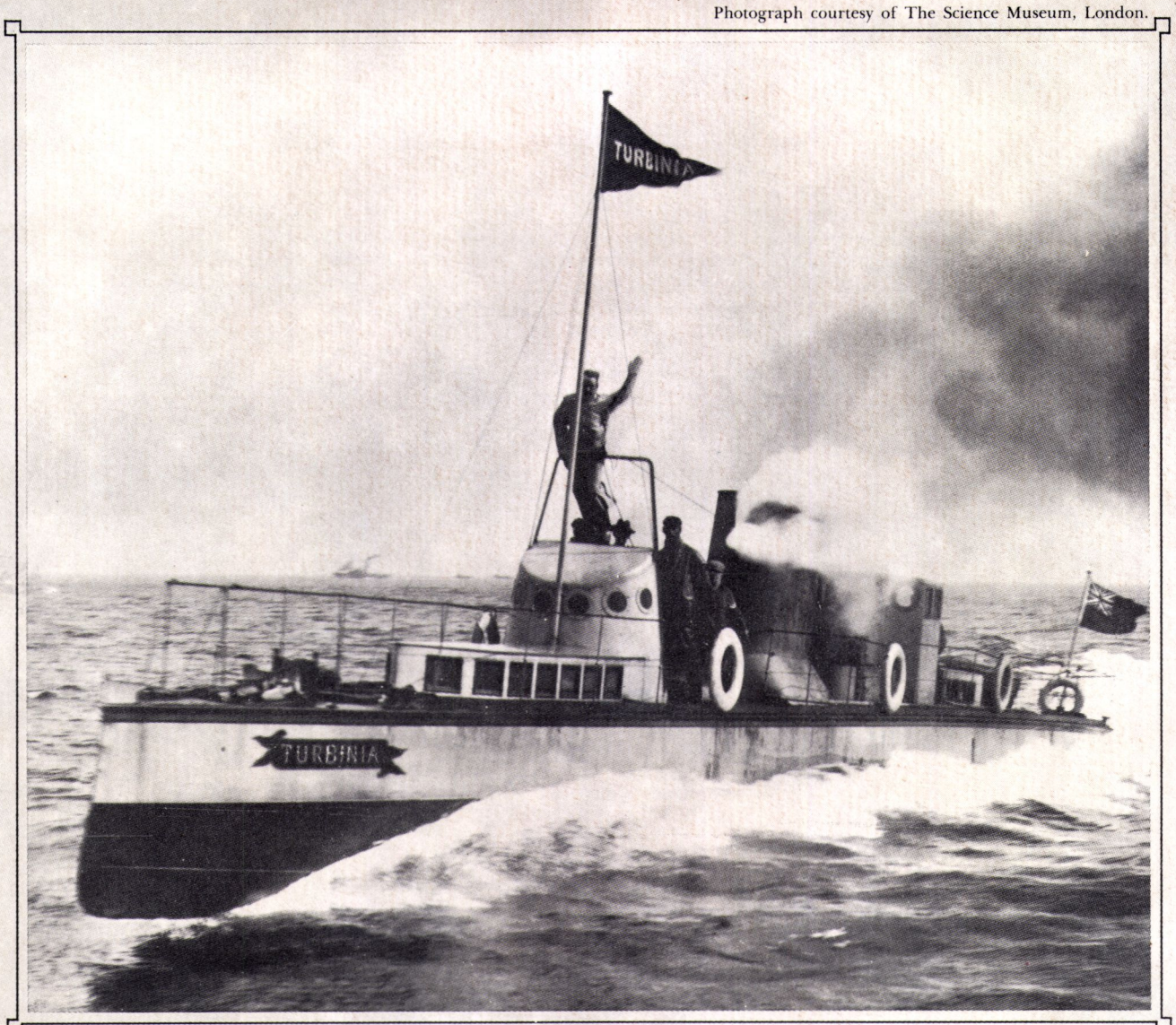
MARITIME
REPORTER
AND
ENGINEERING NEWS

Kockums-Built 255,000-Dwt Tanker Sea Swift Introduces New Roller Bearing Propeller Shaft

(SEE PAGE 7)

FEBRUARY 1, 1974

Photograph courtesy of The Science Museum, London.



"What is it? Where did it come from?"

The year was 1897. The occasion, the naval review celebrating the DIAMOND JUBILEE OF QUEEN VICTORIA.

Suddenly there dashed out among the assembled ships a small craft scooting along at the then incredible speed of 34½ KNOTS.

From the astounded naval officers came cries of, "What is it? Where did it come from?"

It was the "TURBINIA," the first ship powered by turbine engines. It had been built at Wallsend on the Tyne in 1894, with engines invented by SIR CHARLES PARSONS, and taken secretly to COWES for its surprise appearance in the naval review.

The "TURBINIA" was only 100 ft. long with a 9 ft. beam, and although it was a sensation, it was some time before Parsons could persuade commercial ship owners to take an interest in his invention.

Turbine driven ships today are a far cry from the "TURBINIA" and their complicated engines call for precise lubrication.

Popular with ship owners and engineers are Gulf Harmony turbine oils. These premium quality oils are especially designed for the lubrication of turbine bearings and gears and for auxiliary machinery aboard turbine driven ships. They are fully inhibited with anti-rust, anti-oxidant and anti-foam additives.

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Shipyard Marketing Conference Planned

The Commerce Department/Maritime Administration is evaluating proposals, submitted on January 8, 1974, from independent contractors interested in furnishing "necessary qualified personnel, services, materials and facilities," and providing support services for a two-day "shipyard marketing seminar and planning conference" to be held probably in June. Contract award is expected by April 1.

Shipyard officials, as well as representatives of financial institutions, Export-Import Bank, Federal Trade Commission, Office of Export Trade Promotion/Commerce Department, and Census Bureau, will be invited to participate in discussion of four specific technical areas:

"**Market Data and Forecasts**—Develop the necessary cargo movement data and forecasts that will assist the U.S. shipyards in the identification of market opportunities for ships. The impact of competition, due to both shipping and other modes, would also be considered.

"**Design and Technology**—Design of advanced systems in response to market opportunities would be covered, with special emphasis on advanced technology and innovative designs enhancing the competitive posture of U.S.-flag operations.

"**Financing and Contracts**—Identification of sources of capital and associated costs, and the development of innovative and responsive contract instruments would be included. The development of an industry specification might be considered, for example.

"**Export Sales**—The special requirements of overseas sales in all of the above topics (and others) would be covered here. The need for unique and centralized marketing activities could be explored."

TTT And Zim Israel Reach Agreement To Exchange Containers

Zim Israel Navigation Co. Ltd. and Transamerican Trailer Transport Inc. (SSA) have reached agreement to exchange containers and related equipment "to facilitate and coordinate the transportation of cargo in containers . . ."

Zim runs between U.S. ports and ports in the Far East, Europe and the Middle East. TTT confines its operations to the U.S. mainland-Puerto Rico trade.

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Cordon International To Supply Equipment For Three LNG Ships

Cordon International Corporation, 12011 San Vicente Boulevard, West Los Angeles, Calif. 90049, has announced that it has received a contract valued at approximately $2 million from Kaiser Aluminum & Chemical Corporation, Oakland, Calif., to produce specialized equipment for use aboard three liquefied natural gas (LNG) transport ships to be built by Avondale Shipyards, Inc., New Orleans, La.

The equipment consists of cryogenic piping, flanges and related controls used for handling the LNG flow within the ships' storage vessels, which Kaiser is producing. Each of the three ships will house five specially insulated aluminum tanks which will store the LNG at minus 260 degrees Fahrenheit.

John J. Connolly, Cordon chairman and president, said his firm's Cosmodyne Division, Torrance, Calif., will perform the manufacturing.

"This contract is especially significant as it represents our first major order for cryogenic equipment specifically to be used aboard LNG ships," said Mr. **Connolly.** "The market for similar orders looks promising, as numerous LNG ships will be needed to transport this energy resource to the United States and elsewhere around the world."

Avondale is building these three 900-foot-long tankers for subsidiaries of El Paso Natural Gas Company, which will transport LNG from Algeria to the U.S. East Coast. Cordon has provided cryogenic equipment and systems for numerous LNG import and export facilities and satellite and peak shaving plants throughout the world, and for nuclear power plants. In addition, the company provides logistical air support services to international petroleum companies.

Todd San Francisco Appoints Harrison Rowe

Harrison G. Rowe

Harrison G. Rowe has been appointed general manager, San Francisco Division, Todd Shipyards Corporation, effective January 1, 1974, it was announced by **Angel Garate,** general manager.

Mr. **Rowe** has been employed at the San Francisco Division located at Alameda for 25 years, and since 1971 has served as assistant to the general manager. Mr. **Rowe's** service at Todd has included marine structural design and analysis, estimator, contract administrator, and technical supervisor.

A veteran of the U.S. Navy, with service in World War II, Mr. **Rowe** is a native of San Francisco. He is a graduate of the University of California at Berkeley, where he received a B.S. degree in mechanical engineering in 1943. He is a member of The Society of Naval Architects and Marine Engineers, The Society of Port Engineers, The Propeller Club of San Francisco, and is a registered mechanical engineer in the state of California.

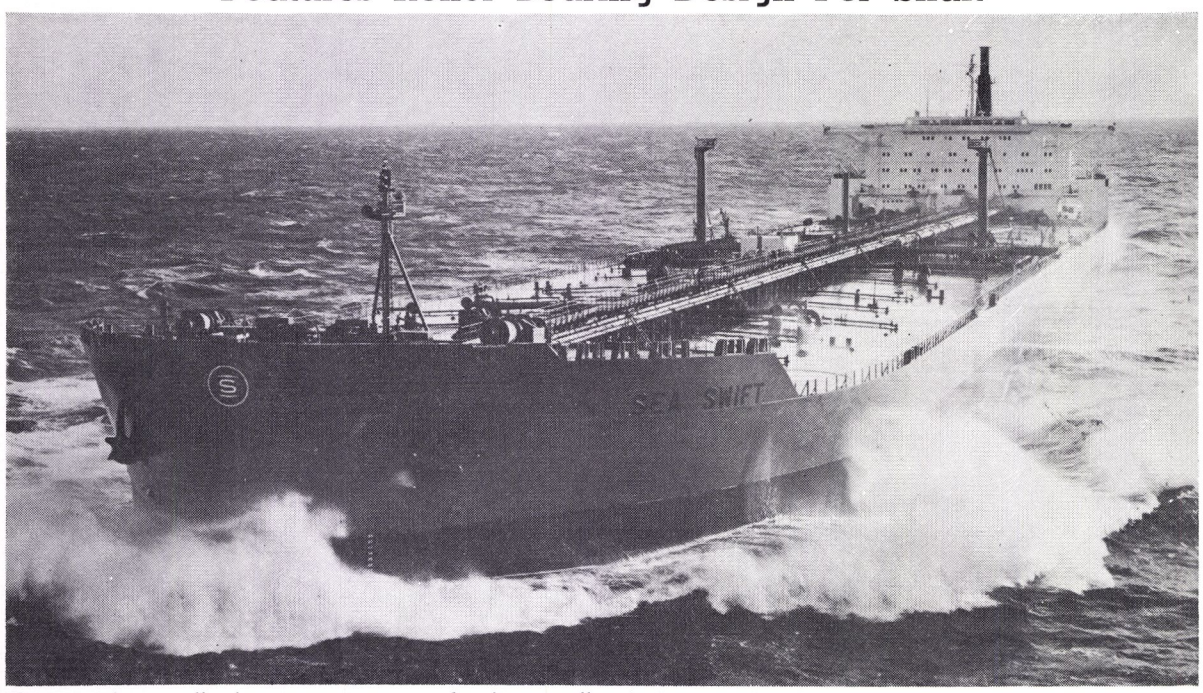
German Cruise Ship Bought By Russians

The 25,000-gross-ton cruise ship Hanseatic has been sold by her West German owners to Russian shipping interests who plan to place the vessel in service as the Maksim Gorkiy.

The vessel was built in 1969 for German Atlantic Line as the Hamburg. The company renamed the ship the Hanseatic shortly before ending passenger operations several months ago.

The newly acquired Russian ship will be represented in the United States by March Shipping Passenger Services, which also represents other Soviet cruise lines, including the Mikhail Lermontov and the Alexandr Pushkin.

Sixth VLCC Delivered By Kockums To Salen Features Roller Bearing Design For Shaft



The special new roller bearing construction for the propeller shaft on the Sea Swift developed by Kockums in cooperation with Svenska Kullagerfabriken and Salen is designed to stand the pressure of the heavy supertanker propeller.

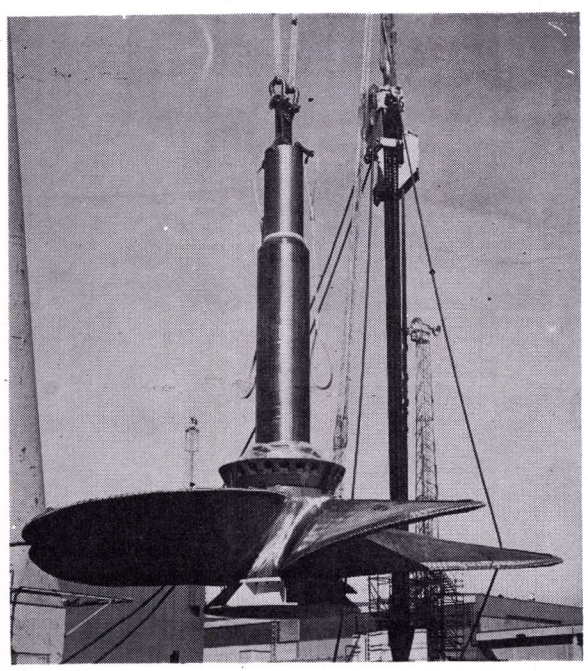
Kockums Shipyard, Malmo, Sweden, has just announced delivery of the 256,050-dwt tanker Sea Swift to the Salen Shipping Companies of Sweden.

The turbine-powered VLCC is the last of six tankers ordered by Salen and the 16th in the Kockums present series of twenty 255,000-tonners.

Built under special survey of Lloyd's Register of Shipping, the Sea Swift is a highly automated ship, with complete electronic control and monitor systems to enable periods of unmanned engine room operation at sea. The ship is equipped with a sophisticated data-processing system, including autopilot, bridge control system and fouling calculator, which regulates navigation and the supply of steam to the main turbines.

The innovations on board the Sea Swift feature the introduction of a new roller bearing design for the propeller shaft, which was developed by Kockums in cooperation with Svenska Kullagerfabriken and the Salen Shipping Companies.

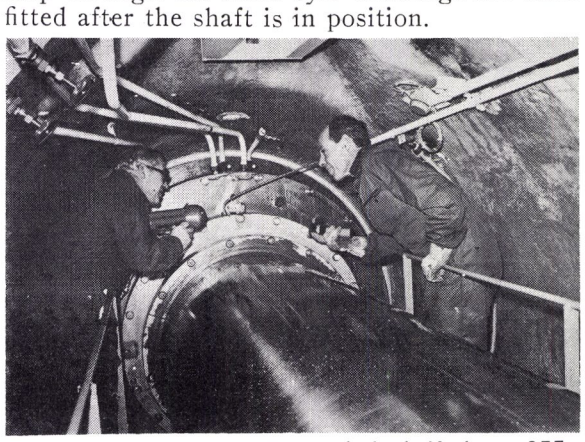
The new self-adjusting roller bearing construction is designed to stand the pressure of the heavy supertanker propeller. It is composed of a spherical roller bearing with an external diameter of 50.4 inches, weighing 1.5 tons, and of a shaft 34.0 inches in diameter.



This new design permits propeller and shaft to be installed in a single unit from outside the ship through the stern eye. Bearings are then fitted after the shaft is in position.

Propeller shaft, bearings and seals have been designed in such a manner that their inspection and seal replacement can be accomplished without drydocking.

This new design permits propeller and shaft to be installed in one unit from outside of the ship through the stern eye. Bearings are then fitted after the shaft is in position.



Presently being tested in the newly built Kockums 255,000-tonner, the propeller shaft, bearings and seals can be inspected and the seals even replaced without drydocking the ship. Two men can easily move along the bed plates to carry out these operations in the conical cavity which opens toward the after peak bulkhead.

During the ship's sea trials in the North Sea, observations of cavitation and measurement of propeller-induced impulses on the hull were recorded for the Swedish Institute for Technical Development. Measurements of wake distribution on the propulsion system will be continued in the forthcoming Kockums 255,000-dwt ship ordered by A/S Athene of Norway.

Kockums specialists seek to determine more precise measurement for wake impact on propeller design, so as to weigh cavitation and vibration properties of the propeller. Estimates are that the new bearing design will prove superior and less sensitive to seawater penetration.

The observations of cavitation for the Swedish Institute were made with both still and TV cameras, equipped with special lighting placed on both sides of the hull, just in front of the propeller. TV images were monitored during the trials and simultaneously recorded on video-tape for shoreside analysis.

Pressure impulses were measured at six points on the hull above the propeller with pressure transducers. Variations in pressure were then recorded on a 14-channel tape for later digital conversion and evaluation on land.

The results of these tests will be compared with corresponding data obtained from model experiments, so as to facilitate more accurate approximation of model experiment reliability.

Other vital Sea Swift data are as follows: gross registered tonnage, 125,389; overall length, 1,117.1 feet; length between perimeters, 1,080.0 feet; molded breadth, 170.0 feet; depth to main deck, 84.0 feet; draft, 65.9 feet, and pump capacity, 70,445.9 gallons per minute.

Propelling machinery used in the ship is of the Kockums/Stal-Laval type steam turbine, 32,000 shp at 85 rpm with speed of 15.9 knots.

Admiral Payne To Succeed Admiral Brockett At Webb

RAdm. Charles N. Payne

RAdm. William A. Brockett

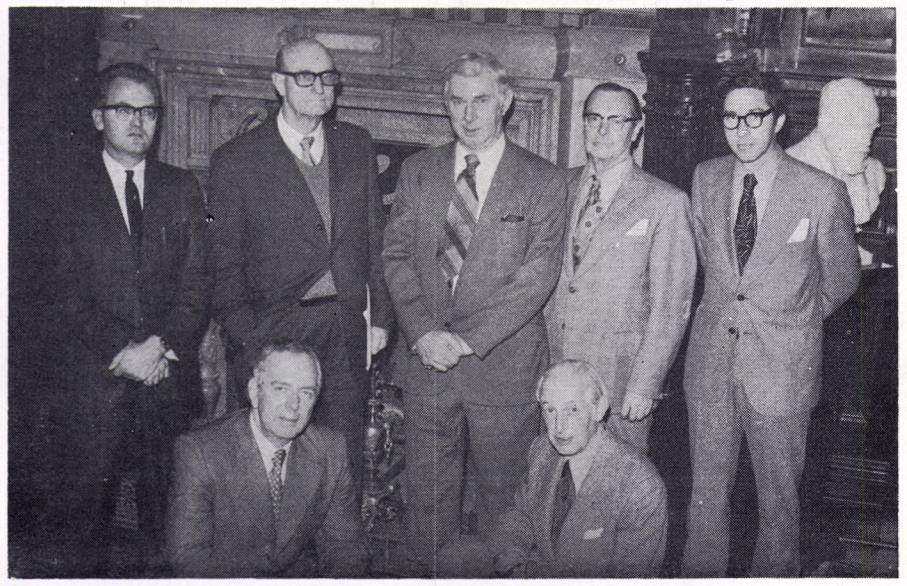
John A. Livingston, chairman of the board of trustees of Webb Institute of Naval Architecture, has announced that Rear Adm. **Charles N. Payne,** USN (ret.), will succeed Rear Adm. **William A. Brockett** as president of Webb when the latter retires next July.

Admiral **Payne** graduated from the U.S. Naval Academy in 1942. After wartime service on the cruiser Columbia in the Pacific, he attended M.I.T. and received his advanced degree in naval architecture and marine engineering there in 1948. Designated an Engineering Duty Officer that same year, he subsequently had tours in Navy yards with the Fleet and in the Bureau of Ships. He also taught at the Naval Academy for three years and during that period authored a textbook on Naval Steam Propulsion Plants. In 1963, he became Comptroller of the Navy's Bureau of Ships when Admiral **Brockett** was Chief of that Bureau. In 1968, he assumed command of the Charleston (South Carolina) Naval Shipyard and was promoted to the rank of Rear Admiral the following year. In April 1971, Admiral **Payne** was assigned to Pascagoula, Miss.. as Supervisor of Shipbuilding, Conversion and Repair, the position he currently occupies.

In commenting on his retirement, Admiral **Brockett** observed: "After eight rewarding years at Webb, I'm ready for a second and real retirement. Admiral **Payne** is an old friend and our careers have remarkable similarities. We both are graduates of the Naval Academy and M.I.T., and both attended the Advanced Management Program at Harvard Business School. We both served on cruisers in the Pacific during World War II, taught at Annapolis, wrote engineering textbooks, served as Maintenance Officers in the Fleet and commanded Navy Yards. The culmination of the parallel courses is the presidency of this unique college, Webb Institute of Naval Architecture. I'm delighted that **Charlie Payne** will be my successor."

Webb, an all-scholarship free-tuition institution, specializing in naval architecture and marine engineering, is located in Glen Cove, Long Island, N.Y.

SNAME Eastern Canadian Sect. Meets With Canadian Institute Of Mechanical Engineers



Shown at the joint meeting, left to right: (standing) **Maurice Parkes,** program chairman, Montreal Section, Canadian Society for Mechanical Engineering; **C.F. Collins,** Chief-Marine Systems Division, Shipbuilding Branch, Department of Supply and Services, Ottawa; **R.G.A. Lawrence,** Manager-Icebreaker Development, Canadian Coast Guard, Ministry of Transport, Ottawa; **F.J. Murfin,** retiring vice president, Quebec Region, E.I.C.; **Andre Biron,** vice president, Quebec Region, E.I.C.; (seated) **J.C. German,** chairman, Eastern Canadian Section, SNAME, and **G. Southmayd,** manager of constituent societies services, Canadian Society for Mechanical Engineering.

The Eastern Canadian Section of The Society of Naval Architects and Marine Engineers held a joint meeting in Montreal in December with the Canadian Institute of Mechanical Engineers.

A paper titled "Considerations in Design of Marine Installations and Equipment for Cold Weather Service" was presented.

The paper was prepared and presented by **R.G.A. Lawrence,** P.Eng., C.Eng., Manager-Icebreaker Development, Canadian Coast Guard, and **C.F. Collins,** P.Eng., C.Eng., Chief-Marine Systems Division, Shipbuilding Branch, Department of Supply and Services.

