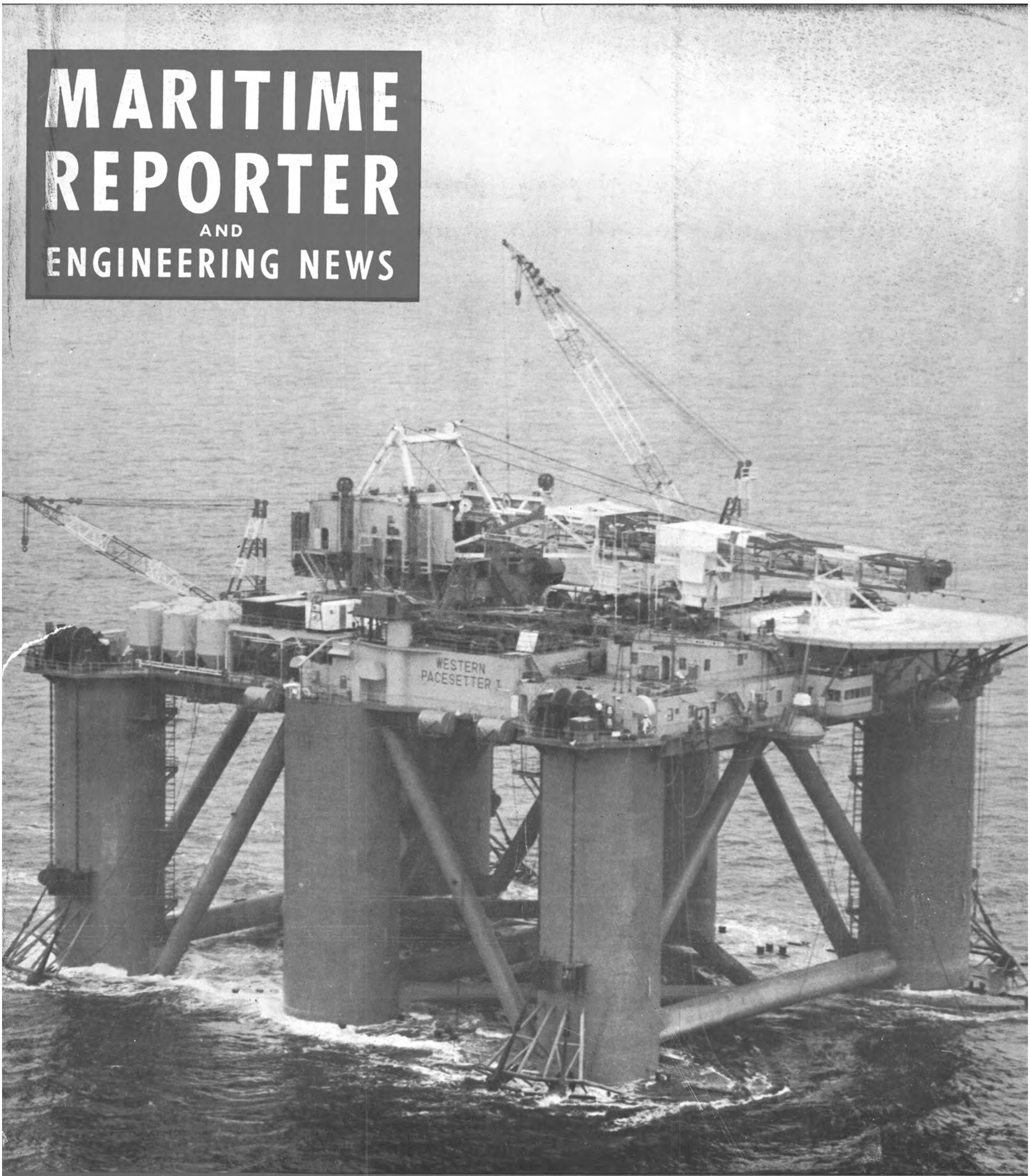
MARITIME REPORTER
AND
ENGINEERING NEWS



Pacesetter I Built By Bethlehem Beaumont —First Of A New Series Of Self-Propelled Semisubmersibles By Friede & Goldman, Inc.

(SEE PAGE 9)

SNAME Annual Program

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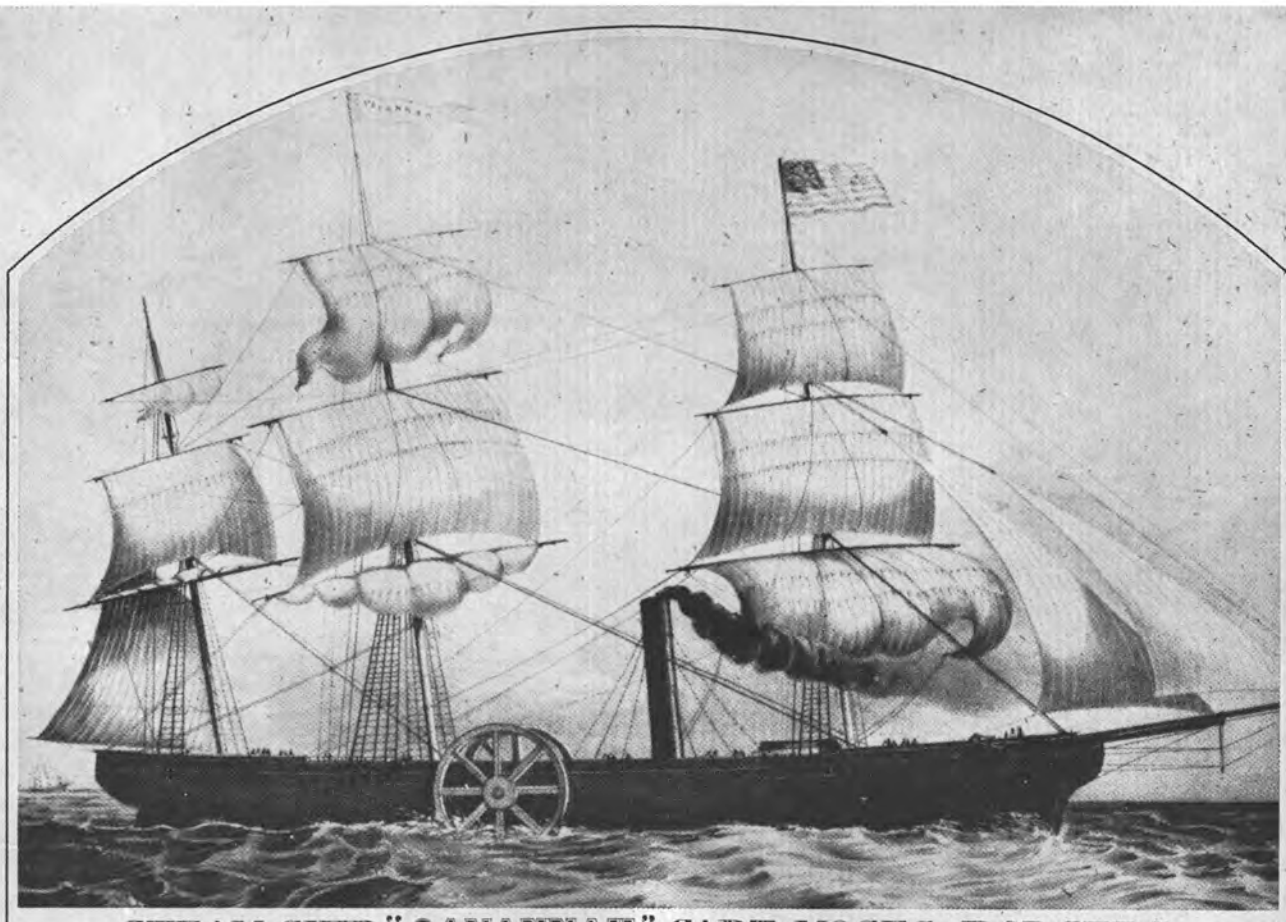
NOVEMBER 1, 1973



STEAM SHIP "SAVANNAH" CAPT. MOSES RODGERS.

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

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Michigan Alumni Dinner To Be Held Nov. 15 In N.Y.C.

The Annual Dinner of the Naval Architecture and Marine Engineering Alumni of the University of Michigan will be held in New York City on Thursday, November 15, 1973 at the American Room, International Building, 630 Fifth Avenue, between 51st and 52nd Streets.

The reception will start at 6 p.m. A highly interesting and entertaining program has been arranged. It is noted that this dinner will take place during the annual meeting of The Society of Naval Architects and Marine Engineers on the night before this Society's annual banquet.

Those interested in obtaining tickets for the dinner should contact **Lester Rosenblatt,** M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013. All Michigan alumni, family and friends are welcome.

Equitable Receives $2.7-Million Contract For LASH Barges

Equitable Equipment Company, Inc. began construction August 3, 1973, on a new $2.7-million LASH barge contract for Pacific Far East Line, Inc. The barges are being built at Equitable's Madisonville, La., shipyards. The company recently invested several million dollars in new equipment and shipbuilding facilities at the Madisonville and New Orleans shipyards to handle new construction of LASH and SEABEE barges and other types of vessels for the marine and offshore industries.

Equitable Equipment Company is the world's largest builder of LASH and SEABEE barges, with contracts in excess of $50 million.

Bank Holding Company Creates Subsidiary For Lease-Financing

A marine industry department to provide lease-financing for shipping projects has been established by Charter New York Leasing Corp., a subsidiary of Charter New York Corp., a bank holding company.

The new department, according to **Robert J. Cullen,** executive vice president and general manager of the subsidiary organization, will offer lease-financing assistance to marine projects generally, with particular stress on activities in coastal and inland waterway shipping. Charter New York Leasing is located at One Wall Street, New York, N.Y.

MARITIME REPORTER AND ENGINEERING NEWS

No. 21 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.

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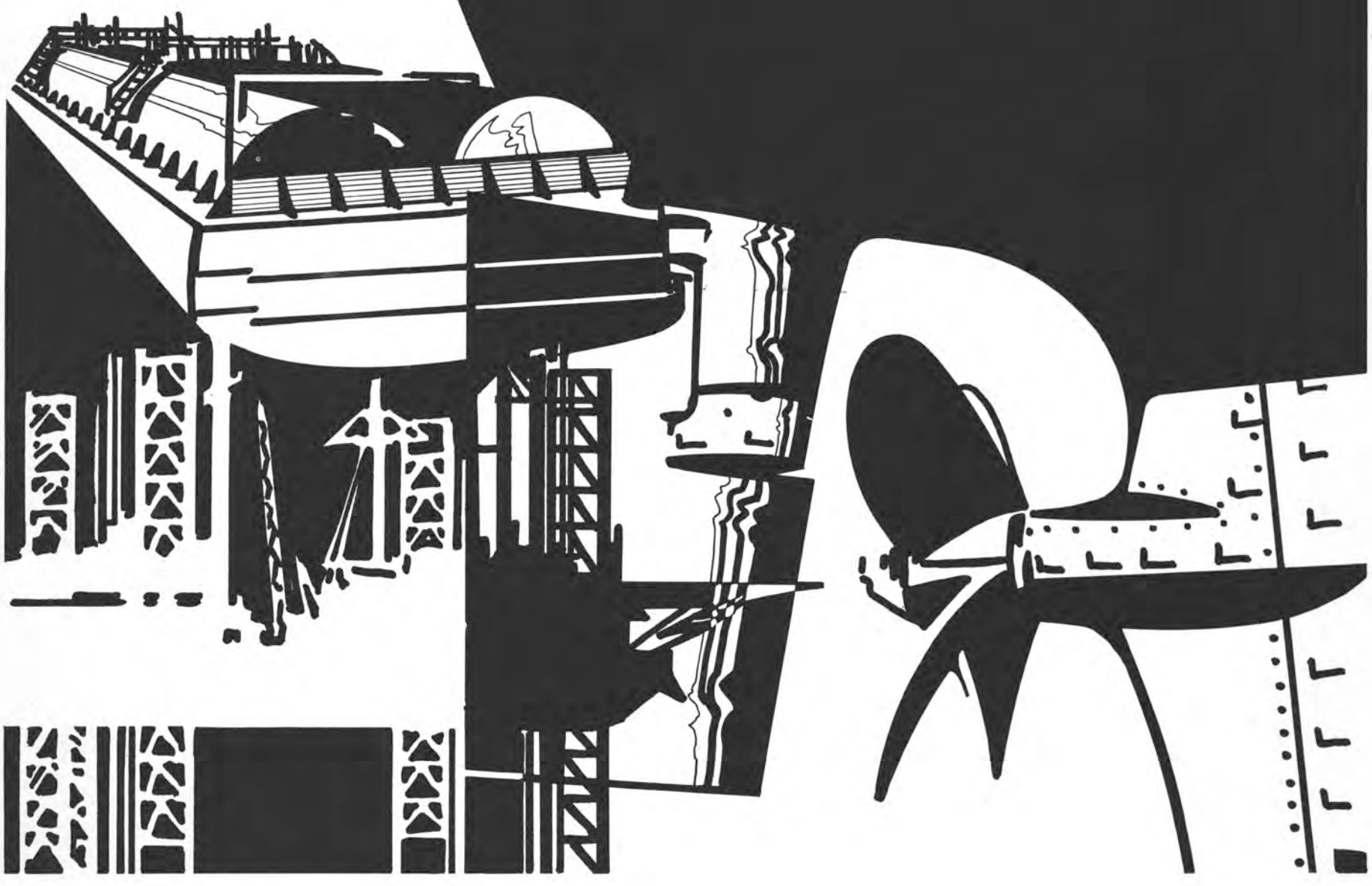

FROM MANGONE TO OSLO: The Tender Tarpon (shown above), a 185-foot offshore vessel constructed by Mangone Shipbuilding Company, Houston, Texas, was recently delivered to Wilhelmsen Offshore Services of Oslo, Norway. Now at work in the North Sea, the vessel is the fourth ship delivered in Wilhelmsen by Mangone. **Don Godeau,** vice president and general manager of Mangone Shipbuilding Company, said that two additional ships for Wilhelmsen are scheduled for 1974 delivery. The Tender Tarpon is a sister ship to the Tender Trout, the Tender Tuna, and the Tender Turbot. The vessel is powered by two turbocharged GM-EDM 16-645-E5 engines developing 2,800 hp each. Mangone is the first shipbuilding company in the United States to build offshore vessels for Norwegian firms.

Combustion Engineering Consolidates Operations; Names Four Vice Presidents

Combustion Engineering, Inc., has announced a consolidation of its operating structure from six divisions into four major groups and the appointment of a group vice president to head each unit.

The group vice presidents named were **James B. Kelly,** industrial products group; **William P. Orr,** engineering group; **John H. Slack,** process equipment group, and **Howard M. Winterson,** power systems group.

Combustion Engineering has been evaluating its rapid expansion and studying strategies for continued profitable growth, according to **Arthur J. Santry Jr.,** president. "This realignment is a basic step that will help us to sustain our progress and take advantage of opportunities that we see ahead of us in key primary markets —nuclear and fossil-fueled steam generation systems, oil and gas production process equipment, petroleum and petrochemical process plant design, and related energy systems and services. C-E's new group structure will retain the flexibility in our management process while we continue to grow," Mr. **Santry** said.

Mr. **Kelly,** vice president, industrial products group, is responsible for C-E's Refractories, Minerals, Glass, Building Products, Tyler, and Tec units.

Mr. **Orr,** vice president, engineering group, is in charge of C-E Lummus and C-E Crest.

Mr. **Slack,** vice president, process equipment group will head C-E Tulco, C-E Air Preheater, C-E Bauer, and two other companies.

Mr. **Winterson,** vice president, power systems group, is responsible for C-E Combustion Division, C-E Industrial Boiler Operations, C-E Canada, and two other units.

McIlwain Named VP Fruehauf Corporation Maritime Operations

Arnold P. McIlwain

Arnold P. McIlwain has been elected a corporate vice president in charge of maritime operations by the board of directors of Fruehauf Corporation. The announcement was made by **William E. Grace,** chairman of the board and chief executive officer.

In his new position, Mr. **McIlwain** is responsible for Fruehauf's Maryland Shipbuilding & Drydock Company; Jacksonville Shipyards, Inc.; Bellinger Shipyards, and the Paceco Division. He will continue to serve as president of the Maryland, Jacksonville and Bellinger facilities.

He is a member of the board of directors of Maryland Shipbuilding & Drydock Company, and Jacksonville Shipyards, Inc.; a member of the board of governors of the National Maritime Council, and holds membership in The Propeller Club and The Society of Naval Architects and Marine Engineers.

Kockums Yard Backlog Largest In World— More VLCCs Ordered

Kockums Shipyard, Malmo, Sweden, the eighth largest shipyard in the world, has announced orders for three more 355,000-dwt oil tankers to bring its total tonnage on order to 6,600,000 deadweight tons. Kockums believes that this is the biggest backlog of orders in the world.

Two of the newly ordered ships will go to Halfdan Ditlev-Simonsen and Company of Oslo, Norway, and one to the Salen Shipping Companies of Sweden.

Kockums' order book now lists five 255,000-dwt and fifteen 355,000-dwt VLCCs (very large crude carriers), with deliveries scheduled into 1978.

The first in the new 355,000-dwt ship series is set for completion in November 1974, while the last of the twenty 255,000-dwt supertankers will be delivered in August of the same year.

To shorten contract delivery time and to insure ship quality, all of the 355,000-dwt VLCCs will be built to formula—1,188 feet long, 197 feet wide, 93 feet deep, and 73 feet maximum draft.

Kockums, which receives no Government subsidies, has one of the highest productivity rates in the world. In 1972 alone, the Swedish yard delivered and launched six supertankers.

GATX Subsidiary Orders 770-Foot Self-Unloader From Bay Shipbuilding

American Steamship Company, a subsidiary of General American Transportation Corp. (GATX), has awarded a contract for construction of a new Great Lakes carrier to the Bay Shipbuilding Corp.

T.M. Thompson, GATX board chairman, announced the award. The amount of the contract was not disclosed.

The new addition to American Steamship's fleet will be a 770-foot self-unloader with a 92-foot beam and a 52-foot depth, Mr. **Thompson** said. He said the vessel will have a deadweight capacity of 42,000 net tons of coal or 35,000 long tons of iron ore pellets.

Bay Shipbuilding, located in Sturgeon Bay, Wis., is scheduled to deliver the new bulk carrier in April 1976. Bay Shipbuilding is a subsidiary of Manitowac Company, Inc.

American Steamship presently owns or operates a fleet of 20 self-unloading bulk carriers and has two other self-unloaders under construction or on order. The company recently accepted delivery of the 680-foot carrier Charles E. Wilson, which was also built by Bay Shipbuilding.

Bethlehem Beaumont Delivers

The Pacesetter I

First Of A New Series Designed For Western Company Of North America By Friede & Goldman, Inc., New Orleans, The Self-Propelled Rig Is Capable Of Speeds Of Eight To Ten Knots And Drilling To 25,000 Feet In Water Depths Exceeding 600 Feet.

Leaving Port Arthur on August 31, the Pacesetter I made the Atlantic crossing from the Gulf of Mexico to the North Sea in a record-breaking 24 days and 8 hours.

The end of August 1973 saw the completion of the first of a new family of semisubmersible drilling vessels, the Pacesetter I. Owned by the Western Oceanics Division of the Western Company of North America, and built by the Bethlehem Beaumont Shipyard, the new unit was designed by the naval architectural firm of Friede & Goldman, Inc. of New Orleans, La. Western has two sister units under construction—the Pacesetter II, also with Bethlehem; and the Pacesetter III building at Avondale Shipyards, Inc. Meanwhile, the Pacesetter I has begun drilling work in the North Sea.

While the Western Company of North America is well-known as a service company in the oil drilling industry, its entry into offshore contract drilling occurred not too many years ago with the acquisition of several medium-sized jack-up rigs. The building of three giant semisubmersibles at one jump moves Western into the big leagues of offshore drilling, and such a move was only made after a painstaking study of future offshore drilling potential demand. Having decided to order a number of "semis," Western consulted with the Friede & Goldman, Inc. New Orleans firm of naval architects for a suitable design. As part of its in-house research and development efforts, Friede & Goldman, Inc. had expended several years of effort in designing and model testing a highly advanced new type of semisubmersible. With the pioneering design experience extending back over more than 100 offshore drilling units, including a score or more of semis, Friede & Goldman's new design incorporated promise of an extremely high standard of performance that appealed to Western. With some design adjustments to suit Western, a contract was speedily negotiated with Bethlehem, and construction of the Pacesetter I began.

Radar scanners flank the bridge console in the pilothouse. Course keeping is maintained through a rate control gyro and gyropilot, and steering is by fine differential RPM control. No rudders are fitted to the rig as the control of the speed and direction of rotation of the propellers provide excellent control under power.

The Pacesetter I, while being a massive craft, lays no claim to being the most gigantic drilling vessel yet built. It is big enough to work in the most severe oceans, have excellent motion characteristics, carry a big load of supplies, and yet be as compact as possible for both economy of construction and ease of future maintenance. Minimum drag due to wind and wave forces was also a prime consideration, to minimize forces upon its sturdy anchoring system. High speed for moving across oceans and between drilling locations was an important design target which was fully demonstrated on its first trans-Atlantic crossing. Great structural strength with a minimum amount of steel is evident upon examining the carefully designed structure, using the experience of the designers combined with advanced structural design computer programs.

The Pacesetter design is of the two-hull catamaran configuration, the elevated main deck being supported by six cylindrical stability caissons. The lower hulls are subdivided into compartments for fuel oil, drilling water, potable water and salt water ballast tanks. The six stabilizing caissons are subdivided horizontally, forming watertight compartments for additional stability against damage when the unit is drilling in the floating position. Each hull contains a pump room with provision for cross-connected ballasting. The elevated decks house drilling machinery, pipe racks, mud tanks, storage facilities, crews quarters and heliport. The drilling substructure is positioned near the center of the unit for maximum stability, minimum motion while drilling. Anchor chain lockers are located in each of the corner caissons.

The basic design of the Pacesetter I provided an offshore unit that could drill anywhere in the world, transport itself to the drilling site in the fastest possible time and carry out drilling operations with minimum motion. Extensive model testing confirmed the Pacesetter I's performance characteristics and revealed that the ship-like configuration of the lower hulls proved superior, particularly in the dampening effect when subjected to surge motions and in enabling the unit

(Continued on page 11)

Moran Tug/Barge Operations help meet critical transportation needs

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

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Bethlehem Beaumont Delivers The Pacesetter I –

(Continued from page 9)

with its 6,000-shp propulsion plant to travel independently at speeds well over eight knots.

