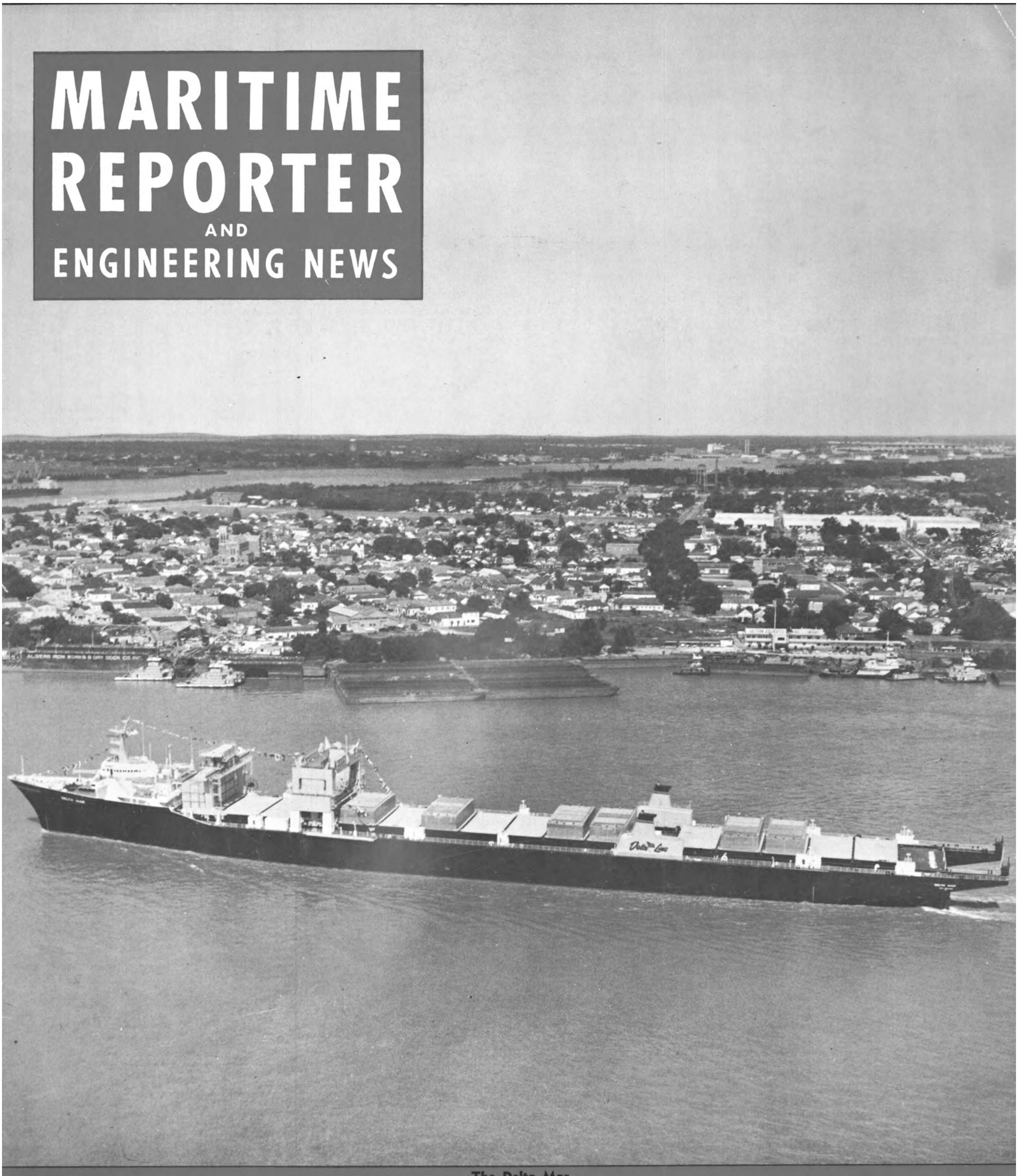
MARITIME REPORTER
AND
ENGINEERING NEWS

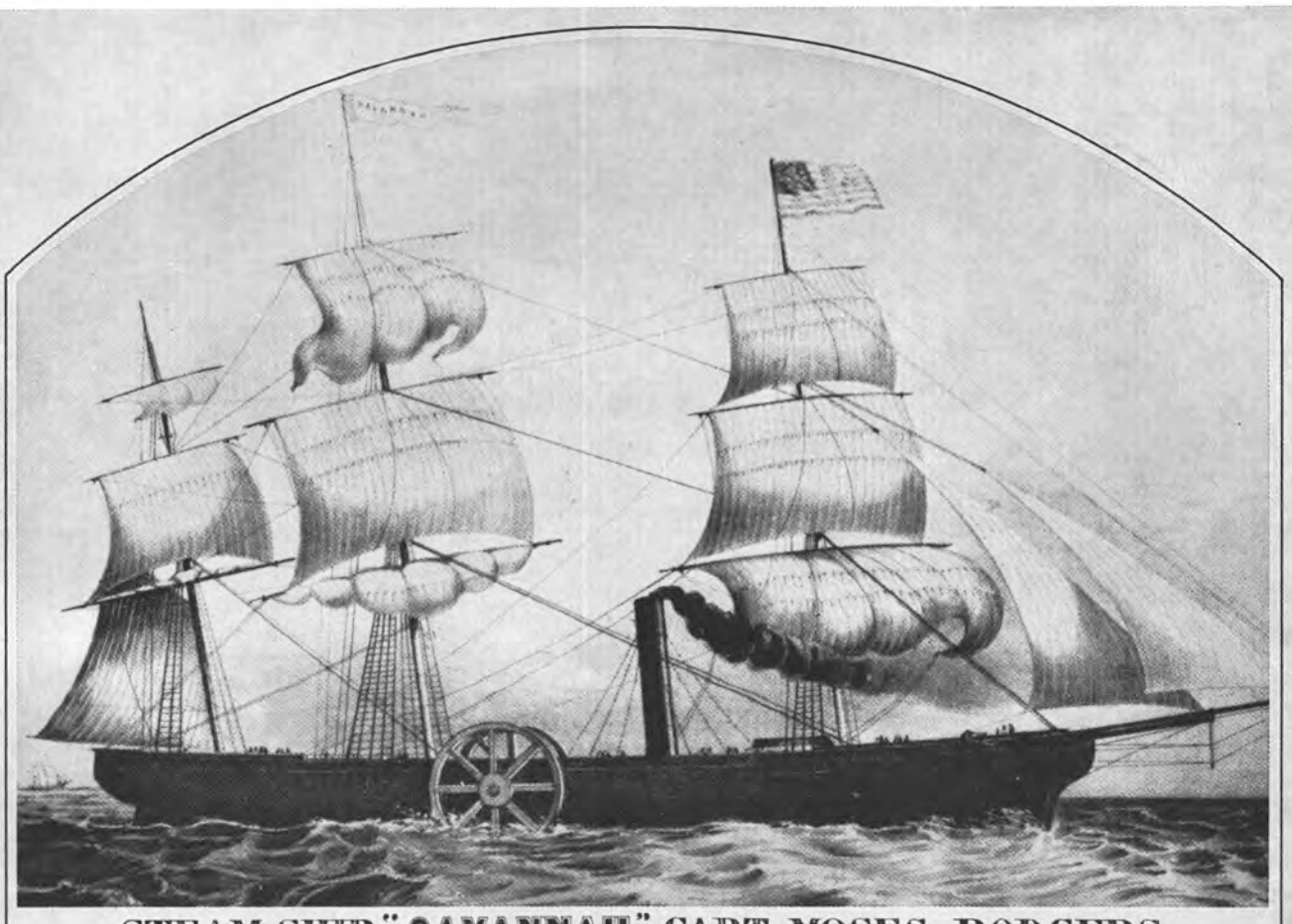


The Delta Mar

Avondale Shipyards Delivers New Design Giant LASH Ship To Delta Steamship— Largest Unitized Cargoliner Built In U.S.

(SEE PAGE 11)

SEPTEMBER 1, 1973



STEAM SHIP "SAVANNAH" CAPT. MOSES RODGERS.

THE FIRST STEAMSHIP THAT CROSSED THE ATLANTIC OCEAN

Was built in NewYork and sailed March 28th 1819 arrived in Savannah after a passage of six days, thence to Liverpool in 18 days.

Full steam ahead . . . but pray for wind

The "Savannah" was the FIRST STEAMSHIP to cross the ocean. It left Savannah, Georgia, May 22, 1819, arrived in Liverpool, England, on June 20th.

However, the steam lasted for only about 85 HOURS. Then, it was time to hoist the sails. Nevertheless, it opened up the sea lanes to steam.

The "Savannah" was fitted with a 90-horsepower auxiliary steam engine and COLLAPSIBLE PADDLE WHEELS. The fuel was COAL and probably a single lubricant served for all moving parts.

Ships have come a long, long way since the "Savannah" and the diversity and complexity of today's engines call for PRECISE high-quality lubricants.

To meet this need, Gulf offers a number of superior marine diesel dual-purpose lubricating oils.

Veritas DPO's for high, medium and slow-speed diesel engines using distillate fuels.

Veritas Select 253, 254 and 353 for use in high and medium-speed, four-cycle diesel engines using distillate and residual fuels.

Each of these oils has optimum TBN to neutralize the acidic products of combustion, along with the effective dispersant detergent qualities necessary to maintain excellent overall engine cleanliness.

Gulf Marine Lubricants — unsurpassed for quality, performance and excellence.

Gulf

Gulf Oil Trading Co. — New York, N.Y.

World-Wide Shipping Orders 170,000-Dwt Tanker From IHI

IHI (Ishikawajima-Harima Heavy Industries Co., Ltd.) recently received an order for a 170,000-dwt tanker from World-Wide (Shipping) Ltd., Hong Kong.

The tanker will be built at the IHI Aioi Shipyard, with delivery scheduled for July 1975. She will have the following approximate dimensions: a length of 915 feet, a breadth of 146 feet, a depth of 81 feet, and a draft of 62 feet.

A 32,000-hp IHI-Sulzer 8RND-105 marine diesel engine will be installed as her main propulsion machinery.

Mitsui Zosen Completes Superdock

A superdock capable of constructing tankers of between 400,000 and 600,000 deadweight tons has recently been completed by Mitsui Zozen, one of Japan's largest shipbuilders. The new dock, located at Chiba City near Tokyo, is intended for bisectional hull construction.

The dock is about 653 feet long, 236 feet wide and 41 feet deep. Construction of the superdock, started in the fall of 1971, cost more than $26.6 million.

Oil Transport Barge Requests Title XI For Towboats/Barges

Application for Title XI mortgage and loan insurance in connection with two double-side barges and two twin-screw towboats has been filed with the Maritime Administration by Oil Transport Barge Lines, New Orleans, La. A contract to build both the barges and towboats has been awarded to American Marine Corp., New Orleans. The cost of the towboats will be $1.3 million each, and the barges will cost $450,000 each.

Title XI Approved For Construction Of 19 River Barges

A Title XI application from 1973 Barge Leasing Corp., 1 Rockefeller Plaza, New York, N.Y., in connection with 19 dry-cargo river barges has been approved by the Maritime Administration. Dravo Corporation, Pittsburgh, Pa., will build 12 rake-type barges at a cost of $1,549,632, and seven box-type barges will be built by Twin City Shipyard, Inc., St. Paul, Minn., at a cost of $917,000.

MARITIME REPORTER AND ENGINEERING NEWS

No. 17 Volume 35

107 EAST 31st STREET
NEW YORK, N. Y. 10016

MUrray Hill 9-3266, 3267, 3268, 3269

ESTABLISHED 1939

Maritime Reporter/Engineering News is published the 1st and 15th of each month by Maritime Activity Reports, Inc. Controlled Circulation postage paid at Hoboken, N.J. 07030.

Postmaster send notification (Form 3579) regarding undeliverable magazines to Maritime Reporter/Engineering News, 107 East 31st Street, New York, N.Y. 10016.

Member BPA
Business Publications Audit of Circulation, Inc.

from sea to shining sea ...at 14.2 knots

"Balboa" owner chooses Waukesha diesels for converted 1000 ton tuna seiner

The 190-ft. long "Balboa," out of Mayaguez, Puerto Rico, fishes tuna in both the Atlantic and the Pacific. She is a converted U.S. Naval vessel and most of the imaginative redesign is the work of owner John Mauricio.

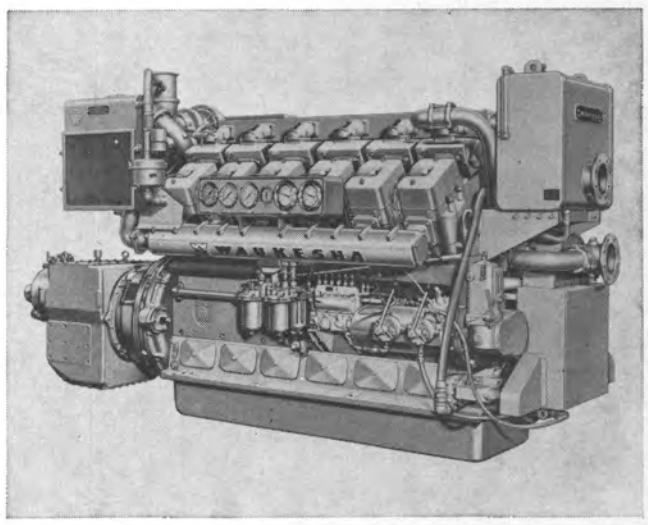
She is Waukesha-powered all the way.

Two Waukesha VHP L5792 supercharged and intercooled diesels, each rated 1421 continuous horsepower at 1215 rpm, power the twin screws. With her 4-blade, 92 x 92 inch screws turning at 243 rpm at full power, the "Balboa" cruises at speeds up to 14.2 knots.

Two Waukesha VC L1616 diesels provide 350 kw each for ship's service power. A Waukesha VC H1077 drives the bow thruster and supplies 250 kw emergency power. The skiff engine is a VC H1077 rated 230 horsepower at 2000 rpm.

Mauricio likes the reliability and performance of his Waukesha engines and says "there is a great advantage in matching propulsion and ship's service electric sets to get maximum parts and service interchangeability. We're pleased with our decision to go with Waukesha."

For complete information on Waukesha marine engines, see your Waukesha authorized distributor.



VHP Series V12 diesel engine, Model L5792 DSIM, turbocharged and intercooled, rated 1421 continuous horsepower at 1215 rpm. Waukesha offers three diesel families — from 85 to 1776 hp for propulsion; 47 to 1100 kw for ship's electrical service.

WAUKESHA

Waukesha Motor Company • Waukesha, Wisconsin 53186 A Bangor Punta Company

Ridgewood, N.J. 07451 • Tulsa, Okla. 74107 • Atlanta, Ga. • Downey, Calif. 90240 • Houston, Tex. 77027 • Calgary 2, Alberta • Brussels, Belgium • Jurong, Singapore 22

DELAVAL TURBINES

DELAVAL STEAM TURBINES AND GEARS POWER WORLD'S LARGEST LASH/ CONTAINER VESSEL.

A 32,000 horsepower main propulsion unit from DELAVAL powers the S.S. DELTA MAR — the largest LASH/container vessel ever built in the United States. Delivered by Avondale Shipyards to Delta Steamship Lines, the 893 foot long DELTA MAR joins a long line of distinctive vessels driven by DELAVAL main propulsion turbine and gear systems.

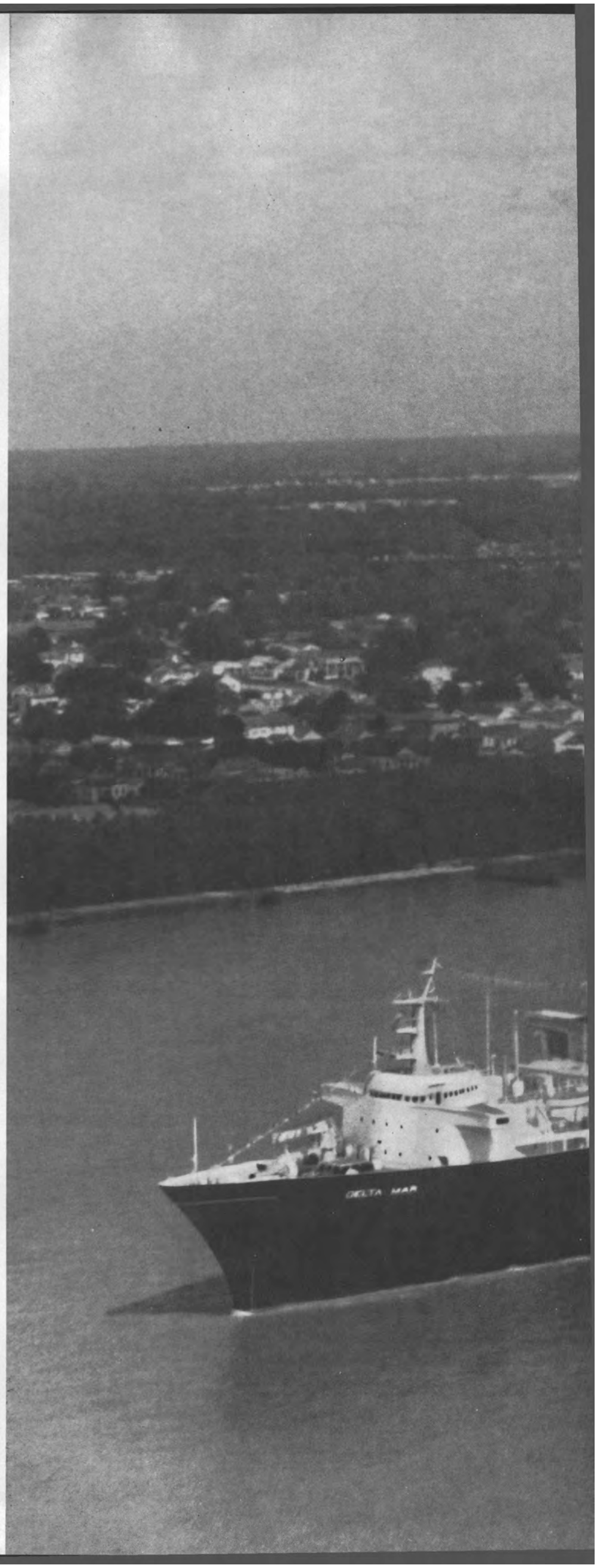
DELAVAL's main propulsion units are products of over seven decades of research, development and commitment to the marine industry.

Electric power is generated in DELTA MAR by DELAVAL's new line of 2000 kw ship service turbine generators.

But that's not all—DELAVAL designs and builds condensers for surface vessels and submarines; quiet IMO® rotary pumps for fuel oil service, fuel oil transfer, lube oil service and hydraulic systems — (above or below deck); and the renowned DELAVAL Enterprise diesel engine delivering up to 12,500 bhp to ships of all types.

For information on how you can take advantage of DELAVAL's experience in the marine industry contact: DELAVAL Turbine Inc., Turbine Division, Trenton, N. J. 08602. (609) 587-5000.

DELAVAL




Delta Line

For vessels up to 60,000 tons deadweight

Syncrolift® marine elevator drydocks & transfer systems

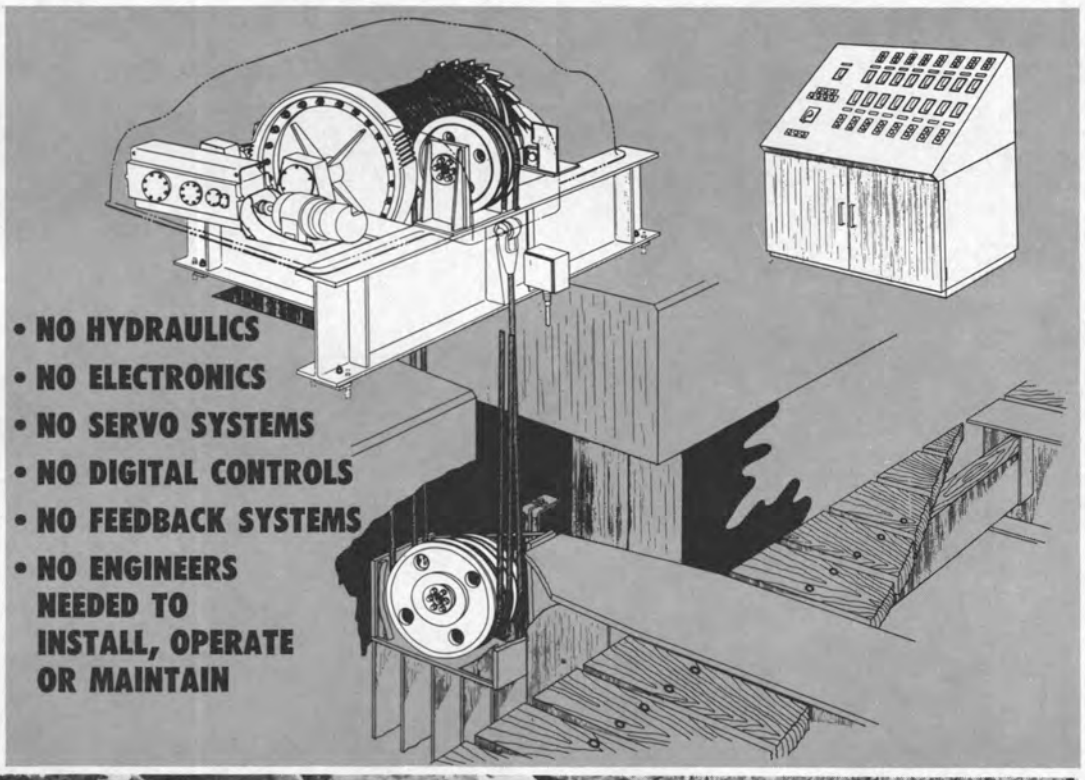
There are good reasons why there are more than 80 SYNCROLIFTS in 36 COUNTRIES— from the tropics to the arctic...

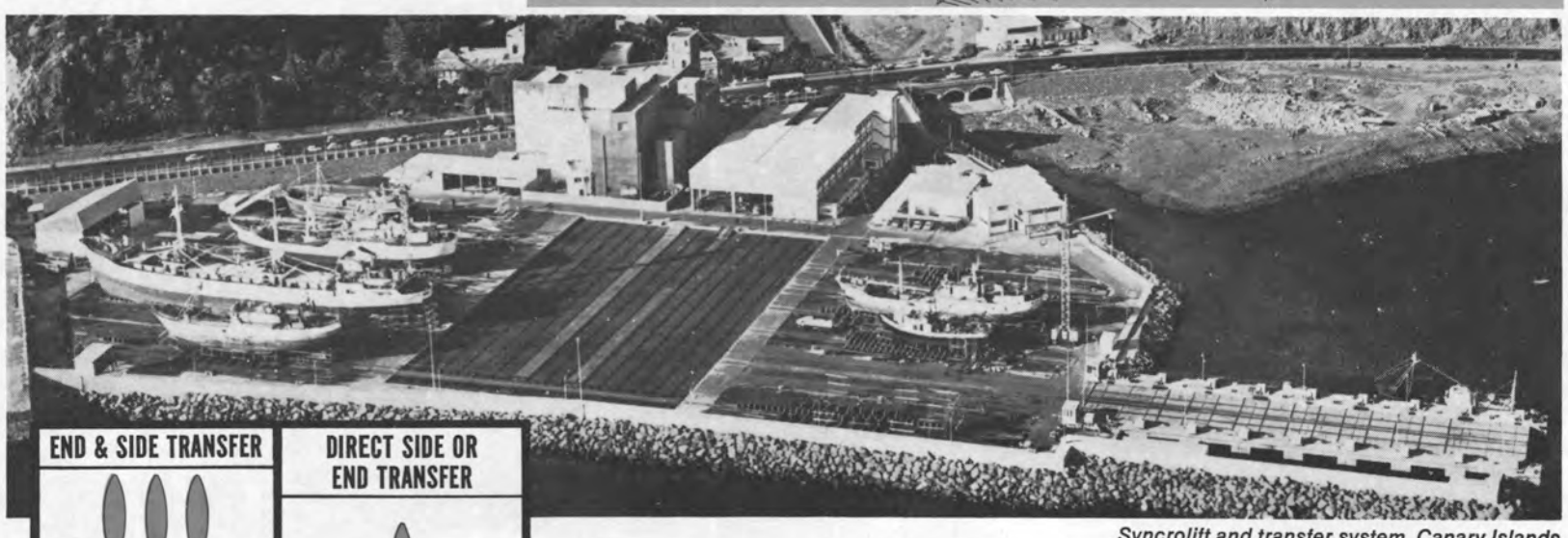
Syncrolift means dependable, synchronized *electric-motor driven* hoists, mounted on standard concrete or steel piles, controlled from a simple-to-operate push-button panel. All mechanical and electrical components are familiar to shipyard operators everywhere. Spares and service available world-wide.

A Syncrolift Drydock and Transfer System gives you fast, economical multi-ship drydocking capability for vessels up to 60,000 tons dwt. End and side or direct side transfer accomplished quickly. Unlimited vertical travel and expansion capability can be built into every Syncrolift.

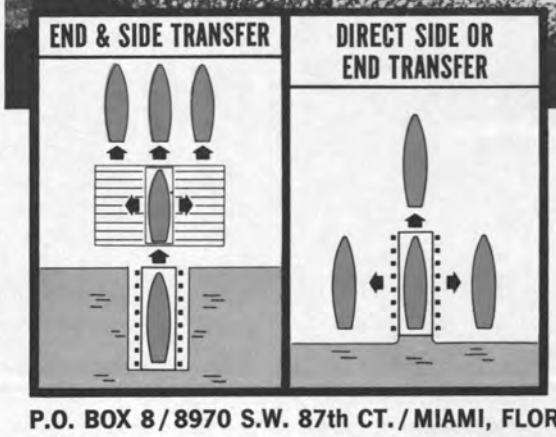
Designed by the most experienced builders of marine elevator drydocks in the world.

Contact us today, for more information, a proposal or a no-cost, no-obligation personal evaluation at your site by a Syncrolift engineer.





Syncrolift and transfer system, Canary Islands



SYNCROLIFT®
DRYDOCKS AND TRANSFER SYSTEMS

PEARLSON ENGINEERING COMPANY, INC.

P.O. BOX 8 / 8970 S.W. 87th CT. / MIAMI, FLORIDA 33156 / U.S.A. • PHONE: (305) 271-5721 • TELEX: 051-9340 • CABLE: SYNCROLIFT

B.B. Cook Jr. Elected To Delaval Board

Barton B. Cook Jr.

W.J. Holcombe, chairman, Delaval Turbine Inc., recently announced that **Barton B. Cook Jr.** has been elected director by the board of directors.

Mr. **Cook's** early service with the company, beginning in 1955, was primarily related to the design and application of marine propulsion systems. Later, he became manager of the marine department and in 1966 was named manager, engineering, of the Turbine Division.

In 1967, Mr. **Cook** was elected vice president, marketing, and served on the corporate staff in that capacity until 1972, when he was named general manager of the Turbine Division and assumed responsibility of the company's Condenser and Filter Division and its European joint venture, Delaval-Stork V.O.F.

Mr. **Cook** is a graduate of the University of Michigan, with a B.S.E. degree in naval architecture and marine engineering. Throughout his career, Mr. **Cook** has been active in The Society of Naval Architects and Marine Engineers and the American Society of Mechanical Engineers.

Tidewater Earnings Up— Fleet To Be Increased Costing $40 Million

Tidewater Marine Service, Inc., New Orleans, La.-based surface support contractors to the offshore oil industry, had earnings of 58 cents per share for the first fiscal quarter ended June 30, 1973, compared with 45 cents per share for the same period a year ago, president and board chairman **John P. Laborde** told shareholders at the company's annual meeting in New Orleans on August 10, 1973.

Net earnings for the first quarter were $2,270,893, compared with $1,757,517 last year. Gross revenues were $16,257,903 for the 1973 quarter, compared with $14,694,-731 a year ago.

The results were the best for any quarter in the company's history, Mr. **Laborde** said.

Mr. **Laborde** attributed the results to the fact that business was good in all operational areas with particular emphasis on the U.S. Gulf of Mexico, where three lease sales were successfully completed during the past year with prospects for another in the near future.

Mr. **Laborde** also noted international recognition of oil and gas shortages has improved the industry's position worldwide and indicated that demand for the company's services should continue high for the remainder of the fiscal year.

A fleet expansion program involving expenditures of approximately $40 million in domestic and foreign shipyards is well under way, Mr. **Laborde** stated, with deliveries due throughout 1973 and into 1974. Financing for this construction has either been arranged or is in the final stages of agreement, he said.

