gyro Compasses, used, good, complete with Master Compass, with Binnacle, Amplifier panel, control panel, carbon pile voltage regulator, motor generator set, alarm panel, and repeaters with mounts.

AXIAL FLOW FANS

Rebuilt Guaranteed LaDel, STURTEVANT etc.

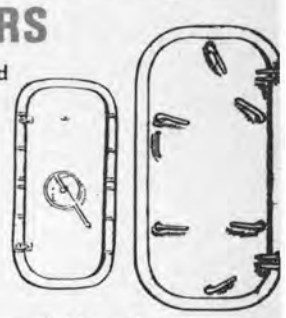
In 440 AC, in 115 DC, and in 230 DC, and i nsizes 1 HP through 20 HP. Completely reconditioned.

EXAMPLE LISTING:

Size A¼	**Size A3**	**Size A8**
Size A½	**Size A4**	**Size A10**
Size A1	**Size A5**	**Size A12**
Size A2	**Size A6**	**Size A16**

Steel Watertight DOORS

Used, Good Condition, Trimmed Frames.



Many sizes available, priced reasonable. Some Typical Prices shown below. Please Inquire for other sizes.

26"x48"-4 Dogs-**$60.00 ea.**
26"x57"-6 Dogs-**$80.00 ea.**
26"x60"-4 Dogs, 6 Dogs-**$86.00 ea.**
26"x66"-6 Dogs, 8 Dogs-**$100.00 ea.**
26"x66"-Q.A. Type-**$175.00 ea.**

REDUCTION GEARS

DE LAVAL Reduction Gear from S/S Texas a C3M ship, Type Double Reduction, 8500 HP size, HP Pinion 5015 RPM, LP Pinion 3461 RPM, low speed gear, 85 RPM.

WESTINGHOUSE Reduction Gear from S/S Montrose, an AP3 ship, size 8500 HP, Gear RPM 85, HP Pinion 5238 RPM, LP Pinion 4422 RPM.

FARREL-BIRMINGHAM, as orig. used on two 1375 HP electric motors in submarine, 2 pinions, single output gear, pinion RPM 1302, Gear RPM 280; ratio 4.65:1.

WESTINGHOUSE, as orig. used on two 1362 HP electric motors in submarine, 2 pinions, single gear.

FALK Reduction Gears—Port & Starboard, Interchangeable with T-3 Tanker Gears, Falk No. 148-300. Also interchangeable with Falk Gears on AO51 Class Tankers (14 ships). Also on AO97 to AO100 Tankers.

PROPELLER SHAFTS

From C3M Vessel
From C3-S1-A3 Vessel,
C2-S-B1 Vessel (Moore Built,
AP2 & AP3 Victory
and Liberty Ships

Fast Service
on any and all inquiries

ZIDELL EXPLORATIONS, INC.

Contact: Ralph Ingram
3121 S.W. Moody · Portland, Ore. 97201 · Phone 503/228-8691 · Telex: 36-0503

CAPSTAN WINDLASSES

Model CWP-3, Vertical 24" Planetary Capstan Windlasses, Single Wildcat — using 1¼" Anchor Chain, Single Gypsy with 20 HP motor, 230 volts DC, complete with Contactor Panel, Master Switch, and Resistors.

3—HESSE-ERSTED VERTICAL, Single Wildcat—for 1⅜" Anchor Chain, single gypsy, with 35 HP General Electric Motor, 230 Volts DC, complete with Controller equipment.

HYDE, VERTICAL, Single Wildcat, for 1⅛" Anchor Chain, single gypsy, with 20/5 HP Motor, 440/3/60.

ANCHOR WINDLASSES

1—LIDGERWOOD horizontal Anchor Windlass, double wildcat—for 2 1/16" Chain, double gypsy, with 50 motors, 230 volts, DC, complete with controls.

1—HORIZONTAL, of German Mfg., double wildcat—for use with 3" anchor chain, double gypsy with 230 VDC motor, complete with electrical control equipment.

AMERICAN ENGINEERING, horizontal, double 2⅛" Chain, 65 HP, 230 DC, complete.

4—AMERICAN HOIST AND DERRICK COMPANY, horizontal, double wildcat—for 2¼" chain double gypsy, 70 HP, 230 Volts DC, with electric controls.

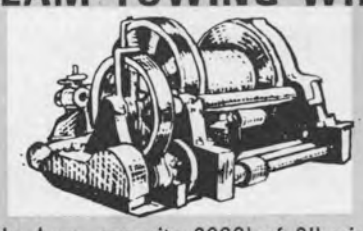
3—HESSE-ERSTED, horizontal, double wildcat, 2⅛" chain, 60 HP, 230 DC.

1—HYDE HORIZONTAL ANCHOR WINDLASS double wildcat—for use with 2⅛" Anchor Chain, and with General Motors Electric Motor, 60 HP, 230 volts DC, 560/1700 RPM, Type CDM 18831 AE. Complete with Contractor Panel, Resistors, and Master Switch.

ANCHOR WINCHES

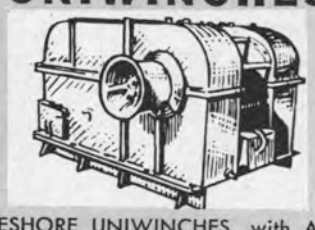
1—JAEGER, single drum—capacity approximately 900' of 1½" wire rope, double gypsy, with 35 HP Motors, 230 Volts DC, complete with electricals.

STEAM TOWING WINCH



Single drum, capacity 2000' of 2" wire rope, cylinder size 9" bore by 10" stroke.

UNIWINCHES



LAKESHORE UNIWINCHES, with Allis-Chalmers Motors, 50 HP, 230 Volts DC, complete with Control Equipment.

Single speed, double drum, 7450 # at 220 FPM.

Single speed, single drum, 7450 # at 220 FPM.

CARGO HOISTER BLOCKS

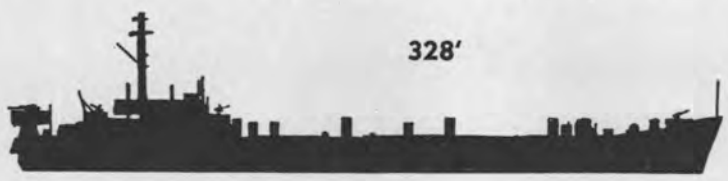
5 ton rated, Steel, as removed from surplus ships. Manufactured by: Young, Draper, etc., 12" & 14" sizes.

