

# MARITIME REPORTER

AND  
ENGINEERING NEWS



**Aries Marine Shipping's OBO Ultramar  
Largest Ship Ever Built On West Coast  
Launched At National Steel And Shipbuilding**

(SEE PAGE 6)

**New \$162-Million  
Ship Repair Facility**

(SEE PAGE 14)

**MARCH 15, 1973**



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### Wisconsin Barge Seeks Construction Loan For 2 Towboats/50 Barges

A Title XI mortgage application has been filed with the Maritime Administration by the Wisconsin Barge Line, Inc., Cassville, Wis., for the construction of two towboats and 50 barges.

Wisconsin Barge, a subsidiary of CLC of America, Inc., estimated the cost of the overall construction at \$10.6 million. Depending on the decision of the Maritime Administration, the loan would be between 75 and 87 percent of that amount.

According to the application, the towboats would be triple-screw, diesel-powered with 8,400-hp engines. Twenty of the barges would be built box-style and the remaining 30 would be rake-style.

Nashville Bridge Company, Nashville, Tenn., will construct the vessels and Wisconsin Barge said the equipment would be used on the inland and Gulf intracoastal waterways.

### NSSC Awards \$6.9-Million Contract To Peterson Builders

The Naval Ship Systems Command, Washington, D.C., has awarded a \$6,964,520 contract to Peterson Builders, Inc., 334 South 1st Avenue, Sturgeon Bay, Wis. 54235, for the design and construction of two coastal minesweepers (MSC-320 and MSC-321) for the Military Assistance Program (MAP).

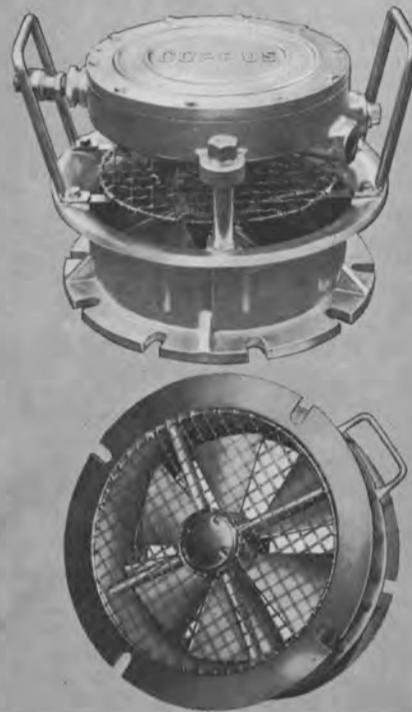
### Blount Receives Contracts To Build Passenger Vessels

Blount Marine Corporation, P.O. Box 368, Warren, R.I., has announced the signing of contracts to construct passenger vessels for service in widely separated areas.

Hyannis Harbor Tours, Inc., Hyannis, Mass., has ordered a 122-foot 500-passenger vessel to operate between Hyannis and Nantucket Island. Propulsion will be furnished by four General Motors 12V-71s. The new four-screw vessel will join the Blount-built East Chop, Menemsha and Viking, operated by Hyannis Harbor Tours.

Duluth-Superior Excursions, Inc., Duluth, Minn., has ordered a 78-foot 280-passenger ferry to operate in the sightseeing service in Duluth Superior Harbor. Touring the busy harbor has become one of the major tourist attractions of the area.

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## MARITIME REPORTER AND ENGINEERING NEWS

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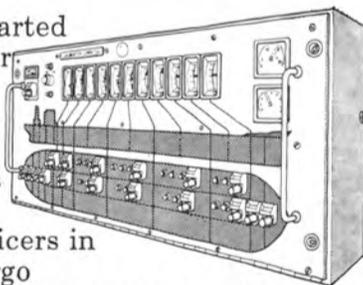
# The Kockum Loadmaster List of Honour.

Afran	2	London & Overseas	1
Antares	2	Luna	1
BP Tanker	34	Malmros	3
Ben Line	4	Marcona	9
Odd Berg	1	Marflet	1
S Bergesen dy	10	Maritime Overseas	11
Bibby Line	1	Mobil Oil	16
Hj Björge	1	A P Möller	17
B Björnstad	1	Naess	2
Broström	7	Nedlloyd	2
Brasch	2	Niarchos	16
CNN	1	Noralliance	2
CNP	4	Ocean Fleets	7
Cameli	3	Ogden Corp	1
Campbell	8	P & O Line	2
Canadian Pacific	6	Panocean	8
Chevron	31	Papadakis	2
Coates Shipping	1	Petrobras	6
Thor Dahl	3	E Rasmussen	3
Docenave	1	H Reksten	19
Esso Int	47	Remsen	1
Fearnley & Eger	1	Rosshavet	1
Fritzen	2	Ernst Russ	8
N Galantes	1	SFTP	4
Gelsenberg	2	SNAM	4
Gerrards	2	Saga	2
O Godager	1	Salénrederierna	16
Gulf	4	Sanko	1
Hamburg Süd	2	Schulte & Bruns	2
Hansen-Tangen	1	Seguoia	1
Hapag-Lloyd	8	Shell	17
HAL	2	Siciloil	1
Houlder Br	2	Skjelbred	1
L Höegh	3	H Staubo	2
A Jahre	3	Texaco	3
J P Jensen	1	UBEM	2
K Jensen	3	United Int Shipping	8
K Knutsen	1	Unterweser	1
Kulu Tanker	1	Varnima	3
F Laeisz	2	Venore Transp	2
Lara Shipping	1	H Waage	4
C M Lemos	12	R Wigand	2
Livanos	4	W Wilhelmsen	2
P Lodding	1	Zim	3

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Those participating in the Ultramar launching ceremony at the NASSCO Yard in San Diego included, left to right: the Right Honorable Lord **Remnant**, director of Australia and New Zealand Banking Group Limited; **Mrs. Alfonso C. Sepe**, matron of honor; **Oliver T. Henry**, Southern California Area Representative, Western Region, Maritime Administration; **John V. Banks**, president and chief executive officer, National Steel and Shipbuilding Company; **Mrs. Leo V. Berger**, sponsor; **Capt. Leo V. Berger**, president, Aries Marine

Shipping Company; the Honorable **Helen Delich Bentley**, chairman, U.S. Maritime Commission, principal speaker; **Peter Conostas**, vice president, Aries Marine Shipping Company; **Campbell L. Nelson**, chairman and managing director, Ultramar Company Limited; **Jesse Calhoun**, president, Marine Engineers Beneficial Association; **Lloyd E. Benson**, executive vice president, American Ultramar Limited; **Robert Young**, president, American Bureau of Shipping, and **Arnold Lorbeer**, president, American Ultramar Limited.

## First Of Two NASSCO-Designed OBOs

# The S/S Ultramar

The S/S Ultramar, the largest ship ever to be built on the West Coast, was launched at National Steel and Shipbuilding Company (NASSCO), San Diego, Calif., on February 17, 1973.

Ceremonies began at 9:30 a.m. with a band concert by the U.S. Marine Corps Depot Band.

**Mrs. Leo V. Berger**, wife of the president of Aries Marine Shipping Company, served as sponsor. Her daughter, **Mrs. Phyllis Spencer Sepe**, wife of the Honorable Judge **Alfonso C. Sepe**, assisted as matron of honor.

The Honorable **Helen Delich Bentley**, Chairman, Federal Maritime Commission, was the principal speaker. **Mrs. Bentley** is the first woman to serve in a key Government position in the maritime field and also the first woman to be appointed by a president to serve as chairman of a regulatory agency.

Others participating in the ceremonies included the Rev. Dr. **Robert H. Mayo**, pastor, First Presbyterian Church, San Diego; **John V. Banks**, president and chief executive officer, National Steel and Shipbuilding Company; **Arnold Lorbeer**, president, American Ultramar Limited; **Capt. Leo V. Berger**, president, Aries Marine Shipping Company, and **John M. Murphy**, vice president, sales, National Steel and Shipbuilding Company.

Immediately following the launch of the Ultramar, the keel was laid for a sister ship, the S/S Ultrasea, by **Dale H. Austin**, vice president, American Ultramar Limited.

The Ultramar is the first of two NASSCO-designed San Clemente Class oil/bulk/ore carriers (OBOs) to be built for Aries Marine

Shipping Company of Lake Success, N.Y. The contract for the construction of the two OBOs was awarded to NASSCO on June 30, 1971, by Aries Marine Shipping Company and the Maritime Administration, Department of Commerce. This was the first contract awarded under the 1970 Merchant Marine Act that provided Government assistance for bulk carriers and encouraged shipyards to design and market high-performance ships.

Economic studies sponsored by the Maritime Administration pointed to the OBO-type vessel as being best suited to recapture the U.S. bulk trade now largely carried in foreign-flag ships. The versatility of the OBO in being able to transport different products, liquid or dry bulk, between ports, permits high utilization and low-cost transportation.

The new OBO will be of the maximum size that can transit the Panama Canal. The Ultramar has an overall length of 892 feet 6 inches, a beam of 105 feet 9 inches, a draft of 62 feet 6 inches, and a deadweight tonnage of 80,500. The propulsion will be single-screw steam turbine, for a sustained full-load speed of 16.5 knots.

When completed, the S/S Ultramar and her sister ship will be operated by Aries Marine for Ultramar Company Limited under a 20-year time charter. The projected use of the OBO is to carry crude oil from Libya to the Ultramar groups' refinery in Quebec. Among the backhaul potentials being explored for the flexible OBO is the haulage of iron ore and refined products from Canada to the United States, and the transport of coal to European

Mediterranean ports, as well as wheat to Russia.

Approximately 8,000 spectators were present to view the colorful ceremonies.

On January 26, 1973, National Steel and Shipbuilding Company signed a \$7.5-million contract with the U.S. Navy for the design support of a new Sea Control Ship.

Subject to appropriations, a year or more from now, NASSCO will be given the opportunity to negotiate with the Navy on construction of the lead ship.

The Sea Control Ship will have an overall length of about 610 feet, a beam of about 80 feet, with displacement of about 14,000 tons.

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

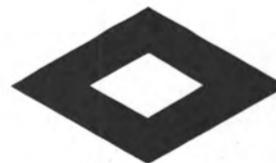


Immediately following the launch of the S/S Ultramar, the keel was laid for a sister ship, the S/S Ultrasea. Shown left to right, **Chester C. Goss**, president, C.I.T. Corporation; **John V. Banks**, president and chief executive officer, National Steel and Shipbuilding Company; **Dale H. Austin**, vice president, American Ultramar Limited, laying the keel, and **John Packett**, NASSCO welding foreman.



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## Todd Shipyards Corp. Signs Letter Contract To Build Eight VLCCs

John T. Gilbride, president of Todd Shipyards Corporation, has announced that his company has executed a letter contract with Virginia Shipping Corporation for the construction of eight very large crude carriers (VLCCs) in the 380,000-ton range. The total cost

covered by this letter contract will be approximately \$760 million.

Virginia Shipping Corporation, a New York corporation, has been set up to provide shipping facilities for a group of U.S. utility companies. Robert J. O'Leary, president of Virginia Shipping Corporation, stated that application for a construction differential subsidy was being made to the Maritime Administration.

Inasmuch as the vessels will be built by Todd in a newly planned extension of its present shipyard on Pelican Island in Galveston, Texas, for which extensive financing will be required, the agreement is conditioned on such financing being available on terms satisfactory to Todd. It is also contingent upon the granting of the construction differential subsidy by the Maritime Administration, and the

early resolution of the questions raised by the pending litigation concerning the impact of tankers on the environment.

## Moore And McCormack Elects Paul Tregurtha Exec. Vice President



Paul R. Tregurtha

Paul R. Tregurtha has been elected executive vice president of Moore and McCormack Co., Inc., it was announced by James R. Barker, chairman of the board.

Mr. Tregurtha has been vice president-finance and a member of the board of directors of Moore and McCormack Co., Inc. In addition to his new duties, he will continue as vice president-finance and a member of the board of its subsidiary, Moore-McCormack Lines, Incorporated, which operates a fleet of American-flag vessels serving the East Coast of South America and South and East Africa from the East Coast of the United States.

He joined Moore and McCormack Co., Inc. in June 1971 from Brown and Sharpe Manufacturing Company, Providence, R.I., where he had been vice president and controller. Mr. Tregurtha joined Double A Products Company, a subsidiary of Brown and Sharpe, in 1963, after graduating from Harvard Graduate School of Business Administration, where he was a Baker Scholar. Mr. Tregurtha received a bachelor's degree in mechanical engineering from Cornell University, Ithaca, N.Y., in 1958, subsequent to which he served in the U.S. Air Force.



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(Grades P&T 1, 2, 5,  
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A-312 A-358 A-376  
MIL-P-1144B

**Low Temp**  
A-333 A-334  
(GR 1, 3, 6, 9)

**Navy Specs**  
MIL-P-1144  
MIL-T-6736  
MIL-T-16286 (Ships)  
MIL-T-16343  
MIL-T-18165  
MIL-T-20155  
MIL-T-20157  
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## Sea Containers, Inc. Appoints Frank Corrie

Thomas A. Ewig, executive vice president of Overseas Enterprises, Inc., One World Trade Center, Suite 2841, New York, N.Y. 10048, has announced that Frank Corrie has been appointed director of sales for Sea Containers, Inc. Overseas Enterprises, Inc. are general agents, Eastern USA, for Sea Containers, Inc., an independent leasing company specializing in containers, chassis, specialized container equipment, cranes, and feeder vessels.

Mr. Corrie came to the United States from England, where he was a regional manager for Overseas Containers Ltd. His first appointment in the U.S. was with CTI, where he assisted the marketing services vice president.



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**Colt F-M Diesels  
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Six marine diesel engines have been added to the schedule for production and delivery this year at Colt Industries' Power System Division in Beloit, Wis. These Fairbanks Morse Model 38D8-1/8 engines have been ordered to power three ferries that will operate

across the Delaware Bay between Cape May, N.J., and Lewes, Del. These ferries will carry both passengers and vehicles. The announcement of the order, in excess of \$1 million, was made by E.L. Fay Jr., vice president-marine marketing.

These steel-hulled vessels will be built in the Houston, Texas, area by Todd Shipyards Corporation for the Delaware River and

Bay Authority, New Castle, Del. It is Todd Shipyards' current plan to sail the ferries from Houston to New Jersey under their own power for delivery to the Authority at Cape May. The 320-foot vessels will carry vehicles on the main deck, and passengers will be accommodated on the cabin and weather decks.

The 12-cylinder Fairbanks Morse opposed piston engines are rated

at 2,060 bhp at 750 rpm, and will give a sustained sea speed of approximately 16 knots. Each ferry will have two nonreversing engines and two 4-blade propellers 8 feet in diameter driven through reverse-reduction gears. An electric motor driven bow thruster will be installed on each vessel for added maneuverability. The Colt division will also furnish the pilot-house and engine room control systems.

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**Shipowners And  
Merchants Towboat  
Elects Figari VP**



**Capt. Wm. V. Figari**

Shipowners and Merchants Towboat Co., Ltd., Pier 50, San Francisco, Calif. 94107, operator of Red Stack tugs, has announced that Capt. William V. Figari has been elected vice president, in charge of the company's entire San Francisco Bay operation. Captain Figari has been a member of the Red Stack organization since 1946. He served as master of several of the firm's powerful harbor tugs, and piloted ships of all types to and from their berths throughout San Francisco Bay until 1958, when he was appointed general manager.

Captain Figari is a second generation member of his family to serve with Red Stack, his father, William F. Figari, having retired as a long-time executive of the firm in 1965, following a career that began in 1900.

Captain Figari is a native San Franciscan. He attended Balboa High School and graduated from the University of San Francisco with a degree in business administration. He is also a graduate of the U.S. Merchant Marine Academy at Kings Point, N.Y., and sailed as chief officer and master of United States merchant ships during the hazardous convoy days of World War II.

Captain Figari has been active in several maritime organizations and local clubs. He is a member of the Olympic Club, Merchants Exchange Club, World Trade Club, Mariners Club, USF Alumni Association, Kings Point Alumni Association, and others. He served as president of the Port of San Francisco Propeller Club in 1970-71, and is presently serving as chairman of the committee in charge of setting up the programs to be staged at the National Convention of The Propeller Club of the United States that will be held in San Francisco in October.

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## ABS Publishes Revised Rules For Offshore Mobile Drilling Units

The American Bureau of Shipping has published a revised edition of its "Rules for Building and Classing Offshore Mobile Drilling Units."

The Bureau's technical staff, with the aid of the offshore industry, wrote and published the original edition of these Rules in 1968. This publication set forth the first industry-wide standards for designing, building, and survey after construction of offshore mobile drilling units. From the time of the publication of the 1968 Rules to the beginning of this year, the Bureau has classed seven column-stabilized units, 20 self-elevating units, and eight surface-type units. Today, over 60 units of various types are building to Bureau class or are under review by its technical staff.

The revised Rules were developed in a cooperative effort by the Bureau's staff and the offshore industry, represented by the ABS Special Committee on Offshore Mobile Drilling Units, whose members are drawn from a broad spectrum of organizations engaged in the field. Many of the committee members assisted in developing the first edition. The new Rules reflect practical operating experience gained since the original edition was published, as well as current technological trends, and a number of changes have been made to provide more specific and useful guidance in areas where the original Rules were rather general.

The "Rules for Building and Classing Offshore Mobile Drilling Units" sells for \$7.50, plus applicable sales tax and overseas mail charge. The book may be ordered from any office of the Bureau or from the Book Order Department, American Bureau of Shipping, 45 Broad Street, New York N.Y. 10004.

## Houston Systems Delivers Third Rig To Asia Drilling

Houston Systems Manufacturing Co., 6022 Cullen Boulevard, Houston, Texas 77021, has delivered a third drilling rig to the Asia Drilling Co., Ltd., according to Joe C. Stine, Houston Systems president.

Asia Drilling Co., Ltd., based in Tokyo, recently took delivery of rig No. 3, which was assembled and tested at the Houston Systems' facilities in less than three weeks. The Houston company additionally provided mud systems, tool, utility and camp generator houses, water tanks, pipe racks, catwalks and cable trays.

The National 80 UE Diesel-Electric Land Rig, purchased from Armco Steel Corp., Machinery and Equipment Division, is capable of drilling to depths in excess of 12,000 feet. The rig is under contract to Pertamina, the Indonesian Government Oil Agency.

Houston Systems' complete rig-up unitization programs enables

the company to provide equipment and services to customers on a rigid time schedule.

The Houston Systems Manufacturing Company plant has 110,000 square feet under roof, in addition to 14 acres outdoor area used for assembly of heavy equipment, including complete rig-up of drilling rigs and mud systems.