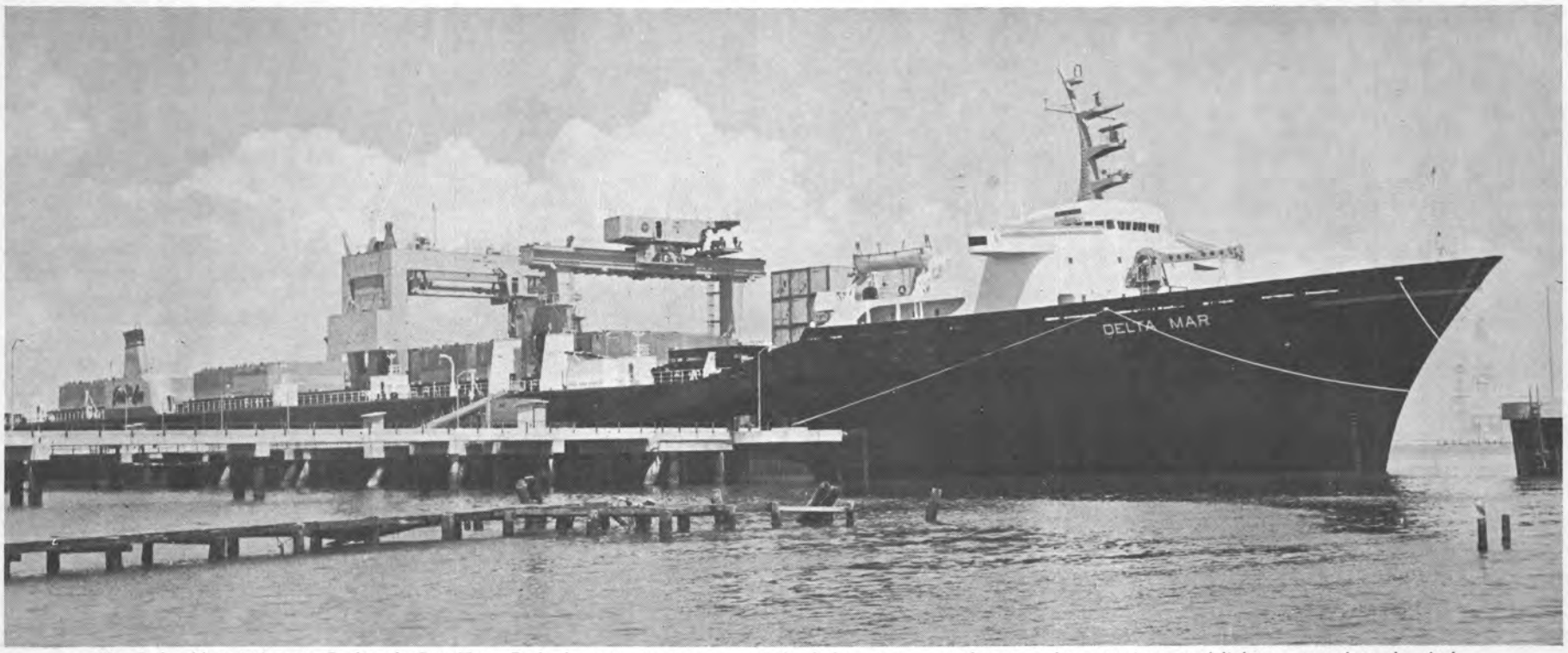
New Orleans Bank Lends $14 Million For Supply Vesels

A direct loan of $7 million, and another $7-million guaranteed loan approved by the Export-Import Bank of the U.S. is being made by the First National Bank of Commerce in New Orleans, La. The loan is in support of a $17.5-million sale of six offshore supply vessels for use in the North Sea and other offshore drilling sites.

The borrower, Allseas of Panama Inc., will make a cash payment of $3.5 million toward the total costs. Allseas is a new company established to operate tug and supply vessels to serve marine oil rigs.

A spokesman for the Export-Import Bank said the loans are to be repaid in 16 semi-annual installments, beginning November 5, 1974, at an annual interest rate of 6 percent on outstanding balances.

The Export-Import Bank is an independent agency of the U.S. Government.



The Delta Mar tied up in Barbour's Cut, Tex. Both the container crane and the lighter crane can be seen plus containers and lighters stowed on the deck.

Avondale Shipyards Delivers Largest LASH Ship

The DELTA MAR

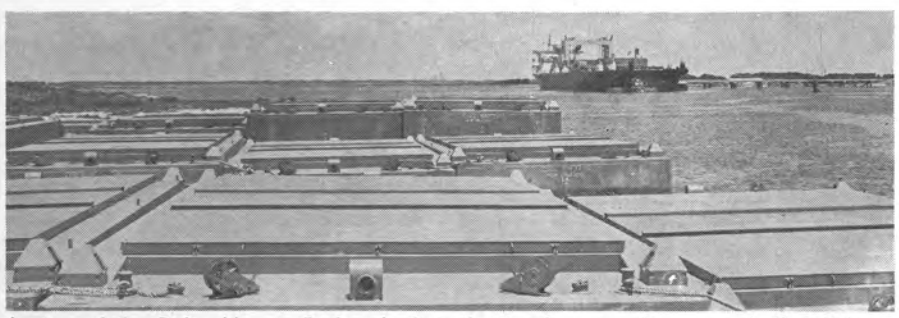
The first of a new design of giant LASH ships, the Delta Mar, was recently delivered to the Delta Steamship Lines of New Orleans. This vessel is the first of three sisterships for Delta, and was built by Avondale Shipyards, Inc., also of New Orleans. Following this group will be three for Central Gulf Lines, Inc. These vessels are the largest unitized cargo liners ever built in the United States.

The new Delta Mar has the distinction of being the first ship contracted for, as well as delivered, under the 1970 Merchant Marine Act.

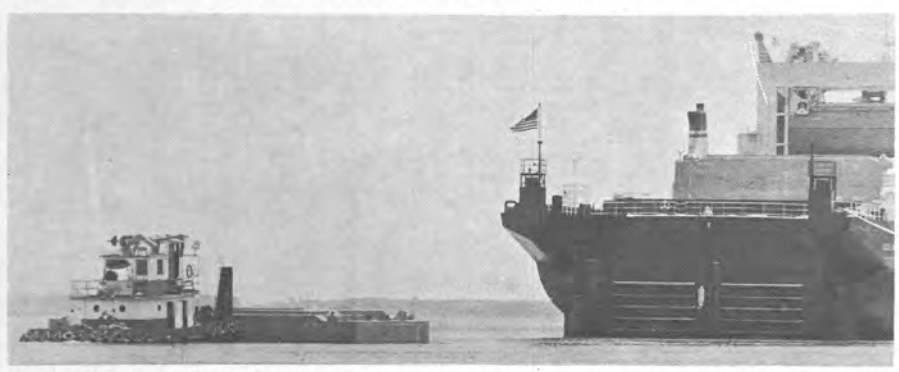
The Delta Mar and her two sisterships, the Delta Norte and the Delta Sud, will be in the Gulf, U.S., to the East Coast, South America, trade. Each vessel is initially configured to transport 74 lighters and 288 containers of 20-foot equivalent size. The Waterman and Central Gulf new LASH vessels will transport lighters only in a total amount, per vessel, of 89 lighters. The Delta provides easy adjustment to any ratio of lighters and containers during the life of the ship, from a 100 percent lighter capability of 89 lighters to a 100 percent container usage for 1,740 units of 20-foot equivalent size. Both 20 and 40 foot containers are provided for.

The Delta Mar is the 12th LASH vessel to be completed by the Avondale Shipyards. A previous group of five somewhat smaller vessels have been constructed for Prudential Grace Lines and another group of six for Pacific Far East Line. Four other LASH vessels are also at sea, these being the Moslash two LASH vessels operated by Central Gulf Lines which were constructed in Japan, and the Combi Line two LASH vessels which were constructed in Belgium. The pioneer LASH ship M.V. Acadia Forest, was placed in service nearly four years ago. With the arrival

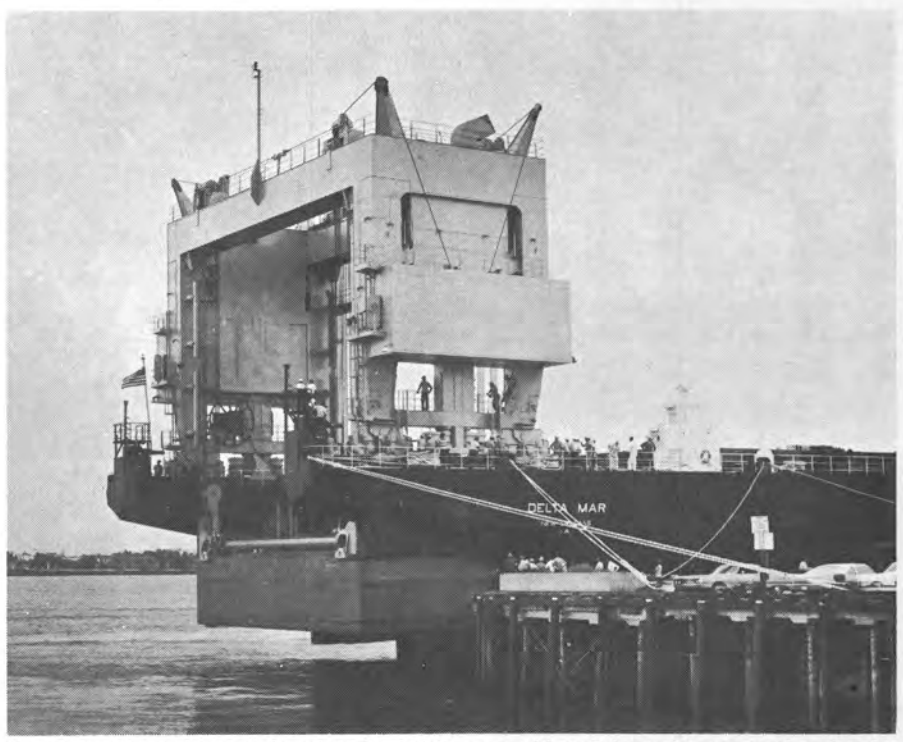
(Continued on page 12)



A view of the Delta Mar in Barbour's Cut. In the foreground are marshalled lighters tied to the bank in readiness for being taken and lifted on-board the ship.



A stern view of the Delta Mar with a tug going into the slot with a lighter. The fendering system in the stern slot can be seen as well as the crane with a barge.



The Delta Mar taking on her first loaded barge at New Orleans in preparation for the ship's maiden voyage. The massive Morgan crane can lift and transport 455 long tons.

Avondale Shipyard Delivers The Delta Mar

(Continued from page 11)

of the Delta Mar in South American waters LASH vessels will be sailing to all six continents, and the LASH System can truly be said to have achieved world-wide service.

The design of the Delta Mar was developed by the naval architectural firm of Friede & Goldman, Inc., and licensed for use to Delta Lines by LASH Systems, Inc. **Jerome L. Goldman,** the inventor of LASH, is president of both LASH Systems, Inc. and Friede & Goldman, Inc.

PRINCIPAL CHARACTERISTICS

Length Overall (Extreme)	893 feet
Breadth	100 feet
Design Draft	28 feet
Deadweight (At design draft), long tons	21,300
Scantling Draft	38 feet
Deadweight (At scantling draft), long tons	40,090
Normal Service Speed	22.4 knots
Shaft Horsepower, Continuous	32,000
Barge Capacity	74
Container Capacity, 20-foot	288
Barge Crane Capacity, long tons	455
Container Crane Capacity, long tons	30
Maximum Container Capacity, 20-foot	1,740
Crew Complement	33

GENERAL ARRANGEMENTS

Delta Mar has been constructed in accordance with the requirements of the American Bureau of Shipping to entitle her to the highest class for ships of this type, as well as conforming with the regulations of the Coast Guard.

The profile appearance of the Delta Mar is of the unique type in that the house is located well forward and the machinery located as far aft as possible. This arrangement permits the best part of the vessel to be used for the transport of cargo, and at the same time offers excellent protection for the on-deck stowage of lighters and containers. Officers and crew members are quartered in the forward superstructure. The navigating bridge design is ultra-modern in appearance as well as offering 360 degree visibility. Clear, unobstructed walkaround is provided on the entire bridge deck. Forward of the accommodations and bridge house a stores crane is located on the starboard side for quick and easy handling of stores into the second deck stowage space.

At the aftermost part of the vessel two canterlevers are located which allow the lighter crane to overtravel the vessel for off-loading and on-loading lighters over the stern. The container crane on-loads and off-loads containers over the port or starboard side of the vessel.

Both the lighter crane and the container crane work their respective lighters/containers simultaneously, thus assuring rapid loading or discharging of cargoes.

All holds are so arranged that complete access is had to all lighters and to the cell stow of the containers. All holds are so dimensioned that conversion from lighter to container or from container to lighter hold transport is a relatively simple matter, not requiring shipyard facilities.

Each of the holds, having from one to three vertical cells are secured for sea and on-deck lighter/container stow, by steel pontoon type hatch covers. Handling of the hatch covers is accomplished by the LASH gantry crane in a matter of minutes. As the gantry lighter crane does not travel to the position of Hold No. 1, cell position No. 1, the hatch cover for this cell is of the hydraulic folding type.

To handle the lighters which transport 370 long tons of cargo, a gantry crane having a hoisting capacity of 455 long tons is provided and runs on rails mounted on both sides of the ship. This crane was manufactured by Morgan Engineering Company of Alliance, Ohio. The crane legs are equipped with guides giving continuity with the cargo hold and stern guides. Lighters are lifted vertically or lowered along these guides either from water level or double bottom top up to the highest point. These guides insure that the lighter does not sway while the crane is traveling along the deck. A load frame is provided which is equipped with a latching device which clamps onto the lighter or hatch cover. A swell compensating device is also provided which allows for latching-on and latching-off a lighter while relative motion between lighter and vessel is experienced.

The lighters are secured in the holds as well as on deck by a system of wedging.

PROPULSION MACHINERY

The Delta Mar is powered by one cross-compound propulsion unit of DeLaval design and manufacture, comprising a high-pressure ahead turbine, a low-pressure turbine including ahead and astern elements, and double-helical, double-reduction gears. The turbines are connected to the reduction gear through flexible, mechanical dental-type couplings. The units provide 32,000 shp to the propeller.

The thrust bearing is of the hydro-dynamic bearing having pivoted-pads of the Kingsbury Inc. design and is located well aft of the reduction gear. Lubrication to this thrust is supplied from the lubrication system of the main-propulsion reduction gear. The bearing is of the horizontal double-equalizing type, having eight thrust shoes on each side of the thrust collar, which is integral with the thrust shaft. The estimated forward thrust load is 350,000 pounds and the total bearing area in square inches being 1,061.

Steam at 850 psi and 950° F is admitted to the h-p turbine inlet through the DeLaval throttle arrangement which incorporates hydraulic power assist features thus providing a means of interfacing the ship's control system with the turbine ahead and astern control valves.

The condenser is a rectangular, peripheral-flow, single-pass unit. The condenser is arranged to support the 1-p turbine, being bolted rigidly to the 1-p turbine exhaust. Circulating water is supplied by a scoop injection method, along with a circulating pump for slow-speed operation and maneuvering.

Steam is generated by means of two Combustion Engineering single-cased welded-wall construction units, with oil burners located in the furnace roof. Each unit is composed of a steam drum and a water drum connected by a bank of inclined generating tubes. The units are further provided with floor-screen tubes which shield the superheater elements from direct radiant heat of the furnace. Frontwall/roof tubes, sidewall tubes, lower frontwall header, upper and lower sidewall headers, and external downcomers are provided. Sidewall tubes connect the upper and lower sidewall headers. Each tube in the furnace floor, roof, side and front wall is joined to the adjacent tube by a welded fin. In this welded-wall construction, the tubes form a gas-tight enclosure on three sides of the furnace. The need for insulation and refractory has therefore been greatly reduced. A superheater, auxiliary and control desuperheater and economizer are further provided. Burners are located in the roof, firing downward and evenly across the screen, superheater, and generating bank.

The electrical power for the vessel is supplied by two 2,000-kw electrical generators. One is steam-turbo driven while the other is diesel driven. The steam turbine-generator is provided with a reduction gear all being mounted on a supporting-type base plate. The unit is so arranged that the exhaust steam from the turbine flows downward into the ship's main condenser.

Characteristics of the unit are: No. of stages 5, speed rpm 10,638, steam pressure psig at throttle 850, steam temperature °FTT 950, exhaust pressure in. Hg abs 1.5, reduction gear output shaft-speed rpm 1200.

The other generator is diesel driven. The diesel is in a 16 cylinder "V" block arrangement capable of developing 2,793 rated brake horsepower. The unit is in a standby status and is equipped with necessary controls to automatically start the engine on failure of the normal power source and bring the engine to generator operating speed, ready to assume load.

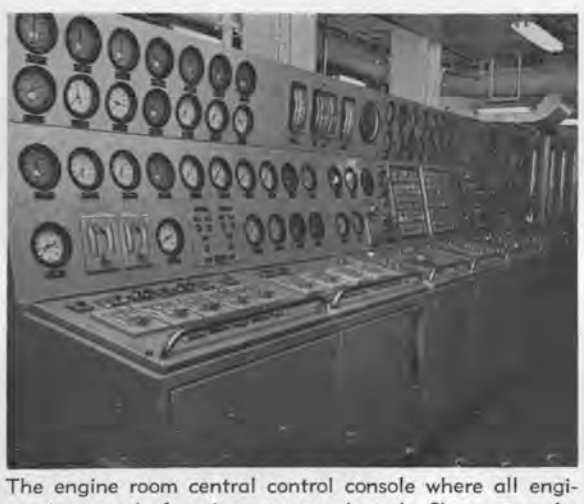
DECK MACHINERY

The lighter handling crane is the product of Morgan Engineering Company of Alliance, Ohio. The crane is provided with four independent gantry drives which move the crane and its load fore and aft. Positive rack-type drives assure full traction under all conditions of operation. Should one, or even two, of these gantry drives be out of service, the remaining drives can still propel the crane at reduced speed. The hoisting arrangements consist essentially of four hoisting drums and associated pairs of blocks. Each hoist is driven by its own electric motor. In turn, the hoist drive gears are so arranged that one or two of the motors can be out of service, and still the crane will be operable at reduced speed.

The container-handling crane is the product of Skagit Corporation of Sedro-Woolley, Washington.

The crane is provided in an "L" configuration having forward and after gantry trucks located

(Continued on next page)



The engine room central control console where all engineering watch functions are conducted. Shown are the boiler, engine, auxiliary and electrical controls.

A view of a distribution panel located outboard of the main engine, port side. The low-pressure turbine casing is viewed along with the jacking gear.

on the extreme ends of the horizontal members. Vertical structural members are positioned toward the after part of these horizontal structurals upon which a transverse beam is provided to accommodate an athwartships travelling hoisting cab. As the containers are placed in a forward and aft position on the dock for pick-up/or discharge by the crane, and the containers are placed athwartship while on-board, the cab rotates to accommodate this requirement.

The hoisting capacity of the container crane is 30 long tons and is designed to accommodate both 20 foot and 40 foot containers.

MACHINERY SUPPLIES

Propulsion Machinery	
Propulsion turbine	De Laval
Reduction gear	De Laval
Condenser	Avondale
Thrust bearing	Avondale/Kingsbury
Steam generators	Combustion Engineering
Burners	Wallsend
Forced-draft fans	Westinghouse
Combustion control	Bailey
Feed pumps	Coffin
Auxiliary Machinery	
Turbo-generator	De Laval/Electro-Dynamic
Diesel-generator	ALCO-GE
Emergency generator	Caterpillar
Distilled water evaporator	Aqua-Chem
Majority of pumps	Warren, Goulds, De Laval, Pacific, Carver
Circulating pump	Warren
Soot-blower panel	Copes-Vulcan
Central control:	
Propulsion panel	Tano
Boiler panel	Bailey
Auxiliary panel	Tano
Electrical panel	ITE
Deck Machinery	
Lighter gantry crane	Morgan
Container gantry crane	Skagit
Deck Auxiliaries	Rice Barton/Pine Tree Engineering

ACCOMMODATIONS

The accommodations provided are of the highest standard. Located on the cabin deck are the captain, deck officers, and radio officer's quarters. A passenger stateroom and day room are also located on this deck, while on the upper deck the engineering staff is accommodated along with the officers' lounge and a passenger stateroom. All staterooms are furnished to the highest standards along with complete and individual toilet/shower facilities.

The main deck accommodates the other members which make up for the remainder of the crew, being the able-bodied seamen, ordinary seamen, electricians, stewards, and firemen/water tenders.

Provisioning for the need of the crew is accomplished by the use of 8 x 8 x 10 foot, food/linen/stores containers, which lend themselves to rapid and efficient handling on and off the vessel. Additionally to these, refrigerated containers, permanent chill, and freeze boxes are provided for the vessels every day needs. Electrically operated fork lift trucks are utilized for the handling of the containers to and from the hatch opening area which is serviced by the rapid handling stores crane located on the main deck.

NAVIGATION EQUIPMENT

The Delta Mar is controlled and maneuvered from a central console located in the 360-degree visibility wheelhouse. This bridge is fitted with one main combined console which in turn has a radar unit located on both the port and starboard sides. The radar on the port side being the true motion unit while the unit on the starboard side has the relative motion radar. Behind this conning station a chart room is located. This station has blackout arrangements for versatility as required for its use at all times. Located forward of the central control console, on the bridge front, is a gyro repeater, a VHF unit, and a shaft RPM indicator.

Shown on the platform when the Delta Mar was launched are, from left, **Jerome L. Goldman,** LASH designer and president of Friede & Goldman, Inc., naval architects; **Jorge O. Petterson,** president of the Latin American Shipowners Association; U.S. Representative **Leonor K. Sullivan** (D-Mo.), Chairman of the Merchant Marine and Fisheries Committee of the House of Representatives, and sponsor for the Delta Mar; **Robert J. Blackwell,** Assistant Secretary of Commerce for Maritime Affairs, and Capt. **J.W. Clark,** president of Delta Steamship Lines.

The following instruments are located within the confines of the chart room. An Omega receiver, a depth finder, wind speed and direction, chrometer, course recorder and recording Fathometer. Located outside the chart room are the master gyro compass, the smoke detector, log recorder, auto dial telephones, inclinometer, and clock.

The radars were provided by the Radiomarine Corporation and supplied as a type CRM-NID-75 True Motion 3CM unit, and a type CRM-NIC-75 Relative Motion 3CM unit.

The master gyro was provided by the Sperry Rand Corporation. The unit is a Mark 227 Mod. 0 gyro compass.

Two depth recorders are provided, one being an ITT Mackay Marine Model DE-741 unit which utilizes a chart and the other a Raytheon Company Model DE-740 Digital Fathometer. The chart unit is located within the chart room while the digital unit is located at the conning station.

Capt. **J.W. Clark,** president of Delta, stated: "It is of particular significance to the Gulf Coast and to the nation that these advanced vessels will specifically serve the South American trades. We believe these high-capacity and highly adaptable ships will have the capability to open a new era of mutual cooperation and friendship between the Americas through more efficient shipping services, increased foreign trade and general economic growth. The Delta LASH vessels, all to be in service by the end of the year, will also play a vital peacetime role in helping the nation carry forward its diplomatic, economic and political policies directed toward bringing about a closer relationship between the United States and South America."

The chief engineer's day room and office is spacious. Similar day room and office is provided for the captain.

This view of the pilot house shows the bridge console with conning station, throttle control, watch call buttons, navigation lights, etc. centrally located between the radars.

The chart room is located centrally behind the pilot house. An Omega receiver, a depth finder, wind speed and direction indicator and other instruments are in this room.

J.O. Crooke Retires From Bethlehem Steel Shipbuilding Division

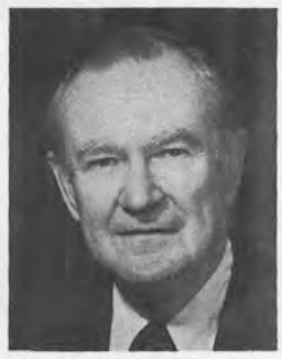
The retirement, effective August 31, of **J.O. Crooke,** general manager of the Beaumont, Texas, shipyard of Bethlehem Steel Corporation, was announced by **Walter F. Williams,** vice president-shipbuilding for the corporation.

Mr. **Crooke,** who is also retiring from the position of executive vice president and director of Bethlehem Singapore Private Ltd., a Singapore shipyard, is completing 32 years of service with Bethlehem and its predecessor company at Beaumont.

Mr. **Crooke,** a director of Union State Bank in Beaumont, was elected president of the bank earlier this year, and will devote full time to his duties as bank president.

A native of Conroe, Texas, he attended Houston Law School, Lamar University and the University of Texas. He is a registered professional engineer in Texas, both in structural and industrial engineering.

He joined the engineering department of Pennsylvania Shipyards Inc. in Beaumont in August 1941, and subsequently served as draftsman, supervisor of controlled materials and assistant to naval architect. When Bethlehem acquired the yard in 1947, Mr. **Crooke** became assistant to superintendent of sales. He later served as assistant superintendent of sales and development, superintendent of planning and production, assistant to manager, and assistant manager. He was named manager in 1962 and general manager in 1964.



J.O. Crooke

Mr. **Crooke** is active in civic affairs and has served on the board of directors of the Beaumont Chamber of Commerce for eight years. He is also a former vice president of the chamber. He is a past president of the Beaumont Rotary Club and served on the club's board of directors for five years. He is a former president and life member of the Beaumont Junior Chamber of Commerce and is a member of the Young Men's Business League. He is also president of the Beaumont Club.

He has served on the advisory board of the Beaumont Council on Alcoholism and is chairman of the advisory board of St. Elizabeth Hospital. He has served on the official board of Trinity Methodist Church and is also a member of the board of trustees of The Central City Development Corp.

Mr. **Crooke** is a former director of Greater Beaumont Inc. and a former member of the board of trustees and vice chairman of United Appeals. He is a member of The Society of Naval Architects and Marine Engineers and is currently chairman-elect of the Gulf Section of the Society. He is also an active member of other civic organizations and numerous professional organizations, including The Propeller Club, American Management Association, and Texas Manufacturers Association.

Norton, Lilly Names Captain Mihajlovic VP, Gulf Operations

Norton, Lilly & Company, Inc. has announced the appointment of Capt. **D. Mihajlovic** as vice president in charge of their Gulf operations.

Captain **Mihajlovic,** who is based in Houston, Texas, has had extensive experience in the shipping business and previously held management positions with American Export Isbrandtsen Lines, Inc. and States Marine-Isthmian Agency, Inc.

He is a member of the National Defense Transportation Association, Maritime Association-Port of New York, Downtown Athletic Club, and the Whitehall Club.

Moran Tug/Barge Operations help meet critical transportation needs

Barge "Rhode Island," 64,000 barrel capacity, under tow of tug, "Eugenia Moran," 3160 horsepower.

Keeping pace with the ever increasing requirement for petroleum products, Moran has helped maintain a steady, safe flow of fuels vital to our nation's health, comfort, and economy. Through the year millions of barrels are moved to refineries, distributors, and consumers along the Atlantic seaboard and inland waterways. More than a century of experience enables Moran tugs and barges to effect the greatest possible economy and efficiency.

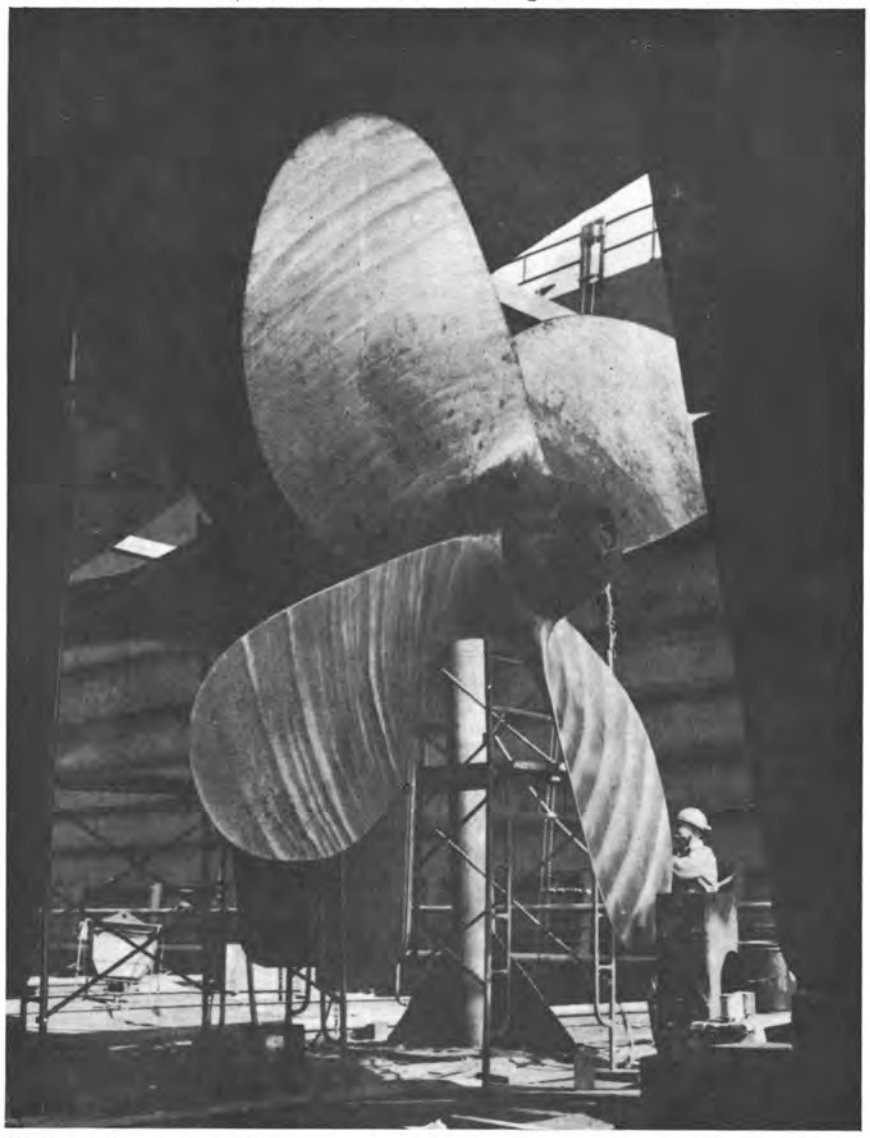
Moran Towing & Transportation Co., Inc.