The authors discussed the various problems encountered with ships when operating in Arctic waters. In designing ships to operate in this environment, special engineering consideration must be given not only to main propulsion, but also to deck machinery.

After presentation of the paper, two excellent films were shown of Arctic operation and navigational problems encountered in the Canadian northern supply route.

Hugh Reilly III Joins Chartering Firm

Hugh Reilly III has joined Marine Chartering Co., Inc., as a principal and manager of special projects. His associations with the San Francisco, Calif.-based firm became effective January 2, 1974.

A.C. Chaplain Named Tidewater Marine VP

Albert C. Chaplain Jr. has been elected a vice president of Tidewater Marine Service, Inc.

John P. Laborde, president and chairman of the New Orleans, La.-based firm, said Mr. **Chaplain's** election was effective January 1, 1974.

Mr. **Chaplain** joined Tidewater Marine as controller in 1968, after serving for eight years as an auditor for Peat, Marwick, Mitchell & Co. In October 1972, he was elected to the office of treasurer, which office he continues to hold, and in June 1973, he was made chief financial officer of the company.

Born in New Orleans, Mr. **Chaplain** was graduated in accounting from Louisiana State University in 1960.

Tidewater Marine, with more than 375 towing, supply and crew boats in every major offshore oil producing area, is the largest marine transportation contractor in the world.

Farrell Lines Expands Shoreside Services —Opens Norfolk Office

With all four new containerships now in service between the United States East and Gulf Coasts and Australia/New Zealand, Farrell Lines Incorporated of New York will expand its shoreside services.

Thomas J. Smith, president, has announced that as of February 1, 1974, a new office will be opened in Norfolk, Va., one of its main ports of call. This office will be located at the Norfolk International Terminals, 7737 Hampton Boulevard.

W. Lawrence Durrett, former district manager in Baltimore, Md., has been appointed regional manager, and **Thomas Rapcavage** will be district manager. Mr. **Rapcavage** was supervisor of the New York Booking Section.

Replacing Mr. **Durrett** as district manager in Baltimore is **J. Edward Reed,** former assistant manager there.

Ogden Marine, Inc. Buys Two Tankers

Ogden Corporation has announced the acquisition of two American-flag oil tankers by Ogden Marine, Inc., an Ogden Corporation subsidiary.

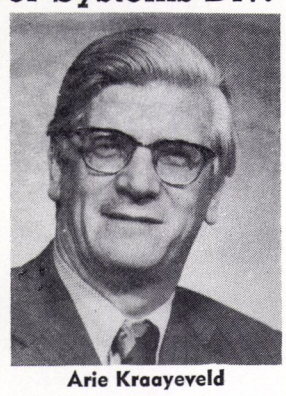
The two vessels, the Penn Champion and the Penn Challenger, acquired through purchasing the stock of Penn Tanker Company from U.S. Industries, Inc., are 37,000 deadweight tons and 35,000 dwt respectively.

The purchase price was not disclosed.

With the addition of these two tankers, Ogden Marine's fleet consists of 24 vessels exceeding one million dwt, including tankers, oceangoing bulk carriers, liquid propane gas carriers and freighters. Eleven additional new vessels will be delivered to Ogden Marine by 1977, increasing the fleet to 35 vessels exceeding two million dwt—of which more than 65 percent will be engaged in transporting oil, liquefied gas and refined products helping to solve the worldwide energy crisis.

These 11 ships have been entirely chartered out for periods ranging from 5 years to 15 years, and are a part of Ogden Marine's continuing program to own and operate a larger fleet of modern and efficient ships.

Colt Names Kraayeveld Vice Pres. Finance Power Systems Div.



Arie Kraayeveld

Arie Kraayeveld, financial executive with 20 years' experience with Colt Industries, has been named vice president-finance for Colt's Power Systems Division in Beloit, Wis. The appointment was announced by **John F. Morgan,** division president.

Before joining Colt Industries in 1953, Mr. **Kraayeveld** was an accountant with Smit Machine Works, a large shipbuilder in Rotterdam, Holland. He started his accounting career in 1939, after receiving a business administration degree in his native Holland.

In making the announcement, Mr. **Morgan** emphasized the progressively responsible positions held by Mr. **Kraayeveld** during his lengthy career with Colt. He started as a senior clerk and advanced as cost accountant, senior accountant, supervisor of budgets and assistant controller, which gives him an exceptionally strong financial management background, Mr. **Morgan** said.

French Yard To Build 4 Containerships Worth Over $100 Million

Compagnie Maritime des Chargeurs Reunis, a leading private French shipping concern, has placed an order estimated at over $100 million for four containerships.

The vessels are to be built in southern France by the Toulon shipyard, Constructions Navales et Industrielles de la Mediterranee.

The chief characteristics of the vessels ordered stress versatility and economic consumption of fuel. Each ship will be able to transport 1,400 containers at speeds of 23 knots.

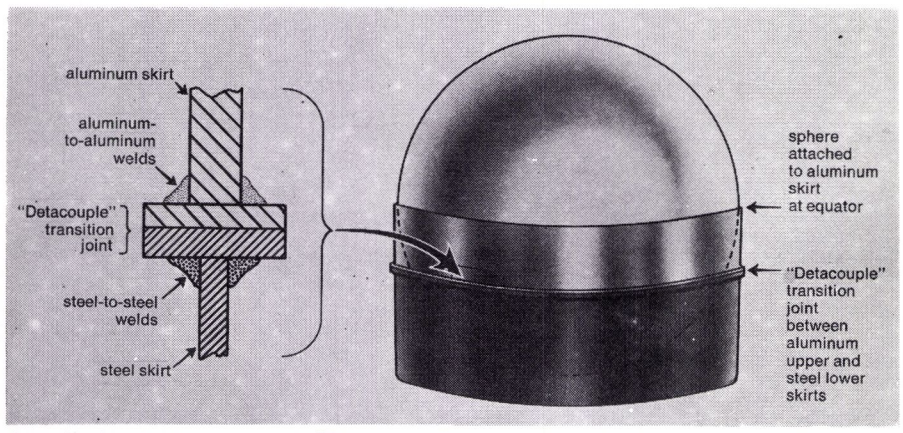
Three of the ships are to be delivered in 1976 and the fourth early in 1977.

Berger Miller Inc. Names Murphy, Gross

Berger Miller Inc. has announced that **Leo G. Murphy** has been appointed a vice president, and that **Thomas Gross** was named a broker of the New York, N.Y.-based firm of ship charter brokers. Both Mr. **Murphy** and Mr. **Gross** were formerly associated with Furness, Withy Chartering Ltd.

Berger Miller Inc. offices are located at 19 Rector Street, New York, N.Y. 10006.

Aluminum Tanks And LNG Ship Steel Hulls To Be Joined By Using Du Pont Detacouple Explosion Bonded Welding Transition Joints



Artist's sketch shows use of "Detacouple" explosion bonded welding transition joints to attach aluminum spherical cryogenic tanks to ship's steel structure.

The first three liquid natural gas tankers to be built in this country using the spherical design will incorporate the Du Pont Company's "Detacouple" explosion bonded welding transition joints to attach the aluminum cryogenic cargo tanks to the ship's steel structure.

The "Detacouple" transition joints were selected because they offer greater economy in installation than a mechanical joint.

The tankers are being built by the General Dynamics Corporation at its Quincy, Mass., shipyard. The cryogenic cargo tanks are being supplied by Pittsburgh-Des Moines Steel Company's subsidiary, World Southern Corporation, near Charleston, S.C. The first of the three tankers is scheduled for launch in mid-1975.

Each of the tankers will carry five spherical aluminum cryogenic tanks 120 feet in diameter. The tanks will be supported by 18-foot-long aluminum skirts attached to the spheres at their equators and to the ship's structure at the top of matching steel skirts.

The joining of the aluminum and steel skirts will be accomplished using the "Detacouple" transition joints butted one against the other around the full 377-foot circumference of the skirts. The "Detacouple" transition joints will consist of ¼-inch-thick 5083 aluminum explosion bonded to ¾-inch-thick normalized and impact tested steel plate with an interlayer of ⅜-inch-thick 1100 aluminum. The explosion bonding process forms a metallurgical bond between the metals, which cannot be fusion welded directly to one another.

When the tankers are in use, the transition joints will bear both the weight of the filled cargo tanks and the dynamic forces created by the ship's motion at sea.

The aluminum skirt supporting each tank will be welded to the aluminum portion of the transition joints during fabrication of the tank structure. The steel-to-steel welds joining the steel portion of the transition joints to the steel skirt of the tankers' structure will be made upon installation of the cryogenic cargo tanks at the shipyard.

According to a General Dynamics spokesman, the "Detacouple" transition joints were selected for the tankers because it is easier and less costly to weld the transition joints than to flange the aluminum and steel skirts and join them with bolts or other mechanical devices.

Brewer-Titchener Corp. Names Edwin Dewling New York District Mgr.

Edwin J. Dewling

J. Ward Abbott, vice president for marketing and sales, Brewer-Titchener Corporation, Cortland, N.Y., has announced the appointment of **Edwin J. Dewling** as new district manager for New York.

Mr. **Dewling** has responsibility for the sales and marketing of all Brewer-Titchener and Boston and Lockport Corporation marine and industrial products for the greater New York metropolitan area, Mr. **Abbott** said.

Brewer-Titchener is a major manufacturer and marketer of wire rope and chain hardware for the marine and industrial markets. Joslyn Mfg. and Supply Co., parent firm of Brewer-Titchener, recently acquired Boston and Lockport and now operates it as a subsidiary of Brewer-Titchener.

Mr. **Dewling** has been associated with Boston and Lockport for the past 12 years, the last five as assistant sales manager in charge of jobbed items for the New York metropolitan area. A native of Brooklyn, he held sales positions with several other firms in the New York area before joining Boston and Lockport. Mr. **Dewling** is a veteran of four years in the U.S. Navy.

Service Machine Building Two Tugs For North Sea Service

Service Machine & Shipbuilding Corporation of Morgan City, La., has signed a contract to build two American Bureau of Shipping-approved 136-foot ocean tugs for service in the North Sea area off Great Britain. These vessels are being constructed for F & S Boat Corporation, a division of ELPAC, Inc.

Each tug will have 6,000 shp, a 250,000-pound line pull anchor handling winch, two central heat/air units, complete electronics, and an enclosed aft control station to protect the crew from the adverse weather conditions of the North Sea.

Y.K. Mok, the well-known New Orleans architect, designed these tugs in conjunction with Service Machine & Shipbuilding Corporation's Engineering Department.

Delta SS Awards Contract To Equitable For 50 LASH Barges

Equitable Equipment Company, Inc. was recently awarded a second contract to construct an additional 50 LASH barges for Delta Steamship Lines, Inc. The barges will be built at Equitable's New Orleans, La., shipyard.

Equitable Equipment Company is the world's largest builder of LASH and SEABEE barges. Equitable currently has a backlog of 730 LASH barges valued in excess of $35 million.

Cecil M. Keeney, president and chief executive officer of Equitable, stated that "this contract from Delta assures continued long-range and increased employment at our shipbuilding facilities. Additionally, we are delighted with the opportunity we have of providing long-term and high-paying employment for our employees at New Orleans and Madisonville."

Equitable Equipment Company, Inc., builds various types of offshore support vessels, oceangoing tugs, tugs for harbor and inland waterways operations, self-propelled drilling ships, pipelaying barges, general purpose barges, and other marine equipment for the maritime and petroleum industries worldwide.

Waukesha Motor Names J.H. Steinberg Vice Pres. Marketing

J.H. Steinberg

J.H. (Jerry) Steinberg has been promoted to vice president-marketing of Waukesha Motor Company. The announcement was made by **Robert A. D'Amour**, president of the Waukesha, Wis.-based engine and power systems equipment manufacturer, a division of Bangor Punta Corporation. He added that Mr. **Steinberg** has been heading up the company's marketing operation for the past year in the capacity of sales director. Mr. **D'Amour** went on to emphasize that during this period Waukesha booked the largest incoming engine order volume ever recorded in the company's history, and the engine order backlog is now at an all-time high.

Mr. **Steinberg** joined Waukesha in June 1970 as OEM sales manager. In 1971, he took over Waukesha's international marketing activities and initiated the company's present export marketing thrust through the development of overseas sales offices.

Before coming to Waukesha, Mr. **Steinberg** was with Cummins in Europe, South America and the United States. He is a graduate of the University of Illinois.

Burner Manufacturers Sign Worldwide Service Agreement

Combustion Equipment Associciates Inc., New York, N.Y., Associated British Combustion Limited, Portchester, England, and Volcano Company Limited, Osaka, Japan, have each agreed to service burning equipment manufactured by any of the three companies for main or auxiliary boilers, including Todd burners.

This agreement, along with an existing agreement covering spare parts distribution, now makes parts and service available on a worldwide basis for equipment manufactured by all three companies.

John Martinsen Joins Bulkservices Inc.

Bulkservices Inc. announced that **John Martinsen,** formerly with Fjell Navigation, has joined the firm as operations manager. Prior to his services with Fjell, Mr. **Martinsen** was associated with Olsen & Ugelstad of Oslo, Norway.

Kearfott Marine Products Names Riebling Director

Walter G. Riebling

John Drish, vice president-special products of Kearfott Marine Products Division of The Singer Company, Mt. Vernon, N.Y. 10550, has announced the promotion of **Walter G. Riebling** to director-marine products.

A 30-year employee, Mr. **Riebling** has been associated with Kearfott's Marine Products operation exclusively, having served as assistant director for the past five years.

Mr. **Riebling** studied engineering at New York University. He is a member of The Society of Naval Architects and Marine Engineers (Metropolitan Chapter), for which he served as secretary-treasurer for four years and held several committee appointments over the years.

During World War II, he served in the United States Navy.

Matson Navigation Names L.F. Hughes VP

Lyle F. Hughes, Matson Navigation Co. controller since 1965, has been appointed a vice president of the West Coast-based shipping organization. Mr. **Hughes** joined the line in 1961.

Greek Committee Established By Det norske Veritas

An increasing number of Greek vessels are now being classified with Det norske Veritas and at the last turn of the year, the figures were 166 ships totaling 1.75-million gross tons, or 11 percent of the fleet registered in Greece. As a consequence of this development and in order to strengthen the relations with the Greek shipping community, a Greek Committee of Det norske Veritas has been established.

At the inaugural meeting which recently took place in Piraeus, **C.M. Lemos** of C.M. Lemos & Co. Ltd., London, was elected chairman for the first two-year period. **A.M. Karageorgis** of Michail A. Karageorgis S.A., Piraeus, was elected vice chairman.

The other members of the committee are: **A.J. Chandris** of Chandris (England) Ltd., London; **J.J. Colocotronis** of Colocotronis Brothers, Piraeus; **C. Dracopoulos** of Hellenic Shipyards Co., Athens; **D.S. Fafalios** of Fafalios Ltd., London; **A.G. Gratsos** of Standard Bulk Transport Corporation, Athens; **A. Halcoussis** of Halcoussis A. & Co., Ltd., Piraeus; **John E.G. Kulukundis** of Rethymnis & Kulukundis Ltd., London; **F.P. Lykiardopulo** of Lykiardopulo & Co. Ltd., London; **M.J. Lyras** of Lyras Brothers Ltd., London; **Constantinos Manglis** of Pilot Shipping Co. Inc., Athens, and **B.S. Rossolimos** of Treasurer Union of Greek Shipowners, Athens.

The task of the committee is to discuss the activities of Det norske Veritas in Greece, to give recommendations to the Permanent Committee, and to convey the Society's experience and know-how to the shipping community in Greece.

The Permanent Committee may authorize the Greek Committee to act on its behalf in matters connected with governmental surveys and, in this capacity, to give instructions to Veritas-surveyors in Greece.

The members of the committee represent Greek shipowners, shipbuilders and other persons connected with shipping. They are elected for a period of three years at a time and may be reelected. The committee is to meet at least once a year.

Altogether, the fleet now classified with Det norske Veritas totals 3,226 ships of 32.5-million gross tons registered in 71 different countries.

Esso Norway Test Of Hull Structure Proves Design And Good Workmanship

Henry A. Schade*

From June 28 to July 7, 1969, the new 190,800-dwt tanker Esso Norway lay at anchor in Eckernfoerde Bay, about 20 miles from Kiel, Germany, where she was built. Figure 1 gives the general arrangement and dimensions of this ship.

An extensive static structural test program was carried out on a continuous round-the-clock basis during this period. The objective was to measure the structural response of the internal framing system to a wide range of cargo-tank loadings (salt water ballast) at drafts ranging from about 23 feet to about 60 feet. Counted as parts of the internal framing system in this sense are the longitudinal and transverse bulkheads, as well as the longitudinal girders and transverse webs.

Approximately 1,400 strain gages had been installed at the shipyard, and strain readings were registered by a scanning system during each of 17 "runs." In this context a "run" is defined as a period of data-taking while ballast was held constant according to the planned schedule. The time required for a run was usually about half an hour.

At 27 points on the deck, vertical deflections from a laser-established base plane were measured; see Figure 1. At six points in the bottom grillage a taut-wire system measured vertical deflections relative to the deck. These grillage deflections showed nothing unexpected and are not discussed in this paper. The entire instrumentation system was designed and monitored during the test program by Germanischer Lloyd of Hamburg, in accordance with requirements established by Esso International.

Following the static test program, some instrumentation was left on board and used for a limited program of dynamic observations during the first or ballast voyage of the ship. Prior to this, but after completion of the 17 test runs programmed for the static investigations, three additional runs were made specifically for correlation with the dynamic tests. This part of the test program forms a separate entity not covered in this paper.

The planning and execution of this test program were stimulated and influenced largely by some unexpected structural behavior in earlier large tankers. The degree of size extrapolation in the design of these huge ships was unprecedented. There was widespread concern about the structural response of the internals under extreme loading conditions, particularly of the deep transverse members of the center bottom and wing-tank structures. This is really a matter of transverse, or secondary strength, mainly influenced by static pressures. Wave pressures and corresponding acceleration loadings play a minor part in the design of the transverse structure.

Deficiencies which had been noted in earlier ships were largely of a type shown by buckling or bulging of large internal plate areas. In this usage, "buckling" is intended to mean elastic deformation and "bulging" plastic deformation. There had been some minor cracking of plates, but none of catastrophic proportions so far as is known. Damages and catastrophies caused by collisions, explosions, groundings, and similar events are excluded.

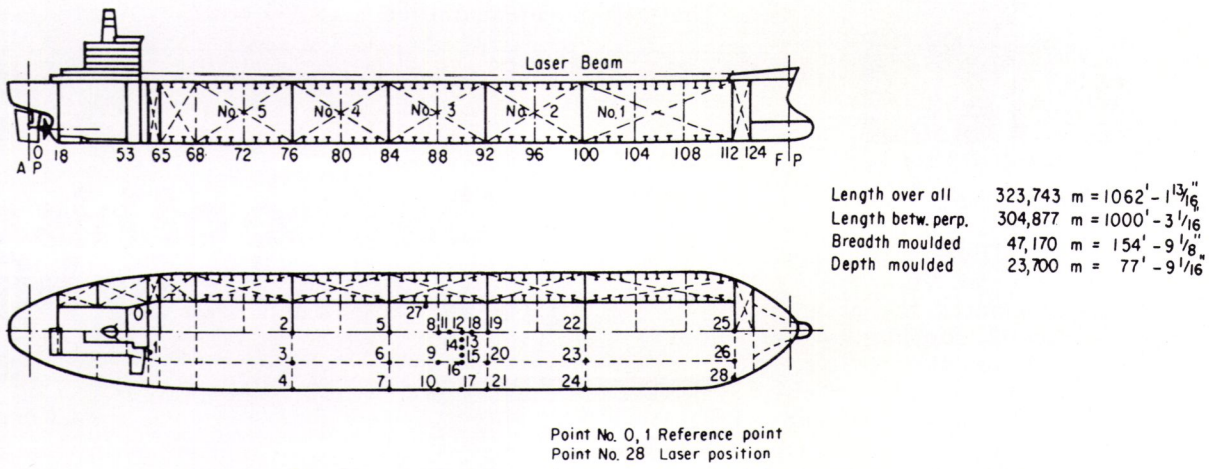


Figure 1—Esso Norway dimensions, basic structure and laser measurement points.

Therefore. the focus of this program was on systematically examining the behavior of important internal plate areas together with their stiffening systems. This was done by correlating measured strains and deflections with load and draft conditions, and by checking possible buckling and bulging situations closely. The program was planned so that analysis of the experimental data might indicate safety factors and adequacy of current designs, and lead toward improvements in future practice.

No excessive loadings were intentionally placed on any tank boundaries, and it was reassuring to note, on the basis of examinations of tank interiors, that no permanent visible damage occurred during or after the testing. Clearly, the ship was carefully constructed, with excellent workmanship. The quality of workmanship plays a large part in the vulnerability of plated structure to instabilities, and in particular to permanent buckling or bulging. None of this whatever was to be seen, and therefore it can be said with assurance that the tests in no way damaged the ship structure.

The results of the measurements were processed by Germanischer Lloyd in two volumes, titled "Full-Scale Tanker Investigation, Esso Norway, Part A." The first gives a very brief description of the test program, the instrumentation procedures, and measurement results, largely in graphic form. The second is the Appendix under the same title, giving the computer output of the programs which transformed strains to stresses and deflections.

Planning the Tests

Instrumentation other than that for primary ship-girder deflection (the laser system) was limited to a single "tank group," consisting of center tank and adjacent wing tanks bounded by two adjacent oil-tight transverse bulkheads. Tanks Nos. 1 and 5 are clearly areas of special structural configuration due to the form of the ship, and are longer than the other tanks. No. 4 tank contains the flume system, and was eliminated from consideration on this account. The remaining two tank groups, namely, Nos. 2 and 3, are identical in structure; both having repetitive structural internal stiffening systems and are part of the parallel middle body. Special considerations such as tank coating problems led finally to the decision to instrument part of tank group No. 3 rather than No. 2.

Advantage was taken of structural and load symmetry wherever possible in order to reduce the amount of instrumentation.

Load Conditions

If ballast heights above the baseline in tank groups 2, 3, and 4 were limited to extremes (i.e., either full or empty) symmetrical about the mid-length of tank No. 3, there are 16 possible combinations of loading in the nine tanks which make up these groups. However, due to the flume openings in group No. 4, ballast levels in all three tanks of that group are always identical and the symmetry requirement imposes the same limitation on the tanks in group No. 2. This circumstance reduces the possible number of tank combinations from 16 to eight, provided, of course, that only the two extremes are acceptable, i.e., as near completely full or completely empty as possible.