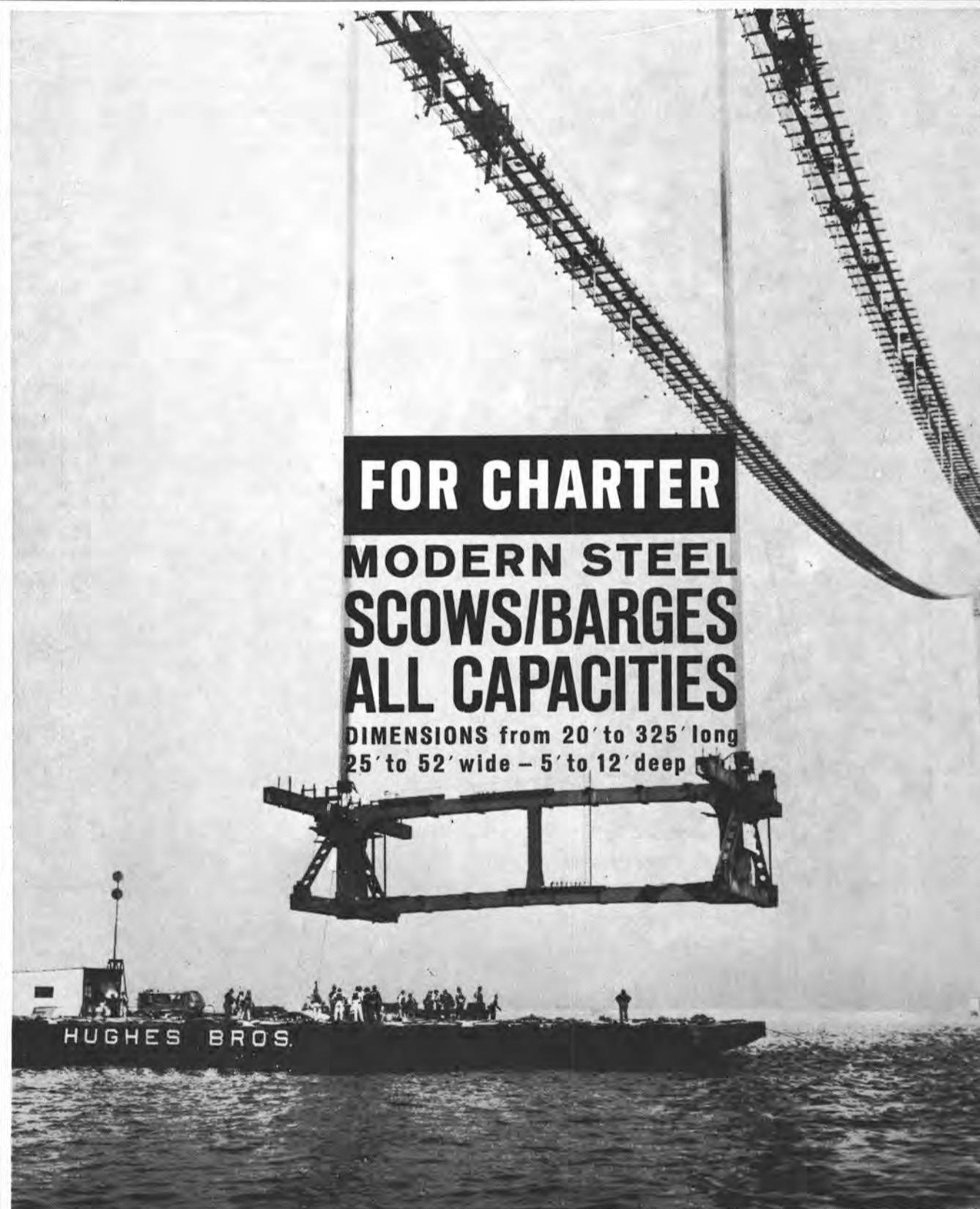
The plant has been serving the worldwide needs of the petroleum industry since 1953. The plant out-

put has steadily increased requiring numerous plant enlargements.

Among products designed and manufactured by Houston Systems are Roto-Cranes; jib cranes; offshore pipelaying equipment such as davits and line-up stations; custom hydraulic cylinders, complete with power units and controls; rig skidding and rig moving devices; special hydraulic systems; drilling mud equipment including agitators, valves and tanks; trailers, tool

houses, pipe racks, workbenches and other special equipment.

Houston Systems also does custom fabrication and unitization of machinery and assemblies to customer specifications. A technical staff, with extensive field and shop experience, designs special equipment and assemblies to suit the specific needs of industry. The shop is equipped with large and modern machine tools to handle large, heavy equipment.



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## Sun To Reserve Ways To Build LNGs Under \$2.5-Million Award

Pacific Lighting Service Co., 810 South Flower Street, Los Angeles, Calif. 90017, has announced it has signed a \$2.5-million contract which could lead to the purchase of up to five tankers from Sun Shipbuilding and Dry Dock Co., Chester, Pa.

The tankers would be used for

transportation of liquefied natural gas (LNG) to Southern California from overseas sources.

Pacific Lighting Service is a subsidiary of Los Angeles-based Pacific Lighting Corp., a parent company of Southern California Gas Co.

Paul A. Miller, chairman of the board of Pacific Lighting Corp., said the contract will cover economic, naval architectural, marine engineering and ecological studies,

to produce the most advanced design capable of reliably and economically serving Southern and Central California natural gas consumers.

Construction facilities for the ships will be reserved by Sun during the three-to-four-month study period.

Mr. Miller said that under the contract, Pacific Lighting has the option to purchase a minimum of two and a maximum of five ships.

If a construction contract is agreed upon, the first ship is tentatively scheduled to be completed in the third quarter of 1976.

Mr. Miller emphasized that a study to determine Pacific Lighting's role in the ownership and operation of these vessels is underway. The 130,000-cubic-meter 23-knot service speed ships will utilize the Conch containment system, a proven design which uses self-supporting aluminum tanks. The ships will cost \$100 million each.

Mr. Miller said the ships will be used to transport LNG from Alaska and Indonesia to Southern California.

Subsidy application for those vessels which will be engaged in the Indonesian trade was made earlier this year to the Federal Maritime Administration.

## Paceco Appoints John L. King



John L. King

John L. King has been named sales manager-international for Paceco, a Division of Fruehauf Corporation, Alameda, Calif.

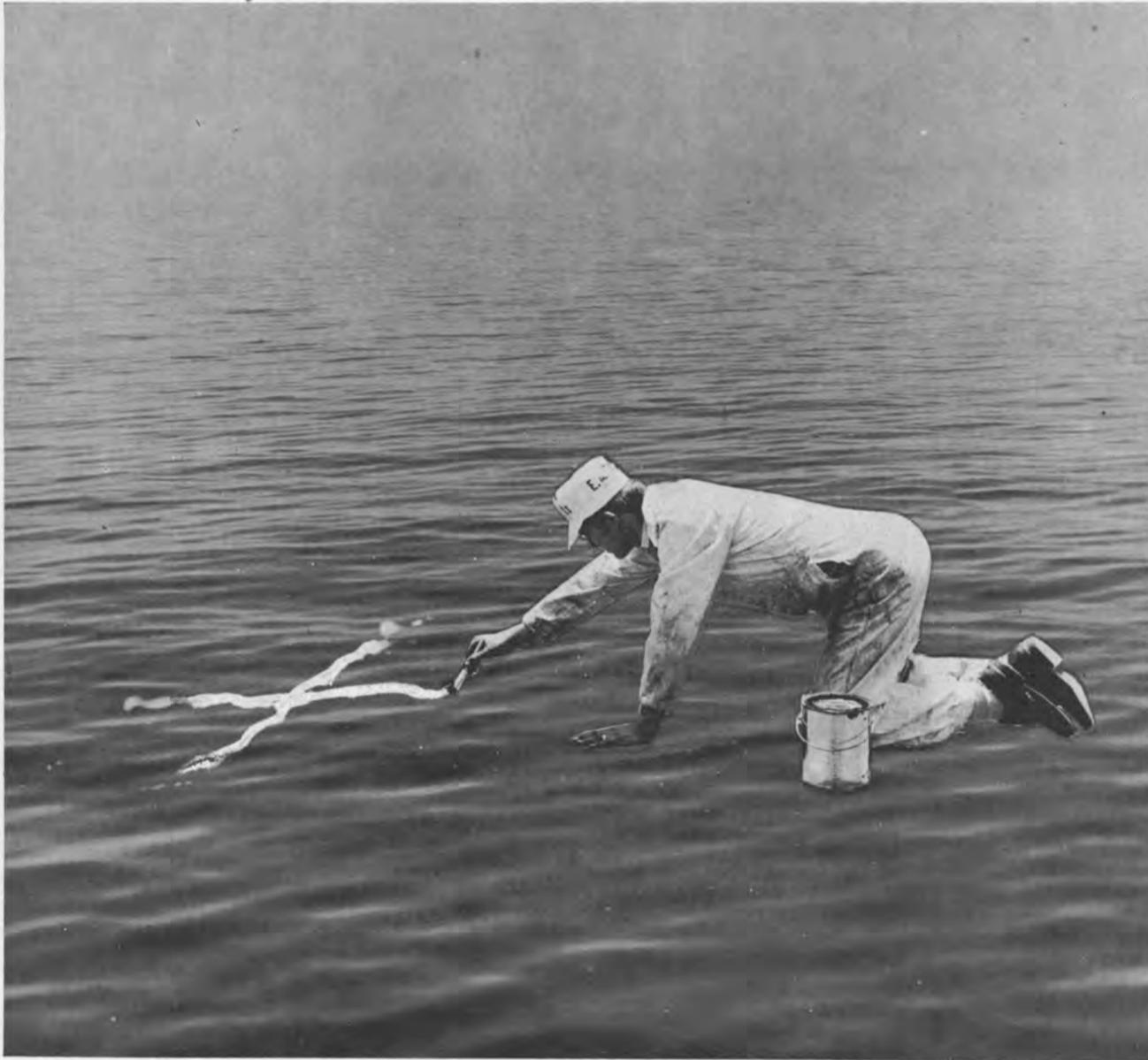
Mr. King was formerly a project manager for the firm. His new duties will encompass worldwide travel, contacting customers and the firm's representatives in more than 50 countries. He is already familiar with many of the areas in his new assignment, having traveled in Europe and Asia for Paceco in previous assignments.

## Summer Program On Ship Structural Analysis At M.I.T. June 11-15

The Massachusetts Institute of Technology Department of Ocean Engineering has announced a five-day summer program on "Ship Structural Analysis and Design," to be given at the institute in Cambridge, Mass., June 11 through June 15, 1973.

The intent of this special summer program is to discuss several of the most important aspects of ship structural design as they have developed during the very recent past. The program is an outgrowth of the book "Ship Structural Design Concepts," to be published this spring. Lectures will be given on the statistics of hull loadings and structural strength, compression strength of welded grillages, strength of welded gross panels under combined loads, first cycle midship section design synthesis and applications of optimization and structural synthesis methods.

Further information may be obtained by writing to: Director of Summer Session, Room E19-356, M.I.T., Cambridge, Mass. 02139.



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## Acadian Marine Names Hebert And Leary Jr.



Edwin R. Hebert

Doyle Landry, president of Acadian Marine Service, Inc., Lafayette, La., has announced the election of **Edwin R. Hebert** as the company's treasurer. Mr. Hebert, who has served as Acadian Marine's comptroller since he joined the company in 1971, is a 1966 graduate of the University of Southwestern Louisiana. He has worked in accounting in the oil industry since graduation.

Mr. Landry also announced that **Prieur J. Leary Jr.**, the company's former secretary-treasurer, has been named vice president-secretary.

Acadian Marine Service is an international marine transportation company which owns more than 50 vessels serving the international oil fields and construction industries. The company has offices in New Orleans, Morgan City, Delcambre and Hamburg, as well as Lafayette.

## Globtik To Build 706,000-Ton Tanker —World's Largest Ship

Globtik, the British-based shipping group owned by **Ravi Tikoo**, is to order a giant tanker of 706,000 tons from a Japanese shipyard. Mr. Tikoo said that a letter of intent had been signed with IHI (Ishikawajima-Harima Heavy Industries Co. Ltd.) in Japan.

The shipping magnate, speaking in London by telephone link from Kure, where he was personally taking over the 477,000-ton Globtik Tokyo, the largest vessel in the world, from IHI, said that, like the Globtik Tokyo, the 706,000 tonner would go on long-term charter to Tokyo Tankers, to bring in crude oil from the Persian Gulf.

The cost of the new vessel was estimated to be around \$115 million at today's prices.

The Globtik Tokyo, a spokesman added, was built at a cost of \$55 million, and on her 20-year charter with Tokyo Tankers, would bring crude into the Nippon oil terminal at Kure. She would earn an estimated \$100 million in her first 10 years.

She was laid-down last April and launched in October. Financing was arranged with Mitsui, 80 percent payable over eight years at 6 percent, and William Brandt's and National and Grindlays, who provided the balance over a period of 10 years.

## Norwegian Yard Uses Nickel Steel Tanks For LNG Vessels

A new 555,000-barrel LNG tanker, with five spherical tanks of 9 percent nickel steel, will be launched at Stavanger, Norway, during the second quarter of 1973. It is one of two ships being completed at the yards of Moss Rosenberg Verft A/S for Buries-Markes, Ltd. and P & O Lines, both of the United Kingdom. The second tanker will be completed in the first

quarter of 1974.

Kvaerner-Brug of Oslo utilized 800 tons of alloy in fabricating each of the 115-foot-diameter tanks, which are fully integrated with the main hull structure by means of a continuous tank support skirt.

A combination of 9 percent nickel steel and the spherical design offers several advantages for seagoing containment of LNG—excellent strength, fracture toughness and ductility at cryogenic temperatures; ease of fabrication; excellent weldability; the

elimination of the normal secondary barrier requirement (at substantial cost savings), and improved overall reliability of the containment system.

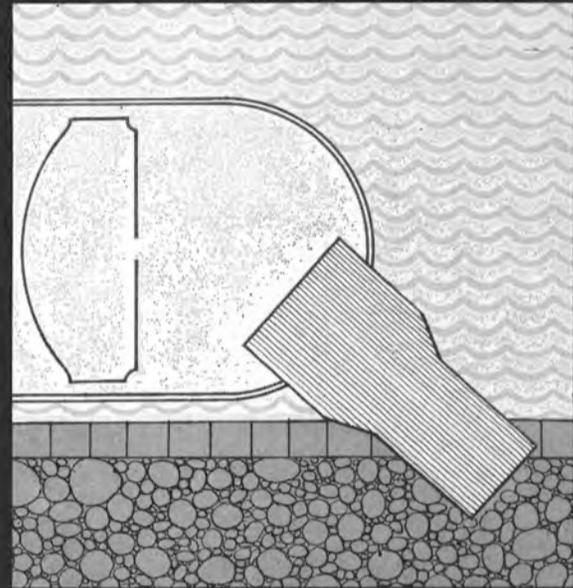
Developed by International Nickel, 9 percent nickel steel can be readily welded in the field, and requires no stress relief. It provides a design stress of 23,750 psi at ambient temperature (and up to 32,200 psi at -260° F under a pending ASME code case), has a low coefficient of expansion, and it may be directly joined to stainless steel piping and fittings.

## problem



Inadequate port facilities for Ro-Ro traffic.

## solution



There's nothing new about Roll-on/Roll-off. Ro-Ro traffic continues to expand fast, but its growth rate is restricted because some ports, even large ones, cannot provide the necessary stern loading facilities such as right angled quays or linkspan connections.

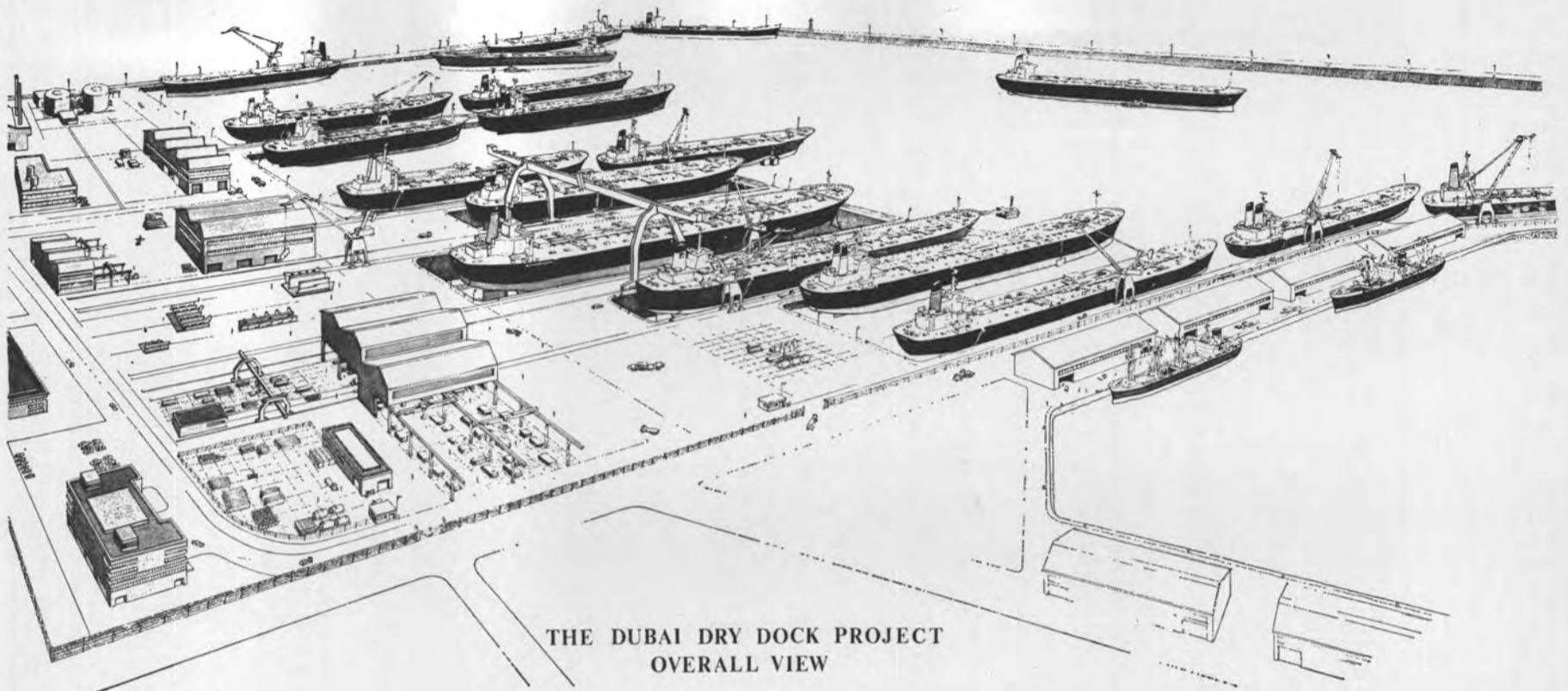
The solution to this problem is a MacGregor Quarter Stern Ramp. Which immediately puts both ship and port in the Ro-Ro business, with no additional investment in special quay design.

MacGregor experience in ramp technology has been built up through hundreds of Ro-Ro installations of all types; from the first drive on/drive off ships, more than a decade ago, to large transatlantic vessels, and to contracts completed and in hand for Quarter Ramps. The MacGregor world-wide network of service stations is your assurance that your traffic will roll on and off at all times.

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THE DUBAI DRY DOCK PROJECT  
OVERALL VIEW

The new Arabian Gulf repair facility will have 11 berths, five moorings, three drydocks, two of which will handle vessels up to 500,000 dwt, and the third capable of handling 1,000,000-dwt tankers.

## John J. McMullen Associates Announces

# \$162-Million Ship Repair Facility

The construction of a massive new \$162-million ship repair facility in the Middle East was announced on February 22 at the New York World Trade Center offices of John J. McMullen Associates, Inc., by Dr. **John J. McMullen**, chairman of the board. Present at the announcement were representatives of Taylor Woodrow International Limited, Costain Civil Engineering Limited, and Lazard Brothers & Co., Limited.

Initiated by Sheikh **Rashid bin Said al Maktoum**, the Ruler of Dubai and its Dependencies, the mammoth new ship repair facility is designed to match the needs of the new VLCCs—the jumbo oil tankers ranging from 175,000 to 500,000 deadweight tons.

The new facility will be the largest of its kind in the world and the largest single industrial venture in the Middle East. Its strategic location in Dubai, one of the United Arab Emirates on the Arabian Gulf, is of key significance in the worldwide logistics of petroleum resources and distribution



His Highness  
Sheikh Rashid  
bin Said al Maktoum,  
Ruler of Dubai

—and another example of Sheikh **Rashid's** vision and enterprise. The huge new ship repair yard and drydock will be part of the port area of Dubai, already the most modern port installation in the Middle East.