"The Best in the Business"

One World Trade Center • Suite 5335 • New York, New York 10048

Eleven ton, fifteen foot diameter Avondale stainless steel propeller proves its worth

Avondale's stainless steel propellers have proved their worth because of their resistance to shock damage, corrosion and erosion.



Workman inspecting 15 foot diameter 11 ton Avondale stainless steel propeller on ENCO Sunshine State

Avondale Shipyards, Inc.

A SUBSIDIARY OF **OGDEN**

Propeller Dept.

P.O. Box 116, Harvey, Louisiana 70058
(504) 341-4211

NASSCO Announces Three Promotions

Harry R. Hipwell

George V. Tonner

Grover Edwards

National Steel and Shipbuilding Company, San Diego, Calif., has announced the following promotions: **Harry R. Hipwell** was advanced to the position of hull superintendent; **George V. Tonner** has been promoted to contracts administrator, repair division, and **Grover Edwards** has been promoted to assistant superintendent, welding.

Mr. **Hipwell** will report to **Ernest Schneider.** A graduate of New Brighton Technical School of Wallasey, England, Mr. **Hipwell** has been with NASSCO for 14 years, serving in various supervisory positions. His most recent assignment has been that of assistant superintendent, hull department.

Mr. **Hipwell** is a member of The Society of Naval Architects and Marine Engineers and the past president of the NASSCO Management Club and the San Diego Area Council of Management Clubs.

Mr. **Tonner** will report to **William T. Egan**, vice president, administration. Mr. **Tonner** was born in San Francisco but at the age of five went to England with his parents. He was schooled at Blackpool Technical College and completed his apprenticeship training with Lusse Bros., an electrical manufacturer, also of Blackpool.

In 1955, Mr. **Tonner** returned to America, settled in San Diego, Calif., and went to work for Ets-Hokin-Galvan, Electrical Contractors.

He joined NASSCO in 1957 as a journeyman electrician and was soon advanced to leadman. He transferred to the repair estimating department in 1960 as an electrical estimator and for the past eight years has supervised the department.

Mr. **Edwards** will report to **Ray Parrott,** welding superintendent. In his new assignment, Mr. **Edwards** will in addition to assuming greater supervisory responsibilities, provide instruction and technical advice to new construction and repair on welding production processes. He will also be involved in the development of new welding processes and setups.

Mr. **Edwards** was born in Tuskegee, Ala. He is a graduate of Tuskegee Institute High School and learned his profession at San Diego City College and at a U.S. Navy Welding School.

Mr. **Edwards** joined National Steel and Shipbuilding Company (NASSCO) in 1960 as a production welder. Since that time, he has held jobs with increasing responsibilties. For the past three years, he has held the position of general foreman, welding.

He is a member of the American Welding Society and the National Steel and Shipbuilding Company Management Club.

Marlin Drilling Orders Semisubmersible Unit From Beth-Beaumont

A semisubmersible drilling unit, to be named the Marlin No. 7, has been ordered from the Bethlehem Steel Corporation's Beaumont, Texas, shipyard by Marlin Drilling Co., Inc.

The vessel will be capable of drilling a 30,000-foot well in water up to 1,000 feet deep.

The unit, which will have two rectangular lower hulls to provide good towing characteristics, is scheduled for delivery in March 1975.

Tangarone Appointed Controller Of C-E Marine Division

Robert J. Tangarone

Robert J. Tangarone has been appointed controller, C-E Marine Division, Windsor, Conn., a unit of C-E's Windsor-based Industrial Group, according to **William C. Freeman,** general manager.

Mr. **Tangarone** joined C-E in 1970, and has held positions in marine engineering, service, erection, contract administration, and proposition/cost estimating.

He received a B.S. degree in mechanical engineering from the University of Connecticut and is currently completing an M.B.A. program at the University of Hartford.

Mr. **Tangarone** is a member of the American Society of Mechanical Engineers.

C-E Marine Division supplies steam generating systems for marine power and service applications and provides service, maintenance parts and engineering consultation.

Floating Shell service station speeds

turnarounds at Portland, Maine.

Ships can take on 4800 gal./hr. of Shell Lubricants here; 4000 gal./hr. at Hampton Roads; 4400 gal./hr. at New York City. Cost-saving bulk delivery of Shell Lubricants is available at 13 major ports on the East, West and Gulf coasts.

Shell knows that ships have to get back in service fast. That's where the profit is—when the ship is moving. So in Portland, Maine (and 12 other major ports) the speedy, cost-saving bulk delivery of Shell marine lubricants is available to serve you.

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

Advantages to motorships

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

It's a speedy tank-to-tank delivery system that involves very little chance of product contamination, and no interference with cargo handling operations. The time for the turnaround is trimmed. Money is saved for the ship's operator.

MELINA® Oil—one oil in bulk for 8 different shipboard applications

Shell MELINA Oil can effectively lubricate a motorship's main engines—plus most other shipboard machinery. MELINA Oil is a diesel engine oil, air compressor oil, turbocharger oil, steering gear oil, stern tube bearing oil, and variable-pitch propeller oil.

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

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

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

Why not start saving with the speed and economy of bulk delivery of Shell lubricants at Seattle; Portland, Me. and Portland, Oregon; San Francisco; Oakland; Los Angeles; Houston; Galveston; Texas City; New Orleans; Hampton Roads; Philadelphia; and New York. Call your nearest Shell Office listed below. Transportation Sales Offices:

New York, N.Y., (212) 262-7310;
Baltimore, Md., (301) 821-5905;
Chicago, Ill., (312) 341-3275;
New Orleans, La., (504) 588-4942;
San Mateo, Calif., (415) 574-5300.
Shell Commercial Marketing,
One Shell Plaza, Houston, Texas 77002.

Shell Products Perform

SHELL

Colt Industries' Power Systems Div. Promotes Phillips

The promotion of **E.J. Phillips** to manager of renewal parts marketing for Colt Industries' Fairbanks Morse Power Systems Division was announced by **B.W. Feldmiller,** vice president, customer service.

Mr. **Phillips** joined the company in 1935 in the apprentice training program. He advanced through manufacturing management positions in the Beloit, Wis., plant and was later involved in field sales and service. Before returning to Beloit in 1968, he was manager of an Eastern region customer service office.

In announcing the promotion, Mr. **Feldmiller** pointed out that additional emphasis is being placed on expanded customer service as an important factor in company growth. He stressed the extensive background and management experience of Mr. **Phillips** as being of extreme value in the implementation of an expanded customer service program.

In his new position, Mr. **Phillips** will be responsible for all renewal parts sales nationwide, as well as the foreign export market and Canada.

Bethlehem Names Leaf General Manager Beaumont Shipyard


Ralph A. Leaf

The appointment, effective September 1, of **Ralph A. Leaf** as general manager of the Beaumont, Texas, shipyard of Bethlehem Steel Corporation, was announced by **Walter F. Williams,** vice president, shipbuilding, for the corporation.

Mr. **Leaf,** who is advancing from assistant general manager of the yard, will succeed **J.O. Crooke,** who retired August 31.

A native of Baltimore, Md., Mr. **Leaf** studied mechanical and civil engineering at Johns Hopkins University, as well as ship production and management development courses sponsored by the Massachusetts Institute of Technology and the University of Baltimore. He is a professional engineer in the state of Maryland and a member of the American Society of Naval Engineers and The Society of Naval Architects and Marine Engineers.

He joined Bethlehem Steel as a draftsman at its Baltimore ship repair yard in 1937, and through the years was promoted to naval architect, technical superintendent, assistant to manager, and assistant manager. He was transferred to the Beaumont yard as assistant manager in November 1965.

Mr. **Leaf** is a member of the Rotary International and a board member of The Propeller Club of the Port of Sabine, Texas. He is a member of the Beaumont Chamber of Commerce and serves on its waterways committee, industrial development transportation committee, and advisory council for technical-vocational education. He also serves on the board of directors of the YMCA, is chairman of the board of trustees of All Saints Episcopal School, and was a division chairman in the United Appeals Campaign in 1970, 1971 and 1972.

Oskarshamn Shipyard Wins $124,000,000 Order For 7 Tankers

The Oskarshamn Shipyard in south Sweden has won an order valued at approximately $124,000,000 for the delivery of seven tankers to M.A. Karagforgis, a Greek shipowner.

This order brings Oskarshamn's total order book to 13 tankers, all of them in the 30,000-deadweight-ton class. Three of the first six ships were ordered by a Swedish concern earlier this year, while the remaining three have been ordered by Poland.

Gene M. Woodfin Elected President Marathon Mfg.

Gene M. Woodfin

Gene M. Woodfin has been elected as president of Marathon Manufacturing Company, Houston, Texas, one of the world's largest producers of drilling rigs for the offshore industry. He succeeds **Wayne D. Harbin** in that capacity.

Mr. **Harbin** will continue to serve the company as a director and chairman of the board. A spokesman for the company stated that Mr. **Harbin** will remain as an integral part of the management of the company and will work with Mr. **Woodfin** in directing the company's operations. Mr. **Woodfin** was also elected a director of the company, along with **J.R. Butler** of Houston, chairman of the board of Butler, Miller & Lents, Ltd., oil consultants.

Mr. **Woodfin** has been a partner in Loeb, Rhoades & Co., a leading investment banking firm in New York City, since 1959. Before going with Loeb, Rhoades & Co., he was a partner in the firm of Vinson, Elkins, Searls, Connally & Smith in Houston, where he specialized in oil, gas and corporate law. Mr. **Woodfin** was an officer in the United States Navy from 1942 to 1945 and is a native of Paris, Texas, and a graduate of the University of Texas and the University of Texas Law School. Mr. **Woodfin** is currently a director of Apco Oil Corporation, Susquehanna Corp. and Jim Walter Investments, as well as other Corporations. He is also the president and a director of the University of Texas Foundation at Austin, Texas.

Mr. **Harbin** stated: "I am pleased to have a man of Mr. **Woodfin's** business experience join the company, and I am looking forward to working with him in continuing the success of Marathon."

Bath Iron Awards $1-Million Contract To Mock/Walz & Krenzer

Julius Mock & Sons, Inc., in association with Walz & Krenzer, Inc., has received contracts in excess of $1,000,000 from Bath Iron Works to supply the cargo sideport and doors, watertight doors, hatches, scuttles and sliding doors on the four States Steamship vessels.

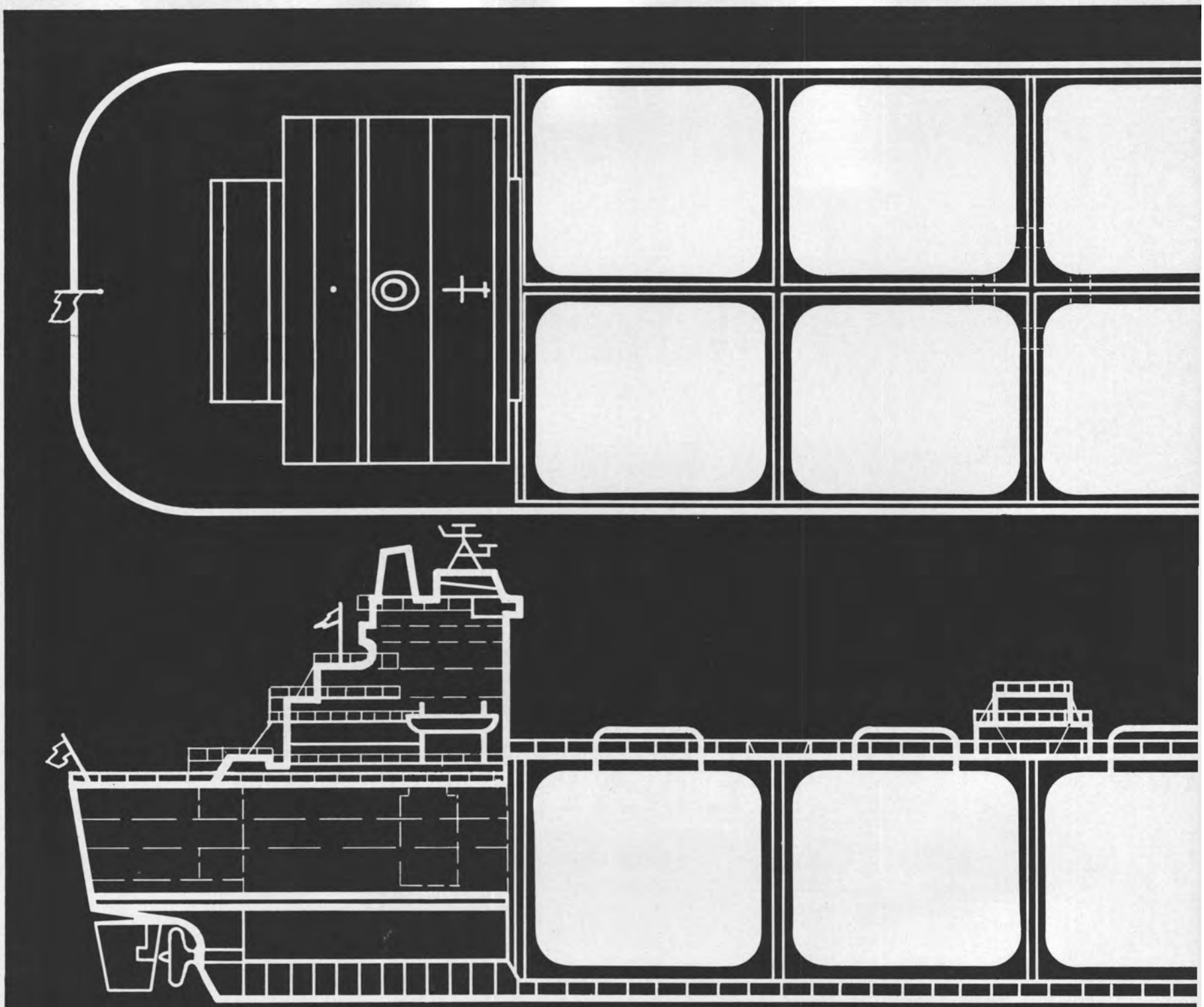
One combination 10-foot by 24-foot sideport-ramp, one 14-foot by 15-foot sideport, one 16-foot by 40-foot stern door, and 12 interior cargo doors in sizes up to 24 feet by 15 feet will be supplied for each ship.

All cargo doors have individual electro-hydraulic power units to permit simple push-button operation. The equipment follows the designs developed over the past 20 years by Walz & Krenzer, Inc. and already in service on the majority of roll-on/roll-off vessels built in this country.

Hitachi Building Yards For Very Large Vessels In Japan And Singapore

In order to meet world demand for larger ships, Hitachi Zosen is now constructing the Ariake Shipyard, which will be capable of building ULCCs of up to 400,000-600,000-dwt. Ariake is located in Kyushu, Japan, and is scheduled to be completed in April 1974. With construction still under way, the shipyard started test operations in April 1973, and will lay the keel for the first ship this autumn.

In Singapore, Hitachi Zosen Robin Dockyard (Pte.) Ltd. — a joint venture between Hitachi Zosen of Japan, and Robin Shipyard of Singapore—is now building a repair yard which will be capable of accommodating VLCCs of up to 300,000 dwt when it begins operations in the first half of 1974.



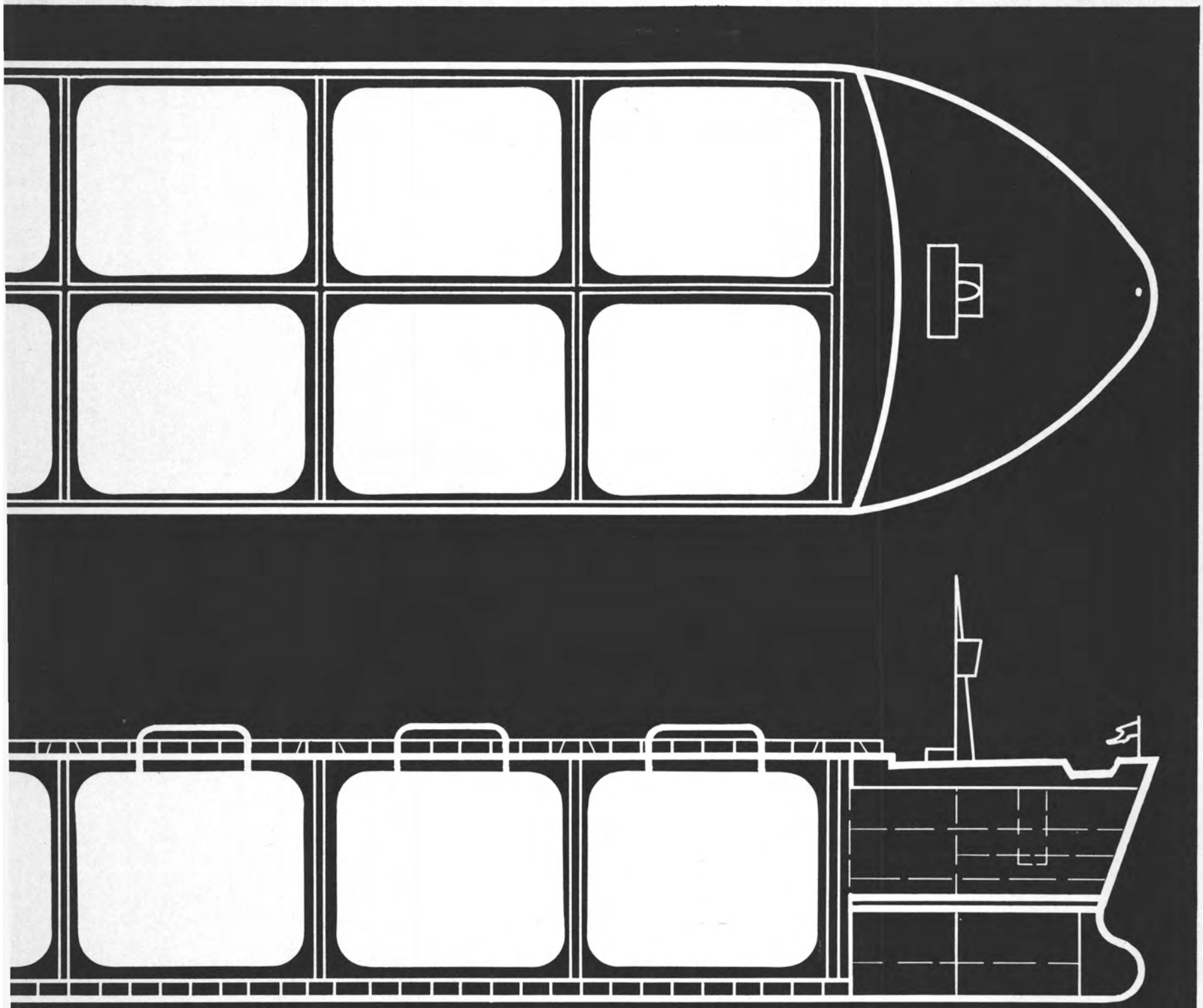
The first step in turning 30,000 tons of steel into

First, the containment tank material is of critical importance. Armco CRYONIC 5 Steel may be the answer. It's economical—20% lower in cost than 9% Nickel Steel. It's tough—meets these *minimum* Charpy V-Notch values at —275 F: 25 ft-lbs longitudinal, 20 ft-lbs transverse. It's weldable—can be joined to other nickel-alloy steels, carbon steels and austenitic stainless steels by all commonly used welding processes. It's strong—included in the ASME Boiler and Pressure Vessel Code as SA-645 with an allowable design stress of 23,700 psi at room temperature. This combination of strength, toughness, weldability and economy make Armco CRYONIC 5 Steel the logical material for LNG containment tanks.

Second, what about shell and deck plating, framing and beams and the rest of the components that comprise the ship? Here, too, Armco has the answer. In addition to supplying standard ABS Grades such as CS, E, DH and EH, Armco provides a broad array of Heat-Treated Carbon Steels for shipbuilding applications.

For example, Armco QTC is used extensively in the scantlings of LASH vessels; Armco LTM-QT for the hull of the icebreaking Coast Guard cutter, *Polar Star.* Others, such as Armco LTM-N, Lo-Temp, and Super-

CRYONIC 5 and QTC ® trademarks of Armco Steel Corporation, Middletown, Ohio
Lo-Temp, Super-Lo-Temp, and LTM trademarks of Armco Steel Corporation



an LNG tanker is knowing how Armco can help

Lo-Temp can also provide excellent low temperature notch toughness in a variety of strengths for use in all environments and climates.

Just knowing that Armco can supply marine steels for virtually every type of marine construction is an important step in ship design and construction. Take the next step and mail the coupon to receive more information on the complete line of Armco Marine Steels.

Armco Steel Corporation, Dept. H-113, Box 723, Houston, Texas 77001.

Send information on_____

Name _____ Title _____

Company _____ Street _____

City _____ State _____ ZIP _____

ARMCO STEEL

Evans Succeeds Romberg As NASSCO Chief Naval Architect

Kenneth Evans

Capt. Albert K. Romberg

The advancement of **Kenneth Evans** to the position of chief naval architect at National Steel and Shipbuilding Co., San Diego, Calif. 92112, was announced by **John B. Letherbury,** vice president, engineering. He will fill the position vacated by Capt. **Albert K. Romberg,** who recently retired. Mr. **Evans** will report to the vice president, engineering, in carrying out his duties.

Mr. **Evans** is a native of Sunderland, England. He was schooled in naval architecture at Sunderland Technical College and alternately served a five-year apprenticeship as ship draftsman at Bartram and Sons, Ltd., also of Sunderland.

From 1954 to 1956, Mr. **Evans** was a design engineer and estimator for Furness Shipbuilding Company of Hoverton Hill, England.

He served as supervisor of the naval architects department of Davie Shipbuilding Company of Quebec, P.Q., Canada, from 1956 to 1961.

Since joining NASSCO in 1961, Mr. **Evans** has served as assistant naval architect, where he was responsible for all hull design calculations and associated drawings with follow-up through detail design of working plans for both commercial and Naval vessels.

Mr. **Evans** has co-authored two technical papers entitled "Launching," and "Design and Construction of the 80,500-dwt OBOs." Both were presented to the San Diego Section of The Society of Naval Architects and Marine Engineers.

He is a member of The Society of Naval Architects and Marine Engineers, and the Royal Institution of Naval Architects.

Captain **Romberg,** U.S. Navy (ret.), a U.S. Naval Academy graduate, attended Massachusetts Institute of Technology and the Industrial College of the Armed Forces.

Captain **Romberg** served 26 years in the Navy as a commissioned officer in the Bureau of Ships, 12 years in various Naval shipyards, with progressive responsibilities in engineering and production. His last assignment was as commanding officer of the Naval Repair Facility in San Diego.

For the past 13 years, Captain **Romberg** has served as naval architect at National Steel and Shipbuilding Co., the last 10 as chief naval architect.

LNG Study Available From H.P. Drewry Ltd.

The publication of a study entitled "World Trade in Liquefied Natural Gas" has been announced by H.P. Drewry (Shipping Consultants) Ltd. According to the organization, the study closely examines the worldwide demand for gas and the geographical distribution of gas reserves in an attempt to quantify the scope for expansion in international LNG trades and the possible derived demand for LNG tankers.

Copies may be obtained from Drewry at 87 91 New Bond Street, London, WIY 9LA.

NEW TYPE UNLOADER: A new concept for faster bulk unloading will be put into operation later this year upon delivery of a Catenary Unloader to Goodpasture, Inc., Brownfield, Texas. Built by Paceco, a division of Fruehauf Corporation, the Catenary Unloader consists of an endless line of buckets connected by wire rope and suspended from a hinged boom with special sprockets. The suspended line of buckets form a catenary loop which affords unusual unloading versatility. As the bucket line moves, it digs and fills at a steady rate regardless of depth of material. Maneuvered by the hinged boom, buckets reach into the remote areas of a ship's hold and clean up with practically no residual. The new unloader will be operated by Shippers Stevedoring Company at Galena Park on the Houston Ship Channel, Texas. Material to be handled will be clinker cement, barytes, titanium sand, fertilizer, and phosphate rock.

Mike Stewart's million-dollar fleet can save you money in Norfolk.

You're not likely to wait in line for bunkering when you deal with Mike Stewart, the Exxon® Marine Port Representative in Norfolk.

That's because Exxon Marine is the only oil company service in the port that maintains its own bunkering fleet and stays open 24 hours a day, 365 days a year.

And that can save you money.

In addition to the tug Exxon Virginia and two 12,000-barrel Exxon bunker barges, Mike also offers Norfolk's largest supply of bunker fuel from the 1,600,000-barrel Exxon tanks.

To back up his lubricant deliveries, he's got the support of a large fleet of Exxon transport trucks nearby and plenty of Exxon lubricants on hand.

Mike and the people at Exxon Marine know what time means to your ship in port, and they keep things moving to save it for you.

EXXON

Exxon Company, U.S.A.
Houston, Texas

Shipbuilding Contracts Pending Before MarAd

Speculation as to merchant shipbuilding involving construction differential subsidy (CDS) funds, which might be awarded in the near future, centers on the following applications now pending before the Maritime Administration:

Three 38,200-dwt tankers for Moore-McCormack Lines, Inc. to be built by National Steel & Shipbuilding Co., San Diego, Calif.

Seven 80,500-dwt oil / bulk / ore (OBO) vessels—three for Hedge Haven Farms, Inc. and four for American Trading and Production Corp.—to be built by Todd Shipyards Corp., San Pedro, Calif.

Two 125,000-cubic-meter liquefied natural gas (LNG) carriers for subsidiaries of Amoco International Oil Co. and Natural Gas Pipeline Co. of America to be built by Tenneco's Newport News Shipbuilding, Newport News, Va.

Six 380,000-dwt very large crude carriers (VLCCs) for affiliates of Burmah Oil Co. to be built in the new Todd Shipyards Corp. facility at Galveston, Texas.

Two 265,000-dwt VLCCs for a subsidiary of Maritime Fruit Carriers Co., Ltd., to be built by Bethlehem Steel Corp., Sparrows Point, Md.

Four conversions of 13,500-dwt Challenger class freighters to 80,000-dwt tankers for United States Lines, Inc.—shipyard not yet selected.

Other active possibilities for U.S. yards, according to industry sources, are said to include three 55,000-dwt wood product carriers, two 120,000-dwt tankers, three 100,000-dwt ocean-going tug-barge systems for coal transport, and four to six additional 125,000-cubic-meter LNGs, plus conversion of two liquefied petroleum gas (LPG) carriers.

In addition, Suwannee River Lines, newly formed subsidiary of Occidental Petroleum Corp., has applied to the Maritime Administration for CDS in the construction of six 67,000-dwt chemical carriers to transport superphosphoric acid from the United States to Soviet ports and to bring ammonia back to the United States as part of a trade agreement Occidental concluded earlier this year with the Soviet Union. The cost of the ships is placed at $348 million.

National Steel & Shipbuilding Co. and Overseas Shipholding Group, Inc. have reached tentative agreement on construction of four 89,000-dwt tankers for operation in U.S. domestic trades at an estimated price of $120 million. Three would be delivered in 1977 and one in early 1978. Title XI Federal mortgage insurance guarantee is sought, and agreement supersedes the conditional contract announced in March covering the same vessels based on CDS.

Concerning CDS, shipbuilding contracts awarded in late June seemingly exhausted available funds, except for $50 million deferred for commitment in FY '74 by the Nixon Administration and $30 million set aside for acquisition of existing vessels for the reserve fleet. A budget request for FY '74 would provide an additional $275 million, but these funds, though authorized, have not yet been appropriated by Congress.

GATX Elects Sol Frisch VP

Sol Frisch

Sol Frisch has been elected a vice president of General American Transportation Corp. (GATX), Chicago, Ill., it was announced by chairman **T.M. Thompson.**

Mr. **Frisch** is also a vice president, director, and member of the executive committee of American Steamship Co., a subsidiary of GATX.

A licensed professional engineer for more than 30 years, Mr. **Frisch** joined the GATX engineering staff in 1945. He subsequently held a number of engineering, sales, and marketing positions, and in 1968 was assigned to corporate planning to work on special assignments for management.

A native of New York City, he holds engineering degrees from Cooper Union and New York University.

Acadian Marine Service Appoints J.R. Jumonville

J. Robert Jumonville

J. Robert Jumonville has been appointed administration manager of Acadian Marine Service, Inc. Mr. **Jumonville** will work out of the company's New Orleans office and will have responsibilities in Acadian Marine Service's international operations.

