

MARITIME REPORTER AND ENGINEERING NEWS



**Marathon's New Texas Shipyard Combines
Modular And Conventional Methods To Build
For Offshore Drilling, LNG And Chemical Fields**

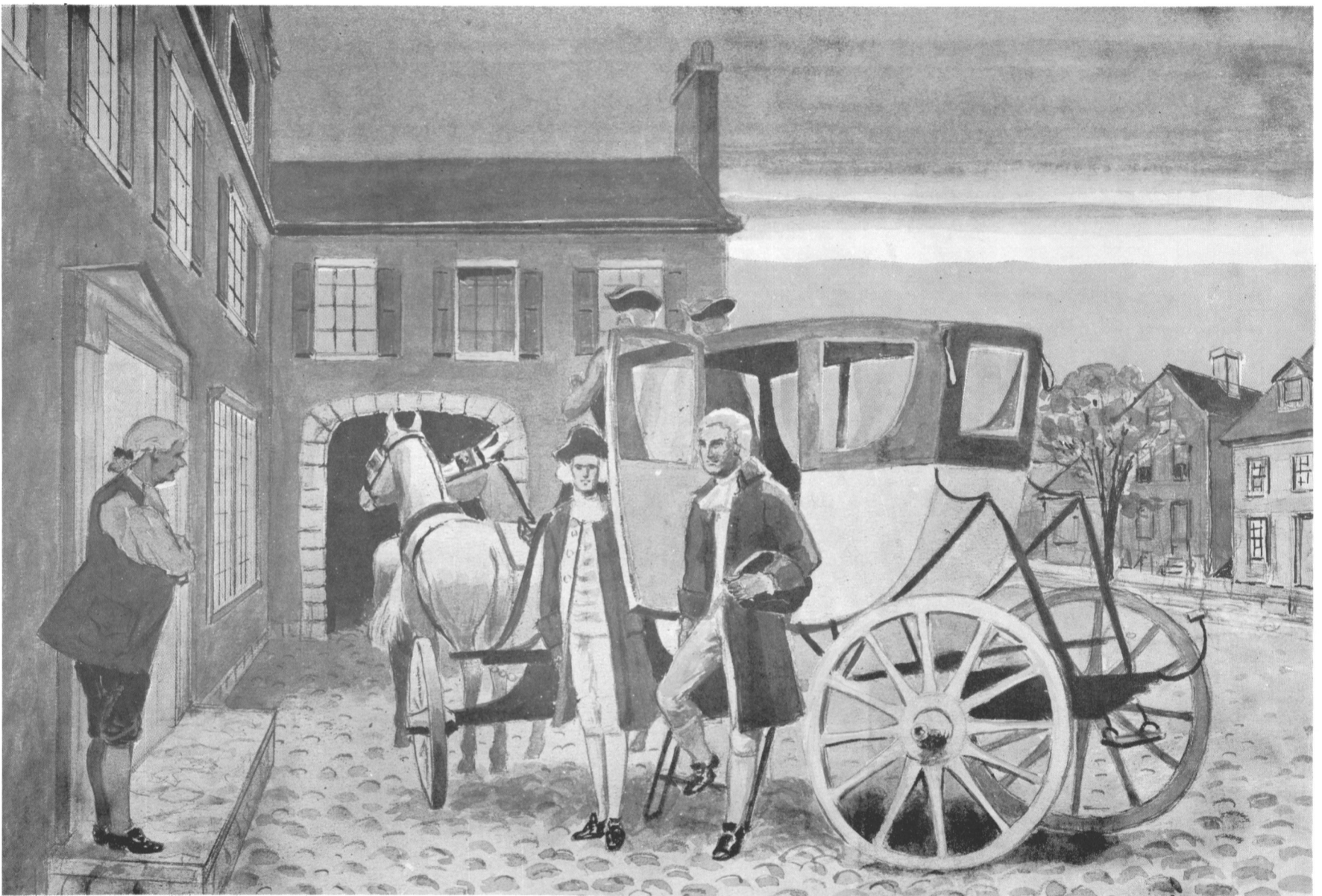
(SEE PAGE 6)

APRIL 15, 1973

George Washington did more than sleep in a different bed each night

He was a surveyor, tobacco planter, operator of a fishery and a flour mill, a breeder of cattle, an attorney and of course, the Father of His Country.

He probably never threw a stone across the broad Rappanock River nor chopped down his father's cherry tree. But, Henry "Lighthorse Harry" Lee, one of his officers, summed up the way Americans felt about him... "First in war, first in peace and first in the hearts of his countrymen."



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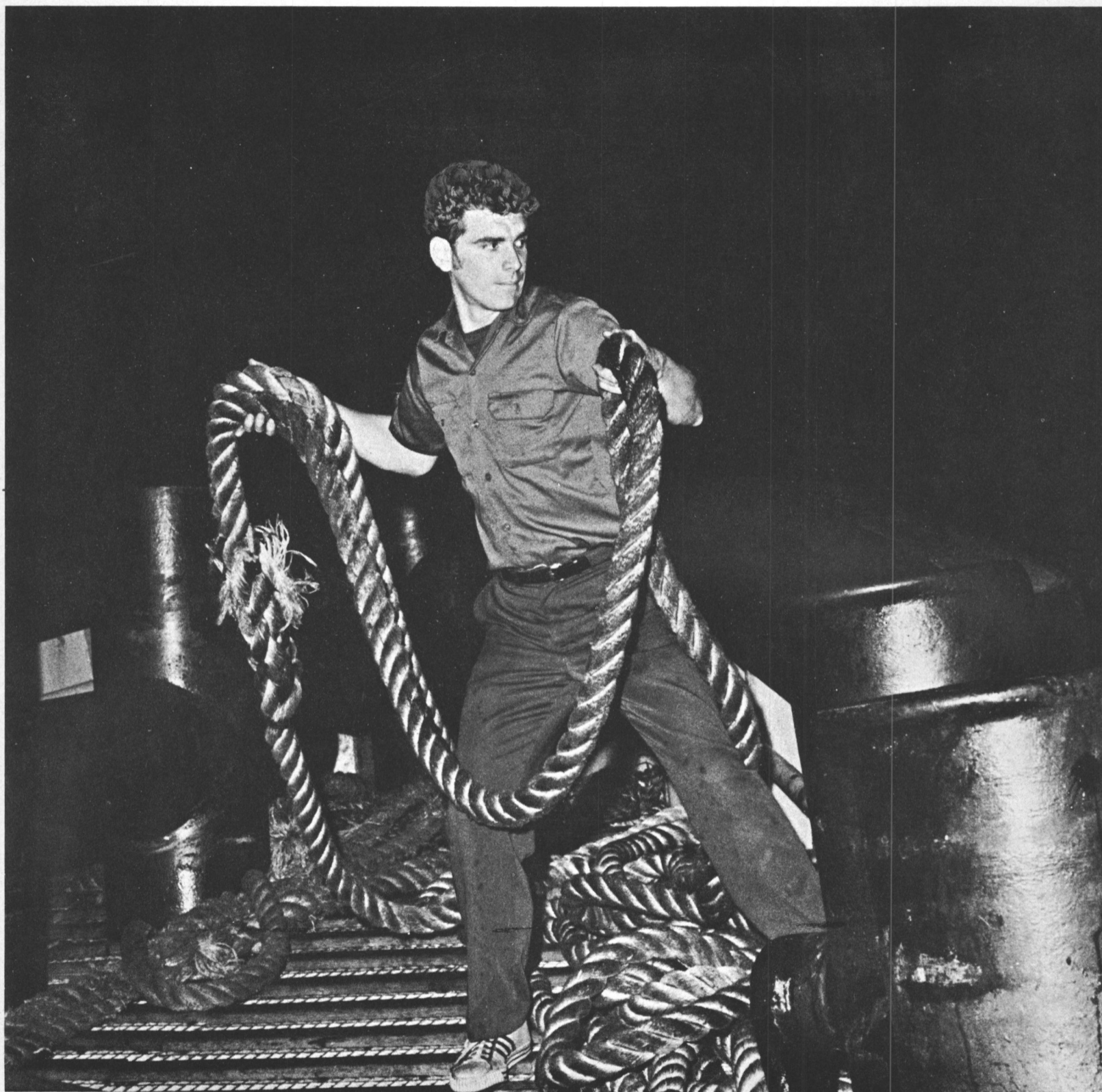
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Contract To Build 220-Passenger Boat Awarded To Schwarz

Schwarz Marine Co., Inc., builders of steel and aluminum boats in Two Rivers, Wis., has announced the signing of a contract to build a 68-foot steel-welded passenger boat for the Pictured Rocks Scenic Tours, Inc. of Munising, Mich.

The boat will carry 220 passengers on lower and upper decks. Power is two 8V71 Detroit Diesels. Upholstered seats are provided for passenger comfort. A snack bar will also be installed.

Passengers will be taken on the scenic tour of the Pictured Rocks area on Lake Superior. In the past several years, Schwarz Marine has built three other boats of this type operating on the Pictured Rocks run.

Jet Foil Inc. Applies For Title XI To Build 3 Boeing Hydrofoils

The Maritime Administration, Washington, D.C., has received an application for Title XI guarantee from Jet Foil, Inc., Pier 4, Maine Avenue N.W., Washington, D.C., to assist in building three Model 929 Boeing passenger hydrofoils.

Each vessel will cost about \$3.5 million, and will be able to transport 190 to 250 persons. Three different routes are planned for the hydrofoils: (1) Puerto Rico to St. Thomas, Tortola and St. Croix; (2) Washington, D.C., to Mt. Vernon and Marshall, Md., and (3) Annapolis, Md., to Norfolk, Va.

Richards Towing Seeks Title XI To Build Two Double-Skinned Barges

The Maritime Administration has received an application from Richards Towing Company, Port Richards, Savage, Minn., for Title XI mortgage and loan insurance in connection with the construction of two double-skinned barges at a total cost of \$900,000.

The barges will be built by Jeffboat, Inc., Jeffersonville, Ind.

Depend-A-Craft Gets Award From C Of E To Build Survey Boat

The Jacksonville District of the Corps of Engineers, P.O. Box 4970, Jacksonville, Fla. 32201, has awarded a contract to Depend-A-Craft, RFD Box 225, Pierre Part, La. 70339, to build a 65-foot survey boat. The cost of the contract is \$196,400.

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MARITIME REPORTER AND ENGINEERING NEWS

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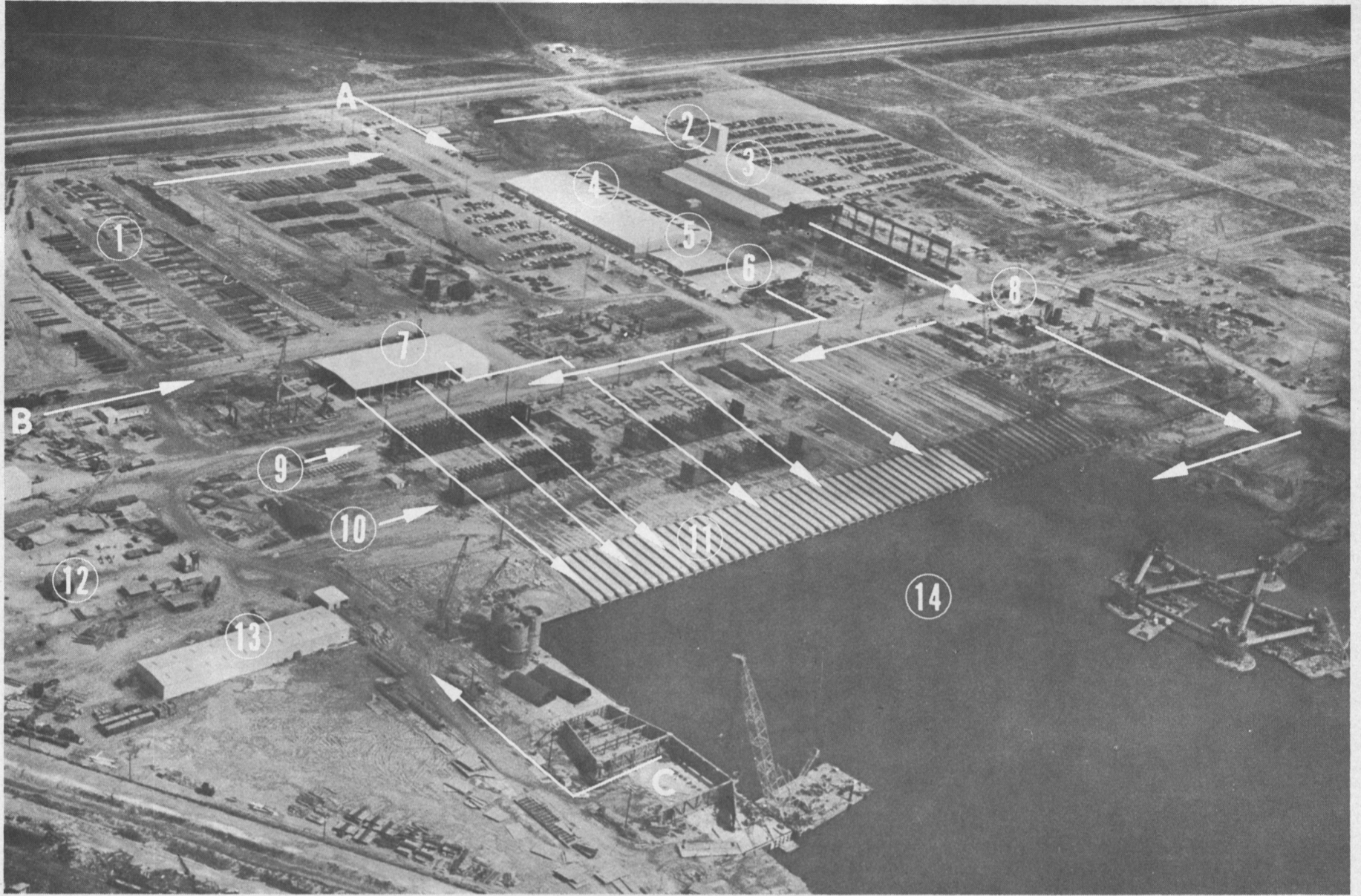


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Shipyard Layout and Material Flow—Numbers correspond to plant facilities. Arrows show material flow. Letters designate raw material receiving with A, truck shipments; B, rail, and C, barge shipments. Numbers: (1) Secondary steel storage, (2) Primary steel storage, (3) Plate shop, (4) Mold loft, (5) Administrative offices, (6) Electrical, plumbing shops, (7) Pipe shop, (8) Forming slab, (9) Building ways, (10) Outfitting ways, (11) Launch way, (12) Outside customer storage, (13) Customer warehouse, and (14) Launch slip.

Marathon Manufacturing Company's

New Gulf Coast Shipyard

Designed By Marathon For Flexibility, The 133-Acre Brownsville, Texas Shipyard Has The Capability Of Fabricating And Launching Drill Ships, LNG Tankers, Work Boats, Tugs, Supply Vessels, Chemical Carriers And Other Seagoing Ships

There's a new shipyard on the Gulf Coast and it's not like any yard in the United States or anywhere else. It has been years in planning and development but it's built and it's working.

Located on a 133-acre tract on the ship channel at the Port of Brownsville (Texas), the new yard is the Gulf Marine Division of Marathon Manufacturing Company. Marathon (headquarters is in Houston, Texas) is a major builder of mobile offshore drilling platforms.

Marathon builds other things. The company is a major manufacturer of industrial metal products. Our story, however, is concerned with one operation, shipbuilding, and one yard, Brownsville. The

company has yards in Vicksburg, Miss. (two), in Singapore and at Clydebank, Scotland, in addition to Brownsville.

The Gulf Marine Division was built because Marathon could not meet a continuing heavy demand for different types of mobile offshore drilling rigs without additional facilities. Marathon designed the Brownsville plant for flexibility. In addition to the offshore platforms, the yard has the capability of fabricating and launching drill ships, LNG tankers, work boats, tugs, supply vessels, chemical carriers, and other seagoing ships.

Marathon's new yard combines modular construction (assembly line) techniques with conventional shipbuilding methods. Marathon

feels the combination of the two concepts will permit the yard to build a number of different type vessels simultaneously—build them faster and at a lower cost.

The yard has five primary areas. These are materials storage, the buildings which include shops and offices, the fabrication and subassembly area, the ways (including the building ways, outfitting and launchways) and the slip.

Steel plate comes to the yard by rail, truck and barge. Plate goes into inventory storage. The primary storage area is adjacent to the Plate Shop. Capacity of this area is 20,000 tons, with additional steel storage elsewhere in the yard. The Plate Shop is designed for 50,000 tons of steel per year, or

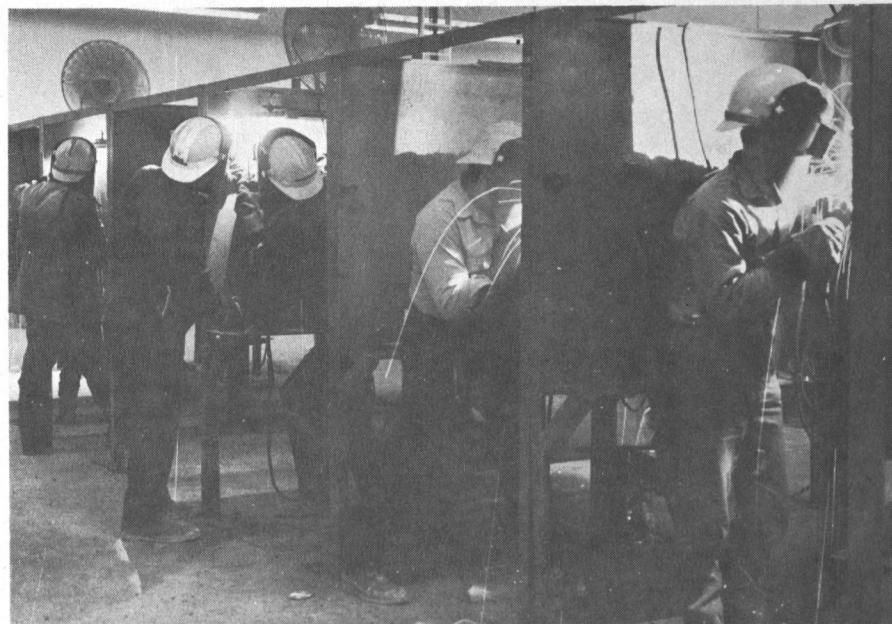
about 200 tons every working day. Fabrication and material flow begins when a 20-ton bridge crane using a vacuum lift places the steel on a conveyor and it's moved into the shop. As it enters, the steel is descaled, shot blasted, primed and dried. At this point, the plate is transferred to one of the shop's four bays, depending on the requirements for the particular plate.

The Plate Shop is equipped with a bulldozer, frame benders, shears, rolls, press brakes, manipulators, turning rolls, jigs and other fixtures. Eight overhead cranes (four at 20 tons and four at 10) serve the complete shop.

The yard's mold loft has facilities for full-scale drawings and produces patterns for the Plate



A semisubmersible drilling platform similar to the French-built Pentagone 81 pictured here is being built at Marathon's Brownsville, Texas yard for Societe de Forages en Mer "Neptune." The Pentagone 81 is a 5-column platform. The rig can drill in water depths to 600 feet, and its special design enables it to perform in rough sea environment.



Welder Training—Welders receive personal instruction at Marathon's new shipyard in Brownsville, Texas. Over 600 trainees have completed the course and have been certified to ABS standards. The yard has about 100 welders in the program on a continuing basis. The trainees are paid for time both in the classroom and on the job.

Shop's automatic flame cutting machines. However, there are two other methods used by the yard for plate patterns. One other method is for the company draftsmen to reduce the full-scale drawings to 1/10th scale. The 1/10th pattern can be put under the reader on a special flame cutter and the cutting machine will convert to full scale. Still another method is to take a picture of the 1/10th scale drawing. A glass negative about three inches square is produced, and the negative is placed in an optic system. The drawing image is projected onto the steel plate and a worker, using a tape roller, traces the pattern. The glass negative avoids the problem of distortion in projection of the pattern.

Shears in the shop will handle plate to 12 feet in size and one inch in thickness. The largest of the plate rolls will take care of 3/4-inch steel up to a length of 36 feet. Press brakes are available to meet all requirements. The shop can form intricate shapes and angles.

Automatic welding machines are located in the shop and in the plate fabrication area just outside the shop. In this assembly area, two 30-ton overhead cranes do material handling chores as the heavy steel components begin to go together. The two cranes have a clear hook height of 65 feet.

A 150-ton-capacity dolly is used to move components a short distance to the forming and subassembly slab. The slab is about 400 feet long and about 200 feet wide—big enough for fabrication of large vessel modular sections. The slab is actually an extension of the building ways. These ways are 200 feet wide and 1,400 feet long. Marathon has installed rails the full length of the building ways and the slab. The rails are for a 250-ton-capacity mobile gantry crane which is not yet installed. The crane will have two hooks and a clear span of 200 feet. Hook height will be 200 feet.

The full length of the building, outfitting and launchways are

crossed by launch beams set on 19-foot centers. The beams have a load bearing capacity of 16.25 tons per linear foot.

The 250-ton gantry crane will lift the subassembly sections from the fabrication slab and move down the building ways and lower the sections onto building platens. These sections are then joined to form the completed vessel.

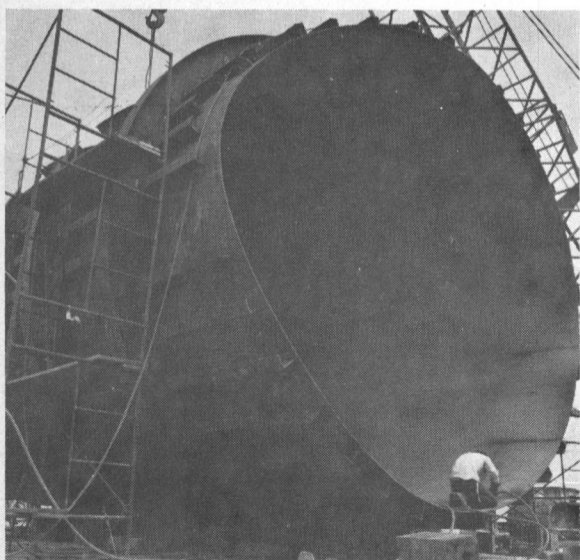
The building platens are vital to Marathon's vessel transfer system on the building and outfitting ways. The platens ride the beams. With its hydraulic transfer system, the yard is able to move the vessels in any of four directions. The yard is set up for side launches. The system permits vessel transfer either toward or away from the launchway, or forward or backward parallel to the launch. This feature offers maximum utilization of the building/outfitting area.

On the building ways, all heavy machinery items are placed aboard, and major steel work is completed while the vessel is on the building

platens and being serviced by the 250-ton gantry. After this is complete, the vessel is then transported to the outfitting ways outside the gantry rails. At that time, another vessel can be started on the building ways.

To this point of construction, the vessel has gone together primarily in a modular construction manner. The steel fabrication processes are either automated or semi-automated. It's on the outfitting ways that vessel construction is more in the conventional method of shipbuilding. At this point, coating of the vessel is accomplished. Internal piping, electrical and machinery installation (not already in place) may be handled during this painting process. The outfitting ways are not served by overhead cranes. For material handling jobs at this point, temporary cranes are placed aboard the vessel. These cranes are wide-based skid-type revolving cranes which are moved about as need dictates.

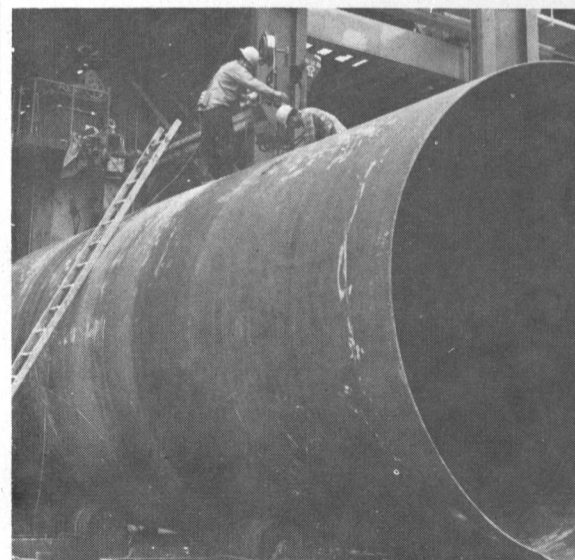
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Components Are Huge—Shipyard workers perform tasks on a section of a semisubmersible offshore rig. Heavy duty material handling equipment enables the yard to fabricate large components before moving to building ways.



Grinding Operation—This worker is shown as he smooths out the steel in a tubular section of a semisubmersible mobile offshore drilling platform. Marathon currently has an employment of 1,800 in the new yard.



Automatic Welding Machines—These workers are using an automatic welding machine for work on a component section of a semisubmersible offshore drilling rig being built at Marathon's new Brownsville shipyard.

Marathon's New Shipyard—

(Continued from page 7)

After completion in outfitting, the vessel is transported again by the hydraulic transfer system to the launchway. The launchway slopes, and as the vessel moves across, it is transferred from the building platens to wedges. Even though the launchway does slope, the vessel is maintained in a level attitude.

The building platens are available again for construction of another vessel. Final internal work and outfitting can be accomplished on the launchway.

When launch day arrives, a triggering mechanism releases the vessel and it slides into the launch bay. The bay is a slip which opens onto the ship channel. Water depth in this area varies from 25 to 60 feet, with the latter depth used for

incline testing of the vessels. The slip is 500 feet wide and 1,700 feet long.

Often the outfitting (and even fabrication) of the big mobile offshore rigs that Marathon builds will be done in the slip and a large area is provided for this. To handle the heavy lift jobs in the slip area, the yard utilizes two barge cranes, each with a rated capacity of 150 tons. Two push tugs at the yard move the cranes about. Marathon built both cranes and the tugs at another of its yards in Vicksburg, Miss. Marathon's Vicksburg plant and another in Longview, Texas, serve as support facilities for the Brownsville yard. This is in addition to product lines produced and marketed from the two plants. Marine deck cranes are manufactured at Vicksburg for installation on rigs in Brownsville. The company's steel mill in Longview produces many of the special alloys that go into Brownsville rigs. The Longview Division also supplies electric motors and generators for vessels at Brownsville.

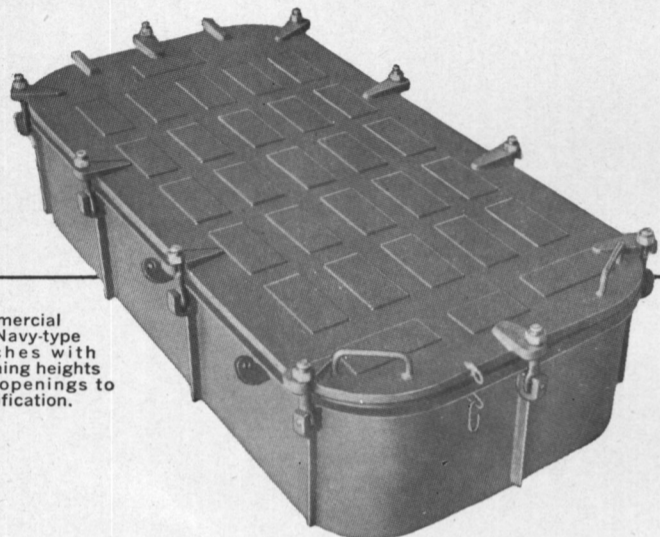
In other areas of the Brownsville facility, Marathon has a completely equipped pipe shop and electrical and plumbing shops. A machine shop is on the drawing boards. Often the customer will supply much of the equipment to be incorporated into an offshore rig or other vessel. Marathon's yard has outside storage areas and a warehouse for customer use.

When a mobile offshore rig or other vessel leaves the yard, it enters the deepwater channel at the Port of Brownsville, and from there it's just a few miles to the Gulf of Mexico. An important con-

sideration for Marathon is that there could be no overhead obstructions on the ship channel. The big offshore rigs are tall and overhead obstructions would have prevented use of the channel.

Marathon's Gulf Marine Division is now building vessels on a production basis. The yard has seven units under construction at the present. The company faced and overcame numerous matters concerned with building a new yard and commencing production. One reason for the firm's decision to locate in Brownsville was the area's low average annual rainfall—just 27½ inches. In 1972, however, the rainfall was much above the annual average.

Another point is that Brownsville has relatively little heavy industry. Marathon learned that though there were few skilled workers available, there was a large labor pool that (and testing showed this) could be trained. The company first began working with Texas Southmost College on a vocational training program for welders. Training facilities were later moved to the shipyard and classes are continuing. Trainees attend classroom lectures on such diverse subjects as blueprint reading and job safety. Early welding skills are developed in a laboratory situation. Training continues on the job. Trainees must meet ABS standards for full employment but they are paid from the time training begins. A total of 610 employees have completed the program and have been certified with another 100 in training. The yard's total work force now stands at 1,800 and is expected to be 2,500 by year end.

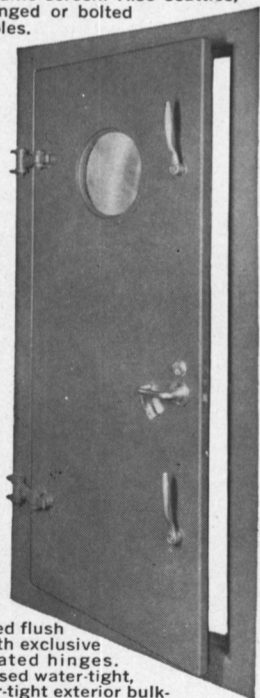


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Discussions On LNGs Highlight ASNE Meeting

At a recent dinner meeting of about 90 members and guests, the Tidewater Chapter of The American Society of Naval Engineers presented an informative program on the design, construction and operation of large modern LNG tankers.

Michael Goudouin of Marine Technigaz, Inc., Boston, Mass., was the guest speaker. Mr. Goudouin—a rare combination of designer, engineer and cost accountant—discussed, with the aid of excellent motion pictures and slides, the two leading types of LNG carriers.

The spherical tank type is more adaptable to the smaller ships where the weight is proportionate to capacity, as is cost.

The very large ships will use the membrane construction. The primary barrier liner consisting of waffled stainless steel sheets, and the secondary barrier consisting of modular elements are separated by a balsa wood and sugar maple plywood sandwich. It is anticipated that the LNG tankers to be built by Newport News Shipbuilding & Dry Dock Co. will use the membrane system. The size of these vessels makes automation of welding and material handling mandatory.

All of the research and development of this system was financed by Technigaz, a subsidiary of Gaz-ocean.

At the business meeting preceding the program, the officers for calendar 1973 were installed as follows: chairman, Capt. **W.E. McGarrah**, USN, Fleet Maintenance Officer, COMPHIBLANT; vice chairman, Comdr. **J.A. Siebel**, US-CGR, marine consultant; councilors, Rear Adm. **D.H. Clark**, USN (ret.), Rear Adm. **E.H. Thiele**, USCG (ret.), Rear Adm. **Jamie Adair**, USN (ret.), Capt. **R.F. Roche**, USN, Assistant Fleet Maintenance Officer, CINCLANT, and **J. Eaton**, Chief, Facilities Branch, Atlantic Marine Center (NOAA); secretary, **R.S. Gray**, Chief Surveyor, SUPSHIP FIVE, Norfolk Naval Shipyard; treasurer, Lt. Comdr. **E.S. McGinley**, USN, Naval Safety Center.

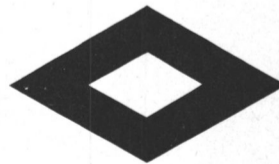
Committee chairmen: program, Comdr. **J.F. Yurso**, USN, Fleet Maintenance Division, CINCLANT; publicity, **J.R. Miller**, J.J. Henry Co., Inc.; membership, Comdr. **M.R. Gluse**, USN, Maintenance Division, COMCERVLANT, and hospitality, **J.T. Hickman**, nuclear engineer, Norfolk Naval Shipyard.

The meeting was held at the Fort Monroe Officers' Club, Hampton, Va.



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NASSCO Awarded \$119.6-Million Contract To Build Four Tankers

Overseas Shipholding Group (OSG) and National Steel and Shipbuilding Company (NASSCO) have jointly announced the signing of a contract for the construction by NASSCO of four U.S.-flag 89,000-dwt tankers, three of which will be delivered to OSG in 1977 and one in early 1978.

The agreement for the construction of the four vessels is subject to several conditions, including approval by the Maritime Subsidy Board of OSG applications for required differential subsidies. This class of ship incorporates unique pollution abatement features such as a double bottom and a high capacity clean ballast system, but OSG has the right to terminate the contract if, after the filing of an environmental impact statement by the Maritime

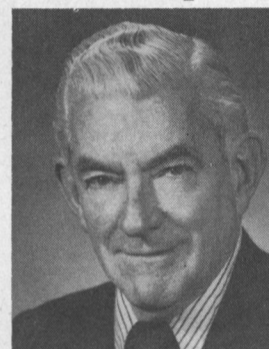
Subsidy Board, the Board establishes additional pollution abatement requirements on the vessels which OSG considers too costly.

The total purchase price for the four vessels will be \$119,600,000. Designed by NASSCO as the "San Clemente Class" oil carrier, the vessels will be 894 feet in length and 106 feet in beam, with a molded depth of 62 feet. The control system in the new 16-knot ships is of the latest design.

The new contract brings NASSCO's current backlog of work to be performed to about \$450 million, its highest level. National Steel and Shipbuilding Company is managed by Kaiser Industries Corporation and owned equally by Kaiser Industries and Morrison-Knudsen Company, Inc.

Overseas Shipholding Group, a major bulk shipping company, owns and operates a fleet of 36 tankers and dry bulk carriers aggregating in excess of 1.6-million deadweight tons. OSG's current newbuilding program, not including this contract, will increase its fleet by early 1976 to 52 vessels aggregating more than 4.1 million deadweight tons, including seven 50-percent owned and two 60-percent owned ships.

J. Bernard Rafferty Elected President Baker-Whiteley Towing



J. Bernard Rafferty

J. Bernard Rafferty was elected president and reelected a director of The Baker-Whiteley Towing Company of Baltimore, Md. He succeeds Leon A. Talbott, who retired on March 13, 1973, after 54 years of service with the 95-year-old company.

Mr. Rafferty is a former president of The Propeller Club, Port of Baltimore. He is a member of the Maryland and Baltimore Bar Associations, the Marine Law Association of the United States, and The Society of Naval Architects and Marine Engineers.

John K. Buttner was elected vice president and secretary. Capt. Thomas J. Murphy Jr., a graduate of Kings Point and well-known in shipping circles here and abroad, was also named a vice president. Richard C. Gross continues in his position of assistant secretary and general manager of operations.

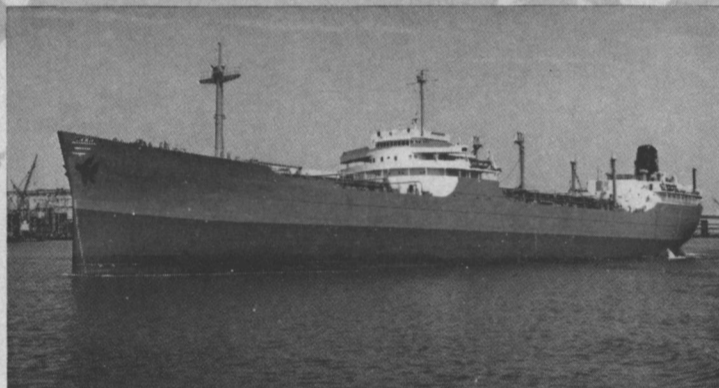
Hitachi To Build 500,000-Dwt Tanker At Ariake Shipyard

Hitachi Zosen has received an order for a 500,000-dwt tanker from Andreadis (U.K.) Ltd. This vessel will be built at Hitachi Zosen's Ariake Shipyard and delivered to her owner at the end of 1976.

Principal particulars and approximate measurements are as follows: length, 1,280 feet; breadth, 233 feet, and depth 102 feet. Built to ABS classification, the tanker will be powered by a steam turbine with a maximum output of 45,000 hp to deliver a maximum trial speed of 15.3 knots.

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Colt Industries Names D.E. Babb To New Sales Post In Houston

Colt Industries' Power Systems Division of Beloit, Wis., has increased their product representation in the Gulf Coast area with the assignment of D.E. Babb of Houston, Texas, to handle an expanded line of the division's products. F.J. Eubank, vice president

and general manager of the water and waste management operation, recently announced that the additional product lines that Mr. Babb will handle will include vapor compression desalters and waste treatment equipment. These products are primarily directed to the growing offshore drilling industry.

"With the expanded demands and increased sales in the areas of desalting equipment and waste con-

trol, particularly in the areas of offshore drilling, it is necessary to extend the representation of our product line in this geographical area," Mr. Eubank said. He also emphasized that Mr. Babb, with an extensive sales-engineer background, is ideally located to handle this new assignment.

The Colt division maintains a sales office in Houston. Mr. Babb has been with the company for 22

years, and is well-known in the Houston and Gulf Coast marine and industrial areas. He has extensive experience in product application to the offshore drilling market.



