MARITIME REPORTER
AND
ENGINEERING NEWS

81st Annual SNAME Meeting
Held In New York Hilton Hotel

(SEE PAGE 10)

DECEMBER 15, 1973

Designed, engineered and manufactured especially for MARINE USE

REFRIGERATORS

BAILEY offers a complete line in standard, portable and under-counter models ranging from 4 to 102 cubic feet, AC or DC. All are equipped with heavy duty components and condensing units for efficient operation at high ambient temperatures. Cabinets are constructed of stainless steel with easy-to-clean interiors. AC units with blower-type evaporators are self-defrosting. All units are U.S. Public Health approved.

WATER COOLERS

MODEL MB-12 has a heavy gauge, stainless steel top, self-cleansing cooling unit and a sanitary, squirt-proof bubbler. It is rat-proofed in accordance with U.S. Health Service requirements.

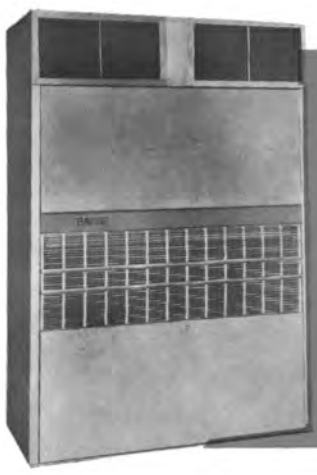
Other models, attractively styled and compactly sized, include those that are wall mounted or fully recessed to conserve floor space.

ICE CUBERS

MODEL 613-N is a sea water cooled unit, assuring highest efficiency under almost any conditions. It will function equally as well in a hot galley or in a locked room with a limited circulation of air. Approximately 2,500 sparkling cylindrical-type cubes are produced every 24 hours.

MODEL 150 is an air cooled unit designed to fill the need of tankers and freighters whose ice cube requirements are usually less than 150 lbs. per day. Produces about 2,000 cubes in 24 hours, using less than 5 quarts of fresh water per freezing.

Other models, producing up to 800 lbs. of ice cubes daily are also available.



AIR CONDITIONERS

THESE WATER COOLED, self-contained units have cabinets of heavy gauge steel, protected with rust inhibiting primer possessing excellent water immersion, salt spray and humidity resistance. Finish is neutral beige, baked enamel.

In 3, 5, 7½ and 10 ton models, all of which are available in AC or DC. Four smaller models (AC only), measuring only 24" x 24" x 36" high, that have cooling capacities ranging from 9,400 to 27,100 Btu/hr can be installed quickly and inexpensively anywhere in a ship. These are water cooled with 90/10 Cupro-Nickel sea water condensers.

FOR YOUR PROTECTION

When you purchase any kind of automatic equipment, be certain that your supplier can furnish proper service when needed. BAILEY maintains qualified mechanics to install units and service them properly, as well as a team of engineers to cope with any problems that may arise.

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URI Publishes Report On R.I. Offshore Sand And Gravel Mining

A new report recently published by the University of Rhode Island Sea Grant Program predicts that an offshore sand and gravel mining industry may soon develop in Rhode Island waters and says the state should be ready to cope with it.

Rising demand for sand and gravel, decreasing land supply, and increasing exploitation of ocean deposits may soon stimulate offshore mining on the East Coast, **Malcolm J. Grant,** author of "Rhode Island's Ocean Sands," says. He is a resource analyst at URI's Coastal Resources Center.

In a series of management recommendations, Mr. **Grant** states that mining in depths shallower than 80 feet should be prohibited unless it is proved that such an operation would not result in beach erosion.

Mr. **Grant** recommends that firms be required to submit an environmental impact statement—perhaps a joint effort of all bidders—before the management council issues a mineral extraction lease.

"Rhode Island's Ocean Sands" is available to the public at no cost. The 51-page publication contains information on the possible economic and environmental impact on the state of offshore mining, as well as legal considerations.

Copies may be obtained by requesting "Rhode Island's Ocean Sands," marine technical report number 10, from the Marine Advisory Service, University of Rhode Island, Narragansett Bay Campus, Narragansett, R.I. 02882.

Brown & Root Issues Brochure Covering Firm's Marine Work

A new 92-page marine brochure is available from Brown & Root, Inc., covering the company's capabilities in engineering, construction, and installation of marine structures. The company's marine work is represented by color photographs of various projects around the world. Listings of structures completed and of equipment are included.

Copies of the brochure can be obtained by writing to the Public Relations Department, Brown & Root, Inc., P.O. Box 3, Houston, Texas 77001.

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Leveraged Lease Financing

Diamond M Offshore Company
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a wholly-owned subsidiary of

Diamond M Drilling Company

The undersigned arranged the private placement of these securities issued to finance a portion of the purchase price of one semi-submersible drilling vessel. This advertisement appears as a matter of record only.

A. G. Becker & Co.
INCORPORATED

December, 1973

$3,000,000

United States Government Insured Merchant Marine Bonds

Sinking Fund Bonds due 1993-1994

Principal and interest insured under Title XI of the Merchant Marine Act, 1936, as amended.

Leveraged Lease Financing

Mallard Well Service, Inc.
(Lessee)
a wholly-owned subsidiary of

Crutcher Resources Corporation

The undersigned arranged the private placement of these securities, which will be issued to finance a portion of the purchase price of four workover drilling barges. This advertisement appears as a matter of record only.

A. G. Becker & Co.
INCORPORATED

December, 1973

$6,500,000

Robin Towing Corporation
(Lessee)

Leveraged Lease Financing

$5,250,000 United States Government Guaranteed Ship Financing Bonds due 1988

Principal and interest guaranteed under Title XI of the Merchant Marine Act, 1936, as amended.

$1,250,000 Ownership Interests

The undersigned structured this lease financing and arranged the private placement of these securities, which will be issued to finance the purchase price of four ocean-going tugboats. This advertisement appears as a matter of record only.

A. G. Becker & Co.
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December, 1973

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For further information and assistance you are invited to contact any of the following officers:

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INCORPORATED

Multimillion Contract Awarded To PDM To Build LNG Containment For Ships

Pittsburgh-Des Moines Steel Company, Neville Island, Pittsburgh, Pa. 15225, has received a contract, with a reported value of between $50 million and $75 million, from Quincy Shipbuilding Division of General Dynamics to supply the storage vessels for four additional LNG ships.

The contract consists of twenty 120-foot-diameter aluminum spheres, each with a capacity of 25,000 cubic meters of LNG. The spheres will be built at PDM's subsidiary, World Southern Corporation located near Charleston, S.C., and delivered to General Dynamics at Quincy, Mass., where they will be installed aboard LNG ships.

Dillingham Announces Plans To Invest $32 Million In Worldwide Shipping Partnership

Dillingham Corporaion (NYSE) and A/S Kristian Jebsens Rederi, a privately owned company based in Bergen, Norway, have announced that they have signed a letter of intent to jointly engage in worldwide shipping.

According to the terms of the letter, Dillingham, a diversified Honolulu-based company, will hold 51 percent of the proposed venture, with Jebsens holding the remaining 49 percent. Dillingham will contribute $32,000,000 in cash to the venture through January 1976, and Jebsens will contribute a fleet of nine modern operating bulk carrier vessels under British flag, totaling about 215,000 deadweight tons, the average age being about 15 months, the oldest one built in 1970. In addition, the joint venture has contracts for two bulk carriers to be delivered in 1975. All vessels are in the 20,000 to 35,000-deadweight-ton class. The new company, to be known as Norse-Pacific Shipping Co., is scheduled to begin operations in early 1974. The formation of the company is subject to the preparation and execution of the definitive joint-venture documents.

Lowell S. Dillingham, chairman and chief executive officer of Dillingham Corporation, will be chairman of the board of the new company, and **Atle Jebsen,** chairman and chief executive of Jebsens, will be managing director.

Operation of the company will be under the management of Jebsens, which has been in the shipping business since 1929, when it was founded by **Kristian Jebsen, Atle Jebsen's** father. The total tonnage of vessels presently owned by Jebsens is about 430,000 deadweight tons (35 vessels), of which about 340,000 deadweight tons are in the 20,000 to 35,000-ton class, the rest being smaller size bulk carriers trading the North Sea. In addition, Jebsens presently runs about 200,000 deadweight tons (14 vessels) on a charter basis.

Commenting, Mr. **Dillingham** said: "For the past two years, while improving our financial flexibility, we have been working to identify investment opportunities with above average growth potential which are consistent with our existing categories of business and offer opportunities for near term earnings. Bulk shipping is such a business. Tonnage has tripled in the past 10 years. Continued international industrial development should generate a steady growth in demand for basic commodities and raw materials, many of which must be shipped from areas remote from the marketplace."

Commenting on the prospects for the company, Mr. **Jebsen** said: "Jebsens have over the years specialized in carrying raw materials in bulk, mainly based on contracts of affreightment with industry. There has been a tremendous growth in the shipment of bulk commodities over the past several years, and I am convinced that this trend will continue. The financial strength of the joint venture combined with the existing know-how and expertise will enable us to expand our present business as opportunities present themselves."

Dillingham's principal activities are in real estate, maritime, construction and resources throughout the Pacific Basin. Revenues last year were approximately $533,000,000. The company recently reported record third-quarter earnings.

Carrington Slipways States Overseas Advertising Produces Results For Australian Yard

The two 85-foot tugs shown above, the La Trobe and the McLarty (on the ways), were built by Carrington for Howard Smith Industries.

In spite of the gloom that has surrounded the Australian shipbuilding industry in recent years, Carrington Slipways Pty. Ltd. have taken orders for two overseas tugs and have inquiries for eight more. The company states that these are a direct result of an overseas advertising campaign commenced six months ago in U.S. and U.K. shipbuilding publications.

Inquiries from as far afield as Taiwan, the Caribbean, the Middle East, India, Malaysia and the Persian Gulf prove that not only is Carrington leading the way for specialized shipbuilding in Australia, but in fact are highly competitive on an international market.

Having established their reputation with local companies for building extremely sophisticated work vessels of many classes—tugs, offshore supply vessels and fishing trawlers to name a few—the directors of the company, after investigation into overseas market potential, decided that they could offer Australian-built ships at a competitive price with speedy delivery.

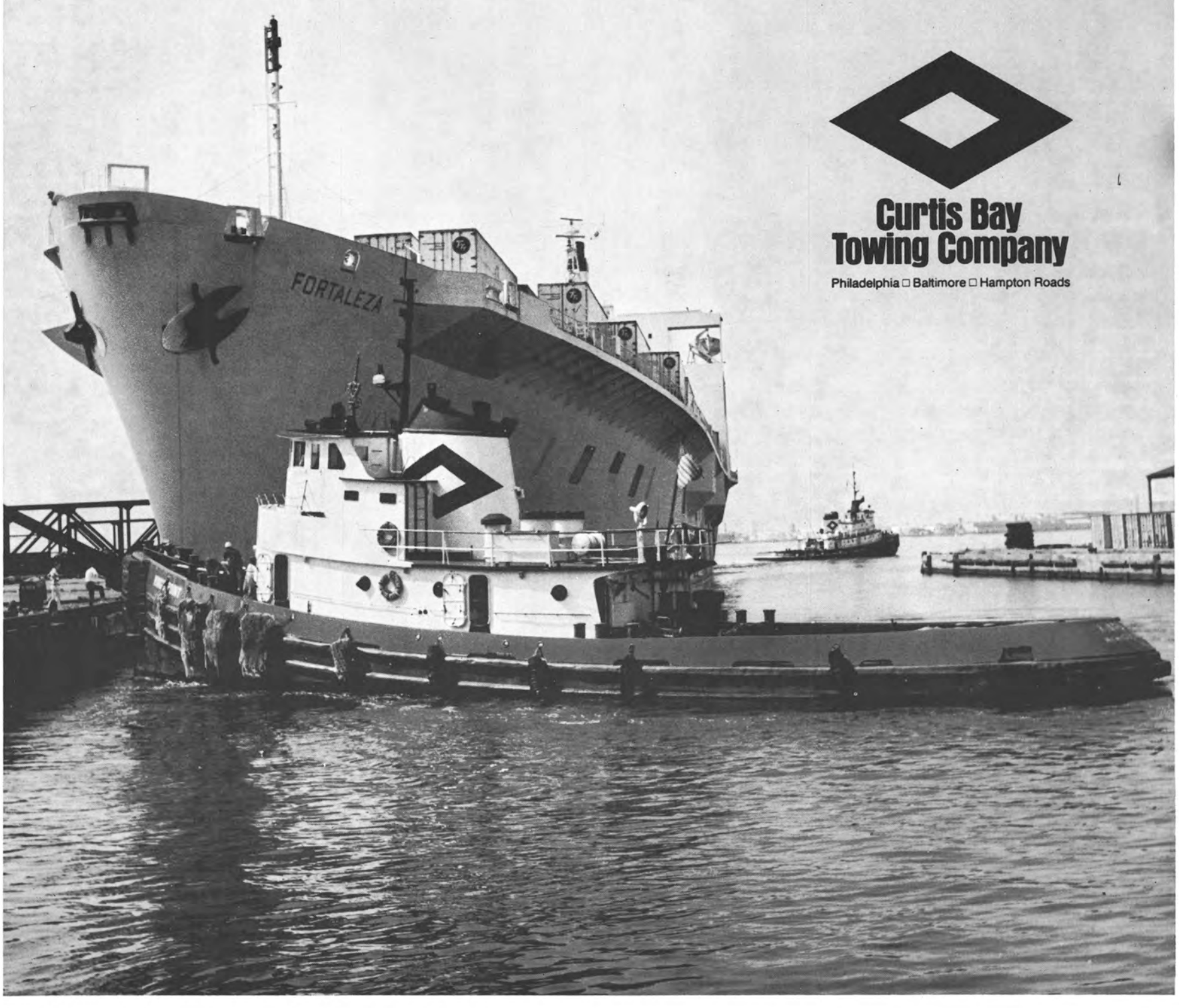
The order for two tugs, which will be similar to the La Trobe and the McLarty built for Howard Smith Industries, comes from Gray Mackenzie Company, Ltd., for operation in the Persian Gulf. Gray Mackenzie is a diversified company servicing oil companies, tanker groups and varied marine interests in the Persian Gulf area, and the company is a subsidiary of Inchgroup of London.

The La Trobe and the McLarty are 85-foot tugs and are powered by two 1,000-bhp Mirrlees Blackstone engines with twin-screws and independent steering nozzles, giving them increased maneuverability. Some modifications have been made to suit the conditions of the operational area of the two new tugs, and they will be extremely maneuverable. Both tugs will provide accommodation for 12, and they will work two full crews of six in around-the-clock operation in separate shifts, catering for up to 200 shipping movements each month.

Carrington Slipways are proving to be an exception to the rule in Australia at a time when many other shipyards have been forced to close or reduce their output. The company has doubled their staff and built more than 20 ships in the last two years.

THERE IS A DIFFERENCE IN TUGBOAT COMPANIES.

Equipment and personnel make that difference. The best of both are required by the FORTALEZA, shown sailing from Baltimore. Both are provided by Curtis Bay. In the photograph, the new tug CAPE HENLOPEN exerts her 3300 horsepower on the stern of the ship. The 2400 horsepower tug KINGS POINT controls the bow. Curtis Bay Towing Company, 63 years of superior service.



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New Astilleros Yard Building First 8 Ships To Lloyd's Register

The first eight ships to be built at Astilleros Espanoles S.A.'s new Cadiz yard, scheduled for completion in 1975, will all be Lloyd's Register class. They include six 260,000-dwt tankers and two 410,000-dwt tankers, all for Spanish owners. The two larger ships are the first tankers ordered by a new Spanish company, Naviera Abasotas S.A.

The machinery for the 260,000 dwt tankers will be 36,000-shp steam turbines to be made by AESA, Bilbao, under GE license. The 410,000-dwt ships will have 48,000-shp steam turbines manufactured at the same plant under Stal-Laval license.

The new shipyard is being built around the Matagorda Works near Puerto Real in the Bay of Cadiz. The building dock will be 525 meters long and 100 meters wide, and the total area of the yard will exceed 1,000,000 square meters. Continuous flow building capacity will enable six 200,000-dwt, or four 350,000-dwt ships to be produced annually, but the shipyard arrangements are flexible enough to enable the construction of vessels up to 1,000,000 dwt to be undertaken.

Delivery dates for the 260,000-dwt tankers range from the end of 1975 to the third quarter of 1977. For the two 410,000-dwt ships, delivery dates are quoted as mid-1977 and the end of 1977.

Interstate Oil Asks Title XI For 11 Vessels To Be Built By SBA

The Maritime Administration has received a Title XI application from Interstate Oil Transport Co., Wilmington, Del. for the acquisition of $13 million worth of tugs and barges for coastwise petroleum carriage.

Construction loan and mortgage insurance is being sought for the following: four barges, costing about $750,000 each, with a capacity of 35,000 barrels; two barges, costing about $1,753,000 each, with a capacity of 70,000 barrels; one barge, costing about $3,154,000, with a capacity of 160,000 barrels; two 3,200-hp oceangoing tugs at approximately $960,000 each, and two 2,850-hp coastwise tugs at about $777,000 each.

SBA Shipyard, Jennings, La. 705-46, will construct the vessels.

Taiwan Yard To Build Four Tankers For GATX At $280-Million Cost

General American Transportation Corp. (GATX), Chicago, Ill., has announced that its subsidiaries have ordered four new ultra large crude carriers to be constructed in Taiwan at a cost of approximately $70 million each.

T.M. Thompson, GATX chairman, and **C.Y. Chen,** chairman of GATX's subsidiary, Marine Transport Lines, Inc., said the four 445,-300 deadweight-long-ton oil carriers will be chartered by four subsidiaries of GATX Oswego Corporation to a major oil company under long-term charters.

The carriers will be constructed by China Shipbuilding Corp. at Kaohsiung, Taiwan, from designs and materials supplied by Ishikawajima-Harima Heavy Industries Co., Ltd. of Japan.

The vessels, to be delivered in 1977, 1978 and 1979, will be manned and operated by Marine Transport Lines, Inc.

GATX Oswego also announced it is acquiring a 25 percent equity in China Shipbuilding Corporation, which will be 45 percent owned by the Republic of China. China Shipbuilding is constructing a major shipbuilding and repair facility at Kaohsiung. Mr. **Thompson** and Mr. **Chen** said that in addition to the four carriers, GATX Oswego has options to purchase certain other vessels to be built at Kaohsiung.

A Eurodollar loan agreement with The First National Bank of Boston, Manufacturers Hanover Trust Company, Irving Trust Company, Continental Illinois National Bank and Trust Company of Chicago, Wells Fargo Bank, N.A., and Continental Illinois Limited has been signed to provide the interim financing presently required for the first two of the four new vessels.

Three Firms Receive MarAd Approval To Construct Vessels

The Maritime Administration recently approved three Title XI applications.

A subsidiary of Arctic Tankers Group, Inc., Arctic Liquid Gas Co., won approval for one integrated tug/barge unit. To be used to transport ammonia between Alaska and Oregon, the 7,500-shp tug and 12,000-cubic-meter capacity barge will be built by John A. Martinoli Shipbuilding Corp., Tacoma, Wash., at an estimated cost of $9,430,350.

The application from Pacific Far East Line covered 50 LASH barges which are to be built by Equitable Equipment Co., New Orleans, La., at an estimated cost of $2.5 million.

Approval for four 7,000-bhp, 149-foot oceangoing tugs was won by Nolte J. Theriot, Inc., Golden Meadow, La. The tugs, also to be built by Equitable at a total estimated cost of $13 million, will be used in the North Sea.

Dave S. Miller Joins State Boat

Dave S. Miller

Dave S. Miller has joined the State Boat Corporation, Houston, Texas, as manager of finance and will work out of the firm's Houston office. In addition to supervising financial matters, Mr. **Miller** will be involved in new vessel procurement and other facets of State Boat's expansion.

His background includes an M.B.A. degree from Harvard Graduate School of Business, and a bachelor's degree in naval architecture and marine engineering from the University of Michigan. Also, Mr. **Miller** has at varying times served as executive officer, diving officer, navigator and first lieutenant of an oceangoing tug in the U.S. Navy.

He is currently an associate member of The Society of Naval Architects and Marine Engineers.

Waterways Company To New Quarters

The Waterways Company, developer and manufacturer of the Steermaster bow steering system for river towboats, has moved its offices from New Orleans, La., to Pass Christian, Miss. The new office address for The Waterways Company is 109 East Scenic Drive, Pass Christian, Miss. 39571, telephone (601) 452-9456.

Santa Fe International Designing Reel Ship To Lay Large Pipelines

Santa Fe International Corp., Orange, Calif., has announced that it is designing a new reel ship to lay large-diameter pipelines in deep water.

President **E.L. Shannon Jr.** said plans call for construction of a 540-foot self-propelled ship utilizing the patented reel techniques acquired last May from Fluor Ocean Services, Inc. The new ship, which would be capable of spooling 70,000 feet of 18-inch pipe, is expected to be completed before the 1976 construction season.

The vessel is designed with a shipshape hull for operation in deep, hostile waters such as the far northern area of the North Sea and across the Norwegian trench, where water depths of nearly 1,000 feet make present pipelaying techniques inefficient.

Preliminary plans indicate the new vessel will be nearly twice the length of Santa Fe's Chickasaw, formerly known as the RB-2. This unit has been operating in the Gulf of Mexico since 1970, and uses the reel method to lay pipe up to 12 inches in diameter.

SNAME Holds 81st Annual Meeting In New York

Technical Papers Covering A Wide Range Indicate The Scientific Skills Of Today

The 81st Annual Meeting of The Society of Naval Architects and Marine Engineers brought together the outstanding maritime talents in the United States and Canada plus many distinguished engineers from Europe and Japan. Held in the New York Hilton Hotel on November 15 and 16, this Annual Meeting had an attendance in excess of previous years. Known worldwide for the high quality of the technical papers and discussions, these meetings are also the place for leaders in the marine fields to meet and discuss individual problems and goals.