A native of New Orleans, Mr. **Jumonville** is an economics graduate of Tulane University. He formerly worked with a ship agency in several executive capacities and is experienced in technical accounting.

Acadian Marine Service is an international marine transportation company operating more than 50 vessels serving the oil field and construction industries. The company has offices in Lafayette, New Orleans, Morgan City and Delcambre, La.; and Hamburg, Scotland and Bermuda.

MarAd Consolidates 3 Independent Offices —Names Marvin Pitkin

In a further effort to improve the competitive ability of the American merchant marine, the Maritime Administration has reorganized its research, market and port development, and intermodal systems promotion activities.

According to Assistant Secretary of Commerce for Maritime Affairs **Robert J. Blackwell,** who recently announced the reorganization along with other agency changes, these elements will now be combined under one high-level manager.

Formerly located in three independent organizational components, the Offices of Research and Development, Market Development, and Ports and Intermodal Systems will now be under the jurisdiction of an Assistant Administrator for Commercial Development.

"By bringing these offices together," Mr. **Blackwell** said, "we hope to strengthen the ability of the Maritime Administration to aid the shipping and port industries in capitalizing on new technology. The integration of these activities, designed to improve the competitiveness of American-flag steamship lines, will hopefully reduce the time lag between the development and commercial application of new shipping systems.

"It will also improve communication between ship operators, port administrators and exporters and importers," he stated.

Marvin Pitkin, formerly the agency's Assistant Administrator for Research and Development, was named to head the new organization.

Mr. **Blackwell** also disclosed that **John J. Nachtsheim** has been appointed Assistant Administrator for Operations, succeeding **E. Scott Dillon,** who has retired. Mr. **Nachtsheim** will also continue as Chief of the agency's Office of Ship Construction.

James A. Higgins, who formerly headed the agency's Office of Advanced Ship Development, will now serve as Mr. **Pitkin's** deputy in his new position.

Lewis C. Paine and **Armour S. Armstrong** will continue as Chief, Office of Market Development, and Chief, Office of Ports and Intermodal Systems, respectively.

ABS Publishes 1973 Record

The 1973 Record of the American Bureau of Shipping is now available according to an announcement by the bureau. Requests for the publication, which sells for $125 annually with semimonthly supplements, can be addressed to any local office of the bureau, or to the Book Department, American Bureau of Shipping, 45 Broad Street, New York, N.Y. 10004.

FMC Wins Fourth Oil Tanker Contract

FMC Corporation, Portland, Ore., received a contract for one more $17-million gas-turbine-powered oil tanker to be built at their Marine and Rail Equipment Division in Portland. This brings the total ships being built at the division to four, with contracts totaling $70 million. The first tanker is scheduled to be launched in February 1974, while the fourth will be chartered to Standard Oil Company of California in early 1976.

The FMC Division, formerly Gunderson, Inc., brought the first shipbuilding to the Portland area since World War II, with this tanker project.

The 35,000-ton tankers incorporate innovative design concepts developed by Chevron Shipping Company (a subsidiary of Standard Oil) after several years of study. The hull design and gas turbine-electric power units combine to produce a safe, economical, environmentally sound tanker. Chevron officials believe these vessels will establish a precedent in U.S.-tanker design and operation.

Construction methods are vastly modernized from the World War II system when steel was placed one piece at a time as the ship took form on the ways. FMC constructs steel modules weighing over 100 tons each and sets them in place with a giant crane. Modular living quarters will be installed in the steel deckhouse to facilitate construction. The pilothouse will be equipped with the latest design navigational equipment.

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

FMC developed both hull and propulsion system details in consultation with Chevron Shipping Company, Nickum and Spaulding Associates — the naval architects, and General Electric—the propulsion system manufacturers. Chevron's new-design concepts, which are embodied in these vessels, are creating considerable interest in the maritime industry.

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

J.B. Allison & Assoc. Initiate A Financial Consulting Service

J.B. Allison, president of J.B. Allison & Associates, Inc., financial consultants, 1414 Dallas Federal Savings Building, Dallas, Texas 75201, recently announced that a needed consulting service has been instituted by J.B. Allison & Associates for the intermediate and smaller ship, tug, barge, and inland and offshore drilling owners and operators considering lease financing of marine equipment.

The service consists of analysis of the owner's requirements and recommendation, contact and negotiations with leasing companies and other financial institutions.

A similar service is also available to shipyards interested in their own leasing program or in programs available through numerous leasing companies.

J.B. Allison & Associates, Inc. have been involved in the preparation and negotiations for Title XI mortgage guarantees under both lease and loan structures.

Mar-Ten Marine Moves To New Offices

Mar-Ten Marine Associates, Ltd. of Houston, Texas, the American operating organization of Martin Marine Co., Ltd. of Grand Cayman Island, has moved its offices to Jacinto Towers, 10202 East Freeway, Houston.

Nolty J. Theriot, Inc. Names John W. Arendt General Superintendent

John W. Arendt

John W. Arendt has joined Nolty J. Theriot, Inc., the New Orleans and Golden Meadow, La., marine and towing contractor, as general superintendent as of August 1, 1973. Mr. **Arendt,** who was previously superintendent of engineering and construction for Ingram Ocean Systems, Inc., will be based in Theriot's New Orleans offices and will assist the executive vice president, **Charles R. Sanders,** in all phases of management of the company's operations, both domestic and foreign.

Title XI Aid Asked For Four Tankers To Be Built By Nassco

First, Second, Third and Fourth Shipmor Associates, 511 Fifth Avenue, New York, N.Y., has applied to the Maritime Administration for Title XI mortgage and loan insurance in connection with the construction of four tankers.

The 89,700-dwt tankers, estimated to cost $34,375,000 each, will be built by National Steel and Shipbuilding Company, San Diego, Calif.

$635 Million Amended CDS For Six VLCCs Filed By Central Gulf

An amended application to an original request for construction differential subsidy covering multiples of three vessels in the categories of ore carriers, tankers, VLCCs or LNGs has been received by the Maritime Administration from Central Gulf Lines, Inc. of New Orleans, La.

The new filing requests CDS for six VLCCs of 380,000-dwt each. These VLCCs—costing $635.4 million—will be used in United States foreign trade and are planned to be built at Todd Shipyards Corporation's Galveston, Texas, yard.

Total Of 20 Barges Ordered From Dravo And St. Louis Ship

The Maritime Administration has approved a Title XI application from Port City Barge Line of Louisiana, Inc., 230 Main Street, Greenville, Miss. 38701 for 20 open-top barges. Dravo Corporation will build 10 of the barges, and the other 10 are to be built by St. Louis Ship, St. Louis, Mo. The total cost of the barges is in excess of $2.5 million.

Twin Disc, Inc. Offers New Bulletin On Marine Gears

Twin Disc, Incorporated, has published a complete-line catalog covering Twin Disc Hydraulic Marine Reverse and Reduction Gears for workboats, fishboats and pleasure craft in the 100 to 1,000-hp range. The new Bulletin 319-E contains engineering and dimensional data on the nine basic Marine Gear models, as well as other marine products, including heat exchangers, combination V-Drive Reverse and Reduction Gears, Marine Top Power Take-Off Units. Bulletin 319-E includes the new Model MG-502 which features a 10° output shaft down angle for level engine installation, and the new Twin Disc Model MG-514M Omega Power Control Marine Gears with power dividing capability and separate variable propeller speed control in both forward and reverse.

Bulletin 319-E is available from any Twin Disc distributor or Twin Disc, Incorporated, Racine, Wis. 53403.

ADVERTISE TO THOUSANDS MORE ...IN MARITIME REPORTER/

Marine sales managers agree...management, engineering and purchasing personnel...shoreside...in vessel operations, shipbuilding, ship repair and naval architecture have the authority to specify, order and buy all types of marine equipment, products and services.

Sales managers tell us men aboard ship do not specify or purchase.

COMPARE THE TITLES OF THE READERS OF THE TWO MAGAZINES

MARINE ENGINEERING/LOG

OCCUPATIONAL BREAKDOWN OF TOTAL WORLD-WIDE CIRCULATION

		BUYING POWER
SHIPBUILDING & SHIP REPAIR COMPANIES		
Companies, Presidents, Vice Presidents, Secretaries, Treasurers, General Managers & Purchasing Agents		1,828
Works Managers & Superintendents		196
Naval Architects, Marine Engineers, Chief Draftsmen		767
Shipbuilding & Ship Repair Personnel (Draftsmen, Foremen, Inspectors & Others) not included in above classification	454	
SHIP OPERATING COMPANIES, OWNERS, AGENTS & BROKERS:		
Companies, Presidents, Vice Presidents, Secretaries, Treasurers, General Managers, Purchasing Agents, Passenger & Freight Agents		2,721
Marine Superintendents, Port Captains, Port Engineers, Port Stewards		1,224
Deck Captains, First, Second & Third Mates Only	1,979	
Engine Room Chiefs & Licensed Assistants	2,935	
Ship Operating Personnel Ashore & Aboard not included in above classifications	398	
PROFESSIONAL MEN:		
Naval Architects & Marine Engineers		1,476
Admiralty lawyers	20	
Insurance Companies, Agents & Brokers	55	
NAVY	313	
MARINE SUPPLIES & EQUIPMENT: Manufacturers	1,777	
Ship Chandlers, Dealers & Agents	34	
Bunkers (Coal & Fuel Oil)	4	
ALLIED MARINE INDUSTRIES:		
Freight Agents & Forwarders	1	
Exporter & Importers	7	
Stevedoring Companies not owning Floating Equipment	25	
Government Schools, Libraries, Students & Commercial Organizations	1,069	
Miscellaneous	863	
Awaiting Classification by Business & Industry	51	
NON BUYING POWER	9,985	

WORLD-WIDE BUYING POWER TOTAL 8,212

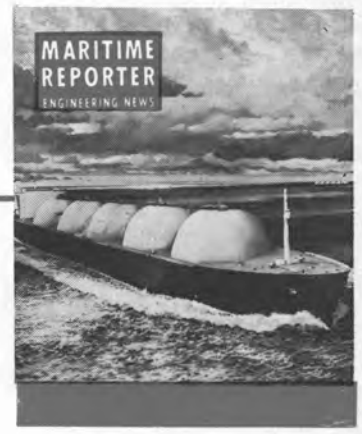
Why settle for less . . . . . MARITIME REPORTER/Engineering News

Source of information—Each publication's own official circulation statement—Available July, 1973.

MARINE BUYERS IN 1973–'74 ENGINEERING NEWS

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

You be the judge... compare the readers of both magazines... separate the buyers from the non-buyers... for the one reaching the largest number of men you know can give business to your company.



... FOR THE ONE REACHING THOUSANDS MORE BUYERS.

MARITIME REPORTER/Engineering News

OCCUPATIONAL BREAKDOWN OF TOTAL WORLD-WIDE CIRCULATION

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

WORLD-WIDE BUYING POWER TOTAL 14,154

OUR TOTAL CIRCULATION IS OVER 97% REQUESTED ... IN WRITING ... BY EACH INDIVIDUAL READER

BRINGS YOUR ADVERTISING TO THOUSANDS MORE BUYERS WORLD-WIDE ... TWICE AS MANY IN THE U.S. MARKET.

MARITIME REPORTER AND ENGINEERING NEWS

107 EAST 31st STREET
NEW YORK, N. Y. 10016
MUrray Hill 9-3266 • 7 • 8 • 9

DIESEL GENERATOR SETS

1

350 KW DIESEL GENERATOR SET

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

2

250 KW DIESEL GENERATOR SET

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

3

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

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

4

UNUSED 10 KW SUPERIOR DIESEL GENERATOR SET

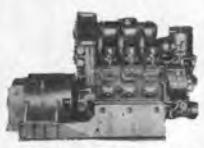
GENERATOR: Delco 10 KW — 120 VDC — 83.3 amps—1200 RPM. ENGINE: Superior diesel—2 cyl.—4½x5¾ — 15 HP — heat exchanger cooled.

5

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

GENERATOR: Allis Chalmers—Compound wound. Has Class "A" insulation. Output 500 KW—120/240 volts DC—2080 amperes—720 RPM—drip-proof—self-cooling. Ambient 50°C—temperature rise 40°C. ENGINE: Model GM 8-278—2-cycle—Vee type—8½"x10½"—air starting—720 RPM. Complete with switchgear. Condition very good. Stilll aboard naval vessel. Has Ross shell & tube type lube oil & raw coolers—temp. control valve—shock mounts.

6



300 KW DIESEL GENERATOR SET

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

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

TURBO GENERATOR SETS

7

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

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

8

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

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

9

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

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

10

WESTINGHOUSE 440/3/60 200 KW UNIT

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

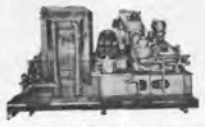
11

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

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

12

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



1962—DeLaval. Very little use. Completely preserved with rotors and diaphragms crated separately. TURBINE: DeLaval —585 PSI — 840°TT—6-stage—6391 RPM—class CD — Also suitable 440 lbs.—740°TT—25" vac. GEAR: 6391/1200 RPM. GENERATOR: Allis-Chalmers—450/3/60. Totally enclosed, with static exciter and voltage regulator system. Weight 17,665 lbs. Complete with latest dead front switch gear. Also available are the condensers, circulating and condenser pumps. All very up-to-date, compact construction. Turbines will easily handle 600 KW if up-grading is desired.

13

AP2 VICTORY WORTHINGTON-MOORE CROCKER-WHEELER 300 KW UNIT

TURBINE: 440 PSI—740°TT—28½" vacuum—type S4 — 5-stage — 6097 RPM — serial 7547 & 7548. GEAR: 6097/1200. GENERATOR: 300 KW—120/240 volts DC—1250 amps—compound wound—973643—999759. Armature flange 8½"; B.C. 7"—12 holes. ALSO NEW ARMATURES IN STOCK & 300 KW SHUNT ARMATURES.

14

UNUSED C-4 CROCKER-WHEELER 500 KW GENERATOR ENDS ONLY 120/240 VOLTS D.C.—1200 R.P.M.

FORMERLY USED WITH WORTHINGTON-MOORE TURBINES & GEARS

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

15

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

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

16

TWO 538 KW WESTINGHOUSE T-2 AUX. GENERATORS (COMPLETE)

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

TURBINES & ROTORS

MAIN PROPULSION

17

BETH. CLASS—13,600 H.P.

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

18

H.P. & L.P. COUPLINGS

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

19

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

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

T-2 TURBINES & ROTORS

20

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

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

21

2 COMPLETE T-2 G.E. TURBINES

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

ROTOR WILL INTERCHANGE WITH ELLIOTT MAIN TURBINE

Will Sell Rotors Separately

22

T2-SE-A1 MAIN PROPULSION ROTOR — G.E.

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

23

T-2 TANKER UNUSED—4 UNITS AVAILABLE

AUX. G.E. TURBO GEN. ROTORS

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

VICTORY SHIP TURBINES & ROTORS

24

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

L.P. – 3509 RPM
H.P. – 6159 RPM

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

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

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

WRITE OR PHONE FOR DETAILED INFORMATION AND PRICES

TON METALS CO.

ORE ST. • BALTIMORE, MD. 21202

) 539-1900 Marine Dept.: (301) 355-5050

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

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

26 **6000 H.P. G.E. — NORTH CAROLINA C-2**

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

27

19 STAGE WESTINGHOUSE H.P. ROTOR FOR AP2 VICTORY

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

28

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

MD-48A—8500 HP—6159/3509/763/85 RPM.

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

Westinghouse 4A-1640.

PUMPS

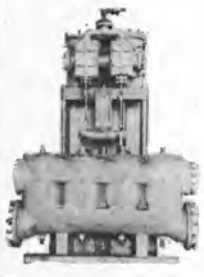
30

CARGO STRIPPING PUMPS

BRONZE T2 TANKER STRIPPING PUMPS

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

31



WORTHINGTON 16"x14"x18" VERTICAL DUPLEX STRIPPING PUMP

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

32

UNUSED DELAVAL IMO ROTARY PUMP

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

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

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

34

DAYTON-DAWD 2-STAGE FIRE AND BILGE PUMP

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

BOILER FEED PUMPS

Suitable for Navy and Merchant Vessels

35

COFFIN TYPE CG-4A FEED PUMP

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

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

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

37

BUFFALO SIZE 4 FEED PUMPS

Terry Turbine—BM—273 HP—550 RPM—exhaust 15 lbs—590 PSI—superheat 0°—425 GPM Buffalo Pump—discharge pressure 750 lbs—5"x4"—built for USN DD destroyers. DD 445 Class Fletcher.

38

WORTHINGTON 3-STAGE UNUSED BOILER FEED PUMP

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

39 **INGERSOLL-RAND BRONZE CARGO PUMP**

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

40

C-25 CARGO PUMP TURBINE SPARE GEARS

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

MISCELLANEOUS

DOUBLE REDUCTION GEARS for Diesel Drive

41

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

Farrell-Birmingham — 3200 SHP. REDUCTION GEAR: 1.81:1—handles two 1600 HP diesels @ 720 RPM. With hydraulic couplings & Fawick clutch. Port and starboard. Gear output 400 RPM. Suitable for dredge pumps. Non-reversing. OK for 38D8-⅛ engine.

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

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

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

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

44 **SINGLE ENGINE REDUCTION GEAR**

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

45 **ANCHOR WINDLASS**

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

46

SHARPLESS LUBE & DIESEL OIL PURIFIERS

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

47

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

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

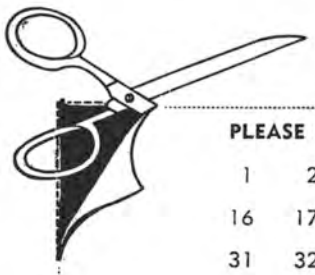
48

UNUSED 70 HP McKIERNAN-TERRY WINDLASSES

Chain and two 10640 lb anchor & 30 fathoms chain @ 30 FPM. 70 HP—230 volts—shunt DC motors—233 amps—550 RPM—55°C rise. Wildcat centers 47½". Base 9'5" wide x 11' long. Weight 36,000 lbs.

INQUIRE FOR ALL OTHER ITEMS

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



PLEASE SEND INFORMATION ON THE FOLLOWING: (Please circle items) 9/1/73

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48												

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

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

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

Standard Oil (Indiana) Orders Seven New Tankers For Fleet

As a result of orders it has placed on its own account and arranged through charter-and-build arrangements, the tanker fleet of Standard Oil Co. (Indiana) will be increased by seven new ships.

The new ships, all to be operational by 1975, account for about one million deadweight tons and will bring the company's tanker capacity to approximately 3.6 million deadweight tons.

Two of the vessels, in the 128,000-ton class, will be built in Spain by Astilleros Espanoles, S.A., and two similar ships by Mitsui Shipbuilding and Engineering Co. in Japan. The four ships, to be owned by the company ,are to be delivered in 1976.

Three 153,000-ton vessels are being constructed by another Japanese shipyard for delivery in 1974-75 and will be operated by the oil company for 20 years at a full-term cost of more than $100 million. The construction orders and charter arrangements have been made through the company's wholly owned subsidiary, Amoco Ocean Tanker Co.

The oil company's tanker fleet currently numbers 41 vessels, including its own ships and those operated under charter and units on order or under construction.

The total includes two 230,000-ton ships recently launched in Spain and two similar ships which have been ordered from a Spanish yard.

The seven new ships the company has ordered will be capable of delivering crude oil in volumes equal to a delivery rate of about 100,000 barrels per day from the Middle East to free world ports, according to **R.S. Haddow,** president of the company.

Mr. **Haddow** also pointed out that U.S. East and Gulf Coast ports are not now capable of docking tankers larger than the 70,000-deadweight-ton class. By placing the company's new large tankers in service to deeper-water foreign ports, he noted smaller vessels in its fleet will be free to move crude oil imports into U.S. ports.

Odense Steel Shipyard Ltd. Delivers 285,000-Dwt Tanker

The T/T Rania Chandris, equipped with the most modern navigation instruments, achieved a speed of 15.25 knots during her sea trials.

The tenth in a series of 285,000 tonners and the third this year from the Lindo Shipyard, Lindo, was commissioned following successful trials in Danish waters and was delivered to her owners, Chandris Tankers Limited, London.

The approximate main dimensions of the Rania Chandris are as follows: length overall, 1,139 feet; breadth, 170 feet, and depth, 93 feet. The vessel has a speed of 15.25 knots.

The main engine is a Stal-Laval turbine plant with an output of 32,440 shp at 85 rpm, a Combustion Engineering main boiler type V2M9, developing at normal output 95 tons steam per hour at 513 degrees, and a Combustion Engineering auxiliary boiler type V2M8, developing 32 tons steam per hour at 350 degrees.

The vessel is built to the rules of Lloyd's Register of Shipping class +100 A.1 "Oil Tanker" pt. H.T., +LMC.

The next 285,000 tonner for the A.P. Moller Shipping Companies, Copenhagen, is scheduled for delivery this month. She will be followed by another sister ship for the A.P. Moller Shipping Companies, and two for the Livanos Group.

With these vessels, the series of 285,000 tonners will be completed, and the yard will thereafter go ahead with the construction of five 330,000-dwt tankers for the A.P. Moller Shipping Companies.

MISTER CAP JOINS F & S FLEET: Service Machine & Shipbuilding Corp. of Morgan City, La., recently delivered the M/V Mister Cap, a 1,200-hp tug, to F & S Boat Corporation, a division of Elpac, Inc. The vessel, named after **F.L. Capert,** chairman of Elpac's board, measures 75 feet by 24 feet and is equipped with two 16V71N engines by General Motors, MG527 clutches by Twin Disc, two 30-kw generators by Delco with G.M. 371 power, anchor handling winch (100,000# line pull), fire fighting system, and a complete package of modern electronic equipment. F & S Boat Corporation is under the management of **Andy Wedaman** and **Albert (Sam) Smith Jr.,** and operates 14 tugs from offices in Morgan City and New Orleans, La., Houston, Texas, and London, England.

Oglebay Norton Company Elects Thompson And Benson

Renold D. Thompson

Keith S. Benson

Oglebay Norton Company, Cleveland, Ohio, has announced the election of **Renold D. Thompson** and **Keith S. Benson** as executive vice presidents of the company, effective August 15, 1973.

Mr. **Thompson** becomes executive vice president-operations and assumes responsibility for the direction of all the company's operations and services. Mr. **Benson** as executive vice president-administration and finance will be responsible for the direction of the administrative, legal, financial and corporate activities, including the development of new business ventures.

In announcing the election of the two new executive officers, **Courtney Burton,** chairman of the board, and **John J. Dwyer,** president of the company, stated: "We believe this major realignment in our management group will not only strengthen our company in its competitive position, but will also allow the president and other senior executives of our company to devote greater attention to long-range planning and future growth by the utilization of the company's total assets.

"Mr. **Thompson** has held top management responsibilities in several divisions of the company and is presently in charge of its iron ore and vessel operations. Under the new arrangement, he will now have all operating units and subsidiaries of the company reporting to him.

"The election of Mr. **Benson,** who was formerly chairman and chief executive officer of Pickands, Mather & Company, brings into our management an exceptionally qualified senior executive with considerable background and experience in our lines of business and in the development and implementation of expansion and financial programs for the procurement and transportation of raw materials."

Oglebay Norton Company and its subsidiaries are engaged in the mining, sale and transportation of iron ore, coal and other minerals, the operation of a diversified fleet of Great Lakes vessels and general cargo docks on the Great Lakes, and the manufacture and sale of hot tops and related items used in the pouring of steel ingots.

Second Intersociety Conference On Transportation To Be Held In Denver, September 24-27

Two hundred technical papers will be presented at the second Intersociety Conference on Transportation, September 24-27, 1973, at the Brown Palace Hotel, Denver, Colo.

Some 40 technical sessions will serve as platforms for transportation experts representing Government and industry, both domestic and foreign, to air their views. Technical scope is broad, with presentations relative to every phase of the transportation industry. This is largely due to the multi-society sponsorship—the first time a transportation conference has had such intersociety participation.

Sponsoring societies of this conference are The American Society of Mechanical Engineers, American Economic Association, American Institute of Aeronautics and Astronautics, American Institute of Industrial Engineers, Inc., The Institute of Electrical and Electronics Engineers, Inc., The Engineering Institute of Canada, The Institute of Management Sciences, Operation Research Society of America, Society of Automotive Engineers, and The Society of Naval Architects and Marine Engineers.

Items of particular interest to people in the marine industry include:

1. A panel discussion entitled "Environmental Protection and Tanker Design." This will be chaired by **Phillip Eisenberg,** president of The Society of Naval Architects and Marine Engineers, assisted by Rear Adm. **William M. Benkert,** Chief, Office of Environment and Systems, USCG. A broad participation by representatives of industry and Government is planned, and coming shortly before the next meeting of IMCO, this event is expected to attract wide interest.

2. At one of two sessions devoted to the state-of-the-art in the major transportation modes, **Thomas Pross** of the Maritime Administration will give a comprehensive review of current developments in marine transportation.

3. A paper by **Joseph Porricelli** and **Virgil Keith,** entitled "Tankers and the U.S. Energy Situation—an Economic and Environmental Analysis." This will be part of a special session on environment and energy.

4. "Hovercraft Technology" will be covered in a paper to be presented by **John Chaplin,** director of engineering for Bell-Aerospace, in a session devoted to advanced technology.

For further information and copy of program, contact **Ms. Marion Churchill,** Manager, Conferences and Divisions, ASME, 345 East 47th Street, New York, N.Y. 10017, telephone: (212) 752-6800, Ext. 226.

Moore And McCormack Appoints L.W. Ehrhardt Director Of Planning

Laurence W. Ehrhardt has been appointed director of planning of Moore and McCormack Co., Inc. (NYSE, Pacific) according to **Paul R. Tregurtha,** executive vice president and chief financial officer. Mr. **Ehrhardt** will be responsible for the development and operation of long-range planning programs and analysis of specific plans and activities of the company, whose principal activities are Moore-McCormack Lines, Incorporated in ocean shipping, and Pickands Mather & Co., which operates Great Lakes ore carriers, iron ore and coal mines, and acts as sales agents for various materials.

Mr. **Tregurtha** noted that Mr. **Ehrhardt** has "an extensive background in analysis, planning and development of operations and of budget systems, and the use of computer technology in these areas."

Prior to joining Moore and McCormack, Mr. **Ehrhardt,** since 1969, had been affiliated with Applied Decision Systems, Inc., Wellesley Hills, Mass. — a consulting firm specializing in the application of quantitative analysis to problems of business decision making in large corporations — as treasurer and as a consultant. His previous business experience also includes two years at Xerox Corporation, where he served as an operations research analyst and as a senior budget analyst.

Mr. **Ehrhardt** received a B.A. degree from Yale in 1961, and an M.B.A. degree in 1966 from the Harvard Graduate School of Business Administration, where he concentrated on managerial economics.

John T. Owens Named Controller At Sun Shipbuilding

John T. Owens

Sun Shipbuilding and Dry Dock Co., Chester, Pa., has appointed **John T. Owens** to the post of controller. In his new post, he will report to **G.C. Liacouras,** vice president-finance, and will be responsible for the general accounting functions of the Finance Division. Mr. **Owens** will carry out the duties of controller while continuing to administer his present duties as manager of the shipyard's cost accounting department.

A graduate of La Salle College with a B.S. degree in accounting, Mr. **Owens** joined Sun Ship in March 1966 as assistant to the controller and manager of cost accounting.

Ackerman Resigns From Newport News

L.C. Ackerman, chairman and chief executive officer of Newport News Shipbuilding & Dry Dock Co., has resigned, effective August 15, it was announced by the shipyard's parent company, Tenneco, Inc.

Mr. **Ackerman** has been top officer of the shipbuilding company since 1969, having previously been with the Walker Manufacturing Co., Racine, Wis., another Tenneco subsidiary.

John P. Diesel, president of the shipbuilding organization, will take over as chief executive officer, in addition to his present duties.

Bethlehem Beaumont Receives Contract For Self-Propelled Rig

Bethlehem Steel Corporation's Beaumont, Texas, Shipyard, has received a contract from Walker-Huthnance Offshore Co. of Houston, Texas, for the construction of a self-propelled jackup rig. To be named Ranger III, the new rig, similar to its sister ships Ranger I and Ranger II, is designed for drilling and workover operations in water depths up to 70 feet.

Seakeeping Symposium To Be Held Oct. 18-19 At Webb Institute

A symposium to commemorate the 20th anniversary of the milestone paper "On the Motions of Ships in Confused Seas," by Dr. **Manley St. Denis** and Dr. **Willard J. Pierson Jr.,** has been organized by Panel H-7 (Seakeeping Characteristics) of the Technical and Research Program of The Society of Naval Architects and Marine Engineers. The purpose of the symposium is to present and discuss the current and future status of all aspects of seakeeping research and design applications. The symposium will take place at Webb Institute of Naval Architecture, Glen Cove, N.Y. 11542, on October 18-19, 1973, with all technical sessions held in the new Henry Auditorium.

