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First Of New Breed Of Tankers Launched At FMC Corporation's Shipyard In Portland, Oregon

(SEE PAGE 6)

MAY 15, 1974

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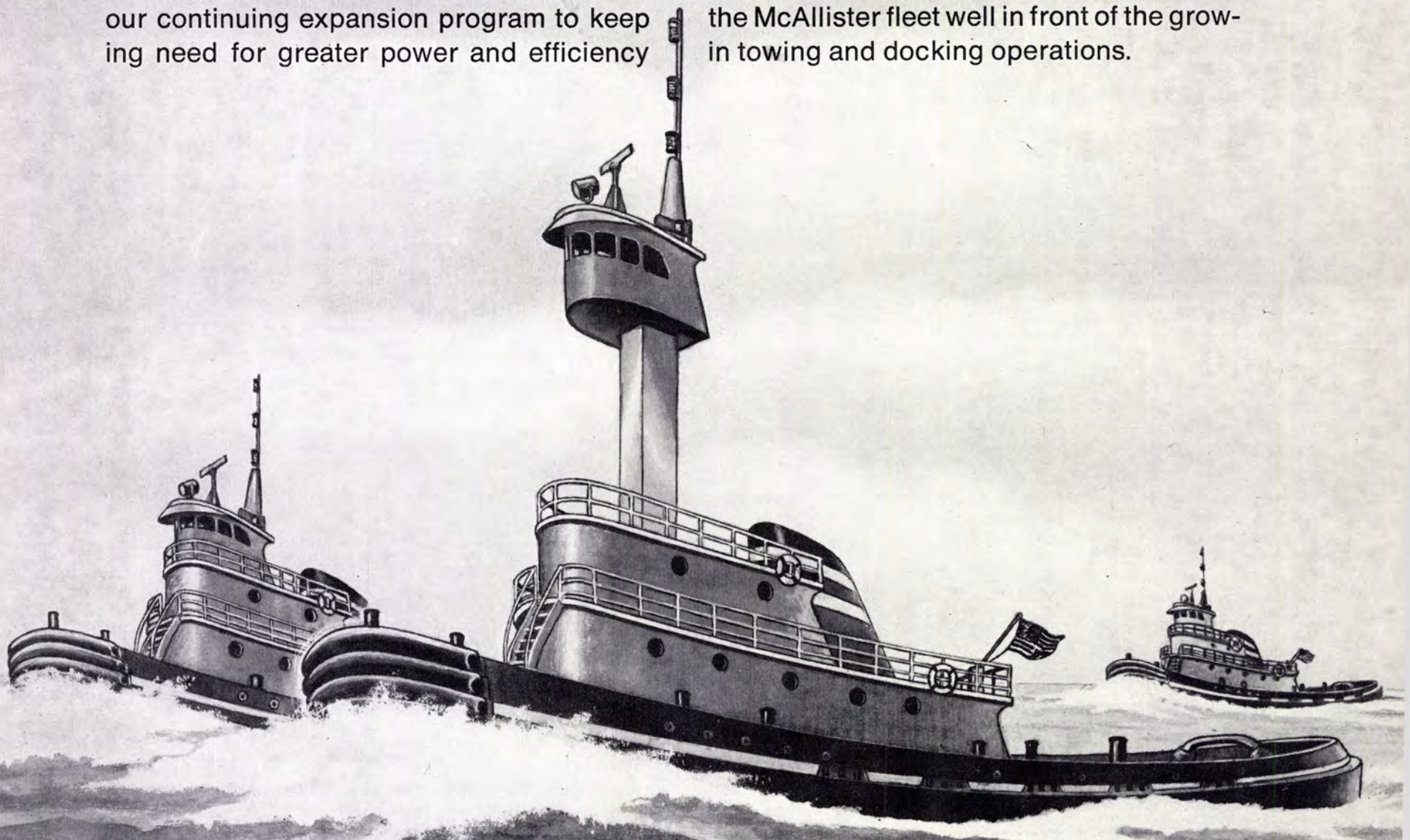

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Boland Awarded $22.4 Million For DLG Conversion

The Fiscal Year '74 Defense Department Appropriations Bill provided $124.5 million for the conversion of two DLGs, including the cost of Government-furnished items for both vessels.

Boland Marine and Manufacturing Company, 1000 Tchoupitoulas Street, New Orleans, La., has received a $22.4-million negotiated contract from the Naval Ship Systems Command for the conversion of one guided missile frigate, the USS King (DLG-10).

Raymond To Construct Navigation Station In Monrovia, Liberia

Raymond International Inc., Houston, Texas, was awarded a $5.6-million contract to construct an Omega Navigation Station in Monrovia, the Republic of Liberia, for the U.S. Navy. The construction is under the administration of the Naval Facilities Engineering Command Chesapeake Division.

The contract includes the erection of a 1,400-foot-high steel antenna, a remote monitor link consisting of a very high frequency (VHF) transmitter/receiver and small antenna, paving, earthwork, and construction of two buildings to house a transmitter and a helix.

A work force of approximately 500 Liberian nationals and 15 U.S. supervisors and specialists will be employed on the project, which is scheduled to be completed in July 1975.

Dearborn-Storm Corp. Stockholders Approve Change Of Name

Dearborn - Storm Corporation, 9545 Katy Freeway, Houston, Texas 77024, has announced that at a meeting of stockholders held in Houston, the stockholders approved a change of the corporate name to Storm Drilling & Marine, Inc. The new trading symbol will be SDC for common shares and SDCA for bonds.

Following the meeting of stockholders, the board of directors authorized an increase in the quarterly cash dividend rate from 6¼ cents per share to 8 cents per share. The increased cash dividend will begin with the quarterly dividend to be paid in July 1974.

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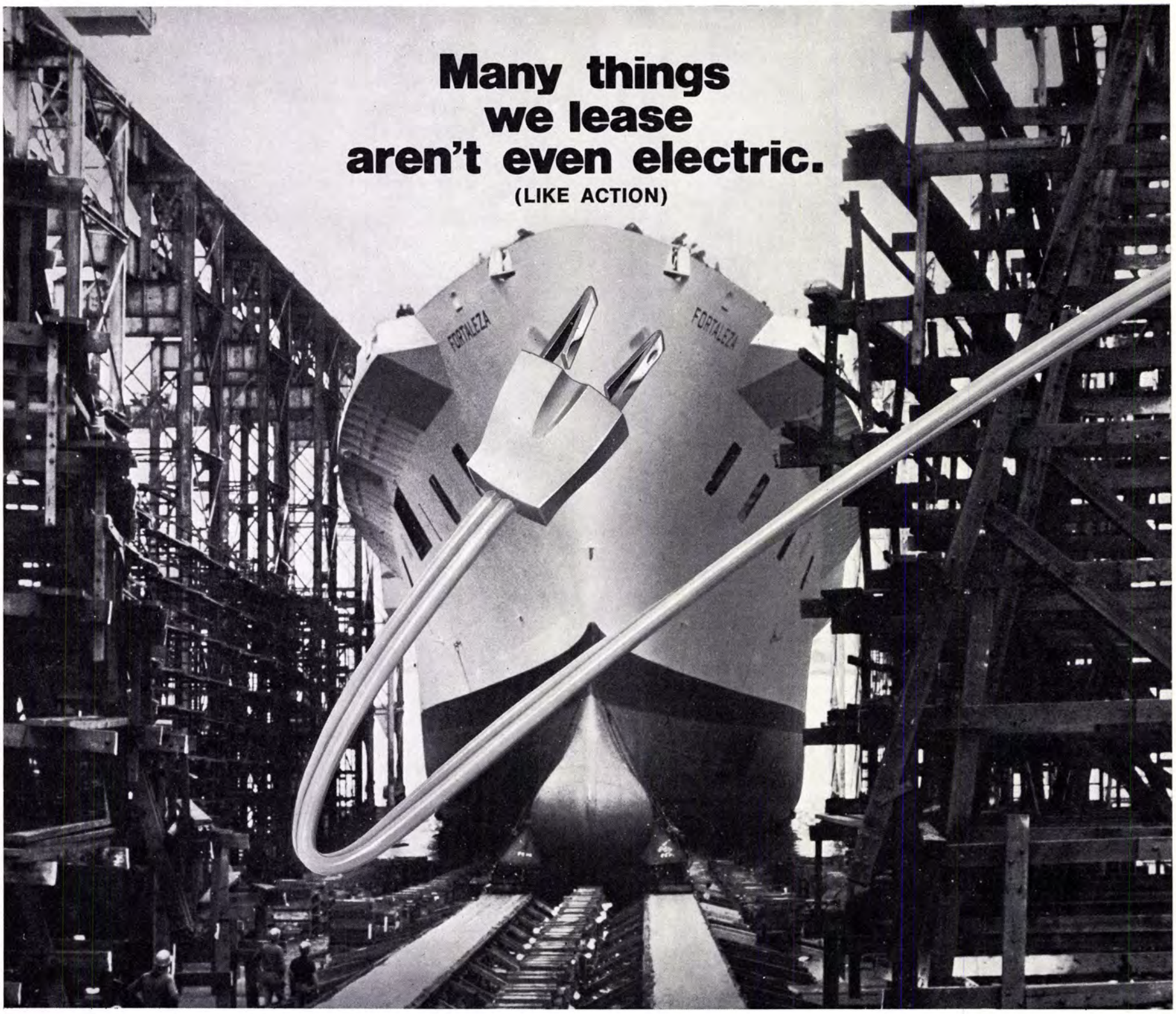

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FMC Marine And Rail Equipment Division Launches Largest Ship Ever Built In Portland

Among the innovative design concepts in the six new tankers will be the first application of an industrial gas turbine-electric power system on a merchant vessel in the United States.

The largest ship ever built in Portland, Ore., and the first since World War II, was recently launched at FMC Corporation's Marine and Rail Equipment Division. The 35,000-dwt vessel made a spectacular splash as it slipped down FMC's side-launch ways into the Willamette River.

Chevron Shipping Company, a wholly owned subsidiary of Standard Oil Company of California, will be the operators of the vessel, the first of six being built at FMC's yard. This fall, after the ship is outfitted at Swan Island, it will be christened at a formal ceremony and turned over to the owners.

New design concepts, developed by Chevron Shipping Company and the FMC division (formerly Gunderson, Inc.) have been incorporated into the vessel.

The hull design and gas turbine-electric drive combine to produce a safe, economical, environmentally sound tanker. This is the first application of an industrial gas turbine-electric power system on a merchant marine vessel in the United States.

FMC developed both hull and propulsion system details in consultation with Chevron Shipping Company, Nickum & Spaulding Associates, Inc.—the naval architects—and General Electric—the propulsion system manufacturers. The innovative design concepts, which are embodied in these vessels, are creating considerable interest in maritime circles around the world.

Utilizing modern construction methods, FMC fabricates steel modules weighing up to 200 tons each and sets them in place with a giant crane. To facilitate construction, modular living quarters, complete with carpets and drapes, will be installed in the steel deckhouse. The pilothouse will be equipped with the sophisticated navigational equipment to satisfy today's navigation requirements.

The hull on each tanker is 650 feet in length, with a molded breadth of 96 feet and a molded depth at the side of 50 feet. The operational draft is 34 feet. Ship cargo will be divided into a tank layout in accordance with latest requirements of IMCO, the international maritime agency of the United Nations.

To handle expanded shipbuilding work, FMC acquired an additional 23 acres adjacent to its existing facility in Northwest Portland, and also invested in a $1-million, 200-ton-capacity whirley crane and new types of welding equipment, including a computer-operated burning machine for cutting metal plates.

Hull construction on the second tanker (GTT-2) began immediately. Launch date is expected early next year.

DESCRIPTION

Length Overall	650'-0" (625' bp)
Breadth Molded	96'-0"
Depth Molded at Side	50'-0"
Design Loaded Draft	34'-0"
Cargo Oil Capacity	267,000 barrels
Horsepower	12,500 SHP Max.
Speed (approximate)	15 knots
Cruising Range	8,000 sea miles

Navy Budget Request For 69 Service Craft Calls For $41.6 Million

The Navy FY '75 Shipbuilding and Conversion budget request for service craft includes 26 Ship Waste Offloading Barges (SWOB), $10.4 million; one Medium Auxiliary Repair Drydock (Floating) (ARDM), $19.8 million; four Fuel Oil Barges (YON), $2.2 million; 11 Landing Craft, Mechanized (LCM-6), $0.9 million; two Patrol Craft Fast (PCF), $0.6 million; seven Armored Troop Carriers (ATC), $4.0 million; 12 River Patrol Boats (PBR), $1.4 million; three Landing Craft, Personnel, Large (LCPL), $0.4 million; three Monitors, $1.9 million, for a total of 69 items at a total cost of $41.6 million. The floating drydock (ARDM) would be capable of lifting long-hull SSN-637 Sturgeon Class and SSN-688 Los Angeles-Class submarines.

Institute Of Gas Technology Sponsors LNG Fundamentals Course Set For July 8-19

A course entitled "LNG Fundamentals" will be conducted in Chicago July 8-19, 1974, at the Crawford Auditorium, Engineering 1 Building, northwest corner, State and 32nd Streets. The course is being sponsored by the Institute of Gas Technology, 3424 South State Street, Chicago, Ill. 60616.

Recent international developments have highlighted the importance of liquefied natural gas in meeting our essential energy requirements. The purpose of "LNG Fundamentals" is to provide a foundation in LNG technology and equipment and to give a perspective of LNG in the total picture of international supply and demand for natural gas.

This course has been designed for engineers whose responsibilities require them to understand both engineering fundamentals and the current technology of LNG production, storage, transport, and applications. For those whose knowledge of LNG technology is limited, this course will give a comprehensive introduction to the field. For those who have worked with LNG, the course will give an opportunity to both broaden their knowledge and exchange information with other experienced men.

The class will meet five days a week from 8:30 to 4:30 p.m. Presentation techniques will include lectures, problem sessions, group discussion, and films. Those attending should plan to spend approximately two hours a day on reading and problem assignments outside of class.

Subjects to be covered during presentation of the course are: "History and Development of LNG"; "Process Thermodynamics"; "Liquefaction Cycles—classical cascade, expander, mixed refrigerant cascade"; "Feed Gas Preparation—removal of H_2S, CO_2, H_2O, and heavier hydrocarbons"; "LNG Process Equipment—compressors, heat exchangers, pumps, materials of construction"; "Safety in LNG Operations—hazards to personnel and equipment, LNG fires, safety codes and procedures"; "LNG Storage—steel tanks, concrete tanks, cryogenic inground storage"; "LNG Transport—ocean vessels, barges, pipelines, rail and road tank cars"; "Uses of LNG—peak shaving, base load. satellite facilities, other uses"; "Estimating Costs of LNG Projects—cost components in LNG projects"; "Supply and Demand for Energy in the U.S."; "LNG Requirements of Other Countries"; "Synthetic Gas Alternatives to LNG"; and "Sources of LNG for the World Markets."

The course will feature lecturers from companies that manufacture equipment or operate LNG facilities. The faculty will include:

Philip J. Anderson, manager, energy transport and storage, IGT. Mr. **Anderson** has extensive experience related to LNG, including studies of the behavior of soil around buried LNG storage vessels, the physical properties and thermal stresses of mined caverns, design of mined caverns for LNG storage, and safety in LNG operations.

William W. Bodle, director, management science, IGT. Thirty years of process design experience form the basis for Mr. **Bodle's** contribution to this course. His experience includes design of liquefaction, storage and vaporization equipment for three existing LNG facilities.

Richard F. Bukacek, former director of education, IGT; now associate planning engineer with Natural Gas Pipeline Co. of America. Dr. **Bukacek** has been involved in measurement and correlation of the properties of cryogenic fluids, and simulation of liquefaction processes.

Aman R. Kahn, senior advisor, IGT and vice president of Gas Developments Corporation. Mr. **Khan** was previously responsible for IGT's research activities in the area of gas transmission, storage and distribution. He has been closely associated with IGT's research on the storage and economics of LNG.

Stuart Leipziger, adjunct associate professor, department of gas engineering, IIT. Dr. **Leipziger** teaches thermodynamics, transport phenomena and applied mathematics, and directs graduate research in fluidization, mass transfer processes, and the measurement and prediction of thermodynamic properties of mixtures of natural gas components at cryogenic conditions.

Henry R. Linden, executive vice president and director, IGT. Dr. **Linden** is internationally known for his research in gasification and related processes. He is widely recognized for his contribution to and understanding of the national and world energy supply situation.

Wendell W. Waterman, acting director of education, IGT. Dr. **Waterman** has long experience in the process design and petroleum refining, petrochemical and natural gas processing plants. His work included design of systems to liquefy natural gas, reject nitrogen by low temperature fractionation, separate higher hydrocarbons, and revaporize the residual gas.

The cost of the two-week session is $400 for IGT members, and $475 for nonmembers. These costs cover tuition, fees, and books, but do not cover accommodation and living expenses. Each applicant accepted will be sent an invoice, the payment of which completes the enrollment.

Address all correspondence to: LNG Fundamentals, Institute of Gas Technology, 3424 South State Street, Chicago, Ill. 60616.

Norfolk Shipbuilding Elects Jory And Tyler To Board

William H. Jory

J. Hogge Tyler III

William H. Jory, retired shipyard executive, and **J. Hogge Tyler III**, retired banker, have been elected to the board of directors of Norfolk Shipbuilding & Drydock Corp.

They join chairman **John L. Roper II, John L. Roper III, George W. Roper II,** and **M.N. Lawrence** as board members. Mr. **Lawrence** retired as an officer of the corporation a few years ago.

Mr. **Jory** was a senior vice president and member of the board of Maryland Shipbuilding & Drydock Co., when he resigned in 1962 to become president, director, and chairman of the executive committee of the American Ship Building Company in Cleveland, Ohio. He retired from that post in 1968, and has since made his home on Gibson Island, Md.

Mr. **Tyler,** a Tidewater, Va., native, retired in 1972 as chairman of the board of United Virginia Bank/Seaboard National. He lives in Virginia Beach.

Norfolk Ship chairman **Roper** said the collective knowledge and sound business judgment and experience of Mr. **Jory** and Mr. **Tyler** will truly be a great asset to Norfolk Ship.

Clareden Inc. To Direct Sales For The Port Of Galveston From Offices In Kansas City

The Port of Galveston, Texas, has opened sales offices in Kansas City, center of one of the major trading areas of the United States, served by 12 major railroads and 165 truck lines.

The transportation consulting firm of Clareden Inc., headed by **Denton R. Johnston,** will direct Galveston sales efforts in Kansas City. Offices are located at 9419 East 63rd Street, Kansas City, Mo.

Letter Of Intent To Dravo To Build Largest Man-Made Structure Ever Placed In Ocean

The Public Service Electric and Gas Company, New Jersey, has issued a letter of intent to award a contract for construction of the breakwater for its proposed offshore floating nuclear power plant to the Dravo Corporation of Pittsburgh, Pa. The American Dredging Company and the Gates Construction Corporation of Little Ferry, N.J., will be associated in the project, whose cost will be more than $200 million. The breakwater will be the largest man-made structure ever placed in the ocean and will be located 2.8 miles in the Atlantic Ocean about 12 miles northeast of Atlantic City.

Nine 700-Ft. Ore Carriers Of NBC Fleet Converted To Automated Firing While At Sea

The 700-foot ore carrier S/S Ore-Jupiter, shown above, owned by National Bulk Carriers, Inc., is one of nine ships of this fleet recently retrofitted with automated burner controls designed and built by Chas. Lowe Co., Control Systems Division, Cleveland, Ohio.

A quarter-of-a-million-dollar contract for conversion to automated firing of nine 700-foot vessels of National Bulk Carrier's fleet was recently completed by the Chas. Lowe Co.'s Control Systems Division, 5845 Harper Road, Cleveland, Ohio 44139, builders of automated boiler systems. The contract is believed to cover the largest number of ships ever automated under a single order.

The nine ships, under charter as ore carriers and operating on a two-week turn around schedule from Venezuela to Philadelphia area steel plants, were automated under way without interruption of their schedules. The automation system installation caused no loss in revenue-producing time.

"It's the kind of job we're organized to do," said **J.D. Connors,** division sales manager. "We are a relatively small outfit, but have extensive experience in controls. Many of our people have sailed as licensed engineers, so we are familiar with the problems involved. We knew the importance of coordinated delivery of materials, and planned accurately for it. We also detailed procurement of installations and mounting hardware. At no time did the ships lack the needed materials to complete the installations under way."

An immediate result is that all nine NBC ships are now sailing with unmanned fire-rooms. System payout is projected at less than two years per ship.

The first four shipsets were designed, built and factory-tested in only 90 days. Thereafter followed a tightly-controlled program of installation, tune-up, testing and light-off, with virtually no margin for error.

Systems were installed by a six-man installation crew while the ships were on their regular runs between Venezuela and Morrisville, Pa. Upon arrival at Morrisville, Chas. Lowe Co. service engineers checked out the installation, made final adjustments and put the system on line. It was imperative that no time be lost, as the single installation crew had to be available for the following ship, which sailed only two to three days after the previous ship arrived.

Chas. Lowe Co.'s project manager organized the task under five headings: (1) survey-in-depth of requirements; (2) preliminary design and discussion with owners; (3) construction; (4) pre-installation plan; and (5) installation, test and personnel instruction.

Each system had to be built and de-bugged in advance to insure zero defects, as the lay-over at the unloading port allowed only two days for testing and activation, and no time for repairs. The program called for each ship to sail on automation on the first trip following installation. To guarantee trouble-free operation, each system was double-checked for all functions at the division's plant on a test-stand wired to a four-burner boiler simulator.

Working with the ships' owners, Chas. Lowe Co. engineers prepared a pre-installation plan for each ship. This detailed all preparatory and installation tasks and designated who was to perform them. Plans were reviewed with all concerned to assure completeness and avoid misunderstanding.

Bills of materials—modified for each ship—also were prepared in advance, listing such items as foundation materials, pipe-fittings and related parts. Each item was tagged with its part number and the name of the ship, and directed to a specified warehouse space at the ships' docking facilities. Inventories were checked about 10 days before each sailing.

Upon arrival of a ship back in Morrisville with installation completed, Chas. Lowe Co. engineers went aboard. Their missions: to check all installation work, test and tune for optimum performance, put the system on line and instruct ship's personnel in its operation.

Sea trials were held as the vessel departed for Venezuela.

Diamond M Receives Letters Of Intent For Over $60 Million

Diamond M Drilling Company of Houston, Texas, has announced that it has received letters of intent expressing the principal provisions of long-term drilling contracts relating to all four of its mobile drilling units which are now under construction.

Don E. McMahon, president and chief executive officer of Diamond M, stated that the first letter of intent—with Gulf Oil Company-U.S. and providing for a one-year contract term—relates to the Diamond M New Era, the company's second semisubmersible drilling vessel of the Diamond M-Korkut design. Capable of operating in water depths up to 1,000 feet, the New Era is scheduled for completion in August 1974.

Mr. **McMahon** said that the second and third letters of intent—both with Amoco Production Company and each providing for two-year contract terms—relate to the Diamond M Epoch, another self-propelled semi of the Diamond M-Korkut design capable of drilling in waters up to 1,000 feet deep, and the Diamond M Gem, a self-elevating jackup mobile platform capable of drilling in waters up to 300 feet deep. Delivery of the Gem is expected in September 1975, and the Epoch is scheduled for November 1975.

The fourth letter of intent, said Mr. **McMahon**—with Empresa Nacionale del Petroleo (ENAP) the national oil company of Chile and providing for a three-year contract term—relates to the Diamond M Nugget, another Levingston-designed jackup capable of drilling in waters up to 300 feet deep. Delivery of the Nugget is expected in January 1976.

Mr. **McMahon** also said that definitive drilling contracts are now being negotiated. The company anticipates that its revenues from such contracts, commencing with the dates of delivery of the rigs, over the terms of the contracts, based on the initial day rates specified in the letters of intent and without allowance for unusual rig downtime, will exceed $60.5 million.

In a related development, Mr. **McMahon** announced that the company has received a commitment from a bank for a three-year revolving credit in the amount of $16 million. It is anticipated that such agreement, together with existing interim financing relating to the New Era, will provide the company's interim construction financing requirements for all four rigs. The company has received a preliminary commitment from the Maritime Administration for a Title XI guarantee of permanent financing for the New Era, and has submitted an application to the Maritime Administration for guarantees to aid in the permanent financing of the other three drilling rigs.

It is anticipated that upon delivery, the New Era, the Gem and the Epoch will operate domestically, and that the Nugget will operate offshore Chile in the Strait of Magellan.

Netumar International Announces Changes In Executive Staff

In a series of executive staff changes, **Charles T. Mattmann,** president of Netumar International, Inc., has announced the promotion of **M. Joseph Kelly** to executive vice president, while **Courtland R. Chapman Jr.** and **Edward T. Murphy** were named vice presidents of the company.

Prior to their new appointments. Mr. **Kelly** was Netumar International vice president, Mr. **Chapman,** assistant vice president, and Mr. **Murphy,** traffic manager.