D.E. Babb

The Power Systems Division products that Mr. Babb now sells and services include a line of vapor compression, water desalting equipment in 15,000-gpd and 7,500-gpd capacities, and waste treatment equipment that has been primarily designed for marine application. In this group of products is a new vacuum sewage collection system now being manufactured and marketed under the trade name "Envirovac." This system is available for both permanent and mobile installations, with the advantages of using 90 percent less water and economical cost of installation and operation.

Storm Awards Contract To Beth-Beaumont For Self-Propelled Drillship

Arthur Weiss, president of Dearborn-Storm Corporation, Chicago, Ill., has announced that its subsidiary, Storm Drilling Company, has agreed with Bethlehem Steel Corporation for the construction of a self-propelled drillship, the Hurricane, to add to Storm Drilling Company's fleet of offshore drilling units. The Hurricane, the third self-propelled drillship to be owned by Storm, will be comparable in design to the Cyclone, and will cost approximately \$14,000,000. It will be built at Bethlehem's Beaumont, Texas, Shipyard, and is expected to be completed in May 1974.

Mr. Weiss stated that he was pleased to announce this important expansion of Storm Drilling Company's offshore drilling fleet to enable it further to serve the needs of the domestic and international industry.

Western Co. Of N.A. Awards Avondale Ship \$25-Million Contract

A \$25-million construction contract for a third semisubmersible offshore drilling vessel has been awarded Avondale Shipyards, Inc. of New Orleans, La., by Western Co. of North America. No delivery date has been given.

Two other semisubmersibles are under construction for Western Co., one is scheduled for delivery in the middle of 1973, and the other set for the first half of 1974.

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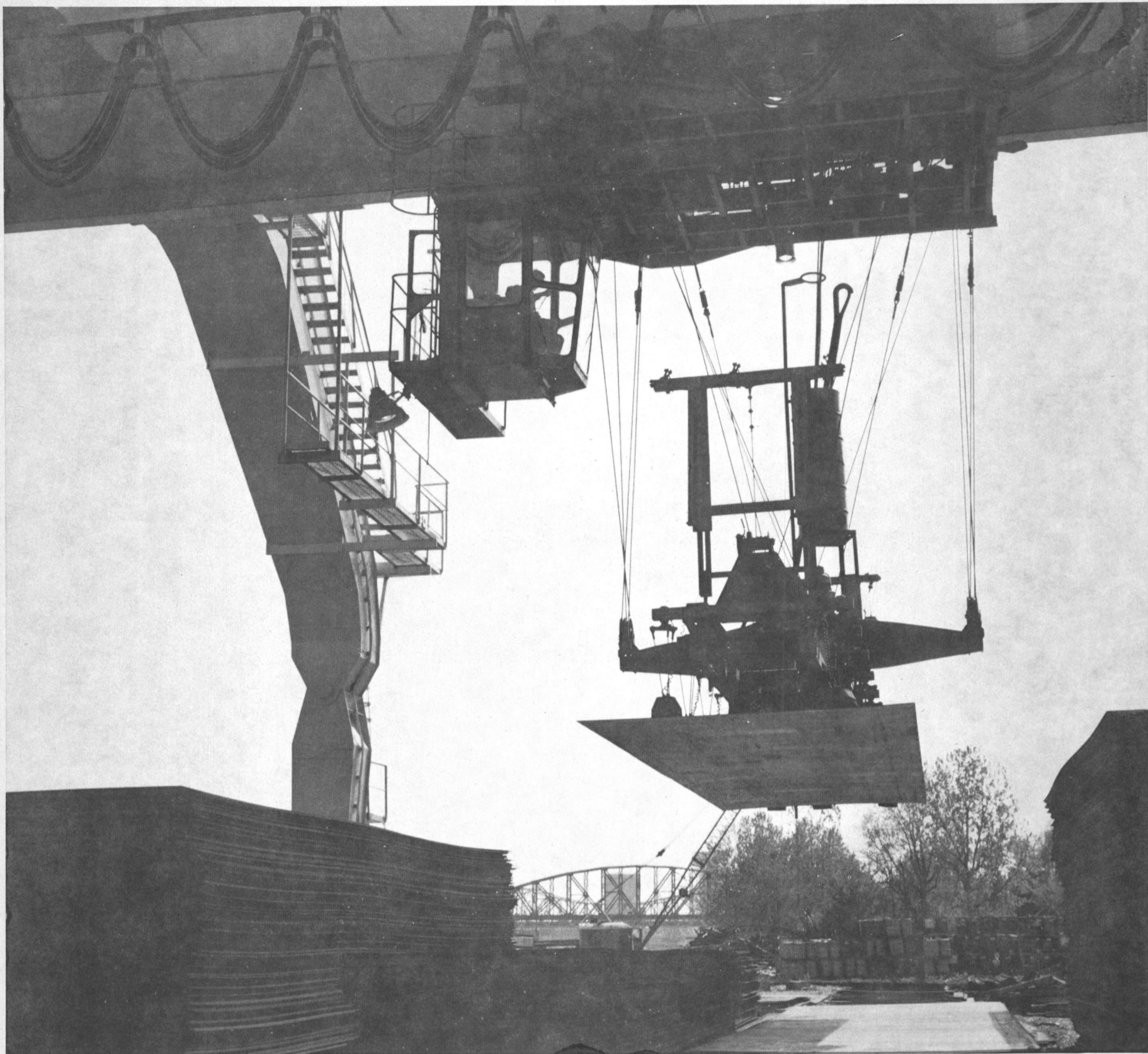


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Neptune I (Neptune)
Intrepid (Zapata)
Neptune-Gascogne (Neptune)
Endeavour (Zapata)
Penrod 53 (Penrod)
Mr. Jack (Reading & Bates)
Penrod 54 (Penrod)
Penrod 55 (Penrod)
Ocean Master II (Loffland)
Penrod 56 (Penrod)
Chaparral (Zapata)
Heron (Zapata)
Aramco Drilling Platform #2
Penrod 57 (Penrod)



Placid 66 (Placid Oil)
Dixilyn One-Fifty (Dixilyn)
Topper I (Crestwave)
Zapata Explorer (Zapata)
Topper II (Crestwave)
Penrod 58 (Penrod)
Penrod 59 (Penrod)
Westdrill I (Westburne International)
W. D. Kent (Reading & Bates)

Gulf Commander (Walker-Huthnance)
Western Star (Western)
Rowan-Houston (Rowan)
Rowan-New Orleans (Rowan)
Western Delta (Western)
Earl Rowe-San Antonio (Field International)
Penrod 60 (Penrod)
Zapata Nordic (Zapata)

Penrod 61 (Penrod)
Penrod 62 (Penrod)
Mr. Mel (Fluor)
Pentagon 82 (Sea & Land Drilling Contractors) (Neptune)
Topper III (Crestwave)
Rowan-Anchorage (Rowan)
Rowan-Texas (Rowan)
Ocean King (Odeco)
Key Biscayne (Key International)
Key West (Key International)
Grand Large (Triton Industries) (Neptune)
Penrod 71 (Penrod)
Penrod 72 (Penrod)
Penrod 64 (Penrod)
Penrod 73 (Penrod)
Margie (Atwood Oceanics)
Demaga (Reading & Bates)
Super Discoverer (Deep Ocean Drilling Inc.) (Offshore Co.)
Penrod 75 (Penrod)
Colonel Drake (Offshore International)
Chickamauga (Atwood Oceanics)
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Senior Officers Elected At ABS Annual Meeting

Robert T. Young, chairman and president of the American Bureau of Shipping, was reelected to that post on March 20, by the board of managers of the international classification society.

It was also announced that the board elected **Charles J.L. Schoefer**, formerly senior vice president, to executive vice president, and **Ralph C. Christensen**, formerly vice president, to senior vice president.

Reelected vice presidents of the Bureau were **Sydney Swan**, **Robert S. Little**, **Kenneth D. Morland**, and **Kurt Molter**. **N. Herbert Mullem**, formerly assistant treasurer, was elected treasurer, and **John R. Blackeby** was reelected secretary of the Bureau.

Hubeva Marine Names Two European Agents

W. George Huntington, president of Hubeva Marine Plastics, Inc., sole distributor of Cordobond Strong-Back products, has announced the appointment of two new European agencies. In France, the Cordobond line will be handled by Sogeric of 148, Rue Sainte, 13—Marseille (7e), France; and in Portugal, it will be handled by Valadas, LDA. of Avenida D. Carlos 1, 60, Lisboa-2, Portugal.

NRA Board Holds First Meeting At Academy In Helena

The Fourth Annual Membership and Board of Directors Meetings of the National River Academy of the United States of America were held March 15, 1973, at the Academy in Helena, Ark. Forty-three members and guests attended the meetings, held for the first time at the Academy's new facility.

Members elected for a three-year term to serve on the board of directors are: **James O. Gundlach**, Canal Barge Company, Inc.; **W.R. Murphy**, American River Transportation Company; **Sheldon G. Held**, Hartford Insurance Group; **Noble C. Parsonage**, Pott Industries, Inc.; **H.N. Spencer**, The Waterways Journal; **L.E. Thompson**, Pine Bluff Warehouse Terminal, and **George Hale**, Marine Inspection Engineers.

Floyd A. Mechling, A.L. Mechling Barge Lines; **John M. Donnelly**, Ingram Barge; **B.D. Brandon**, Arkansas State Representative, and **Pierre R. Becker**, Superintendent of the Academy, were elected chairman/president, vice chairman/vice president, secretary/treasurer, and assistant secretary/treasurer, respectively, to serve for the year 1973-74.

M.E. Midgely, Nilo Barge Lines, Inc., was named co-chairman of the fund raising committee. He shares this position with Mr. **Murphy**.

Mr. **Mechling** expressed his deep appreciation for the dedication and excellent performance of the following board members, whose

terms expired March 1973: **M.E. Midgely**, **T.F. Ellis Jr.**, **Gene Raff**, and **Dr. Bart Westerlund**.

Mr. **Murphy**, chairman of the fund raising committee, gave credit to the Academy superintendent for concentrating the fund drive toward a much-needed river pilot simulator trainer.

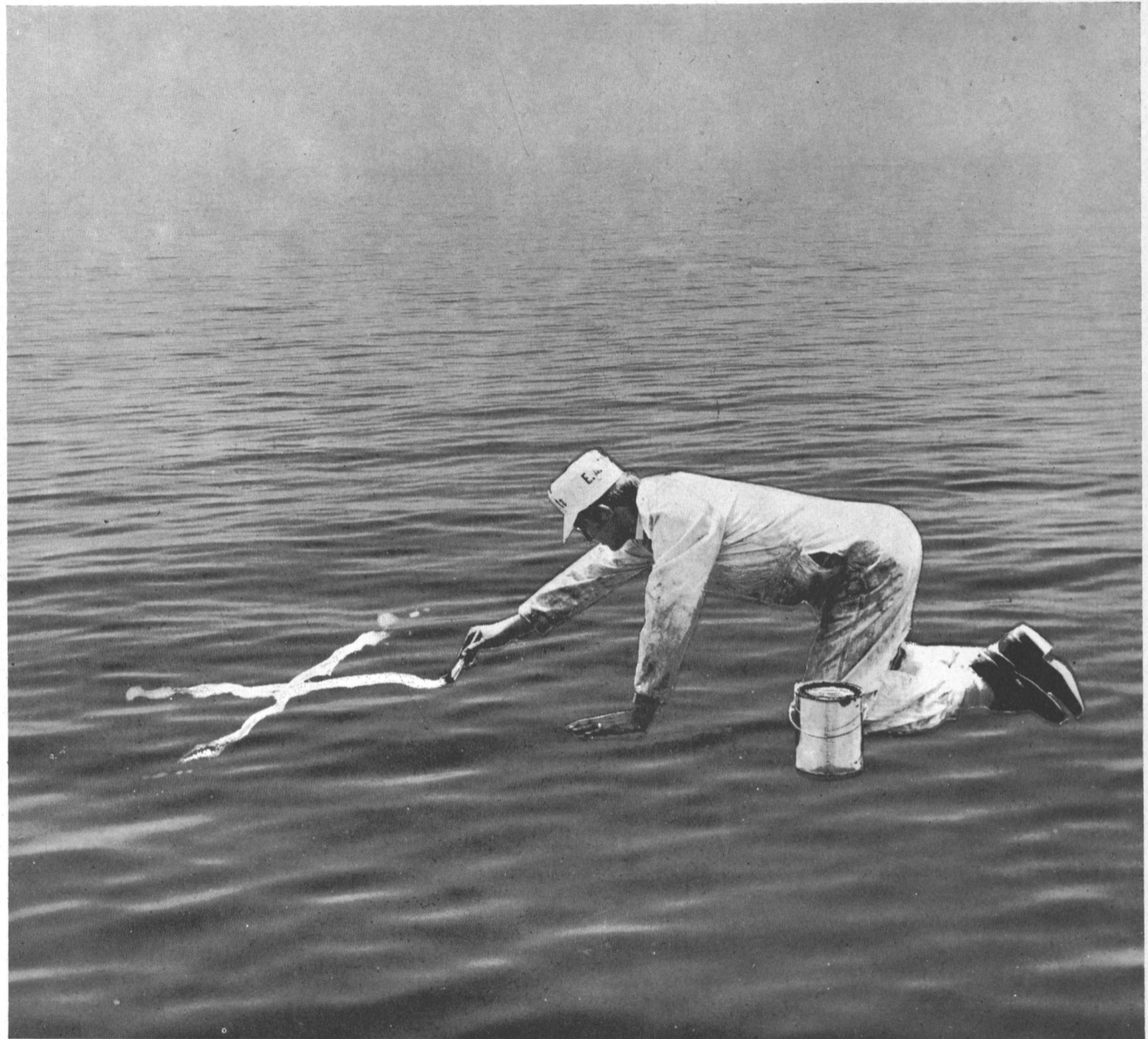
William J. Wolter, Waterfront Services, Inc., chairman of the membership committee, asked the board's approval of 17 membership

applications, which were unanimously approved.

Mr. **Held**, chairman of the education committee, complimented the Academy's staff for their untiring efforts in developing and implementing the cadet/pilot program. He further urged all members to assist in the recruitment of young men for the cadet/pilot program, and announced that several openings are still available for April 30, 1973, class.

Mr. **Parsonage**, chairman of the first NRA Invitational Golf Tournament, announced that June 7 and 8 had been set at the Helena Country Club for the tournament, in conjunction with the dedication ceremonies of the Academy's initial building.

Mr. **Held** and **James E. Walden** were each presented an award for outstanding services as chairman of the education and building committees, respectively.



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Astronaut Lovell Joins Bay-Houston Towing As Senior Exec. VP

The appointment of Astronaut Capt. James A. Lovell as senior executive vice president of Bay-Houston Towing Company, was announced by Cecil R. Haden, president. Captain Lovell assumed his new position March 1, 1973—following his retirement from the United States Navy.

In his new position, Captain Lovell will participate in overall operations of the diversified firm, which has interests in water transportation and harbor towing, mining, ranching and ecological products. Previously elected to Bay-Houston's board of directors, he will also serve as a member of Bay-Houston's executive operating committees, reporting directly to Cecil Haden, chief executive officer.

Other officers involved in the ma-

rine operations of Bay-Houston include W.D. Haden II, chairman of the board, R.J. Wales, vice chairman of the board, John C. Master-son Jr., executive vice president, and Walter J. Fernandez, vice president.

Mr. Haden noted that Captain Lovell's joining the Houston-based organization reflected "continuing momentum in our diversification program."

Captain Lovell is now complet-

ing his 21st year of commissioned service in the Navy, and is Deputy Director-Science and Applications for the NASA space program.



Capt. James A. Lovell

A 1952 graduate of the United States Naval Academy, he has also attended the Harvard University Advanced Management Program.

Captain Lovell presently holds the record for time in space with a total of 715 hours and 5 minutes. He has served in the space program since 1962, and has been active in both the Gemini flights and the recently completed Apollo series.

He holds innumerable medals and awards, including two Navy Distinguished Flying Crosses, as well as the Legion of Honor from France.

Bay-Houston Towing Company and its predecessors have been engaged in the water transportation and harbor towing business since the middle 1880s. Owned by Cecil R. Haden and his family, it is presently one of the largest harbor and coastwise towing companies on the Texas Gulf Coast.

Bay-Houston was formed in 1948 by the merger of two Haden-owned companies, Bay Towing Company and Houston Towing Co.

With offices in Houston, Galveston, Corpus Christi and Freeport, Texas, agent representatives are located in all major shipping centers in the world.

Carrying on in the tradition of his father and grandfather, W.D. Haden II is a member of the board of commissioners of the Houston Port Authority, and was honored in 1970 by being appointed honorary Consul of Norway.

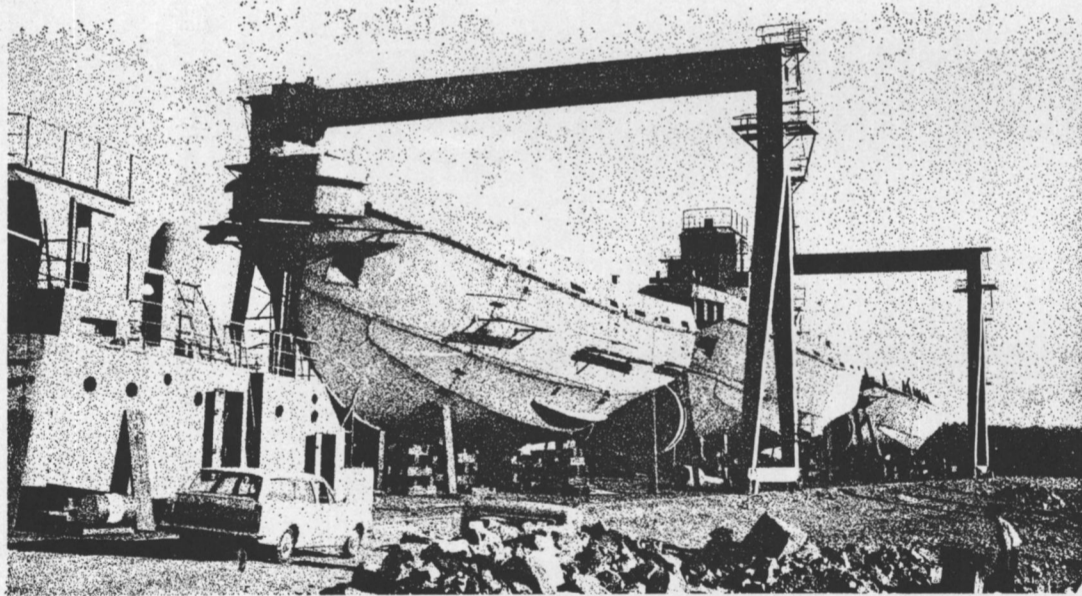
ACL Appoints Stoddart Market Research Mgr.

Jeffrey Stoddart has been named manager of market research in New York for Atlantic Container Line, U.S., it has been announced by O.I.M. Porton, president.

Mr. Stoddart was assistant marketing manager in New York before his current appointment. He joined ACL in 1969 as an administrative assistant to the traffic and operating director of Atlantic Container Line Services, Southampton, England. After service with the marketing department of ACLS, he was transferred to New York. Between 1959 and 1967, Mr. Stoddart was associated with Cunard Line.

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Int'l Paint (Calif.) Inc. Appoints David Haas



David S. Haas

International Paint Co., (California) Inc., worldwide manufacturers of marine coatings, has announced the appointment of **David S. Haas** as sales manager.

He has been associated with International Paint Co., (California) Inc., since 1966, in the capacity of West Coast sales engineer. Before joining International Paint Co., (California) Inc., Mr. Haas served other major coating suppliers in the industry.

As sales manager, he will coordinate the company's sales program in five district offices on the West Coast, and distributors in Hawaii and Alaska.

In addition to his managerial function, Mr. Haas is an active member of The Propeller Club of the United States Port of San Francisco, and The Marine Exchange.

GE Credit Leases Fortaleza To TTT Via Sun Subsidiary

General Electric Credit Corporation has announced that it is the "sole equity investor"—or owner—in the lease financing of the \$28-million roll-on/roll-off cargoship *Fortaleza*, now under charter to a subsidiary of Transamerican Trailer Transport, Inc.

The *Fortaleza* was launched at Sun Shipbuilding & Dry Dock Company's Chester, Pa., yard in October 1972. GE Credit purchased the 24,000-ton ship and leased it to a subsidiary of Sun Shipbuilding which subleased to TTT on a bare-boat charter for 20 years. Partial financing was provided by a public offering, insured under the Government Title XI program.

The *Fortaleza* is 700 feet long overall, and 660 feet long at the waterline when loaded to a 27-foot draft. Her beam is 92 feet molded, and she displaces 24,000 tons when loaded to a draft of 27 feet in salt water. She has a single-screw and a two-boiler geared steam turbine delivering 30,000 continuous shaft horsepower. She will operate between Baltimore and Puerto Rico on a weekly sailing schedule.

GECC's transportation financing department is engaged in the financing and leasing of large dollar transportation equipment, including ships, commercial aircraft, corporate aircraft, locomotives and box cars.

German Shipbuilders Plan Four-Year Program

The German Shipbuilders' Association has announced plans for a major four-year investment program estimated to cost approximately \$380 million. At the same time the shipyards have alerted the Federal Government to the fact that unless sizable aid is provided in the form of investment contributions and favorable credit terms, shipyards would be un-

able to meet this target deemed essential to meet future overseas competition.

Following an inquiry, the Association prepared "Structural Concept 1973-77," which suggests that the Government should provide about 40 percent of the required investment in one form or another, while the remaining funds necessary should be obtained within the industry's own resources.

Tidal Elects H.J. Michaelson VP

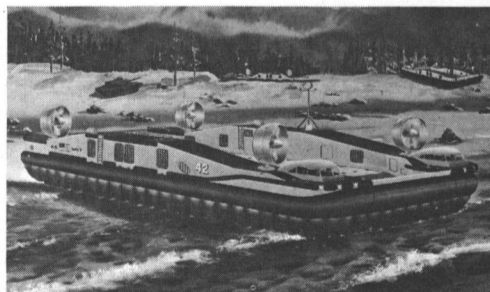
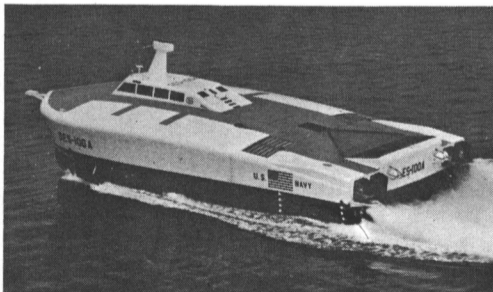
Tidal Companies, Inc., Eleven Broadway, New York, has announced that **H.J. Michaelson** has been elected vice president. Mr. Michaelson will also serve as vice president of Tidal Equipment & Transportation Company, a newly formed division to handle activities involving purchase, sale and use of containers and chassis.

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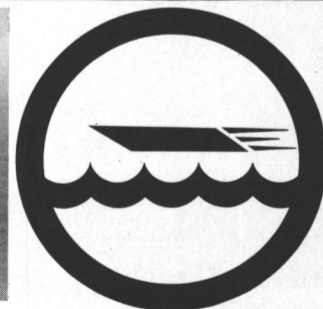
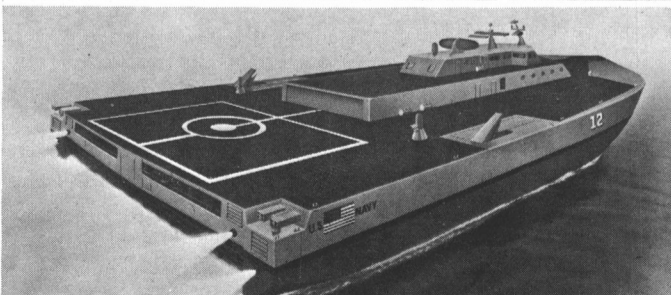
...Full speed ahead

SES-100A: Designed and built for Surface Effect Ships Project Office.



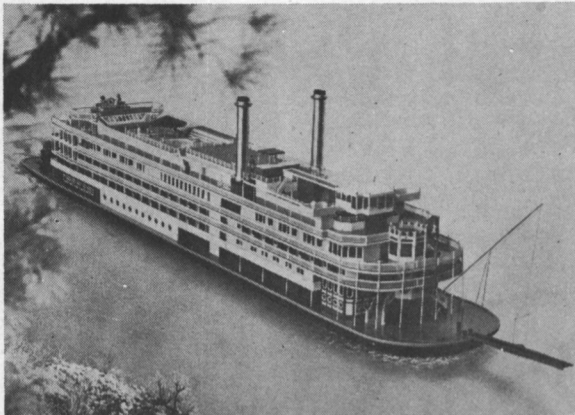
JEFF(A): Amphibious assault craft under construction for Naval Ships Systems Command.

2,000 TON: Preliminary design of 2,000 ton surface effect testcraft.



Aerojet Surface Effects Ships Division
Tacoma, Washington

Jeffboat Building \$15.5-Million Stern Paddlewheel Riverboat For Greene Line Steamers, Inc.



A model of the new \$15.5-million stern paddlewheel riverboat, which is under construction at the Jeffersonville, Ind., yards of Jeffboat, Inc. The 400-passenger vessel is being built for Greene Line Steamers, Inc., Cincinnati, Ohio, a wholly owned subsidiary of Overseas National Airways.

A new \$15.5-million 400-passenger stern paddlewheel riverboat is under construction at a Midwest shipyard, and will be ready for overnight trips on the U.S. river system by mid-1975, Overseas National Airways recently announced in New York.

The 397-foot 4,500-gross-ton steamboat is being built for Greene Line Steamers, Inc., Cincinnati, Ohio, a wholly owned subsidiary of ONA, by Jeffboat, Inc., at its Jeffersonville, Ind., yards.

Jeffboat is a subsidiary of Texas Gas Transmission Corporation. Greene Line also operates the Delta Queen, the last overnight passenger steamer in the United States.

The new vessel will be a sister ship of the Delta Queen. It will be the largest passenger river steamer ever built in this country.

Construction of the new boat was made possible by a Federal Maritime Administration guarantee of 87½ percent of the \$15.5 million cost. The balance was financed by ONA through the First National Bank of Chicago.

The Delta Queen is currently operating under a reprieve from the Safety at Sea Law, since the 47-year-old vessel cannot be brought up to certain standards enacted in the 1966 law. Legislation to permit an additional five-year extension of the Delta Queen's reprieve was introduced last month by Chairwoman **Leonor K. Sullivan** (D-Mo.) of the House Merchant Marine and Fisheries Committee.

The new riverboat is the result of more than six years of planning by Greene Line and the maritime division of ONA. It will have the exterior appearance of an old-time Mississippi River steamboat, but will use the latest construction materials, and will be built to U.S. Coast Guard safety standards.

The boat will be powered by two 1,000-horsepower steam reciprocating engines that will turn her paddlewheel, and will be capable of 12 miles an hour. She will have a swimming pool, a sauna, large lounges, four bars, air-conditioning, elevators, and a steam calliope.

Design and construction of the new vessel is under the direction of **James S. Demetrios**, assistant to the chairman of ONA, and director of maritime affairs for the airline. Mr. **Demetrios** supervised design and construction of a 15,000-ton ocean cruise ship begun by ONA and now sailing as the *Cunard Adventurer*.

For exterior design, ONA retained **James Gardner**, who did the exterior design of the *Cunard Adventurer*, and also that of the *QE II*. Supervising naval architects are Schuller and

Allan of Houston, a firm that has been working on passenger vessel design for the Greene Line since 1967. The firm of Three Quays Marine Service of London, a division of P & O Steamship Company, Ltd., is a marine consultant.

Testing of the new riverboat's hull and propulsion system was done at the Netherlands Ship Model Basin at Wageningen, Holland, and at the department of naval architecture of the University of Michigan.

Todd Receives Letter Contract To Construct Three OBOs Costing \$30.7 Million Each

E.C. Stamatiou, owner of Hedge Haven Farms, Clinton, N.J., announced that he had signed a letter contract with Todd Shipyards Corporation for Todd to build at its Los Angeles Division three 80,500-dwt oil/bulk/ore (OBO) vessels at a cost of \$30,750,000 each.

"Application has been made to the Maritime Administration for a construction differential subsidy," Mr. **Stamatiou** added, "and if approved, the vessels will be chartered to Burmah Oil Company under a 25-year agreement. They would be used to transport petroleum from Burmah's proposed offshore terminal in the Bahamas to U.S. ports."

In December 1972, Burmah signed a letter contract with Todd to build six 380,000-dwt tankers (VLCCs) at an approximate price of \$95 million each at Todd's proposed Galveston, Texas, facility. Application for construction differential subsidy has also been made for these vessels, which would transport crude oil from the Near East to Burmah's Bahama terminal.

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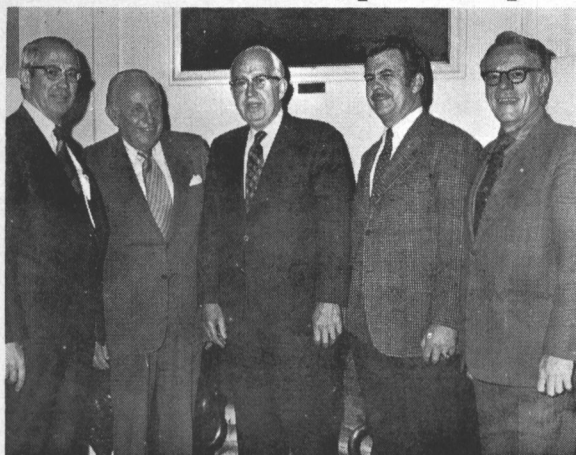


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**NSC Marine Section
Discusses Plans For 1973
—USCG Honors Capt. Bishop**



Captain **Bishop** and his newly elected regional vice chairmen shown left to right are: **H.H. Howard**, assistant to vice president, Bethlehem Steel Corporation, Bethlehem, Pa.; **Fred R. Smith**, chairman of the board, Seattle Stevedore Co., Seattle, Wash.; Capt. **Bishop**; **John D. Geary**, vice president, The Ohio River Co., Cincinnati, Ohio, and **Robert Kratzert**, manager, vessel personnel and service, Columbia Transportation Division, Oglebay Norton Co., Cleveland, Ohio.

The Executive Committee of the Marine Section, National Safety Council, held its first 1973 meeting in the offices of the American Bureau of Shipping, New York City. Almost the complete slate of elected officers in the 1973 Marine Section Executive Committee headed by their new general chairman, Capt. **Hewlett R. Bishop**, president, National Cargo Bureau, Inc., were present. The prospects for even better Marine Section Safety Conference Meetings in the future were made brighter by the discussion held and programs announced that are to be implemented during the remainder of the year.

Captain **Bishop** was recently cited for distinguished contribution to maritime safety and other activities by the United States Coast Guard, which tendered him its Distinguished Public Service Award. The citation, presented to Captain **Bishop** by Coast Guard Commandant Adm. **Chester R. Bender**, is the highest civilian award of the Government agency.

**Norwegian Firm Receives
Large Order To Supply
U.S. Shipbuilding Industry**

Norwegian computer firms—tiny by international standards—are winning important foreign orders.

In February 1973, a contract—believed to be one of the biggest ever in the commercial software field—was signed between Shipping Research Services A/S-SRS-Oslo, and the United States Government represented by the Maritime Administration. The contract allows the Maritime Administration to market the Autokon-71 ship design system throughout the U.S. shipbuilding industry. The agreement also includes the Prelikon programs for design calculations.

In the United States, the first generation of the Autokon system was acquired by General Dynamics Corporation as early as 1966, followed by Litton Industries in 1968, and Seatrain Shipbuilding Corporation in 1970. In 1972, the Autokon-71 system was sold to Newport News Shipbuilding & Dry Dock Co.

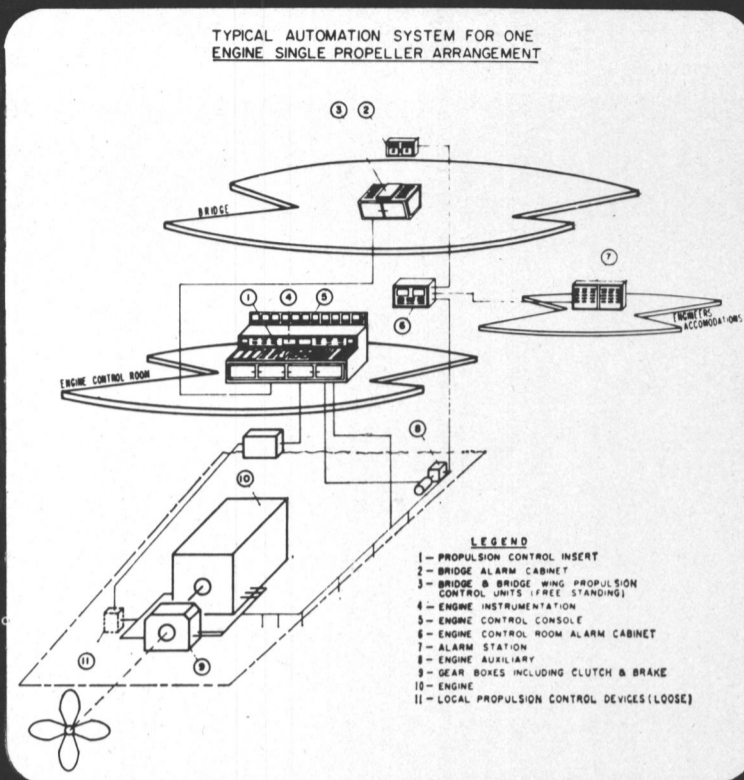
Now the Maritime Administration has acquired exclusive rights in U.S. territory. American shipyards will acquire rights to the system as sublicensees under contract with the Maritime Administration.

Three major shipyard companies have already taken a sublicense for this new generation of Autokon—namely Todd Shipyards Corporation, Bethlehem Steel Corporation, and General Dynamics Corporation.

April 15, 1973

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SYSTEMS for
UNMANNED
and ONE-MAN
ENGINE ROOM
OPERATION
by GPM**

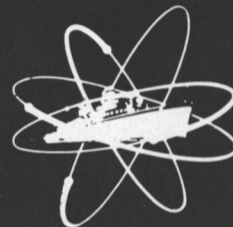
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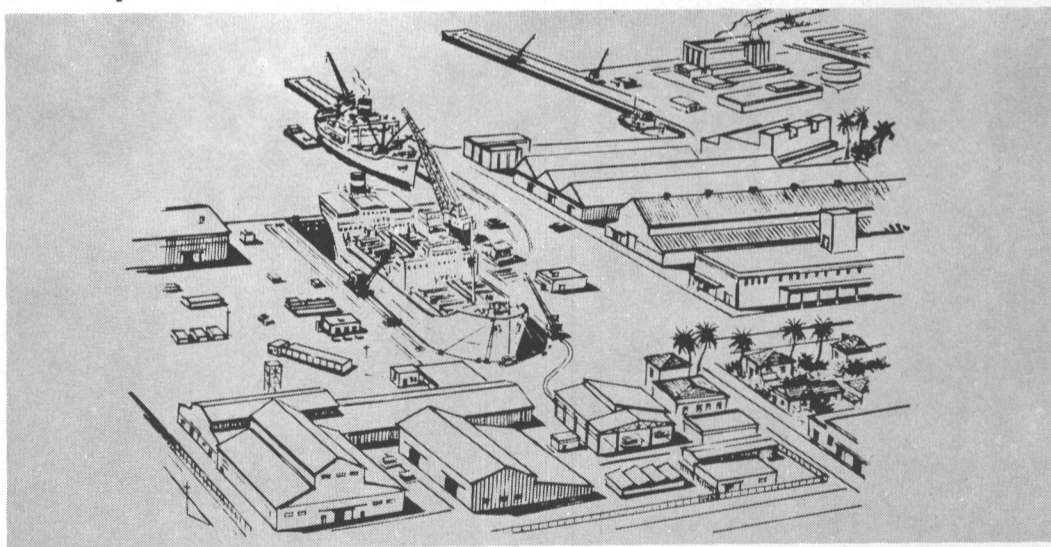
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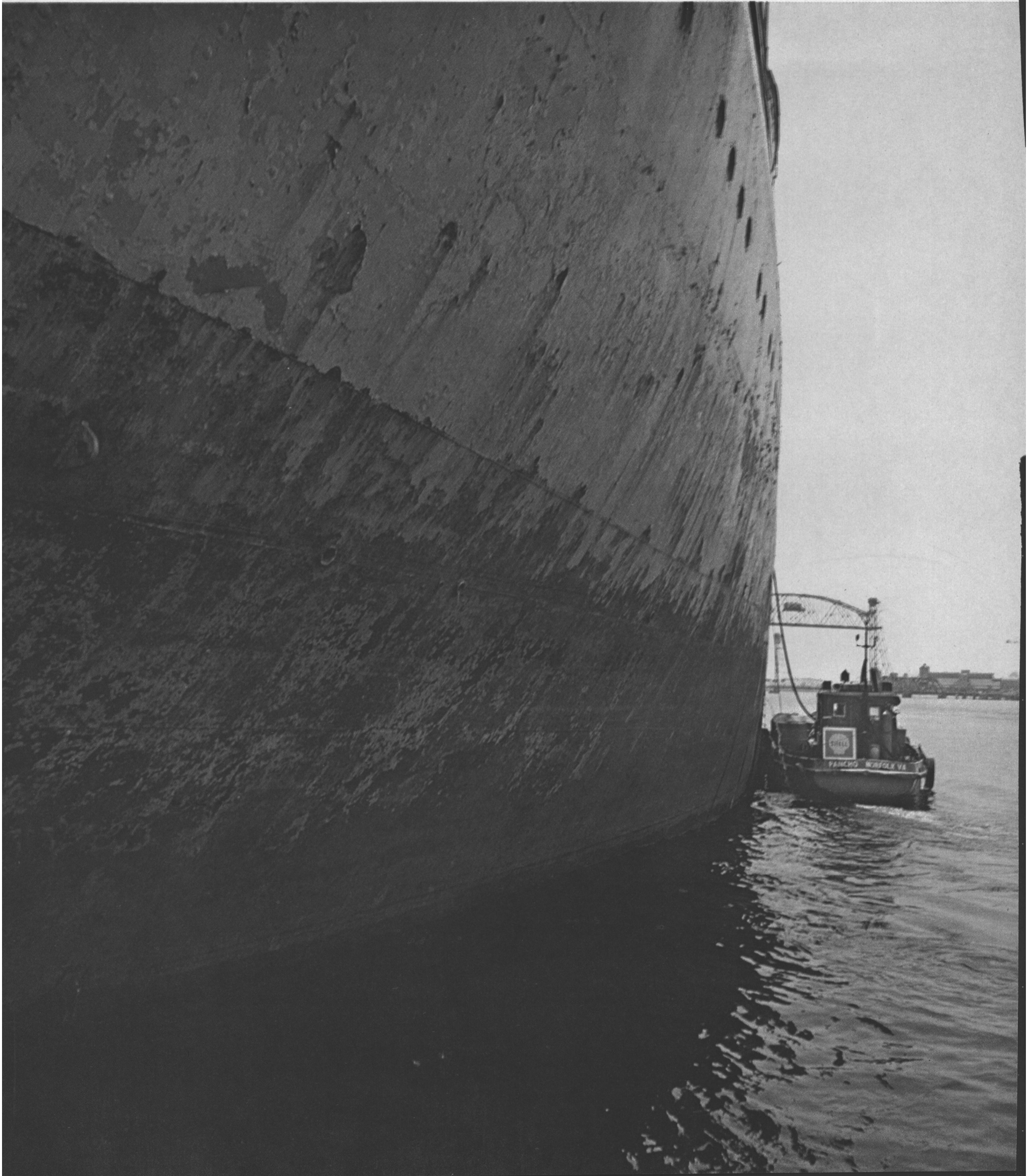
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Motorships are saving time and costs with bulk oil delivery service offered by Shell's Agent, Marine Oil Services, Inc., Anders Williams Company, Norfolk, Virginia.