In the 20 years since the **St. Denis** and **Pierson** paper was presented, almost everyone connected with ship design all over the world has learned to understand the principles set forth in this paper. During this time, rapid research progress, partially stimulated by the paper, has been made in the study of accelerations, shipping water, incidence of slamming, wave-induced bending moments, bow sonar effectiveness, added resistance, and other aspects of seakeeping. Furthermore, designers of unusual craft—catamarans, hydrofoils, surface effect ships, and floating platforms—have been able to use the basic techniques of the **St. Denis/ Pierson** paper to ascertain seakeeping requirements for vessels for which there was no design precedent.

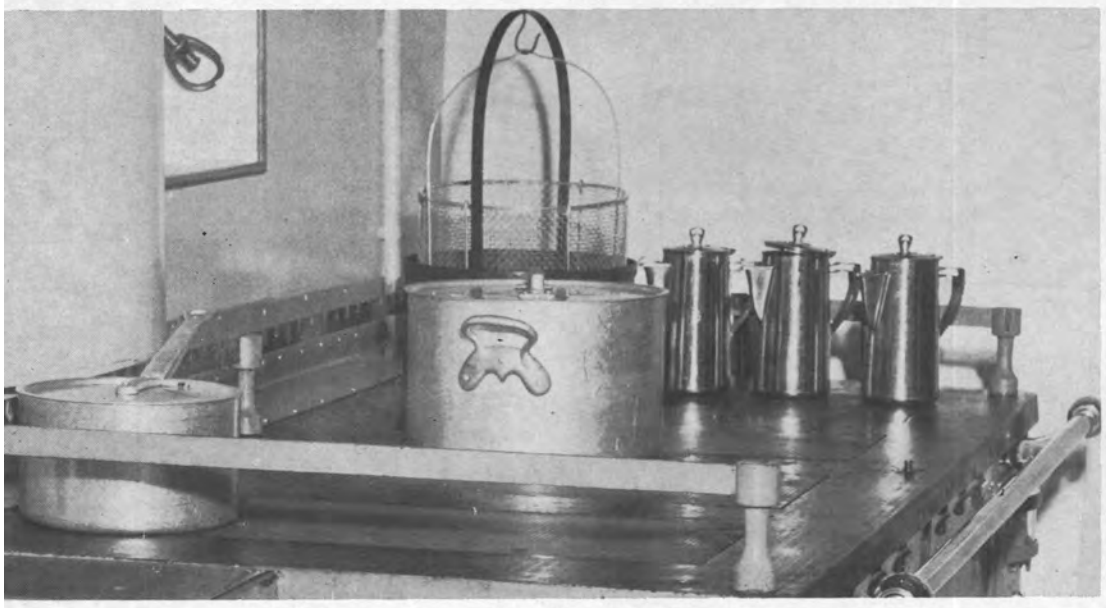
The symposium will be divided into three successive sessions dedicated to waves, transfer functions and ship responses (theory and applications), and 13 papers will be presented with ample time for discussion. Each of the papers will include a short review of the progress achieved over the past 20 years and will emphasize recommended future developments and applications. The keynote address on Thursday, October 18, will be given by Dr. **W.E. Cummins** (Naval Ship Research and Development Center), to be followed by three papers on the prediction, measurement and application of wave data presented by Dr. **V.J. Cardon,** Dr. **O. Oakley** (University of California, Berkeley), and Prof. **D. Hoffman** (Webb), and **W. Marks** (Poseidon), respectively.

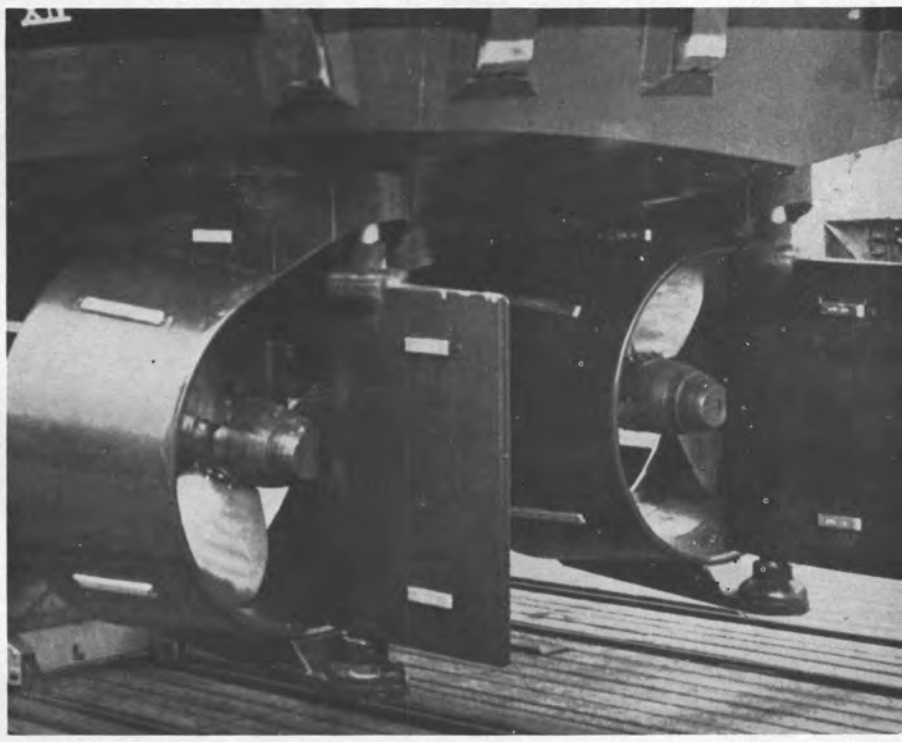
Following a box luncheon served on the beautiful campus, the afternoon session will be devoted to subjects related to the transfer functions, with presentations by Prof. **T.F. Ogilvie** (University of Michigan), Prof. **J.R. Paulling** (University of California), and Dr. **W.E. Cummins** (NSRDC), respectively, on the theory, time domain analysis and problem areas.

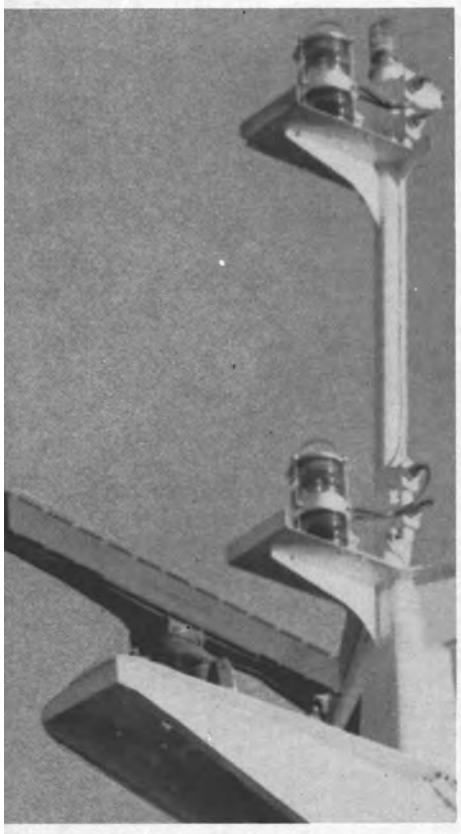
A banquet will be held on Thursday evening at the Swan Club in Glen Head to suitably honor the guests of honor, Professors **St. Denis** and **Pierson.**

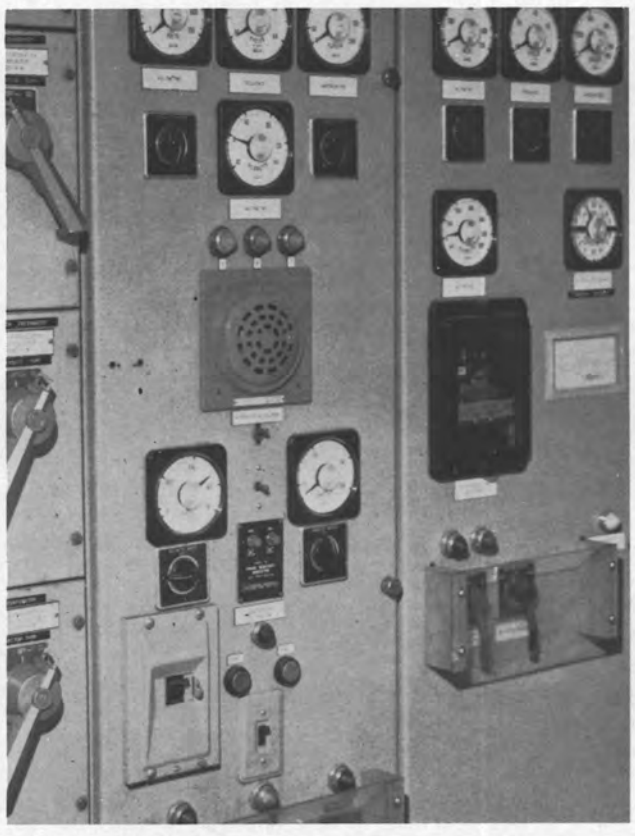
The session on applications will take place on Friday, October 19, and will include five papers covering a wide-range of subjects by **J.F. Dalzell** (Davidson Laboratory), Dr. **M.K. Ochi** (NSRDC), Prof. **E.V. Lewis** (Webb), **J.B. Hadler** (NSRDC) and **T.H. Sarchin** (Naval Ship Engineering Center), and Prof. **M.A. Abkowitz** and **C. Chrissostemidis** (Massachusetts Institute of Technology). One complete set of preprints will be made available to each participant and T&R Report S-3, "Proceedings of Symposium on Seakeeping (1973)," which will include papers and discussions, will be available early in 1974.

Advance registration fee (before October 1) is $75 for members of the Society and $85 for non-members, including Thursday lunch and banquet. Registration fee after October 1 will be $90 and $100 for Society members and non-members, respectively. All interested persons are urged to contact Dr. **Dan Hoffman,** Symposium Organizing Committee Chairman, at the Webb Institute of Naval Architecture, Glen Cove, N.Y. 11542; telephone (516) 671-2356.









You've picked your propulsion power...

...now what about ship's service, refrigeration, bow thrusters, winches, pumping and cargo handling?

You don't need to think about it long. Because you can get all the dependable auxiliary and emergency power you need from Caterpillar.

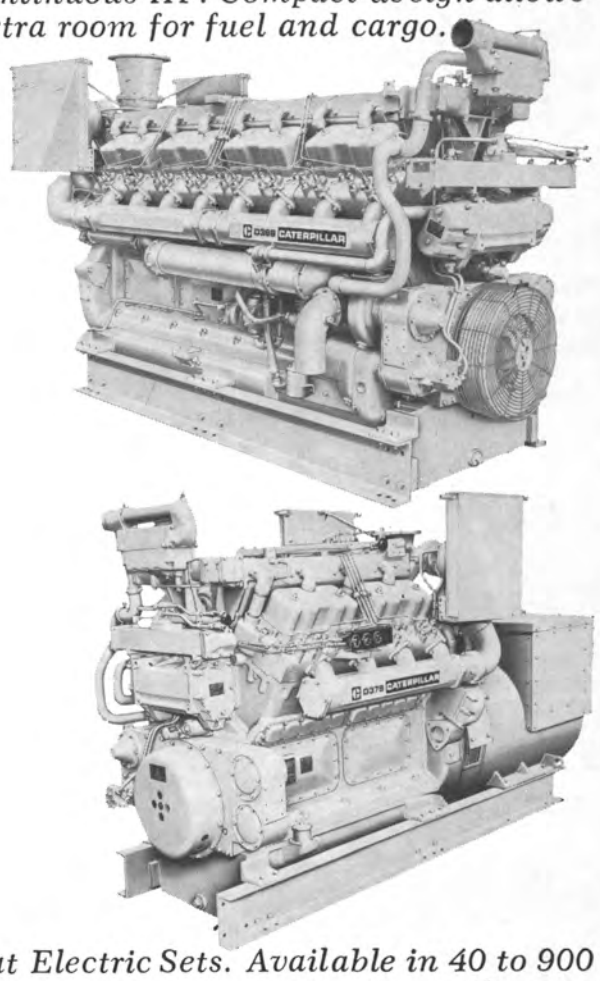
Cat Diesel Engines and Electric Sets offer a wide range of reliable auxiliary power. Power that's proven itself in years of use, in a variety of assignments. With durability built in, part by part.

But Caterpillar gives you *more* than just power.

Your Caterpillar Dealer is an experienced power consultant. And his service goes far beyond the sale to give you the best return on your engine investment. You get fast, complete parts and service assistance from Cat Dealers — worldwide. You get parts interchangeability that enables you to keep inventories at cost-saving levels.

Discuss your auxiliary power needs — new or replacement — with your Naval Architect or nearby Cat Dealer. Ask about Society approvals, too.

Cat-built Diesels. Range from 85 to 1125 continuous HP. Compact design allows extra room for fuel and cargo.



Cat Electric Sets. Available in 40 to 900 KW configurations. Handle auxiliary and emergency needs above or below deck.

CATERPILLAR

Caterpillar, Cat and ⊞ are Trademarks of Caterpillar Tractor Co.

National Steel And Shipbuilding Announces Four Promotions

Clarence L. French

John Angles

John V. Banks, president and chief executive officer, National Steel and Shipbuilding Company, San Diego, Calif., has announced the promotion of **Clarence L. French** to the position of director of engineering. Mr. **French** will assume the duties of **John B. Letherbury,** vice president, engineering, who retired on July 31.

Mr. **French** had been manager of engineering at NASSCO for the past year and a half. He joined the company in 1967 as project engineer. In 1969, he advanced to the position of chief materials engineer.

James C. Saunders

John Murray

Mr. **French** is a native of New Haven, Conn. He earned his bachelor of science, mechanical engineering, and bachelor of science, naval science degrees at Tufts University, Medford, Mass., in 1947.

He is a member of The Society of Naval Architects and Marine Engineers, American Iron and Steel Engineers, The American Society of Naval Engineers, the California State Professional Engineers, and the National Society of Professional Engineers. He is also a registered professional engineer, state of California.

Also announced was the promotion of **John Angles** to chief materials engineer. He will fill the position vacated by the late **Gordon N. Carpenter** and will report directly to the vice president, engineering.

In his new position, Mr. **Angles** will supervise the Materials Engineering Division in the timely and accurate preparation of specifications for purchased equipment, technical evaluation of equipment proposals, and vender liaison. He will also serve as value engineer and be responsible for engineering subcontracts.

Mr. **Angles** was born in Edinburgh, Scotland, and schooled in naval architecture, engineering science and mathematics at the level of Ordinary National Certificate at the Kirkcaldy Technical School in Scotland.

He joined National Steel and Shipbuilding Company in 1960, and for the past three years has been chief draftsman.

Mr. **Angles** is active in The Society of Naval Architects and Marine Engineers, having served as chairman of the San Diego Section and vice chairman for the Southern California Section. He currently represents the San Diego Section on the national sections committee.

Mr. **Banks** also announced the advancement of **James C. Saunders** to the position of manager, quality assurance department. Mr. **Saunders** will assume the duties of **Fred Gunn,** who also retired on July 31.

Mr. **Saunders** joined NASSCO in 1969 as quality control engineer after a 32-year Civil Service career with the U.S. Navy. For 23 years during that period, he was employed in various supervisory positions at Mare Island. His last nine years were with the supervisor of shipbuilding, San Diego, in the capacity of supervisory inspector of the quality control department.

Mr. **Saunders** was born in Oakland, Calif. He graduated from the Mare Island Naval Shipyard apprenticeship system as a shipfitter in 1940. His education includes an associates of arts degree from Vallejo Junior College, as well as numerous in-service technical courses sponsored by the U.S. Navy.

Also promoted at NASSCO was **John Murray** to the post of chief draftsman, machinery. He will report to **George Uberti,** chief marine engineer.

Mr. **Murray** was born in Edinburgh, Scotland. He received his education and engineering training at the Ramsey Technical Institute and Heriot Watt College in Edinburgh.

He joined NASSCO in 1962, and for the past nine years has been design supervisor.

GATX Leasing Corp. Applies To MarAd For CDS To Build 2 Towboats And 27 Barges

GATX Leasing Corp., San Francisco, Calif., has applied to the Maritime Administration for Government construction loan and mortgage insurance to help finance the building of two towboats and 27 barges. The craft will be chartered from GATX by Twin City Barge & Towing Co., St. Paul, Minn., for use on inland waterways in various bulk trades.

Planned for construction were 10 open hopper barges, 12 covered types, three petroleum tank barges, and two chemical barges.

The 21,900-barrel-capacity petroleum barges are to be built by Gretna Machine and Iron Works, Harvey, La.; the open hoppers and the 1,650-hp towboats by Twin City Shipyard, Inc., St. Paul, and the covered hoppers and chemical barges by Dravo Corp., Pittsburgh, Pa.

The barges, in all, the applications for loan and mortgage insurance said, would cost about $4.9 million and the towboats $920,544.

The Government financing aid would back 87½ percent of the financing cost of the barges and 75 percent of the towboats.

Twin City, established in 1968, owns seven oil barges and 14 towboats, it was indicated.

HITACHI DELIVERY: The Monemvasia, a 128,366-dwt tanker built at Hitachi Zosen's Innoshima Shipyard, was recently delivered to her owner, Metropolitan Navigation Corp. Approximate measurements of the vessel are length, bp, 836 feet; molded breadth, 136 feet, and molded depth, 73 feet. Classed by ABS, the new tanker is powered by a Hitachi B&W 9K84EF diesel engine with a maximum output of 23,200 hp delivering a trial speed of 15.7 knots. The Monemvasia's maiden voyage will be to the Persian Gulf.

Bethlehem Beaumont Delivers New Generation Self-Propelled Semisubmersible Drilling Unit

Designed by Friede & Goldman, the Pacesetter can drill in wave heights up to 30 feet.

Western Pacesetter I, the new $20-million semisubmersible drilling vessel built for The Western Company of North America, was recently christened at Bethlehem Steel Company's Beaumont, Texas, Shipyard.

Senator **John Tower,** principal speaker at the christening ceremonies, cited the new semisubmersible as an excellent example of cooperation between industry and Government in seeking to overcome the energy crisis.

Senator **Tower** pointed out that Western received loan and mortgage insurance from the U.S. Department of Commerce Maritime Administration to aid in financing the construction of the Pacesetter. He stated that this is the first grant under Title XI of the Merchant Marine Act of 1936 ever made for construction of a semisubmersible drilling vessel. Western currently has two similar units under construction, also being financed under Title XI.

H.E. Chiles, chairman and president of Western, praised the excellent cooperation his company had received from the Maritime Administration.

The long-term financing will be in the form of a 15-year leveraged lease arranged by Manufacturers Hanover Leasing Corporation.

Mr. **Chiles** stated that the Pacesetter represented a major step forward in the field of offshore drilling for the Fort Worth-based firm. Western currently operates two jackup drilling rigs in the Gulf of Mexico.

Mrs. George C. Hardin Jr. of Houston, wife of the president of Ashland Exploration Company, was sponsor of the vessel and broke the symbolic bottle of champagne.

Ashland will make intitial use of the Pacesetter drilling for oil in the North Sea for its Ashland Oil Development (U.K.) Ltd. subsidiary. Contracts have also been signed with Siebens Oil & Gas (U.K.) Ltd. and Transworld Petroleum Corporation for drilling which should last approximately two years. The three companies have an option to use the vessel for approximately one year beyond the primary contract period.

Western Pacesetter I is a new generation self-propelled semisubmersible drilling unit designed for operations in oceans virtually anywhere in the world. Its designers, the New Orleans firm of Friede & Goldman, Inc., state that with its installed power and tested hull characteristics, it should be unmatched in speed by any known unit of its type.

Designed for drilling in water depths to 600 feet or more, the Pacesetter is 260 feet in length and 200 feet wide. The unit has a basic structure of two parallel lower hulls, each 50 feet in width. Three caissons on each hull, each 32 feet in diameter, support the main deck.

When the unit is drilling, the lower hulls and caissons will be partially flooded to sink the unit to the depth desired to achieve maximum stability.

The Pacesetter is designed for drilling in wave heights up to 30 feet or more and meets the structural and stability requirements (both damaged and undamaged) of the American Bureau of Shipping and the U.S. Coast Guard for 100-knot winds and waves of 100 feet high.

The rig's ability to stay on position in rough seas is enhanced by eight 30,000-pound anchors and eight 3-inch mooring chains, which meet or exceed mooring capabilities of the largest rigs afloat. Propulsion is twin-screw with four GM Electro-Motive Division motors in each hull driving a 10-foot diameter propeller, with 3,000-shaft horsepower per side.

J.O. Crooke, general manager of Bethlehem's Beaumont Shipyard, welcomed visitors to the ceremony. Other honored guests included **George C. Hardin Jr.,** president, Ashland Exploration Company, **W.W. Siebens Jr.,** chairman and president, Siebens Oil & Gas, and **Roy Yowell,** Chief of the Office of Subsidy Administration, U.S. Department of Commerce Maritime Administration.

Participants at the Pacesetter launching included, left to right: **M.C. (Clay) Chiles,** vice president and division manager, Western Oceanic; **H.E. Chiles,** president, Western Company of North America; **George C. Hardin Jr.,** president, Ashland Exploration Co.; **Mrs. Hardin,** sponsor; Senator **John Tower; Mrs. Clay Chiles,** and **J.O. Crooke,** general manager, Bethlehem Beaumont Shipyard.

Farrell Lines Opens New Office In Melbourne

Farrell Lines will open a new office in Melbourne, Australia, later this year, according to **Thomas J. Smith,** president. **Allan M. Teicher,** who joined the line in 1965, will become owner's representative in Melbourne. He will work in conjunction with **George W. Jones Jr.,** in Sydney, who has been owner's representative for Australia since March of 1971.

With the entry of the Austral Entente into the Australia-New Zealand service, Farrell now has all four of the new containerships it ordered for this route in operation.

WEBB SEMINAR: Thirty persons from industry and Government attended a seminar on Practical Applications of Probability to Hull Structural Design held at Webb Institute of Naval Architecture, Glen Cove, N.Y., on August 1-3, 1973. Guest lecturers included Prof. **A.M. Freudenthal** of George Washington University; Prof. **S.R. Heller** of Catholic University; **E.G.U. Band** of Payne, Inc.; Dr. **M.K. Ochi** of Naval Ship Research Development Center, and **John Dalzell** of Davidson Laboratory. Along with members of the Webb staff—Professors **Hoffman, Karst, Lewis, van Hooff,** and **Zubaly**—they discussed recent developments in the applications of probability theory to the determination of short-term and long-term distributions of wave loads, with implications for ship hull design. Shown, left to right: (front row) **J.E. Stevens,** Chicago Bridge and Iron Co.; **William Garzke,** Gibbs & Cox; **Robert Zubaly** (speaker), SUNY, Fort Schuyler, N.Y.; **E.G.U. Band** (speaker), Payne, Inc.; Lt. Comdr. **C.S. Loosmore,** USCG, Secretary, Ship Structure Committee; Dr. **M.K. Ochi** (speaker), NSRDC; **E.V. Lewis** (Speaker), Webb Institute, and **Richard W. Rumke,** National Research Council; (second row) **Donald S. Wilson,** Naval Ship Engineering Center; **M.C. Bampton,** Aerojet-General Corp.; **A.E. Baitis,** NSRDC; **James R. Dwyer,** Ensign, U.S. Coast Guard; **P.R. Johnson,** Chicago Bridge and Iron Co.; **Sherman Cauldwell,** Naval Ship Engineering Center; **James Macullum Jr.,** Sperry Systems Management; **William A. Cleary Jr.,** U.S. Coast Guard, and **S. Rao Guntur,** Zapata Off-Shore Company; (third row) **E. Neal,** NSRDC; **Chad B. Doherty,** NOAA Data Buoy Office; Prof. **J.E. Goldberg,** Purdue University; **John S. Spencer,** U.S. Coast Guard; **David L. Folsom,** Lt. Comdr., U.S. Coast Guard; **Edward S. Geller,** Sperry Systems Management; **Ralph E. Johnson,** U.S. Coast Guard, and **Robert J. Kramer,** Texaco Inc.; (back row) Dr. **Paul van Mater,** U.S. Naval Academy; **William Siekierka,** Naval Ship Engineering Center; Dr. **Hung Chi Lee,** J.J. McMullen Associates, Inc.; Dr. **A.M. Elbatouti,** American Bureau of Shipping; Dr. **Sheng Lun Chuang,** NSRDC; **Henry J. Karsch,** J.J. Henry Co., Inc.; **William N. France II,** Exxon Corporation, and **Edward D. Schaeffer,** J.J. Henry Co., Inc.

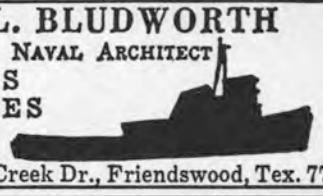
PROFESSIONAL

AGENCIA MARITIMA DE REPRESENTACIONES C.A.
Calle 77 No. 9b-50—P.O. Box 1465
Maracaibo—Venezuela
SHIPS AGENCY/NAUTICAL ASSISTANCE/PROTECTIVE SERVICES (24 hour service) at Terminals: Puerto Miranda, Bajo Grande (Chevron), Bajo Grande (Sun Oil), San Lorenzo, Punta de Palmas, El Tablazo (I.V.P.)—La Estacada*, La Salina*. *As Ships Owners' Representative only. Cable Address: "AGEMAR".
Telex Number: 61274. Phone Numbers: 70304—76118.