$42.00 ea.

$49.50 each with pull test certificates

2—L.S.T. TYPE VESSEL HULLS

For Immediate Sale



Steel Hull, 328' overall, 50' extreme beam, maximum draft 14', approximate displacement 1780 tons. To be sold stripped of all machinery and deck house. Located in Portland, Oregon.

SUBMARINE DIESEL GENERATOR ENGINES

(Without Generators)

2—GENERAL MOTORS, Model 16-278A, 1600 HP, 750 RPM.

4—FAIRBANKS-MORSE, Model 38D8-1/8, 16 cylinder, O.P., 1600 HP, 720 RPM.

STERN ANCHOR WINCHES

2—ALMON A. JOHNSON Stern Anchor Winches as removed from L.S.T. Vessels, line pull rating 100,000 pounds at 10 FPM in low gear, complete with Contractor Panels, Resistors, and Master Switches.

OS & D RUBBER HOSE

21—6" size, 20' long sections with flanged ends, in little used, good condition.

12—4" size, 30' long sections, with flanged ends, in little used, good condition.

FOB Portland, subject to prior sale.

your choice $150 per section

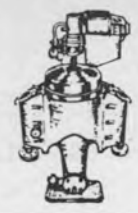
CENTRIFUGES

SHARPLES AND DE LAVAL

150 GPH—440 AC
—230 DC

350 GPH—230 DC

600 GPH—230 DC



TOWING WINCHES

JOHNSON TYPE AUTOMATIC TOWING MACHINES

2—A.A. Johnson Towing Machines from V-4-M-A1 Seagoing Tugs, drum spools 3000' of 2¼" diameter wire rope. Line pull rating 40,000 lbs. Winches have 50 HP, 230 DC Motors and are complete with Contractor Panels, Resistors and Master Switches.

HATCHES from TANKER

12—47" diameter, with 16" coaming, Ullage Cover with strong back (1 bolt each side).

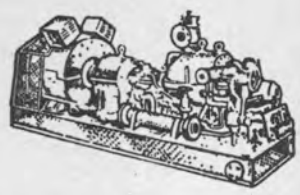
TURBINE GENERATORS

2—DE LAVAL, 360 HP, 440 PSI, 740°F, with Crocker-Wheeler Generators, 250 KW, 240/120 DC, 1200 RPM.

1—WORTHINGTON, 225 PSI, 397°F, 6510 RPM, with Westinghouse Generator, 150 KW, 120 DC, 1250 Amperes.

6—WESTINGHOUSE, 200 PSI, with Westinghouse Generators, 60 KW, 120 DC.

4—ALLIS-CHALMERS, 440 PSI, 740° F, with Allis-Chalmers Generators, 300 KW, 240/240 DC.



1—GENERAL ELECTRIC, 525 PSI, with G.E. Generator, 250 KW, 440/3/60.

1—GENERAL ELECTRIC, with G.E. Generator, 350 KW, 440/3/60.

GENERAL ELECTRIC, Type ATB-2, 1563 KVA, 1250 KW, 450/3/60.

ALLIS-CHALMERS, 440 PSI, 740°F, 300 KW, 120/240/DC

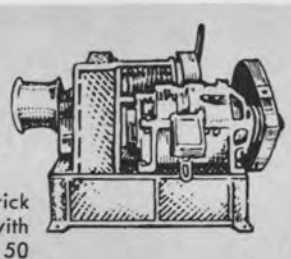
TERRY, TM5, 440 PSI, 740°F, 300 KW, 120/240 DC.

JOSHUA HENDY, 300 PSI, 550°F, with Westinghouse Generator, 300 KW, 120/240 DC.

WORTHINGTON, Form S4, 440 PSI, 740°F to a Westinghouse Generator, 250 KW, 440/3/60, and to a 90 KW, 120 DC.

DELAVAL, 450 PSI, 750°F, 300 KW, 120/240 DC.

CARGO WINCHES



American Hoist and Derrick Company Winches with Westinghouse Motors, 50 HP, 230 Volts DC, complete with Contractor Panels, Master Switches, and Resistors.

Single Speed, Single Drum
Two Speed, Single Drum

UNIT WINCHES

American Hoist and Derrick Company

U3H—SINGLE DRUM, Single speed (4)
Line Pull: 7450# — 223 FPM,
6360# — 237 FPM,
3720# — 287 FPM.

U6H—DOUBLE DRUM, Single speed (2)
Line Pull: 7450# — 223 FPM,
6360# — 237 FPM,
3720# — 287 FPM.

Motor: Westinghouse, 50 HP, 230 Volts DC, 1900 RPM, Model 288212, 183 Amperes, compound wound, Frame 9 UW, horizontal.

Unit Winches complete with Contactor Panels, Resistors, Master Switches.

TERRIFIC INVENTORY... AC & DC

Marine Pumps

CENTRIFUGAL

DC – HORIZONTAL

1—ALLIS-CHALMERS, 40 GPM, 30.2 ft. hd., with Allis-Chalmers Motor, 5 HP, 230 DC, 575/1150/RPM.

1—WORTHINGTON, Size 3UB1, 400 GPM, 280' head, with Westinghouse Motor, 50 HP, 230 DC.

1—WESTCO, 100 GPM, 100 PSI, 2" suction, 3" discharge, Imperial Motor, 10 HP, 120 DC.

2—WORTHINGTON, Size 8L1, 2100 GPM, 138.5 TDM, with Westinghouse Motors, 100 HP, 230 DC.

1—WARREN, Size 8DM11½, 1175 GPM, 11.1 PSI, with Reliance Motor, 10 HP 230 Volts DC.

1—WORTHINGTON, 3½" suction, 3" discharge, 150 GPM, 23.8 PSI, with Diehl Motor, 3.47 HP, 230 DC, 1750 /3500 RPM.

3—GOULDS, 250 GPM, 100 PSI, Figure 3380, 4"x3", with 30 HP Motors, 230 DC.

4—WORTHINGTON, Size 8L1, 2100 GPM, 138.5 TDM, 100 HP, 230 DC.