The program for this year's meetings was changed from recent years in that the technical sessions were held on Thursday and Friday, with the Banquet for members being held on Friday and the Dinner-Dance on Saturday. Another departure from the conventional was the Awards Luncheon held on the first day of the meetings. This change in schedule was made to shorten the Banquet and allow time for the speaker to cover his subject completely.

Through the courtesy of Sea-Land Service, Inc., a technical field trip was held on Saturday afternoon. The tour included a survey of the Sea-Land Terminal at Port Elizabeth and an opportunity to observe terminal operations, new high-speed container cranes, computerized stowage arrangements, and a chance to board one of Sea-Land's new SL-7 super containerships, the largest containerships in the world.

Dr. **Athelstan F. Spilhaus** was the principal speaker at the Annual Banquet. Dr. **Spilhaus** is a FELLOW of the Woodrow Wilson International Center for Scholars, former president and chairman of the American Association for the Advancement of Science, father of the United States Sea Grant Program, and a foremost advocate of the development of ocean resources.

The Society president, **Phillip Eisenberg,** presided at the meetings and the Banquet. He reported that the membership of the Society, totaling over 10,000, represents all of the various segments and disciplines which interact to provide our Merchant Marine and naval fleets with the most modern technology. The communities represented in the Society include education, research, design, equipment and power-plant development, manufacturing, shipbuilding and operations in the commercial and naval services.

The Society takes advantage of these Annual Meetings to hold many committee meetings which otherwise would not be available to members because of the time and distances required to get members together. The Sections Committee met for breakfast on Thursday. The Membership Committee met for breakfast on Friday, and the Steering Committee on Technical and Research also met during breakfast on Friday.

A special breakfast was held each day for the authors, presiding and assistant presiding officers on the day when they were to participate in the Technical Sessions. These gatherings are sponsored by the Society so that participants can get acquainted, insure program understanding, adequacy of visual-aid equipment, and mutual agreement concerning session details.

At the Annual Business Session held on Thursday, Mr. **Eisenberg** reported on the progress of the Society during the preceding year, the financial status of the Society, summarized and praised the efforts of the various technical committees, and the election of officers. He also gave a brief report on the actions taken by the Council at their annual meeting on the preceding day.

A special bruncheon was held for the ladies attending the Annual Meeting. **Eleanor Phelps,** a character actress, entertained the ladies with a presentation on "How to be Somebody Else."

During the meetings the Society handed out requests for papers to be presented at the 1974 Annual Meeting, which will be held on November 14-16, 1974 in New York City. This hand-out stressed the need for technical excellence and timeliness.

(Continued on page 12)

Jerome L. Goldman, (left) president, Friede and Goldman, Inc., receiving the David W. Taylor Medal from President **Eisenberg.**

James F. Goodrich (right), president, Bath Iron Works, receiving Vice Admiral "Jerry" Land Medal from **Daniel D. Strohmeier.**

J.E. Ancarrow Jr. and **R.L. Harrington** (from left) receiving Vice Admiral E.L. Cochrane Award from RAdm. **R.K. James.**

Karl E. Schoenherr (right) receives 50-Year Golden Award Membership Certificate from SNAME President **Phillip Eisenberg.**

Past presidents of the Society meet prior to the Annual Banquet. From left to right: Rear Adm. **Ralph K. James,** USN (ret.); **Matthew G. Forrest;** Rear Adm. **Albert G. Mumma,** USN (ret.); **James J. Henry,** president, J.J. Henry Co., Inc., and **Daniel D. Strohmeier.**

SNAME Council elects, from left to right: Prof. **R.B. Couch,** honorary vice-president; **L. Rosenblatt,** vice-president; Rear Adm. **W.A. Brockett,** Council member; **P.E. Atkinson,** vice-president, and **A.E. Cox,** Council member representing members.

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Officers of the Society, left to right: **Robert Axelrod,** assistant treasurer; **Robert G. Mende,** secretary; **Phillip Eisenberg,** president, and **Ralph C. Christensen,** treasurer. All but the president were reelected by the Council.

At the Banquet reception, left to right: President **Phillip Eisenberg; Mrs. Helen Delich Bentley,** chairman, Federal Maritime Commission, and Dr. **Athelstan F. Spilhaus,** the principal speaker at the Annual Banquet.

Newly elected by the Society, left to right: **Jerome L. Goldman,** Council member; **James R. Maumenee,** elected to the Council to represent Affiliates, and **A. Dudley Haff,** elected by the Council to be a vice-president.

Donald A. Holden (from the left), past Society president, presents The Graduate Paper Award to **R. Bruce Woodruff;** The Graduate Paper Honor Prize to Prof. **J. Harvey Evans** on behalf of **Theodore A. Achtarides,** and The Undergraduate Paper Award to **Mark C. Oakes.**

Attending the banquet, left to right: **Paul E. Atkinson,** president, Sun Shipbuilding & Dry Dock Company, **John T. Gilbride,** president, Todd Shipyards Corp.; **William A. Sheehan,** president, Kirlin, Campbell and Keating, and Prof. **Richard B. Couch,** University of Michigan.

Attending the banquet, left to right: **John R. Blackeby,** chairman of the Society's committee on public relations; **Vernon A. Olson,** technical administrator; **Walter B. Gallagher,** administrative assistant, and **Richard Garthwaite,** technical coordinator for the Society.

W.B. Van Berlekom and **T.A. Goddard** (from left) are awarded The Captain Joseph H. Linnard Prize by **Matthew G. Forrest,** a past president of the Society.

SNAME Annual Meeting

(Continued from page 10)

Awards

At the Annual Banquet the following awards were made to members for notable and outstanding accomplishments in the marine field:

The 34th award of the "David W. Taylor Medal" was made to **Jerome L. Goldman** for notable achievement in naval architecture by the president of the Society. As president of his own firm, Friede and Goldman, Inc., Mr. **Goldman** has been responsible for a great number of innovations in the marine industry for which he has been honored with many awards, among them the Distinguished Achievement Award for individuals by the Offshore Technology Conference, an Honorary Doctor of Science Degree from the University of Michigan, and the Louisiana Propeller Club Maritime Man of the Year Award. Among these innovations are the concepts of the LASH-Barge-carrying ship, the All-Hatch or "Open" ship, the ultra-wide supertanker configuration with a length-breadth ratio of 5.0 and the design of the first true offshore mobile drilling unit for working in open sea conditions. Over the years he has served the Society in many ways; as founding chairman of the Gulf Section, a member of the Technical and Research Steering Committee and chairman of the 1963 Spring Meeting Steering Committee. Additionally, he has given of his time and knowledge to various advisory committees of the American Bureau of Shipping, The International Cargo Handling Coordination Association and other marine activities.

The 22nd award of the "Vice Admiral 'Jerry' Land Medal" was made to **James F. Goodrich** for outstanding accomplishment in the

Banquet reception group, left to right: **James J. Reynolds,** president, American Institute of Merchant Shipping; Rear Adm. **William A. Brockett,** USN (ret.), president, Webb Institute; Rear Adm. **Arthur B. Engel,** USCG (ret.), superintendent, U.S. Merchant Marine Academy; Dr. **Ira Dyer,** head, Dept. of Ocean Engineering, Massachusetts Institute of Technology; **Robert T. Young,** chairman and president, American Bureau of Shipping, and Dr. **T. Francis Ogilvie,** chairman, Dept. of Naval Architecture and Marine Engineering, University of Michigan.

Banquet Committee, left to right: Capt. **Robert F. Desel,** USN (ret.), Mobil Oil Company; **Lawrence B. Bennett,** district marine superintendent, Atlantic-Allegheny District, General Electric Company; **Charles A. Narwicz,** United States Lines, banquet chairman; **Patricia McGovern,** Hull Scientific Dept., George G. Sharp, Inc.; **Marvin A. Morris,** manager, marine sales, I-T-E Imperial Corporation; **Nicola F. Pergola,** chief marine engineer, Designers and Planners, Inc., and **Norman R. Farmer,** manager, Systems Analysis Dept., George G. Sharp, Inc.

Dinner-Dance Committee, left to right: **Donald L. Caldera,** consultant; **Robert P. Fulton,** mechanical engineer, Gibbs & Cox, Inc.; **Preston H. Hadley Jr.,** chairman, vice-president, Gibbs & Cox, Inc.; **James G. Price,** assistant vice-president, Norfolk Shipbuilding & Drydock Company, and **Robert D. Markoff,** General Electric Company.

marine field by **Daniel D. Strohmeier,** past president of the Society. Mr. **Goodrich** has had a long and active career in the marine field during which time he has risen from a wiper in the engine room to his present position as president of Bath Iron Works. Along the way he worked at Bethlehem Steel Company's Sparrows Point Shipyard and for a number of divisions of Todd Shipyards, rising to general manager of the Los Angeles Division before moving to Bath in 1964 to become executive vice-president. During his time at Bath, he has overseen the delivery of a significant number of ships, both commercial and naval; as well as implementing an extensive expansion of the facilities at Bath in anticipation of the current demand for ships. He has served the Society in many ways during his 36 years of membership, including chairman of the Pacific Northwest Section, vice president of the Society and a member of the Executive Committee and Council.

At the Society's Awards Luncheon, held on Thursday, the following awards were presented.

"The Captain Joseph H. Linnard Prize" was presented jointly to **William B. Van Berlekom** of the Swedish State Shipbuilding Experimental Tank, and **Thomas A. Goddard,** an associate member of the Society since 1967, for their paper entitled "Maneuvering of Large Tankers." This prize is given to the author or authors of the best paper contributed to the proceedings of the Society at its Annual Meeting the preceding year.

"The Vice Admiral E.L. Cochrane Award" for 1973 was presented jointly to **Roy L. Harrington,** a Life Member of the Society since 1960, and **John E. Ancarrow Jr.,** an associate member of the Society since 1967, in recognition of their paper "Main Propulsion Shafting Eccentricity Considerations" delivered at the Hampton Roads Section on February 15, 1973.

"The Graduate Paper Honor Prize" for 1973 was awarded to **Theodore A. Achtarides** for his paper entitled "Plastic Design of Plate Panels for Ice Strengthening and Slamming" delivered at the New England Section on September 22, 1973.

The "Graduate Paper Award" for 1973 was presented to **R. Bruce Woodruff** for his paper entitled "Heavy-Duty Gas Turbine—A Viable Marine Propulsion Option" delivered at the New England Section on September 22, 1972.

The "Undergraduate Paper Award" for 1973 was presented to

(Continued on page 14)

President **Phillip Eisenberg** (left) presents Certificate of Appreciation to **Blakely Smith.**

W. Tilford Smith (left) accepts Certificate of Appreciation from President **Eisenberg.**

Authors (seated from left): **E.S. Geller;** Comdr **C.S. Niederman,** USCG; Capt. **V.R. Milano,** USN, and Prof. **H.A. Schade.** (Standing from left); presiding and assistant presiding officers: Capt. **W.M. Nicholson,** USN (ret.); **M.D. Macpherson; R.G. Kline;** Capt. **H.P. Rumble,** USN (ret.), and Capt. **K.P. Farrell,** RCN.

Authors (seated from left): **Jorgen Strom-Tejsen, Hugh Y.H. Yeh, David D. Moran, Michel K. Ochi** and **Lewis E. Motter.** (Standing from left); presiding officers and assistant presiding officers: **William M. Cummins,** Capt. **Perry W. Nelson,** USN, and **Harry S. Townsend.**

Authors (seated from left): **Edward F. McCann II, C.J. Mole, Jose Femenia,** and **Robert T. Young.** (Standing from left); presiding and assistant presiding officers: **Robert P. Giblon, William E. Zimmie,** Dr. **Lasker Wechsler,** Rear Adm. **William A. Brockett,** USN (ret.), and **John V. Banks.**

Authors (seated from left): **Kenneth W. Fisher, G.C. Volcy,** and **Ralph G. McTaggart.** (Standing from left); presiding officers and assistant presiding officers: **Alvin E. Cox, Jack A. Obermeyer,** Dr. **J.D. Van Manen, Jerome L. Goldman,** Dr. **A.D. Carmichael, James Francis Dunne** and Dr. **Yoram Goren.**

SNAME Annual Meeting

Mark C. Oakes for his paper "Experimental Added Resistance Prediction vs. Theoretical Predictions for a Transom Stern Containership" delivered at the New England Section on September 22, 1972.

One Fifty-Year Golden Award Membership Certificate was presented to **Karl E. Schoenherr** (M '23).

Two Fifty-Year Golden Award Membership Certificates was presented in absentia to **Edward C. Davidson** (M '23), and **Joseph C. Groff** (M '23).

Technical Meetings

Twelve outstanding technical papers by specialists in their respective fields, both from the United States and abroad, were presented during the two days of technical sessions.

The Papers Commitee, under the chairmanship of **Jack A. Obermeyer,** won high praise from the Society's president and members for the outstanding quality of the papers. The members of the committee are: **John P. Breslin, William A. Brockett, A. Douglas Carmichael, Joseph J. Cuneo, James Francis Dunne, Keith P. Farrell, Zelvin Levine, Chester L. Long, Perry W. Nelson, Henry P. Rumble, John Vasta, Charles Zeien,** and **William E. Zimmie.**

The 12 technical papers presented were:

Paper No. 1—"Superconducting Electric Propulsion Systems for Merchant and Naval Ship Concepts" by **Edward F. McCann II** and **C.J. Mole.**

Paper No. 2—"Economic Comparison of Various Marine Power Plants" by **Jose Femenia.**

Paper No. 3—"Added Resistance in Waves" by **Jorgen Strom-Tejsen, Hugh Y.H. Yeh,** and **David D. Moran.**

Paper No. 4—"Prediction of Slamming Characteristics and Hull Responses for Ship Design" by **Michel K. Ochi** and **Lewis E. Motter.**

Paper No. 5—"The Role of the Classification Society in Relationship to Design Responsibility" by **Robert T. Young.**

Paper No. 6—"The Inclusion of IMCO Tanker Design Constraints in General Optimization Procedures" by **Kenneth W. Fisher.**

Paper No. 7 — "Maneuvering Safety of Large Tankers: Stopping, Turning, and Speed Selection" by **C. Lincoln Crane Jr.**

Paper No. 8 — "Mathematical Simulation and Model Tests in the Design of Data Buoys" by **Dan Hoffman, Edward S. Geller,** and **C.S. Niederman.**

Paper No. 9—"Ship Resistance to Continuous Motion in Ice" by **V.R. Milano.**

Paper No. 10—"Investigation on Free and Forced Vibrations of an LNG Tanker with Overlapping Propeller Arrangement" by **K. Restad, G.C. Volcy, H. Garnier,** and **J.C. Masson.**

Paper No. 11—"On Damaged Stability of Drilling Vessels" by **Ralph G. McTaggart** and **Richard H. Gunderson.**

Paper No. 12—"Interpretations of the Esso Norway Static Tests" by **Henry A. Schade.**

Kuwait Shipping Co. Orders Three More Vessels From Govan

According to reports from Glasgow, the Kuwait Shipping Co. has awarded an order for three more 22,300-deadweight-ton multipurpose cargo vessels to Govan Shipbuilders, the U.K.-Government controlled shipyard on the River Clyde. The winning of this award brings the total orders with Govan for these ships up to nine, with an overall value of $95 million at current exchange rates.

D.H. Todd, general manager of Kuwait Shipping, commented that the first of the nine vessels would be delivered in April 1974 and the last early in 1976. He added that the company was paying for the ships in cash.

The first batch of four ships was ordered from Govan in July 1972. This was followed by two more in March of this year and the recent announcement of the latest three.

The order is being seen as providing a valuable program for Govan, not only in terms of work, but also in the form of a fairly long production run for a standard ship series.

The ships have been ordered to cater for a "substantial increase" in trade moving into Arabian and Iranian ports.

International Paint Names G.J. Robinson

George J. Robinson

Thomas M. Reinhardt, president of International Paint Company, Inc., recently announced the appointment of **George J. Robinson** as assistant vice president. Mr. **Robinson** will be located at the corporate and sales offices of International Red Hand Marine Coatings, located at 21 West Street, New York, N.Y.

Mr. **Robinson** has been active in the marine industry over the past 30 years. This would include his service as an officer in the United States Navy, employed by a ship repair firm for five years after the war, and for the past 20 years he has been involved in giving guidance and assistance to owners, naval architects and shipyards in the selection of marine paints and coatings.

Mr. **Robinson** attended Niagara University and is active in several marine-oriented organizations such as The Propeller Club, Whitehall Club, Robert Hague Post and others.

Whitehall Corp. To Build 175-Foot Survey Vessel

The earth science group of Whitehall Corporation (WHTASE), 1133 Empire Central, Dallas, Texas 75247, has been awarded a contract to build and equip, and arrange the personnel training for, a 175-foot oceanographic seismic survey vessel for the Oil and Natural Gas Commission of the Government of India, **Lee D. Webster,** Whitehall's chairman of the board and president, recently announced.

"This new ship for India will be similar to but larger than the two seismic survey vessels designed and now operated by our Seismic Explorations International, S.A. subsidiary, and will cost more than $4,000,000," **George M. Pavey,** president of the Whitehall subsidiary stated. "To be staffed by 16 scientists and technicians as well as a 24-man crew, the craft will be used to develop seismic data on potential mineral-bearing locations off the coast of India and in the Bay of Bengal."

P.K. Lahiri, Member-Stores, Oil and Natural Gas Commission, represented the Government of India at the contract award signing; Mr. **Pavey** represented Whitehall.

The new ship is designed to tow a two-mile-long streamer containing 2,000 sensitive hydrophones. Signals generated by an air-gun array will be echoed off subsurface strata, received by the hydrophones and recorded on digital magnetic tape. This recorded data is later interpreted to create a subsurface geologic map.

Much of the survey equipment was developed and will be manufactured or assembled by the 30-year-old Seismic Engineering Company subsidiary of Whitehall.

Ship construction and installation of maritime equipment will be subcontracted by Seismic Explorations International, S.A.

Cleveland-Cliffs Iron Names Wallace Rohn Marine Superintendent

Wallace J. Rohn has been named marine superintendent for The Cleveland-Cliffs Iron Company, Cleveland, Ohio, according to **Samuel K. Scovil,** senior vice president.

Mr. **Rohn** was formerly manager of marine traffic and in his new position will be responsible for the day-to-day operations of the Cliffs fleet, reporting to **Richard P. Eide,** manager-marine department. He will continue to be in charge of marine traffic and will have the marine personnel section—headed by **Peter J. Collins**—under his guidance.

A former Air Force staff sergeant, Mr. **Rohn** attended Cleveland State University and Case Western Reserve University, joining Cliffs in 1947. He served in a variety of accounting positions until 1956, when he moved to the marine department as a dispatcher. He was named manager-marine traffic in 1970.

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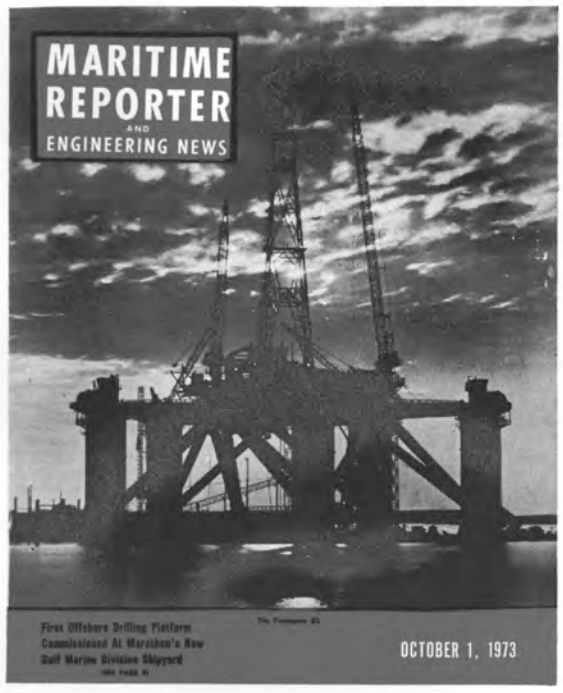

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Avondale Lays Keel For Lash Vessel In $100-Million Central Gulf Lines Program

Taking part in the keel-laying ceremonies are (from left), **Richard F. Brunner,** executive vice president of Avondale; **C.V. Wolff Jr.,** general manager of Central Gulf's Marine Division; **R.E. Dassey,** assistant general manager of the company's Marine Division; **R.C. Bloom,** U.S. Maritime Administration construction representative; and **Stanley M. Bebler,** vice president of Friede & Goldman, Inc., designers of the vessel.

Keel-laying ceremonies on November 26 signaled start of construction of the S/S Green Island, third of three 893-foot-long LASH vessels ordered by Central Gulf Lines, Inc. in a $100-million expansion program for its U.S.-flag fleet.

The Green Island and her sister ships, Green Valley and Green Harbour, are under construction at Avondale Shipyards, New Orleans, La. Delivery of the Green Valley is scheduled in August 1974, with the other two ships to follow at 75-day intervals.

Central Gulf has contracted for 440 standard 370-ton capacity LASH barges to serve the new vessels. Each of the new LASH vessels is designed to carry 89 LASH barges.

Central Gulf plans to operate its three new LASH vessels in an express service between U.S. Gulf and East Coast ports and the Middle East, Indian subcontinent, Southeast Asia and the Far East. The company presently operates the world's first two LASH ships in a fortnightly service between U.S. Gulf ports, the United Kingdom and Continental Europe.

Designed by the naval architectural firm of Friede & Goldman, Inc., the new Central Gulf LASH vessels have an overall length of 893 feet, beam of 100 feet, molded depth of 60 feet at the side, 32,000 shaft horsepower, speed of 22 knots, and a deadweight of 40,400 tons at 38 feet.