J.B. ALLINSON & ASSOCIATES, INC.
Financial Consultants
Consultation on Leasing and Long Term Financing
Title XI Applications, Preparation and Negotiations
1414 Dallas Federal Savings Building
Dallas, Texas 75201 Phone (214) 742-1851

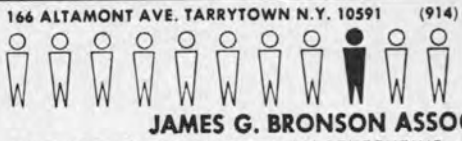
"STABILOGAUGE"
Predetermines Stability (GM), Mean Draft, Deadweight and Displacement for any distribution of cargo including Free Surface and KG corrections.
"LOADOSCOPE"
Automatically calculates and displays the Draft Fore & Aft, Deadweight, Bending Stress and Shear Stress which a ship will have under any longitudinal distribution of load, for any number of preselected stations or readouts.
Acts as a Summary Status Board
American Hydromath Company **55 Brixton Road**
Garden City, N.Y. 11530 **516 248-9511**

BISHOP ENGINEERING CO.
20 NASSAU ST.
PRINCETON, N.J. 08540
(609) 924-0552
ANALYSIS OF MACHINERY SUBJECTED TO SHIPBOARD SHOCK OR EARTHQUAKE

J. L. BLUDWORTH
NAVAL ARCHITECT
TUGS
BARGES

608 N. Clear Creek Dr., Friendswood, Tex. 77546

BOUCHER SHIP MODELS
Since 1905
Ship Models—Show Case
Plating, Test and Industrial Models
Repairs and Parts
BOUCHER-LEWIS PRECISION MODELS, Inc.
36 East 12th St., New York 10003, N.Y., GR 3-6073

BREIT ENGINEERING, INC.
441 GRAVIER ST.
NEW ORLEANS, LA. 70130
504-524-3575
NAVAL ARCHITECTS & MARINE ENGINEERS
MARINE SURVEYORS

166 ALTAMONT AVE. TARRYTOWN N.Y. 10591 (914) 631-2915

JAMES G. BRONSON ASSOCIATES
MANAGEMENT CONSULTANTS/EXECUTIVE SEARCH
Executive & Professional recruiting for the marine industry

CHILDS ENGINEERING
CORPORATION
Waterfront & Structural
Engineering • Diving Inspection
Box 333/Medfield/MA 02052
(617) 359-8945

COAST ENGINEERING CO.
& ASSOCIATES
CONSULTING ENGINEERS
NAVAL ARCHITECTS & MARINE ENGINEERS
MARINE SURVEYORS
711 West 21st Street Norfolk, Virginia 23517
Telephone 625-2744

CRANDALL
DRY DOCK ENGINEERS, INC.
Railway and Floating Dry Docks; Waterfront Structures
Consulting • Design • Inspection
Dry Dock Hardware and Equipment
238 Main Street Cambridge, Mass. 02142

FRANCIS B. CROCCO, INC.
Marine Consultants, Marine & Cargo Surveyors
"Thirty-five Years of Surveying Experience in the Caribbean" Phone: 723-0769
BOX 1411, SAN JUAN, PUERTO RICO
Telex RCA 325 2409 WUI 3654241

C. R. CUSHING & CO., INC.
NAVAL ARCHITECTS, MARINE ENGINEERS
& TRANSPORTATION CONSULTANTS
ONE WORLD TRADE CENTER
NEW YORK, N. Y. 10048
TEL: (212) 432-0033 CABLE: CUSHINGCO

ARTHUR D. DARDEN
INCORPORATED
1040 International Trade Mart (504) 523-1661
NAVAL ARCHITECTS & MARINE ENGINEERS
NEW ORLEANS, LOUISIANA 70130

DESIGN ASSOCIATES, INC.
M. KAWASAKI
1732 Canal Street
New Orleans, La. 70112
Naval Architects **Marine Engineers**
Marine Management **Transportation Consultants**
Phone: (504) 588-9918 **TWX 810-951-5317**

DESIGNERS & PLANNERS
INCORPORATED
114 FIFTH AVENUE
NEW YORK, NEW YORK 10011
(212) 691-7770
NAVAL ARCHITECTS
MARINE ENGINEERS
P.O. BOX 1080
GALVESTON, TEX. 77550
(713) 502-1002

M. MACK EARLE, P.E.
COMPLETE MARINE ARCHITECTURAL SERVICE
103 Mellor Avenue 301/747-4744
BALTIMORE, MARYLAND 21228

CHRISTOPHER J. FOSTER, INC.
WORLD-WIDE EXPERIENCE AS DESIGNERS OF
GRAVING DOCKS • MARINE STRUCTURES
SHIPYARDS • MODERNIZATION • PORT FACILITIES
OFFSHORE TERMINALS • FLOATING DRYDOCKS
MARINE ENGINEERS • NAVAL ARCHITECTS
CONSULTING ENGINEERS
PORT WASHINGTON NEW YORK 11050
(516) 883-2830 TELEX 14-4674 CABLE: "CEFOSTA"

FRIEDE AND GOLDMAN, INC.
Naval Architects & Marine Engineers
SUITE 1414, 225 BARONNE STREET
NEW ORLEANS, LA. 70112
523-4621

GIBBS & COX INC
NAVAL ARCHITECTS & MARINE ENGINEERS
40 Rector Street, New York, N.Y. 10006
and
Presidential Building, Hyattsville, Maryland 20782

JOHN W. GILBERT ASSOCIATES, INC.
Naval Architects *Marine Engineers*
Brokerage
58 COMMERCIAL WHARF BOSTON, MASS. 02110

MORRIS GURALNICK ASSOCIATES, INC.
Naval Architects and Engineers
San Francisco, California

·J·J·HENRY·CO·INC·
NAVAL ARCHITECTS · MARINE ENGINEERS · MARINE SURVEYORS
90 West St., New York, N.Y. 10006—943-2870
West Park Dr., Mt. Laurel Industrial Pk., Moorestown, N.J. 08057
609-234-3880
430 South Main St., Cohasset, Mass. 02025—617-383-9200

L K HOMYER
MARINE ARCHITECTURE and ENGINEERING
Box 408 Corona del Mar California 92625
(714) 673-6491

6338 Lindmar Dr.
P.O. Box 1068
Goleta, Calif. 93017
(805) 964-7747
Naval Architects
Marine Engineers
Hydraulic Ship Lifting
& Moving Systems
HYDRANAUTICS

C. T. ILARIUCCI & ASSOCIATES
MARINE SURVEYORS & CONSULTANTS
"ANYWHERE IN THE CARIBBEAN"
Tourism Pier #3
San Juan, P.R. 00902
P.O. Box 4351
San Juan, P.R. 00905
Office: 724-7570 722-5508
Home: 723-4013 723-3635
Cable: MARISURV
Telex: ITT 345 3020
RCA 265 2758

Jantzen Engineering Co., Inc.
Consulting Engineers
Ocean Mining and Dredging
BALTIMORE, MD. **PALM BEACH, FLA.**
(301) 539-7766 **(305) 844-6677**

JAMES S. KROGEN & CO., INC.
NAVAL ARCHITECTS & MARINE ENGINEERS
Tel. (305) 854-2338
2500 So. Dixie Hwy., Miami, Fla. 33133

Littleton Research and Engineering Corp.
Consulting and Contract Research in Applied Mechanics
Hull Vibration and Shock Noise Control
Structural Analysis Hydrodynamics
95 Russell Street, Littleton, Massachusetts 01460
Telephone 486-3526 area code 617

ROBERT H. MACY
Naval Architect & Marine Engineer
P.O. Box 758 **Phone: 762-5667**
Pascagoula, Mississippi

MARINE CONSULTANTS & DESIGNERS, INC.
Naval Architects *Marine Engineers*
Cable Address: "Midship"
Main Off.: 308 Invest. Insur. Bldg. • Cleveland, O. 44114 • (216) 781-9070

Marine Design Associates
NAVAL ARCHITECTS
P.O. Box 2674, Palm Beach, Florida 305/655-6360
Designers-Consultants
Commercial Vessels, Trawlers & Yachts

MARINE DESIGN INC.
NAVAL ARCHITECTS & MARINE ENGINEERS
Formerly Tams Inc., Established 1865
401 BROAD HOLLOW ROAD (Rt. 110)
MELVILLE, L.I., NEW YORK 11746
516 293-4336

TUGS, BARGES, WORK BOATS & CONVERSIONS

Tracor, Inc. Awarded $4.9-Million Contract

The Naval Ship Systems Command has awarded Tracor, Inc. a $4.9-million contract to continue engineering, installation, and logistics support to the sonar systems on the Navy's missile-carrying submarines.

Under this contract, Tracor will coordinate with several other contractors, Navy laboratories and shipyards, and Navy offices involved in the development, installation, and logistics of sonars being developed and produced for the Navy's Polaris and Poseidon submarines. These sonars will provide the strategic missile fleet a better capability to avoid potential enemies at sea and to protect themselves if attacked.

As coordinator, Tracor will review the sonar designs and installation plans, and will assist in planning and carrying out tests at sea. The company will also make certain that the technical manuals and supplies needed to keep the sonars operating properly are adequate.

Tracor Group vice president Dr. **Wayne Rudmose** states that approximately 150 Tracor, Inc. scientists, engineers, technicians, and managers will be involved on this contract. Most of the work will be accomplished at Tracor's Rockville, Md., and Austin, Texas, facilities. However, Tracor representatives located in various manufacturing plants and shipyards throughout the country will also be involved in this work.

The program office for this 24-month contract will be in Rockville under the general management of division vice president **Wendell C. Murray.** The program manager, **J.D. Morell,** will report to **Robert Jackson,** director, tactical systems, submarine department. The program office will be supported by three system managers—**Neil Ellis, J. Bailey Rathbone,** and **Richard Miller.**

Tracor began its work in sonar systems in 1958, and has had a continued involvement with Navy sonar programs since that time. The company, headquartered in Austin, does research and development in a number of scientific fields and manufactures scientific and medical analysis equipment, electronic navigation systems, and electronic components. Tracor has operations in 11 states and six foreign locations.

FOR TEXACO NORTH SEA: The Netherlands Offshore Company, has announced that its catamaran survey vessel, the M/V Duplus (shown above), will be employed for subsoil investigations for Texaco North Sea U.K. Company. The vessel will be utilized for soils sampling to a penetration of approximately 400 feet below the sea floor in over 400 feet of water depth in the northern North Sea. The soil borings and soils engineering will be undertaken on board by McClelland Engineers Inc. of Houston, Texas. Technical assistance will also be provided by Dredging Investigation Ltd. of Bromborough, U.K., a related company to Netherlands Offshore Company. Drilling on this particular project will take the vessel into U.K. North Sea blocks off the Shetland Islands, as well as near Aberdeen.

Ogden's ITO Appoints Butler VP Southern Stevedoring

C. Baylor Butler

The appointment of **C. Baylor Butler** as manager and vice president of Southern Stevedoring Corporation, the Norfolk, Va., subsidiary of International Terminal Operating Co., Inc. (ITO), was announced by **F.X. McQuade,** president of ITO, an Ogden Corporation subsidiary.

Mr. **Butler** joined Southern Stevedoring in 1965 as a manager trainee, advanced to assistant superintendent, and then to superintendent and safety director before being appointed to his new post. Prior to joining Southern Stevedoring, he was associated with the Mutual Insurance Co. of Norfolk, Inc., and while with Mutual, attended the Comprehensive Insurance School at Oberlin College in Ohio.

Mr. **Butler** attended Western New Mexico University and the University of Washington in Seattle. During the Korean Conflict, he served in the U.S. Air Force and saw active duty in Korea.

Southern Stevedoring Corporation is a major handler of oceanborne freight in the Norfolk/Portsmouth area. Both containerized and breakbulk customers are serviced, including United States Lines, Dart Containerline, Finnlines, Orient Overseas Line, Concordia Line, Mexican Line, and Turkish Cargo Lines. Southern Stevedoring also performs the loading and discharging of vessels for the U.S. Government at the Norfolk Naval Base.

New Carboline Bulletin On International Div.

The International Division of Carboline Company, St. Louis, Mo., has announced the release of a new four-page bulletin describing the company's foreign operations and extent of coverage.

Illustrated Bulletin 500 discusses the range of services, manufacturing and warehousing available to U.S. companies, and engineering design and construction firms having overseas operations.

The categories of Carboline products are explained and include protective coatings, offshore and marine coatings, nuclear coatings, waterproofing, roof coatings, fireproofing products and tank linings. A listing of Carboline International affiliated companies is shown.

Copies of Bulletin 500 may be obtained by writing Carboline Company, 350 Hanley Industrial Court, St. Louis, Mo. 63144.

Raytheon Offers Automatic Continuous Tracking Loran

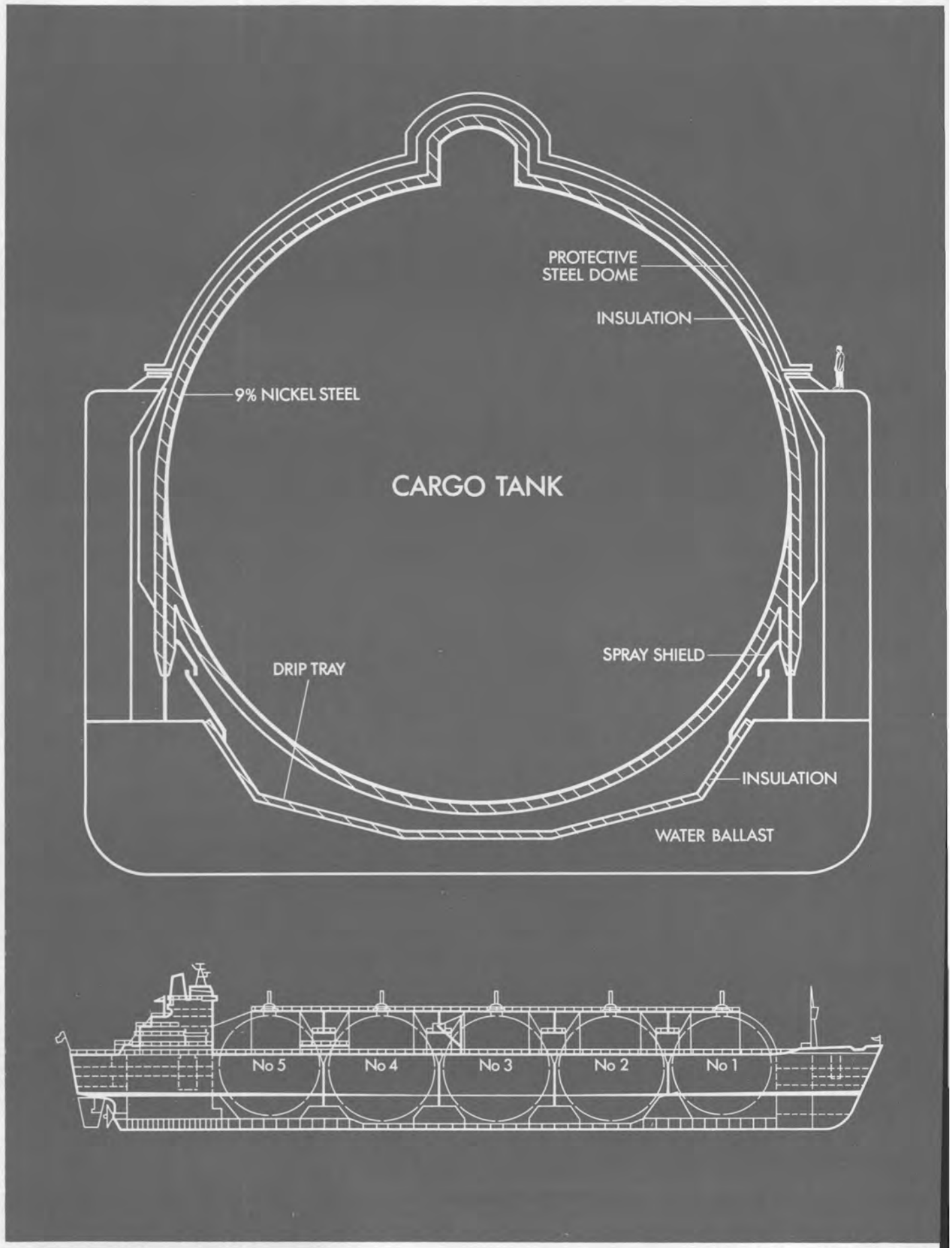
The Raytheon Loran System II, a navigational system featuring automatic continuous tracking, is now being offered by Raytheon Marine Company of Manchester, N.H.

Two independent NA-110 Loran receivers operating from the same antenna provide an up-to-date continuous fix. The automatic tracking system continuously presents two Loran lines of position so that at any instant the display will identify the ship's present position. Should either receiver become inoperative, the other will continue to function and determine all necessary lines of position for an accurate fix.

Each receiver is capable of tracking any one Loran A signal automatically.

The Loran System II receives all Loran A signals on 1850, 1900 and 1950 kHz. The units are highly sensitive, with low power drain (less than a 75-watt bulb), and feature plug-in solid-state circuitry. Price of the Loran System II is $3,790.

Further information is available from Raytheon marine dealers or from Raytheon Marine Company, 676 Island Pond Road, Manchester, N.H. 03103.



MMC Appoints BASREC To Service Middle East

Efficient and prompt servicing for all Marine Moisture Control Company equipment has been extended to the Middle East with the appointment of BASREC (The Bahrain Ship Repairing and Engineering Company) as a service agency for ships plying routes in the Arabian Gulf.

In announcing the designation, **William Henry,** vice president of MMC, said the BASREC facilities and personnel at Bahrain are geared to provide survey, repair and original installation services to meet the high standards established by his firm. He indicated that the appointment of BASREC is one more step in Marine Moisture Control's plan to provide a worldwide service and installation network.

Communications with BASREC via cable and ship-to-shore radio are available on a 24-hour basis for emergency alert or scheduled reservation. If desired, a fully qualified repair technician or engineer can be alerted and placed aboard a vessel en route anywhere within the Gulf, thus minimizing costly route deviation or delays in port. Evaluation and servicing of all MMC products under the unique MMC 5-year prorated guarantee is also assured and expedited.

Some of the broad-range of Marine Moisture Control Company products to be serviced by BASREC include the MMC gear case dehydrator, lube oil clarifier-coalescers, sonic point and interface probe alarm systems for liquid level and pollution control, the MMC remote control valve system, MMC tank gaging systems, quick opening deck covers, remote reading digital draft indicators, the MMC mucking winch, plus the ubiquitous C-L coupling and its cryogenic counterpart, a standard item of equipment to LNG shipping.

Marcona Corp. Names Koepke To Marine Post

John C. Koepke

John C. Koepke has been named general manager-Marine Operations Division of Marcona Corporation, San Francisco, Calif.-based shipping, mining and resource development firm. The announcement was made by **C.W. Robinson,** president of Marcona.

Mr. **Koepke** will assume primary responsibility for the direction of Marcona's fleet operations, which currently includes more than 1-million deadweight tons of owned vessels, plus an additional 1.5-million tons of chartered ships.

Prior to joining Marcona, Mr. **Koepke** served as vice president for Temple, Barker & Sloane, Inc., and earlier for Fry Consultants, Inc., both major management consulting firms, where he participated in the maritime, energy and public sector fields. His background also includes service with the U.S. Army Transportation Corps in marine cargo control.

Mr. **Koepke** is a graduate of Northwestern University and holds an M.B.A. degree from Harvard Graduate School of Business Administration.

Kawasaki To Build $75-Million Shipyard

A shipyard capable of building vessels of up to 1,000,000 deadweight tons at a cost of about $75,000,000 is planned by Kawasaki Heavy Industries Ltd. of Japan by 1978. Company officials cited increasing demands for large ships and said details will be worked out later.

Kawasaki currently maintains two shipyards, one in Kagawa Prefecture, Shikoku Island, capable of building ships up to 600,000 deadweight tons, and the other in Kobe, Hyogo Prefecture.

MA Awards Contract To Garrett To Study Brayton Cycle Power

The U.S. Department of Commerce Maritime Administration has awarded The Garrett Corporation a $310,000 cost-shared contract, which is the initial study in a program to develop advanced closed Brayton Cycle turbine power for a liquefied natural gas ship refrigeration system.

The Quincy Shipbuilding Division of General Dynamics, which is building three of the cryogenic tankers, will act as a subcontractor to Garrett on the project. The Garrett study will be conducted by both AiResearch Manufacturing Company of Arizona and AiResearch Manufacturing Company, Los Angeles.

During the study phase, a 9,000-shp closed-cycle engine will be designed for auxiliary power applications. This engine, which would be the largest of its kind yet developed, would provide power for a liquefied natural gas refrigerator system for LNG tankers.

The refrigeration system, also being designed under the contract, is of an advanced design which will insure zero boil-off of the LNG cargo. This functional application for advanced engine technology promises increased efficiency for LNG shipping systems by eliminating boil-off of the cargo.

A secondary objective is to look beyond the 9,000-shp power plant and define a technologically advanced, economical, closed gas turbine main propulsion plant. Such advanced propulsion systems could be incorporated into future large cargoships in the 1980-90 time period.

If the study proves successful, a second phase will follow during which a 9,000-shp liquid natural gas refrigeration system will be built and delivered by the end of 1976. General Dynamics is presently building a tanker capable of carrying 125,000 cubic meters of liquid natural gas. It is anticipated that the closed-cycle LNG Refrigeration System will be installed on this tanker, although the system has been sized for a second generation LNG tanker having a capacity of 165,000-200,000 cubic meters. The experience gained with the 9,000-shp auxiliary power unit for the refrigeration system is expected to provide a technological building block for development of the closed-cycle power plant as main propulsion.

The closed gas turbine engine is a sealed system in which the working fluid, clean dry gas, is continuously recirculated through the engine. High pressures of 200 to 500 psi are used to minimize the physical size and weight of the system.

The use of clean dry gas as the working fluid assures corrosion-free operation with low maintenance and long life. The engine is extremely efficient, with specific fuel consumption comparable to a diesel. It can operate on a variety of fuels, produces very little noise, and is vibration free. Very low exhaust pollution results from the external combustion approach.

A closed Brayton Cycle power plant differs from an open-cycle, an example of which is a jet engine, in that gases are continually recirculated in a closed loop. In the proposed closed-cycle power plant, the gas is compressed in conventional gas turbine fashion by a rotating compressor. After the gas exits the compressor, it is heated by passing through a recuperator and then a radiant heater, which takes the place of combustion in an open-cycle gas turbine.

The heated gas then passes through a turbine and into the recuperator, where heat is rejected into the compressor discharge air. After passing through the recuperator, the gas goes through a cooler which lowers the temperature to near ambient levels. The gas then re-enters the compressor to complete the loop.

The relatively low weight and small size of the 9,000-shp unit permit it to be containerized and quickly installed on the ship deck structure.

The LNG Refrigeration System is a fully-sealed reverse closed Brayton Cycle system in which mechanical energy is put into the system and thermal energy is extracted. This is a reverse of the process of the standard Brayton Cycle. In the LNG Refrigeration System, mechanical energy is put in through a compressor, and thermal energy is extracted by multiple heat transfer units and a turbo-expander. The system uses gaseous nitrogen as its working fluid and employs heat transfer equipment of conventional design.

The heart of the LNG Refrigeration System is a patented AiResearch turbo-expander unit utilizing gas bearings. Use of gas bearings eliminates conventional oil lubrications systems, thereby reducing maintenance, increasing operational life, and preventing contamination of the process fluids. Gas bearings also eliminate the need for dynamic bearing seals.

The LNG Refrigeration System, like the closed gas turbine power plant, will be containerized and mounted on the deck structure.

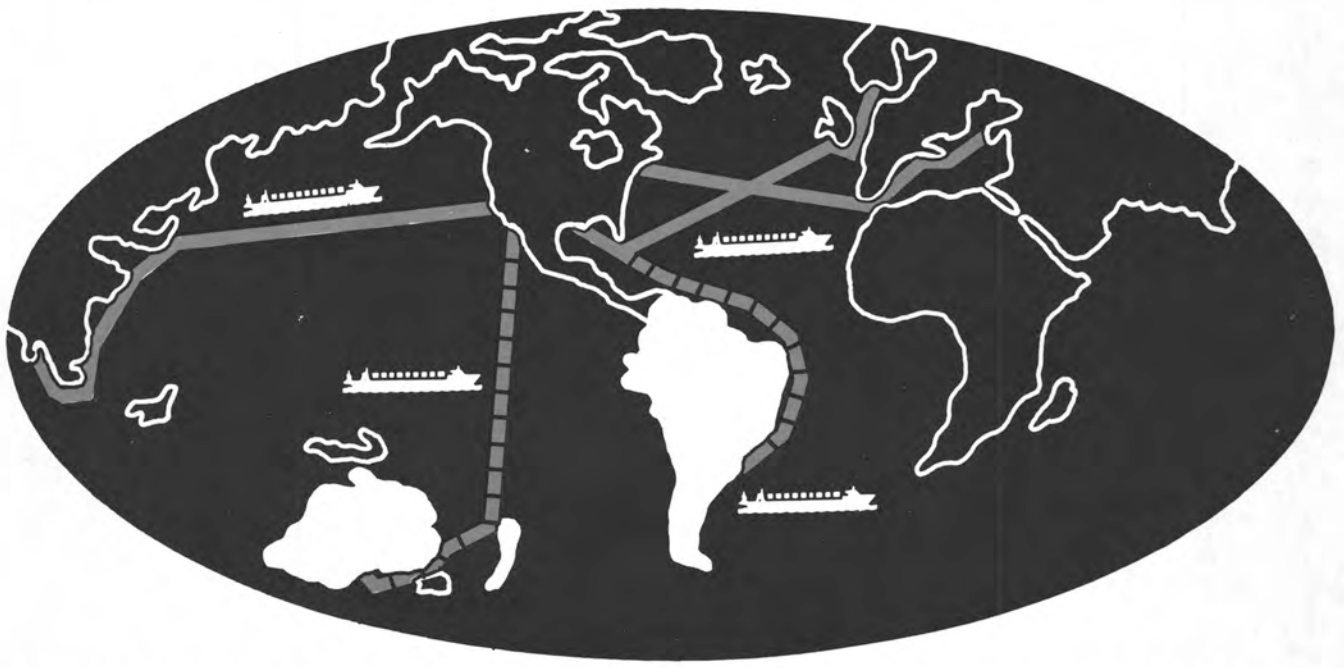
As part of the contract work, the method of integrating the LNG Refrigeration package into the ship with minimal impact will be studied. Other goals of the study are to evaluate optimum cycle efficiencies and operational techniques, operation and life cycle costs, maintenance and time between overhaul expectancies, and overall economics. The system will be designed in accordance with the American Bureau of Shipping and U.S. Coast Guard regulations.

General Dynamics will provide design guidance from the shipbuilder standpoint and will assure that appropriate maritime codes are met. General Dynamics' role also is to study the economics of ship operations.

The Garrett Corporation is located at 9851 Sepulveda Boulevard, Los Angeles, Calif. 90009.

LASH adds Australia and South America...

and now serves all major continents.



Barely 3½ years after the first LASH vessel embarked on its maiden voyage, the LASH System links the world's major continents with regularly-scheduled, express service on established trade routes.

In the summer of 1973, Pacific Far East Line began operating LASH service between U. S. West coast ports and Australia, New Zealand and selected South Pacific islands; and Delta Steamship Lines inaugurated a LASH trade route between U. S. Gulf ports and the East coast of South America with calls at Caribbean ports.

North America, Europe, Africa, Asia, and now Australia and South America. LASH vessels serve them all. Seventeen LASH vessels have been launched, to be followed by seven more in the next 18 months. More than 3,000 standard-size LASH barges, interchangeable throughout the worldwide LASH System, are in operation or ordered to serve the LASH ocean carriers. LASH has come a long way in just a few years, and its growth will continue in the coming months as new trade routes to the Middle East, Indian subcontinent and Southeast Asia are opened by Waterman Steamship Corporation and Central Gulf Lines, Inc.

LASH

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

Zeien Named Technical Program Chairman Of SOCCO

Charles Zeien, executive vice president of J.J. Henry Co., Inc., has accepted the chairmanship of the technical program committee of the Super Ocean Carrier Conference (SOCCO). The appointment was announced by **Robert E. Apple,** chairman of the steering committee. The conference will be held January 16-18, 1974, at the Americana Hotel in New York City.

Mr. **Zeien** stated that the technical sessions will cover the entire range of subjects related to VLCCs, ULCCs, LNGs and other extra large bulk carriers such as slurry and dry bulkers. These subjects include financing, underwriting, legal, regulatory considerations, types of propulsion systems, controls, cargo handling, shallow draft, inshore and offshore facilities, logistics, structural, and environmental. The chairman also stated that the conference could still accommodate some additional papers. Requests for information should be sent to the address below.

The papers committee includes **Robert Rourke,** vice chairman, West Coast representative of the J.J. Henry Co.; **Elwin Messer,** vice president-engineering, Todd Shipyards, San Pedro; **K.M. Graham,** manager of marine transportation, Pacific Alaska LNG Co., and **John E. Marriner,** consulting naval architect.

Charles Zeien

The Super Ocean Carrier Conference will also include a large exhibit area featuring displays reflecting the latest technology, product lines and facilities which support these huge ships, according to Mr. **Apple.** He also stated that the board of advisors for the Super Ocean Carrier Conference include an impressive group of leading executives in this critical segment of the marine industry.

Mr. **Apple** announced that the exhibit area still has some choice locations available. For further information on exhibits, technical papers, etc., write SOCCO, P.O. Box 269, San Pedro, Calif. 90733, U.S.A.

Celli Named President Containerized Shipping Division Of Seatrain

Joseph John Celli

Seatrain Lines, Inc. has announced the appointment of **Joseph John Celli** to the position of president of the firm's international containerized shipping division, headquartered in Weehawken, N.J., according to **Howard M. Pack,** president of the company.

Mr. **Celli** joined Seatrain in June of this year as a corporate vice president whose main area of responsibility was intermodal operations. Prior to joining Seatrain, he held the position of executive vice president of Associated Transport, and Werner Continental, both major trucking companies.

With a wide range of experience, handling all phases of common carrier operations, sales and finance, Mr. **Celli** is noted for his application of modern management sciences and technologies to maximize corporate efficiency and profitability. He has been associated with motor carrier transportation since graduating from Lehigh University under A.S.T.P. as an engineer.

United States Lines Names W.J. Klauberg

William J. Klauberg

William J. Klauberg has been named vice president of traffic for United States Lines, it was announced by **Donald G. Aldridge,** executive vice president of the containership company.

Mr. **Klauberg** joined the company in 1949. Most recently, he served as vice president for the West Coast Division from the inception of the company's expanded operations in that area to its present high-level of activity. This increase in traffic has resulted in the current construction of new container terminal facilities in Long Beach and Oakland, Calif., as well as in Honolulu.

Previously, Mr. **Klauberg** headed United States Lines' European Operations as vice president in charge of the London headquarters, after serving in a similar capacity for Far East Operations in the Tokyo office.

In his new post, he will direct documentation and booking procedures and oversee the commercial employment of the company's breakbulk vessels that are being returned after military service.

Mr. **Klauberg** is a graduate of the United States Merchant Marine Academy and the Georgetown University School of Foreign Service. He will operate out of United States Lines' corporate headquarters at One Broadway, New York City.

United States Lines operates a fully containerized Tri-Continent service between Europe, the United States, Hawaii, Guam and the Far East, utilizing an all-modern fleet of 16 high-speed high-capacity containerships.

IHI, Turkey Complete Agreement To Build $41-Million Shipyard

Partnership negotiations for the construction of a $41-million shipyard at Pendik, Istanbul, have been successfully completed between the state-owned Maritime Bank of Turkey and Ishikawajima-Harima Heavy Industries, Co., Ltd. of Japan (IHI).

The agreement is subject to review by the Turkish Government. Under the agreement, a joint company is to be formed with IHI holding 47 percent of the $19 million initial capital stock and the Maritime Bank of Turkey and other Turkish public institutions holding the rest.

Curacao Drydock And Burmeister & Wain Sign Service Agreement

Burmeister & Wain Engineering Company Limited has entered into a service agreement with Curacao Drydock Co. Inc., Curacao, in the Netherlands Antilles. According to the agreement, this shipyard is authorized to act as an "Authorized Repair Shop for B&W Engines."

The agreement comprises the repair of B&W diesel engines installed in ships calling at ports in the Netherlands Antilles, as well as the supply of spare parts for these engines. Repairs and technical assistance will be effected by personnel specially trained in the maintenance of B&W engines.

Curacao Drydock Company possesses special workshops for the repair of ships and their machinery, and docking facilities include a drydock for vessels of up to 28,000 deadweight tons, as well as a new drydock for ships of up to 120,000 deadweight tons.

Levingston To Build Drilling Vessel For Global Marine, Inc.