4—WORTHINGTON, Size 12LA1, 4000 GPM, 67.3 TDM, 100 HP, 230 DC.

5—WORTHINGTON, Size 4L1, 400 GPM, 83' head, 15 HP, 230 DC.

2—ALLIS-CHALMERS, Type 5G, Size 5x5, 650 GPM, 29' head, 7½ HP, 230 DC.

2—ALLIS-CHALMERS, Type SS-L, Size 4x2, 45 GPM, 2 HP, 230 DC.

AC – HORIZONTAL

2—WARREN, 60 GPM, 50 PSI, 1.87 HP, 440/3/60, 3500 RPM.

1—WARREN, 17 GPM, 110 PSI, 3½ HP, 440/3/60, 3500 RPM.

1—WARREN, 600 GPM, 50 PSI, 8¼ HP, 440/3/60, 1135 RPM.

1—GARDNER-DENVER, 750 GPM, 360' head, 6" suction, 5" discharge, 3500 RPM, with G.E. Motor, 100 HP, 440/3/60.

1—WARREN, Size 3-SED-8, 150 GPM, 26.2' hd., with Westinghouse Motor, 3.96 HP, 440/3/60.

4—WORTHINGTON, 200 GPM, 100 PSI, 3½" suction, 3" discharge, Size 2UB1, with Wagner Motor, 25 HP, 440/3/60.

1—GARDNER-DENVER, 5" suction, 3" discharge, 350 GPM, 336' head, 50 HP, 440/3/60, 3500 RPM.

1—CARVER, 400 GPM, 100 PSI, 3½" suction, 2½" discharge, 3500 RPM, 35.7 HP, 440/3/60.

2—WORTHINGTON, 875 GPM, 10 PSI, 1160/860 RPM, with Westinghouse Motor, 4.45 HP/7.92 HP, 440/3/60.

3—WORTHINGTON, 6" x 6", 550 GPM, 25' head, 6 HP, 440/3/60, 1750 RPM.

2—BUFFALO, 250 GPM, 100 PSI, Class CCS, Size 4 x 3½", with Westinghouse Motors, 25 HP, 440/3/60.

(Continued)

AC – HORIZONTAL

1—GOULDS, 2000 CFM, 470' head, Size 8x10, 350 HP, 2300/3/60.

3—ALLIS-CHALMERS, 35 GPM, 100' head, Size 2x1½, 3 HP, 440/3/60.

DC – VERTICAL

1—AURORA, 4" x 3", with G.E. Motor, 25/40 HP, 230 DC, 1310/1750 RPM.

1—INGERSOLL-RAND, Size 8VCM, 8" suction, 8" discharge, with Westinghouse Motor, 15 HP, 230 DC, 850/ 1210 RPM.

1—INGERSOLL-RAND, 4" suction, 3" discharge, with Westinghouse Motor, 15 HP, 230 DC, 1310/1750 RPM.

1—WARREN, 6" suction, 3" discharge, with G.E. Motor, 5 HP, 440/ 3/60, 1725 RPM.

1—DAYTON-DOWD, 5" suction, 4" discharge, with Century Motor, 15 HP, 230 DC, 1310/1750 RPM.

2—ALLIS-CHALMERS, 170 GPM, 208' head, Type CF2V, 6" suction, 3½" discharge, 20 HP, 230 DC.

2—ALLIS-CHALMERS, 30 GPM, 208' hd, Type CF2V, 2½" suction, 1½" discharge, 7½ HP, 230 DC.

1—ALLIS-CHALMERS, 12,500 GPM, 10.4 PSI, Type LS-V, Size 20" x 20", 100 HP, 230 DC.

1—ALLIS-CHALMERS, 2520 GPM, 14.4 PSI, Size SE-V, 12" x 12", 30 HP, 230 DC.

2—ALLIS-CHALMERS, 600 GPM, 30 PSI, Type SGV, 5" x 5", 20 HP, 230 DC.

1—ALLIS-CHALMERS, 450 GPM, 120 PSI, 4" x 3", 50 HP, 230 DC.

3—GARDNER-DENVER, 1500 GPM, 56' head, 8" suction, 6" discharge, with 30 HP Motors, 230 DC.

1—WORTHINGTON, Type 20 LAS1, 13,000 GPM, 11:5 PSI, 100 HP, 230 DC.

2—DELAVAL, 80 GPM, 75 PSI, 5/10 HP, 230 DC.

1—WORTHINGTON FIRE & BUTTERWORTH, Size 3 UBS, 400 GPM, 300 PSI, 75 HP, 230 DC.

4—ALLIS-CHALMERS, Type SGV, 600 GPM, 30 PSI, 20 HP, 230 DC.

AC – VERTICAL

1—DE LAVAL, 155 GPM, 59.9 PSI, 440/3/60.

1—WARREN, 17 GPM, 55 PSI, with Westinghouse Motor, 4.26 HP, 440/ 3/60.

1—INGERSOLL-RAND, Size 2VHMA, 65 GPM, 75 PSI, 440/3/60.

1—BUFFALO, Size 6, 875 GPM, 10 PSI, 6.3 HP, 440/3/60.

2—WORTHINGTON, 275 GPM, 56.6 PSI, 22.9 HP, 440/3/60.

3—DAYTON-DOWD, 1160 GPM, 15 PSI, 10 HP, 440/3/60.

3—ALLIS-CHALMERS, 68 GPM, 114' head, 7½ HP, 440/3/60.

ROTARY PUMPS

DC – HORIZONTAL

3—NATIONAL TRANSIT, 50 GPM, 50 PSI, 3x2½, with G.E. Motor, 3 HP, 230 DC.

DC – VERTICAL

1—WORTHINGTON, Size 4GRVS, with Westinghouse Motor, 15 HP, 230 Volts DC, 1310/1750 RPM.

2—QUIMBY, Size 4D, 225 GPM, 50 PSI, 15 HP, 230 DC, 540/740 RPM.

2—QUIMBY, Size 5, 6 x5, 400 GPM, 48 PSI, 25 HP, 230 DC.

2—QUIMBY, Size 6, 500 GPM, 70 PSI, 40 HP, 230 DC.

1—QUIMBY, Size 2½, 17 GPM, 405 PSI, 7½ HP, 230 DC.