In each hull, four DC motors drive a 10-foot-diameter propeller in a Kort nozzle through a reduction gear and normal marine shaft installation, with 3,000 shp per side, 6,000 shp total. The Kort nozzles provide increased thrust and speed, reduce propeller racing in heavy seas and provide better maneuverability at the drilling location.

The designers took a unique step in deciding not to fit rudders, but instead to steer and maneuver with the two wide-spaced propellers. Course keeping is maintained through a rate control gyro and gyropilot, and steering is accomplished by fine differential rpm control. Sea trials confirmed superb steering and handling qualities without the expense of fitting rudders and steering gears, nor their subsequent maintenance over the years.

Structure. The unit meets all requirements of the American Bureau of Shipping and is classed as an A-1 M Column stabilized barge with an unrestricted load line. Safety equipment has unrestricted certification from the U.S. Coast Guard and the Norwegian Maritime Directorate.

The structure utilizes ABS grades of ship steel with bracings, girders and vital connections of low alloy high-strength steel. EH grade steel (low temperature, notch tough) is used at all vital joints of bracings, deck girders and caisson connections. A total of 6,000 long tons of steel was used in the construction of Pacesetter I.

Substructure. A Lee C. Moore unit, 33 feet high, 40-foot by 39-foot 3-inch base, and 40-foot by 51-foot 6-inch rig floor. The spider deck is 65 feet 9 inches by 40 feet, allowing for the operation of double B.O.P. stacks, 30 feet high and weighing 85 tons each. The operation is conducted by two Lee C. Moore track-mounted 80-ton bridge cranes provided with two B.O.P. dollies powered by electric motors.

Mooring System. The Pacesetter I has eight anchor lines, each consisting of 3,000 feet of 3-inch chain connected to a 30,000-pound Baldt anchor with pendant lines and mooring buoys. The unit has four National D 503E double wildcat windlasses with fairleaders located on each corner caisson with a tubular pipe structure for housing each anchor.

Tension Equipment. Four Rucker 60,000-pound riser tensioners and four Rucker guide line tensioners.

Cranes. Two National cranes, one with 80-foot boom and 86-ton capacity and one with 120-foot boom with 60-ton capacity, plus one Manitowac crane with 110-foot boom and 38-ton capacity.

Variable Load. The Pacesetter I carries 2,000 long tons of variable load topside, giving a clearance above the still water line of 51 feet under normal drilling conditions. The clearance is easily increased in the event of storm conditions.

Storage Onboard. Bulk mud and cement, six 1,500-cubic-foot tanks; sack mud and cement, 6,000 sacks; fuel, 6,882 barrels; drill water, 12,245 barrels; potable water, 1,322 barrels and two watermakers, and liquid mud, 7,600 cubic feet.

In summary, the Western Company of North America's new Pacesetter drilling units will have superior speed, excellent stability, above average maneuverability on location, high-capacity drilling equipment, high deck load capacity, rugged eight-point chain mooring system and ability for unrestricted travel anywhere in the world.

Principal Characteristics

Overall length	260 feet
Beam, overall	200 feet
Height, keel to top of main deck	111 feet
Lower hulls	
Beam	50 feet
Length of hulls	260 feet
Depth of hulls	20 feet
Caissons (6)	
Diameter	32 feet
Elevation of top above keel	111 feet
Quarters accommodations	80
Draft (towing)	17 feet
Draft (normal drilling)	60 feet
Draft (severe storm)	45 feet
Displacement (towing)	10,500 L.T.
Displacement (normal drilling)	19,288 L.T.
Displacement (severe storm)	17,080 L.T.
Variable deck load	2,000 L.T.

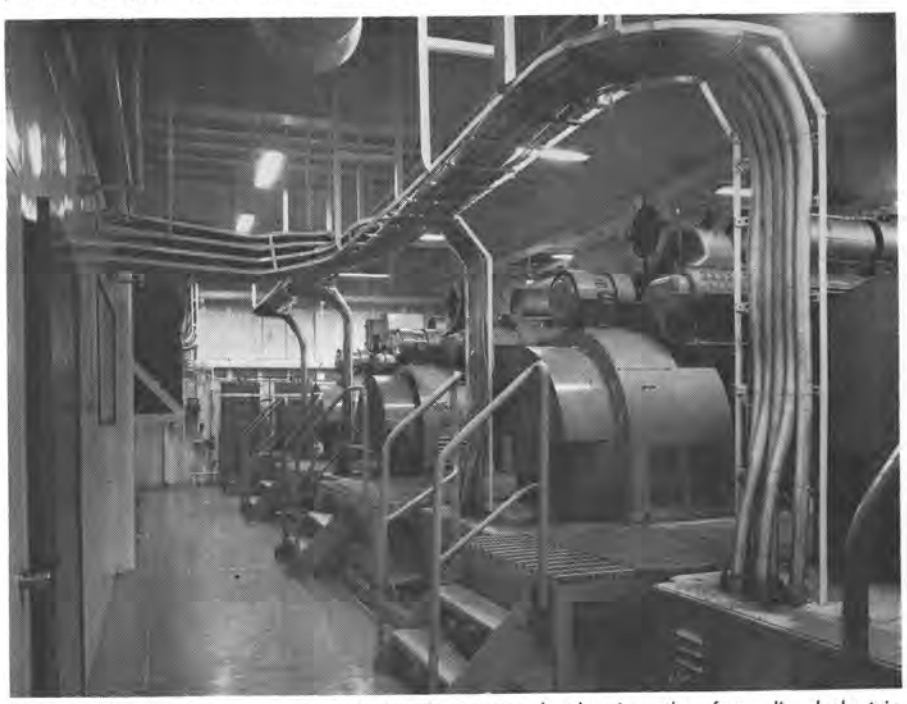
Certification: ABS and U.S. Coast Guard with no restrictions

Drilling Equipment

Drawworks	National 1625-DE powered by two GE 752 motors.
Prime Movers	Four-EMD 16E8-GW6-1400 KW 1950 HP.
Mud Pumps	Two-National 12P-160 powered by two GE 752 motors.
Rotary Table	National C375 37½ powered by GE 752 R Motor.
Derrick	Lee C. Moore, 1,000,000 Lb. static load capacity.

Central control panel of Pacesetter I, located adjacent to pilothouse, employs sophisticated instrumentation to monitor operation of the drilling unit. The console shown controls all pumping of hull tanks, with continuous registering of the amount of fluid in each tank visible on the circular gauges seen at the top of the picture.

View of the mud pump room showing the triplex mud pumps on the right, the centrifugal supercharging pumps in the middle and the mud suction manifold on the left. The mud pits are located beyond the bulkhead seen at the extreme left.



View in the engine room aboard the Pacesetter I, showing the four diesel-electric generating sets that provide power for drilling, propulsion and all other purposes.

A.G. Weser Officials Credit Yard's Success To Series Orders

The secret of success in the highly competitive shipbuilding industry is to set a long-range company policy with broad business opportunities, and then stay with it. This is the policy followed by A.G. Weser of Bremen, West Germany's biggest shipbuilding firm.

In the case of A.G. Weser, the policy is to design new ships that meet the trade needs of many world shipowners and to concentrate on series construction, which permits the yard to operate efficiently and profitably.

Two of A.G. Weser's top officials, Dr. **Heinz Ache** and **Louis A. Vernede,** explained the corporate philosophy on a recent visit to New York. A.G. Weser does not seek single-ship contracts that would merely meet the desire of one operator to have, as an example, the largest vessel in the world. Instead, they reported in an interview with The Journal of Commerce in the office of their New York agent—"Weser" Shipyards Inc.—the company strives for block orders of a vessel type that could become a standard ship for many owners.

In this fashion, said Dr. **Ache** and Mr. **Vernede,** savings in materials, building time, and labor utilization can be realized with an ultimate benefit to both the shipbuilding company and the owners who contract for vessels with A.G. Weser. Such a policy has been in effect at the company for a number of years and the results in profits and activity are encouraging, said Dr. **Ache,** who carries the title of speaker of the board of managing directors, and Mr. **Vernede,** a member of the board in Bremen.

They noted that the company is now completing the final units of the series building of an A.G. Weser-designed 255,000-deadweight-ton tanker, and that yard preparations are under way for the start of construction of its new "Europa" tanker design. The "Europa" is a 380,000-dwt oil carrier, which the A.G. Weser officials said is the standard for virtually all tankers in such sizes now being built.

The 255,000-dwt series involved 13 orders, 10 of which have already been built, with one more slated for launching this month, they said. When the remaining two are completed, the yard in Bremen—one of two yards that are part of the A.G. Weser complex—will swing over fully into production of the new giant 380,000 tonners.

In line with the company concept of efficiency, Mr. **Vernede** stressed that the "Europa" construction program is being geared to fast assembly of large components of the new tanker, with concentration of the yard on this one design into 1977. As part of the "Europa" series, A.G. Weser is expanding the length of the slipway now being used to build the 255,000-dwt vessels to accommodate the much larger new tankers.

The "Europa" design calls for vessels more than 1,200 feet in length, 210 feet in width, and with full cargo load draft of nearly 74 feet.

Coinciding with the construction plans of the tanker, the shipyard intends to use a smaller slipway parallel to the main slip for the assembly of massive components for the "Europa" series. The smaller slip was most recently used for construction of three of the SL-7 containerships of Sea-Land Service, the last of which—the Sea Land Market—was launched in the middle of May.

Since that time, the smaller slip has been prepared for its role of building components for the big tanker that will be assembled alongside. Part of the preparation of the smaller slip is the construction of a 500-ton-lift gantry crane, and the introduction into the Bremen shipyard of multi-wheel ground carriers that will be used to shift the components from one slip to the other, the A.G. Weser officials explained.

Expansion of the existing slipway to handle the much larger tanker series and utilization of the adjacent way to handle component as-

semblies was described as a highly efficient method of building the giant new ships needed in ocean transport, without costly investment in building docks that are used in other yards, particularly in Japan. Mr. **Vernede** said that is the system decided upon by the A.G. Weser board to give the yard flexibility as vessel demands change.

Dr. **Ache** explained that the Bremen yard is committed to the long-range construction of giant tankers that are now in great demand, but that a change of direction to construct other types of vessels in the future could also be done quickly.

Mr. **Vernede**, who pointed to the company's net earnings of $20.5 million in 1972 as an indicator of the success of the shipyard's building policy, said that there is great optimism for the future. "The series construction program is geared to orders of at least 10 vessels," he said, "and the company already has contracts for eight of the new 'Europa' class, and it expects to get two more before the end of 1973."

Typical of the long-range view that A.G. Weser has adopted as company policy, Mr. **Vernede** said that the visit in the United States was part of discussion effort being maintained with world shipowners to determine future vessel needs and trends.

Mooremack Appoints Hodder Eastern Rep For States Steamship

Clinton F. Hodder

Moore-McCormack Lines, Incorporated has announced the appointment of **Clinton F. Hodder** as Eastern representative for States Steamship Company. States Line is headquartered in San Francisco, Calif., and operates a fleet of 13 ships between the Pacific Coast of the United States and Canada, Hawaii and the Far East. Moore-McCormack Lines is the general agent for States Line in the Eastern United States and Canada.

Mr. **Hodder** joined Mooremack upon graduation from William and Mary College, serving first as a purser and later coming ashore to organize and head the marine personnel and labor relations departments. Prior to his assignment in Detroit, Mich., he served as assistant to the executive vice president of traffic-sales.

Mr. **Hodder** will maintain his headquarters at Moore-McCormack Lines, 2 Broadway, New York, N.Y.

International Paper Names Nguyen Director Marine Operations

Huy T. Nguyen has joined International Paper Company as director of marine operations within the Distribution and Transportation Division, it has been announced by **Ted Przedpelski,** director of export and marine services.

Mr. **Nguyen's** responsibilities will include the coordination of International Paper's worldwide marine operations, as well as the development of distribution systems for the company's export products.

Prior to joining IP, Mr. **Nguyen** was vice president and director of Atlantic Europe trade route for Seatrain Lines, Inc. He earlier served as manager of the container and barge division of Prudential-Grace Lines.

Mr. **Nguyen** is a graduate of the State University of New York Maritime College, and also holds an M.B.A. degree from Columbia University. He will make his headquarters in IP's corporate offices, 220 East 42nd Street, New York, N.Y. 10017, and will report directly to Mr. **Przedpelski.**

81st Annual Meeting Of SNAME Schedule

The Expanding Areas Of Ship-Design Technology Will Be Covered In Twelve Outstanding Papers

Twelve technical papers, covering a wide range of subjects, will be presented at the 81st Annual Meeting of the Society of Naval Architects and Marine Engineers on November 15, 16 and 17, 1973 at the New York Hilton Hotel in New York City.

Phillip Eisenberg, the Society's president, will deliver his annual address at the close of the technical sessions on Thursday, November 15th. The president's address will be followed by the business session.

The 12 technical papers to be presented are:

Paper No. 1—"Superconducting Electric Propulsion Systems for Merchant and Naval Ship Concepts" by **Edward F. McCann II** and **C.J. Mole.**
Synopsis—Today's "advanced" electric-propulsion systems are justified as evolutionary application of new components to early system concepts having logged successful at-sea experience. Operational feasibility of cryogenic-zero resistance electric-machinery propulsion systems is discussed in terms of recent developmental success. Potential of superconducting electric transmission is shown to possess classic advantages, without overwhelming disadvantages of conventional electric ship drive.

Paper No. 2—"Economic Comparison of Various Marine Power Plants" by **José Femenia.**
Synopsis—This paper is based on the results of two Maritime Administration sponsored studies. The paper compares the annual operating costs of various fossil-fuel-fired marine power plants. Included in the total operating costs are acquisition and financing costs, fuel-oil costs, maintenance and repair costs, lubricating-oil costs, crew-related expenses, and insurance costs.

Paper No. 3—"Added Resistance in Waves" by **Jorgen Strom-Tejsen, Hugh Y.H. Yeh** and **David D. Moran.**
Synopsis—A method is outlined for predicting added resistance in a seaway. Average added resistance can be determined from the mean response curve and the energy spectrum of the sea. Various methods for computing mean response curves are compared with experiments. Average added resistance in a seaway is computed for one- and two-parameter sea spectra representations and for actual sea spectra.

Paper No. 4—"Prediction of Slamming Characteristics and Hull Responses for Ship Design" by **Michel K. Ochi** and **Lewis E. Motter.**
Synopsis—This paper presents a method to predict the necessary information on ship slamming at an early design stage, using only the ship lines. The prediction includes severity of slamming, ship speed associated with bottom plate damage as well as the speed tolerable for the crew, impact force and hull girder responses, etc. Procedure of the prediction is discussed with a numerical example made on the Mariner-Class ships.

Paper No. 5—"The Role of the Classification Society in Relationship to Design Responsibility" by **Robert T. Young.**
Synopsis—The ship classification society is responsible for verifying that submitted plans adhere to "Rules" based upon service experience and engineering tenets. However, advancements in the maritime industry necessitated methods supplemental to predominant reliance upon experience in design evaluation. By applying techniques developed from investigative programs and advanced engineering principles, the American Bureau of Shipping is able to review a novel design expeditiously and effectively.

Paper No. 6—"The Inclusion of IMCO Tanker Design Constraints in General Optimization Procedures" by **Kenneth W. Fisher.**
Synopsis—The sub-division arrangement of a VLCC is designed by the use of an optimization procedure incorporating the complex IMCO tanker design constraints. A review of previous optimization applications in ship design, together with the sub-division example, leads to the conclusion that a 50-parameter optimization of a total tanker design is achievable.

Paper No. 7—"Maneuvering Safety of Large Tankers: Stopping, Turning, and Speed Selection" by **C. Lincoln Crane Jr.**
Synopsis—Devices and procedures for improving large tanker stopping are examined, keeping in mind real operating circumstances and employing tanker trial data, computer simulations and previous research. Results show the importance of ship approach speed to the decision to "crash astern" or to turn, and indicate the relatively modest potential gains realizable through various propulsion system alternatives, and the general impracticality of special devices for improving stopping performance.

Paper No. 8—"Mathematical Simulation and Model Tests in the Design of Data Buoys" by **Dan Hoffman, Edward S. Geller** and **C.S. Niederman.**
Synopsis—Data buoys collect and report meteorological and oceanographic information. The short-term performance of these small platforms under given environmental conditions is predicted by a frequency domain simulation with its steady-state configuration perturbated by wave forces. This simulation has been validated by model tests. Long-term performance is forecast by statistical techniques. Plans for full-scale tests are presented.

Paper No. 9—"Ship Resistance to Continuous Motion in Ice" by **V.R. Milano.**
Synopsis—This paper analyzes the mechanism involved in moving continuously through sea ice with a ship form, and develops a model for computing the associated resistance to motion. The model is shown to be sensitive to principal ship and ice parameters, and correlation with full scale ship data is good. A computer program is developed to facilitate use of the model for parametric analysis and use as a predictive design tool.

Paper No. 10—"Investigation on Free and Forced Vibrations of an LNG Tanker with Overlapping Propeller Arrangement" by **K. Restad, G.C. Volcy, H. Garnier** and **J.C. Masson.**
Synopsis—The research for economy in transportation is leading to introduction of power plants having increased propulsive efficiency. The overlapping propeller arrangement is very promising but presents unknown factors concerning vibratory behavior. The integral analysis of the response in free and forced vibrations to hydrodynamic excitations determined experimentally for such an arrangement shows that the vibratory behavior obtained is acceptable for the vessel.

Paper No. 11—"On Damaged Stability of Drilling Vessels" by **Ralph G. McTaggart** and **Richard H. Gunderson.**
Synopsis—This paper discusses the effect of the vertical center of gravity on damaged stability of drilling units. The use of KB equal to KG can be disastrous, and a self-elevating drilling unit is used to demonstrate the need for accurate evaluation and use of the vertical center of gravity in stability calculations.

Paper No. 12—"Interpretations of the Esso Norway Static Tests" by **Henry A. Schade.**
Synopsis—Planning this experimental test program was aimed largely toward examining transverse strength, particularly the response of large internal plate areas to optimum static loadings. Some interpretations of the large mass of data (about 28,000 strain reading plus deflection measurements) are given, bearing on thermal effects, shear deflections, buckling, grillage load distributions, bracket performance, strut response, and similar items, which may be useful in future designs of this kind.

The Annual Banquet will be held on Friday evening in the Grand Ballroom of The New York Hilton Hotel with Mr. **Eisenberg** presiding. Attendance at the Banquet is limited to members of the Society and non-member guests sponsored by a member of the Society.

A ladies' buncheon and a program "How To Be Somebody Else" given by **Eleanor Phelps,** noted character actress of stage and television, will be held in The Warwick Room of The Warwick.

A technical field trip, through the courtesy of Sea-Land Service, Inc., is scheduled for Saturday afternoon at 1:00 p.m. A tour to the new Sea-Land Terminal at Port Elizabeth will include an opportunity to observe terminal operations, new hi-speed container cranes, computerized stowage arrangements and, subject to availability, a chance to board one of Sea-Land's new SL-7 super containerships.

The Society's Annual Dinner Dance, in the hotel's Grand Ballroom, on Saturday evening will conclude the 1973 Annual Meeting.

Artist's conception of tug/supply vessels being built by Todd for Allseas of Panama, Inc. The craft will be 228 feet overall.

All the craftsmanship it takes for the stormy North Sea.

Six new tug/supply vessels (and possibly six more, which are under option by Allseas) will shortly make the scene in the North Sea in support of worldwide offshore drilling and oil exploration.

They represent a breakthrough for Todd's Seattle Division in successfully competing for contracts to build these 8,000-hp craft which have traditionally been built on the Gulf Coast and abroad.

Todd Seattle—with its enclosed steel fabricating and assembly capabilities, its extensive use of n/c techniques, and its new side-launch facilities—is ideally suited to build these vessels.

Todd's innovative approach to building gets results. Big results for you: faster delivery—important savings in time and money.

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Ocean Drilling And Two Australian Firms In Rig Partnership

Ocean Drilling & Exploration Company has announced that it has entered into a joint venture agreement with two Australian interests, who will share ownership in one ODECO rig currently working in Australian waters and another presently under construction in Australia.

The two firms participating with ODECO in the joint venture are Ampol Petroleum Ltd. (Ampol), and Australian Industry Development Corporation (AIDC). Ampol is the leading Australian-owned integrated oil company, and AIDC was established by the Australian Government to foster development of Australian industry.

Under terms of the agreement, the two Australian companies together will contribute approximately $21 million, with each acquiring a 25 percent interest in the two drilling rigs. The rigs are the semisubmersible Ocean Digger, presently working off Western Australia, and the self-propelled semisubmersible Ocean Endeavour, which is presently under construction in Western Australia.

Ocean Drilling & Exploration Company's newest drilling rig, the Ocean Kokuei, has completed a 15,000-mile propulsion-assisted tow from Japan to the North Sea, where it has begun a drilling program for Burmah Oil (North Sea) Ltd.

The big new self-propelled semisubmersible unit has spudded its first well in Block 3/3 of the United Kingdom Sector of the North Sea, according to **James L. Kilpatrick,** ODECO senior vice president of drilling.

In completing the journey to its new location, the Ocean Kokuei covered the distance in 90 days, much of it under its own power, Mr. **Kilpatrick** said.

The addition of the new vessel to ODECO's North Sea drill fleet makes a total of seven rigs working there, the largest number of any offshore drilling contractor.

The Ocean Kokuei is 320 feet by 266 feet, has a rated water depth of 600 feet afloat and drilling depth of 25,000 feet, with 7,000 diesel-electric horsepower and modern quarters for 81 personnel.

It joins another recently completed rig of its class in the North Sea, the Ocean Rover, which was built in New Orleans, La., and went to work for Phillips Petroleum Co. at the end of the summer.

The Ocean Kokuei was built by Mitsubishi Heavy Industries, Ltd. at Hiroshima, Japan.

Armco Catalog Offers New Data On Cryogenic Steels

Armco Steel Corporation has just published a comprehensive 20-page engineering catalog comparing nickel steels, aluminum, and stainless steels for cryogenic containment. Extensive data is given for Armco 9% nickel steel and for CRYONIC 5 (5% nickel steel) developed for use in cryogenic applications. The catalog also provides material properties, notch and fracture toughness, fatigue, welding and availability.

Armco-developed CRYONIC 5 provides basically the same strength and notch toughness as higher alloyed 8% or 9% nickel steels, but costs approximately 20 percent less. It is designed for transporting, storing and processing liquefied gases such as ethane, ethylene, methane (LNG) and oxygen.

For a copy of the catalog, titled "Cryogenic Steels for Exceptional Performance," write to Armco Steel Corporation, P.O. Box 723, Houston, Texas 77001.