A contract to build a 14,500-ton drilling vessel has been received by Levingston Shipbuilding Co. of Orange, Texas. The award for the 450-foot-long vessel was given by Global Marine, Inc., with delivery set for March 1975. Because of a dynamic positioning system, the vessel will be able to sustain its position without the use of mooring cables while drilling in seas of great depth.

One Package Order—Five Containerships For Three Companies

Hapag-Lloyd AG, Hamburg/Bremen, Harrison Line, Liverpool, and KNSM Line, Amsterdam, have jointly awarded a contract for five full container vessels to the Gdanska Shipyard (Danzig). Hapag-Lloyd and Harrison each ordered two of these vessels; one will be built for KNSM.

All five ships are intended for a joint service system to be introduced by the three lines between Europe and certain ports in the Caribbean. They will be equipped with on-board container cranes, their capacity being 1,200 twenty-foot containers. The Sulzer main engine will provide for a service speed of 22 knots.

The first vessel is due for delivery in 1976.

Western Gear Elects Eitner Vice President

Ade K. Eitner

Ade K. Eitner, manager of Western Gear Corporation's Heavy Machinery Division at Everett, Wash., has been elected a vice president of the company, chairman **Bernard J. Bannan** has announced.

Mr. **Eitner** was named manager of the Everett division a year ago, following three years in a similar capacity with the firm's Flight Structures Division, also at Everett.

At Heavy Machinery Division, he has spearheaded and maintained the company's leading position in developing and producing specialized proprietary equipment such as pipeline tensioners, heave compensators, riser and guideline tensioners, and other massive machinery and equipment for the offshore oil industry, marine, and industrial fields worldwide.

A native of San Francisco, Calif., and a 1955 graduate of the University of Santa Clara with a B.S.M.E. degree, Mr. **Eitner** has held successive managerial and engineering posts with other Western Gear divisions since joining the firm in 1955, including positions as program manager for several major projects. He has also had duties in the corporation's executive office at Lynwood, Calif.

Mr. **Eitner** will continue as division manager of the Heavy Machinery Division at Everett, and will report directly to Western Gear president **Philip J. Gomez** at Lynwood, Calif.

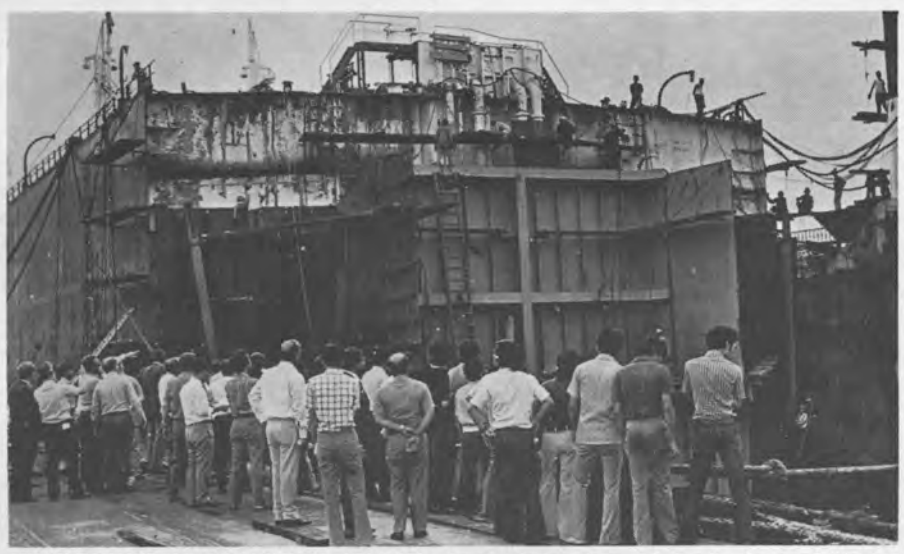
Mitsubishi Negotiating Tanker Order With Anglo-Nordic Shipping

The Anglo-Nordic Shipping Group, in less than a month after its acquisition by P and O and the Reksten's Palmerston holdings, is negotiating with Mitsubishi Heavy Industries for three 402,000-ton ultra large crude carriers (ULCCs).

The finance for the tankers, which are to be built on fixed-price contract and delivered in 1977, is being arranged by Anglo-Nordic, formerly Zapata Naess.

A statement from P and O added that "In keeping with the present trading policy of Anglo-Nordic, P and O and Palmerston, employment for the new tankers will be arranged nearer the time of delivery."

P and O, the U.K. shipping group, and Palmerston, a company headed by Norwegian tanker owner **Hilmar Reksten,** each have a 50 percent holding in Anglo-Nordic. The affiliated Associated Bulk Carriers (ABC) shipping consortium is 75 percent owned by P and O and 25 percent by Palmerston, and it is not known whether these new ULCCs will be employed strictly by Anglo-Nordic or within the ABC framework.



FIRST STAGES OF OPERATION AT HUD: Over 40 members of the Institute of Marine Engineers, Hongkong Branch, recently visited Hongkong United Dockyards Ltd., Taikoo Yard, to view the first stages of an operation to join the stern section of the M/V Thomas to the tank section of the S/S Brussels. A short lecture given by **W.B. Brown,** presently in charge of this project, was followed by a visit on board both vessels which are now alongside Taikoo Yard. Mr. **Brown** explained that the Thomas enters drydock first and a double cut is made around the ship, leaving the two wing tanks and one center tank intact on the aft portion. These tanks will be fully ballasted to keep the aft body on the keel blocks while the forebody is pulled clear at low tide. The forebody of the Brussels replaces that of the Thomas and has a completely new section fitted to it, incorporating pump room, generators and motor room. This new section has been prefabricated into units weighing about 20 tons each. On completion of the attachment of this new section, the Brussels will enter the drydock to be lined up and joined to the Thomas stern. The ship thus formed will emerge under the new name of Kassos. Institute members will again visit this interesting project when work has progressed to a further stage.

New Drilling Operation In North Sea Begun By Texaco Subsidiary

Texaco North Sea U.K. Company, a wholly owned subsidiary of Texaco Inc., has started new drilling operations in the North Sea, off the coast of Scotland, where the company holds nearly half a million acres.

Texaco North Sea is drilling in Block 3/4, which lies about 85 miles east of the Shetland Islands. Block 3/4, held 100 percent by Texaco North Sea, is located immediately to the south of Block 211/29, where drilling by others has uncovered the Brent Field.

Texaco's new drilling activity began when the semisubmersible drilling vessel Zephyr I arrived on location in late June.

Zephyr I has been specially constructed to withstand the unusually harsh weather conditions characteristic of the North Sea. It can operate in winds up to 37 knots and wave heights up to 25 feet. It can also operate in water depths of between 100 and 800 feet, and can drill to a depth of 25,000 feet.

Almost all machinery and controls are enclosed, enabling the crew to work the rig efficiently during severe winter weather. Eight anchors, each weighing 30,000 pounds, keep the Zephyr I on station.

An exceptionally large blowout preventer stack has been installed on the rig. It is more than 40 feet high and weighs about 180 tons. A sophisticated data-recording system has also been installed to evaluate sea conditions and their effect on the behavior of the unit.

Texaco participated in the first drilling operation in the North Sea nearly a decade ago. The company's total holdings in the North Sea area amount to about five million acres.

SNAME Presents New Edition On Guidelines For Coating Ships

A new updated edition of the "Coating Systems Guide for Hull, Deck and Superstructure (Revised 1973)" has been released by Panel 0-23 (Ships' Paints) of The Society of Naval Architects and Marine Engineers" Technical and Research (T&R) Program. This edition was necessary in order to provide detailed information on the new, proven, coating systems for ships which have come into service since 1969.

The bulletin presents concise tabulations of the application, performance and miscellaneous characteristics of the generic types of coatings now in service on U.S. ships. Basic health and safety precautions are included, as well as references to applicable U.S. Government specifications. The cost data has also been updated and compatability tables expanded in an attempt to reduce the number of failures that seem to accompany the introduction of new coatings.

An expanded glossary of terms related to coatings helps to chemically define the new coatings and also to recognize such new surface preparation techniques as hydroblasting. The grades of surface preparation are referenced to SNAME's popular T&R Bulletin 4-9, "Abrasive Blasting Guide for Aged and Coated Steel Surfaces," as this publication provides color photographs of various steels with different grades of blasting suitable for field comparison and evaluation with the ships' or the structures' blasted surface. These bulletins also conform to other industrially accepted definitions for each grade of blasting as contained in the "Surface Preparation Specifications" of the Steel Structures Painting Council.

T&R Bulletin 4-10, "Coating Systems Guide for Hull, Deck and Superstructure (Revised 1973)" should be most useful to owners, operators, builders and designers of ships and offshore structures. It has been approved for publication by the ship technical operations committee and is available through The Society of Naval Architects and Marine Engineers, 74 Trinity Place, New York, N.Y. 10006, at a price of $9.75 per copy. Members of the Society may obtain a copy of the bulletin for $6.50. If postage is received with the order, these prices include postage via third class mail in the United States and as "Printed Matter" in all other countries. Shipments will be insured or sent air mail at additional cost only if requested.

Rolls Royce Gas Turbine Approved For Marine Use By Lloyd's Register Of Shipping

Lloyd's Register of Shipping has recently approved the design of the Rolls Royce Olympus TM3B gas turbine for use as a main ship propulsion unit and for other marine duties.

The TM3B engine is a fully marinized version developed from the Olympus series of aero gas turbines, of which the latest is installed in the Concorde. In its marine form, the Olympus has been adopted for propulsion in many naval vessels and is already in service with several navies. A closely similar type is also in use for land-based power generation.

The marinization of a pure jet aero engine is achieved essentially by the addition of a power turbine to provide an output shaft drive, the basic engine being used as a gas generator unit. Further design changes affecting the engine structure and the control systems are necessitated by the requirement to operate continuously at sea level. Special attention is also paid to the effects of operation in a corrosive marine environment, involving the selection of resistant materials for components most affected and the provision of air filtration to minimize salt ingestion.

The operation and control of the TM3B is fully automated for remote or unmanned running and a comprehensive range of protective and safety devices is incorporated. Fire risks are minimized by the installation of engines in sealed enclosures within the engine room, equipped with automatic fire extinguishing systems.

Approval of the TM3B design by Lloyd's Register is for a continuous service rating of 18,000 bhp at 5,370 rpm (power turbine output) and a corresponding maximum rating of 21,000 bhp at 5,660 rpm. This approval follows the examination of the engine design for compliance with the Society's Rules for marine gas turbines, in respect of basic structural integrity and safety and reliability in service.

TM3B engines certified under this approval will be subject to the usual Lloyd's Register survey requirements for marine engines relating to manufacture, testing, installation and maintenance.

Frigitemp Awarded $40-Million Subcontract From Litton

Frigitemp Corporation, New York, N.Y., has been awarded a $40-million subcontract by Ingalls Shipbuilding Division of Litton Industries to perform joiner installation work on a series of new Navy destroyers and amphibious assault ships.

Gerald Lee, Frigitemp president, said the contract—one of the largest of its kind ever awarded in the marine field—would be carried out by Frigitemp's Marine Division. He said the company is required to secure necessary performance bonds under the contract.

The subcontract to Frigitemp involves work on five LHA amphibious assault ships and 16 DD-963-class destroyers, with an option for future contracts on 14 additional destroyers.

Under the subcontract, Frigitemp will perform all joiner work on the vessels, including the assembly and installation of galley equipment, crew accommodations furnishings and other interior finishing work aboard the ships.

Mr. **Lee** said Frigitemp will coordinate the contracts from the company's new plant outside Gulfport, Miss., located about 40 miles from Pascagoula, where the ships are in production.

MILLION POUND LIFT: When Ingalls Shipbuilding Division of Litton Industries in Pascagoula, Miss., moved the deckhouse for the first of a fleet of amphibious assault ships it is producing for the U.S. Navy, the first direction was straight up—100 feet. The all-aluminum deckhouse, five stories high and weighing more than a million pounds, was fabricated on the ground and then lifted aboard the ship in two sections by four 200-ton-capacity cranes. After reaching the height necessary to clear the top deck of the LHA (background), the two sections, each weighing in excess of 250 tons, were moved into place on the starboard side of the ship. The deckhouse, which will contain all the ship's electronics and command and control functions, measures 42 feet by 180 feet by 50 feet high. The mast atop the structure adds an additional 54 feet to the total height, making the LHA tower some 200 feet above the ground. Designed by Ingalls to transport and land a Marine battalion landing team and support equipment, the LHA is 820 feet long at the flight deck, as large as a World War II aircraft carrier. The first ship, named Tarawa, will be launched this year.

Shell Offshore Rigs Produce Fresh Water From Waste Heat

Off the Louisiana-Texas Gulf Coast, Shell Oil Company has many offshore production and drilling platforms at work. Both oil and gas are being produced.

Until five years ago, all of the fresh water was barged out for use by the crews manning many of the platforms; water used for drinking, cooking, make-ready and wash down. Today, this need is primarily met by the use of desalinators. Shell engineers designed a system using Continental Emsco supplied Maxim HJ50 waste heat recovery desalinators. These units provide normal freshwater requirements by utilizing the available waste heat on platforms.

The units are completely packaged on skids, and include piping, pumps, electricals and salinity controls—for easy handling and quick installation. The first HJ50 units went into Shell service in 1967. They now have over 55 units in operation on production platforms. A typical installation produces 2,400 gpd of fresh water using jacket water heat from generator drive engines.

The system operates under vacuum, with the boiling of seawater at a low temperature (125° F). Chemical cleaning is required every three months. Continental Emsco has coated the desalinator package exterior with Shell's specified corrosion resistant epoxy, and has included an electrolysis control system.

Maxim seawater desalinators are manufactured by Riley-Beaird, Inc., P.O. Box 1115, Shreveport, La., 71130, in a wide range of produced freshwater capacities—from 50 to 500,000 gallons per day.

Seatrain Consolidates Container Operations

Seatrain Lines, Inc. has announced the restructuring of its Container Division organization to provide centralized control and administration of international operations.

Joseph J. Celli, the division's president, said the new structure was designed to consolidate, with substantial cost savings, the previous largely autonomous operations of the company's widely separated port and marketing facilities, each with its own marketing and operations organizations.

Mr. **Celli** said **Arthur C. Novacek** has been named to the newly created post of executive vice president, responsible for worldwide marketing functions formerly held by the presidents of autonomous divisions. In his new position, Mr. **Novacek** will establish an integrated marketing network reporting to him through marketing vice presidents in each of the major zones of international trade.

Mr. **Celli** also named **Ronald A. Kucks** to the newly created post of executive vice president responsible for operations throughout the Seatrain system. Mr. **Kucks** was formerly vice president, transportation, for Associated Transport. Both new posts carry greater authority and broader control in Seatrain's expanded container system than had existed in the organization for any position previously, Mr. **Celli** said.

Also announced were the appointments of **Kevan H. Cleary** as vice president, management control, and **George Workman,** vice president, management information, and of three executive assistants to the president, **John J. Haggerty, Peter G. Murphy** and **Kurt Rosenbach.**

Mr. **Cleary** will have divisional responsibility for personnel, office management, cost control, budgeting and administrative services. Mr. **Workman** will oversee the division's data processing, industrial engineering and systems/procedures operations.

SAFETY FIRST: Capt. **Bernard J. Hickey** (left), of United States Lines' containerliner S/S American Liberty, receives Fleet Seamanship Safety Award noting ship's 366-day accident-free record, from **Kenneth W. Gundling,** vice president for marine operations of United States Lines, and **L.H. Pert** (right), assistant marine superintendent. United States Lines has started this award program to recognize safety achievements by its fleet and personnel. There were six other containerliners with perfect records for 1972.

Boston And Lockport Block Co. Acquired By Joslyn Mfg.

The formal signing of final papers for the acquisition of the Boston and Lockport Block Co., Inc., Boston, Mass., by the Joslyn Mfg. and Supply Co., Chicago, Ill., was announced in Boston by officials of both companies.

The joint statement reads as follows:

"Completion of the acquisition of the assets of Boston and Lockport Block Co., Inc. was announced by **George W. Stamm,** president of Joslyn Mfg. and Supply Co., Chicago, and **Donald C. Seamans**, president of Boston and Lockport Block Co., Inc., Boston. The consideration was not announced.

"Mr. **Stamm** stated that the business should be continued under the name of Boston and Lockport Corp. under present management with Mr. **Seamans** serving as president. The company will be operated as a subsidiary of Brewer-Titchener Corp., Cortland, N.Y., which is a wholly owned subsidiary of Joslyn Mfg. and Supply Co.

"Joslyn, a Chicago-based firm, is in its 71st year and has 22 plants in 10 cities."

Isherwood System Reduces Large Ship Operating Costs

Sir Joseph W. Isherwood & Company Limited, consultant naval architects and marine engineers, with officers in London and Newcastle upon Tyne, are launching a new service—A-mar-Z—which aims to provide a powerful management tool to enable fleet managers to optimize the costs associated with the total repair and maintenance function of ships of all sizes.

By identifying the total work load necessary to maintain ships in service and apply planning techniques to ensure that manpower deployment is executed in the most cost effective manner, Isherwoods are making available a service designed to overcome many of the problems that detract from the profitable operation of modern ships.

Many modern vessels, including VLCCs and containerships, incorporate a high degree of sophistication in an endeavor to improve their commercial productivity. Technical problems, however, aggravated by a number of external factors, have resulted in recent times in an unprecedented increase in repair, maintenance and associated off-hire costs, which has detracted from the value of the investment made in these areas.

This situation has caused many owners to question traditional methods of managing maintenance, and in some cases planned maintenance schemes have been implemented in an endeavor to bring costs back under control.

From their observations and after "in-depth" research, Isherwoods have concluded that the majority of these planned maintenance schemes are failing to produce the anticipated benefits. They believe that the reason for this failure stems largely from too great emphasis being placed on office-bound systems and insufficient attention being paid to the job of effectively managing the whole range of maintenance and repair activities.

Illustrating the size of the problem, Isherwoods have determined that currently some VLCCs spend up to 40 days out of service in an 18-month period due to maintenance and repairs, and total costs of about $1,500,000 during such a period are not untypical.

The A-mar-Z system has been designed to overcome the problems in an economical fashion. Given full management and sea-staff support, the system has the potential to reduce the total repair bill during an 18-month drydocking interval by some 33 percent and on the basis of their quoted costs for operating this system, this gives a saving to cost ratio of the order of 6:1.

The A-mar-Z system not only provides the basic planning and documentation software, but makes available an operating bureau which provides the ship manager with a complete management service —without any of the problems and overheads associated with in-house systems. The planning system is all embracing in respect of maintenance and repair activities and covers steelwork, pipework, systems and spares, in addition to the traditional planned maintenance which is concerned principally with rotating machinery.

Cost reduction is the major objective of the scheme. This is achieved by maximizing the amount of maintenance, inspections and repairs carried out at sea, using shoreside facilities only for work which cannot possibly be carried out at sea.

In order to effect work on board ship, which is beyond the resources of the ship's staff, skilled labor will be made available by a number of approved specialized contractors who will undertake the work at sea. The work will be planned and coordinated by the planning bureau.

To complete the all-embracing nature of the system, advisory services, including drydock planning, operating manuals and operational research will be made available through the bureau.

A-mar-Z is operated by Isherwood's Maintenance Services Division based in Newcastle upon Tyne and in association with the following approved contractors: Wm. McCrindle & Son, work squads; R. Pollard Associated, operating manuals; Engineer Test Services (Far East) Ltd., steelwork surveys (ultrasonics); Rodger, Morley Ltd.; vibration analysis, and I.M.E.C. (Marine Ltd.), automation and electronic equipment maintenance.

Astilleros Espanoles Launches Second Of Four 230,000-Dwt Tankers For AMOCO Transport

Pictured at the launching, left to right: **Luis Nadal,** director of the Cadiz Yard; **Robert Haddow,** vice president of supply and transportation of AMOCO International Oil Company; **Mrs. Haddow,** sponsor; the port commander, and **Mrs. Delgado,** wife of the director of the Southern Area of Astilleros Espanoles, S.A.

The 230,000-dwt AMOCO Singapore has been launched at the Cadiz Shipyard of Astilleros Espanoles, S.A. This is the second of a series of four vessels that are being built at the Cadiz Shipyard for AMOCO Transport Company of the U.S.

The approximate measurements and main particulars of the vessel are length overall, 1,096 feet; length between perpendiculars, 1,027 feet; molded breadth, 167 feet; molded depth, up to main deck, 86 feet, and molded draft, 65 feet. The cargo tank capacity (100%) is about 10,011,857 cubic feet, and the anticipated fully laden trials speed is 15.3 knots.

The 230,000-dwt tanker AMOCO Singapore slides down the ways at the Astilleros Espanoles Cadiz Shipyard.

The propulsion machinery on the AMOCO Singapore comprises an AESA-Burmeister & Wain 8K98FF type main engine, totaling 30,400 bhp at 103 rpm, built by Astilleros Espanoles, S.A.

Other equipment such as winches, windlasses, steering gear, main boilers, heavy forgings and castings have also been constructed at different works of Astilleros Espanoles, S.A.

Mrs. Ginger S. Haddow, wife of the vice president of supply and transportation of AMOCO International Oil Company, served as sponsor during the launching ceremony, accompanied by authorities, executives of the shipbuilding company and officials of the AMOCO Group.

ZIDELL EXPLORATIONS, INC.

(503) 228-8691
3121 S.W. Moody
Portland, Ore. 97201
Telex: 36-0503

MARINE EQUIPMENT VALUES

AXIAL FLOW FANS

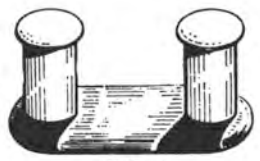
Rebuilt Guaranteed LaDel, STURTEVANT etc.

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

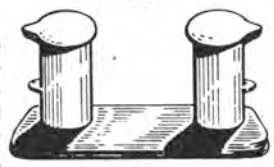
EXAMPLE LISTING:

Size A¼	**Size A3**	**Size A8**
Size A½	**Size A4**	**Size A10**
Size A1	**Size A5**	**Size A12**
Size A2	**Size A6**	**Size A16**

DOUBLE BITTS



STYLE A

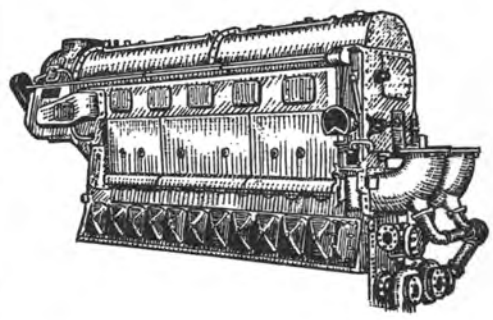


STYLE B

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

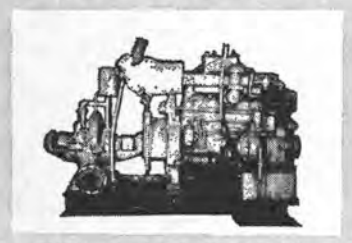
Specify quantity, size and style required, for fast quotation.

MARINE DIESEL ENGINES

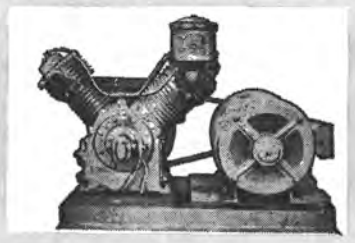


MATCHED PAIR . . . FAIRBANKS-MORSE Model 38D8-⅛—1 Port; 1 Starboard. Used condition, 1800 HP, 800 RPM, 2 cycle, 8½" bore, 10" stroke, Air Start. Complete with Westinghouse Reduction Gears, 2.216:1 ration—with Hydraulic Coupling.

FIRE PUMPS AIR COMPRESSORS



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



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

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

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

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

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

Steel Watertight DOORS

Used, Good Condition, Trimmed Frames.

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

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

CARGO HOISTER BLOCKS

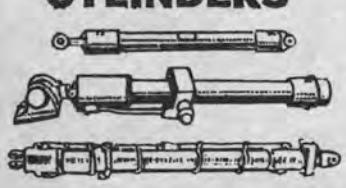
5 ton rated, Steel, as removed from surplus ships. Manufactured by: Young, Draper, etc., 12" & 14" sizes.

$34.50 ea. $39.50 each with pull test certificates

Electro - Mechanical STEERING GEAR

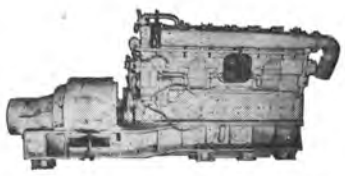
1—SPERRY No. 2, 5 HP, 230 Volts DC, complete with Steering Winch, Controller Panel, Ballast Resistor, Electro-Mechanical Steering Stand —with Steering Wheel (with Pull-out Knob).

HYDRAULIC CYLINDERS



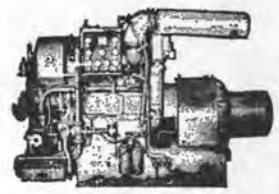
Bore	Overall Stroke	Rod Diameter	Retracted Length	Action
10"	12"	3.75"	45½"	double
10"	26"	3.75"	58½"	double
2"	8"	1½"	20"	double
2.5"	15"	1.12"	25½"	double
3"	8"	1.37"	15½"	double
6"	8"	4"	144"	double

MARINE DIESEL GENERATORS



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

2—SUPERIOR Diesel Engines . . . Model GBD8 Marine, 150 HP, 1200 RPM, 8 cylinder, with Delco Generators, 100 KW, 120/240 DC.



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

3—GENERAL MOTORS, Model 3-268 A, Marine, 150 HP, 1200 RPM, 3 cylinders, with Allis-Chalmers Generators, 100 KW, 120/240 DC.

TURBINE GENERATORS

A.C. and D.C. Voltage

D.C.

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.

D.C.

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.

A.C.

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

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

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

DON'T MISS ZIDELL'S 2-PAGE SPREAD in alternate issues of MARITIME REPORTER

Contact Ralph E. Ingram (see Portland address above) . . . or Shell Phillips, Zidell Dismantling, Inc. • 401 Alexander Ave. • Tacoma, Wash. 98401 • Phone: 206/383-2701

GIBBS & COX, Inc.

Naval Architects and Marine Engineers

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

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

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

Electrical Engineering, Electric Power, Lighting and Cableways.

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

Weapons Engineering, Arrangements, and Weapon Control Systems.

Project Management, Naval and Merchant, New Construction and Conversion.

Excellent salaries and benefits. Relocation expenses.

U.S. Citizenship Required.

Openings also in Hyattsville, Maryland office.

Send resume, including salary history, to:

Gibbs & Cox, Inc.

40 Rector Street, New York, New York 10006

An Equal Opportunity Employer (m/f)

NAVAL ARCHITECT

Gulf Oil Corporation has career position for Naval Architect. B.S. in Naval Architecture required with Shipyard or Design Office Experience.

Excellent Working Conditions in Philadelphia area with full range of Company Benefits.

Send resume in confidence to:

GULF OIL CORPORATION
Marine Department
P.O. Box 7880
Philadelphia, Pa. 19101
Attention: W. F. Muir

An Equal Opportunity Employer m/f

MARINE EMPLOYMENT SPECIALISTS

If you are a marine professional who desires employment assistance or an employer seeking qualified Marine Design Engineers, Naval Architects, Port Engineers, Shipbuilding Supervisors, Ocean Engineers or other shoreside marine personnel, you will get results by contacting:

RAY AGENT
Personnel Services
Incorporated
823 West Street, Wilmington, Delaware 19801
302/655-9661

WELDING—PRODUCTION SPECIALIST

Thirty-Eight (38) years shipbuilding experience in responsible positions.
Have worked foreign. Resume on request.

Box 704 Maritime Reporter/Engineering News
107 East 31 Street New York, N.Y. 10016

WANTED
SHIPYARD MANAGER

TO SUPERVISE ALL OPERATIONS IN SHIPYARD SPECIALIZING IN TUG AND BARGE CONSTRUCTION AND REPAIR. MUST HAVE ESTIMATING EXPERIENCE. SEND PAST EMPLOYMENT DETAILS TO:

Box 901 Maritime Reporter/Engineering News
107 East 31 Street New York, N.Y. 10016

SOLD Through your CHANDLER

99.99+% pure **ZINC** For Cathodic Protection

Meets Military Spec. Mil-A-18001 (ships)

Anodes • Bars • Circles • Rings • Rods IN STOCK

SMITH and McCRORKEN, Inc.

153 Franklin St. Dept. MR, New York 13, N. Y. • Call WA 5-2171 FOR FAST DELIVERY

TARABOCHIA
MARINE HYDRAULICS CO., INC.

Service Repair
Parts Consulting

201 Harrison Street
Hoboken, New Jersey 07030

Phones: Hoboken (201) 792-0500-01-02
New York (212) 267-0328

T2 TANKER

Immediately available for non-transportation uses anywhere in the world. Ideal as 240,000 bbl. (approx. 10 million gal. or 40 million liter) heated or bonded storage tanks and/or 11,000 HP power plant. Oil fired turbo-generators produce 8200 KW, 3500/450/225 Volts, 3 phase, AC electric power. Can offer exceptionally attractive terms. Will consider joint venture arrangements.

MAX B. WENDER 313/863-9047 or write
P.O. Box 43, Detroit, Mich. 48221, U.S.A.