2—QUIMBY, Size 5, 400 GPM, 60 PSI, 30 HP, 230 DC.

2—WORTHINGTON, Type 3GRVS, 90 GPM, 75 PSI, 7½ HP, 230 DC.

Rotary, AC – Vertical

2—NORTHERN, Size 7020, 10 GPM, 350 PSI, 200 RPM, 3.65 HP, 440/3/ 60, 1720 RPM.

2—BLACKMER, Size IN5INV, 50 GPM, 50 PSI, geared, 2 HP, 440/3/60.

HYDRAULIC PUMPS

WATERBURY, some Model A, some Model B, piston type Pumps, Size 2, Size 5, Size 10, Size 20, Size 50.

BOILER FEED PUMPS-STEAM

Size 11 x 7 x 18 vert. simplex

Size 11 x 7 x 24 vert. simplex

Size 12 x 8 x 24 vert. simplex

Size 12 x 8½ x 12 vert. simplex

Size 14 x 9 x 24 vert. simplex

TURBINE DRIVEN FIRE PUMPS

4—INGERSOLL-RAND, 1200 GPM, 98 PSI, Size 5UV, with Elliott Turbines, 84.3 HP, 3550 RPM, 1 stage, impulse type.

FAIRLEADS

Designed and Manufactured by ZIDELL EXPLORATIONS, INC.

To Give You These Features:

One size fairlead with universal type sheave to accommodate wire rope sizes 1" up to and including 2".

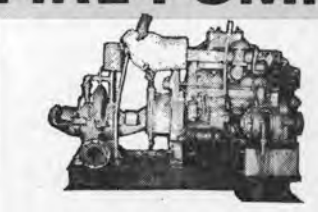
Self Aligning, Swivel Type Head.

Dependable and Ruggedly built to perform consistently year after year with minimum maintenance.

Model Design
$1350 each

PRICES ARE F.O.B. PORTLAND, ORE.

FIRE PUMPS



2—BUDA, Model 6-LD-468, Diesel Engines, 6 cylinders, 100 BHP, Marine, Gardner-Denver. centrifugal Pumps, Bronze, horizontally split case, 1000 GPM, 280' head, 6" suction and 5" discharge.

CLYDE 17-DE-90 WHIRLEY CRANE

LIFTING RATE: 25 tons at 50 Ft. Radius at 50 to 60 FPM.

BOOM: 80' to headblock (with 10' whip)

WHIP: 10 tons at 125 FPM—2 part line

TRACK CENTERS: 20'—Engine: Cummins HBIS 601, 180 HP supercharged, elec. start

MOTORS: Each leg (4 tot.) 7½ HP, 230 DC.

POWER: Diesel electric (DC)

FORGED STEEL LINE SHAFTING

1000 Tons of miscellaneous line shafting — Call on your requirements.

We also have . . .
Machinery & Equipment

From: AP2 & AP3 VESSELS
C2-SB1 VESSELS
C3-S1-A3 VESSELS
AND LIBERTY SHIPS

SALT WATER EVAPORATORS

OVERHAULED—TESTED

Used, Davis Engineering or equal, with ABS and/or Coast Guard certification. 5 sizes available:

SIZE 48-23 **SIZE 26-8**
SIZE 36-17 **SIZE 20-5**
SIZE 36-14

PROMPT QUOTATIONS & DELIVERY

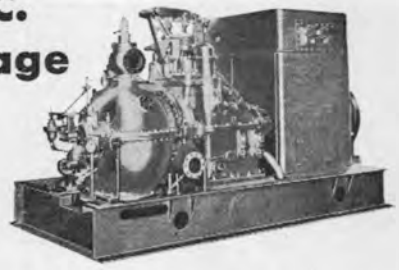
ANCHOR CHAIN

Used, good, with or without test certificate .....

1-3/8" size
1-1/2" size
2-1/16" size
2-1/4" size
2-5/8" size
2-3/4" size
3-3/8" size

r Shell Phillips, Zidell Dismantling, Inc. • 401 Alexander Ave. • Tacoma, Wash. 98401 • Phone: 206/383-2701

TURBINE GENERATORS
A.C. Voltage



4-1250 KW, General Electric. Turbines: Type FSN, 525 PSI, 7938 RPM. Generators: 1250 KW, 450/3/60, 3600 RPM, Type ABT2.

8-750 KW, General Electric. Turbines: Type FN3-FN24, 525 PSI, 10,033 RPM. Generators: 750 KW, 450/3/60, 1200 RPM, Type ATI.

4-500 KW, General Electric. Turbine: Type FN3-FN20, steam 375/425 PSI, 6 Stage, 9987 RPM. Generators: 500 KW, 450/3/60, 1200 RPM, Type ATI.

Used, Clean, Good Condition

Please Contact: Ralph Ingram

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3121 S.W. Moody Ave., Portland, Oregon 97201
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SPECIAL!
BATTERIES
NEW SURPLUS BARGAIN

Heavy Duty, 8 volts, 500 amps, 13¾" wide, 27¼" long, 18" high. Weight in case, 488 lbs.

AL EPSTEIN, INC.
Most Anything in Marine Supplies
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T2 "MISSION SANTA CRUZ" TANKER HULL
Excellent for Grain or Oil Storage

141,286 BBL—OAL 523'—Beam 68'—Draft 39' 3". For oil storage, grain storage, drill barge conversion, etc. For details, contact H.B. Chait, V.P. at:

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

FALK IN-LINE MARINE REVERSE REDUCTION GEAR

SUITABLE TO 1600 HP WITH MODIFICATIONS

700 HP @ 750/246 RPM—30" clutch drum—ratio 3.05:1—equal to new. Can be used with up to 1600 HP by modifying with larger clutch drums & tires.

