MARITIME REPORTER
AND
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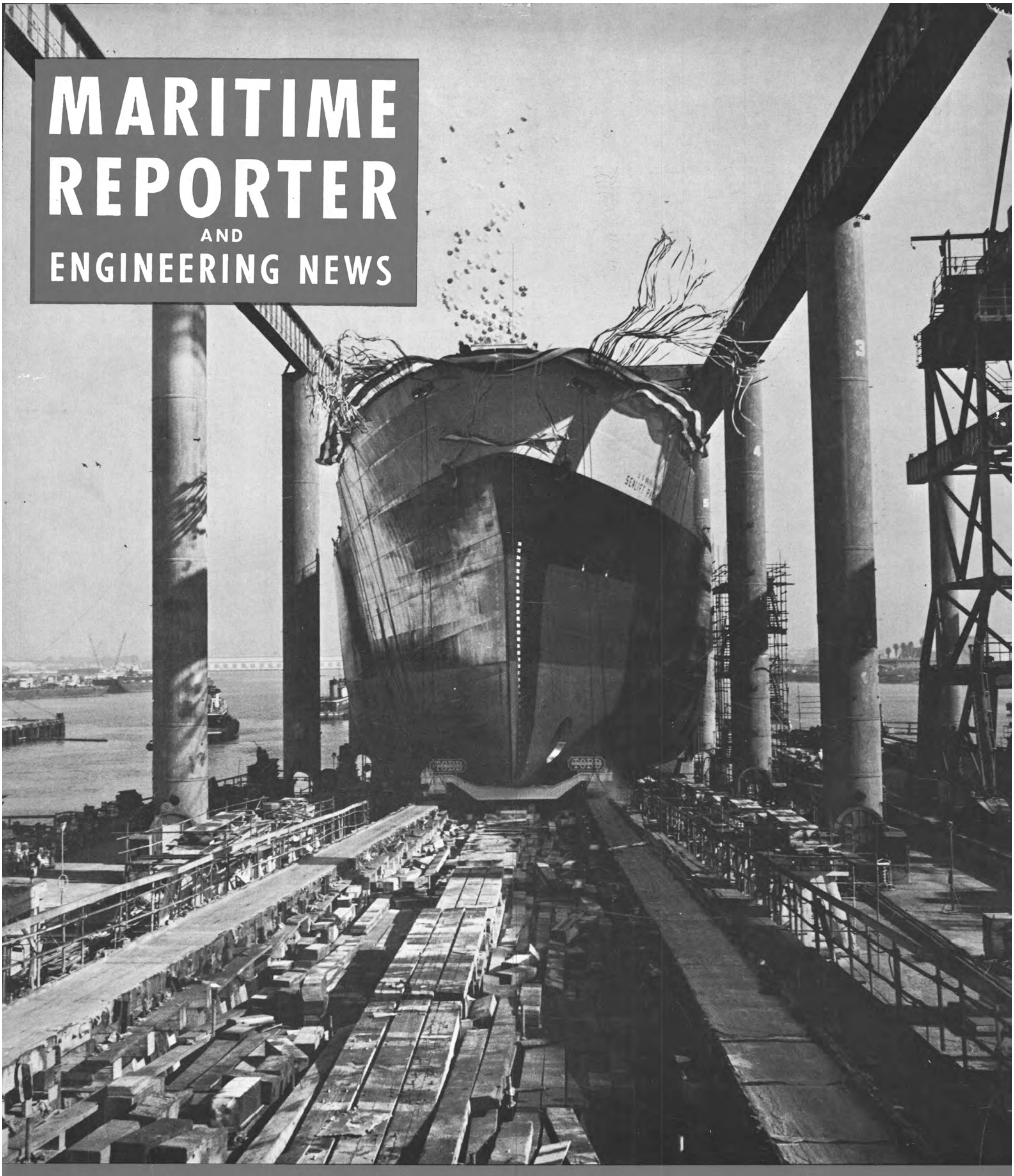
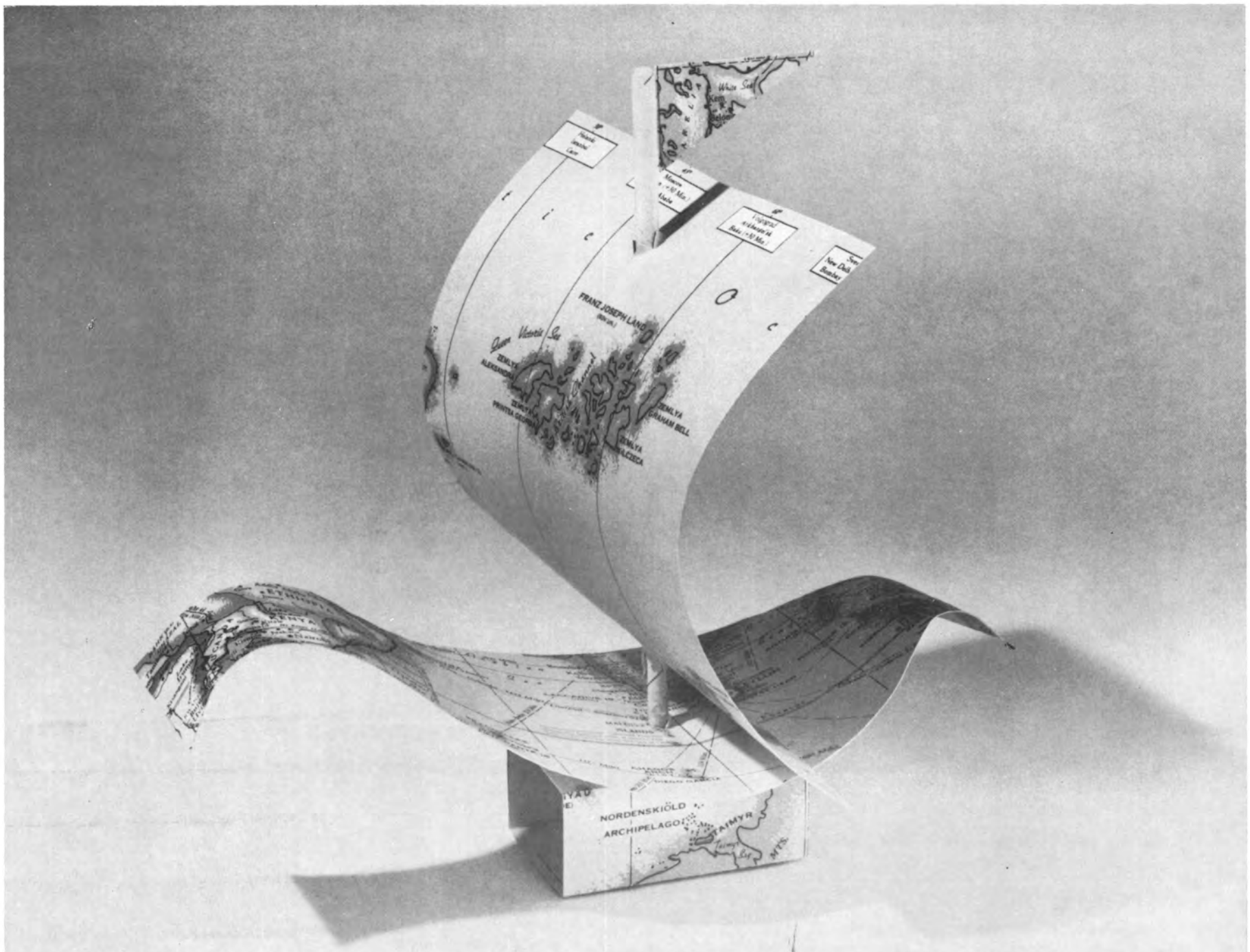


Todd Los Angeles Division Launches First Of Four Tankers For Charter To Military Sealift Command
(SEE PAGE 7)

U.S. Shipbuilding Commission Report
(SEE PAGE 19)

NOVEMBER 15, 1973



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Mitsui To Build 414,000-Dwt Tanker

Mitsui Shipbuilding and Engineering Company, Chiba, has contracted to build an ultra large crude carrier (ULCC) for P&O, it was announced in London. P&O, the world's largest independent shipping group, has ordered the biggest ship in the firm's 140-year history — a 414,000-dwt tanker—from the Japanese shipbuilder.

The new ULCC is due to enter service with P&O bulk shipping division during 1977. However, the new vessel will be only slightly larger than three ULCCs already on order to Anglo-Nordic, a firm that is jointly owned by P&O and Palmerston Holdings. The latter ships are also due for delivery in 1977.

Mooremack Subsidiary Charters 3 Tankers To Shell Int'l Petroleum

Moore and McCormack Co., Inc. (NYSE, Pacific) recently announced that its subsidiary, Moore-McCormack Bulk Transport, Inc., has chartered three 38,000-ton product carriers for a seven-year period to Shell International Petroleum Company, Ltd., which is a member of the Royal Dutch/Shell Group of companies.

The three tankers, now under construction at the San Diego, Calif., shipyard of National Steel and Shipbuilding Co., are scheduled for delivery in October 1975, June 1976 and January 1977.

National Boat Wins Title XI Approval For Six Vessels

The Maritime Administration has approved a Title XI application from National Boat Corporation, Houston, Texas, in connection with four 5,600-hp oceangoing tugs and two 1,700-hp supply vessels. American Marine Corporation, New Orleans, La., will build the first two tugs at a total cost of $4.2 million. The contract for the other vessels has not been signed.

Texaco Seeks Subsidy To Build Three VLCCs

Texaco Inc., New York, N.Y., has filed a construction differential subsidy with the Maritime Administration in connection with plans to construct three vessels.

The proposed ships, based on a design by Todd Shipyards, will be 383,600-dwt very large crude carriers (VLCCs), and each will cost an estimated $114 million. No shipbuilder has yet been selected for the job.

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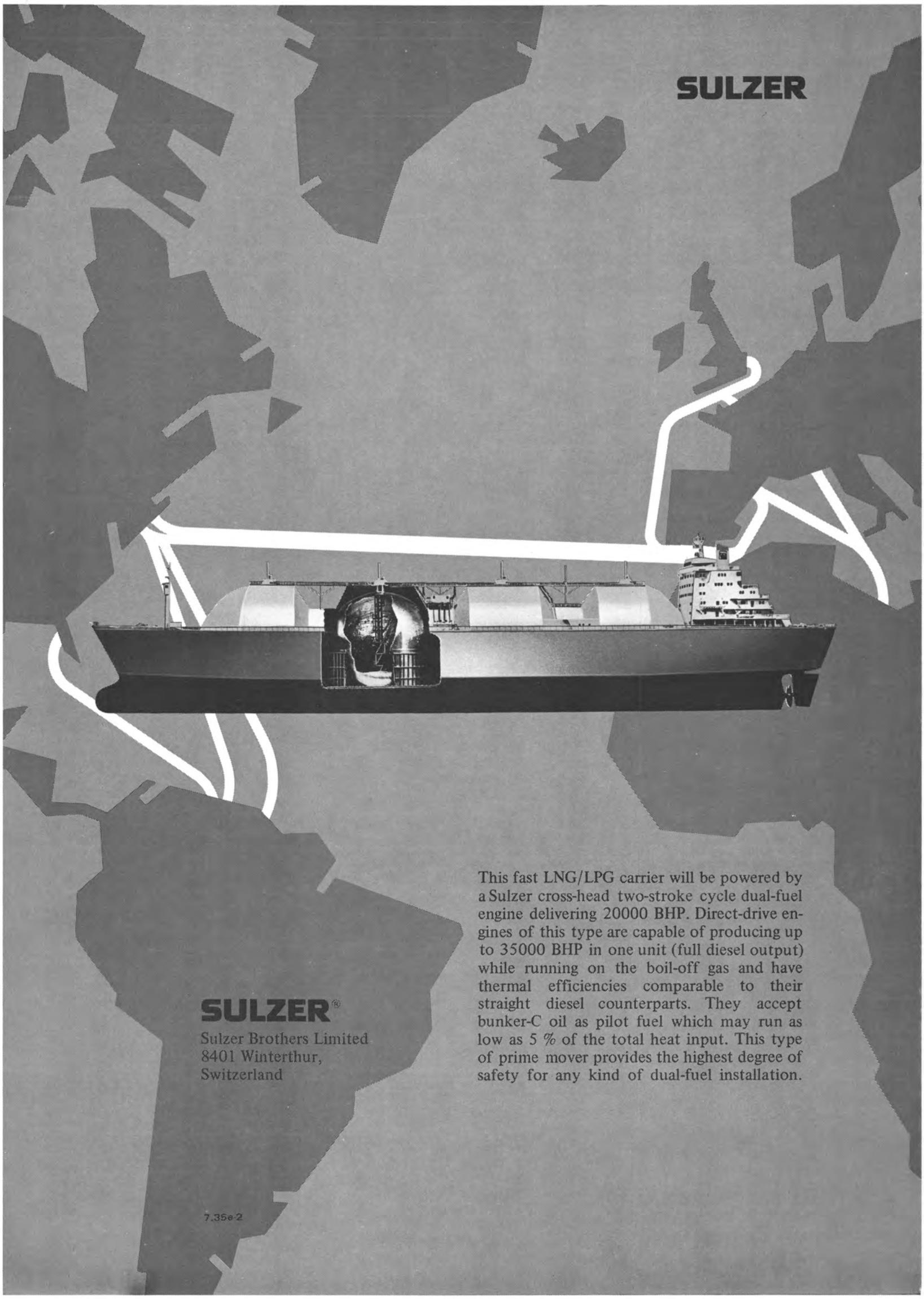

This fast LNG/LPG carrier will be powered by a Sulzer cross-head two-stroke cycle dual-fuel engine delivering 20000 BHP. Direct-drive engines of this type are capable of producing up to 35000 BHP in one unit (full diesel output) while running on the boil-off gas and have thermal efficiencies comparable to their straight diesel counterparts. They accept bunker-C oil as pilot fuel which may run as low as 5 % of the total heat input. This type of prime mover provides the highest degree of safety for any kind of dual-fuel installation.

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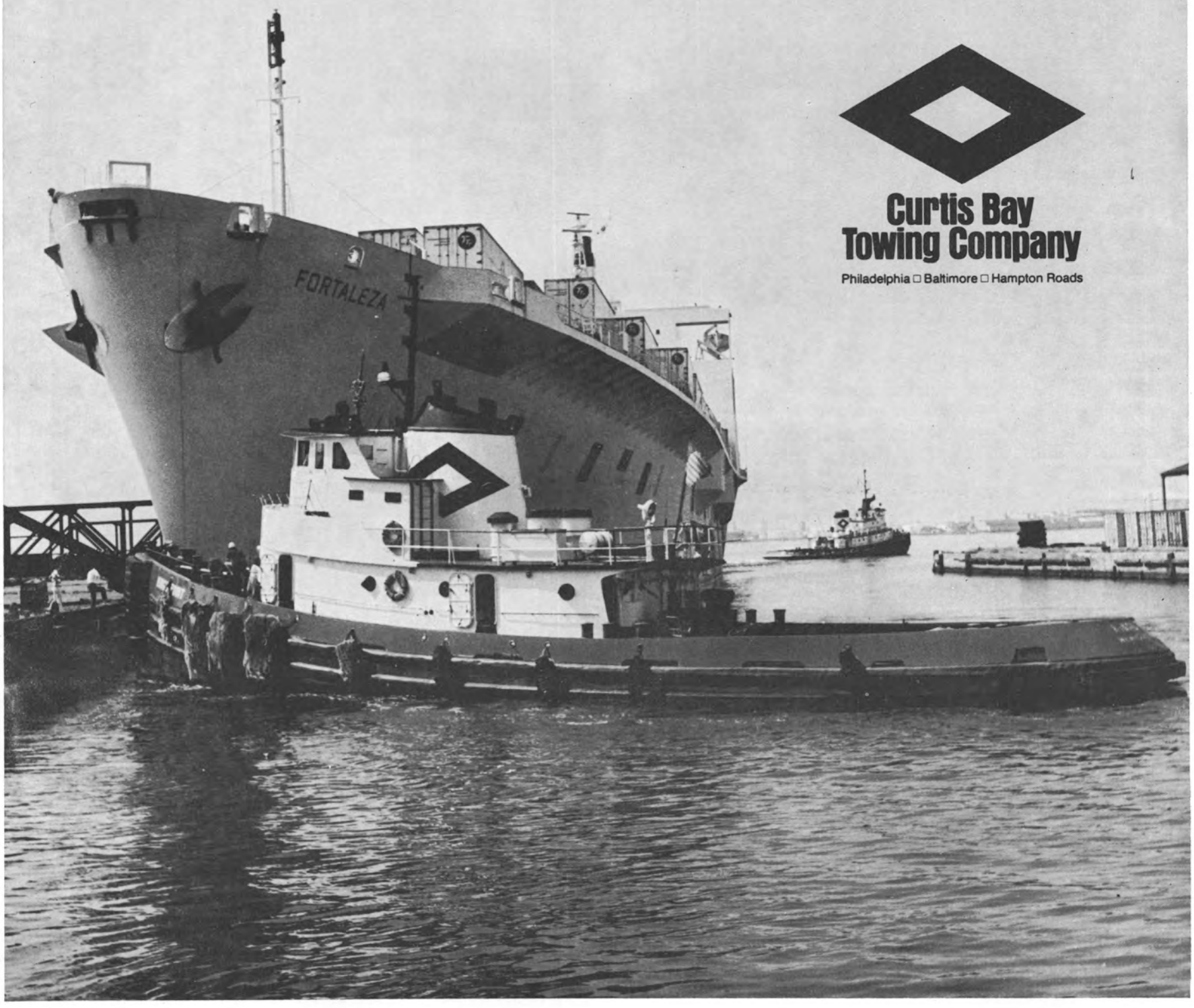
THERE IS A DIFFERENCE IN TUGBOAT COMPANIES.

Equipment and personnel make that difference. The best of both are required by the FORTALEZA, shown sailing from Baltimore. Both are provided by Curtis Bay. In the photograph, the new tug CAPE HENLOPEN exerts her 3300 horsepower on the stern of the ship. The 2400 horsepower tug KINGS POINT controls the bow. Curtis Bay Towing Company, 63 years of superior service.



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Todd Los Angeles Launches First Of Four Tankers Built For Private Investors For Charter To Military Sealift Command

Shown on the launching platform, left to right: **David Glyn Marshall; Mrs. David Glyn Marshall,** matron of honor and daughter of the sponsor; Rear Adm. **John D. Chase,** USN, Commander, Military Sealift Command; **Mrs. Arthur I. Mendolia,** sponsor, and **Arthur I. Mendolia,** Assistant Secretary of Defense (Installations and Logistics).

The Los Angeles Division of Todd Shipyards Corporation recently launched the tanker Sealift Pacific, first of four tankers being constructed at this Todd yard by private investors for long-term charter to the Navy's Military Sealift Command.

The Sealift Pacific, designed by the naval architectural firm of J. J. Henry Co., Inc., is 587 feet in overall length, has a beam of 84 feet, and a deadweight in excess of 25,000 long tons. She will carry approximately 220,000 barrels of cargo at a speed of 16 knots, with the capability of handling up to four separate liquid cargoes.

Mrs. Arthur I. Mendolia, wife of the Honorable **Arthur I. Mendolia,** Assistant Secretary of Defense (Installations and Logistics), smashed the traditional bottle of champagne across the bow of the ship. **Mrs. Mendolia** was assisted by her daughter, **Mrs. David Glyn Marshall,** matron of honor.

The tanker is a motor vessel propelled by two medium-speed Pielstick diesel engines, manufactured by Colt Industries, driving a single-screw Bird-Johnson controllable and reversible pitch propeller through a twin-pinion single reduction gear. The total installed designed horsepower is 14,000 bhp. The engine room is automated for one-man operation from a central control station, with a remote control station located on the bridge.

The Sealift Pacific is the first in a class of vessels designed to meet the requirements of the Military Sealift Command for logistical support of our military forces. Todd Shipyards Corporation is the lead yard for this class of tankers, of which a total of nine will be constructed.

Master of ceremonies at the launching was **Carl M. Lippincott,** general manager of Todd Los Angeles. Short addresses were delivered by **J.T. Gilbride,** president of the Todd Corporation; Rear Adm. **John D. Chase,** USN, Commander, Military Sealift Command; **T.M. Thompson,** chairman of the board, General American Transportation Company, and **Jerome Shelby,** senior vice president, Marine Transport Lines, Inc.

The principal speaker was the Honorable **Arthur I. Mendolia.** Close to 4,000 people attended the ceremonies.

Mr. **Mendolia** said the new tankers will allow vintage World War II ships to be laid up and enable the Department of Defense to fulfill more specific needs. "The shallow draft of this vessel will allow it to get into and out of small ports —the type of ports which typically serve Army, Navy, Marine and Air Force units. Their relatively small size also makes them economically advantageous in ports where ashore storage facilities are limited."

He noted a third advantage, expansion of traditional Defense reliance on merchant ships.

"Revenue which is derived from the lease of privately owned ships to the Government provides a steady flow of funds to the maritime industry," he explained.

An even greater significance, Mr. **Mendolia** said, was that Sealift Pacific "represents an investment in America" providing "direct employment for 1,200 people, and indirect employment for 3,600 more."

Mr. **Mendolia** added that the $70-million Todd contract for Sealift Pacific and three more tankers "has assisted in the modernization of the Los Angeles Division of Todd Shipyards.

"Today we face a reality, the product of several years of cooperative effort among several Federal agencies, the owners of these ships, and the shipyards in which they were built," he added.

Financing and construction of the nine tankers was arranged by a consortium of three commercial companies: Marine Transport Lines, a ship operating company; Salomon Brothers, an investment banking firm which sold bonds necessary to finance the ships, and Citi-Corp Leasing, a firm which specializes in leasing arrangements.

"Before the financial package was complete, more than 14 major banks were involved. And 39 bonding companies, most of them representing insurance companies and pension funds, arranged for sale of bonds which financed the development of all nine ships," Mr. **Mendolia** said. A number of investors, primarily institutions, actually own the nine vessels.

Mr. **Mendolia** explained that it would be difficult to describe the extent of pre-construction effort, but illustrated the complex arrangements by noting that the paper work alone that needed to be signed filled nearly 25 large boxes.

"That which followed," he said, "is more tangible, more visible to those of us who have gathered here today. I understand that this ship —and each of the others—is the product of more than one-million hours of labor."

In brief remarks preceding the address by Mr. **Mendolia**, Admiral **Chase** noted that acquisition of the ships would help increase U.S. seapower. The MSC commander also cited the flexibility of the small tankers which can effectively serve ports with limited petroleum storage facilities ashore.

Admiral **Chase** also lauded key MSC staff members and those in other governmental agencies who helped make the build-and-charter program successful. He noted that the ship was delivered on time, in accordance with established specifications, and without an increase in the cost set forth in the contract. This is a tribute, he said, to all involved, especially the Todd Shipyards crews who actually built the ship.

MSC is currently seeking to have two other ships built for long-term charter, one a LASH or lighter-aboard-ship vessel, and the other a SEABEE. Both are barge carriers and would be used to help modernize U.S. contingency sealift capability.

Military Sealift Command (MSC) will charter the tankers for an initial five-year period, with options for an additional 15 years. The ships will be civilian manned.

The ships will have a draft of 32½ feet and cruise at 16 knots. The 587-foot-long vessels will have a range of 12,000 nautical miles and each have a crew of 26, plus two cadets.

MSC presently operates a fleet of 16 Government-owned tankers, and 23 additional tankers are operating under MSC charter.

The command first issued a request for proposals to build the tankers in February 1971.

Shell Oil Names R.E. White Manager Int'l Marine Sales

R.E. White

R.E. White has been appointed manager of international marine sales for Shell Oil Company, according to **E.F. Loveland,** vice president, commercial sales.

His appointment reflects a restructuring at Shell to centralize supervision of all international marine sales operations in the head office in Houston, Texas.

"The consolidation will enable Shell to be better able to expedite answers to all phases of customers' inquiries covering fuels and lubricants in today's ever-changing supply climate," Mr. **White** said.

Mr. **White,** who has a B.S. degree in marine engineering from the U.S. Merchant Marine Academy, has been with Shell Oil for 19 years. He had been manager of marine and railroad sales, then Eastern industrial sales manager, prior to being promoted to his present position.

Shell's international marine sales manager is a member of the Water Resources Congress and The Propeller Club of the U.S.

Overseas Shipholding Orders Three Tankers Totaling 487,000 Dwt

Overseas Shipholding Group, Inc. (OSG), New York, N.Y,. announced that it has placed orders with Hitachi Shipbuilding & Engineering Company Ltd. of Japan for the construction of a 279,000-dwt tanker, a 128,000-dwt tanker and an 80,000-dwt tanker. The three tankers, aggregating 487,000-dwt, are scheduled to be delivered in the last quarter of 1977.

OSG presently owns and operates 39 tankers and dry bulk carriers aggregating 2,076,150 dwt.

OSG's newbuilding program now encompasses 24 ships, totaling 3,471,500 dwt. By early 1978, when the last of these vessels is scheduled to be delivered, OSG's fleet will total in excess of 5,500,000 dwt, including ten 50-percent owned and six 60-percent-owned vessels. Over 60 percent of the tonnage now on order has already been chartered for terms of five years or more from delivery.

SOCCO Conference On 'Million Ton Carrier' Set For New York City, January 16-18, 1974

A conference on the "Million Ton Carrier," sponsored by the nonprofit industry association called "SOCCO-Super Ocean Carrier Conference," is firming up for January 16-18, 1974, at the Americana Hotel in New York City.

The board of advisors, representing a cross-section of industry interested in the advancement of knowledge and technology toward the design of super carriers, is as follows: **David O. Beim,** vice president, First Boston Corp., New York, N.Y.; **John H. Chafee,** chairman of the board, General Maritime Corp., New York, N.Y.; **A. Henry Chester**, Lloyd's, London, England; **A.E. Cox,** general manager of Commercial Ship Division, Newport News Shipbuilding, Newport News, Va.; **W.M. Elmer,** chairman of the board, Texas Gas Transmission Corp., Owensboro, Ky.; **Bernard Frankel,** president, Imodco, International, Los Angeles, Calif.; **Harold Futtrup,** technical director, Ralph M. Parsons Co., Los Angeles, Calif.; **Edwin M. Hood,** president, Shipbuilders Council of America, Washington, D.C.; **Barry Hunsaker,** vice president, El Paso Natural Gas Co., Houston, Texas; **M.L. Ingwersen,** president, Lockheed Shipbuilding & Construction Co., Seattle, Wash.; Rear Adm. **D.H. Jackson,** USN, president, American Society of Naval Engineers, Washington, D.C.; **Keith C. McKinney,** vice president and general manager, Pacific Alaska LNG Co., Los Angeles, Calif.; **Hirotaro Nemoto,** director and general manager, Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan, and **Marvin Pitkin,** Assistant Administrator for Commercial Development, Maritime Administration, Department of Commerce, Washington, D.C.

The Technical Paper Program is practically filled, and contains some of the leading authorities from around the world on the subjects of design, construction, operation, and financing and economics of the super ocean carrier.

The tentative Technical Paper Program is as follows:

January 16, 1974

Morning — Registration and opening remarks; "Insurance Aspects of the Million Ton Tanker," **A. Henry Chester,** Lloyd's, Lime Street, London; "Discharging Supertankers Without Hazard to the Environment," **Robert Taggart,** R.T.I., Fairfax, Va.; "Financing Methods for Super Tankers," **David O. Beim,** vice president, The First Boston Corp., New York, N.Y.; "The Million Ton Tanker Crude Oil Terminal," **Christian Guary**, manager, Port of LeHavre Authority.

Luncheon — Speaker: **E.M. Hood,** president, Shipbuilders Council of America, Washington, D.C.

Afternoon — "Nuclear Powered Ocean Carriers—Engineering Status and Economics," **R.W. Dickinson,** manager, Maritime Reactors, Babcock & Wilcox, Lynchburg, Va.; "Offshore Tanker Terminals: Study in Depth," **Bernard Frankel**, president, Imodco International, Los Angeles, Calif.; "Automation Systems & Control," **Bill Bringier**, Tano Corp., New Orleans, La.; "Measurement of Gaseous Oxygen Concentrations Aboard Ship," **D.A. Willett,** Analytical Inst. Div., Taylor Servomex, Sybron Corp., Rochester, N.Y.; "New Dimensions in 'Supership Construction' and Trade Routes," Dr. **W.R. Stanley,** Assoc. Prof., University of South Carolina; "Industrial Gas Turbine Propulsion Systems," **A.D. Travaly,** manager, marine sales, General Electric, N.Y.