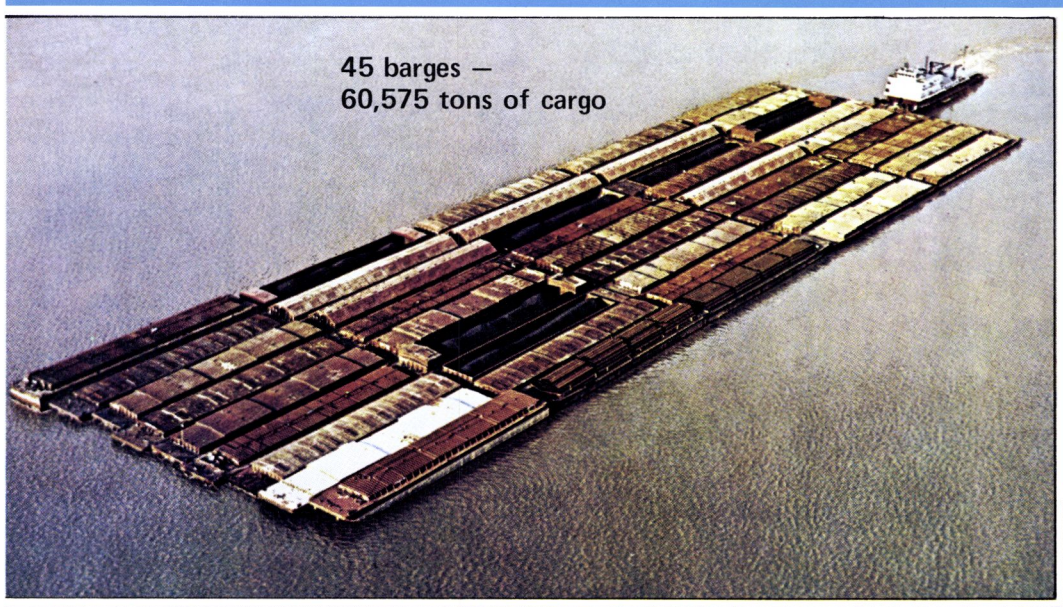
The net pressure loadings on the envelope boundaries of a tank result from internal pressures due to tank loads and external pressures governed by draft. Because the objective here was to measure under extreme conditions, each of these eight tank-load combinations was studied with respect to the possibility of running at two extreme drafts — namely, light draft (about 23 feet) and full-load draft (about 60 feet). This produced 16 possible test-run combinations, counting draft as one of the variables.

Obviously, some of these 16 combinations of tank loading and draft would be impossible. For example, to bring the ship down to full-load draft with all tanks of groups Nos. 2, 3, and 4 empty is clearly a physical impossibility. Furthermore, the limiting values assigned by classification to primary bending moment and shear force had to be studied in connection with those corresponding to each of the 16 combinations. Some of the 16 were ruled out completely by these considerations, and for others the original objectives of (a) tanks either full or empty, and (b) draft either light or full load, had to be compromised. Finally, 11 test runs were planned and carried out.

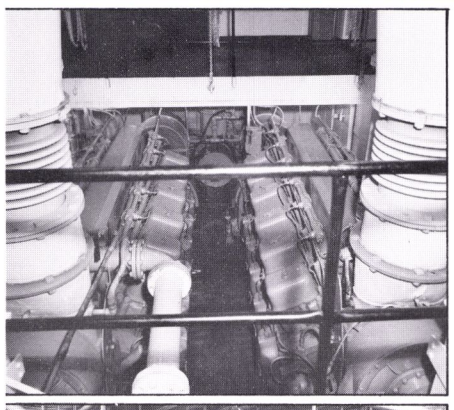
(Continued on page 17)

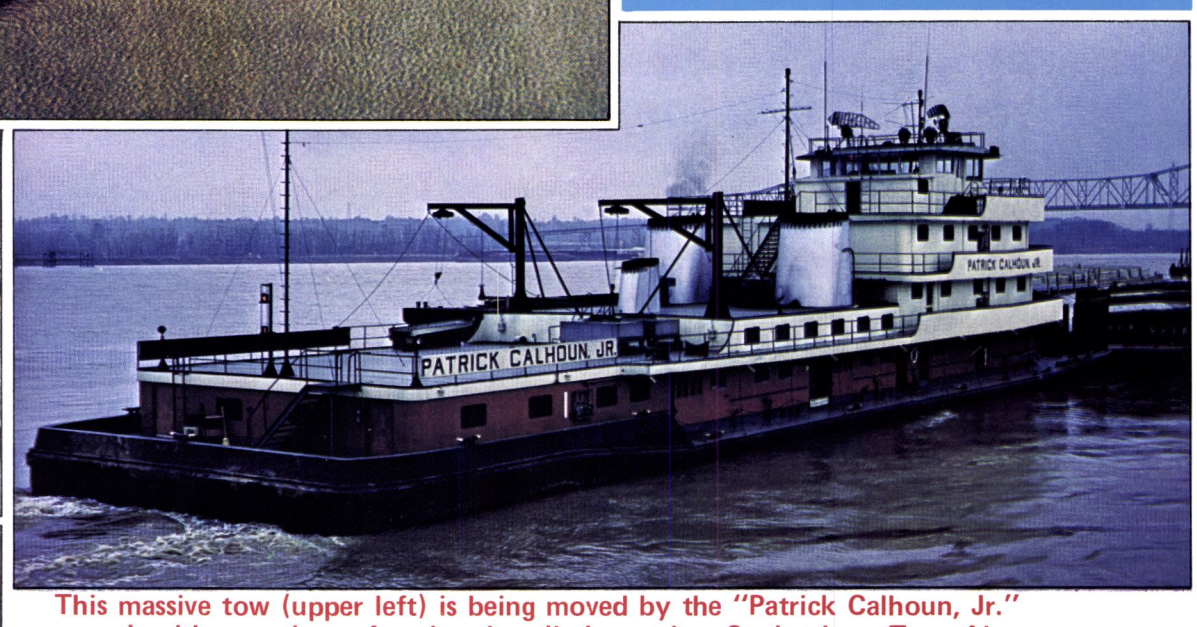
*Mr. **Schade,** professor of naval architecture, emeritus, University of California, Berkeley, Calif., presented the paper condensed here before the recent Annual Meeting of The Society of Naval Architects and Marine Engineers.

THE "ONE BOAT" WORK FLEET!



The "Patrick Calhoun, Jr." powered by ALCO ENGINES through WICHITA Marine Clutches!





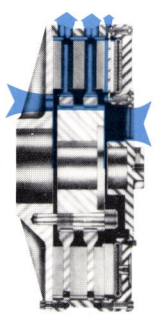
This massive tow (upper left) is being moved by the "Patrick Calhoun, Jr." powered with a unique 4-engine installation using 8 clutches. Two Alco diesel engines are compounded on each of two screws with Western Gear reverse and reduction gear and four Wichita marine clutches.

IN ENGINE ROOM:

Upper Left —This view between 2 of the 4 Alco diesel engines shows how they are compounded through the Western Gear reverse and reduction gear.

Lower Left — The Western Gear Seamaster marine gear showing 2 of the 8 Wichita ATD-227 marine clutches.

Cooling Air Flow



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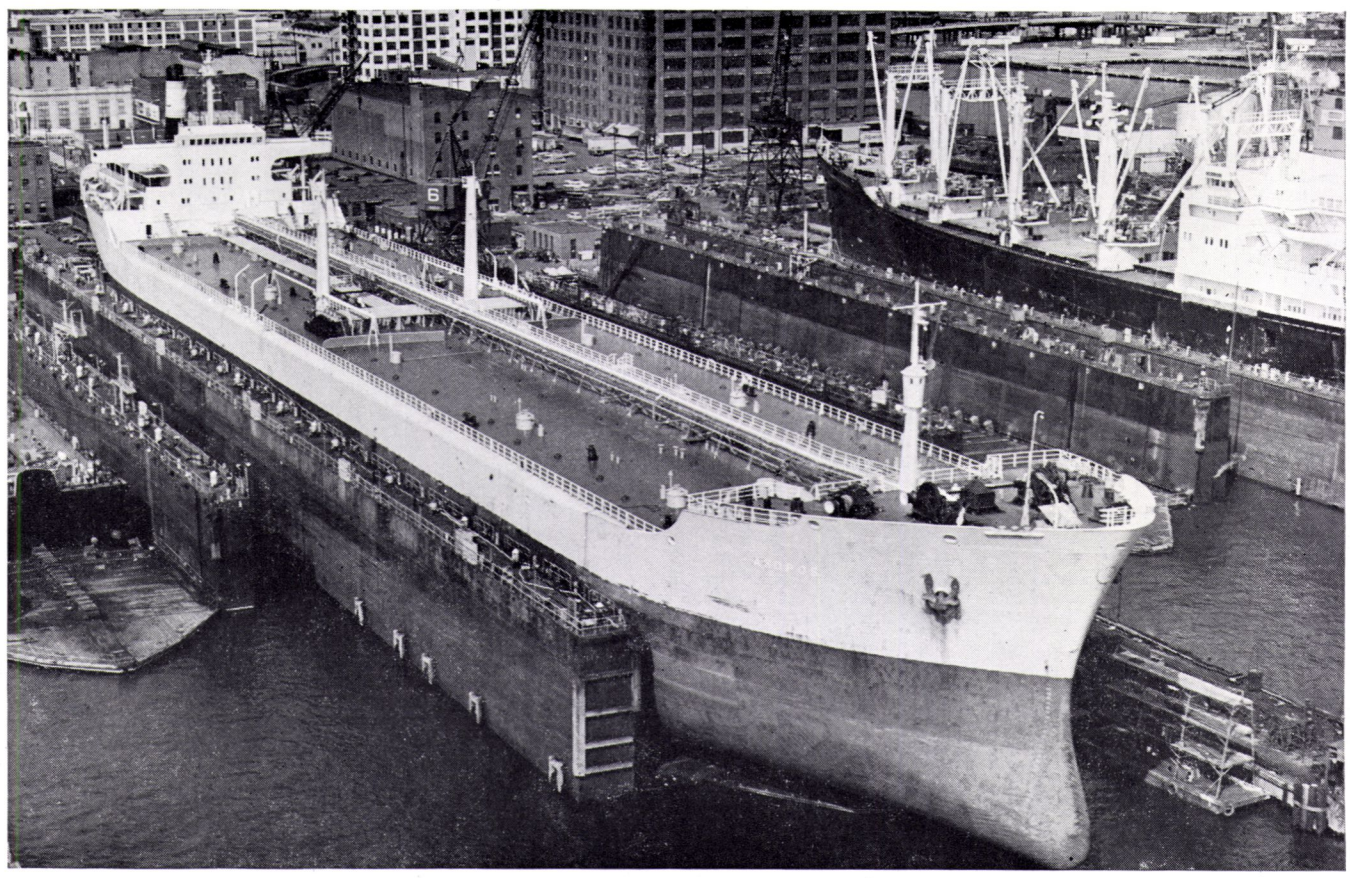

Hoboken dry docks 62,700-dwt tanker

With her 106-ft beam and 775-ft length, the 62,700-dwt Panamanian vessel, ASOPOS, was successfully lifted at Bethlehem's Hoboken, N.J., repair yard late last year. She is the largest ship ever placed in a floating dry dock in New York Harbor.

Scheduled for a quick hull painting and voyage repairs, the ship was docked stern in, leaving the relatively light-weight bow overhanging the river by 114 ft. More critical, however, was the beam width, which allowed the ship only two feet of clearance between wingwalls. But with the help of five tugs and seven lines to land-based winches, the dock master brought the big tanker in without incident. The ASOPOS departed on schedule a few days later.

Bethlehem's Hoboken Yard is the largest in the harbor. With four dry docks and 6,400 ft of berthing space, it can accommodate more than 20 vessels simultaneously. It also maintains a fleet of work boats and derrick barges, a shore-based tank-cleaning plant, and a large complex of shops, tools, and other repair facilities. The yard can handle all kinds of ship repair, reconditioning, and maintenance work, and has performed numerous large-scale vessel conversions.

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Esso Norway Tests—

(Continued from page 14)

Structural response caused by pressure systems on tank boundaries must be compared to a condition with zero pressure on tank boundaries in order to get absolute values. This meant that, under conditions of zero trim, the internal pressures on the boundaries of tank groups Nos. 2, 3, and 4 (except for the forward boundary of No. 2 and the after boundary of No. 4) must be matched by the external pressures governed by the draft. Expressed otherwise, this meant that the height of water ballast in all tanks in groups Nos. 2, 3, and 4 must equal the draft under conditions of zero trim. Because this combination of drafts and tank loadings formed the base with which all readings of instruments were compared, this condition was called a "base run."

Ideally, if the structure were affected only by pressures, only one base run would be needed. In reality, however, there are a number of other influences which affect the instrument readings which measure structural response. Some of these are:

1. Thermal Influence. The phenomenon of thermal stress is well-known, and the fact that it is powerfully affected by radiation from the sky had to be considered in planning the test program. Time limitations led to the decision to operate the test schedule on a continuous round-the-clock basis, without regard to the ambient weather conditions at the time of the instrument reading. In addition to the temperature effects on the steel of the structure, temperature obviously has some effect on the cabling of the instrumentation system itself.

2. Instrument Drift. Instrument systems normally show some drift, that is, continuous change with time, even with the best compensation available. Thus, in comparing the readings of a test run with those of a base run, the shorter the time interval separating the two runs, the more reliable the results should be.

3. Shakedown. The structure itself in some areas is subject to sequential instabilities, often characterized by the words snap-through or oil-canning. This means that a nominally plane plate may exhibit a bulge to one side at one time, and at another time under exactly the same conditions of loading may exhibit a bulge of another character, usually on the other side. Phenomena such as this characterize structural "shakedown" and may be presumed to gradually disappear as the structure undergoes a series of loadings and unloadings and finally assumes its ultimate form.

These three influences and some others less important led to the decision to intersperse among the sequence of test runs a number of base runs instead of depending on a single base run.

Strain Gage Locations

Most strain gages were located in stations spaced along straight lines spanning regions of expected high stresses, particularly high shear stresses. Most of the lines of such gage stations spanned the depth of the instrumented member in order to get continuous stress maps over the depth. Some emphasis was placed on gaging locations which had exhibited difficulties or unexpected behavior, particularly bulging or buckling, in previous ships in service. Three transverses, one oiltight bulkhead, one swash bulkhead, the centerline girder, and one wing-tank longitudinal girder, were so instrumented. The locations and identifying numbers (circled) of strain gage sections are shown in Figures 2, 3, and 4. Wing-tank girder is not shown since the results are not used in this paper.

A total of about 1,400 measurement strain gages were used. Ideally, each strain gage station should consist of six gages, three on each side of the plate, arranged in three-gage rosettes, to get the complete state of stress. In locations in which the principal stress directions were clear from the configuration, only gages aligned with one or both of those directions were used and, in locations in which buckling or bulging was inhibited or prevented by adjacent structure, gages were placed on only one side of the plate.

The general aim was to get, by means of the measured strains, the so-called gross stresses. Some consideration was given to gaging in regions of expected high-stress gradients, such as in the vicinity of cutouts for longitudinals in transverses. This was abandoned in view of the very large number of gages which would have been required, and the somewhat questionable nature of possible results.

Deflection Measurements

The deflection measurements can be grouped in three categories:

1. Deflections identifying longitudinal and transverse hogging or sagging at deck.

2. Vertical deflections of the platefield which forms the bottom structure of the center tank. These could be important as indications of the effect of web buckling or bulging on bottom deflection, if any occurs.

3. Lateral buckling or bulging of individual plate panels. Here, direct measurement was judged to be impossible. Instead, reliance was placed on a scheme of measuring pretest bulging along important lines of strain-gage stations. Only those sections were so measured which either were expected to show high stressing or which indicated before the tests started that sizable fabrication bulges existed. The intention was, of course, to relate these bulges with the plate bending stresses which the gage system would reveal.

Conclusions

The conclusions derived from the analyses and interpretations are listed together for convenience, without the justifications and explanations that are given in the paper.

1. The effects of thermal changes on stresses were smaller than anticipated. The same conclusion applies with respect to instrument drift and shakedown.

2. Vertical hull girder deflections at deck were about as computed at bulkheads but showed distinct flattening (i.e., reduced curvature) between bulkheads.

3. For runs which involved the same hydraulic loading on them, the oiltight and swash bulkheads at deck displaced vertically about the same amount, although the loading is of course applied at bottom and the in-plane stiffnesses of the two are quite different. Analysis of stresses at bottom shows they cannot displace vertically the same amount there, due to differences in vertical in-plane strains.

4. Lateral elastic plate deflections under in-plane loading were generally small, not over one inch. Growth in bulging over a two-year service period was perceptible (¼ to ½ inch).

5. In analyzing vertical shear forces transmitted by deep thin-webbed beams of tapered form (such as brackets in bottom transverses), the flange must be accounted for. Use of an "effective flange" technique, with the Vierendeel formula, was well verified by the tests.

6. Safety factors based on averaged coordinate shear stresses against yield were generally satisfactory, but the use of the 2-D equivalent stress criterion (von Mises) showed some areas where safety factors were close to unity. Gages placed along raw edges of the lower openings in transverses in wing tanks showed very low safety factors.

7. Safety factors against buckling in some panels of deep webs are low for some runs, even less than unity, especially where in-plane stressing normal to the axis is accounted for. No buckling failures occurred.

8. The use of the "shadow rule" with 60-degree triangular shadows gave good correlation between bottom forces and structural support forces in the center tank.

9. In the center tank, with the bottom under heavy hydraulic loading, the longitudinal components support 20-25 percent of the total load. Of that part of the loading carried by the transverse system, about 75 percent is transmitted to the longitudinal bulkhead and about 25 percent to the center girder.

10. In the middle wing-tank strut there was consistently good agreement between measured axial forces and those computed by a simple method, but in the bottom strut the measured forces were generally much lower than those computed by the same method.

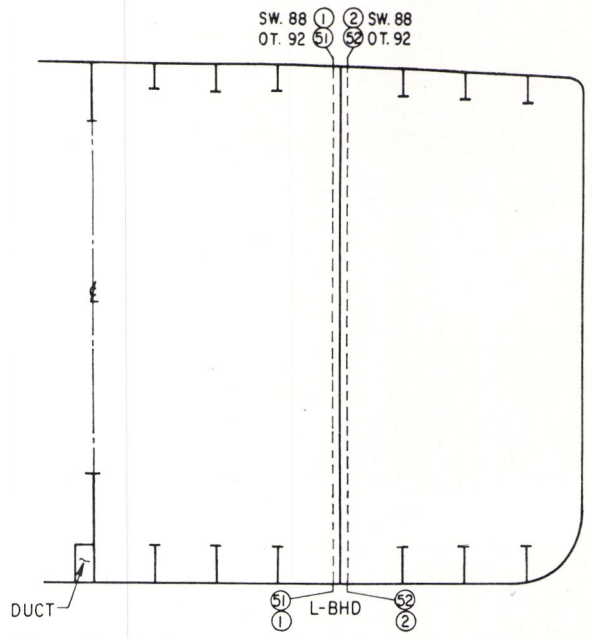


Figure 2—Strain gage station on transverse bulkheads.

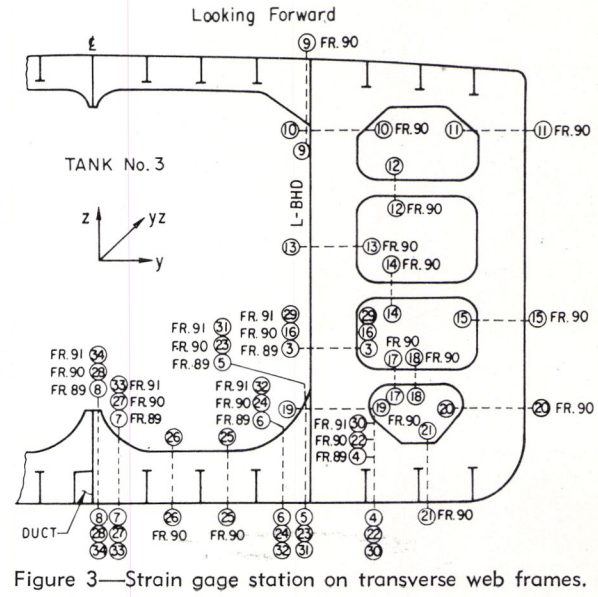


Figure 3—Strain gage station on transverse web frames.