### Feasibility Of The Project

John J. McMullen Associates, Inc. has carried out the economic evaluation of a drydocking and

ship repair facility in Dubai at the request of Sheikh **Rashid**. The study indicates that the Arabian Gulf is particularly well placed to offer this type of facility.

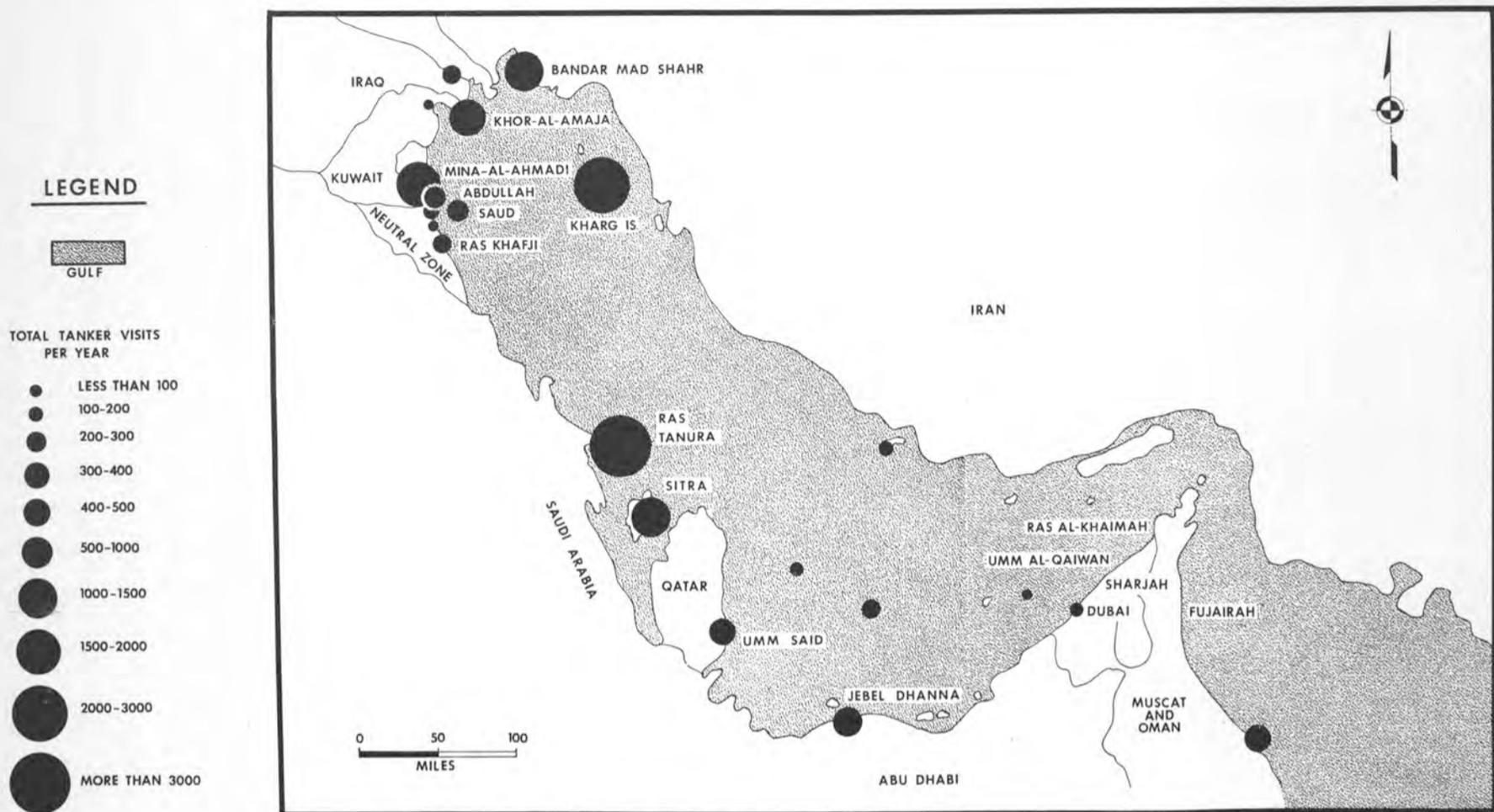
A significant number of oil majors and VLCC owners approached have confirmed that the siting of the drydock in the Arabian Gulf is more attractive to them than the existing facilities which are available in Europe and the Far East. Reasons: VLCCs require drydocking for maintenance and repair on an average of every 18 months. Before the work can begin, the ship must be tank cleaned and gas free. The time needed for tank cleaning and gas freeing is 8 to 14 days. At present, VLCCs arrive at existing repair facilities in under 8 days from the discharge terminal or must make a substantial deviation from normal routes. With the new facility in Dubai, the long ballast voyage from either the European or Japanese unloading ports will allow ample time to complete the required tank cleaning and gas freeing en route prior to

drydocking. This can save many otherwise wasted days—and a VLCC costs its operators \$20,000 to \$35,000 per day.

The McMullen Report has been reviewed by the American Bureau of Shipping, and it has endorsed the concept and the availability of the market and its determination. In addition, the bureau has indicated that it will establish an office in Dubai to provide the necessary surveyors for the implementation of the dockyard services, and it is expected that other classification societies, e.g. Lloyd's Register, Det norske Veritas, Bureau Veritas, will also be represented.

### The Project

In view of the serious world shortage of properly located drydocks capable of handling the servicing and repair requirements of crude carriers of over 175,000 deadweight tons (VLCCs), Sheikh **Rashid** has authorized the establishment of the major ship repair facility in Dubai. It will have three  
(Continued on next page)



Countries of Arabian Gulf and tanker terminals.

drydocks, two of which are capable of handling vessels of up to 500,000 deadweight tons, and the third capable of handling vessels of at least 1,000,000 deadweight tons. In addition, the facility will have 11 berths and five moorings and will be capable of handling virtually all types of repair, fabrication and maintenance work. The three drydocks, estimated to employ over 4,000 when fully operational, will have the following dimensions:

(1) 1,230 feet by 230 feet, up to 500,000-dwt tankers.

(2) 1,361 feet by 262 feet for up to 500,000-dwt tankers and special designs, such as shallow draft tankers.

(3) 1,722 feet by 410 feet and up to at least 1,000,000 dwt or alternatively multiple VLCC dockings.

The third dock is large enough to take the World Trade Center Tower and the Empire State Building together.

The total cost of the shipyard complex, including the construction of a breakwater and preoperational financing, is expected to be in the region of U.S. \$162,000,000.

Originally, the project envisaged two drydocks with provision for a third dock later. However, because of the enthusiastic response and market survey, the Ruler of Dubai endorsed the recommendation of including the third mammoth dock immediately.

A letter of intent for the construction of the dockyard, which is estimated to take three years, has recently been signed with a joint venture comprising Taylor

Woodrow International Limited and Costain Civil Engineering Limited.

This joint venture brings together two of the largest British groups operating in the construction industry, with a combined annual turnover in 1971 of \$588 million and with particular experience in the field of marine and harbor works.

Costain Civil Engineering Limited, a wholly owned subsidiary of Richard Costain Limited, has been engaged in Dubai since 1966 and has recently completed a \$60-million contract for the construction of Port Rashid adjacent to the Dubai Dry Dock Company site.

Taylor Woodrow International Limited, the principal overseas subsidiary of Taylor Woodrow Limited, has a long record of harbor works and is currently completing the East Lagoon Wharf Extension in Singapore, which is valued at \$25 million.

The joint venture is carrying out engineering design work with the support of Babbie, Shaw and Morton, consulting engineers, of Glasgow.

#### Viability Of The Project

The McMullen Report forecasts the number of tankers loading oil in the Arabian Gulf in 1975 at over 400 VLCCs and 440 less than VLCC size classes. Of these, about 317 VLCCs and about 400 less than VLCCs will require drydocking in 1975. By 1980, the number of VLCCs loading in the Arabian

Gulf will have doubled, and projected drydocking requirements available for Gulf drydocks will have increased proportionately.

#### Further Studies

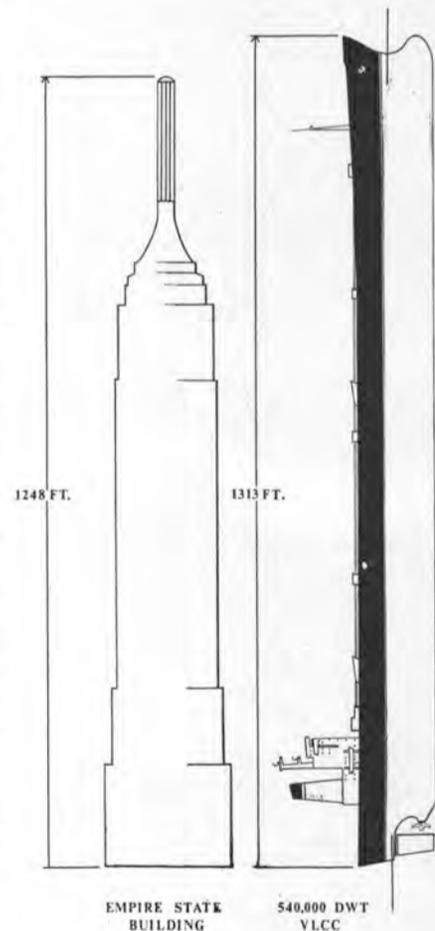
To ascertain the likely demand for a new dockyard at Dubai, a number of major VLCC operators, including major oil companies, were approached. Having studied the McMullen Report, almost all these operators confirmed their approval of the siting of the project in relation to existing facilities. They have indicated their willingness to consider the dockyard for use by their fleets in routine drydockings.

As evidence of the potential demand, 20 of these operators alone have a total requirement of 120 routine dockings per annum.

**Management:** The design and construction of the project will be directed by John J. McMullen Associates, Inc., who will also be responsible for the management of the dockyard when completed.

**Shareholders:** His Highness Sheikh Rashid bin Said al Maktoum, Abdulrahim E. Galadari & Brothers, and John J. McMullen Associates, Inc.

**Board of Directors:** chairman, His Highness Sheikh Hamdan bin Rashid al Maktoum; His Excellency M. Mahdi Al Tajir, Abdul Rahim Galadari, Abdul Wahab Galadari, Nasser Abdul Latif, Ahmed Moosa, the Honorable R.H.M. Kindersley, and Dr. John J. McMullen.



The World Trade Center Tower and the Empire State Building together can be accommodated in the largest of the three Dubai drydocks.

## Engineers Society Honors John R. Kane

John R. Kane, vice president for engineering at Newport News Shipbuilding, has been named Engineer of the Year by the Peninsula Chapter, Virginia Society of Professional Engineers.

Mr. Kane received the award, given each year in recognition of outstanding service to the profes-

sion, during a National Engineers Week dinner, February 23. The Peninsula Chapter, VSPE, is a prestigious group of 13 organizations representing all engineering disciplines on the Peninsula. During the special week, engineers throughout the nation met to discuss the theme "Engineering—A Better Environment Through Technology."

As the top engineer at Newport

News Shipbuilding, Mr. Kane is responsible for the activities of more than 2,600 engineering and design personnel at the Tenneco subsidiary. The award is in observance of Mr. Kane's engineering accomplishments during his career which, according to the Society, "are inseparably bound with the engineering advances made by his company and reflected by its engineering reputation."

The shipyard vice president pioneered efforts in the first major application of high pressure-high temperature steam systems and boilers for ship propulsion. He was instrumental in design development and testing of nuclear power plants for submarines and aircraft carriers and was responsible for engineering work on machinery systems for cargo vessels and tankers.

During his career at Newport News Shipbuilding, Mr. Kane's efforts and direction have led to the extensive use of computers in engineering calculations and design, providing a capability for analysis of indeterminate structure, system routing, and the semi-automation of material control.

A life member of The Society of Naval Architects and Marine Engineers, Mr. Kane last year was awarded that Society's highly

esteemed David W. Taylor Medal for his "notable achievements in marine engineering."



John R. Kane

Mr. Kane began his employment with the shipyard in 1936 as a draftsman and, in 1951, was appointed engineer of the engineering technical department. Four years later, he was named assistant chief engineer of the machinery design division and was promoted to chief engineer of that division in 1957. He was appointed director of engineering in 1966 and was elected a vice president of the company in December 1972.

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



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## SNAME New York Section Discusses Reduction Of Tanker Cleaning Hazards



Shown at the New York Metropolitan Section meeting, left to right: Donald B. Carpenter, Section vice chairman; Charles W. Wilson, chairman; M.M. Brauer, author, Texas Instruments, Inc.; I. Hilary Rolih, chairman, papers committee; Nicola F. Pergola, executive committee, and Robert G. Mende, national secretary, SNAME.

The New York Metropolitan Section of The Society of Naval Architects and Marine Engineers met on February 15 at the Seamen's Church Institute, New York, N.Y.

After a social hour and dinner, a paper was presented entitled "A System for Reduction of Tanker Cleaning Hazards and Pollution Abatement," by M.M. Brauer, Texas Instruments, Inc.

The subject paper describes a systematic human-factored combination of equipment, facilities, personnel and procedures that, the author states, obviates the existing

technique in favor of a cost, time, and safety-effective approach; personnel are used where they perform best, and machines are likewise allocated to the tasks that they do best. The proposed system is based upon the use of freon as the cleaning agent, in a continuous-stream closed-loop in-port activity. The proposed system, it is claimed, greatly reduces the human hazard from toxicity, explosion, fire, and asphyxiation. A brief trade-off analysis is included to compare the existing technique with the proposed system.

## Jerguson Gage & Valve Appoints R.M. Brambley



Richard M. Brambley Jr.

Richard M. Brambley Jr. has been appointed general sales manager of Jerguson Gage & Valve Company, 15 Adams Street, Burlington, Mass. 01803. The announcement, made by Jerguson president Charles Fletcher, assigns Mr. Brambley overall responsibility for sales and customer service on Jerguson's extensive line of liquid level gages and valves for power and process applications.

Educated at the United States Naval Academy, Annapolis, Md., Mr. Brambley joined Jerguson as a sales engineer in 1971. Prior to that, he was Midwest regional distributor sales manager for Yarway Corporation.

Jerguson Gage & Valve Company is one of the White Consolidated Industries, Inc., a widely diversified manufacturer of machinery and equipment for industry and the consumer.

## Icebreaking Tugs Proposed To Keep Lakes Shipping Open

Tugboats, stressed and powered for icebreaking, and costing about one-fifth as much as a conventional medium-sized icebreaker, should be sought for keeping shipping routes open for late winter sailings on the Great Lakes, Vice Adm. Paul E. Trimble, president of Lake Carriers' Association, told a meeting of shipping representatives and the Coast Guard at a recent meeting in Cleveland, Ohio. Assessing the icebreaking requirement as a matter of numbers more than of size, the admiral said: "A fleet of five 'general duty' icebreaking tugs would give the lakes much more icebreaking for the buck than one of the larger-sized icebreakers could."

Experience in winter operations, aimed toward extending the lake navigation season beyond mid-December, has shown that smaller but high-powered icebreaking vessels can do much of the work needed to keep shipping moving through lake ice fields. This indicated that a much more cost-effective approach to icebreaking is several small "general duty" icebreakers, rather than more large ones, Admiral Trimble said. The smaller vessels could be a more or less standard seagoing tug design 160 to 180 feet in length, rein-

forced for operation in ice, with 7,500 to 10,000-horsepower engines, and a crew of about 20 men. They would cost \$6 million to \$9 million apiece. A fleet of five could be built, manned, and operated for about the same cost as one medium-sized icebreaker.

Emphasizing the need for at least five of the smaller icebreakers, the admiral said that effective movement of freighters in early winter requires icebreaking in four

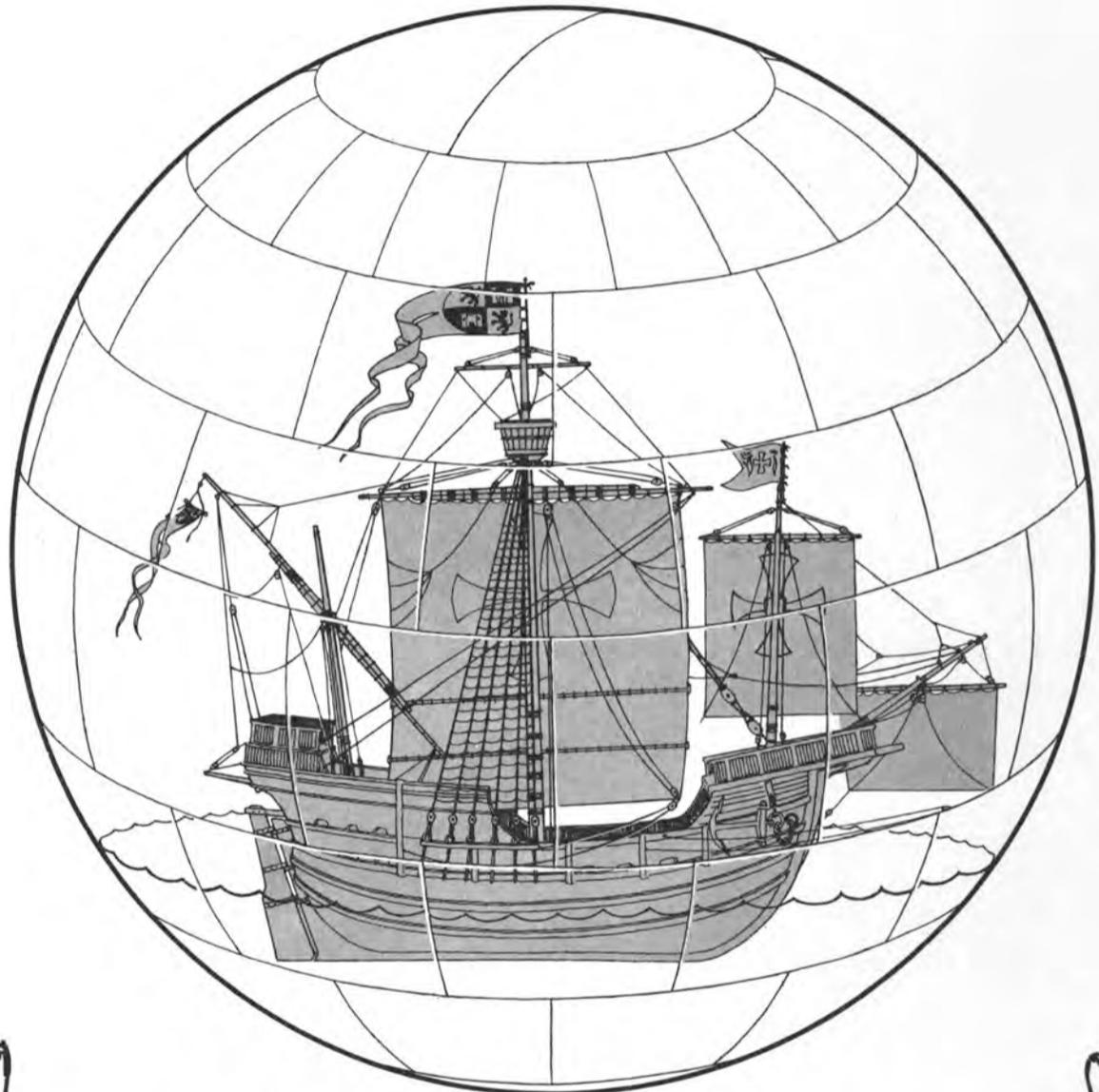
lakes simultaneously, and occasionally at several places in each lake. This means a number of icebreakers are necessary to do the job; one can only be in one place at a time. Also, with the wider beam of the new lake vessels, an icebreaker has to make two swaths to open the channel and have the maneuverability to "ease the turns" for the long vessels.