In other executive personnel changes, Mr. **Mattmann** designated **Philip F. Walkley** as assistant treasurer, and **Joseph F. Munson,** formerly traffic manager and manager, documentation, to the post of traffic manager.

The New York-based Netumar International, Inc., acts as general agents for U.S., Canadian East Coast, and Great Lakes ports for the Brazilian-flag line, Companhia de Navegacao Maritima Netumar.

Matson Navigation Promotes James Reid To Senior Vice Pres.

James L. Reid

James L. Reid, Matson Navigation Company's vice president and area manager for Hawaii, has been promoted to a senior vice president, it was announced by **R.J. Pfeiffer,** president.

Mr. **Reid** joined Matson in Honolulu last August, after 27 years with C. Brewer & Company. He was president of the subsidiary Brewer Chemical Corporation when he joined Matson.

Raymond Joint Venture To Build Terminal For LNG Tankers

A joint venture sponsored by Raymond International Inc., Houston, Texas, was awarded a contract to construct marine facilities for a liquefied natural gas (LNG) receiving terminal at Cove Point, Md. The terminal will be jointly owned by subsidiaries of the Columbia Gas System and the Consolidated Natural Gas System, with Columbia building and operating the facility.

The three partners in the construction joint venture are Raymond, Tidewater Construction Corp. of Virginia Beach, Va., and Peter Kiewit Sons' of Omaha, Neb.

This phase of the LNG complex consists of building an offshore facility to simultaneously berth two tankers, and an underwater and onshore tube-tunnel more than a mile long to house the pipelines needed to bring the liquefied natural gas ashore.

When completed, the terminal will have an unloading capacity of one billion standard cubic feet of LNG per day.

Raymond Technical Facilities Inc. of New York City, a wholly owned Raymond subsidiary, performed the engineering and design for the marine portion of the complex.

Construction is scheduled to be completed in two years.

The berthing portion of the LNG complex will stand in 40-foot-deep Chesapeake Bay water on precast, prestressed concrete cylinder piles and steel pipe piles. Bayshore Concrete Products Corp. of Cape Charles, Va., owned by the three construction partners, will manufacture the concrete piles for the project.

The joint venture group has in the past successfully completed such large construction projects as the 17.6-mile-long Chesapeake Bay Bridge-Tunnel in 1963, and the 3.6-mile-long San Francisco Bay Area Rapid Transit (BART) tunnel in 1969. It is presently building a second Hampton Roads tunnel linking Hampton and Norfolk, Va., and a 3.9-mile bridge spanning the James River between Newport News and Isle of Wight County, Va.

Sun Ship Orders Five Revolving Cranes From Washington Iron Works

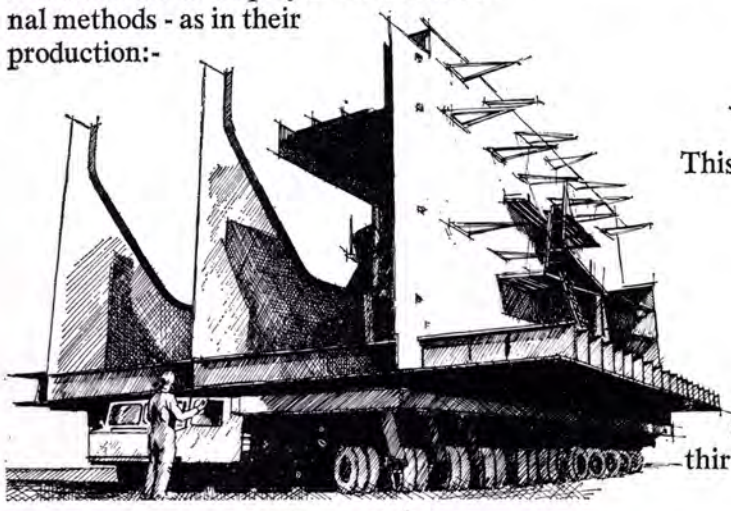
Five diesel-electric, revolving gantry cranes are being manufactured by Washington Iron Works, Seattle, Wash., for delivery early in 1975 to the Chester, Pa., shipyard of Sun Shipbuilding and Dry Dock Company.

Three cranes are of 75-ton capacity, two of 250-ton capacity at 100-foot radius, with respective boom lengths of 150 and 225 feet. All are on gantries 105 feet high. Value of the contract, issued in April 1974, is said to exceed $6,000,000.

Washington Iron Works, a division of Formac International, Inc., manufactures logging equipment, hydraulic particleboard and hardboard presses, and cranes for construction, container handling and shipyard applications.

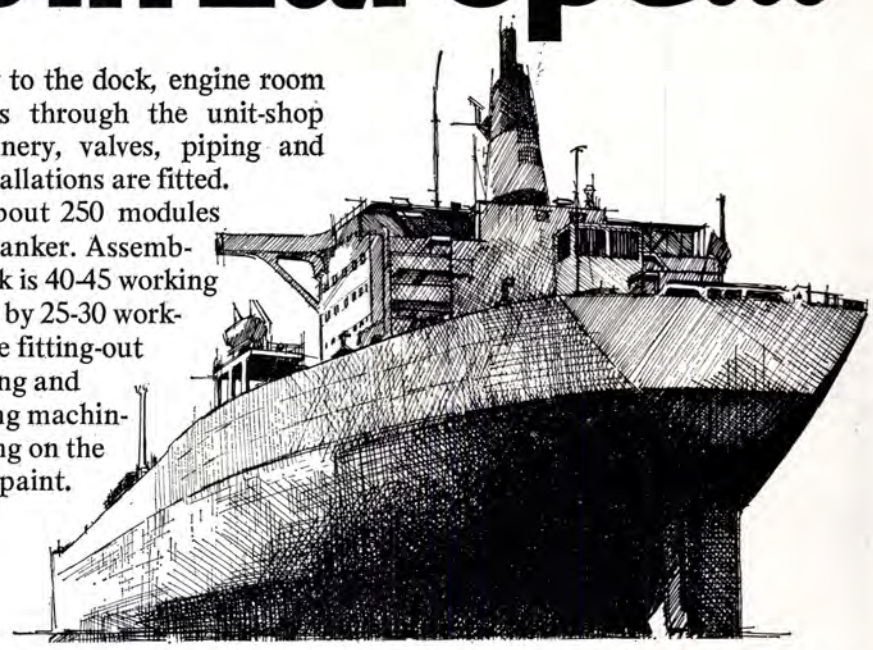
LINDØ, largest producer of tankers in Europe...

Once again a prominent shipowner takes delivery of a Lindø - built tanker.
What makes Lindø so special?
The strength of Lindø is, and has been for a number of years, its policy of specialisation and of series production. Advantages to the owners are a sound construction with layout and details designed for practical operation and low maintenance cost.
Special studies are constantly being made to ensure component and system reliability. To obtain these results, Lindø has often employed unconventional methods - as in their production:-



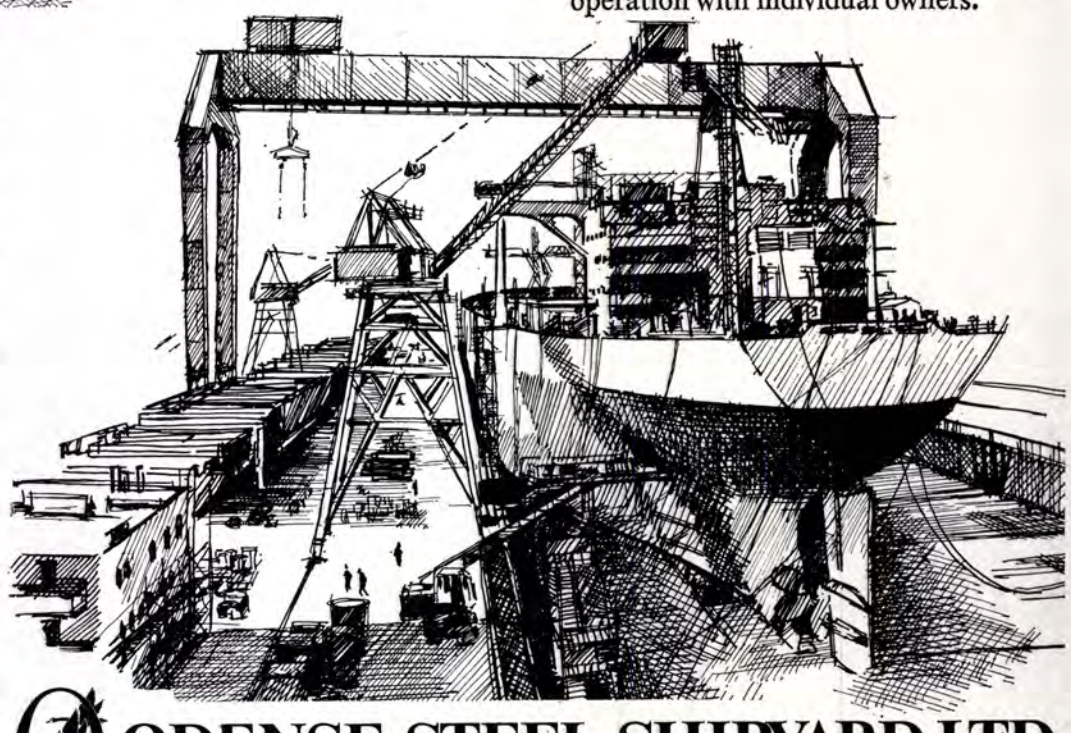
This adds up to the amazingly low production time of 70-75 days per ship, among the world's best.
After a series of four 250,000 tonners came the series of fourteen 285-288,000 tonners now due to be followed by thirteen 310-330,000 tonners.

On their way to the dock, engine room modules pass through the unit-shop where machinery, valves, piping and electrical installations are fitted.
Altogether about 250 modules go into each tanker. Assembly time in dock is 40-45 working days followed by 25-30 working days at the fitting-out quay for testing and commissioning machinery and putting on the final coats of paint.



In 1971 the annual output exceeded one million tons deadweight.
In 1973 five ships aggregating 1.43 million dwt. were delivered, thus maintaining Lindø's position as the largest producer of ships from a single yard in the Western World.
New and larger carriers are well advanced on the drawing boards, details as usual being worked out in close co-operation with individual owners.

Lindø was first with advanced blasting and painting shops featuring controlled climate for coating large block units - with paint systems that really last - and first with rubberwheeled trolleys to transport their block units weighing up to 320 tons.
Activities are at present concentrated around a single building dock, 415 x 90 m, capable of up to 650,000 tdw ships or more.
Materials are delivered by sea direct into the stockyard. Thence they flow through blasting and priming, to edge preparation shops and into initial assembly, collecting minor items on the way. Final assembly-shops produce modules of 320 tons and soon up to 700 tons capacity.
Painted modules are transported to the dockside where two of these are joined together, outfit added and the combined module lifted by the 800-ton capacity gantry crane, into the building dock.



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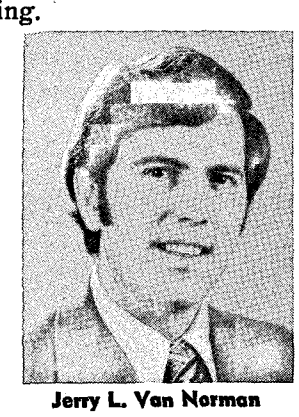
Jerry Van Norman Named VP At ETA— Office Opened In Oslo

Engineering Technology Analysts, Inc. (ETA), Houston, Texas, has announced the promotion of **Jerry L. Van Norman** to vice president of systems engineering. Formerly a managing engineer with ETA, **Mr. Van Norman** supervises the international activities in the mechanical, electrical, and equipment design for ETA's range of mobile offshore drilling and pipelaying vessel designs. In addition, he supervises ETA's piping design and piping flexibility analysis for refineries, gas compressor stations, and oil and gas production systems.

ETA is involved in the design and analysis of offshore structures, marine pipelaying, and pipe stress analysis.

Prior to joining ETA in 1970, Mr. **Van Norman** spent two years as an associate for Theodore Barry and Associates, a Los Angeles management consulting firm. He specialized in the development of computer-based management information systems and the application of computer techniques to business problems. Mr. **Van Norman** has also served as production supervisor, systems engineer, and project engineer for the General Electric Company, where he gained extensive experience in facilities planning and manufacturing engineering.



Jerry L. Van Norman

Mr. **Van Norman** received his B.S. degree in industrial engineering and his M.S. degree in operations research from Arizona State University. He is a registered professional engineer in the state of Texas and is a member of the Houston Society of Management Consultants, the Texas Society of Professional Engineers, and the National Society of Professional Engineers.

ETA has also expanded its engineering design and consulting services on an international scale, and recently appointed a representative office in Oslo, Norway, to provide general professional engineering services to overseas clients. Representing ETA is Ingenior **Per O. Kopaas** of Kopaas Shipping Agency A/S, an engineer and naval architect with many years of experience in the marine industry.

ETA has designed a new generation of offshore mobile drilling units for service in 200- to 400-foot water depths in the U.S. Gulf Coast, Southeast Asia, and the North Sea. Through the setup of the Norwegian representative office, ETA and Mr. **Kopaas** can provide closer liaison with Norwegian clients on complete design and analysis assignments on offshore drilling units, marine pipelaying, and pipe stress problems.

The Philadelphia Maritime Exchange Elects Directors

Seven directors whose terms were expiring were reelected to the board of The Philadelphia Maritime Exchange, according to an announcement made at the conclusion of the 99th annual meeting, held by the organization in Philadelphia, Pa.

Reelected for three-year terms were: **William T. DeWitt,** executive vice president, Lavino Shipping Co.; **John J. Gibbons,** president, Delaware River Terminal and Stevedoring Co.; **Maylin H. Greaser,** president, American Dredging Co.; **Lloyd E. Long,** president, Merchants Warehouse Co.; **Francis H. Muldoon,** president, J.A. McCarthy, Inc.; **Samuel M. Schellenger,** president, Pilots' Ass'n for the Bay & River Delaware, and **Norman E. Walls,** port captain, Sun Transport, Inc.

United States Lines Names Madigan VP, Chief Financial Officer

Richard E. Madigan

Richard E. Madigan has been named president and chief financial officer of United States Lines, Inc., it was announced by **Edward J. Heine Jr.**, president.

Mr. **Madigan** was formerly director of taxes for Walter Kidde and Company and before that, held executive positions with Arthur Andersen and Company. He is a magna cum laude graduate of Fordham University where he studied accounting, and holds an M.B.A. degree in taxation from Pace College Graduate School.

He is author of the book "Taxation of the Shipping Industry," published by Cornell Maritime Press in 1971.

Mr. **Madigan** is a member of the American Institute of Certified Public Accountants, the New Jersey Society of CPA's, and the Tax Executives Institute.

Bethlehem Singapore Receives Orders For Three Drilling Platforms

Bethlehem Singapore Private Ltd. has been awarded contracts for the construction of three jackup mobile drilling platforms for use in 250 feet of water.

These units, which will be the Bethlehem mat type similar to the five already under contract at Bethlehem Singapore, are being purchased by European and Far East shipping interests in conjunction with Wallem Ringdal Offshore Ltd. in Hong Kong.

Delivery of the three is slated for February, June and October 1976. This brings Bethlehem Singapore's backlog in drilling platform contracts to a total of eight.

In announcing the contracts, **John C. Estes,** president and general manager of Bethlehem Singapore, noted that it was the largest order for drilling platforms ever signed at one time by a Bethlehem yard. The Bethlehem Singapore facility is jointly owned by Bethlehem Steel Corporation and the Development Bank of Singapore, and is managed by Bethlehem Steel.

The Singapore facility has delivered four jackup drilling units and numerous barges, and also does steel fabrication and drilling rig repairs. In late 1973 and early 1974 it performed extensive repairs on the Reading and Bates jackup Chris Seger and Dolphin International's Bali Dolphin.

Hawaii Section Hears Paper On Interisland Hydrofoil Transportation

The Hawaii Section of The Society of Naval Architects and Marine Engineers met at the Elks Club in Honolulu on April 2.

After the social hour and dinner, members, their ladies and guests were presented with a paper on the interisland hydrofoil transportation system scheduled for operation in October 1974. The topic, "SeaFlite —A New Way To Travel," was presented by Capt. **Francis T. Cooper,** USN (ret.), president of Pacific Sea Transportation, Ltd., a Kentron subsidiary.

Captain **Cooper** discussed the history of interisland transportation and the various factors which resulted in the hydrofoil transportation system being favored for interisland service. This unique and exciting new means of travel will soon be available to residents and visitors in Hawaii. Three jetfoils are presently being constructed by The Boeing company for delivery to Pacific Sea Transportation in late 1974. With the delivery of these revolutionary new surface craft, the Hawaiian Islands will once again be linked by a waterborne transportation system.

Shell bulk customers: Can you to be using an oil as

think of a better time versatile as Shell's Melina® Oil?

One multi-purpose oil—Shell MELINA Oil has 8 major motorship applications; can help you tie up fewer inventory dollars, cope with shortages. Its performance can help extend engine service life, too.

Versatile Shell MELINA Oil has so many shipboard applications that Shell customers would do well to consider it as the single replacement for an assortment of other oils.

First, MELINA Oil provides excellent lubrication for the systems of slow-speed crosshead-type diesels and the crankcases of medium and most high-speed trunk piston engines.

Next, this versatile oil meets nearly all the lubrication needs of seven other important items of shipboard equipment: air compressors, turbochargers, auxiliary diesels, steering gear, gear transmissions, stern tube bearings and variable-pitch propellers. Eight major applications in all! Some very high output auxiliary engines and other highly-stressed equipment will of course continue to require specialized oils, but MELINA is designed to satisfy most requirements.

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

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

What this means to you

A multi-purpose top quality oil—that's good reason for buying in bulk. And bulk purchasing saves you money. There's also less chance of misapplication when your crew is working with fewer oils. Versatile MELINA Oil makes a lot of sense, particularly in times of shortage.

Properties that pay

MELINA Oil has good oxidation stability, and this means good resistance to thickening. Its dispersant properties hold down carbon deposits in piston cooling spaces and help keep crankcases and sump tanks clean.

Good anti-wear and anti-corrosion characteristics are another feature. And MELINA Oil protects against corrosion of lead-bronze bearings. It can mean longer life for engine components and lower maintenance costs for you.

Two more cost-saving Shell lubricants

1. ALEXIA® Oil offers excellent anti-wear properties for cylinder lubrication of slow-speed crosshead-type marine diesel engines burning high-sulfur residual fuel oil. It covers the liners with a high alkalinity barrier to corrosive combustion products, protects rings and liners against destructive wear.
2. ARGINA® Oil is a top-quality crankcase oil designed for medium-speed trunk type diesels burning heavy fuels. It, too, can help trim maintenance costs.

For more information about these three versatile Shell oils, write: Shell Oil Company, Manager, Commercial Advertising, One Shell Plaza, Houston, Texas 77022.

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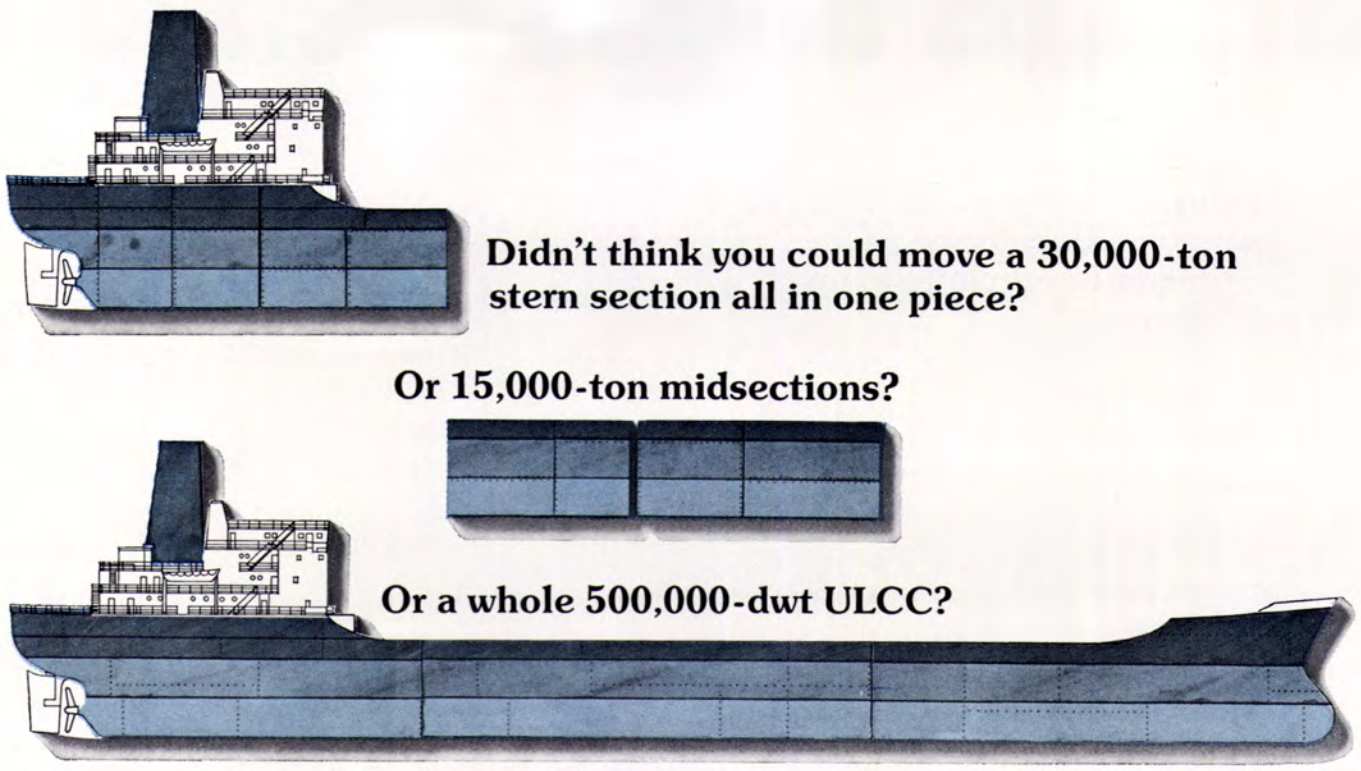

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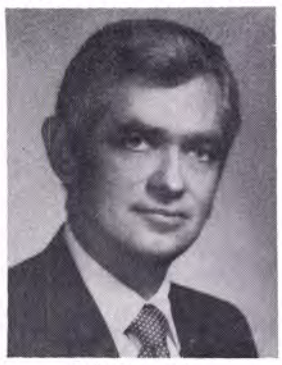
Alcoa Steamship Appoints R.S. Hospodar Operations Manager



R.S. Hospodar

G.C. Halstead, president of Alcoa Steamship Company, Inc., has announced the appointment of **R.S. Hospodar** as manager, operations.

Following graduation from the U.S. Merchant Marine Academy at Kings Point, N.Y., in 1950, Mr. **Hospodar** joined United States Lines where he served as deck officer aboard a number of vessels until 1954, when he reported for active duty in the Naval Reserve.

Upon completion of service as navigator aboard the U.S.S. Rockbridge in 1956, Mr. **Hospodar** joined Alcoa Steamship Company. He has since filled assignments at San Juan, Baltimore, Santo Domingo and Mobile. In his new position Mr. **Hospodar** will direct the worldwide operation of Alcoa's bulk carrier fleet and supervise the company's chartering program. He will be based at the company headquarters in New York City, and will report to Mr. **Halstead.**

Smith-Rice Orders Another Crane Barge From Paceco Yard

E.R. Rice, vice president of Smith-Rice Derrick Barges, Inc., San Francisco, Calif., has announced the purchase of a second barge with a heavy-duty 250-ton-capacity revolving crane. The designer and builder of the new crane barges is Paceco, a division of Fruehauf Corporation, Alameda, Calif.

The new crane barge is identical to Crane Barge 3, which will be launched at the Paceco yard on May 17 of this year. The barges measure 215 feet by 76 feet by 15 feet. The revolving cranes have a rated capacity of 250 tons over the side at a 56-foot radius and 350 tons over the stern.

The barges are fitted with Paceco-designed molded bows for fast towing and are built to ABS class for full ocean service. Delivery of the second crane barge is scheduled for September 1975.

Murphy Pacific Moves NYC Office

Murphy Pacific Marine Salvage Co. announced that effective May 1, it will have moved its New York office to One World Trade Center, Suite 8833. The New York office was formerly at 17 Battery Place.

Smith And Cangelosi Receive Promotions At Beth-Hoboken Shipyard

The promotion of **Edward J. Smith** to chief estimator, and **Joseph Cangelosi** to assistant to the chief estimator has been announced by **John J. Brangan,** general manager of Bethlehem Steel Corporation's Hoboken, N.J., ship repair yard.

Mr. **Smith,** previously the yard's assistant chief negotiator, joined Bethlehem in 1937 as a ship repair helper at the company's former Brooklyn 27th Street yard. He remained there until 1962, progressing through such positions as rollerman, snapper, supervisor of ship repair and estimator.

In 1962, he transferred to Bethlehem's Hoboken yard as a negotiator, and in 1968 was promoted to assistant chief negotiator.

Mr. **Cangelosi,** a native of Brooklyn, attended Saint Francis College there, where he received a bachelor of arts degree in 1962.