Atlantic Richfield Names Kollar Manager Marine Engineering

Atlantic Richfield Company, 260 South Broad Street, Philadelphia, Pa. 19101, has announced the appointment of **Walter L. Kollar** as manager, marine engineering and repair, with headquarters at Fort Mifflin, Pa. He formerly was supervisor of marine inspection at the Fort Mifflin Marine Terminal.

A native of Brooklyn, N.Y., Mr. **Kollar** joined the Sinclair Oil Corporation (now Atlantic Richfield) in 1946 as an engineer.

Bertram Yacht Names Werner Kuhnke VP

Werner Kuhnke

Paul Schaffer, president of Bertram Yacht Division of Whittaker Corporation, Miami, Fla., has announced the promotion of **Werner Kuhnke,** formerly production manager, to the new position of vice president of manufacturing.

Mr. **Schaffer** noted that Bertram production has more than quadrupled since Mr. **Kuhnke** became production manager in 1966 and that this increase in volume has not altered the company's commitment or ability to build the highest quality production yacht in America. He credited this tradition of quality to the skills of Bertram personnel, including Mr. **Kuhnke**, whose background in ship and pleasure craft manufacturing started in Germany and in Switzerland, after which he moved to the United States in 1956 to establish a boatbuilding plant for another manufacturer.

Working out of Bertram Yacht's headquarters and major production facilities in Miami, Mr. **Kuhnke** in his new capacity will be responsible for the manufacturing operations on the line of quality fiberglass yachts ranging in size from 25 feet to 58 feet.

Sabourn And Matson Named To New Posts By Amercoat Europa

John Wise, managing director of Amercoat Europa, The Hague, the Netherlands, has announced two major sales appointments to increase the company's ability to serve European, North African and Middle Eastern customers with its extensive line of corrosion control products, including inorganic zinc topcoats and primers, PVC sheetings and fiberglass-reinforced plastic pipe.

Robert Sabourn has been appointed to the position of sales manager, Europe. The European sales office headquarters is located at Croydon, England. Mr. **Sabourn** was formerly Amercoat's district manager for the United Kingdom.

Leonard C. Matson has been appointed to the position of sales manager, Middle East. Middle East sales headquarters will be located in Dubai, an United Arab Emirate on the Persian Gulf. Mr. **Matson** was formerly Western regional sales manager for Bondstrand® (FRP) pipe.

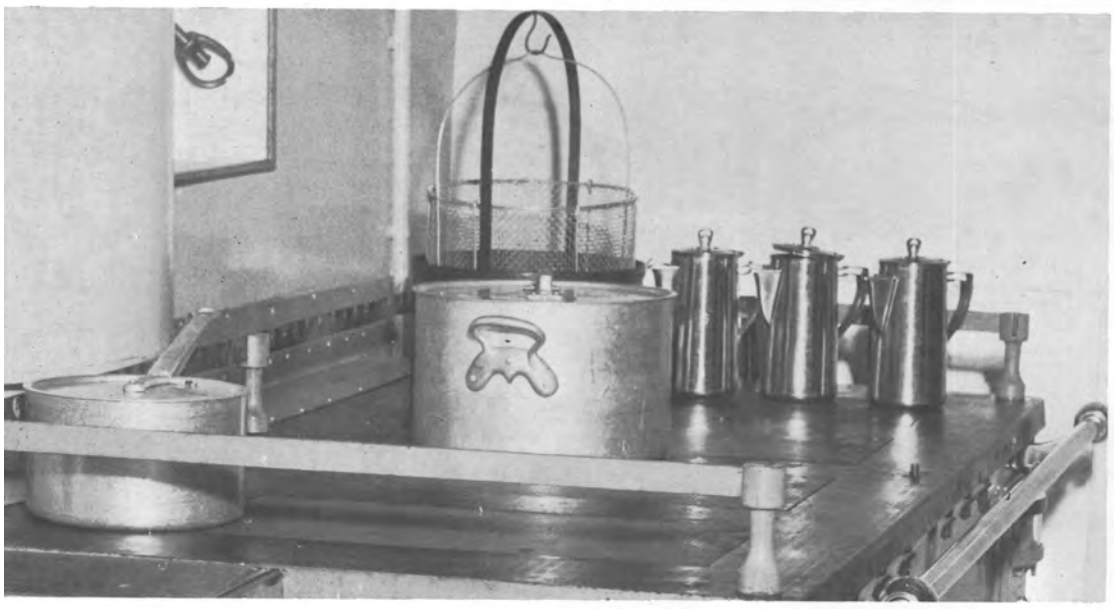
Amercoat Europa is a wholly owned Ameron subsidiary, which reports to the company's Corrosion Control Division, Brea, Calif. The products manufactured by or marketed through Amercoat Europa were developed by the company's Corrosion Control Division and include such well-known trade names as Amercoat® and Dimetcote® primers and coatings; Nukem® and Nu-Klad grouts, cements and surfacings; T-Lock® and Nob-Lock® PVC sheetings, and Bondstrand® FRP pipe and filament-wound fittings.

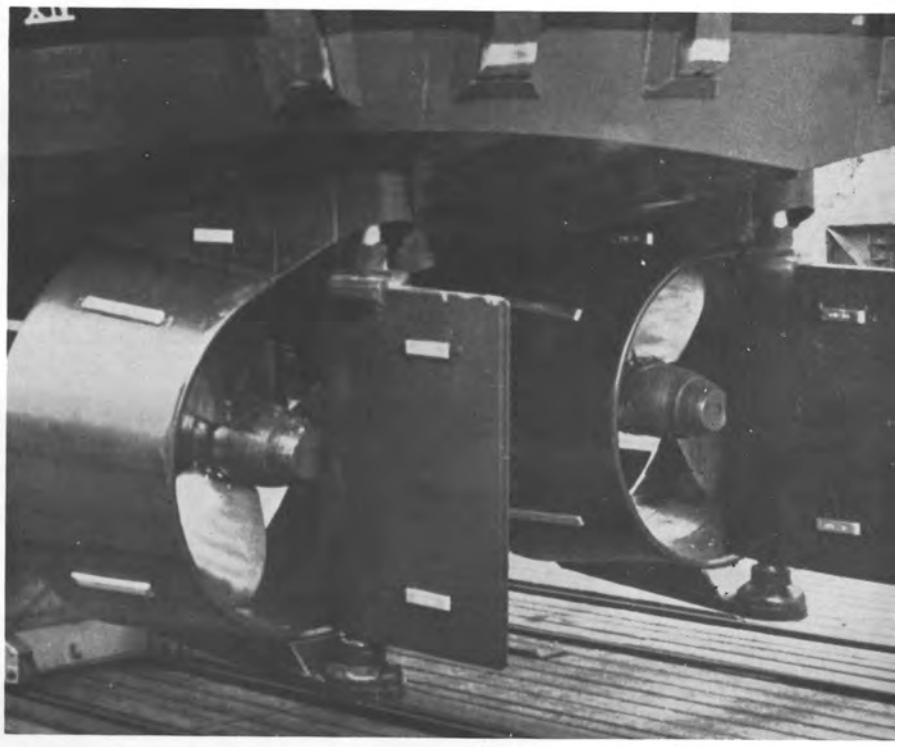
Exxon And Sun Oil Apply For Subsidy To Build 5 Tankers

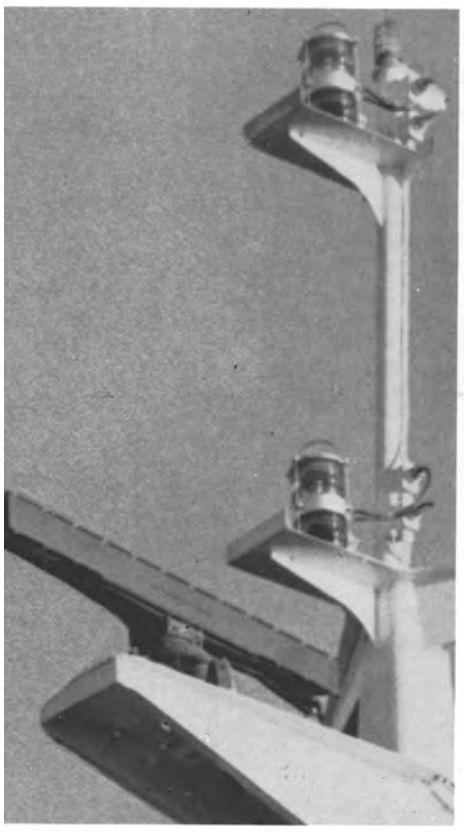
Construction subsidy applications have been submitted to the Maritime Administration, Washington, D.C., for the construction of five more tankers.

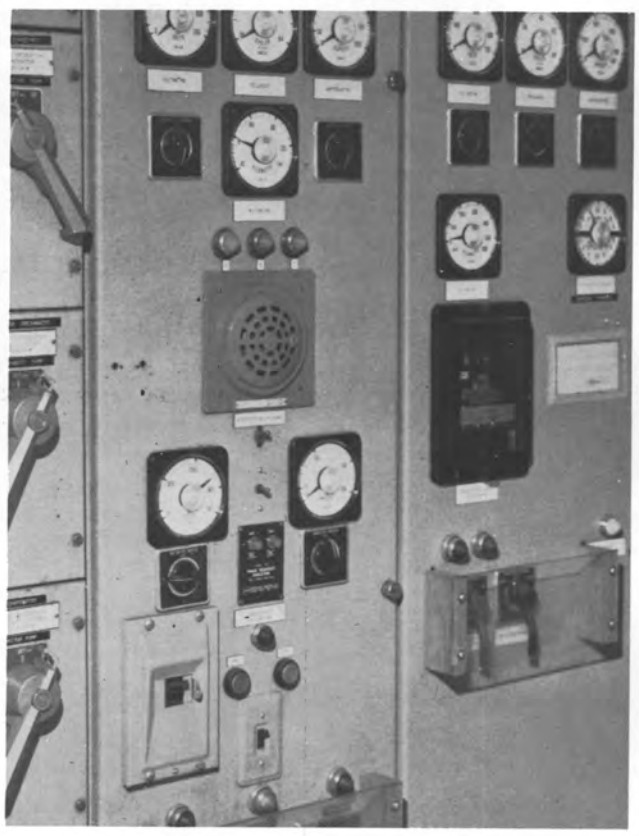
Two are 129,000-deadweight-ton tankships to be built for Northern Sun Shipping Co., Inc., and Maryland Sun Shipping Co. Inc., subsidiaries of the Sun Oil Co. They are estimated to cost $37 million each and when delivered would haul oil chiefly from North and West Africa and the Persian Gulf to U.S. Atlantic Coast ports north of Cape Hatteras.

Meanwhile, Exxon Corp. also filed applications for both construction and operating subsidy for three tankers of 37,000 dwt. They would be used to haul petroleum from Caribbean producing areas to the United States.









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.

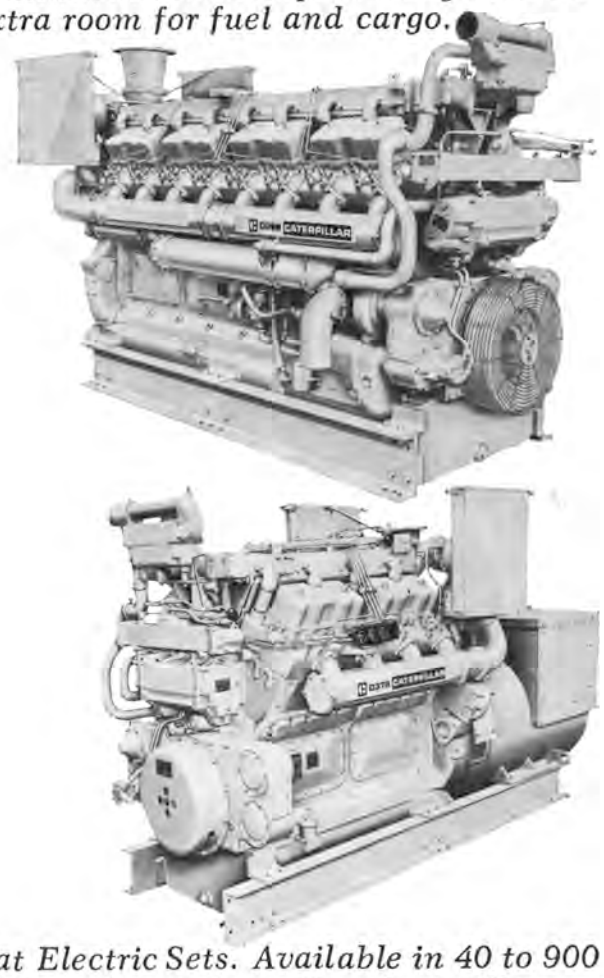
Cat Diesel Engines and Electric Sets offer a wide range of reliable auxiliary power. Power that's proven itself in years of use, in a variety of assignments. With durability built in, part by part.

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

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FIRST FOR THE NEW YEAR: The first meeting of the 1973-74 year of the San Diego Section of The Society of Naval Architects and Marine Engineers was held at the Hilton Inn in Mission Valley on September 19, 1973. Following the social hour and enjoyable dinner, **R.J. Ziobro,** manager of marine engineering at Aqua-Chem, Inc., Water Technologies Division, Milwaukee, Wis., gave a very interesting talk on shipboard distilling plants. Current shipboard distilling plants can be broadly classified as being of the flash-type and nonflash-type, and variations within these classifications were defined. Advantages and disadvantages of each type were discussed and were related to interfacing with steam, gas and propulsion systems. Shown above at the Hilton Inn meeting are, left to right: **R.E. Nichols,** papers chairman, San Diego Section; **Joe Busch,** chairman, Northern California Section; **Mel Good,** chairman, San Diego Section; Mr. **Ziobro,** speaker; **R.P. Nolan Jr.,** secretary-treasurer, San Diego Section, and **David Krepchin,** vice chairman, San Diego Section.

Waukesha T400 Turbine Powers Hovercraft

Waukesha T400 Turbine-Powered Hovercraft.

The production model of the Waukesha Motor Company's T400 Turbine has been incorporated into a unique and futuristic marine application.

The particular application is the installation of twin T400 turbines in a large commercial hovercraft being constructed in England by Enfield Marine.

The 40-foot by 20-foot power craft is designed to carry a 3½-ton payload at 45 knots, and will be used between ports in England and France. Use of the freight hovercraft will enable cargo to be loaded directly from the warehouse, moved to and over the water, and delivered to the other port for unloading. This concept eliminates the need for docks, as well as the use of multi-carrier transportation.

The twin Waukesha T400s used in the vessel are the marine versions of the rugged standard industrial power plants that have found wide application in the petroleum and power generating fields.

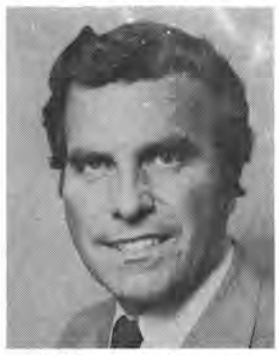
The T400 engine provides broad application capability through the use of a unique fixed/free shaft arrangement. This provides the excellent response of a fixed shaft turbine for power generation, yet provides the necessary high torque characteristics of a free shaft turbine for variable speed applications.

An over running clutch provides both the variable speed characteristics of a two-shaft turbine and the constant speed advantages of a single-shaft configuration, required for power generation.

In addition, the T400 low exhaust emission levels easily meet the proposed EPA 1975 standards.

The T400 is rated at 400 hp continuous with a maximum rating of 485 hp with multi-fuel capabilities.

Michael J.L. Stracey Named VP-Finance For Sea Containers



Michael J.L. Stracey

Michael J.L. Stracey has been appointed vice president-finance of Sea Containers Inc., international company in the leasing field for containers, containerships and container cranes, it was announced by **James B. Sherwood,** president.

Mr. **Stracey,** who is British and a chartered accountant, comes to Sea Containers from the British-based international Foseco Minsep Group, where he was managing director of its steelworks services contracts division.

Mr. **Stracey** was with Foseco Minsep for four years, and before that spent seven with the General Electric Company Limited — the largest British electrical group—in financial and commercial positions.

Sea Containers owns a fleet of 21 purpose-built containerships and a total of 46,000 specialized and general containers, operating worldwide, as well as eight container gantry cranes working in European ports.

Goulds Pumps, Inc. Elevates Three In Engineering Dept.

William C. Osborne, vice president-engineering of Goulds Pumps, Inc., Seneca Falls, N.Y., has announced new assignments for three in the firm's industrial pump engineering department.

Paul T. Lahr has been named manager, application and contract administration. He has been supervisor of the application department. This change reflects more accurately the scope and nature of total departmental responsibility, which includes not only pump application but also contract administration functions.

Joining the firm as an application engineer in 1954, he has managed the former application engineering group since 1965. He has written several papers and articles for trade journals and holds a chemical engineering degree.

Assisting Mr. **Lahr** are **Walter A. Connolly** and **John T. Strapach.** Both have the title assistant manager, application, but with different responsibilities.

Mr. **Connolly** is responsible for the management of application and contract administration work associated with general industrial pumps. An engineer with the firm since 1959, he became a senior application engineer in 1969. He is a registered professional engineer in New York State.

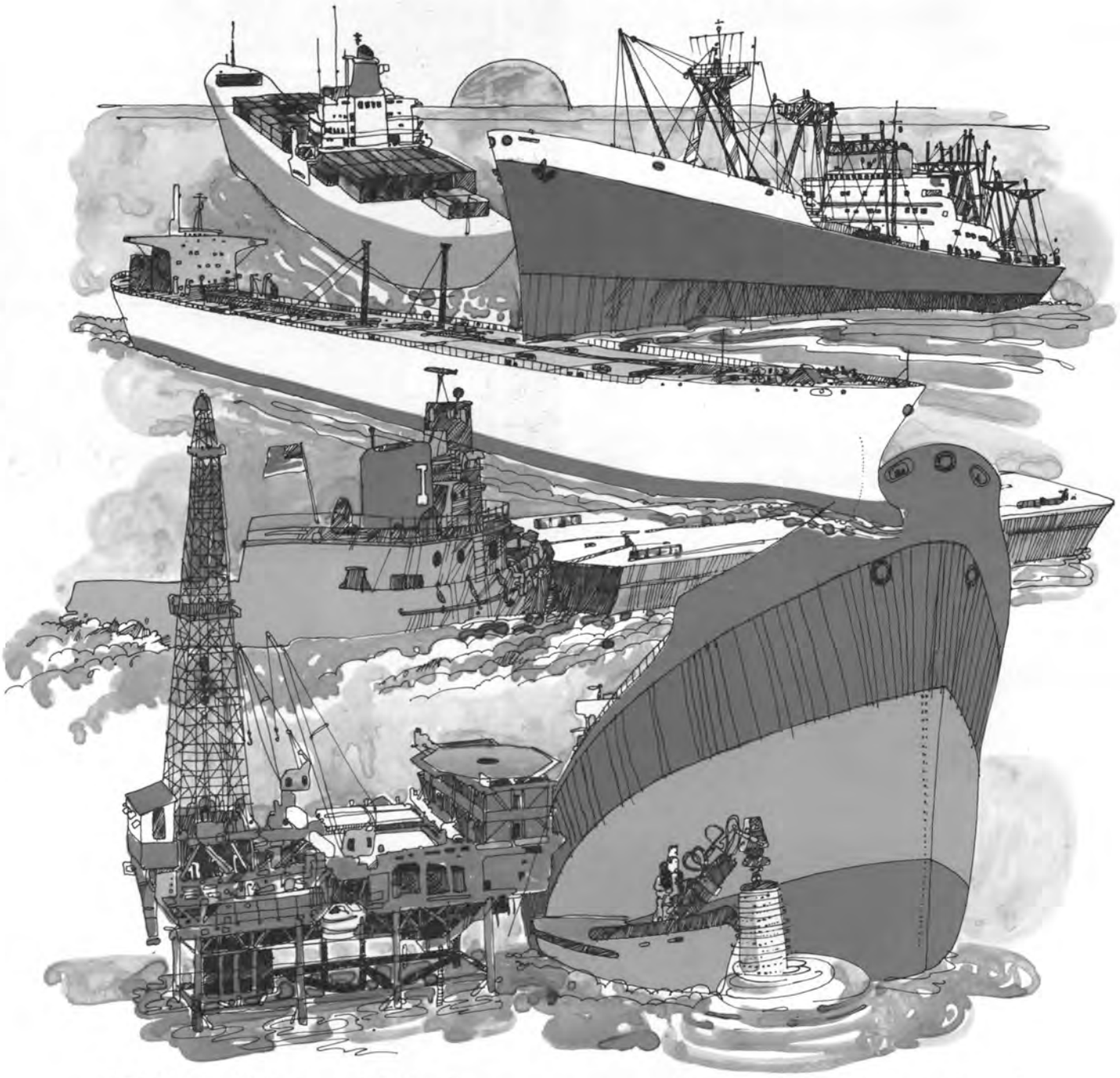
Mr. **Strapach's** area of responsibility is the management and contract administration work associated with nuclear and municipal pumps. Joining the firm in 1965 as an order editor, he later received his mechanical engineering degree and became an application engineer in 1971.

Water Transportation Accounting Group Elects Officers

Benjamin Abrambowitz, executive vice president of Colonial Tankers, Inc., has been elected president of the Association of Water Transportation Accounting Officers, the association has announced.

Also elected are **John F. Moynihan,** group controller, Sea-Land Service, Inc., executive vice president; **William J. McCutchan,** assistant treasurer, Japan Lines, regional vice president East Coast; **Lyle F. Hughes,** control, Matson Navigation Co., regional vice president West Coast; **J.H. Rosher,** controller, Lykes Bros. Steamship Co., regional vice president Gulf Coast, and **John P. Mooney,** auditor, Farrell Lines, secretary-treasurer.

All around products. All around service. All around the world.



INTERNATIONAL is our name. And we live up to it. By offering you a world-wide service network and supply capability for performance-proven, top quality paint and coating products. For new construction. For maintenance and repair. Corrosion control and antifouling protection systems of every generic type that work and keep your vessels working. Systems that include low temperature applications are available when you need them, wherever you need them. From expert service representatives who'll see that you get the best out of every application, every time. For all around satisfaction on your next job, call or write your nearest International Red Hand office or representative. Also inquire about our Brushboat cleaning service available in most major port terminals throughout the world. WE HAVE IT ALL.

International Red Hand
Marine Coatings

International Paint Company, Inc. World's Largest Marine Paint Organization, 21 West St., New York/ 220 S. Linden Ave., S. San Francisco/3915 Louisa St., New Orleans.