Central Gulf, an affiliate of Trans Union Corporation, maintains headquarters in New Orleans, with offices in New York, Houston, Memphis, Chicago, and Dallas, and a network of agency affiliates in other major United States and world ports.

United States Leads In Advanced Liner Ships

The leading position of the United States in the development of advanced shipping techniques is illustrated in the following table listing containership and barge carrying vessel data as of January 1, 1973.

	Total World Fleet	United States-Flag Fleet	
Number of Full Containerships	321	97	(30% of World Fleet)
Deadweight Tonnage of Containerships	4,587,000	1,430,000	(31% of World Fleet)
Number of Barge Carrying Vessels	15	10	(67% of World Fleet)
Deadweight Tonnage of Barge Carrying Vessels	505,000	315,000	(62% of World Fleet)

Los Angeles SNAME Hears Technical Paper On Treatment Of Shipboard Waste

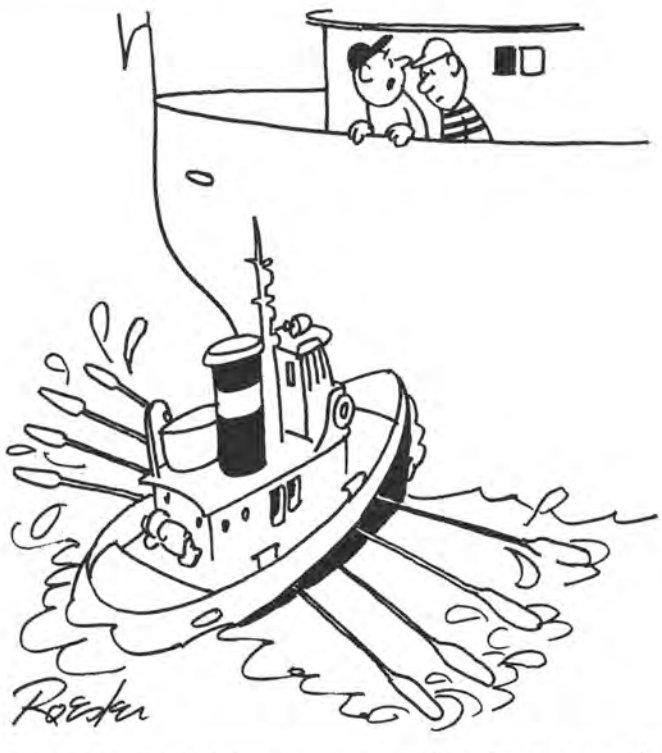
Principals of the Los Angeles Metropolitan Section meeting, shown above at the Princess Louise Ship Restaurant, left to right: **Charles K. Pollock,** vice chairman; **Peter Bowman,** chairman, papers committee; Dr. **W.M. Fassell,** author; **Frank Nickels,** chairman of the Section, and **Harry Levy,** secretary-treasurer of the Section.

The Los Angeles Metropolitan Section conducted its second meeting of the season on November 8, 1973, at the Princess Louise Ship Restaurant, which is located in the Port of Los Angeles.

The meeting, which was preceded by a cocktail hour and dinner, was stimulating and well attended.

A very interesting technical paper was presented by Dr. **W.M. Fassell** of the Barber Coleman Company. The paper was entitled "Puretec System for Treatment of Shipboard Waste," and was authored by Dr. **Fassell** and **D.W. Bridges.**

The paper discussed the national objective of cleaning up our environment, specifically as it pertains to the curtailment or elimination of human waste discharge into the navigable waters of the United States. Dr. **Fassell** discussed in detail a process developed by Barber Coleman Company, known as "Closed Circuit Wet Oxidation." Wet oxidation is a term used to describe a chemical reaction occurring in water between oxygen and suspended or dissolved combustible matter. The water temperature must be well above normal boiling point, and for this reason wet oxidation is conducted in an autoclave where the water, steam and oxygen are pressurized. Wet oxidation seems uniquely applicable for the on-board processing of marine sanitary waste.



APL Appoints Henry Kozlowski VP

American President Lines, San Francisco, Calif., has announced the appointment of **Henry Kozlowski** as vice president. His primary responsibility will continue to be corporate planning, long-range as well as operational.

Mr. **Kozlowski** graduated from Glasgow University, Scotland, in 1951, with first class honors as a naval architect. He attended the Massachusetts Institute of Technology, where he attained an S.M. degree in naval architecture and marine engineering and taught on the M.I.T. staff.

In 1971, he joined APL from Matson Navigation Company, where he served as project engineer and manager of preliminary design.

Shipping Official Sees Public Relations Need In Maritime Industry

A shipping official finds the maritime industry standing in urgent need of a greater overall public relations effort, and has advocated the setting up of an industry-wide association to promote such a project.

Decrying the "uncommunicativeness" of industry-related companies as a whole, Capt. **Joseph Lala,** executive vice president of Netumar International, said that "an ailing industry such as ours" stands in far greater need of public relations than the more prosperous sectors of U.S. industry and commerce, which wield the promotional tool with an effectiveness equal in depth to the maritime industry's reluctance to develop a public relations image for itself.

The New York-based Netumar International acts as general agent for U.S., Canadian East Coast and Great Lakes ports for the Brazilian-flag Line Netumar.

Speaking at a U.S. Atlantic and Caribbean Ports' Association dinner in Jacksonville, Fla., Captain **Lala** told his audience that their "light is being hidden under a bushel" because their messages are not getting across effectively.

In a country "where we are surrounded by the consumer orientation impact of public relations for everything imaginable," he saw it as "paradoxical" that "we in maritime continue, at best, with outdated methods of selling our services or, at worst, by relying on a customer to pass the good word along."

Captain **Lala** told the port officials that they all have messages to convey to a specific public, be it shippers, manufacturers or importers, "who need and want your services.

"But your messages are not getting across effectively," he emphasized.

"We in the maritime trades are so backward in the communications field that we don't even have surveys to document our uncommunicativeness," he noted.

To further the concept of an effective public relations image for the maritime industry, Captain **Lala** advocated the establishment of an organizaion composed of member firms in the maritime trades, and underlined the short and long-term benefits, "unknown to us today," that such an association could bring.

Stressing that "first impressions are lasting impressions," he also urged the officials to look with a critical eye at their own port publications, with a view to revamping them so as to bring about a more favorable impact with their public.

He also pressed them to promote a greater flow of information about their ports to national publications.

"The Journal of Commerce, Maritime Reporter, Shipping Digest and scores of other periodicals are looking for industry news," Captain **Lala** said, "and would be as happy to receive your stories and pictures as you are reluctant in giving them."

Homelite Introduces New Generator With Latest Safety Features

A 150-pound generator, ideal for operating lights, motors and power tools, has been introduced by Homelite, manufacturer of construction equipment for more than 50 years. Known as model 9HY-1C, the unit has been designed to incorporate the latest safety regulations.

The new Homelite generator, replacing model 9HY-1B, provides for a direct current circuit breaker to comply with the National Electric Code. The 150-pound addition to the company's generator line has the control box on the side for ease in servicing components.

According to **Thomas Winn,** market manager, industrial and construction equipment at Homelite headquarters, 70 Riverdale Avenue, Port Chester, N.Y. 10573, the 9HY-1C has the same output rating of 3,000 watts two-cycle engine as the 9HY-1B, as well as the same safety grounding features.

Selling for $725, the new generator delivers 230-volt AC power at 180 cycles of three-phase current and 115 volts DC.

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Ships in Portland Harbor, for example, can have their lubricants tanks filled in mid-harbor. No need to tie up at a dock. Shell distributor, Golten Ship Repair, sends out the Aubrey L. Hudgins. The little 95-gross-ton tanker has a capacity of 48,000 gallons of lube oils.

Advantages to motorships

The Hudgins pulls alongside a newly arrived ship. One man hooks up the connection and opens the ship's intake valve. Another man watches the sight in the ship's engine room. That's all there is to it. No cranes. No cargo nets. No tank trucks needed on a pier.

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Buying multi-purpose MELINA Oil, and having it pumped aboard in a speedy bulk loading operation makes good business sense. The savings in time, labor and paper work are obvious.

Golten Ship Repair tank boat, the Aubrey L. Hudgins, pumps Shell MELINA Oil into ship in mid-harbor at Portland, Maine. The Hudgins' pumps can deliver 4,800 gallons per hour from her 48,000-gallon-capacity tanks. Turnaround time for ships is speeded up by this fast, clean delivery system.

Bulk lube oil delivery of Shell marine lubricants at major U.S. ports offers motorships fast, clean, safe delivery. Lifting lube oil in bulk directly into ships' tanks is much faster than drums, safer and more economical than drums, and there is far less chance for product contamination.

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Albert J. Sehorn Appointed President Carboline Marine Corp.

Stanley L. Lopata, president of Carboline Company, St. Louis, Mo., has announced the appointment of **Albert J. Sehorn** as president of the newly formed Carboline Marine Corporation, a wholly owned subsidiary operating as a part of Carboline International Division.

In his new position, Mr. **Sehorn** will have the responsibility of strengthening and expanding Carboline marine sales and servicing of protective coatings, linings and deck coatings to shipowners and shipyards throughout Carboline's worldwide network of affiliates and representatives.

It was also announced that **E.W. Skiles,** formerly sales manager of the Carboline Marine Division, has been promoted to vice president of the Carboline Marine Corporation. Mr. **Skiles,** operating out of the St. Louis offices, will coordinate marine activities in the East and Gulf Coasts and also with the foreign affiliates.

Mr. **Sehorn's** background consists of 30 years in marine sales and management. Most recently, he was executive vice president and a director of International Paint Company (California) Inc. Prior to that, he was associated with States Steamship Company and Commercial Iron Works, a shipbuilding firm. Among his many related activities, he was a director of the Marine Exchange of San Francisco Bay Area and The Propeller Club Port of San Francisco.

Albert J. Sehorn

As a part of Carboline's expanded marine marketing program, a new manufacturing plant will be opened in the San Francisco Bay Area in early 1974 to supply products to the West Coast and throughout the Pacific.

Mr. **Sehorn** will headquarter in offices located at 1799 Bayshore Highway, Suite 239, Burlingame, Calif. 94010.

Carboline is a major supplier of marine and industrial protective coatings, tank linings, floor coatings, finishes, waterproofing, architectural and fireproofing products. Main offices are at 350 Hanley Industrial Court, St. Louis, Mo. 63144.

Hydro Products Promotes Mike Kelly

Mike Kelly

Jim Hitchin, assistant general manager of Hydro Products, San Diego, Calif., recently announced the promotion of **Mike Kelly** to export manager. Mr. **Kelly** will also continue in his capacity as offshore manager, providing sales and service to the offshore industry for Hydro Products' Wellhead Inspection Television System.

As export manager, he will direct the successful program that enabled Hydro Products' export sales to increase from 20 percent of total sales in 1969 to nearly 40 percent in the current year. In recognition of this achievement, on October 10, 1973, the Department of Commerce presented Hydro Products with the President's "E" Award for excellence in exporting. This is the highest peacetime award the President of the United States can confer on a business organization.

Mr. **Kelly** joined Hydro Products in April of this year. He was previously associated with Oceaneering International Incorporated.

but not duplicates

The new 7500 H.P. M/V Gale C. is the second Hydrodyne towboat built for Upper Mississippi Towing Corporation by St. Louis Ship, in the past 2 years. The Gale C. and its predecessor, the Leslie Ann, are twins but *not* duplicates. Their crisp lines and quality appearance are the same, above the water. But beneath the surface, modifications have been made on the Gale C. to improve the famous Hydrodyne performance. These resulted from a new series of tests recently performed at the Netherlands Ship Model Basin. St. Louis Ship's exclusive HYDRODYNE has now been more highly refined to produce even greater maneuverability, without sacrificing any of the famous Hydrodyne push. For an efficient new towboat, to increase *your* profits, call St. Louis Ship, at (314) 638-4000.

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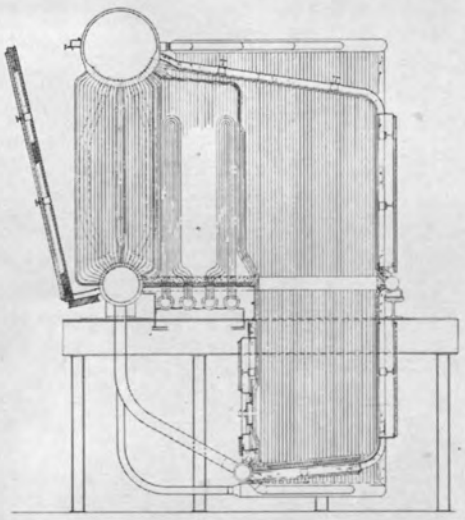

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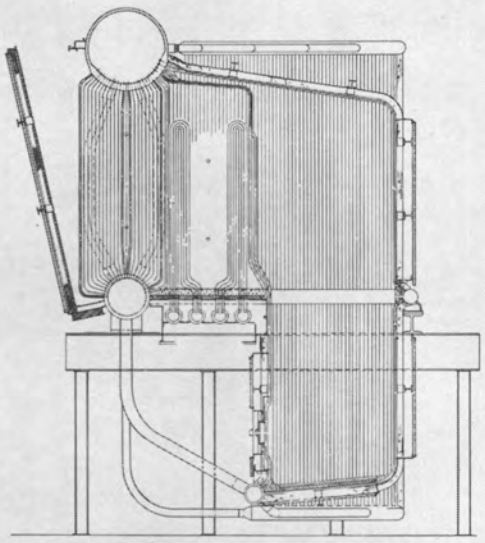

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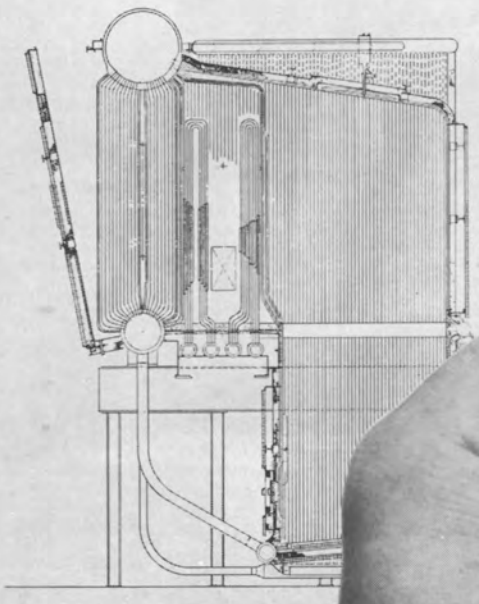

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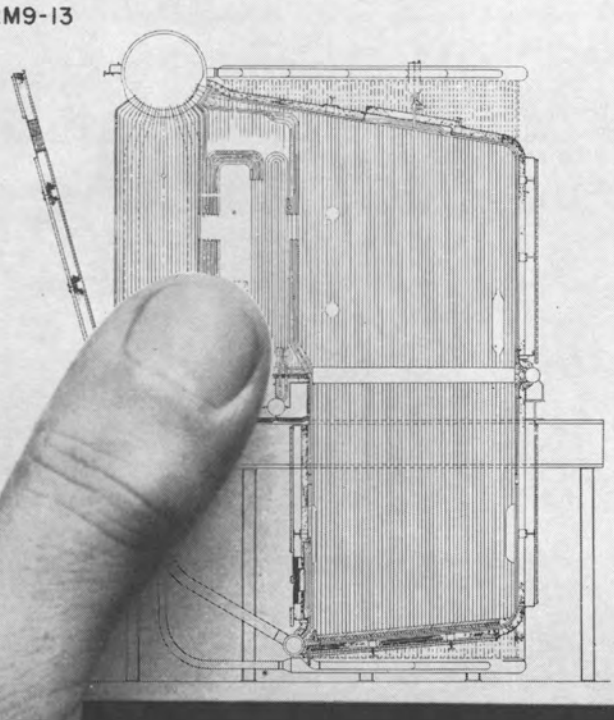
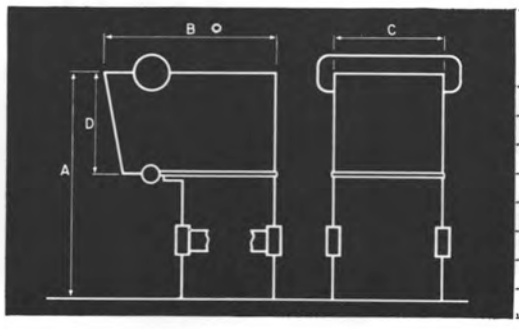


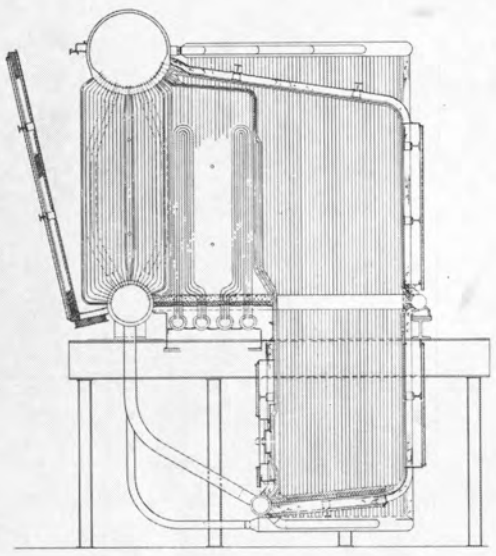
A full line of standard C-E V2M9



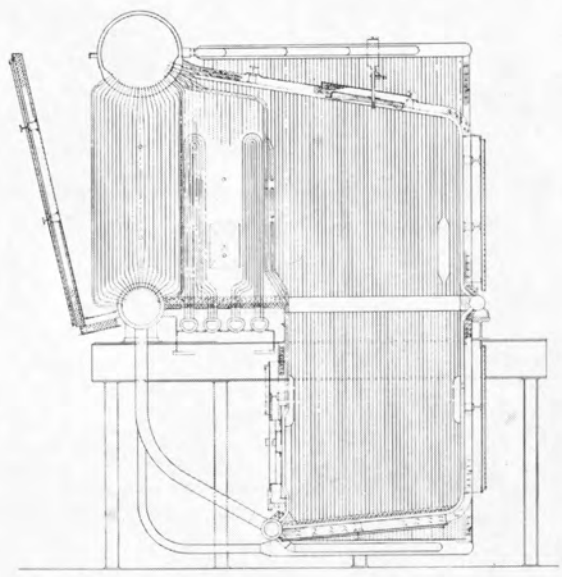
BOILER DESIGN	CAPACITY METRIC TONS/HR*	A		B		C		D	
		MM	FT	MM	FT	MM	FT	MM	FT
V2M9-7	70	9930	32.4	8070	26.5	3160	10.3	5029	16.5
V2M9-8	80	10032	32.9	8376	27.4	3460	11.3	5029	16.5
V2M9-9	90	10134	33.2	8692	28.4	3760	12.3	5029	16.5
V2M9-10	100	10236	33.6	9017	29.5	4056	13.3	5029	16.5
V2M9-12	120	11050	36.3	9017	29.5	4380	14.3	5791	19
V2M9-13	130	11735	38.6	9921	32.6	4764	15.6	5791	19
V2M9-15	150	11735	38.6	10529	34.6	5360	17.6	5791	19
V2M9-17	170	11735	38.6	10985	36	5970	19.6	5791	19

*Varies with cycle conditions

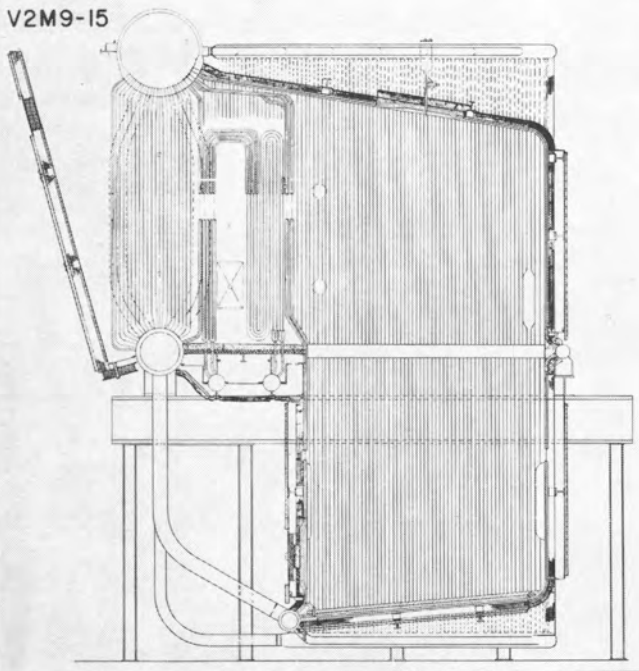
V2M9-9



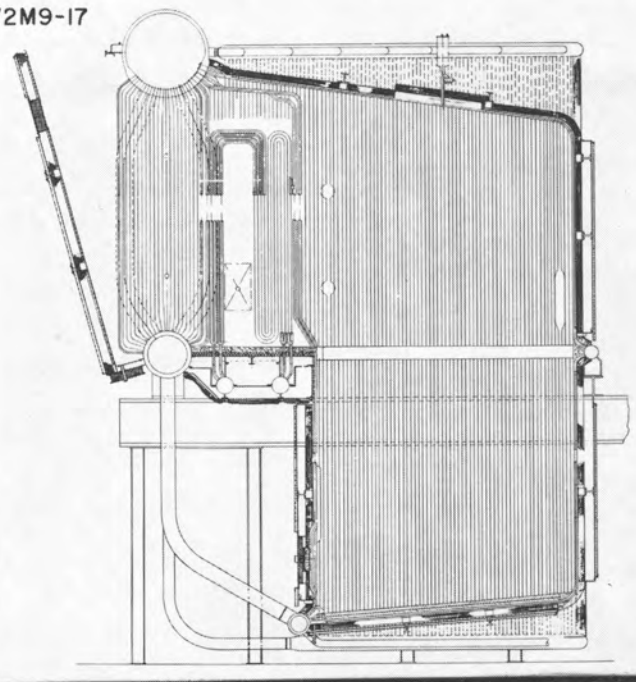
V2M9-10



V2M9-15



V2M9-17



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1

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350 KW—120/240 volts DC—600 RPM—compound wound G.E. generator with switchgear. ENGINE: Ingersoll-Rand—heavy-duty type S—505 HP—10½x12—reconditioned to ABS.