In addition to providing the needed support for the domestic

shipping industry's extended navigation season goals, Admiral Trimble said a tug icebreaker of the same size would be capable of supporting the St. Lawrence Seaway's effort for a longer season for ocean-going shipping as well.

The icebreaker Mackinaw, built especially for lake service, still has many years of operation remaining and will be most helpful for heavier icebreaking assignments, such as in Lake Superior in the spring.

## 1492-1973



In 1492 an Italian explorer, Christopher Columbus, a unique man who relished a challenge, sailed on a voyage to prove his theory that the world was a sphere.

His ship, The Santa Maria, was the largest of the three ships he commanded when he discovered a new world.

480 years later, Pittsburgh-Des Moines Steel Company, a unique American company that also has the reputation of meeting challenges, is building spherical tanks for

ships which will carry LNG to the new world Columbus discovered.

Columbus would have liked PDM ... especially if he knew that the spheres PDM is building WOULD ENCOMPASS HIS WHOLE FLAGSHIP, THE SANTA MARIA, including hull, masts, sails, bowsprit and enough ocean to float her!

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**PDM builds for the future**

Pittsburgh-Des Moines Steel Company



## NASSCO Announces Three Appointments



John J. McQuaide



Ernest R. Schneider



Norman Henderson

The appointment of **John J. McQuaide** as vice president, yard operations, National Steel and Shipbuilding Company, San Diego, Calif., has been announced by **John V. Banks**, president and chief executive officer.

Mr. **McQuaide** joined NASSCO in 1959 as hull superintendent and, in 1962, advanced to assistant production manager. He was appointed plant manager in 1970.

A veteran of over 38 years in shipbuilding, Mr. **McQuaide** start-

ed his career in 1931 at the New York Shipbuilding Corporation of Camden, N.J., where he held various positions of increasing responsibility. He was also employed by the naval architectural firm of J.J. Henry Co., Inc.

Mr. **McQuaide** is a native of Philadelphia, Pa. He attended Drexel Institute and Rutgers University at night, completing courses in physics, mathematics, time and methods, engineering, and advanced management.

He is a member of The Society of Naval Architects and Marine Engineers and The Propeller Club of the United States.

**Ernest R. Schneider** has been promoted to fill the position of production manager, new construction. He will be responsible for all production operations pertaining to new ship construction and will report to Mr. **McQuaide**.

Since joining National Steel and Shipbuilding Company in 1946, Mr. **Schneider** has held supervisory positions of increasing responsibility. He has held the position of outfitting superintendent and sea trial coordinator since 1963. He started in shipbuilding in 1941 at California Shipbuilding Corporation at Terminal Island in San Pedro, Calif. From 1942 to 1946, he served in the U.S. Army Signal Corps.

Mr. **Schneider** is a native of St. Paul, Minn. He attended Northern State Teachers College in Aberdeen, S.D., and has completed courses in production supervision, labor relations, and management at San Diego City College.

He is a member of The Society of Naval Architects and Marine Engineers, the NASSCO Management Club, and the Information Film Producers of America.

**Norman Henderson** has been advanced to fill the position of superintendent of outfitting. He will report to Mr. **Schneider**, production manager, new construction.

Mr. **Henderson** started at National Steel and Shipbuilding Company in 1963 as engineering liaison in the engineering hull department. A short time later, he transferred to the outfitting department as outfitting general foreman, a position he held until 1969. For the past four years, he has served as assistant outfitting superintendent.

Mr. **Henderson's** previous work experience includes six years at Port Arthur Shipyard in Ontario,

and 16 years at Yarrows Shipbuilding at Vancouver Island.

A native of Hull, East Yorkshire, England, Mr. **Henderson** began his career as an apprentice shipwright at the Henry Scarrs Shipyard at Hassel, East Yorkshire, England. In connection with his apprenticeship, he attended Riley Technical College, completing courses in naval architecture and related subjects.

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

## Kockums Announces Order For Three 355,000-Ton Tankers

Kockums Shipyard, Malmo, Sweden, received an order on February 27 for three 355,000-ton tankers, increasing orders on hand to 18 ships totaling 5.5-million deadweight tons. The value of the 18 ships, according to the purchase contracts, is approximately \$675,000,000.

Two of the three newly ordered ships will be delivered in 1976, and the other in 1977. The ships have been ordered by foreign buyers, whose names by agreement will not be made public at the present time.

Nine ships are still to be built in Kockum's 20-ship series of 255,000-ton oil tankers. One of these, the *Turquoise*, will be delivered to a French shipping line this month.

Present plans call for the delivery of the 20th and last 255,000 tonner in this series on August 1974, and the first 355,000 tonner will be delivered before the end of that year.

All 355,000-ton tankers are of the same type—each of them is 1,188 feet long, 197 feet wide, and 93 feet deep. Maximum draft is 73 feet, which conforms to Rotterdam harbor conditions.



## Floating Dry Docks

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## Where Hard Thought Becomes Hardware

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have produced an impressive variety of designs including OBO's and tankers, while our skilled workers working in almost perfect weather build superior ships.

# NASSCO

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## New Tanker Study And Forecast For Oil And LNG Market

Edie Economics, the Economics Consulting Division of Merrill Lynch, Pierce, Fenner & Smith Inc., has established a new economics service in their natural resources program exploring the economic aspects of the international oil and gas industry and their implications upon the international oil and LNG tanker market.

The approach is both quantitative and qualitative. The analysis and forecast is based upon an Edie-M.I.T. developed mathematical model of international oil movements and their effect upon oil tanker demand. A computer matrix output is produced for each year in a 10-year forecast. The mathematical model approach is flexibly designed to absorb and adjust for all potential factors upon the world oil scene, including price of world oil by region; competing

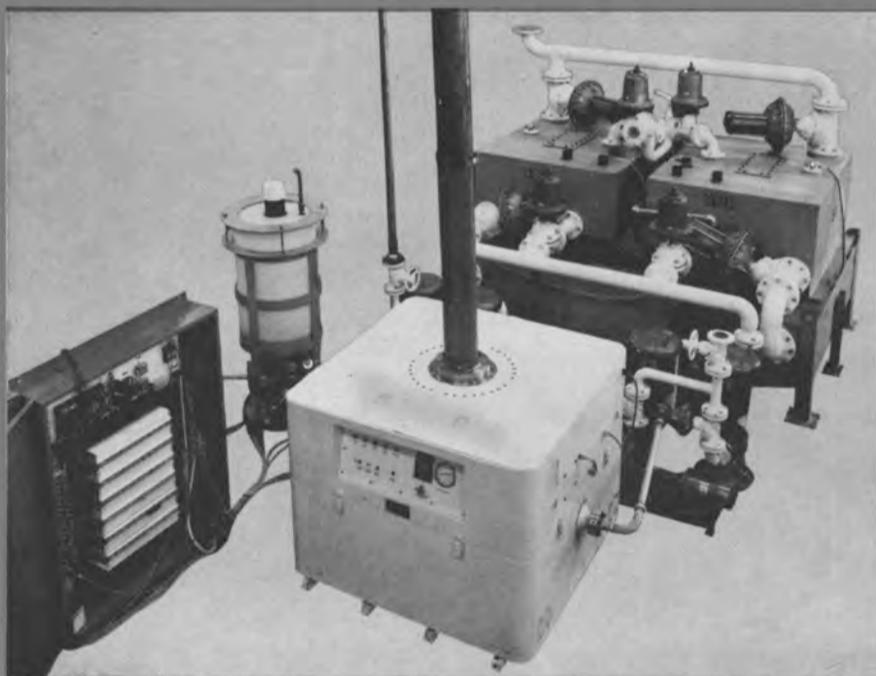
energy source—gas, coal, nuclear; Suez Canal open or closed; changes in import rate for Japan, Western Europe or the United States; changes in export capacity for North Africa, Middle East, West Africa, Southeast Asia or Latin America; change in potential capacity of oil refineries to process crude oil, and ability of present and potential fleet of tankers to transport oil.

All quantitative results are analyzed qualitatively to indicate the

ultimate pressure on the demand and supply of oil tankers. The study will be issued as an annual report with a quarterly update. Although geared for the oil tanker market in general, the model is flexible enough to be modified to suit an individual client's needs.

This study is directed by **Michael Gaffen**, a naval architect and senior economist at Edie. Detailed information about this tanker study and forecast can be obtained from **Joseph W. Jerzewski** at Edie's Executive offices, 530 Fifth Avenue, New York, N.Y. 10036.

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The MSTS System shown above was designed for a 3,500 passenger New York Ferry. Unique in design and simple in operation, the system uses treated liquid wastes for flushing purposes and reduces solids to ash in a highly efficient thermal chamber. For more information call or write: Koehler-Dayton, Inc. Department MSTS, P.O. Box 309, New Britain, Connecticut.

## Koehler-Dayton

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## Moore And McCormack Elects Robert O'Brien



Robert E. O'Brien

Robert E. O'Brien has been elected vice president of Moore and McCormack Co., Inc., it was announced by **James R. Barker**, chairman of the board.

Mr. O'Brien will continue as executive vice president of Moore-McCormack Lines, Incorporated, the subsidiary which operates a fleet of American-flag vessels serving the East Coast of South America, and South and East Africa from the East Coast of the United States.

He is a member of the board of directors of both Moore and McCormack Co., Inc. and its subsidiary, Moore-McCormack Lines, Incorporated.

A graduate of Villanova University, Mr. O'Brien joined Moore-McCormack Lines in 1940. He served as naval officer in the U.S. Navy from 1942 to 1945. Returning to Moore-McCormack, he rose through the operating department to become its operating manager in 1956, and in 1957, was made vice president in charge of operations. In 1962, he was transferred to vice president of sales, and in 1967 was elected to the board of directors of the line.

## Sun Ship Subsidiary Asks Title XI For 80,000-Dwt Tanker

660 Leasing Company, Wilmington, Del., a subsidiary of Sun Shipbuilding and Dry Dock Company, has applied to the Maritime Administration for Title XI to aid in the construction of an 80,000-dwt tanker. The vessel, which is under construction at Sun Shipbuilding, is estimated by the company to have a market value of \$28 million.

**Berwind Lines, Inc.  
Names Ethel Kohler**



Ethel Kohler

Berwind Lines, Inc., Old San Juan, Puerto Rico 00905, has announced that **Ethel Kohler** has been named sales representative for the U.S. Virgin Islands. **Mrs. Kohler**, a graduate of Adelphi College, has vast experience in the transportation field. Her previous employment was a three-year stint with a Puerto Rican-based transportation company.

**Mrs. Kohler** will shortly be calling on all importers and exporters in both St. Thomas and St. Croix to offer her assistance and liaison in transportation needs and requirements.

**Lockheed Data Buoy  
Delivered To NOAA  
For Station In Gulf**

A prototype of an environmental data buoy designed to collect weather and ocean information automatically and send it to a shore station or space satellite was recently delivered to the Commerce Department's National Oceanic and Atmospheric Administration (NOAA).

The first of three Lockheed-designed-and-built Limited Capability Buoys (LCB) will be carried to its first duty station in the Gulf of Mexico by the U.S. Coast Guard cutter *Salvia*, homeported in Mobile, Ala. The other two buoys are scheduled to be placed at duty stations in the Gulf later in the spring.

Lockheed Missiles & Space Co., Sunnyvale, Calif., has developed and built three self-contained buoys for NOAA's Data Buoy Office, which is located at the Mississippi Test Facility, Bay St. Louis.

Off-the-shelf sensors on the drum-shaped three-ton buoy will collect wind speed and direction, and air temperature and pressure from the top of the 7½-foot mast. Water temperature and pressure to depths of more than 600 feet will be collected along a weighted separate data line.

This information is used by weather forecasters in working out their predictions.

Designed to be anchored in water depths from 240 feet to 24,000 feet, these buoys have a set of batteries to power a three-channel radio transmitter, a small data processor and a warning light on the mast. The batteries are expected to last six to 12 months before requiring replacement or recharge.

Lockheed project leader **Martin H. Rosenblum** said data from the

11¼-foot-long 4½-foot-diameter buoys is sent automatically every six hours. If commanded by the shore station, these buoys can send the information at more frequent intervals.

The taut mooring system on the buoys consists of a 40-pound dig-in anchor and another 4,700-pound clump anchor connected to the buoy by chain and nylon. The top 5,000 feet of nylon is protected against fish bite by a polyurethane sheath.

Environmentally, the LCBs are designed to survive in a four-knot cur-

rent, winds to 100 knots and waves to 45-foot height.

The LCBs are one of a family of buoys developed by Lockheed.

Under a separate NOAA contract, Lockheed has also designed and built an experimental high-capability buoy that also collects meteorological and oceanographic information automatically and transmits it to the shore stations. This sophisticated Deep-Keel Buoy is larger and collects a greater variety of data.

Weighing 30 tons, this 29-foot boat-

shaped buoy is scheduled to be towed to its duty station in the Gulf of Mexico, about 230 miles south of New Orleans, La.

Other buoys developed by Lockheed include a company-financed water-quality monitoring buoy for inland waters, which has been successfully tested on San Francisco Bay, and a Reference Measurement System Buoy for NOAA that will be used as a standard for oceanic and atmospheric measurements to evaluate all NOAA-funded buoys.

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## American Waterways Operators Elects Robert J. Hughes Chairman — James R. Smith Named President



Robert J. Hughes



James R. Smith



Braxton B. Carr

**Robert J. Hughes**, president of James Hughes, Inc. of New York, was elected chairman of the board of The American Waterways Operators, Inc. at the recent annual meeting of directors of the association in Washington, D.C.

**James R. Smith**, Assistant Secretary of the Interior for Water and Power Resources, was elected president of the association, following his resignation from the Interior Department post.

**Braxton B. Carr**, president of the association since 1957, was elected to the newly created position of chairman of the executive committee.

**William E. Cleary** was elected to his 18th annual term as secretary-treasurer.

AWO, the national association of the barge and towing industry, has headquarters in Washington and field offices in New York City and New Orleans, La. Mr. Cleary operates the association's North Atlantic regional office in New York City.

Mr. Hughes succeeds **Harley G. Noland**, manager, transportation operations, Chemicals and Plastics Division, Union Carbide Corporation, South Charleston, W.Va., who has served as AWO board chairman for the last year. He will continue to serve as a director-at-large of the association for the next year.

The new chairman of the board, Mr. Hughes, with his brother, **William**, represent the third generation in the transportation operations of James Hughes, Inc., which have been conducted on the East Coast since 1894. The corporation is a certificated Interstate Commerce Commission water carrier.

Prior to entering the transportation field, the family firm constructed barges in New Brunswick, N.J. The barges were used to deliver coal from mines in Pennsylvania to New York City via the Delaware and Raritan Canal which linked Philadelphia and New York during the period 1850 through 1930.

James Hughes, Inc. has specialized since World War I in carrying by water large and heavy objects too big to move by rail or truck on the East and Gulf Coasts.

Hughes Brothers, Inc., of which **William J. Hughes** is president, is

an affiliate company engaged in chartering, towing and supplying vessels to contractors for heavy construction activities.

**Robert J. Hughes** has served since 1964 as a director of AWO. He served as chairman of the association's Coast Guard liaison committee in 1971 and 1972, and in that capacity testified before several Congressional committees on matters of major interest to AWO. He has also served on various other committees of the association, including the legislative, executive, general advisory, budget and finance, membership, public relations, education and movie production committees.

A son, **James J. Hughes**, is a vice president of James Hughes, Inc.

The new president of AWO was appointed Assistant Secretary of the Interior by President **Nixon** in 1969. In this capacity, his responsibilities included the operation of the Bureau of Reclamation; the Bonneville Power Administration; the Southwestern, Southeastern and Alaska Power Administrations; the Defense Electric Power Administration; the Office of Saline Water, and the Office of Water Resources Research.

In addition to his responsibilities as Assistant Secretary of the Interior, Mr. Smith's duties in that position included representing the U.S. Government on the Electric Research Council and membership on the board of directors of the Electric Power Research Institute. The institute is an organization of private and consumer-owned electric utilities, and the Federal Government, now undertaking electric power research to help guarantee future reliable power to the nation.

A native of Sioux Falls, S.D., Mr. Smith received his law degree from the University of South Dakota.

The new AWO president served as vice president and general counsel of the Mississippi Valley Association, now the Water Resources Congress. When appointed Assistant Secretary of the Interior, he was an executive of the Northern Natural Gas Company in Omaha, Neb.

In 1970, Mr. Smith was awarded the Ohio Conservation Award and, in 1972, the "Water Statesman of

the Year" by the National Water Resources Association. He also received the Department of the Army's distinguished civilian service award and the distinguished service award of the Water Resources Congress.

The following new directors of AWO took office at the annual board meeting:

**H.J. Aguero**, manager, inland waterways fleet, Mobil Oil Corporation, New York, N.Y.; **S.D. Campbell**, chairman of the board, Foss Launch & Tug Co., an affiliate of Dillingham Corporation, Seattle, Wash.; **A.D. Fulmer**, Port Birmingham Terminal, Warrior & Gulf Navigation Co., Chickasaw, Ala.; **J. Merrick Jones Jr.**, president, Canal Barge Company, Inc., New Orleans, La.; **Bernard T. Kelley**, president Hillman Transportation Company, Brownsville, Pa.; **Harvey H. Loumiet Jr.**, president, Loumiet Enterprises, Inc., Harvey, La.; **T. Truxtun Morrison**, vice president and manager, barge operations, Peavey Company, Alton, Ill.; **Edward Renshaw**, president, St. Louis Ship, Division of Pott Industries, Inc., St. Louis, Mo.; **William R. Saul**, president, Steuart Transportation Company, Piney Point, Md.; **Robert E. Scatterday**, president, Campbell Barge Line, Inc., Pittsburgh, Pa.; **George H. Shaver**, executive vice president, Shaver Transportation Company, Portland, Ore.; **Frank T. Stegbauer**, vice president, operations, Southern Towing Company, Memphis, Tenn., and **Sydney Wire**, assistant general manager, marine department, EXXON Company, U.S.A., Houston, Texas.

The AWO board of directors is made up of 47 water carrier executives from throughout the United States.