LPG Shipbuilding Contract Sold At Profit Of $4.5 Million

Universal Gas and Oil Company Inc., New York, N.Y., has announced that it has reached an agreement to sell its shipbuilding contract for a liquefied petroleum gas carrier for $28.15 million. The agreement, which is subject to finalization of certain details and the approval of French Government authorities, involves the 52,000-cubic-meter LPG carrier Dorsetown.

This vessel, one of four the company has under construction at Constructions Navales et Industrielles de la Mediterranee, La Seyne, France, is scheduled for delivery this month.

As a result of this transaction, Universal Gas and Oil expects to recognize cash receipts of approximately $9.5 million, of which approximately $4.5 million will represent profit. UGO anticipates utilizing the proceeds from this sale to pursue other projects currently under consideration in the energy transportation field, as well as completing down payments on its other three liquefied gas carrying vessels.

Of the three other vessels under construction, one is a sister LPG ship to the Dorsetown and two are 35,000-cubic-meter liquefied natural gas carriers. The latter two are currently undergoing modifications at the shipyard in order to qualify for registration under the U.S. flag. All three of these vessels are scheduled for delivery by the end of 1974.

Universal Gas and Oil will engage primarily in the transportation of liquefied gases. In addition, the company owns various oil, gas and hard mineral exploration rights.

Device To Analyze Steel Developed By Bethlehem

A portable device to analyze steel, developed by Bethlehem Steel Corporation's research department, has been selected by the editors of "Industrial Research" magazine as one of the 100 most significant new technical products in 1973.

The prize was announced in Chicago, Ill., as part of a three-day exhibit, conference and awards program at the Museum of Science & Industry.

The development is important to steelmakers because they exert every effort to avoid cases of mistaken identities among their products. But with large numbers of pieces of steel handled every day, mixes sometimes occur. Because the pieces of steel involved look alike, separation of mixes must be based on differences in composition or other characteristics not visible.

Now the task of separating mixes has been greatly simplified through the use of the portable manganese analyzer which separates steel pieces whose manganese contents differ by 0.2 percent or more.

Spark testing to determine the carbon content of steel has been the traditional means to separate mixes. Spark testing is inexpensive and fast compared to laboratory analysis, but only 65 percent of steel mixes can be separated this way. In the past, if spark testing could not separate the mix, time-consuming laboratory analysis was usually the only alternative. Now, using the manganese analyzer to supplement spark testing, approximately 90 percent of mixes that occur in carbon steel grades can be separated quickly.

The new manganese analyzer weighs about 35 pounds. It is self-contained except it must be connected to 110-volt power. The instrument can be carried and operated by one man in the normal environment of steel mills, storage yards and shipping terminals.

The two main parts of the analyzer are a sampling probe and a flame photometer. The probe is placed against the steel to be analyzed. An electrical arc between the probe and the steel creates dust-size particles, which are carried through a flexible tube connected to a flame in less than five seconds. The probe can be used up to 20 feet away from the flame photometer.

The flame is fueled by camper-size containers of propane. The normally blue flame changes to orange when the fine particles of steel enter the flame. The change in color intensity varies in proportion to the amount of manganese in the steel. Electronic circuits measure the change in color intensity and within a few seconds display percent manganese on a meter.

An analysis is made on the as-rolled surface of steel and is nondestructive. Each analysis takes less than 10 seconds. A switch on the sampling probe resets the instrument for the next analysis.

Bethlehem spokesmen state that use of the manganese analyzer reduces significantly the cost of detecting and separating mixed steel. In a case where several hundred pieces must be analyzed, up to 200 man-hours can be avoided. In addition, because analyses are made rapidly (100 or more per hour), the steel can be shipped on schedule and customer relations maintained.

Bethlehem Steel is currently negotiating with potential manufacturers to build the manganese analyzers for Bethlehem's own use and for sale to others.

Those who developed the device include **Theodore R. Linde, Thomas E. Cody, Joseph A. Grohowski,** and **Geza J. Horvath,** all members of Bethlehem Steel's research department, and **Arthur L. Davison,** a former Bethlehem Steel employee now living in Saugus, Calif.

So. California Begins Feasibility Studies For LNG Facility

Southern California Gas Co. has begun preliminary studies to determine the feasibility of a proposed liquefied natural gas (LNG) facility in the Port Hueneme area, according to **Keith McKinney,** director of LNG projects for the company.

As an initial step, the company applied to the South Central Coast Regional Coastal Commission for permission to collect soil samples on property owned by a gas company affiliate near Port Hueneme. The application was approved at a commission meeting.

This application is the first of several to be made to appropriate authorities for permission to conduct the various studies needed to determine the feasibility of this site for a facility to receive, store and regasify LNG.

The LNG would help to alleviate Southern California's energy shortage, Mr. **McKinney** said. The gas would come from Indonesia as the result of a recently signed contract. A similar facility is being considered in Los Angeles Harbor to receive LNG from south Alaska.

Ships would be unloaded in new berths at the port and the LNG transported to the nearby property for regasification and delivery into the gas company's existing transmission system in the Port Hueneme-Oxnard area.

International Paint Appoints Birnbaum Special Consultant

Leon S. Birnbaum

Leon S. Birnbaum has been appointed to the position of special consultant by International Paint Company, Inc., one of the world's largest manufacturers of marine coatings.

Mr. **Birnbaum** recently retired from the Naval Ship Engineering Center where he was head of the Coatings, Corrosion Engineering and Chemistry Branch of the Materials Development and Application office. In this position, Mr. **Birnbaum** managed the Navy paint program as it relates to design, construction, operation, maintenance and repair of Navy ships. Prior to that, Mr. **Birnbaum** was with the Philadelphia Naval Shipyard Industrial Test Laboratory for 11 years.

A member of numerous professional organizations, including the American Society of Naval Engineers, the American Chemical Society, and the National Association of Corrosion Engineers, Mr. **Birnbaum** received a B.S. degree in chemistry from City College of New York, and an M.A. degree in public administration from American University.

Webb Institute To Hold Annual Alumni Banquet In New York Nov. 15

The Webb Institute of Naval Architecture Alumni Association will hold its annual banquet on Thursday, November 15, at The Tavern On The Green, 67th Street and Central Park West, New York, N.Y.

The evening will start with a reception at 6 p.m., followed by dinner served at 7 p.m. **Donald Caldera,** president of the association, will introduce the program for the evening. The highlight of the affair will be the presentation of the eighth W. Selkirk Owen Award to **Owen Oakley Sr.,** former head of the Naval Ship Engineering Center Design Group. His former boss, the eminent **John Niedermaier,** will present the award. Rear Adm. **William A. Brockett,** USN (ret.), president of Webb, will present the "State of the Institute" message.

A *NEW KIND* OF LORAN

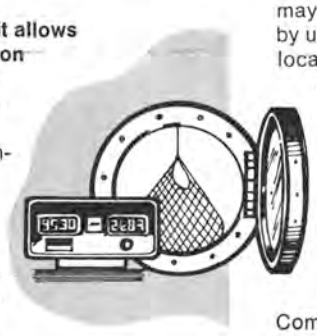
FROM DECCA

Now there's a Loran receiver worthy of the Decca name: The DAL-222. Two channels, fully automatic acquisition and tracking, a memory circuit and scores of other design features make the DAL-222 the most advanced Loran A available. Its price—$2695.—makes it the best value.

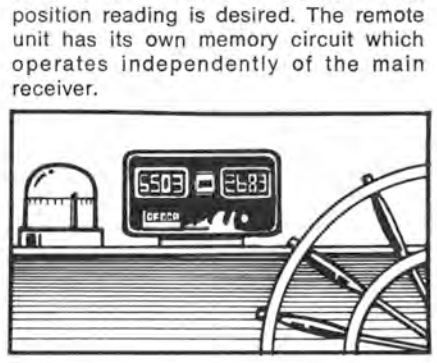
Decca's new Loran provides a simultaneous two-station position fix in as little as thirty seconds. The operator merely selects the appropriate stations and turns on the power—sophisticated solid-state circuitry does the rest. Both lines of position appear automatically on bright digital displays equipped with a dimmer for nighttime use.

The DAL-222 continuously tracks both stations and updates the position readings every six seconds. Its unique averaging circuit, computing the average of 100 consecutive delays, provides unmatched accuracy (resistance to electrical noise, too.)

A "memory" circuit allows any specific position reading to be held indefinitely on the display while the real position is continuously tracked. Captains will appreciate being able to retain the position where the fish are or where a submerged object is located.



Decca Loran is available with a weatherproof remote display unit suitable for mounting in wheelhouse, flybridge or tuna tower — wherever an additional position reading is desired. The remote unit has its own memory circuit which operates independently of the main receiver.



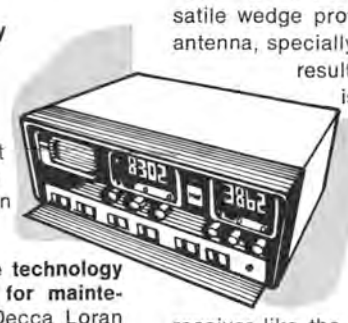
A high-intensity cathode ray tube shows groundwave and sky wave signals. Either may be manually acquired by using simple controls located behind a hinged front cover—in the rare cases when manual acquisition is necessary.

Advanced solid state technology minimizes the need for maintenance and service. Decca Loran uses fewer than half the integrated circuits and semi-conductors of other dual-channel Loran systems. Compact plug-in printed circuit boards are used throughout.

Not even poor shipboard voltage regulation poses a problem for the Decca Loran. The self-contained power supply operates on any DC input from ten to forty volts. A built-in AC power supply is available as an option.

A two-year on-board service guarantee—six months on labor—backs every unit. And the guarantee is backed by over 100 authorized dealers nationwide, who will fix your Decca Loran **on board** if service is ever required.

The handsome low-profile receiver installs almost anywhere in a minimum of space. Easy horizontal, vertical or overhead mounts are possible using the versatile wedge provided with the unit. An antenna, specially designed for optimum results with the Decca Loran, is available as an option.



Loran A has been around for a long time and it will be around for a long time to come. But, there's never been a Loran receiver like the DAL-222 by ITT Decca Marine.

See it at Fish Expo in New Orleans, November 25-28 and at Decca dealers everywhere starting in December.

When Decca does Loran Decca does it right.

386 Park Avenue South / New York, N.Y. 10016 / Tel. (212) 685-5157

DECCA
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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.

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C.I.T. To Explain Financing At '73 Fish Exposition

The benefits of financing and leasing as a means of acquiring vessels and equipment used in the commercial fishing, marine and seafood industries will be explained by officials of C.I.T. Corporation and C.I.T. Leasing Corporation at the 1973 American Commercial Fish Exposition November 25-28 in New Orleans, La.

C.I.T.'s delegation in Booth 902, headed by **Charles F. Hodgins,** C.I.T. vice president and head of the companies' New Orleans division, will explain how the financing plans make it possible for machinery and equipment to help pay for itself through added income.

"With modern, efficient machinery, changing consumer and industry needs can be met," observed Mr. **Hodgins.** "Besides learning about leasing plans, those attending the show will also find out about the manner in which they can profit from financing equipment, including payment plans geared to seasonal factors."

C.I.T. Corporation and its affiliate, C.I.T. Leasing Corporation, enable business, industry and the professions to acquire machinery and equipment, or meet other expansion needs, through installment financing, inventory and accounts receivable financing, leasing and sale-and-leaseback programs.

Both are subsidiaries of C.I.T. Financial Corporation, a multi-line financial services company with assets of more than $3.5 billion.

Ocean-Oil Appoints Albert Westerman VP

Albert B. Westerman

Hector V. Pazos, P.E., president of Ocean-Oil International Engineering Corporation, New Orleans, La., has announced the appointment of **Albert B. Westerman** as vice president in charge of the firm's Marine Survey and Inspection Division, recently formed as part of their expansion program.

Mr. **Westerman,** born in Philadelphia, Pa., has completed studies at Spring Garden Institute, New Jersey State College of Commerce, the University of Maryland, Bucks County Technical Institute, and Tulane University.

Mr. **Westerman** recently returned from England, where he served as general manager to Weldit Engineering (Offshore) Ltd., a North Sea oil field-oriented engineering and construction company engaged in projects for Phillips Petroleum's Ekofish Field, Pel-Lyn's Pentagon Drilling Rig Construction, Amoco Platforms, and J. Ray McDermott. Prior to this, Mr. **Westerman** has been engaged by several petroleum and marine related corporations.

Mitsubishi To Build Three Tankers For Atlantic Richfield

Atlantic Richfield Company has announced that contracts were signed for construction of three oil tankers totaling 420,000 deadweight tons to be built by Mitsubishi Heavy Industries, Ltd., Tokyo.

Scheduled for delivery in the spring and summer of 1977, the order comprises two 150,000-deadweight-ton tankers and one 120,000-deadweight-ton tanker of foreign registry, **Byron E. Milner,** vice president, crude supply and transportation said. The cost was not disclosed.

Mr. **Milner** said the order represents the first phase of a long-range plan to expand Atlantic Richfield's foreign tanker fleet, which currently totals six vessels equaling 308,000 deadweight tons.

Expansion is necessary, Mr. **Milner** added, so the company can transport a growing volume of foreign crude oil being imported to meet burgeoning domestic energy needs.

Carl Staggs Joins South Carolina Ports New York Staff

Carl M. Staggs

Carl M. Staggs has joined the New York staff of the South Carolina State Ports Authority.

Trade development director **Charles A. Marsh** said Mr. **Staggs** holds a newly created post as assistant manager in New York, with responsibility for the state's northwest region.

The New York Regional Office was opened last January. The South Carolina agency operates other out-of-state offices in Chicago, Ill., and Tokyo, Japan, and will soon open one in Brussels, Belgium.

Prior to joining SPA, Mr. **Staggs** served in several traffic management and sales posts with Southern Railways System, most recently as a marketing specialist in the New York area.

Andrew J. Corbett Sr. is manager of the New York Regional Office of SPA, located in Room 3345 of the World Trade Center in New York City.

SPA regional office personnel solicit cargo and seek improved shipping services for S.C. Ports Authority facilities at Charleston, Georgetown, and Port Royal. They also provide close liaison with industrialists, traders, investors and governmental leaders for the S.C. State Development Board.

New England SNAME Hears Student Papers

After a social hour and dinner, 41 members and visitors of the New England Section of The Society of Naval Architects and Marine Engineers heard two papers presented as part of the annual Student Night Program on September 21.

Section chairman **Richard Roberts** asked **Keatinge Keays,** past chairman, to introduce the authors.

Michael Kennedy, a junior in the Massachusetts Institute of Technology's department of ocean engineering, is the author of the first paper, entitled "Static and Dynamic Stability of a Small 14-Foot Flat-Bottom Boat as it Relates to Boating Safety." The work presented in the paper was done under M.I.T.'s Undergraduate Research Opportunities Program for the U.S. Coast Guard Research and Development Center in Groton, Conn. A computerized static stability analysis of a 14-foot "Jon" boat was performed, followed by "live loading" experiments. Dynamic effects were studied by experimentation and comparison with an industrial standard in current use.

The second paper was authored by **Robert Stewart,** a graduate student in the department of ocean engineering at M.I.T. His paper, entitled "A Survey of Oil Spill Transport on the Surface of the Ocean," presents work he did in the form of a thesis to receive a master of science degree in June of 1973. The work was part of the study done by the Offshore Oil Task Group, headed by Prof. **J.W. Devanney, III,** in its study of Georges Bank as a possible offshore oil field. The toxicity and environmental effects of petroleum products was discussed, and a review of current analytical descriptions of oil spill transport phenomena was given. The tanker Arrow oil spill of February 4, 1970, is reanalyzed to show the inappropriateness of the analytic descriptions, given new ocean current data.

Robert Williams of the Coast Guard Research and Development Center gave a discussion of Mr. **Kennedy's** paper, and numerous questions from the floor were fielded by both authors.

Copies of both papers are available for $2 each. Requests for papers should be directed to: **Robert W. Baseler,** General Dynamics Corporation, Quincy Shipbuilding Division, 97 East Howard Street, Quincy, Mass. 02169.

Join The Center Of The Maritime World At

EUROPORT '73

The World's Largest Maritime Show To Be Held In Amsterdam Between November 13 And 17 Will Have Exhibits From 45 Countries. Concurrent With The Exhibitions Will Be A Series Of Interesting Technical Papers.

The world's largest maritime exhibition will take place in Amsterdam, Holland, from November 13 to 17. Known as Europort '73, this showing of marine equipment and services to a world-wide audience has eight cooperative national stands plus individual stands from firms located in a total of 45 countries. The organizers of Europort '73 have reported that over 1,750 companies will display their products and services.

A short rundown of the firms with exhibition areas shows that the exhibits will include ships gear of all shapes, sizes and description; shipyards; 47 makes of diesel engines; repair and maintenance services and equipment; marine propulsion; electrical equipment; automation equipment; navigation and communication equipment; port construction; dredging, and every other conceivable type of marine equipment and services.

The entire exhibition will be held under one roof in the RAI-Halls. The exhibits will cover 500,000 square feet of space. The organizers of Europort '73, known as Europort Organisation, recommend that visitors should allow at least two days for viewing and inspecting the exhibits.

Many United States' firms are listed among the exhibitors. With the monetary re-evaluations that have taken place during the past year, these firms feel that their market has been extended to cover the international marine market.

In conjunction with the exhibition the Europort '73 Congress will be held on November 13th through the 16th. This Congress will be held in the RAI-Building.

An added inducement to attending the exhibits and Congress is the concurrent Interocean '73 which is held in Dusseldorf from November 13th to the 18th. People interested in underwater technology problems can, therefore, combine the attendance at Europort and Interocean. Dusseldorf can be reached from Amsterdam in three hours by train and 30 minutes by aircraft.

Europort '73 is the twelfth year that this exhibition has been held. The enormous response by the maritime industry throughout the world has led the organizers to start planning Europort '74. Many requests and reservations for stand space in the 1974 show have been received by the organizers. Some of these requests have come from companies wishing to renew the success achieved at previous Europort shows, some wishing to follow the lead set by other international concerns exhibiting, and some companies wishing to continue their association and direct identification with this international marketing event.

For those firms who have not participated in these international shows, information on Europort '74 can be obtained by writing to Europort Tentoonstellingen B.V., Waalhaven Z.Z. 44, Rotterdam 3022, Holland.

Europort '73 Congress

The technical congress held in conjunction with the Europort exhibitions has been drawing a large audience each year. This year should not be an exception. The technical program is as follows:

Tuesday, November 13 (starting at 2 P.M.)

Presentation of the winning paper of a contest offered under the auspices of Europort '73 by the Norwegian Journal of Commerce and Shipping entitled "Considerations on the Impact of the Extended European Community on Shipping and Shipping Policy."

Wednesday, November 14 (starting at 10 A.M.)

The theme for this session is "Lubrication, Wear and Repair."

The papers to be presented are:

"Preventive Maintenance of Electrical Machinery on Board Ships" by **B.A. van Gameren** of Smit Slikkerveer B.V.

"Marine Engineers Guide to Filtration" by **P.A. Knowles** of Frazer-Nash Limited.

"The Bearing Maker's Contribution to Improved Reliability" by **A. Hill** of the Glacier Metal Company Ltd.

"Electro-Plating in Marine Engineering" by **P.A.D. Fenton, A. Oolbekkink** and **W. Assmus** of Van der Horst Europe B.V.

Thursday, November 15 (starting at 10 A.M.)

Two concurrent sessions will be held. The theme of one is "Marine Diesel Engines" and the other is "Ergonomic Aspects of Ship Design, in particular with regard to Ship's Bridges and Wheelhouses."

The papers to be presented are:

"Improved Wear and Deposit Control in Medium-Speed Diesel Engines" by **G.W. van der Horst, J. Polman** and **J.J.H. Sundermeijer** of B.V. Chevron Centrale Laboratoria.

"Continuous Monitoring of Combustion Pressure in Diesel Engines" by **N. Hammerstrand** of A.S.E.A.

"Marine Diesel Engines" by **J.H. Wesselo, A. Hootsen** and **J. van der Vegt** of Stork-Werkspoor.

"Investigations of Cylinder Lubrication and Wear in Sea-Going Installations" by **A.J.S. Baker, P.G. Casale** and **H. Breyer** of the Esso Petroleum Company Limited.

This is a view of Europort '72 showing the RAI-Halls which will house Europort '73 but on a larger scale since this exhibition has grown larger with each succeeding year. The expanse of the hall makes it possible for each exhibit to be properly shown.

"General Ergonomic Aspects Applied to Maritime Conditions" by **A. Lazet** of the Institute for Perception.

"Human Engineering Problems in the Design of Ship's Bridges from Point of View of Practical Experience" by **J.N.F. Lameijer** of the Royal Netherlands Shipowners' Association.

"Human Engineering Problems in the Design of Ship's Bridges, a Human Factors Approach" by **R. Hermann** and **M.A. Bottger** of the Berufsgenossenschaft fur Binnenschiffahrt.

"Static and Dynamic Simulation" by **H. Schuffel** of the Institute for Perception.

"Human Factor Considerations in Advanced Bridge Design" by Capt. **J. O'Sullivan** and **H. Johnson** of Sperry Marine Systems Division.

"Adaption of Navigation Instruments, Displays, and Controls (Air and Marine) to Human Capabilities" by **E.W. Anderson** of Kelvin Hughes.

At 2 P.M. there will be a break in the proceedings of the second session so that a visit can be made to see a mock-up and demonstration on the stand at the exhibition.

Friday, November 16 (starting at 10 A.M.)

The theme for this session is "Problems of Cargo Handling and Shipping of Bulk Cargo and Container."

"Unloading of Bulk Goods" by **Ernst Otto Schneidersmann** of Demag Lauchhammer-Maschinenbau und Stahlbau GmbH.

"Port Facilities for Bulk Handling of Pulverised Material" by **Eberhardt Langheld** of Claudius Peters AG.

"Stockpile Yards for Bulk Goods in Ports" by **Max H. Kuns** of Demag Lauchhammer.

"Equipment for Bulk Material Handling in Modern Stockyards" by **Otto Wichern** of Demag Lauchhammer.

"Cargo Handling and Transportation of Bulk Goods in the Future —Problems and Limits" by **Willibald Kamm** of Eisenwerk Weserhutte AG.

"Continuous Discharging of Bulk Goods by Shore and Ship Gear" by Dr. **Walter Durst** of Orenstein & Koppel AG.

"Meteorological Conditions in Containers with Respect to the Cargo" by Dr. **Gunter Grunewald** of Seewetteramt Hamburg.

