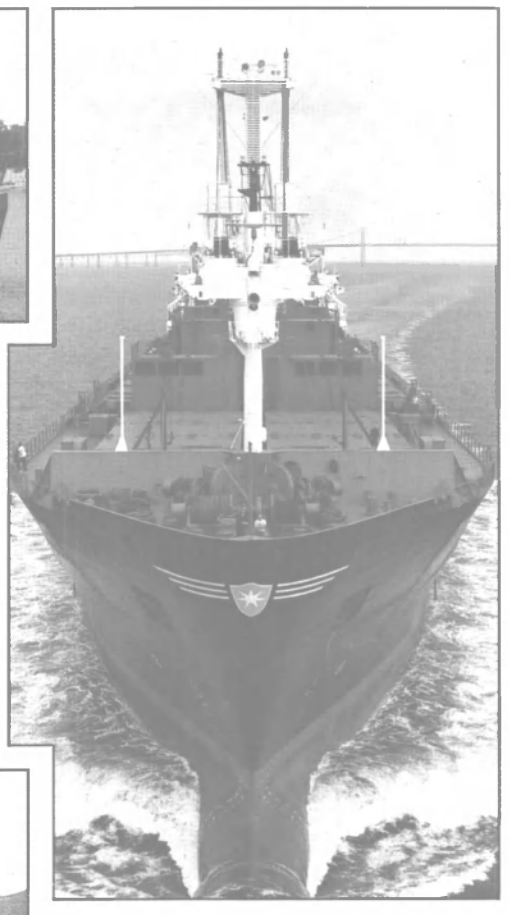
MARITIME REPORTER
AND ENGINEERING NEWS



ANNUAL

OUTSTANDING OCEANGOING SHIPS REVIEW

DECEMBER 1985 DOUBLE ISSUE

Bad news travels fast by satellite which is a very good thing.

"Data we're receiving from your ship indicates that due to the weather out there, you should adjust heading and ballast as follows...

"It'll put you into San Francisco ahead of schedule."

"Thanks for the info. If you can have the following parts waiting at the dock when we get there it'll really speed things up."

A conversation like this one, via satellite between a fleet operator and one of his ships halfway around the world, can take just seconds. And when you figure an average ship burns millions of dollars of fuel a year, these few seconds adjusting heading and ballast, relative to ship movement, can save thousands.

It's all possible with COMSAT Maritime Services via INMARSAT, a satellite communications network which keeps fleet operators in constant touch with their ships.

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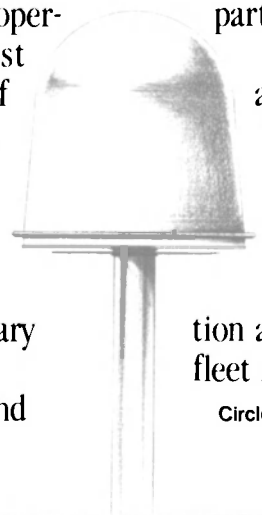

You can keep your finger on such vital signs as engine operation and fuel usage. Sensors can pick up malfunctions and relay them back even before the crew is aware there's a problem.

In a business where speed is often the competitive edge, every minute you can save makes a difference. Call COMSAT toll-free at 1-800-424-9152. We'll provide complete satellite communications information and help you manage your fleet more efficiently worldwide.

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ON THE OOVER

COVER PHOTOS: Clockwise from top center: **Eastern Sun** (Jeffboat) page 23; **Pvt Harry Fisher** (Bethlehem Steel) page 48; **Regulus** (National Steel & Shipbuilding) page 49; **Paul Buck** (Tampa Shipyards) page 40; **Holiday** (Aalborg Werft) page 27; Center top: **Japan Apricot** (Hitachi Zosen) page 30. Center bottom: **American Ohio** (Samsung Shipbuilding) page 22.

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PAGE 22

Shipboard Computer Survey
PAGE 58

U.S. Navy Ship Procurement —Second Update—
PAGE 70

United States Cruises Applies To MarAd For $150-Million Title XI

The Maritime Administration has received an application from United States Cruises, Inc., a subsidiary of Pacific Building Corporation of Seattle, for a Title XI mortgage guarantee to aid in refinancing the reconstruction of the passenger ship United States.

Built by Newport News Shipbuilding for United States Lines in 1952, the luxury liner operated in trans-Atlantic service until she was laid up in Norfolk in 1969, and subsequently sold to the U.S. Government. United States Cruises purchased the vessel from MarAd in 1978 for $5 million.

The Seattle firm has announced plans to operate the 990-foot vessel in the U.S. West Coast-Hawaii cruise trade. The company proposes to have major structural repairs performed, staterooms and public areas refurbished, and shops and recreation facilities installed at Alabama Dry Dock and Shipbuilding Company in Mobile. If approved, the Title XI guarantee would cover approximately $150 million, or 75 percent of the estimated cost of $200 million.

The ADDSCO contract would involve adding two new decks, removing some existing bulkheads, adding 800 new staterooms and 300 cabins for crew members, and upgrading the ship's machinery. If MarAd approves the financing, work could begin as early as January 1, 1986.

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No. 20 Volume 47

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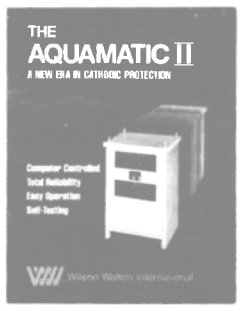

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PROPULSION UPDATE

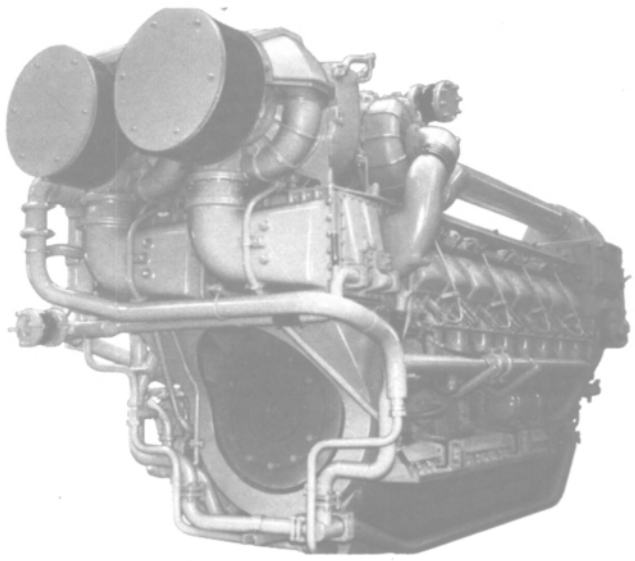
PA Series Heavy Fuel Diesel Now Available From Fairbanks Morse —Literature Available

The PA Series of "V" and in-line diesel engines now being offered by Fairbanks Morse lend themselves to a wide range of marine propulsion and other power requirments. The engines, ranging in size from six to 20 cylinders, have a horsepower range from 1,000 to 10,000 horsepower and can burn available residual fuels for maximum operating economy.

The PA engine series, a development of Alsthom and S.E.M.T. Pielstick has achieved worldwide acceptance for marine requirements since their introduction in 1950. Over 6,000 units are presently in service. Throughout their operating history they have achieved an enviable record for low fuel consumption over their entire power range and have a record of long service life between major overhauls.

In support of the PA Series, Fairbanks Morse offers complete engine operation and maintenance training in its customer training school in Beloit, Wis. In addition, spare parts and complete engine service is also available throughout all Fairbanks Morse Service and Parts Centers.

With the addition of the PA Series of engines, Fairbanks Morse now offers one of the widest ranges of diesel engines for marine application from a single U.S. engine builder with a horsepower range from 600 to 29,200.



For complete free literature and detailed information on the PA Series of engines offered by Fairbanks Morse Engine,

Circle 91 on Reader Service Card

Six-Page Color Brochure On Energol Lubricants Offered Free By BP Marine

BP Marine International, a major supplier of lubricants to meet shipboard needs of the merchant fleets of the world, has published a free six-page pull-out brochure on products offered by the company.

Titled "Energol Marine Lubricants," the publication gives the grade name, application, typical data, and description for the principal grades of these lubrication oils. Included are cylinder and systems oils: low-speed crosshead engines and trunk piston engines; multipurpose engine oils; turbine oils; gear oils; general purpose circulatory oils; hydraulic oils—high viscosity index, and very high viscosity index; refrigerator compressor oils; steam engine oils; stern tube oil; and LPG gas compressor lubricant.

Also listed are BP Energol specialty products such as wire ropes, corrosion preventives, and cutting oil, as well as BP Energrease marine greases along with description, grade name and application, classification, etc.

For a copy of the brochure and further information about the products or service offered by BP Marine International,

Circle 31 on Reader Service Card

Getty Fleet Orders Lips Speed-Adapted Propellers To Increase Efficiency —Literature Available

Cognizant of the efficiencies achieved through modern propeller designs, Getty Fleet (Texaco) ordered a Lips speed-adapted propeller to meet the revised operational specifications of the M/T Getty Fleet.

The new four-blade propeller has a maximum diameter of 7,400 millimeters (24.27 feet) and an expanded area ratio of .527. Cast from Lips "Cunial" alloy (ABS Grade IV/nickel aluminum bronze) material and manufactured to ISO Class 1 standards, the finished propeller weighed approximately 62,800 pounds.

Speed-adapted propellers become a viable consideration when vessels are continually operated at lower ship speeds than they were originally designed for. It pays to exchange the propeller for a speed adapted one, designed for a new operating point. In this point the number of revolutions is lower than in the original one. Optimization of the propeller diameter now leads to a larger propeller. As a consequence of the resulting larger diameter, thrust loading coefficient is reduced, axial and rotational losses are reduced and the open water efficiency is increased. Note that the propulsive efficiency is not improved as much as the open water efficiency due to hull propeller interaction. Due to the reduced propeller load, cavitational properties will be better and an additional increase in efficiency can be obtained by reduction of blade area ratio.

For additional information, including a listing of vessels retrofitted with Lips speed-adapted propellers,

Circle 51 on Reader Service Card

Karl Senner Offers Free Color Brochure On Reintjes Marine Gearboxes

Karl Senner Inc., Kenner, La., the North American distributor of Reintjes marine gears, is offering a free color brochure on Reintjes marine gearboxes.

The colorful publication offers a bevy of information on the West German-based Reintjes marine gearboxes, from reverse reduction gearboxes for fast vessels (Type WVS) to twin input single output reduction gearboxes with built-in hydraulically operated clutches (Type DVAL). The brochure also contains text, configuration diagrams and color photographs on Reintjes reverse reduction gearboxes for workboats (Types WAF, WAV, and WGV); two-speed reverse reduction gearboxes for workboats (Type ZWAV); reduction gearboxes for workboats (Type VA/SVA); reduction gearboxes with built-in hydraulically operated clutch for workboats (Type VAL);

and twin input single output reduction gearboxes for workboats (Type DVA).

All the gearboxes use carburized and ground wheels, internal hydraulic clutches and are available in vertical, horizontal or coaxial (in-line) configurations. Karl Senner, Inc. also offers combining gears for multiple engine applications, gears for reversible engines and gears for use with controllable pitch propeller systems.

The brochure points out that Reintjes gearboxes, which are among the finest in the world, can be found on a large variety of vessels. The back cover of the publication displays several vessels equipped with Reintjes gearboxes including the customs boat Zeevalk with two high-speed reverse reduction gears (Type WVS); the freighter Sloman Ranger with two reverse reduction gears (Type WAV); and the luxury cruising vessel Berlin with two reduction gears with hydraulically operated clutch (Type VAL).

Eisenwerke Reintjes GmbH, Hameln, West Germany, have been building marine gearboxes for more than 50 years. More than 60,000 Reintjes gearboxes are in service around the world.

Karl Senner, Inc. has been in business since 1972, and has sold nearly 1,500 gearboxes ranging from 100-10,000 hp. The company also maintains a 24-hour parts and service system that is one of the finest in the world.

For a free copy of the full-color brochure or further information on Reintjes gearboxes distributed by Karl Senner,

Circle 54 on Reader Service Card

Allegretti Joins AWO As Vice President-Operations

Thomas A. Allegretti, formerly director of domestic waterways at the Transportation Institute, has joined the American Waterways Operators Inc. as vice president-operations. He had been with the Institute for nine years. He will be based at the AWO headquarters in Arlington, Va.

George G. Sharp Awarded $300,000 MarAd Contract

The Maritime Administration has awarded a $300,000 contract to George G. Sharp, Inc., New York, N.Y., to provide technical support services for reactivation and conversion of an Auxiliary Crane Ship (T-ACS).

This vessel, the former President Polk, is the third in a series of 12 ships in the T-ACS program.

Under its present contract with MarAd, the company will provide project inspection and plan approval service for the agency. The project is expected to be completed next September.

OMSA Elects New Officers —Congressman Warns Of 'California Plan'

The Offshore Marine Service Association has elected eight new members to its board of directors replacing those whose terms have expired.

Capt. **W. A. Mayberry**, executive director of OMSA said those elected to two year terms are: chairman, **Ken Waldorf**, Zapata Gulf Marine Corp., Houston; vice chairman, **Otto Candies Jr.**, Otto Candies, Inc., Des Allemands, La.; secretary/treasurer, **Charles Burrell**, Leevac Corp., Morgan City, La.; **John Bissell**, Seal Fleet, Inc., Galveston; **Jody Powers**, Otis Engineering Corp., Harvey, La.; **Ogden Thomas**, Seahorse, Inc., Morgan City, La.; **F. C. (Butch) Felterman**, Galaxie Marine Service, Inc., Patterson, La.; and **James Clement**, Offshore Logistics, Inc., Lafayette, La.

The election was held at the association's recent quarterly meeting which was addressed by Rep. **Billy Tauzin** (D La.). The Congressman, who serves on important marine and energy committees, discussed standby vessels, warehouse vessels, and urged OMSA members to defeat the "California Plan," a moratorium proposal which would have deleterious impact on offshore energy interests.

OMSA, whose offices are located in New Orleans, La., promotes the goals and interests of firms providing vessel support services to all phases of the offshore oil, mineral, construction and pipelaying industries. Its vessel owning members operate more than 3,000 vessels and employ more than 30,000 personnel.

Interested parties should call (504) 523-7363.

Recently launched Birka Princess is the first passenger vessel built by Valmet's Helsinki Shipyard. When delivered in the spring of 1986, she will operate on the Stockholm-Mariehamn (Aland Islands) route, replacing Birka Line's ferry Prinsessan.

Birka Line Cruise Ship Launched At Valmet's Helsinki Shipyard

Valmet's Helsinki Shipyard recently launched its first passenger vessel, the Birka Princess being constructed for Birka Line Ab of Mariehamn, Finland. The ship's sponsor was **Mrs. Runa Lundberg,** wife of Birka managing director **Gunnar Lundberg.** After delivery in the spring of 1986, the Princess will replace the ferry Prinsessan, built by Wartsila in 1966 and modernized in 1980.

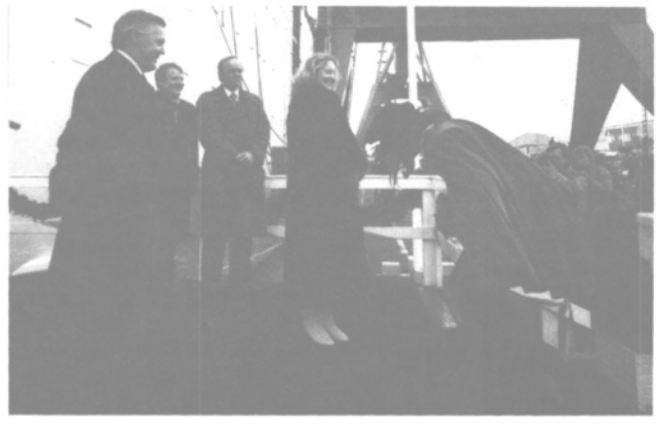
The Birka Princess is a true cruise liner, unlike the numerous passenger/car ferries operating on the Baltic. She has only a small car deck at the stern that will accommodate six coaches and 50 private cars, or 75 cars, with access via a side ramp.

The new liner has an overall length of 469 feet, beam of 81 feet, depth to Deck 11 of 100 feet, and draft of 18.4 feet. Main propulsion will be Wartsila-Vasa diesel engines with a total output of 23,600 bhp, driving KaMeWa propellers via Valmet reduction gears. Cruising speed will be 18 knots.

The standard of the accommodations, which will provide for 1,500 passengers in 500 cabins, will be superior to those of the latest ferries in the Baltic, achieved by skillful detail work and selection of materials, and several refined details such as in the lighting system.

Efficient space utilization and clear general arrangement is achieved by well-considered architectural solutions. The marine surroundings are brought close to the passengers by special panorama windows in the a la carte restaurant and dancing restaurant aft, and in the cocktail lounge and one of the big conference rooms forward.

The main targets in the design of the Birka Princess were economical operation, operational safety, easy maintenance, and a high level of automation. Machinery is controlled by Valmet's Damatic ship automation system. The corporation's other units are also well represented among the suppliers. Valmet's Tampere Works provided the



Sponsor of Birka Princess was **Mrs. Runa Lundberg.** Shown with her are (L to R): **Matti Kankaanpaeae,** chairman, president, and CEO of Valmet Corporation; **Gunnar Lundberg** managing director of Birka Line; and **Kari Airaksinen,** general manger of Valmet's Helsinki Shipyard.

six passenger and service elevators, and the reduction gears were supplied by the Rautpohja Works.

Valmet has developed a totally new cabin construction method, with cabin wall elements completely fabricated in the factory. The units will be fitted with all needed details, including furniture fastenings. This method will insure the highest quality and a neat appearance. All elements are light, solid, easy and fast to erect, and will insure the best possible sound insulation between cabins.

BIRKA PRINCESS
Major Suppliers

Main engines	Wartsila-Vasa
Engine control system	Valmet
Propellers & bow thrusters	KaMeWa
Reduction gears	Valmet
Couplings	Vulkan
Generators	Stromberg
Generator engines	Wartsila-Vasa
Boilers	Rauma-Repola
Air compressors	Hamworthy
Separators & plate heat exchangers	Alfa Laval
Centrifugal pumps	Iron Maskinfabriken
Oil pumps	IMO
Air conditioning	Nordisk
Ref. plant for air cond	Stal Refrigeration
Sewage disposal plant	Deering
Elevators	Valmet
Mooring winches	Rauma-Repola
Fire & other doors	Saajos
Watertight doors	Synkronex
Lifeboats	Fiskars
Life rafts	Viking
Autopilot	Kockumation
Gyrocompass	Anschutz
Radar	Racal Marine
Echo sounder	Simrad
Loudspeaker system	Philips

Fire Combat, Inc. Offers 10-Page Manual On Fire Suppression Systems

Fire Combat, Inc., Marinette, Wisc., is offering a free 10-page product manual on their fire suppression systems (dry chemical, foam and halon), fire apparatus and custom systems engineering.

The 10-page binder-type manual outlines the general scope of the company's fire suppression product engineering and manufacturing services. The text illustrates a sampling of Fire Combat standard products and its custom solutions to special customer applications.

The product manual features such equipment as: trailer-mounted twin agent fire suppression system; twin agent fire suppression system; dry chemical fire suppression system for truck mounting; and crash fire rescue package system.

Some of the customers that Fire Control, Inc. has served include: the U.S. Navy, Marine Corps and Army; distributors of fire apparatus; fire truck manufacturers; military and civilian airports; industrial fire safety departments; and municipal fire departments.

To obtain a free copy of this informative product manual from Fire Control, Inc.,

Circle 33 on Reader Service Card

Loftus Appointed Vice President-Construction & Repair For Moran Towing

Robert M. Loftus has been named vice president of the construction and repair department of Moran Towing & Transportation Company of New York City. The announcement was made by **Thomas E. Moran,** president.

Mr. **Loftus,** a 1953 graduate of the State University of New York Maritime College at Fort Schuyler, joined Moran in 1962 after service in the merchant marine and the Navy. He was named sales manager for New York Harbor in 1964, and sales manager in 1977. His most recent position was vice president of marketing and sales.

Mr. **Moran** also announced that **W. Anthony Watt**, a vice president, has taken over the sales and marketing division of the company. Working with him are sales representatives **Karl B. Eckhardt** and **Paul Flynn**, and public information director **Frank Duffy**.

Federal Pacific Electric Publishes New Free 72-Page Control Catalog

A new 72-page control catalog is now available from Federal Pacific Electric. This control catalog covers products that are used extensively in commercial, industrial, OEM and utility applications. The catalog offers general, descriptive and price information as well as wiring diagrams, NEMA enclosure definitions, an alphanumeric index, and a list of FPE sales offices, manufacturing facilities, customer service centers and SOS facilities.

For further information,

Circle 46 on Reader Service Card

Texaco Appoints Quegan General Manager, Marine Department

Richard J. Quegan has been appointed general manager in charge of the marine department of Texaco Inc., it was recently announced by **John K. McKinley,** chairman and chief executive officer. Mr. **Quegan** will continue to be located at Texaco's offices at Harrison, N.Y.

The marine department manages Texaco's U.S. and foreign-flag fleets of owned and chartered tankers and support units. At present, these fleets include more than 50 ocean-going tankers totaling 7.7 million deadweight tons.

Mr. **Quegan** graduated from the U.S. Merchant Marine Academy at Kings Point, N.Y., in 1959 with a Bachelor of Science degree in marine transportation, and joined Texaco in 1960 as a fleet officer. After serving as captain with Texaco's U.S. fleet vessels, he was appointed assistant fleet superintendent in 1966.

Mr. **Quegan** was appointed general manager of the Texaco Panama fleet in 1971 and assistant manager-traffic in the marine department in 1974. He was named manager-operations in 1975 and assistant general manager in 1979.

Fernstrom Elected President And CEO Of American Ship Building

H. Allen Fernstrom

H. Allen Fernstrom was elected president and chief executive officer of The American Ship Building Company according to a recent announcement by **George M. Steinbrenner,** chairman of the board. He succeeds **George A. Chandler,** who is leaving to become president and chief executive officer of Aqua-Chem, Inc. of Milwaukee, Wisc.

Mr. **Fernstrom,** who will assume his new duties immediately, most recently served as executive vice president, chief operating officer and director of The American Ship Building Company. Under his guidance, the company was successful in the T-5 program which involved building five vessels for Ocean Products Tankers, Inc. for ultimate charter to the Military Sealift Command of the U.S. Navy.

Philip A. McNiff has been elected executive vice president of the company replacing Mr. **Fernstrom.** Mr. **McNiff** most recently served as vice president of administration.

The American Ship Building Company is a major independent ship construction, conversion, and repair firm. It is one of the largest ship repair and construction facilities in Florida, and one of the major builders of barges on the inland waterways.

For further information on The American Ship Building Company,

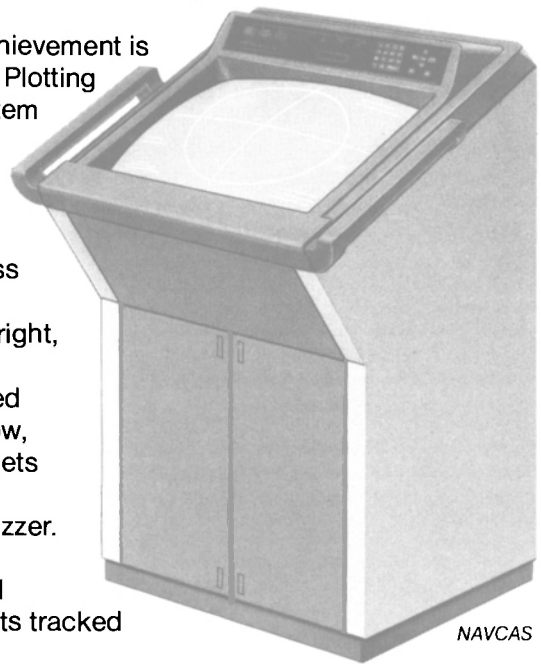
Circle 56 on Reader Service Card

Hitachi Zosen sets a new course for computerized and automated ships.

NAVCAS Automatic Radar Plotting Aids.

Hitachi Zosen is constantly looking for ways to improve the safety, efficiency and economy of ship operation. Years of intensive research and development have led to new breakthroughs in computerized and automated systems.

The latest Hitachi Zosen achievement is the NAVCAS Automatic Radar Plotting Aids. This remarkable subsystem provides the operator with up-to-the-minute collision-avoidance information by processing signals from any type of radar, gyrocompass or speed log on the market. It displays all information on a bright, easy-to-read 26″ color CRT — hazardous targets are indicated by a change from blue to yellow, with extremely hazardous targets changing from yellow to red, accompanied by a warning buzzer. Operation is simple and easy through the latest touch-panel technique, with up to 20 targets tracked automatically, or manually.



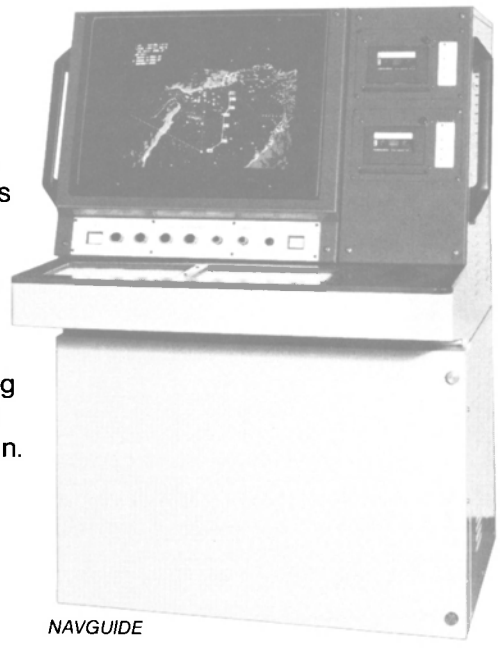
NAVCAS

This new system, together with the other systems shown here, provides you with a complete navigation package that improves both safety and efficiency.

NAVGUIDE for narrow water and harbor navigation.

This breakthrough system allows safer operation in the navigation of constrained areas, such as narrow channels and harbors. It also reduces crew labor, through electronic displays and automation.

NAVGUIDE has advanced features such as simultaneous display of radar raw video, color display of chart information, ship's route information, and various navigational data, including accurate ship's position fixing, course keeping, and alarm for course deviation. With these advantages, NAVGUIDE is indispensable for safer, more efficient navigation of coastlines, harbors, and other constrained areas.



NAVGUIDE

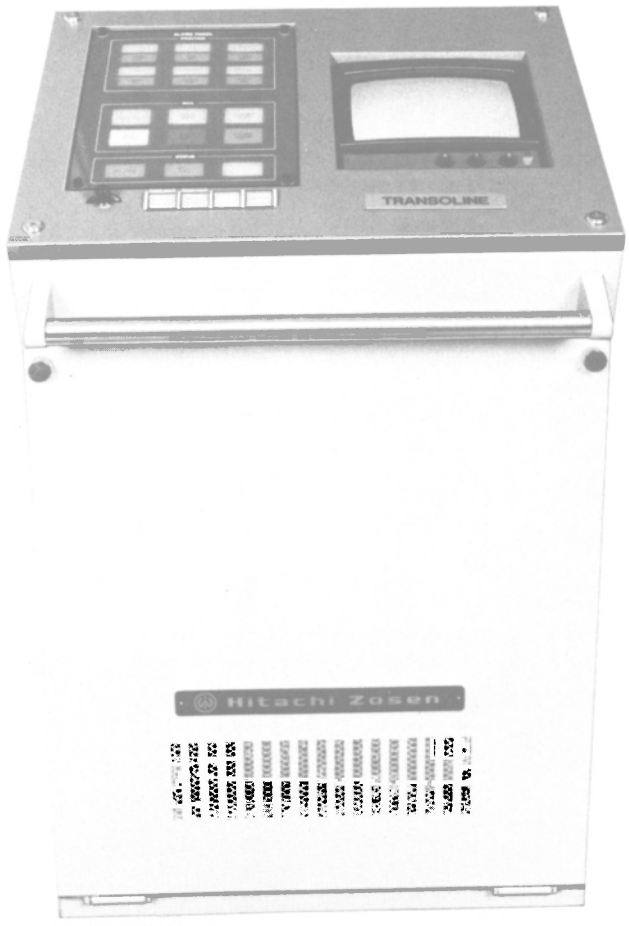
TRANSOLINE MK-II Integrated Automatic Navigation System.