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ONE PAIR OF CATERPILLAR MAIN ENGINES AVAILABLE. ENGINES ARE CATERPILLAR D398 WITH TWO CATERPILLAR MODEL 3192 REDUCTION GEARS—APPLY TO:

TURECAMO COASTAL & HARBOR TOWING CORP.
P.O. Box 201 Oyster Bay, New York 11771

FOR SALE

1 NEW Scotch Marine Boiler complete with smoke box and steam drum—12' 6" I.D. x 12' 0" overheads—2 pass—wet back—150# ASME—3008 Sq. Ft. of combustion volume—225 PSI hydrostatic pressure. For inspection and/or additional information contact:

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SURPLUS SHIP PARTS
Ex AOG Tanker M/V Rio Grande
Diesel Electric Power Units For Ship Propulsion, Dredges, Industrial and Marine Applications

4 Each General Motors Diesel Engines, Model 16-278, 1,600 HP, 750 RPM Direct Connected to—
4 Each G.E. Generators, 775 KW, 268/250 Volts, 3,100 Amps, Shunt Wound
4 Each G.E. Main Drive Motors, 950 HP, 650/950 RPM, Form L, 250 Volts, 1,300 Amps, Shunt Wound
2 Each Farrel Reduction Gears, Double Input—Single Output, Ratio: 3.957 to 1, Pinon 850/950 RPM—937 HP, Main Gear 215/240 RPM, 1,875 HP
Auxiliaries:
2 Each General Motors Diesel Engines, Model 8-268A with Delco Generators 200 KW, 250 Volt DC

GENERAL METALS OF TACOMA, INC.
1919 Canal Street
Tacoma, Washington 98421
FUlton 3-3443
Cable Address: Genmetac Tacoma

REVERSIBLE STEAM MOORING WINCHES
Suitable for St. Lawrence Seaway

11,000 lb. duty. Capacity: 900' of 1⅛" wire. Built by American Ship 9"x10". Drum diam. 16"—flange 34"—OA width 63"—OAL 69". Steam inlet 1½" located on side of winch so there is no obstruction to reversing. Has handwheel compressor brake. Adaptable for use with air.

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

BERGER FAIRLEADS

For up to 1⅝" wire—weight 2680 lbs.—8" shank opening—20" sheave—manufactured with tapered roller bearings. Original equipment still aboard U.S. Naval vessel .

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539-1900 (301) 355-5050

SHIPS FOR SALE
6 CIMAVI TYPE VESSELS
for
NON-TRANSPORTATION USE

Dimensions: LOA 338' 8" — Beam 50' — Depth 29' — Draft 23' 5"
Tonnage: Gross 3805 — Net 2123 — DWT 6090 — Displ 8370
Main Propulsion: Single Screw, 1700 HP Diesel
Auxiliary Generators: 250 KW, 230V D.C. Diesel
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1000-30,000 CFM—A-A4WJ—440/3/60

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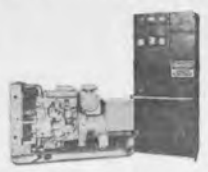
539-1900 (301) 355-5050

94 KVA—75 KW CAT. DIESEL SET
125/216/236/440/3/60
1800 R.P.M.



Caterpillar turbo-charged D-330 engine—4 cyl. radiator cooled. GENERATOR: 10 wire—low connection: 125/216 volts 250 amps 230 volts 236 amps; high connection: 460 volts 116 amps. Fully alarmed—electric starting—complete with free-standing switchgear. Test run only 75 hours. Static exciter.

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10 KW—120/1/60 M.G. SET

INPUT: Motor 25 HP — 120 VDC — 156 amps — 1800 RPM —flange-coupled to output generator.
OUTPUT: 10 KW generator — 120 volts 60 cycle single phase —108 amps — 0.80 PF — with direct-connected 125 volt 8 amp exciter. Motor starter by Cutler-Hammer. AC generator has voltmeter and ammeter. Bassler voltage regulator.

3.7 KW Reconditioned M.G. SET
115 VDC Input — 115/1/60 Output
Manufactured by Century. Reconditioned—4 bearing ball bearing. MOTOR: 5 H.P.—115 volts DC—38 amps—1800 RPM—60°C continuous. GENERATOR: 3.7 KW—4 KVA—115 volts—60 cycle—single phase—0.85 PF—1800 RPM —10.4 amps.

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525 KW GENERAL ELECTRIC AUXILIARY TURBOGENERATOR UNIT

Complete with L.O. Cooler. **Turbine:** General Electric 525 KW, Type DORV-325M, 5645 RPM. **Reduction Gear:** General Electric Type S-162-D, 5645/1200 RPM, single helical. **Generators::** General Electric. (1) Type ABT, 3 phase, 400 KW, 450 VAC, 1200 RPM. (2) Type MPC, 75 KW, 110 VDC, 1200 RPM, Exciter. (3) Type MPLI, 55 KW, 120 VDC, 1200 RPM, Generator. (4) Auxiliary DC generators.

538 KW WESTINGHOUSE TURBOGENERATOR UNIT

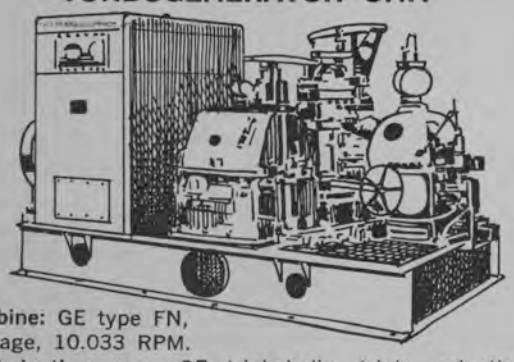
Complete with L.O. Coolers and exciters. **Turbine:** Westinghouse 538 KW, 5010 RPM. Inlet pressure 435 psi. Temp. 750 degrees F.TT. Exhaust pressure 28½ hg vac. **Generators:** (1) 400 KW, 450 VAC, 3 pole, 60 cycle, PF 80%, 1200 RPM, ship's service. (2) 32.5 KW, 125 VDC, 1200 RPM, variable voltage exciter. (3) 110 KW, 125 VDC, 1200 RPM, constant voltage generator. (4) 5 KW, 125 VDC, 1200 RPM, ship's service Generator-Exciter. **Reduction Gear:** Ratio 5010/1200 RPM.