He served four years in the U.S. Navy, attaining the rank of lieutenant before his separation in 1966.

He then joined Bethlehem at the Hoboken yard as a ship repair superintendent. In 1969, he was promoted to estimator, a position he has held until now.

52 Technical Papers To Be Read At LNG Conference In Algiers

The Fourth International Conference on Liquefied Natural Gas (LNG-4) will be held June 24-27, 1974, in Algiers.

All technical sessions will be held in the Grand Hall of the Palace of Nations. Simultaneous interpretation will be available at all sessions.

Technical films will be shown in parallel to afternoon sessions in Commission Room A. Details of films will be announced at the conference.

The program for the four-day conference is as follows.

Monday, June 24, Morning

10 a.m. Opening Ceremonies—Message from the President of the Democratic and Popular Republic of Algeria; Welcome by conference sponsors; Address by **E.F. Janssens,** Director of the Energy Division of the Economic Commission for Europe.

11:30 a.m. to 12:30 p.m. Session I—World Trade in LNG; co-chairmen: **L.J. Clark,** Northern Region British Gas Corporation, United Kingdom, and **S.A. Ghozali,** SONATRACH, Algeria.

Papers: (1) "World Trade in LNG from the Algerian Point of View," **N. Aït-Laoussine,** SONATRACH, Algeria; (2) "World Trade in LNG: An American Viewpoint," **G.M. Bennsky,** U.S. Department of State, U.S.A.; (3) "World Trade in LNG: Progress and Future Prospects," **M.W.H. Peebles,** Shell International Gas Ltd., United Kingdom; (4) "World Trade in LNG from a Financier's Point of View," **Paul Slater,** Brandts Shipping Finance Limited, United Kingdom.

Monday, June 24, Afternoon

2:30 to 5:30 p.m. Session II—Large-Scale Transportation Projects; co-chairmen: **C. Brecht,** Ruhrgas A.G., Federal Republic of Germany, and **S. Kitada,** Tokyo Gas company, Ltd., Japan.

Papers: (1) "Alaska to Japan LNG Project—Kenai Revisited," **J. Horn,** Phillips Petroleum Company, U.S.A.; **P.W. Tucker,** Phillips Petroleum Company Europe-Africa, United Kingdom; **W.B. Emery II,** Marathon Oil Company, U.S.A.; (2) "Early Operating Experience with the Brunei-Japan LNG Project," **J.E. Jenkins,** Shell International Gas Ltd., United Kingdom; (3) "Construction and Operation of Tokyo Gas, Sodegaura Works," **S. Kitada,** Tokyo Gas Company Ltd., Japan; (4) "Columbia-Consolidated LNG Receiving Terminal, Cove Point, Maryland," **D.B. Crawford** and **R.A. Bergman,** The M.W. Kellogg Company, U.S.A.; (5) "Supply to Europe of Algerian Natural Gas in the Framework of a Multinational Corporation," **B. Bergmann,** Ruhrgas A.G., and **J. Kirsch,** Saarferngas A.G., Federal Republic of Germany; **L. Meanti,** SNAM S.p.A., Italy; **J. Tellier** and **P. Verret,** Gaz de France, France; (6) "The Role of Operational Research and Computing Techniques in the LNG Business," **A.M. McCarthy** and **H.W. Walker,** Shell International Gas Ltd., United Kingdom; (7) "A Computer Program for Optimization of LNG Transportation," **M. Oshima, H. Narita,** and **Y. Kunitake,** Mitsui Shipbuilding and Engineering Company, Japan.

Tuesday, June 25, Morning

9:30 a.m. to 12:30 p.m. Session III—Liquefaction and Processing; co-chairmen: **M. Grenier,** L'Air Liquide, France, and **O.M. Ivantsov,** Ministry of Oil and Gas Industry Construction, USSR.

Papers: (1) "Optimum Design of Reliable LNG Facilities," **M.G. Zellner, C.L. Newton,** and **L.L. Phannenstiel,** Air Products and Chemicals, Inc., U.S.A.; (2) "Optimum Parameters—Choice of a System for Natural Gas Liquefaction, Its Transmission by Pipelines and Regasification," **O.M. Ivantsov,** Ministry of Oil and Gas Industry Construction, and **A.P. Klimenko,** Gas Institute of Ukranian Academy of Science, USSR; (3) "LNG-Skikda—Balance of Construction-Extension and Start-Up," **A. Kazi Tani, B.O. Kassis, D.B. MacIntyre,** and **L. Bentamar,** SONATRACH, Algeria; (4a) "Construction and Start-Up of Skikda I, II and III," **J. Dollé,** TECHNIP, France; (4b) "Operating Results of the TEA-LARC Liquefaction Unit in the

Skikda LNG Plant," **J.M. Bourguet** and **R. Schlatter,** TEAL, France; (5) "The Determination of Bottlenecks," **A. Bendani,** CAMEL, Algeria; (6) The Contractor's Role in Managing a Major LNG Project Requiring Multinational Cooperation," **R.E. McHarg,** Procon Inc., U.S.A.; (7) "Economic Comparison of Compressor Drivers for LNG Plants," **A.L. Tanner, C.R. Cooper, E.F . Drucker,** and **E.J. Miles,** Flour Engineers and Constructors, Inc., U.S.A.; (8) "Incidents Encountered with the Axial Turbocompressor at Skikda," **M. Gugen** and **A. Cherifi,** SONATRACH, Algeria.

Tuesday, June 25, Afternoon

2:30 to 5:30 p.m. Session IV—Peakload Plants and Liquid Handling; co-chairmen: **J.M. Geist,** Air Products and Chemicals, Inc., U.S.A., and **G.F.I. Roberts,** British Gas Corporation, United Kingdom.

Papers: (1) "Custody Transfer Instrumentation Systems for LNG Marine Transportation Projects," **C.F. Moore,** El Paso Natural Gas Company, and **R.L. Blanchard,** Trans-Sonics, Inc., U.S.A.; (2) "The Method Used at the Receiving Terminal of FOS-SURMER to Determine the Thermies Delivered by SONATRACH to Gaz de France," **M. Farrugia** and **M. Chevalier,** Gaz de France, France; (3) LNG Tank Stratification Consequent to Filling Procedures," **K.A. Smith** and **A.E. Germeles,** Distrigas Cabot Corporation, U.S.A.; (4) "Production of a Natural Gas Within Specifications from Two LNG Delivery Sources," **C. Torrent,** Gas Natural, S.A., Spain; (5) "LNG Peaksaving Plant—Operation Experience," **P.A. Sipple,** Air Products and Chemicals, Inc., U.S.A.; (6) "Liquefaction and Boil-Off Reliquefaction Facilities at Canvey Island," **P.W. Eke, E.B. Graham,** and **T.H. Malyn,** British Gas Corporation, United Kingdom.

Wednesday, June 26, Morning

9:30 a.m. to 12:30 p.m. Session V—Marine Transportation; co-chairmen: **R. Boudet,** Gazocean, **France,** and **C.G. Filstead,** Conch Methane Services Ltd., United Kingdom.

Papers: (1) "Five Year-Ten Year Projection of Worldwide Shipyard Capacity of LNG Tankers," **I.W. Robertson,** H. Clarkson and Company, Ltd., United Kingdom; (2) "Transporting Gas—LNG vs. Methanol," **P. Soedjanto,** King-Wilkinson, (International) B.V. The Hague; **F.W. Schaffert** and **N.C.M. Mason,** King-Wilkinson, Inc., U.S.A.; (3) "Thermal and Thermodynamic Aspects Regarding the Operation of LNG Trades," **J.P. Morel** and **L. Pascual,** Technigaz, France; (4) "Safety Considerations in the Design and Operation of LNG Terminals," **P.J. Anderson** and **W.W. Bodle,** Institute of Gas Technology, U.S.A.; (5) "Shipboard Jettison Tests of LNG Onto the Sea," **L.R. Prew,** Shell International Marine Ltd., and **A. Kneebone,** Shell Research, United Kingdom; (6) "Shipboard Reliquefaction of Boil-Off—Technical and Economic Considerations," **J.A. Lorenzen,** J.J. Henry Co., Inc., U.S.A.

Wednesday, June 26, Afternoon

2:30 to 5:30 p.m. Session VI—Storage Systems; co-chairmen: **J. F. Isamat,** Gas Natural, S.A., Spain, and **O. Khouani,** SONATRACH, Algeria.

Papers: (1) "Considerations for the Safety of LNG Storage Terminals," **L.K. Stone,** U.S. Department of the Interior, **R.F. Hill,** and **T.S. Needels,** Federal Power Commission, U.S.A.; (2) "LNG Inland Transportation with Railway Tank Cars and River-Going Tankers," **H.W. Backhaus,** Natural Gas Service Deutschland GmbH, and **R. Janssen,** Vereinigte, Tanklager und Transportmittel, GmbH, Federal Republic of Germany; (3) "LNG Storage Tanks for Metropolitan Areas," **M.R. Schuller** and **J.C. Murphy,** Pittsburgh-Des Moines Steel Company, and **K.F. Glasser,** Consolidated Edison Company of New York, Inc., U.S.A.; (4) "Determination of Storage Capacities in an LNG Terminal," **R. Vincent,** Gaz de France, France; (5) "Eight Years of Experience with LNG Underground Storage," **A. Bendani,** CAMEL, Algeria; (6) "The Storage System at LNG Receiving Terminal for Brunei LNG Project," **K. Yoshida,** Tokyo Gas Company,

(Continued on next page)

LNG Conference—

(Continued from page 21)

Ltd., Japan; (7) "Environmental and Safety Aspects of LNG Storage," **W.J. Walters, F.E. Dean,** and **M. Carne,** British Gas Corporation, United Kingdom; (8) "The Development of Insulation Systems for Large Capacity Double Walled Metallic LNG Storage Tanks," **P. Dodd** and **G. Todd,** Whessoe Ltd., United Kingdom.

Thursday, June 27, Morning

9:30 a.m. to 12:30 p.m. Session VII—New Developments; co-chairmen: **G.G. Haselden,** University of Leeds, United Kingdom, and **P. Verret,** Gaz de France, France.

Papers: (1) "A Survey of LNG Technological Needs in the U.S.A. —1974-2000," **L.A. Sarkes,** American Gas Association, and **D.B. Mann,** National Bureau of Standards, U.S.A. (2) "Problems Involved in the Scale-Up of LNG Plants," **D. Roger,** TEAL, France; (3) "The Arctic Air/Sea LNG Project," **R.L. Purvin,** Purvin & Lee Associates; **H.W. Withington,** Boeing Commercial Airplane Company, and **C. Smith,** Transworld Gas Systems, U.S.A.; (4) "Moving Natural Gas From the Arctic to Markets," **L. Kniel,** The Lummus Company, U.S.A.; (5) "Simultaneous Pipelining of Solidified Crude Oil and LNG," **E.J. Jensen,** Research Council of Alberta, Canada; (6) "Utilization of LNG Cold for the Refrigerated Warehouse," **H. Kataoka,** Toyko Cryogenics Industry Ltd., and **Y. Maeda,** Tokyo Gas Company, Ltd., Japan; (7) "LNG as Motor Fuel: French Studies and Results," **F. Bellus** and **R. Humbert-Basset,** Gaz de France, France.

Thursday, June 27, Afternoon

2:30 to 5 p.m. Session VIII—Economic and Legal Aspects; co-chairmen: **A. Reyes,** Ministry of Mines and Hydrocarbons, Venezuela, and **P.G. Smith,** Southern Natural Gas Company, U.S.A.

Papers: (1) "Financing LNG Carriers and Ground Facilities in the United States and European Capital Markets," **H. de Grandcourt;** Cleary, Gottlieb, Steen & Hamilton, France; (2) "The Effect of Intended Trade Route on the Optimum Size of LNG Tankers," **T. Lamb, E. Castrinakis** and **T. Arnas,** COM/CODE Corporation, U.S.A.; (3) "Policies for Training Operating Personnel of Future LNG Plants in Algeria," **M. Souidi,** Institut Algérien du Pétrole, Algeria; (4) "Overland Transportation of Imported LNG in Japan With Special Reference to the Quantitative Measurement of LNG," **S. Hirakawa,** University of Tokyo and **S. Sugiyama,** Tokico Ltd., Japan; (5) "Environmental Factors in Siting LNG Facilities," **F.H. Warren, T.J. Joyce, R.J. Davis** and **H. Firstenberg,** NUS Corporation, U.S.A.; (6) "Economic and Legal Aspects of LNG Imported Into the United States," **W. E. Matthews IV,** Southern Natural Gas Company, U.S.A.

5:00 to 5:30 p.m. Closing Session.

The Fourth International Conference on Liquefied Natural Gas is sponsored by the International Gas Union, the International Institute of Refrigeration, and the Institute of Gas Technology, under the patronage of the Algerian Government.

Du Pont Offers Bulletin On Ultra I&T Pump Packing Yarn

Ultra I&T is a new pump packing yarn containing Teflon® TFE fluorocarbon fiber designed to solve problems associated with high-speed pumps and excessive shaft runout. Excellent flexibility allows liquids to be sealed with a minimum of gland pressure. The result is less friction and heat build-up, thus longer wear life. This improved wear life means less equipment downtime. Installation is easy because the material conforms to just about any shape.

The Du Pont Company is offering a free bulletin describing this new product, its advantages and applications. For a copy write Du Pont Company, Eden Park Building, PDM #15699, New Castle Avenue, Wilmington, Del. 19898, Attention: **L.B. Gates.**

Amirikian Engineering Brochure Describes Floating Pontoon Dock

Amirikian Engineering Co., 1401 Wilson Boulevard, Arlington, Va. 22209, has published a brochure describing the AMMI Floating Pontoon Dock.

The AMMI Floating Pontoon Dock is a multifunctional new facility for the shipyard and the waterfront. The principal uses include the following:

(1) As a submersible launch platform, serves to lower and raise a craft into and out of the water, similar to a floating drydock.

(2) As a floating carrier platform, with a craft on board, makes it possible to perform repairs at any transfer site along the waterfront.

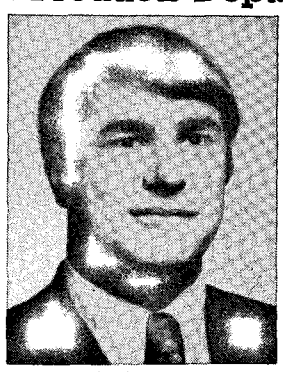
(3) As a stationary work platform, when placed on an underwater support grid, provides a fixed deck on which to assemble a ship or transfer it to shore.

The pontoon is a rectangular box-shaped structure, featured by a special framing, compartmentation and ballasting system. Draft and water ballast are regulated by compressed air; and in the submerged condition, stability is obtained through cables from four independently supported winches, located two on each side.

There are no limitations in the lifting capacity of the dock, since the pontoon can be designed to accommodate any type and size of vessel presently in service or planned for the future. In support of this view, preliminary designs of a great number of docks, varying in sizes up to supertanker category of 1,000,000 dwt, have already been prepared.

The AMMI Floating Pontoon Dock was conceived by Dr. **Arsham Amirikian** in 1968 while serving as Chief Engineering Consultant to the Commander, Naval Facilities Engineering Command of the U.S. Navy Department. In view of certain economic and constructional advantages apparent in the scheme, a comprehensive test and development program was undertaken by the Navy during the period 1969-72. For this purpose, a small dock of about 3,000-ton lifting capacity was built, together with adjunct facilities, and an extensive series of tests was carried out to appraise the conceptual and operational features of the dock. In addition to verifying the feasibility of the basic concept, the experiments resulted in a number of beneficial modifications in the original details and arrangement of the system.

Cincotta Named To GE Turbine And Gear Products Dept.



Gerald A. Cincotta

Gerald A. Cincotta has been appointed to the post of sales engineer for General Electric's Marine Turbine and Gear Products Department, according to **Raymond J. Walsh,** manager of marine sales for the domestic market.

In his new position, Mr. **Cincotta** will be responsible for marketing GE steam turbine and gear ship propulsion machinery in coordination with the Marine & Defense Facilities Sales Operation's field sales force. General Electric Company is a leading supplier of engine room steam turbines and gears for ships of all classes.

Most recently associated with the New Orleans, La., office of GE's Marine & Defense Facilities Service Operation as a sales engineer, Mr. **Cincotta** is a graduate of the General Electric Company Technical Marketing Program, which he joined in 1967 after earning a bachelor's degree in mechanical engineering from the University of Cincinnati. He has also held training program posts in Salem, Va., Philadelphia, Pa., and Wellesley, Mass.

Charles B. Darcy Establishes Marine Equipment Sales Firm

Charles B. Darcy

The establishment of a new marine equipment sales company, known as C.B. Darcy-Marine Sales, was announced by **Charles B. Darcy,** president of the firm.

The company represents several marine equipment manufacturers; in particular, the Marine Division of Johnson Rubber Co., Middlefield, Ohio, and Diesel Systems, Inc., San Rafael, Calif.

Johnson Rubber Co., is a major manufacturer of rubber propeller shaft bearings of every size and type presently in use, and also offers heavy duty fendering and container door gasket seals.

Through Diesel Systems, Inc., Marine Sales can offer total capability diesel-driven power-generating plants and marine applications to 5,000 hp, with installation and service worldwide.

Mr. **Darcy** has over 25 years of marine experience and has held positions with several naval architectural and marine engineering firms, including M. Rosenblatt and Son, Inc., and Marine Applications Co. He is a member of The Society of Naval Architects and Marine Engineers.

C.B. Darcy can be contacted at P.O. Box 33, Glen Head, N.Y. 11545.

First In New Series Of Car/Bulk Carriers Added To Ogden Fleet

Ogden Marine, Inc., a subsidiary of Ogden Corporation, has announced that it has taken delivery of the first in a series of three combination new car and bulk cargo carriers. The new vessel, the M/V Ogden Jordan, is about 37,300 deadweight tons and 590 feet long. As a car carrier, it has a capacity of 2,115 economy-size automobiles. As a bulk cargo carrier, it can carry about 36,000 tons of bulk cargo such as coal, ore and grain.

It was built in Japan for OMI and will be employed under a long-term charter. The remaining two sister ships will be delivered in 1974, at approximately three-month intervals and have been similarly chartered.

In 1975, three additional car/bulk carriers are scheduled for delivery to OMI, and will be similarly employed under long-term charters.

Under the terms of the charter, OMI has no obligation for fuel or other operating costs.

ISES Annual Meeting Set For May 27-29 In Montreal, Canada

The 11th Annual General Meeting of ISES (International Ship Electric Service Association) will be held May 27 through 29, 1974, at the Hotel Bonaventure, Montreal, Canada. Host for this meeting will be the firm of Bedard Girard Ltd., Montreal. Scheduled to attend will be representatives of 42 member firms from 31 countries around the world. U.S. members attending will be Arnessen Electric Co., Inc., New York, Electric Industries, Inc., New Orleans, and Dahl-Beck, Inc., San Francisco.

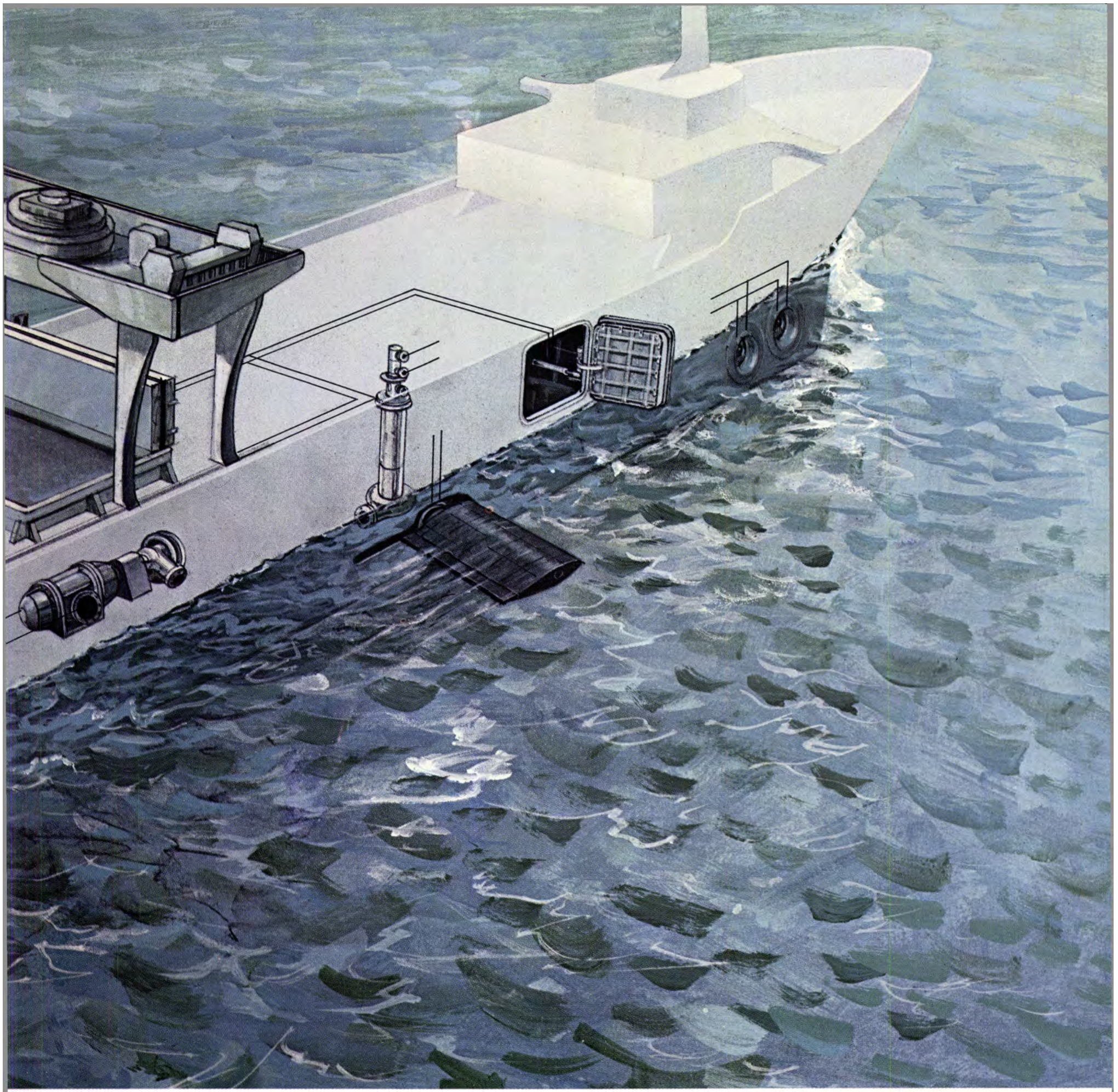
ISES was formed in 1963 by six European firms, all specialists in the field of electric/electronic service to ships. Through the years, the association's policy of careful screening of applicants has resulted in a membership comprising the most qualified firms in their respective geographic areas.

Present president of the organization is **R. Bann,** Durban, South Africa; vice president, **F. Cribb,** Montreal, Canada, and secretary-general, **G. Cave,** Manchester, England.

Design IMO® hydraulic pumps

Aboard this 'all purpose' ship are IMO hydraulic pumps for—central hydraulic systems—controllable pitch propellers—elevators—stabilizers—bow thrusters—hatch covers—steering gear—gantry hydraulics—turbine governor controls—*plus* IMO hydraulic motors driving cargo pumps, lube oil pumps and water pumps.

Use IMO pumps for any hydraulic pump application requiring smooth, reliable, quiet power. Use them as hydraulic motors



motors into your next vessel.

too—whenever it's desirable to locate rotary machinery remote from its power source or where variable speed is essential.

Above or below deck—for hydraulic power as well as lube oil, fuel oil or cargo pumping—there's a reliable, quiet IMO pump to meet your requirements. IMO pumps, the most widely used rotary pumps in shipboard service, have logged billions of nautical miles on tugs, cargo ships, passenger ships, tankers, surface naval vessels and submarines.

Not only do you benefit from experience. IMO pumps also provide the ultimate in reliability. Ship owners report operating ships for over 15 years without experiencing any failures or parts replacement.

Find out how you can design IMO hydraulic pumps or motors in your next shipboard project.

Write DELAVAL Turbine Inc., IMO Pump Division, P.O. Box 321, Trenton, New Jersey 08602.

DELAVAL

ETA Promotes McTaggart To VP Of Naval Architecture

Engineering Technology Analysts, Inc. (ETA), 4140 S.W. Freeway, Houston, Texas 77027, has announced the promotion of **Ralph G. McTaggart** from chief naval architect to vice president of naval architecture. In this new position, Mr. **McTaggart** is responsible for all naval architectural analysis of mobile offshore drilling units, ships, and barges, and assists shipyards in determining construction techniques and in eliminating possible problems. Mr. **McTaggart** is a noted author in his field, and has been recognized internationally for his achievements.

ETA is a Houston-based engineering design and consulting firm, now in its fifth year of business. ETA is involved in the design and analysis of offshore structures, marine pipelaying, and pipe stress analysis.