The TRANSOLINE System, first installed in 1976, has computer-controlled, highly-accurate steering, and has consistently reduced both sailing mileage and fuel consumption.

This efficiency has been carried even further with the state-of-the-art TRANSOLINE MK-II.

Designed for container ships, PCC, reefers and other high-speed vessels, MK-II handles complex calculations and routine tasks, and displays the needed navigational data on a CRT.

Navigation language is in 4-letter commands for easy man-machine communications using a keyboard. A "hybrid" positioning-measuring system gives you fast, accurate determination of position, using Loran-C, NNSS, Omega receiver, or Decca navigator data. In addition, computer-controlled autotracking saves labor, improves safety, and cuts fuel usage.



TRANSOLINE MK-II

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Circle 341 on Reader Service Card

ELECTRONICS UPDATE

New Briefcase Computer For Marine Industry From NAV-COM —Literature Available

NAV-COM Incorporated, Deer Park, N.Y., has been named an official value-added reseller for the line of portable computers manufactured by GRiD systems Corporation. The GRiD computers have been integrated into NAV-COM's BUSISHIP marine management information system, using proprietary software developed by NAV-COM for marine data processing and satellite communications.

"The GRiD computers add a new dimension to our BUSISHIP package," said NAV-COM president **Gerald A. Gutman**. "It is a truly remarkable advance in the state-of-the-art in computer miniaturization, offering a unique combination of power, portability, ruggedness and versatility. These attributes make them ideally suited for the computing and data communications requirements of the marine and offshore industries," he added.

The GRiDCase portable computer, which has a magnesium casing, weighs 12 pounds and fits into a standard-size briefcase. The 16-bit computer is IBM-PC compatible and can communicate with a wide assortment of personal computers and mainframes. It can be configured for up to 512K RAM and 512K ROM, and a 10 MB hard disk drive is available as an option. A built-in rechargeable battery pack permits the computer to be used without external power. An optional 1,200-bps internal modem links the GRiDCase computer into telephone lines or satellite voice channels for data exchange.

The GRiD portable computer is now available with special marine management software from NAV-COM Incorporated.

BUSISHIP is a shipboard computer system developed by NAV-COM to provide increased operating efficiency and reduced data communication costs for modern commercial ships. The BUSISHIP system, which is designed around a ruggedized IBM-PC/XT personal computer, uses specialized NAV-COM software for many shipboard management functions, including onboard spares inventory, crew records and payroll, personnel rotation and assignment, and load/stress/trim calculations.

GRiD computers have been field tested and are currently in use for a variety of applications ranging from U.S. warships to offshore oil rigs and even on board space shuttle missions.

NAV-COM Incorporated is a leading U.S. marine electronics firm specializing in the integration of complex communications, navigation and information systems. It is a wholly owned subsidiary of the Magnavox Government and Industrial Electronics Company.

For further details and literature on GRiD computers,

Circle 75 on Reader Service Card

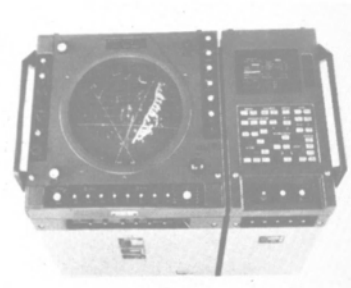
Furuno USA Introduces New Doppler Speed Log And ARPA Line —Free Literature Available

Furuno USA, Inc., South San Francisco, Calif., has introduced a new ARPA series and a new compact doppler speed log, DS-70.

The DS-70 doppler speed log displays vessel speed and distance run to accuracies of ± 1 percent. The system uses paired-beam transducers to eliminate the effects of pitch and roll, and corrects signal velocity for changes in water temperature and salinity.

The new Furuno ARPA series, which are available either as standalone units that may be interfaced with existing Furuno or other radars, or as completely integrated X- or S-band radar/ARPA installations, consist of a 16-inch PPI radar display that shows raw radar echoes in amber and computed vector data in white, plus a control unit with a 9-inch daylight display for target data. The system provides for automatic acquisition of 20 targets and manual acquisition of an additional 10 targets within the range of 0.3 to 32 nm. Picture quality is achieved through the use of a logarithmic receiver and Furuno's custom hybrid microwave IC circuitry. The trial maneuver function permits instant evaluation of potentially dangerous CPA and TCPA situations. The operator can change any simulation characteristics without interrupting normal target information update. Audible and visual alarms are activated if there is collision risk, a target is lost, a target transits the guard ring, in a target saturation condition, or if there is a system failure.

The DS-70 doppler speed log measures forward speeds throughout the range from 0 to 30 knots and speeds astern from 0 to 10 knots.



One of the new ARPAs from Furuno.

The DS-70 doppler speed log.

The distance run is displayed from 0 to 99,999.99 nm and may be reset by the operator to any value.

In addition to exceeding IMO, IEC and other standards, the DS-70 provides standard output signals to ARPAs, satnavs, onboard computers, and other ship's equipment. Remote displays are available and, with an optional signal distributor, a wide range of multiple signal outputs can be handled.

For complete information and free literature on Furuno's DS-70 doppler speed log,

Circle 64 on Reader Service Card

Or for further information on Furuno's new ARPA series,

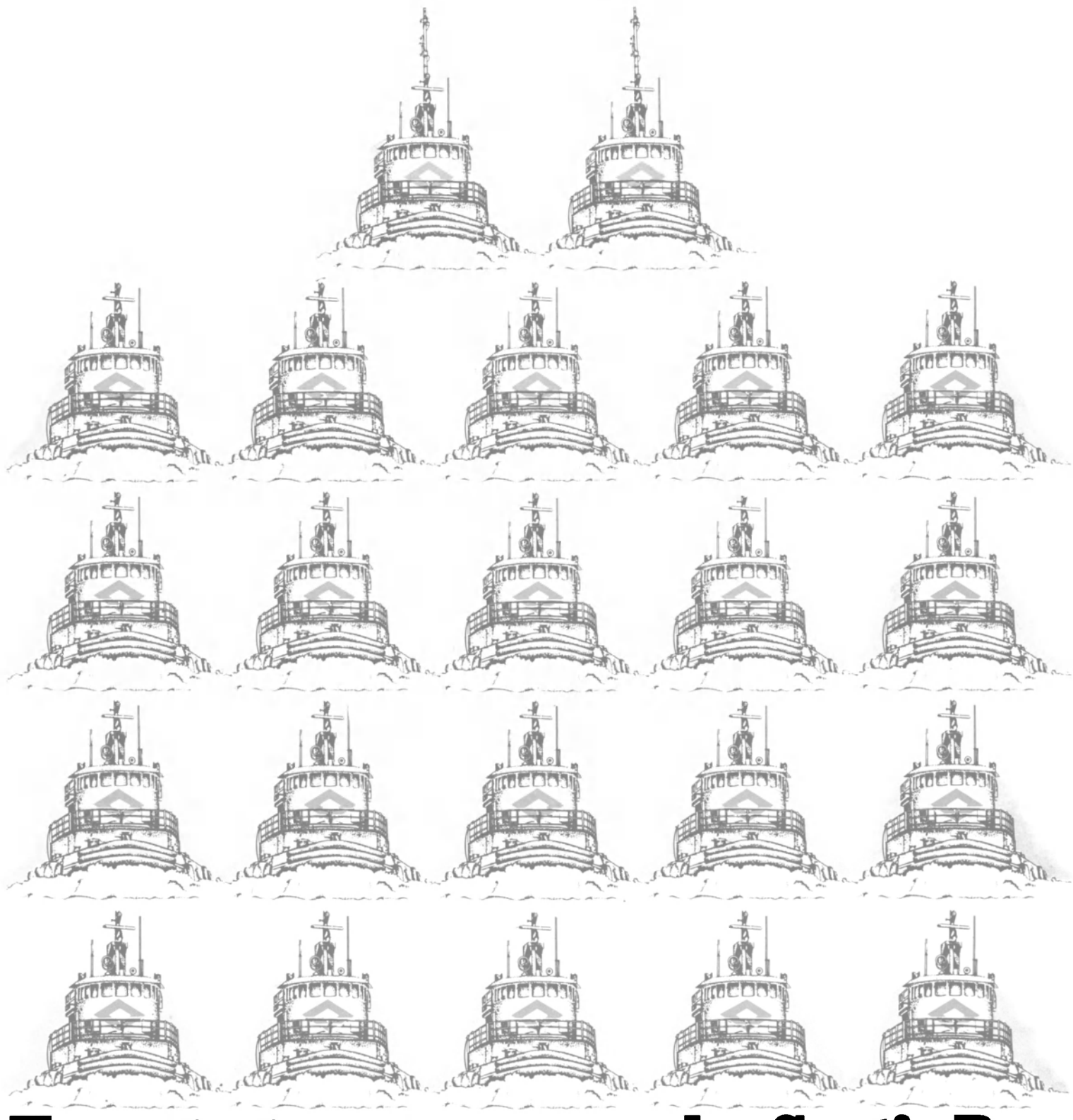
Circle 65 on Reader Service Card

Chantiers De L'Atlantique Wins LNG Tanker Design Contract

Chantiers de l'Atlantique, a unit of Alsthom's Shipbuilding Division, has been selected to design a vessel for transporting liquefied natural gas (LNG) using the LNG/LIN liquid-nitrogen liquefaction technique.

This design project included two orders, one placed to Chantiers de l'Atlantique and the other to Technip. It is part of joint efforts implemented by Elf Aquitaine Norge and Statoil for possible exploitation of gas fields off the coast of Norway.

Chantiers de l'Atlantique was chosen for its experience and reputation in the field of LNG carrier design and construction.



Twenty-two reasons why Curtis Bay is the towing choice in three major East Coast ports.

Twenty-two tugs make a powerful difference. And with over 70 years of experience plus trained, expert crews, you can be sure of time-saving (and cost-saving) efficiencies. Perhaps that's why more marine managers are saying, "When you go with Curtis Bay Towing, you have more on your side."

CURTIS BAY TOWING COMPANY

Philadelphia □ Baltimore □ Hampton Roads
Headquarters: The World Trade Center Baltimore, Suite 800, Baltimore, Maryland 21202, 301-962-6500.

...More on your side.

Since 1910

Circle 261 on Reader Service Card

Sales and marketing department of the Moran Towing & Transportation Company. Seated is vice president **W. Anthony Watt;** Standing (L to R) are: sales representatives **Karl B. Eckhardt** and **Paul J. Quinn;** and public information director **Frank Duffy.**

W. Anthony Watt Heads Sales And Marketing Division At Moran Towing

Thomas E. Moran, president of Moran Towing & Transportation Company, Inc., has announced new areas of responsibility for vice president **W. Anthony Watt.** Mr. **Watt** took over the sales and marketing division of the company. Working with Mr. **Watt** will be sales representatives **Karl B. Eckhardt, Paul J. Quinn** and public information director **Frank Duffy.**

A career executive in the maritime industry with extensive experience in shipyard management and sales, Mr. **Watt** joined Moran in 1976. He had continued as vice president of Florida Towing of Jacksonville, Fla., when that company became part of the Moran organization. In 1978, he came to the headquarters office of Moran in New York, as manager of the subsidiary company Seaboard Shipping. Moran's board of directors elected Mr. **Watt** a vice president in 1985. His last assignment for the company was in the construction and repair department.

Marinette Delivers First Of Ten Torpedo Weapons Retrievers

The first of 10 Torpedo Weapons Retrievers (TWR) under contract at Marinette Marine Corporation in Marinette, Wisc., departed the shipyard recently for delivery to the Naval Sea Systems Command in Charleston, S.C.

The TWR Class is an entirely new design developed by Marinette in cooperation with the Navy to meet stringent mission requirements. The new vessels will replace the aging TWRs now in service. They are used by the Navy for recovering spent torpedoes, missiles, small drones, and mobile targets fired during weapons systems tests of all submarines and surface combatant ships. The new TWRs will be capable of staying on station for a week in support of these tests; the smaller existing boats have to return to base at night and return to the test site the next day.

The new TWR is 120 feet long with a beam of 25 feet, depth of 12 feet, and approximate displacement of 213 tons. The vessel is all-steel construction with 2,000 bhp of propulsion power, and twin shafts driving fixed-pitch propellers. It has a design speed of 16 knots, range of 1,700 nautical miles, and accommodates up to 18 persons.

Four more of the TWRs will be ready for departure from the Marinette Marine yard prior to the 1985 closing of the St. Lawrence Seaway. The remaining five will be delivered in the spring of 1986.

Bassett Named President Of Interocean Management

Robert Bassett

The chairman of the board and chief executive officer of Interocean Management Corporation, **George P. Steele,** has announced the election of **Robert S. Bassett** as president of the company. Mr. **Basset** previously served as executive vice president and has been with Interocean Management Corporation since its founding.

Interocean Management is a managing operator of oceangoing vessels, with contracts covering a variety of vessel types including tankers, RO/ROs and crane ships. The company currently has ships under contract from major oil companies, independent owners and the Maritime Administration.

Interocean Management is headquartered in Philadelphia, with a branch office in Long Beach, Calif., to service West Coast ships.

Put your fleet on your desk . . . with the Sperry Satellite Communicator.

Reroute that ship bound for Hong Kong to pick up cargo in Singapore. Check on the position of the vessel heading for LeHavre. And while you're at it, check the fuel consumption on the new tanker.

In fleet management, cost-effective decisions depend on fast, reliable communication. The Sperry Satellite Communicator puts you in touch with every ship in your fleet in seconds, anytime, day or night. With voice clarity that's as good as your local telephone connection.

Sperry's Satellite Communicator is a compact, light-weight, communications system that can be readily installed on any ship. Passive antenna stabilization guarantees high quality communication in any weather and on highly maneuverable vessels.

You can interface the Satellite Communicator with our ruggedized Sperry personal computer, or with any on-board computer, for cost-effective message and data transmission over satellite voice channels. Add a fax machine for high quality facsimile traffic. Plug-in circuit boards in the electronics unit make it easy to expand your system.

The Sperry Satellite Communicator . . . when you need reliable, instantaneous, and secure communications between ship and shore. Between you and your fleet. Go ahead. Put your fleet on your desk. Contact Sperry Corporation, Charlottesville, VA 22906. Attn: Marketing Dept. Phone: 804-973-0100.

SPERRY

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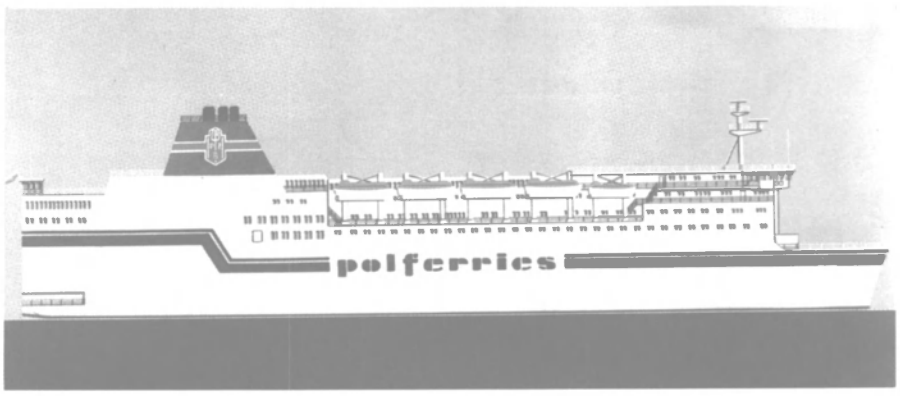
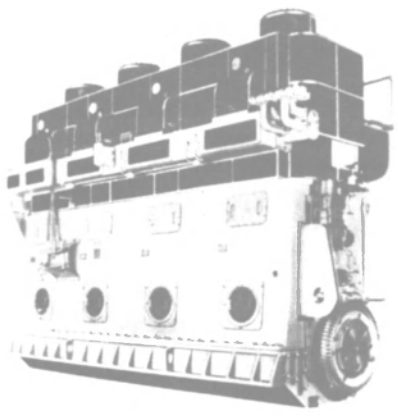


Kockums To Build Ferry With First Coal-Fired Marine Steam Engines In 30 Years

Skinner Engine Company, Erie, Pa., a subsidiary of Banner Industries Inc., has announced that the first marine steam engines specified for a coal-fired vessel in more than 30 years will soon power a Polish-owned ferry engaged in trans-Baltic service. Delivery of the engine room package is scheduled for October 1986.

David McArthur, manager for Skinner's Steam Engine Group, reported that the multimillion-dollar contract calls for two 4.0-MW multi-cylinder Skinner compound unaflow engine sets as propulsion machinery for a train/car passenger vessel. The ferry is being built by a Swedish shipyard, Kockums AB (Malmo, Sweden) for the Polish Baltic Steamship Company. The vessel will operate between Ystad, Sweden, and Swinoujacie, Poland.

He also reported that the entire engine room package will be manufactured and delivered by an Anglo-American consortium of companies, which, in addition to Skinner, includes: Romac Limited of Shoebury, Essex, UK, consortium coordinator; Senior Green Limited of Wakefield, UK, manufacturer of boilers and automated coal combustion equipment; and Peter Brotherhood Limited of Peterborough, UK, manufacturer of turbine generator sets.



Skinner Compound Unaflow Marine Steam Engine

Members of the consortium currently are engaged in negotiations with the shipyard and another Polish shipping company to produce similar propulsion systems for as many as twelve 6,700-dwt bulk carriers for coal trade.

"This order for a coal-fired ship propelled by Skinner steam engines comes on the heels of a great deal of research throughout the shipbuilding industry for a return of this dependable, efficient alternative for marine power following years of oil dependence," said Skinner president **R. Dennis Whiting.** "It is the result of concerted effort by four suppliers who have pooled their knowledge, resources and facilities.

"We believe that there is a bright future for this type of propulsion," he added, "as well as for the steam engine itself for numerous applications including biomass energy systems and cogeneration. The steam engine, once thought to be dead, is alive and well."

"This propulsion system will employ the first of a new generation of low-speed steam engines applied in a modern coal-fired setting," Mr. **McArthur** stated. "It signals a rebirth of a once-popular power source as a viable alternative for any vessel given the proper engineering and economic circumstances."

Mr. **McArthur** explained that Skinner's Compound Unaflow Marine steam engines offer superior maneuverability compared with diesel or turbine powered propulsion. Because it has no minimum continuous operating speed, full torque is available at a dead stall ahead or astern, allowing faster and more effective transfer of power to the propellers. Similarly, it enables rapid and complete reversibility for optimum response in emergency situations.

The Marine Compound engine, like most other steam engines, is highly regarded for its long life and low operating and maintenance costs. Several of the coal-fired Skinner Compounds built for vessels in Great Lakes service following World War II remain in operation today.

Mr. **McArthur** pointed out that the "proper economic circumstances" for this propulsion alternative would be found in nations with ready supplies of coal, but small or no native sources of petroleum. "Beyond the appreciable price difference between native coal and imported oil, a nation must consider the social cost of having currency spent outside the country on petroleum rather than at home on coal," he said. "That currency is likely to serve the nation far better at home. For these reasons, we believe there will be a market for coal-fired, marine steam engines in Europe, India, Africa, South America and elsewhere in the Third World."

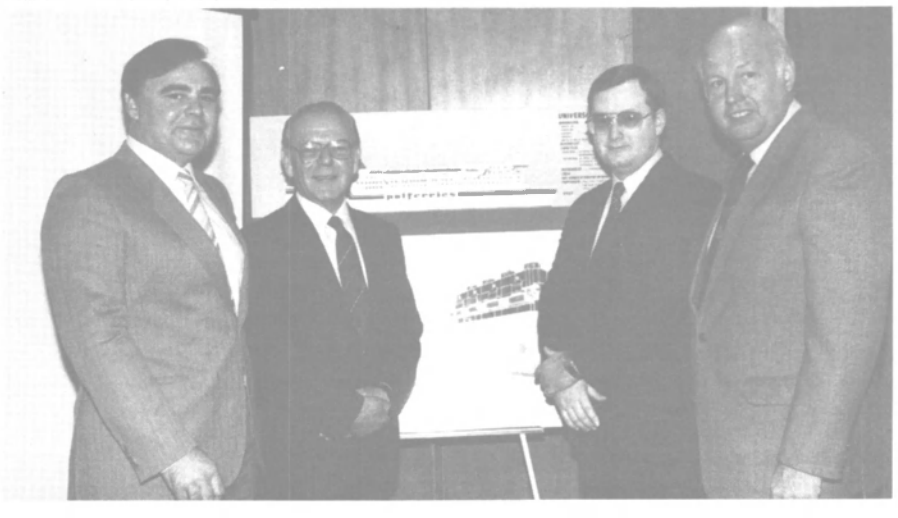
While applications of this technology for large commercial vessels will require a home port with coal handling facilities, Skinner and its associates have developed a system with dual firing boilers so that oil—although less economical—can be a standby in emergencies.

Polish shipping authorities were first approached by Romac Limited regarding this propulsion technology in 1983 when they declared an interest in building coal-fired vessels to take maximum advantage of a native energy resource.

"Since that time," said Romac's managing director **Derek McNamara**, "we have endeavored to develop a coal-fired engine room package which would prove technicallly, commercially and financially viable.

"Coal-fired turbines were considered but did not project as favorably economically as steam engines," Mr. **McNamara** noted. "Capital and

The first coal-fired marine steam engine in more than 30 years was announced in London by Skinner Engine Company, Erie, PA, and three U.K. based companies. Representing the Anglo-American consortium at the announcement were (left to right) **Gerald Wareham** of Senior Green Limited, **John Gilbert** of Peter Brotherhood Limited, **David McArthur** of Skinner and **Derek McNamara** of Romac Limited.



VESSEL FACT SHEET

Type . . . . . twin screw train/car/passenger ferry
Size . . . . . 5,000 metric tons dwt.
Length:
155 meters (overall)
145 meters (between perpendiculars)
Beam . . . . . 26 meters
Draft . . . . . 6 meters
Propulsion system:
two coal-fired 4.0-MW, multi-cylinder, Skinner Compound Uniflow Marine Steam Engines; combined shp of 10,730
Service speed . . . . . 17.7 knots
Capacities:
train deck—6 tracks, 510 meters total length (36 standard goods wagons of 14 meters each)
trailer deck—8 lanes, 800 meters total length (42 lorries of 18 meters length each)
passengers—448 persons in cabins
crew—83
maximum number of persons—600
Shipyard . . . . . Kockums AB, Malmo, Sweden
Intended service:
Trans-Baltic service between Ystad, Sweden and Swinoujacie, Poland. One round trip in 24 hours with operating interval of 7 hours at sea and 2-8 hours in port
Ownership/flag . . . . . Polish Baltic Steamship Company/Poland
Classification:
Vessel with equipment and machinery to be built to dual class under special survey of Lloyd's Register of Shipping, Baltic and North Sea Service with the symbols: +100 A1 Ferry, +LMC, UMS, movable decks, Baltic ice class 1C

also under the special survey of Polish Register of Shipping with the symbols: ★ KM, L3, 1 I, ★RPM, A24, Ferry

TECHNICAL SPECIFICATIONS
Steam Engines

Type:
Multi-cylinder, compound engine using uniflow principle (central exhaust ports) to obtain uniform direction of steam travel for a constant temperature gradient through the steam circuit
Number of engines 2
Number of cylinders 4
Diameter of high pressure cylinder . . . . 571.5 mm/22.5 in.
Diameter of low pressure cylinder . . . . 1295.4 mm/51.0 in.
Length of stroke . . 914.4 mm/36.0 in.
Ratings:
Maximum continuous rating . . . . . 4.0 MW
Shaft horsepower 5365
Propeller speed . . . . . 120 rpm
Overload, 10% for 2 hours in 24 . . . . . 4.4 MW
Shaft horsepower 5900
Steam Conditions:
Live steam pressure at engine throttling valve . . 3.13 MPa abs/440 psia
Live steam temperature at engine throttling valve . . 393° C/740° F
Condenser pressure . . 8 kPa/27 inches Hg
Normal steam consumption . . . . . 20,948 kg/hr per engine . . . . . 46,086 lbs/hr per engine
Control System Design Features:
Bridge Control; Automatic engine room control with speed setting in control room; Emergency stop from the bridge; Local manual control via control levers on the engine.

maintenance costs for turbines would have been higher. Moreover, turbines would not offer equivalent maneuverability. In particular, there would be less horsepower on demand for reversing engines.

"Working closely with Skinner, Senior Green and Peter Brotherhood, we arrived at a design concept—featuring two engines, two boilers and two turbo alternators—that met the engineering and economic criteria of both the shipyard and the ferry operators."

The major reason for selecting the Skinner Compound Marine Steam Engine is greatly reduced operating costs—chiefly due to availability of inexpensive coal—to be enjoyed during the expected 30-year life of the steam engines.

For brochures and complete information on the Skinner Compound Marine Steam Engine,

Circle 55 on Reader Service Card

COSCO And McMullen Form New Company—COSCO North America

China Ocean Shipping Company (COSCO), the national shipping company of the People's Republic of China, and Dr. **John J. McMullen,** owner of Norton, Lilly & Co., Inc., announced the formation of COSCO North America, Inc. COSCO North America, which is jointly owned by COSCO and Dr. **McMullen,** is acting as general agent for COSCO's activities in North America.

Norton, Lilly & Co., Inc., has been selected as the new company's subagent, providing agency services outside the Port of New York through its coast-to-coast network of offices.

COSCO North America, Inc., based in Secaucus, N.J., began operations last month. The new company is serving as general agent for COSCO's fortnightly containership service between China and the U.S. East Coast and Gulf Coast, and COSCO's new fortnightly container and RO/RO service between China, Hong Kong and the U.S. West Coast. The company is also providing agency service for COSCO in the Port of N.Y.

All formalities and the signing of documents for the new joint venture were completed in Beijing, China, in October by **Chen Zhong Biao,** deputy managing director of COSCO; **Liu An Lu,** senior financial manager of COSCO and chairman of COSCO North America; Dr. **McMullen,** chairman of The McMullen Group; **Chang Senchang,** president of COSCO North America; and **John H. Griffith,** chairman and president of Norton, Lilly & Co.

China Ocean Shipping Company, which is headquartered in Beijing, operates one of the largest shipping fleets in the world, with over 500 vessels. COSCO provides worldwide liner service in addition to operating bulk, tanker and passenger vessels.

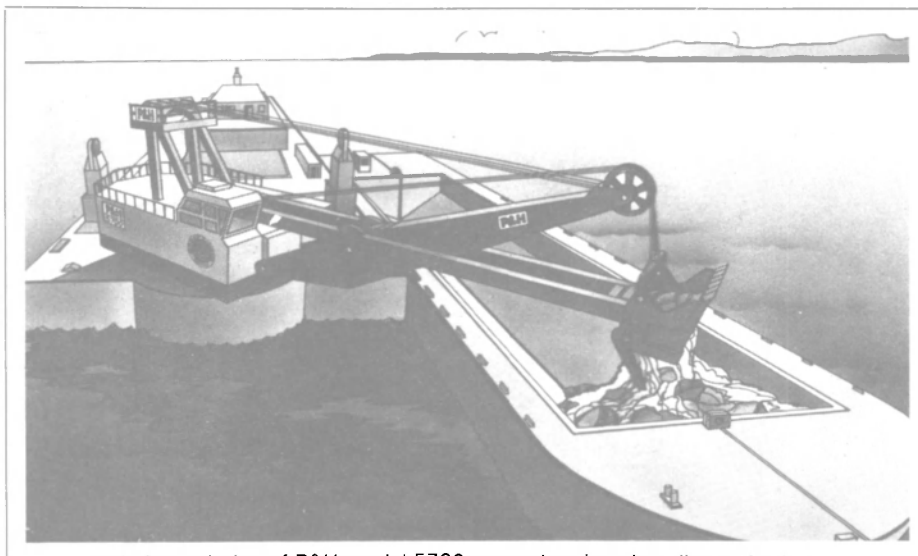
For additional information on the new company, COSCO North America,

Circle 3[illegible] on Reader Service Card

Cunard Gives $115-Million Contract To Lloyd Werft To Convert QE2 To Diesel And Alter Accommodations

A contract valued at $115 million has been awarded by Cunard Line to Lloyd Werft of Bremerhaven, West Germany, to convert the luxury liner Queen Elizabeth 2 from steam to diesel propulsion. According to Trafalgar House, Cunard's parent company, no British yard was able to tender for the contract. Cunard has insisted, however, the German yard must buy some $37 million worth of British equipment for the conversion.