These technical sessions are sponsored by the Europort Organisation, The Institute of Marine Engineers, the Royal Netherlands Shipowners' Association, the Institute of Perception, the Netherlands Ship's Research Centre, the Consul General of the Federal Republic of Germany in Amsterdam and the Deutsche Verkehrswissenschaftliche Gesellschaft e.V. in Cologne.

The organizers of these Europort exhibitions feel that the importance of these shows rests in the establishing of new contacts and creating and maintaining sales with companies in the international maritime field. This has been proven over the years and, thus, the organizers must maintain both the quality and the reputation of the exhibits at a high level.

Thomas Opatz Named VP Of Fabri-Valve, A Dillingham Company

Thomas D. Opatz

Thomas D. Opatz has been appointed vice president of Fabri-Valve, a Dillingham company. The announcement was made by **Bruce Hobbs,** president of the Portland, Ore.-based firm.

Mr. **Opatz's** responsibilities will include marketing, engineering and purchasing for the manufacturing firm, which specializes in valves for industry. Prior to his appointment, he was in charge of marketing and the operations of the Western plants for Peerless Pump, a division of FMC in Los Angeles, Calif.

A native of Glendale, Calif., Mr. **Opatz** is a graduate of Oregon State University and attended the Stanford Executive Program.

Container Operator Names Two Executives

The appointment of **Michael G. Himoff** as executive vice president of Maritime Container Lines Ltd., has been announced by **Allen F. Elia,** president and chief executive officer. Also named was **William L. Kasper** as vice president-sales, and as Eastern trade representative for the Port of Duluth.

Maritime Container Lines, an independent container operation, supplies a regular 10-day service in the North Atlantic, with calls at Antwerp, Bremen, New York, Portsmouth, and Philadelphia.

American-Standard Power And Controls Group Names Three

Robert R. Trimble, Dean W. Hart, and **Micheal D. Queenan** have been named district sales managers of the general sales force of the American-Standard Power and Controls Group, Dearborn, Mich., it has been announced by **Ronald L. Gaylord,** field sales manager of the group.

Mr. **Trimble** will be in charge of sales activities for WABCO Fluid Power products in the Detroit sales area. He was formerly a sales engineer for the J.N. Fauver Company, Madison Heights, Mich. He is a native of Detroit and attended Macomb County Community College, Warren, Mich.

Mr. **Hart** will manage the Los Angeles sales area, which includes Arizona and southern California. He replaces **Fred W. Guy,** who was recently appointed Western regional manager of the group's general sales force. Mr. **Hart** has served as a pneumatic and hydraulics specialist for Rucker Products Company and for Bellows-Valvair. He is a native of Long Beach, Calif., and a graduate of Long Beach State University. He has a degree in business management.

Mr. **Queenan** will be responsible for the Cincinnati sales area. He was previously a territory manager for PABCO Fluid Power, a Cincinnati-based distributor. Prior to that, he was a product specialist for the Miller Fluid Power Company. He is a native of Cincinnati, where he attended Xavier University. He has a degree in economics from Thomas More College in the same city.

"These men have the experience and expertise to make them eminently well qualified for their new positions," Mr. **Gaylord** said. The general sales force of the American-Standard Power and Controls Group, headquartered in Dearborn, is responsible for sales of the full line of hydraulic and pneumatic cylinders, valves and related devices made by the company's WABCO Fluid Division, Lexington, Ky. It also handles sales of all models of standard and custom-design heat exchangers produced by the American-Standard Heat Transfer Division, Buffalo, N.Y.

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

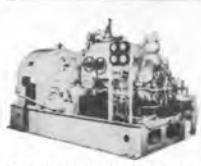
300 KW DIESEL GENERATOR SET

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.

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

14

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.

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

16

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

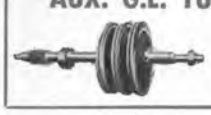
22

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.

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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

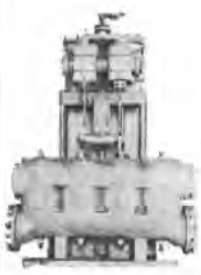
CARGO STRIPPING PUMPS

30

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.

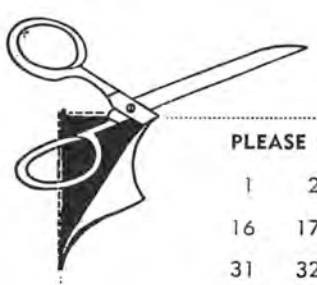
48

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.



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

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

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

Luckenbach SS Files Subsidy Applications

Edgar F. Luckenbach Jr., president of Luckenbach Steamship Company and its affiliate Luckenbach International Corporation, has announced that he has formally filed applications with the Maritime Subsidy Board in Washington requesting Government funds for the construction and operation of two 56,000-ton dry bulk carriers.

These ships, costing $28 million each, will be the largest of their class ever built in the United States. These and other new American-flag vessels, which the company expects to add to its fleet in the future, will be operated by the recently formed Luckenbach International Corporation to serve primarily the needs of the world's forest products industry.

Each vessel will be a single-screw medium-speed diesel-powered lumber carrier with an effective service speed of 15 knots. In addition to carrying packaged lumber in its six hatches as well as on deck, each ship will also be suitable for carrying bulk grain and ore cargoes.

The main deck will be continuous, with straight line sheer forward and no camber. All machinery, navigation, and accommodation spaces will be located aft.

The vessel will be arranged with a double hull in way of the cargo holds designed for the carriage of fuel oil or water ballast.

Each of the six holds will be served by an 18-ton capacity crane, mounted on pedestals to permit timber stowage to a height of 24 feet atop the hatch covers. These cranes will be suitable for grab equipment and fitted with cargo spotting devices.

The engine room and main and auxiliary machinery will be configured for unattended operation. Controls, alarms, indicators and instrumentation will be in accordance with all applicable regulatory bodies, and carbon dioxide flooding provided for the engine room as well as cargo holds. These vessels are so advanced in technological innovations that Luckenbach has applied for patents on a number of design and engineering features.

Capt. Watkins Named Marine Superintendent U Of Washington Fleet

Capt. **John B. Watkins Jr.** has been appointed marine superintendent for the University of Washington research fleet.

He succeeds Capt. **Frank Bean,** who has retired after six years in the post.

Captain **Watkins** is a 22-year veteran of the U.S. Coast & Geodetic Survey. He commanded several vessels and was director of the International Tsunami Information Center in Hawaii.

VERSATILE CONTAINER CRANE: One of the huge Paceco Portainers® at the Port of Southampton, England, is shown loading double decker buses aboard the O.C.L. ship Liverpool Bay, bound for Australia. The crane, specialized for handling containers, can handle general cargo and unusual cargo such as buses, as well. It has a rated capacity of 35 long tons, and has a 122-foot outreach for servicing the largest of the new supercontainerships. The Port of Southampton, a major container port in the world, has six of these large Paceco container-handling cranes, which were built by Vickers Limited under a license agreement with Paceco, a division of Fruehauf Corporation, Alameda, Calif.

Bell Aerospace Tests Air Cushion Vehicles For Year-Round Arctic Region Operation

Voyageur 002 operates on the Mackenzie River in Canada's Northwest. Manufactured by Bell Aerospace Canada Division of Textron Canada Ltd., Grand Bend, Ontario, the craft went north early this year and has performed a wide-range of tasks.

A series of tests have been conducted to check the capability of air cushion vehicles to operate in Arctic regions year-round without harming the environment.

Trials with a 45-ton Voyageur ACV, built by Bell Aerospace Canada Division of Textron Canada Ltd., Grand Bend, Ontario, included operating the craft repeatedly over soft, summertime tundra.

In contrast to the Voyageur, which exerts a surface pressure of only ⅓ of a pound per square inch despite its gross 45-ton weight, wheeled and tracked vehicles bog down in soft tundra and grind it up. This leaves permanent scars that widen with each year's thaws and freeze-ups.

As a result, remote area construction projects in the Arctic and sub-Arctic—including oil field work—can be performed only in the four coldest months of the year, when the tundra is frozen solid.

But while these months provide a hard surface for transportation purposes, they also are the coldest months of the year for working conditions in the North.

Because of this, the Canadian Arctic Gas Pipeline System is expected to take four years to complete. If the same job could be done on a year-round basis, the project could possibly be done in two years.

The Voyageur tests were sponsored by the Canadian Ministry of Transport's Transportation Development Agency. The 10-day trials in late August were supervised by the Federal Government Department of the Environment.

Traveling to the test location, the Voyageur made a 1,180-mile trip down the Mackenzie River from Hay River to Inuvik in 23 hours' operating time.

After that, operations were conducted daily on Richards Island in the Mackenzie Delta, with the craft accumulating an average of nearly 10 hours per day. Supervised by environmental representatives from F.F. Slaney & Co., Ltd. of Vancouver, British Columbia, the Voyageur:

—Was operated repeatedly at 15, 30 and 40 miles per hour over selected tracks of tundra as technicians from Slaney took measurements of the impact the vehicle made on the surface. The craft was driven 20 times at each speed over separate tracks.

—Operations over two-foot-deep polygons (mounds that are split at the top) were conducted in fields where polygons were located as close as 10 feet apart.

—In a wild-life test, the craft was operated in the vicinity of ducks, Canada geese and wild swans, to check on how close the ACV could operate without disturbing them.

—Underwater sounding tests were made to compare the ACV underwater noise level with that of ships and motorboats.

The researchers are compiling a report on the tests, with the result to be announced later this year.

The ACV used in the tests was Voyageur 002, which is owned by the Ministry of Transport. Earlier in the summer, the craft was operated for eight weeks by the Canadian Coast Guard, performing a range of aid-to-navigation duties on Great Slave Lake and the Mackenzie River.

Before that, the craft had been operated on the Great Lakes and in the Northwest Territories since August 1972 by Northern Transportation Company Ltd.

Another craft, Voyageur 001, is being operated by Kaps Transport Ltd., a cargo hauling company operating in the Northwest Territories.

Production of additional Voyageurs and a smaller sister ACV, the 17-ton Viking, is under way at the Grand Bend facility of Bell Aerospace Canada Division of Textron Canada Ltd.

Butterworth Relocates Office Staff To New Quarters In Bayonne

A.J. Kelly, Jr., president of Butterworth Systems, Inc., has announced the recent move of its 24 office employees to newly renovated spaces in the Main Office Building of Exxon USA's Bayonne, N.J. plant at East 22nd Street and Avenue J.

Since becoming a wholly-owned Exxon affiliate in 1930, Butterworth had conducted its worldwide marine sales operations from a building at the foot of New Hook Road in Bayonne.

Butterworth is a leading supplier of tank cleaning machines and automated equipment to scrub barnacles from tanker hulls. Its new mailing address, effective October 1, is P.O. Box 9, Bayonne, N.J. 07002.

The 12 employees of the Butterworth repair shop will remain at the New Hook Road location.

National Steel Receives $65-Million Tanker Order

National Steel & Shipbuilding Company, San Diego, Calif., has been awarded a $65,088,000 contract to build three 38,300-ton tankers for Moore-McCormack Bulk Transport, Inc., New York, N.Y.

In announcing the contract, Under Secretary of Commerce **John K. Tabor** pointed out that the Commerce Department's Maritime Administration will pay $23,005,737 of the total price in construction-differential subsidy under President **Nixon's** program to revitalize the American merchant marine.

"This contract provides ample evidence of the success of the President's maritime program in generating the new ships needed for the American merchant fleet and the increasing competitiveness of American shipbuilders," he said.

"At 35.18 percent, the subsidy rate on these new ships is nearly four percentage points better than the 39-percent target subsidy rate called for by the President's program.

"More importantly, it is the lowest subsidy rate on a conventional-type ship in the 37-year history of construction subsidies," he emphasized.

Mr. **Tabor** pointed out that this contract brings to 50 the number of new ships contracted for under the President's three-year-old program. Along with 16 containership conversions also awarded, these vessels have a total value exceeding $2.4 billion.

The Commerce Department official also pointed out that, with this contract, National Steel has received orders for 15 new ships under the President's maritime program. Valued at more than $376 million, these awards translate into over 11,000 man-years of work for National Steel employees.

An additional 11,000 man-years of labor are being generated in supplier industries.

The maritime program as a whole has created over 125,000 man-years of work for shipyard employees and workers in related industries, as well as thousands of man-years of employment for American seafarers, Mr. **Tabor** stated.

Similar to three tankers of the same class ordered from National Steel last year, the Mooremack tankers will be 688 feet long, with a beam of 90 feet and full-load draft of 35 feet. Each of the 16-knot vessels will carry a crew of 25 men when delivered in 1975-77.

Arthur Tickle Engineering Names Adm. Will Vice Pres.

Adm. John M. Will

Arthur B. Tickle Jr.

Adm. **John M. Will,** USN (ret.), has been named vice president of the Arthur Tickle Engineering Works. The announcement was made by **Arthur B. Tickle Jr.,** president and board chairman of the Brooklyn, N.Y., firm that has been offering the maritime industry a variety of engineering services for a period of over 69 years.

The admiral, who retired from the U.S. Navy after a distinguished career, went on to serve as president and board chairman of one of America's largest steamship firms, American Export Lines Inc. He will also serve as a board member in his new position.

"The admiral and his knowledge of every aspect of the maritime industry will provide an important link for our firm," said Mr. **Tickle.** "We are delighted he has joined our company and look forward to a long and fruitful relationship."

The firm specializes in ship and container repairs along with its other work, which includes boiler repairs, forging and welding, machine work, metal spraying, engine and turbine repairs and balancing, and internal and precision cylindrical grinding.

A graduate of the U.S. Naval Academy at Annapolis, Admiral **Will** received his master's degree in engineering from Pennsylvania State College. Admiral **Will's** naval career spanned two wars, and at his retirement as a four-star admiral, he was serving as Commander of the Military Sea Transportation Service, now the Military Sealift Command, in Washington.

His career as one of the Navy's most versatile officers included duty in battleships, destroyers, cruisers and submarine and amphibious forces.

Admiral **Will** also served as president and chairman of First Atomic Ship Transport, an AEL subsidiary which operated the world's first commercial nuclear powered vessel, the N/S Savannah, for the U.S. Government.

Upon leaving American Export in January 1972, he served as an advisor to the Maritime Association of the Port of New York.

Admiral **Will** was president of the Whitehall Club, is chairman of a Coast Guard Advisory Committee for Ship Traffic Control in New York, and served four years as president of the New York Shipping Association, among other activities. He has also received Italy's highest award for a foreigner for his work as president of the Italy America Chamber of Commerce.

No. Calif. Section Discusses Systematic Sequencing For Loading/Offloading Tankers

Pictured at the Engineers Club, left to right: **Joseph Busch** (Wickert Co.), chairman, Northern California Section; Lt. **David B. Lorenz** (USCG), author, and **James A. Stasek** (Kings Point Machinery), public relations chairman.

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

A paper entitled "Systematic Sequencing for Loading and Off-Loading Tankers" was presented by Lt. **David B. Lorenz,** USCG, graduate student, University of Michigan.

Lieutenant **Lorenz's** paper summarized the difficulties in working out tanker loading and discharge sequences by pointing out that there are 480 million possible sequences with only 12 tanks.

He outlined a computer program which selects acceptable loading procedures utilizing the "influence line method" traditionally used for analyzing bridge structures and recently adapted for this type of application by **J. Moe** at the University of Michigan.

Northern California Section officers shown left to right at the meeting: **William C. Webster** (U.C.), secretary-treasurer; **Robert Herbert** (naval architect), vice chairman; **Joseph Busch** (Wickert Co.), chairman, and **Thomas B. Cole** (American President Lines), meetings chairman.

A stated purpose of the paper was to develop discussions which would allow the author to learn more about constraints and considerations required to develop a practical program.

Discussion developed that the primary considerations should be time, maximum allowable hull stress acceptable to regulatory bodies and low-cycle fatigue limits. Practical usage for this program was suggested as vessels with separate ballasting facilities under 100,000 dwt carrying mutiple petroleum or chemical products.

Discussers were: **Arthur Haskell,** Matson Navigation; **Henry Kozlowski,** American President Lines; **William Webster,** U.C.; **Ezio Palmieri,** Chevron; **Robert Boston,** USCG; **Graham Frazer,** Paceco; **Robert Herbert,** and **Bert Lundegaard.**

Galveston Port Director C.S. Devoy Elected President Of A.A.P.A.

C.S. Devoy, port director and general manager, Galveston, Texas, and first vice president of the American Association of Port Authorities, has been elected president for 1973-74.

A member of the port authority since 1963, Mr. **Devoy** was named Galveston's 1970 Maritime Man of the Year by The Propeller Club and Chamber of Commerce. He served as president of the Gulf Ports Association during 1969, and is also a past president of the Texas Ports Association.

In 1971, Mr. **Devoy** was selected as "Gulf Coast Man of the Year in International Trade" by the Gulf International Trader, shipping weekly covering the Gulf area. The award was made because of Mr. **Devoy's** leadership in putting the Port of Galveston into the age of containerization by the building of container terminals and attracting Lykes Bros. SEABEE ships to Galveston for their West Gulf base of operations.

Currently, Mr. **Devoy** is a director of the Galveston Cotton Exchange and Board of Trade, and the Galveston County Research Council. He has been a visiting lecturer at the Texas A & M Maritime Academy, teaching a course in international trade and finance.

A native of Brooklyn, N.Y., he graduated from Georgetown University in Washington, D.C., and attended the Graduate School of Business Management at Northwestern University.

M.E. Knabe Joins American Standards Testing Bureau

Murray E. Knabe

Murray E. Knabe, after many years of experience in the steamship industry, has joined the consulting staff of American Standards Testing Bureau, New York, N.Y. The bureau has been rendering vital technical and management services to the transportation industry worldwide. Mr. **Knabe's** professional exposure to this sector (F.M.C., I.L.A., N.Y.S.A., North Atlantic Conference, etc.) enlarges the scope of services which now includes Charter Party Agreements-Disputes and Arbitration, Labor Relation Disputes and Arbitration, Litigation and Arbitration Consulting Services, Claim Evaluation and Subrogation, Operations Management and Control-Vessel / Cargo / Injury Loss Analysis, etc.

Mr. **Knabe** was formerly vice president - treasurer - director of Charles Hill & Sons, Inc., general agents for The Bristol City Line of Steamships Ltd. in the United States and Canada.

Upon the merger of Bristol City Line, Clarke Traffic Services, and Belgian Line into the Dart Containerline, Mr. **Knabe** has taken consultation assignments. The most recent one took him to Jakarta, Indonesia on behalf of the International Executive Service Corps, New York, where he assisted a steamship company as a volunteer executive in overall evaluation, management, control, operations, and finance.

Mr. **Knabe** holds the degrees of B.C.S., LL.B., is a member of the Maritime Law Association of the United States, Iota Theta Law Fraternity and Downtown Athletic Club.

Boise-Griffin Names Charles R. Senner

Charles R. Senner has been named senior executive vice president of Boise-Griffin Steamship Co., Inc., according to **W.J. Griffin,** president.

Mr. **Senner** has also been elected a director of the corporation.

Zapata Corporation Completes Purchase Of Crestwave Offshore

Zapata Corporation, Houston, Texas, has announced that it has completed the previously reported acquisition of Crestwave Offshore Services, Inc. from Texas Gas Transmission Corporation. Under terms of the transaction, Zapata Off-Shore Company, a Zapata subsidiary, has acquired all of the outstanding capital stock of Crestwave for a consideration to Texas Gas of approximately $12 million in cash. Concurrently with the acquisition, Zapata prepaid all of Crestwave's bank debt of approximately $8 million.

New Orleans-based Crestwave owns and operates a fleet of three jackup drilling rigs—the Topper I, Topper II, and Topper III. The versatile rigs range in water depth capability from 120 to 300 feet and are designed for both exploration and workover operations. Two of the rigs are currently operating in the Gulf of Mexico, and one is working in the Arabian Gulf.

Zapata said that the acquisition, coupled with its current rig construction program, will result in the addition of five offshore drilling rigs to the company's fleet during its 1974 fiscal year, which began October 1. This will bring the total number of rigs operated by Zapata subsidiaries to 16 by year-end. The Zapata Ugland, a super semisubmersible rig now under construction in Beaumont, Texas, is scheduled for delivery in the spring of 1974, and the Zapata Trader, a self-propelled drillship being built in Port Arthur, Texas, is expected to be completed in the summer.

Founded in 1954 as an offshore drilling company, Zapata was a pioneer in that field and has operated in virtually all of the world's major offshore petroleum areas. Other Zapata businesses include furnishing supply vessel services for offshore operators, petroleum exploration, copper and coal mining, menhaden and tuna fishing, and building and general construction.

Peter Baci Joins Phs. van Ommeren

Peter A. Baci has joined Phs. van Ommeren Shipping as assistant operating manager, it was announced by **Johannes Solleveld,** president of the company.

Mr. **Baci** graduated from the State University of New York Maritime College with a bachelor of science degree and after graduation, spent time at sea as a second officer in the U.S. merchant marine. Terminating his sea duties early in 1972, he worked as a marine surveyor, and recently in the operating department of Alcoa Steamship Company.

Mr. **Baci** is a lieutenant in the U.S. Naval Reserve, and his duties with Van Ommeren will be in ocean towing and salvage and ships' operations.

National Cargo Bureau Names Capt. Hathaway For Portland, Maine

The National Cargo Bureau has announced the appointment of Capt. **Brian Hathaway,** as its non-exclusive surveyor at Portland, Maine, succeeding Capt. **Thomas Campbell.** Captain **Hathaway** will cover the ports of Portland and Searsport. He is a graduate of Maine Maritime Academy, and has had seagoing experience with a number of American-flag steamship companies.

Captain **Hathaway's** address is 25 Carriage Road, Cumberland Foreside, Maine 04110.

The National Cargo Bureau has representation in all principal ports of the United States, and is a non-profit membership organization dedicated to the safe stowage, securing and unloading of cargo on all vessels.

The Bureau performs various types of shipboard surveys including condition surveys, loading of miscellaneous cargoes on and under deck, hatch surveys, and draft surveys (on ships and barges). Loading certificates are accepted as complying with dangerous cargo regulations. In addition, the Bureau inspects container loadings and cargo handling gear.

Rose Barge Names Griglione And Antrainer

William J. Griglione and **Norman Antrainer** have been appointed to newly created positions at Rose Barge Line, Inc., it was announced by **Earl C. Rose Jr.,** president.

Mr. **Griglione** was named vice president for dispatch operations, and Mr. **Antrainer** was appointed port captain of Kenner Bend Fleet of New Orleans.