Reelected to the board were:

**Jack W. Campbell**, vice president and general manager, Mobile Towing Company, Mobile, Ala.; **Leo L. Collar**, president, Alaska Hydro-Train, Seattle, Wash.; **Stanley J. Fairhurst**, vice president for administration, Dilmar, Honolulu, Hawaii; **A. Giallorenzi**, manager, marine transportation department, New York Branch, EXXON Company, U.S.A., Bayonne, N.J.; **Thomas L. Gladders**, president, G.W. Gladders Towing Company, Inc., St. Louis, Mo.; **Howard S. Guttman**, president, Mon River Towing, Inc., Belle Vernon, Pa.; **Edward M. Hensley**, vice president, Security Barge Line, Inc., Greenville, Miss.; **James P. McAllister**, president, McAllister Lighterage Line, Inc., New York, N.Y.; **F.A. Mechling**, executive vice president, A.L. Mechling Barge Lines Inc., Joliet, Ill.; **Thomas E. Moran**, president, Moran Towing Corporation, New York, N.Y.; **Jerry L. Page**, president, Southern Barge Line Corporation, Paducah, Ky.; **Ed A. Smith**, president, Alamo Barge Lines, Houston, Texas; **L.P. Struble Jr.**, group vice president, Dravo Corporation, Pittsburgh, Pa., and **J.W. Von Herbu-**

**lis**, president, Pittston Marine Corporation, New York, N.Y.

Other AWO directors, in addition to Mr. Noland, who continue in office are:

**W.H. Barton Jr.**, senior vice president, Nashville Bridge Company, Nashville, Tenn.; **Lester C. Bedient**, general manager, Harbor Carriers, Inc., San Francisco, Calif.; **Peter J. Brix**, president, Knappton Towboat Company, Portland, Ore.; **Francis B. Bushey**, president, Spentonbush Transport Service, Inc., New York, N.Y.; **Harry J. Collins**, president, Collins Towing, Inc., Westwego, La.; **John M. Donnelly**, president, Ingram Barge Co., New Orleans, La.; **Donald G. Foss**, vice president, marine division, Puget Sound Freight Lines, Tacoma, Wash.; **Capt. Noble L. Gordon**, president, Mid-South Towing Company, Tampa, Fla.; **Ralph W. Hooper**, vice president, Interstate Oil Transport Co., Philadelphia, Pa.; **Gresham Houglund**, president, Crouse Corporation, Paducah, Ky.; **Robert J. Hughes**, president, James Hughes, Inc., New York, N.Y.; **H.M. Jones**, vice president, Livingston Shipbuilding Company, Orange, Texas; **John W. Lambert**, president, Twin City Barge & Towing Company, St. Paul, Minn.; **Capt. C.C. Rasmussen**, president and general manager, Bay and River Navigation Company, Richmond, Calif.; **K.W. Scoggins**, president, Midwest Towing Company, Inc., Minneapolis, Minn.; **David T. Sheehy**, president, M/G Transport Services, Inc., Cincinnati, Ohio; **Neville Stone**, president, Upper Mississippi Towing Corporation, Minneapolis, Minn.; **H.G. Williams**, president, Gulf Atlantic Transport Corporation, Jacksonville, Fla., and **H.C. Wynn**, operations manager, Triangle Refineries, Inc., Houston, Texas.

### Robert B. Grant Joins Diehl And Lundgaard As Senior Engineer

**Robert B. Grant** has joined the marine engineering and consulting firm of Diehl and Lundgaard, Inc., Bainbridge Island, Wash., as a senior engineer. He will be assigned to projects involving propulsion control systems, machinery and shafting vibration, and shipboard test instrumentation.

Mr. Grant graduated from the United States Merchant Marine Academy in 1953, and received a degree in mechanical engineering from the University of Arizona in 1955. He is a licensed professional engineer in the state of Washington.

Eighteen years of engineering experience include design work on turbine engines, shipboard operating experience, and development testing of large hydraulic systems.

Mr. Grant also has experience with instrumentation for vibration testing, hydraulic system performance tests, and electro hydraulic servo development tests.



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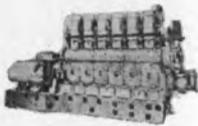
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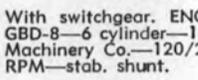
## DIESEL GENERATOR SETS

1



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

2



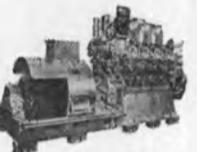
**EMERGENCY GENERATOR SUPERIOR 75KW 120/240 VOLT D.C. DIESEL GENERATOR SET**  
With switchgear. ENGINE: Radiator cooled Superior GBD-8—6 cylinder—1200 RPM GENERATOR: Electric Machinery Co.—120/240 volts DC—316 amps—1200 RPM—stab. shunt.

3



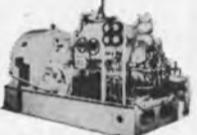
**UNUSED 10 KW SUPERIOR DIESEL GENERATOR SET**  
GENERATOR: Delco 10 KW—120 VDC—83.3 amps—1200 RPM. ENGINE: Superl-diesel—2 cyl.—4 1/2 x 5 1/4—15 HP—heat exchanger cooled.

4



**500 KW—120/240 VOLT DC DIESEL GENERATOR SET EQUAL TO NEW**  
GENERATOR: Allis-Chalmers—Compound wound. Has Class "A" insulation. Output 500 KW—120/240 volts DC—2080 amperes—720 RPM—drip-proof—self-cooling. Ambient 50°C—temperature rise 40°C. ENGINE: Model GM 8-278—2-cycle—Vee type—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.

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.



10

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

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

## 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



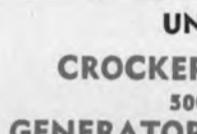
**AP2 VICTORY WORTHINGTON-MOORE CROCKER-WHEELER 300 KW UNIT**  
TURBINE: 440 PSI—740°TT—28 1/2" vacuum—type S4—5-stage—6097 RPM—serial 7547 & 7548. GEAR: 6097/1200. GENERATOR: 300 KW—120/240 volts DC—1250 amps—compound wound—973643—999759. Armature flange 8 1/2". B.C. 7"—12 holes. ALSO NEW ARMATURES 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—re-wound 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

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400 KW—450/3/60/1200 RPM—rise 40°C—100% and 58°C—125%. In book 5442. Serial 3S-35P792 and 4S-35P792.

**EXCITER**

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

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### MAIN PROPULSION

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**BETH CLASS SERIES TURBINE—13,600 H.P.**

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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

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  
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AND SUN-BUILT C4 VESSELS

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**NEW L.P. BLADE RINGS for large 8500 H.P. Victory**

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**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.

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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

23



### T2-SE-A1 MAIN PROPULSION ROTOR — G.E.

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

24

## 2 COMPLETE T-2 G.E. TURBINES

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

ROTOR WILL INTERCHANGE WITH ELLIOTT MAIN TURBINE

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.

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.

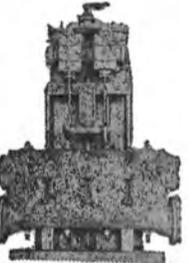
37



### NEW TURBINE DRIVEN FIRE AND GENERAL SERVICE PUMP

Allis-Chalmers 6x5 pump, type SKH—1200 GPM—125 PSI—3500 RPM. Coppo turbine type TF-22-2½—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—2½" Steam—4" Exhaust. Overall width 6'8"—Overall height 9'1½"—depth 3'9½"—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 4½" 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

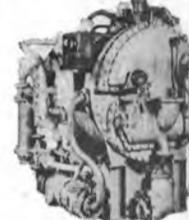


### DUPLEX MAGNETIC OIL STRAINERS

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—¾" 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.

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

PLEASE SEND INFORMATION ON THE FOLLOWING: (Please circle items)

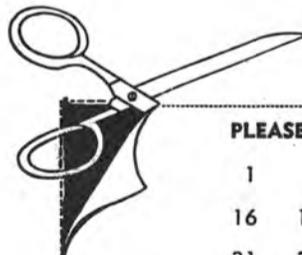
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46														

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



## Litton Delivers First In Series Of New Containerships To APL



The S/S President Jefferson, one of the world's largest and most modern containerships, is the eighth ship to be delivered by Ingalls in the past year.

Ingalls Shipbuilding Division of Litton Industries, Pascagoula, Miss., has delivered the S/S President Jefferson, one of the world's largest and most modern containerships, to American President Lines, Ltd., of San Francisco, Calif.

The President Jefferson is the first of four in a new series of containerships, the Pacesetter class, being built in Pascagoula by Ingalls for APL. Three sister ships—the S/S President Madison, launched and in final outfitting, and the S/S President Pierce and S/S President Johnson, both in shipway construction—are also scheduled for delivery to APL this year.

The President Jefferson is the eighth ship to be delivered by Ingalls in the past year.

The Pacesetters are designed to carry 1,100 cargo containers at speeds in excess of 24 knots. Refrigerated containers are carried on deck, and a dehumidification system in one cargo area permits transport of special cargoes.

The President Jefferson and her sister ships are 668 feet long and 90 feet wide. Displacement is 25,855 tons. The ships are designed for direct bridge control of speed and maneuvering.

The high-speed Ingalls-built Pacesetters will be used to upgrade APL's Atlantic/Straits service, the longest of the American-flag routes, covering more than 32,000 nautical miles.

Sailing from the East Coast United States ports of New York, Baltimore and Norfolk, the President Jefferson will make calls in the ports of Hong Kong, Singapore, Keelung and Saigon and ports of Japan before returning to the East Coast on voyages averaging 68 days.

The delivery of four Pacesetters this year marks the second major series addition to APL's fleet built by Ingalls. In the late 1960s, Ingalls built and delivered to APL a series of five Seamaster cargo liners that now form the backbone of American Presidents Lines' trans-Pacific service.

The S/S President Van Buren, first of the Seamasters, established a crossing record on her maiden voyage. Sister ships of the Seamaster class are the S/S President Grant, the S/S President Taft, the S/S President McKinley, and the S/S President Fillmore.

Delivery of the Pacesetters will give APL a fleet of 24 cargo vessels, with nine of its most modern and fastest ships built by Ingalls. APL, which traces its history to 1848, is the oldest American-flag line in continuous operation and the only American line continuing to offer around-the-world service.

Ingalls has also under construction three similar

containerships for Farrell Lines, Inc., of New York. The first of that series of four ships, the S/S Austral Envoy, was delivered to Farrell last fall.

## Three Bulk Carriers And Three 'Santa Fe' Type Vessels To Be Built At Astilleros Yards

Astilleros Espanoles, S.A. has recently received orders for six new vessels—three bulk carriers, and three vessels of the "Santa Fe" type.

One 53,000-dwt bulk carrier, to be built at Astilleros' Matagorda shipyard for Garth Shipping Co., Ltd., will have the following approximate dimensions: length overall, 678 feet; breadth, 66 feet, and depth, 59 feet. The ship will be powered by a B&W 6K84EF main engine totaling 16,500 bhp at 121 rpm, producing a speed of 16.9 knots. Delivery is scheduled for July 1974.

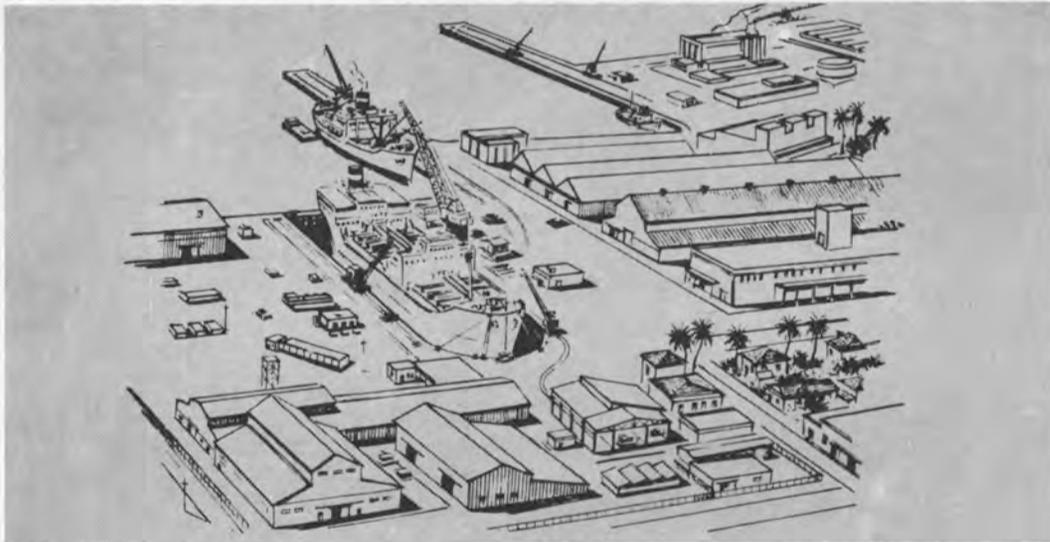
Two 35,000-dwt bulk carriers are to be built at the Sevilla and Matagorda shipyards for Naviera Galea, S.A. The vessels, to be delivered in November, and April 1974, respectively, will measure about as follows: length overall, 640 feet; breadth, 79 feet, and depth, 50 feet. The 15.15-knot carriers will be powered by a 7RND68 AESA-Sulzer main engine totaling 11,500 bhp at 150 rpm.

The three "Santa Fe" type vessels, to be of 20,900-dwt, are to be built at Astilleros Olaveaga shipyard for Aegis Shipping Co. Ltd. They will have the following approximate dimensions and principal particulars: length between perpendiculars, 486 feet; breadth, 75 feet, and depth, 44 feet. The vessels will be powered by a 6RND68 AESA-Sulzer main engine totaling 9,900 bhp, producing a service speed of 16 knots. Delivery is scheduled for December 1974, March 1975 and June 1975, respectively.

With these contracts, the order book of Astilleros Espanoles, S.A. showed 59 vessels with a total of 2,034,502 gross tons as of January 31, 1973, with distribution as follows: 19 vessels with 959,304 gross tons for the home market, and the remaining 40 units with 1,075,198 gross tons for foreign owners.

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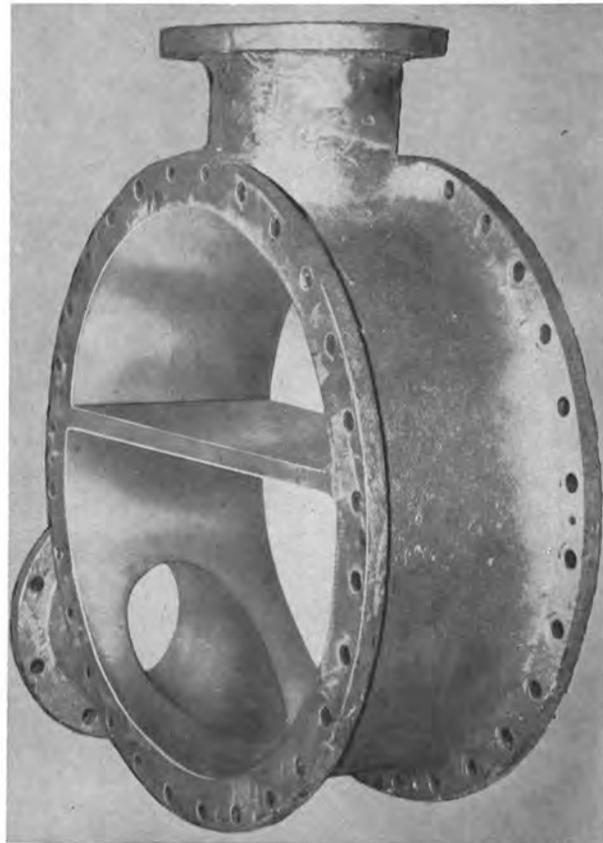
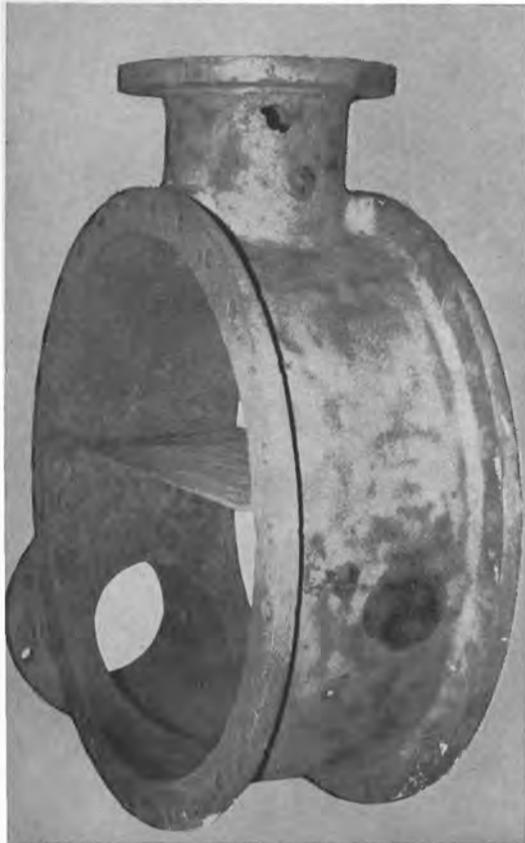
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P. O. Box 302, Quakertown, Pa. 10951

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BEFORE

AFTER ↑

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First proven under the most difficult conditions by the Navy, the Cordobond Strong-Back Method offers a fast and easy method of repair both aboard ship and ashore. Applied quickly by ship or maintenance personnel, Cordobond Strong-Back products are used extensively for repairing and lining:

- |                           |                                   |
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| <b>Water Boxes</b>        | <b>Ventilators</b>                |
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| <b>Ducts</b>              | <b>Pumps</b>                      |
| <b>Pipes</b>              | <b>Sea Valves and Chests</b>      |
| <b>Condenser Covers</b>   | <b>Tanks, Bulkheads and Decks</b> |
| <b>Cooler Heads</b>       | <b>Shell Plating Etc.</b>         |
| <b>Tail Shafts</b>        | <b>Frozen Pipes, etc.</b>         |

The Cordobond Strong-Back Components, when used according to directions, will repair anything from a pin hole to a complete break with a patch of great strength that clings tenaciously and lastingly.

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**STANDARD KIT For Ocean Going Vessels JUNIOR KIT For Harbor Craft**

**CORDOBOND REPAIR KITS CONTAIN ALL THE COMPONENTS AND ACCESSORIES FOR MAKING EMERGENCY REPAIRS AT SEA**  
Packed in sturdy Navy type refillable metal containers.

SEND FOR LIST OF CONTENTS AND LITERATURE

Over 6000 ocean going vessels carry our standard repair kits. Cordobond is not affected by water, oil, gasoline, etc. It does not corrode. It eliminates costly gas freeing. Cordobond is self curing, no applied heat necessary.

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## Tug-Barge Systems And Shipboard Waste Disposal Discussed By No. Calif. Sect.

Over 100 members and guests attended a technical program consisting of a symposium at which papers were presented on the subject of tug-barge systems by **Edmund L. Hukill**, vice president, Ingram Ocean Systems, Inc., New Orleans, La.; **William P. Wood**, president, Envirosol, Inc., Fairfield, Calif.; **Miklos M. Kossa**, naval architect, and **Norman Farmer**, George G. Sharp, Inc., New York, N.Y., at the January 11 dinner meeting of the Northern California Section of The Society of Naval Architects and Marine Engineers at the Engineers Club, San Francisco, Calif.

Mr. Hukill discussed the two Ingram tug-

barge combinations currently operating between Puerto Rico and Boston, Mass., including a report on their findings to date on the barge failure during loading in January 1972.

Mr. Wood briefly detailed the contemplated roll-on/roll-off garbage disposal barge systems currently contemplated for the metropolitan San Francisco area. He additionally reviewed his previous experience with Foss Towing.

Mr. Farmer outlined the scope of a current Maritime Administration study into all phases of tug-barge operations which will involve both detailed design and economic analysis of powers up to 50,000 hp and 100,000 dwt. An additional feature of the study is to develop a "Systems Analysis Technique" for use by interested U.S. firms.

Mr. Kossa summarized the major types of tug systems, outlining both advantages and



Pictured at the January meeting are, left to right: **Norman Farmer**, George G. Sharp, Inc., author; **Jack Troyer**, Todd Shipyards, Section chairman; **Miklos M. Kossa**, naval architect, author; **William P. Wood**, president, Envirosol, Inc., author, and **Edmund L. Hukill**, vice president, Ingram Ocean Systems, Inc., author.

disadvantages from a naval architect's point of view.

**Clyde Jacobs**, Crown Zellerbach; **Commander Malberg**, USCG; **Vincent Van Riper**, American Bureau of Shipping; **David Seymour**, naval architect; **Robert Herbert**, naval architect; **Jack Gary**, Ohio Barge; and **Ted Weiss**, Marcona Corporation, additionally contributed to an extensive discussion period which brought out the following observations:

(a) Minimum tug crews in ocean service are 12 to 14, compared with a ship's complement of 34.

(b) Tugs in moderate horsepower are available cheaper in the United States than elsewhere in the world.