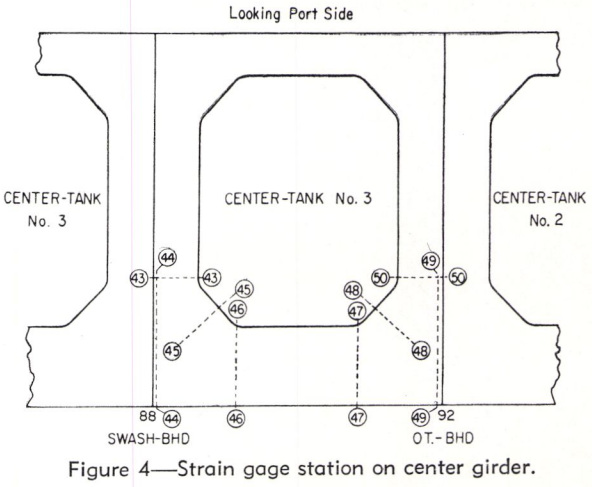
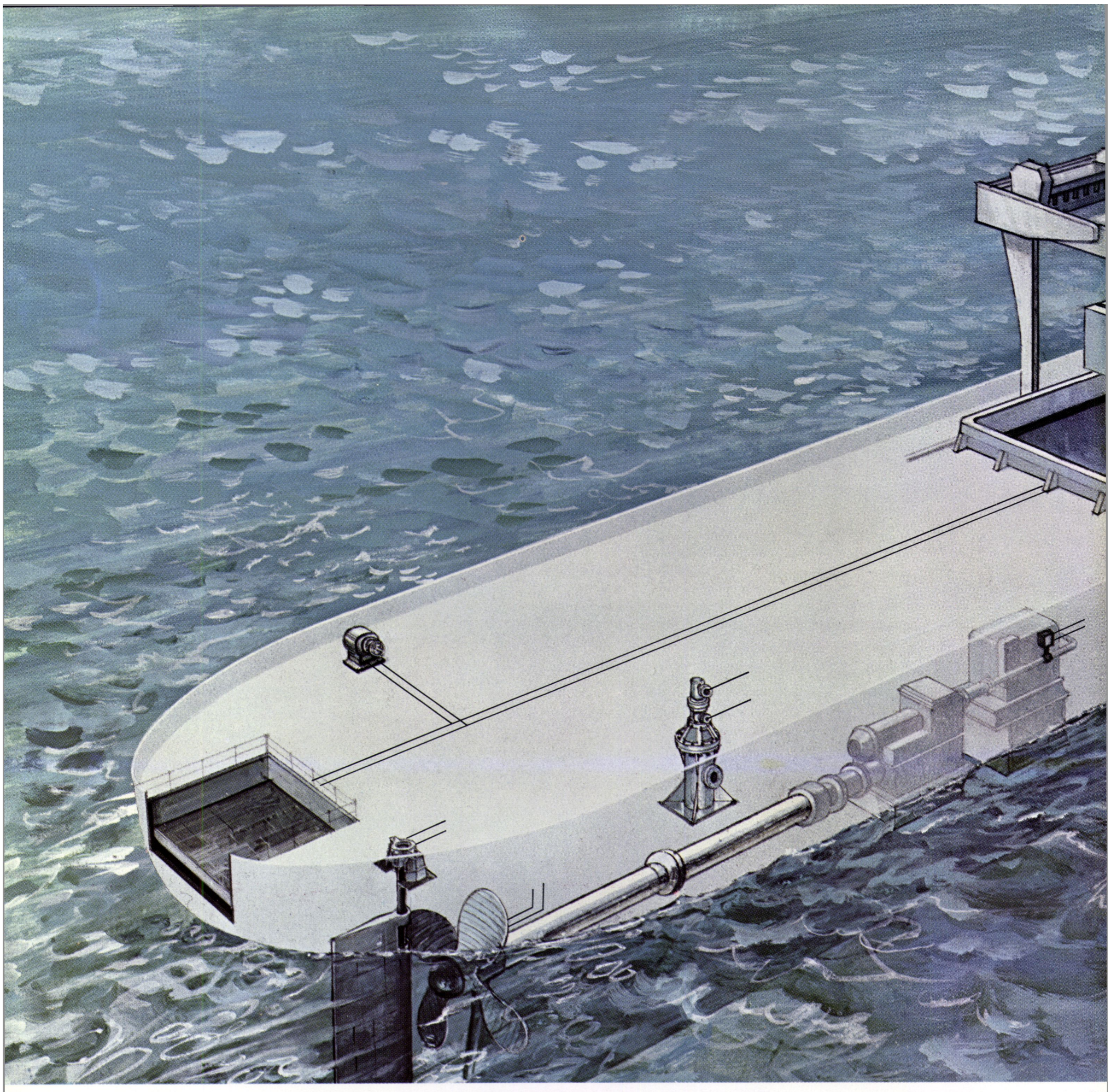


Figure 4—Strain gage station on center girder.



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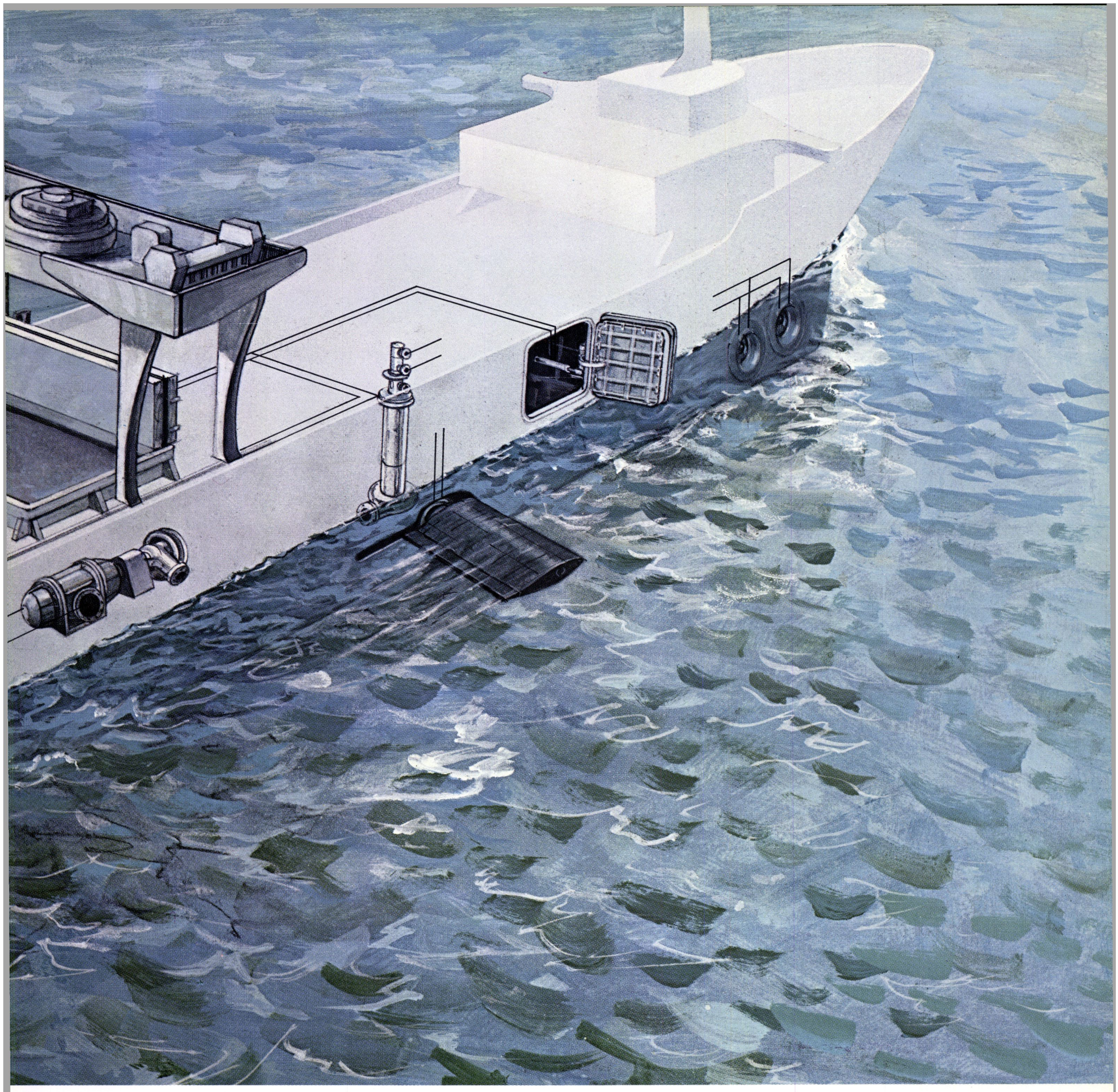

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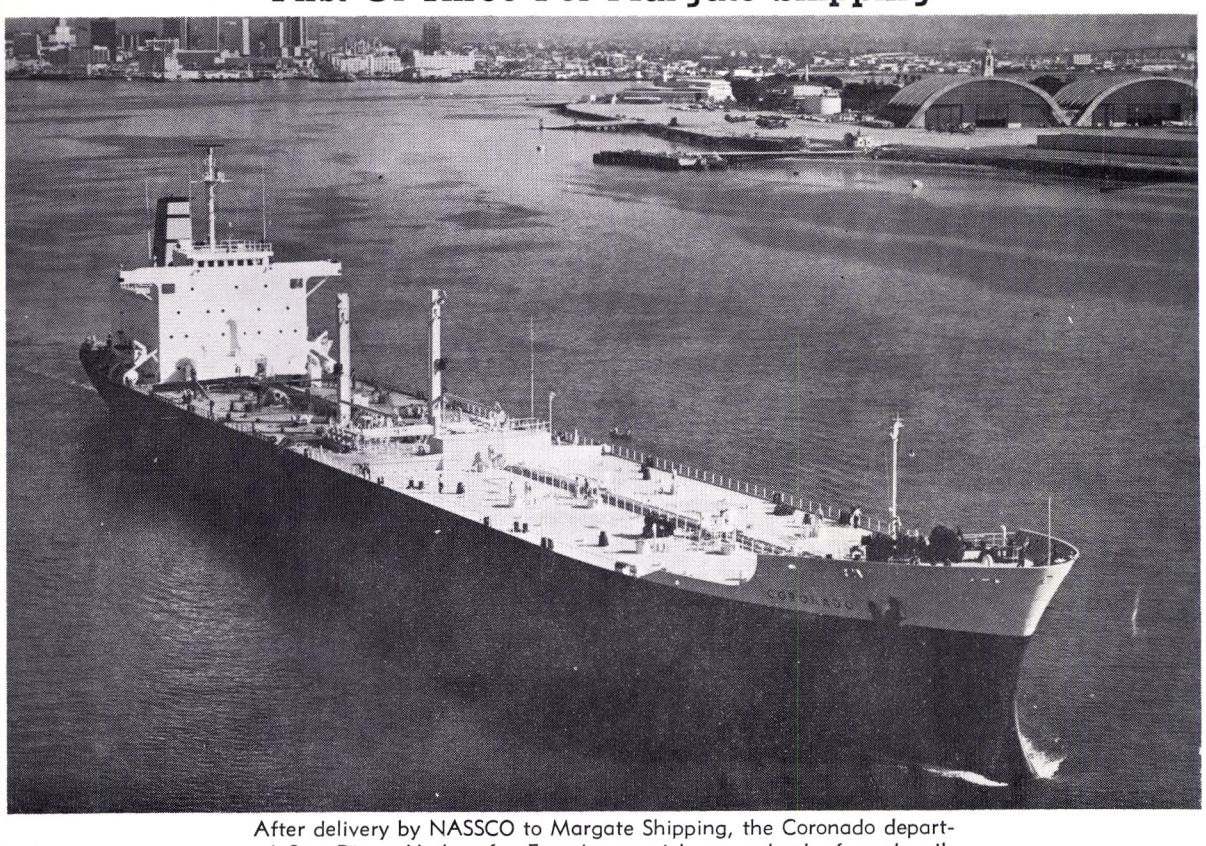
NASSCO Delivers S/S Coronado— First Of Three For Margate Shipping



After delivery by NASSCO to Margate Shipping, the Coronado departed San Diego Harbor for Ecuador to pick up a load of crude oil.

On December 28, 1973, National Steel and Shipbuilding Company (NASSCO) of San Diego, Calif., delivered the S/S Coronado, a 38,300-dwt tanker to Margate Shipping Company of Philadelphia, Pa.

The S/S Coronado, the first of three NASSCO-designed Coronado class tankers under construction for Margate Shipping Company, is 688 feet 6 inches in overall length, has a beam of 90 feet, a depth of 47 feet, and is 38,300-deadweight tons. The propulsion is single-screw steam turbine and has a sustained full load speed of 16 knots. The latest in automation of operational controls is included in the design of the new ship.

Principals at the delivery ceremony aboard the S/S Coronado included, left to right: Capt. **William A. Thurston,** resident owner's representative, Margate Shipping Company; **Thomas M. McGeoghegan,** construction representative, Maritime Administration; Capt. **John Strunk,** master of the S/S Coronado, and **William T. Egan,** vice president, administration, National Steel and Shipbuilding Company.

Upon leaving NASSCO, the S/S Coronado will proceed to Ecuador for a load of crude oil. From there, she will pass through the Panama Canal. The S/S Coronado will be operated by Keystone Shipping Company and time-chartered to Shell International.

The contract for these ships was announced personally by President **Richard M. Nixon** when he visited NASSCO on January 2, 1972, and was the first tanker contract awarded under the 1970 Merchant Marine Act that provided Government assistance for bulk carriers and encouraged shipyards to design and market high-performance ships.

National Steel and Shipbuilding Company has also recently been awarded a $65.7-million contract to build two 90,000-dwt tankers for Chestnut Shipping Company, Philadelphia, Pa., to be delivered in April and September 1978.

Designed by NASSCO as the San Clemente oil carrier, the vessels will be 90,000 deadweight tons, 894 feet in length, 106 feet in beam, and 62 feet molded depth (the maximum size that can transit the Panama Canal).

The contract for these two tankers represents the sixth group of bulk carriers to be built under President **Nixon's** new Maritime Program at NASSCO and brings the company's backlog of work to be performed to about $500 million.

National Steel and Shipbuilding Company is managed by Kaiser Industries Corporation and owned equally by Kaiser Industries Corporation and Morrison-Knudsen Company, Inc.

IMODCO Gets $21.7 Million In Orders For Two Projects

IMODCO, Inc. has announced receipt of two letters of intent aggregating $21.7 million for nine offshore Single Point Mooring terminal systems.

President **Robert C. Houser** said one letter was for eight systems, by far the largest order in the company's history. The other letter of intent was for a single SPM system.

Work on the two projects is expected to be performed over the next two and one-half years, Mr. **Houser** said.

IMODCO pioneered the development of Single Point Mooring terminal systems and is now recognized as one of the world's leaders in their design, engineering and construction.

IMODCO engineered and installed the first Single Point Mooring terminal system for the Swedish Navy in 1958, and since that time has installed 46 SPM systems in many countries throughout the world.

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Government Schools, Libraries, Students & Commercial Organizations	1,069	
Miscellaneous	863	
Awaiting Classification by Business & Industry	51	
NON BUYING POWER	9,985	

WORLD-WIDE BUYING POWER TOTAL 8,212

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Total circulation numbers are meaningless. Some magazines, apparently not wanted by thousands of shoreside buyers, inflate their total circulation numbers with thousands of non-buyers. The only readers of any value to marine advertisers are those with the authority to purchase... the shoreside buyers.

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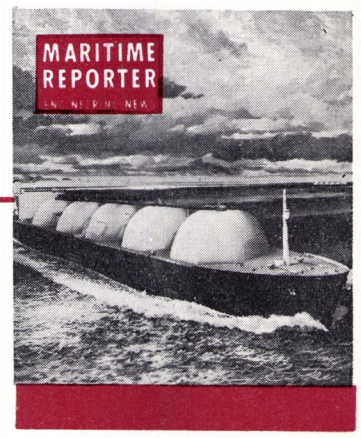

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OCCUPATIONAL BREAKDOWN OF TOTAL WORLD-WIDE CIRCULATION

		BUYING POWER
SHIPBUILDING & SHIP REPAIR (Commercial, U.S. Navy and U.S. Coast Guard):		
Companies, directors, owners, presidents, vice-presidents, secretaries, treasurers, superintendents, managers and purchasing agents		4,044
Naval architects, engineers and chief draftsmen		1,166
Other employees (draftsmen, inspectors, foremen and others employed by shipbuilding and repair companies) not included in above classifications	110	
VESSEL OPERATING COMPANIES OCEAN, RIVERS, HARBORS, OFFSHORE OIL DRILLING AND RELATED OPERATIONS		
(Owners, Agencies & Brokers) Companies, directors, owners, agents, presidents, vice-presidents, managers, secretaries and treasurers		5,600
Port engineers, superintendents, purchasing agents, port captains, port stewards, naval architects and engineers shoreside		1,719
Other employees ashore not included in above classifications	49	
PROFESSIONAL MEN:		
Naval architects, engineers and consultants shoreside		1,625
Admiralty lawyers and insurance	35	
MARINE SUPPLIES & EQUIPMENT:		
Manufacturers, dealers and agents	1,896	
Ship Chandlers	172	
Allied marine industries	302	
GOVERNMENT:		
U.S. Maritime Administration, U.S. Senators, U.S. Congressmen and others in official capacities	31	
SCHOOLS, LIBRARIES AND ORGANIZATIONS	54	
NON BUYING POWER	2,649	

WORLD-WIDE BUYING POWER TOTAL 14,154

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Experimental LNG Carrier Will Evaluate Two Tank Systems Under Operating Conditions

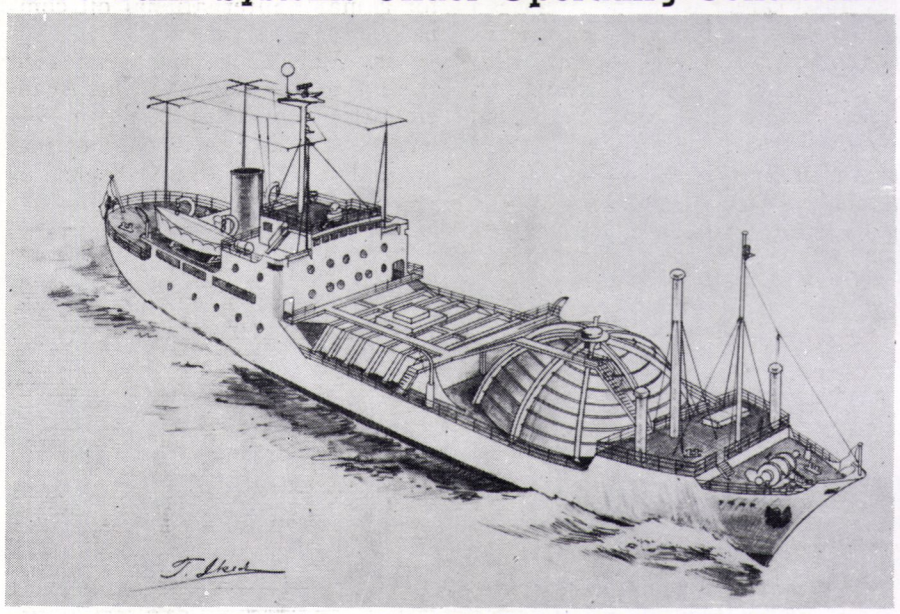


Figure 1—Artist's rendering of experimental LNG carrier being built by Hitachi Zosen. The unusual appearance is due to the fact that two different types of tanks are installed for engineering evaluation. The ship will enter service this summer.

An experimental LNG carrier was recently launched at the Taguma Shipyard of Naikai Shipbuilding & Engineering Co., Ltd., one of Hitachi Zosen's affiliated companies. This 1,000 cubic meter LNG ship is one of the steps being taken by Hitachi Zosen to solve shipbuilding and design problems prior to entering into the construction of large LNG carriers. This Japanese firm established in 1970 an LNG Carrier Development Project to conduct research based on its previous experience in building LPG carriers.

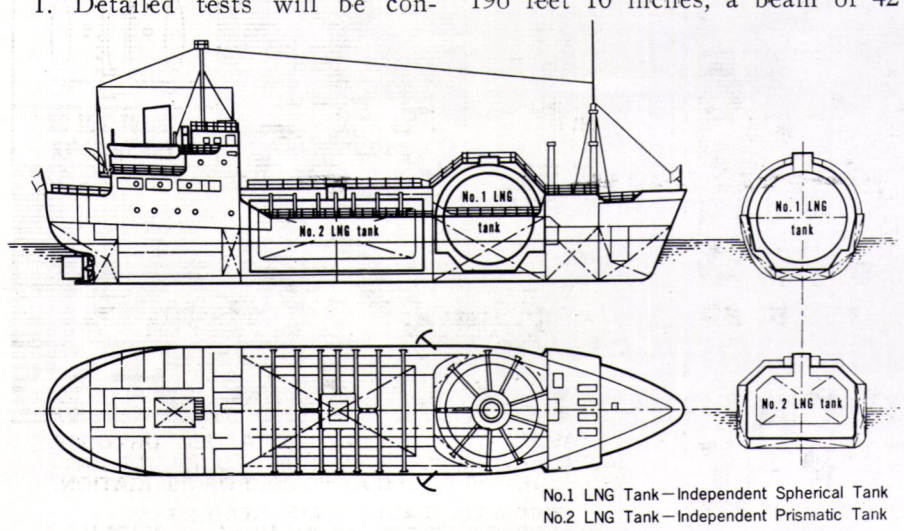
The purposes given by Hitachi Zosen for this project are:

1. To confirm the greater safety of the Hitachi Zosen system (a prismatic, independent tank) and the Chicago Bridge & Iron system (a spherical, independent tank).
2. To solve problems regarding construction methods.
3. To obtain an accurate measure of building efficiency per unit of time.
4. To make sure by the trial-run construction that the construction of actual LNG carriers can be performed smoothly.

The testing program will include:

1. Detailed tests will be conducted on land on the strength of the tank and the tank-supporting structure in a static state before installation, since there are many restrictions on the methods of measuring and testing on board ship.
2. After the tanks have been installed in the ship and while at the dock, relations between the hull and the tank will be checked by rolling and pitching the carrier on a calm sea surface.
3. Based on the above test data, tests will be performed at sea to check the relations between the hull and the tanks and the surface effects of liquids in the tanks.
4. After cooling the tanks with liquid nitrogen until the working temperature is reached, the insulation, cooling conditions and the deformation of the tanks and the hull will be checked.
5. After the ship has sailed as an ethylene carrier, long-term tests will be conducted to determine the actual sailing conditions under which the LNG carrier must operate. This will enable the compilation of the necessary statistical data.

This experimental ship has a length between perpendiculars of 196 feet 10 inches, a beam of 42 feet 7½ inches, a depth of 21 feet 4 inches and a draft of 13 feet 5½ inches. It is propelled by a single diesel engine developing 1,300 bhp.



No.1 LNG Tank—Independent Spherical Tank
No.2 LNG Tank—Independent Prismatic Tank

Figure 2—Inboard profile and deck plan of experimental ship being built in Japan.

As can be noted from the accompanying sketches of the ship, two tank systems are being tested. The prismatic tank with insulation were constructed by the Innoshima Shipyard of Hitachi Zosen. The CBI-type spherical tank and related parts were built at the Kanagawa Shipyard of Hitachi Zosen.

The Hitachi Zosen system was developed through the Hitachi Zosen's unique technology in the fields of LNG carriers based on its previous experience and joint research and development by Hitachi Zosen and Exxon International Company. The main features of this system are: Self-supporting, prismatic, independent tank of nine percent nickel steel; welding of nine percent nickel steel by using a new filler metal, "HZ-CL," developed for automatic welding by Hitachi Zosen; a double thermal-insulation system, and specially treated plywood with a simple and rational structure for the secondary barrier.

The spherical, independent tank was made of aluminum and is based on the system developed by Chicago Bridge & Iron Company. The main features of this system are: Self-supporting, spherical, independent tanks of aluminum that can be manufactured outside of the hull.

International Ship Suppliers To Meet In Washington, D.C. September 22-26

Pictured at the planning meeting, left to right: **Arthur Rosenfeld,** Peltz Bros., Inc.; **Tom Snyder,** Diplomatic Marine, Inc.; **Guy Stanley,** Sonessco, Inc.; **Don Crouthamel,** San Pedro Harbor Ship Supply; **Charles Smith,** Southeastern Supply Co., Inc.; **Carlos Lozano,** Neptune Supply, Inc.; **Stanley Denstad,** Nautilus Ship Supply Corp.; **James Taylor,** R.J. Taylor Co., and **C. Willman Brown,** National Association of Marine Services, Inc.