The company serves dry bulk commodity shippers on the Mississippi and Illinois River Systems between Chicago, Ill., and New Orleans, La. Headquarters are in Clayton, Mo.

Mr. **Griglione** will be responsible for round-the-clock communications with shippers' terminals and the Rose Barge Line fleet of eight towboats and 220 barges. A native of Marseilles, Ill., he joined the company in 1965, and has been serving as assistant vice president-dispatch.

Mr. **Antrainer** will supervise operations of Kenner Bend Fleet, a service division of Kenner Shipyard, Inc., which is a wholly owned subsidiary of Rose Barge Line. A graduate of Central Methodist College in Fayette, Mo., he has been serving in the operations department at headquarters.

Mr. **Rose** also announced the addition to the fleet of the towboat Pixie Rose, which will operate in and out of Kenner Bend.

Floating Nuclear Plant Commitments Exceed Two Billion Dollars

Offshore Power Systems, 8000 Arlington Expressway, Jacksonville, Fla. 32211, has announced that the Jacksonville Electric Authority has unanimously approved a resolution to sign a letter of intent for the purchase of two floating nuclear plants to be delivered for commercial operation in 1982 and 1984, respectively.

The two 1150 MW units, which will be manufactured at Offshore Power Systems' facility on Blount Island in Jacksonville, are to be sited off the north Florida coast at a location still to be determined.

In announcing the letter of intent, OPS vice president **J.R. Stadelman** called the action by the JEA "a positive step in the future growth of Jacksonville," a city that has made remarkable progress since it consolidated its government five years ago, almost to the day.

The letter of intent is expected to become a firm contract within six months after a number of conditions are studied, evaluated and resolved. The move by the JEA brings the backlog of units under commitment to Offshore Power Systems to six, representing a total of approximately 2.25 billion dollars in sales.

Offshore Power Systems, a Westinghouse-Tenneco enterprise, has a firm contract with Public Service Electric and Gas Company of New Jersey for two floating nuclear plants to be sited off Little Egg Harbor, N.J., with delivery scheduled for 1979 and 1980.

In July, Middle South Utilities System signed a conditional letter of intent for two floating nuclear plants to be sited in south Louisiana, with operation scheduled for 1982 and 1984.

The six plants under commitment to Offshore Power Systems are part of the initial eight essentially identical plants that are being reviewed for licensing by the Atomic Energy Commission. On June 8 of this year, the AEC accepted the application from Offshore Power Systems for official review. Approval is expected sometime in 1975, when the manufacturing facility to produce the floating nuclear plants will be completed.

Mr. **Stadelman** pointed out that even before ground had been broken on the manufacturing facility to be built on Blount Island, "Offshore Power Systems has a backlog in sales exceeding two billion dollars, with additional sales expected shortly."

American River Awards 50-Barge Contract To Twin City Shipyard

An order for 50 river cargo barges valued at about $5.5 million has been received by Twin City Shipyard, Inc., St. Paul, Minn., **John W. Lambert,** president, announced.

The fleet of hopper barges, each 195 feet long and 35 feet wide, was ordered by American River Transportation Company, St. Louis, Mo., a subsidiary of Archer Daniels Midland Co. The last barge of the order is scheduled to be delivered by December 1, 1975.

At present, Twin City Shipyard is turning out barges at the rate of one per week, but the production rate is being accelerated, Mr. **Lambert** noted.

Twin City Shipyard's current backlog is about 130 barges, valued at about $15 million. Mr. **Lambert** said the new order from American River Transportation Company will extend the facility's backlog almost to 1976. He added the demand for river transportation equipment "continues to be very strong."

The new semiautomated shipyard —the only one in the Upper Midwest—features the most modern marine fabrication facilities.

With a total of 105,000 square feet of enclosed floor space, the facility is large enough (600 feet long and 140 feet wide) to accommodate four river cargo barges in various stages of fabrication.

Twin City Shipyard is a subsidiary of Twin City Barge & Towing Company, with headquarters in St. Paul. Twin City Barge has served the Twin Cities area since 1937, and Chicago since 1961. The company operates harbor towing, petroleum barge service and barge fleeting service around these cities.

J. Kwangse Kim Joins ARCTEC As Consulting Engineer

J. Kwangse Kim

Jack W. Lewis, president of ARCTEC, Incorporated, has announced that **J. Kwangse Kim** has joined ARCTEC as a consulting engineer. Mr. **Kim's** initial assignment is to determine ice loads for conical shaped structures to be used in the Arctic. Subsequently, he will participate in the conduct of model experiments of ships and offshore structures in model ice fields. These experiments will be conducted in ARCTEC's new ice model basin presently under construction in Columbia, Md.

Mr. **Kim** received his master's degree in naval architecture and marine engineering from the University of Michigan, and prior to joining ARCTEC was employed on two important programs related to extended navigation season on the Great Lakes and Arctic marine commerce in Alaska. Both of these programs included economic and technical feasibility of marine transportation systems in ice-covered waters. During the conduct of the latter study, he developed new methods for the prediction of ship performance in pressure ridges and expanded on ship resistance predictions in uniform sheet ice.

ARCTEC, Incorporated is a consulting engineering firm engaged in research, design, construction, and operations in the field of cold regions technology. Construction of the most advanced marine laboratory has begun, and includes an ice model towing basin, a hydraulics laboratory, and a general purpose refrigerated flume. The new laboratory will greatly enhance the capability and services provided by the firm in ice engineering.

J.L. Sullivan Named President Smit International (Americas) —Offices Opened In New York

Smit International of Rotterdam has announced the organization of a United States subsidiary, Smit International (Americas), Inc., as of October 1, 1973. The new company will have its offices at Suite 1227, 17 Battery Place, New York, N.Y., and will be under the direction of **J.L. Sullivan Jr.,** as president.

In addition to overseeing many of the Smit interests in this hemisphere, Smit International (Americas), Inc. will also represent in the United States most of the Smit Group of companies such as Smit International Ocean Towage and Salvage Company, Smit Tak International Salvage Company, and Smit International Marine Services. Biehl & Company will continue to represent Smit in the Southwest United States. Smit International (Americas), Inc. will also act as managers for Smit Moran American Salvage, in which Moran Towing and Transportation Company of New York and Smit International are partners.

Smit International (Americas), Inc. will share the respresentation of Smit & Cory International Port Towages with the Cory organization in New York, Cory Mann George Corporation.

Smit is well known throughout the world for their feats in ocean towing and salvage, with their tugs ranging in power up to 11,000 ihp.

Smit Tak International Salvage Company is presently executing a large wreck removal undertaking in Bangladesh for the United Nations, an ongoing project that will last several more months. It is the second time the United Nations has called upon the Smit organization for their special expertise, the first time being in 1957 as managers of the Suez Canal Clearance.

In addition to their harbor fleets in Rotterdam and Europort, Smit also enjoys a substantial interest in one of the world's largest supply vessel fleets—Smit Lloyd.

WILLIAM E. CLEARY HONORED: **William E. Cleary,** president of the New York Towboat & Harbor Carriers Association and national secretary-treasurer of The American Waterways Operators, is shown receiving The Rudder Club's "Golden Quill Award" at its annual New York Port Industries Night Dinner, which was held in the Grand Ballroom of the Hotel Commodore.

Shown above, left to right, are: **Bert Guido,** president of A.G.Ship Maintenance Corporation and general chairman of the affair; **Thomas J. Giardino,** traffic manager of the Marchessini Steamship Lines and dais chairman; Mr. **Cleary,** and **Clifford M. Palmer**, vice president of Lee & Palmer and commodore of the maritime organization.

Mr. **Cleary,** honored guest at the affair, has been associated for a period of 20 years with The New York Towboat & Harbor Carriers Association, which is a Marine Trade Association composed of over 50 companies operating in excess of 1,200 vessels such as tugboats, barges, motor-tankers, lighters and scows on the waters of New York Harbor, the Hudson River and Long Island Sound.

He also represents the carriers and shippers on the State Barge Canal System in his capacity as Executive Secretary of the New York State Waterways Association, Inc.

In addition, Mr. **Cleary** is the secretary-treasurer of The American Waterways Operators, Inc., the nationwide Association of the barge and towing vessel industry.

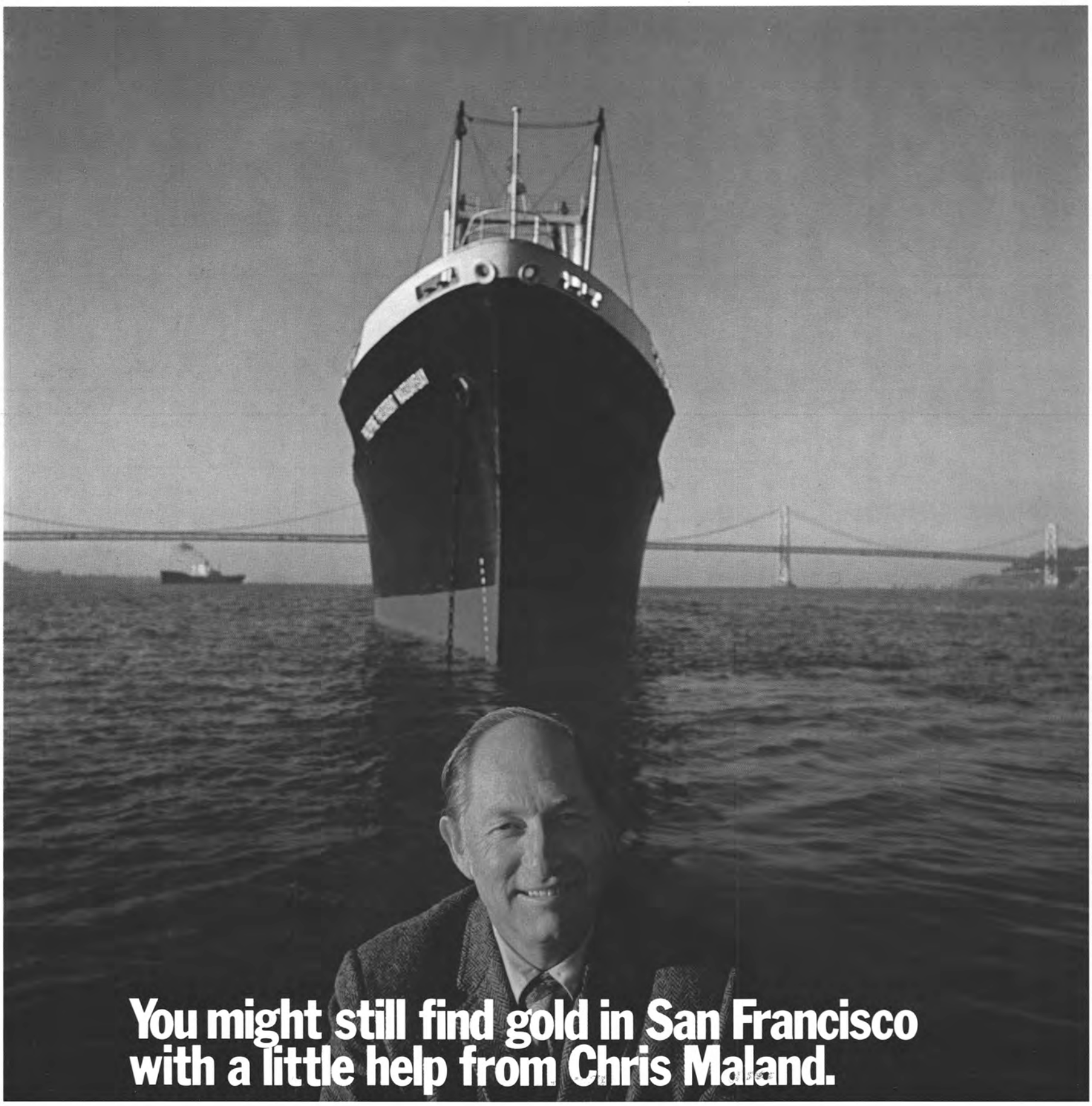
The three Associations maintain joint and staff facilities at 17 Battery Place, New York City.

In June of this year, he was the recipient of the Franz W. Sichel Award for distinguished public service at the 90th Commencement Exercises at La Salle Military Academy.

Mr. **Cleary's** numerous appearances before legislative and governmental regulatory bodies have earned for him the title of "The Voice of The Waterways."

Last March, Mr. **Cleary** was named "Man of the Year" by The Foreign Commerce Club of New York and received a commemorative plaque at the Club's annual Port of New York Banquet.

Mr. **Cleary** is a member of the New York Port Promotion Association, the Harbor and Shipping Committee of the New York Chamber of Commerce, the New York-New Jersey Port Preparedness Planning Committee operating under the auspices of the U.S. Maritime Administration, The Propeller Club of the United States, the Whitehall Club and the Downtown Athletic Club of N.Y.C.



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Hazardous Substances Responsibility Rules Approved By FMC

The final rules which ship operators must follow to establish financial responsibility for the cleanup of spills of hazardous substances into United States waters has been approved by the Federal Maritime Commission, it was announced by Chairman **Helen Delich Bentley.**

Chairman **Bentley** said the deadline for meeting financial requirements will be the same date the Environmental Protection Agency's (EPA) list of hazardous substances becomes effective. The Commission's rules were forwarded to the Federal Register.

Under the Federal Water Pollution Control Act, the Commission already had the authority for certifying that owners of certain vessels operating in American waters have met the financial responsibility requirements for oil pollution cleanup. A 1972 amendment to that act extended the Commission's authority to include establishment of similar evidence of financial responsibility regarding pollution by hazardous substances. On August 14, 1973, when the Commission published its proposed rule-making proceedings in the Federal Register, it served notice that the new regulations would be implemented October 18, and that shipowners would have to comply with the certification requirements by that date.

Many maritime interests objected to the October 18 deadline, primarily because the EPA has not yet published a list defining what it considers to be hazardous substances, and until it does, the extent of the risk to be insured is causing confusion and concern in the shipping industry. Since it is estimated that the EPA might not publish its final hazardous substances list until sometime in 1974, the Federal Maritime Commission decided that its effective date of the actual certification process should not be implemented until the EPA's list is finalized and published.

Although the October 18 deadline has been postponed, the Federal Maritime Commission's application and other related forms which shipowners will be required to complete will be available in advance.

"I hope the concerned carriers will take advantage of this opportunity to obtain their forms during this grace period," Chairman **Bentley** said, "so they will have them completed in time to meet the deadline and avoid a last-minute rush. If they have them in advance of the deadline, the certification process will be expedited and will flow far more smoothly, and this will benefiit both the ship operators and the Commission."

Requirements for meeting financial responsibility for pollution by oil and hazardous substances, with limited exceptions, apply to both American-flag and foreign vessels over 300 gross tons.

The vessels affected must establish financial responsibility of $100 per gross ton, or $14,000,000—whichever is lesser—to cover liability for removal of oil or hazardous substances discharged into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone.

Chairman **Bentley** said that approximately 21,000 vessels are currently certified under the Federal Maritime Commission's oil pollution regulations.

Requests for the application forms may be addressed to: Office of the Secretary, Federal Maritime Commission, 1405 - I Street, N.W., Washington, D.C. 20573.

The forms will also be available at the Commission's field offices in Puerto Rico, New York, New Orleans, and San Francisco.

Greek Interests Award $76-Million Order To Marine Industries Ltd.

A $76-million contract for the construction of six 17,000-dwt cargo vessels has been awarded to Marine Industries Ltd., Montreal, by the Michail A. Karageorgis S.A. group of companies in Greece.

The ships are scheduled for delivery by July 1976.

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Four Kings Point Graduates Honored At Academy Dinner

Four graduates of the U.S. Merchant Marine Academy were recently presented with awards for outstanding professional achievement by the Alumni Association at a special dinner held on the Academy grounds at Kings Point, N.Y. The recipients were: **Henry J. Luck**, president of Mobil Shipping and Transportation Company; **Edmund D. Osbourne,** president of Western Rivers Corporation in Pittsburgh; **Robert E. Martin Sr.,** vice president, operations and sales for UTS, a division of Universal Maritime Service Corp., and **Efstrative Karikas,** managing director of engineering and planning for Seres Shipping, Inc. in New York City.

Mr. **Luck,** who is a resident of Briarcliff Manor, N.Y., graduated from the Merchant Marine Academy in 1948. He rose from the position of third assistant engineer with Mobil in 1949, to manager of Mobil's worldwide marine / fuel and lubricant sales by 1970.

In 1971, Mr. **Luck** was appointed general manager of the marine transportation department of Mobil Oil Corporation, and president of the Mobil Shipping and Transportation Company. He is responsible for the worldwide marine activities of Mobil, whose fleet consists of over 10 million deadweight tons.

Serving as the director of the American Institute of Merchant Shipping, Mr. **Luck** also acted as a consultant on petroleum shipping for the NATO Conference in Brussels.

Mr. **Osbourne,** a native of Pittsburgh, graduated from the Merchant Marine Academy in 1943. He has served as a staff advisor to former Pennsylvania Congressman **William S. Conover,** and as the director of American Waterway Operators, Inc. He is also responsible for founding the Waterways Freight Bureau.

A Ruling Elder of the Westminster Presbyterian Church, Mr. **Osbourne** recently presented a paper to the American Society of Naval Architects and Marine Engineers.

Mr. **Martin** is a resident of West Hempstead, N.Y. Upon graduating from the Academy in 1948, he sailed as deck officer for U.S. Lines on the S/S America, as well as their Far East runs. Since then, he has continued to serve the shipping industry for 23 years with the same company, formerly known as Universal Terminal and Stevedoring Corp., and a subsidiary of Bush Universal, Inc.

Mr. **Karikas,** a resident of Scarsdale, N.Y., graduated from the Academy in 1943. Following three years with the Navy, he was actively engaged in various phases of the shipping industry as a naval architect, a specialist in production and procurement and as an officer and director of varied shipping firms.

In 1965, Mr. **Karikas** joined Seres Shipping, Inc., where he has since supervised the development and construction of a fleet of 90 vessels. He has also been appointed by the American Bureau of Shipping to its Special Committee on Ship Operations.

Ohio Machinery Appoints Mueller

Jerome Mueller

Jerome Mueller has been appointed as marine sales representative for the Power Division of Ohio Machinery Co., the Cleveland, Ohio-based dealer for Caterpillar engines. He was formerly associated with the Power Systems Division of Colt Industries in Cleveland.

In his new position, he will be responsible for sales and application of Caterpillar Marine Engines for propulsion, thrusting, generating sets, and other auxiliaries for commercially operated vessels.

Bethlehem Hoboken Yard Drydocks Largest Vessel Lifted In N.Y. Harbor

The Asopos was docked stern first, with the bow overhanging the river by 114 feet.

The largest ship ever placed in a floating drydock in New York Harbor was lifted at Bethlehem Steel Corporation's Hoboken ship repair yard.

The tanker, the 62,700-deadweight-ton Panamanian vessel Asopos, has an overall length of 775 feet, beam of 106 feet and depth of 53 feet 9 inches. She came to the yard for sea voyage repair and hull painting.

Hoboken's floating drydock, the largest one in New York Harbor, is 685 feet long. However, outriggers in the dock take some of the space.

It was necessary, therefore, to dock the ship stern first, with the raked bow overhanging the river by 114 feet.

The dock is 110 feet wide but wooden fenders, used to protect the tanker's hull, leave only 108 feet of usable space, or two feet more than the width of the vessel.

Because of the small clearance, it took five radio-equipped tugboats, seven land-based winches with five-inch lines, and the dockmaster's great skill and careful coordination to haul in the big tanker.

"It's like trying to back a moving van into a family garage while fighting a river current," said a yard employee.

John J. Brangan, the general manager, said the yard has three smaller drydocks in addition to the big one that lifted the Asopos. "We can handle anything from these big tankers down to a fishing trawler," Mr. **Brangan** said.

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Edo Western Adds Doppler Speed Log

The Model 582C Doppler Speed Log is the latest addition to Edo Western Corporation's outstanding line of speed logs. Designed for use in solving many different types of speed sensing problems, this instrument combines the functions of Pitot tube, electromagnetic, continuous wave, and pulse type Doppler speed logs into one system that definitely shows marked improvement performance-wise.

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Some outstanding features of the Model 582C Doppler Speed Log are operation from only six inches above bottom to full ocean depths, high accuracy at low speed for critical docking requirements, rugged construction, low purchase price of system, and low cost of system installation.

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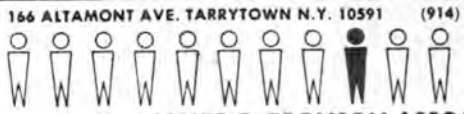
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Equitable Builds Tug/Fireboat For Brazilian Company

The 3,000-hp tug Helio Ferraz is equipped with an external fire-fighting system.

Equitable Equipment Company, one of the world's largest shipbuilders for the marine and oil and gas industries, christened and launched a new 95-foot tug/fireboat at its New Orleans Industrial Canal shipyards. The new tug is the Helio Ferraz, built for Companhia Vale do Rio Doce. It was christened by **Mrs. Iedda Ferraz,** Vitoria, Brazil, widow of **Helio Ferraz,** former general superintendent of the ports of Vitoria and Tubarao. Under Mr. **Ferraz's** direction, the ports of Vitoria and Tubarao became the world's largest iron ore ports. **Mrs. Ferraz** was accompanied to New Orleans, La., by her son **Edmundo** and principals of Itabira International, New York, N.Y.

Principal characteristics of the tug are length overall, 95 feet 6 inches; beam, molded, 28 feet 2½ inches; depth, molded amidships, 13 feet 1⅞ inches; draft, DLWL (maximum), 11 feet 9 inches, and brake horsepower, ABS rating, 3,000.

The vessel is designed and built to American Bureau of Shipping Class Maltese Cross A-1 Towing Service, Maltese Cross AMS, and has an ABS Loadline assigned. The two propulsion engines are DAIHATSU Model 6VSHTCM-26E turbocharged marine diesel engines with DAIHATSU DRA-22D reduction gears. The tug is equipped with an external fire-fighting system, consisting of two gear-driven fire monitors rated 4,000 gpm at 150 psi, each with three position fog-nozzle hydraulically operated at the monitors. The pump is driven by a Detroit Diesel Engine Model 12V149T, turbocharged, rated 1,000 bhp at 1,900 rpm.

The vessel recently departed New Orleans with her crew for Vitoria, Brazil. This is the second Equity tug that will be operated by Companhia Vale do Rio Doce in Brazil, and is indicative of Equitable Equipment Company's shipbuilding capabilities in producing for both the domestic and international markets.