January 17, 1974

Morning—"Million Ton Tanker Fleets," **A.G. Spyrou,** technical director, Olympic Maritime, S.A. (Onassis Group), Monaco; "LNG Container Systems," **Stan Whitehead,** contracting engineer, Pittsburgh Des Moines Steel Co., Pittsburgh, Pa.; "Low Speed Diesel for VLCC," **Per V. Meulengracht,** president, Burmeister & Wain Amer. Corp., New York, N.Y.; "Louisiana Superport Terminal System," **J.G. Baird,** manager, Pipeline & Marine, Union 76 Division, Eastern Region, Union Oil Co. of California.

Luncheon—(Speaker to be announced)

Afternoon — "Economic Aspects of Super Ocean Carriers," **David Gorman,** Harbridge House Inc., New York, N.Y.; "Unique Design Problems," J.J. Henry Co., Inc., New York, N.Y.; "Maneuvering Characteristics of Large Tankers," **Haruzo Eda,** senior research engineer, Stevens Institute of Technology, Hoboken, N.J.; "LNG Carriers Marine Gas Turbine Plant," **Carl Merz,** Marine Marketing, Turbo Power & Marine Systems, Farmington, Conn.; "Peak Shaving in Transportation," **Fendall Marbury Jr.,** Ingalls Shipbuilding, Maryland; "Shallow Draft VLCCs," **Frank Nichols,** Rohr, Inc., San Diego, Calif.

January 18, 1974

Morning—"Classification of Super Carriers," **Charles J.L. Schoefer,** executive vice president, American Bureau of Shipping, New York, N.Y.; "Steam Propulsion for Super Carriers," **Ray Walsh,** Marine Turbine & Gear Department, General Electric Co., Lynn, Mass.; "Optimum Shaft Alignment for VLCCs," **Roy Bradshaw,** Marine Vibration Associates, Cambridge, Mass.; "Port Facilities," **Harold A. Futtrup,** Ralph M. Parsons Co., Los Angeles, Calif.

Luncheon—Informal

Afternoon — "Cue Theory for Loading & Discharging," Dr. **S.M. Fersht,** Tetra Tech Inc., Pasadena, Calif.; "Common Aspects for the Demand for Super Tankers," **Michael Gaffen,** economist, Lionel D. Edie & Co., New York, N.Y.; "Financial Engineering of a Successful Mammoth: An Essential Challenge," **Peter Nevitt,** president, First Chicago Leasing Corp., **Richard Stranger,** Division G, First National Bank of Chicago, **Donald Caldera,** Qualpeco Financial Services, Inc. "The Incidence of the Savings Associated with Supercarriers and Superports," **J.W. Devanney III**, Assoc. Prof. of Marine Systems, Massachusetts Institute of Technology, department of ocean engineering, Cambridge, Mass.; "Strength Problems/Design Loads in VLCC Construction," **Huynh duc Bau.,** assistant general representative, **M. Hutter,** Department of Research & Regulations, Bureau Veritas, Paris, France.

For further information, contact: SOCCO, P.O. Box 269, San Pedro, Calif. 90733.

Three Key Appointments Announced At Gulf Marine Division Of Marathon LeTourneau

Richard M. Johnston

D.B. Waller

Robert L. Crow

Marathon Manufacturing Company has announced the appointment of **Richard M. Johnston** of Houston as president of the Gulf Marine Division of Marathon LeTourneau Company, a Marathon subsidiary.

Marathon's Gulf Marine Division, a shipyard which builds mobile offshore drilling rigs, is located at the Port of Brownsville, Texas. Prior to his present assignment, Mr. **Johnston** had been a vice president of Marathon LeTourneau Offshore Company, Houston, another Marathon subsidiary.

Mr. **Johnston** is a graduate engineer of Texas A & M University, College Station. He is a member of The Society of Naval Architects and Marine Engineers, and the National and Texas Societies of Registered Professional Engineers.

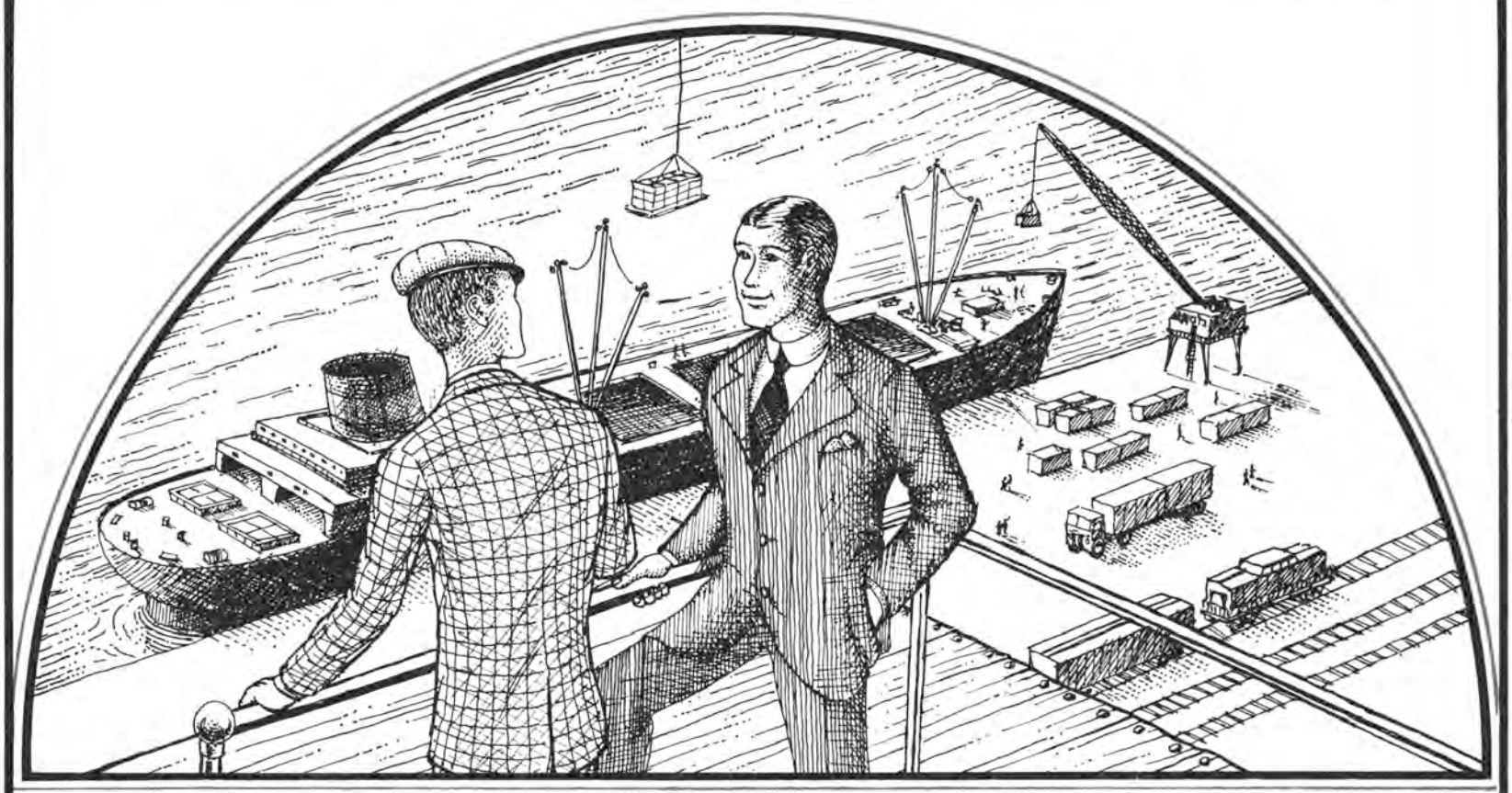
In a related announcement, Mr. **Johnston** named **D.B. Waller** vice president, and **Robert L. Crow** manufacturing manager of the Gulf Marine Division. "Mr. **Waller** will direct our engineering activities, and Mr. **Crow** will handle manufacturing at our Brownsville yard," said Mr. **Johnston.**

Mr. **Waller** was formerly manager of naval architecture and marine engineering for Marathon LeTourneau Offshore Company. Mr. **Crow** previously served for three years as manufacturing manager at Marathon LeTourneau Offshore Pte. Ltd., a Marathon subsidiary shipyard in the Republic of Singapore.

Mr. **Waller** is a graduate of King's College, the University of Durham in Great Britain, where he was awarded a science degree in naval architecture and shipbuilding.

Mr. **Crow** has been associated with Marathon and predecessor companies for 27 years. He began by attending the training course for welders, and has progressed over the years to the position he now holds.

TOM SWIFT
and
The Law of the Waterfront



"**The smartest** thing I ever did was to take your advice and call Midland, Tom." Tom Swift was being addressed by his friend Ned Newton as the two of them stood on a promontory observing the hectic waterfront activities.

"**I knew** that when it came to stevedoring, terminal operations, ship repair and maintenance, dredging and just about anything else that goes on around the waterfront, Midland could offer you exactly the coverage you needed," said Tom broadly. "Midland has the highest level of experience of any insuror in the field of Maritime risk management," he added loftily.

"**True enough,** Tom," said Ned, "but what I appreciated most of all was the way Midland guided me through the intricacies of the new Longshoremen's and Harbor Workers' Act."

"**It's not** a new law," amended Tom, "but there certainly is a great deal of confusion about the changes and about what the future will bring.

"**We all** know there are some companies who go in and out of the Maritime field," Tom interjected inconsistently. "But today you have to have an outfit that stays on top of the changing situation, one you can count on to have all the facts you need to know. And that describes Midland," he concluded authoritatively.

John Downey, Midland's Port Claims Control Manager, recently spoke to the AMA on the meaning of the changes in the Longshoremen's and Harbor Workers' Act. If you'd like a copy of his valuable comments, just drop him a note at 160 Water St., N.Y., N.Y. 10005.

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Have you sent in your Swifties yet?

"There's been a veritable outbreak of Swifties around here lately," said Tom rashly.

It's time you caught the bug, too. Come up with a Swiftie that has something to do with insurance and submit it on your company letterhead. Every quarter, the five best entries will win Tom's latest invention. Everybody who enters will win a Tom Swift poster.

"So sharpen your pencil," reminded Tom pointedly.

P.S. Watch this space next month for names of first contest winners!

There Is A Need To Revise Design Methods

On Damaged Stability Of Drilling Vessels

Ralph G. McTaggart and Richard H. Gunderson*

Stability of oceangoing vessels has been the subject of many articles and discussions, but in researching this presentation we have found damaged stability to be elusive, if not altogether ignored. We feel there is a need to recreate an interest in the effect of damage on vessels—in particular vessels with large KG values. While not casting aside the age-old question of "How much GM does it have?", we feel that the GM is not the proper indicator of a vessel's stability in either the intact or damaged conditions.

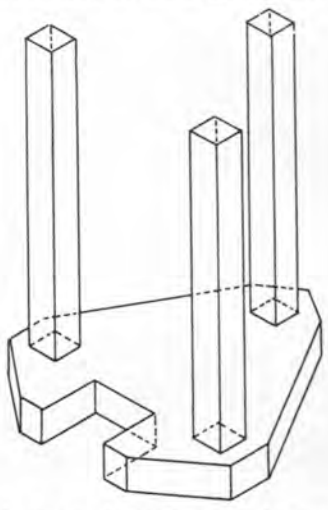


Figure 1—Typical self-elevating drilling unit.

Today's mariner is a reverse of the evolution theory, and is leaving the land and searching the oceans of the world for gain and glory. With him comes a new approach to marine applications and problems. We are speaking of the offshore oil industry and the vessels it needs that outstrip the imagination and make the ancient mariner shake his head. These vessels are the subject of this discussion, and in particular the self-elevating units, Figure 1. To fulfill the need to drill in ever-increasing water depths, the self-elevating unit must be capable of transporting more and more leg if it is to remain competitive. But one of the penalties lies in the increasing height of the vertical center of gravity.

Because it is a ready calculable figure, KG is used as a guide line. The users of the offshore vessels are not mariners; it is easier for us to relate to them in their language than it would be for them to learn the complex terminology used by naval architects and marine engineers. We have found, and will show, that close control must be kept over the KG value; otherwise, what appeared to be a stable condition could prove to be disastrous, not only in a damaged state but even in the intact condition. This is particularly true if we consider BM equal to GM. It is a generally accepted practice to consider GM approximately equal to BM for ship stability calculations. However, damaged-stability calculations based on this assumption may indicate that a vessel is very stable when, in fact, it is extremely unstable.

The method of assessing damaged stability known as the "lost-buoyancy method" described in detail in Chapter III, Section 7.3 of Principles of Naval Architecture is used throughout this presentation. We feel that although the subject of lost buoyancy has been covered very well, the effect that the center of gravity has on determination of the final still-water damaged condition is insufficiently mentioned. We will show that for most damaged conditions a single damage calculation is insufficient to arrive at the final still-water condition. Technology today, primarily computer technology, has advanced sufficiently to the point that a realistic evaluation of the effects of damage can be achieved.

The 1929 Convention, Regulation V(S), points out the necessity of considering stability concerning the possible listing effect of flooding in way of watertight decks, inner skins, or longitudinal bulkheads. It did not, however, attempt to establish any suitable standards for such an evaluation.

This inconsistency was eliminated by the 1948 Convention, which required that a ship have sufficient intact stability in all service conditions so as to be able to withstand the final stage of flooding. However, the convention left some inconsistencies in the extent of flooding and decided that it was not practicable, at that time, to extend the newly established standards of stability of ships in damaged conditions beyond the limits set forth in Regulation 7.

By introducing standards for stability of ships in damaged condition, a minimum limit is established on the amount of intact stability a ship must maintain under all service conditions. The intact stability of a ship is dependent, principally, on the ship's mechanical and geometrical characteristics, which are fixed, and also on the amount and vertical distribution of the weights taken aboard for any service condition. Providing a standard that establishes a level below which intact stability cannot be extended results in restricting the range within which the amount and vertical distribution of the weights taken aboard in service can be varied at will. More specifically, the damaged-stability requirements may preclude indiscriminate vertical distribution of cargoes may limit the operational range of draft by requiring ballasting under certain operating conditions. The requirements could restrict slack tankage in order to limit free surface.

Under certain conditions, it is possible that the operational restrictions may be mitigated by modifying either the mechanical characteristics of the ship (KG) or the geometrical characteristics (KM), or both. This would depend on the circumstances. It would thus improve stability by varying the fixed factor, the ship. The increase in intact stability for the critical service condition obtained is necessarily carried throughout the entire operating range of the ship; this may produce a short period of roll, at least at some drafts.

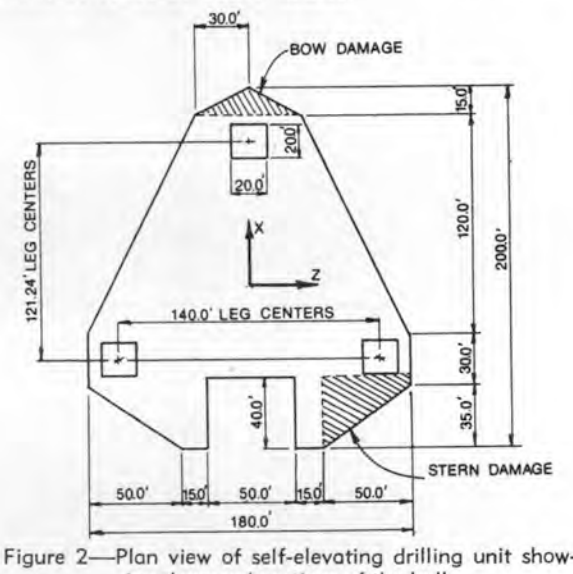


Figure 2—Plan view of self-elevating drilling unit showing damaged portions of the hull.

Almost all work that has been done to date on damaged stability discusses GM. We would point out that the position of the metacenter M is so flexible that keeping track of it could be a naval architect's nightmare when large angles of heel and trim are involved. Besides, the offshore drilling-unit mariner is not usually a naval architect. He understands only real numbers, and this is why we feel that KG is a better reference than GM.

Stability Study

The final section of this paper presents the results of a portion of a study conducted by the authors on stability of intact and damaged self-elevating drilling units. There are many different types and configurations of self-elevating drilling units, but for the purpose of illustration we have chosen a three-legged type that is commonly seen. Figure 2 shows the geometry of the hull and the portions to be considered damaged. We shall assume an in-

(Continued on page 15)

*Mr. **McTaggart,** chief naval architect, and Mr. **Gunderson,** senior engineer, Engineering Technology Analysts, Inc. of Houston, Texas, presented the paper condensed here before the recent Annual Meeting of The Society of Naval Architects and Marine Engineers.

Stability Of Drilling Vessels—

(Continued from page 10)

tact draft of 13.50 feet and a KG value of 50.00 feet. For comparison, we also use a KG equal to KB of 6.75 feet.

Figure 3 shows the hydrostatic properties of the intact hull. For this example, all the sides are vertical for the hull depth of 22 feet, so that the WPA and KP1 curves are straight lines. The LCB and LCF are equal. The MT1 and MH1 curves are drawn for KG values of 6.75 feet and 50 feet. Three conditions are shown for the stability curves, and on each is shown a wind heeling moment Mw. Figure 4 illustrates the intact hull stability curves, and a ratio under the GZ curve for KG equal to 50 feet of 1.4 times the area under the wind heeling curve.

The bow damage stability curves are shown in Figure 5 and it can be seen that the damage caused little change in the GZ value and had little effect on the area ratio between the GZ curve and wind heeling curve.

In Figure 6 the stern damage stability curves reveal that the damage had a catastrophic effect on the ratio of GZ curve at 50-feet KG to the wind heeling curve. In this condition, in order to achieve a safe ratio between the GZ curve and wind heeling curve, the KG would be in the order of 25 feet. In Figure 6 it is demonstrated that satisfying the intact stability requirement does not guarantee a safe vessel. A satisfactory KG for damage must be calculated.

In all of the above conditions, a KG equal to KB (6.75 feet) curve showed a ratio in excess of 1.4 times the area under the wind heeling curve. This, of course, proves that the approximation of GM equal to BM should not be used with this type of vessel. The prime factors in the change in stability are the location of the lost buoyancy and the location of the vertical center of gravity.

Figures 7, 8, and 9 show how the KG value affects the trim when the vessel is heeling during conditions of damage. The effect KG has on an intact hull is illustrated in Figure 7. The trim angle is measured from the bow to stern on the centerline. Figure 8 shows the change in trim when the bow is damaged. It is interesting to note that this damaged condition has little effect on the stability curve (Figure 5), but does in fact improve the trim angle. The change caused by damage to the stern is covered in Figure 9. It should be noted that the 50-foot KG curve reacts very rapidly to heel angles.

Figure 10 shows a typical curve that could be developed from a series of curves similar to those illustrated in Figures 4, 5, and 6. This curve would show the allowable KG that can be used safely for a given draft and wind velocity. A curve such as this would simplify the problems facing offshore mobile rig operators.

Conclusions

The results presented illustrate the necessity to accurately evaluate and include the vertical center of gravity when preparing stability calculations. It is recommended that righting arm curves be developed to determine stability of a vessel in both intact and damaged conditions, and that GM values based on intact hydrostatics calculations not be used as an indicator of a vessel's stability.

The effect of trim must be included in the calculations of the righting arm versus heel angle curves. Also, damaged stability calculations must be based on hydrostatics data for the damaged hull. This requires several steps to satisfy the conditions of equilibrium and displacement.

In the course of researching this paper, the authors found the casualty rate on drilling rigs to be fairly high. Although, many casualties occurred while drilling, a sufficient number occurred during tow to give concern to the stability analysis. Data on the causes of loss during tow are not easy to obtain, but we cannot help but feel that the stability calculations might have been prepared on the same assumptions as a regular vessel. Our results have shown that these vessels, because of the additional trim and heel resulting when KG is greater than KB, must be analyzed using more exact methods than required for standard ship forms. This fact is becoming more recognized, and the classification societies now have special stability requirements for offshore drilling units.

The American Bureau of Shipping now requires all offshore drilling vessels to have sufficient reserve stability to withstand the overturning effect of a 50-knot wind while in the damaged condition. We feel that now is the time for further study on the subject of damaged stability, and trust we have at least laid a foundation upon which to start such a study.

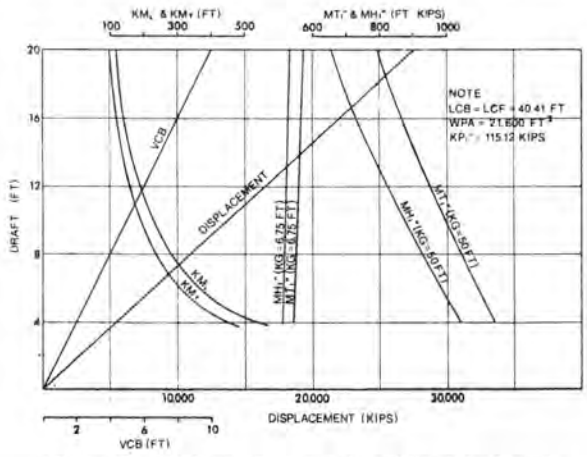


Figure 3—Hydrostatic properties of the intact hull.

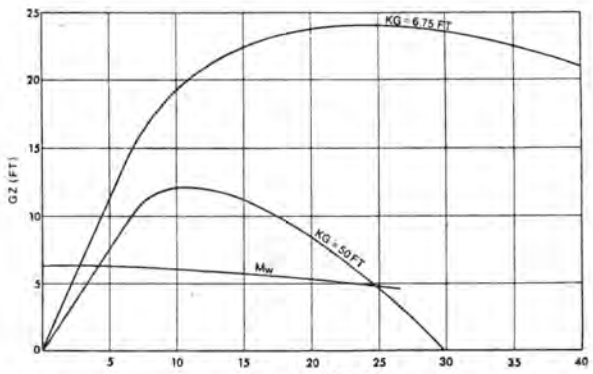


Figure 4—Stability curves—no damage.

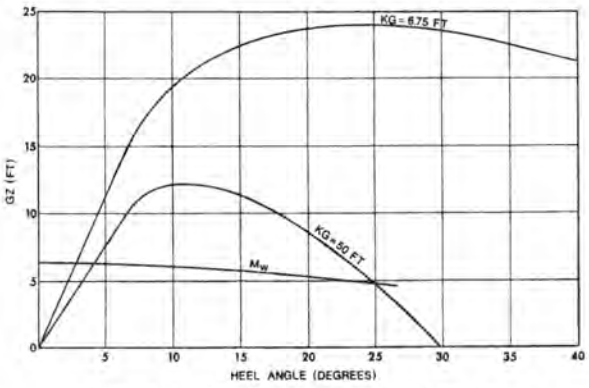


Figure 5—Stability curves—bow damage.

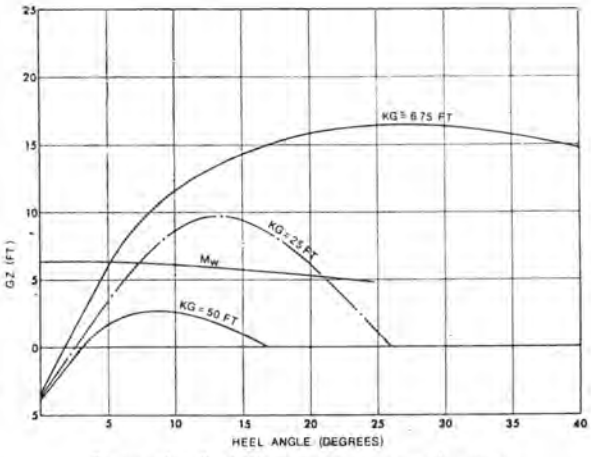


Figure 6—Stability curves—stern damage.

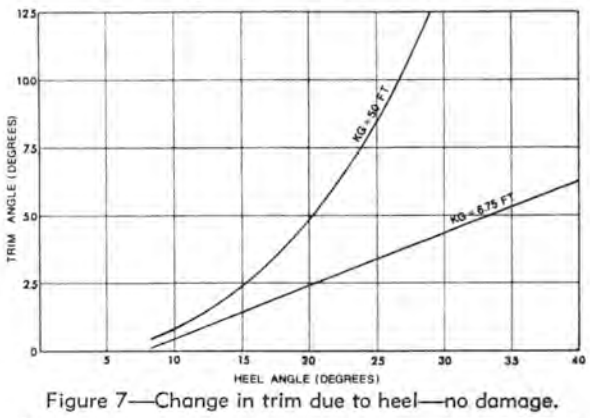


Figure 7—Change in trim due to heel—no damage.

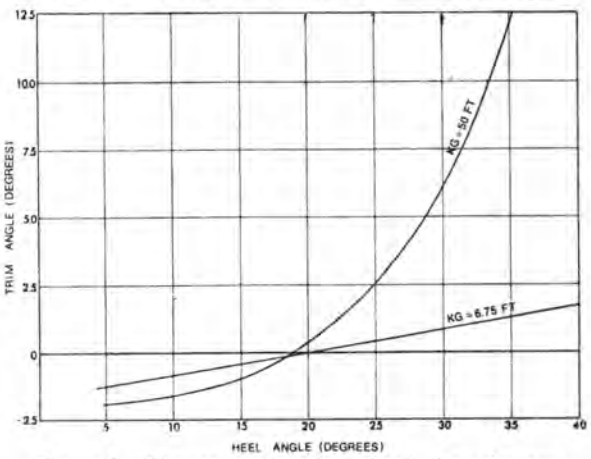


Figure 8—Change in trim due to heel—bow damage.

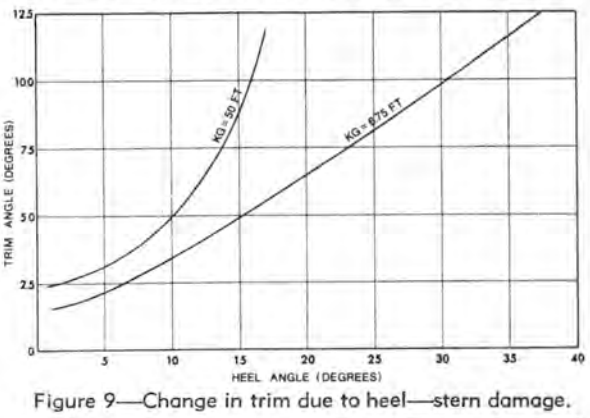


Figure 9—Change in trim due to heel—stern damage.

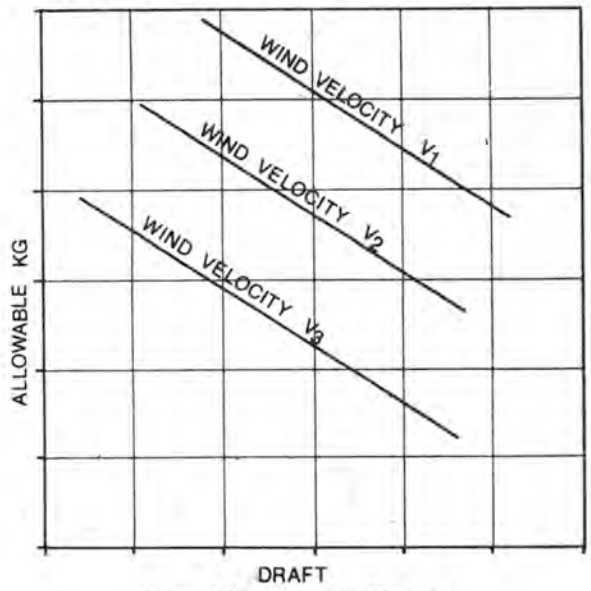


Figure 10—Allowable KG curve.

Marine Ventures Ltd. Formed In London By R.P. Holubowicz

The formation of Marine Ventures Ltd., with offices in central London, was announced by its chairman and managing director **R.P. Holubowicz.**

Marine Ventures Limited is a technology-transference company geared to searching out and obtaining rights to new technology and products on behalf of client companies interested in diversification or product-line expansion. The company will also promote and sell advanced technology cargo-handling concepts for dry bulkships—centering mainly on self-discharging systems—as well as developing new markets and applications for maritime products and services on behalf of clients.

As an example of these activities, Marine Ventures Limited is currently engaged in developing the market potential for the well-known Rivenaes Motor Cleaning System (RMCS). This patented system is marketed by the International MacGregor Organisation to the marine industry worldwide where it shows continued success, having to date been adopted for well over 200 diesel-engined vessels. Having proved the effectiveness of RMCS in this field, Marine Ventures is now actively engaged in developing and introducing RMCS to other areas where fouling of internal combustion engines proves costly to the operator.