The 67,000-grt QE2 will be taken out of service for six months beginning on November 1, 1986, resuming service with her new diesel propulsion plant in May 1987. The ship will be fitted with a M.A.N.-B&W diesel-electric system that will produce a service speed of about 28 knots. Cunard hopes that the new plant will provide big savings over the $28-million annual fuel costs of the steam turbine engines. In addition to the engine retrofit, passenger accommodations will be altered and crew quarters renovated.



Artist's rendering of P&H model 5700 excavator rigged as dipper dredge.

Harnischfeger To Build World's Largest Dipper/Clamshell Dredge

Harnischfeger Corporation of Milwaukee has announced that it has been awarded a contract to build the world's largest dipper/clamshell dredge for Great Lakes International Corporation of Oak Brook, Ill. The dredge will consist of a P&H 5700 electric excavator mounted on a self-propelled 220- by 75-foot hull. It will operate with either a 27-cubic-yard dipper or a 50-cubic-yard clamshell bucket for excavation of harbors and river channels. The excavator will be readily convertible from shovel configuration to clamshell boom operation for maximum versatility.

The operating weight of the 5700 excavator, excluding the hull, will be about 1,000 short tons. The unit's slewing rim (turntable) will be attached to the hull on a large adapter mounting designed by Harnischfeger using CADAM-NASTRAN computer engineering technology. This design capability not only optimized the configuration and costs of the hull adapter, but also reduced manhours significantly to speed the design process.

As a dipper dredge, the 5700 has a 92-foot shovel boom equipped with a 92-foot handle and 27-yard dipper. The boom is set at a 25-degree angle to accommodate an underwater digging depth of more than 70 feet and a maximum dumping radius of 113 feet.

The clamshell has an even more impressive working range. The 155-foot-long, lattice type boom is equipped with a 50-yard bucket that has a maximum digging depth of 150 feet below the water surface. Maximum dumping radius is 120 feet.

A pair of diesel generator sets mounted within the hull will provide power for operation of the electric excavator. Each generator will be driven by a 4,400-bhp GM Electro-Motive Division EMD20-645 diesel engine. The dredge will be controlled by a P&H Electrotorque® solid-state system. Total connected DC rated power of the electric motors aboard the 5700 is 5,625 hp.

For further information on P&H excavators,

Circle 61 on Reader Service Card

Bethlehem Steel Dedicates Its New Sabine Yard In Port Arthur, Texas

Bethlehem Steel Corporation dedicated its new Sabine Yard recently in Port Arthur, Texas.

The keynote speaker, **Walter F. Williams**, Bethlehem's president and chief operating officer, said that despite current depressed conditions in the industry, the new yard is in a good position to be profitable and to provide badly needed employment in the Port Arthur area.

The Sabine Yard is the only facility of its type in the Gulf area and its 64,000-ton-capacity drydock—one of the largest in the nation—is capable of servicing any type of mobile offshore drilling unit and production facility, as well as all types of ships.

Mr. **Williams** noted, too, that since the greenfield facility is located only eight nautical miles upstream from the anchorage at Sabine Pass and there are no bridges to restrict marine traffic, the new yard will provide easy access from and to the Gulf of Mexico.

The depth of the Sabine-Neches Ship Channel at Bethlehem's 100-acre Pleasure Island location is 40 feet. It is downriver from the Beaumont Yard which has been operated by Bethlehem since 1947.

Dignitaries from federal, state and local governments, as well as community and business leaders and union officials, took part in the dedication ceremonies for the Sabine Yard.

In addition to Bethlehem's president, other company officials participating in the dedication were **David H. Klinges**, vice president, marine construction group, **Richard E. Blackinton**, general manager of the new yard and Bethlehem's Beaumont Yard, and **Frank W. Richardson III**, manager of the Sabine Yard.

The new facility went into service on August 3, 1985, when a ship reconstructed by Bethlehem at Beaumont for the U.S. Navy's Maritime Prepositioning Ship Program utilized the yard's newly modified 64,000-ton-capacity drydock. While the ship was drydocked, its hull was cleaned and painted and a new propeller was installed. Three other ships have been serviced at the Sabine Yard since then.

The dedication climaxed a series

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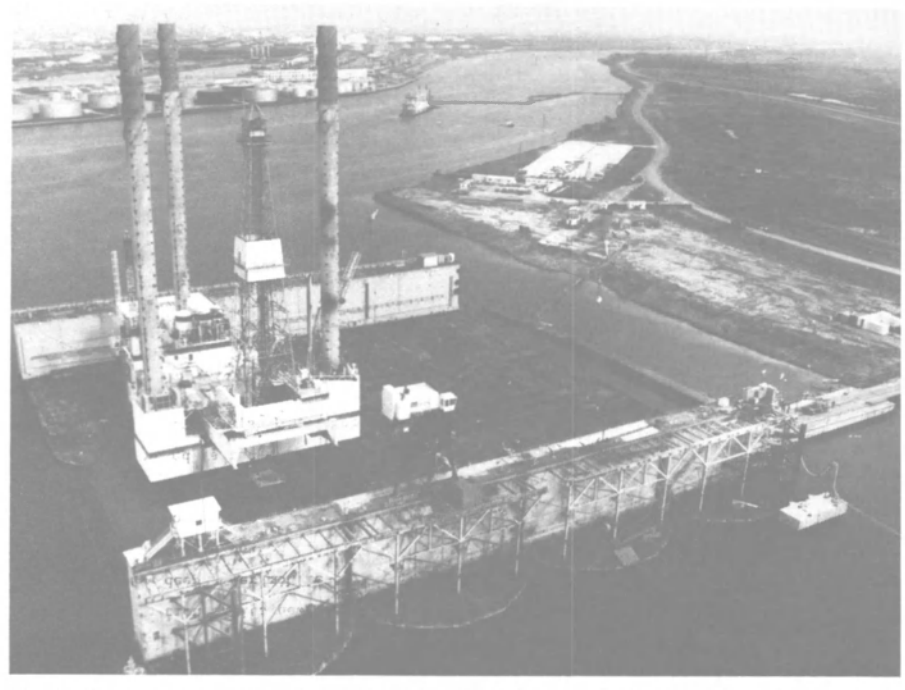

The Sabine V, which provided an appropriate backdrop for Bethlehem Steel Corporation's dedication of its new Sabine Yard, became the first deepwater mobile offshore drilling unit in the world ever to be docked on a floating drydock. The Sabine V, a 200-foot jackup, underwent minor repairs and inspection during its brief visit to the yard. The floating drydock is one of the nation's largest and is the only one in the world that can be configured in either a ship mode or a rig mode. The dedication ceremony was held on the drydock and during the program guests boarded the drilling rig for a tour of its facilities.

Bethlehem Dedicates

For oil rigs, the sections can be

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Norton, Lilly & Co., Inc., has been selected as the new company's subagent, providing agency services outside the Port of New York through its coast-to-coast network of offices.

COSCO North America, Inc., based in Secaucus, N.J., began operations last month. The new company is serving as general agent for COSCO's fortnightly containership service between China and the U.S. East Coast and Gulf Coast, and COSCO's new fortnightly container and RO/RO service between China, Hong Kong and the U.S. West Coast. The company is also providing agency service for COSCO in the Port of N.Y.

All formalities and the signing of documents for the new joint venture were completed in Beijing, China, in October by **Chen Zhong Biao,** deputy managing director of COSCO; **Liu An Lu,** senior financial manager of COSCO and chairman of COSCO North America; Dr. **McMullen,** chairman of The McMullen Group; **Chang Senchang,** president of COSCO North America; and **John H. Griffith,** chairman and president of Norton, Lilly & Co.

China Ocean Shipping Company, which is headquartered in Beijing, operates one of the largest shipping fleets in the world, with over 500 vessels. COSCO provides worldwide liner service in addition to operating bulk, tanker and passenger vessels.

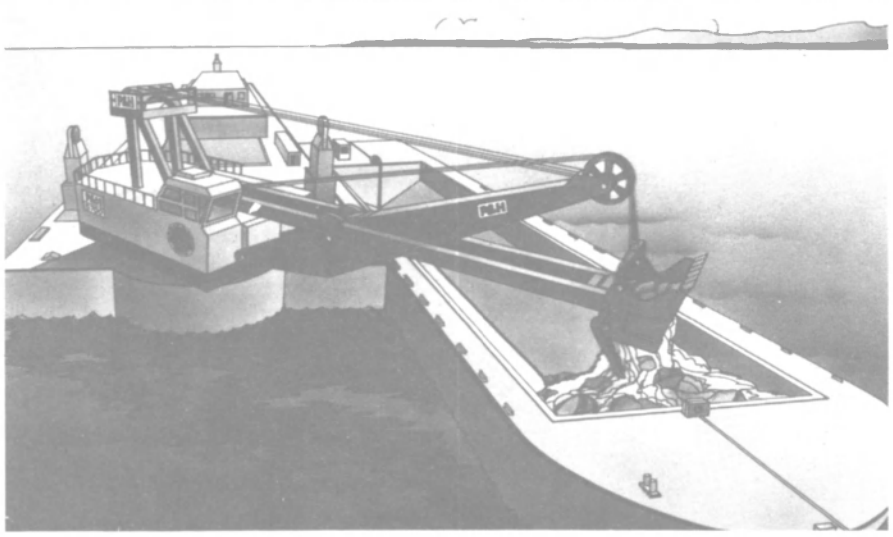
For additional information on the new company, COSCO North America,

Circle 30 on Reader Service Card

Cunard Gives $115-Million Contract To Lloyd Werft To Convert QE2 To Diesel And Alter Accommodations

A contract valued at $115 million has been awarded by Cunard Line to Lloyd Werft of Bremerhaven, West Germany, to convert the luxury liner Queen Elizabeth 2 from steam to diesel propulsion. According to Trafalgar House, Cunard's parent company, no British yard was able to tender for the contract. Cunard has insisted, however, the German yard must buy some $37 million worth of British equipment for the conversion.

The 67,000-grt QE2 will be taken out of service for six months beginning on November 1, 1986, resuming service with her new diesel propulsion plant in May 1987. The ship will be fitted with a M.A.N.-B&W diesel-electric system that will produce a service speed of about 28 knots. Cunard hopes that the new plant will provide big savings over the $28-million annual fuel costs of the steam turbine engines. In addition to the engine retrofit, passenger accommodations will be altered and crew quarters renovated.



Artist's rendering of P&H model 5700 excavator rigged as dipper dredge.

Harnischfeger To Build World's Largest Dipper/Clamshell Dredge

Harnischfeger Corporation of Milwaukee has announced that it has been awarded a contract to build the world's largest dipper/clamshell dredge for Great Lakes International Corporation of Oak Brook, Ill. The dredge will consist of a P&H 5700 electric excavator mounted on a self-propelled 220- by 75-foot hull. It will operate with either a 27-cubic-yard dipper or a 50-cubic-yard clamshell bucket for excavation of harbors and river channels. The excavator will be readily convertible from shovel configuration to clamshell boom operation for maximum versatility.

The operating weight of the 5700 excavator, excluding the hull, will be about 1,000 short tons. The unit's slewing rim (turntable) will be attached to the hull on a large adapter mounting designed by Harnischfeger using CADAM-NASTRAN computer engineering technology. This design capability not only optimized the configuration and costs of the hull adapter, but also reduced manhours significantly to speed the design process.

As a dipper dredge, the 5700 has a 92-foot shovel boom equipped with a 92-foot handle and 27-yard dipper. The boom is set at a 25-degree angle to accommodate an underwater digging depth of more than 70 feet and a maximum dumping radius of 113 feet.

The clamshell has an even more impressive working range. The 155-foot-long, lattice type boom is equipped with a 50-yard bucket that has a maximum digging depth of 150 feet below the water surface. Maximum dumping radius is 120 feet.

A pair of diesel generator sets mounted within the hull will provide power for operation of the electric excavator. Each generator will be driven by a 4,400-bhp GM Electro-Motive Division EMD20-645 diesel engine. The dredge will be controlled by a P&H Electrotorque® solid-state system. Total connected DC rated power of the electric motors aboard the 5700 is 5,625 hp.

For further information on P&H excavators,

Circle 61 on Reader Service Card

Bethlehem Steel Dedicates Its New Sabine Yard In Port Arthur, Texas

Bethlehem Steel Corporation dedicated its new Sabine Yard recently in Port Arthur, Texas.

The keynote speaker, **Walter F. Williams**, Bethlehem's president and chief operating officer, said that despite current depressed conditions in the industry, the new yard is in a good position to be profitable and to provide badly needed employment in the Port Arthur area.

The Sabine Yard is the only facility of its type in the Gulf area and its 64,000-ton-capacity drydock—one of the largest in the nation—is capable of servicing any type of mobile offshore drilling unit and production facility, as well as all types of ships.

Mr. **Williams** noted, too, that since the greenfield facility is located only eight nautical miles upstream from the anchorage at Sabine Pass and there are no bridges to restrict marine traffic, the new yard will provide easy access from and to the Gulf of Mexico.

The depth of the Sabine-Neches Ship Channel at Bethlehem's 100-acre Pleasure Island location is 40 feet. It is downriver from the Beaumont Yard which has been operated by Bethlehem since 1947.

Dignitaries from federal, state and local governments, as well as community and business leaders and union officials, took part in the dedication ceremonies for the Sabine Yard.

In addition to Bethlehem's president, other company officials participating in the dedication were **David H. Klinges**, vice president, marine construction group, **Richard E. Blackinton**, general manager of the new yard and Bethlehem's Beaumont Yard, and **Frank W. Richardson III**, manager of the Sabine Yard.

The new facility went into service on August 3, 1985, when a ship reconstructed by Bethlehem at Beaumont for the U.S. Navy's Maritime Prepositioning Ship Program utilized the yard's newly modified 64,000-ton-capacity drydock. While the ship was drydocked, its hull was cleaned and painted and a new propeller was installed. Three other ships have been serviced at the Sabine Yard since then.

The dedication climaxed a series

(continued)

The Sabine V, which provided an appropriate backdrop for Bethlehem Steel Corporation's dedication of its new Sabine Yard, became the first deepwater mobile offshore drilling unit in the world ever to be docked on a floating drydock. The Sabine V, a 200-foot jackup, underwent minor repairs and inspection during its brief visit to the yard. The floating drydock is one of the nation's largest and is the only one in the world that can be configured in either a ship mode or a rig mode. The dedication ceremony was held on the drydock and during the program guests boarded the drilling rig for a tour of its facilities.

C-2000

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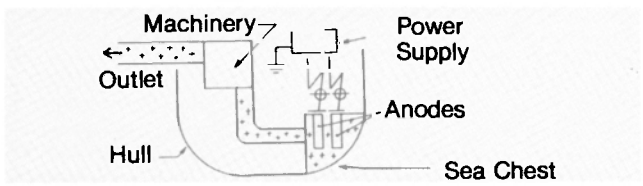
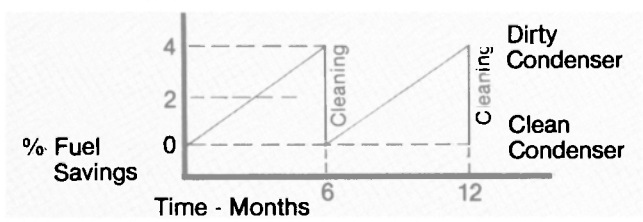
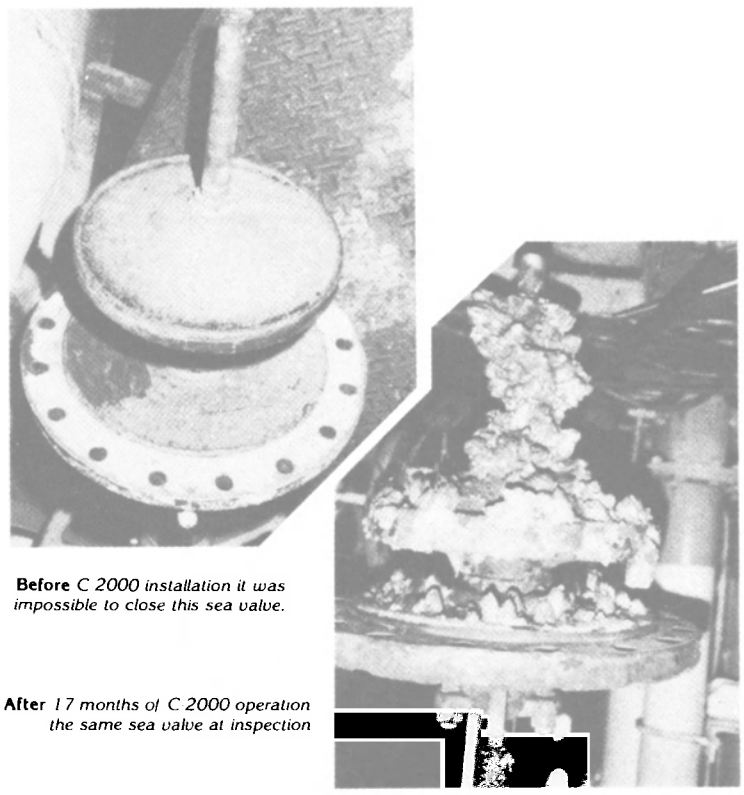


Simple, low cost C 2000 system emits, non-toxic, metallic ion products into sea water entering vessel. Virtually eliminates accumulation of marine growth. . . minimizes corrosion inside piping.

ANTI-FOULING SYSTEM



In steam applications C 2000 saves 2% average in fuel costs and can save up to 5X the systems cost in annual fuel savings.



Before *C 2000 installation it was impossible to close this sea valve.*

After *17 months of C 2000 operation the same sea valve at inspection*

Here's Why 16 Navies Worldwide and Major Oil, Cargo and Cruise Fleets Have Installed C-2000 Systems:

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- Reduces seawater piping renewals during dry docking or at sea
- Reduces power loss and overheating of diesels from heat exchanger and charge-air cooler blockages
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For technical information and systems quotations contact:

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MIAMI, FL. 33173 | TEL· (305)
TELEX 49-49668 | 279-7304

Circle 140 on Reader Service Card

Bethlehem Dedicates

(continued)

of events which got underway more than a year before. In the interim Bethlehem had acquired use of the U.S. Navy surplus drydock—a self-sustained floating shipyard—constructed ancillary facilities for the drydock and dredged a portion of the ship channel to a depth of 60 feet to accommodate the drydock. Also, Bethlehem built office and equipment repair facilities and relocated two miles of a state highway which ran through the Sabine Yard property.

The drydock had been berthed in Hawaii for more than 40 years when it was towed earlier this year to the Beaumont Yard for modification and reactivation work—a 14,000-mile journey.

After several months at Beaumont, the sections were towed to the Sabine Yard and assembled into the ship configuration mode in mid-July.

For oil rigs, the sections can be arranged in two side-by-side batteries. This configuration provides a clear docking area of 414 feet by 362 feet. To accommodate drillships or other types of vessels, such as the four ships drydocked during the summer and early fall, the sections were lined up in tandem for a clear docking area of 829 feet by 122 feet.

Lease and operational documents between Bethlehem and the City of Port Arthur, owner of the Pleasure Island property, and the Port of Port Arthur, owner of the drydock, were signed in November 1984.

Ownership of the drydock was transferred from the U.S. General Services Administration to the State of Texas to the Port of Port Arthur. The port allows Bethlehem to use it through an operating agreement approved by the federal agency and the port authority.

For further information on Bethlehem Steel,

Circle 69 on Reader Service Card

Totem To Acquire Controlling Interest In Interocean Steamship Corp.

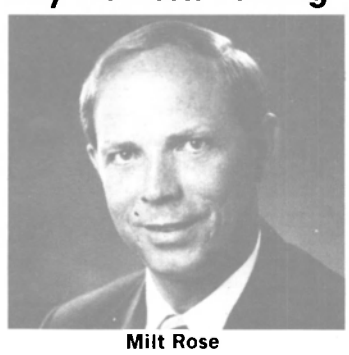
W. J. Amoss Jr., president of Lykes Bros. Steamship Co., Inc. and **Stanley H. Barer**, chairman of Totem Resources Corporation of Seattle, Wash., jointly announced that an agreement in principle had been reached for the acquisition by Totem Resources Corporation of controlling interest in Interocean Steamship Corp., a Florida corporation which is the parent of Lykes Bros. Steamship Co., Inc. The senior management of Lykes Steamship will continue their financial interest in Interocean.

Totem Resources Corporation (TRC) is a privately owned company and the parent of Totem Ocean Trailer Express Company, Inc. ("TOTE") which operates American-flag high-speed roll-on/roll-off liner vessels between the Pacific Northwest and Alaska. Lykes Bros. Steamship Co., Inc. operates a fleet of 32 American-flag vessels serving five continents and ports on the U.S. Gulf, West Coast, South Atlantic Coast and Great Lakes and in the St. Lawrence Seaway.

"It is hoped that negotiations can be finalized along with fulfillment of certain conditions and necessary regulatory approvals by year end," Mr. **Amoss** said.

Mr. **Barer** said: "Our acquisition will substantially broaden and increase TRC's investment in the future of the American-flag Merchant Marine. We believe in that future and that Lykes is ideally positioned to enhance its transportation activity in both the Pacific and Atlantic."

Milt Rose Named VP At Bay-Houston Towing



Milt Rose

The appointment of **Milt Rose** as vice president-Marine Division of Bay-Houston Towing Co. was recently announced by **Cecil R. Haden,** president.

Formerly with Zapata Gulf Marine Corporation and responsible for its operations in Central and South America, Mr. **Rose** will direct the activities of Bay-Houston's harbor, offshore and coastwise towing fleet.

Facet Acquires Fram Filter Facility—Renamed Quantek —Literature Available

The Fram Industrial Filter Corporation facility in Tulsa, Okla., has become a wholly owned subsidiary of Facet Enterprises, Inc., and will be part of the company's Industrial Filtration Division, according to an announcement by **James R. Malone,** Facet president and chief executive officer. The purchase was part of an acquisition by Facet which included three of Fram's industrial filter manufacturing and marketing operations in Europe.

The new facility, which had been renamed Quantek, designs, manufactures and markets coalescing plate separators and packaged industrial filtration systems used for the separation and recovery of oil and solids from oil/water mixtures.

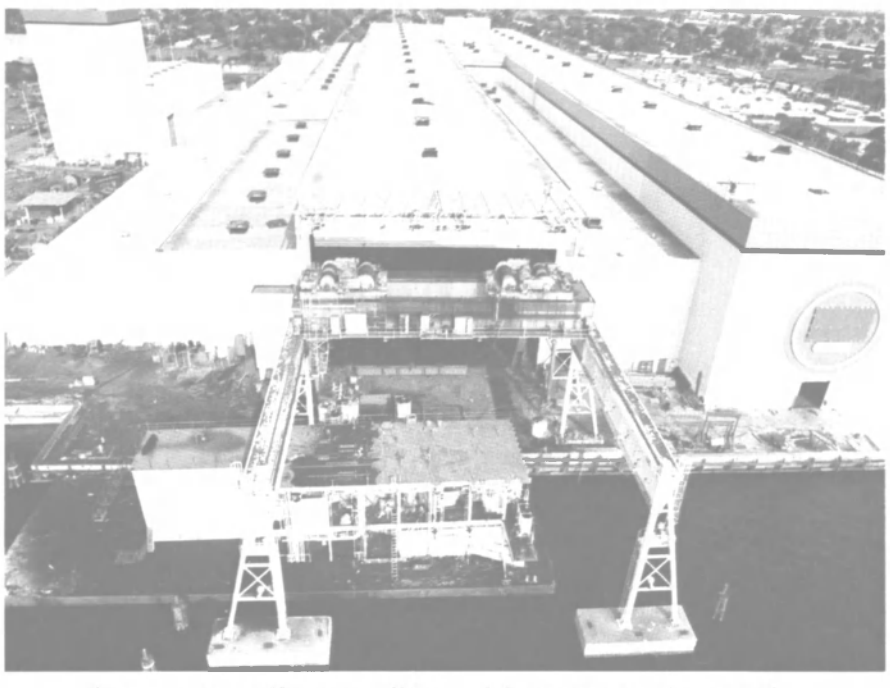
For further information on Quantek and its products,

Circle 29 on Reader Service Card

A DISTINCTIVE SHIP

The second vessel of five, 615′, 30,000 DWT T-5 Product Tankers shown underway on her maiden voyage on September 12, 1985. The M/V Gus W. Darnell incorporates the new generation of hull lines and efficient operating economy. Three vessels have been delivered and the final two ships are under construction at the Tampa shipbuilding facility.

A DISTINCTIVE SHIPYARD



The fabrication facility—11 acres under roof with a 700 ton bridge crane.

The erection & assembly building—600′ x 145′ x 115′ with three-250 ton bridge cranes—spans 350′ of Dry Dock No. 4.

TAMPA SHIPYARDS INCORPORATED

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Circle 205 on Reader Service Card

OUTSTANDING OCEANGOING SHIPS OF 1985

A roundup of some of the most notable vessels delivered by shipyards during 1985—selected for their outstanding design features, fuel efficiency, performance, and service characteristics.

PHOTOS: (Clockwise, starting top left) The Nosac Express, sistership of the **Nosac Tasco** constructed at Daewoo Shipbuilding—page 37. The **Probo Biakh** built by Hyundai—page 41. The **Idemitsu Maru** built by Ishikawajima Harima—page 28. The **Golden Queen** constructed by Mitsubishi—page 27.

AMERICAN OHIO
Samsung Shipbuilding

Samsung Shipbuilding and Heavy Industries Company of South Korea recently delivered the 35,900-dwt containership American Ohio to First American Bulk Carrier Corporation of Washington, D.C. The new vessel and a sister ship, American Georgia, were built through financing by the pension fund of the National Marine Engineers Beneficial Association, and have been chartered to United States Lines. They will be used, along with three Odense-built containerships chartered from Crowley Maritime, on USL's service to and from South America on the routes acquired with the purchase of Delta Lines.

The American Ohio has an unconventional asymmetric stern whose performance and economy has been proven in more than a year's operation of the Humboldt Express and Cordillera Express that Samsung's Koje shipyard delivered last year to Hapag Lloyd. In addition to providing excellent maneuverability and seakeeping properties, the asymmetric stern is said to provide fuel savings of some eight percent at a service speed of 19.1 knots, a cost reduction of about $360,000 per year.

The new containership has an overall length of about 675.8 feet, beam of 105.6 feet, depth of 61.7 feet, and maximum draft of 37.7 feet. Main propulsion is provided by a Hyundai/Sulzer 6RTA76 diesel engine with maximum continuous rating of 19,740 bhp at 95 rpm, driving a SMM 5-bladed fixed propeller via Kobe Steel shafting. Electric power is supplied by three 1,470-kw generators driven by Daihatsu 6DL-32 diesels.

The container loading capacity of the vessel is 552 FEUs plus 16 TEUs, or 1,120 TEUs in holds and 1,291 TEUs (including some empties and reefer containers) on the basis of five tiers on deck—a total maximum capacity of 2,411 TEUs. Electric outlets for 308 reefer containers are provided on the upper deck.

Ten container holds have cellular guides for 40-foot-box stowage except for forward in No. 1 hold that is fitted with 20-foot cell guides, and the No. 10 hold that can accommodate 20-foot or 40-foot containers. Underdeck passageways are provided on the upper deck and second deck for easy and safe personnel transit between living quarters or the engine room and the forecastle.

The American Ohio has been built to American Bureau of Shipping classification +A1(E), +AMS, +ACCU, and meets all the rules and regulations of the U.S. Coast Guard and Maritime Administration for a U.S.-flag vessel. Accommodations are outfitted to the highest standard, with single cabins and private lavatories provided for a crew of 25.

The spacious bridge is designed for convenience of navigation and best visibility. Complete navigation

and communications equipment is installed, including radars, echo sounder, Decca Navigator, Loran C, satellite navigator, and weather facsimile. The underwater hull is coated with self-polishing antifouling supplied by International Paint (Korea).