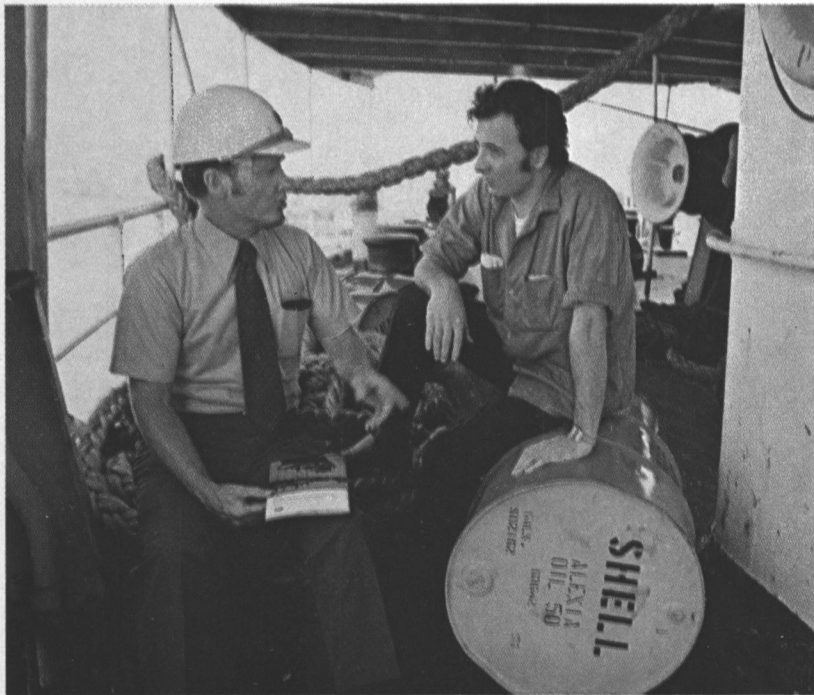
This firm uses two tank boats—one holds 13,500 gallons, the other 19,500 gallons, to service ships in Hampton Roads. Each boat is divided into two compartments and can deliver up to 4,000 gallons of Shell Lubricants per hour to ships' tanks.

Advantages to ship owners

With this speedy tank-to-tank delivery system, there is less chance of product contamination, and only minimum assistance is needed from ship crews. In addition, there is no interference with cargo operations. Delivery is faster and less hazardous than with drums. Still, both of the tank boats frequently carry drums on deck, in addition to full tanks below, to fill smaller orders.

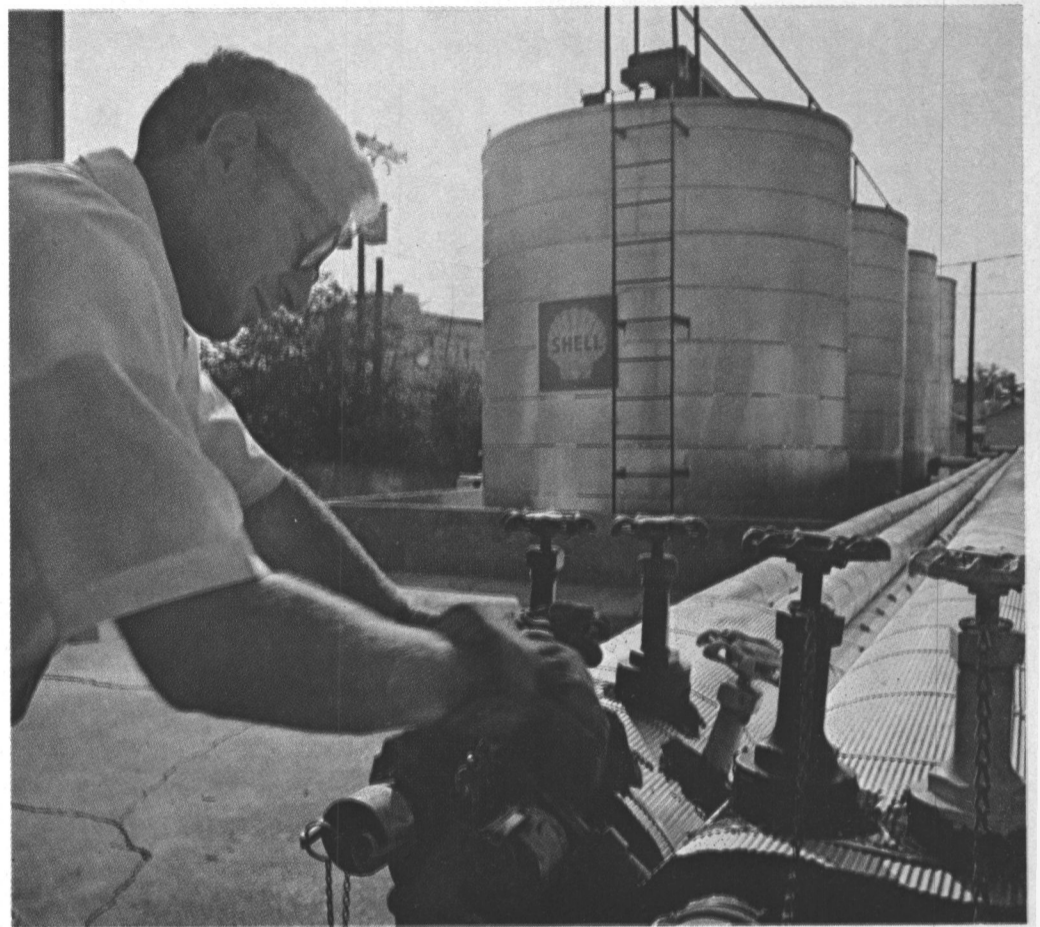
Use of Shell MELINA® Oil increasing

Demand for multi-purpose MELINA Oil is increasing for both slow speed crosshead-type diesels—including Sulzer, MAN, B & W, Gotaverken, Fiat, Stork—and medium and high speed trunk piston engines. MELINA Oil protects engine parts against wear and corrosion, and resists oxidation over a long service life. MELINA also satisfies the requirements of other shipboard equipment such as gear transmissions, variable pitch propellers, steering gear, turbochargers and air compressors.



Shell Representative, John Barnett, discusses some of the advantages of MELINA Oil with Chief Engineer, Demetrios Kalisporis. MELINA Oil neutralizes acids that straight mineral oils cannot.

◀ Marine Oil Services' tank boat, Pancho, pumps Shell MELINA Oil into the Greek tanker, Captain Xilas. Pancho's pumps can deliver 4,000 gals./hr. from her 19,500-gallon tanks. This fast, clean delivery speeds ship turnaround time.



E. J. Wheeler, Manager of Marine Oil Services, Inc., opens an outlet valve so that ALEXIA Oil can be pumped at 55 gals./minute into a waiting tank boat. Four insulated 10,000 gallon storage tanks hold Shell lubricants at a constant 120°F., permitting fast flow in any season.

Marine Oil Services also offers TALPA® Oil, a specially refined straight mineral oil, for engines not requiring additive type lubricants. And Shell ALEXIA® Oil is in demand for engines with separate cylinder lubrication because of its anti-wear and acid-neutralizing properties.

Start saving with the speed and economy of bulk delivery of Shell lubricants at Seattle, Portland, Oregon; San Francisco, Oakland, Los Angeles, Houston, Galveston, Texas City, New Orleans, Hampton Roads, Philadelphia, New York and Portland, Maine. Call your nearest Shell Transportation Sales Office listed below:

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Chicago, Ill., (312) 341-3275;

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Shell Commercial Marketing,

One Shell Plaza, Houston, Texas 77002.

Shell Products Perform



Todd And J.J. Henry Join Aerojet Team Bidding To Build Huge Surface Effect Ship

Todd Shipyards Corporation has joined the industrial team formed by Aerojet Surface Effect Ships Division as a key member to compete for the job of building a 2,000-ton-class high-speed ship for the U.S. Navy.

E.D. Ward, vice president and general manager of the Tacoma, Wash.-based Aerojet Division, said: "Todd's more than 55 years of experience in building naval ships of all kinds gives our team a powerful boost."

The craft to be built is a large surface effect ship (SES)—a vessel designed to move on a cushion of air while riding the sea at high speeds.

Todd's role will be carried out by its Seattle Division, builder of a wide variety of naval and commercial ships. Most recently, the facility

has turned out destroyer escorts and guided missile destroyers.

Mr. **Ward** said another key team member is the internationally known naval architectural and marine engineering firm of J.J. Henry Co., Inc. "We feel that with the combination of Todd's know-how in marine construction, J.J. Henry's established talent in ship design, and Aerojet's own experience in surface effect ships, we will be able to give the Navy a seaworthy SES ship, and not just a high technology vessel," Mr. **Ward** said.

J.T. Gilbride, president of Todd Shipyards, said: "After careful study of SES technology, we have every confidence that we can contribute advanced construction principles appropriate to such advanced ships."

Mr. **Ward's** division managed the design and construction of the Navy's 100-ton experimental prototype SES which is now conducting a sea-test in Commencement Bay at Tacoma.

IF YOU RATE EXPERIENCE HIGHLY, CONSIDER CHAN YORK HIN... HE'S BEEN ON THE JOB AT KEPPEL FOR 35 YEARS!

It's not surprising Chan York Hin knows his job inside out. After all, 35 years of working in boiler repairs has taught him a thing or two about his work. It's made him quite an expert. But Chan York Hin always has been just that. Because even when he joined us 'way back in 1938, he already was a skilled Boilermaker. He just had to prove it to us. And to our customers. And that's exactly what he did. So over the years Chan York Hin patiently and methodically worked his way up. Up the long ladder of experience until he earned the title of Chargehand, the position he holds today. It's a position that places him in a supervisory capacity over a team of 30 boilermakers. And because they've got Chan York Hin to guide them, they're a very skilled team indeed. They're skilled and professional like all Keppel men. And there are plenty of them—3,000 men in all. It's these Keppel men who make our shipyard one of the finest in Asia. We have the capacity to undertake any type of work on any type of vessel. And that includes ship repair and maintenance, conversions, annuals and specials. If you're in shipping and you rate experience highly, think of Keppel Shipyard. Think of the Keppel men.

Keppel Shipyard (Private) Limited.
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Agent in U.S.A./Canada: James A. McQuilling, Midland Marine Brok Inc., 17, Battery Place, New York N.Y. 10004, Tel: 212.944.6720 after hours 516 Manhasset 75435 or 212 Flushing 37215, Telex 232081, Cable: Midmarbrok New York.

Aerojet is one of four companies selected by the Navy currently engaged in preliminary design competition to construct a 2,000-ton version.

Of approximately \$100,000,000 that the United States has invested during the past six years in developing SES technology for use in the fleet, two-thirds has been invested by the Navy toward two experimental 100-ton prototypes, of which the Aerojet-built craft is one.

In addition, Aerojet has been developing an amphibious assault landing craft air cushion vehicle for the Navy, which is a related technological development. To construct this sophisticated craft, Aerojet has selected another highly rated Pacific Northwest firm, Tacoma Boatbuilding Co., which also fabricated the 100-ton SES. To date, the Government has invested approximately \$40,000,000 in advanced ship technology at Aerojet.

Other members of the Aerojet 2,000-ton SES team include: Weapons Command and Control—Sanders Associates, RCA, Honeywell and Univac; Lift Fans—Garrett Corporation; Waterjet Propulsion Pumps—Aerojet Liquid Rocket Company; and The Boeing Company is looking at possible application of its hydrofoil experience to SES technology.

Puget Sound Tug & Barge Promotes McLean And Watkins

Two executives of the Puget Sound Tug & Barge Co. have been promoted to key positions as a result of the company's recently announced participation in a Canadian-sponsored transportation consortium, Arctic Transportation, Ltd.

William D. McLean, formerly vice president-operations, has been named senior vice president, and **G.A. (Al) Watkins**, formerly general sales manager, has been appointed vice president in charge of marketing and sales, according to **Leo L. Collar**, president of the Seattle, Wash.-based tug and barge firm.

Mr. **Collar** said that "because of the potential for increased transportation requirements in the Arctic, we have joined in the formation of Arctic Transportation, Ltd., and have initiated some changes to accommodate this business expansion and make our firm even more Arctic-oriented than it has in the past.

"In addition to a broad range of towboat experience, both Mr. **McLean** and Mr. **Watkins** have in-depth Arctic experience, which gives them the necessary expertise and knowledge to develop and operate transportation services to the North," stated Mr. **Collar**.

Mr. **McLean**, who has been with the company since 1949, first became involved with specialized transportation to the Arctic when the Red Stack company formed Arctic Marine Freighters to deliver 7,000 tons of cargo to Foggy Island in 1968 for British Petroleum. In 1969, he was assigned as project manager for delivery of 70,000 tons of drilling supplies and materials to Prudhoe Bay on Alaska's North Slope, and in 1970, he was general manager for the 187,000-ton sealift to Prudhoe Bay, the largest commercial sealift in history.

Since then, Mr. **McLean** has been vice president and general manager of Arctic Marine Freighters, directing the total operation in 1971 and 1972.

Mr. **Watkins** joined Puget Sound Tug & Barge in 1969, and has also been active in supervising the firm's Arctic operations since then. He first became involved in transportation to the Far North in 1965, when he planned and supervised a tow to Point Barrow, the northernmost tip of Alaska, for another tug and barge firm.

Although Mr. **Watkins** is in charge of general sales, his primary area of activity under his new assignment will be developing Arctic business.

World's largest LASH vessel will introduce LASH service to Latin America

The 893-foot-long DELTA MAR is the first of three LASH vessels ordered by Delta Steamship Lines. All will be placed in operation during 1973 on Delta's trade route between U.S. Gulf of Mexico ports and the east coast of South America with calls at Caribbean ports.

In addition to its distinction as the world's largest LASH vessel, the DELTA MAR is also the largest general cargo vessel ever built in the United States. The vessel is equipped with a 510-ton LASH crane and a 30-ton

container crane. It will be arranged to carry 74 LASH barges and 288 standard 20-foot containers (or a combination of 20 and 40-foot units) when it is placed in service.

The DELTA MAR is the sixteenth LASH vessel launched in a continuing program that includes a total of 24 LASH vessels placed in operation or ordered by seven vessel operators. LASH vessels now serve nations in North America, Europe, Africa and Asia, with South America and Australia to be added this year.



Delta Steamship Lines' S.S. DELTA MAR is launched at Avondale Shipyards on January 27

LASH

SYSTEMS, INC. SUITE 1414, 225 BARONNE ST., NEW ORLEANS, LOUISIANA, U.S.A.

ABS Elects Three To Board Of Managers —New Members Named

Elected to the board of managers at the annual meeting of the members of the American Bureau of Shipping, held in New York, N.Y., on March 20, were: **George H. Blohm**, president, Cities Service Tankers Corp.; **George P. Livanos**, president, Seres Shipping,

Inc., and **Thomas J. Smith**, president, Farrell Lines, Inc.

The board of managers is the governing body of the Bureau, an international ship classification society which establishes standards for the design, construction and maintenance of merchant vessels. The membership of the Bureau is composed of shipowners, shipbuilders, marine underwriters and other persons prominently identified with maritime commerce.

Twenty-two men were elected as new members of the Bureau. They are: **James Amoss**, president, Lykes Bros. Steamship Co., New Orleans, La.; **Capt. Leo V. Berger**, president, Avon Steamship Company, Inc., Lake Success, N.Y.; **J.N. Blackman**, president, Mutual Marine Office, Inc., New York, N.Y.; **James Yu Shu Chen**, president, Sea King Shipping & Trading Corp., New York, N.Y.; **Granville Conway Jr.**, president, Cosmo-

politan Shipping Company, Inc., New York, N.Y.; **William J. Dorman**, manager, J.J. Henry Company, Inc., New York, N.Y.; **R.I. Hoskins**, vice president-marine operations, Gulf Oil Trading Company, Philadelphia, Pa.; **Will Kluss**, president, World Wide Transport Manager-Marine, Continental Oil Co., Stamford, Conn.; **Howard L. Kleinoeder**, president, American International Underwriters Corp., New York, N.Y.; **Paul J. Kreuzkamp**, vice president, Alexander & Alexander, Inc., New York, N.Y.; **Robert L. Liston**, vice president and manager, Western Dept. Marine Office, Appleton & Cox Corp., Chicago, Ill.; **H. McCullough**, president, Westdale Shipping Ltd., Port Credit, Ontario, Canada; **Myrle E. Midgley**, president, Nilo Barge Line, Inc., St. Louis, Mo.; **John F. Nace**, manager, Marine and Defense Facilities, Application Engineering and Sales, General Electric Company, Schenectady, N.Y.; **Constantine S. Nicandros**, vice president, Transportation & Supplies, Continental Oil Co., Stamford, Conn.; **William Pettersen Jr.**, underwriter, American Hull Insurance Syndicate, New York, N.Y.; **Enrique Rojas Guadamarra**, director general, Transportation Maritime Mexicana, Mexico City, Mexico; **Joseph G. Romans**, vice-president-marine manager, Royal-Globe Insurance Companies, New York, N.Y.; **John L. Stewart**, vice president, Ocean Marine-West Coast, Fireman's Fund American Insurance Companies, San Francisco, Calif.; **John Walbridge**, general manager-marine and aviation, Insurance Company of North America, New York, N.Y.; **D.A. Wittwer**, general manager, Oil & Gas Division, The Broken Hill Proprietary Co. Ltd., Melbourne, Australia, and **Winthrop A. Wyman**, president, Triton Shipping, Inc., New York, N.Y.

K & K Marine, Intralog And G. Perl Associates Open Joint Offices

K & K Marine Corporation, and the two companies Intralog-International Transport and Logistics Services, Inc./G. Perl Associates, Inc. announce the joining of their companies under a close cooperative arrangement.

While the three firms will retain their corporate identity, under their new union-in-action they will be in a position to offer to their clients the full spectrum of services falling within the area of international surface logistics with special emphasis on ship/fleet management, ship agency, shipbroking and marine/international transportation consulting.

The move by the companies takes into account the general trend toward integration of the various interrelated segments of the physical distribution function.

The new and joint offices of K & K Marine, Intralog and G. Perl Associates are located at 17 Battery Place, New York, N.Y.

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Kernan To Coordinate Matson's \$72-Million Ro/Ro Ship Program

Matson Navigation Company has assigned **Robert S. Kernan**, vice president - southern California, to coordinate its \$72-million roll-on/roll-off ship program in San Francisco, it was announced by **Malcolm H. Blaisdell**, president.

Robert E. Waegner has been appointed vice president - southern California to succeed Mr. **Kernan**. Mr. **Waegner** is returning to Matson after 18 months with another company.

Both Messrs. **Kernan** and **Waegner** are Matson freight operations veterans, and they worked together in Tokyo on Matson's former Far East container service.

Mr. **Kernan**, in his new assignment, will coordinate the implementation of Matson's ro/ro trailership program. The first new vessel will go into Hawaii service in August, and the second in December.

Sperry Vickers Issues New Bulletin Covering Power Steering System

The highly precise and versatile DOL-FIN power steering system for pleasure and work boats is featured in a new two-page bulletin published by Sperry Vickers.

The all-hydraulic system provides full-time power steering, is compact and easily installed, is adaptable to electrical or mechanical autopilots, offers variable rudder slew rates, and automatically reverts to manual steering as an emergency backup. It consists basically of an engine-driven pump, helm unit pump, and steering valve/cylinder assembly for rudder actuation.

Bulletin DF731 covers system operation, features and benefits, available options, and performance specifications.

Copies of the DOL-FIN Steering System Bulletin DF731 may be obtained by writing to Sperry Vickers, Aerospace-Ordnance-Marine Division, Troy, Mich. 48084.

Port Of New York Steamship Directory Available At No Cost

The 1973 edition of the "Port of New York Steamship Services Directory" has been issued by the Port Authority to meet the needs of importers, exporters, freight forwarders and other business organizations and Government agencies.

The 24-page directory, published annually since 1955, lists the names, addresses, telephone numbers and pier locations for 188 steamship lines and agents offering regularly scheduled services from the New Jersey-New York Port on international, intercoastal and coastwise routes. It also contains names, addresses and pier locations of the Port's terminal operators and a listing of world ports served by the bi-state harbor. In addition, the new edition lists active steamship piers, together with the

lines, terminal operators and railroads serving them. For the first time, passenger and cruise services are included.

Copies of the new directory may be obtained without charge from the Port Promotion Division, The Port Authority of New York and New Jersey, 111 Eighth Avenue, New York, N.Y. 10011, or from the Port of New York Trade Development Office at 170 Broadway, New York, N.Y. 10038.

Lightner Yard To Build Taubler-Designed Boat For Collecting Debris

A contract for the construction of a debris-collecting vessel has been awarded to Lightner's Boat Yard, Inc., West Sayville, N.Y., by the Department of Conservation and Waterways, Town of Hempstead, N.Y.

The new vessel, of catamaran type,

is of welded-steel construction, diesel engine powered, and is fitted with a large debris basket between the hulls. The vessel is capable of collecting floating debris, as well as being grounded to collect beach debris.

Principal dimensions are 30 feet 1 inch length overall, 12 feet extreme beam, and the draft is about 15 inches.

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

Here's what happens with the new Raytheon Watchstander System for remote monitoring of engineering, cargo and bridge parameters — as well as spares inventory, fuel consumption, cargo control, dockside maneuvering, satellite navigation, or just about anything else you might need a computer to do:

What happens is safe, efficient ship operation.



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April 15, 1973

Successful Sea Trials

Sea Trials Are Expensive And Time Consuming But Are Necessary To Prove That A Ship Will Perform Satisfactorily In Service. The Author Points Out The Reasons For Many "Do's" And "Don'ts" For Good Results

Robert L. Jack*

Sea trials are expensive in terms of time, equipment and manpower. It is probably the only time during the life of the ship when operational data, some from special instrumentation, is documented for all of the ship's systems. It, therefore, appears shortsighted to undertake such a comprehensive and expensive effort without taking every reasonable precaution to ensure that the recorded results will be as accurate as possible.

By carefully sequencing the trial events, this operation can be conducted with a minimum loss of time and the chance of mechanical failure.

Where one trial event bears a technical relationship to another, thought must be given to their proper order. In addition, care must be taken to schedule events in such an order that possible damage to the plant or its equipment is minimized.

Table 1 shows a suggested, if not typical, trial agenda for the first ship of a design. Where appropriate, a generous time allowance has been provided to prepare for subsequent events. It will be noted that total underway time from departure to arrival back at the shipyard (allowing eight hours to and from the trial area) is approximately 40 hours. Experience has shown, however, that the actual time for merchant-ship trials often approaches three days for the first ship of a class. With proper pre-trial preparation, the agenda in Table 1 could easily be met.

Trial Supervisor

All trials should be under the direction of a trial supervisor for the contractor. He should have full authority and should be in charge of the trials and all trial personnel, including the captain and chief engineer of the ship. Failure to establish this clear line of authority can result in poor trial results. For

*Mr. Jack, Office of Ship Construction, Maritime Administration, presented the paper summarized here before a recent meeting of the Chesapeake Section of The Society of Naval Architects and Marine Engineers. Mr. Jack has represented the Maritime Administration on trials of hundreds of ships.

example, practically every trial captain tends to follow the same course on every trial regardless of the purpose of the trials or the prevailing weather. One captain did all of his navigation by radar and refused to go beyond range of land. Consequently, these trials were conducted in waters of varying depths. The accuracy of the torsionmeter readings and resulting horsepower calculations under such conditions are greatly impaired.

After the ship is safely at sea, the trial supervisor should have full say as to which course should be followed, the power to be developed, the scheduling of events, the directions to the helmsman during maneuvers, etc. unless overruled by the captain solely for safety reasons.

Likewise, the engine room should be under the control of the operating engineers but only as directed by the trial supervisor. Except for emergency situations, no changes in plant operating conditions should be undertaken by the engine crew unless so directed by the technical supervisor in charge of the trials. This applies to minor plant adjustments as well as operation of auxiliary systems.

Shaft Calibration

The question has often been raised as to the necessity for the calibration of shafts as a prerequisite for accurate horsepower determination. It is obvious that if unchallengeable horsepower data is desired, shaft calibrations must be undertaken. There is a 37-percent chance of an error exceeding one percent in using an assumed modulus. This should be considered unacceptable. This is particularly true where the shipbuilding contract includes a bonus-penalty provision in the order of \$50,000 per 0.01 pounds of fuel per horsepower-hour. This corresponds to nearly \$25,000 for each percentage point of horsepower accuracy, which in turn is the same as each percentage point of shaft calibration accuracy.

Torsionmeters

Unless the propulsion system is electric drive, the horsepower must be determined by a torsionmeter attached to the propeller shaft. The variable mutual-inductance-type

Table No. 1—Typical Trial Agenda For First Ship Of A Class

Event No.	Time	Event
1	8:00 AM	Depart shipyard
2		Pre-trial conference
3	4:00 PM	Calibrate compass and RDF
4	6:00 PM	Drag shaft for zero torsionmeter reading
5	6:45 PM	Conduct standardization trials
6	10:45 PM	Conduct turning circles
7	11:15 PM	Conduct "Z" maneuver
8	12:15 AM	Conduct non-extraction water rate
9	2:00 AM	Conduct fuel rate
10	6:00 AM	Conduct ahead steering
11	6:30 AM	Conduct emergency steering
12	6:45 AM	Drag shaft for zero torsionmeter reading
13	7:45 AM	Conduct crash ahead from astern
14	8:00 AM	Conduct crash astern from ahead
15	8:15 AM	Conduct astern endurance run
16	9:15 AM	Conduct astern steering
17	10:30 AM	Conduct boiler overloads
18	1:00 PM	Conduct automation demonstration
19	2:30 PM	Conduct anchor-handling test
20	2:30 PM	Calibrate shaft torsionmeter (during event 19)
21		Post trial conference
22	11:30 PM	Arrive shipyard

instrument should be used exclusively for trial purposes. Descriptions of its design, installation, calibration and zero determination are presented in Section 5.5 of The Society of Naval Architects and Marine Engineers T&R Bulletin C2. Other types of horsepower meters, installed as permanent ship's instruments, do not have sufficient accuracy and reliability for use as trial instrumentation.

Shaft-Revolution Counters

The determination of the shaft revolutions is quite straightforward and is usually routinely accomplished with great accuracy and reliability using special dual trial counters as described in Bulletin C2. However, these mechanical devices are not infallible, and a back-up for this essential data can be readily provided by merely taking hourly readings of the ship's counters.

Fuel-Oil Meters

If fuel economy trials are to be conducted, reliable and accurately calibrated twin fuel-oil meters must be used. Experience has proven beyond any doubt that these meters must be calibrated with fuel of approximately the same flow, temperature, and viscosity as that to be used on trials. Attempts have been made to calibrate such meters with water or other fluids and applying correction factors for viscosity. Without exception, such calibrations have proven to be

worthless. It is believed that the only facility with the capability of calibrating with Bunker C fuel is the Naval Ship Engineering Center, Philadelphia Division. Fortunately, this facility also has a supply of reliable meters that are available to any ship contractor on a loan basis for a reasonable fee. These meters, or others calibrated by NAVSEC Philadelphia, must be used where accurate fuel measurement is a factor.

Radiometric Equipment

Radiometric equipment was first used on commercialship trials 20 years ago for the standardization of the SS United States. Since then, this equipment has revolutionized the procedures used in conducting not only standardization trials but also such maneuvering tests as turning circles, Z maneuvers, and crash stops. The result has been greater accuracy with less effort and a significant saving of trial time.

In addition to plotting the movement of the ship in respect to two stations, the instrument also records time in seconds and shaft revolutions, as well as the ship's heading by means of a connection to the ship's master gyro system. The result is a permanent and accurate record of ship location, heading, and rpm versus time over an almost unlimited time frame. The owners of the equipment boast of an accuracy to within 10 feet in

(Continued on page 28)

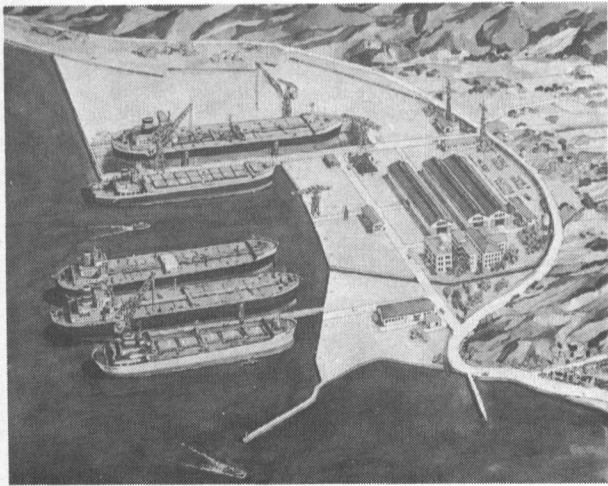
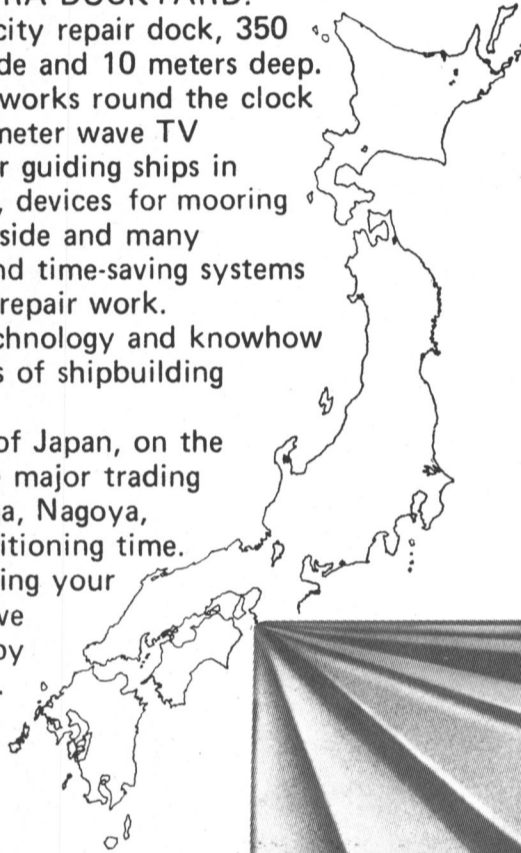
330,000-ton repair dock at YURA

To meet the increasing demand for repair yards capable of handling large-sized ships, MITSUI has specially designed and built the YURA DOCKYARD.

It has a 330,000-ton capacity repair dock, 350 meters long, 65 meters wide and 10 meters deep. The new dockyard which works round the clock is equipped with the milli meter wave TV and laser beam systems for guiding ships in and out at night or in fog, devices for mooring trials at wet berth or pier side and many other latest labor-saving and time-saving systems and facilities for efficient repair work. Besides it is backed by technology and knowhow accumulated over 50 years of shipbuilding and repairing.

Its location in the center of Japan, on the main route connecting the major trading ports of Tokyo, Yokohama, Nagoya, Osaka and Kobe saves positioning time.

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Sea Trials—

(Continued from page 26)

the determination of the ship's location.

Turning Circles

Figure 1 is a typical turning circle plotted from data taken from a chart produced by the radiometric equipment. With the accuracy afforded by this method, the actual position of the ship can be shown at any desired spot, and a circle can be developed from the locus of points corresponding to any location on the ship. In this case, the circle has been drawn through the ship's center of gravity.

Similar charts can be produced for the quick-reversal trial which record accurately the stopping distance and time, the course, heading and deceleration of the ship during the entire maneuver.

Operating Conditions

Steady operating conditions are essential if meaningful trial results are to be achieved. Plant conditions should be stabilized and preferably at the design values during all power runs. Special attention should be given to superheater outlet temperature and pressure and condenser vacuum, and adjustments should be made prior to the runs to bring these values as close as practicable to design conditions.

No changes should be made to the plant during the runs that would affect power output, and variances in auxiliary load should be kept to a minimum. The use of make-up steam and the possible dumping of auxiliary exhaust to the condenser should be carefully monitored and eliminated.

The most frequent source of torque variation, but also the easiest to correct, is that due to excessive use of the helm. This generally results from: 1. The captain's insistence on maintaining a straight course, and 2. the use of improperly adjusted automatic steering equipment which produces excessive rudder angles. Small rudder movements induce disproportionately large changes in shaft torque, particularly at higher powers. Since course keeping is not essential except during standardization, rudder angles should never exceed two degrees.

Course changes should never be made during power runs without the bridge first notifying the computing room. Rudder angles should be kept to a practical minimum during such changes, but should not exceed five degrees.

If these precautions are followed, the deviations in power and fuel consumption from one time period to another should be well within one percent.

Fuel Analysis

Experience has proven to the MarAd Trial Board that the average commercial laboratory cannot be relied upon to provide the consistent accuracy required in the determination of the higher heating value (HHV) of the fuel.

For this reason, this value used in calculating the official fuel rate

should be determined by the National Bureau of Standards, if at all possible. Unfortunately, the quality service provided by NBS is limited to other Government agencies and is presently available only to those contractors building ships under MarAd or Navy programs. Unless these services are available, it is the author's opinion that a guaranteed fuel rate is meaningless and should not be specified.

Fuel-Rate Calculations

If the fuel-rate calculations are being made for the purpose of determining a specified guaranteed operational rate, it is my opinion that no correction should be made for the deviation from design conditions of steam pressure and, perhaps, of propeller rpm. Furthermore, the propriety of correcting for steam temperature deviations might also be questioned, particularly if the cause is not correctable or will not be corrected. This is particularly applicable to the bonus-penalty type of contract where the owner has attempted to ensure that he will obtain an efficient propulsion system by agreeing to reward the contractor if the fuel rate is below a specified amount.

One of the most significant fuel-rate correction factors is due to deviation from design conditions of the condenser vacuum. This correction is justified since the vacuum will obviously vary with the temperature of the seawater. Other corrections which are proper since they are variables beyond the control of the designer and contractor are for items such as generator load, distiller and ship-service steam.

Steam-Rate Corrections

As in the case of fuel-rate determinations, every effort should be made to have steam and vacuum conditions at design values. However, if this is impractical, corrections should be applied to all values. This apparently inconsistent opinion is logical when it is realized that in the case of the fuel rate, the objective should be to determine the true capability of the complete propulsion system as constructed and not as designed.

In the case of the steam rate, what is desired is to verify that the turbine manufacturer provided a unit meeting the design expectations, and he should neither be penalized nor given an advantage for reason of off-design operating conditions. Similarly, a correction factor should be provided for any deviation of rpm since this will certainly have an adverse effect on the steam rate, and it is a factor over which the turbine manufacturer has no control.