(c) A 2½-percent rate is available on Hull and Machinery insurance for at least one tug-barge system on a "worldwide trading" basis.

(d) The Ingram tug-barge has functioned successfully up to 5 knots in 50-foot seas.

(e) The ideal tug application should have the sea passage time equal to the loading or discharge time.

(f) The limit on "towing" is suggested as approximately 12 knots based on a 2½-inch maximum practical wire size.

(g) Up to a 2-knot speed gain has been observed on a "ship hull" barge with a controllable steering device.

(h) A summary statement was suggested to the effect that a tug-barge system is an "Insult to the Naval Architecture profession stemming from archaic Government laws and regulations compounded by inept Labor and Management Negotiators."



**WASTE DISPOSAL DISCUSSION:** Approximately 75 members and guests attended the presentation of the technical paper "A Zero Discharge Method for Shipboard Waste Disposal" by **Edward P. Foster** of the Babcock & Wilcox Co. at the December 14 meeting of the Northern California Section of The Society of Naval Architects and Marine Engineers, also held at the Engineers Club in San Francisco. The paper reviewed various types of sewage treatment and described in detail why total incineration in the ship's boilers is recommended by the author on both an environmental and economic basis. Shown at the meeting are, left to right: **J. Troyer**, Todd Shipyards, Section chairman; **Mr. Foster**, author; **M. Kossa**, naval architect, papers committee chairman, and **Robert Whitam**, marine sales manager, Babcock & Wilcox Co.

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## Herrman To Direct Alcoa Marketing In LNG Industry



George E. Herrman

To direct and coordinate its role as a major supplier to the internationally expanding liquefied natural gas industry, Aluminum Company of America, Pittsburgh, Pa. 15219, has named **George E. Herrman** as corporate manager-LNG.

Mr. **Herrman** will be responsible for formulating and implementing Alcoa's worldwide marketing strategies to all facets of the liquefied natural gas industry.

A graduate of the University of Michigan, Mr. **Herrman** joined Alcoa in Detroit in 1948 as a sales engineer. In 1957, he moved to Pittsburgh to become commercial automotive sales manager. He was named transportation industry sales manager in 1960 and has been general manager - industry sales since 1968.

## Global Terminal Names J.B. Barbera Exec. VP

Richard T. Norton, president of Global Terminal & Container Services, Inc., Port Jersey, N.J., has announced the promotion of **Joseph N. Barbera** to the newly created position of executive vice president.

Mr. **Barbera** joined Global Terminal & Container Services as a vice president, and has been with the firm from the conceptional to the present operational phase. He was formerly associated with Sealand Services, Inc., and the U.S. Treasury Department, Internal Revenue Service. A former resident of Jersey City, N.J., Mr. **Barbera** obtained his B.S. degree at St. Peter's College.

## Seatrains Shipbuilding Names New President — Two Vice Presidents

Seatrains Lines, Inc. has announced a realignment of the top management of its shipbuilding operations, naming a new president and two vice presidents—a specialist in steel fabrication and in production scheduling.

Elected president of Seatrain Shipbuilding Corp., a wholly owned subsidiary of the parent, was **Thomas P. Howes** formerly assistant group general manager at International Telephone & Telegraph Corp. and responsible for 10 of its companies. He has been associated with North American IT&T since 1964, first as director of operations staffs in Canada, then as general

manager of IT&T's Communications Systems Companies. He is a graduate of Harvard College, and received his master's degree in business administration at Columbia University.

Mr. **Howes** succeeds **Warren B. Pack**, who has been reassigned to a corporate supervisory position coordinating the operations of all divisions of Seatrain Lines. Mr. **Pack** has been in charge of the

shipyard since the company began operating there in 1969, and president of the shipyard subsidiary since 1970. He was responsible for redeveloping the former Brooklyn Navy Yard and initiating construction of the two 225,000-dwt tankers now being completed there—the largest tankers ever built in the United States.

Named vice presidents were **Raymond J. Cicconi**, general su-

perintendent of U.S. Steel Corporation's American Bridge Division plant at Orange, Texas, and **Stuart Rock**, vice president-manufacturing at Tech-Serv, Inc. and previously director of operations at Republic Electronic Industries Corp. Mr. **Cicconi** is a graduate of Elmira College, N.Y. Mr. **Rock** received his bachelor's degree in mechanical engineering at Polytechnic Institute of Brooklyn.

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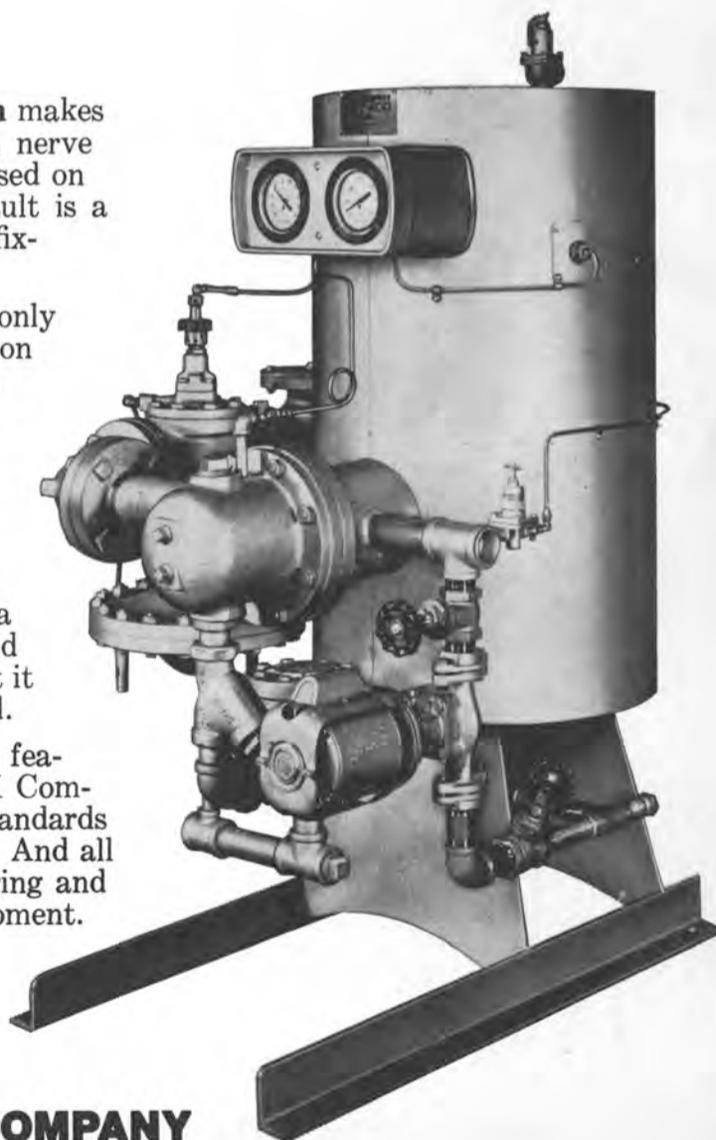
**Its Unique Anticipator<sup>®</sup> Control System** makes sure of that. The Anticipator, acting as a nerve center, continuously senses heat demand based on inlet water flow and temperature. The result is a constant supply of hot water to shipboard fixtures, with temperature controlled to  $\pm 5^\circ$ .

**Packaged** for quick installation — only five connections — the Compact 400 saves on labor costs. Routine inspection just means pulling out the tube bundle. And servicing is easy because the gaskets are all independent.

**Compact** but powerful, the marine 400 does the work of a conventional unit four times its size, delivering up to 660 gpm. For maintenance access, it requires a maximum of only 36" frontal clearance and no overhead clearance. You can even mount it on a bulkhead or hang it from the overhead.

**Nonferrous Materials** of construction feature an SB-96 copper-silicon shell. All P-K Compact 400s are built to ASME and ABS standards as well as to U.S. Coast Guard regulations. And all reflect our 93 years' experience in engineering and manufacturing reliable heat transfer equipment.

Send for Bulletin 400.



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## New Company, Arctic Transportation, Ltd., Formed To Specialize In Service To North



One of Arctic Marine Freighters' 7,000-hp tugs towing a barge load of 48-inch pipe in the ice-choked Arctic during the 1970 sealift to Prudhoe Bay on Alaska's North Slope.

The formation of a new Canadian Company, Arctic Transportation, Ltd., which will offer specialized transportation service to the Western Arctic, was announced in Vancouver, British Columbia. Two major Canadian marine transportation firms, Seaspan International Ltd. of Vancouver, and Federal Commerce and Navigation Co. of Montreal, were responsible for the formation of the transportation consortium.

Officers of the new consortium are: chairman, **Laurence G. Pathy**, president of Federal Commerce & Navigation Co., Ltd.; president, **J.F.C. Stewart**, chairman of Seaspan International; vice president, marketing, **Michael H. Bell** of Federal Commerce & Navigation Co., Ltd.; vice president and secretary-treasurer, **Edward Judd**, vice president, corporate services of Seaspan International.

The unusual difficulties and de-

mands related to transportation in the Arctic dictated the formation of the company, which utilizes the equipment and expertise of three established towing companies and a worldwide steamship company.

In addition to the Canadian companies, there will be participation by Puget Sound Tug & Barge Co., and PAC, both of Seattle, Wash., bringing together virtually all of the experience and knowledge that has been developed in this specialized field in the past 15 years.

The oil and gas activity at Prudhoe Bay and elsewhere along Alaska's North Slope and the Canadian Western Arctic, provided the incentive for the formation of Arctic Transportation, Ltd. The company is prepared to provide specialized transportation services along the Western Arctic coastline.

The companies have developed, with experienced operating personnel and properly designed equipment, a transportation system that will operate from any world port, and thence around Point Barrow, to final delivery point anywhere in the Western Arctic. Since 1958, member companies have provided annual transportation of military and commercial cargoes to this remote part of the world. In 1970, a fleet of 56 barges and 28 tugs of member companies delivered over 200,000 tons of cargo along the Arctic coastline.

Seaspan, which two years ago brought together the resources of British Columbia's two largest and longest established towing companies, Island Tug and Barge, and Vancouver Tug, has an established reputation in North Pacific salvage, trans-Pacific towing and the operation of some of the world's largest oceangoing bulk-cargo barges along the Pacific Coast. The company's flagship Sudbury II is well-known to shipping circles and the public alike.

Federal Commerce and Navigation Company has been in operation since 1944. It owns and operates, as well as charters, a fleet of specialized cargo and supply vessels ranging from 33,000-ton bulk-cargo carriers, capable of navigating the St. Lawrence Seaway, to 16-ton icebreaking tugs for use in the Arctic Islands.

Through its subsidiary, Resolute Shipping Ltd., the company has figured prominently in the water transportation of supplies to oil companies exploring in the Arctic Islands, as well as to Atlantic offshore drilling operations. Federal Commerce and Navigation Co., Ltd. has made a specialty of transportation of steel and heavy equipment under exceedingly difficult conditions.

Puget Sound Tug & Barge Co. and PAC, through their joint venture, Arctic Marine Freighters, were responsible for moving almost all the materials and equipment required thus far for development of the oilfield at Prudhoe Bay, as well as the transportation of 48-inch pipe for the northern

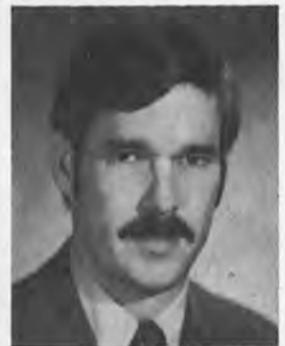
portion of the proposed Alyeska Pipeline. Both companies are known for their worldwide and coastwise towing and barging capabilities.

Commenting on the formation of the new company, which will be Vancouver based, president **Stewart** said that the formation of the consortium was essential. "No single shipping company or towing company could begin to provide the transportation services that are going to be required in the Arctic North.

"We are going to be engaged in sealifts unheard of in the past. Our ports of delivery quite often will be locked in by sea ice for all but six weeks of the year. It's not just a matter of the right quantity and the right kind of equipment. A vast knowledge of the marshaling of supplies is required, together with the ability to devise loading and off-loading methods that leave absolutely no room for error. I think Arctic Transportation, Ltd. is big enough and good enough to handle the Arctic," he said.

In addition to its head office in Vancouver, the company will have offices in Calgary and Montreal and will provide transportation services to the Arctic from both the West and East Coasts.

### Thomas L. Gladders Elected President G.W. Gladders Towing



Thomas L. Gladders

**Thomas L. Gladders** has been elected president of G.W. Gladders Towing Company, Inc. He was formerly vice president of the company, with headquarters at 230 South Bemiston, Clayton, Mo.

Before joining the company in 1968, Mr. **Gladders** was a commercial loan officer of the First National Bank of Chicago. He is a graduate of Dartmouth College and Stanford University Graduate School of Business. He is an active member of the towing industry, serving as a director and Region 1 vice president of the American Waterways Operators, Inc.; a member of the Barge and Towing Industry Advisory Committee to the U.S. Coast Guard; a member of the advisory board of The National River Academy, Helena, Ark., and Missouri governor, Water Resources Congress.

It was also announced that **G. Warren Gladders** was elected chairman of the board, a newly created position.

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## American Bulk Carriers Names Wesley Wheeler As Technical Director



Wesley D. Wheeler

Samuel H. Wang, president of American Bulk Carriers, Inc., 711 Third Avenue, New York, N.Y. 10017, has announced the appointment of Wesley D. Wheeler as technical director of the corporation.

At the time of acceptance of his new position, Mr. Wheeler was technical counselor to the Bay of Cadiz new shipyard group (NABAC) of Astilleros Espanoles, S.A. He holds a master's degree in naval architecture and marine engineering from the University of Michigan, and a bachelor's degree in mechanical engineering from Worcester Polytechnic Institute.

Having been born into the shipbuilding industry, Mr. Wheeler brings a wealth of theoretical and practical experience to his new position. He has been a private consultant, was previously employed by ABC as project engineer, and has been affiliated with leading consultants in New York.

Mr. Wheeler recently presented a paper to the Asociacion de Ingenieros Navales of Madrid, of which he is now a member, entitled "Buques y Fletes? Como Van?" (Shipping, How goes it?).

He is also a member of the professional societies of The Society of Naval Architects and Marine Engineers, RINA, NECIES, I-Mar.E., and the New York Society of Port Engineers.

## Western Gear Receives \$3-Million Order From Bath Iron Works

Western Gear Corporation, Lynwood, Calif., has been selected by Bath Iron Works, Bath, Maine, to provide the main reduction transmission system for the new gas turbine-powered patrol frigates which will guard the nation's shores. The initial order totals in excess of \$3 million, but potential value for all 30 ships in the program is estimated in excess of \$20 million.

The first main reduction gears to be built by Western Gear are to be used by the Navy for the Land-based Test Facility at Philadelphia, Pa., and for the lead ship of the new fleet.

The frigates, of the single-screw type, will be powered by two gas turbines working in parallel through a Western Gear reduction gear to a

controllable pitch propeller. The transmission system will be of the locked train and double reduction concept.

One or two gas turbines will be used to transmit up to approximately 40,000 shp for full power operation. The first of these large marine reduction gears is scheduled for delivery mid-1974.

## Moore And McCormack To Pay \$64 Million For Pickands Mather

Moore and McCormack Co., Inc. and Diamond Shamrock Corporation have announced execution of a definitive contract for the purchase by Moore and McCormack of the business of Pickands Mather & Co., a subsidiary of Diamond Shamrock. Agreement in principle as to the proposed sale was announced on December 21, 1972.

The purchase price is approximately \$64 million. It will be payable in 300,000 shares of 9 percent senior preferred stock, par value \$100 per share, \$30 million in an 8½ percent note due January 15, 1974, and the balance in cash. The securities will be issued by new subsidiaries of Moore and McCormack, which will be formed to conduct the business of Pickands Mather. Moore and McCormack may be required to purchase, at the holder's option, for cash at par value, up to 100,000 shares of the preferred stock in January 1974, and an additional 200,000 shares in January 1975 and thereafter. The preferred stock may be called for redemption as to 100,000 shares in January of each of 1974, 1975 and 1976 thereafter.

Moore and McCormack also announced that long-term financing in connection with the acquisition has been arranged with the Chase Manhattan Bank, N.A.

A special meeting of the Moore and McCormack stockholders will be held on March 30, 1973, for the purpose of taking action on the purchase. Closing of the transaction is subject to Maritime Administration approval and satisfaction of certain other conditions and is scheduled to take place shortly after the Moore and McCormack stockholders' meeting.

## Atlantic Richfield Marine Headquarters Moved To Los Angeles

Atlantic Richfield Company has relocated the headquarters of the company's marine transportation department from Fort Mifflin, Philadelphia, Pa., to the new corporate headquarters offices in Los Angeles, Calif. 90051.

Capt. C.M. Lynch, manager of marine transportation, is directing operations from the ARCO Tower, one of twin 52-story buildings in the recently completed Atlantic Richfield Plaza complex in downtown Los Angeles.

On Captain Lynch's staff at Los Angeles are C.E. Heil, manager of chartering and evaluation; W.R. Miller, supervisor of budgets, and

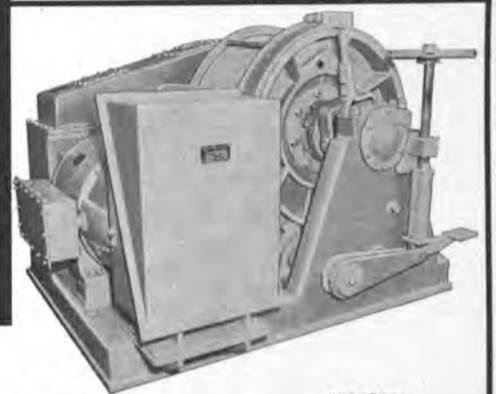
L.M. Schmillen, supervisor of chartering.

F.W. Jacobanis, manager of operations reporting to Captain Lynch, has retained his office at Fort Mifflin. His staff includes Capt. L.W. Keller, general supervisor of Eastern operations; E.A. Winkler, general supervisor of Western operations; T.F. Waite, supervisor of fleet manning; E.J. Hinks, supervisor of services and

supply, and J.E. Banister, manager of environmental affairs and safety.

Also located at Fort Mifflin but reporting directly to Captain Lynch is E.V. Stewart, recently named manager of construction and repair. His staff includes W.A. Walls, manager of engineering and maintenance; H.A. Diek, supervisor of development, and W. Kollar and W. Vogel, supervisors of marine inspection.

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## Maritime Fruit Carriers To Receive \$620 Million In Charter Agreement

Maritime Fruit Carriers Company Limited, 122 East 42nd Street, New York, N.Y. 10017, has announced it has entered into a 15-year time charter agreement with a major shipping concern for approximately 1.3 million deadweight tons of very large crude carrier capacity, consisting of several vessels scheduled for delivery in 1975-76.

Under the agreement, Maritime Fruit Carriers will receive gross minimum charter hire of \$620 million plus escalation, depending on operating costs. In addition, Maritime Fruit Carriers will participate in profits derived from commercial income of the vessels above the fixed-charter rates, plus escalation costs.

The shipping concern has been granted an option by Maritime Fruit Carriers for an additional

five-year time charter on these same terms. If exercised, the minimum gross charter hire will aggregate \$827 million.

Maritime Fruit Carriers Company is a multinational organization specializing in refrigerated shipping and oil transportation.

## Schnitzer Subsidiaries File For Tankers

Two maritime firms—Pacific Shipping, Inc., and American Shipping, Inc., both of Portland, Ore., have filed for construction and operating subsidies with the Maritime Administration for two 87,000-deadweight ton tankers.

The estimated cost of each vessel is \$28.4 million, with the subsidy on each amounting to 41 percent or \$11.6 million, according to the application. Both firms are wholly owned subsidiaries of Schnitzer Steel Products Co.