Mr. **McTaggart** started working in shipyards in Scotland in 1953, and since arriving in the United States in 1967, has been involved in the design, analysis, classification, and construction of drillships and self-elevating and semisubmersible drilling units. His 20 years of experience include the layout, fabrication, drafting, and design of ships, tugs, barges, and offshore mobile drilling units. Prior to joining ETA in March 1973, he worked for several of the major offshore design and fabrication companies.

Ralph G. McTaggart

Mr. **McTaggart** was recently named a member of the American Bureau of Shipping's special "Rules" committee for preparing the "Rules for Building and Classing Offshore Mobile Drilling Units," and has worked with several regulatory bodies on the design and operation of drilling units. Mr. **McTaggart** is a chartered engineer (U.K.) and a member of the Institute of Marine Engineers and The Society of Naval Architects and Marine Engineers. He received his degree in naval architecture from Stow College in Glasgow, Scotland, and holds the City and Guilds of London Certificate in Shipbuilding.

Marcona Names Bilhorn Senior VP-Marketing

William W. Bilhorn

William W. Bilhorn has been elected senior vice president-marketing for Marcona Corporation, according to an announcement by **C.W. Robinson,** president.

Mr. **Bilhorn** has served as vice president-marketing of the San Francisco, Calif.-based mining, shipping and resource development firm since April 1973, having been elected vice president-sales in 1970.

A graduate of the Wisconsin Institute of Technology, Mr. **Bilhorn** began his professional career with Kennecott Copper Company's Rancagua Mine in Chile. Following service with the U.S. Army, he spent five years with the Erie Mining Company, Hoyt Lakes, Minn. He joined Marcona Mining Company in Peru in 1960.

In 1964, he was transferred to Marcona's San Francisco headquarters to act as manager of ore scheduling, followed by two years as resident manager of the company's New York office before returning to San Francisco in 1967.

Propeller Club Of U.S. Annual Convention Set For October 16-18

Leading shipping officals make plans for the 48th Annual Convention of The Propeller Club of the United States and the 1974 American Merchant Marine Conference. Seated, left to right: **James P. McAllister,** president of McAllister Brothers, Inc., who is general convention chairman, and Capt. **Robert E. Hart,** USN (ret.), president of the Marine Index Bureau, deputy convention and conference chairman. Standing, left to right: **Edward J. Heine Jr.,** president of United States Lines, Inc., and chairman of the American Merchant Marine Conference; **Jasper S. Baker,** vice president of United Fruit Company and national president of the 12,000-member Propeller Club of the United States, and **Francis J. Barry,** president of Circle Line, Inc., and coordinating committee chairman of the convention and conference.

Maritime executives from 60 American ports and 13 foreign ports will meet in New York for the 48th Annual Convention of The Propeller Club of the United States from October 16 through 18, it was announced by **Jasper S. Baker,** national president of the 12,000-member organization. The 1974 American Merchant Marine Conference, conducted by The Propeller Club in conjunction with the convention, will hold seminars on current trade and shipping concerns under the theme "World Trade—Priority and Challenge." The convention and conference, to be held at the Waldorf-Astoria Hotel, are being organized by The Propeller Club of the Port of New York.

James P. McAllister, president of McAllister Brothers, Inc., has been named general convention chairman, and **Edward J. Heine Jr.,** president of United States Lines, Inc., will serve as chairman of the American Merchant Marine Conference. **Francis J. Barry,** president of Circle Line, Inc., will be coordinating committee chairman and Capt. **Robert E. Hart,** USN (ret.), president of the Marine Index Bureau, will serve as deputy convention and conference chairman. Capt. **Adrian P. Spidle,** vice president of Prudential-Grace Lines, Inc., is president of the host Propeller Club in New York.

The Propeller Club of the United States was formed as a national organization in 1927 to promote and support an American merchant marine, including all American-flag commercial craft in foreign and coastwise service, and on inland waterways. The organization, whose individual member clubs in the United States and overseas are designated as "Ports," originated in New York, where The Propeller Club was established in 1923 as "Port No. 1." There are also 13 Student Port Clubs at colleges teaching marine engineering, naval architecture, foreign trade, transportation and related subjects.

Marine Gauging Guide Offered

An 18-page Application Guide AG-1, describing Metritape® marine gauging, is being offered at no charge by Metritape, Inc., 77 Commonwealth Avenue, West Concord, Mass. 01742.

It explains and illustrates the patented Metritape concept for gauging the levels of liquids, slurries, and dry bulk solids by means of a unique and simple resistive sensor having no moving parts, and providing a stable and accurate output independent of material specific gravity, material temperature, or tank pressure. Application to local and remote gauging of cargo, ballast, draft, waves, and general ship's tanks is described. Illustrations show analog and digital level readouts, adjustable high and low level alarms, and Metrotemp™ product temperature indication.

Diesel And Williams Head Shipbuilders New Committees

The board of directors of the Shipbuilding Council of America has authorized the establishment of two new committees—the Executive Committee and the Finance Committee—to divide the functions of the single Executive-Finance Committee.

John P. Diesel, president, Newport News Shipbuilding and Dry Dock Company, has been elected chairman of the Executive Committee, which will continually assess trends and conditions affecting the shipbuilding/ship repairing industry and recommend policy guidelines to the board of directors.

Other members of the Executive Committee elected by the board are: **Thomas J. Defoe,** president, Defoe Shipbuilding Co.; **John T. Gilbride,** president, Todd Shipyards Corp.; **Edwin Hartzman,** president, Avondale Shipyards, Inc., and **Walter F. Williams,** vice president-shipbuilding, Bethlehem Steel Corporation.

For the purposes of coordination, Mr. **Williams** has been named chairman of the Finance Committee, which will oversee the council's financial affairs.

Other members of the Finance Committee are **James F. Goodrich,** president, Bath Iron Works Corporation, and **Ned J. Marandino,** president, Ingalls Shipbuilding.

Also, in recent weeks, the following additional committee chairmanships were announced: Allied Industries—**J.W. Chandler,** Borg-Warner Corp., York Division; Industrial Health and Safety—**John A. Chantrey,** Avondale Shipyards, Inc.; and Industrial Relations—**Devon Smith,** National Steel and Shipbuilding Company.

Marchessini Promotes Thomas J. Giardino

Thomas J. Giardino

Alexander P. Marchessini, president of the Marchessini Lines, has named **Thomas J. Giardino** general traffic manager. Mr. **Giardino** is well-known in the shipping industry, having been in the transportation field for many years.

It was also announced that **Robert J. Hannon,** who has been with the Marchessini Lines for the past 14 years, will succeed Mr. **Giardino** as outward traffic manager.

G. Gerry Gedenk, inward freight manager, in addition, will assume the responsibilities of claim manager.

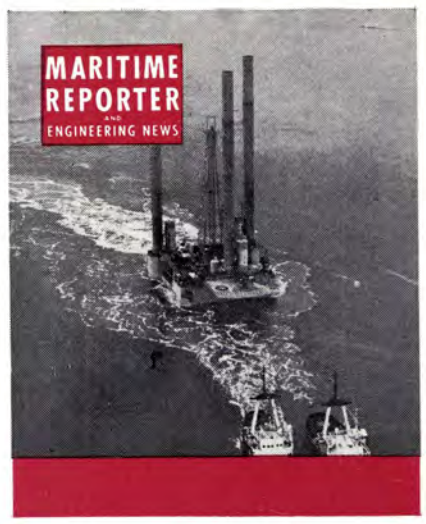
Marchessini Lines, one of the foremost independent operators, maintains a monthly service from East Coast ports to the Far East, as well as a service from United Kingdom and Continental ports to the East Coast and Far East.

Webb Institute Alumni Homecoming Scheduled For June 29

The Webb Institute of Naval Architecture Alumni Association will hold its Annual Homecoming on Saturday, June 29, at Webb, Glen Cove, Long Island, N.Y.

The annual meeting of the Alumni Association will start at 3:30 p.m. in the auditorium. All alumni, their guests, and their ladies are welcome. Rear Adm. **William A. Brockett,** USN (ret.), will deliver his farewell message as president of Webb Institute. Rear Adm. **Charles Payne** will be welcomed as the incoming Webb president. **Don Caldera,** president of the Alumni Association, will chair the meeting.

A cocktail party will be held on the main veranda, overlooking Long Island Sound, from 5 p.m. to 6 p.m., followed by a buffet dinner to be served from the veranda and enjoyed at tables on the upper terrace lawn—weather permitting.



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Let's face it... the offshore oil drilling market is a part of the marine industry. Drilling rigs, supply vessels, crew boats, research vessels, workboats, tugs, dredges, barges, etc.... are all designed by naval architects, constructed in shipyards and operated by vessel owners.

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MEMBER BPA
Business Publications Audit of Circulation, Inc.

DIESEL GENERATOR SETS

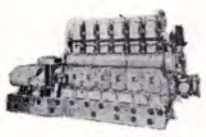
1

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

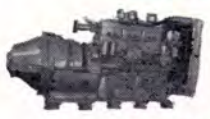
250 KW DIESEL GENERATOR SET



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

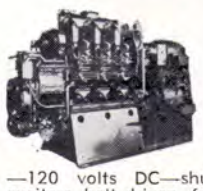
EMERGENCY GENERATOR SUPERIOR 75KW 120/240 VOLT D.C. DIESEL GENERATOR SET



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

415 KW 250 VOLT DC GM 6-278 DIESEL GENERATOR SETS



ENGINE: GM Model 6-278—6-cylinder—8½ x 10½—2-cycle—800 RPM—complete with heat exchanger. GENERATOR: Allis-Chalmers—415 KW—250 volts DC—800 RPM—1660 amps—shunt wound. Top mounted exciter—800/1600 RPM—208 amps—type EB5-123. Pilot exciter 2½KW—120 volts DC—shunt wound—20.8 amps. Both exciters belt-driven from main generator shaft.

5

ELECTRIC PROPULSION MOTOR

1 Available. 515 HP—230 volts DC—shunt wound—1040/1400 RPM—1660 amps—120 volts DC exciter.

6

ALSO SUITABLE FOR COMPANIES OPERATING AN NET TENDERS

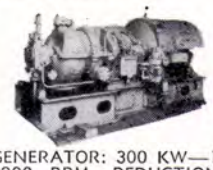
TURBO GENERATOR SETS

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



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

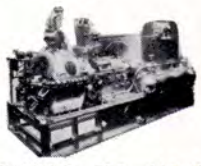
GENERATOR: 300 KW—120/240 VDC—1250 amps—1200 RPM. REDUCTION GEAR: 8.344:1—10012/1200 RPM—type S-182. TURBINE: DOR418N—449 H.P.—10012 RPM—working pressure 180/220 PSIG.

9

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.

10



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

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

11

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.

12

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.

13

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

14

BETH. CLASS—13,600 H.P.

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

15

H.P. & L.P. COUPLINGS

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

16

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

17

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

18

T2-SE-A1 MAIN PROPULSION ROTOR—G.E.

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

19

T-2 TANKER UNUSED—4 UNITS AVAILABLE

AUX. G.E. TURBO GEN. ROTORS

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

20

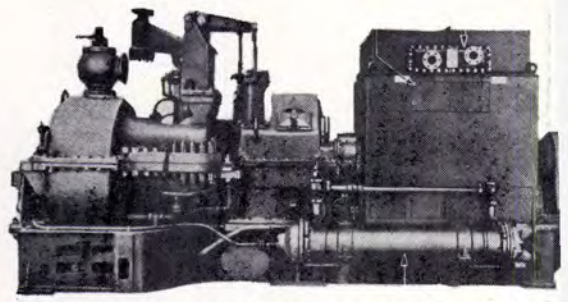
KNOWN 'ROUND THE WORLD

THE BOST

313 E. BALTIM

Main Office: (301)

TURBO GEN



TURBINE: 11 Stage type FN4— 8145 RPM—3½" stea absolute back pressure—complete steam with seal regulatc

GEAR: Type S-195A—reduction 8145 RPM to 1200 RP

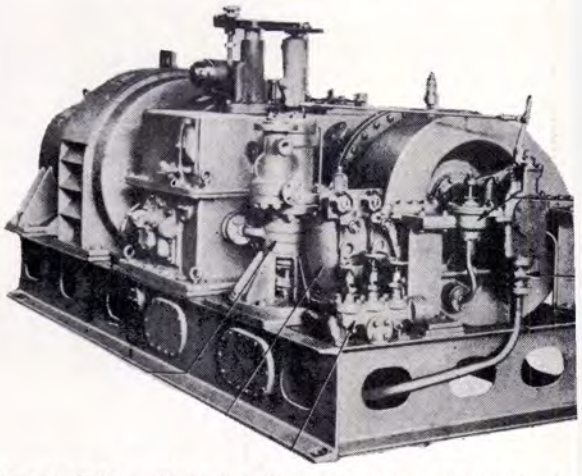
GENERATOR: 1500 KW —450 volts—2405 amps—12(enclosed. Insulation: Class B stator and rotor. Temperatu thermometer. Mfg type AT1—form HL. Oil lubricated by sump in turbo generator set base. Generator cooling: —120 volts —110 amps—40°C rise—frame 654—mfg

GENERAL INFORMATION: Overload rating 2 hours—12 weight 36,000 lbs. Guaranteed steam flows & condition flange. The set will carry 1500 KW with steam conditior flange. The set will withstand 644 PSI and 850°F. Gu at exhaust flange:

50% Load	—	750 KW	—	D.(
75% Load	—	1125 KW	—	D.(
100% Load	—	1500 KW	—	D.(

Exhaust flange size: 18" x 38" rectangular.

21



GENERATOR: 400 KW 450 volts 3-phase 1200 RPM 0.8 sulation—natural self-ventilated cooling. Exciter: 50 KW

GEAR: Single helix—single reduction—10059/1200 RPM

TURBINE: Six stage—10059 RPM—525 PSI—825°F no tors. **OVERLOAD CONDITIONS AT NORMAL STEAM 525** overload for 2 hours at normal conditions; overload capa turbine generator will deliver full load output 400 KW A capable of withstanding 634 lbs PSIG 850°TT.

STEAM FLOWS

100% Load	—	400 KW AC	—	
75% Load	—	300 KW AC	—	
50% Load	—	200 KW AC	—	

When operating at 575 PSIG & 0° Superheat and 1 lb/s

125% Load	—	500 KW AC	—	
100% Load	—	400 KW AC	—	
75% Load	—	300 KW AC	—	

UNIT DESIGNED FOR NAVY FOR DD692 CLASS DEST HOUSE 8316.

Since Westinghouse and G.E. built them for the same cla able.

DIMENSIONS: OAL 10' 10⅛"—OAW 4'10½"—OAH 5'5

TOTAL WEIGHT: 14,855 lbs.

2" steam inlet—17" Round exhaust—20½" bolt circle.

UNIT DIMENSIONS OAL 16' 3⅜"—OAW 6'6"—OAH

ON METALS CO.

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9-1900 Marine Dept.: (301) 355-5050

RATOR SETS

4 G.E. 1500 KW AC SHIPS SERVICE SETS

G.E.I. BOOK 19320

inlet. Normal steam conditions 525 PSI 825°TT—1 lb

RPM—P.F. 0.8—60 cycles—3-phase—6-pole—totally rise normal—stator 60°C by thermometer—rotor 70°C by positive displacement pump for gears and bearings from stream and circulating water. Amplidyne Exciter: 13.2 KW type 5AM654A1.

% load; Overload rating 5 minutes—150% load. Total normal 525 PSIG—825°TT and 1 PSI absolute at exhaust 420 PSIG and 825°TT and 1 PSI absolute at exhaust anteed steam flows—525°F & 825°TT at 1 PSI absolute

Exciter 5.9	—	Steam Flow 8190 lbs/hr
Exciter 8.0	—	Steam Flow 11385 lbs/hr
Exciter 10	—	Steam Flow 14790 lbs/hr

400 KW WESTINGHOUSE/GE DESIGN

MFG. BY WESTINGHOUSE

PF 641 amps alternating current generator—class B in-—120 VDC—1200 RPM.

mal. Type G.E 618N—equipped with synchronizing mo-**LBS/825°TT:** Sets 500 KW AC and 62.5 KW DC—city 50%—600 KW & 75 KW DC for five minutes. The C & 50 KW DC at 420 lbs and 825°TT. The turbine is

	STEAM RATE
50 KW DC	5100 lbs/hour
37½ KW DC	3999 lbs/hour
25 KW DC	2885 lbs/hour

quare inch absolute back pressure at flange:

62½ KW DC	—	8720 lbs/hour
50 KW DC	—	6980 lbs/hour
37½ KW DC	—	5450 lbs/hour

ROYER—G.E. INSTRUCTION BOOK 17716—WESTING-

ss destroyer, G.E. and Westinghouse parts are interchange-

5¼".

7'5¼" over steam strainer.

PUMPS

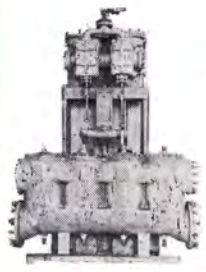
22

CARGO STRIPPING PUMPS

BRONZE T2 TANKER STRIPPING PUMPS

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

23



WORTHINGTON 16"x14"x18" VERTICAL DUPLEX STRIPPING PUMP

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

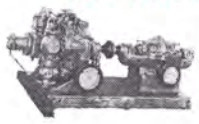
24

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.

25

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.

26

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.

27

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

28

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

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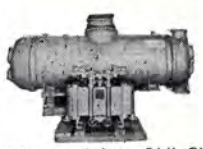

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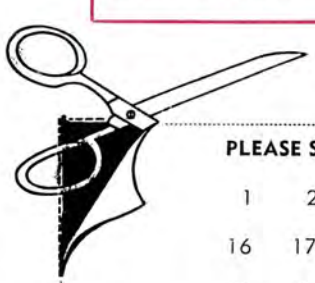

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Harold G. Holden

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Mapping Of Ship Characteristics

more complete design calculations.

Hence, an advanced method is required whereby a simple storage

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inlet. Normal steam conditions 525 PSI 825°TT—1 lb

RPM—P.F. 0.8—60 cycles—3-phase—6-pole—totally rise normal—stator 60°C by thermometer—rotor 70°C by ositive displacement pump for gears and bearings from stream and circulating water. Amplidyne Exciter: 13.2 KW ype 5AM654A1.

6 load; Overload rating 5 minutes—150% load. Total normal 525 PSIG—825°TT and 1 PSI absolute at exhaust 420 PSIG and 825°TT and 1 PSI absolute at exhaust nteed steam flows—525°F & 825°TT at 1 PSI absolute

Exciter 5.9	—	Steam Flow 8190 lbs/hr
Exciter 8.0	—	Steam Flow 11385 lbs/hr
Exciter 10	—	Steam Flow 14790 lbs/hr

400 KW WESTINGHOUSE/GE DESIGN

MFG. BY WESTINGHOUSE

°F 641 amps alternating current generator—class B in--120 VDC—1200 RPM.

al. Type G.E 618N—equipped with synchronizing mo-**.BS/825°TT:** Sets 500 KW AC and 62.5 KW DC—ty 50%—600 KW & 75 KW DC for five minutes. The & 50 KW DC at 420 lbs and 825°TT. The turbine is

	STEAM RATE
50 KW DC	5100 lbs/hour
37½ KW DC	3999 lbs/hour
25 KW DC	2885 lbs/hour

ıare inch absolute back pressure at flange:

62½ KW DC	—	8720 lbs/hour
50 KW DC	—	6980 lbs/hour
37½ KW DC	—	5450 lbs/hour

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destroyer, G.E. and Westinghouse parts are interchange-

¼".

7'5¼" over steam strainer.

PUMPS

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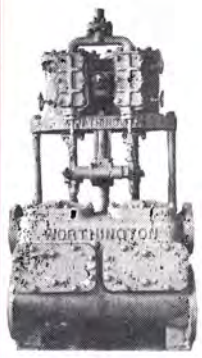
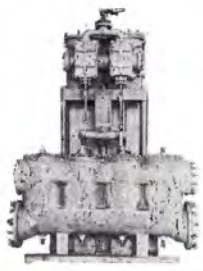


CARGO STRIPPING PUMPS

BRONZE T2 TANKER STRIPPING PUMPS

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

23



WORTHINGTON 16"x14"x18" VERTICAL DUPLEX STRIPPING PUMP

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

24

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.

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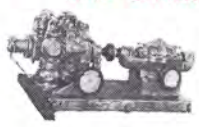
NEW TURBINE DRIVEN FIRE AND GENERAL SERVICE PUMP



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.

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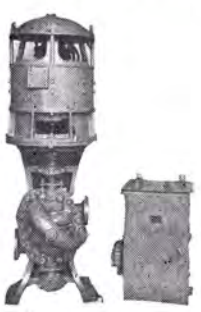

DAYTON-DAWD 2-STAGE FIRE AND BILGE PUMP

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.

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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

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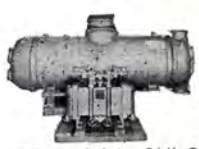

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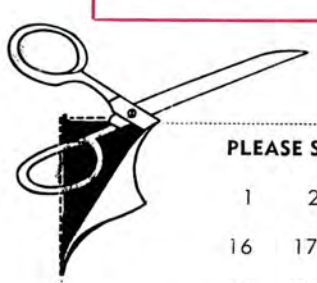

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Tribute to a grand lady

When Sam Goldstein, President of Apex Oil Company of St. Louis, Missouri, ordered their new Hydrodyne towboat from St. Louis Ship, he wanted it to be something special. Before the boat was designed, Sam had already selected the name Gloria G, as a tribute to his wife Gloria. This new 5600 H.P. Hydrodyne measures 138′ x 44′. It was designed and built by St. Louis Ship for use in the petroleum trade. St. Louis Ship is proud to have built the Gloria G, and to have shared in this Tribute to a Grand Lady.

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Mapping Of Ship Characteristics Provides Many Solutions To Ship Design Problems

D. Hoffman and T. Zielinski*

The unique geometrical characteristics of ship forms, being usually of an empirical shape rather than a single simple geometric form or a combination of several simply defined shapes, have led to a rather specialized hull-form design practice.

The early designer could not define the hull mathematically and therefore could not determine the simple hydrostatic characteristics such as volumes and centroid locations analytically. The thrust of the designer's effort was therefore diverted toward the development of graphical means to describe the form, as well as refinement of the various approximate numerical integration techniques and their application to everyday design. Simultaneous efforts to derive empirical or semi-empirical expressions for aid in preliminary design were made along with the derivation of appropriate parametric coefficients defining the general characteristics of the hull.

In today's practice of ship design and production, a more sophisticated approach must be adopted in defining the ship form. The benefits of mathematical hull form representation for a wide variety of ship design calculations and practices, as well as production methods, are currently being recognized by the profession. The analytical approach, where the ship surface is defined wholly or in part by mathematical equations, has been vigorously pursued in the past.

In spite of the rapidly accumulating information, mathematical hull-form representation has remained a matter of interest, but not a usable tool accepted by the designer, and therefore it has not been generally adopted. Partial use of polynomial-fit methods is presently being used for representing curve segments only and not the complete ship section. Due to the fact that any mathematical description of the ship hull, whether the spline, polynomial or surface-fitting method, requires extensive numerical calculations, the use of such methods therefore depended to a large extent on the advent of computers as a tool in ship design.

The introduction of computers in general, and as an aid to ship design in particular, has been generally accepted by the profession, particularly in its simplest mode, as a sophisticated tool to perform routine tasks of repetitive nature. Such applications are generally of immediate economic return, as they allow a substantial reduction in man-hours together with greater accuracy and thoroughness.

The mathematical description of the ship form is needed as basic information for most computer-aided ship-design procedures, as well as for lofting and automated production systems. With the introduction of interactive computer graphics, the generation of polynomial-defined lines is becoming a promising tool in the preliminary design stage. It facilitates not only the visual inspection of the lines but also the immediate determination of important design parameters, such as the location of the center of buoyance, volume up to specified waterline, metacentric height, or any other variable which is a function of the ship's shape.

Much effort in recent years has been directed to computerized lines fairing; i.e., the mathematical approximation of the ship lines and automated fairing in place of 1/10 or full-scale loft work.

C. von Kerczek, and E.O. Tuck, in their paper entitled "The Representation of Ship Hulls by Conformal Mapping Functions", Journal of Ship Research, 1969, first demonstrated that mapping functions could be used for geometrically describing a ship's section. They showed that the Series 60 hull sections could be mapped very accurately using a limited number of terms in the mapping series, but made no attempt to extend their application to calculate hydrostatic hull characteristics using such representation.

Mapping, as a method of hull representation, has several advantages over the more commonly used polynomial fit. The major one being the ability to describe the whole section by one mathematical equation. Furthermore, for all practical purposes, it can describe vertical lines and sharp chines which the polynomial fit cannot handle because of numerical instability. One specific problem which plagued conformal mapping in the past was the inability to represent a section flared in the vicinity of the waterline. However, it has now been found that with an additional number of terms in the mapping series flare and other difficult shapes can be represented very accurately.