2

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.

3

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.

4

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.

5

500 KW— 120/240 VOLT DC DIESEL GENERATOR SET EQUAL TO NEW

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. Has Ross shell & tube type lube oil & raw coolers—temp. control valve—shock mounts.

6

300 KW DIESEL GENERATOR SET

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TURBO GENERATOR SETS

7

400 KW WESTINGHOUSE TURBO GEN SETS FOR BETH. SPARROWS PT. HULLS 400 TO 4500; QUINCY HULLS 1600

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.

8

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° TF—5286 RPM—Serial 10-A-2611-4. Wt. 16,700 lbs. —complete in original factory crate.

9

LOW-PRESSURE UNUSED 300 KW G.E. 120/240 VOLT DC 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

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 operate 615 PSI—850°TT.

11

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

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

12

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

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.

13

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.

14

UNUSED C-4 CROCKER-WHEELER 500 KW GENERATOR ENDS ONLY

120/240 VOLTS D.C.—1200 R.P.M.

FORMERLY USED WITH WORTHINGTON-MOORE TURBINES & GEARS

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 temperatures 50°C. APPLICATION: For C-4-SA1; C4-SA-3; T-AP-134 vessels, using Worthington-Moore Turbine—Form S-6 and generator Form 14 x 10. No pedestal bearing.

15

WESTINGHOUSE 400 KW TURBO-GEN 835 LBS — 840°TT

Newport News Hulls 480—541 Esso ships. TURBINE: Westinghouse 835 lbs/840°TT—9018 RPM—6-stage —instruction book 1430-C1—serial 5A-7090-7 & 8. GEAR: 9018/1200 RPM. GENERATOR: Westinghouse 400 KW—440/3/60/1200 RPM—rewound field—instruction book 5442. EXCITER: 5.5 KW.

16

TWO 538 KW WESTINGHOUSE T-2 AUX. GENERATORS

(COMPLETE)

TURBINE: 538 KW @ 5010 RPM—438 PSIG—750°TT—28½" vacuum. GEAR: 5010/1200 RPM. A.C. GENERATOR: 400 KW 450/3/60/1200—0.8 PF. DC EXCITER: 32.5 KW—120 volts (variable voltage)—shunt—4-pole—DC excitation 5 KW. ALWAYS WELL MAINTAINED BY MAJOR OIL CO.

TURBINES & ROTORS

MAIN PROPULSION

17

BETH. CLASS—13,600 H.P.

Sparrows Point & Quincy 1600 hulls. H.P. turbine casing only. Excellent blading & labyrinth packing.

18

H.P. & L.P. COUPLINGS

1 Set—for Beth Class 13,600 HP 4400 hulls and Quincy 1600 hulls.

19

G.E. 6690 HP @ 7062 RPM HIGH PRESSURE 8-STAGE TURBINE

835 lbs—840°TT—#83341—originally built for Esso Christobol—Newport News.

T-2 TURBINES & ROTORS

20

COMPLETE WESTINGHOUSE T-2 MAIN TURBINE—UNSHROUDED 6600 HP—435 PSI—750°F 28" VACUUM—3720 RPM

Instruction book IB-8345—type D—serial No. 5A-2124-6—unshrouded. Unit complete with all packing, stationary blading, linkage, governors, diaphragms, nozzles, etc. WILL SELL ROTOR SEPARATELY OR COMPLETE TURBINE CASING & ROTOR. Always well maintained by major oil company.

21

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

ROTOR WILL INTERCHANGE WITH ELLIOTT MAIN TURBINE

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22

T2-SE-A1 MAIN PROPULSION ROTOR — G.E.

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23

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8500 H.P. 8-STAGE TURBINES FOR LARGE VICTORY SHIPS

L. P. – 3509 RPM

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

26 **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

27

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.

28

G.E. 8500 H.P. REDUCTON 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

CARGO STRIPPING PUMPS

BRONZE T2 TANKER STRIPPING PUMPS

14x14x12—700 GPM at 100 lbs. Same pump available in steel for fuel oil transfer, etc.

31

WORTHINGTON 16"x14"x18" VERTICAL DUPLEX STRIPPING PUMP

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

32

UNUSED DELAVAL IMO ROTARY PUMP

175 GPM—35 PSIG—10 HP—120 volts DC—1750 RPM—serial E-8619—frame 324 VY—76 amps—mfg. by Electro Dynamics. With magnetic control. Excellent condition.

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

Allis-Chalmers 6 x 5 pump, type SKH—1200 GPM—125 PSI—3500 RPM. Coppos turbine type TF-22-2½ — 3500 RPM. 273#—50° superheat.

34

DAYTON-DAWD 2-STAGE FIRE AND BILGE PUMP

Vertical 2-stage type TDV-10—20 HP—20 GPM @ 184'—3" discharge—4" suction—1775 RPM—Maumee Sun. Motor: 120 volts DC—20 HP—1775 RPM.

BOILER FEED PUMPS

Suitable for Navy and Merchant Vessels

35

COFFIN TYPE CG-4A FEED PUMP

2 Available—very little use. Maximum 325 GPM—1760' head or 750 lbs Steam inlet 575 lbs. — 540°TT — exhaust 20 lbs. — speed 760 RPM.

36 **UNUSED DD445 CLASS WORTHINGTON TURBINE-DRIVEN FEED PUMP**

Worthington — drawing SL5043—425 GPM—1675' total dynamic head—5000 RPM 3-stage — double suction. Flanged 4½" inlet—4" outlet. Powered by Sturtevant steam turbine—282 HP—590 PSI. For Fletcher DD-445 Class Destroyers.

37

BUFFALO SIZE 4 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"x4"—built for USN DD destroyers. DD 445 Class Fletcher.

38

WORTHINGTON 3-STAGE UNUSED BOILER FEED PUMP

PUMP: 5" Worthington—460 GPM @ 750 PSI—5000 RPM—305 HP—steam flow 8052/hr—26.4 lbs HP hr. TURBINE: Sturtevant C-22—type 21—575# dry saturated steam—15 lb. back pressure—259°F water temperature—15 lbs/inch suction pressure.

39 **INGERSOLL-RAND BRONZE CARGO PUMP**

10GT—4500 GPM at 125 lbs.—2-stage—size 14x12.

40

C-25 CARGO PUMP TURBINE SPARE GEARS

One set of gears available for Westinghouse C-25 Cargo Pump Turbine.

MISCELLANEOUS

DOUBLE REDUCTION GEARS for Diesel Drive

41

3200 HP DOUBLE INPUT SINGLE OUTPUT DIESEL REDUCTION GEARS 20 DEGREE OFFSET

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. Non-reversing. OK for 38D8-⅛ engine.

42 **2:67:1 RATIO DOUBLE IN-LINE GEARS**

Farrell-Birmingham 3200 HP non-reversing — from seaplane tenders. Ratio 1.867:1. Complete with hydraulic couplings, etc. Will handle two 38D8-⅛ FM diesels. Has Fawick clutch.

43 **2100 HP DOUBLE INPUT SINGLE OUTPUT GEARS—3:435:1 RATIO**

Farrell-Birmingham — heavy duty — originally built for 2 heavy-duty direct-reversing engines —300 RPM—1050 HP each. Ratio 3.435:1.

44 **SINGLE ENGINE REDUCTION GEAR**

Farrell-Birmingham — non-reversing—1600 HP at 2.4909:1. With hydraulic couplings.

45 **ANCHOR WINDLASS**

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

46

SHARPLESS LUBE & DIESEL OIL PURIFIERS

Type M-34-W22-UM—15,000 RPM. BOWL MOTOR: 2 HP—230 volts DC—8.5 amps—3450 RPM—250 to 300 GPH. Originally built for C-1-A diesel vessels.

47

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

20" Ex. inlet—⅝" CU-NI tubes—with or without air ejector.

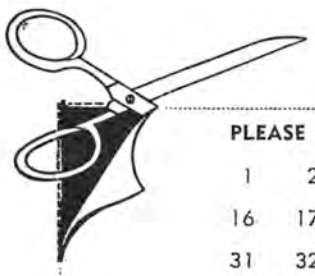
48

UNUSED 70 HP McKIERNAN-TERRY WINDLASSES

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.

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.



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Investigation On Free and Forced

Vibrations Of An LNG Tanker With Overlapping Propeller Arrangement

K. Restad, G.C. Volcy, H. Garnier and J.C. Masson*

Economic imperatives are always compelling shipyards and shipowners to look for the most efficient solutions. One of the ways to reach this aim is to increase the total propulsive efficiency of propulsion installations. In this respect the arrangement of overlapping propellers is very promising.

Since no experience existed concerning the vibration characteristics of this type of propeller arrangement, some investigations aimed at obtaining the values of hydrodynamic excitations and the vibratory response of the propulsive plant and hull steelwork were undertaken. The investigations presented in this paper were carried out as a research project. The ship considered, a 160,000-cubic-meter LNG vessel, is not a ship on order.

The main reason for these investigations was to find out whether the considered ship, with relatively high power and the unconventional overlapping-propeller arrangement, which from other points of view seemed to be an attractive one, could also be attractive with regard to vibration and cavitation.

In addition, this type of investigation also was important to test the experimental facilities for the determination of hydrodynamic excitations as well as the available established methods of calculation.

Another interesting side of this research was to determine how to proceed with structural rearrangements of the steelwork of the shaft arrangement in case of eventually undesired effects due to the application of the existing excitation forces.

As it was not necessary to have very detailed information on this particular vessel, and in order to save time, some simplifications have been admitted in the experimental determination of excitations, for instance, by not paying too much attention to an absolutely correct wake distribution in the cavitation tunnel.

The investigations consisted of two main parts: (1) Experimental determination of the values of hydrodynamic excitations, and (2) Calculations of the response in free and forced vibrations of the propulsive plant and the steelwork of the vessel to the determined excitations.

It may be useful to clarify the opinion of the authors regarding the real hydrodynamic excitations and the vibratory phenomena occurring on ships.

First, decisions were made concerning: vessel speed, propulsive plant power, propeller rpm, type and geometry of propellers, number of propeller blades, and corresponding stern arrangement and geometry of the body of the aft part of the vessel.

Then real hydrodynamic excitations are given. In fact, both types of hydrodynamic excitations, (a) the variation of six components of propeller forces, and (b) the full surface forces, having their origin in the action of the propeller in the non-uniform wake field, are functions of the previously mentioned parameters. Their numerical evaluation can be obtained either on the basis of theoretical calculations, or from model tests in a conveniently equipped towing tank and cavitation tunnel.

To obtain as reliable as possible values of hydrodynamic excitations, we used the experimental technique developed by the Netherlands Ship Model Basin (NSMB) in Wageningen. With regard to the vibratory behavior of the vessel, what is of utmost importance is the response to the given existing excitations, of the elastic systems constituted by the line shafting and propulsive plant and the steelwork of the engine room and hull girder together with appendages.

The responsibility of the engineers in charge of vibration analysis consists in avoiding the dynamic amplification of the given existing excitations due to the eventual resonant response of one or several previously mentioned elastic systems to the excitations present.

Shipboard and theoretical investigations of the commonly called ship vibration have led the authors to conclude that for today's huge vessels the main problem is not the free vibrations of the hull girder, with the exception of springing and whipping phenomena, but the forced vibration of the different partial elastic systems of the steelwork which occur when the so-called forced-vibration resonators are situated in way of the propulsive plant shafting, i.e., mainly in the engine room.

The vibration analysis can be subdivided into three steps:

1. To research the forced-vibration resonators which may be of two types, active and passive;

2. In case of their presence, to attempt to detune them by shifting their natural frequencies the farthest possible from the nearest excitation frequency, in order to diminish the dynamic amplification previously mentioned, and

3. To calculate the response in forced vibrations of the elastic systems present to the previously determined numerical values of excitations.

It also is worth mentioning that the approach adopted for the vibration analysis concerning the investigation of the response in forced vibration of the engine room is also very useful for the integral analysis of static and dynamic phenomena concerning the propulsive plant as well as the assembly of the steelwork outside the engine room. In fact, by the convenient three-dimensional modeling, calling for the finite-element technique of the engine room steelwork, this elastic model allows one to:

1. Determine the deformations of the corresponding structure due to loading and sea conditions, hence the possibility of preparing convenient alignment operations of the line shafting and of investigating the influences on the static conditions of the propulsive plant and its shafting of the aforesaid deformations, and

2. Determine the flux of excitations in way of the extremities of the engine room, which can be afterwards used for the vibratory analysis of the response in forced vibration of the steelwork in the cargo holds, or in tanks, to the excitation flux.

The main particulars of the considered LNG carrier are:

Length, overall	322,200 m
Length bet. perpendiculars	315,000 m
Breadth, molded	43,000 m
Depth, molded	30,846 m
Draft	11,887 m
Capacity of cargo tanks	160,000 cu m

The machinery proposed is one Kockums-Laval geared-steam turbine, type APO-61, developing 30,500 shp at 100 rpm per shaft. The port propeller would have a diameter of 7.27 m and pitch ratio of 1.053. The starboard propeller would have a diameter of 7.27 m and a pitch ratio of 1.106. The service speed would be 23 knots.

A simplified general arrangement of this ship is shown in Figure 1. The propellers are overlapping, outwardly rotating over top. The propulsive arrangement is shown in Figure 2.

The exciting hydrodynamic forces, caused by the work of the propeller in the inhomogeneous wake field, can be divided into propeller and hull-surface forces. The propeller forces are transferred to the hull through bearings and thrust block, and the hull surface forces through pressure impulses on the hull plates above the propeller.

Due to the overlapping arrangement the two propellers have to work in separate wake fields, which made measurements on both propellers necessary. The relative angular propeller positions were also expected to influence the forces, and for that reason the measurements were made both with the propellers in phase (++) and $\pi/4$ degrees out of phase (+×).

The propeller forces were measured on both lineshafts with six component dynamometers in a wooden ship model, made to a scale of 1:35, in the Deep Water Basin of NSMB. The variations in thrust, torque transverse forces (horizontal and vertical) were measured.

The hull surface forces also were measured on the wooden model in the Deep Water Basin. Twenty-five pressure pick-ups were mounted in the hull above the propeller according to Figure 2.

*Mr. **Restad,** naval architect and marine engineer, Kockums Mekaniska Verkstads Ab Malmoe; Mr. **Volcy,** principal engineer, Special Research and Study Section of Maritime Services of Bureau Veritas; Mr. **Garnier,** principal engineer, Special Research and Study Section of Maritime Services of Bureau Veritas, and Mr. **Masson,** engineer, Special Research and Study Section of Maritime Services of Bureau Veritas, presented the paper abstracted here before the recent Annual Meeting of The Society of Naval Architects and Marine Engineers.

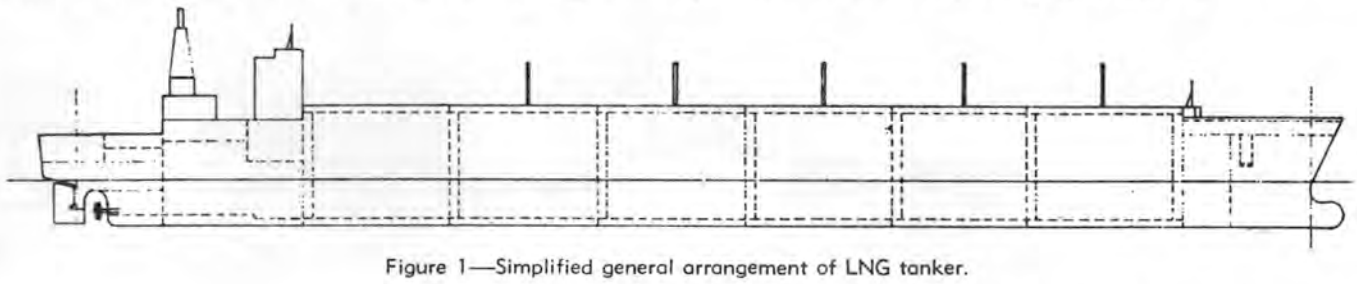

Figure 1—Simplified general arrangement of LNG tanker.

During the measurements in the cavitation tunnel the cavitation on the propellers also was observed. Extended sheet cavitation in the top position was observed on both propellers. With the propellers in phase there occurred strong interference between the tip vortex cavities generated by the port propeller and the suction side of the blades of the starboard propeller, which is shown in Figure 3. This phenomenon causes increased risk of cavitation erosion and should be avoided, if possible.

Calculations

The authors are deeply convinced that many of the discrepancies encountered in the past between calculated and measured values of natural frequencies were due to the over-simplification of the calculations. These over-simplifications did not concern only the too-simplified modeling of the elastic systems but also the hypothesis concerning the arbitrarily chosen boundary conditions. But, thanks to today's speedy computers and decreasing costs related to computer expenses, the authors are happy to note a general tendency to slow down such oversimplifications which have been a great disservice to the profession. The modern technique of finite elements also is helpful to increase the validity of the mathematical analysis of vibrations of today's huge and sophisticated vessels.

In order to predict as accurately as possible the vibration characteristics of the ship concerned, we have adopted an approach the aim of which was to:

1. Proceed with the most faithful, but reasonable from the point of view of cost, idealization of the propulsive plant and ship's structure, keeping in view the practical possibility of detuning the eventually met resonators; and
2. Eliminate as far as possible the hypothetical boundary conditions, not only static but also dynamic boundary conditions.

These principles could lead to very extensive preparation of input data as well as to excessive cost for computer running. So to overcome these difficulties without imperiling the awaited results, we have called upon, once more, the concept of research of forced-vibration resonators. This concept allows us to center attention on the points where the excitation efforts are created, and where their effects may be dynamically amplified. For the type of LNG tanker considered, this allows us to center attention on the steelwork of the aft part of the hull girder and especially the engine room. In order to represent correctly the assembly of the ship's elastic steelwork during its vibration, the forward part of the vessel, incorporating the LNG tanks, as well as the superstructures, have been introduced into the calculation as equivalent dynamic systems.

For calculating the hull-girder free vibrations, because the influence of the elastic asymmetry coming from the bossing and its shafting is very small, it has been possible to consider one half of the ship only, in this case the port side. But in the engine room, where massive asymmetry has been encountered due to the important masses of some auxiliaries, the corresponding corrections have been made. But it must be made clear that for bossing-forced vibrations, and in order to have a correct transmission of the hydrodynamic propeller forces, the presence of different line-shafting systems has been taken into account.

Conclusions

In order to overcome the real and severe problems connected with vibrations of huge, powerful and sophisticated vessels, a new and rigorous approach should be imagined and introduced into the practice. In fact, the tremendous costs connected with repairs and lay-up in case of troubles are forcing shipyards and shipowners to drop the often previously encountered oversimplified approach to the treatment of vibratory phenomena.

It is also our opinion that such oversimplifications, concerning not only the application of nonadequate mathematical methods or modelization of structures, but even hypothetical boundary conditions, were in the past at the origin of a rather poor correlation between calculated and measured values. This was of course of disservice to the profession. But we do believe also that lots of imperfections in knowledge that we have encountered during our work in different fields are more and more improved and this especially in the field of hydrodynamic excitation determination as well as in the establishment of modern calculation programs in connection with the recent creation of ultra-speedy computers.

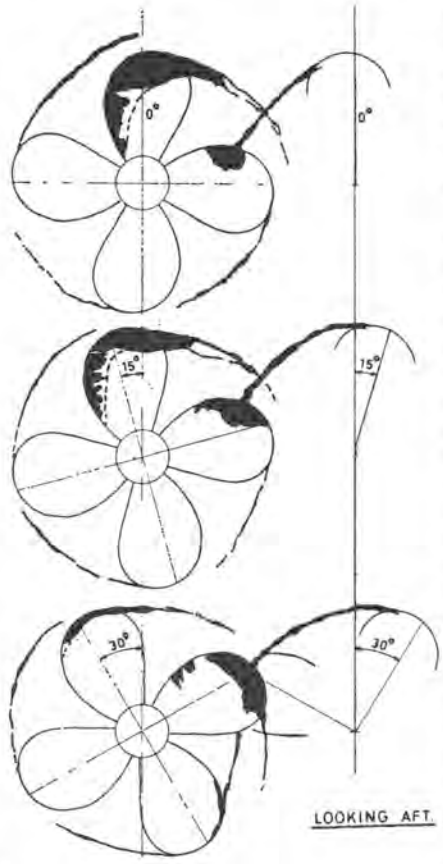

Figure 3—Cavitation patterns on suction side of starboard propeller with propellers in phase. Note the sheet cavitation.

In the critical analysis and conclusions we wish to use the investigated case as an example to stress the recent achievements and results obtained which may present a real, practical solution for shipyards and shipowners in their daily work. Some recommendations for further studies and improvements are also presented. In fact, in our opinion, the final solution of vibratory phenomena of modern ships is due partly to already existing research facilities and also to the strenuous efforts of numerous researchers. The adoption of the integral treatment of static and dynamic phenomena appearing on ships can well accelerate this aim.

It is indeed useful to remember that the real hydrodynamic excitations occurring on ships are well determined by purely economic considerations imposing the given tonnage of the ship and her speed; so the output of the propulsive plant, the hull form, and the geometry of the propeller(s) are then determined by the towing tank to obtain the maximum propulsive efficiency for the minimum consumption of fuel for the given power. When determining the geometry of the hull and propellers, the towing tanks strain to offer the optimum solution, hence minimum hydrodynamic excitations, and this in order to assure propulsion at the desired speed but not to shake and vibrate the ship!