AMERICAN OHIO
Major Suppliers

Main engine	Hyundai/Sulzer
Engine controls	Sulzer
Propeller	SMM
Shaft	Hyundai/Kobe
Steering gear	Mitsubishi
Bow thruster	Nagasima
Windlass & mooring winches	Norwinch-SHI
Boiler plant	Aalborg
Generators	Taiyo
Generator engines	Daihatsu
FW generator, plate coolers, purifiers	Nagase-Alfa
Main switchboard, distribution boards, motor starters	Terasaki
Air conditioning plant	Hi-Press
Valve remote controls	Pleiger
Lifeboats	MASECO
Coatings	International Paint Korea
Accommodation panel	Blohm + Voss
Radars	Kelvin Hughes
Radio plant	ITT
Autopilot & gyrocompass	Hokushin
Satnav system	Magnavox

ASAKASAN MARU
Mitsui

The 197,060-dwt ore carrier Asakasan Maru, built at the Chiba Works of Mitsui Engineering & Shipbuilding Company (MES), was delivered early this year to joint owners Mitsui O.S.K. Lines and Sawayama Kisen Kaisha. The big bulker has an overall length of about 984 feet, beam of 164 feet, depth of 79 feet, and full-load draft of 58.5 feet. She is powered by a slow-speed Mitsui/B&W 7L80MCE diesel engine with a maximum continuous rating of 20,700 bhp at 80.8 rpm. On sea trials the ship attained a speed of 16.35 knots.

A special feature of the new ore carrier is the superstructure located aft, which is shaped like a compact, streamlined tower. Such tower-shaped superstructures have been used by MES in the past for only four ships—three tankers built in 1965 for Fred Olsen of Norway and another in 1968 for Anders Wilhelmsen & Company, also of Norway. Reflecting the current trend for increasing the energy efficiency in ships, use of this unusual superstructure to reduce air resistance is now attracting renewed interest.

A Mitsui ATG-V turbogenerator system (mixed-pressure turbine system) is installed for maximum utilization of the waste heat of the main engine exhaust. The ship is also equipped with a thyrister convertor-invertor type shaft generator that can be used as an emergency propulsion motor, and a power management system for most effective utilization of the turbogenerator's output.

Other energy-saving features include a Mitsui Integrated Duct Propeller, a reaction rudder, and extensive use of high-tensile steel in the hull structure to reduce weight. The exterior hull bottom and waterline areas are coated with self-polishing antifouling paint.

Windlasses, mooring winches, and deck washing equipment are fitted with remote control systems with a view to reducing the crew's workload. The engine control room and cargo control room are integrated for more performance of the duties of both. The main engine room is designed for unmanned operation, and has obtained NK's "MO-A" notation.

EASTERN SUN
Jeffboat

Jeffboat, Incorporated, of Jeffersonville, Ind., at mid-year delivered the motor tanker Eastern Sun to Sun Refining & Marketing Company of Aston, Pa.

The 2,500-dwt product carrier was designed to carry clean petroleum and lube oil products for the U.S. Eastern Seaboard. This new generation of coastal tankers not only enables the operator to service restricted terminals and limited-draft accesses, but concurrently op-

(continued)

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Outstanding Oceangoing Vessels of 1985

(continued)

erate safely and reliably in open ocean trade.

The new vessel has an overall length of 280 feet, beam of 45 feet, and design draft of 16.5 feet. She is powered by two GM Electro-Motive Division 8-645E7C diesel engines developing a total of 2,900 bhp, driving Lips propellers via Reintjes WAV 1450 reverse/reduction gears with WABCO controls. Two Detroit Diesel 8V71 engines drive 120-kw International Electric generators for ship's service electrical power. Compressed air for starting the main and auxiliary engines is provided by two Quincy D325 air compressors.

The 25,700-barrel capacity of the Eastern Sun is handled by three Goulds deepwell and one Sier Bath self-priming cargo pumps. These are driven by Detroit Diesel 8V71 engines. The cargo pump engines are located in a heated deck machinery room, providing effective weather and sea protection.

To gain substantial economic benefits of reduced manning, the new tanker was designed to full unattended engine room requirements (the American Bureau ACCU notation), with automation equipment provided by Harbor Marine Engineering.

Mooring operations are accomplished through the use of deck machinery powered by a central hydraulic system. Redundant hydraulic pumps are driven by front power takeoffs attached to the cargo pump engines. A hydraulic fixed-boom crane is provided for cargo hose handling. In addition to the dual-wildcat anchor windlass, two mooring winches and a vertical capstan are installed for handling lines, all provided by New England Trawler.

Navigation and communications aids and controls include two Raytheon Marine Pathfinder radars, electric autopilot and steering control system, and fully automatic Loran C and RDF equipment, as well

Manitou—Paul Lindenau (page 36).

EASTERN SUN
Major Suppliers

Main engines (2)	Electro-Motive	Sewage treatment plant	Hamworthy
Reduction gears (2)	Reintjes	Capstan-windlass & mooring winches	New England Trawler
Propellers	Lips	Steering gear	Frydenbo
Main engine automation	Harbor Marine	Hydraulic power units	Hydura/Detroit
Generators	Detroit/Int'l Electric	Radars, Loran C, SSB & VHF radios	Raytheon
Cargo pumps/gears	Goulds/Amarillo	Fathometer	Simrad
LO cargo pump	Sier-Bath	Automatic RDF	Furuno
Cargo pump engines	Detroit	Autopilot	Anschuetz
Fire, bilge, & GS pumps	Hamworthy	S-P telephones	Hose-McCann
Emergency genset	Detroit/Delco	Halon system	Ansul
Switchboard	Continental	Machinery vent fans	Hortzell
Air compressors	Quincy	Searchlight	Carlisle & Finch
Air conditioning	Carrier		

as Raytheon SSB and VHF radiotelephones.

The Eastern Sun was designed by Sun Refining & Marketing in conjunction with J.J. Henry Co., Inc. of New York. She is classed by the American Bureau of Shipping +Al, Oil Carrier, +AMS, ACCU.

GOLDEN QUEEN
Mitsubishi

The 7,918-dwt chemical tanker Golden Queen, built at the Shimonoseki Shipyard & Engine Works of Mitsubishi Heavy Industries, Ltd. in Japan, was delivered in April this year to Kyoei Kisen Company of Tokyo. She is expected to operate in worldwide service, including the Great Lakes and Mediterranean areas. The parcel tanker is fully equipped in accordance with the IMO Chemical Code to carry 132 kinds of cargoes, including petroleum products, safely, reliably, and efficiently.

The vessel has an overall length of 357 feet, beam of 58.4 feet, depth of 58.4 feet, and design draft of 25.6 feet. Her main propulsion engine is a Mitsubishi UE 6UEC45HA diesel with a maximum output of 6,000 bhp at 185 rpm; normal output is 5,400 bhp at 179 rpm, producing a service speed of 13.7 knots. A pressurized fuel oil supply system enables the main engine to operate on heavy fuel of up to 5,000 sec Redwood 1. The machinery installation, equipped for automation to satisfy the MO requirement of Nippon Kaiji Kyokai, is designed to permit the main engine, generators, and engine room auxiliaries to be controlled and monitored remotely from the engine control room. In order to safely navigate narrow channels and harbors, the vessel is equipped with a controllable-pitch propeller and a Mitsubishi/KaMeWa bow thruster.

Cargo space is partitioned by two longitudinal bulkheads and several transverse bulkheads. Center tanks are built of stainless steel, without interior frame members in order to facilitate cleaning. Arrangement and frame members of the wing tanks, which are built of mild steel coated with inorganic zinc paint, also give full consideration to the cleaning requirements. Each tank is served by a separate pump and cargo line so that various cargoes can be handled simultaneously, free from contamination. The cargo control room is equipped to facilitate quick and accurate control of cargo handling and monitoring, while reducing the crew's workload. An MHI loading computer is provided to calculate not only the stability and longitudinal strength of the vessel but also the stability when damage occurs under any given loading condition.

Features incorporated in the design of the accommodation space include: the engine casing is separated from the living space to eliminate engine room noise; a floating floor construction is used in the control room and accommodation area; a skewed propeller is used to reduce vibration; and hydraulic power units are installed in the forecastle away from the living quarters.

HOLIDAY
Aalborg

The 46,052-grt luxury cruise liner Holiday was delivered this year by Aalborg Werft in Denmark to Carnival Cruise Lines Inc. of Panama. Designed and built as a steel-hulled, twin-screw/rudder passenger ship, she has a raked stem, transom stern, bulbous bow, bow and stern thrusters, and fin stabilizers.

The new liner has an overall length of 727 feet, beam of 92 feet, depth to upper deck of 69 feet, and design draft of 24.6 feet. A total of 716 standard cabins are arranged on decks 4, 5, 6, and 7, and 10 deluxe verandah suites are located on deck 11 forward. Total passenger capacity is 1,794, and she carries a crew of 646 persons.

Propulsion is provided by two low-speed Sulzer 7RLB66 diesel engines with integral thrust bearings, each coupled directly to KaMeWa controllable-pitch propellers having a highly skewed blade design. The main engines each have a maximum continuous rating of 15,770 bhp at 140 rpm.

(continued)

Outstanding Oceangoing Vessels of 1985

(continued)

The Siemens propulsion control system, which includes automatic main engine overload control as well as an engine load increase feature, incorporates different operating modes, including: constant-speed operating mode at 136 rpm for shaft alternator operation; and two combination operating modes—one thrust mode and one pitch mode—where the engine speed, propeller thrust, and propeller pitch are controlled according to a pre-established curve.

At sea, the ship will normally operate in the constant-speed mode at 136 rpm, and the shaft-driven alternators will feed the main switchboard. As it is not the intention to run the two shaft alternators in parallel, the main switchboard is capable of being operated in a "split" mode by means of a section breaker on the bus bar. In this mode each alternator will feed half of the main switchboard.

The vessel's hull form has been developed to give good propulsion and seakeeping performance with due regard to the large propeller tip clearance requirements at the various design conditions. The lines have been designed to give the smallest possible resistance, with the bulbous bow designed for a draft of 24.6 feet and optimized for a service speed of 19.5 knots.

Except for certain parts of the public spaces, where special features are introduced, Dampa continuous ceiling systems consisting of prestressed, baked enamel, steel/aluminum panels, are used throughout the accommodations. Sound-absorbing decks consisting of mineral wool slabs with steel tops are installed in the crew accommodations above the engine rooms as well as below the bandstand and dance floors to provide maximum insulation against noise.

The Holiday is a typical example of the ships produced by the Ship Division of Aalborg Vaerft—a highly complex passenger vessel of the most advanced design and comprising the latest technology, purpose-built to insure full compatability with the requirements of the owner.

HOLIDAY
Major Suppliers

Main engines (2)	Sulzer
Engine controls	Siemens
Propellers (2) & thrusters (4)	KaMeWa
Steering gear	Frydenbo
Stabilizers	HDW
Alternators (5)	Siemens
Alternator diesels (3)	Wartsila-Vasa
Power takeoffs (2)	Lohmann & Stolterfoth
Switchboards	Merlin Gerin
Oil-fired boilers (2)	Aalborg
Distilling plant	Atlas
Air conditioning plant	Semco
Compressors	McQuay
Sprinkler & alarm system	Semco
Halon system	Wormald
Deck machinery	Norwinch
Anchors	SPEK
Side doors	Aalborg
Watertight doors	Schroder
Windows	Harndrup
Elevators	Dan
Lifeboats	Harding
Life rafts	Nordisk
Radars (3), Loran C, facsimile recorder, speed log	Raytheon
SatNav system	Magnavox
Radio direction finder	Furuno
Gyrocompass, autopilot, & magnetic compass	Plath
Steering controls, rudder indicator	EMRI
Communications equipment	Sailor
TV & PA systems	Phillips
Coatings	International

IDEMITSU MARU
Ishikawajima-Harima

The 258,090-dwt, super-energy-saving very large crude carrier Idemitsu Maru was delivered recently by Ishikawajima-Harima Heavy Industries Company's Kure Shipyard to Idemitsu Tanker Company of Tokyo.

The big tanker has an overall length of 1,058 feet, beam of 196.85 feet, depth of 94.5 feet, and maximum draft of about 63 feet. Propulsion is provided by a low-speed IHI/Sulzer 8RTA84 diesel engine with a maximum continuous rating of 23,500 bhp at 65 rpm and normal rating of 21,150 bhp at 62.5 rpm. On

sea trials, this latest model of the Sulzer design achieved a fuel oil consumption rate of 117.5 grams per brake horsepower hour.

The Idemitsu Maru was designed and equipped with the latest energy-saving features, and is operated with a reduced crew of only 16 persons. IHI's LV (Low Viscosity) hull form minimizes resistance by improved design, and the bulbous open stern lowers the thrust reduction and increases wake gain by improved stern hull form design. The low propeller speed of 65/62.5 rpm improves propeller efficiency and reduces required propulsion power.

The IHI SSG-MK III (Super-Economical Shaft Generator System) saves fuel by generating electric power either by feeding steam from an exhaust gas economizer to a turbogenerator, or by a shaft generator system taking power off the propeller shaft. The IHI Electric Differential Epicycle Drive can control generator frequency within the allowable range against the change in main engine output between 40 and 90 percent of mcr.

The ship is equipped with an IHI Navigationmate, an automatic navigation system with digital chart navigation combined with Loran C and NNSS. Navigation, machinery, radio, and cargo and ballast operations are centrally controlled from the bridge. TV cameras monitor the engine room and cargo manifolds, and the deck machinery is fitted with a central hydraulic system with remote operation. A sequential remote control system for warm-up of the cargo pumps includes remote start and stop operation.

The tanker's segregated ballast tank capacity is sufficient for safe navigation even in rough sea conditions without filling the cargo oil tanks with ballast water. The exterior hull is coated with self-polishing antifouling paint.

IDEMITSU MARU
Major Suppliers

Main engine	IHI/Sulzer
Auxiliary boiler, exhaust gas economizer, shaft generator turbine, deck machinery, inert gas system, & Navigationmate	IHI
Steering gear	Kawasaki
Auxiliary diesels	Daihatsu
Diesel & shaft generators	Nishishiba
Main switchboard	Terasakiu
Cargo oil pumps	Shinkokinzok
Radar & ARPA	JRC
Gyrocompass & autopilot	Tokyokeiki
Data logger	Terasaki

ISOLDE

Kockums

The pure car/truck carrier Isolde has been delivered by Kockums AB of Malmo, Sweden, to Wallenius Lines of Stockholm. With a capacity of 6,230 passenger cars and 540 heavy vehicles, the new ship has an overall length of 649.6 feet, beam of 105.9 feet, depth to weather deck of 103.35 feet, and scantling draft of 38.7 feet.

The main engine is the latest model low-speed Sulzer 7RTA68 diesel rated 18,100 bhp at 106 rpm, providing a service speed of 20 knots. Isolde is a unifuel ship, with the main and auxiliary engines burning the same heavy fuel oil of up to 600 cSt. Direct-reversing and driving a fixed Lips propeller, the main engine is remote-operated from the bridge or the engine control room. Machinery fulfills the UMS requirements of Lloyd's Register of Shipping for unattended engine room.

Electric power is provided by three 1,600-kw alternators driven by Wartsila-Vasa 6R32 diesel engines installed in a separate compartment.

Heavy vehicles are loaded on the 4th, 6th, and 9th decks, which are reinforced to carry heavy loads. The 5th, 7th, and 10th decks, and part of the 8th, are divided into hoistable sections that allow vehicle heights of up to 20.34 feet.

The 6th deck is normally the car entrance deck, but at higher berths the middle outside ramp may also be attached to the 7th deck. Two outside loading ramps are positioned at the starboard side; the aft one is rigged with a 25-degree aft angle to accommodate long vehicles. Internal ramp systems between decks and to doors and openings in

(continued)

Outstanding Oceangoing Vessels of 1985

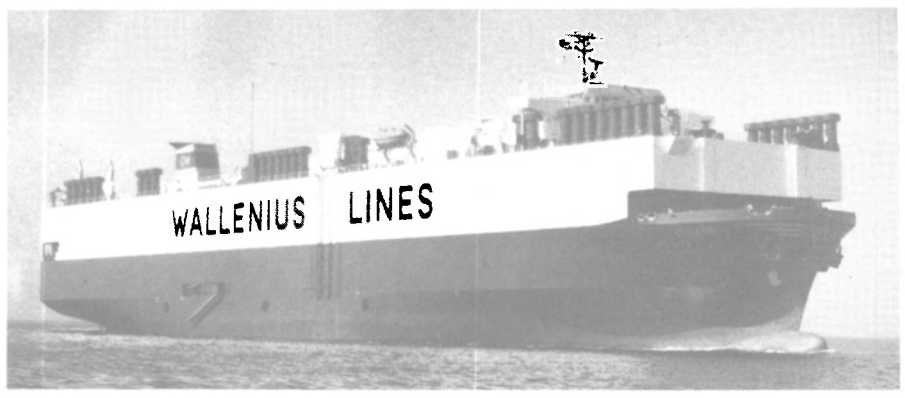
(continued)

the transverse bulkheads make it possible to load/discharge the entire ship via only one of the outside ramps.

All navigation equipment is of the latest design. The Raytheon radar installation has an anti-collision computer with free choice of picture presentation and other features. The Kockumation autopilot is of the totally adaptive, fuel-saving type with set-radius steering for turns. In addition to a Decca Navigator, a Magnavox satellite navigation system is installed.

The speed log equipment is duplicated, a Jungner pressure log for deep waters and a Krupp-Atlas doppler log for more restricted waters. Other equipment includes a Raytheon weather facsimile recorder, Simrad echo sounder, Plath magnetic compass and gyrocompass, and Ramanteen radio direction finder.

The Isolde operates with a crew of 23. Two 50-person Fiskars covered motor lifeboats and four 25-person Viking life rafts are provided.



Isolde built by Kockums.

ISOLDE
Major Suppliers

Main engine	Sulzer
Propeller & bow thruster	Lips
Oil-fired boiler	Sunrod
Auxiliary engines (3)	Wartsila-Vasa
Generators	Nebb
Pumps	Hamworthy
Air conditioning	Stal Refrigeration
Hold ventilation system	Flakt
Radio station, VHF radiotelephones, telex, and lifeboat radios	Televerket
Radars (2)	Raytheon
Satnav	Magnavox
Autopilot	Kockumation
Gyrocompass and compass	Plath
Echo sounder	Simrad
Loran C	Navstar
Direction finder	Ramantenn
Doppler log	Krupp-Atlas
Speed log	Jungner
Facsimile recorder	Raytheon
Cargo access equipment	Kvaerner
Windlasses & winches	Brattvaag
Steering gear	Porsgrunn
Anchors	Pihl
Chain	Ramnas
Elevators	Stahl Electric

JAPAN APRICOT

Hitachi Zosen

The 194,226-dwt bulk carrier Japan Apricot was completed at midyear by the Ariake Works of Hitachi Zosen and delivered to her owner, Japan Line, Ltd. Designed to carry iron ore and coal, the huge ship is operating mainly in transportation of iron ore between Australia and Europe, and from Brazil to Japan under contracts of affreightment with Hamersley Iron Pty. Ltd. and Sumitomo Metal Industries Ltd., respectively.

The Apricot has an overall length of about 984 feet, beam of 156 feet, depth of 82 feet, and maximum draft of 60.16 feet. Her main engine is a low-speed Hitachi/B&W 6L80MCE diesel with a maximum continuous output of 16,500 bhp at 83 rpm, providing a service speed of 13 knots.

A range of energy-saving factors and various devices allow the ship to operate with a crew of 28. Features to reduce fuel costs to the minimum include: the Hitachi-developed HN

(continued)

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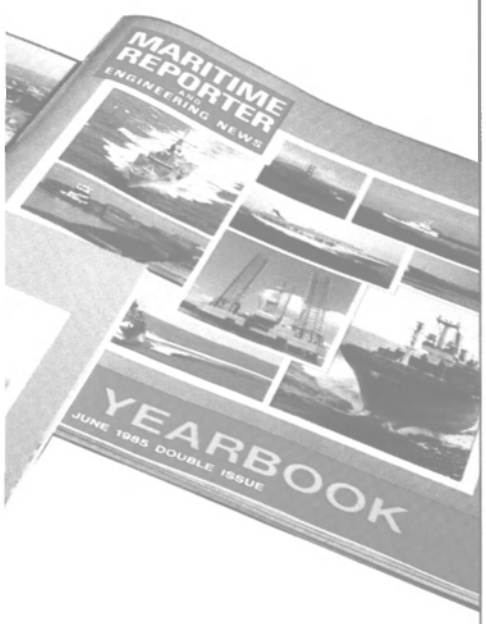

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WORLD'S LARGEST CIRCULATION TO BUYERS

1985—MARITIME REPORTER's total circulation increased to 24,305 including a record 21,609 Buying Influence Readers.

COMPARE CIRCULATION TO BUYERS

	MARITIME REPORTER	ME/Log	WATERWAYS JOURNAL	THE WORKBOAT
BUYERS	21,609 89%	15,107 60%	2,347 34.2%	?
NON-BUYERS AND UNIDENTIFIABLE MIXED GROUPS	2,696 11%	10,028 40%	4,526 65.8%	?
Total Requested Circulation	24,305	22,745	6,873	9,985
Unrequested free copies	0	2,390	0	3,046

WORKBOAT does not report titles of all readers, Presidents, Vice Presidents, Treasurers, Purchasing Agents, etc. Impossible to identify number of buyers reached.

Circulation audit bureaus do not identify buyers.
Identification of BUYERS is based on a 1984 survey, commissioned by MARITIME REPORTER, of over 1,000 marine sales managers who identified true buyers as shoreside management, design and purchasing people in vessel operations, shipbuilding and design (naval architects). Signed and dated replies on file at MARITIME REPORTER.

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PAINT CORROSION CONTROL	SHIPBUILDING/REPAIR
1,033	2,147
714	613
655	570

DECK MACHINERY/ CARGO HANDLING	DIESEL ENGINES
545	1,533
415	1,352
477	1,168

NAVIGATION & COMMUNICATIONS	OILY WATER SEPARATORS
773	936
663	751
623	459

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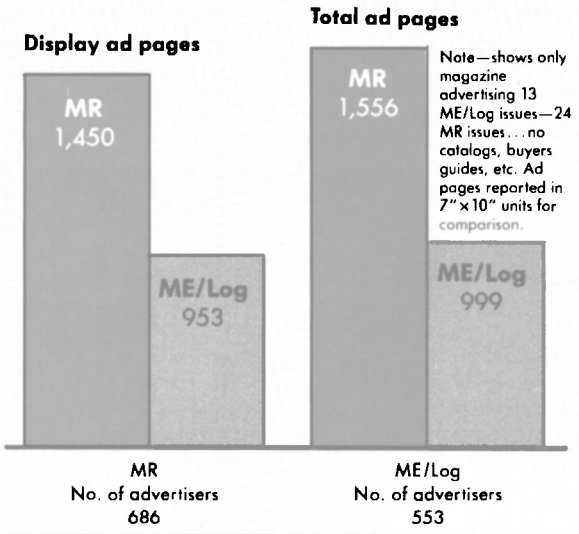
In 1984, and for years, more media buyers placed more pages of advertising, for a larger number of advertisers, in MARITIME REPORTER than in No.2 ME/Log.

COMPARE 1984 ADVERTISING



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MARITIME REPORTER AND ENGINEERING NEWS

DVERTISING SALES FORCE FOR '86

Outstanding Oceangoing Vessels of 1985

(continued)

Nozzle to improve propulsion efficiency; the energy-saving main engine will be operated in a derated mode; turbogenerator and shaft generator; tower-shaped accommodations house to reduce wind resistance; adaptive autopilot system; and self-polishing antifouling on the hull exterior.

Cargo-handling and ship mooring operations, as well as machinery room equipment are highly automated to save labor needs. The machinery automation equipment qualifies the ship for the Nippon Kaiji Kyokai MOA notation for unmanned engine room.

2ND LT. JOHN P. BOBO

Quincy Shipbuilding

The first new-construction, purpose-designed Maritime Prepositioning Ship (MPS), the 2nd Lt. John P. Bobo, was delivered by General Dynamics Quincy Shipbuilding Division early this year. Named in honor of a U.S. Marine Corps Medal of Honor recipient, this vessel is the first of five ships designed and built by the Quincy shipyard for chartered service to the Military Sealift Command. The first three vessels were delivered this year; the next two are scheduled for 1986 delivery. All will be operated by American Overseas Marine Corporation, a General Dynamics subsidiary created for this and other marine endeavors.

The Maritime Prepositioning concept, which originated only within this decade, provides for highly mobile, forward location afloat storage of a mix of selected equipment and supplies for Marine-Air-Ground Task Forces. The Bobo and her sister ships are the only new-construction vessels of the 13 ships that will provide for the requirements of three Marine brigades throughout the world.

The Bobo has an overall length of 671 feet, beam of 105 feet 6 inches, and depth to the main deck of 82 feet. Full-load draft is 29 feet 6 inches, with a corresponding deadweight of 22,700 long tons. Propulsion is by a pair of Stork-Werkspoor medium-speed 18TM410 diesels, each with an output of 13,200 bhp at 580 rpm. These drive a highly

2ND LT. JOHN P. BOBO
Major Suppliers

Main engines (2)	Stork-Werkspoor
Reduction gear	Lohmann & Stolterfoht
Propeller	Ferguson
Engine controls	General Electric
Steering gear	Frydenbo
Bow thruster	Omnithruster
Thruster motor	Reliance
Diesel generators & service pumps	Bergen
Auxiliary boilers	Eclipse Lookout
Main engine & reduction gear service pumps	Stork-Pompen
Fuel oil purifiers	Alfa-Laval
Starting air compressors	Stork-Werkspoor
SS air compressors	Hamworthy
Emerg. diesel generator	Great Lakes Energy
Machinery space, air conditioning, cargo fuel & defueling pumps	Warren
Distilling plants (2)	Aqua-Chem
Proportioning chlorinator	Pennwalt
Vacuum MSD	Demco
CO_2 refrigerated storage	Hiller
Foam firefighting system	National
Switchboards	International
Cargo hold, accommodations & EOS air conditioning	Carrier Transicold
SS refrigeration	Carrier Transicold
Ventilation fans	Hartzell
Stern ramp, stern cargo door, hoistable vehicle ramps, hoistable ramp covers,hoistable car deck, bulkhead cargo doors, & hatch covers	MacGregor-Navire
Cargo deck cranes	Hagglunds
Container spreaders	RPC
Container lift trucks, forklifts, & pallet trucks	Kalmar
Bow anchor windlass/CT winches, stern anchorwindlasses, CT mooring winches	Norwinch
Lifeboats, davits, & winches	Marine Safety
Accommodation ladder, davits, & winches	Washington
Passenger elevator	Unidynamics
Radar & C-A system	Salesmar/ITT Mackay
Gyrocompass & autopilot	Sperry
Radio	ITT Mackay
Loran C	Raytheon
Satnav system	Navidyne
Joiner work & furnishings	Hopeman
Cathodic protection	Wilson Walton

skewed fixed Ferguson propeller through double-input, single-output Lowmann & Stolterfoht reduction gears. The machinery space is rated +ACC by the American Bureau of Shipping, signifying one-man engine room attendance, monitored by a General Electric distributed microprocessor control panel.

The profile of the Bobo is distinct. Due to the high volume and low density of her cargo, she resembles a modern pure car carrier in her very high main deck and squared off upper hull. The forward mooring deck is lowered 18 feet below the main deck, providing excellent visibility from the wheelhouse. Other features of the design are the large accommodation deckhouse and elevated aft helicopter platform.

This house provides living quarters and working areas for a total complement that can exceed 170 men during military operations. The helicopter platform can accept the landing of the Marine Corps CH-53E helicopter. The 1,120-ton deckhouse was assembled and completely outfitted separately from the hull, and using the Quincy yard's immense Goliath crane, was erected on the hull in what is said to be the single heaviest lift in U.S. shipbuilding history.

The cargo being carried and stored on the MPS is diverse. The ship carries 1,400 vehicles stowed on seven decks across two midship holds; 530 twenty-foot containers in two forward holds and on the main deck; a combined cargo of about 1,600,000 gallons of gasoline, diesel, and jet fuel in deep double-bottom tanks; and a variety of lighters, landing craft, and heavy deck cranes.

Unlike commercial vehicle carriers, the MPS has a minimal amount of vehicle hold equipment. MacGregor-Navire supplied a hinged, fully slewing stern ramp 110 feet long with a road width of 24 feet. This ramp was designed with the capacity for loading the heaviest Marine Corps tracked vehicles, and for launching amphibious craft while at anchor. Navire also supplied the 53-foot-wide, 15-foot-high stern door, and six watertight bulkhead vehicle doors, both overhead and side-hinged. All of the cargo doors are hydraulically operated by local controls with indication at the pilothouse damage control station. There are two hoistable car ramps, and a hoistable ramp cover installed to provide access to the various levels of the holds.