The mathematical ship's hull representation is useful for many analytical calculations such as hydrostatics and stability, but is essential for ship motions, wave-induced hull loads, pressure resistance due to wavemaking, vibrations, maneuvering and the finite element analysis of the ship structure. Conformal mapping is ideally suited to the latter. Furthermore, the introduction of conformal mapping for ship lines representation would allow other calculation procedures of advanced concepts that are not ordinarily used in routine ship design calculations. A typical example is the transverse stability of ships in following seas. In spite of excellent work and the importance of the subject for safe ship operation, the required calculations have not been adopted on a routine basis. Many other calculations not presently investigated on a routine basis, such as shear force and bending moments of a damaged ship in waves, would make possible more complete design calculations.

Hence, an advanced method is required whereby a simple storage of the ship lines as a data bank can be facilitated. For preliminary design the delineation of the underwater part of the ship by conformal mapping offers several distinct advantages, in that it not only produces the required sectional shape but as a by-product it provides the added mass and damping characteristics of the two-dimensional sections as required for seakeeping and maneuvering calculations. Furthermore, the sections are automatically fair, with adequate control of local section shape provided by the individual mapping coefficients. The mapping coefficients which define the section geometrically and hence the hydrostatics of the hull also define the hydrodynamic characteristics of the section under oscillating conditions.

The above advantages constitute the reasons for the choice of conformal mapping for detailed study as a means for lines generation and subsequent ship design calculations. Figure 1 illustrates the ship system design as related to the ship lines. The diagram is by no means complete and indicates the extent to which the mathematical ship lines are being used presently. Five major categories are cited:

1. Hydrostatics
2. Quasi-static loads and stability in waves
3. Hydrodynamics
4. Structural analysis
5. On-board computer systems

As shown in the figure, a certain amount of interchange between the above categories is expected. The common element for all the above topics is the need for a form definition of the hull, not necessarily limited to the underwater portion.

The hydrostatics category in-

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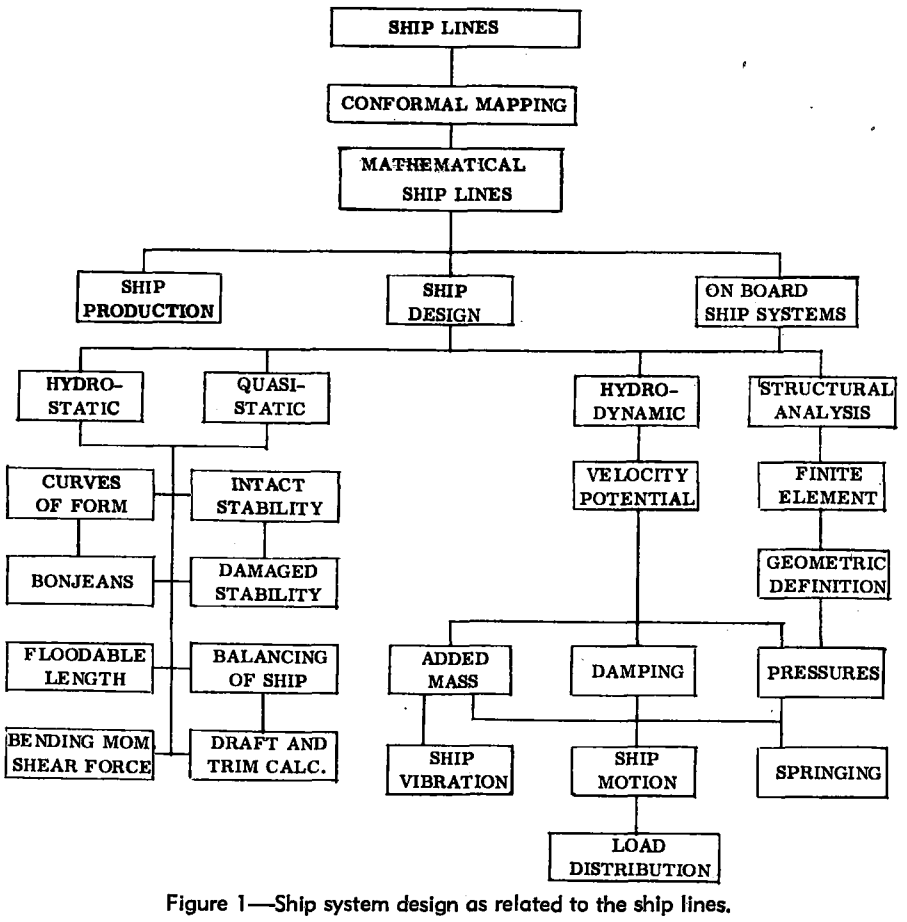


Figure 1—Ship system design as related to the ship lines.

*Mr. **Hoffman,** research professor of naval architecture, and Mr. **Zielinski,** research assistant, Webb Institute of Naval Architecture, presented the paper abstracted here before a recent meeting of the Metropolitan Section of the Society of Naval Architects and Marine Engineers. The complete paper relates recent developments to studies reported in previous papers in order to make it a useful addition to the industries' technologies.

cludes the curves of form, the bonjean curves, trim calculations and a static bending moment evaluation. In addition, the floodable length calculation and large-angle stability, both in the intact and damaged condition, are also described. All of these, and any other calculations requiring offsets or form definition, can be performed using as input the mapping coefficients. It will be shown how, instead of performing numerical integrations of curves defined by offsets, one can proceed as follows:

1. Apply conformal mapping techniques to determine a close fit to the section shapes up to the deck.
2. Hence, determine the mapping coefficients that define the sections.
3. Finally, compute analytically the area or centroid of each section to any waterline using the mapping coefficients.

The quasi-static calculations include the effect of stationary waves on stability (intact and damaged), floodable length, and bending moment and shear calculations. The quasi-static wave can be a trochoidal wave, a sinusoidal wave or an irregular wave of any amplitude, phase and length.

The hydrodynamics category includes the added mass and damping coefficients for both vertical and lateral oscillation at finite and infinite frequencies which are necessary inputs for all ship motion and maneuvering calculations, as well as for determining the pressure distribution over the hull due to ship motion.

The pressure distribution in waves is a necessary input for the fourth category, i.e., the structural analysis of the ship using finite element techniques. In addition, the conformal mapping provides a geometric representation of the ship surface which is required for the generation of the mesh of nodal points to define the elements on the surface.

Conformal mapping representation of ship lines, because of its concise form, is well suited for minicomputer systems placed on board many of today's ships. The monitoring of loading and unloading of tankers, and a heavy weather damage avoidance and guidance system, are two on-board systems presently being introduced which use conformal mapping representation as a data base.

The above described the more widely useful possible applications of conformal mapping, but it by no means includes all possibilities. For example, problems such as slamming pressures are also related to hull form, which, in turn, can be defined by the mapping coefficients. It is intended therefore to use the coefficients as the basic data bank stored in the computer for the purpose of all ship calculations requiring ship form definition.

The introduction of the minicomputer to the commercial world has opened up a new larger scope for improvements and sophistication of navigational aids in both calm and high seas, as well as automated control of ship loading, unloading and stability, safety and control equipment, engine room monitoring and others.

In order to make such systems economically attractive to the ship owner the emphasis has been shifted to advances in software, i.e., computer programs and input-output information, rather than complicated expensive hardware which is not easily accessible to expert service due to ship schedules. One of the major considerations in the development of such systems is the limitation of computer core size to a minimum, as the cost of core can often determine the economical feasibility of the entire system. As mentioned before, with emphasis being on software, the ability to put the size of the programs and the input data required to operate the system without affecting the overall efficiency and accuracy of the results is an absolute necessity.

Two specific applications of conformal mapping coefficients input for on-board ship systems are 1. a static condition for monitoring stress and stability while loading and unloading of tankers, and 2. a dynamic application such as Heavy Weather Damage Avoidance and Guidance system. Other applications in areas such as weather routing, automatic loading control of tankers, and damage stability control are presently being developed.

Conclusions

In the preceding presentation, the authors attempted to introduce the reader to conformal mapping techniques as well as to illustrate numerous new applications to ship system design in which it can be used.

The purpose of the paper is twofold:

1. To present a tool of ultimate great potential in ship system design.
2. To extend current practices using that tool to include new improved design procedures, and new on-board systems.

As a tool in ship design, the method presented is a suggested alternative to currently available techniques, a new approach that does not change the end product. Though some distinct advantages of this method have been cited throughout the paper, the authors are naturally aware of its possible shortcomings, particularly the complexity of the mathematics required to generate the mapping coefficients in comparison to the simple numerical integration approach currently used.

One of the great advantages of the approach is the generality of its use and the possibilities of exploring new design procedures. Although a rather comprehensive treatment of the use of conformal mapping in ship design is illustrated in Figure 1, it is felt that other applications not mentioned exist as well. Such cases may include wetted surface and shell expansion calculations, the hydrostatic aspect of launching calculations or the definition of the lower portion of the hull as required for slamming pressure prediction. Once a physical understanding of the mapping coefficients is acquired, the impact on preliminary ship design may be considerable. When designers learn to work directly with the coefficients, the full potential of the method may be realized. This in turn will completely justify the adoption of the approach as a standard technique for most ship calculations.

The accuracy and adequacy of the method have been proved beyond a doubt, and the ability to store ship data bank on a minimum size core computer may be found very attractive to users utilizing their own small or mini-computers or time-sharing services.

It seems fair to conclude that this particular technique of mathematical hull line representation is of rather general usefulness in ship system design. However, like any other tool, one should use it as a means for an end and properly select its applications so as to improve current techniques rather than simply to adopt it as a mathematical exercise.

APL President Scott In Line For Post Of Secretary Of Navy

San Francisco shipping executive **Norman Scott** is said to be President **Nixon's** leading choice to succeed **John W. Warner** as Secretary of the Navy. Administration sources said that Mr. **Scott,** who is president of American President Lines, was being cleared with key members of Congress.

Mr. **Scott,** a graduate of the United States Naval Academy, is the son of an admiral who was killed in action off Guadalcanal in World War II.

Also considered for the Cabinet post is the Under Secretary of the Navy **J. William Middendorf,** who has been in charge at the Navy Department since Mr. **Warner** resigned to head the Bicentennial Commission.

Aerojet-General Names Edward Brown To New Group Vice Presidency

Edward I. Brown, an executive with wide experience in industrial manufacturing, has been appointed to a newly created position of group vice president at Aerojet-General Corporation, El Monte, Calif.

Mr. **Brown** was formerly president of the Remington Shaver Division of Sperry Rand Corporation, and earlier, president of Sperry's Remington Rand Division. He also held executive management posts directing the manufacture of hydraulic products and heavy machinery during his 20 years with Sperry.

Mr. **Brown** will have corporate responsibility for three Aerojet operating companies specializing in mechanical products—Aerojet Liquid Rocket Company of Sacramento, Calif., Johnston Pump Company of Glendora, Calif., and General Valve Company of Fullerton, Calif.

Moore McCormack First Quarter Net Up More Than 50%

James R. Barker, chairman and chief executive officer of Moore McCormack Resources, Inc., Stamford, Conn., has announced that operating earnings for the quarter ended March 31, 1974, were up substantially from the comparable 1973 period.

Income before extraordinary items for the 1974 March quarter amounted to a record $2,659,000, or $1.11 a share, up 56% from $1,708,000, or $.71 a share in the first quarter of 1973. Per share results are based on 2,391,354 average shares outstanding.

Extraordinary items amounted to $180,000 or $.08 per share, compared with $308,000, or $.13 per share the year before.

At the same time, revenues of $39,162,000 compared with $14,739,000 in the first quarter of 1973, when the company's principal activity was Moore-McCormack Lines which provides cargoliner service from Atlantic Coast U.S. ports to the east coast of South America and South and East African ports. First quarter results this year include operations of Pickands Mather & Co., acquired April 3, 1973. Pickands Mather's activities include operation of iron ore and coal mining properties, management and ownership of limestone and coke facilities, operation of Interlake Steamship, a Great Lakes bulk carrier fleet, and acting as a sales agent for various materials.

Mr. **Barker** stated that the favorable first-quarter comparison was attributable principally to operations of Moore-McCormack Lines and to PM's coke and coal activities which have all benefited from substantial increases in operating volume. Mr. **Barker** noted that iron ore and coal mining and Great Lakes Bulk transport operations of PM make their major contribution to Moore McCormack Resources from the beginning of the second quarter through the balance of the year.

Mr. **Barker** commented that "strong demand for our products and services reinforces our confidence that second quarter results also will compare quite favorably with 1973 performance."

Delta Elects New Directors And Officers

The election of two new members of the board of directors, three new corporate officers and a managerial promotion was announced by Capt. **J.W. Clark,** president of Delta Steamship Lines, Inc., following the company's recent annual meeting.

The new directors are **Roy E. Winegardner,** first vice chairman of the board of Holiday Inns, Inc., and **Clyde H. Dixon,** executive vice president of Holiday Inns, Inc. Holiday Inns, Inc. is the parent company of Delta Steamship Lines.

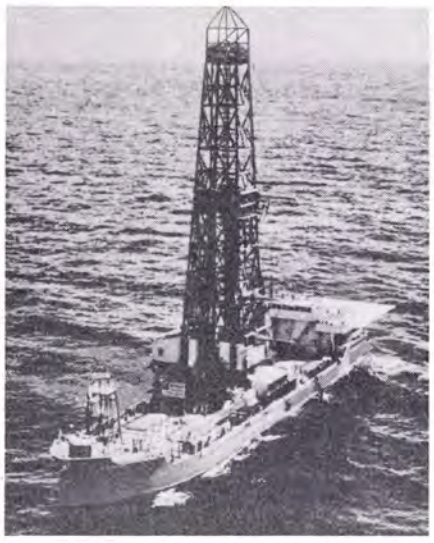
Other directors reelected were **F.E. Farwell,** president of Milliken and Farwell, Inc.; **William B. Burkenroad Jr.,** president of J. Aron & Co.; Capt. **J.W. Clark; L.M. Clymer,** president of Holiday Inns, Inc.; **Fred G. Currey,** president of Tco Industries; **C.A. Sporl Jr.,** chairman of the board of Frank B. Hall of La., Inc.; **George G. Westfeldt Jr.,** president of Westfeldt Bros., Inc., and **Kemmons Wilson,** chairman of the board of Holiday Inns, Inc.

Elected as corporate officers were **Thomas W. Harrelson,** promoted to vice president, while also retaining his present title of assistant to the president; **Richard V. Collins** to assistant vice president, and **Larry J. Byers** to assistant vice president-operations.

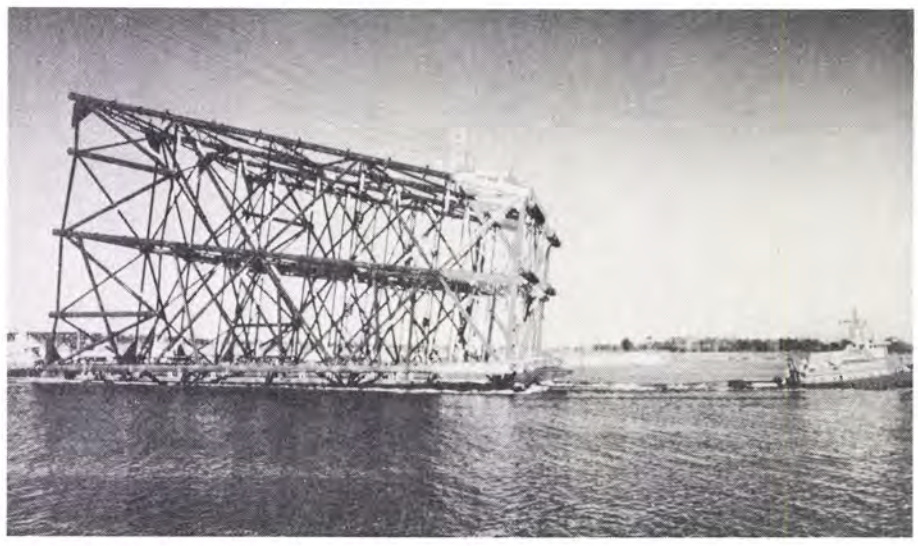
Other officers reelected included **F.E. Farwell,** chairman of the board; Capt. **J.W. Clark,** president; **J.F. Badger,** vice president-market research; **R.N. Burguieres,** assistant vice president and assistant secretary; **H.D. Hunter,** vice president-Eastern Division; **Mario Iacona,** vice president - South America; Capt. **D.P. Kirby,** vice president-operations; **J.D. Landry Jr.,** assistant vice president-sales; **J.A. Munster,** vice president-treasurer; **R.J. Nolan,** assistant vice president and assistant treasurer; **W.E. Walker,** assistant vice president-traffic; **F. A. Wendt,** vice president-traffic and sales, and **R.W. Wismar,** secretary.

Captain **Clark** also announced that Capt. **E.R. Seamen** was promoted to manager-marine operations.

Delta Steamship Lines, Inc. owns and operates a fleet of modern American-flag cargo vessels serving the east coast of South America, Central America, the Caribbean and the west coast of Africa, from ports in the Gulf of Mexico.

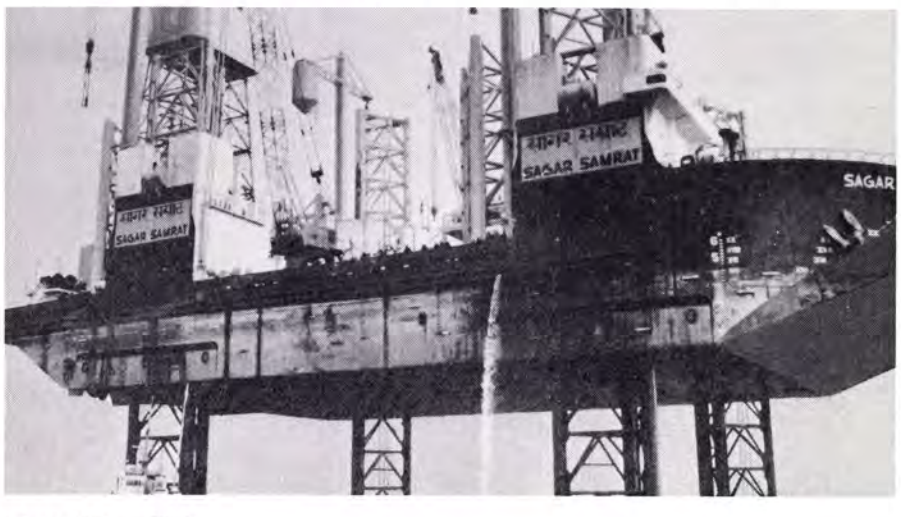


Three ALCO, 12-cylinder diesels power drill ship DISCOVERER II in Malaysia.



WORLD'S LARGEST JACKET, 12 piers, leaves Houston for Ekofisk behind ALCO-powered Mr. Harold on 6,061 mile tow at average speed of 6.95 knots.

SANTA FE INTERNATIONAL'S CHEROKEE, converted to work as bury barge on Ekofisk pipeline, has eight 4,000 BHP Alcos driving high pressure water pump to bury sled.



Jack up SAGAR SAMARAT goes to work off India with power from four ALCO 251 diesel engines.

$13 Million In Orders To Rucker Company For Offshore Equipment

The Rucker Company, Oakland, Calif., a manufacturer of equipment for offshore petroleum drilling, has received five orders totaling approximately $13 million for products on new semisubmersible drilling rigs to be built for Norwegian and U.S. offshore drilling contractors. The equipment is to be delivered during 1975 and 1976, according to the company, and all orders are subject to price escalation within certain limits.

Rucker will supply 15 sets of drill string motion compensators, 15 sets of riser and guideline tensioning systems, and 10 sets of subsea spherical or ram blowout preventers. The items will be manufactured by Rucker Control Systems in Oakland, Calif., and Rucker Shaffer Division in Houston, Texas.

The equipment will be fitted to 17 new semisubmersible drilling rigs to be constructed for petroleum exploration and development in the North Sea. These include 10 Aker H-3 design rigs and one Odeco rig being built for various owners, four SS-2000 semisubmersibles for Zapata Corp., and two Pentagone-design rigs for Gowart-Olsen. In addition, options for equipment on two additional rigs have been granted to two of the purchasers.

The Rucker Company is primarily engaged in developing, manufacturing and marketing petroleum drilling and well completion equipment used in drilling operations on land and offshore. The company is also engaged in developing and manufacturing electrical safety products, and in distributing hydraulic and pneumatic components used in industrial equipment.

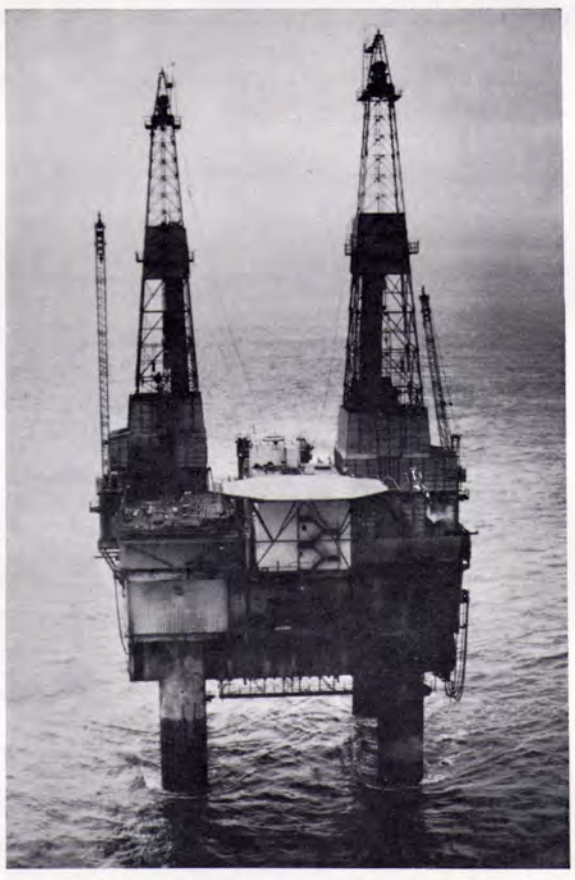
If all you want to save is space, piping, installation time, power and money ...consider Johnston verticals.

In today's maritime world—where time and space are money—there are more practical reasons than ever for using Johnston verticals.

Less space required. Johnston verticals take up at least 50% less space than a comparable horizontal centrifugal.

Less installation and maintenance time. Johnston verticals are unit-assembled and register-fitted for rapid assembly, easy maintenance and maximum interchangeability of parts.

Less power consumption. The vast majority of times a vertical will be a more efficient unit and consume less power than a horizontal centrifugal doing the same job. In addition, Johnston verticals are specifically engineered to meet NPSH requirements and to operate safely at any capacity without overloading.



This production platform in Cook Inlet, Alaska, represents a complete oil field operation, including water injection field. Johnston pumps, highly suitable because of their vertical configuration, serve as crude oil loading pumps.

On each pump application look at the advantages vertical turbines give you—and look to Johnston for vertical turbines... and mixed flow and axial flow verticals as well. Maximum compatability with a variety of basic drivers. Sizes from 10 to 200,000 GPM, for heads from 5 to 4,000 feet.

For all of the facts, or technical assistance of any kind, call your local Johnston office today.

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Johnston Pumps

Marcona Elects New Officers For Subsidiaries

M.J. Fraser

J.C. Koepke

R. Heinicke Jr.

Marcona Corporation, San Francisco, Calif. international shipping, mining and resource development concern, has announced the election of the following officers for three of its major subsidiary companies: **M.J. Fraser,** vice president-Marcona International, S.A. and Marcona Sales, Inc.; **J.C. Koepke,** vice president-Marcona International, S.A. and Marcona Carriers, Ltd., and **R. Heinicke Jr.,** vice president-Marcona Carriers, Ltd.

Mr. **Fraser** is general manager-Ore Sales Division for the parent company and has held a variety of responsibilities in product development, geological evaluation and mineral resources development since joining the firm in 1966.

Mr. **Koepke** serves as general manager-Marine Operations Division for Marcona Corporation and is primarily responsible for the company's ocean transport fleet, which currently includes more than 1-million deadweight tons of owned vessels, plus an additional 1.5-million tons of chartered ships.

Mr. **Heinicke** is Marcona's general manager-Fleet Operations and heads the company's activities in fleet personnel and manning, navigational and safety procedures, port surveys, special marine port projects and governmental liaison.

Messrs. **Fraser, Koepke** and **Heinicke** are all located at Marcona's San Francisco headquarters.

Mobil Exploration Large Oil Find Reported By Norway

An oil find in the North Sea with a big potential has been reported by the Norwegian Government.