The responsibility of vibration specialists is to assure that the effects of given and already fixed hydrodynamic excitations will not be dynamically amplified, which may occur in case of the appearance of resonance phenomena or what the authors call the presence of forced-vibration resonators. These resonators, which are either active or passive ones, are constituted respectively by propulsive plants together with line shafting and associated steelwork or simply by subassemblies of the steelwork of the hull girder, and even, but rather seldom, by the last one itself. Such an approach simplifies considerably the study of vibratory phenomena on ships, accelerating the finding of practical solutions for detuning the eventually met resonators.

Such an approach necessitates the correct and faithful modelization of the elastic systems without simplifications, calling also for the practical elimination of boundary conditions which are always at the origin of discrepancies. Consequently the hull girder assembly should be considered and treated as a free-free beam, attention being particularly centered on the points of application or transmission of the excitation forces, which, for big modern ships, requires us to center attention on the engine room steelwork.

Due to the significant volume of work required by the modelization of the whole structure of the engine room and its propulsive plants, and the limited capacity even of the most speedy computers such as the CDC 6600, the treatment of the hull girder assembly as a free-free structure necessitates the idealization of the forward part of the vessel by means of conveniently calculated equivalent systems.

As it is well known, the dynamic behavior of the propulsive plant and its shafting is largely influenced by the static conditions, which are functions of alignment conditions and steel-work deformations due to loading and sea state. Therefore, an integral treatment of both phenomena is required which is also favorably influenced by the approach adopted, which is the fine analysis and modelization of the engine room steelwork. In fact, this elastodynamic model allows the deformations calculation necessary for assessing the alignment conditions of the line shafting. The previously described elastodynamic model is then used for calculating the free vibrations of the hull girder assembly, attention being centered on the engine room, which presents the possibility of studying the possible appearance of forced-vibration resonators, which of course may be then conveniently detuned, once being in the possession of conveniently idealized elastodynamic systems.

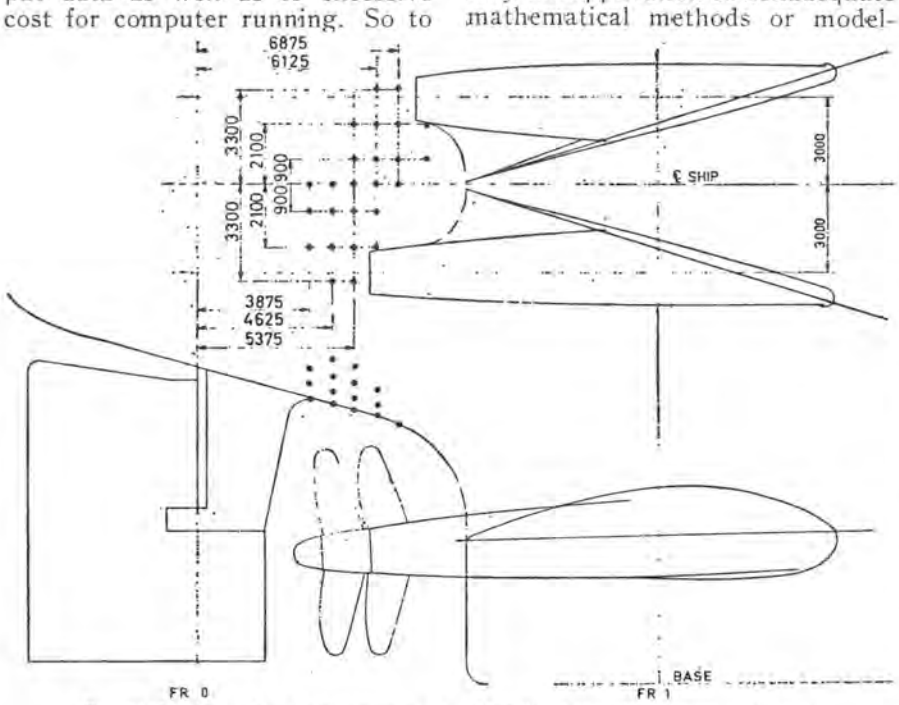

Figure 2—Propulsive arrangement and localization of pressure pick-ups.

U.S. Lines To Patent Container Liner System

United States Lines has developed and is proceeding to apply for patents in the United States and abroad on what company officials feel is the most advanced dry bulk container liner system ever developed for chemical, plastic and other bulk commodities.

Researched, developed and successfully tested by a team of United States Lines technical experts, the giant plastic bag system, called "Unibulk," is in production and available for shippers.

"We are very enthusiastic about this system because our developmental efforts have achieved a package which is superior in regard to performance, economics and viability," said **Edward J. Heine Jr.**, president of the company.

The system is adaptable for 40-foot containers and comes in a conveniently packaged kit. It includes a curved aluminum bulkhead, the liner bag, light steel frames and fasteners. It will soon be available for use in 20-foot containers.

"We have confidence in our system. We did not rush it, and so were able to 'debug' it during the development process," Mr. **Heine** added.

C.A. Narwicz, manager of Systems Development, **R.W. Bjelland,** project engineer, and **H.A. Soder,** manager of special equipment, headed the development team for "Unibulk."

Powdered or pelletized resins, dry bulk chemicals of all kinds, acids and starches can be shipped via "Unibulk."

Texaco Appoints Young And Lewis

Texaco Inc. has announced that **Norman R. Young** has been appointed to the new position of manager, Development Division, petrochemical department, and that **Ralph M. Lewis** has been named to succeed Mr. **Young** as executive assistant to management on the staff of the senior vice president for worldwide sales and marine. Both men will continue to be located in New York.

Mr. **Young** was graduated from Mississippi State College with a bachelor of science degree in 1956, and joined Texaco at Port Arthur, Texas, that same year. He held engineering assignments in the research and technical department there until 1965, when he was named staff engineer in the petrochemical department in New York. In 1967, he was appointed supervisor of operations, petrochemical department. In 1968, he was named assistant plant manager of a chemical plant for a Texaco subsidiary in Ghent, Belgium. In 1972, he was appointed executive assistant to management in New York.

Mr. **Lewis** was graduated from the University of Alabama with a bachelor of science degree in 1956, and joined Texaco at Port Arthur that same year. He held various engineering positions in the research and technical department until 1969, when he was named assistant to management, petrochemical department, in New York. In 1971, he was appointed sales manager, Chemical Division, petrochemical department.

Philadelphia Resins Announces Gulf Coast Operations Expansion

Philadelphia Resins Corporation, Montgomeryville, Pa., worldwide supplier of Chockfast pourable resin chocking systems and other heavy duty marine products, has announced the expansion of their Gulf Coast operations. **John McGuckin,** Gulf Coast district manager, cited increased sales to the oil industry, wider shipyard acceptance of the Chockfast system, and new markets for shore-based machinery mounting as the principal factors involved in the move to increase service in that area.

The new operation, based in New Orleans, La., at 4141 Veterans Memorial Boulevard, Metairie, offers material estimation, loading calculations, technical service supervision and formal training courses for Chockfast distributors and users, as well as material supply coordination for the entire Gulf Coast area. **Mrs. Adrienne Chisholm** has been appointed office manager.

U.S. Lines Appoints Three In Management

Donald G. Aldridge, executive vice president of United States Lines, has announced three high-level management appointments for the company.

They are **James J. Carey,** vice president-West Coast Division; **James Clarke,** vice president-European Division, and **James P. Lawson,** regional manager for Southeast Asia.

Mr. **Carey** joined the company in 1971, and served as general manager of operations in Europe. He later headed the European Division. Before coming to the company, he was a vice president with Seatrain Lines. Mr. **Carey** is a graduate of San Francisco State College and a veteran of the U.S. Air Force.

Mr. **Clarke** began his career with United States Lines in 1957, and has since served in management positions both in Europe and the Far East. Most recently, he has been regional manager-Southeast Asia in Hong Kong. He is a graduate of the U.S. Merchant Marine Academy at Kings Point, N.Y., and served as an officer with the U.S. Navy during World War II. Mr. **Clarke** also holds B.S. and master's degrees in business from Harvard University.

Mr. **Lawson** succeeds Mr. **Clarke** as Southeast Asia regional manager, after serving as operations manager in that division. Mr. **Lawson** came to United States Lines in 1970 as terminal manager in Hong Kong. Previously, he was with Matson Navigation, and his last position there was as regional manager, headquartered in Manila. Mr. **Lawson** was at sea for many years, and worked up from seaman to chief officer.

United States Lines operates an all-modern fleet of 30 vessels serving various areas of the world. Sixteen high-speed high-capacity containerships maintain a 15,000-mile Tri-Continent Service between Europe, the East and West Coasts of the United States, Hawaii, Guam, and the Far East. The company also has 14 fast Challenger-class general cargo vessels engaged in commercial and chartered services in the trans-Atlantic and trans-Pacific areas.

A.B. Henderson Named Exec. Vice President Of Santa Fe Minerals

Allyn B. Henderson

Allyn B. Henderson has been named to the newly created position of executive vice president of Santa Fe Minerals, Inc., the oil and gas division of Santa Fe International Corp. He was formerly vice president and secretary of the parent company.

E.L. Shannon Jr., Santa Fe International president, said the transfer will permit Mr. **Henderson** to devote full time to the company's oil and gas operations. He will report to Dr. **J.E. Warren,** president of Santa Fe Minerals.

A graduate of the University of Wyoming law school, Mr. **Henderson** was an attorney with Union Oil Co. of California before joining Santa Fe in 1962. He had been an officer of Santa Fe and a member of its legal staff since that time.

Stella Maritime Names Canadian Firm

Stella Maritime Video, Inc., Englewood Cliffs, N.J. has appointed Mercator Enterprises Ltd. of Halifax, Nova Scotia, Canada, as its Canadian sales and service representative.

Stella Maritime Video is the creator of, and the world's largest single merchandiser of on-board videocassette feature picture entertainment and educational systems.

Mercator Enterprises Ltd. will be the sole and exclusive sales representative for Eastern Canada. The Company will also maintain sales, service and videocassette program distribution transfer depots in Toronto, Montreal, Halifax, St. John's, and Port Hawkesbury.

Pacific NW SNAME Discusses Shipboard Electrical Cable

Author **Russell V. Carstensen** (left), Puget Sound Naval Shipyard, Bremerton, Wash., is shown above with **Gene Frampton,** vice chairman of the Pacific Northwest Section.

Members and guests of the Pacific Northwest Section of The Society of Naval Architects and Marine Engineers recently met at the Windjammer Restaurant in Seattle, Wash., for the Section's first meeting of the 1973-74 season.

Russell V. Carstensen, electronics engineer of Puget Sound Naval Shipyard, Bremerton, Wash., presented the evening's paper, "The Care & Feeding of Shipboard Electrical Cable."

The variety of electrical cable types available for shipboard use have evolved through years of diligent research, testing and actual shipboard application. While commercially pure annealed copper wire continues to be the single conducting element employed, drastic changes in insulation materials and methods of cable fabrication have contributed to longer and more efficient service life.

Over the years, two basic specifications for cable selection, construction and installations have evolved. For military applications, MIL-C-915E has become the precedent standard, while commercial shipbuilding tends to invoke IEEE Standard 45. Neither faction, however, specifically excludes the other. Rather, mutual reciprocity appears to exist as long as certain minimum criteria can be met.

To a large extent, cable type and size selection has been reduced from a complex design process to research of tabular lists. Without a clear understanding of the design factors involved in cable construction, however, selection of the most efficient type from the 88 military and 288 commercial types available is a very difficult task.

M/G Transport Service Requests Title XI For Variety Of Barges

A Title XI application has been filed with the Maritime Administration by M/G Transport Service, Inc., 111 East 4th Street, Cincinnati, Ohio, in connection with 45 semi-open hopper integrated barges, 30 open hopper barges and four barge integrated oil tank tows. To be built by Jeffboat, Inc. at an estimated cost of $10,325,000, the vessels will be operated on inland waterways of the United States.

Norris Div. Introduces New Actuators For Butterfly Valves

Norris Division of Dover Corporation, Tulsa, Okla., has introduced new diaphragm actuators for on-off and throttling control of 90-degree butterfly valves.

Brad Bertrem, general manager of Norris Valve Operations, announced that the pneumatically operated actuators are applicable for valves ranging in size from 2 inches to 24 inches and will handle differential pressures to 200 psi.

Especially designed for 90-degree butterfly valve actuation, the actuators are available in 35, 70, and 180-square-inch diaphragms in both open and closed yoke versions.

The open yoke model is applicable where precision control is required and can be furnished with all popular models of positioners.

The closed yoke version is offered where environmental corrosion requires a totally enclosed weatherproof unit.

Both types of units have an enclosed weatherproof gear and rack operator and are capable of operating 2-inch through 24-inch valves with supply pressures from 5 to 65 psi.

Norris Division of Dover Corporation manufactures and markets butterfly valves, controls and related equipment for all types of marine, commercial and industrial applications.

American Ship To Construct 680-Foot Self-Unloader For American Steamship Company

The American Ship Building Company has announced the signing of a letter of agreement with the American Steamship Company, a wholly owned subsidiary of General American Transportation Corporation, for the construction of a new 680-foot self-unloader for American Steamship's Great Lakes fleet.

The new vessel, which will cost over $20 million, will be built in American Ship's Toledo, Ohio, yard and is scheduled to go into service in the summer of 1976, according to **George M. Steinbrenner,** chairman and chief executive officer of American Ship.

This marks the third new vessel contract received by American Ship in a two-week period. In this issue of Maritime Reporter/Engineering News, the company has announced plans to build two 1,000-footers for Pickand Mather's Interlake fleet. Total cost of the three exceeds $95 million.

This is also the second self-unloader to be built for American Steamship by American Ship. The first, the Roger M. Kyes, was completed in Amship's Toledo yard and delivered this past summer.

The newest vessel will have the same general dimensions as the Kyes—680-foot overall length by 78-foot beam—but will have a larger carrying capacity through increasing the depth from 42 feet to 45 feet. Its capacity will be approximately 30,000 tons of taconite ore and about 25,000 tons of coal. Speed will be approximately 15 mph.

She will be capable of unloading 6,000 tons of ore per hour through a single conveyor running the length of the ship and a 250-foot deck boom.

"The developing energy crisis and the resultant need to transport more coal is certainly a major factor in this surge of new ship construction on the Great Lakes," said Mr. **Steinbrenner** in making the announcement.

"This is just the start of what is becoming a shipbuilding boom as power companies and others around the Great Lakes increase their demands for coal.

"Ever since the passage of the Merchant Marine Act of 1970, American Steamship has been one of the leaders in new ship construction on the Great Lakes, and spurred by the energy crisis, is stepping up its already impressive program."

Mitsui Delivers Bulk Carrier To South African Operator

The four cargo holds on the S.A. Sukumbi will be used to transport sugar and alumina.

The 25,000-dwt bulk carrier S.A. Sukumbi was recently completed and delivered at the Fujinagata Works of Mitsui Shipbuilding & Engineering Co., Ltd. to her owner, South African Sugar Carriers Ltd. of South Africa. The vessel, of aft-engine aft-bridge type, specializes in hauling bulk cargo. She will be used mainly to transport sugar and alumina.

Mitsui delivered a bulk carrier of the same type to the same owner in August 1966.

Main features of the S.A. Sukumbi are: four cargo holds with the same number of hatch openings featuring MacGregor steel hatch covers; 10-ton electrically-driven stationary deck cranes arranged in such a way as to allow their operation from both fore and aft of the hatch openings; all other deck machinery such as windlasses, mooring winches, capstans, etc., are also electrically operated; each cargo hold is of double hull construction, both sides of which are used as top side tanks, and No. 2 and No. 3 top side tanks can be loaded with bulk cargo; when the vessel is at sea, the top side tanks, in addition to the double bottom tanks, can be filled with ballast water.

All living quarters, including dining room, smoking room and recreation room are fully air-conditioned for the complement of 48 in crew.

Classed by ABS, the diesel-propelled S.A. Sukumbi has an overall length of 587 feet, a beam of 76 feet, and at a full load draft of 34 feet, she has a service speed of 16.625 knots.

a Multitude of Greetings

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SNAME Southeast Section Hears Paper On Drydocks By Guest From Germany

The Southeast Section of The Society of Naval Architects and Marine Engineers held its 1973 fall meeting at the Hidden Hills Golf Club in Jacksonville, Fla.

Papers chairman **Tom Young** organized a unique program around Jacksonville Shipyard's new floating drydock and sent invitations to several interested members outside the Section. The groundwork by him and his colleagues paid off in one of the most well-attended technical meetings of the Southeast Section.

Frank De Grim, meetings chairman, started the morning meeting with an introduction of the guests from Germany—**H.J. Warnke, O. Ristow, K.H. Trainer,** and **A.B. Walter,** all of Gutehoffnungshutte A.G. (GHH)—and welcomed to Jacksonville the new members working at Offshore Power Systems.

The moderator, **Clinton Dotson,** naval architect at Offshore Power Systems, chaired the technical session. The paper, "The Construction and Testing of a 33,000 Ton (M) Lift Floating Drydock," authored by **Helmut J. Warnke,** naval architect of GHH, the builders of the drydock, was abridged and read by prominent Jacksonville naval architect **R. Matzer.** This was followed by a short talk by **Edward T. Motter,** manager of engineering at Jacksonville Shipyards, in which he described various civil engineering aspects and problems of constructing the drydock berth.

After a coffee break, prepared discussions by **Paul Crandall** and **Edwin Phillips** were read before opening the floor to a question and answer period.

A luncheon served in the clubhouse permitted those present to continue the exchange of ideas. Later, a brand-new air-conditioned city bus transported the members and guests across town to visit the 33,000-ton drydock.

Shown at the Southeast Section meeting at the Hidden Hills Golf Club, left to right: **Helmut J. Warnke,** GHH, author; **K.H. Trainer,** GHH; **O. Ristow,** GHH; **Edward T. Motter,** Jacksonville Shipyards, Inc., and **Clinton Dotson,** Offshore Power Systems, presiding officer.

In the evening, a banquet attended by 76 guests and their ladies was held at the Hidden Hills Club, preceded by a cocktail hour hosted by Jacksonville Shipyards. **Jack Lindgren,** retired president of U.S. Salvage Association, Inc., gave an after-dinner talk illustrated with slides, covering the subject of towing large floating structures in ocean waters.

This concluded a beautiful sunny day, and all those who attended were happy to have had the opportunity to meet Mr. **Warnke** and his colleague Mr. **Ristow,** who obligingly endeavored to answer their many questions about a subject as seldom discussed as floating drydocks.

Copies of the paper are available at $1 per set from **Charles S. Smith,** Marine Consultant, 2728 S.E. 11th Street, Pompano Beach, Fla. 33062.

The next meeting of the Southeast Section, featuring small boat design, will be held February 22, 1974, at the University of Miami, Rosentiel School of Marine and Atmospheric Sciences, 10 Rickenbacker Causeway, Miami, Fla.

FIRST OF EIGHT FOR CROWLEY: The flat deck cargo-type barge Atka (shown above), first of eight in the current barge construction program at Bethlehem Steel Corporation's San Francisco, Calif., shipyard, is shown arriving in Seattle, Wash., for delivery to its owner, Puget Sound Tug and Barge Company of Seattle, which is the major operating identity of Crowley Maritime Corporation. All eight barges, which are being built by Bethlehem for the same firm, are 400 feet long, 99 feet 6 inches wide and 20 feet deep. Some of the barges, according to **Patrick G. Filip,** general manager of the yard, will be outfitted to carry railcars; the others will be used for miscellaneous deck cargo. The rail barges will be operated by Alaska Hydrotrain, a subsidiary of Puget Sound Tug and Barge Company, and will be placed in service between Seattle and Whittier, Alaska. The cargo barges may become part of Crowley's participation in Alaska North Slope transportation requirements. Delivery of the eighth barge under the current construction program is scheduled for July 31, 1974.

Moore McCormack Subsidiary Awards $70-Million Contract To American Ship Building Co.

Pickands Mather & Co., a subsidiary of Moore and McCormack Co., Inc. (NYSE, Pacific), and The American Ship Building Company (NYSE), both of Cleveland, Ohio, announced jointly the largest shipbuilding contract in the history of the Great Lakes.

Two 1,000-foot self-unloading bulk freighters will be built by American Ship for Pickands Mather's Interlake Steamship Company fleet.

The announcement was made by **Elton Hoyt,** president and chief executive officer of Pickands Mather, and **George M. Steinbrenner,** chairman and chief executive officer of American Ship, who stated that Pickands Mather has an option on future drydock space for the building of two additional 1,000-footers.

Both new ships will be built at American Ship's Lorain, Ohio, yard, with the first ship being delivered in July 1976, and the second in July 1977.

The estimated combined cost of the two ships is over $70 million, pending working out final design and contract details.

James R. Barker, chairman of Moore and McCormack Co., Inc., indicated that in financing construction of the new Great Lakes vessels, the company will utilize the Title XI provisions of the Merchant Marine Act of 1970, which provides for Government guaranty to creditors of up to 87½ percent of the cost of ships built for use in domestic trade.

To permit construction of these super self-unloaders, American Ship has already contracted with The Horvitz Co. of Cleveland to expand its largest present drydock from 925 feet to 1,020 feet, starting immediately.

Building of the two ships will have a significant economic impact on the Lorain-Cleveland area. American Ship expects to increase its existing work force at Lorain by some 300 jobs. Also required will be the purchase of large amounts of material, steel and equipment from area manufacturers and suppliers.

The new ships, having a 105-foot beam, will carry 59,000 gross tons of iron ore pellets at maximum summer draft, and 52,000 net tons of coal, the largest cargo capacities on the Great Lakes.

Presently planned to be of conventional Great Lakes design with pilothouse forward and propulsion aft, the ships will be twin-screw and powered by two 8,000-hp diesel engines. The loaded speed will be about 16 mph. Propulsion will be controlled from the pilothouse through variable pitch propellers.