The International Ship Suppliers Association (ISSA) has announced that its next general assembly will be held at the Mayflower Hotel in Washington, D.C., on September 22-26, 1974.

This will be the 19th general assembly for this international group, and of special significance is that the upcoming meeting will be the first ISSA meeting held outside of Europe. ISSA is composed of over 800 ship supply companies representing over 30 countries. The organization symbolizes international cooperation in providing services to shipping from all countries of the world.

The National Association of Marine Services (NAMS), the U.S. trade association of major American ship supply companies, will host the four-day affair in Washington. The planning committee is composed of nine members of NAMS (shown in the photograph). They report that the 1974 general assembly is expecting close to 250 delegates to be present, representing companies from all over Europe and the Far East, and the United States.

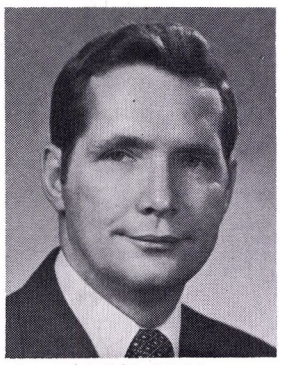
The business format for the assembly will include seminars and discussion groups which address themselves to the key topics facing the ship supply trade, and the vital role of ship supply companies in the maritime industry today. The recommendations and conclusions resulting from this meeting will form the basis from which the ship supply trade meets the present challenges in today's complex and changing maritime market.

Bilingual secretaries and translators will be present to facilitate communication among the group. Guest speakers will include key Government officials involved in merchant marine affairs.

Social events during the meeting include tours of Washington, luncheons, hospitality receptions, a dinner-dance, and a tour of points of interest in the Eastern United States for the foreign delegates, after the meeting has been concluded.

The NAMS planning committee for this affair reports that their initial meeting in New York was very successful, and that the 1974 ISSA meeting in Washington should be the biggest and most productive in ISSA's 19-year history. NAMS is the host for this year's assembly and can be contacted for further information at P.O. Box 1927, Wheaton Branch, Silver Spring, Md., U.S.A. 20902.

Diehl Elected VP Ohio Barge Line And Warrior & Gulf

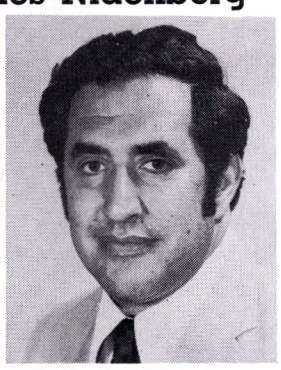


Neil N. Diehl

Neil N. Diehl has been elected vice president of Ohio Barge Line, Inc., Pittsburgh, Pa., and Warrior & Gulf Navigation Company, Chickasaw, Ala., effective February 1, 1974, with headquarters at Pittsburgh. He succeeds **Wallace I. McElroy,** who is retiring after 42 years of service.

Mr. **Diehl** is a graduate of the Pennsylvania State University.

Colt Industries Names Nidenberg



Herbert W. Nidenberg

Colt Industries has named **Herbert W. Nidenberg** to the position of vice president and general manager of the company's Water and Waste Management Operation in Beloit, Wis. The operation's prime objective is to establish Envirovac, Colt's recently announced vacuum sewage collection system, as a major product entry in the environmental market.

Mr. **Nidenberg** joined Colt Industries last year as vice president of the business development center after holding responsible management positions in manufacturing, engineering and operations at General Electric, AMF, Condec Corp., and Burndy Corp.

A mechanical engineering graduate of the Polytechnic Institute of New York, Mr. **Nidenberg** also holds a master's degree in management from Rensselaer Polytechnic Institute.

"Colt's goal is our overall ability to expand the company's identification as a product and service leader in the rapidly growing field of waste management," said **Philip Wallach,** Colt group president, on making the announcement. "I am confident that Mr. **Nidenberg's** broad operational background and leadership, coupled with our existing strengths in people, products and experience, will move us rapidly toward meeting that goal."

Whitehouse To Head ABStech Regional Office In Houston

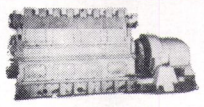
The appointment of **James W. Whitehouse** as regional representative for the Southwest United States and Gulf Area of ABS Worldwide Technical Services, Inc., was announced by vice president of operations **Walter D. Vandegrift.** Mr. **Whitehouse** will direct ABStech activities from Houston, Texas, where ABStech plans to open an office this month.

Mr. **Whitehouse** began his professional career with the American Bureau of Shipping, the parent company of ABStech. While with the American Bureau of Shipping, he served in the New York and Kiel, Germany, offices as a field surveyor, and the New York headquarters office as a technical surveyor. Prior to joining ABStech, Mr. **Whitehouse** was in London for 10 years where he held the position of oil tanker fleet manager for a major international oil company.

Mr. **Whitehouse** was graduated from the Merchant Marine Academy at Kings Point, N.Y., in 1944 with a B.S. degree in engineering. He holds a professional license as chief engineer.

DIESEL GENERATOR SETS

1

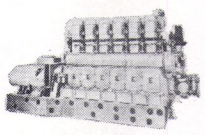


350 KW DIESEL GENERATOR SET

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



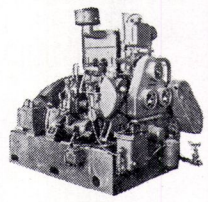
ENGINE: Enterprise 12 x 15 DSG-6 — 6 cyl. — 450 RPM crank No. 50J. GENERATOR: Westinghouse 250 KW—120/240 DC—1040 amps—450 RPM. Typical serial No. 3S-10P-913. Complete with switch gear.

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.

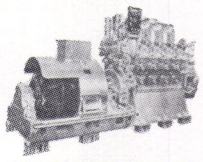
4



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.

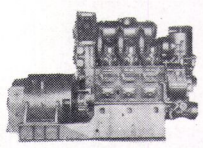
5



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



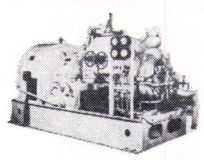
300 KW DIESEL GENERATOR SET

ENGINE: G.M. 6-278—6-cylinder—2 cycle—8¾"x10½"—750 RPM—with oil and water Ross Shell and Tube Heat Exchangers, instrument panel, pyrometer, etc. Vibro Isolators.

GENERATOR: G.E. 300 KW—120/240 volts DC—1250 amps—shunt wound—continuous overload rating 375 KW—2 hours—55° Weight of unit approximately 26,000 pounds. Complete with shock mounts. Unit 13' 2" long, 64" wide, 8' high.

TURBO GENERATOR SETS

7



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

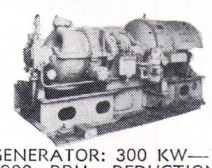
400 KW (500 KVA)—80% PF—1200 RPM—450/3/60. TURBINE: 585 lbs—840°TT—28½" vacuum—9018 RPM—serial 10A4462-3 & 10A4462-4. GEAR: 9018/1200 RPM. A.C. GENERATOR: 500 KVA—400 KW—450 volts—641 amps—80%PF—3 phase 60 cycle—1200 RPM—CR 40°—excitation amps 41—excitation voltage 120. Instruction book 5442. Switchgear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

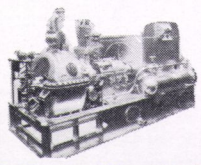
GENERATOR: 300 KW—120/240 VDC—1250 amps—1200 RPM. REDUCTION GEAR: 8.344:1 — 10012/1200 RPM—type S-182. TURBINE: DOR418N—449 H.P.—10012 RPM—working pressure 180/220 PSIG.

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

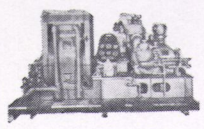


1250 KW G.E. 10-STAGE TURBO GENERATOR SET

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.

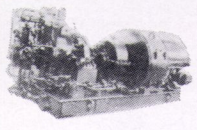
12

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

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BETH. CLASS—13,600 H.P.

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

KNOWN 'ROUND THE WORLD

THE BOS

313 E. BALTI

Main Office: (30

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

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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

2 COMPLETE T-2 G.E. TURBINES

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

ROTOR WILL INTERCHANGE WITH ELLIOTT MAIN TURBINE

Will Sell Rotors Separately

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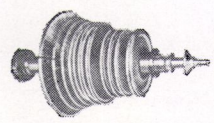

T2-SE-A1 MAIN PROPULSION ROTOR — G.E.

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

23

T-2 TANKER UNUSED—4 UNITS AVAILABLE AUX. G.E. TURBO GEN. ROTORS

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

VICTORY SHIP TURBINES & ROTORS

24

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

L.P. – 3509 RPM
H.P. – 6159 RPM

LP Serial #77943—HP Serial #77942—Interchanges Ingalls C-3—Class 442 & Sun C-4 vessels—U.S. Navy Victory "Liberty".

LP Serial #72272—HP Serial #72271—Interchanges Ingalls C-3—10 boxes of spares.

LP Serial #62042—HP Serial #62043—GEI 16263—Ridgeway Victory.

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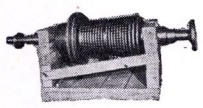
25 **VICTORY SHIP AP2 H.P. & L.P. TURBINES NEW — UNUSED — 6000 H.P. SETS**

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

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

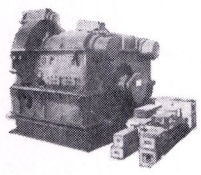
27



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

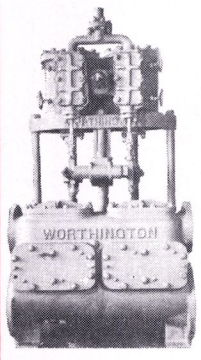
MD-48A—8500 HP—6159/3509/763/85 RPM.

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

Westinghouse 4A-1640.

PUMPS

30

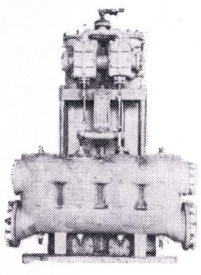


CARGO STRIPPING PUMPS

BRONZE T2 TANKER STRIPPING PUMPS

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

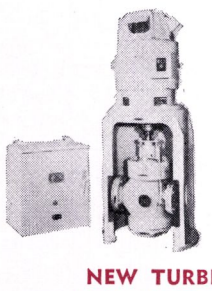
31



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 9'11½" — depth 3'9½"—wt. approx. 10,000 lbs.

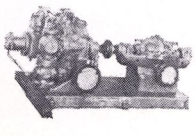
32



UNUSED DELAVAL IMO ROTARY PUMP

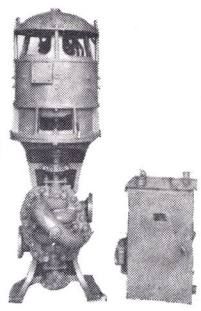
175 GPM—35 PSIG—10 HP—120 volts DC—1750 RPM—serial E-8619—frame 324 VY—76 amps—mfg. by Electro Dynamics. With magnetic control. Excellent condition.

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



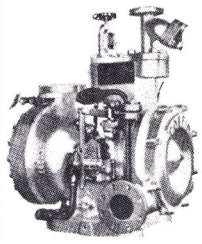
DAYTON-DAWD 2-STAGE FIRE AND BILGE PUMP

Vertical 2-stage type TDV-10—20 HP—200 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

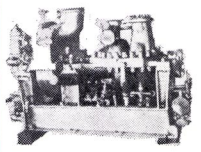
35



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**



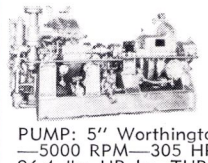
Worthington — drawing SL5043—425 GPM—1675' total dynamic head—5000 RPM 3-stage — double suction. Flanged 4½" inlet—4" outlet. Powered by Sturtevant steam turbine—282 HP—590 PSI. For Fletcher DD-445 Class Destroyers.

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

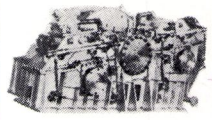
C-25 CARGO PUMP TURBINE SPARE GEARS

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.

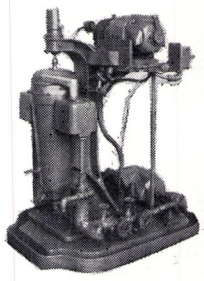
44 **SINGLE ENGINE REDUCTION GEAR**

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.

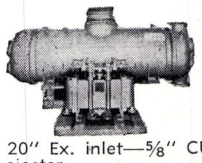
46



SHARPLES 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.

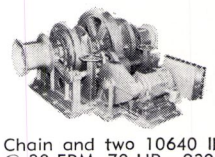
47



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

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

48

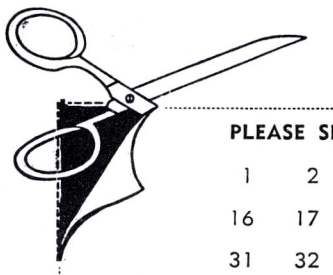


UNUSED 70 HP McKIERNAN-TERRY WINDLASSES

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.



PLEASE SEND INFORMATION ON THE FOLLOWING: **(Please circle items)** 2/1/74

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46	47	48												

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

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

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

Magnavox Announces New Integrated Navigation System

Magnavox Research Laboratories has announced the availability of its new Model 200 Integrated Navigation System for Offshore Geophysical Exploration Systems. The system integrates Loran-C and Doppler Sonar/Gyrocompass information to provide a more precise dead-reckoning capability for offshore use.

The Loran-C addition improves performance by providing a precise measure of ship's velocity, particularly in deepwater areas where doppler sonar equipments operate in a water track mode. Magnavox can provide these systems in a stand-alone configuration or integrated with systems already utilizing Magnavox satellite navigation.

The principal advantage of Loran-C in bounding position error growth due to unknown ocean currents when operating with the sonar in the water track mode. The overall results are that in good loran coverage regions there is no accuracy degradation in deep water as compared with shallow water systems.

For additional information contact the Marine Marketing Manager at Magnavox Advanced Products Division, 2829 Maricopa Street, Torrance, Calif. 90503.

Delta Line Appoints Mrs. Thomas O. Lane

Mrs. Thomas O. Lane

Mrs. Thomas O. (Lucille) Lane has been named manager-public relations and advertising of Delta Steamship Lines, according to an announcement by Capt. **J.W. Clark,** president of the New Orleans, La.-based steamship line.

Mrs. Lane, a native of Liverpool, England, was educated in Argentina and Brazil. She joined Delta at New Orleans in June 1967, after residing more than 18 years in South America.

Delta Line, founded in New Orleans in 1919, owns and operates a fleet of 11 ultramodern American-flag cargo vessels sailing between the U.S. Gulf and ports in West Africa, the East Coast of South America and the Caribbean, including Central American ports.

Paul-Munroe Hydraulics Names Heath To Head National Marine Sales

Ed Heath

To keep pace with the increased activity in the marine industry, Paul-Munroe Hydraulics, Inc., has appointed **Ed Heath** to be in charge of national marine sales for the company.

Mr. **Heath** has had more than 25 years of experience in hydraulics, principally with Vickers Division of Sperry Rand Corporation.

Paul-Munroe Hydraulics manufactures hydraulic equipment for the marine industry, with extensive experience in work aboard tankers, containerships, drill ships, and mining ships.

The company's principal office is located at 8345 East Slauson Avenue, Pico Rivera, Calif. 90660.

Boise-Griffin Names C.R. Senner President

Boise-Griffin Steamship Co., Inc. has announced the appointment of **Charles R. Senner** as president and chief executive officer.

H.J. Griffin will continue as board chairman.

Halter Delivers New York Pilot Boat

The 65-foot Chapel Hill has accommodations for 19 New York Harbor Pilots.

Halter Marine Services, Inc., New Orleans, La., the world's largest builder of offshore support vessels for the oil and gas industry, has delivered a new 65-foot pilot vessel to the New York Pilots Association. The new boat, named Chapel Hill, will accommodate 19 pilots and has been placed into operation by its owners in New York Harbor.

The Chapel Hill has overall dimensions of 65 feet 6 inches by 17 feet, with a 44-inch draft. It was designed and built by Halter Marine Services.

The boat is powered by two General Motors 12V71N marine diesel engines and is equipped with one General Motors 2-71-20 kw generator unit, Konel Model KRA-221 radar and Motorola-Modar V.H.F. radios. The vessel is air-conditioned in the passenger lounge, two staterooms and wheelhouse.

Halter Marine Services has a current backlog of approximately $60 million in contracts to build offshore crew boats, supply vessels, anchor handling and towing ships for the oil and gas industry.

The company's production comes from four fully equipped shipyards in New Orleans, Lockport and Pierre Part (Louisiana) and Moss Point (Mississippi).

Three special type vessels were recently delivered by Halter Marine Services. They include a 15,000-horsepower tug, the most powerful ever built in the United States, and two 174-foot oceanographic research ships for the Navy Ship Command and the Navy's Office of the Oceanographer. One research ship will be used by Texas A & M University; the other will be used by the University of Hawaii's Oceanographic Institute in Honolulu. The new vessels are modified standard Halter Marine offshore supply/anchor handling and rig towing ships.

Lightner To Build Diesel-Powered Scow Of Taubler Design

The Department of Public Works, Town of Islip, N.Y., has awarded a contract to Lightner's Boat Yard, Inc., West Sayville, N.Y., for the construction of a steel-hulled diesel-powered work scow.

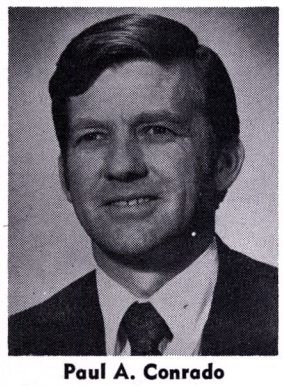
The principal dimensions of the new vessel are: length overall, 35 feet; molded beam, 13 feet; and draft, about 15 feet.

The vessel is to be fitted with a hydraulically operated boom for handling pilings, a diesel-driven jetting pump, pilothouse and workroom, A spud is also to be fitted for anchoring.

The vessel is to be used for transporting and setting piles, repairing and erecting bulkheading, and similar work.

The design agent was Richard R. Taubler, Inc., naval architects of Brooklyn, N.Y.

Paul A. Conrado Named President Santa Fe Affiliate



Paul A. Conrado

Paul A. Conrado, vice president of Santa Fe Engineering & Construction Co., Orange, Calif., has been named president and director of P.T. Santa Fe-Pomeroy Indonesia, with headquarters in Jakarta.

He succeeds **Roger A. Lewis,** who is transferring from Jakarta to California to become manager of administration for Santa Fe-Pomeroy, Inc. at Petaluma. All three firms are affiliates of Santa Fe International Corp.

Mr. **Conrado** is an engineering graduate of the University of Santa Clara, and has a master's degree in construction management from Stanford University.

Since joining Santa Fe-Pomeroy's predecessor J.H. Pomeroy & Co. in 1965, he has been assigned as an engineer and project manager on construction jobs in Sumatra, Irian Jaya, Java, and Singapore. In 1972-73, he was area manager in charge of the company's construction operations in Saudi Arabia. Mr. **Conrado** was promoted to vice president of Santa Fe Engineering & Construction Co. in May 1973, and assigned to company headquarters in Orange until returning to Indonesia in November as Pacific area manager.

Charles Klein Joins Pott Industries Inc. As Tax Manager

Pott Industries Inc., St. Louis, Mo., has announced that **Charles J. Klein** has joined the company as tax manager.

Mr. **Klein** was formerly corporate tax manager of Brown Group, Inc.

Wiley And Clyde Iron Now Division Of AMCA Int'l —AMCA Sales $100 Million

Having achieved the $100-million sales mark in less than three years, Dombrico, Inc. has moved its corporate headquarters to 10 Allen Street, Hanover, N.H. 03755, changed its name to AMCA International Corporation, and announced its intention to become a leading manufacturer of heavy industrial products.

Under the direction of **K.S. Barclay,** chairman and chief executive officer, and **Jack Hatcher,** president and chief operating officer, AMCA began an acquisition program in 1971. Then known as Dombrico, Inc. and located in New York, the company purchased Varco-Pruden, third largest metal building manufacturer. The operations of Priggen Metal Buildings have since been added.

During 1973, AMCA put together a second division. Present constituents of this Equipment Systems Division are Wiley Manufacturing, steel fabricators for the marine and construction industries; Clyde Iron, builders of "Whirley" cranes and other heavy construction and materials handling equipment; and Provincial Crane, manufacturers of overhead industrial cranes.

Combined sales of the Varco-Pruden and Equipment Systems Division exceed $100,000,000.

In mid-1973, Dombrico moved its headquarters to Hanover, and proceedings were begun to change the firm's name to AMCA International Corp., effective in January 1974.

Other AMCA staff officers are **William R. Holland,** vice president and general counsel; **Robert A. Reid,** vice president-manufacturing, and **Frank J. Stevenson,** secretary and controller.

AMCA International is a subsidiary of Dominion Bridge Co., Ltd. of Canada.

Kaiser To Build LNG Tanks For Oceangoing Ships On Pinto Island In Mobile Bay

Kaiser Aluminum & Chemical Corporation, Oakland, Calif., has announced that it will construct a multi-million-dollar facility at Mobile, Ala., to assemble and install huge liquefied natural gas tanks in oceangoing ships.

The company said it has leased approximately 38 acres of land on Pinto Island in Mobile Bay from the Alabama Drydock and Shipbuilding Company for the new facility, and construction will begin immediately.

Fifteen all-welded aluminum tanks will be assembled at the site for installation in three liquefied natural gas vessels to be built by Avondale Shipyards, Inc. at New Orleans, La. The 1,000-foot-long vessels will be brought to Pinto Island and the tanks—each approximately 120 feet long, 120 feet wide, and 75 feet high—will then be placed into position.

T.H. Johnson, manager of Kaiser Aluminum's liquefied natural gas project, displays a model of one of 15 huge aluminum tanks which will be fabricated at the company's new Pinto Island facility.

The individual aluminum tanks will weigh up to approximately 950 tons. They will be assembled at ground level and will be lifted for placement into the ships by a unique, double stiff-legged derrick crane standing 30 stories high.

Other facilities to be constructed at the site will include offices, change and lunch rooms, large storage areas and classrooms for an aluminum welding school. Two large revolving cranes will be installed, as well as special testing facilities capable of hydrostatically testing the huge tanks by filling them with up to 8,000,000 gallons of water.

Kaiser Aluminum said that fabrication of the tanks will begin in mid-1974 and continue into 1977. The company expects employment at the facility will be several hundred workers.