535 KW GENERAL ELECTRIC TURBOGENERATOR UNIT

Complete with L.O. Coolers and exciters. **Turbine:** General Electric Mfg. drawing P-8453535, 3 stages, type DORV-325, 5645 RPM, rating 535 KW, inlet pressure 590 lbs., Superheat 325 degrees F., exhaust pressure 1¾ ABS. **Reduction Gear:** General Electric, type S-162-D, Class, 535 KW, Mfg. dwg, T-8453535, 5645/1250 RPM. **Generator:** General Electric, Dwg, T-8453535, type ATB-976, KNA 500, 450 volts AC, 3 phase, 60 cycle, 400 KW, 642 amps, 1200 RPM, PF .8, Frame 976, Exciter 120 volts DC. Control panel: General Electric, Dwg. 6367270, Type XF-100492, 6 circuits, 450 volts AC.

★★ ALSO AVAILABLE!! ★★

600 KW GENERAL ELECTRIC TURBOGENERATOR UNIT



Turbine: GE type FN, 6-stage, 10.033 RPM.

Reduction gear: GE triple-helix, triple reduction, 10033/1200 RPM. **Generator:** GE type ATI, 600 KW, 6-pole, 0.8 pf, 450 VAC, 3 phase, 60 cycle, 1200 RPM. **Exciter:** GE type MPLI, 7.5 KW, 120 VDC, direct connected. **Air cooler:** Surface type, for generator, complete with control panel.

MAIN MOTOR FOR T2

Gen. Elect. #5690714 Type TSM-80, 6000 HP, 90 RPM, form H.L., 2300 Volts, Amps. arm. 1160, P.F. 1.0, KVA 4625 Phase 3 cycle 60, Exciter volts 120, amps field 390 contin. @ 60°C. rise.

5400 KW MAIN GENERATOR

General Electric, S/N 79938, Marks 6937958 G-4, 5F-1690-2, 164-M.

PUMP UNITS

CARGO STRIPPING PUMP

(Steam) Worthington, vertical duplex, double acting, size 14" x 14" x 12", speed 46 ft./min., 700 GPM, 150 psi operating pressure.

MAIN FEED PUMP

Pump: Coffin Turbo Pump Co., single stage, centrifugal, size CG-12A, 6980/7030 RPM, 240/280 GPM, 254/280 HP, 6" x 3", 750 psi @ 1760 ft. head, complete with turbine.

MAIN FEED PUMP

Coffin, turbine drive, Type F, 7200 RPM, 200 GPM, 150 HP, 150 psi w 1329 ft. head.

MAIN CIRCULATING PUMP

Pump: Ingersoll Rand, type 24 VCM, single stage, double suction centrifugal, 585 RPM, 16,500 GPM against TDH 25 ft. @ 30 psi, 26" x 24". **Motor:** General Electric, Model 5K633AP1, Frame N-6336-B, 585 RPM, 440 volts AC, 191 amps, 3 phase, 60 cycle, complete with controller.

MAIN CIRCULATING PUMP

Pump: Ingersoll Rand, type 24 VCM, size 24", 585 RPM, 14,000 GPM @ 25 ft. TDH, 26" x 24", operating pressure 15 psi. **Motor:** Westinghouse, Model CS, Frame 876C, 125 HP, 585 RPM, 440 volts AC, 159 amps, 3 phase, 60 cycle, complete with controller.

MAIN CARGO PUMP UNIT

Pump: Ingersoll Rand, type 2 stage horizontal, size 6-GTM, 1750 RPM, 2000 GPM, 12" x 12", 100 psi @ 280 ft. head. With motor.

FUEL AND LUBE OIL PUMP

Pump: Quimby, size 2½ head screw, 1200/600 RPM, 15 GPM @ 325 psi disch. press. **Motor:** General Electric, Model 5KF364PP1, Frame 364, 7.5/3.75 HP, 1160/580 RPM, 440 volts AC, 10/9.7 amps, 3 phase, 60 cycle, complete with controller.

LUBE OIL SERVICE PUMP

Pump: Quimby, Type vertical rotex, size 4-B, 1150 RPM, 175 GPM @ 60 psi with 20 ft. head, 6" x 5". **Motor:** General Electric, Model 5KF365AJX1, Frame 365, 5 HP, 1170 RPM, 440 volts AC, 20 amps, 3 phase, 60 cycle, complete with controller.

MAIN CONDENSATE PUMP

Pump: Ingersoll Rand, size 2VHM, 1760 RPM, 180 GPM @ TDH 165 ft., 5" x 2", disch. press. 67 psi. **Motor:** General Electric, Model 5KF365AJN-1, Frame 365V, 20 HP, 1765 RPM, 440 volts AC, 3 phase, 60 cycle, 25.5 amps, with controller.

AIR COMPRESSORS

COMBUSTION CONTROL AIR COMPRESSOR UNIT

Compressor: Ingersoll Rand, type 30, Model 253 x 5, 20 CFM at 100 psi, 600 RPM. **Motor:** General Electric, Model 5KG254B2782, Frame 254, Type K, 440 volts, AC, 7.5 amps, 3 phase, 60 cycles, 5 HP, 1723 RPM, complete with controller and switch.

SHIP SERVICE AIR COMPRESSOR UNIT

Compressor: Ingersoll Rand, Type 30, Model 5 x 5 x 4, 545 CFM at 100 psi, 750 RPM. With motor and base.

VALVES

Gate: 10", 12", 14", 16", 20" and 24"
Angle: 12", 14" and 18" **Crossover:** 16"
High suction: 26" **Low suction:** 26"

TURBINE ROTORS

5400 KW GENERAL ELECTRIC TURBINE ROTOR

ABS, 6275-31, AB-142-WD-8-10-44, 1701461 T8604259, 6275-31 67-KU-102032, A853BY 21 Jan. 1967.

525 KW GENERAL ELECTRIC TURBINE ROTOR

S/N 60137, ABS 71-LA-12430-624 A624 B, Reconditioned April 21, 1971.

5400 KW WESTINGHOUSE TURBINE ROTOR

ABS report 66KU11942 A853B, 6 Sept., 1966, Marks: 6275-45. AB-142 WD9-30-44, 170-1467, 8604259-1, 6275-45.

5400 KW WESTINGHOUSE MAIN TURBINE (Profile type):

5400 KW ELLIOTT TURBINE ROTOR

ABS, 67-LA9644-830, AB-JCB-3-31-67, 9013039-9230P1, 66-KU-11895, A853 1071941, AB142 WDG-4-45.

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MAIN AIR EJECTOR

Main air ejector, Graham Mfg. Co., type 2 stage twin, size 163B, capacity, 65 PPH of air (220 GPM cont. @ 79°F.), oper. press. 150 PPH.