The Bobo has proven to be a highly maneuverable vessel. Her short length, open stern, and lack of a bulbous bow allow her to respond rapidly to helm commands. The spade rubber is powered by a Frydenbo rotary vane steering gear. To assist with slow-speed maneuvering and mooring operations, General Dynamics chose the Omnithruster PV 1100 jet-type bow thruster powered by a Reliance Electric 1,000-hp motor operating at 500 rpm.

LEONARD J. COWLEY
West Coast Manly

The latest addition to the Canadian Department of Fisheries and Oceans fisheries patrol fleet, the 2,244-gt Leonard J. Cowley, is the largest and most sophisticated vessel of her type in Canada. Operating out of St. John's, Newfoundland, her major function is the surveillance of the offshore fishing fleet within the Canadian 200-mile exclusive fisheries zone as far north as 75 degrees latitude and within the

(continued)

Outstanding Oceangoing Vessels of 1985

(continued)

Northwest Atlantic Fisheries Organization waters outside the zone.

This mission requires precise navigation, excellent boarding facilities, and superior communications as well as seakindliness in all kinds of weather, substantial capability in ice, and helicopter facilities. All of these requirements are fully met, and the vessel is also equipped for search and rescue operations.

Built by West Coast Manly Shipyards of Vancouver, B.C., a division of Rivtow Industries Limited, the ship has an overall length of about 236 feet, maximum beam of 46 feet, and mean draft of 14¾ feet. Propulsion is provided by two 12-cylinder Polar Nohab F312A diesels with total output of 4,184 bhp, driving a single controllable-pitch propeller. The vessel is classed by Lloyd's Register of Shipping 100 A1, Ice Class 1, LMC. Machinery and electrical control and monitoring systems meet Lloyd's requirements for Unmanned Machinery Space.

Designed by Cleaver and Walkingshaw of Vancouver, the Cowley has numerous innovative features, representing state-of-the-art technology in navigation systems, communications, electrical monitoring and control, accommodations, helicopter facilities, maneuvering, wheelhouse design, and boarding facilities.

The unique wheelhouse is designed to maximize visibility in all directions. Shaped like a trapezoid with extended wings, it provides six distinct yet interdependent work stations.

Boarding facilities are provided to meet the principal mission of the ship—the boarding of offshore trawlers at sea in winds to Beaufort 7. Boarding craft are of the Watercraft RI-22 type, built by Crockett McConnell Inc. of Bridgewater, N.S., and are propelled by water jet drives powered by Ford Mermaid diesel engines. The port boat is launched by a Miranda davit, and the starboard craft by a HIAB 180 Seacrane.

LEONARD J. COWLEY
Major Suppliers

Main engines (2)	Polar Nohab
Monitoring & control systems	ASEA
CP propeller	Lips
Steering gear & autopilot	Wagner
Bow thruster	Ulstein
Generators (3)	Cat/Stamford
Rudder	Schilling
Switchboards	Siemens
Boarding craft	Watercraft/McConnell
Crane	HIAB
Davit	Miranda
Helicopter strobe beacon & VHF homing transmitter	Aqua-Signal
Radars (2), navigation computer & gyrocompass	Sperry
Satnav system	Magnavox
Loran C	Internav
Doppler log	Raytheon
Radiotelephones	ITT Mackay

MANITOU
Lindenau

The Paul Lindenau shipyard in Kiel, West Germany, in May this year delivered the energy-saving, IMO Type II oil/chemical tanker Manitou to Atlantic-Rhederei F. & W. Joch of Hamburg. This specialized tanker is the fourth of a series that Lindenau developed in collaboration with the owner.

Built for worldwide trading and classed by Germanischer Lloyd, the Manitou has an overall length of 380 feet, beam of 51.8 feet, depth to main deck of 30.5 feet, and draft on summer freeboard of 23.5 feet.

Main propulsion is provided by a Krupp MaK 6M551AK diesel engine with a maximum output of 3,500 bhp at 375 rpm. Service speed is 14 knots. A Schottel bow thruster is installed for enhanced maneuverability. Electrical power is produced by three Volvo Penta/Siemens diesel-driven generator sets and by a Siemens shaft generator.

Due to the optimal lines of the hull and the patented Lindenau bulbous bow, 20 percent less propulsion power is required for this vessel compared with similar oil/chemical tankers with the same deadweight and draft.

The double hull construction enclosing the cargo tanks reduces the amount of energy needed to heat the cargo due to the isolated air layer. Cargo piping and heating coils are of

stainless steel. All cargo tanks are coated with Camrex Camcote epoxy. Further advantages include the easy cleaning of the tanks and quicker unloading due to the slanted form of the tank bottoms.

Electronic equipment includes two Decca radars, Decca Navigator, Anschutz gyrocompass and gyropilot, Atlas echo sounder, Plath radio direction finder, and Debeg radio station.

The tanker has two oil-fired boilers and an exhaust-gas boiler that are used for preheating the heavy fuel oil, and heating water and accommodations. Under favorable conditions (high outside temperature), part of the exhaust-heat energy can also be used to heat the cargo.

The Manitou is equipped with a free-fall lifeboat with a 26-person capacity. She is said to be the first oil/chemical tanker authorized to have such a lifeboat. Two inflatable life rafts are also provided, each with a capacity for 20 persons.

MANITOU
Major Suppliers

Main engine	Krupp MaK	Cargo pumps	Bornemann
Reduction gear	Tacke	Radars, Decca Navigator	Racal Decca
Propeller	Lehne	Gyrocompass, gyropilot	Anschutz
Bow thruster	Schottel	Echo sounder	Atlas
Boilers	GEKA Warmetechnik	RDF	Plath
Diesel generators	Volvo/Siemens	Radio station	Debeg
Shaft generator	Siemens		

NOSAC TASCO
Daewoo Shipbuilding

The first RO/RO car carrier built by Daewoo Shipbuilding & Heavy Machinery Ltd. of South Korea, the Nosac Tasco, was delivered early this year to K/S Benargus, a subsidiary of Oivind Lorentzen Shipping of Norway. A sister ship, the Nosac Express, followed for Wilh Wilhelmsen; both companies are equal partners in the consortium Norwegian Specialized Auto Carriers (NOSAC), the operator of the new ships. Each of the new car carriers has a capacity for 5,532 cars, and operates with a crew of only 13, a reflection of their high degree of automation.

The Nosac Tasco has an overall length of about 640 feet, beam of

(continued)

NOSAC TASCO
Major Suppliers

Main engine	Hyundai/B&W
Propeller	Lips
Steering gear	Frydenbo
Bow thruster	Liaaen
Diesel generators	Bergen/Nebb
Shaft generator	Siemens
Emergency generator	Detroit Diesel
Oil-fired & exhaust gas boilers	Sunrod
LO purifier, FO & DO separators	Alpha-Laval
FW generator	Niles-Alfa
Main LO pump	Maskin (IMO)
Blending unit	Bergen/Dodwell
Air compressors	Sperre
Incinerator plant	Golar
Engine room crane	Munck
ER vent fans	Norsk Viftefabrikk
Access ramps, ramp covers, liftable decks doors, and hydraulic power pack	MacGregor Far East
Lashing gear	Fuji
Cargo hold fans	Norsk Viftefabrikk
Ventilation	Flakt
Anchors	KHIC
Anchor chain	Hamanaka
Windlass/mooring winches	Norwinch
Lifeboats	Harding
Boat davits	Nor-Davit
Lifesaving & firefighting gear	Unitor
Pumps	Frank Mohn
Valve R-C system	Superfos/Valmet
CO_2 system	Heien Larssen
Air conditioning plant	Norsk Viftefabrikk
Radar & CAS	Krupp Atlas
RDF	Koden Steenhans
Satnav & satcom systems	Navidyne/ITT
Decca Navigator	Racal Decca
Gyrocompass & autopilot	Anschutz
Echo sounder & doppler speed log	Simrad
Main radio system	ITT Mackay
ER & bridge control consoles	GSI
Propulsion machinery automation	Norcontrol
Automation for other machinery	Valmet
Fire detection & alarms	Signalco
Alarm & monitoring system	Valmet
Main switchboard	Nebb

Outstanding Oceangoing Vessels of 1985

(continued)

105 feet, depth of 101.5 feet, and design draft of 27.9 feet. Propulsion is by a Hyundai/B&W 6L80GB low-speed diesel engine having a maximum continuous rating of 19,250 bhp at 96.5 rpm and normal continuous rating of 17,320 bhp at 93.2 rpm, driving a Lips highly skewed, fixed-pitch propeller. Service speed is 19 knots.

Equipment necessary for remote control, automation, and monitoring/alarm is installed so that 24-hour unattended machinery space operation can be achieved in normal seagoing conditions, earning the Det norske Veritas EO notation. While the engine room is arranged centrally at the after end of the ship, the cargo space above it has been optimized by placing the exhaust casing and funnel on the extreme starboard side.

Electric power is provided by three diesel gensets—two comprising Bergen KRG9 engines driving 1,205-kw Nebb alternators, and one with a Bergen KRG5 diesel and 670-kw Nebb alternator. While under way, a Siemens shaft generator installed in the intermediate shift produces 800-kw through a static frequency converter. An emergency 160-kw generator powered by a Detroit Diesel engine is located on the upper deck.

The steam supply is produced by a Sunrod oil-fired boiler. While at sea with the main engine running at normal load, steam is generated by a Sunrod exhaust gas boiler. A Flakt Dirivent system provides for the effective ventilation of the engine room.

The Nosac Tasco has a total of 12 decks for car stowage. Decks 2, 4, 5, 7, 8, and 10 are liftable to accommodate a broad range of vehicle sizes. In the case of decks 4, 5, 7, and 8, lifting is accomplished by means of hydraulic jigger cylinders manufactured by MacGregor Far East. Decks 2 and 10, however, are lifted by specially built Nissho movable deck lifters.

Two MacGregor external ramps are fitted for roll-on/roll-off cargo loading and discharge, one approximately at midship and the other at the stern. Larger and heavier vehicles are loaded via the stern ramp, which is about 147½ feet long and 34½/54 feet wide, and is canted 36 degrees to starboard of the ship's centerline. This ramp is designed to carry 112 tons. Its clear opening at the threshold is approximately 54 feet wide and 21½ feet wide. The starboard ramp, normally called the side ramp, is fixed at 90 degrees to the ship's side; clear threshold opening is about 23 feet wide and 16 feet high.

ORANGE BLOSSOM
Trosvik

The specialty tanker Orange Blossom, said to be the world's first purpose-built ship for transportation of fruit juice concentrate in bulk, was delivered early this year by Trosvik Verksted A/S of Brevik, Norway, to Atlantic Reefer Corporation, which is under the general management of Atlanship S.A. of Switzerland.

The unique vessel was designed by Dwinger Marineconsult Inc. of Denmark; the firm also developed the hull lines, which have a very low resistance and thus will insure low fuel oil consumption. The Trosvik Group developed the detail drawings, and Dwinger carried out plan approval and construction supervision on behalf of the owner.

The Orange Blossom has an overall length of 475.7 feet, beam of 70.5 feet, depth to upper deck of 41.3 feet, and full-load draft of about 32 feet. She is able to carry 12,000 tons of juice concentrate in stainless steel tanks, cooled to below 32 F.

Propulsion is provided by a Japanese-built M.A.N.-B&W diesel engine with a maximum continuous output of 9,000 bhp at 111 rpm. B&W Holeby in Denmark provided her three diesel alternators, and Sabroe of Aarhus, Denmark, delivered the refrigeration plant. Trosvik Industri A/S, a member of the Trosvik Group, supplied the steering gear. The majority of other equipment and outfit is of Norwegian origin.

Crew accommodations include
(continued)

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The Eastern Sun, a new generation of coastal tankers. This 2500 DWT product carrier is designed to carry clean petroleum and lube oil products for the U.S. Eastern Seaboard. Her unique design enables her to service restricted terminals and limited draft accesses while still operating safely and reliably in open seas . .

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Orange Blossom built by Trosvik

Outstanding Oceangoing Vessels of 1985

(continued)

single cabins with private showers and toilets for a normal complement of 20, plus some spare cabins, as well as a spacious reception room with bar.

Classed by Lloyd's Register of Shipping, the Orange Blossom is fitted with comprehensive navigation equipment, automation systems, and remote controls.

PAUL BUCK
Tampa Shipyards

The 30,000-dwt motor vessel Paul Buck, first of five sophisticated T-5 product carriers designed and constructed by Tampa Shipyards Inc. in Florida, has been delivered to Ocean Carriers, Inc. of Houston. The new ship is now being operated by the owner's subsidiary, Ocean Product Tankers, Inc., under a charter to the Navy's Military Sealift Command.

The tanker has an overall length of 615 feet, beam of 90 feet, depth of 53 feet 8 inches, and design draft of 34 feet. She is powered by a slow-speed Sulzer 5RTA76 fuel-efficient diesel engine, which also drives an attached shaft generator to provide electric power while the ship is underway. The combination of these two characteristics provides the owner with excellent operating economy.

The propulsion plant is designed for unmanned operation, and is classed +AMS by the American Bureau of Shipping. The engine is direct drive via a solid shaft to a fixed 4-bladed, nickel-aluminum-bronze propeller manufactured by Ferguson. The Sulzer 5RTA76, with a maximum continuous rating of 18,400 bhp at 98 rpm, has been derated to prolong its service life, and is especially adapted to drive a shaft generator through a speed-increasing gearbox.

The Paul Buck is designed to deliver 30,000 long tons of petroleum products worldwide, and is ice-strengthened for Arctic or Antarctic operations. Cargo is carried in seven pairs of tanks, each pair being segregated from any other pair to allow seven different liquid cargoes to be carried. Each tank is fitted with a stainless steel, high-pressure hydraulic cargo pump supplied by Framo. The pumps are sized to discharge the entire cargo within 16 hours, and in service have achieved this easily. All cargo tanks are fully inerted by an inert gas generator. This inert gas system is designed to supply two pairs of tanks through dedicated systems to guard against cargo contamination; the remaining five pairs are served by a common system. Cargo piping and inert gas piping are constructed entirely of stainless steel. Facilities for underway replenishment at sea are provided from two stations; refueling at sea capability over the stern is also incorporated.

The unique construction of the cargo tanks developed by Tampa Shipyards has substantially reduced surface area compared with conventional construction. This results in significant cost reduction in epoxy coating maintenance inside the cargo tanks.

Water ballast is carried in double bottom and wing tanks, totally segregated from the cargo, and is arranged to qualify for "Protectively

Located Segregated Ballast" under IMO regulations.

The entire hull, except foundations and superstructure, is constructed of AH36 high-strength steel, realizing a 15-percent saving in total steel weight over Grade A steel, and is designed for a scantling draft of 36 feet. This allows the owner the flexibility of deeper drafts. Extensive vibration analyses were confirmed by instrumenting the ship during sea trials and conducting a comprehensive vibration survey. Noise predictions were also made and confirmed to be acceptable by survey during sea trials. This survey, combined with the vibration characteristics, results in a comfortable living atmosphere for the operating crew.

PAUL BUCK
Major Suppliers

Main engine	IHI/Sulzer
Propeller	Ferguson
Diesel generators (3)	Caterpillar/Kato
Shaft generator	Nishishiba
Emergency generator	Detroit
Waste heat boiler	Kentube
Air compressors (2)	Hamworthy
Waste heat distiller	Alfa-Laval
Steering gear	Hastie
Sewage treatment plant	FAST
Foam system	National Foam
Cargo tank washing machines (29)	Dasic
Cargo tank remote level gauge system	Saab
FW cooling, SW cooling, lube oil, ballast and cargo pumps	Framo
Fuel oil purifiers (3)	Alfa-Laval
Main switchboard	Westinghouse

PROBO BIAKH
Hyundai

The 36,500-dwt Probo Biakh, a highly advanced and sophisticated product/bulk/oil carrier, was delivered at midyear by the Hyundai Shipyard in Ulsan, South Korea. A sister ship, the Probo Brali, was also delivered this year, and a third, the Probo Britt, is scheduled for January 1986. Owner of the ships is L. Gill-Johannessen, a member of the Norwegian Bulkhandling Group. These PROBO vessels have been cited by the Norwegian Shipping Association as "Examples of Norwegian Ships of the Future."

The Probo Biakh has an overall length of 597 feet, beam of 104.8 feet, depth of 59 feet, and summer draft of 43 feet. Propulsion is provided by a slow-speed Hyundai/B&W 4L80MCE diesel engine with a maximum continuous rating of 12,800 bhp at 83 rpm; normal continuous rating is 10,800 bhp at 79 rpm, providing a service speed of about 15.3 knots.

The new ship was designed as a specialized oil products and bulk carrier, and is equipped to carry both clean and dirty oils, including crude, as well as dry bulk cargoes such as ore, coal, alumina, cement, and grain, and any quantity of caustic soda solutions up to her deadweight capacity. In addition, she is self-loading and self-discharging, with two traveling gantry cranes designed for continuous operation under tropical conditions and dusty environments.

Internal cargo surfaces and hatch covers are coated with pure epoxy paint down to the double bottoms for compatability with a wide range of oil products. For each tank there is one hydraulically driven, submerged cargo pump located in the cofferdam between the tanks. All cargo pumps are remote-controlled from the cargo control room. Tanks and piping are designed for seven grades of cargo. Efficient cleaning equipment insures thorough cleaning of the tanks, with two permanent, high-pressure cleaning guns in each tank.

The integrated Valmet automation system installed in the Probo Biakh is of a star configuration, where the several dedicated systems are connected to the various processes such as navigation, main and auxiliary machinery, cargo plants, and communications. The hose computer acts as a data collector, central mass storage, and central information and reporting system.

All control and monitoring systems operate as individual systems independent of the host computer. One of the main aims of the onboard system is to centralize the various

(continued)

Outstanding Oceangoing Vessels of 1985

(continued)

controls so as to have control from any one center at any given time.

The engine control system is designed to be operated from three individual control centers: the master station in the engine control room, and slave stations in the cargo control room and the wheelhouse. Any monitored or controlled point may be displayed and controlled from any station, either by individual group displays or by process mimics.

Svea (left) constructed at Wartsila's Helsinki Yard

PROBO BIAKH
Major Suppliers

Main Engine	Hyundai/B&W
Shaft generator	Fuji
Dlesel generator	HEMCO
Diesel generator engine	Wartsila
Auxiliary boiler	Sunrod
Main switchboard	HEMCO
Air compressors	Suction Gas & Atlas-Copco
Purifiers	Alfa-Laval
Oil heaters	Gadelius
Fresh water generator	Pasilac
Air conditioning system	Flakt
Tank cleaning machines	Salwico
Inert gas system	Moss Verft
Co_2 & foam systems	Heiem-Larssen
Cargo control console	Daulpleiger
Oil discharge monitoring and control system	Sasakura
Gantry cranes	Tsuji
Windlass & mooring winches	Nor-Marine
Cargo oil pumps	Frank Mohn
Water ballast pumps	Shinkokinzoku
Elevator	Dan Elevator
Laundry equipment	Electrolux
Engine room and cargo monitoring systems	Valmet
Autopilot, gyrocompass, & echo sounder	Krupp Atlas
Magnetic compass	Henry Brown
Decca Navigator	Racal Decca
SatCom system	EB

SVEA
Wartsila

The 33,830-gt passenger cruise ferry Svea was delivered this year by the Helsinki Shipyard of Wartsila Oy to Oy Svea Line (Finland) AB. The new vessel has an overall length of 551 feet, beam of 90.5 feet, and draft of 20.7 feet. Propulsion is provided by four Wartsila/Pielstick 12PC2-6V medium-speed diesel engines, each developing 8,975 bhp. Service speed is 22 knots.

The interiors of the Svea reflect the high standard set by the Finlandia Class built in 1981 for the Helsinki-Stockholm route. Passenger accommodations comprise 566 cabins with a capacity of 1,625 persons. All cabins have individual climate control, temperature alarms, and shower/toilet facilities.

As the ferry will spend only about one hour in port, special attention has been paid to reducing the time required for loading and unloading the car decks, handling the provisions and stores, and discharging waste ashore. Vehicle capacity is 530 motor cars or, as an alternative, 60 long-distance trucks and 40 cars.

Careful consideration was also given to the special requirements posed by the part of the route that goes through the sensitive archipelage environment. These needs are mainly related to maneuverability and the minimization of wave generation. The high total engine output of 17,950 bhp makes it possible to reduce speed in the archipelage, as the time lost can be made up on the open sea. The vessel complies with

all the relevant environmental protection rules.

All restaurants are located on Deck 7; passengers can choose between cafeteria, a la carte, smorgasbord, or gourmet-style service. Bars and tax-free shops are situated on Deck 8, which also has a conference center with a capacity of more than 400 persons.

Navigational equipment includes two gyrocompasses and repeaters, a magnetic compass, autopilot, echo sounder, draft indicator, wind meter, two speed logs, radio direction finder, Decca Navigator, and weather chart facsimile receiver. Comprehensive radar equipment comprises four radars, including an ARPA unit.

The Svea is registered in Sweden and built according to the Swedish requirements for passenger vessels. She is designed to comply with the rules of Det norske Veritas, with the classification +1A1, Carry Ferry A, EO, Finnish/Swedish Ice Class Rules 1971, 1A Super, and also fulfills the regulations of SOLAS 1974. The extent of the remote control and monitoring systems exceeds the DnV rules for unmanned machinery spaces.

Right, the Asakasan Maru built by Mitsui (page 23)

NOTABLE CONVERSIONS OF 1985

A review of some of the oceangoing vessels that were converted during the past year for military and commercial applications.

ANTARES
Avondale Shipyards

The USNS Antares, redelivered this year by Avondale Shipyards, Inc., was the first of three Fast Sealift Ships being converted by the Louisiana yard for the U.S. Navy from Sea-Land's SL-7 containerships. These vessels will provide for the rapid deployment of heavy mechanized Army combat and support equipment and supplies, as well as providing lift capability for unit equipment and supplies of the Marine Corps, the Air Force, and the Navy.

The Antares has an overall length of 944 feet, beam of 105 feet 6 inches, and a displacement of 55,372 long tons. Main propulsion is provided by a twin-screw steam turbine plant with a total of 120,000 shp. The ship's capabilities include 33-knot service speed, RO/RO handling of cargo at pierside and while anchored, and self-sustaining lift-on/lift-off for vehicles and helicopters. She is able to land helicopters and load a mixture of tanks, helicopters, wheeled vehicles, and containerized or palletized cargo.

USNS Antares—Avondale

The conversion of the Antares included the modification of existing container storage areas to provide various new decks including a flight deck, the installation of Hagglunds 35-ton and 50-ton twin cranes, and the installation of two sideports and various platforms and ramps to support RO/RO loading and unloading. All of the cargo access equipment was supplied by MacGregor-Navire.

Avondale utilized state-of-the-art techniques for zone outfitting in the conversion effort. Structural modules were outfitted with pipe, ductwork, electrical wireways, and other equipment prior to being erected at the building site.

BENWALID
Meyer Werft

The Papenburg, West Germany shipyard of Meyer Werft has redelivered the Benwalid, converted into a combination sheep/cow carrier from the former containership Ville D'Orient. The converted vessel was turned over to the Turkish-Libyan Joint Maritime Transport Company of Istanbul, which has chartered the ship from the principals, Islamic Development Bank of Jeddah, Saudi Arabia. For the owner, this conversion is the first venture into the livestock carrying trade.

The Benwalid has an overall length of 378.3 feet and beam of 51 feet, and was converted for worldwide trade in compliance with the Australian Department of Trade regulations. She is capable of loading 21,300 sheep (at 110 pounds each) in 12 tiers, or 2,100 cows (at 992 pounds each) in six tiers below deck and on deck. Main propulsion is by a Crossley/Pielstick diesel engine.

The ship has been fitted with exchangeable aluminum deck pallets for sheep, for which Meyer Werft holds a patent. These pallets enable the ship to be re-equipped for the carriage of cows within one day. All steel decks are provided with a non-skid coating.

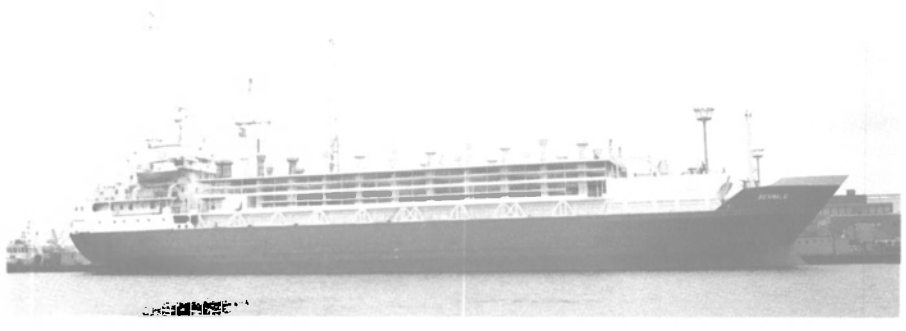
All the systems for the transport of livestock were developed by the shipyard, improved and optimized over many years of experience with this type of conversion. Major installations include the fodder supply system, fodder and drinking vessels of aluminum, dung removal systems, and the ventilation system. All the cow and sheep ports of the pens are made of seawater- and ammonia-resistant aluminum; for all other equipment, galvanized material was used.

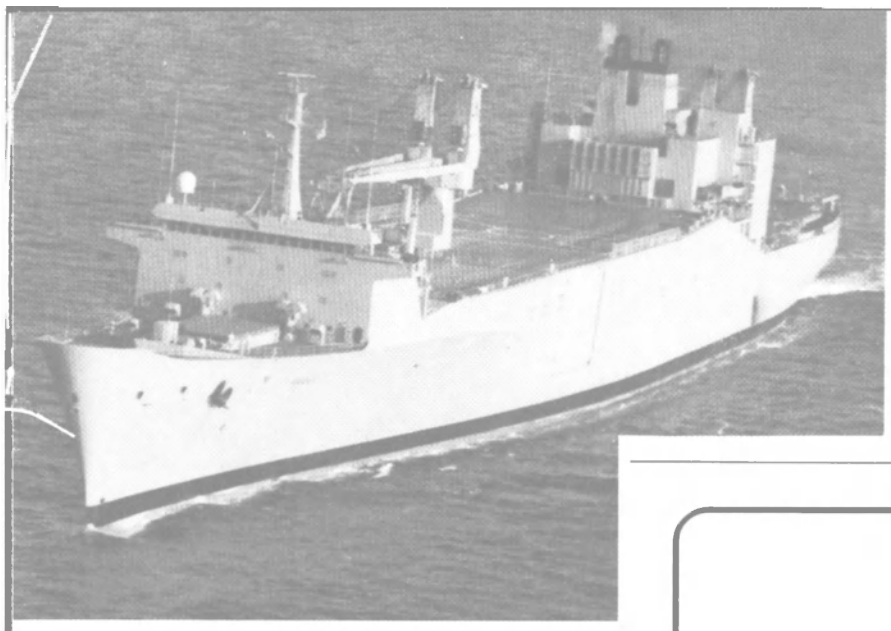
To provide for the extra crew members required for the transport of livestock, the living quarters were expanded to accommodate 40 instead of 24 personnel. Two new suitable sized lifeboats were installed aboard the ship.

Benwalid—Meyer Werft

DENEBOLA
Pennsylvania Shipbuilding

Another of the U.S. Navy's T-AKR Class of fast supply ships, the





USNS Denebola
Pennsylvania Shipbuilding

USNS Denebola (T-AKR-289), was delivered recently by the Pennsylvania Shipbuilding Company yard in Chester, Pa. She is the sister ship of the USNS Capella that was delivered in 1984 ahead of schedule, and is the second of a two-ship, $100-million contract awarded to Penn Ship.

One of the Navy's largest and fastest auxiliary vessels, the Denebola has an overall length of about 946 feet, beam of 105½ feet, depth of 66 feet 7½ inches, and draft of 36 feet 8 inches. She is powered by a steam turbine plant of 120,000 shp that gives her a service speed of 33 knots. The ship will carry tanks, armored personnel carriers, helicopters, and other wheeled equipment for an armored division of the U.S. Army. In one typical arrangement she will load 122 M-1 tanks, 183 helicopters of various sizes, and other assorted wheeled vehicles.