R.P. Holubowicz

With respect to new products, Marine Ventures Limited is at this time conducting a search on behalf of a client company for potential European licensees for a unique and patented U.S.-developed pollution-control unit for shipboard sanitary waste. Known as the Marland Marine Sanitation System (Marland MSS), it is an economically proven chemical/mechanical system that uses a modular approach in providing any degree of treatment in order to meet the differing national regulations governing effluent discharge.

The reason for choosing England as the base of operation, Mr. **Holubowicz,** an American citizen, said, was England's incomparable position as the center of the world's marine transportation business and the opportunity this afforded the new company to perform a two-way "bridging" operation for products and technology between Europe and the United States.

Until June 1973, Mr. **Holubowicz** was chairman and chief executive officer of the International MacGregor Organisation hatch covers and other cargo access equipment. Prior to that, he served as vice president of Litton Industries Marine Group in New York. Mr. **Holubowicz** has also held executive positions with Grace Line in New York and The Port of New York Authority. He is also a U.S. Coast Guard licensed master mariner.

Ronald Cowan Named APL Vice President

Ronald J. Cowan has been named to the new position of vice president-controller for American President Lines.

Norman Scott, president of APL, made the announcement following the decision of **Howard F. Lucas,** vice president-finance, to resign from the company.

Mr. **Scott** said Mr. **Cowan** "will be responsible for all APL and American Mail Line financial functions except those specifically assigned to the office of treasurer."

Mr. **Cowan** was formerly vice president/finance for AML, which was recently merged into APL.

Mr. **Cowan** had been with AML for more than 20 years, joining the company in 1952 as a junior accountant, and had been appointed to the vice president position July 1, 1973.

Sheeran To Manage Western Hemisphere Sales For Mobil

Bernie F. Sheeran

Bernie F. Sheeran has been appointed manager, Western Hemisphere sales, for Mobil Sales and Supply Corporation. He will be responsible for sales of fuels and lubricants to the marine trade in North and South America.

After serving in the U.S. Navy and earning a B.S. degree in commerce from Notre Dame, Mr. **Sheeran** joined Mobil in 1950 in the bunker sales department.

Ecology Two Requests CDS For 3 Tankers To Be Built By Lockheed

The Maritime Administration, Washington, D.C., has received a construction differential subsidy application for three 90,000-dwt tankers costing about $36.5 million each. The request for aid has been filed by Ecology Two Corporation, 551 Fifth Avenue, New York, N.Y., and the vessels are to be built by Lockheed Shipbuilding & Construction Co. of Seattle, Wash.

Offshore Drilling Rig Contract Awarded To Bethlehem Singapore

A contract for construction of a mat-supported jackup offshore drilling device has been awarded by Transworld Drilling Company, Limited, to Bethlehem Singapore Private Ltd. (Bethsing).

The new unit, to be constructed in Singapore, will have a drilling capacity of 25,000 feet in water depths up to 250 feet.

Designated Transworld Rig 63, the drilling device will have a hydraulic self-elevating mobile platform 180 feet long, 132 feet wide and 16 feet deep, with a 50-foot-square drilling slot. The mat, which will rest on the ocean floor when the rig is in drilling position, will have dimensions of 210 feet by 170 feet by 10 feet. The skirt depth will be two feet and its drilling slot will be 90 feet by 87 feet.

The upper platform of the new unit will be supported by three cylindrical columns, similar in design to Transworld Drilling Rig 59. Each of the columns will be 312 feet long with an outside diameter of 12 feet.

The crews' quarters will be air-conditioned and will accommodate 78 men. Additional personnel facilities will include a galley, dining room, recreation room, laundry and offices. A heliport will be located at the extreme aft of the main hull.

Transworld Drilling Company has another drilling unit, Transworld Rig 62, nearing completion at Bethlehem Steel Corporation's yard at Beaumont, Texas.

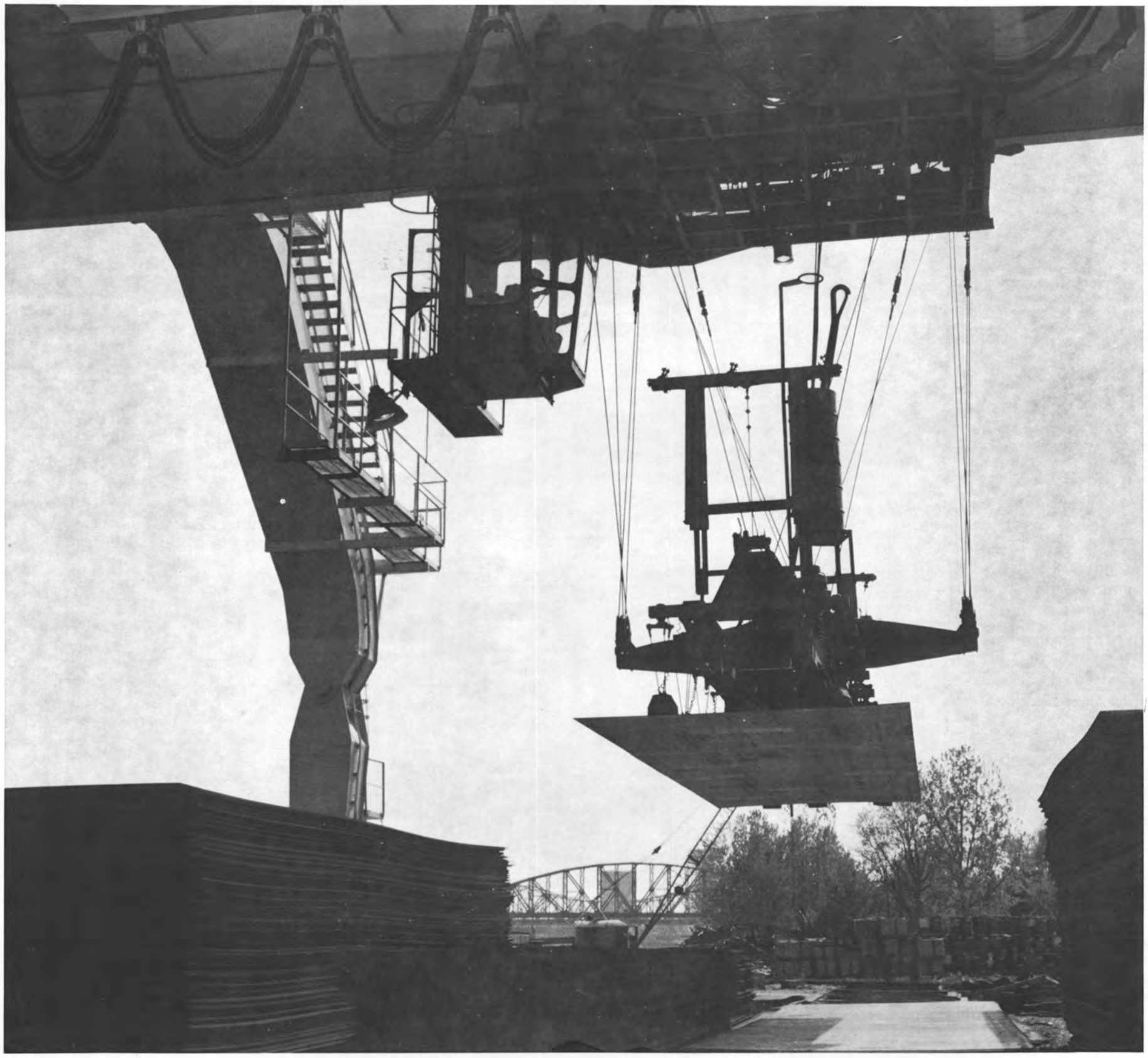
Upon completion of Rig 63, scheduled for November 1974, Transworld Drilling Company and Transworld Drilling Company, Limited, wholly owned subsidiaries of Kerr-McGee Corporation, will have 16 offshore drilling devices for domestic and international operations. Transworld drilling units are presently operating in the Gulf of Mexico, the North Sea, offshore Scotland, England and Denmark, Nigeria, and the gulf between Sharjah and Iran. It is expected that Rig 63 will be contracted for work in the Southeast Asia area.

The shipyard in Singapore, where Rig 63 will be built, is 70 percent owned by Bethlehem and 30 percent by the Development Bank of Singapore. Bethlehem's Beaumont yard provides sales, technical and engineering assistance to the Singapore facility

Trinidad Corp. Files CDS For Four VLCCs

A construction differential subsidy application has been filed with the Maritime Administration by the New York-based firm, Trinidad Corporation, 30 Rockefeller Plaza.

Plans by Trinidad call for construction of four 383,600-dwt very large crude carriers (VLCCs). Each vessel will cost an estimated $116,400,000.



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There's a launching a day at Jeffboat. And every vessel we build starts out here on our 15-ton magnetic crane. It's a workhorse that does everything from unloading steel to servicing the plate yard. And it's here that a sheet of steel begins its journey into inland shipbuilding's *only* automated steel-handling facility.

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Shipbuilding Commission's Intensive Three-Year Study Reaffirms Productive Capability Of U.S. Shipyards

The Commission on American Shipbuilding, concluding three years of intensive study here and abroad, has found that the U.S. shipbuilding industry, given "the opportunity to build ships in series" and "a reasonable stability in its orderbook," is "fully capable of equaling the productive efficiency in any foreign shipbuilding industry for the construction of similar ships."

Created by the Merchant Act of 1970 and appointed by the President, the Commission has submitted its detailed findings and recommendations to President **Nixon** and the leaders of the Congress. The necessity for a firm national policy for the U.S. merchant marine and the shipbuilding industry, properly and effectively implemented in all parts and at all levels of the Government, was reaffirmed. In particular, this policy holds that shipbuilding and ship repair are essential components of a merchant marine, which should be strong enough to support the national defense and the development of U.S. trade in world markets.

Chartered principally to "review the status of the American shipbuilding industry, its problems and its progress toward increasing its productivity and reducing production costs," the Commission gave the industry high marks on shipyard operations and technology, capital improvements, productivity, and labor-management relations. "Barring any major international dislocation," it further expressed belief that U.S. shipbuilders will, as required by the 1970 Act, meet the construction subsidy goal of 35 percent in Fiscal '76, compared with the 50 percent level of three years ago.

To assure availability of ships capable of carrying the required quantities of imported fuels, the Commission recommended a series of coordinated actions which would form, as well as stimulate, construction of said ships in U.S. yards:

(1) A "preference" or "quota" reservation to assure a share of the cargoes of imported fuels for "efficient and competitive" vessels built and registered in the U.S.

(2) Continuance of subsidy programs to cover the difference between foreign and U.S. costs for U.S. construction of vessels needed to carry a "preference" or "quota" reservation for U.S.-flag ships in the transport of petroleum and gas imports.

(3) Tax-deferred transfer to the United States of funds earned by U.S. corporations from earnings on sales of ships flying a foreign flag, provided that the funds be used, in accordance with Maritime Administration regulations, to finance construction of ships in U.S. shipyards for U.S. registry.

(4) Imposition of penalties on importers and exporters who use state-owned shipping at rates consistently below a fair market value determined by the Federal Maritime Commission, so that their freight rates in effect would be equal to those charged by U.S.-built, U.S.-operated ships.

(5) A system of settling labor disputes in the maritime industries "without resort to strike action."

(6) Government encouragement of and support for research, standardization, and exchange of technical information within the industry without risk of penalties under the antitrust laws.

(7) Retention of present provisions of cargo preference and provisions for financing construction and operation of U.S. vessels.

Two members of the Commission submitted statements taking exception to certain of its recommendations. One of the two, although in agreement with many of the findings, did not consider it appropriate to sign the report.

W.H. Krome George, the abstaining member, questioned the wisdom of a petroleum quota system, saying that he felt it was not needed in view of the present and prospective high level of activity in the U.S. shipyards, and further that it will impose an unnecessary burden on U.S. taxpayers to provide the required level of Federal subsidy, and finally that such a quota would inevitably encourage other countries, and particularly OPEC nations, to impose similar flag restrictions. Mr. **George** suggested that the effectiveness of the Merchant Marine Act of 1970 would be better improved by amending those sections of the Act which require that vessels receiving operating subsidies must operate in U.S.-foreign commerce. Mr. **George** stated that he felt that this discouraged international tanker owners from building in the U.S. because of the inflexibility which this requirement imposes on tanker scheduling. Finally, Mr. **George** stated that he felt that American shipowners would be encouraged to build ships in the U.S. under the subsidy provisions of the 1970 Act if the so-called "Grandfather Clause" was removed. This clause prohibits the granting of operating subsidies unless the recipient agrees, in effect, not to expand his foreign-flag fleet and to eliminate it within 20 years thereafter.

Arthur M. Becker signed the report but offered the judgment that U.S. shipyards would compete successfully with foreign yards, despite the wage differential, if Government aid to ships built for U.S. citizens were extended to ships built in the United States for nations of other countries. He argued that a system of cargo preference should be arrived at only through negotiation with foreign countries and should contain proper safeguards to require the beneficiaries to construct new vessels. The proposal for freight-rate equalization, he said, was inconsistent with U.S. Government payment of operating-differential subsidies to U.S. ships. Finally, he proposed modifying the definition of U.S. citizenship as applied to corporations under existing maritime statutes so that greater foreign participation and capital would be available to the U.S. maritime industry.

Other Commission members are: Rear Adm. **Albert G. Mumma,** USN (ret.), chairman; **Charles A. Black,** national secretary-treasurer, Marine Engineers Beneficial Association; **Andrew E. Gibson**, president, Interstate Oil Transport Co.; **John T. Gilbride,** president, Todd Shipyards Corporation, and **Stanley Powell Jr.,** chairman, Ship Funding International.

The conclusions and recommendations of the Commission appear in the first of a three-volume report. Analyses of data in support of the recommendations appear in volume two. The third volume contains reports of studies by independent consultants who provided much of the data which the members and staff of the Commission used in developing the information in volume two.

Edwin M. Hood, president of the Shipbuilders Council of America, had the following comments to make on the Commission's report:

"The report which the Commission on American Shipbuilding has submitted to President **Nixon** and leaders of the Congress objectively separates fact from fiction. It will be enthusiastically applauded by U.S. shipbuilders.

"Against a background of unfounded criticisms which have recurred with regularity for some years, it is refreshing to have this timely appraisal of conditions and trends affecting the private shipbuilding industry of the United States. The distinguished members of the Commission have obviously devoted considerable time and analysis to the complex of governmental, marketing, technological, operations, statutory, environmental and manpower influences that bear on shipbuilding in this country as well as abroad.

"Our industry is particularly encouraged by the Commission's favorable assessment of 'progress and productivity' within the American shipyard industry. These relevant observations from the Commission's report merit repetition:

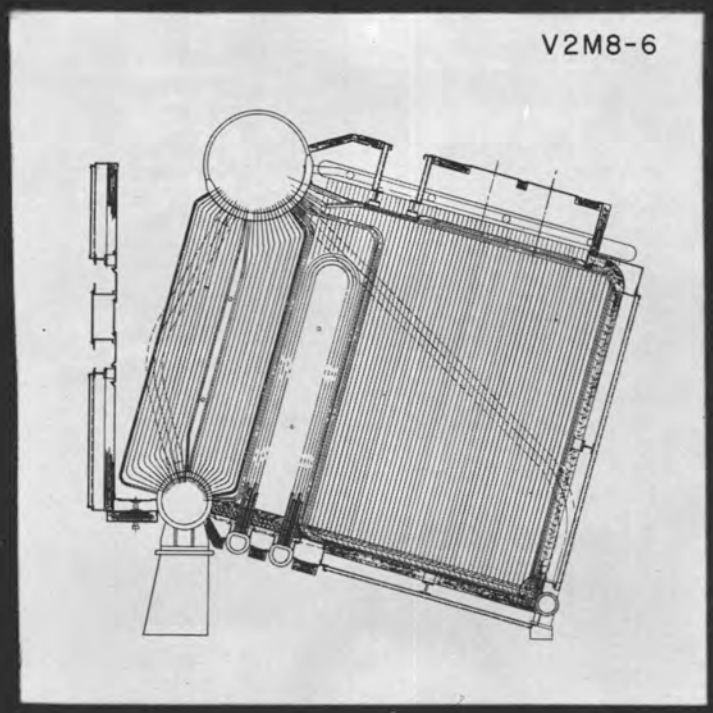
"'Many of the critical allegations about the shipbuilding industry are myths. The visits to U.S. yards have convinced the Commission that shipyard managements have done much in a difficult environment. Major investments have been made in new equipment and facilities in anticipation of a future market. Also, there is little evidence to suggest that improvement in labor-management relations in the industry, which actually have been good, would materially increase individual worker productivity which, in itself, is as high as any in the world.

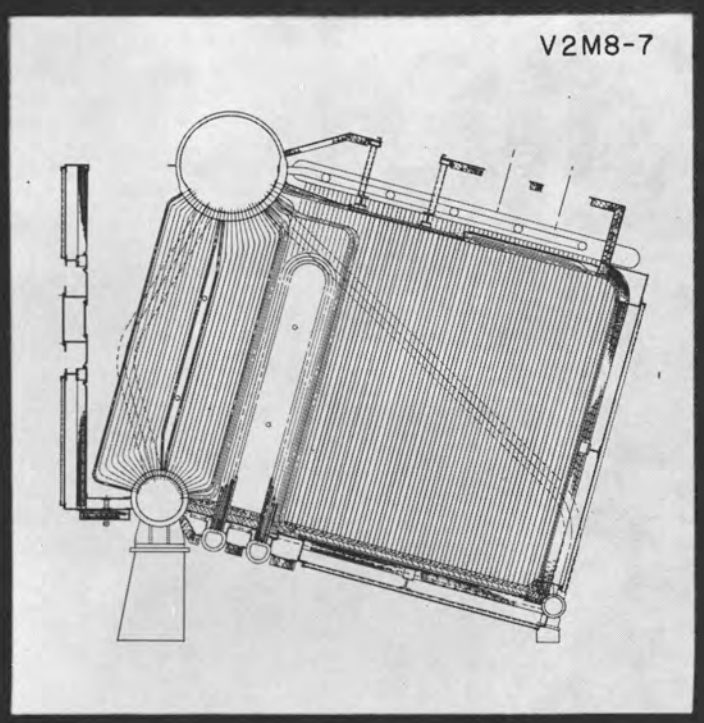
"'What is needed is a well-established market. This market, to assist the shipbuilding industry in improving productivity and attracting investments, must be stable and characterized by series construction. If this market is to be attained, it must be, as in other countries, the result of a sustained, positive national policy. Adherence to such a policy by all branches of the Government would encourage such shipowners and operators as the major U.S.-owned oil companies to build U.S.-flag vessels.'

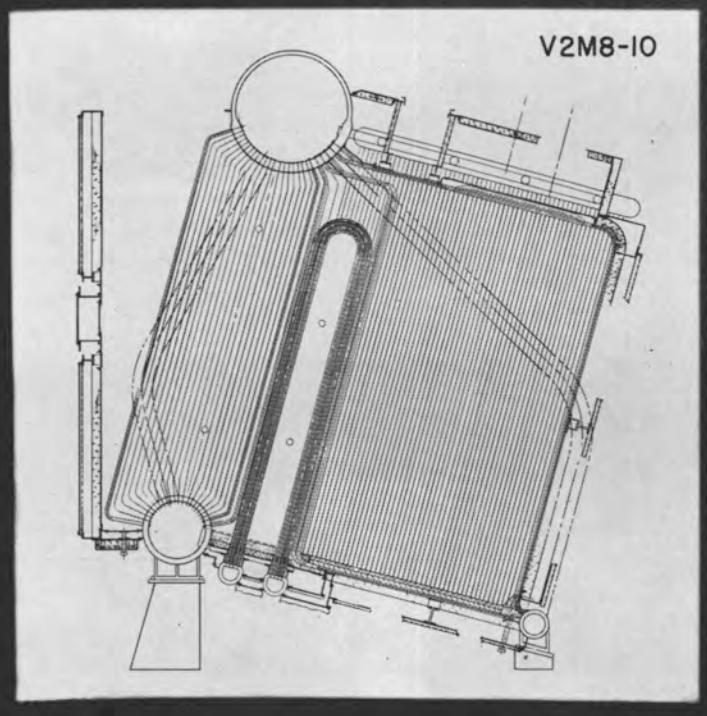
"We are also encouraged by the Commission's attention to the importance of ship financing. Backup study of 'Ship Construction and Acquisition Financing' by the First National Bank of Chicago concludes: 'U.S. Ship Financing Package is substantially better than any alternative financing available for the construction and acquisition of foreign-built ships.' First Chicago recommends: 'The Maritime Administration in conjunction with U.S. shipyards should undertake a promotional program to educate potential ship buyers on the economic advantages of the U.S. Ship Financing Package.'

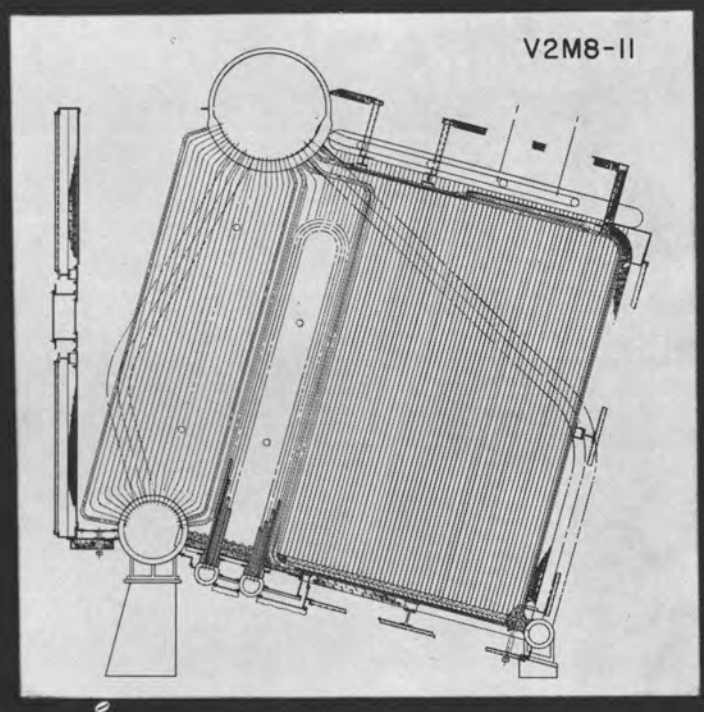
"This recommendation, in addition to others advanced by the Commission, will be actively supported by our industry.

"We, as well as policy-makers and the Congress, will also want to give thoughtful consideration to this statement in the Commission's report: 'With respect to capacity for constructing commercial-type ships for noncombatant needs in a sustained conflict, the industry has presently, at the maximum, only one-third of the required output capacity according to a recent study by the Maritime Administration.'"

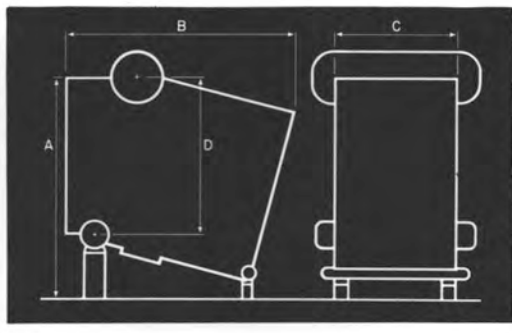






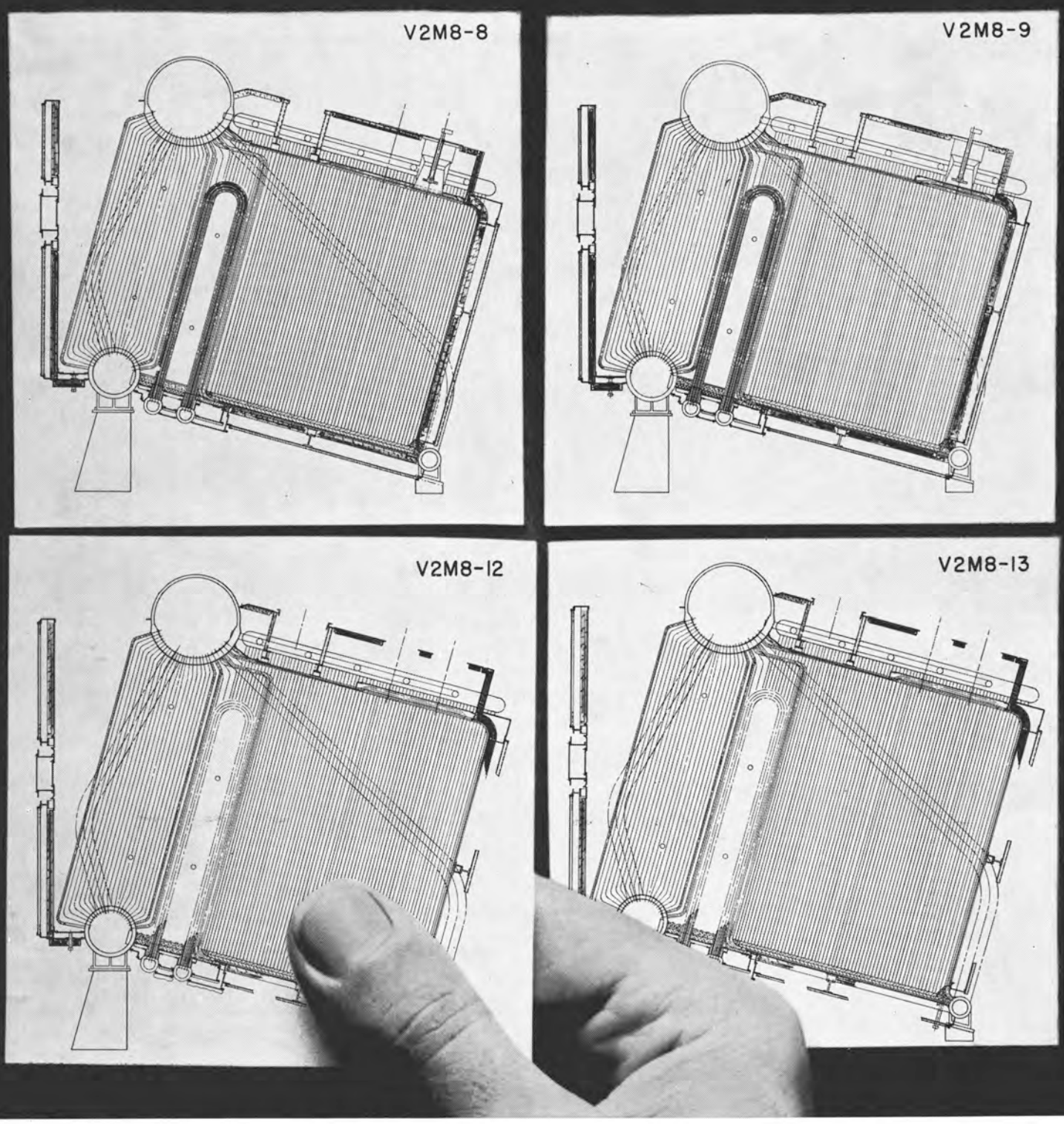


C-E makes a full line of standard V2M8



BOILER DESIGN	CAPACITY METRIC TONS/HR*	A		B		C		D	
		MM	FT	MM	FT	MM	FT	MM	FT
V2M8-6	60	6400	21	7600	24.9	3870	12.7	4572	15
V2M8-7	70	6400	21	7500	24.6	4978	16.3	4572	15
V2M8-8	80	7195	23.6	8450	27.7	4408	14.5	5030	16.5
V2M8-9	90	7160	23.5	8330	27.3	4856	15.9	5030	16.5
V2M8-10	100	8001	26.2	7700	25.2	5614	18.4	5791	19
V2M8-11	110	8099	26.5	8100	26.5	5805	19	5791	19
V2M8-12	120	8268	27.1	8670	28.4	6056	19.8	5791	19
V2M8-13	130	8002	26.2	7700	25.2	7015	23	5791	19

*Varies with cycle conditions



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More than 500 C-E V2M8 marine boilers are in operation throughout the world. Relying on this wide experience we have assembled a series of standard designs for the full range of steaming rates. The choice is yours. And when you choose you have the advantage of design features proven superior in service. Features like:

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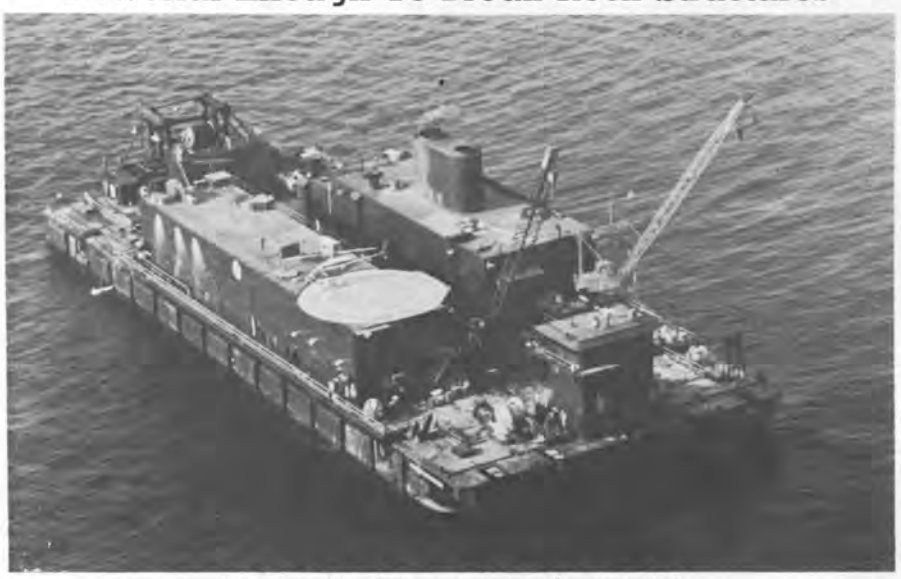
Todd Houston Yard Delivers First Of Two High-Pressure Jet Pipelaying Barges Powerful Enough To Break Rock Structures



Jet Barge No. 3 is equipped with a jet sled which straddles the pipe on the floor of the sea.