The ships will have multiple one-piece hatches for loading, and a system of belts running beneath the cargo hold for unloading. These belts will transfer cargo to another belt on a 250-foot boom that can be swung out from either side of the ship for unloading. These unloading facilities will provide very fast cargo discharge, about 10,000 gross tons of pellets and 6,000 net tons of coal per hour. Both loading and unloading times will be minimized by multiple high-capacity ballast discharge and fill pumps.

All of the ship's navigating and safety facilities, as well as crew accommodations and service equipment, will be the most modern in the industry.

Commenting on Pickands Mather's decision to build the two 1,000-foot self-unloaders for the Interlake Steamship Company fleet, Mr. **Hoyt** said: "While this is the biggest expansion of our fleet ever, both in tonnage and investment, it is the third step in as many years to further increase Interlake's cargo capacity to meet the continually growing needs of our iron ore and coal customers. At the same time, we will be increasing fleet efficiency as a means of combating the constantly higher operating and maintenance costs we have faced over the past several years."

He added: "The new 5.4-million-ton iron ore pellet facility we are building in Minnesota with Bethlehem Steel Corporation, which will start producing in 1976, was a key factor in the decision to build these ships."

In mentioning previously expanded capacity, Mr. **Hoyt** was referring to lengthening of the S/S Charles M. Beeghly in 1971 and the fleet's flagship, the S/S John Sherwin, in 1972. Both ships were lengthened by 96 feet to 806 feet, increasing their cargo capacities to 30,000 tons per trip and making them the largest conventional type bulk freighters on the Great Lakes.

Interlake now has 13 bulk freighters having a combined capacity of 244,400 tons of iron ore per trip, making it one of the largest U.S. fleets on the Lakes. The two new ships represent 118,000 tons of additional fleet capacity.

Pickands Mather's parent company, Moore and McCormack Co., Inc., headquartered in New York, also has a major shipbuilding program in progress. It is having three 38,000-ton tankers built at National Steel & Shipbuilding, San Diego, Calif., for delivery in 1975, 1976 and 1977. These ships will be operated by another subsidiary, Moore-McCormack Bulk Transport, Inc., on seven-year charters to Shell International Petroleum Company.

The new Interlake and Moore and McCormack ships are being built through Title XI financing guarantee provisions of the Merchant Marine Act of 1970. Interlake's lengthening of the S/S Charles M. Beeghly in 1971 was the first use of the Act's capital construction fund provision on the Great Lakes.

Navy Chooses Jacuzzi Jets For Newest River Craft

The new Troop Carriers, built by Teledyne Sewart Seacraft, are equipped with bow ramps for fast troop egress.

The new 36-foot Armored Troop Carriers represent the latest technological developments in riverine warfare.

Each craft, built by Teledyne Sewart Seacraft of Berwick, La., is powered by twin 8V-53 Detroit Diesels and JacuzziJet 20YJ propulsion systems. The Armored Troop Carriers are being delivered to Naval Reserve training squadrons throughout the country to be used as training vessels in developing Naval riverine expertise. They will operate in conjunction with U.S. Navy UDT and SEAL teams to maintain combat-ready units for Naval special warfare groups.

The boats are fully armor-plated with bow ramps for fast troop egress, and have special silencing equipment for clandestine operations. Additionally, they are equipped with an extensive complement of electronics and ordnance equipment.

The continuing trend toward water jet propulsion is a result of extensive military experience with JacuzziJet. The jet drives have demonstrated considerable savings in maintenance, as well as offering exceptional propulsive efficiencies, maneuverability, and shallow water capabilities.

Jacuzzi Bros., Inc., is located at 11511 New Benton Highway, Little Rock, Ark. 72203.

Something To Think About!

Writes **Norman Polmar,** editor of the U.S. Section of "Jane's Fighting Ships" and respected authority on Soviet ocean strength, in the Navy League's "Sea Power" magazine's October 1973 issue:

"Soviet officials recognize U.S. dependence on the sea as a weakness, and have carefully set about exploiting that weakness, primarily through espousal of a dynamic and well coordinated national oceanic policy which has resulted in development and construction of both a large, modern Soviet merchant marine and a new technologically sophisticated Soviet Navy. The real basis for concern, in the view of U.S. naval/maritime analysts, is that the Soviets have come so far so fast and still show no signs of 'topping out' in their effort.

"It also seems clear that the Soviet Navy has optimized its forces specifically against the most significant U.S. capability, the attack carrier and accompanying air groups, and has devloped tactics to match, for which reason there can be no assured outcome to an engagement fought on Soviet terms. This was not the case a decade ago . . .

"It is perhaps too soon to decide whether or not the 'sands of our last hour of greatness' have begun to run out, but now is certainly the time for all Americans to make a new effort to grasp the significance of sea power in their daily lives, to recognize that the U.S. public may well have come to take for granted the benefits of international trade and economic power which makes theirs the highest standard of living mankind has ever known . . . and to resolve that America's strength at sea, both naval and commercial, must be maintained sufficiently to meet the great challenges which lie directly ahead."

SNAME Columbia River Area Holds First Fall Meeting —New Officers Elected

Shown at the Columbia River Area meeting, left to right: **Hugh P. Sturdivant,** chairman, Columbia River Area; **Carl F. Propp,** author; **Gene W. Frampton,** chairman, Pacific Northwest Section, and **Parker C. Emerson,** secretary-treasurer of Columbia River Area.

The Columbia River Area of the Pacific Northwest Section of The Society of Naval Architects and Marine Engineers held its first fall 1973 meeting on October 26 in Portland, Ore.

The new Columbia River Area officers are: **Hugh P. Sturdivant,** Zidell Explorations, Inc., chairman; **George Tuckey,** Northwest Marine Iron Works, vice chairman, and **Parker C. Emerson,** Parker C. Emerson & Associates, secretary-treasurer.

There were 42 members and guests present at the dinner-meeting.

The speaker for the evening was **Carl F. Propp,** shipyard manager for the Port of Portland. His presentation was "The Port of Portland's Oil Skimmer." A model oil skimmer was displayed in a bathtub to simulate the prototype operation. The model cleaned all the oil out of the tub full of water, leaving only clean water.

Mr. **Propp** explained, "You shouldn't try to mess around and make it complicated—nature provides the fact that oil and water do not mix by themselves." Mr. **Propp's** patented machine has a simple self-adjusting weir that floats. The water, oil and floating debris fall over the weir, and the whole mess is trapped in a chamber, except the clean water which is free to decant out of the bottom of the containment tank. Mr. **Propp** went on to describe the Port of Portland's waste oil processing plant, which has proved highly successful at low operating costs. In fact, the port's very reasonable charges to unload unwanted waste and contaminated oils from ships in port should offset the port's operational expenses.

John Flynn, safety director at Northwest Marine Iron Works, presented a formal discussion. Mr. **Flynn** complimented the Port of Portland's new oil pollution control equipment and remarked how well it proved itself during a recent major oil spill in the Willamette River. This river is much cleaner now than it has been in the past.

Extemporaneous discussion followed from the following members and guests: **Bob Smith,** Mr. **Emerson, Bob Connell, Dennis Chard, Herb Billstein,** and **Bill Conchi.**

A brochure describing the Port of Portland's new improved drydocking and waste-oil-handling capabilities is available by contacting the Port of Portland, Swan Island, Portland, Ore.

Gotaverken And Electrolux To Service Ships Worldwide

Electrolux, with their internationally established experience in industrial cleaning, and Gotaverken, one of the leading shipbuilders in Europe, also with a vast knowledge of ship repairs, have joined hands in starting a worldwide ship servicing venture. The new partnership, operating under the name Electrolux Gotaverken Global Ship Services, encompasses a chain of ship servicing stations in the most important ports in the world.

With ship operating costs soaring and high-salaried crews shrinking, it is natural that shipowners are increasingly resorting to outside specialists for routine maintenance services.

The new Electrolux/Gotaverken organization will eventually be able to offer such specialist services as cleaning of holds and engine rooms, in addition to general repairs and maintenance services on a worldwide basis—even on the high seas.

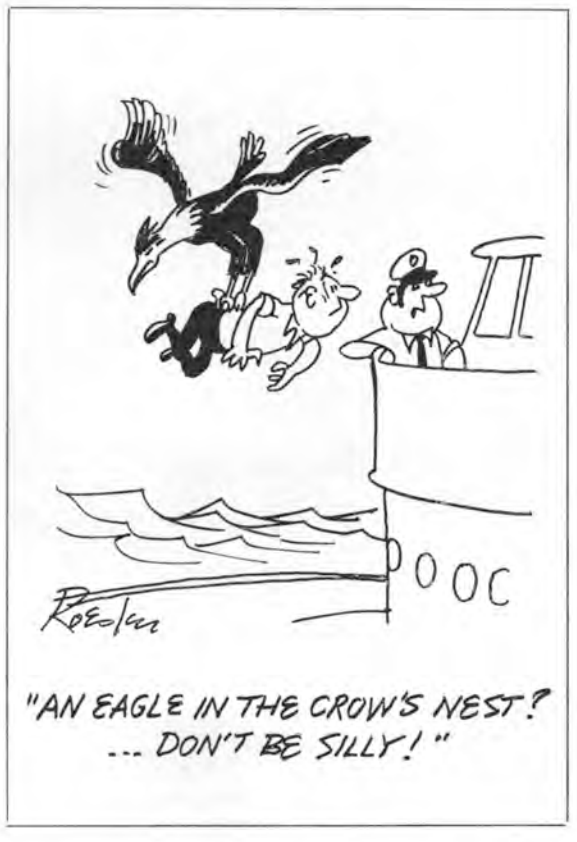
The organization will start out with a number of strategically placed service stations in some of the larger ports in Europe and in Panama, Rio de Janeiro, Buenos Aires, Cape Town, Dubai, Singapore, Hong Kong and Japan. The stations will generally collaborate with local partners. Scandinavian service engineers trained by Gotaverken will supervise the work on board.

The coordination of the activities of Electrolux Gotaverken Global Ship Services will be implemented from the Gotaverken Ship Repair Center in Goteborg, Sweden.

The service station in Buenos Aires has already completed some 30-odd jobs for Latin American and European shipowners, and will soon open its first branch in Puerto San Nicolas. The service station in Dubai, Gulf-Lux Marine Services, started operations in November, when the Wilh. Wilhelmsen 90,000-dwt tanker Taurus had her engine room cleaned en route from Dubai into the Gulf by a flying squad supervised by an Electrolux engineer. The squad was taken aboard and disembarked by Gulf-Lux supply vessels off Dubai.

The Rio organization has already started to canvass for jobs and is currently cleaning the iron ore loading facilities in the port of Vitoria.

The remaining ship service stations are expected to be put in operation during 1974.



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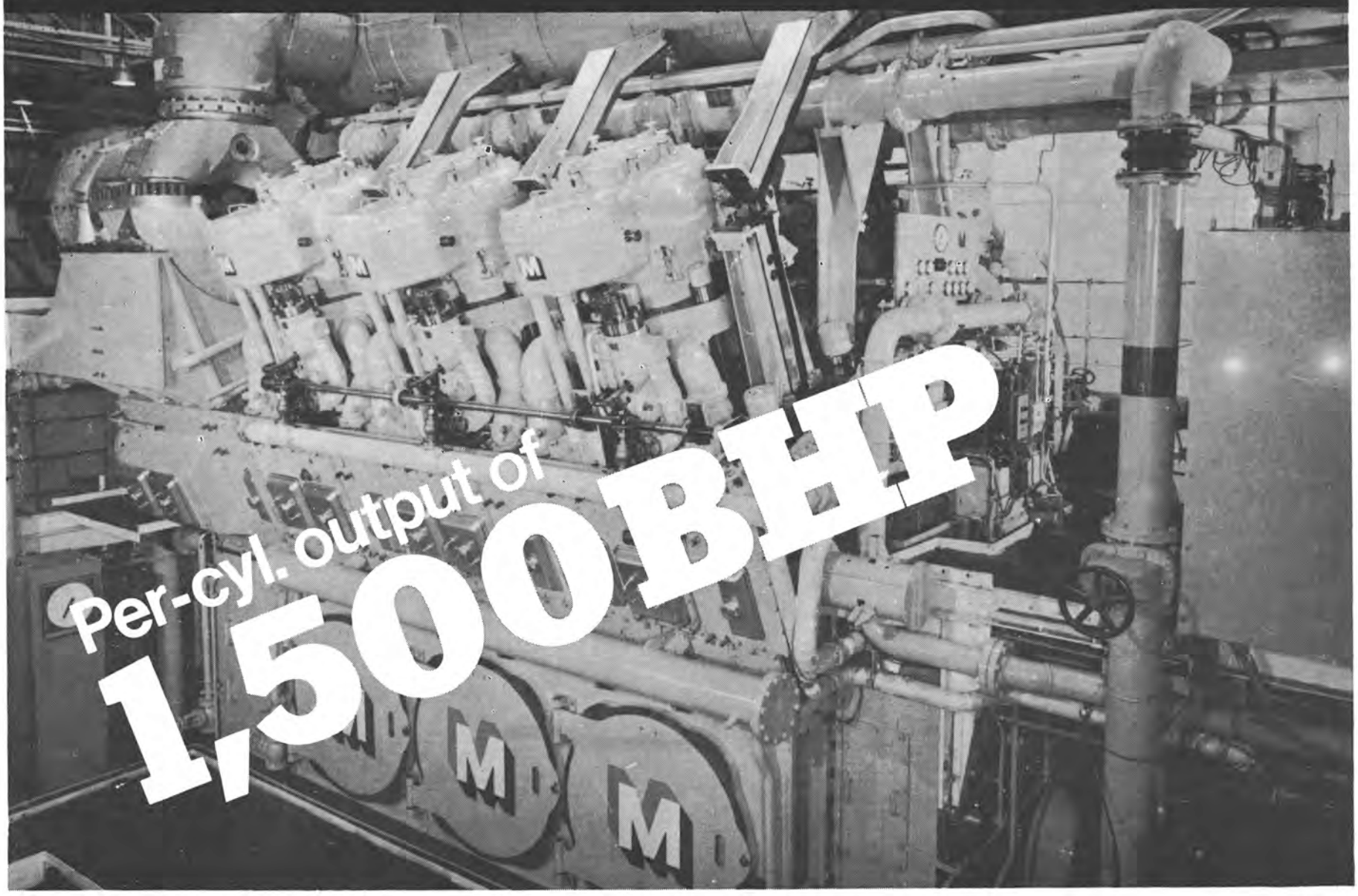
New High-powered 4-cycle Medium Speed Diesel Engine

MITSUI V60M



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MITSUI SHIPBUILDING & ENGINEERING CO., LTD.
Head Office: 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan
Overseas Offices: New York, Los Angeles, London, Duesseldorf, Hong Kong

SNAME Calls For Scholarship Applicants

Scholarships in both the graduate and undergraduate levels are again being provided by The Society of Naval Architects and Marine Engineers to encourage young men and women to pursue studies in the naval architectural and marine engineering or closely related fields. For the graduate study program, application forms have been forwarded to ship operating and shipbuilding companies, affiliated trades and to universities located in all sections of the country. Applications for graduate scholarships for the fall of 1974 should be filed with the Secretary of the Society at 74 Trinity Place, New York, N.Y. 10006, before the closing date of February 1, 1974.

The maximum value of the graduate scholarships usually covers the cost of tuition at the college selected, plus a substantial sum for living expenses. The committee on scholarships will determine in each case the exact value of the graduate scholarship award. Each successful candidate may select the institution for advanced studies subject to the approval of the committee on scholarships.

Factors considered in making the selection include scholastic ability, the candidate's capacity to pursue advanced study, ambition, personality and other factors indicative of prospective leadership status in the marine industry.

In additon to the graduate program, nine undergraduate scholarships of $1,000 each are made available by the Society at the Massachusetts Institute of Technology, the University of Michigan, and State University of New York Maritime College. Two grants-in-aid of $1,000 each are also made available at the University of California at Berkeley. Those interested should contact the above institutions directly and not the Society, since the award decisions on the undergraduate program have been assigned to them.

TTT Announces Three Promotions

The promotion of three veteran executives of Transamerican Trailer Transport, Inc. was announced in San Juan, Puerto Rico, by **Roberto Lugo D'Acosta,** executive vice president. Mr. **D'Acosta** said the following promotions were authorized during the recent visit of TTT president **Peter A. Holzer:**

Ruddie Irizarry, serving as vice president and director of operations, will take on added responsibilities in his new post as assistant to the executive vice president. In his new capacity, Mr. **Irizarry** will direct, supervise and coordinate all activities of the various department heads. He will report directly to Mr. **D'Acosta.**

Angel Colón, director of marketing will take over the position of director of operations.

Froilan Anza, director of traffic and sales, will now occupy the position of director of marketing left vacant by Mr. **Colón.**

Mr. **D'Acosta** said the promotions of these three key men will better enable the company to face the challenges of the future which entails continued growth and expansion.

Literature On Protective Coating Technology Offered By Carboline

The Carboline Company of St. Louis has announced the release of a six-page article entitled "Modern Protective Coating Technology." Emphasis is directed at the waste and water treatment plants and air pollution control facilities. The logic and reasoning can be applied to any industry.

The article deals with the new technical aspects of surface preparation and selection of protective coatings for steel and concrete surfaces. A section is devoted to the advantages and disadvantages of various types of shop primers for steel. In addition, the discussion covers protection for services involving immersion, nonimmersion, and high temperature.

Copies of "Modern Protective Coating Technology" are available from Carboline Company, 350 Hanley Industrial Court, St. Louis, Mo. 63144.

Drewry Report Covers VLCC Employment And Transshipment

The rapidly growing number and size of very large crude carriers (VLCCs) is forcing companies engaged in the oil transportation industry to reconsider traditional attitudes and practices. By 1977, 50 percent of the world tanker fleet (in terms of deadweight tons) will probably be vessels over 150,000 dwt. Whereas 250,000 dwt was considered the maximum standard size of crude carriers only a short time ago, orders for standard 400,000-dwt vessels are now being placed every week. Oil companies are increasingly resorting to such practices as lightening at sea, transshipment, and even multiport discharging as a means of overcoming restrictions, not only on the maximum vessel size, but also on the location for new developments from environmentalists and governments.

The H.P. Drewry (Shipping Consultants) Limited report begins with a comprehensive study of VLCC terminal facilities throughout the world, updating information contained in the previous Shipping Study No. 3, "Terminal Facilities for VLCCs," published in February 1972. The strong competition between Rotterdam and LeHavre for Northwest Europe's very lucrative hinterland oil trade is one of the developments noted since the last report. LeHavre is building a 500,000-dwt terminal at Cape Antifer for completion in 1975, whereas Rotterdam will probably go ahead with its plan to build a 280,000-dwt terminal at Maasvlakte. In the United States, competition to build the first U.S. superport is very keen, but the contestants not only have to fight rival plans, but also the strong environmental lobby. Drewry believes that the USA could have a superport in the U.S. Gulf by 1976-77. The environmental lobby will probably prevent superports being built on the U.S. East Coast in the foreseeable future. In Japan, considerable interest is being shown in the development of offshore Japanese transshipment terminals.

In the second part of the report, they examine the alternative methods of employing VLCCs and discuss the advantages and disadvantages of lightening, two-port discharging and transshipment. Historical details of the European operations of the six specially converted lightening vessels are given from tracking records. Three of the tankers are owned by Shell, two by Exxon and one by BP.

In the last part of this report, all current and proposed crude oil transshipment facilities are discussed in detail. Historical crude oil movements from such transshipment ports as Bantry Bay, Rotterdam, LeHavre and Kiire are given. Of the considerable number of proposed developments of transshipment terminals throughout the world, of particular interest are facilities being built in the Caribbean for the U.S. market. Most of the major oil companies already have, or are developing in the Western Hemisphere, VLCC facilities suitable for transshipment to the U.S.

Comprehensive listings of all world current and proposed VLCC loading and discharge facilities are given, and the locations of these ports are shown on maps and how they connect to crude oil fields and refining areas. Because of the increasing importance of transshipment terminals, a comprehensive listing is also given covering the reported cost, throughput, location, etc. of these facilities.

"Transhipment Terminals and VLCC Employment," No. 15 in a series of reports prepared by the Research Division of H.P. Drewry (Shipping Consultants) Limited, 87-91 New Bond Street, London W1Y, 9LA, England, is available on a subscription basis (£40 per ten reports, about $96) or a single copy rate of £10, about $24.

Virginia Sun/N.Y. Sun File CDS To Build 2 380,000-Dwt Tankers

Two subsidiaries of the Marine Investment Company of Delaware—Virginia Sun Shipping Co., Inc., and New York Sun Shipping, Inc.—have filed a construction differential subsidy application to assist in building two 380,000-deadweight-ton tankers, one for each company. No builder has been selected for the vessels, which will cost approximately $110 million each.

SNAME T&R Bulletin Offers Preliminary Ship Design Aid

The naval architect in designing ship hull have been changed in a systematic manner. The results of such methodical series are usually used to plot design charts or tables which are of inestimable value to been made, but the results are so scattered in the literature that it is often difficult to determine exactly what information is available. Bulletin 1-31, "Index of Methodical Ship Model Resistance Tests."

The bulletin contains information on over 125 different series tests from eight countries. The in-

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SNAME T&R Bulletin Offers Preliminary Ship Design Aid

The naval architect, in designing a new ship, must evaluate power requirements for a number of choices of hull forms and proportions. Some of the necessary information for such evaluations can be derived from using the results of ship model experiments in which the principal characteristics of the ship hull have been changed in a systematic manner. The results of such methodical series are usually used to plot design charts or tables which are of inestimable value to the designer. Selecting a methodical series made with a hull form similar to his proposed ship, the designer could use the results for a preliminary evaluation of resistance and powering requirements.