While the Denebola's engine room and living quarters have not been altered significantly, her cargo holds have been completely reconstructed. Where formerly she had four cargo holds fitted with vertical cells for container stowage, she now has five continuous decks connected by fixed ramps.

Two conventional holds aft of her superstructure can carry up to 46 twenty-foot containers, 53 thirty-five-foot containers, and 53 thirty-five-foot flat racks of supplies, spare parts, etc. She is also arranged for the carriage of eight Sea Sheds, an open-frame supercontainer 35 feet long, 25 feet wide, and 13 feet deep, designed for the transport of outsized and very heavy loads.

Helicopters can operate from two landing pads on her topmost deck, and can be stored in the space below it. Tanks and wheeled vehicles are loaded through special doors on each side of the ship. Each door is fitted with a 73- by 20-foot folding ramp that has a design load capacity of 65 tons. These doors give access to 185,000 square feet of stowage area distributed over the five decks.

Two Hagglunds heavy-duty, 35-ton cranes are installed amidships to handle loads over the side, and

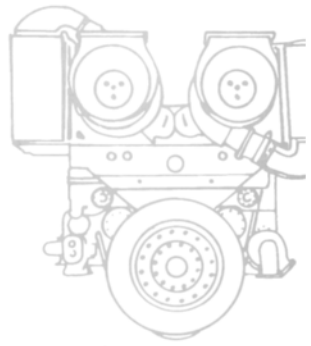
USNS DENEBOLA
Major Suppliers

Main Engines (2)	GE
Boilers (2)	Foster Wheeler
Boiler Control System	Bailey Controls
Air Compressors	Worthington
Reduction Gears (2)	GE
Bearings	Waukesha
Propellers (2)	Lips
Steering Gear	Western Gear
Firefighting	Walter Kidde
Cathodic Protection	Englehard
Anchors	Baldt
Compasses	Sperry/Baker/Lyman
Telephones	Hose McCann
Radio Telephones—Telex	ITT MacKay
SatCom Terminal	ITT MacKay
Radar	Raytheon
Loran	Raytheon
Fathometer	Raytheon
HF/SSB Transceiver	Harris Corp.
Cranes	Hagglunds
Hatch covers, cargo doors, side port doors, bridge ramp and hinged platforms	MacGregor-Navire
Hinged Ramp	Navire Cargo Gear
Mooring Winch	Western Gear
Anchor Windlass	Western Gear

COME TO WHERE

COLT-PIELSTICK*

* S.E.M.T.—Pielstick is a registered trademark of Societe d'Etudes de Machines Thermiques Paris, France.



Colt-Pielstick Diesels
Big horsepower in less spa
Ratings to 29,700 bhp.

THE POWER IS

When it comes to dependable, economical marine POWER, you can't beat Colt-Pielstick diesel engines. The PC-4 Series is now available with a horsepower range to 29,700 bhp. PC-2 Series to 13,266 bhp. Their reliability has been proven in many millions of hours of operation with over 70% on heavy and residual fuels.

Colt-Pielstick engines are compact, too. Their power is packed into much less space than a 2-cycle engine and they weigh less. Initial costs are also less because Pielstick engines can be installed completely assembled resulting in a substantial savings in shipyard labor cost.

Fairbanks Morse has built the Pielstick PC-2 Series diesels in ratings to 13,266 bhp since 1970 and during that time has built engines for a wide range of commercial and naval applications including the current Navy LSD program. In addition to the Pielstick, the Fairbanks Morse O-P engine, with ratings of 700 to 4200 bhp, meets many Navy applications and has long played an important propulsion and ship service role in the fleet.

Get the complete Colt-Pielstick marine POWER story, today. Write or call Colt Industries, Fairbanks Morse Engine Division, Beloit, Wisconsin 53511. 608/364-4411.

Colt Industries

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Fairbanks Morse
Engine Division

Notable Conversions

(continued)

two more, each of 50 tons capacity, are fitted aft for the same purpose. Each pair of cranes can be operated in tandem to provide 70-ton lifts.

NURNBERG EXPRESS
Blohm + Voss

Hapag Lloyd's containership Nurnberg Express arrived in New York recently on her first U.S. call since being jumboized by Blohm + Voss shipyard in Hamburg, West Germany. She is the first of four sister ships in the line's North Atlantic service that are to be lengthened. All are powered by M.A.N. diesels.

The containership was given a new midbody that increased her overall length to 789 feet from the former 667.7 feet, thereby creating two new 40-foot holds. Blohm + Voss won the jumboizing contract against keen European and international competition. A major factor in the award was the Hamburg yard's ability to guarantee the short conversion period of one month for each ship stipulated by Hapag Lloyd.

Nurnberg Express
Blohm & Voss

After only four weeks in the shipyard, the Nurnberg Express moved to a container terminal in Hamburg to pick up cargo bound for the U.S. East Coast. The three sister ships—Stuttgart Express, Koln Express, and Dusseldorf Express—will be jumboized in the same way. During the periods that the vessels are in the shipyard, replacement tonnage is being chartered to maintain Hapag Lloyd's sailing schedule.

Other work performed during the conversion included the rebuilding of the deck to increase the stack loads (slot maximum weight) from 40/60 tons to 60/90 tons per 20/40-foot container, equipping the vessel with a new lashing system for deck containers, and arranging a hold for the transportation of hazardous cargoes below deck. TEU capacity was increased from 1,758 to 2,594.

PVT. HARRY FISHER
Bethlehem Steel

The Maritime Prepositioning Ship Pvt. Harry Fisher, last in a three-ship reconstruction at Bethlehem Steel Corporation's Sparrows Point Yard near Baltimore, was redelivered to the U.S. Navy recently. She is one of five Maersk Line vessels converted by Bethlehem—three at Sparrows Point and two at the Beaumont Yard—under a $600-million Navy contract.

The Fisher will be part of the Navy's Maritime Prepositioning Ship Program under the Military Sealift Command, and will be operated by Maersk Line Limited of New York. As such, the ship will be stationed at potential trouble spots around the world, carrying part of the equipment and supplies needed by a Marine Corps Amphibious Brigade.

To meet the requirements of the MPS conversion, the shipyard separated the vessel amidships and added a 157-foot-long midbody, extending her overall length to 755 feet. Her depth was changed with the addition of two deck levels, increasing the keel-to-deck depth

from 54 to almost 70 feet. Doing this also required the alteration of three existing decks.

These modifications provided more cargo holds, space for a third set of twin Hagglunds 36-ton-capacity cranes, and a new 80-man deckhouse for "surge" crews needed during periodic loading and unloading. The normal crew complement will be about 65, comprised of civilian and MSC Personnel.

Other major additions included new ramps, fuel tanks, repair shops, and a helicopter landing platform aft. Reconstruction statistics, with the new 755-foot overall length and 69-foot 10½-inch depth, include a displacement of 28,249 long tons and a 32-foot 10½-inch full-load draft.

The ship's Sulzer diesel engine propulsion plant, a 7RND76M with a maximum continuous rating of 15,960 bhp at 112 rpm, will provide a service speed of 17.5 knots operating at 85 percent of mcr.

On-board capacities include 120,000 square feet for vehicles, space for 313 ammunition and refrigerated cargo containers, 1.3 million gallons of drummed and bulk petroleum products, 84,933 gallons of potable water, and 615,083 gallons of fuel oil.

USNS REGULUS National Steel

The San Diego yard of National Steel and Shipbuilding Company recently redelivered the USNS Regulus (T-AKR-292), a Fast Supply Ship converted for the U.S. Navy's Military Sealift Command. She and her sister ships are among the largest and fastest cargo vessels in the world, with an overall length of 946 feet and speed of 33 knots. The T-AKRs will be contract-operated by civilian mariners, and held in ready reserve status until needed for contingencies or used in Department of Defense exercises.

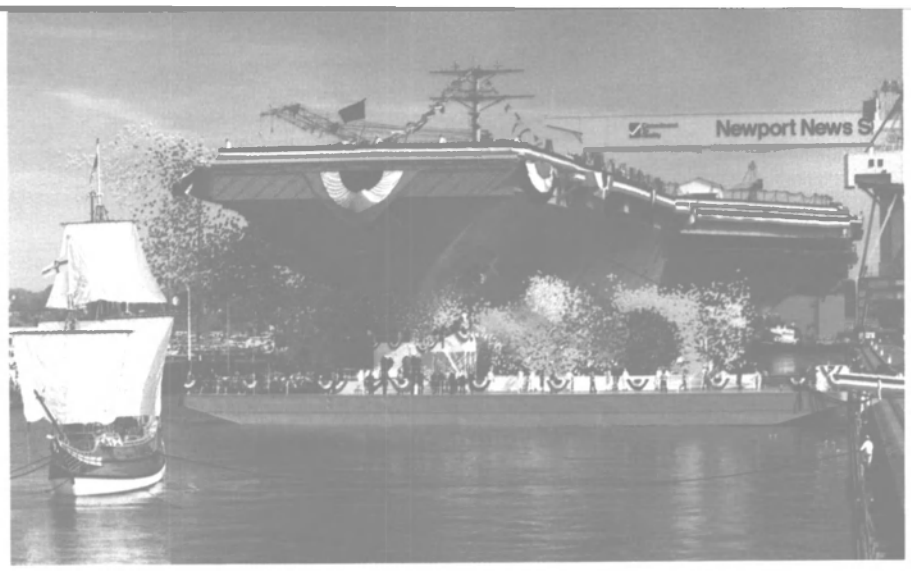
These supply ships are former Sea-Land SL-7 containerships that will provide rapid sealift capability for the transport of military equipment and supplies from the U.S. to any part of the world. They are being converted to give them: roll-on/roll-off capability via MacGregor-Navire access equipment; self-sustaining cargo-handling capability using new 35-ton and 50-ton twin cranes supplied by Hagglunds; an emergency helicopter landing area; and side ports to facilitate rapid loading and discharge.

The Military Sealift Command is responsible for providing the necessary sealift capability to rapidly supply military forces overseas and sustain them for as long as operational requirements dictate. The MSC also operates auxiliary ships that deliver supplies to Navy combatant ships while underway, oceanographic and survey vessels, and tankers and dry cargo vessels that deliver Defense Department cargoes worldwide.

Bender Shipbuilding Wins $4.5 Million In Contracts

Bender Shipbuilding & Repair Co., Inc., Mobile, Ala., has been awarded a $1.292-million contract by the U.S. Navy for the conversion and regular overhaul of YFU-79 (self-propelled harbor utility craft) to HLT-1 (helicopter landing trainer) with redelivery to the Navy in March 1986. Some of the modifications include having the bow ramp welded in the closed position and operating equipment removed, all asbestos removed, and the pilothouse and accommodations located aft are to be modified and relocated forward.

In addition, Bender has been awarded a $3.2-million contract by the U.S. Army Corps of Engineers, Vicksburg District, for the major conversion from steam powered to SCR diesel-electric to the dredge Jadwin. The routine overhaul and maintenance work will be performed concurrently. The duration of this project will be approximately six months.



Gala launching of aircraft carrier Theodore Roosevelt at Newport News Shipbuilding, attended by nearly 23,000 people, featured release of 65,000 balloons and salutes by sirens and cannons.

Construction of 'Theodore Roosevelt' Ahead Of Schedule And Under Budget

Advanced Computer Technology And Huge Superlifts At Newport News Shipbuilding Had At Launching Saved $42.1 Million

At the launching of the aircraft carrier Theodore Roosevelt, Newport News Shipbuilding president and CEO **Edward J. Campbell** cited some of the advancements that allowed dramatic savings in time and money in the construction of the latest launched ship of the Nimitz Class. These included computer technology, huge superlifts, and more experience in carrier construction.

He said, "The Roosevelt keel unit weighed 475 tons. It equaled nine keel assemblies on earlier Nimitz Class carriers. The superlift unit you see behind me is the keel of the Abraham Lincoln. It weighs 840 tons, almost twice as much as Roosevelt's keel. It's the equivalent of 20 such assemblies on older carriers."

The 1,000+—foot-long, 93,000-ton Roosevelt seems to deserve her many accolades. Thanks to the use of extensive modular design and construction techniques, she is being built far ahead of contract schedule. According to Secretary of Defense **Caspar Weinberger**, principal speaker at the launching ceremony, the ship's construction was then 17 months ahead of schedule and $42.1 million under budget.

The Virginia shipyard got off to a fast start with the Theodore Roosevelt, the fourth of the Nimitz Class carriers. The yard jumped ahead of schedule by completing in 23 months with the Roosevelt what it took 40 months to complete with her predecessor, the carrier Carl Vinson. The Roosevelt is one of three Nimitz Class carriers now under construction at the yard; the others are the Abraham Lincoln and the George Washington.

Advanced technology has enabled progress to be accelerated since the Roosevelt's keel was laid in late 1981. For the first time at the yard, engineers there used structural Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) to cut the steel for the carrier, helping speed fabrication dramatically. Once the units came out of Steel Fabrication, they were joined with other assemblies and preoutfitted with much of the piping, ventilation, and electrical equipment they would need.

Computers also controlled tolerences and the manufacturing process so the modules fit together perfectly once they were joined to the ship. The result: the accuracy built into the design function automatically transfers to the manufacturing side.

Another reason for the ahead-of-schedule performance is more extensive use of the yard's 23-story, 900-ton-capacity gantry crane. With it the yard is building larger subassemblies, and putting together the bigger units on assembly platens rather than in the drydock. It is much easier for this work to take place at the shop level.

Preoutfitting was greater on the Roosevelt than on earlier carriers. Doing advance work and lifting much larger sections results in fewer lifts and saves time and money. A superlift for the Roosevelt, for example, was between 700 and 900 metric tons. In erecting the ship's flight deck, which is 1,092 feet long and 257 feet wide, 14 multi-ton assemblies were lowered into the drydock. On previous carriers, it took as many as 150 lifts to form the flight deck.

Advanced technology is also paying off on the construction of the fifth and six Nimitz Class carriers at the Newport News yard. At mid-1985, the construction of the Abraham Lincoln and the George Washington was reported by the Navy to represent $450 million in savings.

Can computer technology, huge superlifts, and more carrier construction experience continue to pay dividends? Can the success story of the Theodore Roosevelt be topped? Newport News Shipbuilding thinks so and continues to pursue every new option for increased efficiency and lower costs.

For further information on Newport News Shipbuilding and their facilities,

Circle 93 on Reader Service Card

ELECTRONICS UPDATE

Magnavox Introduces New Generation SatCom And New GPS/Transit SatNav Receivers

New Generation SatCom

The first of a new generation of marine satellite communications terminals has been introduced by Magnavox Advanced Products and Systems Company (Torrance, CA). The new Magnavox MX 2400 Integrated SatCom Terminal incorporates virtually every capability of earlier generation equipment plus 16 new communication functions. Also included as standard equipment are many of the optional capabilities available at extra cost on earlier INMARSAT terminals. Further, Magnavox reports the new system incorporates provisions for virtually all of INMARSAT's and IMO's planned future capabilities including those for the Future Global Maritime Distress and Safety System (FGMDSS).

Magnavox MX2400 Integrated Satcon Terminal

The new terminal consists of a single, compact below-decks package combining the CRT workstation and the communication electronics into one space-saving unit. To reduce installation costs there are no separate power supplies or junction boxes. The below decks unit connects via an easily routed ½-inch diameter cable to a compact antenna weighing less than 100 kilograms (209 pounds).

Cost savings extend to system operation with a built-in electronic mail capability to reduce traffic charges. A message length calculation feature helps to determine the cost of telex and electronic mail modes prior to transmission so that the most economical mode can be selected. With the addition of only a standard modem, text can be sent and received at up to 2,400 words per minute. Using an external word processor or computer text, data can be transferred at up to 9,600 bps.

In addition, the MX 2400 includes Remote Access File Transfer (RAFT)®, a feature which allows a shore operator to obtain specified ship's files from any telex machine or by electronic mail. The MX 2400 also incorporates the IMO Automatic Distress Message Generator to be required in the FGMDSS. Pressing one button on board ship notifies a designated shore telex of a distress or emergency situation, providing complete notification including the I.D. number, name, position, speed and heading of the vessel.

System management features of the MX 2400 include dual telephone circuits providing for two levels of user service and directing incoming data and voice calls to separate communications devices on the vessel. User access codes can be used to prevent unauthorized outgoing calls and to log all calls by user name. Daily traffic summary reports furnish a permanent record of all calls and messages.

Throughout, the Magnavox SatCom is designed for easy use. All operator selections are made from concise menus displayed on the CRT. Word processing functions provide convenient on-screen message preparation, storage and transmission. Many operating features are automated. For instance continuous clock, calendar and tracking of ship's heading during a power failure eliminates the need to reinitialize the system after a power outage.

The phone user dials from a standard keypad telephone for all outgoing calls. The same telephone keypad can be used to control primary system functions, including selection of satellite and coast earth station. A synthesized voice response provides automatic and positive verification that keypad commands have been properly executed.

For users requiring other communications modes, the system draws on a wealth of commercially available equipment choices. Standard

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Magnavox Introduces

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modular telephone connectors permit plugging in standard telephone instruments and interconnect equipment such as data modems, facsimile machines and PABXs without requiring optional interfaces. Also built in are interfaces for all planned INMARSAT and IMO capabilities, including the Enhanced Group Call Receiver.

Options include popular SatCom peripherals and accessories—200 to 9,600 bps modems, standby power sources, a magnetic compass heading sensor, and Busiship Integrated Ship Management and Communications System.

The MX 2400 exceeds INMARSAT's environmental performance recommendations and meets internationally accepted standards for reducing electromagnetic interference.

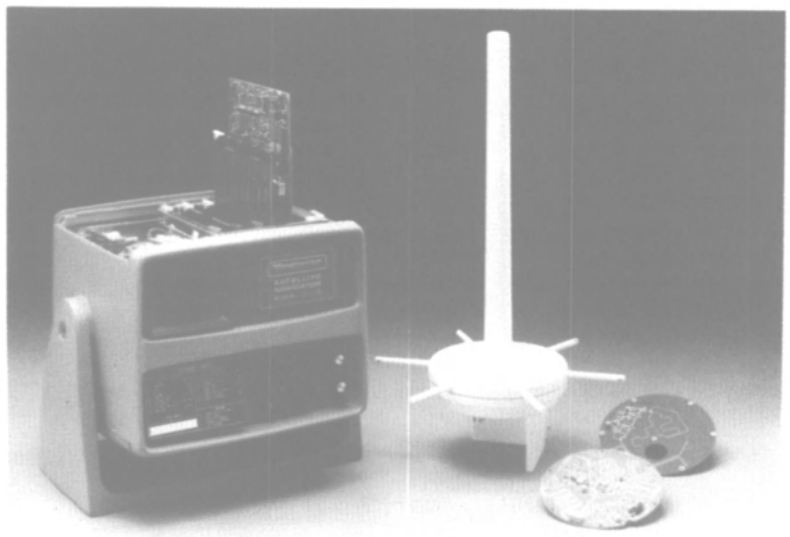
For a full-color brochure containing complete details,

Circle 87 on Reader Service Card

GPS/Transit SatNav Receivers

Four new satellite navigation receivers from Magnavox offer both GPS (Global Positioning System) and Transit capabilities in the same unit. Called the MX 1100-GPS series, these navigators combine GPS and Transit satellite data to generate position information. Further, speed and heading sensors are used to dead reckon between Transit fixes. Both navaids are integrated with dead reckoning for enhanced accuracy and availability.

GPS permit precise, continuous worldwide 2-D navigation whenever three or more satellites are available. When the full 18 satellite constellation is operational, GPS will provide continuous, accurate navigation 24 hours a day. In the interim, large gaps in GPS coverage exist every day. The integration of Transit and dead reckoning with GPS assures the user that he will maintain accurate navigation 24 hours a day. Synergism between Transit and GPS navigation improves the accuracy of each Transit satellite fix. In fact, the position accuracy achieved in this way generally exceeds that available from independent GPS or Transit navigators.



Magnavox MX1100 Transit/GPS Navigator

The Magnavox integration approach means GPS can be utilized immediately instead of postponing use until the 1989 operational date. Using an MX 1100-GPS, the operator can select between full screen displays of Transit and GPS navigation or the receiver can automatically select the optimum navaid, based on satellite orbit configuration.

In its GPS mode, the Magnavox system provides course-over-ground (COG) and speed-over-ground (SOG) information, based on suc-

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Marine Insurance. If it's Greek to your company, you could be in for a big surprise.

Understanding insurance—especially marine business—is a full-time job. So if you're at the helm of your own company, how can you be expected to keep up with the ins and outs?

At Adams & Porter, we know every bend, shoal and snag in the business. Marine insurance brokerage is where we made a name for ourselves 75 years ago.

Adams & Porter professionals can help pilot you through any dangerous waters fully protected by the right amount of coverage for your business.

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Circle 207 on Reader Service Card

Magnavox Introduces

(continued)

cessive 1.6 second position computations. Real-time set and drift information is also displayed using the vector difference between COGs and SOGs, and the ship's measured speed and heading through the water.

The system has a two-channel receiver, for continuous GPS usage. While the first channel sequentially tracks each selected satellite, the second searches for and selects future optimum satellites.

The Magnavox approach emphasizes maximum availability. To optimize the GPS use with the presently limited constellation, the MX 1100-GPS can provide two-satellite navigation, delivering a more precise continuous running fix. This technique minimizes the accumulation of dead reckoning error between either three-satellite GPS or Transit fixes.

Magnavox has designed these receivers for optimum navigation performance today and for a smooth transition to the future. The MX 1100-GPS lets the owner continue working with the familiar Transit system while learning GPS. As more GPS satellites are launched, the receiver takes full advantage of the expanded constellation. Ultimately, and without operator intervention, the Magnavox system will navigate totally on GPS satellites using Transit as a backup system. (The Transit system will remain in operation until at least 1994.)

The new SatNav series is available in either of four models, including single and dual-channel Transit Satellite and Omega capabilities. In addition, an upgrade package consisting of easily installed electronics boards and antenna is offered as a GPS field retrofit for existing Magnavox MX 1102, MX 1112, MX 1142, MX 1105, MX1107, and MX 1157 Transit SatNavs.

For full-color brochures containing complete information,

Circle 88 on Reader Service Card

Newport News Awarded $23.8-Million Contract For Submarine Overhaul

Newport News Shipbuilding and Dry Dock Company, Newport News, Va., was awarded a $23,800,000 cost-plus-fixed-fee contract for planning for the overhaul of the USS Alexander Hamilton (SSBN-617).

The work will be performed on the nuclear-powered submarine at Newport News, and is expected to be completed in June 1986.

Contract funds would have expired at the end of fiscal year 1985. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-C-2085).

Moss Point Marine To Convert Supply Boat To Cargo Vessel

Moss Point Marine, Inc., Escatawpa, Miss., has signed a contract with undisclosed interests to convert a partially completed 171-foot supply boat to a 211-foot cargo vessel.

John Dane III, president of the Mississippi shipyard said the vessel will be delivered in January 1986, and will be powered by two Caterpillar 3512 diesel engines.

Hardie-Tynes To Furnish $6.5-Million Order For SLEP Of 'Independence'

Hardie-Tynes Manufacturing Company of Birmingham, Ala., is being issued a $6,521,000 firm-fixed-price order under a basic ordering agreement to furnish 24 vertical forced draft blower assemblies, ancillary parts and components, and associated technical data for the Service Life Extension Program (SLEP) for the USS Independence (CV-62) at the Philadelphia Naval Shipyard.

The company will perform the work in Birmingham, and is expected to complete the project on September 24, 1986. Contract funds for the project would not have expired at the end of the current fiscal year.

The contracting activity is the Naval Regional Contracting Center, Philadelphia, Pa. (N00104-85-G-0376).

ELECTRONICS UPDATE

Network 90, Integrated Marine Management System For Reduced Costs And Maximized Profits

John Glowe
Senior Market Manager, Marine/Offshore
Bailey Controls Company

No one questions the fact that the survival of the maritime industry is linked to lower operating costs and improved performance. However, we cannot incorporate fully automated controls to effect "reduced manning" for its own sake without considering how this proposed system effectively addresses backed-up control, serviceability, operator interaction with his environment and interface capability to other control systems.

During the past century, ship controls evolved from manual to semi-automated pneumatic and discrete electronic systems and now they stand at the edge of the "microprocessor" age and total vessel automation.

Bailey Controls, in late 1984, introduced Network 90 to the maritime industry. Already a proven system in over 3,000 stationary applications, Network 90 brings the power of microprocessor-based distributed digital control to shipboard and offshore environments. This fully qualified marine system eliminates the need for vessel and platform personnel to see their environment as a series of unrelated processes.

Not only can Network 90 itself provide all the monitoring and control functions required, but it can also tie together formerly dissimilar systems into a single vessel communication network. This is possible because of Network 90's unique system design which does not rely on a central processor or data traffic manager.

The System. A typical marine system configuration consists of remotely located "process control units" and "interface units" connected by a vessel "data highway." The "process control units" provide the direct connection to the various field devices for either monitoring or control. Within each unit resides the required modules to perform the control, alarming and reporting procedures. Each of these units has redundant internal and external

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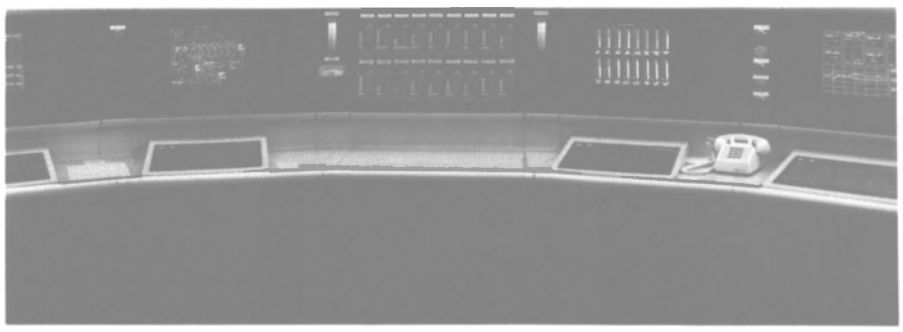

Network 90 brings the power of microprocessor-based distributed digital control to shipboard and offshore environments.

Network 90

(continued)

communication capability as well as redundant and bumpless transfer of control through the Multifunction Controller. In addition, the self-diagnostic capability of Network 90 insures that "bad" data is neither allowed into or out-of the system. And should there be an anticipated problem, a final control signal is transmitted to place all affected processor in a "fail-safe" condition.

The "interface units" can take the form of conventional control consoles with individual hand stations, or it can use the color CRT-based Operator Interface Unit. The CRT-based unit provides, through high resolution graphics, a real-time window on the process. Through this device, automatic printouts of "alarm conditions," equipment performance and operational status may be obtained. A functional keyboard is employed, which allows the operator to use single keystrokes. No programming or keying in of commands is required. These CRT-based units operate in redundancy throughout the vessel or platform.

System Features. Network 90 does not require the operator to physically see or hear the alarm. Through its multiple level alarming capability with corresponding levels of automatic or operator permissive control, this system will provide for preventive actions rather than crisis intervention. This allows operators to take a calmer more efficient approach to dealing with emergencies thereby reducing the possibility of operator error through overreaction.

Network 90 employs conventional logic diagramming to accomplish control functions. This eliminates the need for expensive programming and specially trained personnel. All controls, alarming and monitoring functions are resident in non-volatile memory, further reducing the possibility of loss of control through an accident such as disc wear, magnetic interference, etc.

Network 90 does not require any special tools or training to maintain. In the event of a module problem, a repair is effected by simply sliding out the failed module (indicated by a red LED) and replacing it with a new module from the stores. No other conditioning is required to bring the replacement module on-line. All modules can be replaced without turning off power.

Network 90 uses a system called "exception reporting" in processing signals. This allows priority to be given to those signals which indicate a deviation from expected norm. This allows for the fastest possible response time in the event of a problem with any equipment or process.

Applications. Network 90 has proven itself in various marine applications from highly complex operations such as ballasting control from semi-submersibles to very basic data acquisition and reporting procedures. The following are some examples of how this system is applied.