The pressure jets of Jet Barge No. 3, owned and operated by J. Ray McDermott & Co., Inc., New Orleans, La., are powerful enough to break rock structures if need be to expedite the burying of pipe at sea. This barge is the first of two being built by the Houston Division of Todd Shipyards Corporation, and it is now in operation in the North Sea.

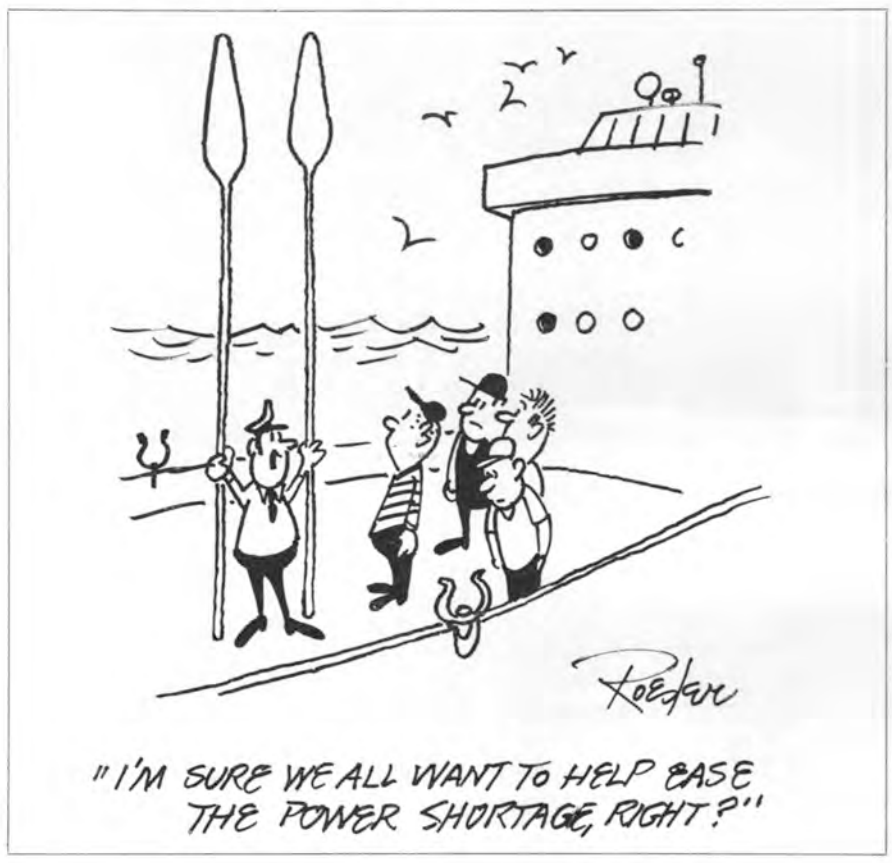
The new barge is equipped with a jet sled which can be lowered at the stern until it rides on the floor of the sea. As it straddles the pipe, high-pressure water jets trench out underneath the pipe, which then drops into place in the trench. Natural action of the ocean later fills in the trench, covering the pipe.

Air-conditioned living quarters are provided for 72 men, and the barge carries enough fuel, potable water, fresh water and dry stores to last 30 days. A helicopter deck facilitates resupply operations.

Located below deck are eight mooring winches and two pull-ahead winches for moving and positioning the barge during the pipe-burying operations, as well as the jet-booster pumps and miscellaneous auxiliary machinery.

The above-deck houses contain boilers, generators, jet pumps and other machinery for barge and pipe-burying operations and control of the barge winches and machinery.

Jet Barge No. 3 can be towed across open seas to operate in all areas of the world. It is classified by the American Bureau of Shipping + A-1 for unrestricted ocean service.



Gulf Oil Creates New Division Gulf Global Exploration (GLOBEX) —Appoints Three Top Executives

M.J. Hill

B.W. Miller

M.M. Rigo de Righi

Gulf Oil Corporation has established a new division, Gulf Global Exploration Company (GLOBEX), to provide central coordination in its worldwide search for gas and oil.

M.J. Hill has been named president of GLOBEX, which will be headquartered in Pittsburgh. Mr. **Hill** will also continue his duties as vice president-exploration and production for Gulf Oil Corporation.

B.W. Miller, formerly exploration coordinator, Gulf Oil Corporation, has been named vice president-operations, and **M.M. Rigo de Righi,** formerly manager-exploration, Gulf Oil Company — Latin America, has been named vice president-technical.

Gulf currently is conducting oil and gas exploration operations and investigations in approximately 28 countries around the world.

In addition to continued exploration in countries where the company is now producing, Gulf-interest wildcats were drilled in the past year in Norway, the United Kingdom, Gabon, Zaire, Indonesia, Korea and Thailand.

GLOBEX will also direct the operations of the Gulfrex, the firm's exploration and research ship. The Gulfrex, a 220-foot-long vessel manned by a crew of 40, has logged more than 250,000 statute miles in its nearly six years of scanning the ocean for petroleum deposits.

PROSA Chairman H.D. Cabassa Urges Warehouse Construction Program In Puerto Rico

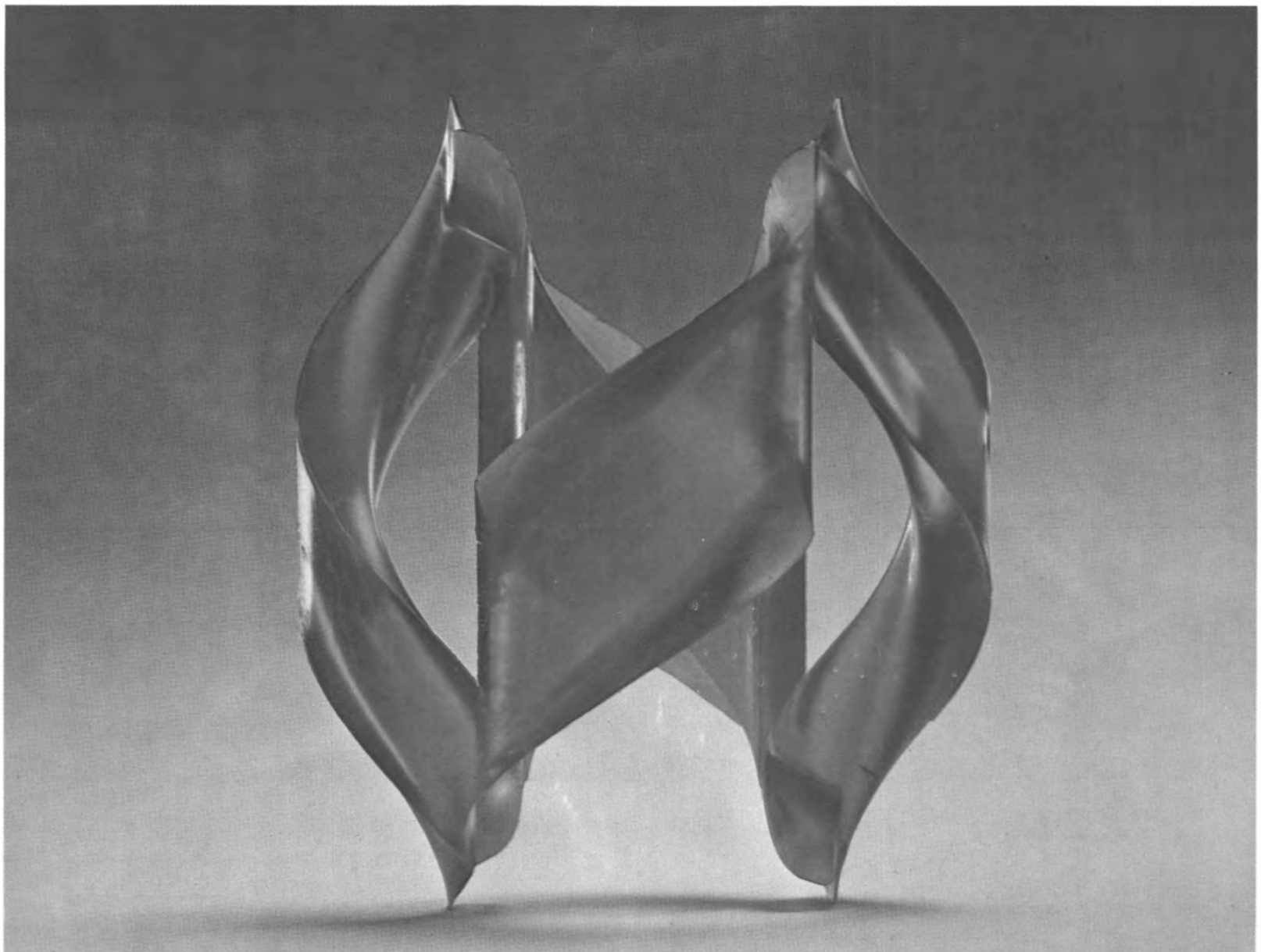
Pictured at the meeting are from left: **Jayson S. Rice,** Borden Inc., International; **John J. Davis,** U.S. Maritime Administration; **Hiram D. Cabassa,** PROSA chairman; **Thomas F. Cermack,** Seatrain Lines, Inc.; **Michael Leigh,** Hudson Pulp & Paper Co., and **Gerald P. Toomey,** Sea-Land Service, Inc.

The techniques used to make Puerto Rico's "Operation Bootstrap" industrialization program a model for economic development around the world should be adapted to turn the Caribbean island into a major Western Hemisphere distribution center, **Hiram D. Cabassa,** chairman of the Puerto Rico Ocean Service Association, said recently in New York.

He spoke before a PROSA public meeting attended by shippers, ocean carrier executives and Government officials.

Mr. **Cabassa** said the island Government should build warehouses on the same crash program basis it built hundreds of factories under the successful Bootstrap program, to also alleviate the current shortage of distribution space, which is causing congestion along the booming San Juan waterfront and increasing costs to the ocean carriers.

PROSA members include Sea-Land, Seatrain, Transamerican Trailer Transport, and Gulf-Puerto Rico Lines, the major U.S.-flag carriers in the $4-billion Puerto Rican trade.



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IMO pumps have long been established as THE rotary pumps for shipboard service—hydraulic systems as well as lube and fuel oil applications. For reliable and quiet operation there's an IMO pump to meet your above or below deck requirements.

For more information on how you too can use IMO marine pumps in your next shipboard project contact: DELAVAL Turbine Inc., IMO Pump Division, P.O. Box 321, Trenton, N.J. 08602.

DELAVAL

Gulf Oil Trading Announces Several Personnel Changes

Gulf Oil Trading Company, a subsidiary of Gulf Oil Corporation, has announced a number of personnel changes.

Richard K. Penland, manager-supply and transportation in London, has been named general manager-logistics planning in the Plan ning and Project Development Department in Pittsburgh, Pa. Mr. **Penland** is a graduate of the University of South Carolina and joined Gulf in 1967.

E.F. Diebes has joined the company as general manager-oil projects and economic analysis, Planning and Project Development Department. Mr. **Diebes** holds B.S. and M.S. degrees in petroleum engineering from the University of Texas and University of Toronto, respectively, and has also attended the University of London.

Jon N. Deakin, formerly manager-supply, trading and cargo sales, New York, has been named general manager-operations in the Supply and Transportation Department in Pittsburgh.

Peter E. Luitwieler, formerly director-sales coordination in Pittsburgh, has been transferred to New York as manager-supply, trading and cargo sales. Mr. **Luitwieler** joined Gulf in 1965 and holds degrees from Dartmouth College and the Amos Tuck School of Business.

Wayne R. Peters has been transferred to London as manager-supply and transportation. Mr. **Peters,** who had been manager-supply operations in Pittsburgh, joined the company in 1953.

W.J. Hindson, formerly manager-performance analysis and short term optimization, has been named manager-supply operations in the Supply and Transportation Department.

Marathon Mfg. Names Morris To Two Posts

George H. Morris

George H. Morris, a Houstonian, has been elected a vice president of Marathon Manufacturing Company, according to a statement by **Gene M. Woodfin,** president and chief executive officer of Marathon.

"Mr. **Morris** has also been promoted to president of our subsidiary, Marathon LeTourneau Offshore Pte. Ltd. in Singapore," said Mr. **Woodfin.** Mr. **Morris** has been managing director of that facility since February this year and before that assignment, had been assistant general manager of the Singapore plant. He holds an engineering degree from Texas A&M University.

Marathon's Singapore shipyard covers 35 acres and has more than 800 employees, according to a Marathon spokesman. The yard builds and repairs mobile offshore drilling platforms and related equipment.

The parent organization is a manufacturer of industrial metal products and is a major builder of mobile offshore drilling platforms. Marathon shipyards are located in Vicksburg, Miss., Brownsville, Texas, and Clydebank, Scotland, in addition to Singapore.

Pacific Resources, Inc. Negotiating With Todd To Build Three OBOs

The Maritime Administration has received an application for a construction differential subsidy from Pacific Resources, Inc., located at 1060 Bishop Street, Honolulu, Hawaii.

Pacific is negotiating with Todd Shipyards Corporation in connection with plans to construct three 80,000 dwt ore/bulk/oil (OBO) carriers, at an estimated cost of $34,800,000 per ship.

Paceco Appoints Frank H. Hayes

Frank H. Hayes

Paceco, a division of Fruehauf Corporation, Alameda, Calif., has appointed **Frank H. Hayes** as manager of field operations. In this capacity, Mr. **Hayes** is responsible for the field erection and servicing of all Paceco-built products in a worldwide territory.

Paceco is one of the world's leading designers and builders of container handling cranes and has more than 200 installations in 53 countries. Other products include equipment for the power and marine industries.

Mr. **Hayes** joined Paceco in 1966 and was former project manager. Previously, he spent 10 years in the aerospace industry. He has a bachelor of science degree in mechanical engineering from the University of Arizona.

Steuart Petroleum To Build $160-Million Piney Point Refinery

The Steuart Petroleum Company has announced plans to build a $160-million 100,000-barrel-a-day refinery on the grounds of their existing oil terminal at Piney Point in St. Mary's County, Md.

In announcing their plans, the Steuart Company stated that the plant would ease the problem of maintaining a steady flow of supplies to meet the growing heating oil needs of the greater Washington area, as well as fuel oil for PEPCO's electricity generating plants at Morgantown and Chalk Point.

Piney Point has been in existence as an oil terminal since 1949. It is located at a point where the depth of the Potomac River permits the berthing of oceangoing tankers. From Piney Point a network of underground oil pipelines extends to PEPCO plants at Morgantown and Chalk Point.

Kockums Receives Order For Electronic Boiler Control Systems

The Kockums Shipyard of Sweden has announced receiving an order for six electronic boiler control systems.

The order, totaling more than $550,000, was placed by the Uddevalla Shipyard in Goteborg. The equipment will be installed in six turbine vessels set for delivery in 1975 or later.

The ships' owners, all Norwegian, include Hansen-Tangen, Godager and E. Rasmussen.

Inland River Tonnage Chart Now Available

The latest edition of an inland waterway traffic flow chart, titled "Inland Freight Tonnage by Direction of Movement on the Mississippi River and Selected Tributaries, and the Gulf Intracoastal Waterway, Calendar Year 1971," is now available.

This chart, published by the Mississippi River Commission of the U.S. Army Corps of Engineers, has generated widespread interest for use in transportation analysis.

In addition to the volume of inland freight moved over the Mississippi River and Gulf Intracoastal Waterway, the chart shows in graphic form, by river mile and direction, the density of traffic over the entire navigable length of the Monongahela, Ohio, Tennessee, Cumberland, Missouri, and Illinois Rivers, and others. Interchange traffic between connecting waterways is also reported on the chart.

Copies of this wall chart, printed in color on white paper, 33 inches wide by 39 inches long, may be obtained for $2 each from the office of the District Engineer, Vicksburg District, Corps of Engineers, P.O. Box 60, Vicksburg, Miss. 39180. Payment must accompany order.

IHI Appoints Ubukata Vice President Shipyard In Brazil

I H I (Ishikawajima - Harima Heavy Industries Co., Ltd.), Japan, recently appointed **Taiji Ubukata,** former managing director of the company, to the post of vice president of Ishikawajima do Brasil Estaleiros S.A. (Ishibras) of Brazil, a joint venture between the Brazilian Government and IHI, succeeding the late **Yoshinobu Obori.**

Mr. **Ubukata** entered IHI in 1939, after graduating from the law department of the Imperial University of Tokyo. He has been a managing director of IHI since 1968, having previously held directorships in Ishibras from 1959 to 1964, and then in IHI.

Ishibras, the largest shipyard in Latin America, was established as IHI's first overseas shipyard in 1959. Since then, more than 30 large ships, including 25,000-dwt bulk carriers and 12,000-dwt high-speed cargoships, have been built there. At present, construction of a 400,000-ton building dock is in progress.

In addition to its shipbuilding and ship repairing activities, Ishibras is also the only manufacturer of Sulzer diesel engines in South America. Other lines of business include the manufacture of Daihatsu engines, and steel structures such as cranes and gates.

Taiji Ubukata

As the successor of Mr. **Ubukata, Michiyasu Nasaka,** former director of IHI, has been elected managing director of the company. Mr. **Nasaka** graduated from the law and literature department of Tohoku Imperial University in 1937 and joined the Nagoya Shipbuilding and Engineering Company in 1941. After the merger of the company with IHI, he was appointed manager of the general management department in 1967 and became a director of IHI in 1970.

RPC Division's New Type Spreader For Fork-Lift Trucks

A new expandable container-handling spreader that gives a fork-lift truck greater mobility in confined areas has been developed by the RPC Division of Midland-Ross Corporation.

The first unit is in operation at the port of Jacksonville, Fla., according to **J.E. Fathauer,** general manager of the division.

The main frame of the 13,000-pound spreader is mounted on a kingpin which permits the operator to slue the unit 3½ degrees left or right to pick up a container that is positioned at an angle. The new feature eliminates much of the maneuvering that is usually necessary to position a fork-lift truck properly in such a situation, Mr. **Fathauer** said.

The new spreader can be adapted to existing fork-lift trucks without a special mast arrangement. It is capable of handling ANSI/ISO and other containers from 20 to 40 feet in length.

Information on the new spreader can be obtained by writing to **J.E. Fathauer,** RPC Division, Midland-Ross Corporation, 55 Public Square, Cleveland, Ohio 44113.

Philadelphia Maritime Group Elects Officers

Thomas P. Kelly, F.H. Muldoon and **William Meyle Jr.** have been reelected president, vice president and treasurer, respectively of the Philadelphia Marine Trade Association, the organization has announced.

Elected to three-year terms as directors of the association were **Gerald C. Bradford** and **John J. Gibbons. Alfred Corry** continues as executive secretary, and **Francis A. Scanlan** counsel for the group.

The ROBERT E. LEE... a new LASH vessel is launched for a new LASH operator

Launching of the 893-foot-long ROBERT E. LEE marks the advent of Waterman Steamship Corporation's new fleet of LASH vessels that will bring LASH service to a new world trade route. The new Waterman vessels are part of a series of LASH vessels that are the largest unitized cargo liners built in the United States.

With the ROBERT E. LEE and sister ships, STONEWALL JACKSON and SAM HOUSTON, Waterman in 1974 will begin offering express LASH service between U.S. Gulf and East coast ports and Red Sea, Persian Gulf, Arabian Sea and Bay of Bengal ports. The vessels will all carry 89 standard LASH lighters, at service speeds in excess of 22 knots.

The ROBERT E. LEE is the nineteenth LASH vessel launched in a continuing program that includes a total of 24 LASH vessels placed in operation or ordered by seven vessel operators. In a continual expansion of trade route service, LASH vessels serve nations in all major continental areas of the world.

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

Todd Awards $7.5-Million Contract to Colt Industries For Tanker Propulsion Systems

The Power Systems Division of Colt Industries, Beloit, Wis., has received a $7.5-million order from Todd Shipyards Corporation, San Pedro, Calif., to furnish diesel ship propulsion systems for four 35,000-dwt tankers.

The systems include two 7,000-hp Colt-Pielstick diesels and associated gearing and controls for each ship. The 14-cylinder turbocharged engines will be manufactured at the division's plant in Beloit.

The tankers, to be built for Sea Service Tankers, Inc., New York, are part of a $659.2-million 16-ship program partially subsidized by the U.S. Government, to make the nation's merchant fleet competitive with foreign fleets.

Colt Industries is one of the nation's leading producers of diesels for marine and land-based power. "This order was made possible by Colt's earlier participation in a Military Sealift Command program for similar equipment in the four 25,000-dwt tankers," said **E.L. Fay,** vice president of product marketing for the Power Systems Division. "The new design is for 'stretched' versions of the ships in the previous order," Mr. **Fay** said.

Todd Shipyards Corporation, using their wholly owned subsidiary, Designers and Planners, naval architects of New York City, will develop the final design of the tankers.

Mr. **Fay** also pointed out that the Power Systems Division will design and furnish the complete monitoring system for an ACC one-man engine room which is designed to be easily converted to an ACCU unmanned engine room. The control consoles will be capable of controlling the propulsion plant from the engineer's console and the bridge console.

He said the equipment will continuously monitor selected temperatures, pressures, flows, levels and electric load characteristics with abnormal conditions actuating an alarm. Effective one-man monitoring of all steady-state cruising and maneuvering watch functions will be incorporated in the system.

The paired turbocharged 14-cylinder engines are of V-configuration, rated at 7,000 hp each with an operating speed of 520 rpm. They have a 15.75-inch bore and 18.11-inch stroke and will be capable of burning number two diesel oil and 3500 sec. Redwood No. 1 heavy fuel oil. The direct-reversible engines will power a single fixed-pitch propeller through flexible couplings, clutches and a twin-pinion single reduction gear to propel the 711-foot vessel at a designed sea speed of 16 knots. The diesels allow optimum flexibility in ship design. They provide a reduction in weight and space requirements over comparable slow speed engine systems.

Over the past several years, an $8-million investment has been made in upgrading the division's large engine manufacturing facilities in Beloit. They are now among the largest and most modern engine shops in the U.S. The Beloit plant is in full production, building diesel engines for marine service and power generation.

For stationary applications the Colt-Pielstick engine is also available as a dual fuel unit.

The Colt division is a licensee with S.E.M.T.-Pielstick of Paris, France, to build the Pielstick engine. It is the world's most widely used medium-speed high-horsepower diesel engine with service available on a worldwide basis. There are now more than 600 oceangoing vessels in service or on order, powered by Pielstick diesel engines.

With annual sales in excess of $700 million, Colt Industries is also a leading producer of automotive engine components and controls, specialty metals, firearms, and such industrial equipment as compressors, pumps, transformers, machine tools and weighing systems. Its 17 domestic divisions employ more than 24,500 people in 50 plants in 20 states. Additional operations abroad manufacture and market a wide selection of Colt products.

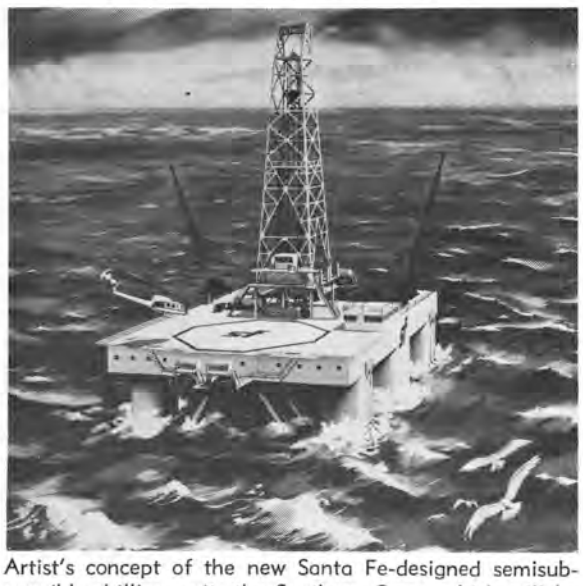
Hillman Barge & Construction Breaks Ground For Expansion

Hillman Barge & Construction Company, Pittsburgh, Pa., has announced the ground breaking for a $750,000 steel preparation shop which is the initial phase of an extended plant expansion and modernization program to eventually include additional under-roof subassembly construction space, and ultimately an expansion of yard erection facilities.

The first-phase 90-foot by 300-foot shop building of structural and sheet steel construction will add 30,000 square feet of under-roof working space. In addition to existing equipment which will be relocated, the new shop will also contain new preparation equipment and six new cranes, one of which will be a 25-ton radio-controlled bridge crane. Craneway extensions are being provided to facilitate the handling of material from the preparation areas to the subassembly fabrication shops. Interior features for improved working conditions include new improved lighting and ventilating systems, power-operated roll-up door, and high intensity localized electrical unit heaters.

The goal of the initial phase of the expansion program is to increase production and efficiency of steel preparation in the manufacture of barges and towboats, providing Hillman's new preparation shop and fabrication shop layout with more "in process" storage and increased under-roof subassembly area.

Evans Deakin To Build Santa Fe International Semisubmersible Drilling Unit



Artist's concept of the new Santa Fe-designed semisubmersible drilling unit, the Southern Cross, which will be built in an Australian shipyard.

Santa Fe International Corp., Orange, Calif., has contracted for construction of a newly designed, compact semisubmersible drilling unit capable of operating in severe ocean environments and water depths to 1,500 feet.

President **E.L. Shannon Jr.** said the unit, to be named the Southern Cross, will be built by Evans Deakin Industries Ltd. in Brisbane, Australia.

The twin-hulled column-stabilized vessel was designed by Santa Fe's Engineering Services Division with the cooperation of the Ocean Engineering Section of Lloyd's Register of Shipping. It is designed to meet the general criteria for all-season operations in rough waters such as the Bass Strait and the Great Australian Bight.

Mr. **Shannon** said its total structural steel weight of approximately 5,200 tons represents "the most economical initial capital outlay commensurate with structural and motion characteristics which approximate those of much larger vessels."

Design criteria include minimum motion in heave, pitch and roll, maximum mobility, and a survival capability in 100-foot seas. Operating at a draft of 43 feet, the unit will have a displacement of 15,700 tons. It will be equipped for drilling to depths of 25,000 feet.

The Southern Cross is scheduled to be delivered in May 1975. It is expected to operate in Australian waters.

Its upper hull, a watertight flotation unit 14 feet deep, will measure 216 by 140 feet. This will be supported by six rectangular stability columns, each 60 feet high. Corner columns will measure 24 by 30 feet. Center columns, containing bulk storage tanks, will be 22 by 40 feet.

Each of the lower hulls will be 260 feet long with a 40-foot beam and a depth of 21 feet 9 inches. Low-temperature steel will be used in critical stress areas to enable the unit to work in cold climates.

The vessel will be classed by Lloyd's Register of Shipping and, in addition, will meet the stability requirements of the American Bureau of Shipping.