A large number of methodical ship model resistance tests have been made, but the results are so scattered in the literature that it is often difficult to determine exactly what information is available. In an attempt to rectify this situation, Panel H-2 (Resistance and Propulsion) of The Society of Naval Architects and Marine Engineers' Technical and Research (T&R) Program in 1970 reviewed the known international literature on this subject and prepared T&R Bulletin 1-31, "Index of Methodical Ship Model Resistance Tests."

The bulletin contains information on over 125 different series tests from eight countries. The information provided includes type of ship tested, where the test was conducted and original publication, range of principal dimensions and proportions investigated, speed, range covered, method of presentation of resistance results, skin friction basis, model size, any propulsion experiments conducted, and other pertinent comments concerning the tests.

In addition, a summary bibliography is included that lists all the series tests and what hull proportions and form parameters are investigated. This will allow the user to quickly determine what tests pertain to the subject he is interested in, such as the effect of varying the block coefficient or the position of the longitudinal center of buoyancy.

The bulletin is offered in loose-leaf tabbed format for easy expansion as the Society intends to publish supplemental data as further results of other series tests are received, thus offering the user as complete an index as possible, as well as serving as a forum for the distribution of information or other tests what have been or will be done by testing facilities. It thus also provides valuable information to towing tank establishments by giving the user an idea of what work has been done and what areas still need to be investigated further.

T&R Bulletin 1-31, "Index of Methodical Ship Model Resistance Tests," has been approved for publication by the Hydrodynamics Committee of the Society's T&R Program and is available from The Society of Naval Architects and Marine Engineers, 74 Trinity Place, New York, N.Y. 10006, at a price of $27.75 per copy. Members of the Society may obtain a copy of the bulletin for $18.50. If payment is received with the order, these prices include postage via third class mail in the United States and as "Printed Matter" in all other countries. Shipments will be insured or sent air mail at additional cost only if requested.

Foreign-Flag Operator To Switch To U.S. Flag

The Zapata Corporation recently sold to foreign buyers all stock in Zapata Naess Shipping Company Limited, a subsidiary engaged in the operation of bulk vessels under various foreign flags, for $208 million.

A significant portion of the proceeds of this transaction has been labeled by the company for reinvestment in shipping, with particular emphasis on U.S.-flag. The primary recipient of this reinvestment will be Zapata Bulk Transport, Inc. of New York, a wholly owned subsidiary, which has applied to the Maritime Administration for subsidy to construct three giant 390,000-dwt tankers.

N.Y. PORT ENGINEERS DISCUSS POLLUTION: The Society of Marine Port Engineers New York, N.Y., Inc. met on November 20 at the Downtown Athletic Club in New York City. At the technical session, which was preceded by a dinner, the subject presented was "Pollution—Marine Vessels," by Capt. **Frank Oliver,** United States Coast Guard, Captain of the Port of New York. The sponsor was **James A. Johnson,** General Electric Company. Pictured above at the meeting are: (seated, left to right) **James A. Johnson,** General Electric, sponsor; Capt. **Frank Oliver,** USCG, Captain of the Port of New York, speaker; **Philip A. Donahue,** Maritime Overseas Corp., president; **Joseph Thelgie,** Marine Transport Lines, first vice president; (standing, left to right) **John Antonetz,** Texaco Inc., chairman, papers committee; **John C. Fox Jr.,** Exxon International, tanker department, chairman of the board of directors of the Society; **Edward English,** Atlantic Repair Co., chairman, program committee; **William P. Towner,** American Bureau of Shipping, second vice president; **Thomas Jones Jr.,** American Export Lines, chaplain, and **H.H. Hunt,** marine surveyor, secretary-treasurer.

Offshore Equipment Brochures Offered By Western Gear Corp.

Western Gear Corporation has published two brochures describing and illustrating their lines of equipment for the offshore oil and pipelaying industries. Giving principles of operation and detailed system descriptions, one booklet covers motion compensation systems and marine riser and guideline tensioning systems, as well as heave compensators and tie-to-ground. The second brochure covers the line of LPT Series Pipemaster Pipe Tensioners which employ constant tension characteristics to control the catenary of a pipeline as it leaves a lay barge and encounters dynamic pressure and stress conditions on the way to the ocean floor.

The brochures are available without charge from the Marketing Manager, Western Gear Corporation, Heavy Machinery Division, Everett, Wash. 98201.

Farrell Lines Names Three Key Personnel

Thomas J. Smith, president of Farrell Lines Incorporated of New York, N.Y., has announced several changes in key personnel.

Raymond H. Fleck has been appointed owners' representative in New Zealand, with headquarters in Wellington. He replaces **Robert L. Kennerly,** who after annual leave, will become resident manager for Nigeria, stationed in Lagos. Mr. **Kennerly** had previously been assigned to Monrovia, Liberia, Takoradi, Ghana, and Nairobi, Kenya.

Replacing Mr. **Fleck** is **Anthony L. Pennachio,** New York, former traffic specialist for the Australia/New Zealand trade, who will assume the sales responsibilities for the coffee and cocoa trades.

S.L. Jubert Joins Smith & Johnson Inc. —Spanish Line Agents

Smith & Johnson (Shipping) Inc., 11 Broadway, New York City 10004, managers of the Mexican Line and general agents for the Spanish Line, have announced that **Samuel L. Jubert** has joined its staff. Mr. **Jubert,** formerly associated with Boise-Griffin, will be responsible for the container traffic and operations at Smith & Johnson, particularly for the Spanish Line, the company said.

Marvin Birlingmair Joins Waukesha Motor

Marvin A. Birlingmair has joined Waukesha Motor Company in the position of senior project engineer. The announcement was made by **D.E. Valentine,** chief project engineer for the Waukesha-based engine and power systems equipment manufacturer. He went on to say that in this capacity, Mr. **Birlingmair** will be responsible for control of project work for the medium-size engine group. This primarily covers developments of engines in the 500 to 1,200 horsepower class.

Mr. **Birlingmair** brings to Waukesha a total of 18 years of engine design and development experience. He has been involved in this type of work at Cummins, Minneapolis-Moline, Nordberg, and Fairbanks-Morse, as a result of which he has a valuable background of competitive engine design philosophies.

He is a graduate of Iowa State University, holding a B.S. degree in mechanical engineering.

KELSO-BUILT CHEMICAL CARRIER: Kelso Shipbuilding, Galveston, Texas, launched the Barge Poseidon on November 17. Built for Chemical Barge Company of Houston, the Poseidon's dimensions are 414 feet by 68 feet by 33 feet 6 inches, and has a cargo capacity of 16,000 tons. Classed by the U.S. Coast Guard and American Bureau of Shipping for full ocean service, the double-skin barge features 10 cargo tanks capable of transporting a wide variety of chemical cargoes. The highly sophisticated barge has two diesel drive units, which provide hydraulic power for the 10 deep-well cargo pumps. Kelso Shipbuilding is a division of Kelso Marine, Inc., subsidiary of C. Brewer and Company, Limited. C. Brewer is headquartered in Hawaii, with major operations both in Hawaii and on the U.S. mainland.

$391,000 Fathometer Contract Awarded To Raytheon Marine

A $391,000 contract for Fathometer® depth sounders has been awarded to Raytheon Marine Company of Manchester, N.H., by the U.S. Army Electronics Command, Fort Monmouth, N.J.

The depth sounder system, designated the AN/SQN-15, will be installed on the larger tugs and supply ships of the Army's "fleet." The AN/SQN-15 is a dual system providing water depth information both visually and permanently on a recorder. It consists of the DE-740 Digital Depth Sounder and DE-741 Depth Recorder. The DE-740 offers precise readings numerically on a visual digital display. This unit features an audible warning which is activated whenever the water depth reaches a preset limit. The DE-740 consists of an electronic control and a transducer for transmitting and receiving the depth sounder signal, plus the digital display.

A permanent, detailed record of underwater topography is provided by the companion unit, the solid state DE-741. It includes a chart-type recorder with an electronic unit and a transducer.

The contract also provides for training of Army personnel and provisioning documentation.

Coppus Engineering Named Exclusive Worldwide Licensee For Golar-Vent Gas Freeing

Coppus Engineering Corporation, Worcester, Mass., has been named the exclusive licensee for the manufacture and worldwide sales and service of the patented Golar-Vent Central Gas Freeing System for tankers.

The Coppus/Golar-Vent System today protects more than 400 tankers by using existing cargo lines as conduits for carrying fresh air in large volumes to expel explosive gases and toxic fumes from both the cargo lines and cargo tanks. It reduces tank vapors below Lower Explosive Limits (LEL) and Threshold Limit Values (TLV) in a matter of minutes, thereby providing complete safety for both the ship and its personnel. The systems are compact and self-contained and can be easily installed in new hulls or retrofits. The equipment is equally suitable for ore/oil carriers and tankers using the free-flow cargo pumping system.

One or two Coppus Turbine-Fan Packages, sized to deliver the air volume required, are centrally located on the deck, or in the pump room or engine room, where they remain readily accessible. Each is connected to a fresh-air inlet and may be used as a backup unit for the other. The operating Turbine-Fan Package delivers a continuous high volume of fresh air through the cargo lines to the tanks to dispel the gases more effectively and efficiently.

Coppus/Golar-Vent Systems also speed tanker turnaround, canal transits, tank cleaning, inspection and repair. They can be used immediately after tank cargo discharge, during and after tank washing. They can easily be operated by one man, thus reducing labor costs.

This new licensee agreement will permit Coppus to offer combined systems to ship operators and shipowners by integrating Coppus/Golar ventilating systems with its FMV Inert-Gas Systems which prevent explosive gas mixtures from forming at any time during vessel operation.

Coppus Engineering has long been a manufacturer and supplier of products for marine application—horizontal and vertical steam turbines, pump and engine room ventilators, portable gas-freeing ventilators, Saxlund Incinerator Systems, and Golar Stripping Ejectors.

Graduate Course Offered On Materials In Ocean Environment

The Institute of Ocean Science and Engineering of the Catholic University of America, Washington, D.C., announces the offering of a one-week graduate-level course entitled "The Behavior of Materials in the Ocean Environment," from June 3-7, 1974.

Topics, including corrosion, stress corrosion, corrosion fatigue, fracture, fouling, protective coatings, cavitation erosion, future trends in materials, as well as basic physical and chemical oceanography, will be discussed by acknowledged experts from governmental and private concerns. The course may be taken for graduate credit.

For further information, contact Dr. **John J. Gilheany,** Director, Center of Continuing Education, The Catholic University of America, Washington, D.C. 20017.

GIBBS & COX, Inc.

Naval Architects and Marine Engineers

is expanding its organization in its new facilities in New York City. Backlog includes new Patrol Frigate, Sea Control Ship, RO/RO Ship and others. Career positions are available for experienced engineers, designers and draftsmen in:

Naval Architecture, Ship Arrangements, Structural, HVAC, Deck Machinery, Replenishment and Handling Systems, Outfit and Furnishings, Test and Evaluation, Shock, Noise and Vibration.

Marine Engineering, Piping Systems Engineering, Piping Layout, Machinery Arrangements, Mechanical Systems, Purchase Specifications and Materials.

Electrical Engineering, Electric Power, Lighting and Cableways.

Electronics Engineering, Compartment Arrangements, Interior and Exterior Communications Systems, Radar, Sonar and ECM Systems.

Weapons Engineering, Arrangements, and Weapon Control Systems.

Project Management, Naval and Merchant.

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Openings also in Hyattsville, Maryland office.

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Experienced person with proven ability and knowledge to assume the responsibility of General Foreman for our progressive growing shipbuilding firm.

Duties involve directing the efforts of semi-skilled and skilled workers in building and repairing barges, tow boats, etc. Any shipbuilding experience helpful.

Write to: Mr. C. Friedrich.

LEMONT SHIPBUILDING & REPAIR CO.
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Small, progressive design organization requires an individual with a broad background in all phases of steel vessel design including knowledge of USCG and ABS requirements. This is an interesting and challenging position in congenial surroundings. Forward resume, sample drawings and salary requirements to:

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BARGE CLEANING OPERATION

We have an immediate opening for the right individual to head our barge cleaning operation. The ideal applicant will possess a tankerman, engineer, or pilots license. For the qualified applicant who does not have a license, a training program is available to earn and secure one. Salary commensurate with experience along with fringe benefits.

Write to: Mr. C. Friedrich.

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MARINE DEALERS WANTED

The leading manufacturer of engine room monitoring systems is expanding its line to include marine tachometers, pyrometers, navigational and environmental control systems. Experienced marine dealers in inland waterways and coastal areas are urgently needed and are invited to send resumes to

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Marine Systems Division
1750 Brentwood Blvd., St. Louis, Mo. 63144
Phone: 314/968-2700

Large steamship company with vessels operating off the West Coast requires aggressive individual, preferably possessing a Chief Mate or Masters license, for supervisor of vessel container lashings and vessel coatings systems. Salary open. Apply in confidence to:

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107 East 31 Street New York, N.Y. 10016

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General Electric	
High and Low Pressure	8500 HP
Westinghouse High & Low Pressure	
Turbine & Type H & Type C Gears	8500 HP
Allis Chalmers Low Pressure	6000 HP
De Laval	
Reduction Gear Components	6000 HP
General Electric T-2 Diaphragms	6000 HP
General Electric	
High & Low Pressure	6000 HP
Westinghouse High Pressure	6000 HP
Westinghouse and Allis Chalmers	
High & Low Pressure	4400 HP

AUXILIARY TURBO-GENERATORS

General Electric FN4-FN30	1500 KW
General Electric	
FN3-FN20 10030 RPM	600 KW
Westinghouse 5015 RPM	538 KW
General Electric DORV 325	525 KW
Allis Chalmers (G.E. Design)	
5645 RPM	500 KW
General Electric	
DORV 618N 10059 RPM	400 KW
Worthington 6097 RPM	400 KW
Allis Chalmers 8000 RPM	300 KW
Allis Chalmers 5645 RPM	300 KW
De Laval 5692 RPM	300 KW
General Electric	
DORV 325 5636 RPM	300 KW
Joshua Hendy (Terry Design)	
HM-5 5965 RPM	300 KW
Westinghouse Non-Recessed	300 KW
Westinghouse Recessed	300 KW
Worthington 6097 RPM	300 KW
General Electric	
DS 60-25 5660 RPM	250 KW
Westinghouse 5015 RPM	250 KW
General Electric	
DORV 518N 10012 RPM	240 KW
Worthington 6510 RPM	150 KW
Westinghouse 7283 RPM	60 KW

Many Units Complete
With Reduction Gears and Generators

We Offer Complete Units
or Component Parts

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From

ZIDELL

Explorations, Inc.

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TELEX: 36-0503 · CABLE "Zidell"

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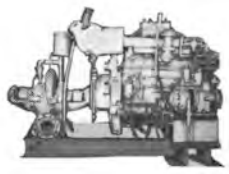
228-8691

A partial listing of our stock from EX-NAVY and MARITIME VESSELS

Certification to A.B.S. or Lloyd's a routine

MARINE PUMPS

FIRE PUMPS

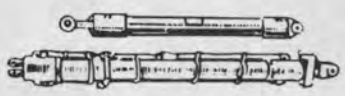


2—BUDA, Model 6-LD-468, Diesel Engines, 6 cylinders, 100 BHP, Marine, Gardner-Denver centrifugal Pumps, Bronze, horizontally split case, 1000 GPM, 280′ head, 6″ suction and 5″ discharge.

DC, VERTICAL-ROTARY

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

HYDRAULIC CYLINDERS



Bore	Overall Stroke	Rod Diameter	Retracted Length	Action
10″	12″	3.75″	45½″	double
10″	26″	3.75″	58½″	double
2″	8″	1½″	20″	double
2.5″	15″	1.12″	25½″	double
3″	8″	1.37″	15½″	double
6″	8″	4″	144″	double

FORGED STEEL LINE SHAFTING

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

We also have . . . Machinery and Equipment from:

AP2 and AP3 Vessels
C2-SB1 Vessels
C3-S1-A3 Vessels
and Liberty Ships

AXIAL FLOW FANS

Rebuilt Guaranteed LaDel, STURTEVANT, etc.

In 440 AC, in 115 DC, and in 230 DC, and in sizes 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

DC, VERTICAL - ROTARY cont.

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

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

DC, HORIZONTAL-CENTRIFUGAL

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

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

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

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

AC, HORIZONTAL-CENTRIFUGAL

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

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—BUFFALO, 250 GPM, 100 PSI, Class CCS, Size 4x3½″, with Westinghouse Motors, 25 HP, 440/3/60.

DC, VERTICAL-CENTRIFUGAL

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

2—ALLIS-CHALMERS, 30 GPM, 208′ head, Type CF2V, 2½″ suction, 1½″ discharge, 7½ HP, 230 DC.

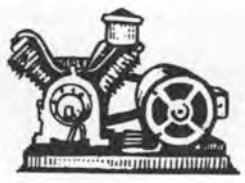
1—ALLIS-CHALMERS, 400 GPM, 100 PSI, 4″x3″, 50 HP, 230 DC.

1—WORTHINGTON FIRE & BUTTERWORTH, Size 3 UBS, 400 GPM, 200 PSI, 75 HP, 230 DC.

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

THE ABOVE LIST REPRESENTS BUT A FRACTION OF OUR MARINE PUMP STOCK. PLEASE INQUIRE FOR SPECIFIC TYPES AND SIZES NOT SHOWN.

AIR COMPRESSORS



2—SULLIVAN, Size WL60, Model A-UB-8, 100 PSI, 2 stage, with 30 HP G.E. Motors. 440/3/60.

1—GARDNER-DENVER, 150 CFM, 125 PSI, Class WB, Size 7x5¾x5, with Diehl Motors, 45 HP, 230 Volts, DC, 870 RPM, 167 Amperes.

3—INGERSOLL-RAND, Size 5x5x4x4, 50 CFM, 150 PSI, with G.E. Motor, 20 HP, 440/3/60.

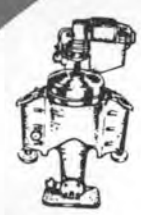
2—WESTINGHOUSE Air Brake Steam, Size 11x11x12, approximately 60 CFM at 100 PSI.

1—INGERSOLL-RAND, Model 40B, 155 CFM, 110 PSI, 870 RPM, wth 40 HP Motor, 230 DC.

2—WORTHINGTON, 20 CFH, 3000 PSI, 4 stage, 585 RPM, with Worthington Steam Turbine, 47 HP, 5502 RPM.

IF YOU DON'T SEE IT CALL!

"IF IT'S ON A SHIP, WE PROBABLY HAVE IT!"



CENTRIFUGES

SHARPLES AND DE LAVAL

150 GPH—440 AC
230 DC
350 GPH—230 DC
600 GPH 230 DC

PROPELLER SHAFTS

From
CS-SI-A3 VESSEL
From AP3 VICTORY SHIP

MARINE DIESEL GENERATORS

HERCULES, DOOC, 10 KW, 120 DC.

CATERPILLAR, D3400, 15 KW, 120/240 DC.

BUDA, 4 cylinder, 15 KW, 120/240 DC.

HERCULES, DJXC, 25 KW, 120 DC.

CUMMINS, WA255, 30 KW, 120 DC.

P&H, 387C-18, 45/56 KVA, 120/208/3/60.

BUDA, 6DH909, 40 KW, 120 DC.

BUDA, 6 DHG691, 60 KW, 120 DC.

GENERAL MOTORS, 6067, 60 KW, 450/3/60.

BUDA, 6DC844, 75 KW, 125-250 DC.

1—CUMMINS, Model HCD, 60 KW, 120/240 DC.

CATERPILLAR, D17000, 85 KW, 220/3/60.

4—COOPER-BESSEMER, Model FSN6, 6 cylinders, 375 HP, 900 RPM, with General Electric Generators, 250 KW, 440/3/60.

MORE DIESEL GENERATORS ON FOLLOWING PAGE

REDUCTION GEARS

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

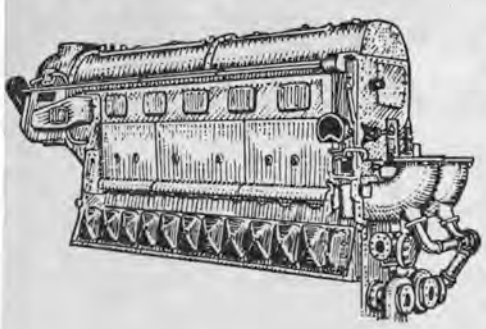
FALK Reduction Gears—Port & Starboard, Interchangeable with T-3 Tanker Gears, Falk No. 148-300. Also interchangeable with Falk Gears on AO51 Class Tankers (14 ships). Also on AO97 and AO100 Tankers.

1—L.S.T. TYPE VESSEL HULL

328′

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.

MARINE DIESEL ENGINES



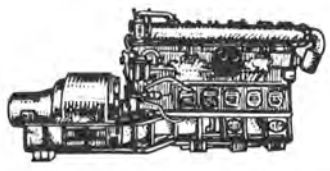
MATCHED PAIR . . . FAIRBANKS MORSE

Model 38D8⅛ —1 port; 1 Starboard. Used condition, 1800 HP, 800 RPM, 2 cycle, 8½" bore, 10" stroke, Air Start. Complete with Westinghouse Reduction Gears, 2.216:1 ratio—with Hydraulic Coupling.

3—COOPER-BESSEMER DIESEL ENGINES, Model LS-8-DR, 1300 HP, 277 RPM, direct reversing, turbo charged.

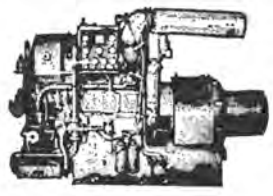
2—SUPERIOR DIESEL ENGINES, Model VDSS, 1160 HP, 325 RPM.

MARINE DIESEL GENERATORS



3—DE LAVERGNE, Marine, 560 HP, 514 RPM, Serials #2180 and #2181, with Electric Machinery Generators, 375 KW, 450/3/60.

2 — SUPERIOR Diesel Engines, Model GBD-8, Marine, 150 HP, 1200 RPM, 8 cylinder, with Delco Generators, 100 KW, 120/240 DC.