MAIN CONDENSER END

Graham (waterbox).

MAIN CONDENSER END

Westinghouse (waterbox).

MAIN CONDENSER END

Westinghouse (return head).

AUXILIARY CONDENSER END

Graham (waterbox and return head), surface condenser, size 1500 sq. ft., S/N 2915, Design press Shell 15-Tubes 25, Test press Shell 30-Tubes 50.

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Reconditioned, ABS 70-LA-11901-946

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Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

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Combustion Engineering, Inc., Windsor, Connecticut 06095

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Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
Devoe & Raynolds Co., Inc., Subsidiary Celanese Coatings Co., 414 Wilson Ave., Newark, N.J. 07105
Hempel's Marine Paints, Inc., 25 Broadway, New York, N.Y. 10004
International Paint Co., 21 West St., New York, N.Y. 10006
Marine Engineering & Construction Co., Inc., 1664 Tchoupitoulas St., New Orleans, La. 70130
Mobil Chemical Company, Metuchen, N.J. 08840
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Porter Paint Company, 400 South 13th Street, Louisville, Ky. 40203

PETROLEUM SUPPLIES
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017
The West Indies Oil Co., Ltd., St. John's, Antigua, W. I.

PIPE—Cargo Oil
Kubota, Ltd., 22, Funade-cho 2-chome, Naniwa-Ku, Osaka, Japan
Tioga Pipe Supply Co., Inc., P.O. Box 5997, Philadelphia, Pa. 19137

PLASTICS—Marine Applications
Ameron Corrosion Control Div., Brea, Calif. 92621
Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231
Philadelphia Resins Co., 20 Commerce Dr., Montgomeryville, Pa. 18936

PORTS
Port of Galveston, P.O. Box 328, Galveston, Texas
Jacksonville Port Authority, 2701 Tallyrand Ave., Jacksonville, Fla.

PROPELLERS: NEW AND RECONDITIONED
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Bird-Johnson Co., 883 Main Street, Walpole, Mass. 02081
Coolidge Propellers, 1601 Fairview Ave. East, Seattle, Wash. 98102
Escher Wyss Gmbh, P.O. Box 798, Ravensburg, Germany
Federal Propellers, 1501 Buchanan Ave. S.W., Grand Rapids, Mich. 49502
Ferguson Propeller, 1132 Clinton St., Hoboken, N.J. 07030

PUMPS
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City, Kansas 66110
Goulds Pumps, Seneca Falls, N.Y. 13148
Houttuin-Pompen N. V. Sophialaan 4, Utrecht, Holland
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Arkansas 72204
Worthington Corporation, Harrison, New Jersey 07029

RATCHETS
W. W. Patterson Co., 830 Brocket St., Pittsburgh, Pa. 15233

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

ROPE—Manila—Nylon—Hawsers—Wire
American Mfg. Co., Inc., Noble & West Sts., Brooklyn, N.Y. 11222
Cating Rope Co., 309 Genesee St., Auburn, N.Y. 13022
Columbian Rope Co., 309 Genesee St., Auburn, N.Y. 13022
Du Pont Co., Room 31H1, Wilmington, Delaware 19898
Jackson Rope Corp., 9th & Oley, Reading, Pa. 19604
Wall Rope Works, Inc., Beverly, N. J. 08010

RUDDER ANGLE INDICATORS
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

SANDBLASTING EQUIPMENT
Pauli & Griffin Co., 826 Folsom St., San Francisco, Calif. 94107

SCAFFOLD BOARDS
Howmet Corporaton, Southern Extrusions Division, P.O. Box 40, Magnolia, Arkansas 71753

SEWAGE DISPOSAL
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017

SHAFT REVOLUTION INDICATOR EQUIP.
Electric Tachometer Corp., 68th & Upland Sts., Phila., Pa. 19142
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913

SHIPBOARD VENTILATION
Coppus Engineering Corp., P.O. Box 457, Worcester, Mass. 01613

SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
Levin Metals Corp., P.O. Box 398, Point Station, Richmond, Cal. 94807
National Metal & Steel Corp., 1251 New Dock St., Terminal Island, Cal. 90731
Zidell Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201

SHIP BROKERS
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
Mowbray's Tug and Barge Sales Corp., 21 West St., N.Y., N.Y. 10006
Oaksmith Boat Sales, Inc., Fisherman's Terminal, Seattle, Wash. 98119

SHIPBUILDING STEEL
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., 25 Broadway, New York, N.Y. 10004
Huntington Alloy Products, Div. International Nickel Co., Inc., Huntington, W. Va. 25720
International Nickel Co., 1 New York Plaza, New York, N.Y. 10004