Air-conditioned quarters for 80 men will be provided, plus a six-man hospital and two galleys. The unit will be equipped with three survival capsules, each with a capacity of 28 men.

Mr. **Shannon** said Santa Fe's goal in designing the rig was to provide the most efficient and economical unit possible, especially for future operations in deep water, heavy seas and cold climates. Designed for year-round operations with little weather downtime, the unit is expected to be competitive with much larger rigs on the basis of cost per foot of hole drilled, he said.

Twin hulls will give the unit excellent towing characteristics and reduce the cost of long moves. The design provides for possible future installation of machinery for dynamic mooring assistance.

The Australian rig is the fourth new offshore drilling unit announced recently by Santa Fe. The company has two jackup rigs currently under construction in a Singapore shipyard, plus a new Blue Water class vessel which is being built in Texas. In addition, Santa Fe will be the operator of two U.S.-built semisubmersibles soon to start drilling in the North Sea.

Pott Industries Buys Nine Offshore Vessels

Pott Industries Inc., St. Louis, Mo., has announced that an agreement had been reached to purchase nine vessels located on the Persian Gulf from Sedco, Inc., for an undisclosed amount of cash. Pott said that eight of the vessels would be acquired and operated in the Persian Gulf by Gulf International Marine Corp., which is jointly owned by Pott and another company. The other vessel will be acquired by a wholly owned Pott subsidiary and operated in the North Sea.

Pott said all of the vessels will be used to service the offshore petroleum industry. It said that the majority of them is presently being operated under contracts which will be assumed.

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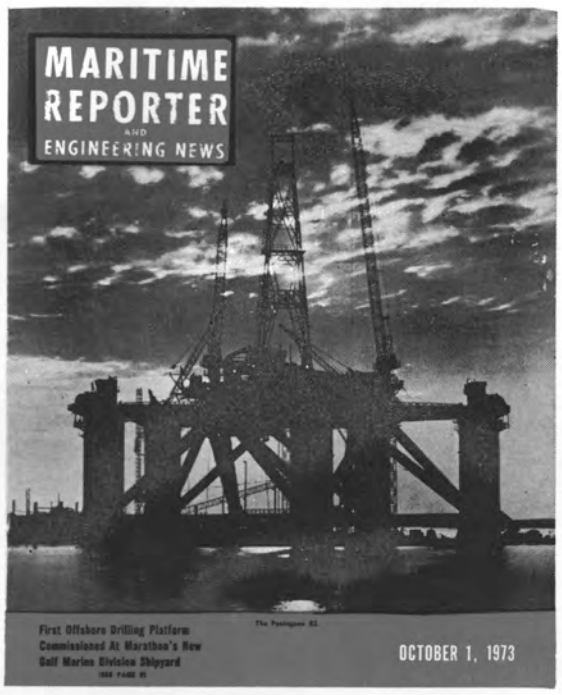

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DIESEL GENERATOR SETS

1

350 KW DIESEL GENERATOR SET

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

2

250 KW DIESEL GENERATOR SET

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

3

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

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

4

UNUSED
10 KW SUPERIOR DIESEL GENERATOR SET

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

5

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

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

6

300 KW
DIESEL
GENERATOR
SET

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

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

TURBO GENERATOR SETS

7

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

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

8

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

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

9

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

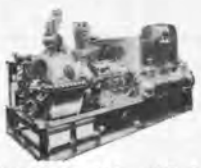
GENERATOR: 300 KW—120/240 VDC—1250 amps—1200 RPM. REDUCTION GEAR: 8.344:1 — 10012/1200 RPM—type S-182. TURBINE: DOR418N—449 H.P.—10012 RPM—working pressure 180/220 PSIG.

10

WESTINGHOUSE
440/3/60
200 KW UNIT

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

11



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

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

12

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

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

13

AP2 VICTORY
WORTHINGTON-
MOORE
CROCKER-WHEELER
300 KW UNIT

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

14

UNUSED C-4
CROCKER-WHEELER
500 KW
GENERATOR ENDS ONLY
120/240 VOLTS D.C.—1200 R.P.M.
FORMERLY USED WITH WORTHINGTON-MOORE TURBINES & GEARS

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

15

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

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

16

TWO 538 KW WESTINGHOUSE T-2 AUX. GENERATORS

(COMPLETE)

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

TURBINES & ROTORS

MAIN PROPULSION

17

BETH. CLASS—13,600 H.P.

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

18

H.P. & L.P. COUPLINGS

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

19

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

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

T-2 TURBINES & ROTORS

20

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

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

21

2 COMPLETE T-2 G.E. TURBINES

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

ROTOR WILL INTERCHANGE WITH ELLIOTT MAIN TURBINE

Will Sell Rotors Separately

22

T2-SE-A1
MAIN PROPULSION
ROTOR — G.E.

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

23

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

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

VICTORY SHIP TURBINES & ROTORS

24

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

L.P. – 3509 RPM
H.P. – 6159 RPM

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

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

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

WRITE OR PHONE FOR DETAILED INFORMATION AND PRICES

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ORE ST. • BALTIMORE, MD. 21202

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

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

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

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

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

27

19 STAGE
WESTINGHOUSE
H.P. ROTOR FOR
AP2 VICTORY

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

28

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

MD-48A—8500 HP—6159/3509/763/85 RPM.

29 ALSO 6000 H.P. VICTORY
AP2 REDUCTION GEAR

Westinghouse 4A-1640.

PUMPS

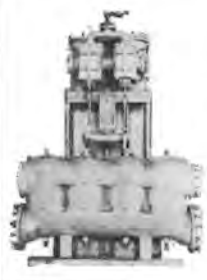
CARGO STRIPPING PUMPS

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.

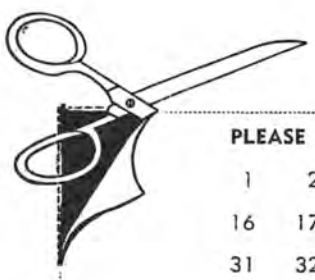
48

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

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

Petrolane Appoints Durkee President Petroleum Services

A 43-year-old industrial entrepreneur with 20 years' experience in the petroleum exploration field has been selected as president of the Petroleum Services Division of Petrolane Incorporated.

W.E. (Gene) Durkee, an expert on petroleum drilling, will head the group of Petrolane companies providing specialized augmentative services required in petroleum exploration and development, primarily offshore. Included in the Petroleum Services Division are Eastman-Whipstock, one of the largest directional drilling companies with operations worldwide, and Arthur Levy Boat Service, the offshore workboat service with a fleet of 62 marine support vessels operating in waters off the U.S. and 13 foreign countries. Also included are Indonesia Air Transport, providing helicopters and air taxi service to petroleum, mining and logging companies in Southeast Asia, and Fishing Tools, Inc., a company furnishing downhole recovery and remedial well services primarily on the Louisiana Gulf Coast.

In the newly created top management position, Mr. **Durkee** will initially be based at Petrolane's headquarters in Long Beach, Calif. Within a short time, he will establish a division headquarters in Houston, Texas.

W.E. Durkee

He is a registered engineer, holding degrees in petroleum engineering and advanced drilling technology from the University of Oklahoma and Texas A & M University, respectively.

He is a director and major stockholder in the First Western National Bank of Moab and Monticello, Utah, and is active in the Young President's Organization, Southern California chapter. For five years, he was regional vice president and director of the American Oilwell Contractors Association, and is currently a director of St. Mary's Hospital of Long Beach, Calif.

Application To Build 625,000-Dwt Tanker Filed By Mobil Oil

Mobil Oil Corporation has filed an application for Federal subsidy to help build either a 625,000-deadweight-ton tanker or one of 425,000 dwt, the Maritime Administration has disclosed. If the larger one is built, it will be the biggest so far in the United States for which subsidy is sought. Exxon has on file an application for subsidy for two 400,000-dwt very large crude carriers.

The cost of the smaller one would likely be around $95 million, and for the larger about $120 million.

Mobil indicated no builder has been chosen.

Mobil's application brought the total backlog to 139 ships, representing more than $9 billion of shipyard business. Forty-nine VLCCs were included in the applications, the balance were mainly smaller tankers under 100,000 deadweight tons, combination ore/bulk/oil carriers, and liquefied natural gas carriers (LNGs).

Alter Gets Title XI To Build 3 Towboats And 75 River Barges

The Alter Company, Davenport, Iowa, has received the Maritime Administration's approval of its Title XI application to build 78 vessels at a cost of approximately $14,582,747. Three of the vessels are towboats, two of which will be built by Dravo Corporation, Pittsburgh, Pa. — one will be 5,600 horsepower and the other will be 4,200 horsepower. Dravo will also construct 75 barges for Alter. Mainstream Shipyards & Supply, Inc, of Greenville, Miss., will construct the third towboat, which will be a 6,400-horsepower vessel.

Hitachi And Kawasaki Sign To Build Four Huge Esso Tankers

Contracts have been signed between Esso Tankers Inc., an affiliate of Exxon Corporation, and two Japanese shipbuilding firms for the construction of four large crude oil carriers.

Kawasaki Heavy Industries, Ltd., will build two 410,000-dwt type crude oil carriers for Esso at its Sakaide shipyard. Delivery will be made in 1976 and 1977. Hitachi Shipbuilding & Engineering Company, Ltd., will construct two 400,000-dwt type crude oil carriers for Esso at its Ariake shipyard, with delivery scheduled for 1977.

All four tankers will be turbine powered and will be used in Exxon's international tanker service.

H.H. Howard To Chair Executive Committee Marine Section, NSC

Harry H. Howard

Harry H. Howard, assistant to the vice president, shipbuilding department, Bethlehem Steel Corporation, was installed as general chairman of the executive committee, Marine Section, National Safety Council.

The installation was conducted during the annual National Safety Congress, held in Chicago, Ill.

The past year, Mr. **Howard** served as executive vice general chairman of the Marine Section's executive committee and has been a member of this group since 1970. He also served two years as co-chairman of the program committee, shipbuilding and repair division, from 1970 to 1972.

In addition to shipyards, the executive committee's activities cover seagoing, Great Lakes, inland waterways, maritime port and stevedoring operations.

Mr. **Howard,** a native of Chesapeake City, Md., was graduated from the University of Maryland in 1935. He joined Bethlehem Steel Corporation in 1937 as a safety engineer in the industrial relations department.

In 1938 he joined the shipbuilding department, holding various positions at Bethlehem's former Brooklyn and Staten Island, N.Y. yards. He was assigned to the vice president's office in 1942.

Mr. **Howard** became assistant to the vice president January 1, 1968, and is currently responsible for administration and public affairs.

Ameroid Marine Sales Appoints Robert Marks

Raymond M. Burke, vice president and general manager, Ameroid Marine Division of Drew Chemical Corporation, 701 Jefferson Road, Parsippany, N.J., a subsidiary of United States Filter Corporation, has announced the appointment of **Robert Marks** to the position of marketing manager, marine equipment. Mr. **Marks** will be responsible for managing this new business area, working through the marine operation throughout the world. The group will be responsible for sales, marketing and service policies for all equipment sold through the marine operation.

Mr. **Marks** is an engineering graduate of the U.S. Merchant Marine Academy; he also attended Tufts College in Massachusetts. He was previously employed with the Cochrane Division of the Crane Company for 22 years, most recently as marketing manager.

Drew Chemical Corporation is a major supplier of products and services for water management and specialty chemicals, with offices and services throughout Europe and the Far East.

Midland Insurance Fills Vacancies On Executive Board

At the latest meeting of the board of directors of the Midland Insurance Company, New York, N.Y., **C. Felix Harvey** and **W. Mason King Sr.** were elected to fill two vacancies on the board, according to an announcement by **Miles S. Chenault**, Midland chairman.

Mr. **Harvey** is president of Harvey Enterprises, Inc. of Kinston, N.C., and is chairman of the board or an officer of 15 affiliated companies. He is also chairman of the board of Georgia International Corporation, an Atlanta-based holding company for five insurance companies and a finance company; and a member of the executive committee of Katy Industries.

A graduate of the University of North Carolina, Mr. **Harvey** is past president of the university's Business Foundation and a trustee of High Point College. He is very active in civic and charitable affairs in North Carolina.

Mr. **King** is a well-known expert in the transportation industry. He was formerly vice president-traffic and a member of the board of directors of the Southern Railway System. He has been very active in industry organizations, including 12 years as chairman of the executive committee of the Southern Freight Association of Railroads. He also helped organize and later served as president and chairman of the American Society of Traffic and Safety.

With his son, Mr. **King** operates King Transportation Consultants, Washington, D.C., serving clients in railroading, paper, forestry and other industries.

Mr. **Harvey** and Mr. **King** replace **Donald Matthews** and **Robert F. Matthews** on the Midland board of directors. They resigned in order to devote their full time and efforts to new business ventures.

Florida Towing Names W. Anthony Watt VP

Dr. **W.T .Coppedge Jr.**, president of Florida Towing Company, Inc. of Jacksonville, has announced the appointment of **W. Anthony Watt** to join **Joseph F. Carroll Jr.** as a vice president of the company. Both Mr. **Watt** and Mr. **Carroll** will be responsible for directing operations development and all marine activities of the company.

In making the announcement of Mr. **Watt's** appointment, Dr. **Coppedge** said, "Mr. **Watt's** duties will include overseeing all fleet maintenance and repair, and he will be in charge of our new construction program."

Mr. **Watt** was formerly with Jacksonville Shipyards, Inc. in the sales and estimating departments. Prior to coming to Jacksonville, he was associated with Midland Marine Brokerage, Inc. in New York, and earlier was port captain of Spentonbush Fuel Transport Company, also of New York.

Sperry Vickers Names DOL-FIN Distributor

Sperry Vickers has announced the appointment of Custom Marine Services, Inc., Chicago, Ill., as a sales and service distributor for its line of DOL-FIN marine products in the Great Lakes area.

Custom Marine will offer complete sales, service, and application support for the DOL-FIN roll stabilizing systems, power steering systems, Powerpak alternator systems, and other marine hydraulic products.

Custom Marine Services is located at 4811 South Western Boulevard, Chicago, Ill. 60609.

Line Fast Completes Deck Lashing System For Zim Fleet

Line Fast Corporation, Holbrook, N.Y., recently completed the outfitting of the Zim containership Hong Kong with Line Fast's container lashing system. This was the sixth vessel in the fleet to be completely outfitted with on-deck container lashing under a contract awarded by Zim Lines.

Line Fast is a leading manufacturer of container-securing systems and equipment with worldwide distribution. For a free catalog describing this system, write to Line Fast Corporation, 805 Grundy Avenue, Holbrook, N.Y. 11741.

Hongkong United Dockyards Creating Company To Build And Repair Mammoth Vessels

Hongkong United Dockyards Limited, and Overseas Shipyard Company Limited (a member of the C.Y. Tung Group), announce that they are to form a new company, Hongkong Consolidated Dockyards Limited, with a view to exploring the possibilities of providing in Hong Kong new shipbuilding and repairing facilities capable of handling the mammoth vessels currently operating on world trade routes. The directors will be Messrs. **J.H. Bremridge, A.G. Hutchinson, J. Cassels, C.H. Tung** and **M.H. Liang.**

A survey team from A.P. Appledore International Limited, who have been commissioned to undertake a detailed feasibility study, is at present in Hong Kong collecting information for its report.

There are presently six drydocks in Hong Kong with the capacity to handle up to 100,000 dwt. The labor force totals 6,000 men per day, according to **Robert M. Catharine,** president of Jackson Marine Corporation, New York City, U.S.A., agent for HUD.

Great Lakes/Rivers Section Hears Three Technical Papers At Meeting In St. Paul, Minn.

Shown at the Great Lakes and Great Rivers meeting, left to right: (standing) **Robert J. Patrick,** vice chairman, Great Rivers; **Trevor White,** Section chairman, and **John C. Greenwood,** public relations chairman; (seated) **Richard Taubler, Greig Sullivan** and **John Buursema,** authors.

The fall meeting of the Great Lakes and Great Rivers Section of The Society of Naval Architects and Marine Engineers was held at the St. Paul Hilton Hotel, St. Paul, Minn., on October 11, 1973. Attendance at the technical session in the morning was 80 members and guests.

After a brief business meeting, the following technical papers were presented: "Much Ado About Barges," by **Richard Taubler,** Richard Taubler, Inc., Brooklyn, N.Y.; "Advanced Production Methods in Barge Construction," by **John Buursema**, vice president, Twin City Shipyards, St. Paul, and ""Safety Watch Instrumentation Aboard Modern Diesel Vessels," by **Greig E. Sullivan,** National Marine Service, Inc.

During the afternoon, attendees toured the highly automated shipyard facilities of Twin Cities Shipyards on Pigs Eye Island in St. Paul, and witnessed the movement toward launch of a barge under construction. The meeting concluded with a reception and dinner.

The next scheduled meeting of the Great Lakes and Great Rivers Section is at the Aqua Marine Motel, Avon Lake, Ohio, on January 17, 1974. The spring meeting will be held in Chicago on May 22-24, 1974, and additional details concerning this will be forthcoming in due course.

IMODCO, Technigaz Sign Joint Venture

A definitive agreement for a joint venture between IMODCO, Inc., West Los Angeles, Calif., and Technigaz, S.A., a company of the Gazocean Group, Paris, France, to develop, manufacture and sell or lease equipment for the handling of cryogenic liquids through offshore Single Point Mooring Terminal Systems, was formerly signed in Los Angeles. The two companies had previously announced a letter of intent for this purpose.

In placing their signatures to the agreement, president **Robert C. Houser** of IMODCO and administrateur **Jean Alleume** of Technigaz, in the United States from Paris for the occasion, said particular attention will be given to the development of a system which would be unaffected by extremely low gas temperatures and could respond to severe marine environmental conditions while loading and unloading.

They noted there is presently planned or in existence more than $1 billion in orders for liquid natural gas tankers, many of which are to be of supertanker size. These tankers will be used for the transport of LNG to the energy hungry markets in the United States, Europe and Japan from distant gas fields in such countries as Iran, Algeria and Indonesia.

Technigaz has already made significant advances in technology for the transportation of cryogenic liquids aboard ship with the development of various tank designs, now widely used, and will work closely with IMODCO, one of the world's leading designers and manufactureres of offshore terminal systems.

Messrs. **Houser** and **Alleume** stated the equipment will be designed to accommodate any type of liquid gas. This equipment will then be offered for direct sale or lease wherein operation and maintenance can be included.

Nickum & Spaulding Contracts To Design Three B.C. Ferries

Canadian Transport Minister **Bob Strachan** has announced that three new ferries, designed by a Seattle firm and costing $35 million, will be operating in the British Columbia ferries fleet by the summer of 1975.

Nickum & Spaulding Associates, Inc. of Seattle, Wash., has been awarded the $577,500 design contract and has agreed to have the designs completed and ready for construction tenders in two months.

Mr. **Strachan** told a news conference that the contract has been awarded for the design of two 376-car ferries, and a trailer ferry capable of handling 64 commercial vehicles or 154 cars.

The two car ferries, expected to cost $13 million each, will be used on the Lower Mainland run, and the $9-million trailer ferry will provide 24-hour service on the Swartz Bay-Tsawwassen run.

Edo Western Offers Brochure On Navtrak Docking System

The large kinetic energy levels encountered in new supervessels require that accurate and detailed velocity information be provided for both fore-aft and port-starboard at the bow and stern.

Edo Western Corporation's Navtrak Docking System is a precise sonar system which provides exact "over-the-bottom" information for docking of supervessels, plus speed log information while the vessel is under way. Range capability allows docking in water depths to 100 feet and speed log operation in any water depths. The system is self-contained and provides a readout of port-starboard velocity information from both the bow and stern, plus fore-aft velocity and accumulated distance traveled.

Edo Western pioneered doppler sonar navigation systems, and this latest version of the Model 482 Docking System is by far the most sophisticated system ever offered.

A comprehensive full-color brochure will be sent upon request. Contact Edo Western Corporation, 2645 South 2nd West, Salt Lake City, Utah 84115.

500,000-Dwt Tanker Ordered From Hitachi—Second From Andreadis

The Ariake shipyard of Hitachi Zosen has received an order for the construction of a second 500,000-dwt tanker from the Andreadis Group. The contract was signed on October 15 by Prof. **Stratis G. Andreadis,** chairman, and **Nobuo Inouye,** executive vice president of Hitachi Zosen. Payment terms were fixed in yen to be paid on a cash basis.

The contract for the first tanker of this size was signed in March of this year.

Built to ABS specifications, propulsion will be supplied by a 45,000-hp steam turbine to provide a speed of 15.3 knots. The new tanker will measure 1,280 feet in length (between perpendiculars), have a molded breadth of 233 feet and a molded depth of 102 feet.

The Andreadis Group recently began construction of an oil refinery in the Megara area, west of Athens. This refinery, when completed in the first quarter of 1975, will have an annual production capacity of 120,000 barrels a day.

The two 500,000-dwt tankers, scheduled for delivery in December of 1976 and December of 1977 respectively, and a 280,000-dwt tanker ordered in December of 1972 and currently under construction in Hitachi's Sakai shipyard, will be engaged in the transportation of crude oil to this refinery.

Institute of Navigation Holds 2-Day Seminar At Kings Pt. Academy

The Institute of Navigation (ION) recently completed two days of seminars and discussions at the United States Merchant Marine Academy at Kings Point, N.Y. The general theme of the meeting was "New Frontiers in Marine Navigation."

Rear Adm. **William F. Rea III,** USCG, the Chief of the Office of Merchant Marine Safety, was the guest lecturer at the highlight of the two-day meeting, a special banquet at Leonard's, in Great Neck, N.Y. He was introduced by the toastmaster for the evening, Dr. **Tom Nicholson,** who is an Academy alumnus and the director of the American Museum of Natural History.

Luncheons were held on both days of the seminar for the 120 members and guests of ION who attended the meeting. The Superintendent of the Academy, Rear Adm. **Arthur B. Engel,** USCG (ret.), introduced at the first luncheon **S.A. Conigliaro,** the president of Sperry Rand Corporation, whose topic was "From Polaris to Trident Navigation." The speaker at the next day's luncheon was Capt. **Lauren McCready,** who discussed the role played by the National Maritime Research Center in marine navigation. Captain **McCready** is the head of NMRC, whose offices are located on the Academy grounds.

Representatives of the Sperry Rand Corporation were among the most active participants at the meeting. Speakers from that firm at both the morning and afternoon seminar sessions were: **J.R. Grymes,** who spoke on "Operation of the Sperry Collision Avoidance System;" **J. Knitz,** "A Doppler Sonar Log for Water-Speed Measurement;" and **C. Sangiovanni** and **J. Moryl,** "Mixed Inertial Navigation Systems for Surface Effect Ships."

The meeting was administered and coordinated by Capt. **Raymond Eisenberg** of the Academy. Other Academy participants were Capt. **Laurence Jarrett,** who spoke about the legal frontiers of navigation, and Capt. **Alfred Fiore,** whose topic was "Marine Instrumentation Developments."

A total of 19 topics were examined in detail during the seminar portion of the meeting. Representatives of Government agencies and private industries related to the field of marine navigation were on hand to give their views on the many subjects.

The U.S. Merchant Marine Academy at Kings Point is a national institution, part of the Maritime Administration of the Department of Commerce.

McMullen Associates To Study West Coast Ship Repair Market

The international consulting firm of John J. McMullen Associates, Inc., has been selected by the Port of Portland, Ore., to undertake a study of the West Coast ship repair market and to recommend plans for the expansion of the ship repair facilities in the port area.

The study will involve a complete survey of West Coast marine activity leading to a projection of drydocking requirements through 1985, by size and type of ship. The capacity of West Coast ship repairers to satisfy these requirements will be assessed and an economic analysis undertaken of different possible levels of expansion, designed to indicate the potentially most advantageous level of investment in new or expanded facilities.

John J. McMullen Associates, Inc. is an internationally known firm of naval architects, marine engineers and transportation consultants engaged in all aspects of shipping and shipbuilding throughout the world. One of their current projects is the development of what will be the largest ship repair facility in the world, at Dubai on the Arabian Gulf. This shipyard, for which McMullen developed the overall concept, prepared the economic feasibility study and designed the business plan, will incorporate three giant graving docks, one large enough for tankers of 1,000,000 deadweight tons and the other two each large enough for tankers of 400,000 deadweight tons.

McMullen Associates is also responsible for the planning, construction and operation of a new shipbuilding yard in Curacao in the Caribbean, to be known as Santa Ana Shipyards Corporation. This shipyard, in which the Island Government of Curacao and McMullen will be partners, is planned to construct vessels of up to 80,000 deadweight tons.

An associate company of John J. McMullen Associates, Inc., Norton, Lilly and Company, Inc., is well-known in West Coast marine circles as a leading steamship agency with offices in Seattle, Wash., San Francisco, and Los Angeles, Calif.

Distillate Fuels Highlights Meeting Of Naval Engineers

The Tidewater Chapter of the American Society of Naval Engineers, at their first meeting of the 1973-74 season at the Little Creek Amphibious Base Officers Club, Norfolk, Va., presented a program on the Navy Distillate Fuel Conversion Program.

Comdr. **Robert A. Teague,** Naval Ship Systems Command Distillate Fuel Project Coordinator, traced the evolution of Navy fuels from coal to the inception of the Distillate Fuel Program.

During the presentation, he described highlights of the Navy's shift to "clean fuel" for all conventionally boilered steam-driven surface ships and detailed many of the major problems, such as pump standardization, encountered in achieving the program objective of converting all NSFO (Navy Special Fuel Oil) fueled ships.

Due to Commander **Teague's** informative presentation, considerable discussion was generated during the question and answer period.

During the regular business meeting, the chapter officers elected during a recent executive committee meeting were announced.

Comdr. **J.A. Siebel,** USCGR, marine consultant, former vice chairman, was elected chairman to replace Capt. **W.E. McGarrah**, USN, who left the area for a Washington assignment. Also elected were **R.S. Gray,** contracting officer SUPSHIPS 5, Norfolk Naval Shipyard, vice chairman; Lt. Comdr. **E.S. McGinley,** USN, Submarine Type Desk, Norfolk Naval Shipyard, secretary; Lt. **J.T. Hickman,** USNR-R, nuclear engineer, Norfolk Naval Shipyard, treasurer, and **R. Bock,** Norfolk Shipbuilding and Drydock Corp., hospitality chairman.

National Propeller Club Reelects Jasper Baker

Jasper S. Baker, a vice president of United Fruit Co. in Washington, D.C., has been reelected as national president of The Propeller Club of the United States. He has been active in the organization for more than 20 years. Elected with Mr. **Baker** at the San Francisco national convention were **George J. Gmelch,** executive vice president of Pacific Far East Line, San Francisco, Calif., first vice president; **Lloyd A. Strickland,** vice president of Lykes Bros. Steamship Co., New Orleans, La., second vice president; **James P. McAllister,** president of McAllister Brothers, New York, N.Y., third vice president; **A.R. Philbrick Jr.,** assistant superintendent of the Texas Maritime Academy, Galveston, Texas, vice president for student ports, and **A.C. Filiatrault,** executive secretary-treasurer.

Named as regional vice presidents were **David S. Walker,** Boston Towboat Co., Boston, Mass., for the North Atlantic; **Milton G. Nottingham**, Peralta Shipping Agency, Inc., Washington, D.C., Middle Atlantic; **Neal L.C. Harrington,** Harrington & Co., Miami, Fla., Southeast; Capt. **C. Ray North,** Gulf Oil Trading Co., Beaumont, Texas, West Gulf; **J. Merle Lemley,** State Employment Security Division, Little Rock, Ark., Mississippi Valley.

Also named, **Neil H. Whitehead,** Louisville, Ky., Ohio Valley; **Michael M. Scheidt,** American Steamship Co., Buffalo, N.Y., Lower Great Lakes; **C. Thomas Burke,** executive director, Duluth Port Authority, Upper Great Lakes; **Donald G. Foss,** Puget Sound Freight Lines, Tacoma, Wash., North Pacific Coast; Capt. **William V. Figari,** Shipowners & Merchants Towboat Co., San Francisco, Calif., South Pacific Coast; **Fabio N. Aliotti,** steamship agent, Genoa, Italy, the Mediterranean, and **Charles E. Botts Jr.,** Xtra Corp., Yokohama, Japan, Asiatic region.

Ocean Fleets Ltd. Appoints Capt. Arnold

Capt. **S.R. Arnold** has been appointed Nautical Adviser Designate of Ocean Fleets Limited, Liverpool, England. He will take over the appointment at the end of February, 1974, from Capt. **A.C. Sparks,** who retires.