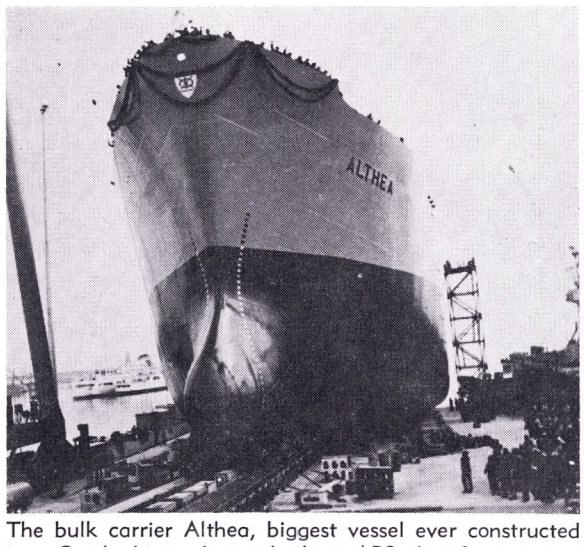
When completed, the liquefied natural gas vessels will be used by subsidiaries of El Paso Natural Gas Co. to haul natural gas at cryogenic temperatures (260 degrees below zero) from Algeria to East Coast ports.

Eleusis Shipyards Launches Largest Vessel Built In Greece

On December 12, 1973, the first of a series of 43,300-deadweight-ton bulk carriers, the Althea, was launched at Eleusis Shipyards S.A. This is the biggest ship ever built in Greece.

Eleusis Shipyards commenced operations in August 1969, and since then the yard has progressed rapidly. The facilities have been extended, and the equipment has been improved by the acquisition of the most modern machinery.

In the first phase of its development, the yard confined itself to repair and conversion work, and its business in these fields expanded. Last year, the order book for repairs and conversions grew at a particularly fast pace: between January 1 and November 30, 1973, repairs were carried out on 148 vessels with a total tonnage of 2,153,000 grt.



The bulk carrier Althea, biggest vessel ever constructed in a Greek shipyard, was built to ABS classification and incorporates all the features of a self-unloading vessel.

On September 1, 1971, Eleusis Shipyards entered the ship construction stage, and on June 8, 1972, the first ship was launched—the 5,900-dwt Okeanis. Since then, Eleusis Shipyards has been operating as a fully integrated yard, with newbuilding on its stocks as well as repair and conversion work.

The yard's facilities, fully up to date in every way, include the following: three floating docks with lifting capacities of 20,000, 65,000 and 115,000 dwt; and a shipbuilding berth for the construction of vessels of up to 150,000 dwt.

The Althea is a bulk carrier of 43,300 deadweight tons. She has an approximate overall length of 673 feet, extreme breadth of 89 feet, a trial speed of about 15.8 knots, and main engine developing 14,200 bhp. She is built for the bulk transportation of dry cargoes (ore, coal, grain, etc.) and incorporates all the design features of a self-loading vessel. She will have air-conditioned accommodations for a crew of 43. The ship has been built in conformity with the American Bureau of Shipping and under its supervision, and she flies the Greek flag.

Eleusis Shipyards is represented in the United States and Canada by Walter Thorsen Inc., One World Trade Center, New York, N.Y. 10048.

Ta Peng Line Names Chie Asst. Operations Manager

John S.F. Chie has been appointed assistant operations manager for Ta Peng Line, according to **O. Arnold Larsen,** vice president, Transnational Maritime, Inc., general agents for the line. Ta Peng maintains an independent operation between the Far East and the U.S. Atlantic and Gulf.

Paclines To Carry Cargo California To Hawaii Using Tug And Superbarge

A superbarge, capable of carrying as much cargo as a World War II Liberty ship, is the mainstay of a new shipping service between the Port of Oakland, Calif., and Hawaii.

Paclines, operator of the service, employs a barge 336 feet long and 98 feet wide, towed by a 5,000-horsepower twin-screw tug in the run to and from the Islands.

The superbarge has a dry capacity of 324,000 cubic feet, in addition to cargo space on deck, for a total capacity of some 12,500 tons of freight.

The service will call at Oakland every 35 days.

A Paclines spokesman indicated that the service is designed to handle virtually all types of palletized and unitized cargo. A so-called "pass-pass" system is used in loading the floating giant, in which teams of forklifts hand-off cargo at the bullrail to a second team of forklifts aboard the barge, which stow the freight. Because a ramp is used in loading, the service is also well-suited for shipping heavy machinery, the spokesman said.

In Oakland, the service is based at the port's Ninth Avenue Terminal.

Paclines, which employs some 1,250 people worldwide and utilizes more than 100 barges, operates Pacific Inland Navigation, Alaska Barge & Transport, B&R Tug and Barge, and Seapac.

Paul J. Evanson Appointed Controller Moore And McCormack

Paul J. Evanson has been appointed controller of Moore and McCormack Co., Inc. (NYSE; Pacific), it was announced by **Paul R. Tregurtha,** executive vice president and chief financial officer.

Mr. **Evanson**, who joined Moore and McCormack as assistant vice president in January 1973, will primarily be responsible for financial and tax reporting activities of this natural resources and transportation company.

A native New Yorker, Mr. **Evanson** received his B.B.A. degree, magna cum laude, from St. John's University in 1963; his J.D. degree, cum laude, from Columbia Law School in 1966, and his LL.M. degree in taxation from New York University Law School in 1972.

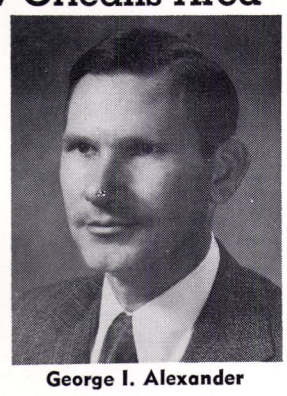
Prior to joining Moore and McCormack, Mr. **Evanson** had been a manager with the auditing firm of Arthur Andersen & Co. He is a member of the bar and a certified public accountant in New York State, and is also a member of the American Institute of Certified Public Accountants, the New York State Society of CPA's and the Association of Water Transportation Accounting Officers.

Paul J. Evanson

Moore and McCormack's principal activities include Pickands Mather & Co. of Cleveland, Ohio, which operates iron ore and coal mines, Great Lakes ore carriers, and acts as sales agent for various materials, and Moore-McCormack Lines, Incorporated, which offers ocean shipping services from U.S. East Coast ports to the East Coast of South America and to South and East Africa.

Other company subsidiaries include Moore-McCormack Bulk Transport, Inc., which will operate oil tankers now under construction and other bulk carriers, and Moore-McCormack Energy, Inc., which develops participation in projects requiring transportation and related logistics of energy-oriented resources.

Rose Barge Line Names Port Engineer New Orleans Area



George I. Alexander

George I. Alexander has been appointed port engineer in the New Orleans area for Rose Barge Line Inc., Clayton, Mo., it was announced by **Earl C. Rose Jr.,** president and chairman of the board.

In this newly created position, Mr. **Alexander** will be responsible for maintenance of all vessels at Kenner Bend Fleet and Kenner Shipyard, Inc., New Orleans, La. subsidiaries of Rose Barge Line.

Mr. **Alexander** has served as chief engineer on two Rose towboats, the White Knight and White Dawn, and as relief engineer on the Crimson Glory. Before he joined Rose in 1969, he was a mechanic for Shell Oil Company, servicing about 30 boats out of the New Orleans area.

His service in the Navy during World War II included deactivation of ships returning to the West Coast from the Bikini atom bomb tests.

Pittsburgh-Des Moines Orders Large Quantity Of Aluminum For LNG Ship And Land Use

Aluminum Company of America has announced receipt of orders for more than 33 million pounds of aluminum plate, extrusions and welding wire to be used in tanks for land-based storage of liquefied natural gas and for LNG supertankers.

The orders, for two unrelated LNG projects, came from Pittsburgh-Des Moines Steel Co. PDM will build four storage tanks for the Cove Point (Md.) Import Terminal, and 20 storage vessels for Quincy Shipbuilding Division of General Dynamics for oceangoing tankers. The orders bring to approximately 100 million pounds Alcoa's commercial plate backlog for LNG applications.

The Cove Point Terminal, expected to be completed in late 1976, is the world's largest aluminum land-based LNG project. Housing four giant storage tanks, each with a capacity of 375,000 barrels, the 1,022-acre terminal will have a design capacity sufficient to meet the annual requirements of more than 1,000,000 homes.

Each of the double-wall storage tanks will measure approximately 141 feet (43 meters) high by nearly 169 feet (52 meters) in diameter—more than half the length of a football field. The inner shell will be built from 15 by 31-foot aluminum plates ranging from nearly two inches thick at ground level to approximately one-half inch at the top. The outer shell will be carbon steel.

The terminal will receive the LNG equivalent of one billion cubic feet of gas each day from a fleet of specially designed supertankers. The tankers will travel nearly 4,000 miles from Algeria. An El Paso Natural Gas Co. subsidiary will purchase and ship the LNG to Cove Point, which is being constructed by a subsidiary of the Columbia Gas System, and will be owned jointly by Columbia and a Consolidated Natural Gas Company subsidiary.

The 20 LNG storage vessel for oceangoing supertankers will be constructed at PDM's new Charleston, S.C., operations. Alcoa will supply flat and machined plate shapes, extrusions and welding wire. Each sphere will have a capacity of 25,000 cubic meters and an inside diameter of approximately 120 feet (36.5 meters).

Each tanker will contain five spheres with a gross ship capacity of 125,000 cubic meters. The tankers will be built at Quincy, Mass., for Cherokee Shipping Corp., for charter to subsidiaries of Energy Transportation Corp., a recently formed United States-flag vessel fleet.

THIRD IN A SERIES FROM HALTER: Halter Marine Fabricators of Moss Point, Miss., recently delivered the motor vessel Khair-Ed-Din to Euro-Pirates International, Inc. of New Orleans, La. Khair-Ed-Din is the third in a series of vessels being built for **Charlie Slater,** better known as Champagne Charlie, a New Orleans hotel owner (French Quarter Inn). The 176-foot by 38-foot by 14-foot vessel is certified by the American Bureau of Shipping for A-1 and Full Ocean, and also by the U.S. Coast Guard. Upon delivery, the Khair-Ed-Din is scheduled to service the offshore oil and mineral industry off the coast of Brazil.

Mainland China Places Order Worth $2 Million For Rucker Petroleum Drilling Equipment

The People's Republic of China has ordered petroleum drilling controls and blowout preventers valued at approximately $2 million from The Rucker Company, a major producer of petroleum drilling and well production equipment.

Company officials said the order is believed to be the first received by a U.S. company for petroleum drilling equipment from the People's Republic since President **Nixon** reduced trade barriers between the two nations.

The order was received through the China National Machinery Import and Export Corporation following a visit of Rucker officials to China, and is for 20 land blowout preventer stacks. This equipment is used to control well bore pressure during drilling operations, and is a safety and environmental protection control preventing blowouts if high pressure pockets of gas or fluid are encountered.

Rucker Shaffer Division, located in Houston, Texas, will manufacture the equipment for delivery in the latter half of this year. Both ram and spherical preventers with high pressure gate valves will be supplied. Four will be specially treated for high toxic, sour gas drilling conditions and will be equipped with rotating blowout preventers.

Rucker is the only major producer of all three basic ram, spherical, and rotating blowout preventers, and supplies them singly or in various types of combinations to suit a broad range of special requirements. The company's petroleum group divisions operate major facilities in Houston and in California, and manufacture special tools and equipment for deep high-pressure petroleum drilling and well production.

N.Y. Shipping Assoc. Names George Panitz Director Of Information

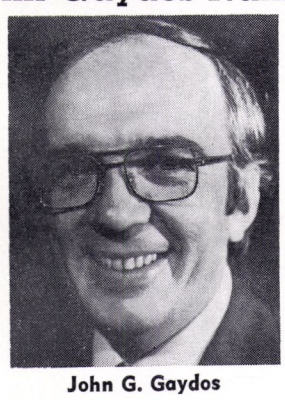
George Panitz, formerly maritime and transportation news editor of The Journal of Commerce, has been appointed director of information of the New York Shipping Association, it was announced by **James J. Dickman,** NYSA president.

In his new position, Mr. **Panitz** will handle a broad range of public and industry information relating to the shipping association's contract relations with the International Longshoremen's Association, Mr. **Dickman** said.

NYSA, the largest harbor employer group in the nation, represents more than 125 stevedores, waterfront terminal operators, ocean carriers and local harbor agents in collective bargaining with the ILA.

Mr. **Panitz** joined the maritime desk of The Journal of Commerce in 1960 and became editor in 1964. He was appointed editor of shipping and transportation in 1969, as a consequence of the growth of intermodal containerized cargo movement.

Japanese Firm Buys Lawson Products Corp. —John Gaydos Named



John G. Gaydos

Lawson Products Corporation has been purchased for an undisclosed amount by Sasakura Engineering Co., Ltd. of Osaka, Japan, it was announced by **Tetsugoro Sasakura,** president.

Located at 70 Pine Street, New York, N.Y., since 1945, the Lawson corporate offices have been moved to 14 South Avenue, Media, Pa., near Philadelphia. Manufacuring operations will remain at a Long Island, N.Y., facility. Principal products are de-oilers used by the marine industry to remove all oil from steam condensate in turbine-driven ships and for oil-water separation in various refinery and industrial plant processes.

Sasakura is an engineering and manufacturing firm conducting business operations internationally. It specializes in heat transfer, oily-water separation and seawater desalination equipment for thermal power, petroleum and chemical processing, marine and municipal water industries.

John G. Gaydos, United States engineering representative for Sasakura since 1971, has been named president of Lawson Products Corporation. He was previously associated with Baldwin-Lima-Hamilton as section head, desalination plant engineering, from 1962. His other professional experience since graduating with an M.E. degree from Case Western Reserve University in 1956 was in heat transfer engineering with the Griscom-Russell Co. of Massillon, Ohio, which was acquired by BLH in 1962.

Terrin Marseilles Names Fuji Trading Representative In Japan

Terrin Marseilles (Société provençale des ateliers Terrin), ship repairers, recently announced that they will be represented in Japan by Fuji Trading Co. Ltd., Port P.O. Box 187, Yokohama, Japan.

The company, which also has offices in Rotterdam, Kobe, Moji, Chiba and Nagoya, has obtained the cooperation of **Shojiro Iwashita,** naval architect, who will continue to act as resident adviser to the Terrin Group. Mr. **Iwashita** will also advise Fuji Trading Co. and may be contacted through that firm.

sweet performing Waukesha diesels for "Sugar Islander"

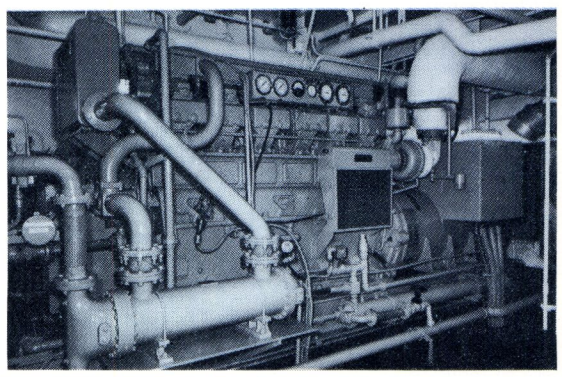
C & H Sugar's new 38,000 ton Sugar Islander relies on Waukesha diesels for all auxiliary requirements — ship's service, emergency power, and bow thruster power.

The highly automated queen of the Hawaiian sugar trade is the largest U.S. built ocean-going dry bulk cargo carrier ever put into service. More than two football fields long (641 feet) it was built by Lockheed Shipbuilding and Construction Co. and is operated by Pyramid Sugar Transport, Inc. of New Orleans.

Auxiliary ship's service includes two 500 KW gen sets powered by two F-2895 DSIM Waukesha diesels, and a third 100 KW emergency set powered by a H-1077 DM V-8 diesel. The bow thruster is powered by a L5792 DSIM V-12 diesel. This engine is capable of delivering 1400 continuous horsepower at 1200 rpm.

For complete information on Waukesha marine diesels, write for bulletin M-008 or see your Waukesha distributor.

Designer: J.J. Henry Co., Inc.



One of two 500 KW Waukesha generating sets on Sugar Islander.

WAUKESHA MOTOR COMPANY

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New Marine Systems Brochure From Waukesha Motor

A full-color 20-page illustrated brochure covering the Waukesha line of marine diesel-powered energy systems for both main propulsion and ship's service power is offered by Waukesha Motor Company. This publication is intended as a guide or reference manual in selecting power needs from Waukesha's four families of marine diesels. Power ratings cover the range 78 to 1,700 horsepower.

Briefly, the basic engine families listed are:

The VHP series, V12 and in-line 6-cylinder diesels; heavy duty big-bore units developing high torque for main propulsion applications or for electrical service power on the larger vessels.

The VC series, V16, V12 and V8 diesels; compact high-speed marine units that offer high performance in the mid-size range for both propulsion and ship's service duty.

The VS series, V8 and 6-cylinder diesels; lightweight high-speed engines offering an attractive combination of performance and economy for work boats or pleasure boats.

The VR series of 6-cylinder diesels offering proven work boat dependability.

Also covered are Waukesha Enginator®, diesel-powered generator sets in both 50-hz and 60-hz versions and power ratings up to 1,000 kw (1,200-kw emergency rating). The Waukesha marine gas turbine, developing up to 485 hp from a surprisingly small package, is also shown. All units listed are illustrated, together with many color views of modern vessels using Waukesha power. Dimensioned clearance diagrams, performance curves and tabular power ratings are given for all engines. Finally, a comprehensive table of comparative design data for naval architects and marine engineers is included. This features no less than 62 useful design factors.

Copies are available at no cost from Waukesha Motor Company, 1000 West St. Paul Avenue, Waukesha, Wis. 53186.

Captain Dunford Joins CDI Marine Company

Capt. James M. Dunford

Capt. **James M. (Jim) Dunford,** USN (ret.) has been appointed as deputy for technical operations of CDI Marine Company. His headquarters will be located at CDI's engineering offices at 9951 Atlantic Boulevard, Jacksonville, Fla. 32211, where he will also serve as facility manager.

Captain **Dunford** was graduated from the United States Naval Academy at Annapolis, Md., in 1939 and received his master of science degree from the Massachusetts Institute of Technology in 1944. His engineering assignments with the Navy included a long association with nuclear submarine and surface ship propulsion, starting with the design of the USS Nautilus. After retirement, he continued his work in nuclear plants with the New York Shipbuilding Corp., managing the nuclear work at that yard in submarine and surface nuclear powered ships. Captain **Dunford** comes to CDI directly from his most recent position as the technical director of the Naval Air Engineering Center in Philadelphia, Pa.

Kaiser Steel To Build Sedco Semisubmersible

Sedco, Inc. awarded a contract to the Kaiser Steel Corporation for construction of the Sedco 706, a semisubmersible drilling unit which is expected to be delivered in the fall of 1975 at a cost in excess of $35 million.

DOD Management Of Energy Resources Highlights Naval Engineers Meeting

Shown at the ASNE meeting, left to right: Comdr. **J.A. Siebel,** USCGR, Section Chairman; Rear Adm. **J.H. Nicholson,** USN, Deputy Chief, NavShips Logistics & Maintenance; Rear Adm. **N. Sonenshein,** USN, Director, Defense Energy Task Group, past national president ASNE, guest speaker; Rear Adm. **J. Williams,** USN, Commander, Norfolk Naval Shipyard; Rear Adm. **E.H. Thiele,** USCG (ret.), past national president ASNE; Rear Adm. **W.C. Barnes,** USN, Fleet Maintenance Officer, CINCLANTFLT; Rear Adm. **D.H. Jackson,** USN, Head, Material Readiness Div., OPNAV, national president ASNE, and Rear Adm. **J.A. Brown,** USN (ret.), former Commander, Norfolk Naval Shipyard.

An address by Rear Adm. **Nathan Sonenshein,** past president of the American Society of Naval Engineers and currently Director of the Defense Energy Task Group, highlighted this season's second regular meeting of the ASNE Tidewater Chapter.

His timely discussion of the Department of Defense's response to the energy crisis in terms of fuel conservation measures and investigations of alternate fuel sources was heard by a record turnout of members and their guests.

Admiral **Sonenshein,** in citing some of the immediate effects of the fuel shortage, said that some military buildings may do without adequate heat this winter, and many training operations will be shortened or eliminated. He pointed out that while the DOD consumes only 2.4 percent of all the energy used in America, it is particularly sensitive to petroleum shortages due to the high jet fuel demands of military aircraft.

Discussing possible oil substitutes, he said that nuclear powered planes, while technically feasible, are not practicable in the near future, and that hydrogen would appear a more likely alternate energy source for aircraft.

Concluding his remarks, he emphasized that our nation's military readiness would not be compromised by the energy crisis.

The interest shown Admiral **Sonenshein's** remarks was evidenced by a lively question and answer period following his address, and his excellent presentation will undoubtedly prove this meeting the outstanding one of the Tidewater Chapter's 1973-74 season.

Captain Paul Krinsky Named Dean USMMA At Kings Point, N.Y.

Capt. Paul L. Krinsky

Robert Blackwell, Assistant Secretary of Commerce for Maritime Affairs, has announced the appointment of Capt. **Paul L. Krinsky,** USMS, as Dean of the United States Merchant Marine Academy, Kings Point, N.Y.

Captain **Krinsky** has been serving as Acting Dean since December 1, 1972, as well as Director of Admissions and Registrar.

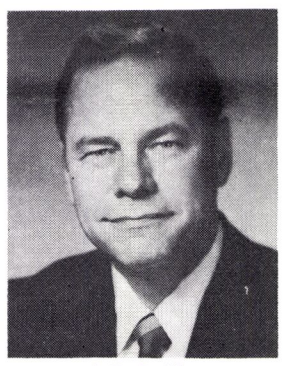
A 1950 graduate of the Academy, Captain **Krinsky** holds a master's degree in education from New York University, and has additionally completed extensive study in college administration there.

He sailed as a deck officer with the United States Lines Company after graduating from the Academy, followed by active duty with the U.S. Navy from 1955 to 1958. Captain **Krinsky** holds a chief mate's license and is also a captain in the U.S. Naval Reserve.

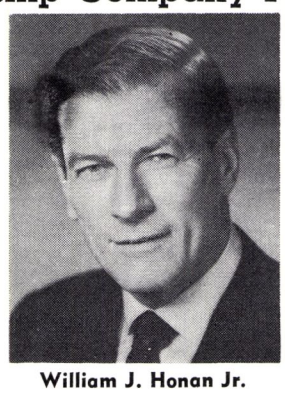
In 1958, he joined the department of nautical science at the Academy as an associate professor, teaching seamanship and navigation. During the years 1963-64, he was assigned to the N/S Savannah program, serving first as officer trainee and subsequently as second officer in the Government backup crew.