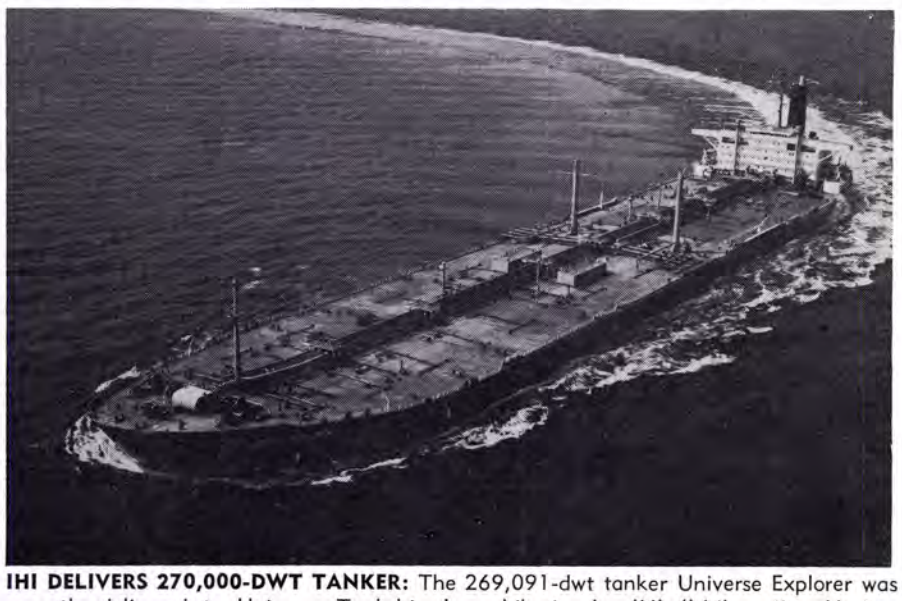
Mobil Exploration, Norway, the operator, had carried out tests of its first well in the Brent Field northwest of Bergen, showing a maximum daily production of 10,560 barrels, according to the Government oil directorate.

Experts said the Brent Field could have bigger potential than the Ekofisk Field, operated by the Phillips Group, which is expected to have a production of almost 19-million tons by 1980.

So far, tests indicate that the new oil resources were mainly concentrated in the Norwegian Section of the North Sea, and did not straddle the dividing line into the British Section of the North Sea.

This interpretation could be made because the first well by Mobil Oil in the Brent Field was drilled almost exactly on the dividing line.

Drilling of a second well has already started in the northeast. This was being done to test the magnitude of the field, the announcement said, while a third well would be drilled between the two next summer.



IHI DELIVERS 270,000-DWT TANKER: The 269,091-dwt tanker Universe Explorer was recently delivered to Universe Tankship Inc., Liberia, by IHI (Ishikawajima-Harima Heavy Industries Co., Ltd.) at its Kure Shipyard. The tanker is one of the Kure Shipyard's standardized vessels, and measures approximately 1,050 feet in length, 179 feet in breadth, 89 feet in depth, and 69 feet in draft. Her main engine is a 40,000-shp IHI turbine developing a service speed of 16.25 knots. She is the second of the three tankers of the same size ordered by the shipowner from IHI. The third ship will be completed in August this year.

San Clemente-Class Ships Built At NASSCO Discussed At SNAME Pacific NW Spring Meeting

Shown above at the spring meeting held recently in Portland, Ore., left to right: **Parker C. Emerson; George A. Uberti,** speaker; **Gene W. Frampton,** chairman, Pacific Northwest Section; **George Tuckey; Phillip Eisenberg,** SNAME national president; **Robert G. Mende,** national secretary, and **Hugh P. Sturdivant.**

The Pacific Northwest Section of The Society of Naval Architects and Marine Engineers held its spring meeting recently in Portland, Ore.

The speaker for the evening was **George A. Uberti** of National Steel and Shipbuilding Company, San Diego, Calif. Mr. **Uberti's** presentation concerned the construction of the San Clemente-Class 80,500-dwt OBO at National Steel.

A film entitled "I Christen Thee . . ." in color with sound was shown depicting construction of the vessel. The film showed various yard trades in action, with emphasis on the steel handling operations.

A slide show presented various design and technical features of the design.

In his synopsis, Mr. **Uberti** reviewed the various "producibility" features with regard to hull and piping, and how this effect was maximized by incorporating these features into the design.

The Pacific Northwest Section was particularly honored in having the president and the secretary of of the Society, **Phillip Eisenberg** and **Robert G. Mende,** respectively, present at the meeting.

Drew Chemical Forms Subsidiary In Japan

A.G. Giudice, executive vice president, Drew Chemical Corporation, 701 Jefferson Road, Parsippany, N.J., a subsidiary of U.S. Filter Corporation, New York, has announced the formation of a new subsidiary, U.S. Filter Japan Company, Ltd., located in Yokohama. This new subsidiary will be responsible for Drew's marine business in Japan, and will undertake, also, to develop industrial business in all areas of Drew's technology.

Dr. **Roy Miron** and **David Ochinero** have been appointed general manager and assistant general manager, respectively.

Dr. **Miron** joined Drew in 1973. He is a graduate of Lehigh University, with a master's degree from Middlebury College, and obtained his doctorate at Lehigh in 1959. He was formerly employed as department manager, New Ventures, with American Cyanamid. A member of the American Chemical Society, and Japan Society, he has published many technical papers and holds numerous patents. Dr. **Miron** and his wife, **Yoshiko,** are now residing in Yokohama.

Mr. **Ochinero** is a graduate of the Merchant Marine Academy at Kings Point, N.Y. After serving with the merchant marine for several years, he joined Drew in 1967 as a marine sales engineer. In August 1971, he was appointed area manager, Japan. Mr. **Ochinero** and wife, **Hatsue,** live in Yokohama.

Drew Chemical Corporation is a major supplier of products and services for water management and specialty chemicals in both the marine and industrial sectors.

Houston Seminar On Marine Insurance To Be Held In October

The 9th Houston Marine Insurance Seminar sponsored by The Houston Mariners Club will be held on October 6-8, 1974, at the Houston Oaks Hotel, The Galleria, 5011 Westheimer Boulevard, Houston, Texas.

The chairman of the planning committee is **Joe Blades** of J.H. Blades & Co. Advertising and publicity will be handled by Capt. **Jack Roberts.**

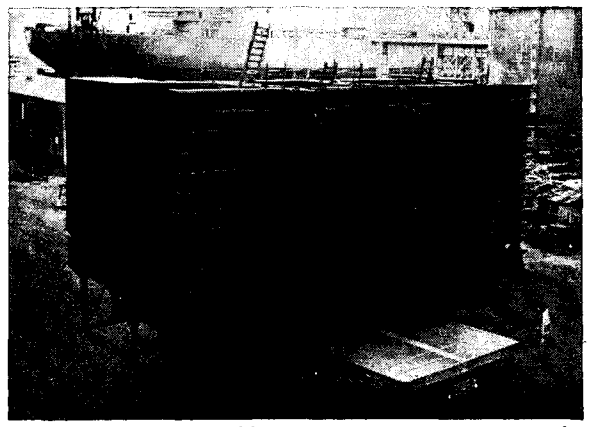
Speakers will be announced at a later date.

The Galleria is a shopping area, under cover, air-conditioned, with hotel, restaurants, lounges and fine shops.

Activities for the seminar will commence with a cocktail reception on Sunday, October 6. Meetings will be held with luncheon served on October 7 and October 8, and there will be a cocktail party on Monday evening, October 7.

Inquiries for a complete brochure and reservation forms can be directed to Capt. **Jack Roberts,** Marine Surveyors, P.O. Box 12638, Houston, Texas 77017.

Huge 'Centipede' Truck Helps Kockums Shipyard Build Supertanker Series



The giant centipede-like transport carries two cabs mounted beneath the trailer at each short side and can be operated from either cab. The steering is mechanical, utilizing the link system.

Kockums Shipyard, Malmo, Sweden, announces the introduction of Europe's largest self-propelled truck as part of the program by the shipyard, largest in Europe, to increase tanker production so as to meet the future demand for super-sized ships.

The truck will be used to facilitate the construction of Kockums newest ship series of 360,000-tonners by transporting heavy hull sections—up to 500 tons each—within reach of Kockums 1,500-ton lift gantry crane, due to go into operation this month.

The 130-ton self-propelled truck is manufactured by Kamag of Ulm, West Germany, and costs approximately $450,000. It was transported to the Swedish shipyard by water from Stuttgart via Holland. The new vehicle is 65.6 feet long and 29.5 feet wide. It is supported by a legion of 112 special Michelin radial tires in groups of four, 28 sets in total.

Two air-cooled diesel engines, developing 230 horsepower apiece, power the massive transport. Engines also charge the oil pumps, which in turn supply oil to the hydraulic motors in the drive wheel sets.

Wheel mechanism and tires have been specially designed to withstand the enormous weight and to negotiate 90 degree turns. Nine hydraulic supports help to reduce wheel stress by 50 percent during turning.

The new Kockums truck has a pulling power of 56 tons and can climb a six percent grade with a full load. It can attain a maximum speed of 6 km/hr with load, and 10 km/hr without. The truck is fitted with equipment for coupling to a tandem vehicle.

SSI Container Corporation Itel's Subsidiary, Arranges $30 Million In New Credit

SSI Container Corporation, a subsidiary of Itel Corporation (AMEX), announced that it has arranged a $30-million line of credit with a group of major banks led by Manufacturers Hanover Trust Company, New York. This new credit line will be used to purchase new cargo containers and chassis required to meet the growing demand for SSI Container's services.

Under terms of the credit agreement, SSI Container will repay the banks over a five-year period beginning in June 1975.

SSI Container's utilization of this $30 million is part of a record capital spending budget of more than $40 million by Itel Corporation's Transportation Services Group in 1974. SSI Navigation, Inc., a ship operating and chartering organization, is the other element in the Transportation Services Group. It has already purchased its fourth bulk-carrying vessel for $10 million.

There's a smile on the face of our lion...

. . . and he has plenty to smile about. In Hongkong the lion symbolizes strength and integrity and plays a vital part in the culture of the community. We have adopted the lion to symbolize the skill and craftsmanship we can offer the world.

Since Hongkong United Dockyards Ltd. started operations their Taikoo and Kowloon yards have more and better facilities to offer shipowners. The combined workforce is now over 5,000 men, backed up by experienced European supervisors. Four drydocks, one floating dock and three marine slipways are at your disposal with full supporting workshop and engineering facilities. We are especially geared to conversion work of all types with a design and planning team devoted solely to the swift execution of such projects.

We aim to get your ships moving as quickly as we can so that your repair at Hongkong will be as economical as possible. We think we succeed and maybe that's why our lion wears such a smile!

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French Yard To Build Nuclear-Powered 650,000-Ton Tanker

Chantiers de l'Atlantique, the largest shipbuilding company in France, has announced it will build a 650,000-ton nuclear-propelled tanker at its Saint Nazaire shipyard on the Atlantic.

Pierre Loygue, the company chairman, said the tanker would develop 80,000 horsepower and would use a water-type reactor, and would be the first of a series of nuclear-powered merchant vessels.

The lead in the actual operation of nuclear merchant ships has been taken by Japan and West Germany, with the United States and Britain joining the race.

A recent international conference concluded that the power at which nuclear commercial ships would become as economic as conventional vessels was between 80,000 and 100,000 horsepower.

Encouraged by the French Transport Ministry, the Chantiers de l'Atlantique, together with two other major shipbuilding companies—France-Dunkerque and La Ciotat—are pushing ahead with plans to build nuclear-powered commercial vessels. They will have access to the techniques used to power France's nuclear submarines.

French shipyards are building a fleet of conventional oil tankers and liquefied natural gas carriers of up to 250,000 tons for Arab oil producing states that recently formed a joint transport company.

Samowitz And Odett Appointed By Elkan

The Elkan Electric Cable Company, an affiliate of Port Electric Supply Corporation, has announced the appointments of **Murray Samowitz** as general manager and **Paul Odett** as assistant manager. Both men are graduates of the University of Miami and St. John's respectively, and have been active in the wire and cable industry their entire working careers. They will make their offices at the company's newly acquired plant at 248 3rd Street, Elizabeth, N.J.

Murray Samowitz (left) and **Paul Odett** have spent their entire business careers in the wire and cable industry.

The Elkan Company originated and pioneered the use of armored cable for shipboard installations over 50 years ago.

The new plant at Elizabeth, N. J. maintains a complete stock of marine and Navy shipboard electrical cable, as well as IEEE 45. Inventories include coaxial, alpha, belden and electric wire (Mil-W-16878). The warehouse is Navy authorized for stocking and handling requirements for U.S. Government-inspected materials.

Terrin Yard Receives $4 Million To Convert Marine Transport Ships

Societe Provencale des Ateliers Terrin shipyard in Marseilles has been awarded a contract to convert two sister vessels from bulk carriers to special products carriers. The contract price will approximate $4,000,000, and the vessels will be operated by Marine Transport Lines, Inc., New York.

Terrin shipyard of Marseilles is one of the largest and oldest ship repair and conversion firms in France.

The announcement of the award was made by **Robert M. Catharine,** president, Jackson Marine Corporation, 405 Park Avenue, New York City.

Diamond M Requests Title XI For 2 Jackups And 1 Semisubmersible

The Maritime Administration has received a Title XI request filed by Diamond M Drilling Company, Houston, Texas, to build two "jackups," costing $37.1 million for both rigs. Levingston Shipbuilding Company, Orange, Texas, will construct the jackups.

Diamond M has also applied for construction loan and mortgage ininsurance for one semisubmersible drilling rig—to cost about $30.3 million—to be built by Alabama Dry Dock & Shipbuilding Co., Mobile, Ala.

Prof. Ewing Receives Offshore Conference Achievement Award

William Maurice Ewing, Cecil H. Green Professor of Geophysics and head of the Earth Planetary Sciences Division at the Marine Biomedical Institute, University of Texas Medical School in Galveston, was the recipient of the 1974 Offshore Technology Conference Distinguished Achievement Award For Individuals. Professor **Ewing** was honored during the Awards Luncheon at the Sixth Annual Offshore Conference, May 6-8, 1974, at the Astrohall in Houston, Texas.

Professor **Ewing** was cited for his pioneering work in the acquisition and interpretation of oceanographic data that has resulted in much of the knowledge and technology used today in offshore prospecting. The citation accompanying his award reads "William Maurice Ewing, scientist, inventor, teacher, experimenter, organizer of research projects, author of scientific publications, and interpreter of the history and structure of the earth. For offshore technology accomplishments in geology and geophysics, for important scientific publications, and in recognition of the many scientists he has taught and trained."

Prior to his present position with the University of Texas at Galveston, Professor **Ewing** served as professor of geology at Columbia University. While at Columbia, he also founded and directed the Lamont-Doherty Geological Observatory, a leading institution in the geophysical study of the oceans. Professor **Ewing's** earliest experiments with seismic refraction established the basic structure and lithology of the continental shelves and provided a stimulus for subsequent successful efforts to explore for oil offshore. During his years at Columbia, Professor **Ewing** played a leading role in the development of accurate recording Fathometers that could operate in the deep ocean, making possible the detailed mapping of features such as the mid-Atlantic Ridge. In the late 1940s, Professor **Ewing** initiated a deepsea coring program on such a widespread scale that—prior to the Glomar Challenger expeditions— the Lamont scientists had taken more than half of the total core samples retrieved from the ocean floor. Professor **Ewing** and his associates also contributed to the field of seismology with the identification of types of surface waves from earthquakes and the development of a mathematical theory to interpret such data.

During his wartime service at the Woods Hole Oceanographic Institution, Professor **Ewing** carried out fundamental studies on sound transmission in the ocean, developed a bathythermograph which made it possible to predict sonar transmission characteristics, and conceived a new approach to long-range sound transmission (SOFAR) which developed into an air-sea rescue network. SOFAR brought Professor **Ewing** the Navy's highest civilian honor—the Distinguished Public Service Award. In addition to the Navy award, Professor **Ewing** has been the recipient of 26 other awards and eight honorary degrees from professional and scientific societies and universities throughout the world. Professor **Ewing** is also a former president of both the American Geophysical Union and the Seismological Society of America.

No. Calif. Section Discusses Matson Navigation Company Roll-On/Roll-Off Vessels

The Northern California Section of The Society of Naval Architects and Marine Engineers recently held a dinner meeting at the Engineers Club in San Francisco. The meeting was attended by 60 members and guests.

Section chairman **Joseph Busch** reported that the nominating committee, under the chairmanship of **Jack Troyer** of Todd Shipyards Corp., past chairman, recommended the following candidates for the terms indicated: **Robert Herbert,** chairman; **Miklos Kossa,** vice chairman; **William Swan,** secretary-treasurer; **Robert Boston,** executive committee (two years); **Henry Kozlowski,** executive committee (two years), and **William Hamilton,** executive committee (two years).

Arthur Haskell, national vice president, manager of engineering, Matson Navigation Co., announced the formation of a steering committee for the 1977 National Spring Meeting to be held in San Francisco.

James Moss, papers committee chairman, introduced **Wm. Boyer,** manager of preliminary design, Matson Navigation Co., author, who presented his paper "A General Description of Matson Navigation Company Roll-On/Roll-Off Vessels," along with numerous slides to illustrate the various features of these vessels.

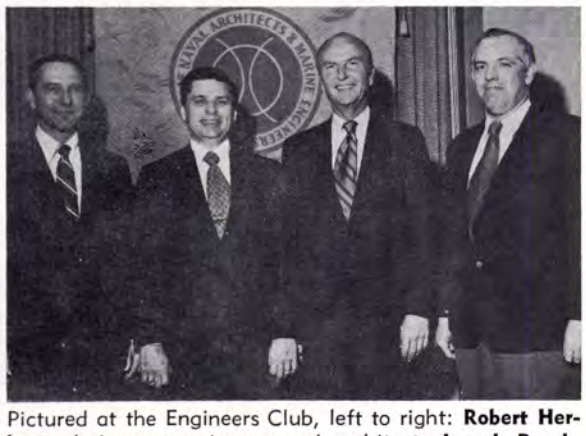
Of these two vessels, one is the fifth vessel to be named Lurline. They are of a completely different design for this type of trade, but were able to start service within an unprecedented six months of contract signing. This was possible due to Sun Shipbuilding's program of producing vessels of their own design, and in accordance with their optimum production schedule for sale to owners who may be able to utilize them at the time they become available.

It was indicated that while no particular savings in hardware cost was effected by buying the "yard design," considerable economic advantage was achieved by obtaining delivery approximately two years quicker than would normally be possible.

Shown, left to right, at the Northern California Section meeting: **Wm. Hamilton,** executive committee nominee, yard superintendent, Bethlehem Steel Corp., San Francisco; **James Moss,** papers chairman, naval architect, Marcona Corp., and **Wm. Boyer,** author, manager of preliminary design, Matson Navigation Co.

The salient features of the ships are a turnaround time of eight hours and the ability to load all sizes and shapes of material capable of being moved on wheels to Honolulu with approximately 24 hours' notice. Cargo is moved on both shipper and operator furnished trailers.

Provision is made for refrigerated vans on the main and second deck. Equipment moves aboard over two portable ramps installed at each terminal with a maximum inclination to 8 degrees.



Pictured at the Engineers Club, left to right: **Robert Herbert,** chairman nominee, naval architect; **Joseph Busch,** chairman, H.J. Wickert & Co.; **Wm. Swan,** secretary-treasurer nominee, General Electric Co., and **Robert Boston,** executive committee nominee, USCG.

Oral discussion was offered by Cmdr. **L.C. Malburg Jr.,** U.S. Coast Guard; **Leigh Miller,** Maritime Administration; **Graham Fraser,** Paceco; **King-Tao Liu,** Herbert Associates; **Ed McCann,** Chevron Shipping; **Vincent Van Riper,** American Bureau of Shipping; **H.P. Stewart,** Bethlehem Steel Corp., **Charles Shields,** States Lines.

Norton, Lilly Names Trust Vice President-Finance

William M. Trust Jr. has been appointed vice president-finance of Norton, Lilly & Company, Inc., steamship agents, New York, N.Y., it was announced by the company chairman, **John H. Griffith.**

A graduate of the University of the City College in New York, Mr. **Trust** has an M.B.A. degree in management from Baruch College and is a certified public accountant. Mr. **Trust** was formerly the controller and assistant treasurer for Teleprompter Corporation.

New Electro-Nav Division Named Distributor For Koehler-Dayton And Mathers

Robert E. Negron, president of Electro-Nav, Inc. of 1201 Corbin Street, Elizabeth Marine Terminal, Elizabeth, N.J. 07201, has announced the formation of its new Industrial Division, and the appointment of **Bob Daniels** as division manager.

Electro-Nav Industrial will market the full lines of both Koehler-Dayton Waste Disposal Systems and the Mathers Marine Engine Control System. Koehler-Dayton, a division of Litton Industries, has over 30 years' experience in the design and manufacture of waste disposal systems and is the world's largest supplier of aircraft toilets used on board commercial airliners. Recently, they have completed installation of their MSTS Incinerator System on the new New York City ferryboat John F. Kennedy.

Koehler-Dayton offers a complete line of disposal systems, starting from the Commidore Recirculating Toilet, the EnviroMac Macerator /Chlorinator, and finally the MSTS Incinerator System.

The Mathers Control System is recognized by workout operators as one of the top systems in its field. Until recently, the company has confined its market to the West and Gulf Coasts. Electro-Nav will offer this fine control system to boat owners and operators on the East Coast.

Containerization Institute First National Conference To Be Held October 8-9

The Containerization Institute, Inc., has announced that its first National Conference will be a Shippers Dialogue sponsored by the Institute.

The National Conference & Shippers Dialogue will be held at L'Enfant Plaza Hotel, Washington, D.C., on October 8-9, 1974.

The participants will be the U.S. Government Regulatory Agencies along with shippers, carriers and leasing companies.

John T. Cassidy is chairman of arrangements for the Containerization Institute, Inc., which is located at 60 East 42nd Street, New York, N.Y. 10017.

Michael Hansson Joins Ship Chartering Staff Of Lambert & Skoglund Co.

Michael G. Hansson has joined the ship chartering staff of Lambert & Skoglund Co., 17 Battery Place, New York, N.Y. He was previously associated with Woodbury Chartering, also of New York City.

IRD Mechanalysis Holds Vibration Measurement Seminar In New York

IRD Mechanalysis, Inc., 6150 Huntley Road, Columbus, Ohio 43229, recently conducted a Marine Industry Seminar at Seamen's Church Institute of New York in New York City.

The seminar covered all aspects of vibration measurement and analysis as applied to shipboard machinery: equipment and techniques for detecting and diagnosing mechanical problems, with live demonstrations; establishing acceptable levels of vibration; setting up shipboard vibration monitoring and analysis programs; marine applications of vibration analysis and automatic vibration monitoring systems.

This one-day seminar was attended by representatives from Exxon International, National Maritime Research Center, Military Sealift Command. Moore-McCormack Lines, Inc., Mobil Shipping and Transportation Company, U.S. Lines, Maritime Overseas Company Ltd., Sun Shipbuiding & Dry Dock Company, Zim American Israeli Shipping Company, Maritime Transport Lines, Inc., Anglo Nordic Shipping Ltd., Seatrain Lines, Inc., American Bureau of Shipping, Maritime Engineering Services and J.J. Henry Co., Inc.

Fearnley & Eger, Inc. Moves To New Quarters

Fearnley & Eger, Inc., firm of shipbrokers, have relocated to new quarters at 375 Park Avenue, Suite 1708, New York, N.Y. 10022.

The firm was formerly located at 29 Broadway, New York, N.Y.

SteelShip Delivers River Towboat To Eby Construction

The twin-screw Little Rock, powered by a pair of GM Detroit Diesels, has push knees 12 feet high and a pilot eye level of 25 feet.

Jim Greer III, vice president of Martin K. Eby Construction Company, recently accepted delivery of SteelShips Hull #32, which was christened the M/V Little Rock.

The M/V Little Rock will be operating out of Eby's Little Rock, Ark., office managed by **R.E. Fanning.** With the addition of this new SteelShip vessel, Eby is now operating three diesel towboats out of the Little Rock area, serving the Arkansas River and its tributaries, building bridges, docks, and other waterfront projects.

Robert L. Kappler, vice president/general manager of SteelShip Corporation, says the M/V Little Rock, SteelShip's Hull #32, is powered by twin 12V 71N General Motors Detroit Diesel workboat engines supplied by the Wilkerson Diesel Engine Company of Little Rock. The vessel is also equipped with a Kohler 12.5 KW diesel generator set which provides power for the living accommodations. Quartz floodlight, switched direct from the pilothouse, completely floods a 500-foot radius circle around the vessel for safe night operation around locks, dams, and other construction sites. The vessel is equipped with two Iva-Lite LD-22 seal beam searchlights mounted fore and aft on the cabin top for 360-degree one-mile beam operation.

Like all other SteelShip 50-foot pushboats, the M/V Little Rock has four flanking rudders, and two main rudders with Vickers steering. She is equipped with hydraulic Nashville Bridge deck winches, remote operated from the pilothouse or the fore deck. Other equipment includes four-blade heavy-duty Federal propellers, four-inch steel propeller shafts with stainless steel bushings and Johnson rubber bearings.

Standard on all SteelShip pushboats is the remote greasing lubrication center which allows the engineer to service all lubrication without leaving the engine room.

For more information concerning any of SteelShip's products or designs, write SteelShip Corporation, Route 4, Box 167, Pine Bluff, Ark. 71601.

Teleflex Completes Acquisition Of Capilano

Teleflex Incorporated, North Wales, Pa., has announced the completion of its acquisition of the hydraulic steering systems operation of Capilano Engineering Co. Ltd. The Capilano operations are located in Vancouver, British Columbia, Canada.