According to the filing, neither company now owns or operates any ships. However, affiliated companies under Schnitzer Co. operate 14 bulk carriers and two tankers under Liberian flag, and one oceangoing tug under Panamanian flag. In addition, three foreign-flag bulk carriers are now under construction.

Pacific Shipping said that the ownership of the foreign-flag vessels was "no bar to subsidy" because the ships involved "negligible competitive impact in essential U.S.-flag service." The application also asked for a waiver on additional foreign vessels which may be acquired by foreign-flag affiliates.

## Zidell Explorations Names Scott VP

Wallace C. Scott has been appointed a vice president of Zidell Explorations, Inc., Portland, Ore.

Emery N. Zidell, president of the Zidell organization, said that Mr. Scott will assume additional management responsibilities while continuing to head the valve division of Zidell Explorations.

Mr. Scott joined the division in 1948 as a sales representative, later becoming sales manager and, in 1967, general manager.

The valve division of Zidell Explorations operates a manufacturing-rebuilding complex at Portland, as well as sales offices and warehouses at Edison, N.J., Long Beach, Calif., Houston, Texas, and Portland, Ore.

Other basic operations of Zidell Explorations include ship dismantling, barge construction, wholesale distributing of marine and electrical equipment, and purchase and sale of scrap and related materials.

## Northeast Communications' New 700 Marine Receiver

Northeast Communications Company announces the availability of a new marine channel 13 monitor receiver designed to comply with FCC specification #83.715. Completely solid-state, the model 700 receiver provides economical, inexpensive and reliable monitoring of bridge-to-bridge marine channel 13.

The 700 receiver's small size (9 inches by 3½ inches by 7 inches) makes it ideal for use in areas where available space is at a premium and optional mounting bracket affords quick and easy installation. Receiver is equipped with internal battery, power on indicator, charging rate indicator, whip antenna and external antenna connector. The unit is capable of operation from 110 volts AC, 12 volts DC, or internal battery.

For additional information regarding the 700 marine receiver, contact Northeast Communications Company, Inc., Newfoundland Professional Building, Route 23 Southbound, Newfoundland, N.J. 07435.

## Seaspan International Ltd. Appoints Judd And Pearson



Edward Judd



John F. Pearson

J. Rod A. Lindsay, president of Seaspan International Ltd., has announced the appointments of Edward Judd as vice president, corporate services, and John F. Pearson as vice president and secretary-treasurer of the company. Both Mr. Judd and Mr. Pearson are chartered accountants, and have been with Seaspan or its associated companies for over 15 years.

Seaspan, a Canadian company owned jointly by Genstar Limited and Dillingham Corporation, operates tugs and barges in coastal and deepsea transportation on the Pacific Coast. These appointments, and the consequent re-alignment of corporate responsibilities, result from the continuing growth of the company.

## Barber Lines Names Cangemi And Enzerink

E.J. Barber, president of Barber Steamship Lines, Inc., 17 Battery Place, New York, N.Y. 10004, has announced the appointment of Frank M. Cangemi to the position of vice president, and the appointment of Capt. Gerhardus J. (Jerry) Enzerink to the position of general manager, operations.

Mr. Cangemi joined Barber in 1968 as inward freight manager after 17 years at Funch, Edye & Co., Inc. He was named an assistant vice president on March 1, 1970, and is presently in charge of all Barber's inward services into U.S. Atlantic, Gulf, and Eastern Canada.

Captain Enzerink, a 1961 graduate of the Nautical Academy, Flushing, the Netherlands, where he obtained his master's license, joined Barber's Cargo Handling section in 1968 as a port captain and served in that capacity until his new appointment. In his new position, Captain Enzerink will be in charge of Barber's U.S. Atlantic, Gulf, and East Canadian vessels' operations.

## Holland America Cruises Names van Tol President

Arie van Tol has been named president of Holland America Cruises in New York, replacing A. Campbell Buchanan who has resigned for personal reasons.

For the past nine months, Mr. van Tol has served as chairman of the board and chief executive officer of Westours, a Seattle, Wash.-based tour operator in Alaska and the South Pacific. Prior to that, he was vice president-finance for Holland America in New York and since 1959, served with that company in the accounting and finance department.

Born in Monnikendam, the Netherlands, in 1921, Mr. van Tol came to the United States in 1956. He graduated from Rutgers University in 1962, and received his master's degree from New York University in 1965.

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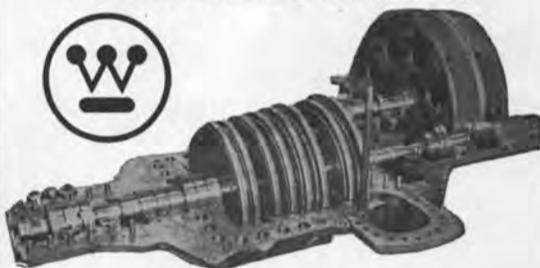
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## Gotaverken's Yard Delivers Tenth 232,664-Dwt Tanker



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The 232,664-dwt tanker Corona built at Gotaverken's Arendal yard, has been delivered to Corona Skibs A/S (H.M. Wrangell & Co. A/S), Haugesund. The T/T Corona is the 10th tanker of this size to be delivered from Gotaverken.

The new ship has been built to the highest class of Det norske Veritas and class EO (unmanned engine room). Her leading particulars are: length overall, 1,090 feet 2½ inches; length bp, 1,050 feet; molded breadth, 149 feet 7 inches; molded depth, 87 feet 6 inches, and draft on summer freeboard, 67 feet 9¼ inches. The ship is equipped with a Stal Laval steam turbine of AP type, which develops a maximum continuous output of 32,450 shp at a propeller speed of 86 rpm. Trial speed was well over 16 knots on a draft of 67 feet 7 inches.

Steam is generated in two oil-fired water-tube boilers of the Babcock & Wilcox type made by Gotaverken. Each boiler has a maximum capacity of 70 tons of steam/hr.

The total capacity of the cargo tanks is 9,993,000 cubic feet, and the ballast water tanks have a total capacity of 979,000 cubic feet. There are about 405,000 cubic feet of bunker space.

The ship is equipped with the usual modern navigational aids, including data radar, gyrocompass, automatic steering, echosounder, radar and doppler sonar log. A direction finder, radio station with VHF-telephone, engine room telegraph order recorder, and Gotaverken Lodicator are also included.

## Brazilian Yard Building LASH Barges

The first LASH (lighter aboard ship) barges to be constructed in Brazil are coming off the assembly line at the rate of five every three weeks.

Companhia Comercio e Navegacao of Rio de Janeiro is building 50 barges for Delta Steamship Lines, Inc. of New Orleans, La. The first of three 89-barge-capacity LASH vessels ordered by Delta was launched on January 27 at Avondale Shipyards in New Orleans, with the other two to follow at 60-day intervals. The vessel, the S/S Delta Mar, will pick up the Brazilian-built lighters, loaded with cargo, on its maiden voyage.

Space restrictions at the Brazilian shipyard have prompted the yard to stack the lighters three-high, an arrangement that is similar to the vertical stacking of the lighters aboard the LASH vessel at sea. As the lighters are completed, they are placed in the water and floated two-high to conserve waterfront space.

Brazil is the fifth nation to build LASH lighters. The others are the United States,

Ireland, Japan, and Argentina. The LASH program represents an investment to date of more than \$600 million.

The standard LASH lighters, interchangeable throughout all the trade routes served by LASH vessels, have an overall length of 61 feet 6 inches, a breadth of 31 feet 2 inches, depth at side of 13 feet, bale capacity of 19,500 cubic feet, and grain capacity of 19,800 cubic feet.

The rapid growth of LASH operations, from the maiden voyage of the first LASH vessel about three years ago, is dramatically illustrated by the fact that 3,296 LASH lighters in operation or ordered have a cargo capacity equal to 62,000 standard 20-foot containers.

Ready acceptance of the LASH lighter "package" has spread rapidly on trade routes that now serve four continents. The handy

size of the lighter, plus its accessibility, has proved more than adequate for transporting all types of cargo—bulk, manufactured, liquid, raw, odd-sized, and heavy lifts. The LASH system renders express service to developed and developing nations, capable of carrying jute and copra in the same manner as exotic wines or electronic equipment.

The LASH system, which consists of a large ocean carrier, a fleet of lighters, and a 510-ton shipboard crane that loads and discharges the lighters, is the invention of naval architect Jerome L. Goldman. Mr. Goldman, who spent 17 years developing the system from drawing board to maiden voyage, is president of Friede & Goldman, Inc., naval architects and marine engineers, New Orleans, La., and president of LASH Systems, Inc., licensor for the LASH system.

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## Santa Fe Rig Christened At Gulfport Shipbuilding

Gulfport Shipbuilding Corporation, a wholly owned subsidiary of Levingston Shipbuilding Company, christened its first semisubmersible offshore drilling vessel on February 16, in Port Arthur, Texas.

Mrs. R.C. Guinness, wife of the president of Standard Oil Company of Indiana, broke the bottle of champagne on the hull of the new vessel, which was built by Gulfport for Santa Fe Marine, Inc. of Orange, Calif. Mrs. Kenneth J. Barr and Mrs. John W. Phenicie, wives of Amoco Production Company division managers, acted as co-sponsors. Edfred L. Shannon Jr., president of Santa Fe International Corporation, parent company to Santa Fe Marine, Inc., spoke during the ceremonies.

Named the Santa Fe Mariner 2, the vessel is scheduled to work for Amoco Production Company on its initial drilling contract in the Gulf of Mexico, following delivery from Gulfport this month.

Similar in most respects to the Santa Fe Mariner 1, built by Levingston, the vessel is designed to drill up to 20,000 feet. The vessel's position is maintained by eight 22,000-pound anchors, while stabilization is accomplished by six identical oblong columns 23 feet wide by 34 feet long. These columns are installed on two rectangular hulls which were built separately and connected by vertical trusses built of tubular sections.

Atop the connecting trusses are 3-foot deep girders which frame the reserve buoyancy tanks and support the Texas deck 42 feet above the bottom of the vessel, with the weather deck 13 feet above this level.

The two lower hulls contain 15 watertight compartments, 14 of which are used for liquid storage and ballast. The midship compartments in each hull contain the remotely operated pumps and control valves for shifting ballast to maintain a stable drilling position. Accesses to pump rooms are through the center stability columns.

The vessel itself is classified as a semisubmersible column stabilized offshore drilling unit and has an overall length of 270 feet by 106 feet wide, and measures 42 feet high to the Texas deck.

Each of the stability columns contains a watertight collision compartment around outer periphery filled with polyurethane plastic foam material for added safety in case of damage. Each of the four corner stability columns houses a double drum mooring winch. The midship columns contain bulk cement and mud storage tanks.

## Hydro Products Introduces Underwater TV System For Inspection Of Wellheads

A totally new Underwater Television System for inspection of wellheads and blowout preventer stacks will be displayed by Hydro Products, a Dillingham Company, at the Fifth Annual Offshore Technology Conference in Houston, Texas, April 30, May 1 and 2.

This new, integrated system is capable of being lowered on guide wires via a telescoping frame, or can be lowered inside the drill string where entry and reentry without the use of guide wires is required. Hydro Products' field proven, reliable Model TC-125 Television Camera, or Model TC-125-SIT Low Light Level Television Camera is the heart of both systems.

In addition, Hydro Products is offering for the first time an explosion proof air winch with armored television cable to lower the viewing equipment to the sea floor, and an explosion proof console containing TV monitor, power supply and remote controls for

winch, TV focus, underwater light and panning and tilting mechanisms.

Hydro Products' Wellhead Inspection System is available complete and ready-to-use for purchase or on a lease plan. Individual components, such as the underwater television camera, winch and telescoping frame, are also available for purchase or lease.

Other equipment Hydro Products plans to display at the OTC include water speed and direction systems, wave and tide analyzers, and seismic recorders.

Hydro Products, a leading manufacturer of oceanographic instruments and underwater viewing systems, will occupy booths 2222, 2224, 2226, and 2228. For further information contact Jim Hitchin, Assistant General Manager, Hydro Products, P.O. Box 2528, San Diego, Calif. 92112.

## Husky Hydraulics Names A.C. Hoyle

The A.C. Hoyle Company of Iron Mountain, Mich., has been designated as the exclusive distributor for the Husky Marine Line of Marine Articulated Knuckle-Boom Cranes for the area east of the Mississippi, by Husky Hydraulics, Inc. of Two Harbors, Minn.

The all-hydraulic salt-air-corrosion-resistant cranes are available in five lift capacities, ranging from 4,650 pounds to 14,300 pounds, at a standard 8-foot radius. Power for the Husky Mariner may be supplied by an independent hydraulic drive system, or the ship hydraulic system. The cranes offer a unique flexibility in cargo handling due to the utilization of the Articulated Knuckle-Boom Crane design.

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

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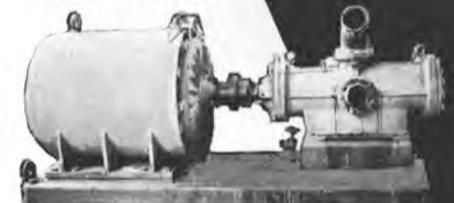
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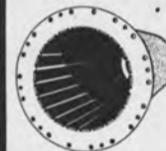


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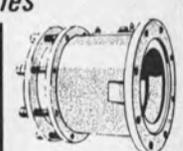
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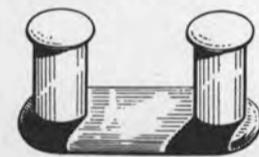
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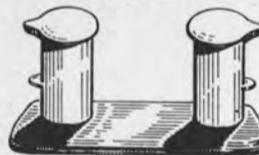


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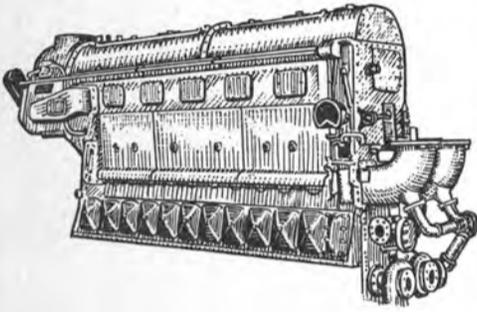
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**MARINE DIESEL ENGINES**

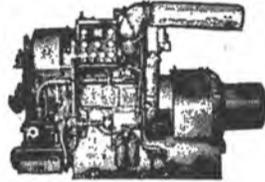


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**MARINE DIESEL GENERATORS**



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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.

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BUDA, 6 DHG691, 60 KW, 120 DC.

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

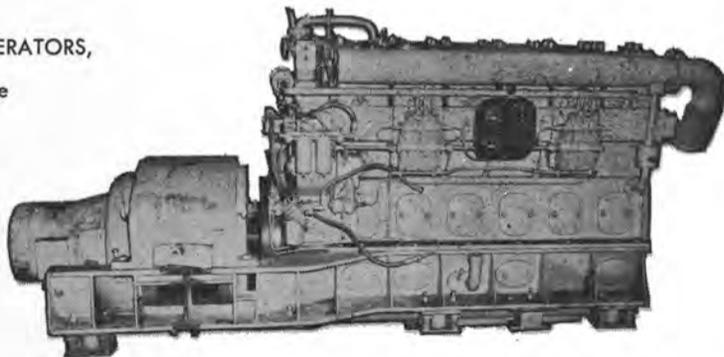
BUDA 6DC844, 75 KW, 125-250 DC.

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

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

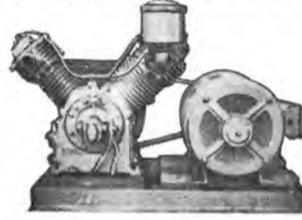
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For TURBINE GENERATORS,  
See Following Page



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

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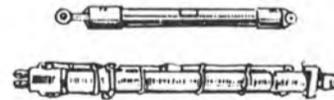
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Bore	Stroke	Rod Diameter	retracted length	Action
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2.5"	15"	1.12"	25 1/2"	double
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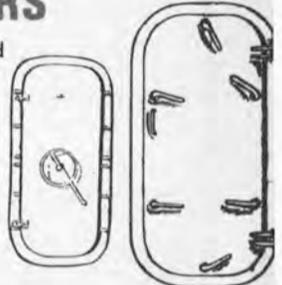
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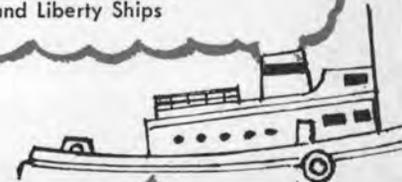
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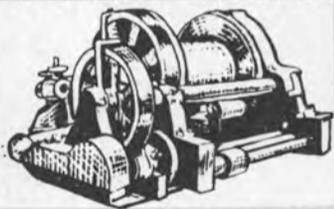
3—HESSE-ERSTED, horizontal, double wildcat, 2 1/8" chain, 60 HP, 230 DC.

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

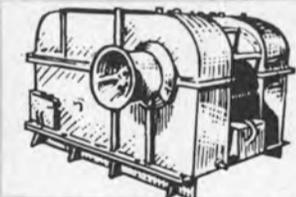
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Single speed, single drum, 7450 # at 220 FPM.

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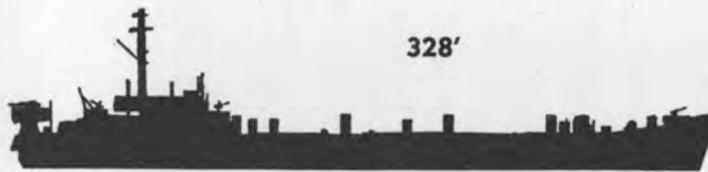
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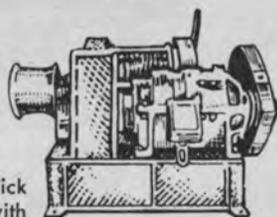
4—FAIRBANKS-MORSE, Model 38DB-1/8, 16 cylinder, O.P., 1600 HP, 720 RPM.

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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.

## 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.

## HATCHES from TANKER

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

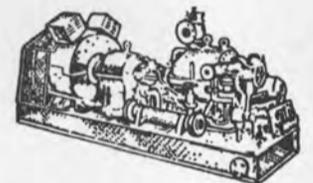
## TURBINE GENERATORS

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.

# TERRIFIC INVENTORY... AC & DC

# Marine Pumps

## CENTRIFUGAL

### DC - HORIZONTAL

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

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

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

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

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

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

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

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

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

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

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

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

### AC - HORIZONTAL

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

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

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

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

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

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

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

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

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

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

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

(Continued)

### AC - HORIZONTAL

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

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

### DC - VERTICAL

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

### AC - VERTICAL

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

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

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

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

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

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

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

## ROTARY PUMPS

### DC - HORIZONTAL

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

### DC - VERTICAL

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

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

2—QUIMBY, Size 5, 6 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 2½, 17 GPM, 405 PSI, 7½ HP, 230 DC.

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

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

### Rotary, AC - Vertical

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

2—BLACKMER, Size 1N5INV, 50 GPM, 50 PSI, geared, 2 HP, 440/3/60.

## HYDRAULIC PUMPS

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

## BOILER FEED PUMPS-STEAM

Size 11 x 7 x 18 vert. simplex

Size 11 x 7 x 24 vert. simplex

Size 12 x 8 x 24 vert. simplex

Size 12 x 8½ x 12 vert. simplex

Size 14 x 9 x 24 vert. simplex

## TURBINE DRIVEN FIRE PUMPS

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

## FAIRLEADS

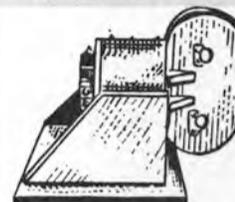
Designed and Manufactured by ZIDELL EXPLORATIONS, INC.