For complex ballasting operations in semi-submersible projects, like the McDermott DB-1102 Heavy Lift Barge, Network 90 controls the pump and valves based on monitoring the list and trim relative to load on the crane, mooring line tension and feed out, current ballast tank status and wave motion. Through an enhanced Multifunction Controller, Network 90 is able to provide simulation by monitoring projected performance against an optimized model of the barge. This procedure is directly applicable to cargo load and discharge of tankers and general cargo carriers as well.

As a propulsion control system, Network 90 can optimize the performance of a diesel plant by as much as two to five percent without reduced manning. By being able, in a single control system, to interact the fuel feed, cooling and lube oil systems proper viscosity, temperature and pressure are constantly maintained with allowances for the varying response time of mechanical devices. This is especially critical with the burning of heavier and dirtier crudes. By integrating vessel attitude while underway relative to optimal hull and running condition, engine maximization can be accomplished on-line in real-time without the need for lengthy stand-alone computer programs.

In older steam plants, even greater savings can be realized. In most cases as much as eight to ten percent savings in fuel consumption. Through Network 90's Combustion Control, Burner Management and Burner Sequencing packages the ramping effect of fuel usage can be compressed under varying operation load conditions. As with diesel plants above, optimization can be achieved through vessel modeling.

Greater levels of marine safety have been realized through Network 90's Emergency Shut-Down and Damage Control applications, as employed on the ARCO production platforms and the Golar Nor and TransOcean semi-submersible production rigs. Because of the system's flexibility in logic configuration premature shutdowns can be prevented thereby reducing expense, downtime and lost production without sacrificing safety.

Not to be overlooked, throttle control, thrust control, generator load management and integration of other auxiliary systems can easily be handled in Network 90's control schematic.

Not only can Network 90 provide immediate payback as a stand-alone control system, but more importantly, Network 90 can totally integrate these processes into an easily managed vessel/platform optimization network. In the applications described above, Network 90 can generally pay for itself in the first year of operation. When one considers the further reductions in administration and preventive maintenance costs through an integrated approach, payback is more greatly enhanced.

Shipyard Cost Savings. Builders as well as operators can reap the benefits of Network 90 cost reductions. Because of this system's distributed capability, modular design and lack of environmental constraints, 25 to 30 percent installation cost savings have been realized. This is accomplished through Network 90's reduced space requirements for cabinetry as well as lower material and labor costs in hardwiring to remotely located process and termination units.

Further savings are realized through the layering of communication cabling. Network 90 utilizes a twisted-pair coaxial cable as its data highway linking the various process units. By connecting various Bailey and non-Bailey systems to remotely located process units and linking them through a single set of cabling, time and expenses associated with cable pulling and installation are reduced.

Owner Operator Cost Savings. As pointed out earlier, fuel savings of from as low as two percent to as high as 10 percent can realistically be achieved regardless of the propulsion plant or manning.

Improved equipment maintenance is provided through Network 90's flexible alarming and equipment trending analysis capability. It has been estimated that this can save up to 40 man-hours per operating week.

Network 90 has obsoleted "obsolescence." Through its modular design and Bailey's unique Module Replacement Program, system upgrade involves simply the change-out of one module or a series of modules for one with greater capability. Even interface devices can be replaced without wholesale system replacements. This insures that state-of-the-art technology can always be cost effectively maintained not only in newbuild but retrofits as well.

The maritime industry is not booming, but neither is it dead. This is especially true for the domestic side of that market. Bailey Controls has always been there to lead the way for marine control systems from the first automated boiler controls to the first operational integrated marine management system. We are committed to the incorporation of technology into safe and reliable control systems. We believe that the wise implemention of this type of control system can play a major role in the revitalization of the industry, and not at the expense of people.

For more information, including free color literature describing all the cost reducing benefits available with a Network 90 system,

Circle 90 on Reader Service Card

SHIPBOARD COMPUTER SURVEY

The last few years have witnessed a proliferation of specialized software and hardware packages for shipboard applications. Many of these products take advantage of the new generation of small, relatively low-cost personal computers. To bring our readers up to date on the latest developments in this rapidly growing industry, Maritime Reporter recently surveyed leading manufacturers and suppliers of shipboard computer systems. Here is a company-by-company report.

ANCHOR MARINE (INTERNATIONAL) LIMITED

Circle 1 on Reader Service Card

Formed into a company in 1978 from a partnership, Anchor Marine has supplied more than 150 ships with loading instruments, their original product. By using a multipurpose marinized micro instead of a single function machine, Anchor Marine has developed a large range of on-board/shore-ship management tolls for cost saving through efficiency improvements. There is also a range of port-based products, which range from VTMS to terminal planning, to hydrographic survey and chart production. Under the Oceanmaster name, Anchor Marine produces for shipboard use sophisticated cargo management systems, which, in addition to the normal stability/stress functions, include cargo lashing (LWP) and stow planning for containerships, tanker planning/reporting, safe stability for gas carriers, damage stability, tank gauging and optrim for all ships, as well as systems for oil rigs, offshore structures and semi-submersibles. Apart from cargo functions, the Oceanmaster range also covers navigation cost savings, with the new NAVEY system, and energy efficiency, through the DECAMS and MEPS systems. On-board monitoring and control combinations of all of these, plus many more, have led to Oceanmaster Automation Systems, which can cover single systems (deballasting, air conditioning, tank gauging, etc.) right through to complete ship systems. Ship management on board is covered by Oceanmaster products such as stock control and planned maintenance systems, plus budget monitoring and master's/passenger accounts. On-board data can be quickly and economically transferred ashore from Oceanmaster computer to another, and at the same time, receive shore data with automatic updating of databases at each end, plus transfer to mainframe systems.

BSRA SYSTEMS LTD.

Circle 2 on Reader Service Card

BSRA Systems has drawn upon the background technology skills of British Maritime Technology to develop and supply innovative solutions to vessel and fleet management computer systems. Full Lloyd's Classification Society approval has been gained for the marinized IBM PC-AT in consultation with existing approval for hardware from Data General and Olivetti. Ship management software systems plus full implementation services are available. The software modules cover analytical, procedural, financial and office automation tasks and are written for Unix MS-DOS and AOS operating systems. Specific software skills with proven applied products are available within the following areas: loading computer systems, service performance monitoring, cargo operation training aids, engineering spares stock control and budgeting, planned maintenance, and victualling accounting.

JOHN FLUKE MFG.

Circle 3 on Reader Service Card

John Fluke Mfg. Co., Inc., has developed the ProLogger, a new software package that links an IBM PC, XT or AT with the Fluke 2280 SERIES Advanced Data Loggers. ProLogger software turns the IBM PC into a high-accuracy data acquisition system, simplifying control and report generation.

The package enables Fluke 2280 SERIES data loggers to be operated from an IBM PC. The operator can create and edit application programs on the IBM PC and download them to either the Fluke 2280B or 2285B. The data logger then handles all A/D conversions, linearizations and control functions, freeing the PC for other tasks. Programs can be developed in BASIC, or by responding to the friendly, menu-driven prompts of the Fluke 2280 SERIES. To help simplify programming, the PC's screen displays a likeness of the 2280 front panel display during program development.

ProLogger software facilitates report generation, by automatically retrieving data and storing it in a report format of the user's choice. The new package allows an IBM PC to retrieve data from a 2280 SERIES data logger and store it in a LOTUS 1-2-3 format.

ProLogger allows an IBM PC to communicate with two versatile and reliable data loggers. A Fluke 2280 SERIES data logger will satisfy virtually every input requirement: DC volts, AC volts, current, thermocouples, RTD's, strain, resistance, frequency, event totalizing, BCD, binary and contact closures. The 2280B and 2285B can be operated from a 12-volt DC power supply or applications when line voltage is not available. The 2280B is expandable to 1,500 channels using several extender chassis. A-to-D conversion is done at each extender chassis for faster and more reliable data acquisition, even in noisy environments. Fluke 2280 SERIES Advanced Data Loggers feature high total instrument accuracy, with 16-bit A-to-D conversion and 0.005% DC volts accuracy.

INFORMATION MARKETING INTERNATIONAL

Circle 4 on Reader Service Card

A large portion of the government's spare parts procurement problem is the staggering amount of data, documentation and paperwork involved.

Anyone who wishes to do business with the government must cope with a bewildering array of specifications, standards, commercial and federal part numbers and various types of vendor and pricing information that is necessary for the procurement of spare parts. The result can be ridiculously high costs for parts and/or long delays in procurement.

For example, the USS Yellowstone, a Navy tender, was spending over $30,000 per year gathering and processing data required for the procurement of spare parts. Installation of an advanced, computer-based product-information system—aptly called "Haystack"—doubled the amount of information available to logistics personnel and cut their research time in half. The Yellowstone saves $14,130 annually in costs of just its logistics information. Additional savings in procurement activities are accruing every day.

The Haystack system was developed by Information Marketing International (IMI)—a Ziff-Davis information company. **Louis B. Nelsen,** president of IMI, explains, "Haystack provides a complete cross-reference system that stocks vital government and industrial information in an integrated electronic database. Users, working with computer terminals or personal computers, can quickly identify parts, search out sources of supply, find names and addresses of manufacturers, and check prices and product descriptions. Haystack also locates full text vendor catalogs and military/federal specifications and standards on microfiche or microfilm."

IRD MECHANALYSIS

Circle 5 on Reader Service Card

IRD Mechanalysis, Inc. has recently developed a computer-based shipboard machinery predictive maintenance program which provides benefits of increased machinery life, reduced downtime, lower maintenance costs, earlier detection of machine defects and elimination of many ABS Special Survey open-and-inspect requirements. The program includes three components: (1) software suitable for operation with shipboard personal computers, (2) a handheld portable data collector and (3) a vibration analyzer. The data collector is automatically programmed by the computer to gather vibration, temperature, pressure, load and other operating parameter information from the ship's critical machines. It then guides the operator by LCD prompting messages as to what measurements to take. After taking the measurements, the data collector is off-loaded to the computer, which automatically analyzes the results and advises shipboard personnel as to the condition of each machine by means of printed or CRT display reports. Should a report indicate that a machine has a problem, the vibration analyzer is used to pinpoint the cause (e.g., unbalance, misalignment, defective bearings) and indicate its severity.

KEEL MARINE LIMITED

Circle 6 on Reader Service Card

In response to the requirements for the provision of Ship Loading Calculators on many types of ships, Keel Marine offers their on-board type-approved Keel Mariner 2. This is a rugged and entirely self-contained unit, with a customized keyboard, display screen and printer, all housed within a "briefcase" unit, which can be either portable or fixed in position. The normal calculation functions of draft, trim, stability and longitudinal strength can be extended to cover grain cargo, containers and RO/RO, as well liquid, dry bulk cargo and most additional customer requirements. External communication links are provided to enable direct input from tank level gauges or direct output to SatCom or printer as required. Being a dedicated instrument, Keel Mariner 2 is extremely fast and easy to use and requires no special training. For the multi-ship requirements of the shipowner's office or the Nautical Training College, Keel Marine also offers a Ship Loading Calculator software package, called Keel Mariner 1, which can be supplied to run on most commonly available microcomputers. Founded in 1962, Keel Marine's staff of naval architects, designers, marine engineers and surveyors carry out work on a worldwide basis, and clients include government agencies, shipbuilders, shipowners, oil companies, civil engineering companies and others. The company's services are supported by full drawing office and in-house computer facilities.

MARINE COMPUTER MANAGEMENT, INC.

Circle 7 on Reader Service Card

In August 1985, Marine Computer Management, Inc. (MCM) re-

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Shipboard Computer Survey

(continued)

leased its Cargo Management/Hull Loading program. This program performs and displays stability, trim and allowable bending moment calculations automatically, as cargo data is entered. It can be used independently or in conjunction with shoreside computers. The system produces numerous reports and has full editing features. It stores past computed stability and trim calculations for future reference. Screen graphics are displayed for cargo management and stability analysis. The system automates many manual calculations, saving time and improving efficiency. It is effective in cargo preplanning and tank management underway. It allows quick and accurate cargo identification and locating on-board. MCM also has programs available for vessel administration and payroll and spare parts inventory control, with enhanced versions of personnel rotation and history, planned preventive maintenance, chart and publication maintenance and stores and provisions available soon. Custom software service is also available. Inventory data collection and engineering services are available through MCM's affiliates.

MARINE MANAGEMENT SYSTEMS, INC.

Circle 8 on Reader Service Card

Founded in 1970, MMS develops and markets computerized management information systems for the maritime industry worldwide. MMS software applications are provided both as standardized and custom software packages relating to the complete spectrum of marine management functions, including vessel operations, fleet management, planning and accounting from shipboard to shoreside. MMS currently offers standardized ship management application systems designed to operate on the IBM personal computer, in the areas of maintenance management, vessel performance and vessel administration. The maintenance management group includes the Spare Parts Inventory Management (SPIM) and Planned Maintenance (PMS) systems, together with Condition Monitoring applications. Under vessel performance, MMS currently offers Cargomax, a trim/stability and stress calculation system. Future additions will include vessel performance and voyage reporting systems. With regard to vessel administration, MMS markets the Fleet Payroll/Personnel Management (FPMS) System, which meets the shipboard and shoreside administrative requirements of the industry. All systems are fully integrated to provide a state-of-the-art ship management tool. MMS systems are installed and operating successfully for several major domestic shipping companies, including AMOCO Transport, S.P.C. Shipping (SOHIO) and ARCO Marine.

MARITIME COMPUTER AND TECHNICAL SERVICES LTD.

Circle 9 on Reader Service Card

MCTS specializes in the design and production of robust computer systems for the marine industry. The company was formed in 1982 and evolved from the Shipboard Computer Group, a university research team at the Department of Maritime Studies, UWIST, Cardiff, Wales. The company offers a range of software design services for both ship and shore-based computers, covering applications such as stores and maintenance monitoring, performance monitoring and shipboard management. MCTS has developed an expandable shipboard software package centered on the TASK-MASTER cargo management system. This interactive package can be tailored to suit any vessel of any type. It is modularized to meet individual requirements and includes voyage cargo records, longitudinal strength, transverse intact stability, transverse damaged stability, Grain Rules requirements and MARPOL

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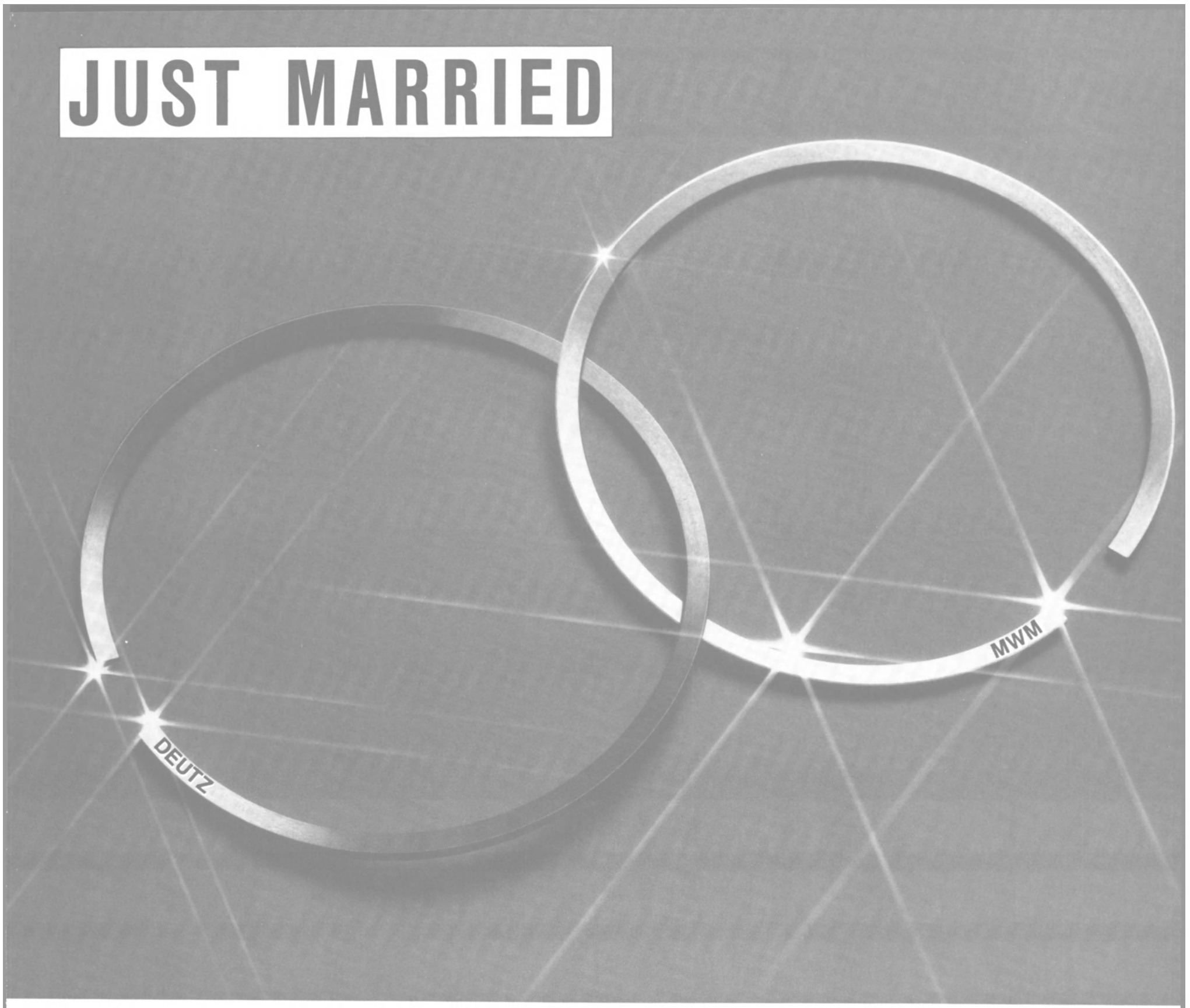
JUST MARRIED



At the time when economic growth appears to be coming to a standstill and stagnating sales figures are seen as a sign of success, it is good to hear there are still companies around that refuse to be associated with this attitude.

We are ready to prove it – with the powerful partnership DEUTZ MWM. Klöckner-Humboldt-Deutz AG has taken a majority interest in the Motoren-Werke Mannheim AG and is now concentrating both companies' activities in medium and big engines at Mannheim.

Thus a new symbol is born. DEUTZ MWM stands for years of experience, outstanding engineering and economy propulsion.

Our customers are guaranteed international service, high trained service personnel and a fast supply of genuine spare parts anywhere, anytime.

Give us a call!

The economical ones.

DEUTZ MWM KHD

Circle 350 on Reader Service Card

Motoren-Werke Mannheim AG, P.O. Box 1563, D-6800 Mannheim 1

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requirements. TASKMASTER is fully approved as a loading instrument by Lloyd's Register of Shipping and Det norske Veritas. The system can operate on either the Commodore 8296 Business Computer System or on the IBM PC-AT personal computer. The TASKMASTER (AT) Damage Stability Module has been implemented for four classes of OCL container ships covering nine different vessels.

McNAB INCORPORATED

Circle 10 on Reader Service Card

McNab's Fuel Management System is a self-contained, microcomputer-based package of hardware and software designed to allow vessel operators to maximize profits by minimizing fuel costs. The system incorporated shoreside accounting and scheduling information along with automatically monitored vessel performance data to arrive at a reliable analysis of per voyage profit versus vessel speed. Shaft torque, shaft rpm, propeller thrust, fuel consumption and voyage speed are continuously monitored and fed to the system, which accurately calculates on the basis of that information and financial data the voyage speed to produce the greatest profit or even minimize a loss. U.S. government studies have concluded that fuel savings of up to 30% may be achieved in this manner. The McNab Fuel Management System also gives valuable insight into vessel drag, hull and propeller efficiency. This allows the operator to determine when it is most cost-effective to recoat the hull or clean the prop. McNab, Inc., has been a marine instrumentation manufacturer since 1909 and is recognized as a leader in the industry.

NAV-COM INCORPORATED

Circle 11 on Reader Service Card

BUSISHIP is an advanced computer-based shipboard management information system developed by NAV-COM Incorporated for operation on the popular and powerful IBM PC-XT and PC-AT microcomputers. NAV-COM is an official value-added dealer for IBM, and has enhanced the basic IBM hardware with extensive ruggedization for the marine environment and with integrated software packages for marine management. BUSISHIP is a "family" of data systems and solutions, which offers a total solution to the overall information and reporting requirements of ships and shoreside offices. The basic building block for BUSISHIP is the shipboard workstation, an IBM PC/XT with 10MB hard disk and cassette back-up, a monochrome monitor, a high-speed dot-matrix printer with graphics capability and a modem for data communications. A similar computer, without the shipboard ruggedization, can be used in the shoreside office, and extensive capabilities have been built into BUSISHIP for data communications between ship and shore. The system incorporates a 2,400-bps modem and built-in error correction capabilities, and is compatible with most standard European and U.S. medium-speed data protocols, including CCITT V.22 bis, to exchange files, reports and messages rapidly and accurately between computers. BUSISHIP is designed to permit users to realize the full benefits of modern electronic mail techniques for sending and receiving text through satellite voice channels. This can produce savings of $8,000 or more per year for typical commercial ships in reduced satellite calling charges. NAV-COM, a wholly owned subsidiary of the Magnavox Government and Industrial Electronics Company, offers a turnkey package that includes system design, software development, systems integration, installation, documentation, training and worldwide service.

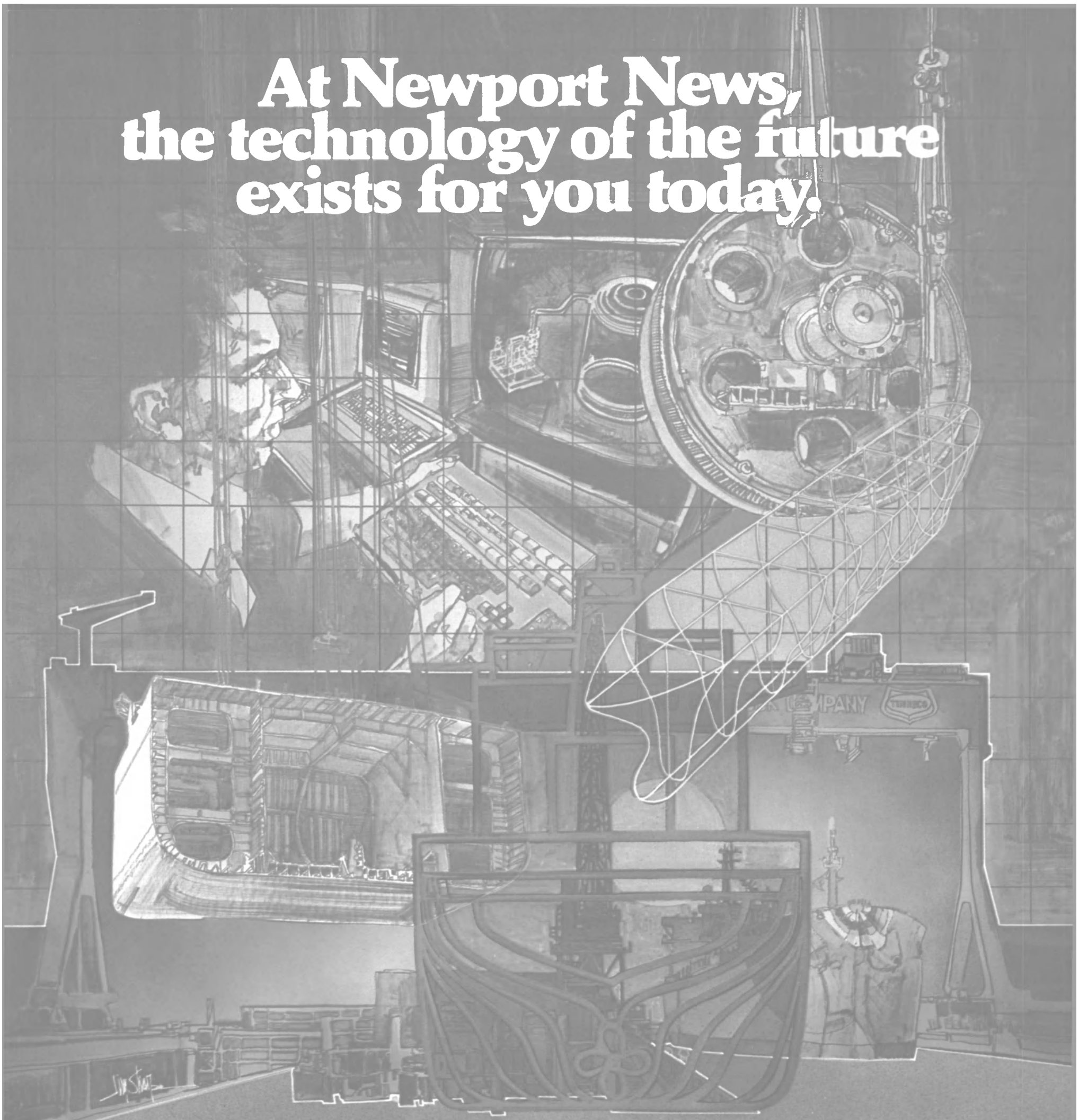
OCEAN MOTIONS COMPANY

Circle 12 on Reader Service Card

Over 240 ships have installed

(continued)

At Newport News, the technology of the future exists for you today.



It takes advanced technology, superior facilities and imagination to design and build the most sophisticated ships in the world.

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Circle 166 on Reader Service Card

Shipboard Computer Survey

(continued)

Ocean Motions Company software and hardware for tasks ranging from traditional trim, stability and strength to very sophisticated stability calculations in wind and waves. Ocean Motions offers Ship Loading Programs for operation on all IBM PC, PC-XT and PC-AT computers, with fully illustrated user manuals, and also a series of Ship Loading Computers, which are fully marinized against shipboard shock, vibration, power transients and line noise. All Ocean Motions software is menu driven with simple prompts and complete input error checking. Six loading conditions are preprogrammed for immediate retrieval, and tonnage, ullage, specific gravity and percent-full changes to bring the nearest condition in line with the user's required load out. In containerships, the stowage/load/discharge sequence is continuously tracked and presented to the user so that he retains the most practical and efficient container distribution. Sophisticated calculations of any stranded, damaged, flooded and intact ship are made easy for the loading officer/master/shore manager by very carefully written minimum input algorithms. Also available from Ocean Motions is the new Stability Alarm, which is absolutely unique and a definite breakthrough in shipboard computer technology. It continuously and automatically senses ship stability. Not to be confused with a traditional loading computer, the Stability Alarm is entirely automatic with no user inputs. It is in effect a navigation feedback device, telling the helmsman how his heading and speed increase or decrease the vessel's stability. Recent installations and orders for Ocean Motions include the General Dynamics Maritime Prepositioning Ships, Avondale T-AO 187 fleet oilers, Sohio West Coast tankers, USCG barge monitoring, Western Geophysical and many other commercial vessels from 30-295 feet.

A.S. SKARPENORD

Circle 14 on Reader Service Card

A.S. Skarpenord is manufacturer of Cargomaster computerized tank monitoring systems for closed level gauging, temperature monitoring and inert gas pressure monitoring in one system. The system will also measure the density/specific gravity of the cargos and present the volume and weight in each tank, groups of tanks or all tanks jointly. An on-line/off-line loading computer, draught measurement, cargo line pressure and automatic pump and valve control can be integrated in Cargomaster. The system is based on a specially designed pressure/temperature sensor. The installation has no moving parts and can withstand all types of tankwashing. The materials selected for the sensor are of highest quality nickel alloys, resisting the most aggressive acids. Cargomaster has since 1979 been installed on chemical, products and crude oil tankers with excellent results. The system has also been installed on semi-submersible rigs under the name Rigmaster for ballast control, draught measurement and stability calculation.

SPECTEC CONSULT A.S.

Circle 15 on Reader Service Card

The AMOS-D marine maintenance program has been developed by SpecTec A.S., the daughter company of Arnesen, Christensen & Co., one of Norway's oldest and most respected shipping consultant firms. The system is based on Arnesen, Christensen's 70 years of experience in the field and has been developed through intimate cooperation between SpecTec's own in-house maintenance engineers and computer specialists. Most recently, the AMOS-D system was installed on the M/S Mariella, Viking Lines' luxury passenger ferry. AMOS-D provides the user with full control of maintenance planning and reporting while simultaneously winning the struggle for coordinated spare parts administration. With AMOS-D, a complete overview of what needs to be done, what has been done, who did it, when and where, plus the kind of "bird's-eye view" of parts inventory that maintenance supervisors need, are all available at the touch of a key. Automatic and selective parts requisitioning, one-key search for components and spare parts, full library of vendors, detailed information at all levels and statistic routines for spare parts consumption and maintenance expenses are standard features. The system is based on a logically structured menu interface which guides the user to the desired operation with clear instructions, written by maintenance experts instead of computer programmers. This menu interface has grown and matured through the several months of testing on actual installation sites and through feedback from users working with AMOS-D daily. SpecTec has installed over 50 systems and instructed some 100 maintenance engineers.