Spiral-Maneuver Test

The T&R Bulletin C2 states that this test "should be conducted only in relatively calm seas and winds of less than five knots." It is the author's opinion that the test should not be attempted except in a flat calm and zero wind, and these conditions must remain throughout

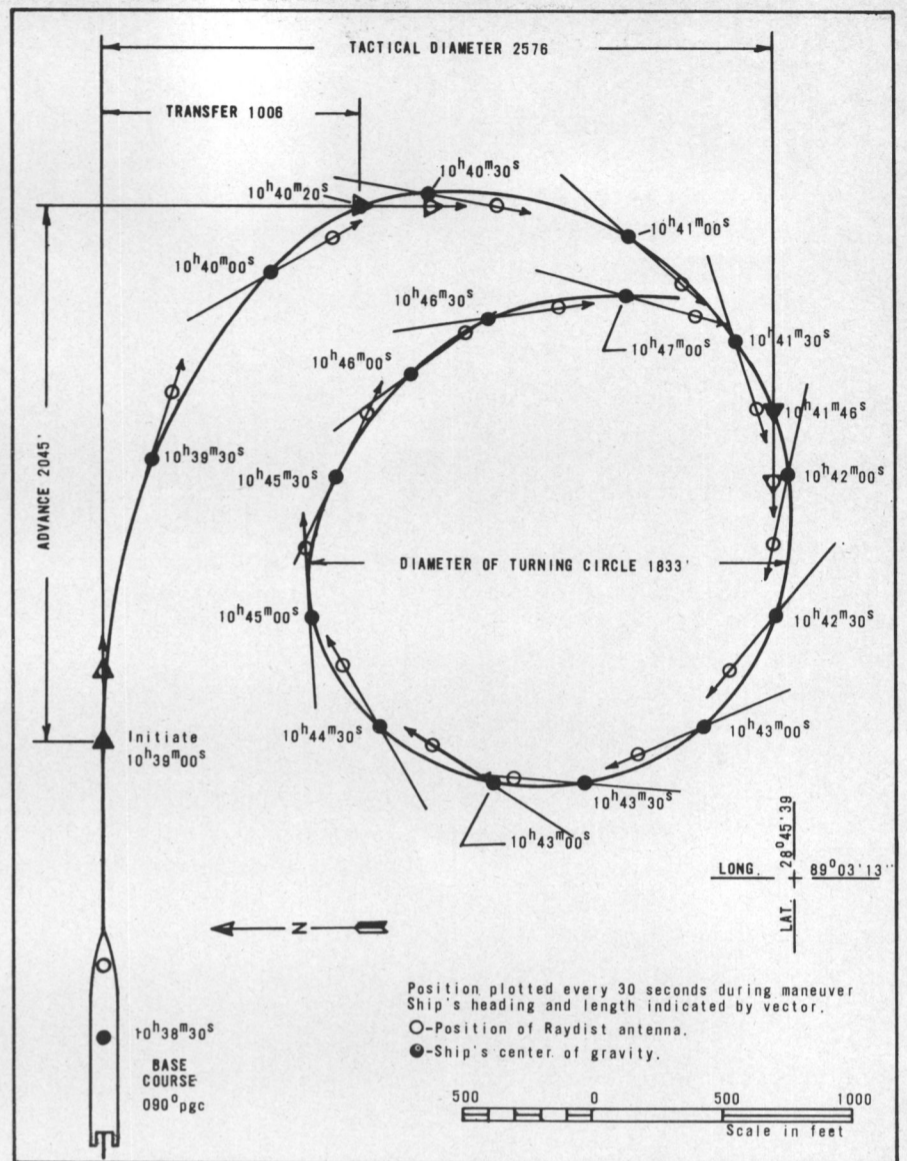


Figure 1—Radiometric plot of right turning circle.

the entire test which usually requires three or four hours. The odds against finding such conditions coincident with the trials are astronomical.

Since the validity of this test is so dependent on extremely improbable environmental conditions, the author questions whether it should ever be specified or even included in the Code for Sea Trials.

Standardization Trials

The use of radiometric equipment permits great latitude in the conduct of standardization trials with reference to direction, distance from shore, time of day, weather conditions, etc. Daylight free of haze and fog is no longer essential, and in fact, many of the recent standardizations have been conducted at night. But equally important is the flexibility in selecting the course, thus permitting a heading to be chosen that will minimize the effect of wind and sea.

Since distance from shore is no longer a constraint, it is recommended all such trials be conducted beyond the 60-fathoms curve to eliminate any possibility of shallow-water effect.

Trial Reports

The trials cannot be considered complete until they have been documented by a comprehensive but concise report. Assuming that all instruments were accurately calibrated, all tests successfully completed, and all data properly re-

corded, there will still remain the large task of summarizing this mass of material and presenting it in a form that will be meaningful and useful.

After reviewing the formats used by the various shipyards in preparing their preliminary reports, some good, but many of a hodgepodge nature, the MarAd Trial Board developed a standard reporting form. If this form is followed, all pertinent data will be presented in a logical sequence so that the report can serve not only as a documentation of the trials but as a ready reference as well. This booklet also includes instructions for calculating fuel rates and steam rates, as well as some recommendations in regard to instrumentation and test procedures. Copies may be obtained from the MarAd Trial Board.

SNAME T&R Bulletin C2

The Society of Naval Architects and Marine Engineers will soon publish Technical and Research Bulletin C2, Code for Sea Trials. This document consolidates, amplifies and updates the previously published SNAME codes. It has been exceptionally well done and covers many of the recommendations the author has made. However, after a careful review of the final draft, there are still many "do's" and "don't's" that are not properly a part of this document but none the less must be observed for good trial results.

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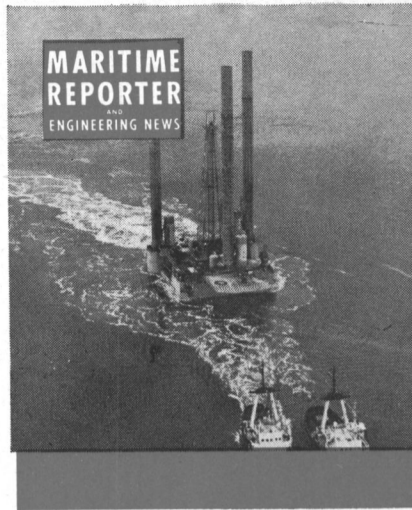
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An aerial photograph of an offshore drilling rig and two support vessels. The rig is a large platform with several tall, vertical derrick structures. It is surrounded by a circular wake of white water. Two smaller support vessels are positioned in a line behind the rig, also leaving a wake. The ocean is dark, and the sky is a uniform grey.

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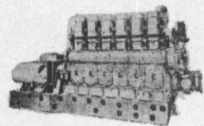
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April 15, 1973

DIESEL GENERATOR SETS

1



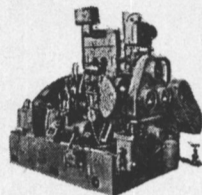
250 KW DIESEL GENERATOR SET

ENGINE: Enterprise 12 x 15 DSG-6—6 cyl.—450 RPM crank No. 50J. GENERATOR: Westinghouse 250 KW—120/240 DC—1040 amps—450 RPM. Typical serial No. 35-10P-913. Complete with switch gear.

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

2

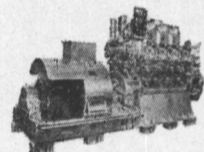
With switchgear. ENGINE: Radiator cooled Superior GBD-8—6 cylinder—1200 RPM GENERATOR: Electric Machinery Co.—120/240 volts DC—316 amps—1200 RPM—stab. shunt.



UNUSED 10 KW SUPERIOR DIESEL GENERATOR SET

GENERATOR: Delco 10 KW—120 VDC—83.3 amps—1200 RPM. ENGINE: Superior diesel—2 cyl.—4 1/2 x 5 1/4—15 HP—heat exchanger cooled.

3

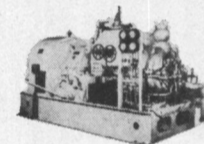


500 KW—120/240 VOLT DC DIESEL GENERATOR SET EQUAL TO NEW

4

GENERATOR: Allis Chalmers—Compound wound. Has Class "A" insulation. Output 500 KW—120/240 volts DC—2080 amperes—720 RPM—drip-proof—self-cooling. Ambient 50°C—temperature rise 40°C. ENGINE: Model GM 8-278—2-cycle—Vee type—8 1/2 x 10 1/2—air starting—720 RPM. Complete with switchgear. Condition very good. Still aboard naval vessel. Has Ross shell & tube type lube oil & raw coolers—temp. control valve—shock mounts.

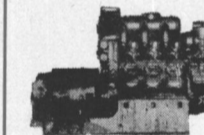
5



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—28 1/2" 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.

6



300 KW DIESEL GENERATOR SET

ENGINE: G.M. 6-278—6-cylinder—2 cycle—8 3/4 x 10 1/2—750 RPM—with oil and water Ross Shell and Tube Heat Exchangers, instrument panel, pyrometer, etc. Vibro Isolators. GENERATOR: G.E. 300 KW—120/240 volts DC—1250 amps—shunt wound—continuous overload rating 375 KW—2 hours—55° Weight of unit approximately 26,000 pounds. Complete with shock mounts. Unit 13' 2" long, 64" wide, 8' high.

TURBO GENERATOR SETS

7

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

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

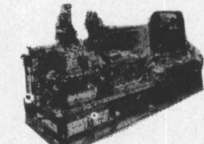
8



WESTINGHOUSE 440/3/60 200 KW UNIT

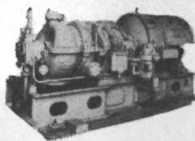
GENERATOR: Westinghouse 200 KW—250 KVA—450/3/60—1200 RPM—80% PF—with 40 KW—120 VDC on same shaft. GEAR: 9989/1200 RPM—double helical. TURBINE: Westinghouse—540 PSI—superheat 322°F. Test 930 PSI 800°TT. Also operate 615 PSI—850°TT.

9



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.



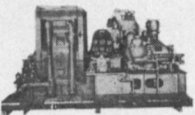
UNUSED 300 KW G.E. 120/240 VOLT DC TURBO-GENERATOR SET

10

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.

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

11



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—28 1/2" 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 8 1/2". B.C. 7"—12 holes. ALSO NEW ARMATURES IN STOCK & 300 KW SHUNT ARMATURES.

13



VICTORY 300 KW WESTINGHOUSE TURBO GENERATOR SET

440#—740°F—5930 RPM—2A-9794-15-16-17—coupling non-recessed on steam end of pinion—5 3/4". GENERATOR: Westinghouse 300 KW—120/240 DC—1250 amps—1200 RPM—C.B. 208.4.

14

UNUSED CROCKER-WHEELER 500 KW GENERATOR ENDS ONLY

120/240 VOLTS D.C.—1200 R.P.M. FORMERLY USED WITH WORTHINGTON-MOORE TURBINES & GEARS

Upgraded by U.S. Navy—rewound in glass. Generator Frame and Armature—Marine 500 KW type 3-1200—drip-proof enclosure—base mount. Modified from Crocker-Wheeler generator frame 152HD—240/120 volts DC—2083/521 amps—1200 RPM. Ambient temperatures 50°C. APPLICATION: For C-4-SA1; C4-SA-3; T-AP-134 vessels, using Worthington-Moore Turbine—Form S-6 and generator Form 14 x 10. No pedestal bearing.

15

FOR USE ON NEWPORT NEWS VESSELS—HULLS 480 to 541 CLASS—SIMILAR TO ESSO LIMA CLASS

400 KW WESTINGHOUSE TURBO GENERATOR

TURBINE

835 lbs—840°TT—9018 RPM—instr. book 1430 CI—serial 5A-7090-7 and 5A-7090-8—6-stage.

REDUCTION GEAR

9018/1200 RPM

A.C. GENERATOR

400 KW—450/3/60/1200 RPM—rise 40°C—100% and 58°C—125%. In book 5442. Serial 35-35P792 and 45-35P792.

EXCITER

5.5 KW—125 volts—shunt wound—frame 6-83—44 amps.

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TURBINES & ROTORS

MAIN PROPULSION

16

BETH CLASS SERIES TURBINE—13,600 H.P.

SPARROWS POINT 4400-4500 SERIES QUINCY 1600 SERIES HULLS

28,000 GT/29,000 GT ONE H.P. TURBINE—BUILT 1949 600 LBS.—860°F—SHAFT HORSEPOWER 6150 AT 4773 RPM—SERIAL #1630-H-4

17

6690 H.P. HIGH PRESSURE 7-STAGE TURBINE

ORIGINALLY BUILT FOR ESSO CHRISTOBOL—NEWPORT NEWS 6690 H.P. AT 7862 RPM PRESSURE 835 LBS GAUGE TEMP. 840°F—SERIAL 83343

FOR EMERGENCY USE

In an emergency, this HP turbine could substitute for Newport News built HP with piping and foundation change.

18



19 STAGE WESTINGHOUSE H.P. ROTOR FOR AP2 VICTORY

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

19

8500 H.P. G.E. TURBINE

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

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

20

NEW L.P. BLADE RINGS

for large 8500 H.P. Victory

Joshua Hendy Westinghouse

21

SPECIAL!

1 WESTINGHOUSE COMPLETE T-2 MAIN TURBINE

PROFILE (UNSHROUDED) 6600 HP—435 PSI—750°F 28" VAC.—3720 RPM

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

IMMEDIATE DELIVERY—WITH ABS

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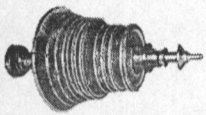
NEW 8500 H.P. G.E. TURBINES

H.P. & L.P.

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

22

23



T2-SE-A1 MAIN PROPULSION ROTOR — G.E.

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

2 COMPLETE T-2 G.E. TURBINES

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

ROTOR WILL INTERCHANGE WITH ELLIOTT MAIN TURBINE

24

25

9500 H.P. G.E. — C-3 OR VICTORY

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

26

6000 H.P. G.E. — NORTH CAROLINA C-2

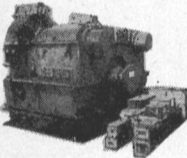
H.P.—8-stage—serial 78040
L.P.—7-stage—serial 78043
G.E.I. 16262

27

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

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

28



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

MD-48A—8500 HP—6159/3509/763/85 RPM.

29

ALSO 6000 H.P. VICTORY AP2 REDUCTION GEAR

Westinghouse 4A-1640.

30

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



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

PUMPS

31

INGERSOLL-RAND BRONZE CARGO PUMPS ONLY

Bronze Ingersoll-Rand 10GT cargo pumps only—without turbine. 4500 GPM at 125 lbs—2-stage—14"x12".

CARGO PUMP TURBINES

32

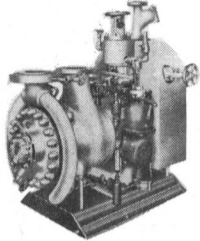
WHITON

Direct drive—type BDS—500 HP—835 lbs at 0° superheat. Exhaust 12" Hg. Will operate at 455 PSIG—599°TT—4 PSI exhaust. Can be used with 10GT Ingersoll-Rand pumps.

WESTINGHOUSE

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

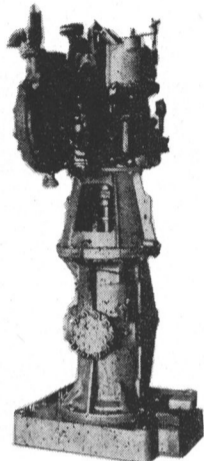
33



COFFIN TYPE D.E.B. TURBO FEED PUMP

CAPACITY: 350 GPM—2600' total head. Steam 845 PSIG—temp. 575°F TT—exhaust 42 PSIG—HP 396—RPM 8030—rated design 10,000 RPM. Serial #51-143-37. Suitable for Tankers 25,000 GT and up.

34



UNUSED DELAVAL 24.5 H.P. LUBE OIL PUMP

Turbine-driven main lubricating oil pumps—vertical rotary with horizontal worm geared turbine drive. 575# Steam pressure—5000 RPM—15# back pressure. GEAR: 5000/1035 RPM. PUMP: 550 GPM at 50 PSI—suction lift 10.0". Suitable for Fletcher Class Destroyer. DD 445 Class.

35



UNUSED SIZE 4 BUFFALO FEED PUMPS

Terry Turbine—BM—273 HP—550 RPM—exhaust 15 lbs—590 PSI—superheat 0°—425 GPM Buffalo Pump—discharge pressure 750 lbs—5" x 4"—built for USN DD destroyers. DD 445 Class Fletcher.

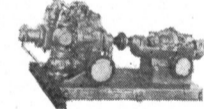
36

FIRE & BUTTERWORTH PUMP

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

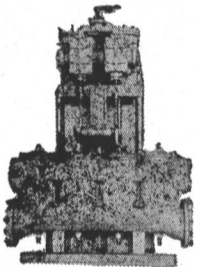
37

NEW TURBINE DRIVEN FIRE AND GENERAL SERVICE PUMP



Allis-Chalmers 6x5 pump, type SKH—1200 GPM—125 PSI—3500 RPM. Coppo's turbine type TF-22-2 1/2 — 3500 RPM. 273#—50° superheat.

38

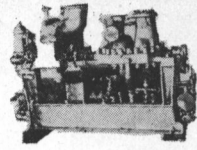


WORTHINGTON 16"x14"x18" VERTICAL DUPLEX STRIPPING PUMP

1400 GPM @ 110 PSI—suction lift 11.5 ft.—steam back pressure 15 lbs. 14" Suction—10" Discharge—2 1/2" Steam—4" Exhaust. Overall width 6'8"—Overall height 9'1 1/2"—depth 3'9 1/2"—wt. approx. 10,000 lbs.

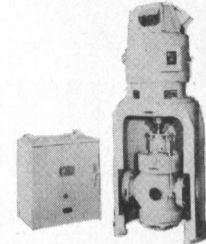
39

UNUSED DD445 CLASS WORTHINGTON TURBINE-DRIVEN FEED PUMP



Worthington — drawing SL-5043—425 GPM—1675' total dynamic head, 5000 RPM—3-stage — double suction. Flanged 4 1/2" inlet—4" outlet. Powered by Sturtevant steam turbine—282 HP—590 PSI. For Fletcher DD-445 Class Destroyers.

40



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.

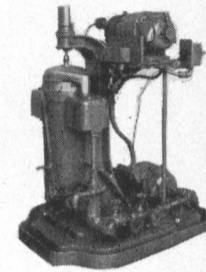
MISCELLANEOUS

41

ANCHOR WINDLASS

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

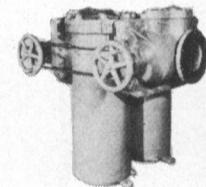
42



SHARPLESS LUBE & DIESEL OIL PURIFIERS

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

43

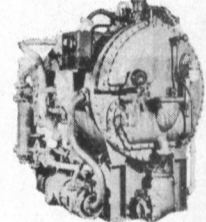


DUPLEX MAGNETIC OIL STRAINERS

4"—5"—6" sizes immediately available.

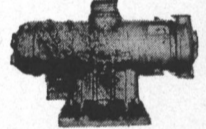
44

BETHLEHEM LOW-PRESSURE SINGLE EFFECT DISTILLING UNITS WITH AUTOMATIC FEED WATER CONTROL



Model S-1-10E—10,000 gallons per day clean tube capacity. Tube nest steam pressure 5 PSI. With brine pump and distillate pump. Units have Weir automatic feedwater controls—salinity indicator, etc.

45



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

20" Ex. inlet—5/8" Cu-Ni tubes—with or without air ejector.

46

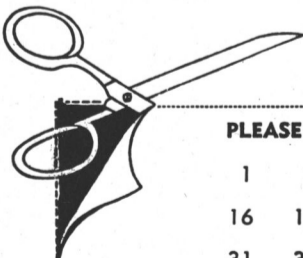


DOUBLE INPUT—SINGLE OUTPUT DIESEL REDUCTION GEARS

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

INQUIRE FOR ALL OTHER ITEMS

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



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46														

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

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

Galbraith-Pilot Marine Moves To New Offices

Galbraith-Pilot Marine Corp. has moved their headquarters to 166 National Road, Edison, N.J.

According to **Harry Parke**, president of the company, the move was made to consolidate the facilities of Galbraith-Pilot Marine Corp. with CML Macarr, Inc., a newly acquired division of Marine Electric Corp., the parent company of Galbraith-Pilot Marine Corp.

Galbraith-Pilot Marine manufactures a complete line of electronic marine equipment, including salinity indicating systems, oil-in-water detectors, transistorized communications centers, alarm and monitoring panels, power panels, and automatic battery chargers. CML Macarr, Inc. manufactures power supplies, battery services and analysis equipment, motor generator controllers, and industrial battery chargers.

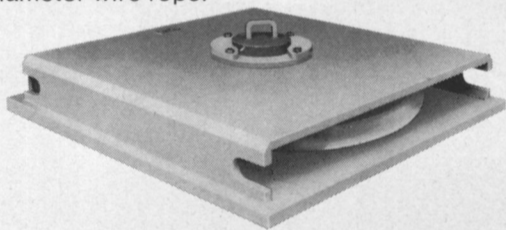
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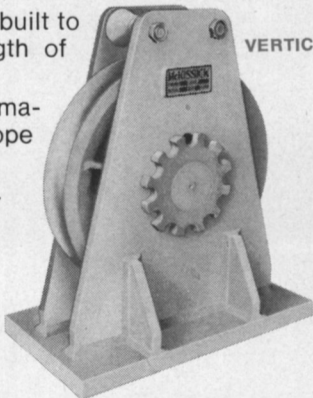
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Timmons Elected NASSCO Vice Pres.



Samuel D. Timmons

Samuel D. Timmons has been elected a vice president and director of National Steel & Shipbuilding Company (NASSCO) of San Diego, Calif. He has also been appointed a member of the executive committee.

Mr. Timmons has been counsel to NASSCO—50 percent owned by Kaiser Industries Corporation—since he joined Kaiser in 1963 as a member of the legal staff. He was elected secretary of NASSCO in 1969.

Previously, he was West Coast counsel for Raytheon Company at Santa Barbara, Calif., from 1960 to 1963 and staff attorney at Cargill, Incorporated, in Minneapolis, Minn., for the prior four years.

Mr. Timmons received his LL.B degree from Stanford University

Law School in 1956, after graduating from Harvard College in 1951. He is a member of the bar in California and Minnesota.

A native of Chattanooga, Tenn., Mr. Timmons served in the U.S. Navy during the Korean Conflict.

First Orders For New Setenave Shipyard In Setubal, Portugal

The new Setenave Shipyard now under construction in Setubal, Portugal, has recently received the first order for the building of a 313,000-dwt turbine tanker for SOPONATA—Sociedade Portuguesa de Navios Tanques Lda. Delivery is scheduled for the last quarter of 1976.

In addition, an order for the construction of a forebody was received from the Eriksberg Yard in Goteborg, Sweden. This forebody, with a length of about 820 feet, is also intended for a 313,000-ton tanker and will be delivered during 1975.

In the meantime, the construction of the yard is progressing according to schedule. New building is expected to start beginning 1974, while the repair activity is intended to start beginning 1975. When completed, the yard will be able to build tankers up to 700,000 dwt and have two dry-docks available for repairs, one for ships up to 700,000 dwt and one for ships of 300,000 dwt.

Pacific Far East Line Introduces LASH Cargo Service To South Pacific



S/S Philippine Bear shown departing Tacoma on her maiden voyage to the South Pacific.

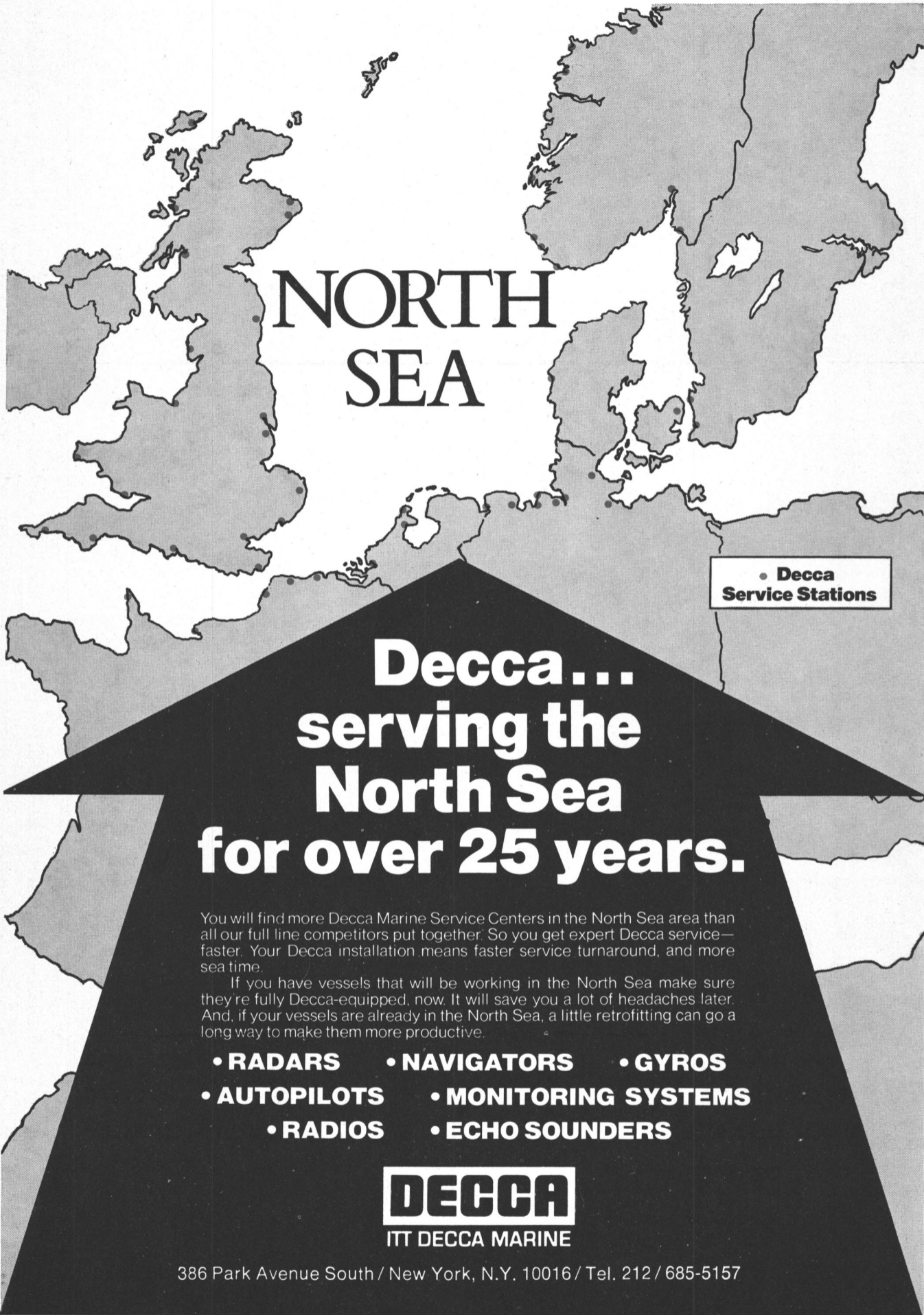
Pacific Far East Line, Inc. has announced the introduction of the revolutionary LASH cargo service into the South Pacific. The first sailing was the maiden voyage of the LASH vessel S/S Philippine Bear from Tacoma on April 1. The LASH vessel S/S China Bear will alternate sailings with the S/S Philippine Bear, commencing May 8 from Tacoma, with both ships then providing LASH service approximately every three weeks.

Leo C. Ross, president of Pacific Far East Line, said: "Introduction of LASH ships in the South Pacific to replace our Mariner vessels is an expression of our confidence in the growth of this area and the expansion of trade between the United States and the South Pacific. Our LASH vessels are ideally suited for this trade."

Each ship has a capacity of 50 barges and 550 standard containers, including outlets for 180 refrigerated containers. It provides more secure cargo protection and greater cargo handling efficiency. There is greater insurance of on-time arrivals and departures under the LASH operation.

Of particular advantage to South Pacific shippers, Lash provides for the handling of bulk and bulk-type commodities to and from Australia and other South Pacific ports which normally could not be handled by conventional vessels or container-ships. LASH ships also have substantially increased capacities for refrigerated cargo.

Pacific Far East Line presently operates five additional new LASH ships in the West Coast/Orient service.



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Decca... serving the North Sea for over 25 years.

You will find more Decca Marine Service Centers in the North Sea area than all our full line competitors put together. So you get expert Decca service—faster. Your Decca installation means faster service turnaround, and more sea time.

If you have vessels that will be working in the North Sea make sure they're fully Decca-equipped, now. It will save you a lot of headaches later. And, if your vessels are already in the North Sea, a little retrofitting can go a long way to make them more productive.

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Harbor Tug And Barge Elects Bedient VP

The Harbor Tug and Barge Company, widely diversified water transportation firm with headquarters in San Francisco, has announced the election of **Lester C. Bedient** to the position of vice president, in charge of all the firm's California operations.

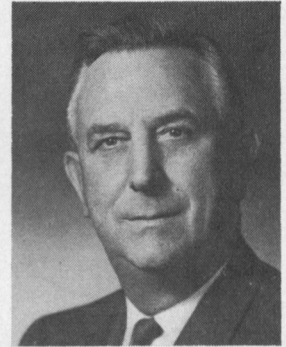
In making the announcement,

Albert D. Elledge, president of the company, said: "Mr. **Bedient** is largely responsible for the great strides this firm has made in developing our passenger vessel operations, and his wide knowledge of tugboats and of the water transportation industry has proved invaluable to the company. It was under his general management that the Red and White Fleet, now well-known to San Franciscans and

tourists alike, has grown from two small sightseeing boats to one of the largest cruise vessel operations in the world."

Mr. **Elledge** went on to say that in addition to supervising the firm's various tug, barge, ferry and cruise boat fleet operations in San Francisco Bay and its many tributaries, the newly elected vice president will be in charge of ever-expanding operations in southern Cali-

fornia. Through an affiliate, Harbor Carriers, Inc., the company operates tour boats in Los Angeles-Long Beach Harbor and offers regularly scheduled daily excursions from Long Beach to Catalina Island. A new 700-passenger cruise vessel for use in southern California waters will soon be launched at a Stockton shipyard.



Lester C. Bedient

Mr. **Bedient**, who worked his way up through the ranks, joined The Harbor Tug and Barge Company in 1929 as a machinist and carpenter's helper in the firm's tugboat maintenance and repair shop. He became a towboat deckhand in 1931, and one year later took over as operator of the vessel. After operating tugboats for over the next 11 years, he moved to the operations department in 1943, serving first as a dispatcher and later in various other capacities before taking over as operations manager in 1947.

Mr. **Bedient**, a member of several maritime clubs and associations, has been very active in the affairs of The American Waterways Operators, Inc., an organization dedicated to the welfare of the small vessel commerce of the nation. He served as West Coast regional vice president of that group in 1971.

Columbian Rope And Subsidiaries New Name 'The Cordage Group'

The Columbian Rope Company's Cordage Division, incorporating five long-established and well-known names in cordage manufacturing, has been reorganized to operate as "The Cordage Group," president **Legare R. Hole** has announced.

The full range of cordage products previously offered under five different names will now be marketed under the new identity, Mr. **Hole** said.

Besides Columbian Rope, other time-honored rope company names that became part of The Cordage Group are Plymouth, Whitlock, Fidler, and Cating. These firms had been acquired by the Columbian Rope Company since World War II, culminating in Columbian's purchase of the Plymouth Cordage Company in 1965.

"This new identity will enable The Cordage Group to give its distributors more effective marketing support, and will clarify the presentation of our product line to the many cordage markets that we serve," Mr. **Hole** said.

Steermaster is a new bow steering system designed to make operations on inland waterways safer, more efficient, and more profitable. In use by major transportation companies, including Chotin Transportation, Radcliff Materials, Thomas Marine, Dixie Carriers and Magnolia Marine, it has proved to be the "most important advance in waterway transportation in this century."

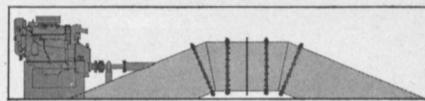
PERFORMANCE. The **Steermaster** is a maneuvering assist system for vessels operating in light and loaded conditions. It steers the vessel at low and high running speeds with precision maneuverability and steering control at all speeds, in all passing situations, and in crosswinds. It substantially reduces underway time for all types of tows and has created marked improvement in the safety of operations.

THE JACKSON NOZZLE. We use a fluid reaction device in the **Steermaster** called the Jackson Nozzle to overcome the head of water built up at the bow of the vessel. It moves water through its tunnels at volumes up to 450,000 g.p.m., creating the

necessary forces to turn the head of a tow in any direction immediately at high running speeds.

SAFETY IN CARRIER OPERATIONS. Safety in operations on inland waterways has improved tremendously because the **Steermaster** provides complete control of a tow in passing, maneuvering, adverse current, and cross wind situations. **Steermaster** goes exactly where you point it. Most important, this capability will reduce inland waterway accidents—and resultant pollution problems—dramatically. (The safety records of those vessels using the **Steermaster** have been extraordinary.)

EFFICIENCY. The **Steermaster** has reduced underway time for carriers. It cancels the effect of winds on a tow, eliminating windbound conditions, cuts the time needed to navigate curves and bends, and gives you complete control over current when approaching



bridges. The system is simple immediate-response control from the wheelhouse; there are no protruding skegs, propellers, or shafts, and tows can be docked in close quarters with the powerful side thrust of the steering vessel. All system components are backed up by duplicate equipment for continuous operation and are completely interchangeable for easy maintenance and service.

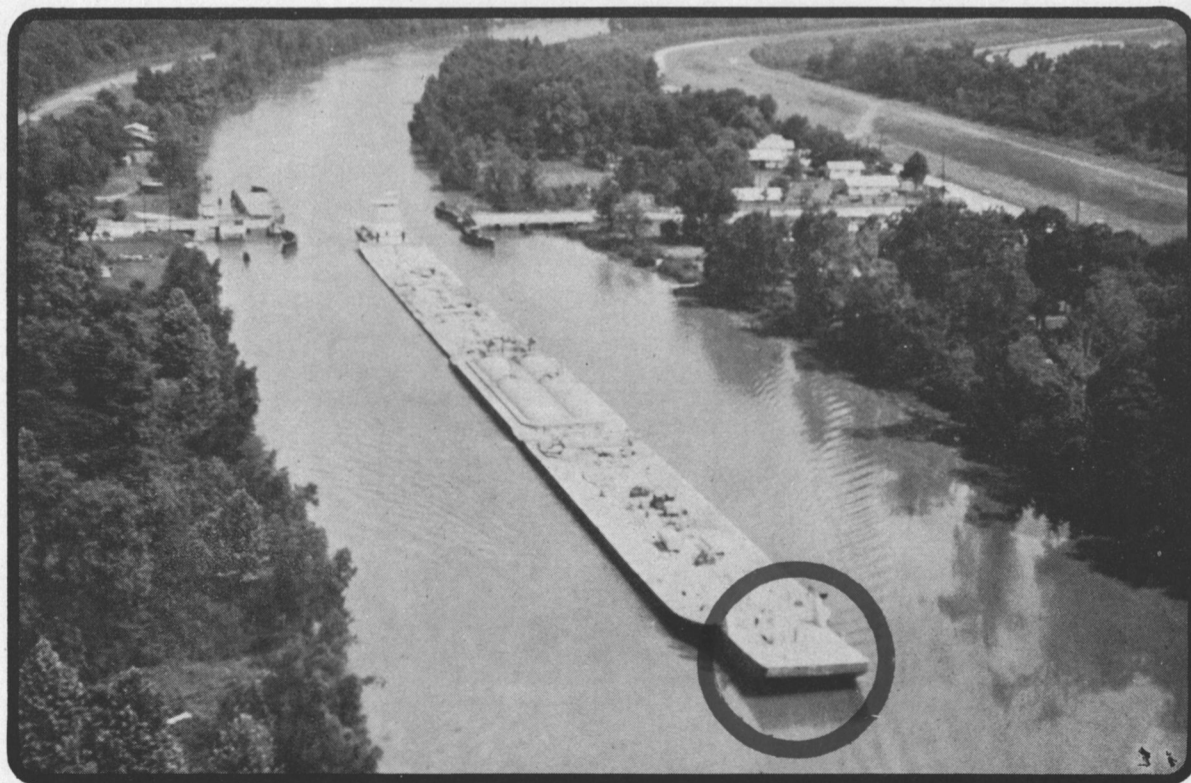
The **Steermaster** is a revolutionary bow steering system for river towboats. Please write or call us for complete information and specifications. We'll be happy to arrange a demonstration.

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Test drive a Steermaster. It's the only bow steering system in the world. It's the only way to handle a tow.

Steermaster. A bow steering system.



(Steermaster at head of Chotin tow—Bayou Sorrel Bridge.)

French And Belgian Shipyards Appoint Frederick A. Ganter



Frederick A. Ganter

Mercantile Marine Engineering and Graving Docks Co., N.V. of Antwerp, Belgium, and Compagnie Marseillaise de Reparations of Marseilles, France, have each announced that they have appointed Marine Repair and Construction Corporation-International as sole agent in the United States.

Mercantile Marine Engineering and Graving Docks Co., N.V. is a large well-equipped and well-staffed ship repair company. The company is now completing the construction of a large new graving dock, their sixth, which will accommodate VLCCs.

Compagnie Marseillaise de Reparations has nine drydocks at their disposal with a maximum capacity of 120,000 dwt. There is a large modern tank cleaning facility and a new graving dock is under construction that will handle VLCCs up to 500,000 dwt.