The acquired line of proprietary hydraulic steering systems are used primarily in commercial and large marine craft and complement Teleflex's existing lines of mechanical steering and control systems. Teleflex is a multimarket manufacturer of mechanical and electromechanical controls for marine, automotive, industrial, aerospace and nuclear applications.

Chas. Lowe Publishes Brochure On Marine Automated Powerplants

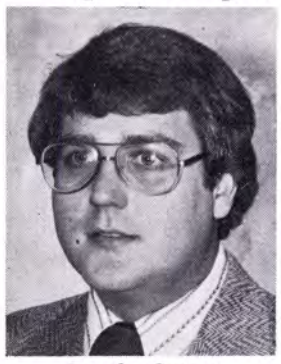
Capabilities in design and construction of automated powerplants for marine and shore-based installations are covered in a new four-page brochure available from Chas. Lowe Co., Control Systems Division, 5845 Harper Road, Cleveland, Ohio 44139.

The firm, a division of Chas. Lowe Co., San Francisco, Calif., producers of heavy castings and machined parts for shipbuilders, is staffed with former licensed powerplant engineers experienced in both steam and diesel operation. A recent accomplishment was the retrofitting of nine ore-carriers for automated steaming without removing the vessels from service.

In addition to design and construction services, the firm offers proprietary standard products, including pneumatic valve operators, high-energy ignitors, bridge-control consoles, and oil-burner air register drives.

Field offices are maintained in New York, San Francisco, Jacksonville, Norfolk, San Pedro, and Honolulu.

Lufkin Anounces Sales Rep Changes



Douglas Orman

Lufkin Industries, Inc., P.O. Box 849, Lufkin, Texas 75901, has announced the transfer of **Douglas Orman** and **Fred Morrow,** both in gear sales.

Mr. **Orman,** formerly in Odessa oilfield sales, has been transferred from Lufkin to the New York City area sales office in Edison, N.J., as a sales representative for Lufkin's industrial and marine gears.

Fred Morrow

Mr. **Morrow** has been assigned to gear sales in Cleveland, Ohio, after working for Lufkin in industrial engineering for two years.

Lufkin manufactures its marine and industrial gears at the home plant in Lufkin, Texas, and markets them worldwide.

Sealift Pacific Named Agents For Matson's New Guam Service

Matson Navigation Company has appointed Sealift Pacific, a newly formed California corporation, to serve as agents for Matson's new Pacific Coast-Guam service, it was announced by **G.E. Bart,** Matson senior vice president.

Sealift Pacific will service as Matson's West Coast marketing agents for the Guam, Kwajelein and Trust Territory service, and as general freight and husbanding agents in Guam.

Matson entered the Guam trade after Seatrain's announcement April 9 that it was discontinuing its Hawaii and Guam containership services.

Matson, which took over the charters of three containerships formerly chartered by Seatrain, now provides a sailing every 10 days from the West Coast to Agana, Guam.

Sealift Pacific was formed by **Frank D. Troxel,** who formerly headed Seatrain California's West Coast operations.

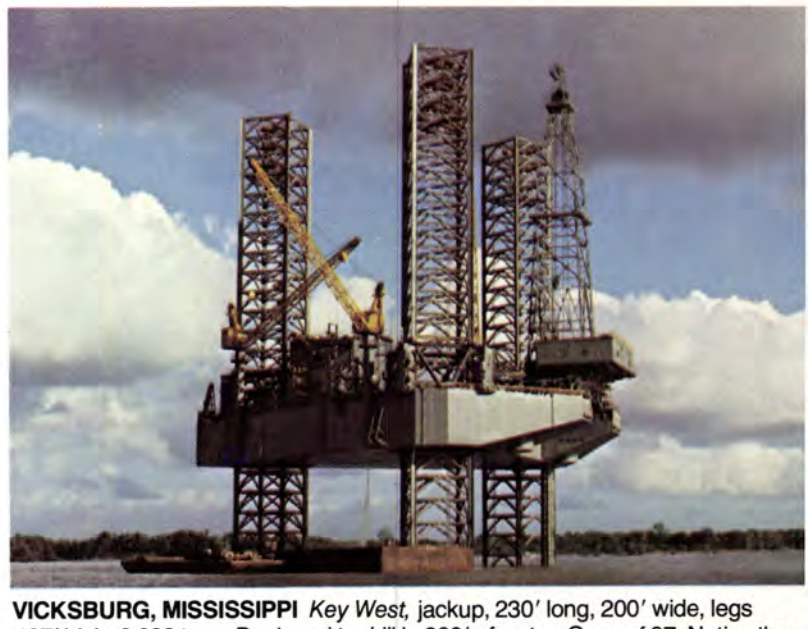
The first sailing in Matson's new Guam service was by the S/S Transontario, which sailed from San Francisco Bay April 18, with a full load of about 450 containers of general cargo.

31,200 tons launched from 4 yards

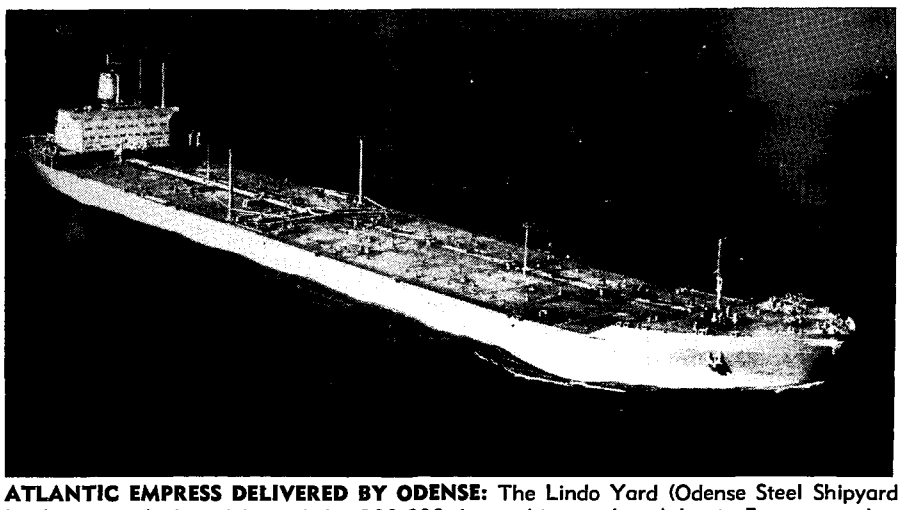
BROWNSVILLE, TEXAS *Pentagone 82,* five-column semisubmersible, 325′ long, 338′ wide, overall height, 317′, 10,200 tons. Each column is 31′ in diameter. Crew of 74. Drilling in North Sea.

CLYDEBANK, SCOTLAND *Penrod 64,* jackup, hull dimensions of 230′ x 200′ x 26′; 6,000 tons. Designed for TD of 30,000′. Crew of 78. Scheduled to operate in North Sea.

REPUBLIC OF SINGAPORE *Margie,* semisubmersible, twin hull, measures 202′ long x 182′ wide x 110′ high; 9,000 tons. Designed to drill in 600′ of water. Crew of 90. Scheduled to drill off the coast of Northern Australia.



VICKSBURG, MISSISSIPPI *Key West,* jackup, 230′ long, 200′ wide, legs 467′ high; 6,000 tons. Designed to drill in 300′ of water. Crew of 97. Notice the three 45-ton marine cranes, usually on almost all rigs Marathon constructs. Scheduled to drill in waters off Belem, Brazil.



ATLANTIC EMPRESS DELIVERED BY ODENSE: The Lindo Yard (Odense Steel Shipyard Ltd.), Denmark, has delivered the 288,000-dwt turbine tanker Atlantic Empress to her owners, the Livanos Group. The Atlantic Empress, shown above on trials in Skagerak, is last in Lindo's series of fourteen 285-288,000-dwt turbine tankers, comprising about four million tons, delivered in less than 33 months. The first ship in Lindo's next series of thirteen 330/310,000-dwt turbine tankers is already 50 percent completed. The 36,000-shp propulsion machinery, boilers, auxiliaries and the 500-ton deckhouse are fitted, and the tanker is due to leave the building dock this month. Her owners are the A.P. Moller Group, who have ordered seven of this series. The remaining six are for Shell Tankers (UK) Ltd.

F.F. Clifford Named To Zapata Marine Post

Frank F. Clifford has been named senior vice president-operations of Zapata Marine Service, Inc., a subsidiary of Zapata Corporation, Houston, Texas.

Mr. **Clifford** is responsible for the operations of the Zapata Marine fleet, which transports men, equipment and supplies to offshore rigs, and tows rigs on local moves. The fleet consists of 44 vessels in operation around the world, with 10 more vessels currently under construction.

Mr. **Clifford** joined Zapata Marine in 1971, and has served as vice president of ship maintenance and construction.

He is a retired captain in the U.S. Navy, where he held a variety of assignments over a distinguished 27-year career. Mr. **Clifford** holds a Bachelor of Science degree from the U.S. Naval Academy, and an M.A. degree in political science from the University of Maryland.

Sedco And Associate Award Drill Rig Contract To Halifax

Sedco, Inc., and its joint venture with Royal Dutch Shell have awarded a contract for th construction of a deepwater semisubmersible drilling unit, the Sedco 710, to Halifax Shipyards, Division, Hawker-Siddeley Canada, Ltd., P.O. Box 640, Halifax, Novia Scotia, Canada.

NYPE DISCUSSES MARITIME INSURANCE: The Society of Marine Port Engineers New York, N.Y., Inc. met on April 17 at the Downtown Athletic Club in New York City. At the technical session, which was preceded by a dinner, a paper was read entitled "The Influence of the Port Engineer on Insurance Costs," by **George D. Benjamin,** vice president of Johnson & Higgins. Pictured above at the meeting, left to right: (seated) **John Antonetz,** Texaco Inc., sponsor; **George D. Benjamin,** vice president, Johnson & Higgins, speaker; **Joseph Thelgie,** Marine Transport Lines, president; (standing) **Louis V. Minett,** American Bureau of Shipping, chairman, board of directors; **Edward English,** Atlantic Repair Co., Inc., chairman, program and entertainment committee; **William P. Towner,** American Bureau of Shipping, 1st vice president; **H.H. Hunt,** marine surveyor, secretary-treasurer, and **John C. Fox Jr.,** Exxon International Co., acting chaplain.

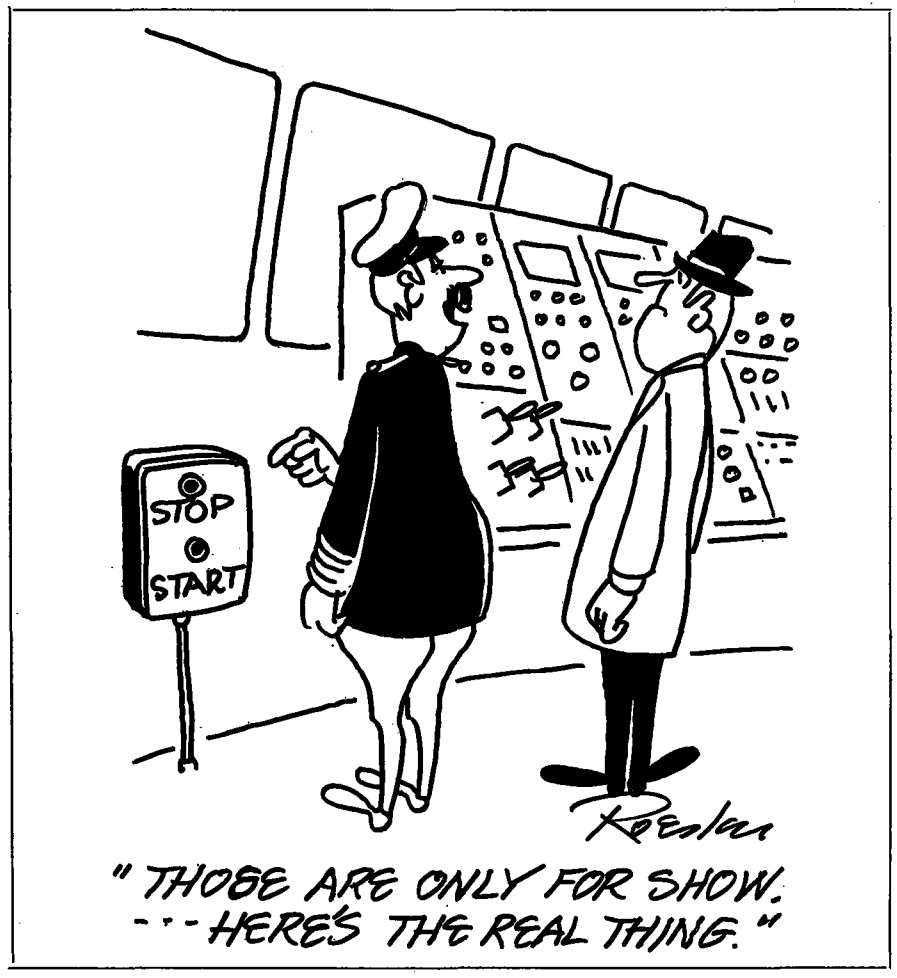
Oceanographic/Seismic Files Request With MA To Build Two Tugs

Oceanographic and Seismic Services Inc. of Galveston, Texas, has filed a request for ship construction loan and mortgage insurance with the Maritime Administration to build two 3,200-hp diesel tugboats. The vessels will be used to service offshore drilling activities in the Gulf of Mexico and will cost $1.8 million each.

Barber Steamship Appoints McCabe VP

E.J. Barber, president of Barber Steamship Lines, has announced the appointment of **Edward L. McCabe** as vice president in charge of the Middle East service.

A graduate of Hobart College, Geneva, N.Y., Mr. **McCabe,** whose 25 years of experience have been devoted exclusively to Middle East shipping, joined Barber Lines in 1965 as manager of the Middle East service.



Dravo Names McMurry Southern Sales Mgr. For Marine Equipment

E.D. McMurry has been appointed southern sales manager for Dravo Corporation marine equipment. He will be headquartered in New Orleans, La.

A former sales manager for a division of Exxon Corporation, Mr. **McMurry** is a mechanical engineering graduate of Vanderbilt University.

He is a member of the American Society of Mechanical Engineers, American Society of Naval Engineers, American Society of Lubrication Engineers, and the National Association of Corrosion Engineers.

Dravo's Engineering Works Division designs and builds a variety of inland and coastal waterway marine equipment, including towboats, barges and tugboats, at its shipyard at Neville Island, Pa., near Pittsburgh.

Advisability Of Long-Term Chartering Discribed To Analysts

Morton P. Hyman, the 38-year-old president of Overseas Shipholding Group (OSG), recently described how the placing of new shipbuilding orders on a fixed-price basis below those currently prevailing, coupled with a policy of chartering their deepsea vessels on long-term period employment, were two of the factors which have enhanced the competitive ability and earning potential of OSG.

New York security analysts, meeting in the Coachman Restaurant in lower Manhattan, heard Mr. **Hyman** stress the economic feasibility of chartering out tonnage for long periods which avoids the sometimes sharp rate fluctuations characteristic of the spot voyage market. These long-term deals, he emphasized, provide the cash flow necessary to service the company's debt, and also enables the firm to acquire and construct additional vessels.

OSG, the largest independent owner of unsubsidized U.S.-flag tankers, also owns and operates an international fleet of very large crude carriers (VLCCs), and dry bulk carriers. As stated in his prepared remarks to the gathering, the company's newbuilding program for the past several years has focused on the international flag oil carriers.

However, Mr. **Hyman** noted that the movement of Alaskan crude must be considered as the single most important development in the history of the domestic fleet. In this regard, he declared that the company is well positioned to play a major role in the transportation of that oil. Six 89,700-deadweight-ton U.S.-flag tankers have been ordered and are scheduled for delivery through early 1978, at which time the Trans-Alaska Pipeline is expected to be at peak capacity.

He also pointed to legislation now before Congress which, if enacted, would further broaden substantially the market for American-flag tankers. The Merchant Marine and Fisheries Committee of the House of Representatives reported favorably on a bill, H.R. 8193, that would reserve 20 percent of U.S. waterborne oil imports for carriage on U.S.-owned ships if available at reasonable rates. This preference, the OSG official said, would rise to 30 percent by mid-1977. The resulting requirements, it was stated, would virtually assure full employment for the entire U.S.-flag fleet.

As for the dry cargo bulk trades, Mr. **Hyman** singled out as the most important the renewed interest in coal as one answer to further energy requirements. At the present time, roughly 100-million tons of coal move in the international trade, which compares with a world coal output in excess of two-billion tons. The effect of even a marginal shift to coal from oil, he exclaimed, would be substantial.

In touching on the financial implications of the long-term charters, Mr. **Hyman** carefully explained that while operating costs have risen sharply, their impact on OSG is softened by cost escalation clauses. Where the charter periods are of a shorter duration, then the company's chartering department must be sharp in anticipating expenses, he added.

Lykes Announces New Assignments For Staff Members

New assignments, involving staff members in the Far East and the Mediterranean, were announced by **W.J. Amoss Jr.**, president of Lykes Lines Agency, Inc., overseas general agency for Lykes Bros. Steamship Co., Inc.

J.R. Hulcher, owner's representative for Japan and Korea, headquartered in Tokyo since 1971, leaves the Far East to become director of the Mediterranean area, with headquarters in Genoa, Italy.

Joseph T. Lykes III, who was assigned to Japan as a special representative last year, will take over Mr. **Hulcher's** post as owner's representative for Japan and Korea.

Octave C. Livaudais of New Orleans, La., is being assigned to Tokyo as special representative for Japan and Korea.

Capt. **Eugenio Campanini,** operations manager in Genoa, assumes new responsibilities as deputy director for the Mediterranean area.

A.W. Hietala, Mediterranean area director since 1967, returns to the United States for reassignment.

Mr. **Hulcher,** a graduate of Springhill College, also attended Mexico City College and the University of Madrid, and has held previous Lykes assignments in New Orleans and Barcelona, and for five years was traffic manager in Genoa, prior to his transfer to the Far East.

Mr. **Lykes,** a graduate of Washington and Lee University, is a graduate of Lykes's management training program, and after various U.S. assignments went to Antwerp as an operations assistant in 1971.

Mr. **Livaudais,** a native New Orleanian, graduated from Louisiana State University in New Orleans with a B.A. degree, and is also a graduate of the Tulane University Law School. He joined the Lykes organization in 1973, and this is his first permanent assignment since completion of his training period.

Captain **Campanini,** who attended maritime technical schools in his native Italy, embarked upon a seagoing career in 1950, and joined the shoreside Lykes staff in Genoa as port captain in 1963. He was named operations manager in 1964.

Howard L. Humphries Elected President SUNY Alumni Ass'n

Howard L. Humphries

Howard L. Humphries of Teaneck, N. J., has been elected president of the State University of New York Maritime College Alumni Association.

Mr. **Humphries** is president of Ocean Machinery Corporation, with a plant in Dumont, N. J., and offices in New York City.

The college, at Fort Schuyler, Bronx, N. Y., is the oldest maritime school in the nation. It celebrates its 100th anniversary during the 1974-75 academic year, starting with commencement exercises on May 18.

International Paint Opens New Facility In Houston, Texas

The International Paint Company, Inc. of New York, with factories in Union, N.J., South San Francisco, Calif., and New Orleans, La., has announced the opening of a new district office and warehouse at 7145 Clinton Drive, Houston, Texas. The new 9,000-square-foot facility stocks a complete line of International Red Hand marine coatings as well as Interlux yacht finishes, and will service International customers in the Houston and Galveston areas.

Stephen Coycault will manage the new facility in Houston.

ASNE DELAWARE VALLEY SECTION MEETS: Approximately 55 people attended the recent Delaware Valley Section meeting of the American Society of Naval Engineers. The four presenters covered the U.S. Navy pollution program at the Naval Ship Engineering Center, Philadelphia Division. They presented a brief history of events and a review of ongoing projects. These included such things as sewage treatment and garbage disposal installations and air pollution monitoring. Principals at the meeting, shown left to right: Capt. **Vernon Klemm,** vice chairman, Delaware Valley Section; **Louis D'Orazio, Ken Graham, John Boyle** and **Michael Cunningham,** all of NAVSEC PHILADIV, and **Gil Carlton,** NAVSEC PHILADIV, chairman, Delaware Valley Section.

Sasebo Yard Delivers VLCC To Sanko For Charter To Shaheen

Shaheen Natural Resources Company, Inc., has taken possession of the Eleftheropolis, a 281,010-deadweight-ton very large crude carrier (VLCC) under a long-term charter from its owners, Sanko Steamship Company Limited.

Built in Sasebo Heavy Industries Company Limited's shipyard, Sasebo, Japan, the vessel was named and delivered to its owner, who then presented the tanker to the charterer. The vessel was accepted by **Eugene L. McDaniels,** vice president of Shaheen Natural Resources. The Eleftheropolis joins the Kyokku Maru, a 233,000-ton VLCC, and nine other tankers Shaheen has on charter.

The Eleftheropolis is 1,115 feet overall, has a beam of 175 feet, and a draft of 69.8 feet. It can cruise at 16 knots and carry 2,000,000 barrels of crude oil. It will sail under a Liberian flag, with Monrovia as its port of registry.

John M. Shaheen, president of Shaheen Natural Resources, praised the workmanship and skill of the shipbuilder. He said Japanese-built ships plying the waters of the world are making a significant contribution to international amity and understanding which is enhanced by trade between nations.

The Eleftheropolis will sail immediately, and be put in service between Persian Gulf ports and Newfoundland Refining Company Limited's 100,000-barrel-per-day oil refinery in Come By Chance, Newfoundland, as well as to other refining facilities now under construction by Shaheen Natural Resources.

Shaheen Natural Resources is building a 200,000-barrel-per-day oil refinery on the Strait of Canso in Nova Scotia, and a second refinery at Come By Chance with a capacity of 300,000 barrels per day.

Bull & Roberts Open West Coast Branch

A new branch to serve the West Coast has been opened by Bull & Roberts, Inc., of Murray Hill, N.J. Located at One Fourteenth Street in San Francisco, it will handle the complete line of B&R chemicals, equipment and instrumentation.

George H. Sattler Jr., manager of the branch, is a graduate of California Maritime Academy. He has enjoyed 25 years' marine experience, was a licensed chief engineer and is a member of the San Francisco Port Engineers Society.

Also appointed is a new distributor, Mar-Nav, Inc., Berth 206, Terminal Island, to serve the Los Angeles area under the direction of **Jack** and **Frank Suter.**

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STEEL DIESEL ELECTRIC DOUBLE-ENDED
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500 Passengers

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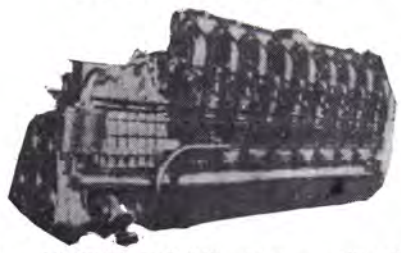

Engine—12-278A-1200HP. Motor—Allis Chalmers, 1020 HP—560 Volts DC, 1454 Amps 875 RPM
Generator—Allis Chalmers, 814KW—560 Volts DC, 1454 Amps 750 RPM.

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26"x66"	320 lbs.

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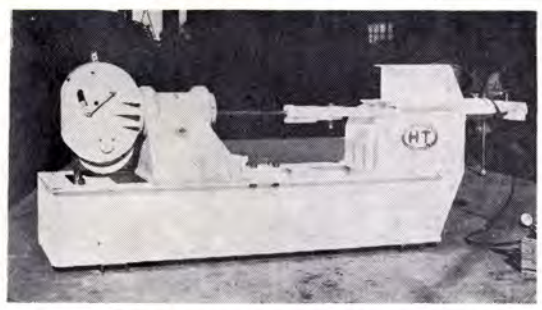

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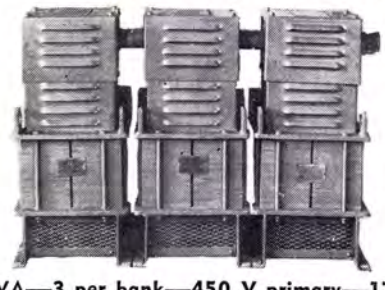

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Also inquire about other sizes: 10 KVA/20 KVA/25 KVA/37 KVA

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525 KW GENERAL ELECTRIC AUXILIARY TURBOGENERATOR UNIT

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

538 KW WESTINGHOUSE TURBOGENERATOR UNIT

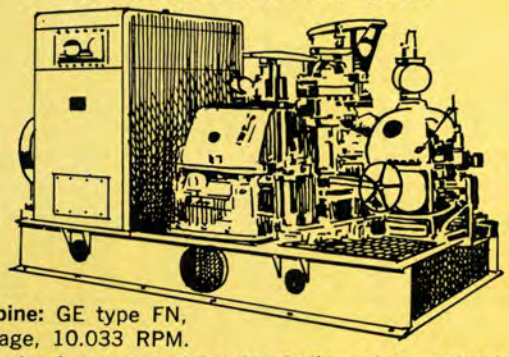
Complete with L.O. Coolers and exciters. **Turbine:** Westinghouse 538 KW, 5010 RPM. Inlet pressure 435 psi. Temp. 750 degrees F.TT. Exhaust pressure 28½ hg vac. **Generators:** (1) 400 KW, 450 VAC, 3 pole, 60 cycle, PF 80%, 1200 RPM, ship's service. (2) 32.5 KW, 125 VDC, 1200 RPM, variable voltage exciter.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

535 KW GENERAL ELECTRIC TURBOGENERATOR UNIT

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

★★ ALSO AVAILABLE!! ★★

600 KW GENERAL ELECTRIC TURBOGENERATOR UNIT



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

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

MAIN MOTOR FOR T2

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

5400 KW MAIN GENERATOR

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

PUMP UNITS

CARGO STRIPPING PUMP

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

MAIN FEED PUMP

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

MAIN FEED PUMP

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

MAIN CIRCULATING PUMP

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

MAIN CIRCULATING PUMP

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

MAIN CARGO PUMP UNIT

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

FUEL AND LUBE OIL PUMP

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

LUBE OIL SERVICE PUMP

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

MAIN CONDENSATE PUMP

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

AIR COMPRESSORS

COMBUSTION CONTROL AIR COMPRESSOR UNIT

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

SHIP SERVICE AIR COMPRESSOR UNIT

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

VALVES

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

TURBINE ROTORS

5400 KW GENERAL ELECTRIC TURBINE ROTOR

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

525 KW GENERAL ELECTRIC TURBINE ROTOR

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

5400 KW WESTINGHOUSE TURBINE ROTOR

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

5400 KW WESTINGHOUSE MAIN TURBINE (Profile type):

5400 KW ELLIOTT TURBINE ROTOR

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

MISCELLANEOUS T-2 EQUIPMENT

MAIN AIR EJECTOR

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

MAIN CONDENSER END

Graham (waterbox).