1—GENERAL MOTORS, Model 3-268A, Marine, 150 BHP, 1200 RPM, 3 cylinders, with 100 KW Generator. 120/240 DC.

4—GENERAL MOTORS, Model 3-268A, 150 HP, 1200 RPM, 3 cylinder, with 100 KW Generators, 450/3/60.

TURBINE GENERATORS A.C. AND D.C. VOLTAGES

A.C.

2—1500 KW, GENERAL ELECTRIC Turbines: Type FN4-FN30, Steam 525 PSIG. 8145 RPM, with G.E. Generators, 1500 KW, 450/3/60.

4—1250 KW, GENERAL ELECTRIC Turbines: Type FSN, 525 PSI, 7938 RPM. Generators: 1250 KW, 450/3/60, 3600 RPM, Type ABT2.

4—600 KW, GENERAL ELECTRIC Turbines: Type FN3-FN20, Steam 525/565 PSIG, 10033 RPM, with G.E. Generators, 600 KW, 450/3/60.

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

2—500 KW, GENERAL ELECTRIC Turbines: Type FN3-FN20, steam 375/425 PSI, 6 Stage, 9987 RPM. Generators: 500 KW, 450/3/60, 1200 RPM, Type ATI.

D.C.

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.

ALLIS-CHALMERS, 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.

SUBMARINE DIESEL GENERATOR ENGINES

(Without Generators)

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

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

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FOR MARINE VALVES & FITTINGS: 503/228-8691 ASK FOR "VALVE DIV."

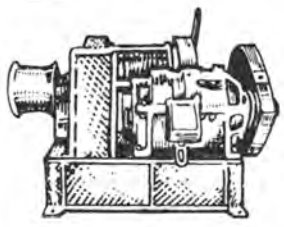
Steel Watertight DOORS

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—$85.00 ea.
26"x66"—6 Dogs, 8 Dogs—$100.00 ea.
26"x66"—Q.A. Type $175.00 ea.

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

UNIT WINCHES

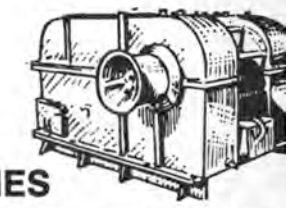
American Hoist and Derrick Co.

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.



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.

ANCHOR WINDLASSES

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.

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

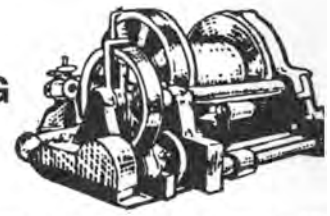
2—HESSE-ERSTED, horizontal, double wildcat, 2⅛" chain, 60 HP, 230 DC.

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.

ANCHOR CHAIN

Used, good, with or without test certificate.

1⅜" size	2 1/16" size	2¾" size
1½" size	2¼" size	3⅜" size
	2⅝" size	

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.

2—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.

CARGO HOISTER BLOCKS

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

$44.50 ea.

$49.50 each with pull test certificates

Hundreds of other items in stock from Carriers, Cruisers, Destroyers, Submarines, Landing Vessels, Troop Ships and Cargo Ships

★

YOUR INQUIRIES INVITED AND PROMPTLY ANSWERED

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ZIDELL EXPLORATIONS, INC.

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A/C 503, Phone 228-8691

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3000 H.P. 110′ x 25′ x 13′ (One Million Dollars
Built 1964 and $100,000)

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H.P. 149′ x 28′ x 14.8′ Rebuilt 1957 $262,500

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79′ x 23′ x 9.3′ Built 1945 $65,000

D. **STEEL HULL CREW BOAT**
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E. **3 COVERED AND 3 DECK BARGES**—Built
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PUBLIC NOTICE

Notice is hereby given that the Port Authority Ferry Corporation will offer for sale, as surplus property, the following three diesel-electric, 185 foot ferryboats now operating on the Delaware River between Chester, Pennsylvania and Bridgeport, New Jersey:

BRIDGEPORT	**Official #242176**
CHESTER	**Official #240877**
DELAWARE	**Official #240384**

1) Said ferryboats will be sold as separate items or as a class, as shall be deemed to be in the best interests of seller.

2) Sealed bids will be received at the Office of the Secretary, Port Authority Ferry Corporation, Administration Building, Bridge Plaza, Camden, New Jersey 08101, until 10:00 A.M. local time Friday, January 4, 1974, at which time all proposals will be opened and publicly read.

3) Complete terms and conditions of sale, descriptions of vessels and bid proposal forms will be available from the Office of the Director, Administrative Services Division, Administration Building, P.O. Box 1949, Bridge Plaza, Camden, New Jersey 08101 on or after November 30, 1973.

4) Any one or more of the named ferryboats may be withdrawn from sale at any time until final award.

5) The named ferryboats may be inspected at the Chester, Pennsylvania terminus of the Chester-Bridgeport Ferry, foot of Flower Street, Chester, Pennsylvania by appointment with the General Manager (telephone 215-874-7105) between the hours of 9:00 A.M. and 4:00 P.M. on weekdays beginning November 26, 1973 through December 28, 1973.

6) The items offered for sale are "as is and where is", to be removed at purchaser's expense after award and within five days after the Commodore John Barry Bridge is opened for traffic on or about February 1, 1974.

W. W. WATKIN, President
11/5/73 **PORT AUTHORITY FERRY CORPORATION**

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Estimates at no cost or obligation
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Page 27, 17 and 12 yd. diesel walking draglines, working. American diesel 40 ton gantry cranes (2) $19,000 each. Dredges, diesel, 20", 22", 24"; - Locomotives. Manitowoc 4000 barge-crane, 125 ton, 90′ bm; (upper). Clyde 20 crane, 50 ton on barge, diesel; and Clyde 24. 40 ton loco. crane, diesel, Ind.-Bhst. $14,500. 75 ton Whirley gantry crane, 60′ high, 25′ gauge $66,000.
For sale contact **H.Y. SMITH CO.**
759 N. Milwaukee St. (276-3830) Milwaukee, Wis.

UNUSED 2" BRONZE STRAINERS (DUPLEX)

Flanged—mfg by Derbyshire Machine & Tool Co. Flange has 6 holes 9/16".

$299.00

THE BOSTON METALS COMPANY
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For sale or rent worldwide for "non-transportation" use at exceptionally attractive terms. Ideal for:
6,500,000 gallon heated Storage Tank w/pumps
8450 KW, 3500V, 60/50 Hz, 3 Ph Power Plant
Conversion to Offshore Drilling Rig or Tank Cleaning Station.
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WINCHES—Steam or Air Operated

4x6 Lidgerwood, 13000# Static Load $995.00 each
8x8 Lidgerwood, 6,000# at 200 FPM $1500.00 each
7x12 American Hoist & Derrick 10,000# at 125 FPM $1500.00 each
9x12 American Hoist & Derrick 20,000# at 110 FPM $2750.00 each
10½x12 Lidgerwood, 32,000# at 90 FPM $4750.00 each
Also Electric
2 Almon A. Johnson Towing Engines Model 232 wire rope included at $19,000.00 each

All sizes of stud link chain, anchors, fittings available from stock

STANDARD STEAM WINCH CO., INC.
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FOR SALE

Dock Overhead Craneway 1000′ long, 150′ span, 77′ lift. AC 3/60/440. (2) 40 ton and (2) 50 ton cranes. Can be seen set up. New approx. 1940-1950. Will sell crane runways and cranes separately or as unit. BARGAIN WHILE ON LOCATION . . .

DRYDOCK FOR SALE 10,000 ton cap.—463′ overall length, 117′ width, 50′ depth, five sections, built 1945. Excellent. Wooden construction.

EVEREADY
Box 1780 Bridgeport, Conn.
(203) 334-9471 — Ed McCallum

SELF-CONTAINED—ALL CONTROLS
CYCLOTHERM STEAM BOILERS
MODEL MC-90
OUTPUT
2600 LBS/HOUR

Design pressure 100 PSI—2-Pass—1 burner (pressure atomizing)—burner capacity 26 gal./hr. Electric ignition. Equipped with fuel pump — 1½ HP (Feed pump 10 GPM @ 300 ft. head — 3 HP — 440/3/60) Blower 5 HP—440/3/60 — pressure 20" water — 3400 RPM. TUBES: 22 at 2½" x 0.110 wall and 22 at 2" x 0.095 wall. Furnace 16" OD x ⅜" thick. Head ½" thick. Steel plate 5/16". **$1395**

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MACHINERY DIVISION
SHIPS FOR SALE
4 CIMAVI TYPE VESSELS
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
Complete With All Accessories. Saw Very Little Service Before Government Layup. Extremely Good Condition.
Ideal as Self Propelled Drill Ship, Crane Ship, or as Stationary Supply or Quarter Ship.
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Anchors (1500) (60) **Generators**
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FOR SALE

2 Each—Fairbanks Morse Diesel Marine Engines—complete with mufflers—slightly used — less than 7,000 hours. Model 38D, OP — 8 x 8⅛, S/N — 848498 and 848501, 10 Cyl. 1800 Lp. each. May be seen at Bellinger Shipyard in Jacksonville, Fla., or contact Birdsall Inc., as Agents for Tropical Shipping Co. at 821 Ave. "E", Riviera Beach, Fla. Phone 844-0281 A.C. 305.

NEW 7" RADIUS PANAMA CHOCKS
(MEET PANAMA REGULATIONS)

With extended legs for welding to deck. IMMEDIATE DELIVERY FROM STOCK.

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NATIONAL METAL'S CURRENT T-2 INVENTORY

MANY OTHER ITEMS NOT LISTED • ALL ITEMS FURNISHED WITH A.B.S. OR LLOYDS'

TURBOGENERATORS

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

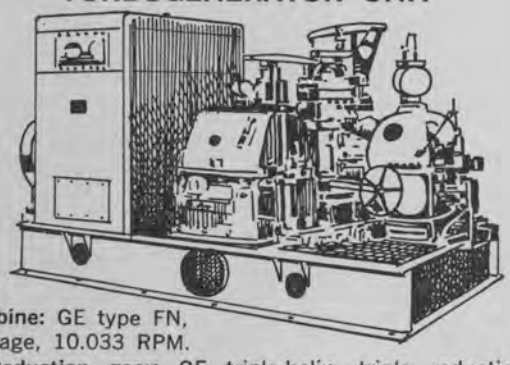
Complete with L.O. Coolers and exciters. **Turbine:** Westinghouse 538 KW, 5010 RPM. Inlet pressure 435 psi. Temp. 750 degrees F.TT. Exhaust pressure 28½ hg vac. **Generators:** (1) 400 KW, 450 VAC, 3 pole, 60 cycle, PF 80%, 1200 RPM, ship's service. (2) 32.5 KW, 125 VDC, 1200 RPM, variable voltage exciter.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

MISCELLANEOUS T-2 EQUIPMENT

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.

TAIL SHAFTS

ABS 59-S1768-AB810
Reconditioned, ABS 70-LA-11901-946

RUDDER WITH STOCK (complete)

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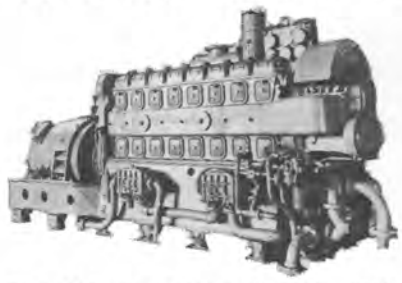
G.M. 8-268A
200 KW A.C.
DIESEL GENERATOR SETS



ENGINE: 8-268A—6½" bore x 7" stroke—1200 RPM—driving 200 KW Westinghouse generator—440 volts—3-phase—60 cycle—321 amps—80% power factor at 1200 RPM.

$3750

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NEW WATERTIGHT DOORS

6-Dog right and left hand hinged steel doors—with frames. Built and tested to A.B.S. specifications.

SIZE	NET WT.
26"x48"	250 lbs.
26"x60"	300 lbs.
26"x66"	320 lbs.
30"x60"	330 lbs.

EACH DOOR

IMMEDIATE DELIVERY

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D.C. GENERATORS

SUITABLE FOR DIESEL ELECTRIC TUGS AND VESSELS OR OIL FIELD DIRECT DRIVE D.C. GENERATORS

1200 KW—525 Volts D.C.—750 RPM—2290 amps—totally enclosed—self-ventilated with surface air coolers. Frame: split type. 2-Bearings: split sleeve, spherical seat, self-aligning. Separately excited from a 120 volt source. Continuous duty. Very good condition.

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GENERAL ELECTRIC
Rewound — with A.B.S. — ex-Pioneer Valley.

WESTINGHOUSE
For T2SE—A-1 tankers—with A.B.S.—ex-Caltex J.H. MacGaregill.

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UNUSED 1⅝" HEAVY DUTY
LINK BELT WINDLASS

Below deck motor drive. Double wildcat—driven by 50 HP 230 VDC motor with vertical shaft and worm drive. Single speed—handles 7000 lb anchors and 60 fathoms of 1⅝" chain at 7 fathoms per minute. Wildcat centers 56". Complete with all controls and warping features. Total weight 27,500 lbs. With spares.

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8" x 8"
WATEROUS HEAVY DUTY
ROTARY CARGO PUMP

Mfg. Waterous Co.—730 GPM—pump speed 232 RPM—reduction ratio 900/232—8" suction—type P-1256—80 PSI pressure—60 HP—herringbone reduction gear—8" discharge.

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DeLaval—600 G.P.M.—type B-1529C-60—with 3 H.P. 440/3/60 Motor. Mfg. by German DeLaval. Spare parts available.

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LESLIE PUMP GOVERNOR VALVE

For U.S. Naval Vessels—type CT-HNS-3. For merchant vessels—type CTHS. Size 2". Typical serial 241-423. For immediate delivery.

$495

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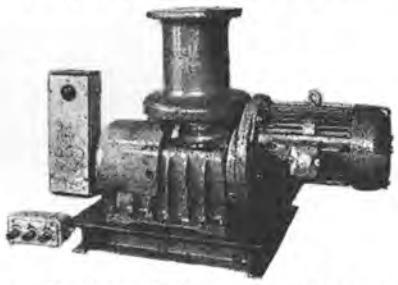
NEW — UNUSED
10 H.P. REVERSING CAPSTANS
SHIPBOARD USE
Duty 10,000 lbs. @ 60 FPM



10 H.P.—220/440/3/60—1750 R.P.M.—Marine type reversing controller. Barrel diameter—10"—2½" Flange. Height between flanges 12".

$2450

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15 KVA—3 per bank—450 V primary—177 volt secondary. **$295.00 PER BANK**

Also inquire about other sizes: 10 KVA/20 KVA/25 KVA/37 KVA

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Reconditioned—mounted in portable steel frame. 1750 RPM—1100 GPM @ 100' head; 1500 GPM @ 70' head; 1800 GPM @ 50' head; 2100 GPM @ 20' head. Leroi gas engine—model D-201P3—4 x 4—1750 RPM—hand crank—wt. 600 lbs. **$995**

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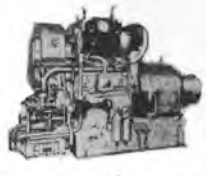

G.M. 3-268A
100 KW A.C. Diesel
GENERATOR SET

Like new, ENGINE: G.M. 3-268A—3 cylinder—6½"x7" bore & stroke. GENERATOR: Century—100 KW—440 volts—3-phase—60 cycle.

AIR STARTING **$2450** ELECTRIC STARTING **$2775**

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Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
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Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

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Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Crandall Dry Dock Engrs., Inc., 238 Main St., Cambridge, Mass. 02142
Francis B. Crocco, Inc., Box 1411, San Juan, Puerto Rico
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Arthur D. Darden, Inc., 1040 International Trade Mart, New Orleans, La. 70130
Design Associates, Inc., 3308 Tulane Ave., New Orleans, La. 70119
Designers & Planners, Inc., 114 Fifth Ave., New York, N.Y. 10011
M. Mack Earle, 103 Mellor Ave., Baltimore, Md. 21228
Parker C. Emerson & Associates, 17935 Cardinal Drive, Lake Oswego, Oregon 97034
Christopher J. Foster, 14 Vanderventer Ave., Port Washington, N.Y. 11050
Friede and Goldman, Inc., 225 Baronne St., New Orleans, La. 70112
Gibbs & Cox, Inc., 40 Rector Street, New York, N.Y. 10006
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
Morris Guralnick, Associates, Inc., 583 Market St., San Francisco, Calif. 94105
J. J. Henry Co., Inc., 90 West St., New York, 10006
Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, Calif. 93017
C.T. Iliriucci & Associates, Tourism Pier #3, San Juan, P.R. 00902
Jantzen Engineering Co., 15 Charles Plaza, Baltimore, Md. 21201
James S. Krogen, 2500 S. Dixie Hwy., Miami, Fla. 33133
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 1180 Ave. of Americas, N.Y., N.Y. 10036
Marine Design Associates, P.O. Box 2674, Palm Beach, Florida
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742
Robert Moore Corp., 350 Main St., Port Washington, N.Y. 11050
Nickum & Spaulding Associates, Inc., 71 Columbia St., Seattle, Wash. 98104
Ocean-Oil International Engrg. Corp., P.O. Box 6173, New Orleans, La. 70114
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
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Trident Studio, Box 670, Spring House, Pa. 19477
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American Hydromath Co., 55 Brixton Rd., Garden City, N.Y. 11530
Communication Associates, Inc., 200 McKay Road, Huntington Station, N.Y. 11746
Edo Corporation, 13-10 111th Street, College Point, N.Y. 11356

Edo Western Corporation, 2645 South 2nd West, Salt Lake City, Utah 84115
Electro-Nav, Inc., 501 Fifth Ave., New York, N.Y. 10017
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
ITT Decca Marine, Inc., 386 Park Ave. South, New York, N.Y. 10016
ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Lorain Electronics Corp., 2307 Leavitt Road, Lorain, Ohio 44052
Magnavox Navigation Systems, 2829 Maricopa St., Torrance, Cal. 90503
Raytheon Marine Co., 676 Island Pond Road, Manchester, N.H. 03103
Raytheon Co., Submarine Signal Div., P.O. Box 360, Portsmouth, R.I. 02871
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Standard Communications Corp., 639 N. Marine Ave., Wilmington, Calif. 90744
Teledyne Hastings Raydist, P.O. Box 1275, Hampton, Va. 23361
Tracor, Inc., 6500 Tracor Lane, Austin, Texas 78721
The Waterways Co., 3512 Metairie Hts. Rd., New Orleans, La. 70002

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Exxon International Company, 1251 Avenue of the Americas, New York, N.Y. 10020
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002

PAINT—Marine—Protective Coatings
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144
International Paint Co., 21 West St., New York, N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Transocean Marine Paint Association, P.O. Box 456, Delftseplain 37, Rotterdam, Holland

PETROLEUM SUPPLIES
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
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

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

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Jacksonville Port Authority, 2701 Tallyrand Ave., Jacksonville, Fla.

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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

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Delaval Turbine Inc., IMO Pump Division, P.O. Box 321, Trenton, N.J. 08602
Houttuin-Pompen N. V. Sophialaan 4, Utrecht, Holland
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Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

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Atlantic Cordage & Supply Corp., 60 Grant Ave., Carteret, N.J. 07008
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
Jered Industries, Inc., 1300 S. Coolidge Rd., Birmingham, Mich. 48008
Koehler-Dayton, Inc., P.O. Box 309, New Britain, Conn. 06050

SHAFT REVOLUTION INDICATOR EQUIP.
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Ultra Products, Inc., 805 Central Ave., New Orleans, La. 70121

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Coppus Engineering Corp., P.O. Box 457, Worcester, Mass. 01613
TANK S.A.P.P. Inc., 330 Madison Avenue, New York, N.Y. 10017 and 1020 Springfield Avenue, Mountainside, N.J. 07092

SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
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
Agemar, P.O. Box 1465, Maracaibo, Venezuela
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
United States Steel Corp., P.O. Box 86, Pittsburgh, Pa. 15230

SHIPBUILDING—Repairs, Maintenance, Drydocking
Albina Engine & Machine Works, 2100 N. Albina Ave., Portland, Oregon 97208
Astilleros Espanoles, S.A. Zurbano, 70, Madrid 10, Spain
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Beliard, Crighton & Cie, P.O. Box 2074, Route des Docks, 59, Dunkirk, France
Beliard Murdoch S. A., Kattendijkdok Westkaai 21, Antwerp, Belgium
Bell Aerospace Company, Div. of Textron, P.O. Box 1, Buffalo, N.Y. 14240
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Bludworth Shipyard, Inc., Box 5426, Cypress St., Brady Island, Houston, Texas 77012
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Havre de Grace, Havre de Grace, Md.
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Kelso Marine, Inc., P.O. Box 268, Galveston, Texas 77550
Keppel Shipyard (Private) Ltd., P.O. Box 2169, Singapore
Kockums Mekaniska Verkstads AB, Malmo 1, Sweden
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
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Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520
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Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047
Mercantile Marine Engineering & Graving Docks Co., N.V., Antwerp, Belgium
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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
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Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
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Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Savannah Machine & Shipyard Co., P.O. Box 787, Savannah, Ga. 31402
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Tracor/Mas, Inc., P.O. Box 13107, Port Everglades, Fla. 33316
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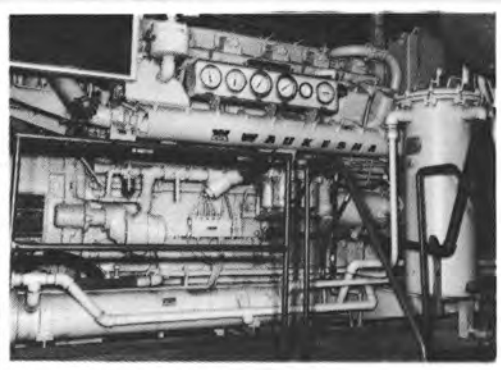

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