Captain **Arnold** joined Alfred Holt & Co. in 1936 as a midshipman and was appointed master in 1959. After commanding a number of Ocean's conventional cargoliners, he became the first master of Ocean's first Far East containership, the 58,889-gross-ton Tokyo Bay, in 1972. He has since commanded two more of Ocean's four Far East containerships, which are operated by Overseas Containers Limited (OCL), and manned by Ocean Fleets.

Before taking up his new appointment in February, Captain **Arnold** will visit those ports in America and West Africa with which he is not already familiar.

$6.5-Million Contract To Equitable Equipment

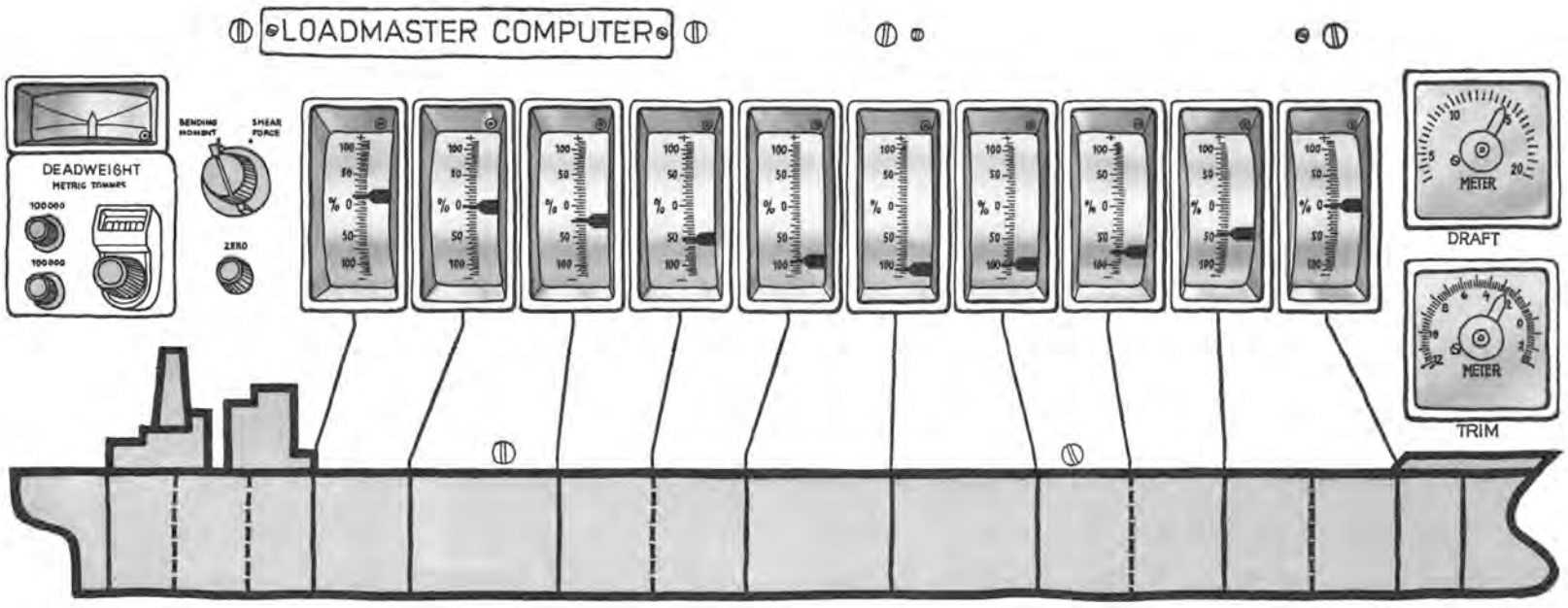
Equitable Equipment Company, Inc., New Orleans, La., has been awarded a contract by Union Tank Car Company of Chicago, Ill., for the construction of 180 LASH lighters for Central Gulf Lines, Inc.

The total estimated value of the lighters is $9 million. Equitable Equipment Company's part of the contract is approximately $6.5 million. The lighters will be built at Equitable's yards in Madisonville and New Orleans.

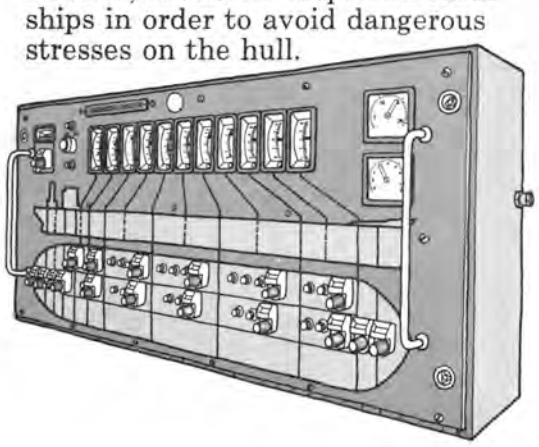
Jack R. Kruizenga, president of Union Tank Car Co. and **C.M. Keeney,** president of Equitable Equipment Company, Inc., signed the contract in Chicago.

Equitable just completed work on 50 LASH lighters for Pacific Far East Line, Inc., and is presently building 450 lighters for Waterman Steamship Corporation. Equitable, the world's largest builder of LASH and SEABEE barges, is a wholly owned subsidiary of Trinity Industries, Inc.

No other instrument can tell you all this. Continuously.



The bending moment graph.
The shear forces.
The trim.
The draught.
The deadweight.
Kockums Loadmaster Computer is the only cargo distribution instrument that can give you continuous display of all this information.
That's why the Loadmaster has been chosen by almost every major oil company and shipowner around the world.
This electronic device correctly and easily pre-calculates cargo distribution in tankers, bulk carriers, container ships and Lash ships in order to avoid dangerous stresses on the hull.



It's easy to operate. You simply turn the potentiometers until a digital counter reads the estimated weight of load in the tanks; this feeds the Loadmaster with all the information it needs. It'll take you 5 minutes to learn how to handle it. And the Loadmaster is designed to be used: you don't have to worry about damaging the mechanism by pushing the wrong button. When it comes to performance, the Loadmaster is practically foolproof; all components are subjected to exacting operational tests and every unit has to pass a simulation test run before it's assembled. And, an easy-to-read test program for use at sea is provided with every unit.
The Loadmaster's basic price – with 7 read-out points – is approximately 39,700 Swedish crowns, FOB Swedish port. Since every Loadmaster is individually built, the price will vary according to the required number of read-out points, etc.
We've also designed a new device, called the Stability Set, for calculation of transverse stability. It works through the Loadmaster and enables fast, easy calculation of your vessel's stability.

We'll be happy to tell you more about the Kockums Loadmaster Computer and the Stability Set. Get in touch with our representative in your country, or use the coupon below.

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Boston Naval Shipyard Engineers Establish Consulting Firm

A marine engineering and management consultant firm known as Marine Systems Corporation has been formed in Boston, Mass. by former Boston Naval Shipyard employees of the Office of Planning and Engineering for Repairs and Alterations for Anti-Submarine Warfare Ships PERA (ASW).

The principals—**John A. Tirrell,** P.E., B.A. degree, physics, president; **Peter M. Bzwoski,** B.S.M.E. degree, vice president; **Robert E. Hollstein,** associate; **Vito D. Torre,** associate, and **Joseph E. Stevens,** P.E., B.S.M.E. and M.S.M.E. degrees, associate—have an average of 19 years of diversified experience in the various engineering disciplines associated with the operation of Naval shipyards and Naval Management Programs.

Prior experience of the principals include working on the development of the following Standard Navy Programs: Shipyard Management Information System, Management Plan for PERA (ASW), Ships Force Overhaul Management Systems (SFOMS), Standard Library of Scientific and Engineering Computer Programs, Integrated Overhaul Repair Planning Program and the initial implementation of PERT/CPM in a Naval shipyard. Other experience includes hull, machinery and electrical design, design of steam test plants, preparing purchase and test specification, descrepancy investigation and recommendations of corrective action or marine equipment, planning/estimating and scheduling (PERT/CPM & GANT) for the overhaul/modernization of naval vessels.

Marine Systems Corporation is located at Suite 2, 416 Medford Street, Charlestown, Mass. 02129.

Seatrain Shipbuilding Names Garvin To Newly Created Post

John O. Garvin Jr.

John O. Garvin Jr. has joined Seatrain Shipbuilding Corp. in the newly created position of director of quality control.

Mr. **Garvin** comes to Seatrain's facility at the former Brooklyn Navy Yard with more than 20 years' shipbuilding experience with particular emphasis in the quality assurance/quality control fields.

Before joining Seatrain Shipbuilding, Mr. **Garvin** was a manager of quality control at the Ingalls Shipbuilding Division of Litton Industries in Pascagoula, Miss. His duties there included the responsibility for all source inspections and vendor surveys throughout 18 Eastern states and two Canadian provinces. He has also held several additional positions in the quality assurance/quality control areas at that yard and at the Mare Island Naval Shipyard in California.

In his new position at Seatrain Shipbuilding, Mr. **Garvin** oversees all quality control activities associated with the inspections and tests for the 225,000-dwt supertankers currently under construction. Seatrain Shipbuilding Corp. is a subsidiary of Seatrain Lines, Inc., owner and operator of oceangoing tankers and container cargoships.

A native of Vallejo, Calif., Mr. **Garvin** is a member of The Society of Naval Architects and Marine Engineers.

Bath Iron Receives $92.4-Million Award For Patrol Frigate

Bath Iron Works Corporation, a unit of Bath Industries Inc., received a $92.4-million Navy contract for design and construction of the first ship of the new patrol frigate class.

The Navy hopes to purchase 50 ships of the patrol frigate class at an average unit price of under $50 million. Plans have called for building the 3,400-ton warships in at least two shipyards. In addition to Bath Iron Works, design work on the patrol frigate was done by Todd Shipyards Corporation.

Western Gear Corp. Names Fred Boswell To Gulf Marine Post

Fred Boswell

Fred Boswell, widely known in marine circles in the Gulf Coast area, has been appointed district sales manager for marine gears and other marine products in Western Gear Corporation's Southwest regional sales organization, headquartered at Houston, Texas.

Mr. **Boswell** will be responsible for sales of the company's products in the New Orleans and Mississippi riverbank areas. He will report to **Richard S. Hollyer,** director of corporate marketing for the Southwest region.

Formerly associated with National Marine Service and the Mobil Oil Company, Mr. **Boswell** is a graduate of the U.S. Maritime Academy at Kings Point, N.Y., and holds licenses as third and second assistant engineer for ocean vessels.

Western Gear Corporation, with executive offices at Lynwood, Calif., is active internationally in the design, engineering, manufacture, and installation of mechanical systems and subsystems, specialized machinery and power transmission equipment for a variety of industries, including marine, aerospace, airport systems, petroleum, primary metals and graphic arts.

Southwest regional sales offices of the company are at Suite 400, Two Greenway Plaza East, Houston, Texas 77046.

Raymond To Construct LNG Marine Terminal Near Savannah, Ga.

Raymond International Inc., Houston, Texas, was awarded two contracts totaling more than $3.3 million to install pile foundations for three concrete storage tanks and to construct an 1,800-foot-long bridge for a liquefied natural gas (LNG) marine terminal at Elba Island near Savannah, Ga. The client is Southern Energy Co.

Prior to the bridge construction award, the client contracted Raymond Technical Facilities Inc., a wholly owned subsidiary based in New York, to perform feasibility studies and complete engineering design. Borings at the bridge site were performed by the Raymond Test Boring Department.

Raymond will drive approximately 1,700 Step-Taper piles for the storage tank foundations, and 54-inch-diameter prestressed concrete cylinder piles to support the bridge superstructure. The prestressed piles are being manufactured and delivered to the site by Bayshore Concrete Products Corporation based in Cape Charles, Va., of which Raymond is a part owner. The bridge will span the south channel of the Savannah River, with one terminal point at Elba Island and the other connecting with highways leading to Savannah.

The bridge construction, on which work has already begun, is scheduled to be completed in 1974.

Flexible Shaft Engineering Handbook Available From Stow

Stow Manufacturing Co. has just published a 76-page Engineering Handbook covering the latest up-to-date information on flexible shafting.

Engineers can learn all about how flexible shafting can reduce cost, save weight and simplify their design. This seventh edition gives complete information on the basics of flexible shafting as well as helping the engineer design it into his drawings by giving him the complete specifications on core, casing and end fittings.

This handbook is divided into sections giving complete details on the basic construction of a flexible shaft, standard flexshaft units, value engineered flexshaft and custom-built units.

For a free copy of this handbook, write Stow Manufacturing Co., 86 Bump Road, Binghamton, N.Y. 13902.

Leonor Sullivan To Receive AOTOS Award

Congresswoman **Leonor K. Sullivan,** Chairman of the House Merchant Marine and Fisheries Committee, has been designated as the recipient of the Admiral of the Ocean Sea Award, it was announced by **E.J. Heine Jr.,** president of United States Lines Company and president of United Seamen's Service.

The AOTOS Award is given annually by the maritime community for outstanding service to American-flag shipping. Former recipients have been the late **Spyros Skouras,** former president of Twentieth Century Fox and chairman of Prudential-Grace Lines, Inc.; **Helen Delich Bentley,** Chairman of the Federal Maritime Commission, and **Andrew E. Gibson,** former Assistant Secretary of Commerce. A special award was given to **Joseph E. Curran** for more than a quarter century of maritime leadership.

Congresswoman **Sullivan** will receive the silver statue of Christopher Columbus at a dinner-dance in the Grand Ballroom of the New York Hilton in New York City on December 11. Capt. **Adrian P. Spidle,** vice president of marine operations of Prudential-Grace Lines, Incorporated, and president of The Propeller Club, Port of New York, is chairman of the arrangements committee for the AOTOS Award which is sponsored by labor, management, Government and naval sectors of the maritime community.

Proceeds from the December 11 dinner-dance will benefit the Hall of American Maritime Enterprise at the Smithsonian Institution, and the United Seamen's Service.

The Hall of American Maritime Enterprise is a permanent exhibition at the Smithsonian Institution in Washington, D.C., and will be a feature of the American Bicentennial Celebration.

United Seamen's Service provides health, welfare and recreational facilities for American seamen, and seamen of all nations in foreign ports.

Marine Management Systems Contract Renewed By MarAd

The U.S. Maritime Administration (MarAd) has renewed its contract with Marine Management Systems, Inc. (MMS) for the lease of a computerized system that is being used in long-range studies aimed at maintaining America's demand requirements in the import of oil and mineral raw materials.

The announcement was made by **William R. Oakes,** MMS vice president, who said that the studies by the Government agency are part of the overall planning for future American superports designed to increase the flow of imports in bulk. MMS, based in Stamford, Conn., designs and implements computer systems for the international marine transportation industry.

Mr. **Oakes** said that MarAd's Office of Policy and Plans in Washington, D.C., has been using the MMS system—called the Marine Economics & Planning System—since last year. The system is one of several computer products offered by his firm and is believed to be the only one of its kind commercially available.

He explained that the system is being used to simulate transoceanic movements of various types of goods—oil, for example. In the studies, such economic factors as speed, quantities, freight rates and costs related to different sized vessels are analyzed from the standpoint of vessel owners and charterers.

An input/output terminal is employed in the use of the MMS system which operates on GE's Worldwide Information Services Network. Heart of the network is a giant computer Mark (III) located in Cleveland, Ohio.

Bureau Veritas Names Three In New York

John X. Erbe, who has served for several years past as general representative of the French classification society Bureau Veritas in New York, has retired as of October 15. Mr. **Erbe** will continue to work with the classification society in an advisory capacity throughout 1973. He will be succeeded as general representative of the society by **Michel Barruel,** formerly chief of the materiel department. **Huynh duc Bau** has been appointed chief of the marine department, assisted by **Andrew Moore.**

Panama Shipping Bureau Appoints Captain Van & Co.

Captain Van & Company, marine surveyors of Port Arthur, Texas, have been appointed as certificating surveyor representatives of the Panama Bureau of Shipping, Inc., for the port areas of Port Arthur, Beaumont, Orange and Lake Charles.

Capt. **John F. Vandegrift Sr.** and **Robert J. Underhill** are empowered to survey vessels of Panamanian registry and issue appropriate loadline, solas, radiotelegraph, radiotelephone, solas exemption, and safety construction certificates as are required by the Convention For Safety Of Life At Sea.

New Carboline Guide On Inorganic Zinc Protective Coatings

The Carboline Company of St. Louis, Mo., has released a new 35-page guide containing detailed technical data on the company's full line of inorganic zinc protective coatings.

The guide contains information on a new economical primer, a fast dry primer for shop application, a fully weldable primer and others. Test data, cost comparisons, recommendations and product data sheels are also included. A useful chart tells when to use inorganic zinc coatings and when to use hot dip galvanizing to protect steel.

Copies of the guide are available from Carboline Company, 350 Hanley Industrial Court, St. Louis, Mo. 63144.

Tug Convention Papers Now In Book Form

There are very few works of reference for the tug designer, builder or owner. Most of them have been produced by Ship & Boat International in the form of proceedings of their tug conventions. "Proceedings of the First North American Tug Convention" is the third such book to be produced as a result of a gathering of owners, designers, builders, seamen, manufacturers, Government officials, surveyors and other professions. The fact that this convention took place in Vancouver and did not have the appellation "international" should not be allowed to fool anyone. It was as "international" as the previous conference, held in London.

The standard of the papers presented in Vancouver was perhaps higher than that of the two previous conferences held in London. Once again there was an interchange of ideas among all sections of industry; once again there was much discussion "out of school," as one author put it; once again delegates were made aware of problems they had never faced or solutions they had never thought of; once again business contracts were set up and friendships cemented.

This book, edited by **Kenneth D. Troup,** follows the same format as the previous copies, where the paper is printed in full and followed by the discussions, presented in a verbatum form. It is quite obvious from the quality of the written word that the various industries represented at the conference had sent their most qualified personnel.

There is no doubt that this volume will take its place with its predecessors as a standard work of reference. Copies may be obtained at a price of $30 each from Thomas Reed Industrial Press Ltd., Saracen's Head Building, 36/37 Cock Lane, London, E.C.1A 9BY, England.

Peter H. Gunn Joins Pacific Marine

Pacific Marine Corporation, shipbrokers, (a Delaware corporation), announced that **Peter H. Gunn,** A.I.C.S., has joined the firm as a sale and purchase broker. Mr. **Gunn** will handle Pacific Marine's newbuilding contracting and secondhand ship sale activities. He brings with him 15 years' experience in the London sale and purchase market.

Pacific Marine Corportaion, with offices in New York, London and Tokyo, offers a complete shipbroking service, all offices now having three separate departments, each devoted to tanker chartering, dry cargo chartering and sale and purchase activities.

Miss Kari Dahl, formerly with leading Oslo brokers, has been promoted to assistant to Mr. **Gunn,** concentrating on the Norwegian market.

The 20,000-dwt MV Avon Forest, shown on trials, has a design speed of 19.5 knots when carrying automobiles.

Highly Specialized Ship Built By Port Weller Dry Docks

The MV Avon Forest

Unique Ship Design Permits Rapid Change Between Two Special Cargoes. This Shipbuilding Order Claims Many Firsts.

The Burnett Steamship Company Limited of Newcastle-Upon-Tyne, a subsidiary of Federal Commerce and Navigation Company Limited of Montreal, recently took delivery of the MV Avon Forest. The Avon Forest and her sistership, the Laurentian Forest, were both built by Port Weller Dry Docks Limited in Ontario.

Both of these new ships are the product of a detailed study resulting in a highly specialized design to carry Canadian newsprint and European automobiles on what is an intensive cross-ocean ferry service.

Designed to carry up to 14,000 tons of newsprint eastbound from St. Lawrence ports, and up to 1,900 European cars westbound, the 682-foot, twin-screw motorship Avon Forest brings modern concepts in cargo handling to the transportation of forest products and automobiles. In addition, the ship has special arrangements to permit loading and navigation during the severe weather conditions experienced during the Canadian winter. The Avon Forest has a length between perpendiculars of 621 feet 6 inches, a molded breadth of 75 feet, a depth to the upper deck of 58 feet, and molded draft of 30 feet 5 inches.

Ordered by The Burnett Steamship Company Limited, the ship was designed by Knud E. Hansen I/S of Copenhagen. The Avon Forest and her sistership are the first ships to be ordered by a British owner from a Canadian shipyard, the first vessels to be built with the assistance of the Canadian Department of Industry Trade and Commerce's Shipbuilding Temporary Assistance Program, and the first Canadian-built ships to be financed by the Canadian Export Development Corporation.

Both ships have been long-term chartered to Seatrade Limited, Bermuda, who in turn have chartered them to International Navigation Limited, Nassau, a subsidiary of the International Paper Corporation, New York, for the transportation of Canadian forest products from St. Lawrence ports to Avonmouth, England. At Avonmouth the cargo will be discharged into a specially built terminal and distributed throughout the United Kingdom by Inland Distributors Limited, also a subsidiary of International Paper Corporation.

On the return voyage to Canada, Seatrade Limited will use the ships for the transportation of British and European automobiles, loaded at Avonmouth and near continental ports, for discharge at Halifax and Montreal. The automobile contracts were arranged on behalf of Seatrade Limited by their general agents, Federal Commerce and Navigation Limited.

Both ships will be managed by Harrisons (Clyde) Limited of Glasgow, who also supervised the construction and assisted in the design and development of the ships.

Both ships were built to Lloyd's Classification requirements +100 A1 UMS Ice Class. 1. They were also built to the requirements of DOTI, represented in Canada by Canadian Steamship Inspection. The hull-steel work was specially designed to provide holds clear of all obstructions, to accommodate the storage of car decks, and to provide flush vertical surfaces for the storage of newsprint.

Cargo Handling

Cargo is handled by 16-ton-capacity straddle carriers which roll on and off the Avon Forest via ramps on the starboard side, forward and aft. The owners required the ship to be capable of operation from conventional berths without the necessity of corner berths for stern ramps, and an unusual ramp configuration in four sections, incorporating a 70-degree turn, was adopted to achieve this. The ramps can take loads up to 30 tons, and accommodate a variation in dock height of 24 feet.

The ship is specially strengthened in way of the shell openings which, when the ramps are stowed, are closed by vertically sliding watertight doors. Within the ship the cargo is handled vertically to and from 'tween decks and lower holds by 23-ton-capacity elevators, and stacked by a combination of clamp and fork-lift trucks. Garage space is provided on board for seven straddle carriers and 11 lift trucks, which are carried on the ship at all times.

Moveable car decks are situated beneath the fixed decks. These are operated by a scissors truck and when lowered into position provide, with the fixed decks, seven levels for the carriage of vehicles. Vehicles reach these decks by internal ramps incorporated both in the fixed decks and the moveable car decks. Access through the bulkheads is provided by sliding watertight doors.

The shell doors, ramp systems, car deck and elevators were built from designs provided by Cargospeed Limited of Greenock, Scotland.

Hull Outfitting

The cargo holds are provided with mechanical ventilation which gives 20 air changes per hour in each hold. The holds also are equipped with fire detection and carbon dioxide fire-fighting systems. All holds are brilliantly illuminated by explosion-proof flourescent lighting recessed into the deckheads, and into the vertical plywood side linings, which provide ideal stowage conditions for newsprint.

To assist the ramp system in coping with the extreme tidal variations at some Canadian ports, the ship is fitted with a ballast system capable of handling up to 2,400 tons of water per hour. This system is fully remote controlled from a ballast-control room on the upper deck.

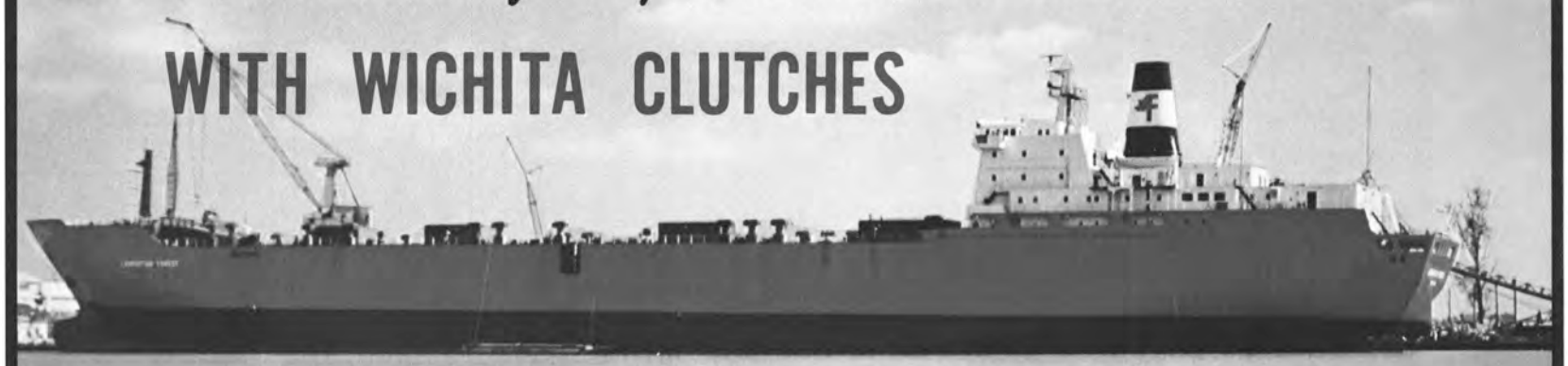
(Continued on page 49)

The Avon Forest unloading automobiles through special shell doors. These doors are located only on the starboard side—one forward and one aft. The ramp folds inboard.

The unmanned machinery installation can be fully controlled from the bridge console shown in this view of the bridge. The bow thruster is controlled from the bridge wing.

20,000 Tons Of Cargo Plows The North Atlantic . . .

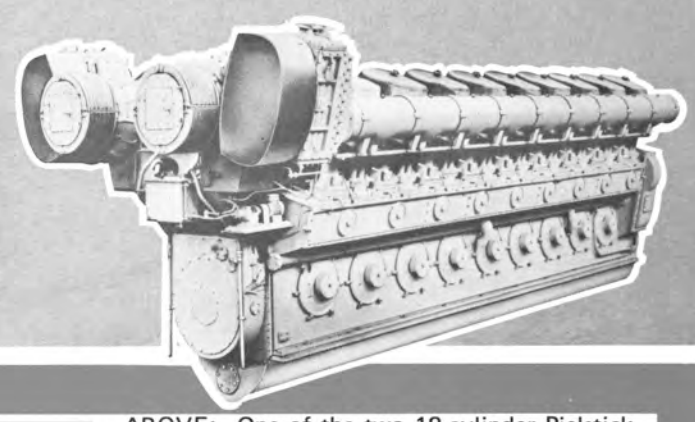
WITH WICHITA CLUTCHES

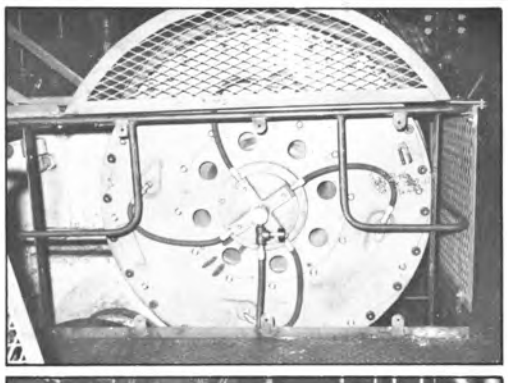


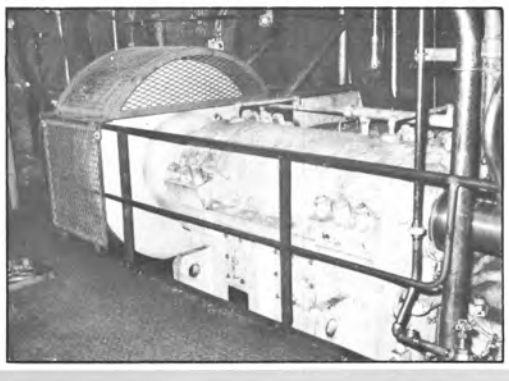
The 682 ft. "Laurentian Forest" handles one of the toughest runs in shipping. From Canada to Europe, and back, through the rough, ice-infested, North Atlantic.

Built for The Burnett Steamship Company Limited by Port Weller Dry Docks Limited, this giant RO-RO cargo vessel demanded lots of tough dependable power.

The solution -- Two 9,000 hp. Pielstick Diesel Engines, each driving through a Wichita Marine Clutch.