Marine Repair and Construction Corporation - International maintains offices at 17 Battery Place, New York, N.Y., it was announced by Frederick A. Ganter.

Peter J.A. Burnyeat Guest Speaker At NAMS Annual Meeting



Peter J.A. Burnyeat

The National Association of Marine Services (formerly National Associated Marine Suppliers) will hold their 23rd Annual Meeting at the Barbizon-Plaza Hotel in New York City on May 2-May 4.

Peter J.A. Burnyeat, M.B.E., president of the International Ship Suppliers Association and chairman of Burnyeat Limited of London, England, will be the featured speaker at NAMS Annual Reception and Banquet to be held in the Yacht Lounge atop the Barbizon-Plaza on Thursday evening, May 3.

A special feature of this year's

meeting will be a member's arrival reception, sponsored by NAMS associate members, on Wednesday, May 2, during which a number of new marine products will be on display. Tom Snyder of Diplomatic Marine, Inc. of Houston, Texas, is the chairman for this event.

Thursday and Friday will be given over to NAMS discussion forum and regular business meeting.

Rumburg Joins Harlson In Partnership Of Crane Consultants Inc.

Gary E. Rumburg has become a partner in Crane Consultants Inc. of Seattle, Wash. Formerly chief design engineer with the Port of Seattle, Mr. Rumburg joins Lyle H. Harlson in the partnership. The new consulting firm specializes in the inspection and testing of

cranes, derricks and hoists, spurred by the rigid safety requirements of the Occupational Safety and Health Act.

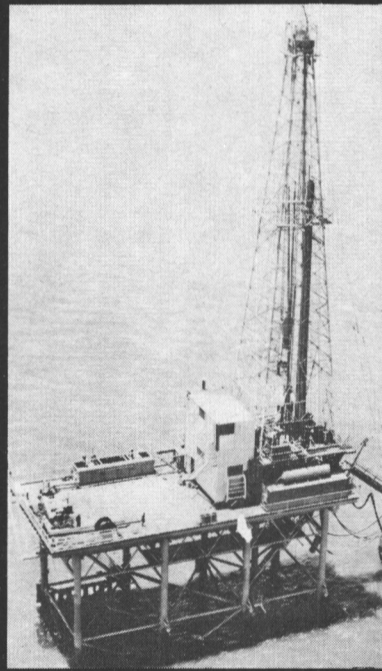
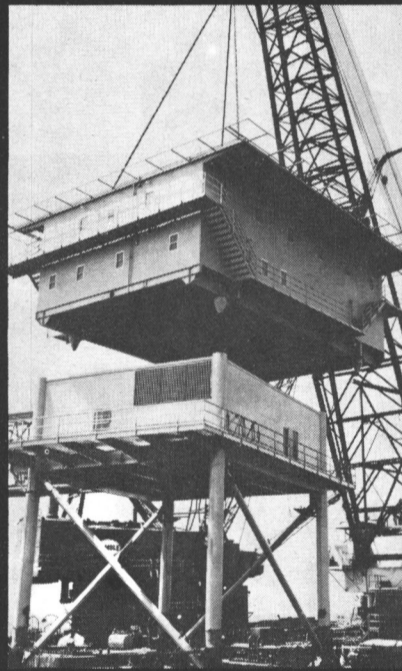
Mr. Rumburg is a registered engineer in Washington and California. He was formerly chief engineer at Star Iron & Steel Co. of Tacoma, where he worked with Mr. Harlson, and project engineer at Colby Crane & Manufacturing Co. of Seattle.

Equitable builds distinctive vessels. First.

Since 1921 we have been designing and building marine equipment and systems for operation all over the world. Special equipment and systems for unique and specialized use.

In 1947 we built the world's first offshore drilling tender. The ship that brought in Louisiana's first tideland oil discovery. In the 1960's we built four self-propelled drilling ships for worldwide use. And they continue to set standards of operational success.

Also in the 1960's we built a container system for the distribution of products to shallow-water ports in the Caribbean. In 1968 Equitable contracted to



build the first LASH barges in the world, and have delivered over 400. In 1970 Equitable contracted to build the world's first SEABEE barge and we're building the prototype. These are major components in a new transportation system that is changing the living habits of millions of people.

And in 1970 we built the 208-foot MANATI, a roll-on/roll-off trailership designed to make the initial container system even more efficient and profitable.

And, in addition to the design and construction of special floating marine equipment, Equitable has become one of the largest builders in the world of tugs, offshore crewboats, oil barges, cargo barges, dredge tenders, towboats, offshore personnel quarters, and other equipment for the maritime and petroleum industries worldwide.

Our stock program is designed for quick delivery, for efficient initial low-cost operation, and has saved our customers thousands of dollars.

Call Equitable for your marine requirements.

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'Cleveland' Name Board To Kings Point



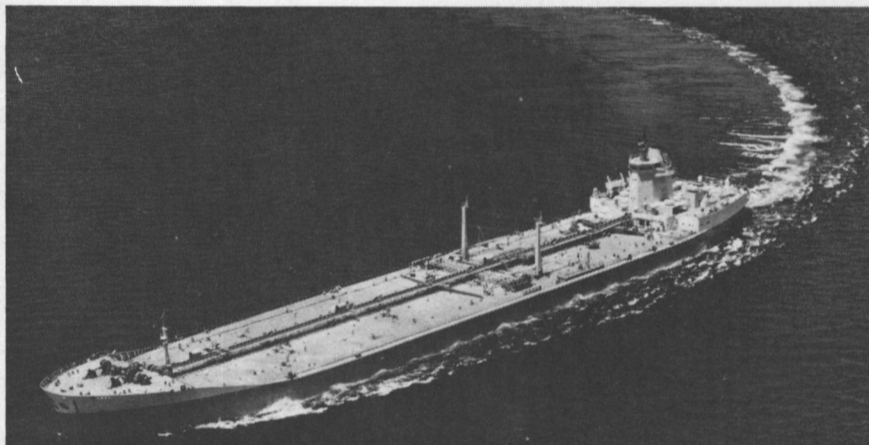
Pictured during the presentation, left to right: Capt. **Joseph F. Corcoran**, USMS; **Richard Zink**, Orient Overseas Line; **Victor Shen**, vice president, O.O.L.; Capt. **Carl Larkin** and **Rollond Fay**, American President Lines, San Francisco; **John Hsia** and **James Liang**, O.O.L., San Francisco.

When Orient Overseas Line recently purchased the famous S/S President Cleveland, her name became the S/S Oriental President.

Orient Overseas Line donated the old name board to the collection of the U.S. Merchant Marine Academy at Kings Point, N.Y.

Capt. **Joseph F. Corcoran**, USMS,

the Academy's Western Region Representative and a Kings Point alumnus, class of 1943, accepted the historic memento from **Victor P.S. Shen**, vice president of Orient Overseas Line, and Capt. **Carl Larkin**, assistant director offshore operations, American President Lines, the ship's owner for 25 years.



7 of the last 10 tankers built in the U.S. use Norriseal butterfly valves.

The reason is Norriseal quality. Norriseal valves are extra rugged and dependable—built to outlast other valves and require less maintenance. They provide positive shut-off time after time with 360° disc sealing and handle working pressures up to 200 psi.

Norriseal design insures long, leakproof operation. O-ring shaft seals, separate from the seat, prevent leakage from the valve bore, lock in lubrication and make replacement of both the seals and the seat easier, faster and lower in cost. Replaceable body O-rings provide end seals and eliminate the need for flange gaskets.

Norriseal offers variety as well as quality. We make valves in sizes from 2" to 28" with manual or automated operators. We offer a variety of body and disc metals, including bronze and a large selection of elastomers.

Norriseal valves meet all standards and regulations. Norriseal butterfly valves are manufactured to meet Coast Guard, ABS, Lloyd's Register of Shipping and Det Norske Veritas regulations, as well as military standards.

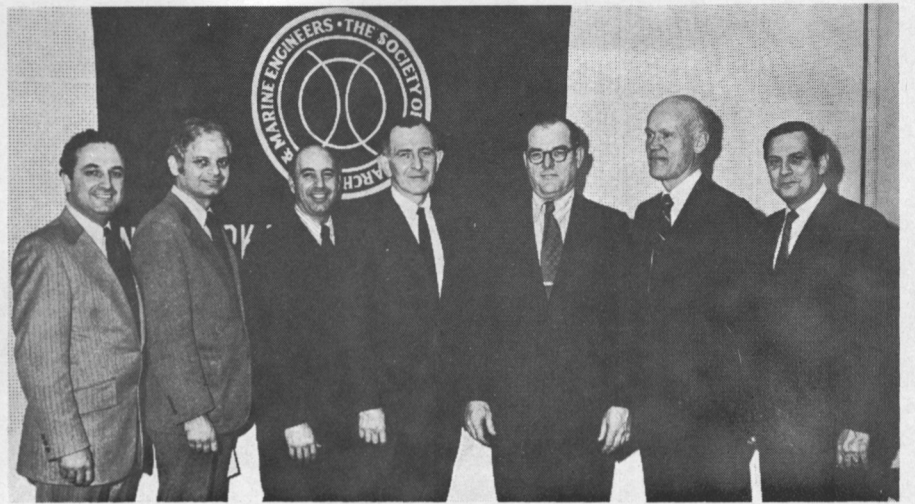
Call or write Pat Dillard for further information on Norriseal valves for marine applications.

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NORRISEAL

N.Y. Metropolitan SNAME Hears G.E. Authors —Nominates Officers For 1973-74 Season



Pictured at the New York Metropolitan Section meeting, left to right: **I. Hilary Rolih**, chairman, papers committee; **Robert D. Markhoff**, General Electric Company; **Nicola F. Pergola**, executive committee; **B. Siegel**, **John W. Mann** and **M.A. Prohl**, authors, and **Charles W. Wilson**, chairman of the Section.

The New York Metropolitan Section of The Society of Naval Architects and Marine Engineers met on March 13 at The New York Times Building, 229 West 43rd Street, in New York City.

After a social hour and buffet in the Executive Dining Room, the technical session was held in the WQXR Auditorium. The paper presented was "Improved Turbine Operation by Drainage of Steam Systems and Monitoring of Vibration," by **J.W. Mann**, **M.A. Prohl** and **B. Siegel**, all with the General Electric Company.

This paper reviews recent operational problems caused by water induction into propulsion turbines and the resulting heavy vibration. The phenomenon is described as an orbiting vibration of the turbine

shaft. Analysis shows the conditions required to produce this result. The steam system is discussed with a view to reducing the opportunities for water induction and specific recommendations are made for improved drainage. A newly developed vibration monitoring system is described which can be used to reduce turbine speed when very large vibration levels occur.

Also during the meeting, chairman of the nominating committee **E.A. Catlin** announced the nomination of the following officers for the 1973-74 season: **Donald Carpenter**, chairman; **Thomas J. Sartor Jr.**, vice chairman, and **Robert P. Fulton**, secretary-treasurer. **I. Hilary Rolih** and **Nicola F. Pergola** were nominated to the executive committee for a two-year period.

Atlantic-Pacific Mfg. Named Distributor For Mitsubishi Life Rafts

Atlantic-Pacific Mfg. Corp. has been designated the exclusive North American distributor for the Mitsubishi Inflatable Life Rafts, which will supplement its line of rigid life floats and other flotation equipment.

Atlantic-Pacific Mfg. Corp. of 124 Atlantic Avenue, Brooklyn, N.Y., is the manufacturer of the nationally known brand of APCO marine life-

saving equipment and is the oldest manufacturer of flotation equipment in the United States.

These rafts are available in 4, 6 and 8-man capacity and packed in either a neoprene valise or fiberglass container. The SOLAS type is available in 10, 15, 20 and 25-man capacity.

The Mitsubishi self-inflating life rafts for use on deepsea shipping or coastwise vessels conform to the conditions set forth in the International Conference on Safety of Life at Sea 1960 (SOLAS).

Equitable Delivers Four Watertaxis For African Offshore Oil Operations



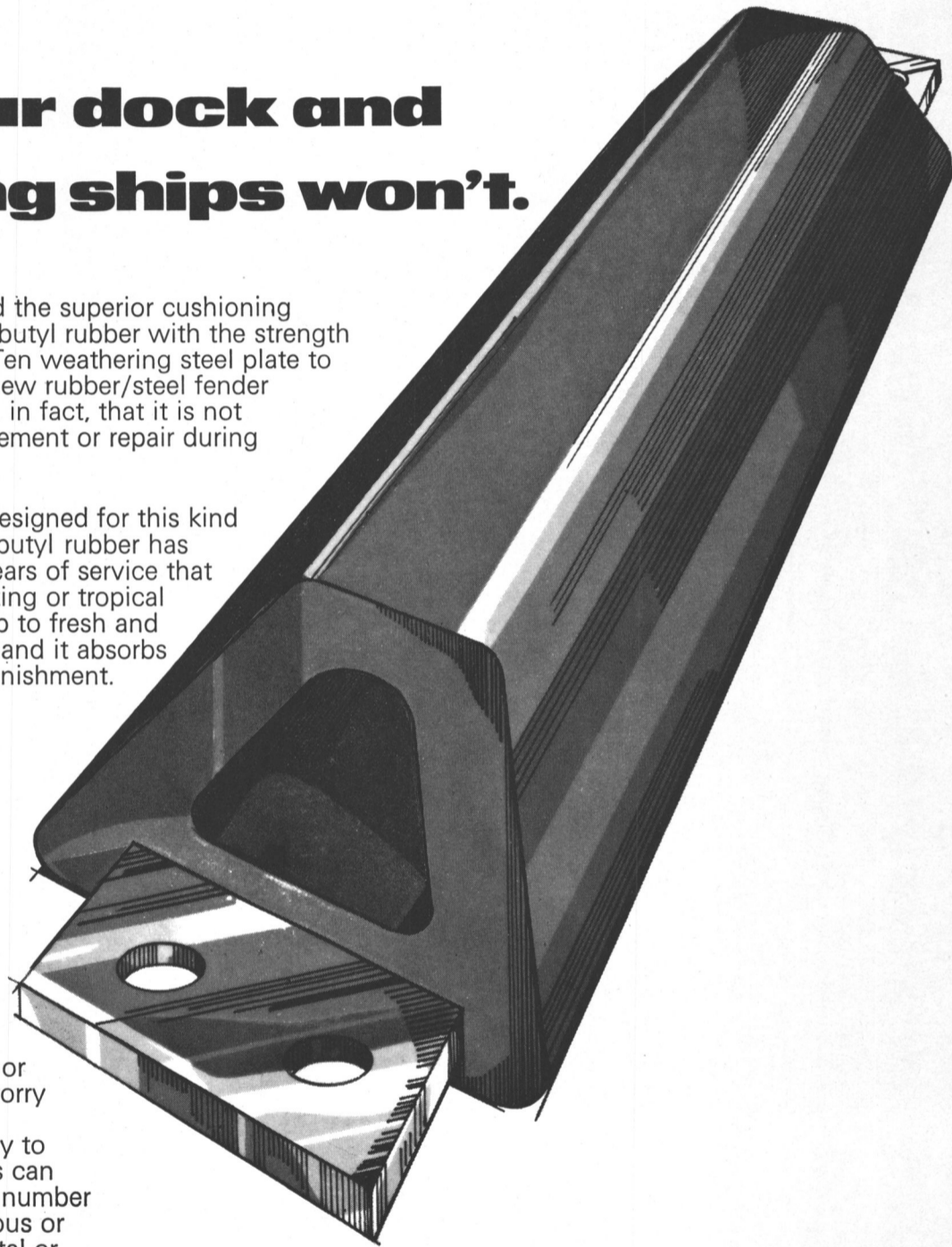
Equitable Equipment Company, Inc., New Orleans, La., shipbuilder, has delivered the four new high-speed watertaxis shown above for work in West Africa's offshore oil fields. The vessels, 32-foot personnel launches, were built by Equitable for Sutherland Ltd., Port Harcourt. They are each powered by a single General Motors 8V71N diesel engine and have top speeds of 25 miles per hour. The new boats were shipped from New Orleans to Port Harcourt via cargowhip. Equitable is a wholly owned subsidiary of Trinity Industries.

Uniroyal and U.S. Steel just got it together...

so your dock and visiting ships won't.

We've just combined the superior cushioning action of Uniroyal's butyl rubber with the strength of U.S. Steel's Cor-Ten weathering steel plate to create this rugged, new rubber/steel fender package. So rugged, in fact, that it is not likely to need replacement or repair during this century.

Cor-Ten steel was designed for this kind of application. And butyl rubber has proven in over 20 years of service that it is at home in freezing or tropical climates, it stands up to fresh and salt water oxidation and it absorbs the worst kind of punishment.



No chains, shackles or other hardware to worry about, this fender package comes ready to install. And the units can be combined in any number of ways for continuous or intermittent, horizontal or vertical installation. Or simply reverse the units to create waler designs.

For more information on how this new fender package can keep your piers looking better, longer, and even reduce construction costs, contact:



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ASP-2565A

Preformed Plastic Strips Prevent Cargo Damage

Six Pacific crossings and one Atlantic crossing prove the utility of a preformed plastic strip in eliminating cargo damage caused by hatch cover leaks. The vessel was the "SS Missouri", operated by Ogden Marine, Inc., carrying more than 100,000 tons of grain, bagged rice and bulk sugar.

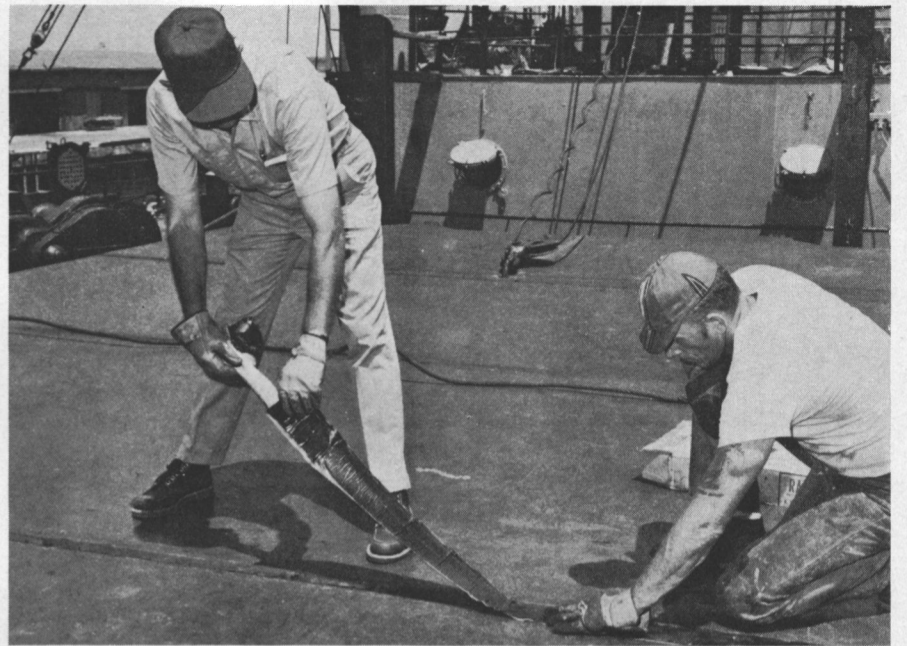
"On the run to Beirut, we ran into heavy seas and high winds in the Atlantic. In port, when we opened the hatches, the grain cargo was bone dry", E. F. Roberts, second mate of the "SS Missouri" said.

"There was more than the usual amount of flexing and twisting of the vessel. We took some pretty solid seas over the bow, and at times 70 mile gale winds. But the cargo in all the holds stayed bone dry."

Following the January 1971 run to Beirut, the "SS Missouri" made six

factory-extruded strip of high-adhesion plastic, formed to the proper cross-section between two protective wrappers, one of which is silicone coated for easy stripping. The other protective wrapper is a non-removable polyethylene covering which remains in place over the tape as a cover strip after application. A layer of woven glass fabric is imbedded in the material to increase strength. The material remains bonded and flexible during unending cycles of wetting and drying, cooling and heating, through endless cycles of movement between metal hatch covers and coamings.

The material is $\frac{3}{16}$ " thick by 3" wide by 48" long (4.8mm x 7.6 cm x 1.22 ms). It is supplied in fiber cartons containing 60 strips. One carton weighs about 90 pounds (approximately 42 kilos) and provides a seal-



Strips are quickly positioned over the joint area to be sealed. Strips are butted end-to-end, providing a watertight seal the length of the joint. Foot pressure forces the instant-bonding plastic into intimate contact, bridging the joint with a flexible, watertight seal.

tape were centered along the edge of the plate, with half of the strip on the plate, and the other half sealed to the hatch cover. This worked perfectly. Small pieces cut to size were fitted around dogging pins," Roberts said.

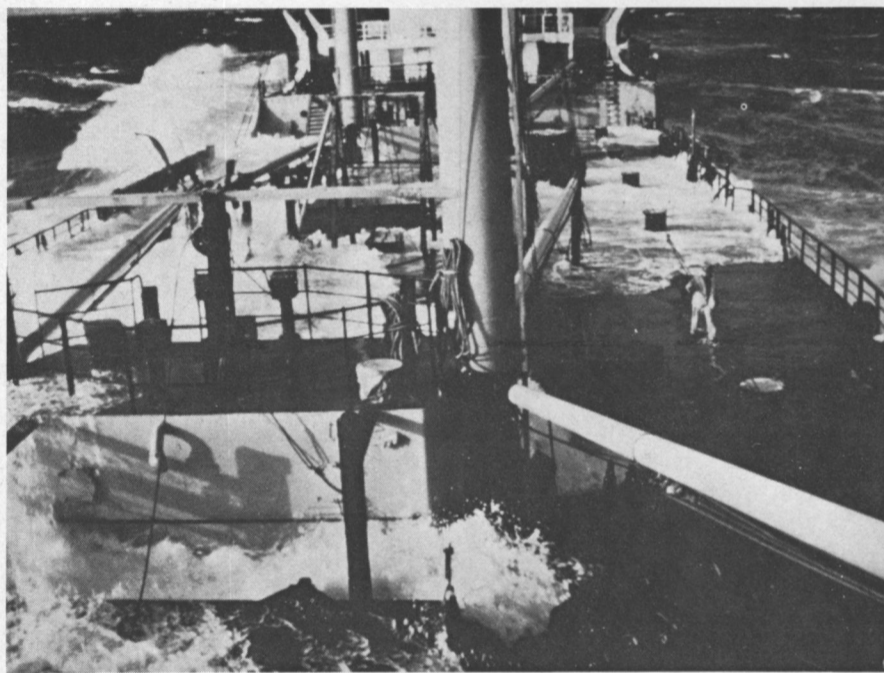
"Removal is quickly done, either by stripping up the tape in a series of fast jerks, or by scrapers. Using a scraper leaves a thin residue of the adhesive plastic in place. This facilitates sealing after the next cargo is loaded," Roberts explained.

An indefinite shelf life makes the product particularly valuable. "When I saw how well this stuff worked on the first leg across the Atlantic, I wondered how it would keep. I got the complete answer from material

that had been on the shelf ten months, which we used to seal the hatches leaving Galveston. On arrival in Madras, an Indian crew unfamiliar with the product opened the hatches. Good-sized paint flecks came up with the strips, showing a good seal."

The material is called "Ram Nek Marine Tape". The manufacturer reports it is now in its fifth year of usage and that nearly one hundred vessels regularly use the material. Manufacturer is Diplomatic Marine, 4101 San Jacinto, Houston, Texas 77004.

Tape removal was fast, simple, using a scraper. Cargo arrived in perfect condition after a difficult Atlantic crossing.



Green seas over the bow provided a severe, prolonged test, particularly on the #1 hatch.

Pacific crossings during the year, carrying rice, grain and sugar to Viet Nam, Korea, India, and returning with bulk sugar to New Orleans from Hawaii. In all cases, there was no damage to cargo.

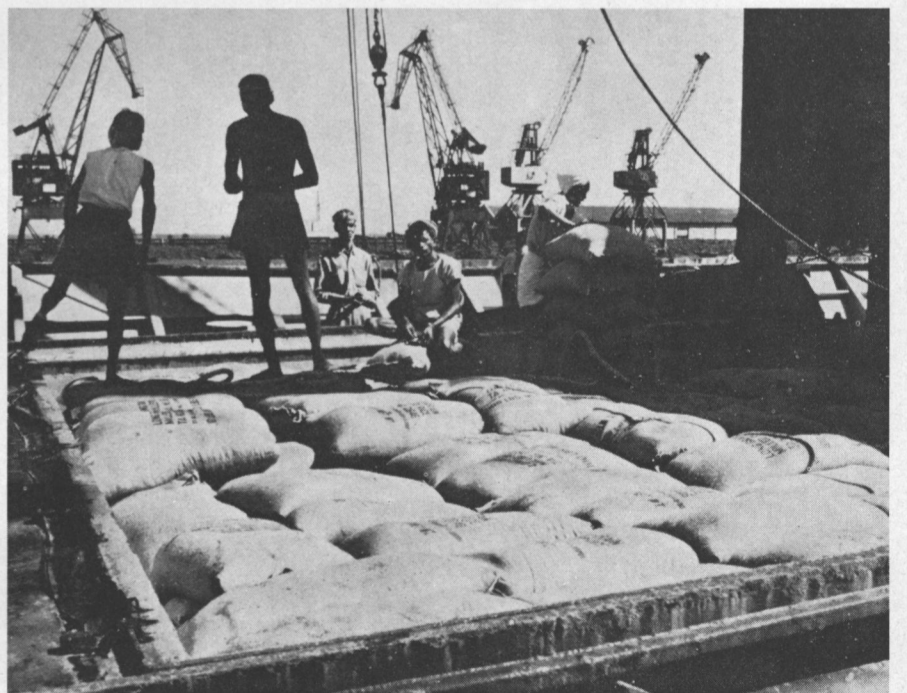
"On the run to India," Roberts recalled, "we loaded in a hurry in Galveston so we wouldn't be hung up in port over the Christmas holidays. That's when this material really saved time. One man can lay tape as fast as another can hand it to him. So we left Galveston with all hatches sealed."

The material is a single-component,

ing length of about 240' (73.2 ms). Carton dimensions are 4" x 13" x 49" (102 cms x 325 cms x 1.225 ms).

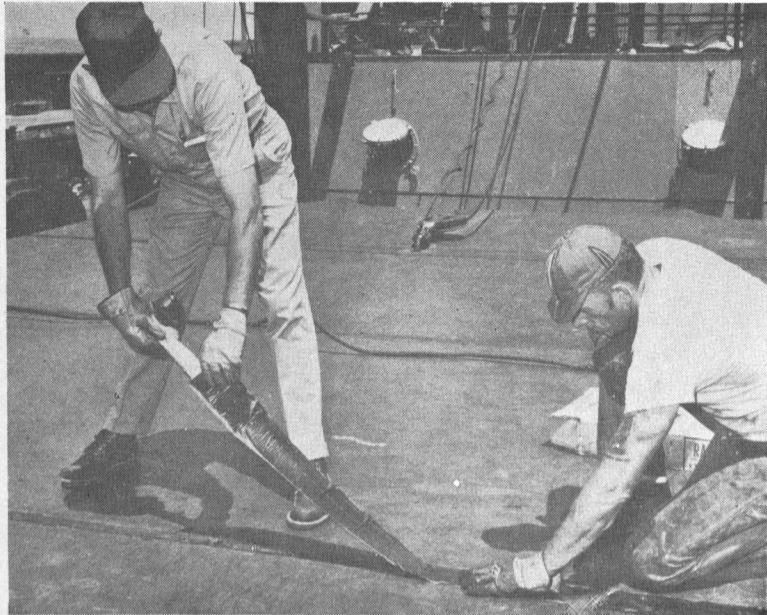
"Routinely, one man strips away the paper strip and hands the strip to the second man, who is kneeling along the joint area to be sealed. The second man puts the end of the strip in position and then lowers the strip, centering it above the joint area. He can either press the strip with his hands or step on it, throughout its four-foot length. This makes the seal."

"In some instances, under certain conditions, we used a metal plate to bridge the gap. Strips of the sealant



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Protect your cargo with **RAM-NEK[®] Marine Tape**



Strips are quickly positioned over the joint to be sealed. The self-sealing material is placed end-to-end to provide a watertight seal the length of the joint.



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Winter Meeting For SNAME Southeast Sect. Held In Miami, Fla.

The winter meeting of the Southeast Section of The Society of Naval Architects and Marine Engineers was held February 9, at the new Miami facilities of Kelly Tractor Co., Caterpillar Tractor Co. dealer for south Florida.

Some 50 members of the Society

gathered at the 2-million-dollar plant of the marine engine dealership. The group toured the facilities as well as witnessed a demonstration of the Caterpillar horsepower computer in use on a compact 225-hp pleasure craft engine, the Caterpillar 3160, while the engine was operating on the dynamometer test stand.

Included in the tour was a visit

to the dealer's newly established Oil Analysis Laboratory.

Attending members of SNAME enjoyed a social hour and buffet dinner, followed by the Section business meeting. The nominating committee presented the following selection of officers for the next year: **James S. Krogen**, chairman; **V.H. Van Bibber**, vice chairman; **Peter C. Ball**, secretary treasurer; **Edward C. Godfrey** for a three-

year term on the executive committee, and **Jack Williams** for a one-year term on the executive committee. There were no nominations from the floor.

Jean E. Buhler, chairman of the steering committee for the 1973 National SNAME Spring Meeting, which is being hosted by the Southeast Section, gave a brief report on the planned activities. Before Southeast Section chairman **Raymond T. Greene** closed the meeting, he reintroduced member **Richard C. Cole** and announced that Mr. Cole was about to be awarded the Evenrude Award of the Year.

Overbeke-Kain Co. Promotes Gallagher



Alex J. Gallagher

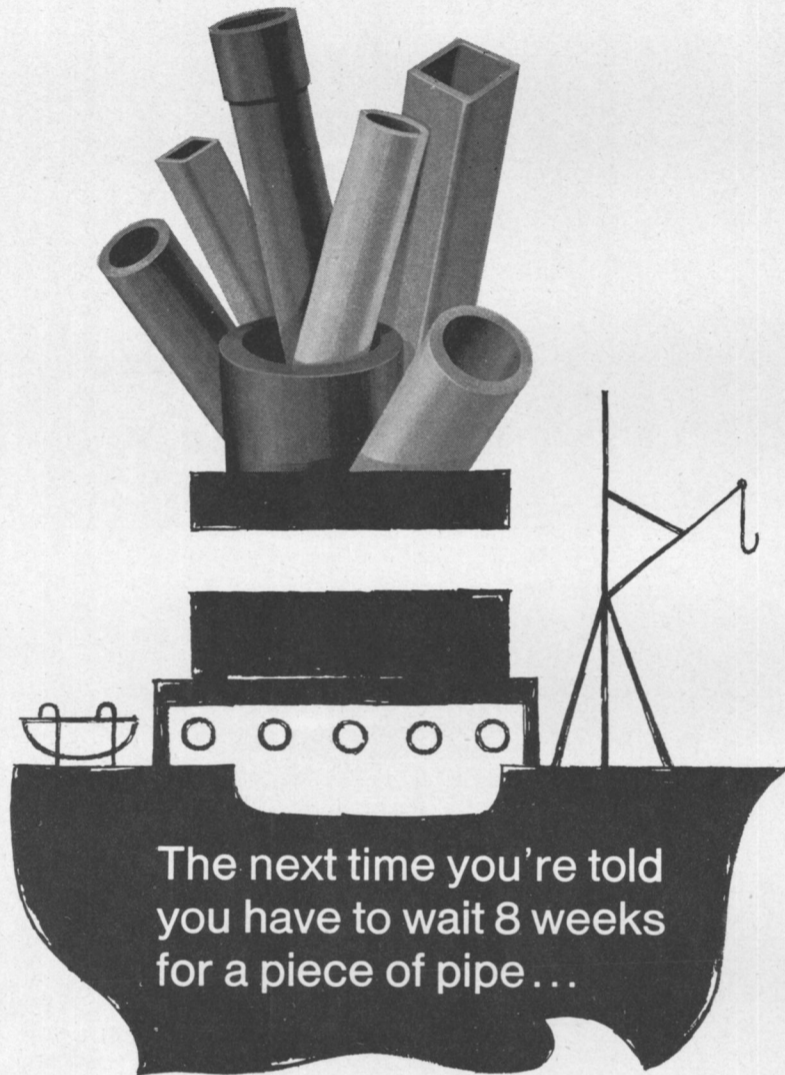
The appointment of **Alex J. Gallagher** to vice president, manufacturing and sales, of the Overbeke-Kain Company, Bedford, Ohio—a leading producer of marine doors, hatches, and dock hardware—has been announced by **R.E. Overbeke**, president. Mr. Gallagher, who joined the company in 1967 as production manager, was also made manager of marine product sales, which accounts for about 75 percent of the company's volume.

In the latter capacity, Mr. Gallagher has visited every major shipyard in the United States, and has been involved in successful negotiations for such major closure contracts as complete door ship sets for the two nuclear-powered aircraft carriers Eisenhower and Nimitz, being built by Newport News Shipbuilding and Dry Dock Co., Newport News, Va.

"I have found the shipbuilding industry completely revitalized," said Mr. Gallagher, "and our name well-known wherever I've visited. I can safely predict that we can anticipate all of the marine closure business that the company can handle for the next several years."

Prior to joining the Overbeke-Kain Company, Mr. Gallagher was production manager of the Dura Corporation, Zanesville, Ohio, Farm Implement Division, which employed 500 persons and reported sales of over \$15 million. He joined Dura in 1962 from the Aerojet General Corporation, Azusa, Calif., where he served as production control manager of the company's aerospace products.

Mr. Gallagher is a member of the American Production and Inventory Control Society.



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Pacific NW Section Reviews Alaska's History And Traces Development Of Ferry System



Pictured above, left to right: **John Hohler**, Columbia River Area chairman; **Andrew Nielsen**, American Bureau of Shipping; **Arthur Farr**, Northwest Marine Iron Works; **Philip Spaulding**, author; **Vincent Van Riper**, American Bureau of Shipping, and **George Salisbury**, chairman, Pacific Northwest Section of SNAME.

A Review of Alaska's History and The Development of Alaska's Ferry System was presented by **Philip F. Spaulding**, vice president of Nickum & Spaulding Associates, Inc., at a Portland, Ore., meeting of the Pacific Northwest Section of The Society of Naval Architects and Marine Engineers on February 9.

Commencing with the Russians' fur-trading interests in the 1700s, Mr. Spaulding talked his audience through "Seward's Folly," whaling expeditions during Civil War years, gold discovery in 1898, World War II's role in Alaska's development, and finally, statehood. He pointed out that extensive studies determined that, unlike the growth of roadways in the "lower forty-eight," a complete conventional highway system would not be economically feasible when considering sparse population, great distances to be traversed, and the many bridges and structures which would have to be built to span the countless rivers and inlets.

And so the Alaska Marine Highway was born.

The first ferry in the Juneau area, a converted Navy LCT, was replaced in 1957 by the 100-foot Chilkoot, built by Martinac Shipbuilding Corporation. Five larger vessels soon followed—the M/V Taku, Matanuska, Bartlett, Tustumena, and the largest of all, the 408-foot M/V Malaspina. The M/V Wickersham, whose activities are somewhat restricted because of The Jones Act, is also a member of the "Blue and Gold Fleet." Two more vessels are presently being built and slated to join the system by 1974.

Of interest to all taxpayers in all 50 states: each Alaskan has a stake of over \$215 in the Alaska Marine Highway. This fact in itself indicates that Alaskans became fully aware of this special transportation need and were willing to support their ferry system.

The motion picture "Good Morning Alaska," showing the fleet of ferries gliding through Alaska's breathtaking scenery, concluded Mr. Spaulding's presentation.

New London Freight Lines Asks MarAd For Title XI To Build 216-Foot Ferry

New London Freight Lines, Inc., 17 Battery Place, New York, N.Y. 10004, has applied to the Maritime Administration for Title XI mortgage and loan financing to aid in the construction of a 216-foot ferry which the company plans to use with the other two ferries it operates between Orient Point on Long Island, N.Y., and New London, Conn. The vessel, estimated to cost \$1.6 million, is to have a capacity for 267 long tons of passengers and vehicles and will be 42 feet wide with a 10-foot draft. As yet, no construction contract has been awarded.

Beth-Beaumont Commissions Offshore Drilling Platform For Storm Drilling Company

ZEPHYR I, a semisubmersible mobile platform scheduled to drill for oil in the North Sea for Texaco, was commissioned on March 16 at Bethlehem Steel's Beaumont, Texas, shipyard.

Constructed for the Storm Drilling Company of Houston, Texas, and the A.P. Moller Company of Denmark, ZEPHYR I will have a maximum drilling capacity of 25,000 feet in 1,000 feet of water.

Mrs. Erik Krog-Meyer, wife of the Danish Consul General to the United States, commissioned the rig, which will be delivered shortly.

ZEPHYR I is the first of seven semisubmersible drilling vessels which Bethlehem has on order or under construction. The Beaumont yard will construct six, and Bethlehem's Baltimore, Md., yard one.

The vessel consists of two rectangular lower

hulls, each 202 feet long, 32 feet wide, and 28 feet high. Overall width is 182 feet.

There are eight stability columns, with the four corner columns having diameters of 32 feet, and four intermediate columns with diameters of 10 feet.