In 1965, Captain **Krinsky** was made Assistant Dean of the Academy and Director of Admissions. He remained in this position until his appointment as Acting Dean in 1972.

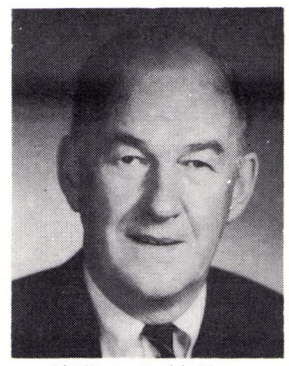
Moller Steamship Company Promotes Three



A.B. Ruhly



William J. Honan Jr.



William C. McKay

Poul Rasmussen, president of Moller Steamship Company, Inc., has announced three executive staff promotions which were effective January 1, 1974.

A.B. (Ted) Ruhly, vice president in charge of traffic, sales and operations, has been promoted to executive vice president. He is a veteran of the transportation field and joined Moller in 1972.

William J. Honan Jr., general manager of marketing and sales, has been named vice president, marketing and sales. He is well-known in the import/export trade and has been with Moller since 1946.

William C. McKay, manager, chartering, was promoted to vice president, chartering. He has many years of experience both here and abroad in the dry cargo and tanker chartering field and joined the company in 1947.

Moller Steamship Company, Inc., New York, handles the Maersk Line interests in North America as general agents for A.P. Moller, Copenhagen.

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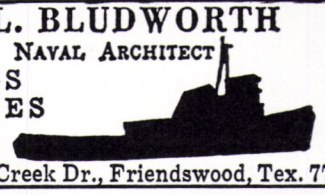
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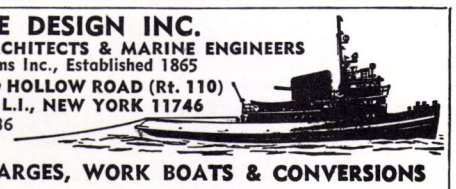
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SNAME Hampton Roads Hears Paper On Operating Experience With High Power Marine Gear

Shown attending the meeting, left to right: **C.F. Peacock,** chairman of the Hampton Roads Section; **R.L. Harrington,** papers committee; **D.B. Lewis,** president of The American Society of Quality Control, and **T.W. Steele,** author.

The Hampton Roads Section of The Society of Naval Architects and Marine Engineers met recently and heard the presentation of a technical paper titled "Operating Experience with High Power Marine Gears," by **T.W. Steele** of the General Electric Co.

In the paper, the author states that the rapid increase in ship size, power, and propeller torque in the past decade has led to the introduction of the dual torque path (locked train) gear into merchant marine service. The performance of these units has been excellent, with relatively few "teething" problems.

The continued growth in ship size and power emphasizes the need to consider the machinery and hull structure as a system rather than as discrete elements. Future trends may dictate more novel propulsion machinery arrangements.

'Weser' Shipyards Names Fritzche And Tregelles

Elmar Fritzche has been appointed to full membership of the board of management of A.G. "Weser," Bremen. Mr. **Fritzche** is in charge of the technical affairs at the Seebeckwerft (Seebeck Yard), Bremerhaven.

Geoffrey F. Tregelles has been named vice president of the Allied Products Program of "Weser" Shipyards, Inc., New York City. He will be responsible for the marketing of Seebeck's equipment, which consists of mooring systems, quick release hooks, and towing systems.

$270-MILLION CONTRACT: Pacific Lighting Marine Co., a subsidiary of Pacific Lighting Corp., Los Angeles, Calif., recently signed a contract with Sun Shipbuilding & Dry Dock Co., Chester, Pa., for two $135-million liquefied natural gas (LNG) ships. (See MARITIME REPORTER/Engineering News January 15, 1974 issue.) Toasting the agreement are, from left, **Keith McKinney,** vice president of Pacific Lighting Marine; **Joseph R. Rensch,** president of Pacific Lighting Corp.; **Paul Atkinson,** president of Sun Shipbuilding, and **Paul A. Miller,** Pacific Lighting Corp., chairman of the board. Ships will carry 130,000 cubic meters of LNG, equal to about 2¾-billion cubic feet of natural gas, from south Alaska or Indonesia. The first vessel is scheduled for completion in mid-1977.

Selective Calling System Saves Time For Oceangoing Tankers And River Vessels

A new selective calling system is helping AMOCO solve the problem of putting marine radiotelephone calls through promptly to its fleet of vessels scattered around the world. On the inland waterways, barge owners are using the same system to dial calls directly to their fleets of towboats without voice monitoring.

At present, 12 oceangoing tankers in the AMOCO fleet are equipped with Lorain Encoders and Decoders, permitting selective automatic communications. Each of the 12 tankers can be called without use of voice calling and without the use of voice monitoring, much in the same way that you would dial a telephone call. A Lorain Selective Encoder and Decoder with six-channel search is installed at Station WSY, Lorain, Ohio, which in turn is connected to the AMOCO home office by a dedicated telephone circuit.

Each vessel is assigned its own five-digit calling code. For example, the Amoco Baltimore has the code 15142. When the company wants to contact the Amoco Baltimore off the African coast, the operator sets the code 15142 on the five thumbwheel switches of the Lorain Encoder. He then selects the correct frequency for the location of the vessel on the single sideband radio and presses the "transmit" button on the Encoder. The correct five-digit code is automatically transmitted in the proper sequence to the vessel.

On the Amoco Baltimore, the Lorain Selective Decoder is constantly searching six channels for a tone sequence representing the code 15142. The first tone stops the search until the tone sequence is identified. The search, and identification of the five digits, requires approximately two seconds.

Upon identification of the correct code by the Decoder on the Amoco Baltimore, an audible two-second signal is sounded and the appropriate channel indicator pushbutton (one of six) is illuminated. This identifies the calling frequency or station. The radio operator then selects the indicated frequency on the single sideband radio and answers the call.

AMOCO is able to save valuable time on its daily position report calls and other business with its fleet. Each call is placed by merely setting up the code and pushing the transmit button.

The radio operators also save time, and the radio can be turned down without missing an incoming call. No voice monitoring is necessary since each call is signaled audibly and also visually displayed on the vessel's Call Indicator. This indication remains until canceled by the operator. Up to six calls can be stored on the "Call Indicator" until the pushbuttons cancel them.

Time can be devoted to navigation and other work, secure in the knowledge that the Lorain Decoder is doing the listening for the radio operator.

The best testimonial a user can make of a system is to make repeated purchases. AMOCO has done just that with 12 ships encoder/decoder equipped, or on order, and more to come.

How do the barge lines feel about this new communications systems? "Based on present results from our encoder/decoder system," said one company spokesman, "we estimate that savings resulting from the ease of picking up new cargo en route should help us pay for the system in a matter of months. The pilothouse remains quiet and the crew is no longer bothered by radio chatter."

Comments from the towboat captains have been favorable. The Lorain decoders have provided dependable communications in the same manner as an office telephone . . . when the signal sounds and a channel indicator light comes on, there is a call for the vessel.

In the words of one captain, "It's just like having a telephone in the pilothouse. When it rings, it's for you."

The system operates from 117 volts AC 50/60 cycles or 13.6 volts DC. Power consumption is 30 watts. Solid-state modules assure dependable performance. The overall cost of the equipment depends upon specifications.

Some of the major barge lines using the Lorain encoder/decoder system fleet-wide are the Ohio River Company, Valley Line, and Wisconsin Barge Line.

Jack Cain, executive vice president, and **Bill Taylor,** sales manager, are optimistic about the future of the new automatic dialing system. Public correspondence stations on the inland waterways also have praise for the encoder/decoder system. Offshore dredging rigs utilize the Lorain System as well.

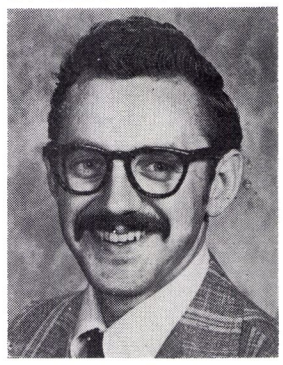
Lorain Electronics Corporation has been a leader in the marine communications field since 1928, with headquarters at 2307 Leavitt Road, Lorain, Ohio 44052.

Ocean Science & Engineering Elects Two New Directors

The board of directors of Ocean Science and Engineering, Inc. (OSE), Long Beach, Calif. 90802, has elected to its membership **Edward R. Lawler,** the company's vice president of operations, and **K.W. Warner,** OSE's corporate secretary, according to an announcement by **William H. Glennon,** president. They will fill vacancies created on the board by the resignations in December of **Thomas Kempner** and **W. Gregg Kerr.** A third seat on the board, resulting from the resignation of **John Menke,** also in December, remains vacant at the present time, Mr. **Glennon** added.

Charles F. Veselik Appointed President A.C. Hoyle Company —Fred Giachino Named VP

Charles F. Veselik



Fred M. Giachino

Albert C. Hoyle, chairman and chief executive of A.C. Hoyle Company, Iron Mountain, Mich., has announced the appointment of **Charles F. Veselik** as president.

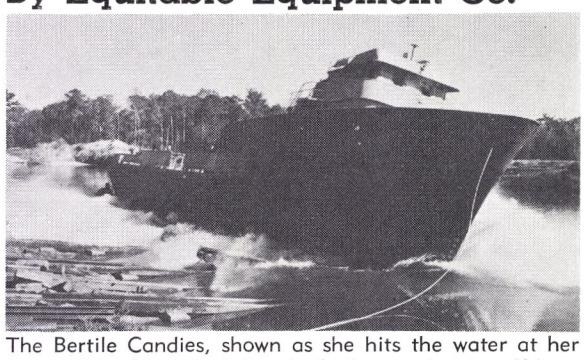
In his new position, Mr. **Veselik** will be responsible for all departments. The A.C. Hoyle Company is a major supplier of marine deck equipment, mooring systems and auxiliaries in the United States.

Mr. **Veselik** has been general manager of the A.W. Hoyle Company for the past three years, and has had 10 years of experience in the marine field.

It was also announced that **Fred M. Giachino** has been appointed vice president of sales and will coordinate all product lines, marketing and sales throughout the district offices on the East, West and Gulf Coasts.

Both Mr. **Veselik** and Mr. **Giachino** will be headquartered in the Iron Mountain offices located at 103 East "A" Street, Iron Mountain, Mich. 49801.

First Of Three Twin-Screw Supply Vessels Launched By Equitable Equipment Co.



The Bertile Candies, shown as she hits the water at her recent launching, is being built for service in offshore drilling operations.

The first of three new 175-foot twin-screw offshore supply vessels for Otto Candies, Inc. —the Bertile Candies—was recently launched by Equitable Equipment Company, Inc. at its Madisonville, La., shipyard.

Principal particulars of the vessels are: length overall, 175 feet; beam, molded, 38 feet; depth, molded amidship, 14 feet, and draft, DLWL, 10 feet 6 inches.

The vessel is designed and built to American Bureau of Shipping Class "Maltese Cross A-1 Maltese Cross AMS," and is in accordance with the current requirements of the U.S. Coast Guard.

Propulsion is supplied by two General Motors EMD-16-645E2 engines having a total continuous rating of 3,900 bhp. Reduction gears are Western Model TSR-21 marine gears. Air-conditioned quarters and electric galley to accommodate 17 men are provided. The vessel, fitted with a bow thruster unit driven by a GM-6-71 engine, is also equipped with a pneumatic bulk mud system.

When completed, the vessel will be delivered to the owners at the builder's shipyard in New Orleans.

Alyeska Pipeline Names Goodwin Operations Manager In Anchorage, Alaska

James M. Goodwin, operations staff manager for The Standard Oil Co. (Ohio), has been named operations administration manager for Alyeska Pipeline Service Company at its Anchorage, Alaska, offices.

Mr. **Goodwin,** a graduate of Louisiana Polytechnic Institute, joined Sohio in 1953. He held various positions in the company's transportation department before assuming his present post in 1965.

In his new position, Mr. **Goodwin** will be responsible for development of the Trans-Alaska Pipeline's operating organization, which will include managing personnel training programs and coordinating plans with Alyeska's owner companies.

Delta Queen Steamboat Co. Elects McLaughlin VP, Finance

James E. McLaughlin Jr., controller for The Delta Queen Steamboat Co., has been elected a corporate officer of the company and has been named to the new post of vice president, finance.

The appointment was announced by **Bill Muster,** president of The Delta Queen Steamboat Co.

Mr. **McLaughlin** joined the Delta Queen as controller early in 1973. He will retain those duties.

Mr. **McLaughlin** is a graduate of the University of Cincinnati and was associated with the Ashland Oil Co. and the Ohio River Co. prior to joining the Delta Queen.

Storehouse Of Information Readily Available From ABS Using Computerized Retrieval

The American Bureau of Shipping has placed into operation a comprehensive computerized system for information storage, correlation, and retrieval known as ABSIRS. Implemented through an in-house IBM 370/135, ABSIRS handles data concerning shipowners, shipbuilders, ship characteristics, service histories and other pertinent data relevant to merchant vessels of the world. As an international classification agency, the American Bureau of Shipping has the unique opportunity of accumulating vast stores of information on merchant vessels throughout the world. ABSIRS enhances the value of this information by providing rapid accessibility to the American Bureau of Shipping and the marine industry.

The nucleus of ABSIRS is the Master File which contains all the data in the Record of the American Bureau of Shipping. The Record is an annual publication which lists the characteristics of 32,000 vessels, including all of those classed by ABS. In addition to the Master File, ABSIRS has six satellite files. There is an On-Order File containing data on vessels either under construction or under contract to be built, and a Dead File which retains data on vessels that have ended their service life and have passed from the Master File. There is also an Owners File and a Shipbuilding and Drydock File. The former holds name and address data of owners, operators and agents of vessels listed in the Record, and the latter contains the names, locations and descriptions of shipbuilding, drydock and repair facilities worldwide. A Construction File records details related to machinery and associated components, in addition to hull construction characteristics and materials for all vessels classed by ABS since January 1973. Lastly, a Technical Notes File holds informaton on casualties which may eventually show a recurring problem and thereby prompt revisions in the Rules. Also included are damages of a significant nature.

Each file can be searched with spontaneous inquiries as an independent entity, and the information within each file can be cross-correlated with data in any other file or files.

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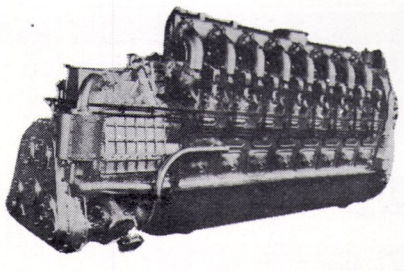

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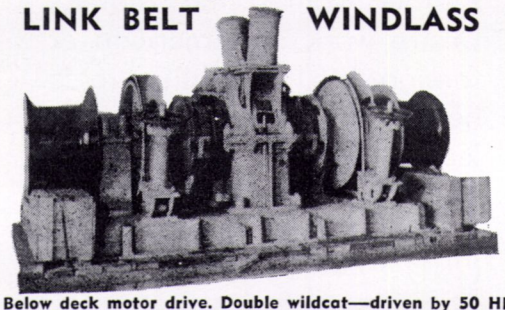

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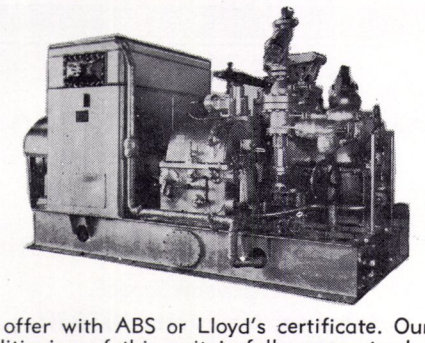

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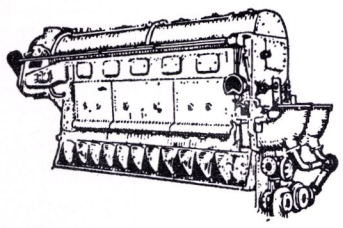

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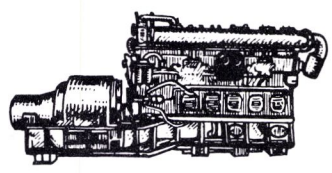

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ALLIS-CHALMERS, 440 PSI, 740°F, 300 KW, 120/240/DC.

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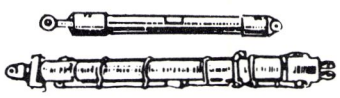

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2.5"	15"	1.12"	25½"	double
3"	8"	1.37"	15½"	double
6"	8"	4"	144"	double

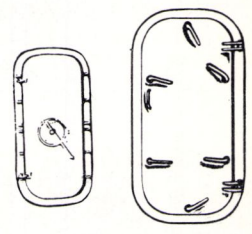
CARGO HOISTER BLOCKS

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

$44.50 ea. **$49.50 each with pull test certificates**

STEEL WATERTIGHT DOORS

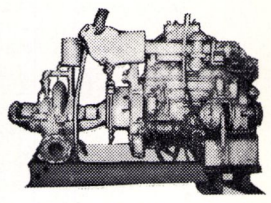
Used, Good Condition, Trimmed Frames.



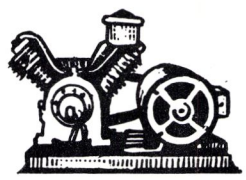
Many sizes available, priced reasonable. Some Typical Prices shown below. Please Inquire for other sizes.

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

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.



AIR COMPRESSORS

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

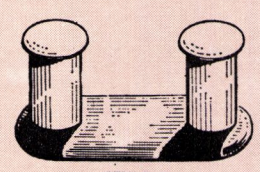
3—INGERSOLL - RAND, Size 5x5x4x4, 50 CFM, 150 PSI, with G.E. Motor, 20 HP, 440/3/60.

2—WESTINGHOUSE AIR BRAKE Steam, Size 11x11x12, approximately 60 CFM at 100 PSI.

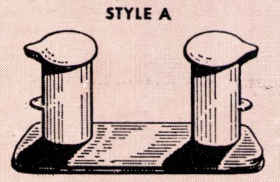
1—INGERSOLL - RAND, Model 40B, 155 CFM, 110 PSI, 870 RPM, with 40 HP Motor, 230 DC.

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

DOUBLE BITS



STYLE A



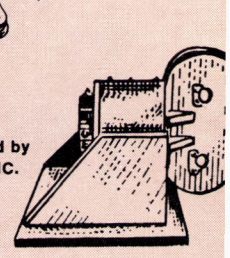
STYLE B

Used, clean, good, suitable for reuse. Predominantly 12" and 14" sizes, 2 styles, Many other sizes in stock, ranging from 6" to 18".

Specify quantity, size and style required for fast quotation.

FAIRLEADS

Designed and Manufactured by ZIDELL EXPLORATIONS INC.

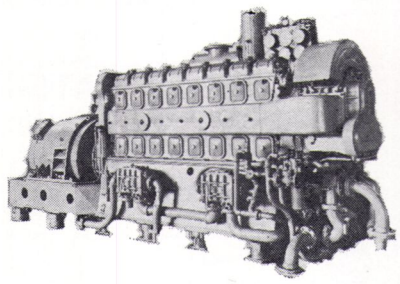


To Give You These Features: One size fairlead with universal type sheave to accommodate wire rope sizes 1" up to and including 2". Self Aligning, Swivel Type Head. Dependable and Ruggedly built to perform consistently year after year with minimum maintenance.

FOR MARINE VALVES AND FITTINGS: A/C 503, 228-8691, ASK FOR "VALVE DIVISION."

FOR ELECTRICAL EQUIPMENT: A/C 503, 228-8691, ASK FOR "ELECTRICAL DIVISION."

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



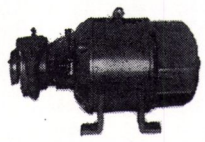
ENGINE: 8-268A—6½" bore x 7" stroke—1200 RPM—driving 200 KW Westinghouse generator—440 volts—3-phase—60 cycle—321 amps—80% power factor at 1200 RPM.

$3750

THE BOSTON METALS COMPANY

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

UNUSED ALLIS-CHALMERS
FIRE & GENERAL SERVICE PUMPS



200 GPM — 180' head — 2½"x2"—bronze—flange connections. MOTOR: 20 HP—115 volts DC—2400 RPM—153 amps.

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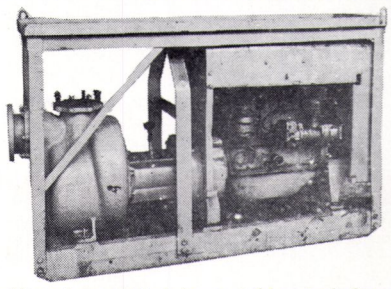
313 E. Baltimore St. Baltimore Md. 21202
539-1900 (301) 355-5050

PORTABLE 6" CARVER SALVAGE PUMPS



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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313 E. Baltimore St. Baltimore, Md. 21202
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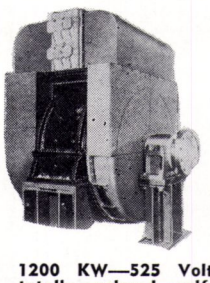
ALLIS-CHALMERS 1200 KW
D.C. GENERATORS



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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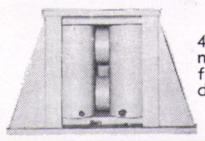
NEW UNUSED NAVY SURPLUS
UNIVERSAL FAIRLEADS



SHIPBOARD TYPE

4 Rollers—8" x 18"—2 horizontal mount—2 vertical mount. OAL of fairlead 36" wide—24" high—24" deep. 28 available.

$995 Each

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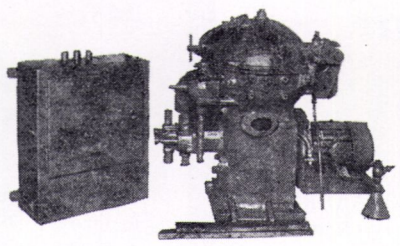
FUEL OIL OR LUBE OIL PURIFIER



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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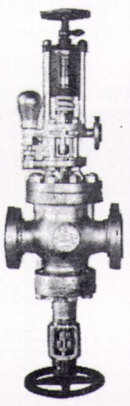

RECONDITIONED

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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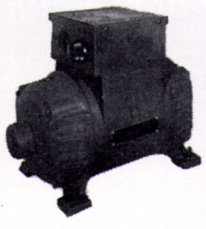
M.G. SETS

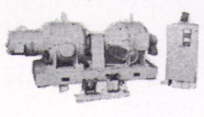


APPROX. ½ KW
110/1/60 M.G. SET
NEW—UNUSED

INPUT: 115 VDC—6.1 amps—3600 RPM. AC OUTPUT: 425 watts—4.55 amps—110/1/60. Ball bearing. 13⅞" long—7 9/16" wide—10½" high. Has radio noise supression filter. Net wt. 58 lbs—83 lbs packed for shipping.