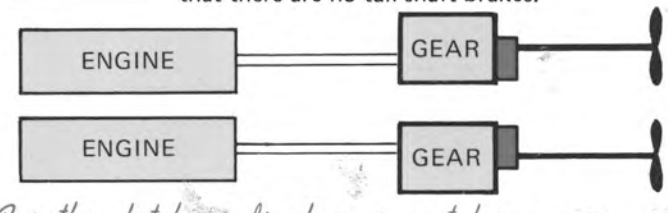
Centrifugal blower characteristics are inherent part of Wichita Clutch Cooling.

ABOVE: One of the two 18-cylinder Pielstick Diesel Engines made by Crossley Premier Engines Limited.

LEFT: One of the Wichita ATD-248 Marine Clutches that offer shock load protection for this boat's exposure to North Atlantic ice.

BOTTOM LEFT: One of the two Philadelphia Gear Drives that reduce the 520 rpm engine speed to 110 rpm of the tailshaft.

BELOW: The power transmission system showing Wichita Clutches in red. Wichita Clutch characteristics greatly aid in reversing . . . notice that there are no tail shaft brakes.



For the clutch needs of your next large cargo or container vessel . . . let a Wichita Engineer show you why Wichita is better.

WICHITA MARINE INTERNATIONAL INC.

Bedford, England

WICHITA CLUTCH CO., INC.	WICHITA COMPANY LTD.	WICHITA COMPANY LTD.
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Representatives in most foreign countries

WICHITA Clutch COMPANY, INC. WICHITA FALLS, TEXAS, U.S.A. ®

WRITE for Wichita Marine Bulletin No. 119

Go Navy... Go Fast... Go SES

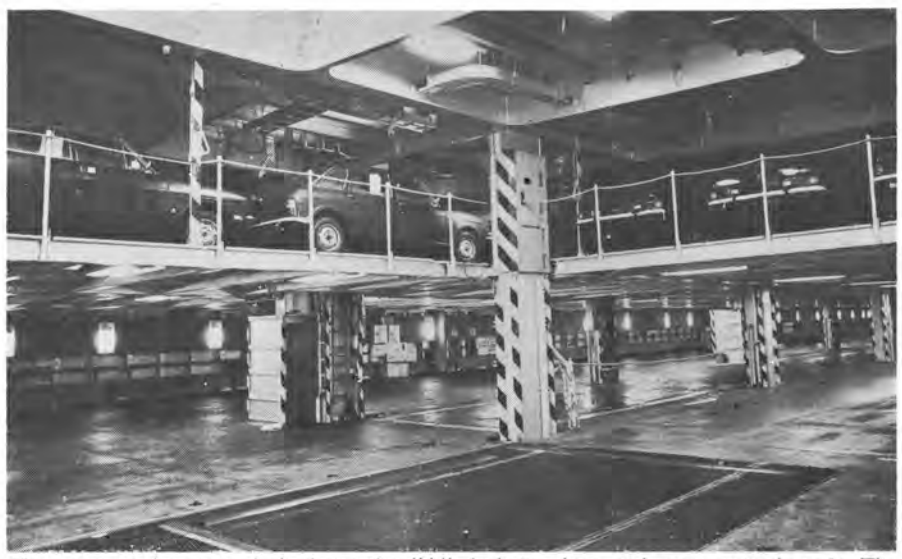
The U.S. Navy's Surface Effect Ship program can revolutionize naval warfare. Surface Effect Ships can meet the challenge of the submarine. With its high speed and shallow draft, an SES can outrun a submarine and be practically invulnerable to torpedo attack.

At 80 knots an SES can reach a point 1,000 miles away in about half a day, compared with more than two days for a conventional 20-knot force. The 2,000-ton operational prototype SES will be another major step toward the 100-knot Navy of the future.

The U.S. Navy's SES-100B test craft, being operated by Bell Aerospace in the Gulf of Mexico, is contributing valuable data to the design of the 2,000-ton SES. The 100-ton SES has achieved speeds of 75 knots (86 mph) and has operated successfully in high sea states.

BELL AEROSPACE
Division of textron Buffalo, New York

This view of the ro/ro deck shows a straddle carrier leaving after placing pallets with newsprint on an elevator for lowering to the decks below.



This view of the main deck shows the "A" deck in place with cars stowed on it. The car deck is operated by a scissors truck which lowers it by sections into place.

MV Avon Forest—

(Continued from page 46)

The ship is not fitted with bilge keels as these are subject to damage in ice conditions. A controlled tank-type stabilization system, designed by Knud E. Hansen I/S, is fitted, incorporating twin tanks which make the system suitable for widely differing stability conditions.

The usual comprehensive navigation equipment found on ships of this class is fitted, including two radars, course recorder, echo sounder, engine-order recorder and weather-facsimile recorder.

Where possible, the mooring equipment, which includes five Garrett Marine constant-tension winches, has been sheltered from the winter weather. For example, the windlass and the forward mooring winch are placed inside the forecastle. The shell doors are fitted with a specially designed electrical heating system to insure that the trackways remain clear of ice.

The rotary-vane steering gear is the largest size manufactured by A/S Frydenbo of Bergen, Norway.

To assist in maneuvering, a 1,000-hp electrically driven controllable-pitch bow thruster unit is fitted, supplied by Lips N.V.

The air-conditioned accommodations for the crew is of a high standard with each crew member having his own shower and water closet. There are no communal washrooms and water closets in the crew areas.

An automatic telephone system connects the bridge, ballast-control and engine rooms as well as each individual crew cabin. The holds are serviced by a public address system operated from the ballast-control room. Shore-phone connections for use in port are supplied in the master's office, ballast-control room, and one, for private use, is situated in the crew areas.

Machinery

Low-head-room machinery was required due to the shore-ramp arrangement. Tank-test results showed that a single screw could not efficiently absorb the required power due to the comparatively shallow draft when carrying automobiles. A medium-speed diesel engine twin-screw arrangement was adopted, each shaft being driven by a Crossley Pielstick-type 18 PC 2V direct-reversing engine rated at 8,500 bhp at 520 rpm. This power is transmitted to bronze propellers rotating at 110 rpm, via Wichita clutches and extremely compact single-helical gear boxes, specially designed by the Philadelphia Gear Corporation.

The reduction gears, made by Philadelphia Gear Corporation, are the largest, single-helical, case-hardened and ground marine bull gears ever to be produced in the United States. The two reduction gears, totaling 18,000 hp, fit into two restricted pods located aft in the hull.

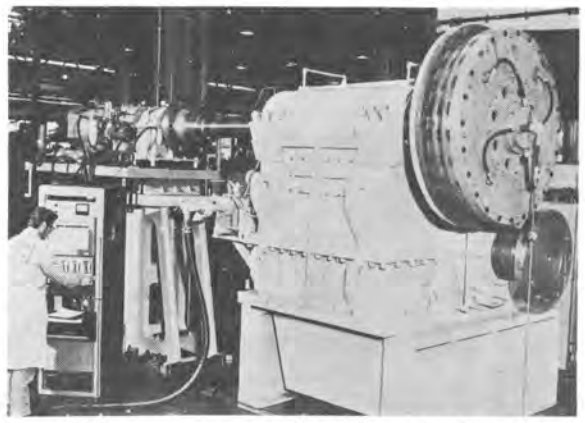
The 93-inch diameter, 30-inch face width bull gears were case hardened and then ground on one of Philadelphia's Maag HSS-360 gear grinders which have a capacity for gears of up to 142 inches in diameter, 39-inch face width and 55,000 pounds. Conventional soft gearing would not have filled the requirements because it would have required a bull gear 50 percent larger in diameter.

This gearing is used to reduce the output speed of the Pielstick engine from 520 rpm to 110 rpm. The specification required the gear units to meet Lloyd's Ice Class 1, which is of 25 percent higher capacity—11,250 hp instead of 9,000 hp—in order to withstand propeller shock loading from ice.

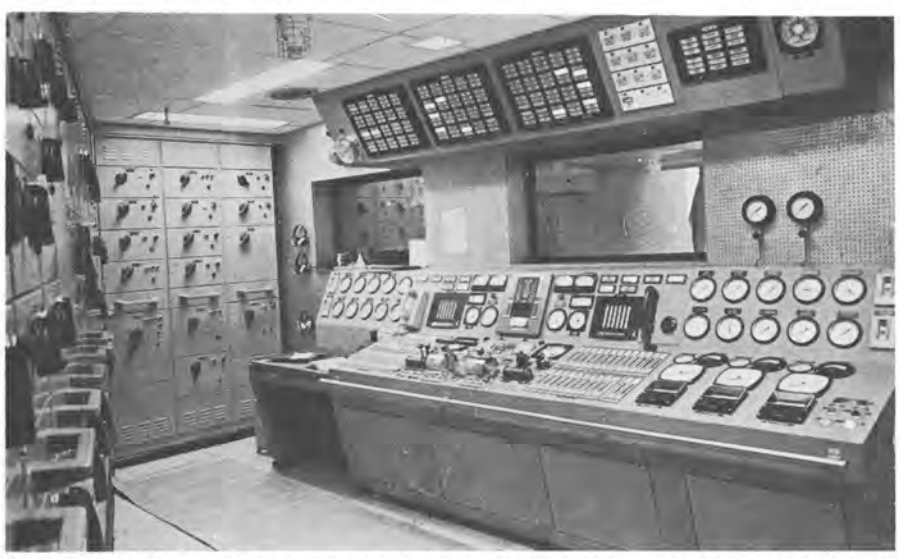
The Wichita ATD-248 marine disc clutches offer torque control characteristics that greatly aid in engine reversing, and provide protection from propeller shock loads. The clutches are quill mounted in a power-transmission system that operates without tailshaft brakes. However, the current Wichita designs include units for both quill-shaft and coupling mounting. This range of Wichita units, manufactured in the United States and the United Kingdom, also includes air-set brakes, spring-set brakes, and water-cooled clutches and brakes.

This powerplant gives the Avon Forest a designed service speed loaded with newsprint of 19.0 knots, and with cars 19.5 knots.

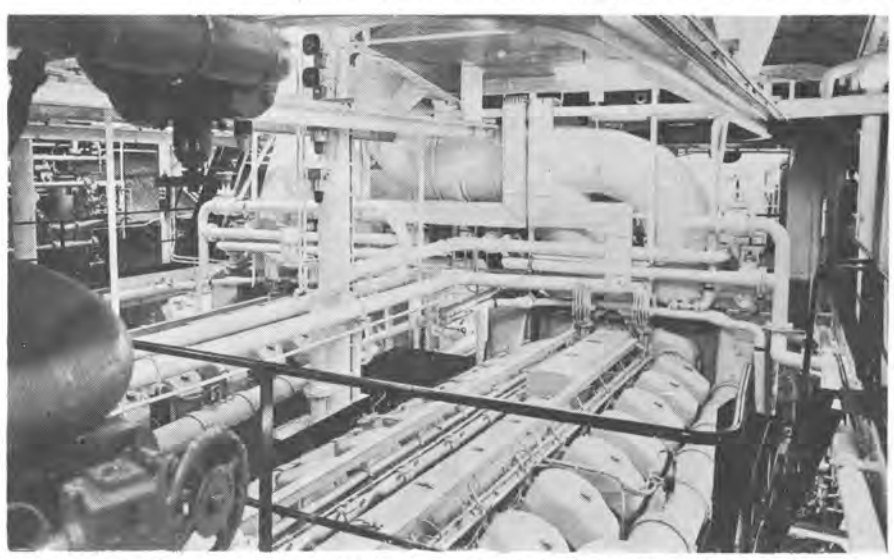
Auxiliary electrical power is provided by three Ruston Paxman-type 6CSRKZ engines driving 900-kw, 460-volt Canron alternators. Heating is provided by two Spanner boilers, one oil-fired and one exhaust-gas fired. The pumps and air compressors in the engine room are mostly of Hamworthy manufacture.



One set of reduction gears on the test stand at Philadelphia Gear. The ship's low headroom required special gears. Power is transmitted to bronze propellers via Wichita clutches.



The consoles shown here in the engine-room control station were designed and built by the shipyard. The windows provide a view of the engine room.



Looking aft in the engine room clearly shows the limited clearances above the engines. This compact space is unmanned during all normal ship operations.

Putnam Shipbuilding Receives Contract To Build 95-Foot Tug For Florida Towing Company

The Florida Towing contract calls for a sister tug to the Atlantic Towing tug, shown under construction at Putnam.

Florida Towing Co., Inc. of Jacksonville, Fla., has ordered a 95-foot twin-screw harbor and coastwise tug from Putnam Shipbuilding Corp. of Palatka, Fla., the first of five which Florida Towing plans to have constructed over the next several years.

This is a sister tug to one currently under construction at the Palatka yard for Atlantic towing Company of Savannah, Ga.

The contract for the second tug was signed on October 15. Present at the signing were Dr. **W.T. Coppedge Jr.,** president of Florida Towing Co.; **Henry Hostrup,** president of Putnam Shipbuilding Corp., and **Joseph F. Carroll** and **W. Anthony Watt,** vice presidents of Florida Towing.

The tug, designed by Norman N. DeJong & Associates, Inc., N.A. of Jacksonville, will have principal molded dimensions of 95-foot length, 30-foot breadth, and 17-foot depth, and will be powered by two Caterpillar D399TA engines, developing 1,425 continuous hp per engine. All equipment on the tug will be of highest quality for as maintenance-free operation as possible.

The vessel will meet all USCG and ABS rules and regulations for harbor, coastwise, and Caribbean service.

At the signing, Dr. **Coppedge** announced that this is the first of five proposed tugs of this class that will be built over the next several years. "With the expected growth of the Port of Jacksonville, this is an extremely important project."

Putnam Shipbuilding, located on Stokes Landing Road in Palatka on the St. Johns River approximately 60 miles south of Jacksonville, was formed by **Henry Hostrup** in the spring of 1971. Aside from tugboat construction, Putnam Shipbuilding has built and delivered a 52-foot and a 64-foot stern trawler.

Santa Fe International And Canadian Firms To Explore Offshore Areas Off Vietnam

Santa Fe International Corp., Orange, Calif., has announced it will participate with three Canadian companies in exploring two offshore concessions covering more than 5,000 square miles in the South China Sea off Vietnam.

Edfred L. Shannon Jr., Santa Fe president, said each concession contains approximately 1.7-million acres. They are located about 135 miles south of the Mekong Delta area in water depths between 120 and 190 feet.

The two areas, designated as Blocks 21 and 22 by the Vietnamese Government, were awarded to Sunningdale Oils Vietnam, Ltd., Calgary, Canada. Sunningdale has assigned 25 percent each to Bow Valley Industries, Ltd. and Siebens Oil & Gas Ltd., both of Calgary, and to Santa Fe.

Mr. **Shannon** said the group has contracted for a seismic survey of the two blocks. The contract for 4,000 miles of marine seismic, gravity and magnetic coverage has been awarded to Geophysical Service International S.A. Bow Valley Industries will be operator for the group during the exploration phase.

Offshore LPG Terminal Prototype Provides Technology To IMODCO International, Inc.

Prototype of an offshore Single Point Mooring (SPM) terminal system, especially designed and constructed some 12 years ago by a European affiliate of IMODCO International, Inc. for the loading of liquid petroleum gas in small bulk LPG carriers, has provided the technology for development of LPG offshore terminals to handle considerably expanded current requirements and demand for butane and propane for long-haul ocean shipping.

Bernard Frankel, president of IMODCO International, Inc., Los Angeles, Calif., reminds that there have been some rather dramatic improvements in SPM technology and engineering in conjunction with rapidly increasing vessel tonnage since 1961, and states his company has had many inquiries about offshore LPG systems to accommodate them.

"It is our prediction," he declared, "that a number of the new generation systems will be constructed in the very near future. They are a necessity if the rapidly increasing demand for LPG in various sections of the world is to be satisfied."

The pioneer IMODCO Single Point Mooring terminal buoy—only such system in existence—was developed for Liquigas S.p.A., Milan, Italy. Constructed in Genoa, it was originally intended for use in northern Sardinia. However, the LPG SPM was subsequently shipped to Nigeria, and is in service near Lagos by Nidogas, a Liquigas affiliate.

The terminal handles about two vessels monthly. Most of the product handled (80 percent) is butane, with propane supplying the remaining 20 percent.

IMODCO International is a leading developer and marketer of offshore terminal systems for the loading and unloading of various liquid cargoes, with 45 installations throughout the world since 1958. It is a wholly owned subsidiary of IMODCO, Inc., Los Angeles-based, publicly held, over-the-counter company.

Bureau Veritas Issues Amendment To Rules

Bureau Veritas has just simultaneously issued lists No. 2 and No. 3 of Amendments and additions to the 1973 edition of its Rules and Regulations for the construction and classification of steel vessels.

List No. 2 is exclusively concerned with Chapter 25, which covers materials and their inspection. It amends some of the conditions covering sampling and testing of test samples.

List No. 3 covers the remaining chapters, the more important items of which are:

The notation "Yacht" is introduced. This is due to the fact that the service conditions under which these craft are operated are quite particular. The creation of this new notation has resulted in the elaboration of new conditions for assigning of the notation "Service special," which was hitherto applicable to yachts.

Following the development of handling vehicles, further care was given to the problem of decks on car ferries and on roll-on/roll-off ships. This has resulted in new scantlings for the shell platings in the case of wheeled loads on deck. The formulas that are suggested determine the thickness of the platings under all the load conditions that may be met with at the present time in terms of existing vehicles.

Water tests of compartments and structural elements are the subject of new requirements. These take account of current technical developments and of shipbuilding practice. In particular, in the case of large-size compartments where water tests are likely to offer practical difficulties, it is henceforth provided that air tests may be substituted to water tests. Furthermore, special arrangements may be accepted in the case of test programs where sister ships are concerned.

Various items in the prescriptions applicable to bulkheads have been modified. The main modification concerns the position of the collision bulkhead, which is henceforth determined in compliance with the decisions adopted by the members of the International Association of Classification Societies (I.A.C.S.), due account being taken of the bulb, if any.

New scantling rules are shown for frames on bulk carriers.

HITACHI DELIVERY: The Eastern Lion, a 264,914-dwt tanker built at Hitachi Zosen's Sakai shipyard, was recently delivered to her owner, Third United Shipping Corporation. Approximate dimensions of the tanker are: length between perpendiculars, 1,037 feet; molded breadth, 168 feet, and molded depth, 93 feet. Power is supplied by a Hitachi UA-320 type steam turbine developing a maximum output of 32,000 hp, providing a maximum trial speed of 16.1 knots.

Campbell Tuna Superseiner —First For New York Group

Sliding down the ways into San Diego Bay is the Sandra C., newest 1,200-ton-capacity tuna superseiner. Shown under construction at the right is her sister ship, which will be named the Marjorie R.

The Sandra C., newest in a series of tuna superseiners built by Campbell Industries, was recently launched at the Campbell Marine Division, San Diego, Calif.

The new ship, valued at approximately $3 million, will be owned by J.W. Uhlein and Associates of New York. She is the first of two seiners being built under contract for the group, and represents the start of their new fleet, which will fish for Van Camp Sea Food Company, a division of Ralston-Purina Company.

Designed and constructed by the Campbell Marine Division, the vessel will now undergo outfitting at the company's facilities on San Diego Bay.

Principal speaker for the event was **Hans H. Sammer,** senior vice president of New York Securities Company. **Jack G. Allen,** Campbell Industries' vice president, officiated as master of ceremonies.

Sponsor for the christening of the Sandra C. was **Mrs. J. Wyatt Uhlein,** wife of one of the principal investors. She was attended by **Mrs. Donald Swartz.** Fr. **James Rafferty** of St. Agnes Catholic Church, San Diego, performed the blessing.

According to Campbell president **George Soares,** the Sandra C. will be equipped with the company's full standard fishing equipment package, including a Marco seine winch and Campbell's proprietary design anchor winch. Other major equipment on board will include Vilter refrigeration, a Brunvoll, 200-hp hydraulic bow thruster and an anti-roll stabilizer.

The new ship is 218 feet long, has a 40-foot beam, and will carry a frozen fish payload of approximately 1,200 tons. Her speed will be approximately 17 knots.

The main propulsion engine for the Sandra C. will be a 20-cylinder General Motors marine diesel, driving a five-blade Coolidge stainless steel propeller through a Falk reduction gear. Auxiliary power will be supplied through three Caterpillar 300-kw generator sets.

Navigational aids and other electronic gear will include a Taiyo ADF, Omega Micro Navigation System, two Kelvin-Hughes long-range radars, two single side-band radios, three emergency radios, two VHF-FM radios, Simrad depth sounder, Decca depth recorder and a PA/intercom system.

In other construction, Campbell's subsidiary, San Diego Marine Construction Corporation, is currently building three bulbous-bow seiners of its own design and has a fourth undergoing outfitting. Two more superseiners and a harbor tug are also under construction in the Campbell Marine Division shipyard. The company's aluminum facility is building three all-aluminum high-speed ferryboats under a $12.6-million contract with the Golden Gate Bridge, Highway and Transportation District, San Francisco. The first of the ferryboats is scheduled for delivery in June 1974.

AquaMarine In New Quarters —Adding Four Vessels To Fleet

AquaMarine Inc. now occupies new offices at 937 The Esperson Buildings, Houston, Tex. 77002. The announcement was made by **Thomas G. Gilbert,** president of AquaMarine, a Houston-based firm providing tug/supply support to oil well drilling installations in offshore locations worldwide. AquaMarine's new telephone number is (713) 225-0094. The telex number (910-881-1604) and cable address (AQUAMARINE) remain the same.

Mr. **Gilbert** also announced that the first half of AquaMarine's advanced-design four-vessel fleet, now under construction at Burton Shipyards in Port Arthur , Texas, will be sea-ready by early 1974. All four new tug/supply vessels will be operational by mid-1974.

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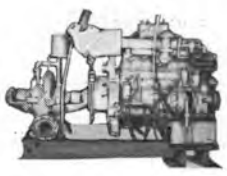

2—BUDA, Model 6-LD-468, Diesel Engines, 6 cylinders, 100 BHP, Marine, Gardner-Denver centrifugal Pumps, Bronze, horizontally split case, 1000 GPM, 280′ head, 6″ suction and 5″ discharge.

DC, VERTICAL-ROTARY

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

DC, VERTICAL - ROTARY cont.

2—QUIMBY, Size 5, 6x5, 400 GPM, 48 PSI, 25 HP, 230 DC.

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

DC, HORIZONTAL-CENTRIFUGAL

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

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

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

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

AC, HORIZONTAL-CENTRIFUGAL

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

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

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

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

2—BUFFALO, 250 GPM, 100 PSI, Class CCS, Size 4x3½″, with Westinghouse Motors, 25 HP, 440/3/60.

DC, VERTICAL-CENTRIFUGAL

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

2—ALLIS-CHALMERS, 30 GPM, 208′ head, Type CF2V, 2½″ suction, 1½″ discharge, 7½ HP, 230 DC.

1—ALLIS-CHALMERS, 400 GPM, 100 PSI, 4″x3″, 50 HP, 230 DC.

1—WORTHINGTON FIRE & BUTTERWORTH, Size 3 UBS, 400 GPM, 200 PSI, 75 HP, 230 DC.

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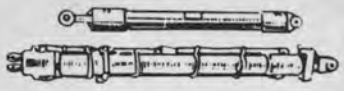

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10″	26″	3.75″	58½″	double
2″	8″	1½″	20″	double
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3″	8″	1.37″	15½″	double
6″	8″	4″	144″	double

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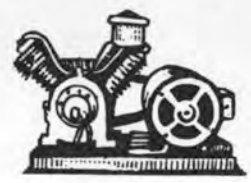

2—SULLIVAN, Size WL60, Model A-UB-8, 100 PSI, 2 stage, with 30 HP G.E. Motors. 440/3/60.

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, wth 40 HP Motor, 230 DC.

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

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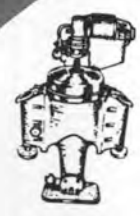

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150 GPH—440 AC
230 DC

350 GPH—230 DC

600 GPH 230 DC

PROPELLER SHAFTS

From
CS-SI-A3 VESSEL
From AP3 VICTORY SHIP

MARINE DIESEL GENERATORS

HERCULES, DOOC, 10 KW, 120 DC.

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

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

HERCULES, DJXC, 25 KW, 120 DC.

CUMMINS, WA255, 30 KW, 120 DC.

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

BUDA, 6DH909, 40 KW, 120 DC.

BUDA, 6 DHG691, 60 KW, 120 DC.

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

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

1—CUMMINS, Model HCD, 60 KW, 120/240 DC.

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

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

MORE DIESEL GENERATORS ON FOLLOWING PAGE

REDUCTION GEARS

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

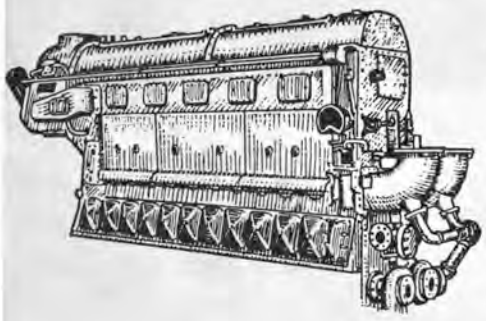
FALK Reduction Gears—Port & Starboard, Interchangeable with T-3 Tanker Gears, Falk No. 148-300. Also interchangeable with Falk Gears on AO51 Class Tankers (14 ships). Also on AO97 and AO100 Tankers.

1—L.S.T. TYPE VESSEL HULL

328′

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

MARINE DIESEL ENGINES



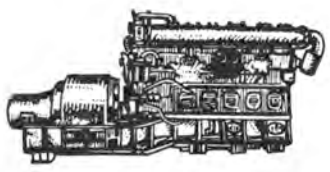
MATCHED PAIR . . . FAIRBANKS MORSE

Model 38D8⅛ —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.

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

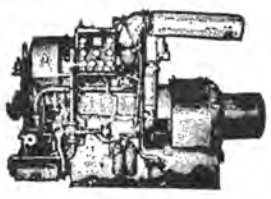
2—SUPERIOR DIESEL ENGINES, Model VDSS, 1160 HP, 325 RPM.

MARINE DIESEL GENERATORS



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

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



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

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

TURBINE GENERATORS A.C. AND D.C. VOLTAGES

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.

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

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

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

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

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

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

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

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

SUBMARINE DIESEL GENERATOR ENGINES

(Without Generators)

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

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

FOR ELECTRICAL EQUIPMENT 503 / 228-8691 ASK FOR "ELECTRICAL DIV."

FOR MARINE VALVES & FITTINGS: 503 / 228-8691 ASK FOR "VALVE DIV."

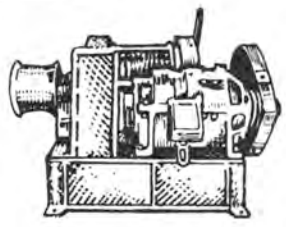
Steel Watertight DOORS

Used, Good Condition, Trimmed Frames.

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

26"x48"—4 Dogs—**$50.00 ea.**
26"x57"—6 Dogs—**$80.00 ea.**
26"x60"—4 Dogs, 6 Dogs—**$86.00 ea.**
26"x66"—6 Dogs, 8 Dogs—**$100.00 ea.**
26"x66"—Q.A. Type **$175.00 ea.**

CARGO WINCHES



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

Single Speed, Single Drum

UNIT WINCHES

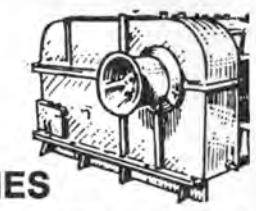
American Hoist and Derrick Co.

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

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

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

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



UNIWINCHES

LAKESHORE UNIWINCHES, with Allis-Ch mers Motors, 50 HP, 230 Volts DC, compl with Control Equipment.

Single speed, double drum, 7450 # at FPM.

Single speed, single drum, 7450 # at 220 FF

ANCHOR WINDLASSES

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

AMERICAN ENGINEERING, horizontal, d ble 2⅛" Chain, 65 HP, 230 DC, complete.

2—AMERICAN HOIST AND DERRICK CO PANY, horizontal, double wildcat for 2 chain, double gypsy, 70 HP, 230 Volts D with electric controls.

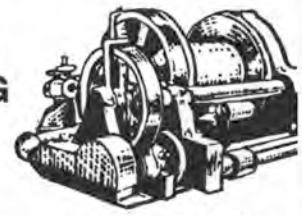
2—HESSE-ERSTED, horizontal, double wi cat, 2⅛" chain, 60 HP, 230 DC.