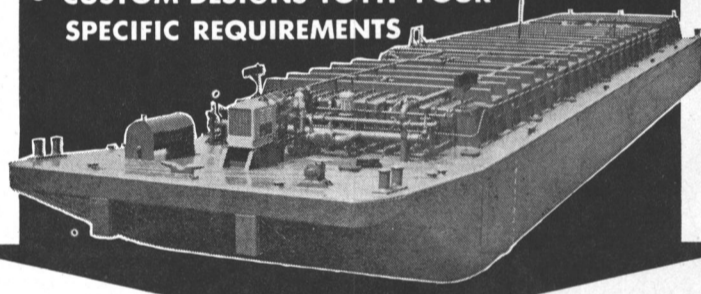
The upper rectangular watertight platform is 186 feet long, 150 feet wide, and 14 feet deep. It contains machinery, mud tanks, cement and mud handling equipment, workshop, drilling equipment, and quarters for 82 men. The machinery deck is 94 feet above the bottom of the lower hull. A heliport, pipe rack and drilling derrick will be mounted on the upper deck.

The platform has an operating draft of 50 feet, and employs an 8-point mooring system. ZEPHYR I has been built in accordance with U.S. Coast Guard Regulations, and classed by the American Bureau of Shipping for unrestricted ocean service as a drilling vessel.

ZEPHYR II, a sister platform, is scheduled for delivery to Storm Drilling Company early next year.

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Alabama Dry Dock Awarded Contract From Diamond M For \$18-Million Drilling Rig

Don E. McMahon, president and chief executive officer of the Houston, Texas-based Diamond M Drilling Company, has announced that the company has contracted with Alabama Dry Dock & Shipbuilding Company of Mobile, Ala., for the construction of another semisubmersible drilling rig at an estimated cost of \$18 million. The unit will be a twin-hull type with eight columns. It is designed for working in 600 feet of water, and will be fully self-propelled.

The company and a bank have agreed in principle on the terms and conditions under which the bank will provide interim construction financing for the rig.

Diamond M expects delivery of the rig in the second half of 1974.

German Firm To Handle Lykes Barges On Rhine

Lykes Bros. Steamship Co., Inc., New Orleans, La., has recently signed an agreement with Rhenus A.G. of Mannheim, Germany, to act as Rhine River ports contractor for the Lykes SEABEE System, according to J.G. Tompkins, Continent and United Kingdom director for Lykes.

The agreement provides for Rhenus to perform all services required in connection with the handling of cargoes and barges of Lykes along the Rhine River, thereby providing export and import customers of Lykes with the modern Rhenus terminals and equipment at major ports on the Rhine.

Rhenus has appointed the French Rhine Company, Compagnie Francaise de Navigation Rheneane (CFNR), as a subcontractor under their contract with Lykes to provide towage on the Rhine River and its tributaries for the Lykes SEABEE barges.

Westinghouse Prototype SC Marine Generator Discussed By SNAME No. Calif. Section



Pictured at the Engineers Club, left to right: **M. Kossa**, Northern California Section papers chairman, naval architect; **C.J. Mole**, project manager, SC Electric Machinery, Westinghouse Electric Corp.; **Edward F. McCann II**, Marine Propulsion, SC Electric Machinery Systems, Westinghouse, author, and **J. Busch**, H.J. Wickert, Section vice chairman.

Approximately 50 members and guests attended the March 8 dinner meeting of the Northern California Section of The Society of Naval Architects and Marine Engineers at the Engineers Club in San Francisco.

A presentation was made on the Westinghouse prototype Super Conducting marine generator by **Edward F. McCann II**, Marine Propulsion, SC Electric Machinery Systems, Westinghouse Electric Corp.

The Westinghouse prototype SC machine consists of a conventional stator and a superconducting rotor. The rotor is kept in the superconduction state by cooling with liquid helium. An external refrigeration plant is used to keep the helium liquefied. This design permits the rotor to be very small, yet produce a powerful magnetic field with very low exciting current. The overall size and weight of the machine is thus much reduced.

Major advantages are apparent in those vessels, such as container ships and barge-carrying ships, where the flexibility of arrangement possible with electric power transmission permits increases in volume usable for cargo. SC machinery total weight and volume does not significantly exceed mechanical propulsion power transmission.

Another suggested application is in small, fast naval vessels, where low machinery weight is of great importance and flexibility of arrangement and fine control possible with electric transmission are definite assets.

Unconventional arrangements such as outboard propulsion pods become practical propositions with SC electric transmission.

The discussion centered mainly around potential advantages and costs to the commercial vessel operator. It was stated that no exotic materials or manufacturing processes are used, thus no development problems are foreseen. However, comparable costs of superconducting versus conventional electric machinery or mechanical transmission are not yet available. A delivery time of about three years was indicated. It was pointed out that due to the more or less constant cost of the helium refrigeration plant, larger installations are likely to be more logical candidates for SC electric transmission.

Discussers at the meeting included **W. Webster**, University of California; **T. Wise**, Marcona Corporation; **G. Rosekilly**, Rosekilly Machinery; **A. Ghush**, Marcona Corporation; **W. Hincks**, Morris Guralnick Associates; **K. Liu**, Robert N. Herbert-Naval Architects; **R. Herbert**, naval architect; **M. Kossa**, naval architect, and **R. Haggart**, Babcock and Wilcox.

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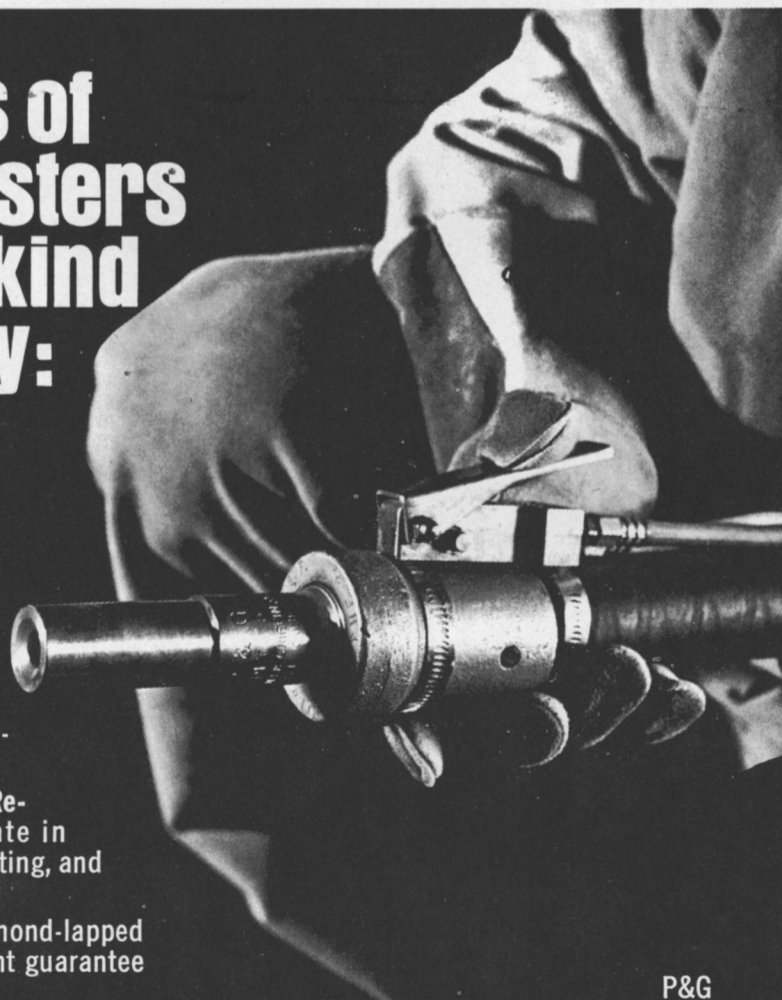
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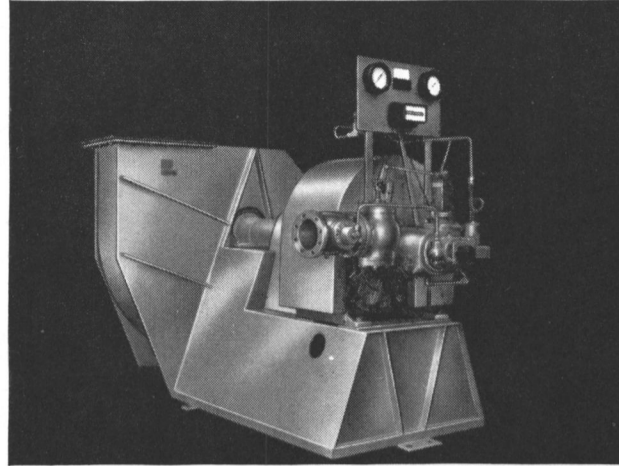
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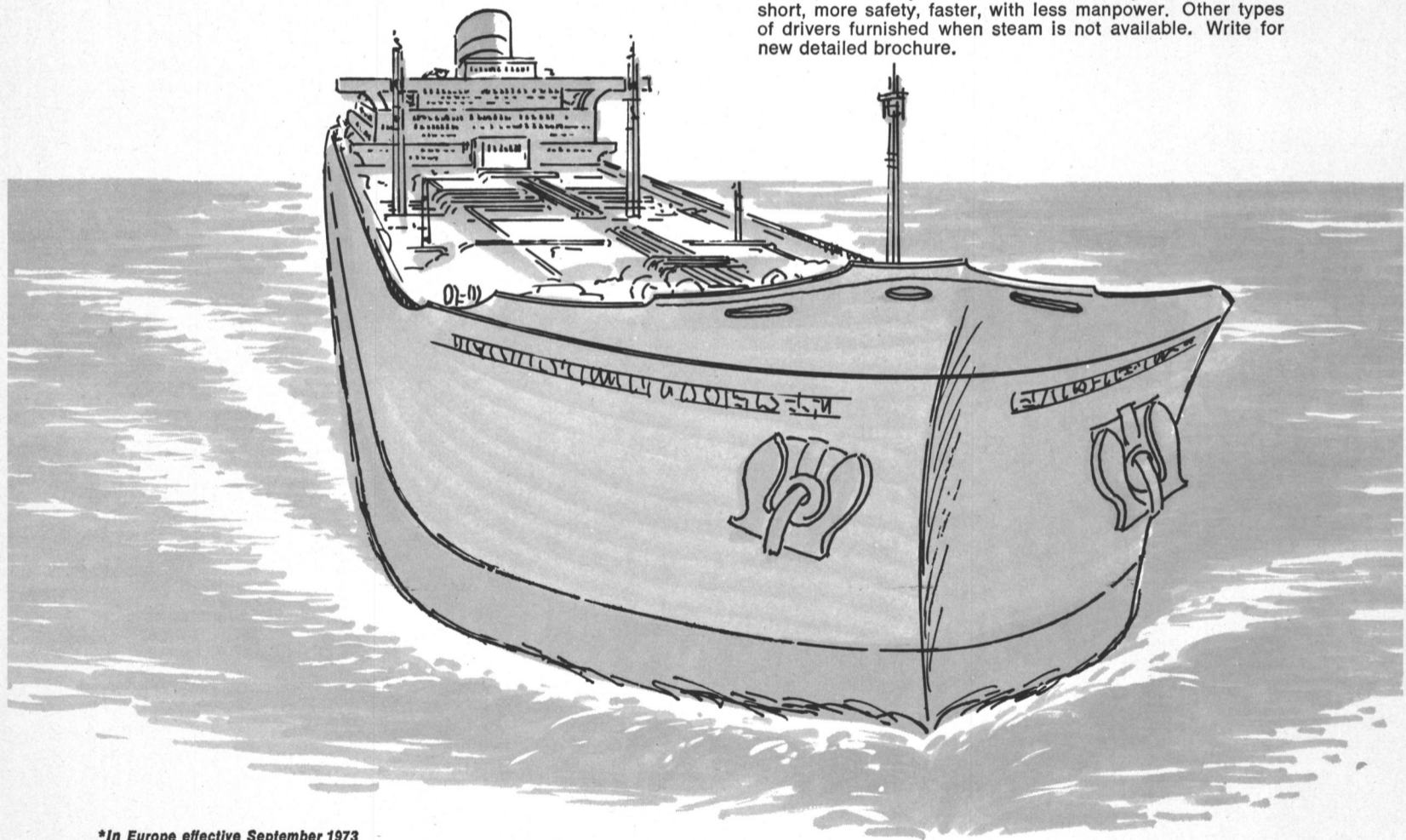


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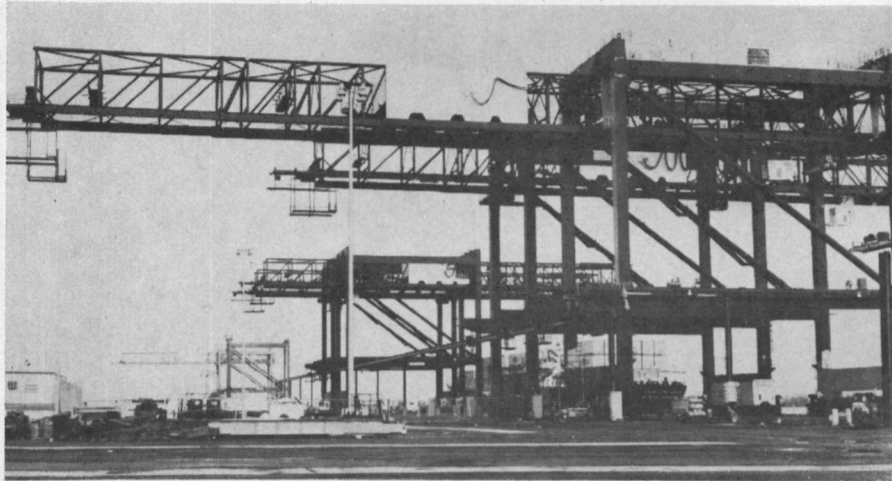
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Devcon Plastic Shims For Crane Rails Provide Accurate Alignment At Low Cost



An overall view of some of the PACECO MACH Portainers at Port Newark. Devcon plastic shimming was used on these cranes to reduce construction cost and time.

Port Newark, N.J., contains what is probably the largest container facility along the Eastern Seaboard. The key to its efficient operation is the giant crane used to load and unload the containerships—there are nine such cranes.

Each PACECO crane has a boom 296 feet long which travels horizontally. The lower structural members of the boom consist of two 296-foot-long I-beams with 200 feet of upside-down railroad-type rails bolted to each one. Because of the long boom length, heavy loads involved and close travel tolerances, construction of the boom is critical—it must travel back and forth without binding.

The mating surfaces of each I-beam and each rail section must be exactly level to assure an exact and smooth horizontal boom movement. However, beams and rails of the lengths involved will never be exactly level throughout. Mating the rail to the I-beam without eliminating these differences could cause uneven horizontal travel and binding of the boom due to the close travel tolerances. Normally, metal shims would be used to provide the leveling function or one single shim made to conform to the varying elevations could be used. Either way, because of the lengths and microscopic differences in measurement, a difficult and critical machining and welding operation would be necessary.

This analysis caused the engineers to seek an alternative solution for shimming between the I-beam and rail. They selected Devcon WR and WR-2 because of their wear resistance, hardness and ease of use. Using WR, the engineers were able to fabricate one continuous shim that conformed to all elevation differences between the mating surfaces, yet did not require machining. In addition, the WR performed a secondary function; it provided a built-in cushion, permitting the rails to adjust more easily to varying stresses exerted on them by rotational forces caused by the horizontal movement of the boom when under load.

The WR was applied in the final

phase of the boom construction. With the boom structure elevated a short way above the ground, the rail is positioned on jacks under the particular section of the I-beam to which it will finally be bolted. The lower plate of the I-beam is sandblasted, wiped clean with solvent and thoroughly dried. Liquid WR is immediately brush-coated on the sandblasted section. The upper plate of the rail is also sandblasted, solvent cleaned, dried and a release agent—a Dupont paste wax for automobiles—spread over the surface. Temporary spacers ¼ inch high and vertical guides are tacked to the I-beam to correctly position the rail.

As soon as the I-beam and rail have received their respective initial coatings of WR and release

agent, Devcon WR-2 with the appropriate portion of slow hardener is mixed using a Devcon M-60 mixer. When thoroughly mixed, the material is puttied onto the rail over the release agent to the appropriate thickness. The rail section is then jacked up against the I-beam, fastened, and the excess WR-2 that was forced out along the edges wiped off.

Since the WR-2 had to be completely cured to be effective, the Shore-D hardness value had to be tested. On the initial application this was done by fastening the rail to the I-beam with special clips. When the WR-2 was cured, the rail was unclipped, dropped down and the Shore-D hardness checked along the rail. (All the WR-2 adhered to the I-beam, none was found to adhere to the rail surface.)

Subsequent applications, nine crane booms, consumed over two tons of WR and WR-2, obtained through Pedley-Knowles & Co. of San Francisco, Calif., a distributor for the Devcon Corporation, Endicott Street, Danvers, Mass. 01923.

Title XI For Four Tug/Supply Vessels Approved In Principle

An application filed by Aquamarine Associates, Houston, Texas, for Title XI mortgage and loan insurance in connection with four tug/supply vessels has been approved in principle by the Maritime Administration.

Burton Shipyard, Inc., Port Arthur, Texas, will build the vessels at a total cost of \$6.5 million.

Ferguson To Build First Highly Skewed Propeller For U.S. Merchant Vessel

The award of an \$869,000 contract to install the first highly skewed propeller on a U.S. merchant vessel was announced by Robert J. Blackwell, Assistant Secretary of Commerce for Maritime Affairs.

Awarded to Aries Marine Shipping Company, the contract covers the manufacture, testing and evaluation of the propeller.

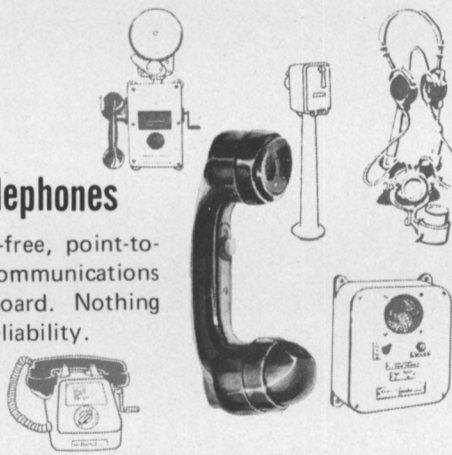
To be built by Ferguson Propeller Reconditioning Ltd., the propeller will be installed on one of the two "San Clemente" Class ore/bulk/oil (OBO) vessels now being built for the company by National Steel and Shipbuilding Company, San Diego, Calif.

Since both OBOs are the same design, installation of a regular propeller on one vessel and the skewed one on the other will provide performance data on the two types of propellers which can be accurately compared.

Shaped like a pinwheel, the skewed propeller is expected to aid in reducing the damage to ships caused by vibrations resulting from the interaction between the propeller and the water flow in which it turns. Reduction of vibration will increase the habitability of work areas and crew quarters aboard merchant vessels, as well as lengthening the life of shipboard equipment.

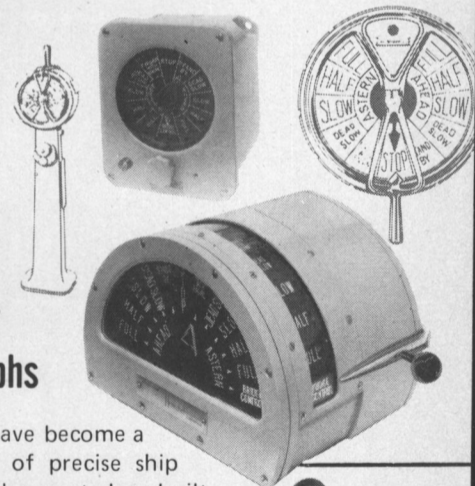
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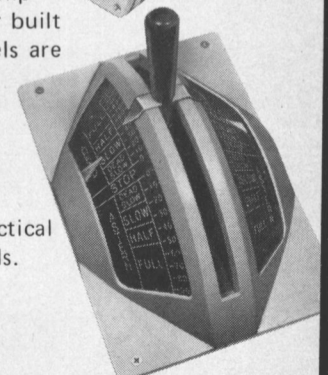
Shaft Speed Indicators

Traditional pointer-type indication is still preferred by many. The newer solid-state integrated circuit systems can provide digital readout at any number of on-board locations.



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American Bureau Of Shipping Reports Increase In Activity During 1972

During 1972, the American Bureau of Shipping classed 1,387 new vessels of 11,986,065 deadweight tons, an increase over 1971 of 6.1 percent in deadweight tons, it was announced by **Robert T. Young**, chairman and president, at the Bureau's annual meeting held in New York on March 20.

Under Bureau classification as of December 31, 1972, there were a total of 9,368 vessels of 102,026,000 deadweight tons.

At the first of the year, there were 2,432 vessels under contract to be built in 40 countries to Bureau classification. These vessels, totaling 41,026,625 deadweight tons, represent an increase of 15.3 percent in vessels and 7.6 percent in deadweight tons over the previous year. Among these vessels is the largest commercial vessel in service, the Globtik Tokyo of 476,025 deadweight tons, which was completed on February 20.

A rapid growth in the Bureau's container certification program was reported. Last year, 25,700 containers were contracted for certification by the Bureau. This is an increase of 42 percent over the total for 1971. Since this program was initiated a few years ago, 78,000 containers have been built or contracted to Bureau certification. Further, the Bureau has certified 14,000 containers of 32 design types in accordance with the United States Custom Requirements for Containers under the TIR Convention.

Growing activity was also reported in the classification of barges being



Robert T. Young

built for use with lighter-aboard-ship (LASH) vessels. As of the beginning year, the Bureau had classed for river and harbor service approximately 1,400 steel LASH barges, while another 1,300 units were under construction. In addition some 200 LASH barges were being constructed of fiberglass to Bureau classification.

Another marine structure receiving increased attention is that of the rigid-tug-barge combination. These vessels incorporate a fit and lock connection between the stern of the barge and bow of the tug, producing a rigid unit of oceangoing integrity. Of the three tug-barge combinations in service to date, three of the barges and two of the tugs have been built to Bureau class. As of January 1, three more tug-barge combinations were being built to Bureau classification.

In his annual report, Mr. **Young** spoke of the pioneer work of the

Bureau regarding liquid natural gas (LNG) carriers. Of the 14 LNG carriers in service on January 1, eleven were constructed under ABS surveillance. The ABS chairman remarked: "We are gratified at the extent to which the Bureau has been requested to participate in the developments of these vessels. We feel the experience gained in the development of LNG carriers places the Bureau in an eminent position in the industry."

During 1972, new design concepts for shipboard LNG tanks presented by designers and builders were evaluated by the Bureau's technical staff. At the same time, the Bureau's Research and Development Department continued to perfect innovative structural analysis techniques which go beyond standard procedures and assure comprehensive evaluation of these vessels using the ABS DAISY computer system. "The DAISY computer system is one of which we are very proud, and which we consider to be the most sophisticated computer system presently being put to work in the international maritime industry," commented Mr. **Young**. DAISY was used during the year for analyses for plan approval purposes of 22 different designs of very large tankers, the majority of which exceeded 200,000 deadweight tons.

The ABS chairman noted in his report that the Bureau was maintaining its position of prominence in the offshore drilling industry. With the assistance of the offshore industry, the Bureau's technical staff wrote

and published the first industry-wide "Rules," or standards, for building and classing offshore mobile drilling units. From the time these "Rules" were published in 1968 to the beginning of this year, the Bureau has classed 7 column-stabilized units, 20 self-elevating units, and 8 surface-type units. Today, over 60 units of various types are building to Bureau classification, or are under review by its technical staff. Changing service conditions, operation experience, and development technology led the Bureau's technical staff and offshore industry representatives to revise the "Rules" and publish a 1973 edition.

It was announced that the U.S. Ship Structure Committee has joined the SL-7 research project, and that the project has been expanded. The original project, jointly sponsored by ABS and Sea-Land, is now in the final stage. It involves mathematical analysis, structural model testing, and vessel instrumentation. The expanded project includes towing tank tests and further analytical study to determine the wave-induced torsional, vertical and lateral bending moments which may be experienced by the SL-7 container vessels in both regular and irregular sea conditions. These parallel studies will provide a firm basis for comparison between measured and predicted value.

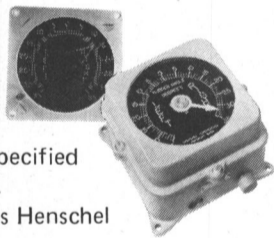
A further provision was made for the installation of strain gage recorders to be installed on the eight high-speed ships for a period of years in order to determine the extreme midship bending stresses experienced by a single vessel during its lifetime. One of the eight vessels, the Sea-Land McLean, has been extensively instrumented in order to obtain torsional moments, bending moments, shear forces, deck deformation, and wave height data. The extensive SL-7 research project promises to emerge as a major contribution to ways in which all types of vessels may be studied for their fitness for intended service.

A continuous growth in business was reported for ABS Worldwide Technical Services, Inc., the wholly owned subsidiary of the Bureau. ABSTECH has carried out condition surveys on oil storage barges, unfired pressure vessels, deepsea diving equipment, and truck trailers. Quality assurance and certification services have been provided by ABSTECH on material handling devices, drydocks, harbor lock gates, and equipment for steel mills, hydroelectric plants, and the offshore drilling industry. ABSTECH has acted as owner's representative during the construction of cargo containers and new vessels, and for condition surveys of existing vessels. Insurance underwriters have enlisted the services of ABSTECH to carry out equipment condition surveys in industrial plants, and for damage and towing surveys in some areas where such service is not easily obtainable. "ABSTECH looks to increase activity in 1973," Mr. **Young** concluded.

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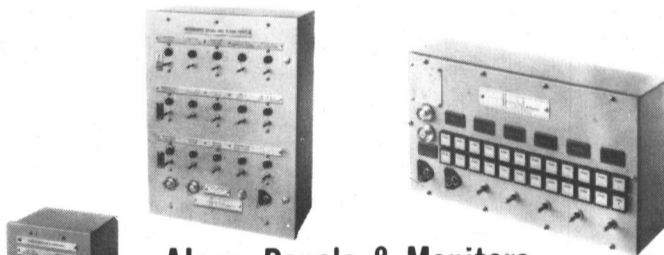


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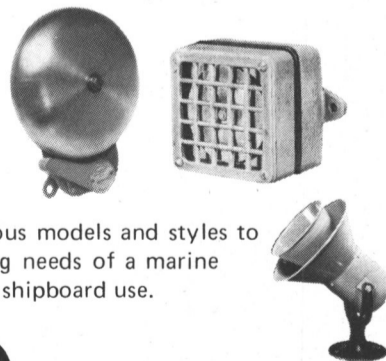
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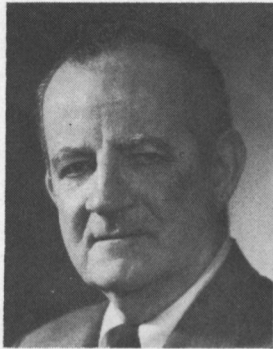
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Farrell Lines President Thomas J. Smith Named AIMS Chairman



Thomas J. Smith

One of the nation's key maritime executives, who has long been a leader in the U.S.-flag cargoliner industry, has been elected chairman of the board of the American Institute of Merchant Shipping (AIMS).

He is **Thomas J. Smith**, president and chief executive officer of Farrell Lines, Inc., New York.

Change in AIMS's leadership was announced by outgoing board chairman **W.C. Brodhead**, vice president, Marine Department, Gulf Oil Co.-Transportation, Philadelphia, following AIMS's annual meeting at the Madison Hotel in Washington, D.C. It was also announced that the new chairman of AIMS Tanker Council will be **Emmett A. Humble**, general manager, Marine Division, EXXON Co., U.S.A., Houston, Texas, replacing **H.A. Steyn Jr.**, manager, Relations Division, Marine Department, Mobil Oil Corp., New York. Remaining as chairmen of AIMS Liner Council and Dry Cargo and

Coastal Council will be **Capt. J.W. Clark**, president, Delta Steamship Lines, New Orleans, and **Eugene Yourch**, vice president, Marine Transport Lines, New York, respectively.

Mr. **Smith**, who has also served as chairman of the Liner Council, comprised of regularly scheduled cargoliner operators with ships under Government subsidy contracts, has been associated with Farrell Lines for nearly 31 years. President of Farrell Lines since 1968 and its chief executive officer since 1970, Mr. **Smith** heads a company with 14 modern cargoliners sailing to South, East, and West Africa and to Australia-New Zealand. Well-known in maritime transportation, both on the national and international scene, he has been a member, director or president of some 40 shipping, trade and other business organizations. (He was recently selected "Man of the Year" by the Foreign Commerce Club of New York.)

Mr. **Smith** has been active for more than 20 years in labor relations as a member of the industry team in New York, and also assisted in the formation of the National Cargo Bureau in New York. He has been president of the African-American Chamber of Commerce and for his contribution to U.S.-African relations has been decorated by the President of Liberia with the Grand Band, the highest rank of the Order of the Star of Africa.

As board chairman of AIMS, Mr. **Smith** assumes the leadership of an association organized in 1969 through the merger of three steamship trade associations represent-

ing all coasts. As the nation's largest American-flag shipowners' association, AIMS is comprised of 35 companies operating over 400 tankers and subsidized and non-subsidized dry cargo ships in the foreign, coastal and intercoastal trades. These vessels represent about 70 percent of all active, privately owned ships registered under the U.S. flag and aggregate over 8 million deadweight tons.

New AIMS board members include **Adolph B. Kurz**, president, Keystone Shipping Company, Philadelphia; **J.T. Lykes Jr.**, chairman Lykes Bros. Steamship Co., Inc., New Orleans, and **James R. Barker**, chairman of the board and president, Moore-McCormack Lines, Inc., New York.

Continuing as board members for 1973, in addition to Messrs. **Smith, Brodhead, Humble** and **Yourch**, are: **Thomas B. Crowley**, chairman, Alaska Hydro-Train; **J.R. Dant**, president, States Steamship Co., and **Larry C. Ford**, president, Chevron Shipping Co., all of San Francisco; **Edward J. Heine Jr.**, president, United States Lines, Inc., and **Henry J. Luck Jr.**, general manager, Marine Transportation, Mobil Oil Corp., both of New York; **Capt. Charles M. Lynch**, manager, Marine Transportation, Atlantic Richfield Co., Los Angeles; **Leo C. Ross**, president, Pacific Far East Line, Inc., San Francisco, and **Fred S. Sherman**, president, Calmar Steamship Corp., New York.

AIMS officers reelected for the year by the board were **James J. Reynolds**, president, **Albert E. May**, vice president, and **William J. Coffey**, secretary-treasurer. **Philip Steinberg** was reelected vice presi-

dent of AIMS Pacific Regional Office, San Francisco.

In a review of AIMS's work in 1972, Mr. **Reynolds** said that AIMS had been "exceptionally active" in working with industry and Government to achieve the goals set forth in the 1970 Merchant Marine Act's building program, adding that "The American merchant marine is now entering the most productive era in our industry's peacetime history."

"The results will be far-reaching," Mr. **Reynolds** continued. "Our nation and our people will be the beneficiaries. The value of the American merchant marine as a creator of jobs, as an instrument to better our balance of payments situation, as a goodwill ambassador to help create world peace, as a builder of foreign trade between our country and foreign nations, as a developer of new markets overseas, and as a more versatile logistical arm of the military are becoming strikingly apparent as we rebuild a revolutionary new merchant fleet."

Including vessels being built under the 1970 Act, Mr. **Reynolds** said that 80 ships totaling more than 4.5 million dwt were being built or on order in U.S. yards as of December 31, and including five additional vessels undergoing conversion, the overall shipbuilding cost topped \$2.4 billion last year. He said these 85 high-capacity ships are critically needed to meet advancing technology of foreign competitors and "will be able to do the job of between 250 and 300 of the older, conventional-type vessels." He added that pending construction differential subsidy applications total over 50 ships, representing a potential of more than 6 million dwt and costing \$3.3 billion.

Looking at 1973 as hopefully a year of "better times and more cargo for U.S.-flag shipping," Mr. **Reynolds** concluded: "Maritime management and labor are continuing to show signs of working toward a united front. There is a general understanding that if they don't, foreign-flag shipping will quickly move in and take over an ever-increasing share of the field. But this seems highly unlikely. Only in the past year have we truly begun to see the chasm close between maritime unions and operators—and this, ironically, as West Coast steamship companies suffered one of the most untimely and illogical maritime strikes of all time. This labor-management 'togetherness'—an awareness of a mutual self-interest in stability of service, as accomplished through the National Maritime Council which AIMS helped conceive and set up two years ago—will encourage attainment of our objectives and assure that the U.S. fleet will again be a dynamic force to be reckoned with in international trade and the pride of a nation determined to rebuild its seapower."

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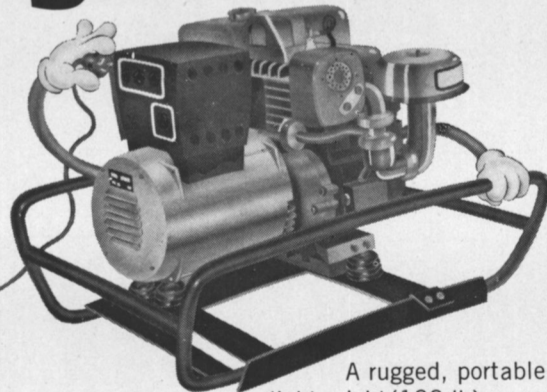
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Wager Introduces VM-8 Smoke Indicator

A new Wager Photoelectric Smoke Indicator for the merchant marine has been introduced by the Robert H. Wager Co., Inc., Chatham, N.J.

Designed to comply as nearly as possible with Environmental Protection Agency specifications for smoke meters, the new Wager VM-8 incorporates a narrow-angle 10,000-hour light source and a special filter over the photocell which will only accept light in the photopic range.

Through re-engineering, the solid-state electronics have been simplified and improved to the present state of the art. The cabinet is more compact, virtually maintenance free and far easier to calibrate, as well as being lower in cost.

Smoke conditions read out automatically on a zero to 100 percent meter. This meter has an adjustable set point which may be manually adjusted by the operator to any desired smoke opacity. When the boilers are operating within the legal limit of smoke, a steady green light will remain on. When this limit is exceeded, a blinking red light will warn the operator of an excess smoke condition. An audible alarm or recorder may also be connected to the smoke indicator system.

As in previous Wager smoke monitoring systems, the photoelectric and visual systems are combined, thus requiring only a single installation.

Descriptive literature and further information on the new Wager VM-8 Visual Photoelectric Smoke Indicator and other Wager photoelectric and visual smoke monitoring systems may be obtained by addressing Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928.

Global Appoints John Hollett To Technical Staff

R. Curtis Crooke, president of Global Marine Development Inc., a wholly owned subsidiary of Global Marine Inc., has announced that **John Hollett** has been added to the technical staff as program manager for special projects. Global Marine Development has been building and will operate the Hughes Glomar Explorer, a deep-ocean mining vessel.

Mr. **Hollett** is a naval architecture graduate of the University of Michigan and has also recently completed his MBA degree from the University of Michigan.

His experience in the offshore business began with Global Marine, where he was a naval architect and project engineer, and he was later employed at Newport News Shipbuilding and Dry Dock Co. as the steel hull budget coordinator prior to gaining his MBA degree.

Global Marine Development Inc. is located at Tishman Airport Center, 5959 West Century Boulevard, Los Angeles, Calif. 90045.

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Corexit 7664 oil spill dispersant, produced by Exxon Chemical USA, has been licensed by the state of California for use in state waters. The product may now be used where deemed necessary by state regulatory bodies when other preferred methods of cleanup such as mechanical containment and removal are not practical.

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used over the past few years on numerous oil spills in many parts of the world. It has been accepted by a number of Governments for preferred use when the circumstances of a spill call for the use of chemical dispersants.

Exxon Chemical USA research affiliates have been active for several years in developing dispersants of low toxicity for use in situations when it is deemed appropriate and consistent with local regulations. Corexit 7664 was developed several

years ago by Exxon Chemical USA's principal research affiliate after much experimentation and testing.

A water-based chemical, Corexit 7664 is noted for its easy application and effectiveness in dispersing flowable oil. Corexit 7664 also minimizes shoreside contamination because a properly treated oil loses its adherent properties.


Corexit 7664 is produced by Exxon Chemical Company U.S.A., a division of Exxon Chemical Company, and other Exxon Chemical affiliates around the world.