$89.50 EACH

UNUSED—10 KW—120/1/60 M.G. SET



INPUT: Motor 25 HP — 120 VDC — 156 amps — 1800 RPM —flange-coupled to output generator.

OUTPUT: 10 KW generator — 120 volts 60 cycle single phase —108 amps — 0.80 PF — with direct-connected 125 volt 8 amp exciter. Motor starter by Cutler-Hammer. AC generator has voltmeter and ammeter. Bassler voltage regulator.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
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1200KW - 525 Volt DC - 2290 Amp
750 R.P.M.
G.M. DIESEL
GENERATOR SETS

ENGINE: G.M. 16-278A — 16 cylinder — 1700 B.H.P. VEE-type — 8¾x10½" — 2 cycle — 750 RPM. GENERATOR: Allis-Chalmers—1200 KW—525 volts DC—2290 amps—totally enclosed—self-ventilated, with surface air coolers. Separately excited from 120 volt source. Continuous duty—frog-leg winding—Class B insulation. Ambient temperature 40°C—temperature rise on commutator 75°C; on winding 70°C. Manufacturers type MHC—10-pole. EXCITATION SETS: 30 HP—440/3/60—driving two 8½ KW 120 volt DC generators.

20 UNITS IN STOCK
& IMMEDIATELY AVAILABLE

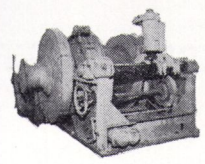
PRICED TO SELL

Will sell generators or engines separately

THE BOSTON METALS COMPANY

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

100,000 lb. Almon Johnson Series 232
Constant Tension Mooring Winches



5 Available. In very good condition. Series 232 mooring & anchoring winches—automatic self-tensioning. Wide range from 100,000 lb line pull at 10 FPM to 26,000 lbs at 400 FPM. Gypsy line pull 12,000 lbs at 125 FPM. Drum declutchable through spiral jaw clutch for free spooling. Driven by 50 HP—230 VDC motors—Westinghouse CK—575 RPM—½ hour—75°C rise—stab. shunt—181 amps—max. RPM 1900. Cutler-Hammer brake—18"—type NM. Complete with magnetic control panel, resistor banks & remote control pedestal—mounted master switch. **Can spool up to 2000' 1¼" wire.**

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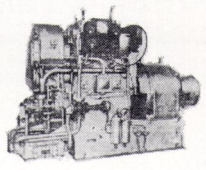

G.M. 3-268A
100 KW A.C. Diesel
GENERATOR SET

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**

THE BOSTON METALS COMPANY

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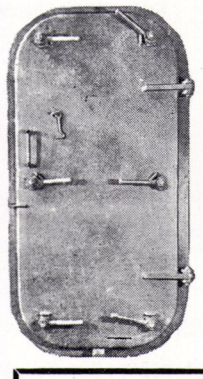
NEW WATERTIGHT DOORS



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

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

EACH DOOR

IMMEDIATE DELIVERY

THE BOSTON METALS COMPANY

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

BUYERS DIRECTORY

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

ANCHORS AND ANCHOR CHAINS
Lockstad Co., Inc., 179 West 5th Street, Bayonne, N.J. 07002

AUTOMATIC DRAFTING SYSTEMS
Gerber Scientific Instruments Co., P.O. Box 305, Hartford, Conn. 06101

BEARINGS
BJ Marine Bearings, a Borg-Warner Industry, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

BERTH FACILITIES
Pouch Terminal Inc., Edgewater Street, Staten Island, N.Y. 10305

BOILERS
Babcock & Wilcox Co., 161 E. 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095

BOW THRUSTERS
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171

BUNKERING SERVICE
Gulf Oil Trading Co., 1290 Ave. of the Americas, N.Y., N.Y. 10019
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
The West Indies Oil Co., Ltd., St. John's Antigua, W. I.

CARGO HANDLING EQUIPMENT
MacGregor International Organization, 49 Gray's Inn Road, London W.C.I., England

CLUTCHES, GEARS & BRAKES
Wichita Clutch Co., Inc., Wichita Falls, Texas 76307

COATINGS—Protective
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144
The Farboil Company, 8200 Fischer Road, Baltimore, Md. 21222
International Paint Co., Inc., 21 West Street, New York, N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Philadelphia Resins Corp., 20 Commerce Dr., Montgomery, Pa. 18936

CONTAINERS—CONTAINER HANDLING SYSTEMS
Ameron Corrosion Control Div., Brea, Calif. 92621
Lighter Aboard Ship, Inc., 225 Baronne St., New Oreans, La. 70112
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
RPC Division, Midland-Ross Corp., P.O. Box 490, Roxboro, N.C. 27573

CONTAINER LASHINGS & COMPONENTS
American Engineered Products, P.O. Box 74 Nichol Ave., McKees Rock, Pa. 15136
Washington Chain & Supply Co., P.O. Box 3645, Seattle, Wash. 98124

CONTROL SYSTEMS
Frederick Cowan & Co., Inc., 120 Terminal Drive, Plainview, L.I. New York 11803
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
WABCO Fluid Power Division, 1953 Mercer Road, Lexington, Kentucky 40505

CORROSION CONTROL
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144

CRANES—HOISTS—DERRICKS—WHIRLEYS
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Houston Systems Mfg. Co., P.O. Box 14551, Houston, Texas 77021
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

CRANE LOAD INDICATORS
W.C. Dillon & Co., 14620 Keswick St., Van Nuys, Calif. 91407
Trans-Sonics, Inc., P.O. Box 326, Lexington, Mass. 02173

DECK COVERING
Randustrial Corp., 13311 Mar Union Ave., Cleveland, Ohio 44120

DECK COVERS (METAL)
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

DECK MACHINERY
Appleton Machine Co., P.O. Box 2265, Iron Mountain, Mich. 49801.
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
A G. Weser, Seebeckwerft, 2850 Bremerhaven 1, Germany

DIESEL ENGINES
Bruce GM Diesel, Inc., 180 Route #17 S. at Interstate 80, Lodi, N.J. 07644
Caterpillar Tractor Co., Industrial Div., 100 N.E. Adams St., Peoria, Ill. 61602
Colt Industries Inc., Power Systems Div., Beloit, Wisc. 53511
De Laval Turbine Inc., Engine & Compressor Div., 550 85th Ave., Oakland, Calif. 94621
Electro-Motive Division General Motors, La Grange, Illinois 60525
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany.
H.O. Penn Machinery Co., Inc., 1561 Stewart Ave., Westbury, N.Y. 11590
Waukesha Motor Co., 1000 W. St. Paul Ave., Waukesha, Wis. 53186

DIESEL ENGINE MUFFLERS
Marine Products & Engrg. Co., 20 Vesey St., New York, N.Y. 10007

DOCK BUILDERS
GHH Sterkrade Ferrostaal Overseas Corp., 17 Battery Place, New York, N.Y. 10004

DOORS—Watertight—Bulkhead
Overbeke-Kain Co., 20905 Aurora Rd., Cleveland, Ohio 44146
Walz & Krenzer, Inc., 20 Vesey St., New York, N.Y. 10007

ELECTRICAL EQUIPMENT
AMP Special Industries, P.O. Box 1776, Paoli, Pa. 19301
Arnessen Electric Co., Inc., 335 Bond St., Brooklyn, N.Y.
Brown and Ross of New Jersey Incorporated, 370 Paterson Plank Road, Carlstadt, N.J. 07072
Galbraith-Pilot Marine Corp., 166 National Rd., Edison, N.J. 08817
Harvard Murlin Div., P.O. Box 302, Quakertown, Pa. 18951
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

EVAPORATORS
Bethlehem Steel Corp., Shipbuilding, 25 B'way, N.Y., N.Y. 10004
Riley-Beaird, Inc., Maxim Evaporator Profit Center, P.O. Box 1115, Shreveport, Louisiana 71130

FAIRLEADS
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Crosby Group, Box 3128, Tulsa, Okla. 74101

FENDERING SYSTEMS—Dock & Vessel
BJ Marine Products, subsidiary of Borg-Warner, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004

FITTINGS & HARDWARE
AMP Special Industries, P.O. Box 1776, Paoli, Pa. 19301
Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

GANGWAYS
Rampmaster Inc., 1226 N.W. 23rd Ave., Fort Lauderdale, Fla. 33311

GAS ALARM SYSTEMS
Lisnave, P.O. Box 2138, Lisboa 3, Portugal

HATCH COVERS
MacGregor-Comarain, Inc., 135 Dermody St., Cranford, Md. 07016

HEATERS & COOLERS
Way-Wolff Associates, Inc., 45-10 Vernon Blvd., Long Island City, N.Y. 11101

HULL CLEANING
Butterworth Systems, Inc., P.O. Box 9, Bayonne, N.J. 07002

HULL INSPECTION SYSTEMS
Hydro Products (A Dillingham Co.), P.O. Box 2528, San Diego, Calif. 92112

INSULATION—Marine
Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

LIGHTS—Emergency, Search & Navigation
Phoenix Products Co., Inc., 4721 North St., Milwaukee, Wisconsin 53209
Snelson Oilfield Lighting Co., P.O. Box 1284, Fort Worth, Texas 76101

LNG SHIP DESIGN AND LICENSING
PDM/GAZ Transport, 919 Third Ave., New York, N.Y. 10022

LNG TANKAGE
Gazocean U.S.A. Inc., 125 High St., Boston, Mass. 02110
LGA—Liquid Gas Anlagen Union GmbH, c/o Ferrostaal Overseas Corp., 17 Battery Place, New York, N.Y. 10004
Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa. 15225

LININGS
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144

MARINE BLOCKS & RIGGING
Crosby Group, Box 3128, Tulsa, Okla. 74101

MARINE DRIVES—GEARS
Hoffert-Lowe, Inc., 108 Ridge Road, North Arlington, N.J. 07032
Philadelphia Gear Corp., Schuylkill Expressway, King of Prussia, Pa. 19406

MARINE EQUIPMENT
Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
Homelite Corporation, 70 Riverdale Ave., Port Chester, N.Y. 10573
ITT Henze Service, P.O. Box 1745, Mobile, Ala. 36610
Kearfott Marine Products, 780 South 3rd Ave., Mt. Vernon, N.Y. 10550
Nicolai Joffe Corp., P.O. Box 2445, 445 Littlefield Ave., So. San Francisco, Calif. 94080
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

MARINE FURNITURE
Bailey Joiner Co., 115 King Street, Brooklyn, N.Y. 11231

MARINE INSURANCE
Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Midland Insurance Co., One State St. Plaza, New York, N.Y. 10004
R.B. Jones Corp., 301 West 11th St., Kansas City, Mo. 64105
UK P&I Club (Bermuda): Thos. R. Miller & Son, Mercury House, Front St., Hamilton, Bermuda (P.O. Box 665)

MARINE PROPULSION
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095
Delaval Turbine Inc., Turbine Div., Trenton, N.J. 08602
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Ark. 72204
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171
Port Electric Turbine Div., 155-157 Perry St., New York, N.Y. 10014
Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Turbo Power & Marine Systems, Subsidiary of United Aircraft Corp., 1690 New Britain Ave., Farmington, Conn. 06032

MARINE SURVEYORS
McClain Marine Service, 2 Hazel Place, Hazlet, N.J. 07730
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Fla. 33316

MARITIME FINANCING—Leasing
A.B. Becker & Co., 2 First National Plaza, Chicago, Ill. 60670
General Electric Credit Corp., 4 Corporate Drive, White Plains, N.Y. 10604
Qualpeco Services, Inc., 750 Third Ave., New York, N.Y. 10017
Rhode Island Hospital Trust National Bank, 15 Westminster Street, Providence, R.I. 02903

NAVAL ARCHITECTS AND MARINE ENGINEERS
American Standards Testing Bureau, Inc., 40 Water Street, New York, N.Y. 10004
Amirikian Engineering Co., 1401 Wilson Blvd., Arlington, Va. 22209
J. L. Bludworth, 4030 Wynne St., Houston, Texas
Breit Engrg. Inc., 441 Gravier St., New Orleans, La. 70130
James G. Bronson Associates, 166 Altamont Ave., Tarrytown, N.Y. 10591
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
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. Ilariucci & 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
S.L. Petchul, Inc., 8-D So. New River Drive East, Ft. Lauderdale, Fla. 33301
Potter & McArthur, Inc., 253 Northern Ave., Boston, Mass.
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 657 Mission St., San Francisco, Calif.
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
Southern Engineering Associates, P.O. Box 748, Ocean Springs, Miss. 39564
T. W. Spaetgens, 156 West 8th Ave., Vancouver 10, Canada
R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler, 50 Court St., Brooklyn, N.Y. 11201
H. M. Tiedemann & Co., Inc., 74 Trinity Pl., New York, N.Y. 10006
Trident Studio, Box 670, Spring House, Pa. 19477
Whitman, Requardt & Associates, 1304 St. Paul St., Baltimore, Md. 21202
Yankee Shipwrights, P.O. Box 35251, Minneapolis, Minn. 55435

NAVIGATION & COMMUNICATIONS EQUIPMENT
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

OILS—Marine—Additives
Exxon Company, U.S.A., P.O. Box 2180, Houston, Texas 77001
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

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

PROPELLERS: NEW AND RECONDITIONED
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
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

PUMPS
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City, Kansas 66110
Delaval Turbine Inc., IMO Pump Division, P.O. Box 321, Trenton, N.J. 08602
Houttuin-Pompen N. V. Sophialaan 4, Utrecht, Holland
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Arkansas 72204

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

REGENERATORS—Fuel Savings
Harrison Radiator Division, General Motors Corp., 200 Upper Mt. Road, Lockport, New York 14094

ROPE—Manila—Nylon—Hawsers—Wire
American Mfg. Co., Inc., Noble & West Sts., Brooklyn, N.Y. 11222
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

SCAFFOLDING EQUIPMENT
Patent Scaffolding Co., 2125 Center Ave., Fort Lee, N.J. 07024
Western Gear Corp./Sky Climber Inc., 17311 S. Main St., Gardena, Calif. 90248

SEALS
Syntron Co., Parts & Material Handling Div., FMC Corp., Homer City, Pa. 15748

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

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

SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
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
Carrington Slipways Pty. Ltd., Tomago, N.S.W. 2322, Australia
C.M.R. (Compagnie Marseillaise de Reparations), 274 Chemin du Littoral, 13 Marseille (15E) France
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock, Inc., P.O. Box 153, Willemstad, Curacao, N.A.
Dillingham Shipyard, Pier 41, P.O. Box 3288, Honolulu, Hawaii 96801
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
Empresa Nacional Bazon, 65 Castellana, Madrid 1, Spain
Equipment Systems, Inc., A Microdot Co., P.O. Box 95, Port Deposit, Md. 21904
Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122
General Dynamics, Electric Boat Division, 99M Eastern Point Road, Groton, Conn. 06340
General Dynamics, Quincy Division, Quincy, Mass. 02169
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
Havre de Grace, Havre de Grace, Md.
Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
Hongkong United Dockyards Ltd., Kowloon Docks, Hong Kong
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Dockyard Co., 8 Kaigon-dori, Ikuta-ku, Kobe, Japan
Kelso Marine, Inc., P.O. Box 268, Galveston, Texas 77550
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
Marathon Manufacturing Company
Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002
Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520
Marathon LeTourneau Marine Division, LeTourneau Rural Station, Vicksburg, Mississippi 39180
Marathon LeTourneau Offshore Pte., Ltd., P.O. Box 83, Taman Jurong Post Office, Singapore 22, Singapore
Marathon Shipbuilding Company, P.O. Box 870, Vicksburg, Miss. 39180
Marathon Shipbuilding Company (U.K.) Ltd., Clydebank Bunbartonshire, G81-1YB, Scotland
Marine & Rail Equipment Division/FMC Corp., 4700 N.W. Front Ave., Portland, Oregon 97208
Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047
Mercantile Marine Engineering & Graving Docks Co., N.V., Antwerp, Belgium
Mitsui Shipbuilding & Engrg. Co. Ltd., 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newport Ship Yard, Inc., 379 Thames St., Newport, R.I. 02840.
Northwest Marine Iron Works., P.O. Box 3109, Swan Island, Portland, Oregon 97208
Odense Steel Shipyard Ltd., P.O. Box 176, DK-5100 Odense, Denmark
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
St. Louis Shipbuilding—Federal Barge, Inc., 611 East Marceau, St. Louis, Mo. 63111
Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Savannah Machine & Shipyard Co., P.O. Box 787, Savannah, Ga. 31402
Sembawang Shipyard (Pte) Ltd., P.O. Box 3, Sembawang, P.O. Singapore, 27
Service Machine & Shipbuilding Corp., Box 1578, Morgan City, La. 70380
Slocum Iron Works, Inc., P.O. Box 2506, 1752 Telegraph Road, Mobile, Ala. 36601
Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Tracor/Mas, Inc., P.O. Box 13107, Port Everglades, Fla. 33316
Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087
Vancouver Shipyards Co., Ltd., 50 Pemberton Ave., North Vancouver, B. C., Canada

SHIP MODEL BASIN
Hydronautics, Incorporated, Laurel, Maryland 20810

SHIP STABILIZERS
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
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STEAM GENERATING EQUIPMENT
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095

STEERING SYSTEMS
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James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
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Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y. 11214

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Hubeva Marine Plastics-Lining, 435 Hamilton Ave., Brooklyn, N.Y. 11231
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

WEATHER ROUTING
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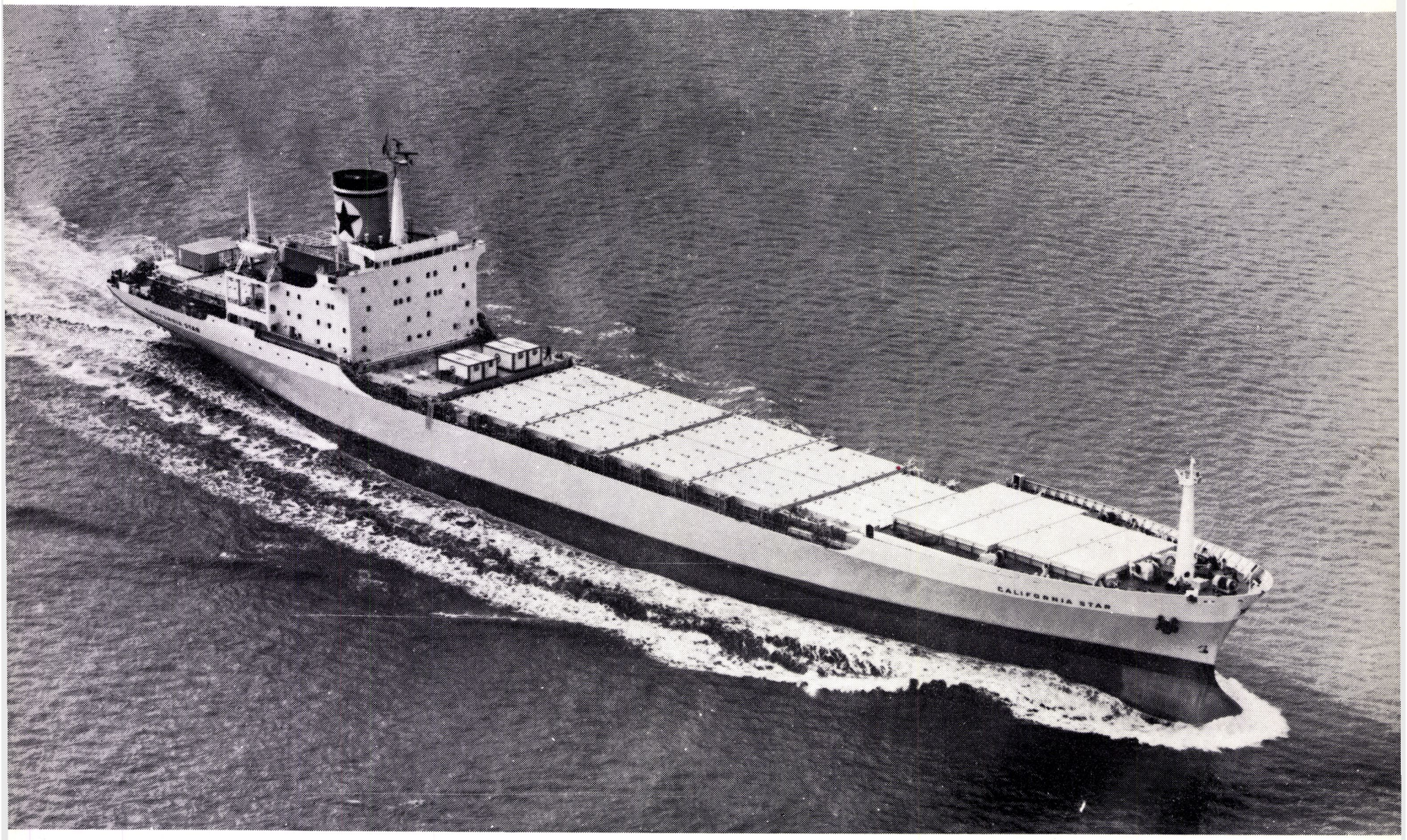

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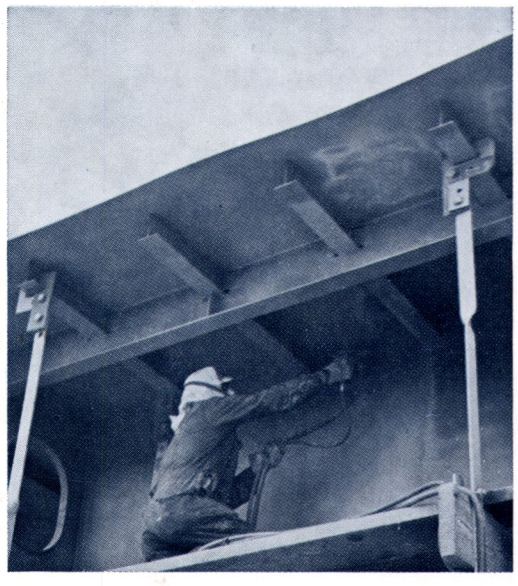

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