Ass'n Of Senior Eng'rs, NSSC To Hold 11th Annual Symposium In Washington, D.C. Mar. 1974

The Association of Senior Engineers of the Naval Ship Systems Command is sponsoring its 11th Annual Technical Symposium on Friday, March 29, 1974, at the Statler Hilton Hotel in Washington, D.C.

The theme of the symposium is "Ship Design and Maintenance." Technical presentations will begin at 3:30 p.m., followed by a social hour (7 p.m.) and a banquet (8 p.m.).

Reservations and advance information will be accepted by **William Brodowski,** Naval Ship Engineering Center, SEC 6163, Room 221A, Hyattsville, Md. 20782, phone (202) 436-1490.

Houston Firm Buys Tacoma Boatbuilding

The Tacoma Boatbuilding Co. yard in Seattle, Wash., has been sold to a new corporation, the Seattle-Tacoma Shipbuilding Corp., in a $3-million transaction.

The new company was formed by the American Northland Oil Co. of Houston, Texas, with financing through the investment bankers Whitney-Todd of New York City.

Elwin Messer will be president of Seattle-Tacoma Ship, with **William Stutts** secretary-treasurer. **Donald M. Surgenor** will be associated with the firm in international development and as interim yard manager.

Besides its own engineering staff, the company will be assisted in new marine design work by the Seattle naval architectural firm of Nickum & Spaulding Associates, Inc.

Seattle-Tacoma Ship intends to complete all contract work under way at the yard.

New Chartering Firm Formed In Vancouver

International Chartering Services Inc., 17 Battery Place, New York, N.Y., and Greer Shipping Ltd., Vancouver, British Columbia, have jointly announced the formation of International Chartering Services, Ltd., which will be active in dry-cargo and liquid-cargo ship chartering. The company will also offer vessel management and vessel operations services.

Matthew DeLuca Sr. has been named chairman of the new concern and **Robert B. Greer,** president. **Charles W. Plester** will be in charge of the chartering operation of the firm, which will be located at 1619 Marine Building, Vancouver, 1, British Columbia.

Norris Division Of Dover Appoints Two For New Center For East Coast Distribution

Kelley Strang

Glen Tatum

Norris Division of Dover Corporation, Tulsa, Okla., has announced the opening of a distribution center in the New York-New Jersey area for its butterfly valve group, and has made two promotions.

Brad Bertrem, general manager of valve operations, announced that the distribution center, located at 5426 Tonnelle Avenue, North Bergen, N.J. at the west end of the Lincoln Tunnel, would serve the Atlantic Seaboard states.

Kelley Strang has been promoted to district manager northeast, and **Glen Tatum** has been assigned branch manager for the distribution center.

"The distribution center is being established to provide better service to our customers in the Atlantic Seaboard states," said Mr. **Bertrem** in making the announcement. "**Kelley Strang** has served our organization admirably in the past years, and will be responsible for the Atlantic Seaboard area. **Glen Tatum's** achievements at Norris have earned him the promotion to branch manager at the warehouse."

Dover Corporation, Norris Division, manufactures and markets butterfly valves and controls for industrial and marine applications.

HOW OIL WOULD BE RECOVERED: Worked into the bight of a Coast Guard developed barrier designed to contain an offshore oil spill, the experimental prototype oil recovery unit is allowed to drift down current until it can be anchored at the "U" of the barrier. A Coast Guard boat and two inflatable craft jockey the unit developed by Lockheed Missiles & Space Co., Sunnyvale, Calif., into position. Once in position, a 300-foot 10-inch hose is passed to the support vessel which will handle the recovered oil. Also, an integrated umbilical control and refueling cable is passed to the support vessel, enabling the unit to be operated by remote control. This scene took place on San Francisco Bay during tests of the maneuverability, durability and stability of the machine. The oil recovery unit is based on Lockheed's patented CLEAN SWEEP oil-water separator which has been sold to a number of companies.

HDW To Build Four 470,000-Dwt Tankers

Howaldtswerke-Deutsche Werft AG of Hamburg and Kiel, Germany's leading shipyard, announced the signing of contracts for the construction of four 470,000-deadweight-ton tankers with Norwegian owners. These vessels are the largest ever to be built by a German shipyard.

This order was received only one week after the HDW board of directors announced the construction of their new 700,000-ton building dock, and will utilize the capacity of the building dock for a period of almost two years.

Not only are these tankers to be among the largest vessels ever built in the world, but they will—because of their 73-foot shallow draft—also be able to operate in European waters and enter all important discharge ports.

The orders for the tankers were placed by AS Havtor (P. Meyer, Oslo (Hull 86), Smedvigs-Tankrederi AS, Stavanger (Hull 87) and Waages Tankrederi AS, Oslo (Hull 88 and 89).

Delivery of the first two vessels will be 1977, and the last two 1978.

According to **Adolph von Zedlitz,** president of Roland Marine, Inc., U.S. agents for HDW, these tankers are the largest ever contracted by a Norwegian owner.

The dimensions of the vessels are as follows: length, 1,280 feet; beam, 233 feet; depth, 95 feet; draft, 73 feet; shaft horsepower, 50,000, with steam turbine drive.

81ST FOR EVANS DEAKIN: Five tugs of a fleet of six used, turn Australia's newest ship, the 66,000-dwt tanker Robert Miller in the narrow Brisbane River in Brisbane, Queensland, after its float-out from the Evans Deakin building dock (shown astern of the vessel). The river is less than 900 feet wide at this point, and a swinging basin 840 feet across was dredged to turn the 785-foot-long tanker. The ship's stern winches were used to haul the vessel from the dock and then the tugs took over. The tanker was turned without a hitch and taken stern-first ¼ mile upriver to the Evans Deakin fitting-out berth. The Robert Miller was built at a cost of $18 million for R.W. Miller (Holdings) Ltd. for service on the Australian Coast. She is the 81st vessel built by Evans Deakin, and the largest to be built in Queensland. Evans Deakin are about to commence work on an order for a semisubmersible drilling rig for Santa Fe International of California.

Dearborn-Storm To Add Three New Vessels To Fleet

Dearborn-Storm Corporation, 6 North Michigan Avenue, Chicago, Ill. 60602, has announced that it will add three new vessels to its Marine Services Division fleet at a total cost of $4.5 million. Two of the vessels, costing roughly $2 million each, will be large, ocean tug/supply boats. The third, costing about $500,000, will be a smaller and faster utility vessel. Delivery on the boats is expected by mid to late 1974.

These planned additions to Dearborn's fleet raise Dearborn's expansion commitment to oil field marine services to $10.5 million. This figure includes two previously announced large vessels now under construction.

Donald D. Zaretsky, vice president, finance, and operational head of the Marine Services Division, stated: "As offshore drilling activities move further away from established supply bases, the demand for larger support vessels increases. With the addition to our fleet of four of the largest, most powerful support vessels in the world, we can fill an important need and maintain our position as one of the leaders in the industry."

The two ocean tug/supply boats will be powered by 5,500-horsepower engines. Each will be 204 feet long and capable of speeds up to 16 knots. The smaller vessel will be a 115-foot aluminum-hulled utility vessel capable of speeds up to 20 knots.

Preformed Plastic Strips Prevent Cargo Damage

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

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

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

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

Following the January 1971 run to Beirut, the "SS Missouri" made six Pacific crossings during the year, carrying rice, grain and sugar to Viet Nam, Korea, India, and returning with bulk sugar to New Orleans from Hawaii. In all cases, there was no damage to cargo.

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

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

The material is 3/16" thick by 3" wide by 48" long (4.8mm x 7.6 cm x 1.22 ms). It is supplied in fiber cartons containing 60 strips. One carton weighs about 90 pounds (approximately 42 kilos) and provides a sealing length of about 240' (73.2 ms). Carton dimensions are 4" x 13" x 49" (102 cms x 325 cms x 1.225 ms).

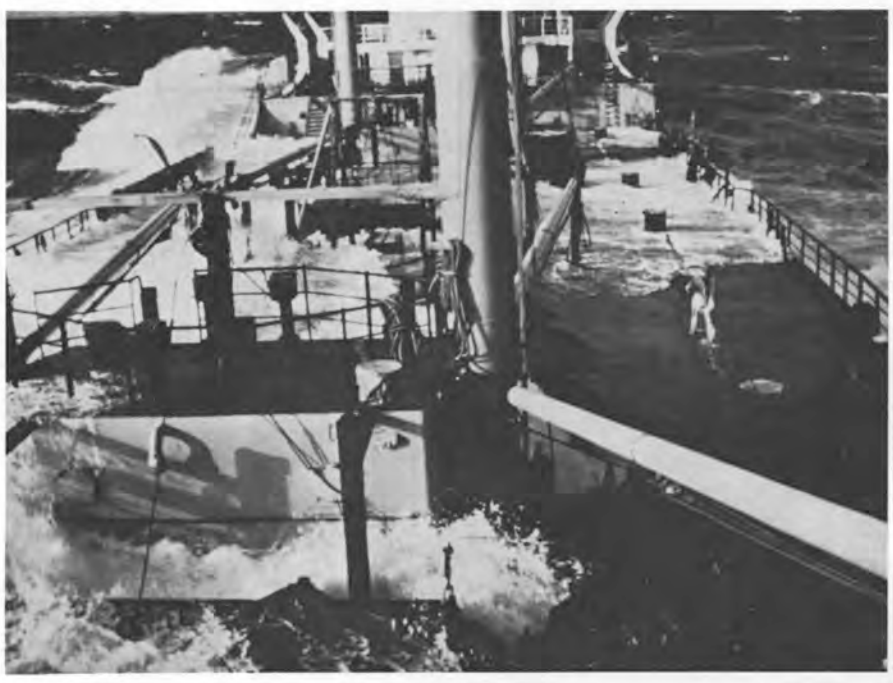
"Routinely, one man strips away the paper strip and hands the strip to the second man, who is kneeling along the joint area to be sealed. The second man puts the end of the strip in position and then lowers the strip, centering it above the joint area. He can either press the strip with his hands or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

"In some instances, under certain conditions, we used a metal plate to bridge the gap. Strips of the sealant tape were centered along the edge of the plate, with half of the strip on the plate, and the other half sealed to the hatch cover. This worked perfectly. Small pieces cut to size were fitted around dogging pins," Roberts said.

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

An indefinite shelf life makes the product particularly valuable. "When I saw how well this stuff worked on the first leg across the Atlantic, I wondered how it would keep. I got the complete answer from material that had been on the shelf ten months, which we used to seal the hatches leaving Galveston. On arrival in Madras, an Indian crew unfamiliar with the product opened the hatches. Good-sized paint flecks came up with the strips, showing a good seal."

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



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

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

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

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

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SEALS OUT SEEPAGE

Los Angeles Plans Big Tanker Port

Detailed preparation of plans to deepen channels leading to the Port of Los Angeles' principal petroleum and bulk-loading terminals in Outer Harbor to a depth of 60 feet were ordered by the board of harbor commissioners.

The dredging is necessary to accommodate tankers of 120,000 deadweight tons already carrying oil to the United States West Coast, but not able to enter Los Angeles Harbor fully loaded, according to a report accepted by the Harbor Commission and prepared by a private consulting firm, Frederic R. Harris, Inc.

Additionally, the Los Angeles Harbor Department staff was instructed to prepare environmental impact assessments at four future potential petroleum terminal points, either in the barbor or just off Point Fermin.

The future petroleum terminals must have a water depth of 80 feet to handle supertankers carrying Alaskan and possibly Indonesian and Mid-Eastern oil. Ships calling on the U.S. Pacific Coast are expected to become as large as 250,000 deadweight tons after the Alaskan pipeline is built and in full use, around the year 1979.

The Harris Report concluded the best possible supertanker terminal at Los Angeles Harbor would be a pier connected to a land-fill located just inside the breakwater and extending northward.

Along with this type of oil facility, the Harbor Department will prepare environmental impact assessments on an island pier terminal outside the breakwater, and two single buoy moorings off Point Fermin.

The Harbor Commission also authorized the Port of Los Angeles management to enter into formal discussions with Western Oil and Gas Association regarding proposed sites, verification of annual volumes, and tanker sizes in order to determine as closely as possible the economic feasibility of the petroleum terminal sites for the port and its customers.

The discussions will also consider the capital investments, sharing of environmental impact report costs, and operating and maintenance costs of the port and its tenants.

Hudson Engineering Develops Compact PrimaVac System

The Penco Division of Hudson Engineering Co., 1114 Clinton Street, Hoboken, N.J., has developed a compact, packaged unit of its PrimaVac System specifically for the removal of bilge water from tugs, work boats, on up to the largest vessels afloat.

It is a completely automated, easily installed system that protects the bilge pump from running dry and eliminates the need for any auxiliary vacuum system. Only minimum maintenance is required for the priming system, since the only moving parts are in the valves, which are readily accessible and easily maintained.

Eight models with capacities ranging from 50 to 700 gpm are standard, although other sizes are available. The units operate at 1,750 rpm. Motor pump drives are non-overloading while handling bilge water up to a specific gravity of 1.03 and viscosity of 100 ssu.

The PrimaVac Bilge System contains all of the features of the main cargo pump system that is now being used throughout the world on tankers with pump capacities to 30,000 gpm.

Bulletin BS-20 gives details and all dimensions of the various models.

Norman Schoenfeld Named President Walworth/Aloyco

Norman Schoenfeld

Norman Schoenfeld has been elected president of the Walworth/Aloyco Division of Walworth Company, Bala Cynwyd, Pa., leading valve manufacturer, it was announced by Walworth board chairman **Anthony A. Goodchild.**

Mr. **Schoenfeld** served for two years as president of the Frick Company in Waynesboro, Pa., a subsidiary of IU International Corporation, which is also Walworth's parent company. He came to Frick from an ITT company, where he held several executive posts.

Walworth/Aloyco manufactures a broad line of valves in ball, butterfly, gate, globe, check and lubricated plug designs—and in materials of bronze, iron, ductile iron, carbon steel, stainless and high alloys—as well as special valves for nuclear, cryogenic and marine applications.

IU provides products and services to worldwide energy, transportation / distribution and environmental markets. Revenues for 1972 were $1.2 billion, with net earnings of $59.4 million.

Zim Lines Name Uri Rosin VP

Mordechai Chovers, president of Zim-American Israeli Shipping Co., Inc., has announced the appointment of **Uri Rosin** as vice president, chartering and breakbulk freight.

Mr. **Rosin,** who joined Zim Lines in Israel in December 1960, has held a number of positions with the organization in Haifa and Ashdod. Prior to his transfer to the United States to assume the post of chartering manager in July 1970, he had served as vice president of the company's Ashdod office.

In his new post, he will be responsible for the company's worldwide chartering operations, including sales, as well as all breakbulk vessel activity involving U.S. ports.

Mr. **Rosin** holds the degree of bachelor of business administration from the Baruch College of the City University of New York, where he majored in marketing. He has, in addition, completed a graduate course in advance chartering problems.

Brewer-Titchener Appoints John Malin

John Malin

John Malin has been appointed sales and marketing manager of the Industrial Products Division of Brewer-Titchener Corporation, Cortland, N.Y., according to **J. Ward Abbott,** vice president of sales and marketing.

Mr. **Malin** will be responsible for all sales and marketing activities of the division, which now includes the Boston and Lockport Corporation of East Boston, Mass. He was vice president-sales of Boston and Lockport Block Co., Inc.

Brewer-Titchener Corporation is a leading manufacturer of high-quality hardware for electrical transmission lines, and has long manufactured and marketed wire rope and chain hardware for the marine and industrial markets.

Mr. **Malin** has spent his entire career with Boston and Lockport Block Co., Inc., first joining the firm in 1937. He served in the U.S. Army Air Force for four years during World War II, and attended St. John's University in New York City.

French Yard To Build 550,000-Ton Tanker

Cie Nationale de Navigation, in which the nationalized oil group Elf-Erap has a large interest, has ordered a 550,000-ton tanker from Chantiers de l'Atlantique Shipyards.

Elf-Erap said the ship will go into service in 1977 and carry oil to the various refineries run by the French oil group in Western Europe.

The company said the tanker will be one of the largest ever built by the shipyards located in Saint Nazaire, Loire River Estuary.

Moore-McCormack Appoints C.J. Netzel

Moore-McCormack Lines, Incorporated has announced the appointment of **Charles J. Netzel** as district manager for Detroit. He succeeds **Clinton F. Hodder,** who was recently transferred to New York as Eastern representative for States Steamship Company, San Francisco, Calif.

Moore-McCormack Lines is general agent for States Line in the Eastern United States and Canada.

Mr. **Netzel** was previously district traffic representative for the Chicago area. He attended DePaul University and the College of Advanced Traffic in Chicago, Ill., and he is a member of the Delta Nu Alpha Society.

John Traina Joins Prudential-Grace Lines

John A. Traina Jr., with American President Lines for 20 years, and most recently its Passenger Division head, has joined Prudential-Grace Lines as vice president-Passenger Division. The announcement was made by **Albert B. Wenzell,** vice president and general manager of Prudential-Grace Lines Pacific Division.

485,000-Ton Tanker Contract Awarded To Uddevallavarvet

Uddevallavarvet, the state-owned shipyard on the Swedish west coast, has received a contract for a 485,000-ton tanker from a Scandinavian owner. This is the largest ship ever ordered in Sweden.

The supertanker will be the first vessel to be built in Uddevallavarvet's new building dock, which will be completed in 1977. The tanker is scheduled for delivery in 1978, and negotiations for another ship of this size and for delivery in the same year was reported.

Uddevallavarvet's present order books comprise 19 vessels aggregating 3.61 million deadweight tons, the largest order backlog in the yard's history. In addition to the 485,000-ton tanker, contracts include tankers of two sizes—233,000 and 127,000 dwt—and one bulk carrier of 118,000 dwt.

Bids Invited On M/V Floridian For Operational Use

By Invitation for Bids No. PD-X-966, the Maritime Administration proposes to sell the M/V Floridian, Official Number 282,733. The ship is offered for sale to United States citizens for operation, subject to the limitations and restrictions of Section 9 of the "Shipping Act, 1916," as amended, under the terms and conditions set forth in Invitation for Bids PD-X-966. The ship is located in the James River Reserve Fleet, Ft. Eustis, Va.

There is no published minimum acceptable bid price for the M/V Floridian. However, the Maritime Administration reserves the right to reject any bid not considered commensurate with the value of the ship.

The purchase price is payable in cash or, alternatively, under credit terms payable 12½ percent at time of sale, which may include the bid deposit of 10 percent required with the bid and the balance in 46 equal quarterly mortgage installments, with interest at 8 percent per annum.

The Maritime Administration, by acceptance of a cash bid, will approve, pursuant to Sections 9 and 37 of the Shipping Act, 1916, as amended, the transfer of the ship to foreign flag, provided the Buyer executes an agreement containing the provisions set forth in Part II, paragraph A. (3) of the Foreign Transfer Policy of 1964, as amended.

Bids will be received until 2:30 p.m., Eastern Standard Time, November 12, 1973, and public opening will be held at 2:30 p.m., Eastern Standard Time, on that date at the offices of the Maritime Administration, Room 3710, Commerce Building, 14th Street between E and Constitution Avenue, N.W., Washington, D.C. 20230.

Copies of the Invitation for Bids giving the terms and conditions of sale and providing bid forms may be obtained from any of the following offices:

Chief, Fleet Disposal Branch, Maritime Administration, Commerce Building, 14th Street between E and Constitution Avenue, N.W., Washington, D.C. 20230.

Eastern Region Director, Maritime Administration, 37th Floor Federal Building, 26 Federal Plaza, New York, N.Y. 10007.

Central Region Director, Maritime Administration, P.O. Box 52948, New Orleans, La. 70152.

Western Region Director, Maritime Administration, 450 Golden Gate Avenue, Box 36073, San Francisco, Calif. 94102.

Eastern USA Branch I. Mar. E. To Meet Nov. 27 In N.Y.C.

The Eastern Branch of the Institute of Marine Engineers will hold a meeting at the New York Times Executive Dining Room (11th floor), 229 West 43rd Street, New York, N.Y., on Tuesday, November 27, 1973.

There will be a social hour commencing at 5:30 p.m., at which a bar will be open and light refreshments served. The technical session will be given by Comdr. **E.H.W. Platt,** M.B.E., who will present an updated version of the paper "Development and Operation of an Inert Gas System for Oil Tankers." The cost to members and guests will be $4 each.

H.P. Drewry Ltd. Appoints Directors

H.P. Drewry (Shipping Consultants) Limited, 87-91 New Bond Street, London W1Y 9LA, England, has announced that **Andrew Carpenter,** manager of its oil department, has been appointed to the board of directors and will be responsible for all oil study and consultancy work.

The company also announced that **Dennis Stonebridge,** manager of the shipbuilding, tramp and liner departments, has also been appointed to the board of directors and will be responsible for all work and consultancy within these departments.

Mathers Controls Names Warner Gilbert

Mathers Controls, Inc., 902 N.W. Ballard Way, Seattle, Wash. 98107, has announced the recent appointment of **Warner E. Gilbert** as manager of domestic and international sales. Mr. **Gilbert** succeeds **Donald N. Healy** in this position.

Recognized specialists in marine propulsion control systems, Mathers Controls, Inc. is now doing business worldwide, providing control systems to meet the requirements of reverse-reduction gears, controllable pitch propellers (Auto. Load Control), direct reversible, compound engines (Load Balance), and a recently introduced compact Bow Thruster Control package.

Moving up from the field engineering sales staff, Mr. **Gilbert** brings years of direct application experience to his new position, and invites direct inquiries regarding the company's products.

Ivory Coast Republic Honors Thomas Smith

Thomas J. Smith, president of Farrell Lines Incorporated, has been awarded a decoration as a Member of the National Order of the Ivory Coast Republic. The award is made to Americans who have contributed to the progress of the Ivory Coast and to the good relations between the United States and the Ivory Coast.

The Honorable **Felix Houphouet-Boigny,** President of the Republic of the Ivory Coast, made the presentation on October 16 at the Waldorf-Astoria Hotel in New York City.

Mr. **Smith,** a resident of Oradell, N.J., was a member of the Advisory Council of African Affairs, U.S. Department of State. He received the 1973 "Man of the Year" award from the Foreign Commerce Club and has been decorated by the President of Liberia with the Grand Band, the highest rank of the Order of the Star of Africa.

New System For Barge Transportation

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This new service will be maintained by the world's first bacatship, Bacat I, a semi-catamaran vessel which was built by the Danish shipyard of Frederikshavn Vaerft and Turdok, A.S. Plans call for this unique vessel to make 130 round-trip voyages annually, beginning in 1974, between Hull and Middlesbrough in England, and Rotterdam.