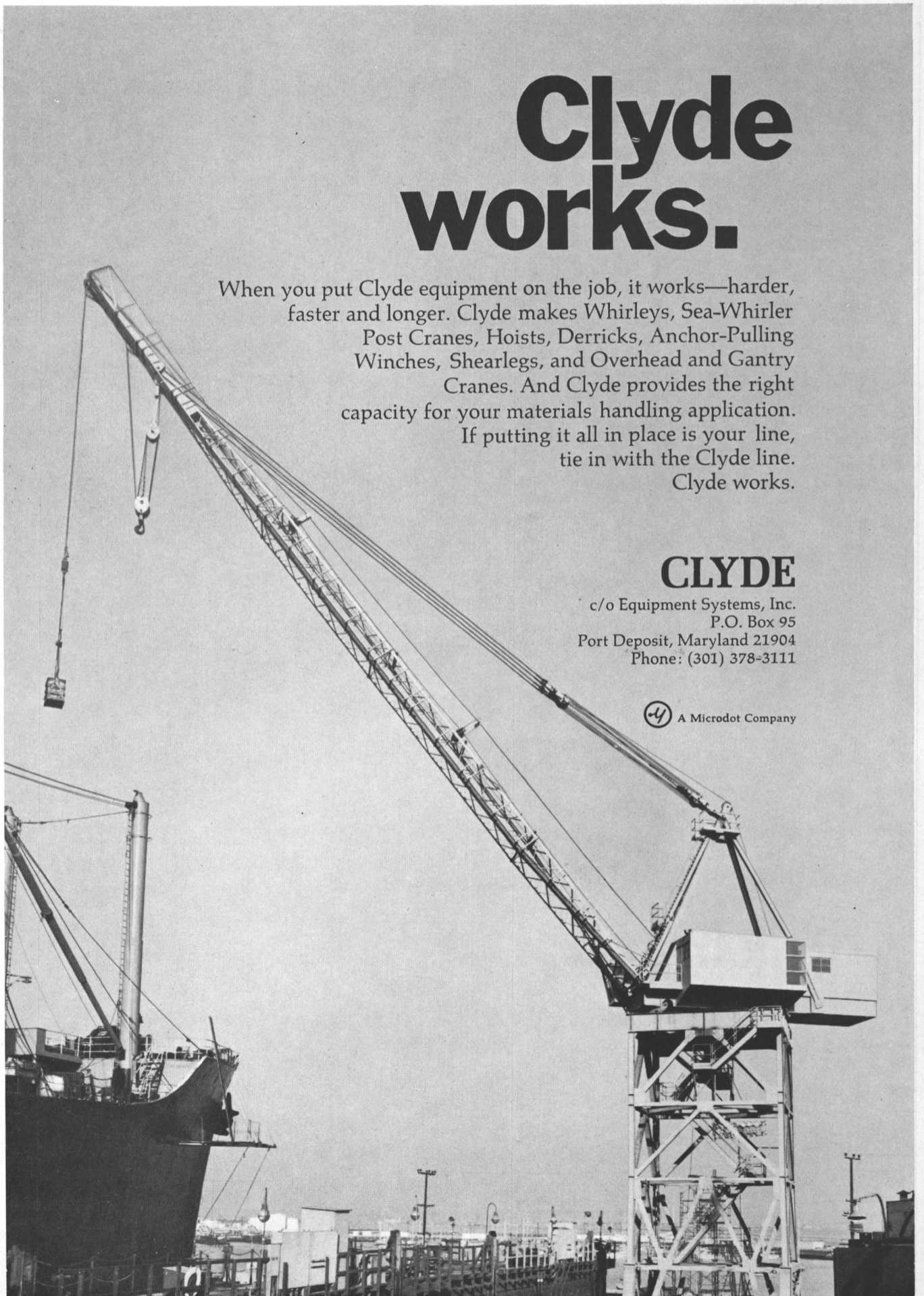
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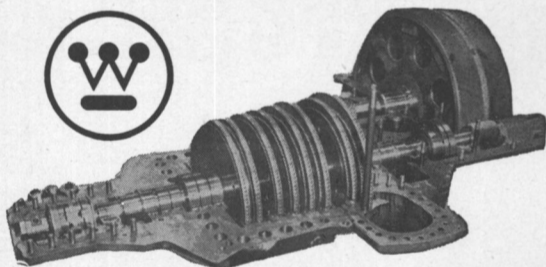
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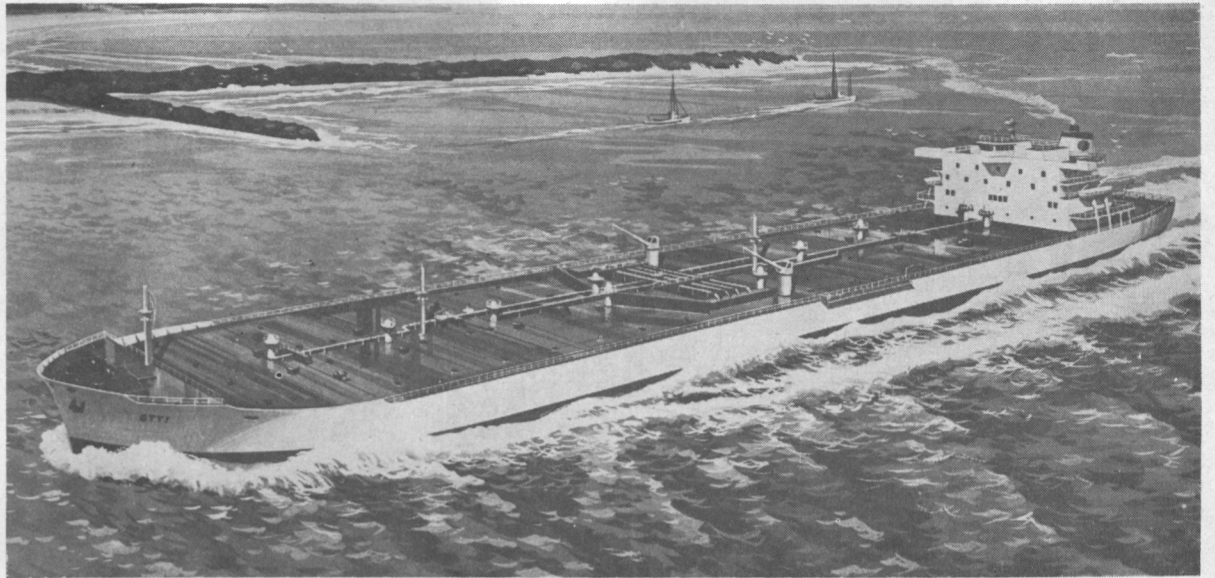
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Gunderson Lays Keel For First Of Three New-Design Tankers



An artist's conception of the new-design gas turbine tankers. Chevron has an option with Gunderson to build three more of these tankers after completion of the initial three.

Gunderson, Inc. of Portland, Ore., recently laid the keel for the first of three new-design gas turbine tankers to be built by the company over the next three years on a \$50-million contract. The vessels are for the use of the Standard Oil Company of California, and Chevron Shipping Company, a subsidiary of Standard, will operate them.

The ceremony also marked the first new shipbuilding in the Portland area since the closing of the Vancouver shipyards at the end of World War II.

These vessels incorporate original design concepts which were developed by Chevron after several years of study. New, modern design ideas in both hull and propulsion system have been combined to produce a safe, economical tanker. Since the vessels represent a significant departure from traditional concepts, Chevron believes they could provide a new standard for U.S. tanker design and operation.

To put the ships into production, Gunderson will invest \$4 million in additional land and equipment, said **William R. Galbraith**, the company's vice president for sales and engineering. An advanced system of module assembly is being introduced.

Delivery of the first ship will be 16 months, Mr. Galbraith said, with the other two expected to take somewhat less time. Each of the new tankers will be capable of carrying 267,000 barrels of oil cargo. The vessels are slated for trade on the West Coast and to Alaska and Hawaii.

Mr. Galbraith, of Gunderson—a subsidiary of FMC Corporation—said Chevron has an option to build three more of the same tankers after completion of the initial three. No Government subsidies are involved in financing the design or construction of these vessels.

To handle expanded shipbuilding work, Gunderson acquired an additional 23 acres adjacent to its existing facility in northwest Portland, according to **C. Bruce Ward**, president and general manager. The company also invested in a \$1-million whirly crane as tall as a 20-story building, a computer-operated burning machine for cutting metal plates, and new types of welding equipment.

Construction methods will be vastly modernized from the World War II system, when steel was placed one piece at a time as the ship took form on the ways. Gunderson will construct steel modules up to 110 tons in weight which will be set on the keel site by the giant crane and welded into place. Modular living quarters will be installed in the steel deckhouse to facilitate construction. The pilothouse will be equipped with the latest-design navigational equipment.

The hull is 650 feet in length, with a molded

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

Both main and auxiliary power will come from new type gas turbine-electric motor systems. Emergency power is also available. The vessel will have a speed of 15 knots and a cruising range of 8,000 nautical miles. Gunderson developed both hull and propulsion system details in consultation with Chevron, Nickum and Spaulding Associates, the naval architects, and General Electric, the systems manufacturers. Chevron's new design concepts which are embodied in these vessels are creating considerable interest in the marine industry. For that reason, Portland and Gunderson's shipyard will be very much in the public spotlight as construction progresses.

Effect on local and national employment will be substantial. GE is building the gas turbine and motor in Schenectady, N.Y., to be shipped in modules for assembly in the ship. Present manpower projections indicate approximately 300 new jobs could be created by the project in the marine division of Gunderson, Inc. Peak employment at the marine and railcar production facility could reach 1,500 men.

Ameron Expands Services To Aid U.S.-Based Firms With Problems Outside U.S.

Ameron's Corrosion Control Division, which manufactures and distributes a broad line of corrosion control products throughout the world, has announced a new service designed to assist U.S.-based firms who encounter corrosion problems in overseas locales. **Sheldon Dunning**, who has responsibility for direction of this service, has been appointed director, engineering services at Ameron Corrosion Control headquarters in Brea, Calif.

Mr. Dunning has had extensive experience in developing and servicing foreign markets, having served four years as managing director, Amercoat Europa N.V. (a wholly owned Ameron subsidiary in the Netherlands), and 20 years as an Ameron products distributor.

He will coordinate the effort to provide unique services supporting the activities of U.S.-based companies in foreign markets. With associates, representatives, and subsidiaries all over the world (Europe, Canada, Mexico, Japan, Australia and Brazil), Ameron has had an intimate experience with nearly every type of corrosion problem presented by environmental conditions.



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Philadelphia Sections, SNAME And IEEE Hold Joint Meeting



Pictured during the joint meeting at the Engineer's Club, left to right: **Walter G. Neal Jr.**, chairman of the Philadelphia Section of SNAME; **George C. Janzen**, author; **Mrs. Janzen**, and **W. Hemphill**, coordinator.

The Annual Joint Meeting of the Philadelphia Section of The Society of Naval Architects and Marine Engineers and the Philadelphia Section of The Institute of Electrical and Electronics Engineers, Inc. was held on March 16, 1973, at the Philadelphia Engineer's Club.

George C. Janzen of the Naval Ship Engineering Center, Philadelphia, presented his paper entitled "Electrical Systems on High Performance Vessels." His paper discussed the following areas:

The United States Navy is presently initiating some challenging programs for ship construction in the areas of combatant, hydrofoils, air cushion and surface effect ships. These designs place considerable burden on subsystem designers to achieve minimum weight and

space-consuming features within ever-present economic constraints. This paper is a general discussion on the use of 400 Hertz electrical systems as a means to satisfy some of these design objectives. A brief description is given of previous studies, hardware developments and present status of 400 Hertz electrical power systems. Problem areas, including costs, reliability, and maintenance philosophy, are discussed. Some thoughts are presented on the need for future studies and hardware development to identify meaningful trade-offs. One of the most important trade-offs discussed is increased equipment cost versus the value of weight and space saving for various ship types. Some projections are offered on high-performance ship electrical system trends over the next 10 to 15 years.

W. Hemphill of the Philadelphia Naval Shipyard acted as coordinator for the joint meeting.



Also attending the annual meeting, left to right: **T.J. Kavanagh**, vice chairman, SNAME Philadelphia Section; **T.P. Campbell**, Sun Shipbuilding Co., discussor; **George C. Janzen**, author; **F. Kussy**, I.T.E. Corp., discussor, and **S.S. Morse**, Atlantic Richfield Co., discussor.

Energy And Environmental Needs Can Be Met In Florida Says Exxon USA's E.A. Humble

There is a continuing need for Government, industry, and the public to work together to assure that energy supplies can be moved economically where needed in the state of Florida, while at the same time working just as hard to protect the environment, **E.A. Humble**, manager of Exxon USA's Marine Department, said in Tallahassee when speaking at the Governor's Conference on Energy Supply and Use.

Mr. Humble said: "This means that environmental laws and regulations must strike a proper balance between state and national energy development and supply on the one hand, and protection of the environment on the other.

"If we work together to achieve this objective, both the consumer and the national interest will benefit," he stated.

Mr. Humble explained that more than 76 percent of Florida's fuel requirements arrived by water in 1971, and that the 200-million barrels of oil which entered the state flowed through 10 ports.

"Supplying this portion of Florida's energy needs required 1,100 deliveries in tankers with an average cargo capacity of less than 25,000 tons," he pointed out. "These ships are rather small when compared to those being constructed with capacities of 250,000 or 500,000 tons. Use of smaller tankers here is the result of two factors—the dispersion of traffic among many ports and the shallow depths found in these ports. These limiting factors require Florida's oil trade to be carried on by a rather large number of relatively small vessels.

"It appears that by 1980, Florida will require 322-million barrels per year of petroleum products," he stated. "If deliveries continue to be made by vessels of the same size and carrying capacity as are used today, we can predict that between 1,700 and 1,800 tankers will call in Florida's ports in 1980, compared with the 1,100 in 1971.

"In the simplest terms, Florida's growing energy demand will require substantial increase in the use of tankers and bulk cargo terminals. This, in turn, will increase the potential for pollution."

Three factors come into play in minimizing the effects of oil spills, he explained. "First, there is the matter of operator technology, equipment, and dedication. Second, there are governmental regulations designed to minimize oil spills. Third, measures can be taken to reduce the expected growth in tanker calls on Florida ports."

In discussing the future of ports in the U.S., **Mr. Humble** urged that consideration must be given to offshore terminals or "superports." "However, because Florida's oil receiving locations are so widely dispersed around the coast, an offshore terminal could probably not be justified here," he stated. "For the foreseeable future, offshore terminals will be feasible only in refining centers—such as Texas, Louisiana, and along the upper East Coast."

Two Appointments At Rice, Unruh Co.

The appointment of **William R. Kern** as general manager of Rice Unruh Co.'s Baltimore, Md., office has been announced by **Larry Giglio**, president. **Mr. Kern** was formerly associated with Terminal Shipping Inc., and Moore McCormack Line, Baltimore.

Nicholas Manzi continues as manager, Rice, Unruh Co., Baltimore, and will head up the newly developed department of equipment control and customer service for container and breakbulk commodities.

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Stolt-Nielsen Chartering Appoints Two Vice Presidents



Rasmus N. Apenes



Per R. Johansen

Rasmus N. Apenes and Per R. Johansen have been appointed vice presidents of Stolt-Nielsen Chartering, Inc., Greenwich, Conn. Mr. Apenes is manager of the Brokerage Division of the company. He has been associated with Stolt-Nielsen since 1963. Mr. Johansen, who joined the firm in 1966, is treasurer.

Stolt-Nielsen Chartering, Inc. operates a fleet of 40 parcel and product tankers engaged in the worldwide transportation of chemicals and specialty liquid products in bulk. The Stolt-Nielsen Brokerage Division acts as competitive shipbrokers in international shipping markets, with corresponding offices around the world specializing in chartering and sale and purchase of tankers and bulk carriers. They have recently established a service organization for oil drilling and exploration for oil in offshore areas.

Philadelphia Section, SNAME 23rd Annual Dinner-Dance Scheduled For May 19, 1973

The Philadelphia Section of The Society of Naval Architects and Marine Engineers will hold its 23rd Annual Spring Dinner-Dance on May 19, 1973, at the Marriott Motor Hotel on City Line Avenue, Philadelphia, Pa.

The affair will be held in the luxurious Commonwealth Ballroom, a magnificent addition to the Marriott's Convention Center. Featured will be the big band of Al Raymond and his orchestra.

In the event people will be attending who will require room reservations for overnight accommodations, please contact the hotel prior to May 1, 1973.

For reservations, contact the Marriott Motor Hotel, City Line Avenue, Philadelphia, Pa. 19131, Attention: SNAME Reservations Desk.

Tickets are available by contacting John Hofstetter, c/o I.T.E. Imperial, 1900 Hamilton Street, Philadelphia, Pa. 19130.

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DYNAMIC NEW AMERICAN SHIPPING COMPANY OFFERS EXCEPTIONAL OPPORTUNITIES FOR CHALLENGE AND GROWTH. Has openings for experienced Naval Architects, Marine Engineers, Shipyard Supervisors—experience with cryogenics and tankers, and both American and Foreign new construction preferred.

Send resume in confidence to:

ENERGY TRANSPORTATION CORPORATION

527 Madison Avenue—Suite 700-14
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Att: J.J. Cuneo, President or call (212) 688-4114

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An immediate opening exists for a Technical Assistant to work in the Marine Division of major oil company based in Connecticut.

This individual will work under the broad supervision of the Technical Director and under the direct supervision of the Chief Naval Architect. The selected candidate should have a minimum of 5 years' experience and should possess a Marine Engineer's license of second or third assistant category. In addition, the applicant would preferably have ship operating experience in the administrative and technical categories.

Please forward resume including salary history in complete confidence to:

BOX #419

MARITIME REPORTER/ENGINEERING NEWS
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Young, growing, offshore marine transportation company requires an assistant operations manager with at least five years' experience in ship construction, personnel management, and general operations. Must relocate to major southern city and travel abroad. Send resume and salary requirements:

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We have an immediate opening in our Engineering Department for a Naval Architect/Project Engineer. Applicants must have a Bachelors Degree or equivalent in Naval Architecture and two or more years experience. The work will include design, estimating, contract administration and project management for towboats, tugs, and barges for river and ocean service to accommodate our three river shipyards. Work will be based in St. Louis.

Salary, benefits and advancement opportunities are excellent. Send resume, including salary information to:

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Field Service Engineer required for direct assignments to shipboard installations consisting of radiotelegraph and radar equipment throughout the United States. Minimum of second-class radiotelegraph operator license (T-2) with radar endorsement. Send resume to:

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All relocation expenses paid.

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Main Propulsion: Single Screw, 1700 HP Diesel
Auxiliary Generators: 250 KW, 230V D.C. Diesel
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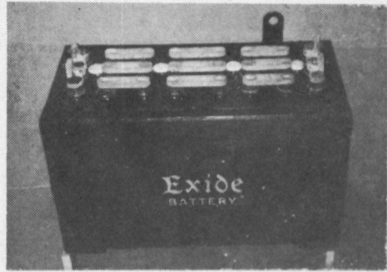
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WASHINGTON 50-75 ton gantry cranes (4).
 American Diesel 40 ton gantry crane (E) \$16,500.
 Dredges, diesel, 20", 22", 24" hydraulic.
 Manitowoc 4000 barge crane, 125-150 ton, 90' bm.
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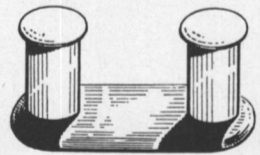
For sale, contact **H.Y. SMITH CO.**
 759 N. Milwaukee St. (276-3830) Milwaukee, Wis.

FOR SALE

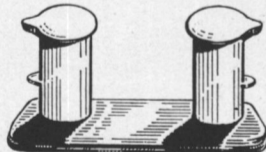
LCM Mark III, 51'x14'. Twin 671 Diesels, less than 300 hours since overhaul. Keel Coolers. Custom Pilot House. \$16,000.

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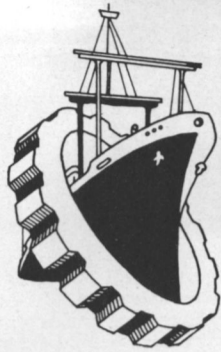
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High and Low Pressure	8500 HP
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Reduction Gear Components	6000 HP
General Electric T-2 Diaphragms	6000 HP
General Electric	
High & Low Pressure	6000 HP
Westinghouse High Pressure	6000 HP
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General Electric FN4-FN30	1500 KW
General Electric	
FN3-FN20 10030 RPM	600 KW
Westinghouse 5015 RPM	538 KW
General Electric DORV 325	525 KW
Allis Chalmers (G.E. Design)	
5645 RPM	500 KW
General Electric	
DORV 618N 10059 RPM	400 KW
Worthington 6097 RPM	400 KW
Allis Chalmers 8000 RPM	300 KW
Allis Chalmers 5645 RPM	300 KW
De Laval 5692 RPM	300 KW
General Electric	
DORV 325 5636 RPM	300 KW
Joshua Hendy (Terry Design)	
HM-5 5965 RPM	300 KW
Westinghouse Non-Recessed	300 KW
Westinghouse Recessed	300 KW
Worthington 6097 RPM	300 KW
General Electric	
DS 60-25 5660 RPM	250 KW
Westinghouse 5015 RPM	250 KW
General Electric	
DORV 518N 10012 RPM	240 KW
Worthington 6510 RPM	150 KW
Westinghouse 7283 RPM	60 KW

Many Units Complete
 With Reduction Gears and Generators

**We Offer Complete Units
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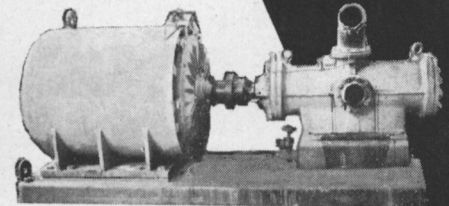
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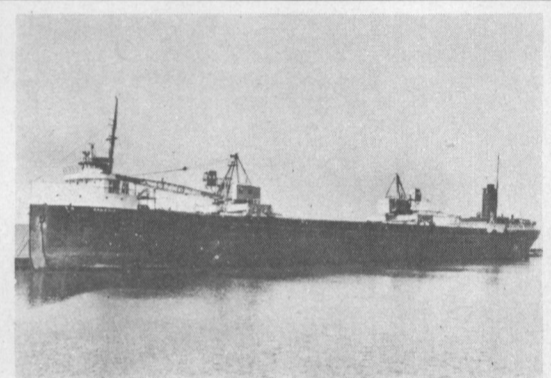
**Used, overhauled,
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4-DeLaval horizontal Screw, 700 GPM, 150 PSI, 1180 RPM, with Continental Motors, 100 HP at 1190 RPM, 440/3/60, constant torque, continuous duty, Frame NF746F.

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Great Lakes steel carrier, formerly owned by Bethlehem Steel Co. and operated by Bolen and Cornelius, length 524 feet, beam is 54 feet.

Two Clyde model 20-DE-75 Whirley cranes mounted on traveling gantries which traverse on rails over the entire 330 foot hold.

This ship is priced right and is available for inspection in Milwaukee, Wisconsin.

This vessel can be permanently moored as a floating warehouse, or towed as a barge, so that the cranes can handle materials off the dockside and into the hold, or provide a stevedoring function to and from an ocean-going vessel on the outboard side (similar to the way the S.S. Donner is being used at our dock in Milwaukee, Wisconsin). Write or call Mr. Robert Miller, Miller Compressing Company, P.O. Box 369, Milwaukee, Wisconsin 53201, telephone (414) 671-5980.

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RCA CR-104A, Government Surplus

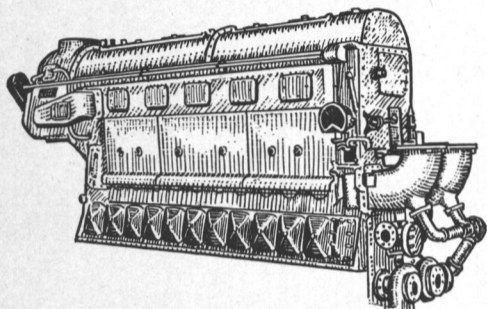
The Cadillac of radars, for ships, tugs, yachts, any type vessel. Installation materials included. Nothing else to buy. Parts available. Financing or leasing. \$3000 price includes \$1000 worth waveguide, accessories, and extras. **SERVICE ENGINEERS**, 62992 Miami Road, South Bend, Indiana. (219) 291-3818.



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MARINE DIESEL ENGINES

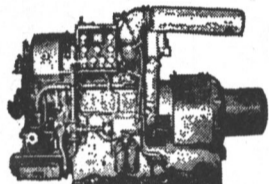


MATCHED PAIR . . . FAIRBANKS MORSE MODEL 38D8-1/8—1 Port; 1 Starboard. Used condition, 1800 HP, 800 RPM, 2 cycle, 8 1/2" bore, 10" stroke, Air Start. Complete with Westinghouse Reduction Gears, 2.216:1 ratio—with Hydraulic Coupling.

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

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

MARINE DIESEL GENERATORS



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

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

HERCULES, DOOC, 10 KW, 120 DC.

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

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

HERCULES, DJXC, 25 KW, 120 DC.

CUMMINS, WA255, 30 KW, 120 DC.

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

BUDA, 6DH909, 40 KW, 120 DC.

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

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

BUDA, 6 DHG691, 60 KW, 120 DC.

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

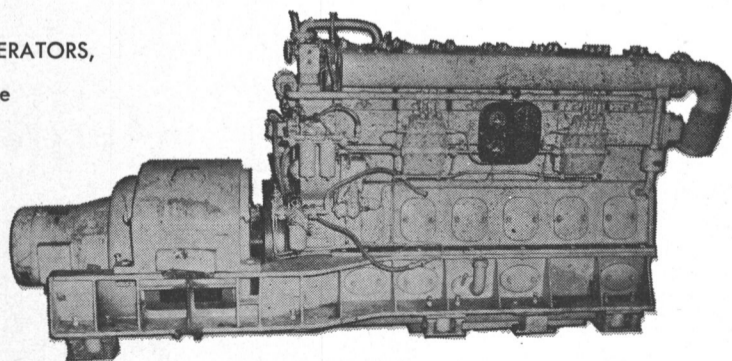
BUDA 6DC844, 75 KW, 125-250 DC.

CATERPILLAR, D17000, 75 KW, 120/240 DC.

LORIMER, F5SS, 75KW, 120/240 DC.

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

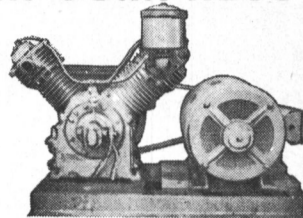
For TURBINE GENERATORS,
See Following Page



4—COOPER-BESSEMER, Marine

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

AIR COMPRESSORS



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

2—GARDNER-DENVER, 150 CFM, 125 PSI, Class WB, Size 7x5 3/4x5, with Diehl Motors, 45 HP, 230 Volts DC, 870 RPM, 167 Amperes.

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

2—INGERSOLL-RAND, Size 4x1 1/2x3 1/2, 10 CFM, 600 PSI, with Diehl Motor, 7 1/2 HP, 120 Volts DC.

2—WESTINGHOUSE Air Brake Steam, Size 11 x 11 x 12, approximately 60 CFM at 100 PSI.

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

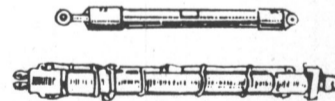
1—WORTHINGTON, 20 CFH, 3000 PSI, 4 stage, 585 RPM, with Worthington Steam Turbine, 47 HP, 5502 RPM.

HEAT EXCHANGERS

3—ROSS Lube Oil Coolers, size 1005.5.

2—ROSS Fresh Water Coolers, size 1206.

HYDRAULIC CYLINDERS



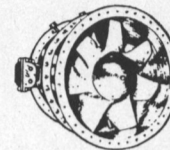
Bore	Overall Stroke	Rod Diameter	retracted length	Action
10"	12"	3.75"	45 1/2"	double
10"	26"	3.75"	58 1/2"	single
2"	8"	1 1/2"	20"	double
2.5"	15"	1.12"	25 1/2"	double
3"	8"	1.37"	15 1/2"	double
6"	8"	4"	144"	double

SPERRY GYRO COMPASSES



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

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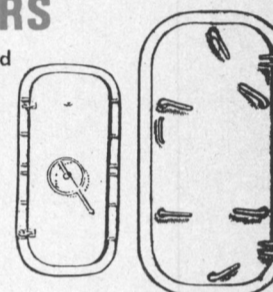
In 440 AC, in 115 DC, and in 230 DC, and in sizes 1 HP through 20 HP. Completely reconditioned.

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Size A 1/4	Size A 3	Size A 8
Size A 1/2	Size A 4	Size A 10
Size A 1	Size A 5	Size A 12
Size A 2	Size A 6	Size A 16

Steel Watertight DOORS

Used, Good Condition, Trimmed Frames.



Many sizes available, priced reasonable. Some Typical Prices shown below. Please Inquire for other sizes.
26"x48"-4 Dogs-\$60.00 ea.
26"x57"-6 Dogs-\$80.00 ea.
26"x60"-4 Dogs, 6 Dogs-\$86.00 ea.
26"x66"-6 Dogs, 8 Dogs-\$100.00 ea.
26"x66"-Q.A. Type-\$175.00 ea.

REDUCTION GEARS

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

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

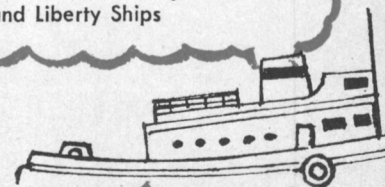
FARREL-BIRMINGHAM, as orig. used on two 1375 HP electric motors in submarine, 2 pinions, single output gear, pinion RPM 1302, Gear RPM 280; ratio 4.65:1.

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

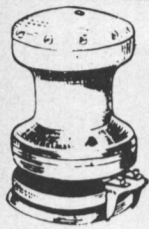
FALK Reduction Gears—Port & Starboard, Interchangeable with T-3 Tanker Gears, Falk No. 148-300. Also interchangeable with Falk Gears on AO51 Class Tankers. (14 ships). Also on AO97 to AO100 Tankers.

PROPELLER SHAFTS

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



CAPSTAN WINDLASSES



Model CWP-3, Vertical 24' Planetary Capstan Windlasses, Single Wildcat — using 1 1/4" Anchor Chain, Single Gypsy with 20 HP motor, 230 volts DC, complete with Contactor Panel, Master Switch, and Resistors.

3—HESSE-ERSTED VERTICAL, Single Wildcat—for 1 3/8" Anchor Chain, single gypsy, with 35 HP General Electric Motor, 230 Volts DC, complete with Controller equipment.

HYDE, VERTICAL, Single Wildcat, for 1 1/8" Anchor Chain, single gypsy, with 20/5 HP Motor, 440/3/60.

ANCHOR WINDLASSES

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

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

AMERICAN ENGINEERING, horizontal, double 2 1/8" Chain, 65 HP, 230 DC, complete.

4—AMERICAN HOIST AND DERRICK COMPANY, horizontal, double wildcat—for 2 1/4" chain double gypsy, 70 HP, 230 Volts DC, with electric controls.

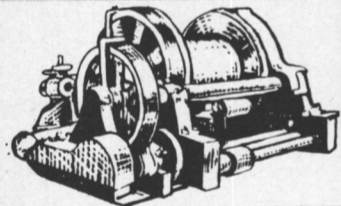
3—HESSE-ERSTED, horizontal, double wildcat, 2 1/8" chain, 60 HP, 230 DC.

1—HYDE HORIZONTAL ANCHOR WINDLASS double wildcat—for use with 2 1/8" Anchor Chain, and with General Motors Electric Motor, 60 HP, 230 volts DC, 560/1700 RPM, Type CDM 18831 AE. Complete with Contractor Panel, Resistors, and Master Switch.

ANCHOR WINCHES

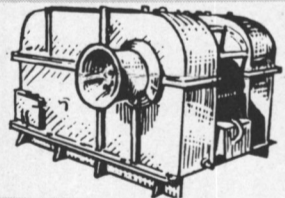
1—JAEGER, single drum—capacity approximately 900' of 1 1/2" wire rope, double gypsy, with 35 HP Motors, 230 Volts DC, complete with electricals.

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

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

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

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

CARGO HOISTER BLOCKS

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



\$49.50 each with pull test certificates

\$42.00 ea.

Fast Service
on any and
all inquiries

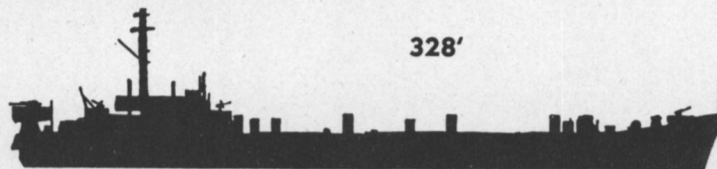
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EXPLORATIONS, INC.



Contact: Ralph Ingram

3121 S.W. Moody • Portland, Ore. 97201 • Phone 503/228-8691 • Telex: 36-0503

2—L.S.T. TYPE VESSEL HULLS For Immediate Sale



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

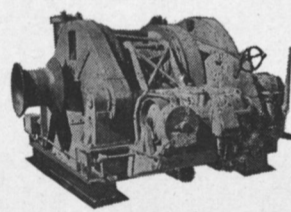
SUBMARINE DIESEL GENERATOR ENGINES

(Without Generators)

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

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

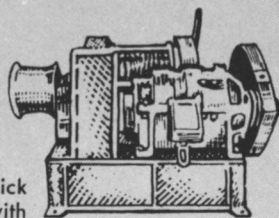
STERN ANCHOR WINCHES



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

CARGO WINCHES

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



Single Speed, Single Drum
Two Speed, Single Drum

OS & D RUBBER HOSE

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

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

FOB Portland, subject to prior sale.

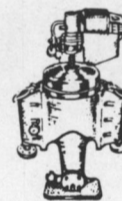
your choice
\$150
per section

CENTRIFUGES SHARPLES AND DE LAVAL

150 GPH—440 AC
—230 DC

350 GPH—230 DC

600 GPH—230 DC



TOWING WINCHES

JOHNSON TYPE AUTOMATIC TOWING MACHINES

2—A.A. Johnson Towing Machines from V-4-M-A1 Seagoing Tugs, drum spools 3000' of 2 1/4" diameter wire rope. Line pull rating 40,000 lbs. Winches have 50 HP, 230 DC Motors and are complete with Contractor Panels, Resistors and Master Switches.

HATCHES from TANKER

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

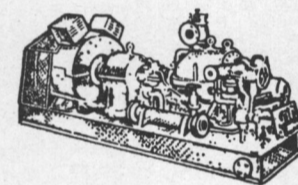
TURBINE GENERATORS

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

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

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

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



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

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

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

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

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

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

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

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

UNIT WINCHES

American Hoist and Derrick Company

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

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

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

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

TERRIFIC INVENTORY... AC & DC

Marine Pumps

CENTRIFUGAL

DC - HORIZONTAL

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

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

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

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

1—WARREN, Size 8DM11 1/2, 1175 GPM, 11.1 PSI, with Reliance Motor, 10 HP 230 Volts DC.

1—WORTHINGTON, 3 1/2" suction, 3" discharge, 150 GPM, 23.8 PSI, with Diehl Motor, 3.47 HP, 230 DC, 1750/3500 RPM.

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

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

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

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

2—ALLIS-CHALMERS, Type 5G, Size 5x5, 650 GPM, 29' head, 7 1/2 HP, 230 DC.

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

AC - HORIZONTAL

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

1—WARREN, 17 GPM, 110 PSI, 3 1/2 HP, 440/3/60, 3500 RPM.

1—WARREN, 600 GPM, 50 PSI, 8 1/4 HP, 440/3/60, 1135 RPM.

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

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

4—WORTHINGTON, 200 GPM, 100 PSI, 3 1/2" suction, 3" discharge, Size 2UB1, with Wagner Motor, 25 HP, 440/3/60.

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

1—CARVER, 400 GPM, 100 PSI, 3 1/2" suction, 2 1/2" discharge, 3500 RPM, 35.7 HP, 440/3/60.

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

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

2—BUFFALO, 250 GPM, 100 PSI, Class CCS, Size 4 x 3 1/2", with Westinghouse Motors, 25 HP, 440/3/60.

(Continued)

AC - HORIZONTAL

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

3—ALLIS-CHALMERS, 35 GPM, 100' head, Size 2x1 1/2, 3 HP, 440/3/60.

DC - VERTICAL

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

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

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

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

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

2—ALLIS-CHALMERS, 170 GPM, 208' head, Type CF2V, 6" suction, 3 1/2" discharge, 20 HP, 230 DC.

2—ALLIS-CHALMERS, 30 GPM, 208' hd, Type CF2V, 2 1/2" suction, 1 1/2" discharge, 7 1/2 HP, 230 DC.

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

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

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

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

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

1—WORTHINGTON, Type 20 LAS1, 13,000 GPM, 11.5 PSI, 100 HP, 230 DC.

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

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

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

AC - VERTICAL

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

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

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

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

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

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

3—ALLIS-CHALMERS, 68 GPM, 114' head, 7 1/2 HP, 440/3/60.

ROTARY PUMPS

DC - HORIZONTAL

3—NATIONAL TRANSIT, 50 GPM, 50 PSI, 3x2 1/2, with G.E. Motor, 3 HP, 230 DC.

DC - VERTICAL

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

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

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

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

1—QUIMBY, Size 2 1/2, 17 GPM, 405 PSI, 7 1/2 HP, 230 DC.

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

2—WORTHINGTON, Type 3GRVS, 90 GPM, 75 PSI, 7 1/2 HP, 230 DC.

Rotary, AC - Vertical

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

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

HYDRAULIC PUMPS

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

BOILER FEED PUMPS-STEAM

Size 11 x 7 x 18 vert. simplex

Size 11 x 7 x 24 vert. simplex

Size 12 x 8 x 24 vert. simplex

Size 12 x 8 1/2 x 12 vert. simplex

Size 14 x 9 x 24 vert. simplex

TURBINE DRIVEN FIRE PUMPS

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

FAIRLEADS

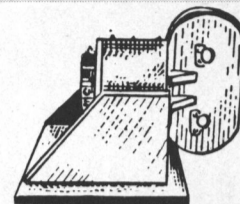
Designed and Manufactured by ZIDELL EXPLORATIONS, INC.