To Give You These Features:

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

Self Aligning, Swivel Type Head.

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



Model Design \$1350 each

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

## FIRE PUMPS



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

## CLYDE 17-DE-90 WHIRLEY CRANE

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

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

WHIP: 10 tons at 125 FPM—2 part line

TRACK CENTERS: 20'—Engine: Cummins

HBIS 601, 180 HP supercharged, elec. start

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

POWER: Diesel electric (DC)

## FORGED STEEL LINE SHAFTING

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

We also have . . .

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From: AP2 & AP3 VESSELS

C2-SB1 VESSELS

C3-S1-A3 VESSELS

AND LIBERTY SHIPS

## SALT WATER EVAPORATORS OVERHAULED—TESTED

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

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SIZE 26-8

SIZE 36-17

SIZE 20-5

SIZE 36-14

PROMPT QUOTATIONS & DELIVERY

## ANCHOR CHAIN

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



1-3/8" size

1-1/2" size

2-1/16" size

2-1/4" size

2-5/8" size

2-3/4" size

3-3/8" size

## SHIPS FOR SALE

6 CIMAVI TYPE VESSELS

for  
NON-TRANSPORTATION USE

Dimensions: LOA 338' 8" — Beam 50' — Depth 29' —  
Draft 23' 5"

Tonnage: Gross 3805 — Net 2123 — DWT 6090 —  
Displ 8370

Main Propulsion: Single Screw, 1700 HP Diesel  
Auxiliary Generators: 250 KW, 230V D.C. Diesel  
Complete With All Accessories. Saw Very Little Service  
Before Government Layup. Extremely Good Condition.  
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Stationary Supply or Quarter Ship.

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8) 30 inch "High Lift" Dump Valves complete with hy-  
draulic cylinders, handwheel operators, deck stands,  
couplings and limit switches. Valves have cast steel  
bodies and stainless steel plugs and stems.

4) 24 inch bonnetless knife gate valves complete with  
hydraulic cylinders, handwheel operators, deck stands  
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T-2-SE-A2 Mission Tanker Beaumont, Tex./Baltimore, Md.  
T2-SE-A1 T2 Tanker Jacksonville, Fla.

**TAILSHAFTS—Reconditioned A.B.S.**

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T2-SE-A2 Mission Tanker Baltimore, Md.  
T2-SE-A1 T2 Tanker Baltimore, Md.

BETHLEHEM Sparrows Point 29,000 Ton Hull 4518,  
13600 HP @ 109 RPM. (Unused) Baltimore, Md.

**RUDDERS—Reconditioned & Unused**

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

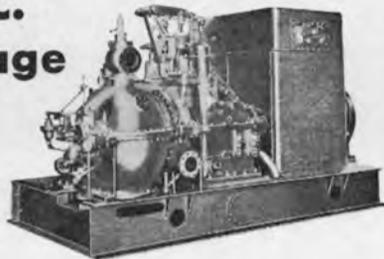
5 Available. In very good condition. Series 232 mooring &  
anchoring winches—automatic  
self-tensioning. Wide range  
from 100,000 lb line pull at  
10 FPM to 26,000 lbs at 400  
FPM. Gypsy line pull 12,000  
lbs at 125 FPM. Drum de-  
clutchable through spiral jaw  
clutch for free spooling. Driven 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  
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## TURBINE GENERATORS

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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,  
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Used, Clean, Good Condition

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EXPLORATIONS, INC.

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## 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" dis-  
charge. Steelflex coupling. MO-  
TOR: Fairbanks-Morse—440/  
3/60—squirrel cage—3600 RPM—class A insula-  
tion. Type KZK—continuous duty—drip-proof—  
ambient temp. 50°C. Complete with Cutler-Ham-  
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DIMENSIONS: 5' 5" OAL—23" OAW—2' 11"  
OAH. UNIT HAS HAD VERY LITTLE USE.

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Excellent for Grain or Oil Storage

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3". For oil storage, grain storage, drill barge con-  
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## NEW 7" RADIUS PANAMA CHOCKS

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With extended legs for welding  
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FROM STOCK.

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## SPECIAL! BATTERIES NEW SURPLUS BARGAIN



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

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Most Anything in Marine Supplies  
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## New and Surplus DIESEL PARTS

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Large inventory.

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## Deck-Mounted BERGER FAIRLEADS

Model 614—1¼" line size  
— 14" sheave — 5" shank

opening. Tapered roller bearings. 985 lbs. Approx-  
imate base dimensions: 32" x 24" fore and aft.

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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 com-  
pressor—all on same car and interconnected. En-  
tire 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  
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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

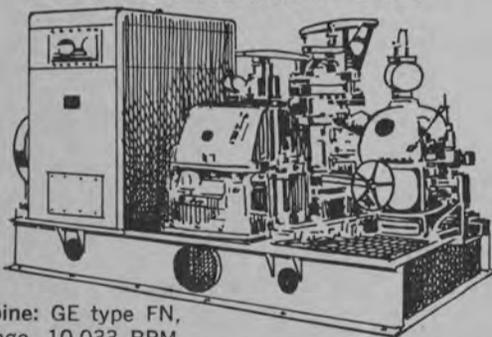
Complete with L.O. Coolers and exciters. Turbine: Westinghouse 538 KW, 5010 RPM. Inlet pressure 435 psi. Temp. 750 degrees F.TT. Exhaust pressure 28 1/2 hg vac. Generators: (1) 400 KW, 450 VAC, 3 pole, 60 cycle, PF 80%, 1200 RPM, ship's service. (2) 32.5 KW, 125 VDC, 1200 RPM, variable voltage exciter. (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  
STEEL  
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691 New Dock Street, Terminal Island, California 90731  
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\*\*\*\*\*



**UNUSED  
30,000 CFM  
AXIAL FANS**

Made by Joy Manufacturing Co.—A30A4W6. MOTOR: 25/14 HP—440/3/60—36-20.4 amps—1200/1900 RPM.

**OTHER AVAILABLE  
AXIAL FLOW FANS**

**115 VOLTS DC**

4000 CFM/5000 CFM/6000 CFM/10,000 CFM/12,000 CFM



**230 VOLTS DC**

Unused 2000 CFM 20AF—mfg. by Joy—0.75 HP motor—3450 RPM—3.4 amps—0.5" static—15" ID—17" flange

ALSO

8000 CFM/10,000 CFM/35,000 CFM

**440 VOLTS AC**

1000 CFM—Buffallo A1A4W5—3/4 HP—440/3/60/3450  
2000 CFM—220/440/3/60—1.5 HP/3400 RPM

**THE BOSTON METALS COMPANY**

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

**FALK IN-LINE MARINE REVERSE  
REDUCTION GEAR**



SUITABLE TO 1600 HP WITH MODIFICATIONS

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

**30" CLUTCH DRUM  
TIRES**



FOR FALK GEAR

700 to 1000 HP. Unused surplus. Type MO-165-099—built originally for use on F.S. vessels and DPC tugs.

\$475 each

**THE BOSTON METALS COMPANY**

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**94 KVA—75 KW CAT. DIESEL SET**

125/216/236/440/3/60  
1800 R.P.M.



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

**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

**BUYERS DIRECTORY**

**AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION**  
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231  
Carrier Air Conditioning Co., Carrier Parkway, Syracuse, N.Y. 13201

**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 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.

**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 Brockett 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—WHIRLEYS**  
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  
Kocks Pittsburgh Corp., Four Gateway Center, Pittsburgh, Pa. 15222  
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  
Nashville Bridge Co., P.O. Box 239, Nashville, Tenn. 37202  
Pacific Pipe Co., 49 Fremont St., San Francisco, Calif. 94080  
Pine Tree Engineering, subsidiary of Rice Barton Corp., P.O. Box 654, Brunswick, Me. 04011  
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  
George Engine Co., Inc., P.O. Box 8, Harvey, La. 70038  
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany  
Sulzer Brothers, Ltd., Winterthur, Switzerland

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

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

**DOORS—Waterlight—Bulkhead**  
Overbeke-Kain Co., 20905 Aurora Rd., Cleveland, Ohio 44146  
Walz & 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., 600 4th Ave., Brooklyn, N.Y. 11215  
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**  
Gazocan 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  
Peltz Brothers, Inc., 3499 Inventors Road, Norfolk, Va. 23502  
Stow Mfg. Co., 225 Shear St., Binghamton, N.Y. 13902  
Yokes 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 Vanderventer 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 Gurainick, 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, Golata, Calif. 95017  
Janzen Engineering Co., 15 Charles Plaza, Baltimore, Md. 21201  
James S. Krogen, 2500 S. Dixie Hwy., Miami, Fla. 33133  
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460  
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567  
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114  
Marine Design Inc., 1180 Ave. of Americas, N.Y., N.Y. 10036  
Marine Design Associates, P.O. Box 2674, Palm Beach, Florida  
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 Engrg. Corp., P.O. Box 6173, New Orleans, La. 70114  
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156  
S.L. Petchul, Inc., 8-D So. New River Drive East, Ft. Lauderdale, Fla. 33301  
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. Spoetgens, 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, Requardt & Associates, 1304 St. Paul St., Baltimore, Md. 21202  
Yankee Shipwrights, P.O. Box 35251, Minneapolis, Minn. 55435

**NAVIGATION & COMMUNICATIONS EQUIPMENT**  
American Hydromath Co., 55 Brixton Rd., Garden City, N.Y. 11530  
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  
FGM 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  
Lorin Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611  
Lorain Electronics Corp., 2307 Leavitt Road, Lorain, Ohio 44052  
Magnovox 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  
Star Lifeline, Ltd., 1148 W. 15th St., No. Vancouver, B.C., Canada  
Teledyne Hastings Raydist, P.O. Box 1275, Hampton, Va. 23661  
Tracor, Inc., 6500 Tracer Lane, Austin, Texas 78721

**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  
Carbolite Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144  
Devco & 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

**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, Funado-cho 2-chome, Naniwa-Ku, Osaka, Japan  
Tioga Pipe Supply Co., Inc., P.O. Box 5997, Philadelphia, Pa. 19137

**PLASTICS—Marine Applications**

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

**PORTS**

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

**PROPELLERS: NEW AND RECONDITIONED**

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

**PUMPS**

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

**RATCHETS**

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

**REFRIGERATION—Refrigerant Valves**

Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

**ROPE—Manila—Nylon—Hawsers—Wire**

American Mfg. Co., Inc., Noble & West Sts., Brooklyn, N.Y. 11222  
Coting Rope Co., 309 Genesee St., Auburn, N.Y. 13022  
Columbian Rope Co., 309 Genesee St., Auburn, N.Y. 13022  
Du Pont Co., Room 3111, 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  
Levin Metals Corp., P.O. Box 398, Point Station, Richmond, Cal. 94807  
National Metal & Steel Corp., 1251 West Dock St., Terminal Island, Cal. 90731  
Zidell Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201

**SHIP BROKERS**

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

**SHIPBUILDING STEEL**

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

**SHIPBUILDING—Repairs, Maintenance, Drydocking**

Astilleros Espanoles, S.A. Zurbano, 70, Madrid 10, Spain  
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150  
Barbour Boat Works, Inc., P.O. Box 1069, New Bern, N.C.  
Bellard, Crighton & Cie, P.O. Box 2074, Route des Docks, 59, Dunkirk, France  
Bellard Murdoch S. A., Kattendijkdok Westkaal 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  
Brodgradiliste "SPLIT", P.O. Box 107, Split, Yugoslavia  
Conrad Industries, P.O. Box 790, Morgan City, La. 70380  
Curacao Drydock, Inc., P.O. Box 153, Willemstad, Curacao, N.A.  
Dillingham Corp., P.O. Box 3288, Honolulu, Hawaii 96801  
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.  
Empressa Nacional Bazan, 65 Castellana, Madrid 1, Spain  
Equipment Systems, Inc., A Microdot Co., P.O. Box 95, Port Deposit, Md. 21904  
Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122  
General Dynamics, Electric Boat Division, 99M Eastern Point Road, Groton, Conn. 06340  
General Dynamics, Quincy Division, Quincy, Mass. 02169  
Gotaverken American Corp., 39 Broadway, New York, N.Y. 10006  
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126  
Havre de Grace, Havre de Grace, Md.  
Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.  
Hongkong & Whampoa Dock Co. Ltd., Kowloon Docks, Hong Kong  
Ishikawajima-Harima Heavy Industries Co., Ltd., 15 William St., New York, N.Y. 10005  
Jacksonville Shipyards, 644 E. Bay St., Jacksonville, Fla. 32203  
Jeffboat, Inc., Jeffersonville, Ind. 47130  
Kawasaki Dockyard Co., 8 Kaigan-dori, Ikuta-ku, Kobe, Japan  
Kelso Marine, Inc., P.O. Box 268, Galveston, Texas 77550  
Kockums Malmo, Fack, Malmo, Sweden  
Litton Industries, 9920 W. Jefferson Blvd., Culver City, Calif. 90230  
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134  
Marathon Manufacturing Company  
Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002

Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520

Marathon LeTourneau Marine Division, LeTourneau Rural Station, Vicksburg, Mississippi 39180  
Marathon LeTourneau Offshore Pte., Ltd., P.O. Box 83, Taman Jurang Post Office, Singapore 22, Singapore  
Marathon Shipbuilding Company, P.O. Box 870, Vicksburg, Miss. 39180

Marathon Shipbuilding Company (U.K.) Ltd., Clydebank Bunbartonshire, G81-1YB, Scotland  
Marine Engineering & Construction Co., Inc., 1664 Tchoupitoulas St., New Orleans, La. 70130

Maryland Shipbuilding & Drydock, P.O. Box 537, Baltimore, Md. 21203  
Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047  
Mitsui Shipbuilding & Engrg. Co. Ltd., 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan  
Mitsubishi Heavy Industries, Ltd., 5-1 Marunouchi 2-chome, Chiyoda-ku, Tokyo, Japan

Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655  
National Steel & Shipbuilding Corp., San Diego, Calif. 92112  
Newport News Shipbuilding and Dry Dock Co., Newport News, Va.  
Newport Ship Yard, Inc., 379 Thames St., Newport, R.I. 02840  
Northwest Marine Iron Works, P.O. Box 3109, Swan Island, Portland, Oregon 97208

Nuclear Service & Construction Co., Inc., 9296 Warwick Blvd., Newport News, Va. 23607  
O.A.R.N. (officine Allestimento e Riparazioni Navi) Genoa, Italy  
Odense Steel Shipyard Ltd., P.O. Box 176, DK-5100 Odense, Denmark  
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156  
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862  
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  
Star Shipyards, Ltd., 61 Duncan St., New Westminster, Vancouver, B.C., Canada  
Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan  
Swedish Shipbuilding Association, Fack S-402 70, Gothenburg 8, Sweden

Teledyne Sewart Seacraft, P.O. Box 108, Berwick, La. 70342  
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004  
Tracor/Mas, Inc., P.O. Box 13107, Port Everglades, Fla. 33316

SHIP MODEL BASIN  
Hydrautics, Incorporated, Laurel, Maryland 20810

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

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

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

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

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

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

VALVES AND FITTINGS—Hydraulic—Safety Flanges  
Dover Corp. / Norris Division, P.O. Box 1739, Tulsa, Okla. 74101  
Hubeva Marine Plastics-Lining, 435 Hamilton Ave., Brooklyn, N.Y. 11231  
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696  
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027  
Mesco Tectonics, Inc., 5 Central Ave., Clifton, N.J. 07011

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

WIRE ROPE  
Armo Steel Corp., 703 Curtis St., Middletown, Ohio 45042  
Bethlehem Steel Corp., Bethlehem, Pa. 18016  
Macwhyte Wire Rope Co., 2959 14th Ave., Kenosha, Wis. 53140  
United States Steel Corp., P.O. Box 86, Pittsburgh, Pa. 15230

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

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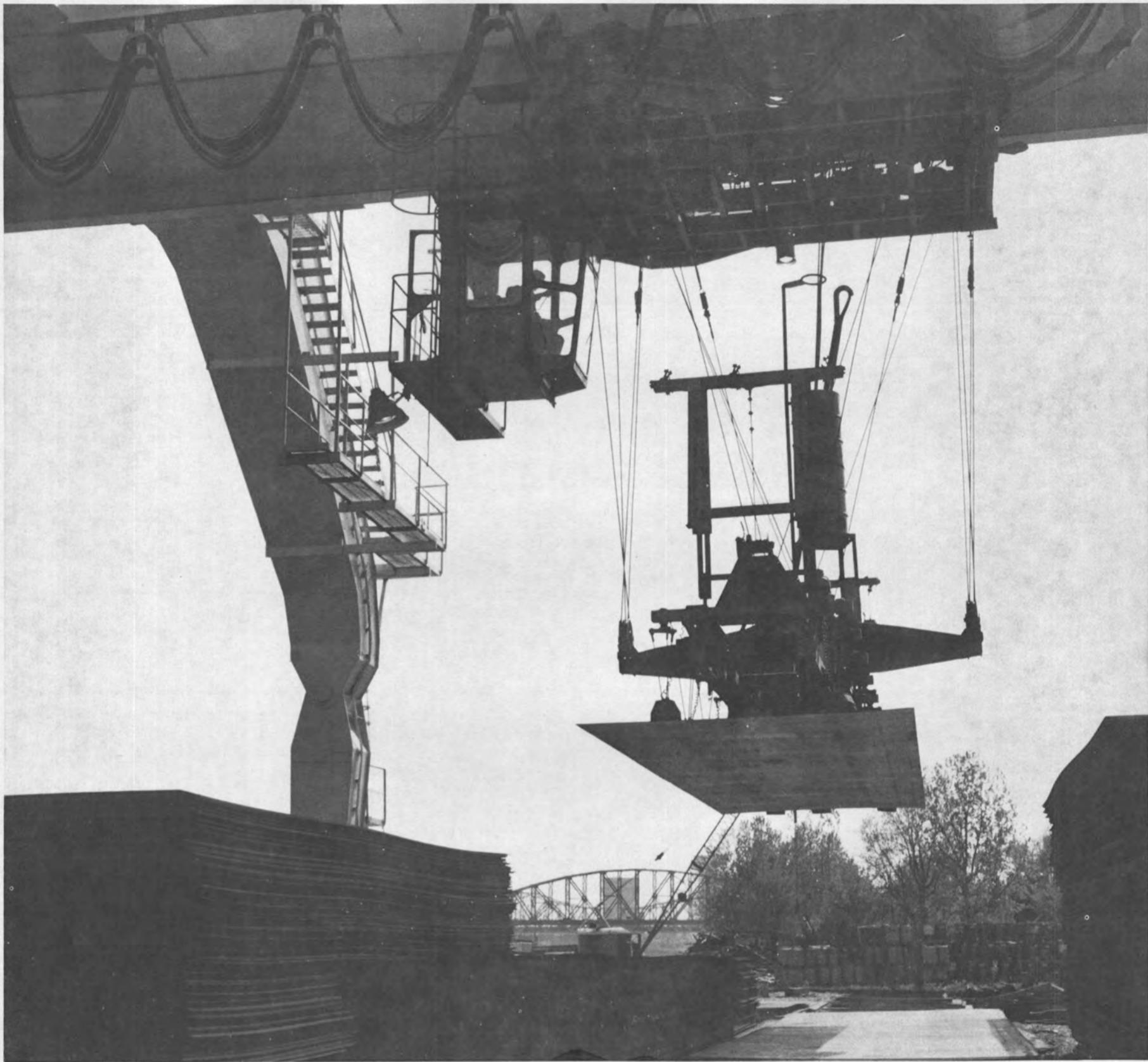
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