BARGES

SALE or CHARTER

COEN MARINE EQUIPMENT, INC.
1571 RICHMOND TERRACE, S. I., N. Y. 10310
(212) 448-0900

11 BROADWAY NEW YORK N.Y. 10004
212 BO 9-2515

ANKER MARINE PAINTS

WORLD WIDE DISTRIBUTION

VALVES • VALVES • VALVES
⅛" to 60" STAINLESS, CAST IRON BRONZE, STEEL, MONEL & ALUMINUM
Most diversified stock in the world
"We got it", "We'll get it" or "We'll make it"
"WHEN YOU NEED IT YESTERDAY"
METROPOLITAN PLUMBING SUPPLY CORP.
5000 2nd St., L.I.C., N.Y. 11101 Phone (212) EM 1-2111
Free Phone: 800-221-9672

FOR SALE

ONE PAIR OF CATERPILLAR MAIN ENGINES AVAILABLE. ENGINES ARE CATERPILLAR D398 WITH TWO CATERPILLAR MODEL 3192 REDUCTION GEARS—APPLY TO:

TURECAMO COASTAL & HARBOR TOWING CORP.

P.O. Box 201 Oyster Bay, New York 11771

Nicolai Joffe Corporation
MACHINERY DIVISION

SHIPS FOR SALE
4 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.
Ideal as Self Propelled Drill Ship, Crane Ship, or as Stationary Supply or Quarter Ship.
4 Available — Gulf Location

SAN FRANCISCO (415) 761-0993
445 Littlefield Ave. (Box 2445)
So. San Francisco, Ca. 94080
NEW YORK SALES OFFICE (212) 832-3320
BEVERLY HILLS MAIN OFFICE (213) 878-0650

FOR SALE
TUG SALVAGE RESEARCH VESSEL

141'x30'x15' Gr. 296 tons net 49 tons 1300HP Diesel electric—2 6-71 GM 60KW DC units—Full electronics plus—Sperry Gyro—Bow Thruster—Tow winch 3700' 1½" wire—double drum salvage winch ea. drum 2000' 1¼" wire—Cargo boom 7 ton capacity—cargo hold—Accommodations 10 crew plus 20 scientists—5,000 mile range—45,000 fuel 8000 water—helicopter platform—power boat Chrysler power Dory type skiff 20' 20HP outboard—Fast sale $145,000.00.

OAKSMITH BOAT SALES, INC.
206-283-1000 Fishermen's Terminal, Seattle, Wa. 98119

PROFESSIONAL OPPORTUNITIES

a prominent New York City shipbuilder, offers immediate opportunities for personnel in the following areas:

NAVAL ARCHITECT

Supervisor of Hull Scientific Group. Calculations and design of structural modules, rudders, weights.

MARINE ENGINEER

Responsible for calculations, specifications, drawings for piping and machinery systems, shafting, pipe stress plus test procedures.

HULL ERECTION PLANNER

Formulating work units for input into CPM/PERT network of engineering, hull structure and related drawings. Estimate resource requirements and work unit duration. Develop and maintain network diagrams.

PIPING DESIGNER

Marine design, draft and check power plant and total service piping drawings.

We offer . . . permanent, long range opportunities . . . excellent salaries and benefits . . . outstanding relocation package which includes a "settling-in" allowance . . . ideal suburban living convenient to the yard.

Qualified applicants are invited to CALL COLLECT or WRITE Bob Galletta.

SEATRAIN
EMPLOYMENT OFFICE
Suite 1005, 25 Broadway
New York, N.Y. 10004
(212) 344-6450
An Equal Opportunity Employer m/f

SHIP PILOTS NEEDED

THE PANAMA CANAL COMPANY
A GOVERNMENT AGENCY

If you have not reached your 40th birthday and have or expect to have a U.S. Coast Guard License as Master of Steam or Motor Vessels, any gross tons, any ocean, and six months' experience as Chief Mate (or Master) of Ocean, Steam or Motor Vessels of 1,000 gross tons or over.

WE CAN OFFER YOU:

A chance to be home with your family; rewarding responsible employment; job security; retirement program; subsidized group health and life insurance; two months' vacation; subsidized round-trip vacation travel to U.S. every two years; educational facilities from kindergarten through Junior college; 10 paid holidays; abundant recreational opportunities; 80° F. average daily temperature; subsidized transportation to Canal Zone for your family, furniture, and car.

ANNUAL SALARIES
FROM
$17,940.00
TO
$31,864.20

Salaries include 15% tropical differential, but are minimums and do not include time and one-half for overtime, 25% premium pay for Sunday and holiday work, 7% night compensation.

Send "Personal Qualifications Statement," SF-171, (Available in Post Offices) to Deputy Personnel Director (Operations), Panama Canal Company, Box 2012, Balboa Heights, C.Z.

No discrimination in employment. Positions are in the career federal service.

BARGE SERVICE TO ALL POINTS

BARGES LEASED
JOB QUOTATIONS • BARGE SALES • TOWS ARRANGED

McDONOUGH MARINE SERVICE
P. O. BOX 26206
NEW ORLEANS, LOUISIANA 70186/504-949-7586
BRANCH OFFICE: P. O. BOX 233 CHANNELVIEW, TEXAS 77530
PHONE HOUSTON 713-622-9977

Nicolai Joffe Corporation
MACHINERY DIVISION

1500 KW GENERAL ELECTRIC TURBO GENERATOR SETS

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

GEAR: Type S195A 8145/1200 RPM

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

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

SAN FRANCISCO (415) 761-0993
445 Littlefield Ave. (Box 2445)
So. San Francisco, Ca. 94080
NEW YORK SALES OFFICE (212) 832-3320
BEVERLY HILLS MAIN OFFICE (213) 878-0650

FOR SALE

DRYDOCK—10,000 ton capacity, total length 146', max. width 117', depth 50', five sections, built 1945. Certified for use two years ago and reconditioned. Capacity 85' wide x 500' long, wooden construction, excellent. Immediately available Southeast. Can be towed anywhere.

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

BARGES FOR LEASE
ON GULF COAST OF FLORIDA

MISENER BARGE AND BOAT RENTAL, INC.
St. Petersburg Beach, Florida 813-360-7033

FOR SALE — AIR COMPRESSORS

1 Each CHICAGO PNEUMATIC Type YCM, 11½ x 7 x 7, 501 CFM @ 100#, 75 HP, 220/440 Volt Motor

2 Each WORTHINGTON Model 80, 7½ x 7½ x 6 x 5, Air Cooled, 369 CFM @ 125#, 100 HP, 220/440 Volt Motor

WRITE OR CALL FOR PHOTOS AND COMPLETE SPECIFICATIONS

UMCO
Universal Machinery Company, Inc.
P.O. Box 23665, New Orleans, La. 70183
504 733-7272

ENGINEERS

Marine equipment company located in Union County, New Jersey, desires engineers for design of welded steel structures and heavy machinery—JUNIOR ENGINEER, PREVIOUS EXPERIENCE UNNECESSARY — PROJECTS/STAFF ENGINEER, 10 YEARS MINIMUM EXPERIENCE. Personal interviews will be arranged only after receipt of resume and salary requirements.

Box 815
Maritime Reporter/Engineering News
107 East 31 Street
New York, N.Y. 10016

FOR SALE

One pair of Enterprise DMM-363 diesel engines, 500 continuous HP at 950 RPM, complete with snow-nabsted SN-3786 2.59 to 1 ratio reverse reduction gears and many spare parts. These units are presently operating on schedule in an offshore supply vessel on Louisiana Gulf Coast. Units can be inspected anytime by appointment and should be available by mid-August. Write for additional details, specifications, photos, or an inspection appointment.

Box 717 Maritime Reporter/Engineering News
107 East 31 Street New York, N.Y. 10016

"CAN YOU DIRECT US TO THE ERIE CANAL?"

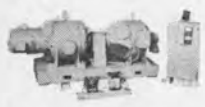
M.G. SETS

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

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

$89.50 EACH

UNUSED—10 KW—120/1/60 M.G. SET



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

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

RECONDITIONED CONTINENTAL
2 KW—220 D.C. TO 120/1/60 A.C.

INPUT: 5 HP—230 VDC—20 amps. **OUTPUT:** 2.5 KVA —2 KW—120/1/60 AC—0.8 PF—1800 RPM—21 amps. With controls. 38" long—15" wide—480 lbs.

THE BOSTON METALS COMPANY

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

T-2 TANKER

VALVES

Reconditioned to ABS standards

24" OVERBOARD DISCHARGE VALVE

●

MAIN INJECTION VALVE

THE BOSTON METALS COMPANY

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

PORTABLE 6" CARVER SALVAGE PUMPS

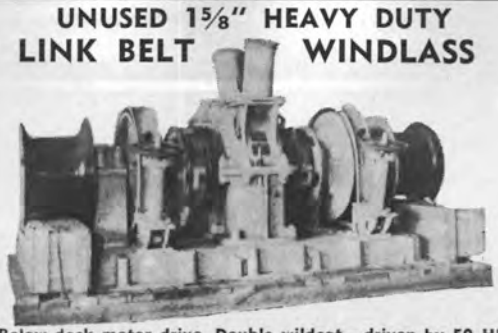
Reconditioned—mounted in portable steel frame. 1750 RPM—1100 GPM @ 100' head; 1500 GPM @ 70' head; 1800 GPM @ 50' head; 2100 GPM @ 20' head. Leroi gas engine—model D-201P3 —4 x 4—1750 RPM—hand crank— —wt. 600 lbs.

$1450

THE BOSTON METALS COMPANY

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

UNUSED 1⅝" HEAVY DUTY
LINK BELT WINDLASS



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

THE BOSTON METALS COMPANY

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

NEW WATERTIGHT DOORS

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

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

EACH DOOR

IMMEDIATE DELIVERY

THE BOSTON METALS COMPANY

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

FUEL OIL OR LUBE OIL PURIFIER

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

THE BOSTON METALS COMPANY

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

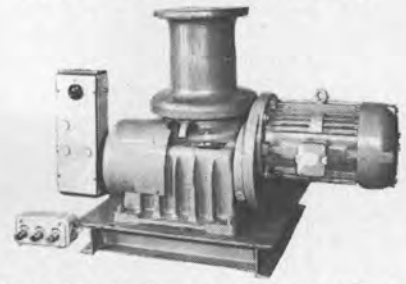
100,000 lb. Almon Johnson Series 232 Constant Tension Mooring Winches

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

THE BOSTON METALS COMPANY

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

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



MOTOR: 10 HP—totally enclosed—fan cooled—continuous duty—horizontal flange mounted—special shaft & oil seal fitted—220/440/3/60—1760 RPM. CONTROL: Marine type watertight pushbutton — forward / reverse / stop—watertight starter box—rated for 40 starts/hour—triple pole contactor with silver contacts, thermal overload relay & trip adjustment. DIMENSIONS: Barrel 10" diam.—flange 10" diam.—approx. 26" wide & 36" long.

$2450

THE BOSTON METALS COMPANY

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

PROPELLERS — RUDDERS

PROPELLERS—Reconditioned A.B.S.
T2-SE-A1 T2 Tanker — Jacksonville, Fla.

RUDDERS—Reconditioned & Unused
AP2 Victory — AP3 Victory
T2-SE-A2 Mission Tanker — Baltimore, Md.
T2-SE-1 T2 Tanker — Baltimore, Md.
C-1MAV-1 (unused)

THE BOSTON METALS COMPANY

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

FOR TANKER & OIL BARGE OPERATORS

VACRAL VALVES

Cargo Tank Venting Valves. Bronze—#100 2½" iron pipe size screwed.

THE BOSTON METALS COMPANY

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

REVOLVING FIELDS

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

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

THE BOSTON METALS COMPANY

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

Berger-Type Deck-Mounted FAIRLEADS

For 1" wire rope—12" diameter sheave—steel frame—self-aligning — 180° swing. Formerly in Naval use on LCT.

$745 EACH

THE BOSTON METALS COMPANY

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

BUYERS DIRECTORY

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

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

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

BEARINGS
BJ Marine Bearings, a Borg-Warner Industry, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
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
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171

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

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

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

COATINGS—Protective
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
EGD Spee-Flo Co., 4631 Winfield Rd., Houston, Texas 77039
International Paint Co., Inc., 21 West Street, New York, N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Philadelphia Resins Corp., 20 Commerce Dr., Montgomery, Pa. 18936

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

CONTAINER LASHINGS & COMPONENTS
American Engineered Products, P.O. Box 74 Nichol Ave., McKees Rock, Pa. 15136
W. W. Patterson Co., 830 Brocket St., Pittsburgh, Pa. 15233

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

CORROSION CONTROL
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 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
Houston Systems Mfg. Co., P.O. Box 14551, Houston, Texas 77021
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

CRANE LOAD INDICATORS
W.C. Dillon & Co., 14620 Keswick St., Van Nuys, Calif. 91407
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
A. G. Weser, Seebeckwerft, 2850 Bremerhaven 1, Germany

DIESEL ACCESSORIES
A.G. Schoonmaker, Box 757, Sausalito, Calif. 95965

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

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

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

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

ELECTRICAL EQUIPMENT
AMP Special Industries, P.O. Box 1776, Paoli, Pa. 19301
Arnessen Electric Co., Inc., 335 Bond St., Brooklyn, N.Y.
Galbraith-Pilot Marine Corp., 166 National Rd., Edison, N.J. 08817
Harvard Murlin Div., P.O. Box 302, Quakertown, Pa. 18951
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014

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

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

FLOATING EQUIPMENT—Steel—Aluminum Pontoons
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

GAS ALARM SYSTEMS
Riken Keiki Fine Instrument Co., Ltd., 2-7-6 Azusawa Itabashi-ku, Tokyo, Japan

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

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

LIGHTS—Emergency, Search & Navigation
Snelson Oilfield Lighting Co., P.O. Box 1284, Fort Worth, Texas 76101

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

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

LININGS
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144

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

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

MARINE EQUIPMENT
Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
Homelite Corporation, 70 Riverdale Ave., Port Chester, N.Y. 10573
ITT Henze Service, P.O. Box 1745, Mobile, Ala. 36610
Kearfott Marine Products, 780 South 3rd Ave., Mt. Vernon, N.Y. 10550
Nicolai Joffe Corp., P.O. Box 2445, 445 Littlefield Ave., So. San Francisco, Calif. 94080
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742
Stow Mfg. Co., 225 Shear St., Binghamton, N.Y. 13902
Vokes Filter Div., (Cardwell Machine Co.), Cardwell and Castlewood Rd., Richmond, Va. 23221
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

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

MARINE INSURANCE
Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Midland Insurance Co., One State St. Plaza, New York, N.Y. 10004
R.B. Jones Corp., 301 West 11th St., Kansas City, Mo. 64105

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
Turbo Power & Marine Systems, Subsidiary of United Aircraft Corp., 1690 New Britain Ave., Farmington, Conn. 06032

MARINE SURVEYORS
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Fla. 33316

MARITIME FINANCING—Leasing
General Electric Credit Corp., 4 Corporate Drive, White Plains, N.Y. 10604
Rhode Island Hospital Trust National Bank, 15 Westminster Street, Providence, R.I. 02903

NAVAL ARCHITECTS AND MARINE ENGINEERS
J. L. Bludworth, 4030 Wynne St., Houston, Texas
Breit Engrg. Inc., 441 Gravier St., New Orleans, La. 70130
James G. Bronson Associates, 166 Altamont Ave., Tarrytown, N.Y. 10591
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Crandall Dry Dock Engrs., Inc., 238 Main St., Cambridge, Mass. 02142
Francis B. Crocco, Inc., Box 1411, San Juan, Puerto Rico
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Arthur D. Darden, Inc., 1040 International Trade Mart, New Orleans, La. 70130
Design Associates, Inc., 3308 Tulane Ave., New Orleans, La. 70119
Designers & Planners, Inc., 114 Fifth Ave., New York, N.Y. 10011
M. Mack Earle, 103 Mellor Ave., Baltimore, Md. 21228
Christopher J. Foster, 14 Vanderventer Ave., Port Washington, N.Y. 11050
Friede and Goldman, Inc., 225 Baronne St., New Orleans, La. 70112
Gibbs & Cox, Inc., 40 Rector Street, New York, N.Y. 10006
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
Morris Guralnick, Associates, Inc., 583 Market St., San Francisco, Calif. 94105
J. J. Henry Co., Inc., 90 West St., New York, 10006
Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, Calif. 93017
C.T. Ilariucci & Associates, Tourism Pier #3, San Juan, P.R. 00902
Jantzen Engineering Co., 15 Charles Plaza, Baltimore, Md. 21201
James S. Krogen, 2500 S. Dixie Hwy., Miami, Fla. 33133
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 1180 Ave. of Americas, N.Y., N.Y. 10036
Marine Design Associates, P.O. Box 2674, Palm Beach, Florida
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742
Robert Moore Corp., 350 Main St., Port Washington, N.Y. 11050
Nickum & Spaulding Associates, Inc., 71 Columbia St., Seattle, Wash. 98104
Ocean-Oil International Engrg. Corp., P.O. Box 6173, New Orleans, La. 70114
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 8-D So. New River Drive East, Ft. Lauderdale, Fla. 33301
Potter & McArthur, Inc., 253 Northern Ave., Boston, Mass.
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 657 Mission St., San Francisco, Calif.
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
T. W. Spaetgens, 156 West 8th Ave., Vancouver 10, Canada
R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler, 50 Court St., Brooklyn, N.Y. 11201
H. M. Tiedemann & Co., Inc., 74 Trinity Pl., New York, N.Y. 10006
Whitman, Requardt & Associates, 1304 St. Paul St., Baltimore, Md. 21202
Yankee Shipwrights, P.O. Box 35251, Minneapolis, Minn. 55435

NAVIGATION & COMMUNICATIONS EQUIPMENT
American Hydromath Co., 55 Brixton Rd., Garden City, N.Y. 11530
Communication Associates, Inc., 200 McKay Road, Huntington Station, N.Y. 11746
Edo Western Corporation, 2645 South 2nd West, Salt Lake City, Utah 84115
Electro-Nav, Inc., 501 Fifth Ave., New York, N.Y. 10017
F&M Systems Co., P.O. Box 20778, 2525 Walnut Hill Lane, Dallas, Texas 75220
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
ITT Decca-Marine, Inc., 386 Park Ave. South, New York, N.Y. 10016
ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Lorain Electronics Corp., 2307 Leavitt Road, Lorain, Ohio 44052
Magnavox Navigation Systems, 2829 Maricopa St., Torrance, Cal. 90503

Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701
Raytheon Co. Marine Products, 676 Island Pond Rd., Manchester, N.H. 03103
Raytheon Co., Submarine Signal Div., P.O. Box 360, Portsmouth, R.I. 02871
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Standard Communications Corp., 639 N. Marine Ave., Wilmington, Calif. 90744
Teledyne Hastings Raydist, P.O. Box 1275, Hampton, Va. 23361
Tracor, Inc., 6500 Tracor Lane, Austin, Texas 78721
The Waterways Co., 3512 Metairie Hts. Rd., New Orleans, La. 70002

OILS—Marine—Additives
Exxon Company, U.S.A., P.O. Box 2180, Houston, Texas 77001
Exxon International Company, 1251 Avenue of the Americas, New York, N.Y. 10020
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Texaco, Inc., 135 E. 42nd St.. New York, N.Y. 10017

PAINT—Marine—Protective Coatings
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
International Paint Co., 21 West St., New York, N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Transocean Marine Paint Association, P.O. Box 456, Delftseplain 37, Rotterdam, Holland

PETROLEUM SUPPLIES
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017
The West Indies Oil Co., Ltd., St. John's, Antigua, W. I.

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

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 Talleyrand Ave., Jacksonville, Fla.

PROPELLERS: NEW AND RECONDITIONED
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Coolidge Propellers, 1601 Fairview Ave. East, Seattle, Wash. 98102
Escher Wyss Gmbh, P.O. Box 798, Ravensburg, Germany
Federal Propellers, 1501 Buchanan Ave. S.W., Grand Rapids, Mich. 49502

PUMPS
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City, Kansas 66110
Houttuin-Pompen N. V. Sophialaan 4, Utrecht, Holland
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Arkansas 72204

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
Du Pont Co., Room 31H1, Wilmington, Delaware 19898
Jackson Rope Corp., 9th & Oley, Reading, Pa. 19604
Wall Rope Works, Inc., Beverly, N. J. 08010

RUDDER ANGLE INDICATORS
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

SANDBLASTING EQUIPMENT
Pauli & Griffin Co., 826 Folsom St., San Francisco, Calif. 94107

SCAFFOLD BOARDS
Howmet Corporaton, Southern Extrusions Division, P.O. Box 40, Magnolia, Arkansas 71753

SEWAGE DISPOSAL
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Jered Industries, Inc., 1300 S. Coolidge Rd., Birmingham, Mich. 48008
Koehler-Dayton, Inc., P.O. Box 309, New Britain, Conn. 06050

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

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

SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
National Metal & Steel Corp., 1251 New Dock St., Terminal Island, Cal. 90731
Zidell Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201

SHIP BROKERS
Agemar, P.O. Box 1465, Maracaibo, Venezuela
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
Mowbray's Tug and Barge Sales Corp., 21 West St., N.Y., N.Y. 10006
Oaksmith Boat Sales, Inc., Fisherman's Terminal, Seattle, Wash. 98119

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

SHIPBUILDING—Repairs, Maintenance, Drydocking
Astilleros Espanoles, S.A. Zurbano, 70, Madrid 10, Spain
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Beliard, Crighton & Cie, P.O. Box 2074, Route des Docks, 59, Dunkirk, France
Beliard Murdoch S. A., Kattendijkdok Westkaai 21, Antwerp, Belgium
Bertram Marine, Division of Whittaker, 3663 N.W. 21 Street, Miami, Fla. 33142.
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Bludworth Shipyard, Inc., Box 5426, Cypress St., Brady Island, Houston, Texas 77012
Carrington Slipways Pty. Ltd., Tomago, N.S.W. 2322, Australia
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock, Inc., P.O. Box 153, Willemstad, Curacao, N.A.
Devcon Corporation, Endicott Street, Danvers, Mass. 01923
Dillingham Shipyard, Pier 41, P.O. Box 3288, Honolulu, Hawaii 96801
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
Empresa Nacional Bazon, 65 Castellana, Madrid 1, Spain
Equipment Systems, Inc., A Microdot Co., P.O. Box 95, Port Deposit, Md. 21904
Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122
General Dynamics, Electric Boat Division, 99M Eastern Point Road, Groton, Conn. 06340
General Dynamics, Quincy Division, Quincy, Mass. 02169
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
Havre de Grace, Havre de Grace, Md.
Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
Hongkong & Whampoa Dock Co. Ltd., Kowloon Docks, Hong Kong
Jacksonville Shipyards, 644 E. Bay St., Jacksonville, Fla. 32203
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Dockyard Co., 8 Kaigon-dori, Ikuta-ku, Kobe, Japan
Kelso Marine, Inc., P.O. Box 268, Galveston, Texas 77550
Keppel Shipyard (Private) Ltd., P.O. Box 2169, Singapore
Kockums Mekaniska Verkstads AB, Malmo 1, Sweden
Litton Industries, 9920 W. Jefferson Blvd., Culver City, Calif. 90230
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
Marathon Manufacturing Company
Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002
Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520
Marathon LeTourneau Marine Division, LeTourneau Rural Station, Vicksburg, Mississippi 39180
Marathon LeTourneau Offshore Pte., Ltd., P.O. Box 83, Taman Jurong Post Office, Singapore 22, Singapore
Marathon Shipbuilding Company, P.O. Box 870, Vicksburg, Miss. 39180
Marathon Shipbuilding Company (U.K.) Ltd., Clydebank Bunbartonshire, G81-1YB, Scotland
Marine & Rail Equipment Division/FMC Corp., 4700 N.W. Front Ave., Portland, Oregon 97208
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
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
Odense Steel Shipyard Ltd., P.O. Box 176, DK-5100 Odense, Denmark
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
St. Louis Shipbuilding—Federal Barge, Inc., 611 East Marceau, St. Louis, Mo. 63111
Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Savannah Machine & Shipyard Co., P.O. Box 787, Savannah, Ga. 31402
Sembawang Shipyard (Pte) Ltd., P.O. Box 3, Sembawang, P.O. Singapore, 27
Slocum Iron Works, Inc., P.O. Box 2506, 1752 Telegraph Road, Mobile, Ala. 36601
Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Tracor/Mas, Inc., P.O. Box 13107, Port Everglades, Fla. 33316
Vancouver Shipyards Co., Ltd., 50 Pemberton Ave., North Vancouver, B. C., Canada

SHIP MODEL BASIN
Hydronautics, Incorporated, Laurel, Maryland 20810

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

SHIP STABILIZERS
Jered Industries, Inc., 1300 S. Coolidge Rd., Birmingham, Mich. 48008
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—Vessel Chartering, Lighterage, Salvage, etc.
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, West End Ave., Oyster Bay, N.Y. 11771
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
Puerto Rico Lighterage Co., P.O. Box 1072, San Juan, P.R. 00902
State Boat Corporation, 3701 Kirby Drive, Houston, Texas 77006
Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002
Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y. 11214

VALVES AND FITTINGS—Hydraulic—Safety Flanges
Dover Corp. / Norris Division, P.O. Box 1739, Tulsa, Okla. 74101.
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

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

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

launch day at Sparrows Point

April 28, 1973. Here at our big yard in Maryland, the 70,000 dwt tanker *Chevron Hawaii* is shown a few hours before launch. She's the last of a series of 6 vessels of her class and size that we've built here.

On other ways on either side of her, thousands of tons of fabricated steel await installation on a large container ship, shown under construction on a way in the background.

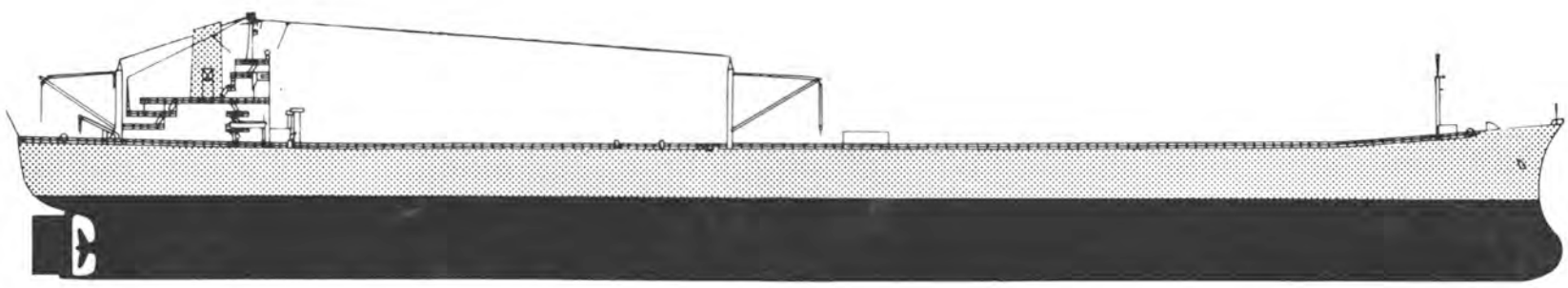
Also in the background, the second, and the stern section of the third of four 120,000 dwt tankers on order here are under construction in our new 1,200 x 200 ft building basin, the largest in the United States. To follow these big tankers are five that will be more than double their size: 265,000 dwt, the largest ships ever built in this country. These nine tankers will keep the basin busy well into 1976. They are based on the ninth and tenth cost-saving "standard designs" developed since World War II by Bethlehem's Central Technical Division (CTD), which is headquartered here.

BETHLEHEM STEEL

SHIPBUILDING • SHIP REPAIR
OFFSHORE CONSTRUCTION
MARINE SERVICES

The VLCC Olympic Bond

It isn't just the largest ship we've ever made. It's probably the largest ship you'll ever want to buy.



The Olympic Bond is a 260,000 DWT Oil Tanker. And while there are larger ones, we can give you a very good reason for buying this "smaller" one.

The maximum draft of the Olympic Bond is just 21 meters. So it can pass through shallow waters like the Malacca Straits and the Euro-Port. Larger tankers can't.

Even so, if you need an even larger tanker than the Olympic Bond, Hitachi Zosen can build it for you. Same place we built the Olympic Bond, Sakai Shipyard.

Sakai Shipyard is in Osaka, on an 822,000 square meter plot of land. Sakai was designed to manufacture large-scale vessels. So it can turn out six VLCCs every year.

The main dock at Sakai is equipped with two 200-ton cranes for constructing 300,000 DWT ships.

And the repair dock can handle 400,000 DWT ships.

At Sakai, we use the "Three Partition Building System." This results in complete rationalization of manufacture and true efficiency.

HITACHI ZOSEN

HITACHI SHIPBUILDING & ENGINEERING CO., LTD.

Head Office: Nishi-ku, Osaka, Japan Telex: J63376 Cable Address: SHIPYARD OSAKA
Tokyo Office: Chiyoda-ku, Tokyo, Japan Telex: J24490 Cable Address: SHIPYARD TOKYO
Overseas Offices: London, New York, Düsseldorf, Hong Kong, Oslo, Singapore, Greece