SHIPBUILDING—Repairs, Maintenance, Drydocking
Astilleros Espanoles, S.A. Zurbano, 70, Madrid 10, Spain
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Barbour Boat Works, Inc., P.O. Box 1069, New Bern, N.C.
Beliard, Crighton & Cie, P.O. Box 2074, Route des Docks, 59, Dunkirk, France
Beliard Murdoch S. A., Kattendijkdok Westkaai 21, Antwerp, Belgium
Bertram Marine, Division of Whittaker, 3663 N.W. 21 Street, Miami, Fla. 33142.
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Blount Marine Corp., P.O. Box 360, Warren, Rhode Island 02885
Bludworth Shipyard, Inc., Box 5426, Cypress St., Brady Island, Houston, Texas 77012
Brodogradiliste "SPLIT", P.O. Box 107, Split, Yugoslavia
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock, Inc., P.O. Box 153, Willemstad, Curacao, N.A.
Dillingham Corp., P.O. Box 3288, Honolulu, Hawaii 96801
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
Empressa Nacional Bazan, 65 Castellana, Madrid 1, Spain
Equipment Systems, Inc., A Microdot Co., P.O. Box 95, Port Deposit, Md. 21904
Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122
General Dynamics, Electric Boat Division, 99M Eastern Point Road, Groton, Conn. 06340
General Dynamics, Quincy Division, Quincy, Mass. 02169
Gotaverken American Corp., 39 Broadway, New York, N.Y. 10006
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
Havre de Grace, Havre de Grace, Md.
Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
Hongkong & Whampoa Dock Co. Ltd., Kowloon Docks, Hong Kong
Ishikawajima-Harima Heavy Industries Co., Ltd., 15 William St., New York, N.Y. 10005
Jacksonville Shipyards, 644 E. Bay St., Jacksonville, Fla. 32203
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Dockyard Co., 8 Kaigon-dori, Ikuta-ku, Kobe, Japan
Kelso Marine, Inc., P.O. Box 268, Galveston, Texas 77550
Kockums Malmo, Fack, Malmo, Sweden
Litton Industries, 9920 W. Jefferson Blvd., Culver City, Calif. 90230
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
Marathon Manufacturing Company
Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002
Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520
Marathon LeTourneau Marine Division, LeTourneau Rural Station, Vicksburg, Mississippi 39180
Marathon LeTourneau Offshore Pte., Ltd., P.O. Box 83, Taman Jurong Post Office, Singapore 22, Singapore
Marathon Shipbuilding Company, P.O. Box 870, Vicksburg, Miss. 39180
Marathon Shipbuilding Company (U.K.) Ltd., Clydebank Bunbartonshire, G81-1YB, Scotland
Marine Engineering & Construction Co., Inc., 1664 Tchoupitoulas St., New Orleans, La. 70130
Maryland Shipbuilding & Drydock, P.O. Box 537, Baltimore, Md. 21203
Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047
Mitsui Shipbuilding & Engrg. Co. Ltd., 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan
Mitsubishi Heavy Industries, Ltd., 5-1 Marunouchi 2-chome, Chiyoda-ku, Tokyo, Japan
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Newport Ship Yard, Inc., 379 Thames St., Newport, R.I. 02840.
Northwest Marine Iron Works., P.O. Box 3109, Swan Island, Portland, Oregon 97208
Nuclear Service & Construction Co., Inc., 9296 Warwick Blvd., Newport News, Va. 23607
O.A.R.N. (officine Allestimento e Riparazioni Navi) Genoa, Italy
Odense Steel Shipyard Ltd., P.O. Box 176, DK-5100 Odense, Denmark
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
St. Louis Shipbuilding—Federal Barge, Inc., 611 East Marceau, St. Louis, Mo. 63111
Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Savannah Machine & Shipyard Co., P.O. Box 787, Savannah, Ga. 31402
Sembawang Shipyard (Pte) Ltd., P.O. Box 3, Sembawang, P.O. Singapore, 27
Star Shipyards, Ltd., 61 Duncan St., New Westminster, Vancouver, B.C., Canada
Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan
Swedish Shipbuilding Association, Fack S-402 70, Gothenburg 8, Sweden
Teledyne Sewart Seacraft, P.O. Box 108, Berwick, La. 70342
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Tracor/Mas, Inc., P.O. Box 13107, Port Everglades, Fla. 33316

SHIP MODEL BASIN
Hydronautics, Incorporated, Laurel, Maryland 20810

SHIP ROUTING
Weather Routing, Inc., 90 Broad Street, New York, N.Y. 10004

SHIP STABILIZERS
Moritech, Inc., 38 Union Sq., Somerville, Mass. 02143
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

STEAM GENERATING EQUIPMENT
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095

STEERING SYSTEMS
Wm. E. Hough Co., 1125 P N.W. 45th St.. Seattle, Wash. 98107

SWITCHBOARDS
Hose McCann Telephone Co., Inc., 524 West 23 St., N.Y., N.Y. 10011

TOWING—Salvage, Lighterage, Barge Chartering
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Bouchard Transportation Co., Inc., 25 West Barclay St., Hicksville, L.I., N.Y. 11801
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, West End Ave., Oyster Bay, N.Y. 11771
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
Interstate Oil Transport Co., 214 Transportation Center, Six Penn Center Plaza, Philadelphia, Pa. 19103
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
L. Smit & Co., 11 Broadway, New York, N.Y. 10004
Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002
Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y. 11214

VALVES AND FITTINGS—Hydraulic—Safety Flanges
Dover Corp. / Norris Division, P.O. Box 1739, Tulsa, Okla. 74101.
Hubeva Marine Plastics-Lining, 435 Hamilton Ave., Brooklyn, N.Y. 11231
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mesco Tectonics, Inc., 5 Central Ave., Clifton, N.J. 07011

WELDING EQUIPMENT
Tweco Products, Inc., P.O. Box 666, Wichita, Kan. 67201

WIRE ROPE
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Bethlehem, Pa. 18016
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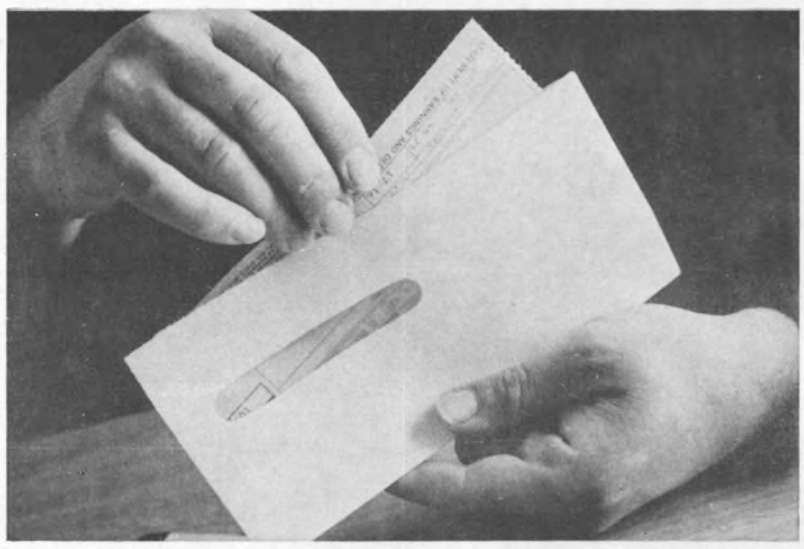

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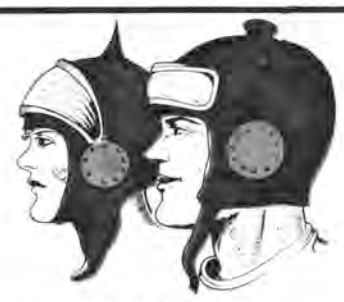

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