1—HYDE HORIZONTAL ANCHOR WINDLA double wildcat for use with 2⅛" Anch Chain, and with General Motors Elect Motor, 60 HP, 230 volts DC, 560/1700 RP Type CDM 18831 AE. Complete with Co tractor Panel, Resistors, and Master Switch.

ANCHOR WINCHES

1—JAEGER, single drum capacity appro mately 900' of 1½" wire rope, double gyp with 35 HP Motors, 230 Volts DC, compl with electricals.

STEAM TOWING WINCH



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

ANCHOR CHAIN

Used, good, with or without test certificate

1⅜" size	2 1/16" size	2¾" size
1½" size	2¼" size	3⅜" size
	2⅝" size	

CAPSTAN WINDLASSES

Model CWP-3, Vertical 24" Planetary Capstan Windlasses, Single Wildcat — using 1¼" Anchor Chain, Single Gypsy with 20 HP Motor, 230 Volts DC, complete with Contactor Panel, Master Switch, and Resistors.

2—HESSE-ERSTED VERTICAL, Single Wildcat—for 1⅜" Anchor Chain, single gypsy, with 35 HP General Electric Motor, 230 Volts DC, complete with Controller equipment.

HYDE, VERTICAL, Single Wildcat, for 1⅛" Anchor Chain, single gypsy, with 20/5 HP Motor, 440/3/60.

CARGO HOISTER BLOCKS

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

$44.50 ea.

$49.50 each with pull test certificates

Hundreds of other items in stock from Carriers, Cruisers, Destroyers, Submarines, Landing Vessels, Troop Ships and Cargo Ships

★

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A. **STEEL HOPPER BARGE**—ALL OCEANS 3000 Ton Cap.
200′ x 40′ x 17.9′ Built 1965 $300,000.00

B. **STEEL DIESEL TUG**—1200 H.P.
85′ x 25′ x 12′ Built 1965 $350,000.00

C. **STEEL DIESEL TUG**—800 H.P.
65′ x 20′ x 9.5′ NEW $275,000.00

D. **FLOATING STEAM WHIRLEY DERRICK**—30 Ton Cap.
Hull—80′ x 46′ x 7′ Built 1964 MAKE OFFER

E. **3 COVERED AND 3 DECK BARGES**—Built 1954
90′ x 30′ x 9′ 350 Ton Cap. $7,500.00

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Our Balanced Head Fairleads are tested to break the line at 90° pull. Roller bearings are used throughout. Line sizes from ½″ to 2¼″.

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LESLIE PUMP GOVERNOR VALVE

For U.S. Naval Vessels—type CT-HNS-3. For merchant vessels —type CTHS. Size 2″. Typical serial 241-423. For immediate delivery.

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MAIN PROPULSION FOR C4, C3, C2, C1, T2, & VICTORY

General Electric
High and Low Pressure ..... 8500 HP
Westinghouse High & Low Pressure
Turbine & Type H & Type C Gears.... 8500 HP
Allis Chalmers Low Pressure..... 6000 HP
De Laval
Reduction Gear Components ..... 6000 HP
General Electric T-2 Diaphragms..... 6000 HP
General Electric
High & Low Pressure..... 6000 HP
Westinghouse High Pressure..... 6000 HP
Westinghouse and Allis Chalmers
High & Low Pressure..... 4400 HP

AUXILIARY TURBO-GENERATORS

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

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With Reduction Gears and Generators

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For sale or rent worldwide for "non-transportation" use at exceptionally attractive terms. Ideal for:
6,500,000 gallon heated Storage Tank w/pumps
8450 KW, 3500V, 60/50 Hz, 3 Ph Power Plant
Conversion to Offshore Drilling Rig or Tank Cleaning Station.
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FOR SALE

2 Each—Fairbanks Morse Diesel Marine Engines—complete with mufflers—slightly used — less than 7,000 hours. Model 38D, OP — 8 x 8⅛, S/N — 848498 and 848501, 10 Cyl. 1800 Lp. each. May be seen at Bellinger Shipyard in Jacksonville, Fla., or contact Birdsall Inc., as Agents for Tropical Shipping Co. at 821 Ave. "E", Riviera Beach, Fla. Phone 844-0281 A.C. 305.

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

PUMP: Mfg by Fairbanks-Morse.. Horizontally split case — 1000 GPM—281′ head — 3545 RPM. Suction pressure flooded—6″ suction—5″ discharge. Steelflex coupling. MOTOR: Fairbanks-Morse—440/3/60—squirrel cage—3600 RPM—class A insulation. Type KZK—continuous duty—dripproof—ambient temp. 50°C. Complete with Cutler-Hammer controller (reduced voltage magnetic starter). DIMENSIONS: 5′ 5″ OAL—23″ OAW—2′ 11″ OAH. UNIT HAS HAD VERY LITTLE USE.

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NATIONAL METAL'S CURRENT T-2 INVENTORY

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

TURBOGENERATORS

525 KW GENERAL ELECTRIC AUXILIARY TURBOGENERATOR UNIT

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

538 KW WESTINGHOUSE TURBOGENERATOR UNIT

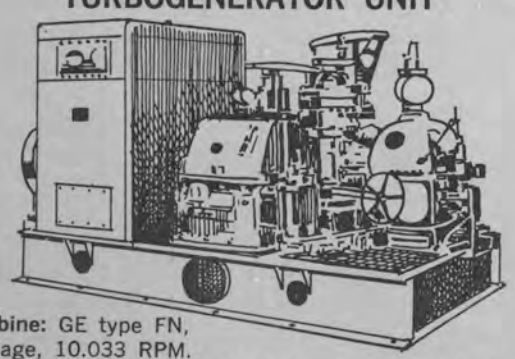
Complete with L.O. Coolers and exciters. **Turbine:** Westinghouse 538 KW, 5010 RPM. Inlet pressure 435 psi. Temp. 750 degrees F.TT. Exhaust pressure 28½ hg vac. **Generators:** (1) 400 KW, 450 VAC, 3 pole, 60 cycle, PF 80%, 1200 RPM, ship's service. (2) 32.5 KW, 125 VDC, 1200 RPM, variable voltage exciter.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

535 KW GENERAL ELECTRIC TURBOGENERATOR UNIT

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

★★ ALSO AVAILABLE!! ★★

600 KW GENERAL ELECTRIC TURBOGENERATOR UNIT



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

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

MAIN MOTOR FOR T2

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

5400 KW MAIN GENERATOR

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

PUMP UNITS

CARGO STRIPPING PUMP

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

MAIN FEED PUMP

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

MAIN FEED PUMP

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

MAIN CIRCULATING PUMP

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

MAIN CIRCULATING PUMP

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

MAIN CARGO PUMP UNIT

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

FUEL AND LUBE OIL PUMP

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

LUBE OIL SERVICE PUMP

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

MAIN CONDENSATE PUMP

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

AIR COMPRESSORS

COMBUSTION CONTROL AIR COMPRESSOR UNIT

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

SHIP SERVICE AIR COMPRESSOR UNIT

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

VALVES

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

TURBINE ROTORS

5400 KW GENERAL ELECTRIC TURBINE ROTOR

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

525 KW GENERAL ELECTRIC TURBINE ROTOR

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

5400 KW WESTINGHOUSE TURBINE ROTOR

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

5400 KW WESTINGHOUSE MAIN TURBINE (Profile type):

5400 KW ELLIOTT TURBINE ROTOR

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

MISCELLANEOUS T-2 EQUIPMENT

MAIN AIR EJECTOR

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

MAIN CONDENSER END

Graham (waterbox).

MAIN CONDENSER END

Westinghouse (waterbox).

MAIN CONDENSER END

Westinghouse (return head).

AUXILIARY CONDENSER END

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

TAIL SHAFTS

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

RUDDER WITH STOCK (complete)

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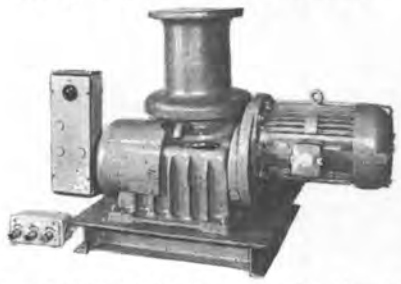
NEW — UNUSED

10 H.P. REVERSING CAPSTANS

SHIPBOARD USE

Duty 10,000 lbs. @ 60 FPM



10 H.P.—220/440/3/60—1750 R.P.M.—Marine type reversing controller. Barrel diameter—10"—2½" Flange. Height between flanges 12".

$2450

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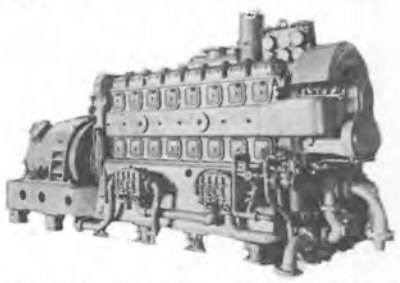
G.M. 8-268A 200 KW A.C. DIESEL GENERATOR SETS



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

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UNUSED ALLIS-CHALMERS FIRE & GENERAL SERVICE PUMPS

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

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NEW 7" RADIUS PANAMA CHOCKS

(MEET PANAMA REGULATIONS)

With extended legs for welding to deck. IMMEDIATE DELIVERY FROM STOCK.

THE BOSTON METALS COMPANY

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TRANSFORMERS

15 KVA—3 per bank—450 V primary—177 volt secondary. **$295.00 PER BANK**

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

THE BOSTON METALS COMPANY

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

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

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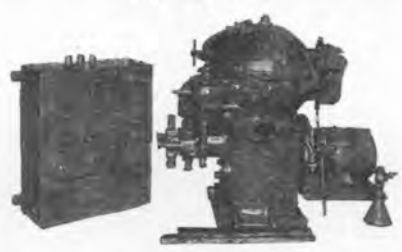
FUEL OIL OR LUBE OIL PURIFIER



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

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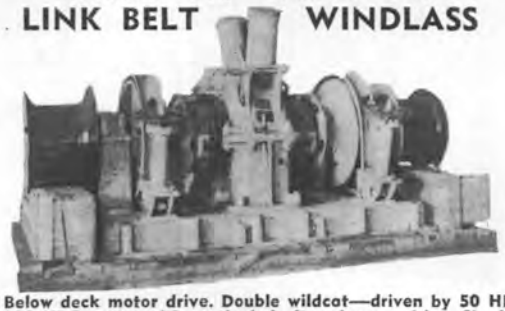
UNUSED 1⅝" HEAVY DUTY LINK BELT WINDLASS



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

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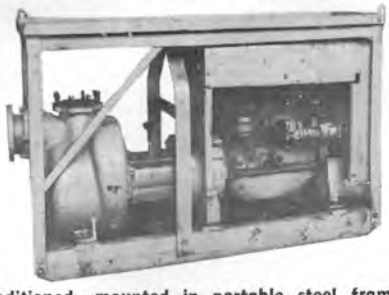
PORTABLE 6" CARVER SALVAGE PUMPS



Reconditioned—mounted in portable steel frame, 1750 RPM—1100 GPM @ 100' head; 1500 GPM @ 70' head; 1800 GPM @ 50' head; 2100 GPM @ 20' head. Leroi gas engine—model D-201P3 —4 x 4—1750 RPM—hand crank— —wt. 600 lbs. **$995**

THE BOSTON METALS COMPANY

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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

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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

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Berger-Type Deck-Mounted FAIRLEADS

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

$745 EACH

THE BOSTON METALS COMPANY

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UNUSED 2" BRONZE STRAINERS (DUPLEX)

Flanged—mfg by Derbyshire Machine & Tool Co. Flange has 6 holes 9/16".

$299.00

THE BOSTON METALS COMPANY

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

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

BEARINGS
BJ Marine Bearings, a Borg-Warner Industry, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

BOILERS
Babcock & Wilcox Co., 161 E. 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095

BOW THRUSTERS
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171

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

CARGO HANDLING EQUIPMENT
MacGregor International Organization, 49 Gray's Inn Road, London W.C.1., England

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

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

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

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

CORROSION CONTROL
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144

CRANES—HOISTS—DERRICKS—WHIRLEYS
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Houston Systems Mfg. Co., P.O. Box 14551, Houston, Texas 77021
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

CRANE LOAD INDICATORS
W.C. Dillon & Co., 14620 Keswick St., Van Nuys, Calif. 91407

DECK COVERS (METAL)
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

DECK MACHINERY
Appleton Machine Co., P.O. Box 2265, Iron Mountain, Mich. 49801.
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
A. G. Weser, Seebeckwerft, 2850 Bremerhaven 1, Germany

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

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

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

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

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Overbeke-Kain Co., 20905 Aurora Rd., Cleveland, Ohio 44146
Watz & Krenzer, Inc., 20 Vesey St., New York, N.Y. 10007

ELECTRICAL EQUIPMENT
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Arnessen Electric Co., Inc., 335 Bond St., Brooklyn, N.Y.
Brown and Ross of New Jersey Incorporated, 370 Paterson Plank Road, Carlstadt, N.J. 07072
Galbraith-Pilot Marine Corp., 166 National Rd., Edison, N.J. 08817
Harvard Murlin Div., P.O. Box 302, Quakertown, Pa. 18951
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014

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

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FENDERING SYSTEMS—Dock & Vessel
BJ Marine Products, subsidiary of Borg-Warner, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004

FITTINGS & HARDWARE
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Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

GAS ALARM SYSTEMS
Lisnave, P.O. Box 2138, Lisboa 3, Portugal
Riken Keiki Fine Instrument Co., Ltd., 2-7-6 Azusawa Itabashi-ku, Tokyo, Japan

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MacGregor-Comarain, Inc., 135 Dermody St., Cranford, Md. 07016

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

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

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

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PDM/GAZ Transport, 919 Third Ave., New York, N.Y. 10022

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

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Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144

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

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Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
Homelite Corporation, 70 Riverdale Ave., Port Chester, N.Y. 10573
ITT Henze Service, P.O. Box 1745, Mobile, Ala. 36610
Kearfott Marine Products, 780 South 3rd Ave., Mt. Vernon, N.Y. 10550
Nicolai Joffe Corp., P.O. Box 2445, 445 Littlefield Ave., So. San Francisco, Calif. 94080
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Stow Mfg. Co., 225 Shear St., Binghamton, N.Y. 13902
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

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

MARINE INSURANCE
Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Midland Insurance Co., One State St. Plaza, New York, N.Y. 10004
R.B. Jones Corp., 301 West 11th St., Kansas City, Mo. 64105
UK P&I Club (Bermuda): Thos. R. Miller & Son, Mercury House, Front St., Hamilton, Bermuda (P.O. Box 665)

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Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Ark. 72204
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171
Port Electric Turbine Div., 155-157 Perry St., New York, N.Y. 10014
Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Turbo Power & Marine Systems, Subsidiary of United Aircraft Corp., 1690 New Britain Ave., Farmington, Conn. 06032

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

MARITIME FINANCING—Leasing
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Qualpeco Services, Inc., 750 Third Ave., New York, N.Y. 10017
Rhode Island Hospital Trust National Bank, 15 Westminster Street, Providence, R.I. 02903

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J. L. Bludworth, 4030 Wynne St., Houston, Texas
Breit Engrg. Inc., 441 Gravier St., New Orleans, La. 70130
James G. Bronson Associates, 166 Altamont Ave., Tarrytown, N.Y. 10591
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Crandall Dry Dock Engrs., Inc., 238 Main St., Cambridge, Mass. 02142
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C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Arthur D. Darden, Inc., 1040 International Trade Mart, New Orleans, La. 70130
Design Associates, Inc., 3308 Tulane Ave., New Orleans, La. 70119
Designers & Planners, Inc., 114 Fifth Ave., New York, N.Y. 10011
M. Mack Earle, 103 Mellor Ave., Baltimore, Md. 21228
Christopher J. Foster, 14 Vanderventer Ave., Port Washington, N.Y. 11050
Friede and Goldman, Inc., 225 Baronne St., New Orleans, La. 70112
Gibbs & Cox, Inc., 40 Rector Street, New York, N.Y. 10006
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
Morris Guralnick, Associates, Inc., 583 Market St., San Francisco, Calif. 94105
J. J. Henry Co., Inc., 90 West St., New York, 10006
Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, Calif. 93017
C.T. Ilariucci & Associates, Tourism Pier #3, San Juan, P.R. 00902
Jantzen Engineering Co., 15 Charles Plaza, Baltimore, Md. 21201
James S. Krogen, 2500 S. Dixie Hwy., Miami, Fla. 33133
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 1180 Ave. of Americas, N.Y., N.Y. 10036
Marine Design Associates, P.O. Box 2674, Palm Beach, Florida
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742
Robert Moore Corp., 350 Main St., Port Washington, N.Y. 11050
Nickum & Spaulding Associates, Inc., 71 Columbia St., Seattle, Wash. 98104
Ocean-Oil International Engrg. Corp., P.O. Box 6173, New Orleans, La. 70114
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 8-D So. New River Drive East, Ft. Lauderdale, Fla. 33301
Potter & McArthur, Inc., 253 Northern Ave., Boston, Mass.
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 657 Mission St., San Francisco, Calif.
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
T. W. Spaetgens, 156 West 8th Ave., Vancouver 10, Canada
R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler, 50 Court St., Brooklyn, N.Y. 11201
H. M. Tiedemann & Co., Inc., 74 Trinity Pl., New York, N.Y. 10006
Trident Studio, Box 670, Spring House, Pa. 19477
Whitman, Requardt & Associates, 1304 St. Paul St., Baltimore, Md. 21202
Yankee Shipwrights, P.O. Box 35251, Minneapolis, Minn. 55435

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Communication Associates, Inc., 200 McKay Road, Huntington Station, N.Y. 11746
Edo Corporation, 13-10 111th Street, College Point, N.Y. 11356
Edo Western Corporation, 2645 South 2nd West, Salt Lake City, Utah 84115
Electro-Nav, Inc., 501 Fifth Ave., New York, N.Y. 10017
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
ITT Decca Marine, Inc., 386 Park Ave. South, New York, N.Y. 10016
ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Lorain Electronics Corp., 2307 Leavitt Road, Lorain, Ohio 44052

Magnavox Navigation Systems, 2829 Maricopa St., Torrance, Cal. 90503
Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701
Raytheon Co., Submarine Signal Div., P.O. Box 360, Portsmouth, R.I. 02871
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Standard Communications Corp., 639 N. Marine Ave., Wilmington, Calif. 90744
Teledyne Hastings Raydist, P.O. Box 1275, Hampton, Va. 23361
Tracor, Inc., 6500 Tracor Lane, Austin, Texas 78721
The Waterways Co., 3512 Metairie Hts. Rd., New Orleans, La. 70002

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

PAINT—Marine—Protective Coatings
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144
International Paint Co., 21 West St., New York, N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Transocean Marine Paint Association, P.O. Box 456, Delftseplain 37, Rotterdam, Holland

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

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

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

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

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

PUMPS
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City, Kansas 66110
Delaval Turbine Inc., IMO Pump Division, P.O. Box 321, Trenton, N.J. 08602
Houttuin-Pompen N. V. Sophialaan 4, Utrecht, Holland
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Arkansas 72204

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

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

ROPE—Manila—Nylon—Hawsers—Wire
American Mfg. Co., Inc., Noble & West Sts., Brooklyn, N.Y. 11222
Atlantic Cordage & Supply Corp., 60 Grant Ave., Carteret, N.J. 07008
Du Pont Co., Room 31H1, Wilmington, Delaware 19898
Jackson Rope Corp., 9th & Oley, Reading, Pa. 19604
Wall Rope Works, Inc., Beverly, N. J. 08010

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

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

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

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

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

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

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

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

SHIPBUILDING STEEL
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., 25 Broadway, New York, N.Y. 10004
Huntington Alloy Products, Div. International Nickel Co., Inc., Huntington, W. Va. 25720
International Nickel Co., 1 New York Plaza, New York, N.Y. 10004
United States Steel Corp., P.O. Box 86, Pittsburgh, Pa. 15230

SHIPBUILDING—Repairs, Maintenance, Drydocking
Albina Engine & Machine Works, 2100 N. Albina Ave., Portland, Oregon 97208
Astilleros Espanoles, S.A. Zurbano, 70, Madrid 10, Spain
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Beliard, Crighton & Cie, P.O. Box 2074, Route des Docks, 59, Dunkirk, France
Beliard Murdoch S. A., Kattendijkdok Westkaai 21, Antwerp, Belgium
Bell Aerospace Company, Div. of Textron, P.O. Box 1, Buffalo, N.Y. 14240
Bertram Marine, Division of Whittaker, 3663 N.W. 21 Street, Miami, Fla. 33142.
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Bludworth Shipyard, Inc., Box 5426, Cypress St., Brady Island, Houston, Texas 77012
Carrington Slipways Pty. Ltd., Tomago, N.S.W. 2322, Australia
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock, Inc., P.O. Box 153, Willemstad, Curacao, N.A.
Devcon Corporation, Endicott Street, Danvers, Mass. 01923
Dillingham Shipyard, Pier 41, P.O. Box 3288, Honolulu, Hawaii 96801
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
Empresa Nacional Bazon, 65 Castellana, Madrid 1, Spain
Equipment Systems, Inc., A Microdot Co., P.O. Box 95, Port Deposit, Md. 21904
Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122
General Dynamics, Electric Boat Division, 99M Eastern Point Road, Groton, Conn. 06340
General Dynamics, Quincy Division, Quincy, Mass. 02169
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
Havre de Grace, Havre de Grace, Md.
Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
Hongkong & Whampoa Dock Co. Ltd., Kowloon Docks, Hong Kong
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Dockyard Co., 8 Kaigon-dori, Ikuta-ku, Kobe, Japan
Kelso Marine, Inc., P.O. Box 268, Galveston, Texas 77550
Keppel Shipyard (Private) Ltd., P.O. Box 2169, Singapore
Kockums Mekaniska Verkstads AB, Malmo 1, Sweden
Litton Industries, 9920 W. Jefferson Blvd., Culver City, Calif. 90230
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
Marathon Manufacturing Company
Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002
Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520
Marathon LeTourneau Marine Division, LeTourneau Rural Station, Vicksburg, Mississippi 39180
Marathon LeTourneau Offshore Pte., Ltd., P.O. Box 8: Taman Jurong Post Office, Singapore 22, Singapore
Marathon Shipbuilding Company, P.O. Box 870, Vicksburg, Miss. 39180
Marathon Shipbuilding Company (U.K.) Ltd., Clydebank Bunbartonshire, G81-1YB, Scotland
Marine & Rail Equipment Division/FMC Corp., 4700 N.W. Front Ave., Portland, Oregon 97208
Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047
Mercantile Marine Engineering & Graving Docks Co., N.V., Antwerp, Belgium
Mitsui Shipbuilding & Engrg. Co. Ltd., 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Newport Ship Yard, Inc., 379 Thames St., Newport, R.I. 02840.
Northwest Marine Iron Works., P.O. Box 3109, Swan Island, Portland, Oregon 97208
Odense Steel Shipyard Ltd., P.O. Box 176, DK-5100 Odense, Denmark
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
St. Louis Shipbuilding—Federal Barge, Inc., 611 East Marceau, St. Louis, Mo. 63111
Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Savannah Machine & Shipyard Co., P.O. Box 787, Savannah, Ga. 31402
Sembawang Shipyard (Pte) Ltd., P.O. Box 3, Sembawang, P.O. Singapore, 27
Service Machine & Shipbuilding Corp., Box 1578, Morgan City, La. 70380
Slocum Iron Works, Inc., P.O. Box 2506, 1752 Telegraph Road, Mobile, Ala. 36601
Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Tracor/Mas, Inc., P.O. Box 13107, Port Everglades, Fla. 33316
Vancouver Shipyards Co., Ltd., 50 Pemberton Ave., North Vancouver, B. C., Canada

SHIP MODEL BASIN
Hydronautics, Incorporated, Laurel, Maryland 20810

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

SHIP STABILIZERS
Jered Industries, Inc., 1300 S. Coolidge Rd., Birmingham, Mich. 48008
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

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

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

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

TOWING—Vessel Chartering, Lighterage, Salvage, etc.
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, West End Ave., Oyster Bay, N.Y. 11771
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
Puerto Rico Lighterage Co., P.O. Box 1072, San Juan, P.R. 00902
State Boat Corporation, 3701 Kirby Drive, Houston, Texas 77006
Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002
Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y. 11214

VALVES AND FITTINGS—Hydraulic—Safety Flanges
Dover Corp. / Norris Division, P.O. Box 1739, Tulsa, Okla. 74101.
Fabri-Valve Co., 2100 N. Albina Ave., Portland, Oregon 97208
Hubeva Marine Plastics-Lining, 435 Hamilton Ave., Brooklyn, N.Y. 11231
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanicol Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

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

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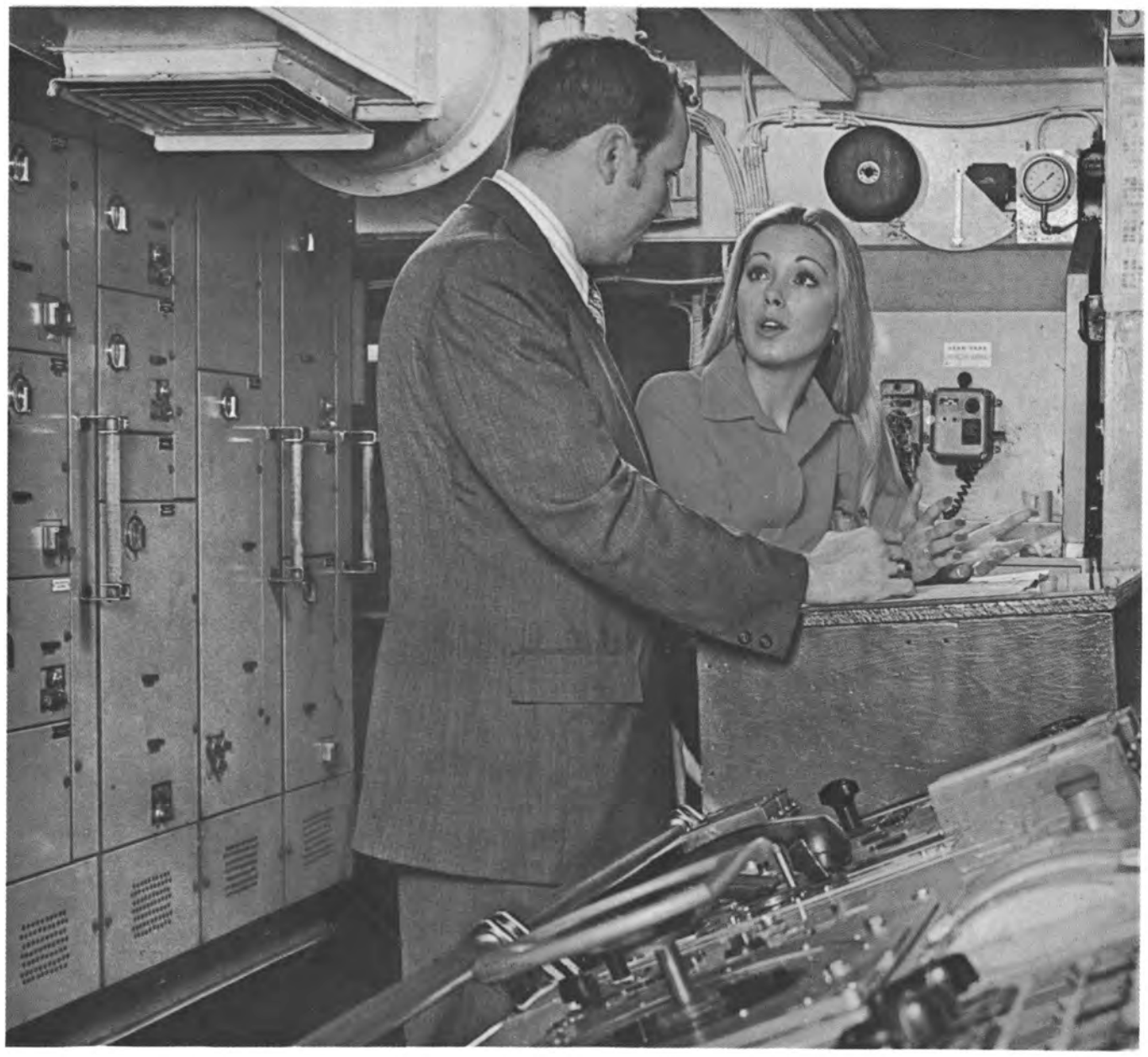

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