MAIN CONDENSER END

Westinghouse (waterbox).

MAIN CONDENSER END

Westinghouse (return head).

AUXILIARY CONDENSER END

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

TAIL SHAFTS

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

RUDDER WITH STOCK (complete)

SEND NOW FOR NEW 1974 CATALOG

HUNDREDS OF OTHER ITEMS ALSO AVAILABLE!

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National Metal AND STEEL CORP.

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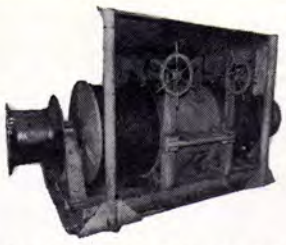

2 LIDGERWOOD DOUBLE DRUM TOWING WINCHES

CAPACITY: Each drum stows 1800' of 1¼" wire. Each drum independently 30,000 lbs. on 2nd layer at from 10 to 50 feet per minute. Both drums simultaneously 15,000 lbs. each. Drums equipped with clutch shift levers. 24" Winch heads for 8" circumference manila rope. Static load 52,000 lbs. applied at mid-length. Base 10' 6" wide with 2 outboard winch heads 20¼" each. Drum diameter 22½"—flange 50"—28" between flanges. Equipped with level wind spooling devices and compressor hand brake. MOTOR: 75 HP—under deck with horizontal drive through worm gear. Drip-proof—fully protected. Mfg by Allis-Chalmers—type EB-127-DC—compound wound—125/250 volts—254 amps—reversible—575/1150 RPM. CONTROLLER: Allis-Chalmers drum type—with 1 off position and 5 heave in positions and five payout conditions in opposite directions. Control cabinet also located below deck. Worm gear reduction 62T at 1½ CP worm wheel 31:1 reduction. Drum shaft beveled bull gear 61T. Drive shaft beveled pinion gear 14T—ratio 4.857:1.

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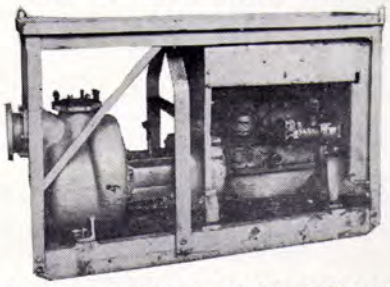
PORTABLE 6" CARVER SALVAGE PUMPS



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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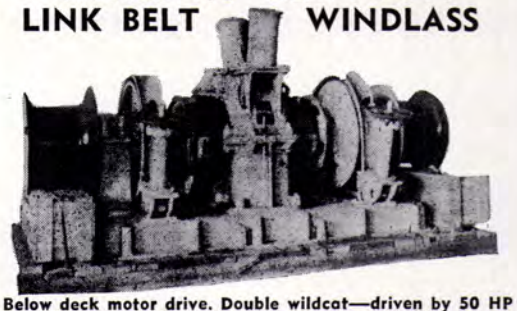
UNUSED 1⅝" HEAVY DUTY LINK BELT WINDLASS



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

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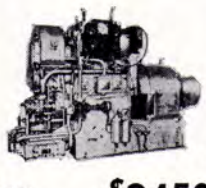

G.M. 3-268A 100 KW A.C. Diesel GENERATOR SET

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

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

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2-STAGE 5x4x4 50 CFM @ 150 LBS INGERSOLL RAND AIR COMPRESSOR

Class R—type 30—5x4x4—750 RPM 3-cylinder air cooled 2-stage compressor with air intake filter. 20 HP Vee-belt drive motor—440 volts—3-phase—60 cycle—27 amps—1800 RPM continuous duty—class A insulation—ball bearing dripproof squirrel cage—low starting current. Motor weight 500 lbs. Complete with GE maanetic starter size 2—27.2 amps—weight 75 lbs. Copper finned intercooler between stages. Total weight motor, compressor and base 1505 lbs. OAL: 4' 1⅝"; OAW: 2' 6½"; OAH 3' 2½".

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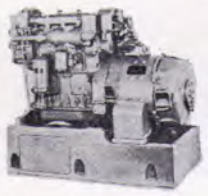
DIESEL GENERATOR SETS



30 KW GM 3-71 DIESEL SET

GENERATOR: Delco 30 KW—120 Volts DC—250 amps—1200 RPM—Type I-3563. ENGINE: GM 3-71—45 HP—electric starting—shock mounted. In Navy crate. New Navy rebuilt. **$4500**

60 KW GM 6-71 DELCO DIESEL SET

GM 6-71 engine with Delco 120 volt DC 500 amp generator with stab. shunt.

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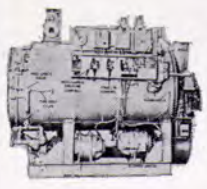
SELF-CONTAINED—ALL CONTROLS CYCLOTHERM STEAM BOILERS

MODEL MC-90
OUTPUT
2600 LBS/HOUR



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

SMALL CYCLOTHERM STEAM BOILER

Made by American Iron Works, Oswego, N.Y. 100 pound working pressure—A.S.M.E.—complete with all accessories. Dimensions: 5'7" overall length—36" overall width—60" high.

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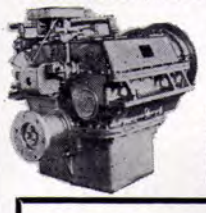
FALK IN-LINE MARINE REVERSE REDUCTION GEAR



SUITABLE TO 1600 HP WITH MODIFICATIONS

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

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M. G. SETS

APPROX. ½ KW 110/1/60 M.G. SETS NEW-UNUSED

$169.50

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

2.5 KW OUTPUT M.G. SETS

Mfg by Electric Specialty Co. INPUT: 5 HP 115 VDC 38.5 amps 1800 RPM. AC OUTPUT: 2.5 KW—120/1/60 41.6 amps 1800 RPM. With controls. Write for price.

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MARINE PUMPS 115 Volts D.C.

Very Little Use

FIRE & BILGE

350 GPM—100 lb. head—1750/3500 RPM—40 H.P. Furnished with Nash Hytor Pump MO-571 & float switch, for self-priming. All controls. Pump & primer weight 900 lbs.

BILGE & FLUSHING

15 GPM—20 lb. head—1750/3500 RPM—¾ HP motor. Furnished with Nash Hytor MD-2 vacuum pump. Approx. weight 250 lbs.

SANITARY SERVICE

35 GPM—40 lb. head—3500 RPM—1 H.P. Pump weight 40 lbs.

DIESEL FUEL OIL TRANSFER

Positive displacement—gear head—15 GPM—20 lb. head—350 RPM—1 HP—pump weight 260 lbs.

LUBE OIL SERVICE

Positive displacement—gear head—30 GPM—35 lb. head—273 RPM—2 HP motor—weight of pump 350 lbs.

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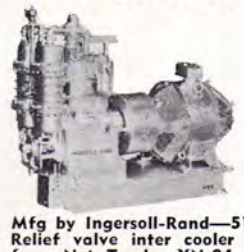
DIESEL STARTING & DIVING COMPRESSOR



30 CFM ACTUAL CAPACITY

44 CFM PISTON DISPLACEMENT AT 400 PSI

Mfg by Ingersoll-Rand—5¼x2½x4—type 20—875 RPM. Relief valve inter cooler setting 85 lbs. Just removed from Net Tender YN-24. 15 HP Westinghouse motor—115 volts—112 amps DC—875 RPM—with magnetic starter. Temp. rise 40°C. Motor frame SK-93—100% load—24 hours—40° rise. The unit is 2-stage water cooled single acting—fitted with inter cooler and after cooler. Weight 2758 lbs. OAL 4'2"—OAW 23"—OAH 4'.

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AIR COMPRESSORS

DIESEL STARTING

Two stage—water cooled—single acting verticle type—10 CFM—600 lbs. Type 30—Class T. Ingersoll-Rand Compressor—4x1½ x3½ @ 630 RPM. Motor 7½ HP—440/3/60—1750 RPM—complete with starter—intercoolers and aftercoolers.

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Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144
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Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
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Chas. Lowe Company, 5845 Harper Road, Cleveland, Ohio 44139
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
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M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
CRANE LOAD INDICATORS
Trans-Sonics, Inc., P.O. Box 326, Lexington, Mass. 02173
DECK COVERS (METAL)
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027
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A G. Weser, Seebeckwerft, 2850 Bremerhaven 1, Germany
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Electro-Motive Division General Motors, La Grange, Illinois 60525
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Brown and Ross of New Jersey Incorporated, 370 Paterson Plank Road, Carlstadt, N.J. 07072
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014
Thrige-Titan, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201
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Riley-Beaird, Inc., Maxim Evaporator Profit Center, P.O. Box 1115, Shreveport, Louisiana 71130
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Crosby Group, Box 3128, Tulsa, Okla. 74101
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Esco Corporation, Wire Rope Rigging Div., 2141 N.W. 25th St., Portland, Oregon 97210
Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207
GANGWAYS
Rampmaster Inc., 1226 N.W. 23rd Ave., Fort Lauderdale, Fla. 33311
GAS DETECTION SYSTEMS
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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
LADDERS
Duo-Safety Ladder Co., 513 West 9th Ave., P.O. Box 497, Oshkosh, Wisc. 54901
LIGHTS—Emergency, Search & Navigation
Phoenix Products Co., Inc., 4751 North 27th St., Milwaukee, Wisc. 53209
Snelson Oilfield Lighting Co., P.O. Box 1284, Fort Worth, Texas 76101
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PDM/GAZ Transport, 919 Third Ave., New York, N.Y. 10022
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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
Philadelphia Gear Corp., Schuylkill Expressway, King of Prussia, Pa. 19406
MARINE EQUIPMENT
Beaver Tool & Machine Co., 525 S.E. 29th St., Oklahoma City, Okla. 73109
Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
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 INERTING SYSTEM
Smit Nymgen Corp. (Smit Ovens Nymegen), 275 Kisco Street, Mt. Kisco, New York 10549
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 PGI Club (Bermuda): Thos. R. Miller & Son, Mercury House, Front St., Hamilton, Bermuda (P.O. Box 665)
MARINE PROPULSION
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
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Fla. 33316
MARITIME FINANCING—Leasing
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, 608 No. Clear Creek Drive, Friendswood, Texas 77546
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
C.D.I. Marine Co., Suite 151, 5400 Diplomat Circle, Orlando, Fla. 32810
Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, Mass. 02026
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
Hydronautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, Calif. 93017
C.T. Iliriucci & Associates, Tourism Pier #3, San Juan, P.R. 00902
Jantzen Engineering Co., 15 Charles Plaza, Baltimore, Md. 21201
James S. Krogen, 2500 S. Dixie Hwy., Miami, Fla. 33133
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, N.Y. 11746
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
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., 50 Hunt Street, Watertown, Mass. 02172
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 657 Mission St., San Francisco, Calif.
Seaworthy Engine Systems, Pond Road, Canton, Conn. 06019
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
Tremayne, Jeffrey and Associates, Inc., 951 Government St., Suite 216, Mobile Ala. 36604
Whitman, Requardt & Associates, 1304 St. Paul St., Baltimore, Md. 21202
Xplo Corporation, 229 Fifth St., P.O. Box 492, Gretna, La. 70053
NAVIGATION & COMMUNICATIONS EQUIPMENT
American Hydromath Co., 55 Brixton Rd., Garden City, N.Y. 11530
Benmar Division, Computer Equipment Corp., 3000 W. Warner Avenue, Santa Ana, Calif. 92704
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., 1201 Corbin St., Elizabeth Marine Terminal, Elizabeth, N.J. 07201
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
Tracor, Inc., 6500 Tracor Lane, Austin, Texas 78721

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
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002

PIPE—Cargo Oil
Kubota, Ltd., 22, Funade-cho 2-chome, Naniwa-Ku, Osaka, Japan

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

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

PROPELLERS: NEW AND RECONDITIONED
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Coolidge Propellers, 1601 Fairview Ave. East, Seattle, Wash. 98102
Escher Wyss Gmbh, P.O. Box 798, Ravensburg, Germany
Federal Propellers, 1501 Buchanan Ave. S.W., Grand Rapids, Mich. 49502

PUMPS
Coffin Turbo Pump, FMC Corp/Pump Division, 326 So. Dean St., Englewood, N.J. 07631
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City, Kansas 66110
Crisafulli Pump Co., Box 1051, Glendive, Montana 59330
Delaval Turbine Inc., IMO Pump Division, P.O. Box 321, Trenton, N.J. 08602
Houttuln-Pompen N. V. Sophialaan 4, Utrecht, Holland
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Arkansas 72204
Johnston Pump Company, 1775 East Allen Ave., Glendora, Calif. 91740

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Foster Refrigerator Corp., Mill & North Second Streets, Hudson, N.Y. 12534

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

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

RUBBER BEARINGS
Johnson Rubber Co. (Marine Div.), 111 Vine Street, Middlefield, Ohio 44062

RUDDER ANGLE INDICATORS
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., 285 Lawrence Avenue, South San Farncisco, Calif. 94080

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

SEAWATER TREATMENT
Engelhard Industries, 430 Mountain Avenue, Murray Hill, N.J. 07974

SHAFT REVOLUTION INDICATOR EQUIP.
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913

SHIPBREAKING—Salvage
American Ship Dismantlers, Inc., Division of Schnitzer Industries, 3300 N.W. Yeon Avenue, Portland, Ore. 97210
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
National Metal & Steel Corp., 691 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

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 Division, AMCA International Corporation, P.O. Box 95, Port Deposit, Md. 21904
Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122
Fincantieri Yard, Via Sardegna, 40, Rome, Italy
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.
Hitachi Shipbuilding & Engrg. Co., Ltd., 47 Edobori 1-Chome, Nishi-Ku, Osaka, Japan
Hongkong United Dockyards Ltd., Kowloon Docks, Hong Kong
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Dockyard Co., 8 Kaigan-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
Murray & Stewart (Marine) (Pty) Ltd., Ocean Road, Table Bay Harbour, P.O. Box 4854, Cape Town, South Africa
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
O.A.R.N. (Officine Allestimento-Riparazioni Navi), P.O. Box 1395, Genoa, Italy 16126
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
Terrin Shipyards, Societe Provencale des Ateliers Terrin, 287, Chemin DeLa Madrague, 13345 Marseille—Cedex 3, France
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 MODELS
Yankee Shipwrights, P.O. Box 35251, Minneapolis, Minn. 55435

SHIP STABILIZERS
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

SHOCK CORD
Wm. B. Bliss, Jr. & Co., Inc., 381 Park Avenue So., New York, N.Y. 10016

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

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

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

TOWING—Vessel Chartering, Lighterage, Salvage, etc.
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, West End Ave., Oyster Bay, N.Y. 11771
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
Puerto Rico Lighterage Co., P.O. Box 1072, San Juan, P.R. 00902
Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002
Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y. 11214

VALVES AND FITTINGS—Hydraulic—Safety Flanges
Dover Corp. / Norris Division, P.O. Box 1739, Tulsa, Okla. 74101.
Fabri-Valve Co., 2100 N. Albina Ave., Portland, Oregon 97208
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

WATER POLLUTION CONTROL
Colt Industries, Water & Waste Management Operation, Beloit, Wisc. 53511
Keene Corporation, Fluid Handling Div., Cookeville, Tenn. 38501
Koehler-Dayton, Inc., P.O. Box 309, New Britain, Conn. 06050

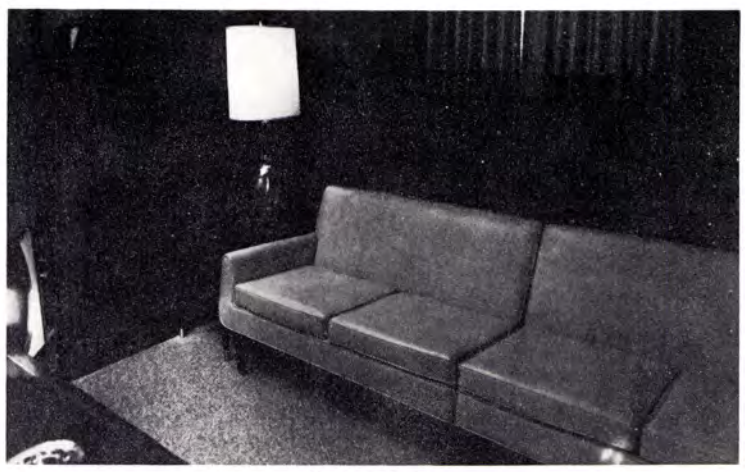
WEATHER ROUTING
Weather Routing Inc., 1415 Boston Post Road, Larchmont, N.Y. 10583

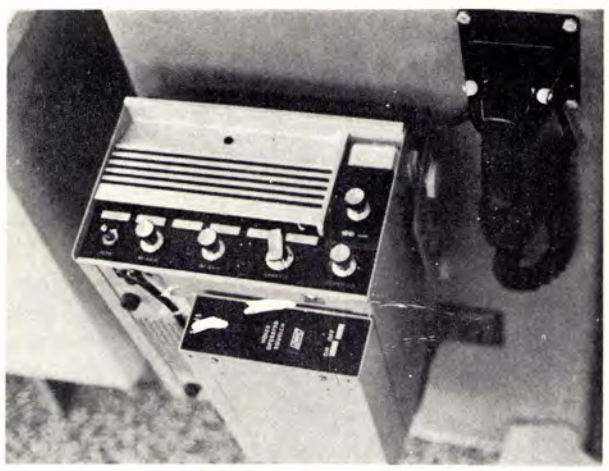
WELDING EQUIPMENT
Unitor Ships Service, Sorligaten 8, P.O. Box 2814 K, Oslo 5, Norway

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

ZINC
Smith & McCrorken, 153 Franklin St., New York, N.Y. 10013

cool-box in control room

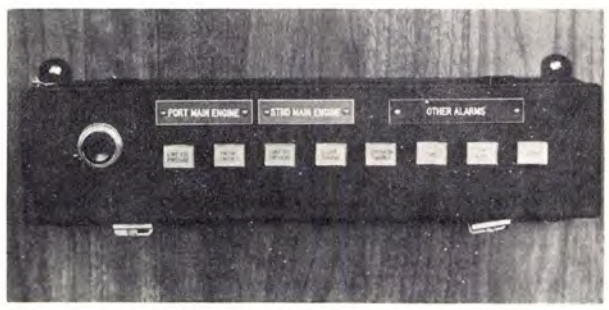

officers' lounge


complete communications system


spacious galley

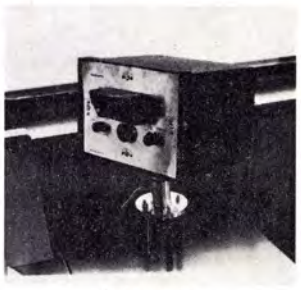

solid Jeffboat construction


semi-private room



computerized warning system

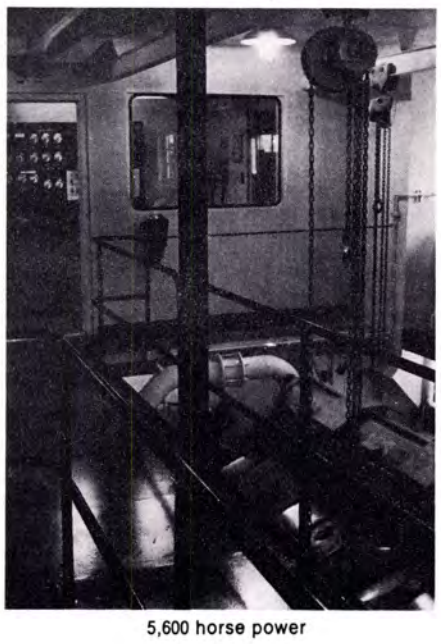

step-saving panel

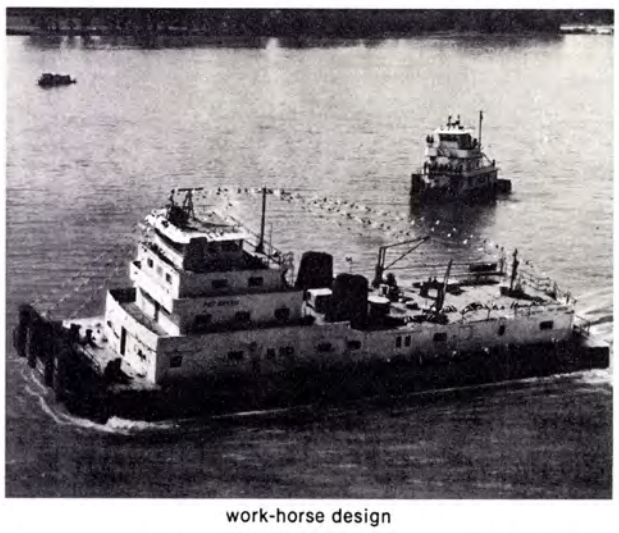

fathometer


air conditioning throughout


auxiliary controls


Sperry Mark 16 radar


5,600 horse power


work-horse design


main control panel


generator

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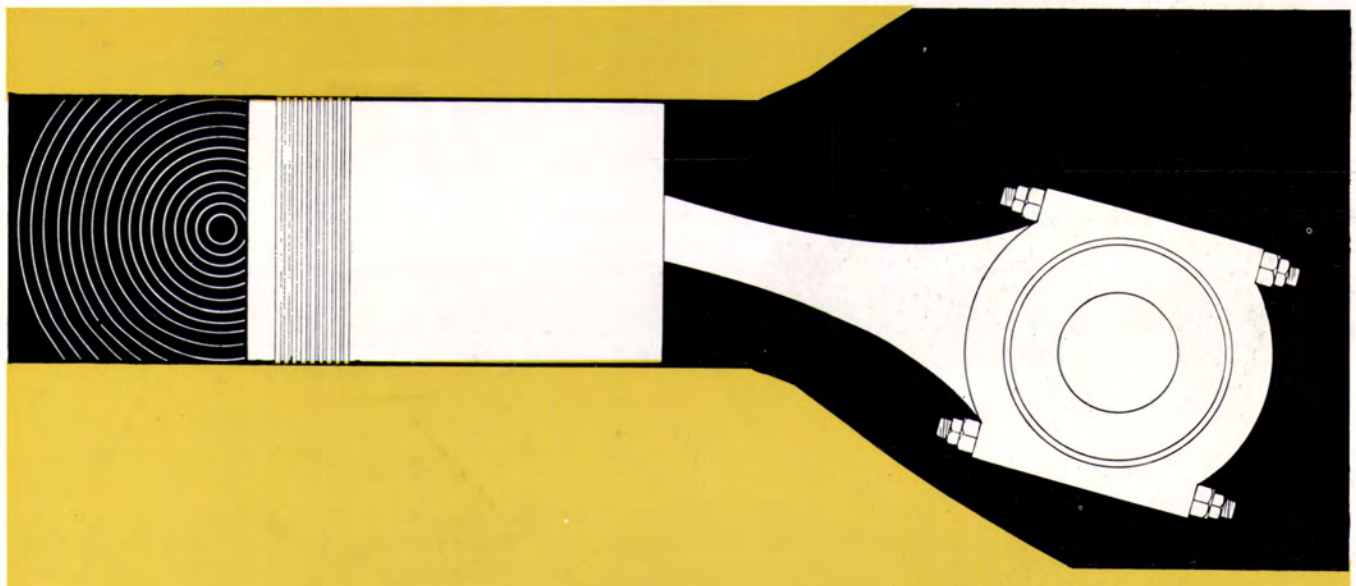

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