The new vessel has two hulls which are joined together at the bow. It has an overall length of 339.5 feet, a width of 67.9 feet and a depth of 34.4 feet. The ship's twin propellers are powered by two 18-cylinder Burmeister & Wain Alpha engines with a capacity of 2,250 horsepower each. These engines give the ship a service speed of 12½ knots. There are accommodations on board for 14 crew members.

Bacat I will carry 10 Bacat barges on its deck. The barges are 55.8 feet long, 15.1 feet wide, and have an outside height of 10.7 feet. Each barge can hold 140 tons of cargo. Loading and unloading of these barges will be done by a crane with a 400-ton capacity. A total of 63 of these barges have been ordered from the Yorkshire Drydock Company in Hull, England, with delivery scheduled for early next year. In addition, in the space between the ship's two hulls three LASH-type barges will be carried, each of which has a cargo capacity of 370 tons.

As general agents, Holland America will represent the Bacat service in the Benelux countries, West Germany, Switzerland and the French ports along the Rhine River.

With the introduction of this new service, raw materials and partially finished products will now be able to flow in short trips between northern England and Rotterdam as well as the industrial area of the Rhine River Delta. It is expected that the system will also extend to Antwerp and the Ruhr industrial complex of West Germany.

SERVICE MACHINE TUG ORDER: Shown above, **Andy Wedaman,** center, president of F & S Boat Corp., a division of Elpac, Inc., signs contract for two tugs to be constructed by Service Machine & Shipbuilding Corp. of Morgan City, La. Representing Service Machine & Shipbuilding Corp. at the signing were, on the left, vice president **B.C. Fernandez,** and on the right, director of marketing **W.K. (Bill) Thompson.** The order is for a 1,200-hp tug 70 feet by 24 feet by 9 feet, and a 2,400-hp tug 100 feet by 27 feet by 14 feet, both of which are to be delivered during 1974.

Riley-Beaird's Maxim Division To Supply Thirteen Evaporators For MSC And SST Tankers

Riley-Beaird's Maxim Evaporator Division, P.O. Box 1115, Shreveport, La. 71130, has received contracts from Todd Shipyards (San Pedro), and Bath Iron Works for the supply of thirteen 2-stage flash evaporators for installation aboard MSC and SST tankers now under construction at those shipyards.

The new packaged 5,000-gallon-per-day desalinators are to be built at Riley-Beaird's giant manufacturing facilities in Shreveport. Fully packaged and automated for unattended service after start-up, these new desalinators will operate for extended periods without shutdown for cleaning, and without chemical feed treatment.

The Maxim Division also received contracts for the supply of the cargo tank cleaning seawater heaters aboard these same tankers.

Delaval Diesels To Power Modular Bulk Transport Ship

Two Delaval RV Series 16-cylinder diesel engines, producing 8,000 bhp each at 440 rpm, will power the world's largest dry bulk carrying combination tug-barge, the engine manufacturer announced. The engines will drive twin screws through reverse-reduction gears permitting speeds over 16 knots for the 35,000-dwt barge. These RV16s are designed to burn diesel oil or heavy fuels with viscosities to 3500 seconds Redwood No. 1.

Intercoastal Bulk Carriers, a subsidiary of Bulk Food Carriers of San Francisco, Calif., will use the $19.3-million vessel to carry 25,000-ton loads of rice and lumber from Sacramento and San Francisco to Florida and Puerto Rico, returning with phosphate and other cargoes.

The tug-barge was designed by Breit Engineering of New Orleans, La., and will be built under license from Ingram Ocean-going Systems, also of New Orleans, by two shipyards —Maryland Shipbuilding of Baltimore, Md., manufacturing the barge, and Southern Shipbuilding of Slidell, La., producing the tug.

RV engines are vee-configuration diesels that are marketed in 12, 16 and the new 20-cylinder versions. The RV20, with horsepower ratings to 12,500 bhp, is the most powerful diesel engine designed and manufactured in the United States. These engines are also offered in dual fuel models for power generation in stationary installations.

Delaval Turbine Inc. is a manufacturing subsidiary of the Transamerica Corporation of San Francisco, Calif.

ITT Decca Marine, Inc. Introduces Versatile Floating Marine Electronics Showcase

The 57-ft. Navigator II will see year round service cruising the East and Gulf Coasts demonstrating ITT Decca electronic products to owners of all types of floating equipment.

Richard V. Warden, president of ITT Decca Marine, Inc., has officially commissioned the M/Y Navigator II, the company's new demonstration vessel.

Fitted with over $100,000 of the company's latest marine electronic equipment, the Navigator II represents a versatile floating marine electronics showcase.

The vessel is a 57-foot twin-diesel-powered offshore trawler yacht which will serve many functions for ITT Decca Marine and its 100 nationwide dealers. She will assist dealers in several important ways—serving as a new operational training center, a floating classroom for marine electronic service techniques and as a realistic demonstrator for customers.

The new ITT Decca marine trawler yacht is fitted with over $100,000 of company's marine electronic equipment.

The vessel is equipped with representative models from the wide range of electronic products supplied by ITT Decca—all fully operational. These include five radar displays, including the latest "solid-state" anticollision system, two autopilots, a gyrocompass, five echosounders and three radios (two VHF, and one SSB).

There is something of interest for every type of marine user, whether he be a yachtsman, commercial fisherman or the operator of the largest ships afloat. Shipowners will have many opportunities to visit Navigator II, whose home port is New York. However, she will see year round service cruising the East and Gulf Coasts, and will be going from the boat show at Newport, R.I., to Annapolis, Md., and later to the Miami Boat Show.

Mathers Controls Names Warner Gilbert

Mathers Controls, Inc., 902 N.W. Ballard Way, Seattle, Wash. 98107, has announced the recent appointment of **Warner E. Gilbert** as manager of domestic and international sales. Mr. **Gilbert** succeeds **Donald N. Healy** in this position.

Recognized specialists in marine propulsion control systems, Mathers Controls, Inc. is now doing business worldwide, providing control systems to meet the requirements of reverse-reduction gears, controllable pitch propellers (Auto. Load Control), direct reversible, compound engines (Load Balance), and a recently introduced compact Bow Thruster Control package.

Moving up from the field engineering sales staff, Mr. **Gilbert** brings years of direct application experience to his new position, and invites direct inquiries regarding the company's products.

Ivory Coast Republic Honors Thomas Smith

Thomas J. Smith, president of Farrell Lines Incorporated, has been awarded a decoration as a Member of the National Order of the Ivory Coast Republic. The award is made to Americans who have contributed to the progress of the Ivory Coast and to the good relations between the United States and the Ivory Coast.

The Honorable **Felix Houphouet-Boigny,** President of the Republic of the Ivory Coast, made the presentation on October 16 at the Waldorf-Astoria Hotel in New York City.

Mr. **Smith,** a resident of Oradell, N.J., was a member of the Advisory Council of African Affairs, U.S. Department of State. He received the 1973 "Man of the Year" award from the Foreign Commerce Club and has been decorated by the President of Liberia with the Grand Band, the highest rank of the Order of the Star of Africa.

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$5-Million Modernization Starts At Dravo Neville Island Plant

Ground was broken on October 9 as full-scale work began on a $5-million modernization of Dravo Corporation's Neville Island Plant near Pittsburgh, Pa.

Preliminary site preparation has already been finished for the project, the third major improvement at the facility since 1965.

The company has spent $12.5 million in capital improvements at the Neville Island Plant alone in the past eight years, increasing production to meet continuing high demand for its products—assemblies indoors for stacker-reclaimers, ship and barge unloaders, and specialized equipment for the steel, mining and utility industries.

The firm's current backlog of business in these lines is approximately $100 million.

Employment has increased about 45 percent —from 950 to 1,400—at the Engineering Works Division plant during the past 24 months.

Robert Dickey III (sitting at the controls), president of Dravo Corporation, headed the team that broke ground as full-scale work began on the $5-million expansion of the company's Neville Island Plant.

Robert Dickey III, Dravo president, headed the groundbreaking team, which consisted of other Dravo executives and officials of Local No. 61, Industrial Union of Marine and Shipbuilding Workers of America, AFL-CIO.

Mr. **Dickey** said current modernization, which focuses on Engineering Works' structural shop, should reduce costs and further improve the company's position in the marketplace.

He added that the expansion—which should be finished in October 1974—was "prompted by several factors."

Mr. **Dickey** said there should be "a continuing favorable market for marine equipment, although undoutedly there will be short-term 'downs' as well as 'ups.' To participate in this market substantially, we must be fully competitive. The new facility will also enable EWD to manufacture materials handling equipment and other products more effectively."

The 58,000-square-foot addition will house two 50-ton cranes providing a capability for lifts of 100-ton sections. There will be a clear-height of 50 feet between crane hook and floor. This will be 18 feet higher than the existing facility. The project will involve relocating part of the yard railroad system.

The last two plant expansions, completed in 1966 and 1972, involved $7.5 million, and included an addition to the barge shop building and installation of new production equipment.

West European Conference On Marine Technology To Be Held May 14-18, 1974, In The Hague

The first West European Conference on Marine Technology initiated by the Dutch, French, German and British institutions of naval architects and marine engineers is to be held in The Hague, May 14-18, 1974.

The purpose of this conference is to demonstrate in a tangible way the advantages of a cooperative attitude between European institutions of naval architects and marine engineers. Such a meeting will also provide a common basis on which to present and discuss the progress of European maritime science and technology to the benefit of the shipbuilding industries concerned.

The central theme of the conference in 1974 is to be "The Future of West European Marine Technology—Problems with Large Energy Carriers."

Eight papers will be presented and discussed in two days covering important topics such as VLCC ship-harbor design, LNG carriers and ports, ship handling and propulsion, marine and marine electrical engineering, the construction, hull strength and vibration of large energy carriers. Social and ladies' programs will be provided. The official conference language will be English.

For information on registration fees, preprints of papers, accommodations, transportation, etc., write to The Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1X 8BQ.

New Executive Appointments At Communication Associates

At the annual directors' meeting of Communication Associates, Inc., **Donald J.S. Merten,** president of the Huntington Station, N.Y., manufacturer of marine and aviation communications equipment, announced the appointments of three new vice presidents and two new members of the board of directors.

Designated vice president for finance was **John Bredin.** Mr. **Bredin,** who has been with CAI since 1971, has served as the company's comptroller.

The post of vice president for operations has been assigned to **Loring Sahud,** formerly the company's manager of operations. He has been a CAI employee since 1963.

Gerald Gutman is CAI's new vice president for marketing. With the company since 1963, he had been sales manager.

The new directors are **Tom Beltrani,** manager of production engineering at CAI, and **Mrs. Patricia Brack,** wife of the company's executive vice president and director of engineering **Werner Brack.**

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Degree required. Minimum 5 years experience as a Naval Architect in shipyard engineering office or owners technical staff. Practical experience should include basic ship and ship structure design, economics of ship selection, hull hydrodynamics, deck machinery selection, ship dynamics including vibration determination, and shipyard techniques and procedures.

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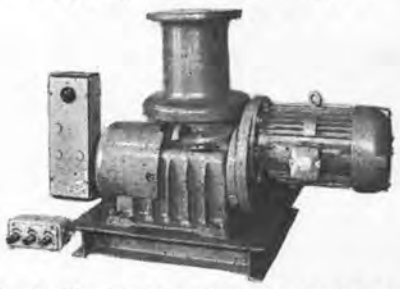
8000 CFM/10,000 CFM/35,000 CFM

440 VOLTS AC

1000 CFM—Bufallo A1A4W5—¾ HP—440/3/60/3450
2000 CFM—220/440/3/60—1.5 HP/3400 RPM
Other sizes from 3,000 CFM to 16,000 CFM

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



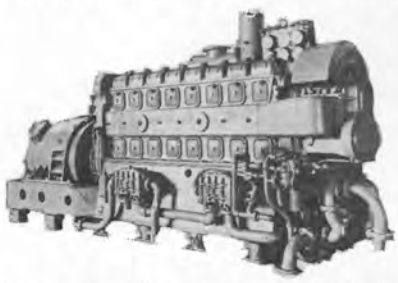
MOTOR: 10 HP—totally enclosed—fan cooled—continuous duty—horizontal flange mounted—special shaft & oil seal fitted—220/440/3/60—1760 RPM. CONTROL: Marine type watertight pushbutton — forward / reverse / stop—watertight starter box—rated for 40 starts/hour—triple pole contactor with silver contacts, thermal 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

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



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

$3750

THE BOSTON METALS COMPANY

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

M.G. SETS

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

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

$89.50 EACH

UNUSED—10 KW—120/1/60 M.G. SET

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

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

THE BOSTON METALS COMPANY

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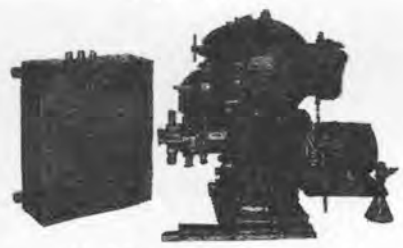
FUEL OIL OR LUBE OIL PURIFIER



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

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
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UNUSED 1⅝" HEAVY DUTY LINK BELT WINDLASS

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

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
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8" x 8"
WATEROUS HEAVY DUTY ROTARY CARGO PUMP

Mfg. Waterous Co.—730 GPM—pump speed 232 RPM—reduction ratio 900/232—8" suction—type P-1256—80 PSI pressure—60 HP—herringbone reduction gear—8" discharge.

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. 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

ALLIS-CHALMERS 1200 KW
D.C. GENERATORS

Suitable for Direct Electric Drive Vessels, Oil Field Generators, Etc.

1200 KW—525 Volts D.C.—750 RPM—2290 amps—totally enclosed—self-ventilated with surface air coolers. Frame: split type. Bearings: split sleeve, spherical seat, self-aligning. Separately excited from a 120 volt source. Continuous duty. Type of armature winding: Allis-Chalmers Frog-Leg, Class B insulation. Ambient temperature 40° C. Temperature rise: 75°C on commutator—70°C on windings. Manufacturers' type MHC. 10 Poles —10 brush studs—8 brushes per stud. Brush sizes: 2¾" x1¼"x¾" All mounted on steel base.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
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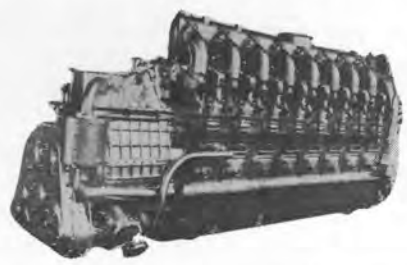
G.M. 16-278A
1700 H.P.
DIESEL ENGINES



Complete, clean and in very good condition. As removed from U.S. Naval vessels. 1700 HP @ 750 R.P.M. Your inspection invited.

$8750

THE BOSTON METALS COMPANY

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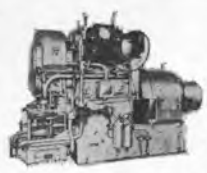

G.M. 3-268A
100 KW A.C. Diesel
GENERATOR SET

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

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

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
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SHIPBOARD EQUIPMENT

From

ZIDELL EXPLORATIONS INC.

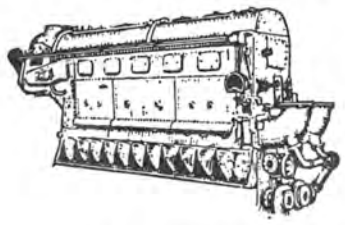
Contact: Ralph E. Ingram
3121 S.W. Moody Ave., Portland, Ore. 97201
Telex: 36-0503 • Cable "ZIDELL"
PHONE: A/C 503 • 228-8691

A partial listing of our stock from EX-NAVY and MARITIME VESSELS

Certifications to A.B.S. or Lloyd's a routine

SEE OUR 2-PAGE SPREAD IN ALTERNATE ISSUES OF M.R.

MARINE DIESEL ENGINES

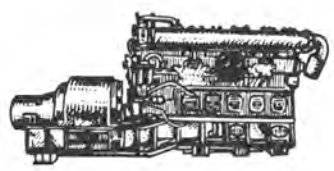


MATCHED PAIR . . . FAIRBANKS-MORSE Model 38D8-⅛ — 1 Port; 1 Starboard. Used condition, 1800 HP, 800 RPM, 2 cycle, 8½" bore, 10" stroke, Air Start.. Complete with Westinghouse Reduction Gears, 2.216:1 ratio —with Hydraulic Coupling.

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

Many other units in stock

TURBINE GENERATORS—AC and DC Voltage

A.C.

2—1500 KW, GENERAL ELECTRIC Turbines: Type FN4-FN30, Steam 525 PSIG. 8145 RPM, with G.E. Generators, 1500 KW, 450/3/60.

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

4—600 KW, GENERAL ELECTRIC Turbines: Type FN3-FN20, Steam 525/565 PSIG, 10033 RPM, with G.E. Generators, 600 KW, 450/3/60.

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

2—500 KW, GENERAL ELECTRIC Turbines: Type FN3-FN20, steam 375/425 PSI, 6 Stage, 9987 RPM. Generators: 500 KW, 450/3/60, 1200 RPM, Type ATI.

D.C.

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

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

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

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

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

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

FAST REPLIES ON YOUR INQUIRIES!

Rebuilt and Guaranteed

AXIAL FLOW FANS

LaDel, Sturtevant, etc.

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

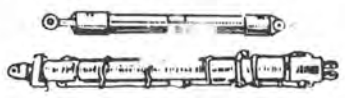
EXAMPLE LISTING:

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

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



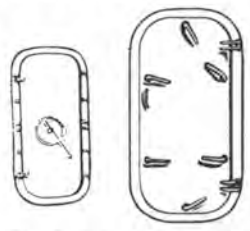
Bore	Overall Stroke	Rod Diameter	Retracted Length	Action
10"	12"	3.75"	45½"	double
10"	26"	3.75"	58½"	double
2"	8"	1½"	20"	double
2.5"	15"	1.12"	25½"	double
3"	8"	1.37"	15½"	double
6"	8"	4"	144"	double

CARGO HOISTER BLOCKS

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

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

STEEL WATERTIGHT DOORS

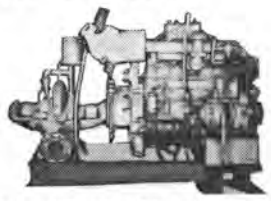


Used, Good Condition, Trimmed Frames.

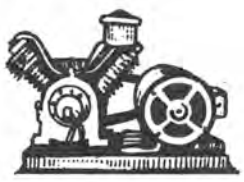
Many sizes available, priced reasonable. Some Typical Prices shown below. Please Inquire for other sizes.

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

FIRE PUMPS



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



AIR COMPRESSORS

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

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

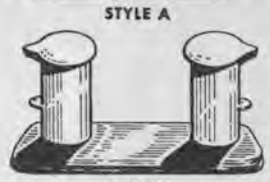
2—WESTINGHOUSE AIR BRAKE Steam, Size 11x11x12, approximately 60 CFM at 100 PSI.

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

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

DOUBLE BITS

STYLE A



STYLE B

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

Specify quantity, size and style required for fast quotation.

FAIRLEADS

Designed and Manufactured by ZIDELL EXPLORATIONS INC.

Model Design
$1350 each

Prices are F.O.B. Portland, Ore.

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

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

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

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Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

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Combustion Engineering, Inc., Windsor, Connecticut 06095

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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
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Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144
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

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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

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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
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Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144

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Houston Systems Mfg. Co., P.O. Box 14551, Houston, Texas 77021
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
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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

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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

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Galbraith-Pilot Marine Corp., 166 National Rd., Edison, N.J. 08817
Harvard Murlin Div., P.O. Box 302, Quakertown, Pa. 18951
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Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

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

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LIGHTS—Emergency, Search & Navigation
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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

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Carboline Co., 350 Hanley Industriol Court, St. Louis, Mo. 63144

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Philadelphia Gear Corp., Schuylkill Expressway, King of Prussia, Pa. 19406

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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
Stow Mfg. Co., 225 Shear St., Binghamton, N.Y. 13902
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

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Port Electric Turbine Div., 155-157 Perry St., New York, N.Y. 10014
Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Turbo Power & Marine Systems, Subsidiary of United Aircraft Corp., 1690 New Britain Ave., Farmington, Conn. 06032

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Rhode Island Hospital Trust National Bank, 15 Westminster Street, Providence, R.I. 02903

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Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Crandall Dry Dock Engrs., Inc., 238 Main St., Cambridge, Mass. 02142
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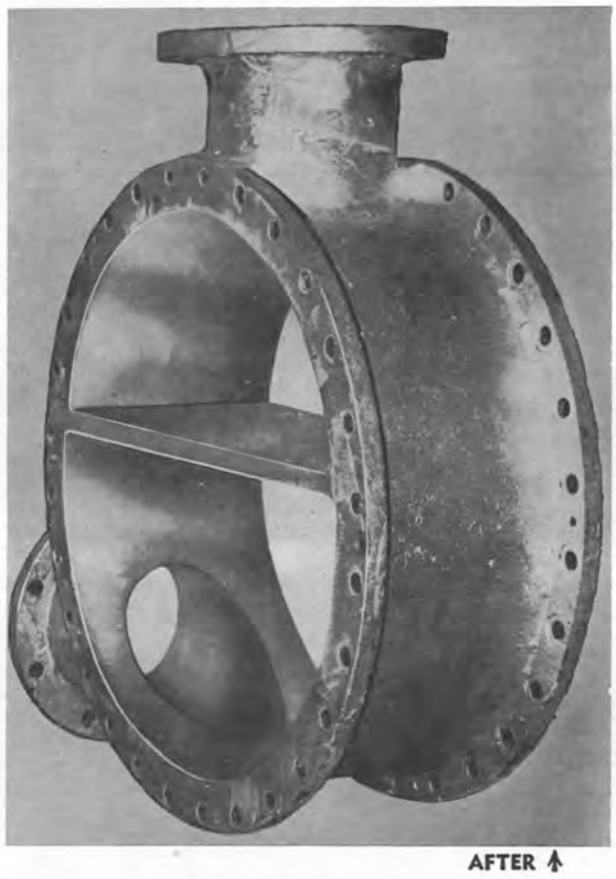

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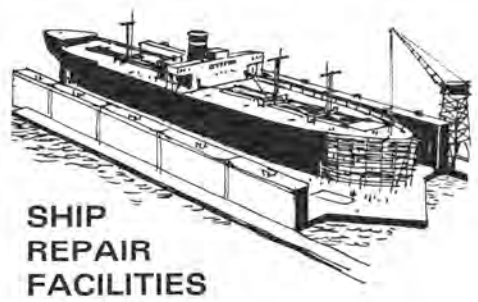

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