To Give You These Features:

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

Self Aligning, Swivel Type Head.

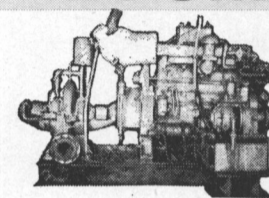
Dependable and Ruggedly built to perform consistently year after year with minimum maintenance.



Model Design \$1350 each

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

FIRE PUMPS



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

CLYDE 17-DE-90 WHIRLEY CRANE

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

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

WHIP: 10 tons at 125 FPM—2 part line

TRACK CENTERS: 20'—Engine: Cummins

HBIS 601, 180 HP supercharged, elec. start

MOTORS: Each leg (4 tot.) 7 1/2 HP, 230 DC.

POWER: Diesel electric (DC)

FORGED STEEL LINE SHAFTING

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

We also have . . .

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From: AP2 & AP3 VESSELS

C2-SB1 VESSELS

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

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SIZE 36-17 SIZE 20-5

SIZE 36-14

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

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FOR SALE

- A. **STEEL DIESEL TUG**—R-1962
141'x33'x18'—3600 H.P. \$650,000.00
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81'x24'x9.8'—900 H.P. \$100,000.00
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200'x42.4'x12.4'—15,000 bbls. \$ 85,000.00
- D. **2 STEEL DECK BARGES**—B-1950
112'x32'x9'—600-Ton Cap. \$15,000.00 ea.
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**1500 KW GENERAL ELECTRIC
TURBO GENERATOR SETS**

TURBINE: 420/618 PSI 825/850° Total Temperature Type FN4-FN30 11 Stage 8145 RPM GEI-19320

GEAR: Type S195A 8145/1200 RPM

GENERATOR: 1500 KW 450 V 3 Ph 60 Cy .8 PF 1200 RPM Continuous 2340 KVA 2 Hrs Type ATI-HL

Four Units Available, Complete with Board, Condensers, Air Ejector and Condenser and Condensate Pumps. Removed from Cruiser ROANOKE. In Like New Condition.



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Attention: Offshore Contractors, Dredgers!

1200 KW—525 Volt DC DIESEL SET

Completely Self-Contained on Railroad
Flat Car—Ex-Navy Emergency Unit

GENERATOR: Allis-Chalmers — 525 VDC — 2290 amps—750 RPM—self-ventilating—horizontally split casing. **DIESEL:** G.M. 16-278A—8¾ x 10½—1700 BHP—720 RPM. Unit includes control panel & switches—excitation sets—aux. lighting generator driven by GM 2-71 2-cyl. 4½ x 5 engine at 1200 RPM. Generator is 120 VDC. Also included are silencers and mufflers.

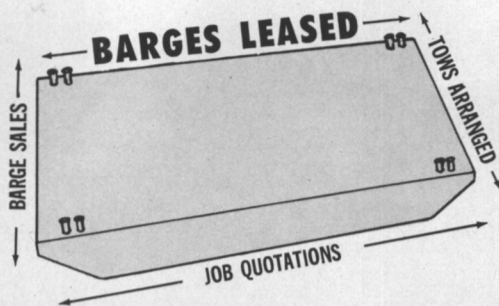
ALL MOUNTED ON FLATCAR WITH STANDARD TRUCKS AND WHEELS—56½" GAUGE

Has air, water and oil tanks—starting air compressor—all on same car and interconnected. Entire unit was fabricated by Navy for Navy Yard use. Total weight 120,000 lbs. Shipping Dimensions: 40' long—9'4" wide—15' high. Car has steel wheels and can be certified to go over the road. **UNIT CAN BE EASILY REMOVED FROM FLATCAR AND PLACED ON VESSEL.**

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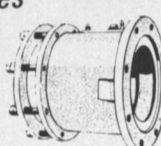
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PRECISION FITTED DEMOUNTABLE WATER LUBRICATED RUBBER STAVE BEARINGS



BRONZE STUFFING BOXES—FOUR STYLES AIR SEAL DESIGN FOR EASY PACKING CHANGE

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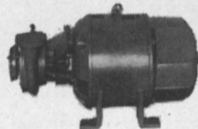


JOHNSON RUBBER COMPANY

MARINE DIVISION

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**UNUSED ALLIS-CHALMERS
FIRE & GENERAL SERVICE PUMPS**

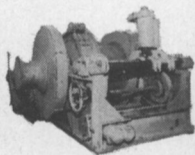


200 GPM — 180' head — 2½"x2"—bronze—flange connections. MOTOR: 20 HP—115 volts DC—2400 RPM—153 amps.

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**100,000 lb. Almon Johnson
Constant Tension Mooring Winches**

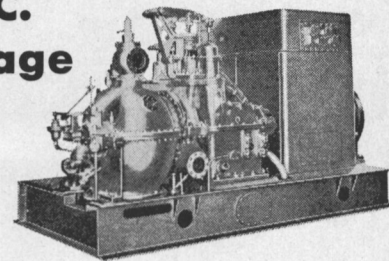


5 Available. In very good condition. Series 232 mooring & anchoring winches—automatic self-tensioning. Wide range from 100,000 lb line pull at 10 FPM to 26,000 lbs at 400 FPM. Gypsy line pull 12,000 lbs at 125 FPM. Drum de-clutchable through spiral jaw clutch for free spooling. Driven by 50 HP—230 VDC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

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**TURBINE GENERATORS
A.C.
Voltage**



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

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

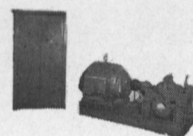
4-500 KW, General Electric. Turbine: Type FN3-FN20, steam 375/425 PSI, 6 Stage, 9987 RPM. Generators: 500 KW, 450/3/60, 1200 RPM, Type ATI.

Used, Clean, Good Condition
Please Contact: Ralph Ingram



3121 S.W. Moody Ave., Portland, Oregon 97201
Phone: 228-8691, Code 503 — Telex: 36-0503

**1000 GPM—125 LB
BRONZE FAIRBANKS-MORSE
FIRE & GENERAL SERVICE PUMP**



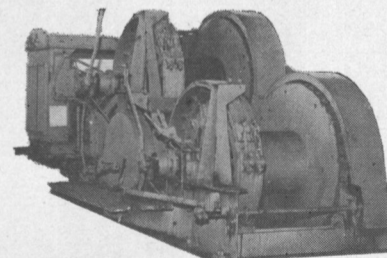
PUMP: Mfg by Fairbanks-Morse.. Horizontally split case — 1000 GPM—281' head — 3545 RPM. Suction pressure flooded—6" suction—5" discharge. Steelflex coupling. **MOTOR:** Fairbanks-Morse—440/

3/60—squirrel cage—3600 RPM—class A insulation. Type KZK—continuous duty—drip-proof—ambient temp. 50°C. Complete with Cutler-Hammer controller (reduced voltage magnetic starter). **DIMENSIONS:** 5' 5" OAL—23" OAW—2' 11" OAH. UNIT HAS HAD VERY LITTLE USE.

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**SKAGIT DOUBLE DRUM
WATERFALL WINCH**



Model G-160—type 2M—serial 160A5—diesel driven by GM 6-71 with TRA-76R 4-speed transmission type 2 MRAG—forward and reverse. LIPE 14-2 clutch. **LINE PULL RATING:** 30,000 lbs. on both drums simultaneously at a line speed of 60 FPM on the outer layer of cable and 25 FPM on the first wrap. **DIMENSIONS:** drum flange 60"—barrel 24"—barrel length 30". **DRUM CAPACITY:** 5000 ft. of 1" cable with 2" of free flange or 5938 ft. of 1" cable using full drum capacity. **UNIT DIMENSIONS:** OAL 188½"—OAW 123"—OAH 104"—foundation centers 63". Equipped with front and rear drum friction devices; front and rear drum brakes; 2 gypsies; pedestal foot brakes; ratchet & pawls; gear shifters; throttle control; clutch controls.

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NATIONAL METAL'S CURRENT T-2 INVENTORY

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

TURBOGENERATORS

525 KW GENERAL ELECTRIC AUXILIARY TURBOGENERATOR UNIT

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

538 KW WESTINGHOUSE TURBOGENERATOR UNIT

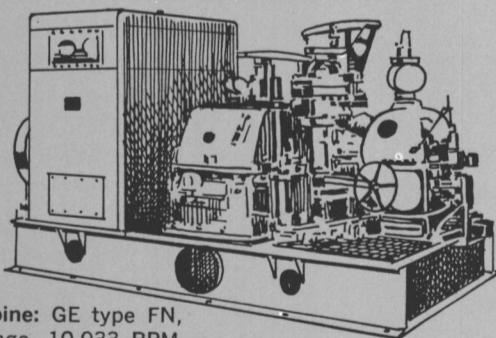
Complete with L.O. Coolers and exciters. Turbine: Westinghouse 538 KW, 5010 RPM. Inlet pressure 435 psi. Temp. 750 degrees F.TT. Exhaust pressure 28 1/2 hg vac. Generators: (1) 400 KW, 450 VAC, 3 pole, 60 cycle, PF 80%, 1200 RPM, ship's service. (2) 32.5 KW, 125 VDC, 1200 RPM, variable voltage exciter. (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 1 3/4 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 2 1/2 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 1973 CATALOG

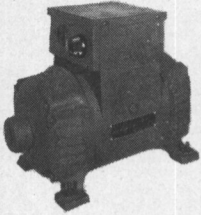
HUNDREDS OF OTHER ITEMS
ALSO AVAILABLE!



**National
Metal** AND
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M.G. SETS

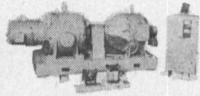


APPROX. 1/2 KW
110/1/60 M.G. SET
NEW—UNUSED

INPUT: 115 VDC—6.1 amps—3600 RPM. AC OUTPUT: 425 watts—4.55 amps—110/1/60. Ball bearing. 13 7/8" long—7 9/16" wide—10 1/2" high. Has radio noise suppression filter. Net wt. 58 lbs—83 lbs packed for shipping.

\$89.50 EACH

UNUSED—10 KW—120/1/60 M.G. SET



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

OUTPUT: 10 KW generator — 120 volts 60 cycle single phase — 108 amps — 0.80 PF — with direct-connected 125 volt 8 amp

exciter. Motor starter by Cutler-Hammer. AC generator has voltmeter and ammeter. Bassler voltage regulator.

3.7 KW Reconditioned M.G. SET 115 VDC Input — 115/1/60 Output

Manufactured by Century. Reconditioned—4 bearing ball bearing. MOTOR: 5 H.P.—115 volts DC—38 amps—1800 RPM—60°C continuous. GENERATOR: 3.7 KW—4 KVA—115 volts—60 cycle—single phase—0.85 PF—1800 RPM—34.8 amps.

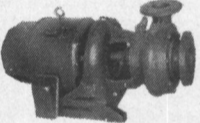
RECONDITIONED CONTINENTAL 220 D.C. TO 120/1/60 A.C.

INPUT: 5 HP—230 VDC—20 amps. OUTPUT: 2.5 KVA—2 KW—120/1/60 AC—0.8 PF—1800 RPM—21 amps. With controls. 38" long—15" wide—480 lbs.

THE BOSTON METALS COMPANY

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

UNUSED 375 G.P.M. ALLIS-CHALMERS PUMP



Bronze—375 GPM @ 40' head—
4" suction—3" discharge. Motor:
5 HP—115 volts DC—40 amps.

THE BOSTON METALS COMPANY

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

Deck-Mounted BERGER FAIRLEADS



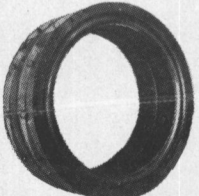
Model 614—1 1/4" line size
— 14" sheave — 5" shank

opening. Tapered roller bearings. 985 lbs. Approximate base dimensions: 32" x 24" fore and aft.

THE BOSTON METALS COMPANY

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

30" CLUTCH DRUM TIRES FOR FALK GEAR



700 to 1000 HP. Unused surplus.
Type MO-165-099—built original-
ly for use on F.S. vessels and DPC
tugs.

\$475 each

THE BOSTON METALS COMPANY

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

BUYERS DIRECTORY

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

BEARINGS
BJ Marine Bearings, a Borg-Warner Industry, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

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

BOW THRUSTERS
Bird Johnson Co., 883 Main St., Walpole, Mass. 02081
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171

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

CARGO HANDLING EQUIPMENT
MacGregor International Organization, 49 Gray's Inn Road, London W.C.1., England

CATHODIC PROTECTION
Engelhard Industries, 430 Mountain Ave., Murray Hill, N.J. 07974

CLUTCHES, GEARS & BRAKES
Amarillo Gear Co., 517 No. Polk St., Amarillo, Texas 79105
Wichita Clutch Co., Inc., Wichita Falls, Texas 76307

COATINGS—Protective
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
Devoe & Raynolds Co., Inc., Subsidiary Celanese Coatings Co., 414 Wilson Ave., Newark, N.J. 07105
EGD Spee-Flo Co., 4631 Winfield Rd., Houston, Texas 77039
Marine Engineering & Construction Co., Inc., 1664 Tchoupitoulas St., New Orleans, La. 70130
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Philadelphia Resins Corp., 20 Commerce Dr., Montgomery, Pa. 18936

CONTAINERS—CONTAINER HANDLING SYSTEMS
Ameron Corrosion Control Div., Brea, Calif. 92621
Lighter Aboard Ship, Inc., 225 Baronne St., New Orleans, La. 70112
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Star Iron & Steel Co., 326 Alexander Ave., Tacoma, Wash. 98421

CONTAINER LASHINGS & COMPONENTS
W. W. Patterson Co., 830 Bracket St., Pittsburgh, Pa. 15233

CONTROL SYSTEMS
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

CORROSION CONTROL
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144

CRANES—HOISTS—DERRICKS—WHIRLIES
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Conrad-Stork, Div. Stork-Werkspoor, P.O. Box 134, Haarlem, Holland
Hoffman Rigging & Crane Service, 560 Cortland Street, Belleville, N.J. 07109
Houston Systems Mfg. Co., P.O. Box 14551, Houston, Texas 77021
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Star Iron & Steel Co., 326 Alexander Ave., Tacoma, Wash. 98401

CRANE LOAD INDICATORS
Mark Products, Inc., 10507 Kinghurst Dr., Houston, Texas 77072
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

DECK MACHINERY
Appleton Machine Co., P.O. Box 2265, Iron Mountain, Mich. 49801.
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
Pacific Pipe Co., 49 Fremont St., San Francisco, Calif. 94080
A. G. Weser, Seabeckwerft, 2850 Bremerhaven 1, Germany

DIESEL ACCESSORIES
A.G. Schoonmaker, Box 757, Sausalito, Calif. 95965

DIESEL ENGINES
Alco Engine Div., White Industrial Power, Inc., 100 Orchard St., Auburn, N.Y. 13021
Bruce GM Diesel, Inc., 180 Route #17 S. at Interstate 80, Lodi, N.J. 07644
Caterpillar Tractor Co., Industrial Div., 100 N.E. Adams St., Peoria, Ill. 61602
Colt Industries Inc., Power Systems Div., Beloit, Wisc. 53511
De Laval Turbine Inc., Engine & Compressor Div., 550 85th Ave., Oakland, Calif. 94621
Electro-Motive Division General Motors, La Grange, Illinois 60525
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany.
Sulzer Brothers, Ltd., Winterthur, Switzerland

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

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

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

ELECTRICAL EQUIPMENT
Arnessen Electric Co., Inc., 335 Bond St., Brooklyn, N.Y.
Galbraith-Pilot Marine Corp., 166 National Rd., Edison, N.J. 08817
Harvard Murlin Div., P.O. Box 302, Quakertown, Pa. 18951
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014

EVAPORATORS
Aqua-Chem, Inc., Water Technologies Div., Box 421, Milwaukee, Wis. 53201.
Bethlehem Steel Corp., Shipbuilding, 25 B'way, N.Y., N.Y. 10004
Riley-Beard, Inc., Maxim Evaporator Profit Center, P.O. Box 1115, Shreveport, Louisiana 71130

FAIRLEADS
Appleton Machine Co., P.O. Box 2265, Iron Mountain, Mich. 49801.

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

FITTINGS & HARDWARE
Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

FLOATING EQUIPMENT—Steel—Aluminum Pontoons
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

HYDRAULICS
Bird Johnson Co., 883 Main St., Walpole, Mass. 02081
Universal Hydraulics, Div. of Ohio Brass Co., 4500 Beidler Road, Willoughby, Ohio 44094

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

LIGHTS—Emergency, Search & Navigation
Elco Corp./Safecraft Div., Maryland Road & Computer Avenue, Willow Grove, Pa. 19090

Snelson Oilfield Lighting Co., 1201 E. Doggett St., Fort Worth, Texas 76104.

LNG TANKAGE
Gazocean U.S.A. Inc., 125 High St., Boston, Mass. 02110

LININGS
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144

MACHINERY MONITORS
Bently Nevada Corp., P.O. Box 157, Minden, Nevada 89423

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

MARINE DRIVES—GEARS
Hoffert-Lowe, Inc., 108 Ridge Road, North Arlington, N.J. 07032
Philadelphia Gear Corp., Schuylkill Expressway, King of Prussia, Pa. 19406
Western Gear Corp., Industrial Products Div., P.O. Box 126, Belmont, Calif. 94003

MARINE EQUIPMENT
Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
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
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742
Paltz Brothers, Inc., 3499 Inventors Road, Norfolk, Va. 23502
Stow Mfg. Co., 225 Shear St., Binghamton, N.Y. 13902
Vokes Filter Div., (Cardwell Machine Co.), Cardwell and Castlewood Rd., Richmond, Va. 23221
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

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

MARINE INSURANCE
Adams & Porter, Cotton Exchange Bldg., Houston, Texas
Midland Insurance Co., One State St. Plaza, New York, N.Y. 10004
R.B. Jones Corp., 301 West 11th St., Kansas City, Mo. 64105

MARINE OIL BURNERS
John Zink Co., 4401 So. Peoria, Tulsa, Okla. 74105

MARINE PROPULSION
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095
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
Tech Systems, Inc., 405 Watertown Rd., Thomaston, Conn. 06787
Terry/Whitton, P.O. Box 350, New London, Conn. 06320
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
General Electric Credit Corp., 4 Corporate Drive, White Plains, N.Y. 10604

NAVAL ARCHITECTS AND MARINE ENGINEERS
J. L. Bludworth, 4030 Wynne St., Houston, Texas
Breit Engrg. Inc., 441 Gravier St., New Orleans, La. 70130
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Crandall Dry Dock Engrs., Inc., 238 Main St., Cambridge, Mass. 02142
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
Sharp DeLong, 29 Broadway, New York, N.Y. 10006
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
Christopher J. Foster, 14 Vanderverter Ave., Port Washington, N.Y. 11050
Friede and Goldman, Inc., 225 Baronne St., New Orleans, La. 70112
Gibbs & Cox, Inc., 21 West St., New York, N.Y. 10006
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
Morris Garainick, Associates, Inc., 583 Market St., San Francisco, Calif. 94105
J. J. Henry Co., Inc., 90 West St., New York, 10006
Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, Calif. 93017
Janzen Engineering Co., 15 Charles Plaza, Baltimore, Md. 21201
James S. Kroger, 2500 S. Dixie Hwy., Miami, Fla. 33133
Littleton Research and Engr. Corp., 95 Russell St., Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 1180 Ave. of Americas, N.Y. N.Y. 10036
Marine Design Associates, P.O. Box 2674, Palm Beach, Florida
Maritech, Inc., 38 Union Sq., Somerville, Mass. 02143
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742
Robert Moore Corp., 350 Main St., Port Washington, N.Y. 11050
Nickum & Spaulding Associates, Inc., 71 Columbia St., Seattle, Wash. 98104
Ocean-Oil International Engr. 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
Sidney Merritt Polhemus, Ballouville Rd., RFD 2, Dayville, Conn. 06241
Potter & McArthur, Inc., 253 Northern Ave., Boston, Mass.
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013
and 657 Mission St., San Francisco, Calif.
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
T. W. Spaetgens, 156 West 8th Ave., Vancouver 10, Canada
R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler, 44 Court St., Brooklyn, N.Y. 11201
H. M. Tiedemann & Co., Inc., 74 Trinity Pl., New York, N.Y. 10006
Whitman, Requaert & Associates, 1304 St. Paul St., Baltimore, Md. 21202
Yankee Shipwrights, P.O. Box 35251, Minneapolis, Minn. 55435

NAVIGATION & COMMUNICATIONS EQUIPMENT
American Hydromath Co., 55 Brixton Rd., Garden City, N.Y. 11530
Collins Radio Co., M/S 407-321, Dallas, Texas 75207
ELCO Corp./Safecraft Division, Maryland Road & Computer Ave., Willow Grove, Pa. 19090
Electro-Nav, Inc., 501 Fifth Ave., New York, N.Y. 10017
F&M Systems Co., P.O. Box 20778, 2525 Walnut Hill Lane, Dallas, Texas 75220
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
National Marine Service, 1750 So. Brentwood Blvd., St. Louis, Mo.
Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701
Raytheon Co. Marine Products, 676 Island Pond Rd., Manchester, N.H. 03103
Raytheon Co., Submarine Signal Div., P.O. Box 360, Portsmouth, R.I. 02871
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Standard Communications Corp., 639 N. Marine Ave., Wilmington, Calif. 90744
Teledyne Hastings Raydist, P.O. Box 1275, Hampton, Va. 23361
Tracor, Inc., 6500 Tracor Lane, Austin, Texas 78721
The Waterways Co., 3512 Metairie Hts. Rd., New Orleans, La. 70002

OILS—Marine—Additives

ESSO International, Inc., 1251 Avenue of the Americas, N.Y. 10020
 Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
 Mobil Oil Corp., 26 Broadway, New York, N.Y. 10004
 Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
 Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017

PAINT—Marine—Protective Coatings

Ameron Corrosion Control Div., Brea, Calif. 92621
 Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
 Devos & Reynolds Co., Inc., Subsidiary Celanese Coatings Co., 414 Wilson Ave., Newark, N.J. 07105
 Hempel's Marine Paints, Inc., 25 Broadway, New York, N.Y. 10004
 International Paint Co., 21 West St., New York, N.Y. 10006
 Marine Engineering & Construction Co., Inc., 1664 Tchoupitoulas St., New Orleans, La. 70130
 Mobil Chemical Company, Metuchen, N.J. 08840
 Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
 Porter Paint Company, 400 South 13th Street, Louisville, Ky. 40203
 Transocean Marine Paint Association, P.O. Box 456, Delftseplein 37, Rotterdam, Holland

PETROLEUM SUPPLIES

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

PIPE—Cargo Oil

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

PLASTICS—Marine Applications

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

PORTS

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

PROPELLERS: NEW AND RECONDITIONED

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

PUMPS

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

RATCHETS

W. W. Patterson Co., 830 Bracket St., Pittsburgh, Pa. 15233

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Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

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

RUDDER ANGLE INDICATORS

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

SANDBLASTING EQUIPMENT

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

SCAFFOLD BOARDS

Howmet Corporation, Southern Extrusions Division, P.O. Box 40, Magnolia, Arkansas 71753

SEWAGE DISPOSAL

Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
 Jered Industries, Inc., 1300 S. Coolidge Rd., Birmingham, Mich. 48008
 Koehler-Dayton, Inc., P.O. Box 309, New Britain, Conn. 06050
 LaMere Industries, Inc., 277 N. Main Street, Walworth, Wis. 53184

SHAFT REVOLUTION INDICATOR EQUIP.

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

SHIPBOARD VENTILATION

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

SHIPBREAKING—Salvage

The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
 National Metal & Steel Corp., 1251 New Dock St., Terminal Island, Cal. 90731
 Zidell Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201

SHIP BROKERS

Agemar, P.O. Box 1465, Maracaibo, Venezuela
 Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
 Mowbray's Tug and Barge Sales Corp., 21 West St., N.Y., N.Y. 10006
 Oaksmith Boat Sales, Inc., Fisherman's Terminal, Seattle, Wash. 98119

SHIPBUILDING STEEL

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 Bethlehem Steel Corp., 25 Broadway, New York, N.Y. 10004
 Huntington Alloy Products, Div. International Nickel Co., Inc., Huntington, W. Va. 25720

INTERNATIONAL NICKEL CO., 1 New York Plaza, New York, N.Y. 10004

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 Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
 Barbour Boat Works, Inc., P.O. Box 1069, New Bern, N.C.
 Beliard, Crichton & Cie, P.O. Box 2074, Route des Docks, 59, Dunkirk, France
 Beliard Murdoch S. A., Kattendijkdok Westkaai 21, Antwerp, Belgium
 Bertram Marine, Division of Whittaker, 3663 N.W. 21 Street, Miami, Fla. 33142
 Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
 Blount Marine Corp., P.O. Box 360, Warren, Rhode Island 02885
 Bludworth Shipyard, Inc., Box 5426, Cypress St., Brady Island, Houston, Texas 77012
 Brodogradiliste "SPILT", P.O. Box 107, Split, Yugoslavia
 Carrington Shipways Pty. Ltd., Tomago, N.S.W. 2322, Australia
 Conrad Industries, P.O. Box 790, Morgan City, La. 70380
 Curacao Drydock, Inc., P.O. Box 153, Willemstad, Curacao, N.A.
 Dillingham Corp., P.O. Box 3288, Honolulu, Hawaii 96801
 Devcon Corporation, Endicott Street, Danvers, Mass. 01923
 Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
 Empresa Nacional Bazan, 65 Castellana, Madrid 1, Spain
 Equipment Systems, Inc., A Microdot Co., P.O. Box 95, Port Deposit, Md. 21904
 Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122
 General Dynamics, Electric Boat Division, 99M Eastern Point Road, Groton, Conn. 06340
 General Dynamics, Quincy Division, Quincy, Mass. 02169
 Gotaverken American Corp., 39 Broadway, New York, N.Y. 10006
 Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
 Havre de Grace, Havre de Grace, Md.
 Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
 Hangkong & Whampoa Dock Co. Ltd., Kowloon Docks, Hong Kong
 Ishikawajima-Harima Heavy Industries Co., Ltd., 15 William St., New York, N.Y. 10005
 Jacksonville Shipyards, 644 E. Bay St., Jacksonville, Fla. 32203
 Jeffboat, Inc., Jeffersonville, Ind. 47130
 Kawasaki Dockyard Co., 8 Kaigan-dori, Ikuta-ku, Kobe, Japan
 Kalso Marine, Inc., P.O. Box 268, Galveston, Texas 77550
 Keppel Shipyard (Private) Ltd., P.O. Box 2169, Singapore
 Kockums Malmo, Fack, Malmo, Sweden

Litton Industries, 9920 W. Jefferson Blvd., Culver City, Calif. 90230

Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134

Marathon Manufacturing Company
 Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002

Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520

Marathon LeTourneau Marine Division, LeTourneau Rural Station, Vicksburg, Mississippi 39180

Marathon LeTourneau Offshore Pte., Ltd., P.O. Box 83, Taman Jurong Post Office, Singapore 22, Singapore

Marathon Shipbuilding Company, P.O. Box 870, Vicksburg, Miss. 39180

Marathon Shipbuilding Company (U.K.) Ltd., Clydebank Bunbartonshire, G81-1YB, Scotland

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Matton Shipyard Co., Inc., P.O. Box 428, Cofoes, New York 12047

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Northwest Marine Iron Works., P.O. Box 3109, Swan Island, Portland, Oregon 97208

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Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156

Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862

Peterson Builders, Inc., 334 So. 1st Ave., Sturgeon Bay, Wis. 54235

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

Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan

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Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004

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Hydraulonics, Incorporated, Laurel, Maryland 20810

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

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Combustion Engineering, Inc., Windsor, Connecticut 06095

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

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

TOWING—Salvage, Lighterage, Barge Chartering

Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002

Bouchard Transportation Co., Inc., 25 West Barclay St., Hicksville, L.I., N.Y. 11801

Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202

Henry Gillen's Sons Lighterage, West End Ave., Oyster Bay, N.Y. 11771

James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004

Interstate Oil Transport Co., 214 Transportation Center, Six Penn Center Plaza, Philadelphia, Pa. 19103

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McDonough Marine Service, P.O. Box 26206, New Orleans, La.

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Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002

Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y. 11214

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Dover Corp. / Norris Division, P.O. Box 1739, Tulsa, Okla. 74101

Hubeva Marine Plastics-Lining, 435 Hamilton Ave., Brooklyn, N.Y. 11231

Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696

Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

Mesco Telectonics, Inc., 5 Central Ave., Clifton, N.J. 07011

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

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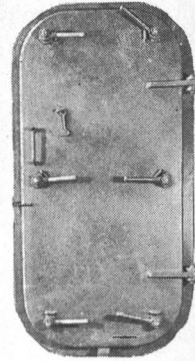
Bethlehem Steel Corp., Bethlehem, Pa. 18016

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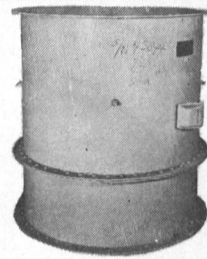
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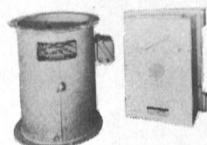


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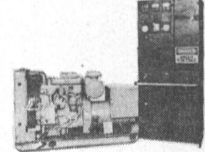
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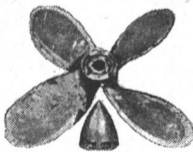
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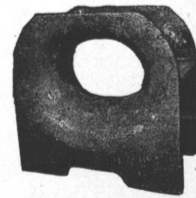
T2-SE-A2 Mission Tanker Baltimore, Md.

T2-SE-1 T2 Tanker Baltimore, Md.

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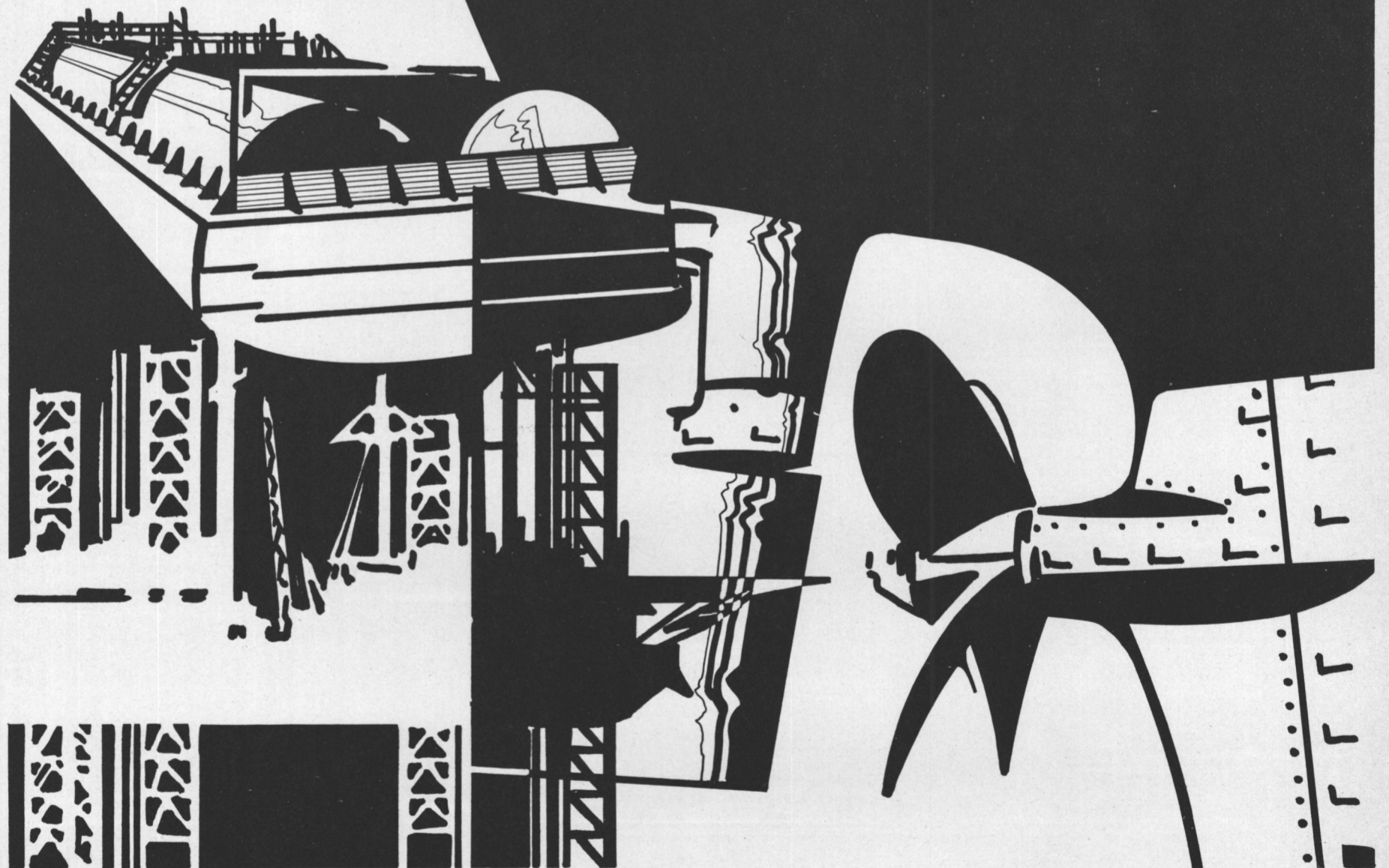
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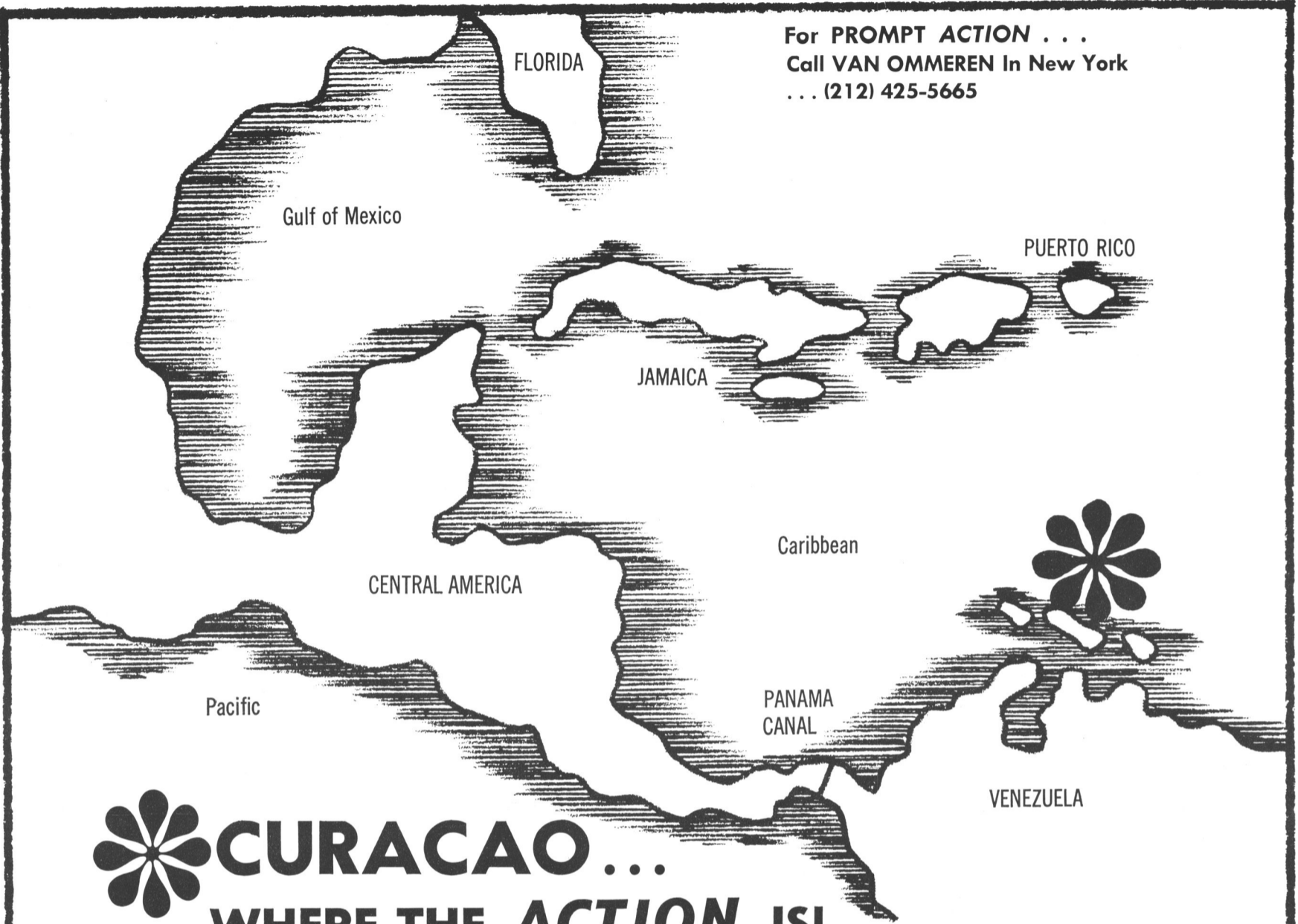
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