STANWICK CORPORATION

Circle 16 on Reader Service Card

The Stanwick Maintenance Management System integrates preventive maintenance and repairs with a management information system. It provides preprinted maintenance work orders and collects cost and repair data for each item of equipment maintained. Complete machinery histories can be printed on command. Other reports include executive summaries of maintenance not accomplished, maintenance labor and material and material expended and repair labor and material expended. Stanwick's programs are designed to run on IBM-PC microcomputers. Stanwick offers programs for onboard inventory control and preventive maintenance. The Spare Parts Inventory Program prints a list of spare parts according to a shipping company's numbering system, cross-referenced to a manufacturer's or vendor's part number, associated costs, quantities on hand, on order and order date. The listing provides an interface between the ship's crew and the purchasing department ashore. Reports include stock status, reorder reports, excessive parts on hand and inventory value.

THREE QUAYS MARINE SERVICES LTD.

Circle 17 on Reader Service Card

Three Quays Marine Services range of shipboard computer uses have been developed over many years of onboard experience. A data

(continued)

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Alban Engine Power has the credentials to back up its claim to be one of the most experienced full-service Caterpillar marine specialists in the country. Shipbuilders, utilities, and commercial fleets have turned to Alban for their marine power needs.

For over a decade, Alban has put its proven in-shop capabilities for fabrication, assembly and supply of both prime and auxiliary power at the service of owner/operators of tugs, trawlers and cargo vessels. Alban not only sells but also services the entire line of Caterpillar's superbly crafted marine engines from 75 to 1700 HP.

Alban tackles every assignment knowing that each vessel, large or small, has its own unique requirements. Together with you, our aim is to fill those requirements as efficiently and economically as possible. If there is a marine engine challenge beyond Alban's capability, we have yet to come across it.

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Circle 348 on Reader Service Card

The Navy, under its TAKX Maritime Prepositioning Ship program, awarded five "stretch ship" conversions to the Marine Construction Group of Bethlehem Steel Corporation. For each of these ships, Bethlehem has entrusted the fabrication and supply of the auxiliary marine generator package to Alban.

ALBAN

ALBAN ENGINE POWER, INC.

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MARINE ENGINES-PARTS & SERVICE

Photo credit of earth in space, NASA.

Shipboard Computer Survey

(continued)

communications system is in service transmitting ships' performance data, accounts, reports and routine mail from IBM PC to PC via satellite. This has more than halved costs compared with telex. Three Quays will convert current paper-based reports and analysis forms to a computer format and integrate with performance monitoring and communications. The hull, propeller and machinery performance of 100 ships is being monitored by a Three Quays program which analyzes routine log book data. This software provides a continuous assessment of vessel performance and the ability to predict future performance using alternative hull maintenance options. Hitherto, this has been done ashore, but the availability of onboard micros allows data to be inputted onboard and only the condensed results transmitted to shore. Monitoring the performance of diesel engines has also received Three Quays attention. DECAMS is a computer based system using a custom-made computer as a data acquisition and the shipboard micro as the analysis unit. This enables the combustion parameters of all engines onboard to be measured, recorded and compared with a calculated standard for the current operating conditions. This allows the engine to be kept to the peak of fuel efficiency while avoiding damage due to burning fuels of variable ignition and combustion quality. The key is to be able to compare performance fully, correcting for current service power, ambient conditions and fuel characteristics.

TIMSCO, INC.

Circle 18 on Reader Service Card

TIMSCO, Inc., of Mobile, Alabama, offers shipboard computer applications for any type and size of vessel using IBM PC XT/AT or 100% compatible computers. Package currently available includes the Fleet Management System for shoreside users, Spare Parts Inventory Control System, Stores & Provisions Inventory/Requisitioning System, Planned/Preventive Maintenance System, Regulatory Body Inspection System, Transport Analysis System and Rig Management System. Through a cooperative marketing agreement with Marine Computer Management, Inc., of Martinez, California, TIMSCO offers the additional software packages, including vessel administration and payroll, cargo management and hull loading, voyage planning and navigation system. As a representative of Palomar Technology International, TIMSCO provides hardware, software and field services for vibration monitoring and vibration analysis of rotating machinery.

VESON, INC.

Circle 19 on Reader Service Card

Veson, Inc., showed a wide variety of shipping computer programs at the recent International Maritime Exposition at the New York Hilton. Veson has pioneered the development of super-microcomputer applications for the shipping industry. The company combines the current hardware and software technologies with extensive business management experience to create what is termed "The Shipping Office of the Future." The company's systems reach well beyond the era of the personal computers. They are multi-user, modular, expandable systems accommodating from one to 120 users. Installations have been made in companies ranging from four-person offices to Fortune 100 corporations. On display at the SNAME exposition were applications relating to operations planning and control, charter management and voyage estimating, accounting, crew information and payroll, vessel spares and maintenance management, information analysis for decision support, telexing and word processing, connection to data base networks and international office communications.

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All three MPS ships converted by NASSCO for Waterman Steamship Company, are now on charter to the Military Sealift Command *within the original schedule and budgeted cost.* The *new dimension* of proven major conversion capability has now been added to NASSCO's already impressive credentials and has *positioned* NASSCO as one of the finest, full service new construction, conversion and repair shipyards in the United States.

General P.X. Kelley, Commandant of the U.S. Marine Corps

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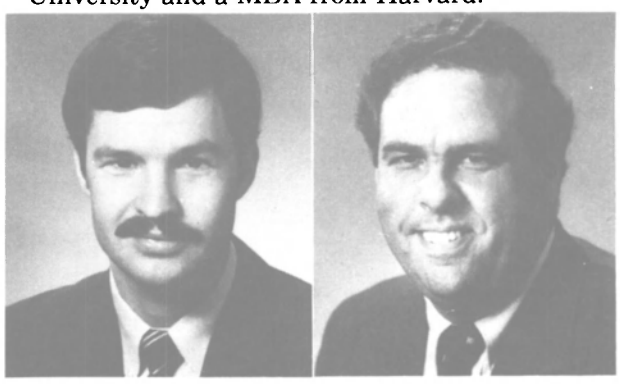
Ellicott Machine Corporation Announces Personnel Changes

Richard E. Bowe, chairman of the board and president of Ellicott Machine Corporation, and **Charles D. Little,** president of Ellicott Machine Corporation International, have announced the following three promotions and one hiring at Ellicott's Dredge Division.

Peter A. Bowe to vice president and general manager. Mr. **Bowe** joined the company in 1982 as secretary-treasurer. He will continue as treasurer of the parent company. Prior to Ellicott Mr. **Bowe** worked for the Morgan Guaranty Trust Co. of New York as a loan officer in the Energy Group. He has a B.A. degree from Yale University and a MBA from Harvard.



P.A. Bowe D.J. Piper

Douglas J. Piper to vice president. In his new position Mr. **Piper** will oversee the company's engineering, estimating, and field service activities. Mr. **Piper** joined Ellicott in 1978 as a project sales engineer, rising to special equipment manager in 1982 and contracts manager in 1983. Prior to Ellicott he spent 11 years with Great Lakes International. He has a B.S. degree in Engineering from the University of Michigan.

A.W. McDowell R.R. Rose

Alexander W.K. McDowell to vice president-sales and new product development. Mr. **McDowell** first started with Ellicott in 1966. He served as field test engineer and project sales engineer before being elected general sales manager in 1982. Mr. **McDowell** is credited as a principal developer of Ellicott's Bucketwheel Excavator which has become a standard in the dredge mining industry. Mr. **McDowell** attended the U.S. Naval Academy and graduated from Allegheny College with a B.A. in economics and business management. He also attended George Washington University Graduate School of Engineering.

Ronald R. Rose has joined Ellicott as chief engineer. Mr. **Rose** has for years been a successful independent hydraulic dredge design consultant. Prior to that he served in engineering capacities at Mobile Pulley and Kennecott. Mr. **Rose** has an engineering degree from Penn State.

Mr. **Bowe** and Mr. **Little** explained that the changes were necessary to guide the Dredge Division's current growth in existing markets and expansion in new markets such as hopper dredge design, deep-digging bucketwheels, and the application of sophisticated technology to dredge operations.

For further information,

Circle 80 on Reader Service Card

ADDSCO Awarded Contract To Overhaul S/S United States

Alabama Dry Dock and Shipbuilding Co. (ADDSCO), Mobile, Ala., has concluded a $192-million contract with United States Cruises, Inc., Seattle, Wash., to modernize the passenger ship United States. The contract, which would mean as many as 1,000 shipyard jobs over a two-year period, is conditioned on the Maritime Administration approving an application to guarantee 75 percent of the financing of the project under Title XI of the Merchant Marine Act of 1936.

Newport News Awarded $6-Million Contract Increase For USS Eisenhower Overhaul

Newport News Shipbuilding and Dry Dock Company, Newport News, Va., is being awarded a $6,000,000 face value increase by the Naval Sea Systems Command, Washington, D.C., to a previously awarded cost-plus-fixed-fee contract to prepare for the overhaul, alteration and repair of the USS Dwight D. Eisenhower (CVN-69).

The work will be performed on the nuclear-powered aircraft carrier in Newport News, and is expected to be completed in January 1987.

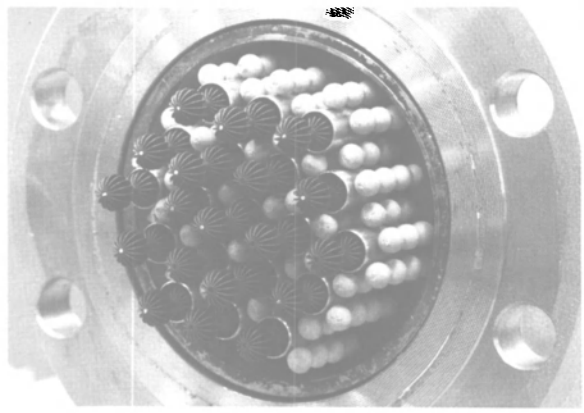
The contract funds would have expired at the end of fiscal year 1985. There were no negotiations because of the face value increase. The contract number for the project is N00024-84-C-2079.

Vapor Corporation Announces New Sphere Matrix Technology —Literature Available

W.B. Lampert, general product manager, Heat Exchange Products Division, Vapor Corporation, recently announced the introduction of Vapor Sphere Matrix® Technology that is said to improve performance of liquid-to-liquid. shell-and-tube heat exchangers.

The Sphere Matrix heat exchanger is similar to a conventional shell-and-tube exchanger in overall design. However, unlike the conventional exchanger, a series of fluted spheres are uniformly spaced on a connecting rod and inserted into each tube of a Sphere Matrix heat exchanger. These inserts serve to interrupt the growth, thereby minimizing the thickness, of the thermal boundary layer that develops on the tube side of the heat transfer surface. They also promote better mixing between the boundary layer and the bulk flow in the tube.

On the shellside it is customary to use solid spheres uniformly spaced on connecting rods that are nestled around the tubes, with point contact between the spheres and the tube. These sphere rods act similarly to minimize the shell-side thermal boundary and to promote better mixing between the boundary layer and the bulk fluid flow. As with the tube inserts, the geometry of the shellside sphere rods can be optimized.



Vapor Corporation will offer limited production of the new heat exchanger in 1985. Vapor also supplies oil, gas and electric fired steam generators for industrial and marine applications in the U.S. and worldwide.

For further literature containing full information,

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NATURAL PROBLEM SOLVERS

Navigation and target detection at night or in poor visibility is always a problem, but, over the millennia, bats developed a natural solution. Bats have a built-in "radar" that is immensely efficient and enormously sophisticated. In flight, for example, some species can easily detect and avoid very fine suspended wires. Bats are able to accurately determine range and bearing, even discriminate between two closely spaced objects. In addition, bats can readily measure the relative velocity between themselves and a target by consecutive range measurements or by doppler frequency shift. The most amazing ability, however, is that bats not only can determine target size, but also shape and surface properties.

Furuno has a product line that solves navigation and target detection problems for commercial vessel operators: Our newest family of 12- and 16-inch radars. These systems are available in 25 kW X-band and 60 kW S-band versions, interswitched if desired, and offer dual VRM's, offcentering, "echo stretch," a variety of antenna lengths, and ten range scales to 120 miles plus a 12-mile true motion scale. All units meet current IMO requirements for ocean-going vessels and provide features such as digital signal processing, continuously visible EBL, Furuno's exclusive hybrid microwave IC receiver circuitry for high sensitivity, and a log amplifier for better target detection at all ranges in any weather.

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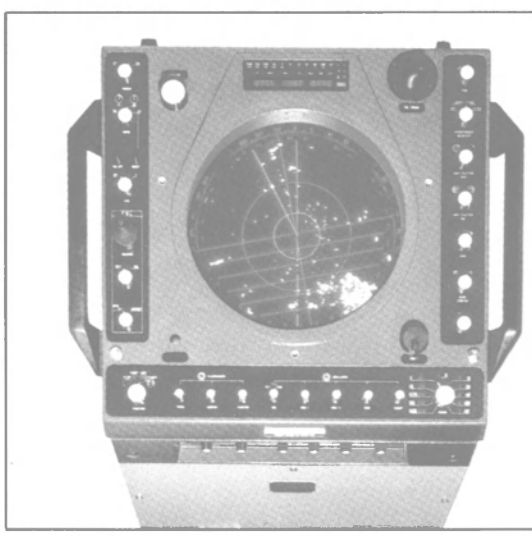

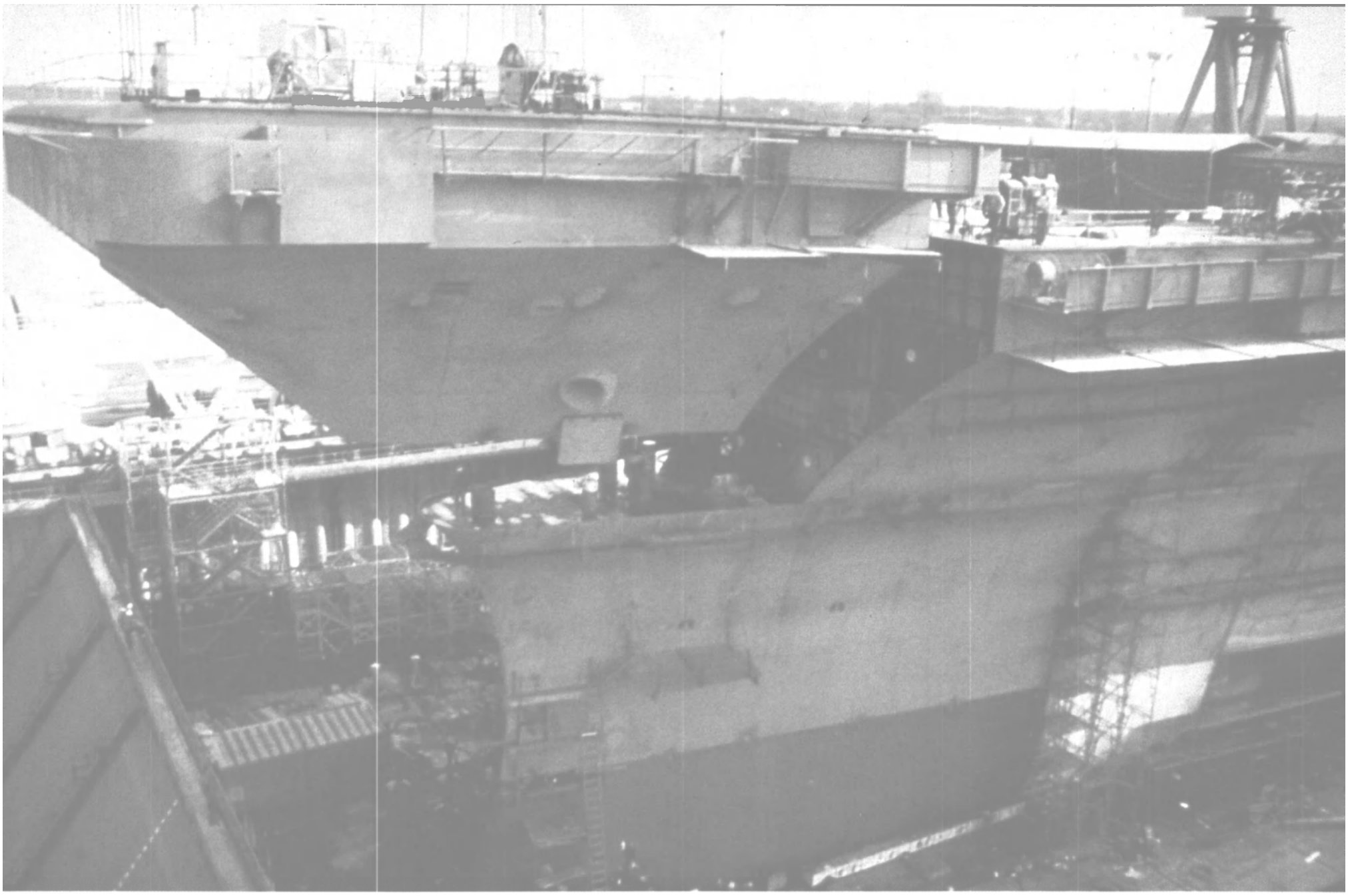

U.S. NAVY SHIP PROCUREMENT

Second Quarterly Update—November 1985

by James McCaul, President
International Maritime Associates

This is an excerpt from the second quarterly update to the IMA report on U.S. Navy Ship Procurement. Information is current as of 8 November, except if noted.

PROGRAM DEVELOPMENTS

The number of Navy ships under contract continues to decline. Reports indicating significant future shipbuilding program cutbacks have appeared in the press. A twin-hull T-AGOS has been scheduled for late 1986 procurement. And Navy has dropped its plans to continue developing JTIDS, a sophisticated tactical warfare communications system.

Photo—Newport News Shipbuilding, Inc.

Ships Under Contract

Navy has 94 major ships and about 40 small craft under contract in U.S. shipyards. In contrast, 114 major ships were under contract in mid-1983. Exhibit 1 provides a summary of work in progress and the scheduled delivery dates.

Future Program Cutbacks?

On 23 September the New York Times reported top DOD officials as saying budget cuts will affect the Navy's five-year shipbuilding plan. **William Taft**, the Deputy Secretary of Defense, is reported as saying 20 warships are to be cut from Navy's five-year plan. He is quoted as saying the cutback in escort ships has "called into question our ability to ever flesh out 15 carrier battle groups."

Two recent congressional staff documents have questioned the affordability of future navy shipbuilding. A staff working paper by the Congressional Budget Office concludes that maintaining the future 600-ship Navy will require funding levels 20-60 percent higher than the present level (in real terms). A 30 August report by the Congressional Research Service points out that Navy has already downrated its cruiser/destroyer force objective from 137 ships to 115 ships. The CRS report goes on to ask "is the projected cruiser/destroyer shortfall a harbinger of future clashes between stated Navy requirements and available resources?"

Navy Developing T-AGOS SWATH Procurement Package

Navy plans to contract for a 3,000-ton small-waterplane-area twin-hull (SWATH) design T-AGOS in late 1986. Ten shipbuilders are now participating in a Navy-industry design program for SWATH. Each of the ten yards has donated one technical person for a six-month period to help in the design. Only the yards participating in the cooperative design will be invited to bid on the construction contract.

The current T-AGOS design is considered insufficiently stable in heavy seas. A SWATH design pro-

(continued)

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Our main propulsion boilers range in capacity from 40,000 to 400,000 lb/hr; auxiliaries from 5,000 to 130,000 lb/hr; and our waste heat boilers reclaim heat from exhaust gases of diesel engines and gas turbines. Providing a reliable source of steam for power generation, hotel services and other functions.

Count on Combustion Engineering to continue its 50 year old tradition of innovation, quality and design leadership. And to provide a complete range of follow-on services. From construction guidance and start-up, through ongoing technical support, outage assistance, onboard service calls and OEM parts.

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Navy

(continued)

vides a relatively stable platform in most sea conditions.

It is uncertain whether the ship construction contract will be funded from FY 1986 or FY 1987 SCN funds. Navy wants to use FY 1986 T-AGOS funds for the SWATH procurement. This would require approval of Congress—and at time of publication the Senate, but not the House, favors such approval. FY 1987 funds would be used if the request to use FY 1986 funds is denied. Presumably the SWATH T-AGOS would be procured using funds originally programmed for the option ships in the Halter T-AGOS contract.

Navy JTIDS Dropped

Navy has cancelled plans to develop its own version of a joint tactical information distribution system (JTIDS). Navy still plans to install JTIDS, a jam-resistant voice and data communications system, on board ships, aircraft and in ground-based command centers. But the system will be that under development by the Air Force at Rockwell-Collins and Singer Kearfott.

The proposed FY 1986 Navy program had included $185 million to continue Navy JTIDS development efforts in progress at ITT and Hughes Aircraft. In the authorization process Congress refused to authorize separate, parallel JTIDS development by Navy and Air Force. DOD was directed to review the current Navy and Air Force JTIDS programs—and choose one for use by both services. The Air Force system apparently was considered the cost effective alternative.

(continued)

Exhibit 1—Current Navy Shipbuilding Contracts (As of 1 November 1985)

Ship Type	Building Yard	Delivery Date	Contract Number	Type
Ocean Surveillance Ships				
TAGOS 7	Tacoma Boatbuilding	11/85	N00024-80-C-2046	FFP
TAGOS 8	Tacoma Boatbuilding	1/86	N00024-80-C-2046	FFP
TAGOS 9	Tacoma Boatbuilding	3/86	N00024-80-C-2046	FFP
TAGOS 10	Tacoma Boatbuilding	6/86	N00024-80-C-2046	FFP
TAGOS 11	Tacoma Boatbuilding	8/86	N00024-80-C-2046	FFP
TAGOS 12	Tacoma Boatbuilding	10/86	N00024-80-C-2046	FFP
TAGOS 13	Halter Marine	3/88	N00024-85-C-2041	FPE
TAGOS 14	Halter Marine	7/88	N00024-85-C-2041	FPE
TAGOS 15 (Option)	Halter Marine	n.a.	N00024-85-C-2041	FPE
TAGOS 16 (Option)	Halter Marine	n.a.	N00024-85-C-2041	FPE
TAGOS 17 (Option)	Halter Marine	n.a.	N00024-85-C-2041	FPE
TAGOS 18 (Option)	Halter Marine	n.a.	N00024-85-C-2041	FPE
Acoustic Gathering Ships				
TAGS 39	Bethlehem-Sparrows Pt.	12/87	N00024-85-C-2188	FFP
TAGS 40	Bethlehem-Sparrows Pt.	4/88	N00024-85-C-2188	FFP
Fleet Oilers				
TAO 187	Avondale Shipyards	9/86	N00024-83-C-2012	FPI
TAO 188	Avondale Shipyards	1/87	N00024-83-C-2012	FPI
TAO 189	Avondale Shipyards	5/87	N00024-83-C-2012	FPI
TAO 190	Avondale Shipyards	9/87	N00024-83-C-2012	FPI
TAO 191	PennShip	3/89	N00024-85-C-2115	FPI
TAO 192	PennShip	12/89	N00024-85-C-2115	FPI
TAO 193	Avondale Shipyards	8/88	N00024-85-C-2131	FPI
TAO (Option)	Avondale Shipyards	n.a.	N00024-85-C-2131	FPI
TAO (Option)	Avondale Shipyards	n.a.	N00024-85-C-2131	FPI
Floating Drydock				
ARDM 5	Todd-Seattle	2/86	N00024-83-C-2002	FPE
Salvage Ship				
ARS 53	Peterson Builders	2/86	N00024-81-C-2022	FPI
Aegis Cruisers				
CG 50	Ingalls Shipbuilding	12/85	N00024-81-C-2049	CPAF
CG 51	Bath Iron Works	1/87	N00024-82-C-2011	CPAF
CG 52	Ingalls Shipbuilding	7/86	N00021-81-C-2049	CPAF
CG 53	Ingalls Shipbuilding	2/87	N00024-81-C-2049	CPAF
CG 54	Ingalls Shipbuilding	6/87	N00024-83-C-2013	FPI
CG 55	Ingalls Shipbuilding	10/87	N00024-83-C-2013	FPI
CG 56	Ingalls Shipbuilding	2/88	N00024-83-C-2013	FPI
CG 57	Ingalls Shipbuilding	6/88	N00024-84-C-2004	FPI
CG 58	Bath Iron Works	6/88	N00024-84-C-2005	FPI
CG 59	Ingalls Shipbuilding	12/88	N00024-84-C-2004	FPI
CG 60	Bath Iron Works	3/89	N00024-85-C-2036	FPI
CG 61	Bath Iron Works	7/89	N00024-85-C-2036	FPI
CG 62	Ingalls Shipbuilding	10/89	N00024-84-C-2035	FPI

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Exhibit 1—continued

Aircraft Carriers				
CVN 71	Newport News	9/86	N00024-80-C-2033	FPI
CVN 72	Newport News	12/89	N00024-83-C-2033	FPI
CVN 73	Newport News	12/91	N00024-83-C-2033	FPI
Aegis Destroyer				
DDG 51	Bath Iron Works	10/89	N00024-85-C-2144	FPI
Frigates				
FFG 57	Todd Shipyards	5/86	N00024-81-C-2202	FPI
FFG 60	Todd Shipyards	11/86	N00024-81-C-2202	FPI
FFG 61	Todd Shipyards	11/88	N00024-81-C-2202	FPI
FFG 58	Bath Iron Works	11/85	N00024-81-C-2201	FPI
FFG 59	Bath Iron Works	10/86	N00024-81-C-2201	FPI
Air Cushion Landing Craft				
LCAC 002	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 003	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 004	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 005	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 006	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 007	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 008	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 009	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 010	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 011	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 012	Bell Aerospace		N00024-84-C-2055	FPI
LCAC 013	Lockheed Shipbuilding		N00024-85-C-2148	FPI
LCAC 014	Lockheed Shipbuilding		N00024-85-C-2148	FPI
Amphibious Assault Ship				
LHD 1	ngalls Shipbuilding	3/89	N00024-82-C-2260	FPI
Dock Landing Ships				
LSD 42	Lockheed Shipbuilding	4/86	N00024-80-C-2080	FPI
LSD 43	Lockheed Shipbuilding	6/87	N00024-83-C-2070	FPI
LSD 44	Avondale Shipyards	7/88	N00024-84-C-2027	FPI
LSD 45	Avondale Shipyards	11/88	N00024-84-C-2027	FPI
LSD 46	Avondale Shipyards	4/89	N00024-84-C-2027	FPI
Mine Countermeasure Ships				
MCM 1	Peterson Builders	10/86	N00024-82-C-2121	CPIF
MCM 2	Marinette Marine	8/86	N00024-83-C-2142	CPIF
MCM 3	Peterson Builders	9/87	N00024-84-C-2077	FPE
MCM 4	Marinette Marine	7/86	N00024-84-C-2078	FPE
MCM 5	Peterson Builders	12/87	N00024-84-C-2077	FPE
Minesweeper Hunter Ship				
MSH 1	Bell Aerospace	11/87	N00024-85-C-2071	FPI
Patrol Craft				
YP (20)	Marinette Marine	by 1/88	N0024-84-C-2120	FFP
Trident Submarines				
SSBN 732	GD-Electric Boat	2/87	N00024-75-C-2014	FPI
SSBN 733	GD-Electric Boat	10/87	N00024-80-C-2201	FPI
SSBN 734	GD-Electric Boat	12/88	N00024-81-C-2134	FPI
SSBN 735	GD-Electric Boat	8/89	N00024-81-C-2134	FPI
SSBN 736	GD-Electric Boat	4/90	N00024-81-C-2134	FPI
SSBN 737	GD-Electric Boat	12/90	N00024-85-C-2062	FPI
Attack Submarines				
SSN 720	GD-Electric Boat	11/85	N00024-79-C-2720	FPI
SSN 721	Newport News	6/86	N00024-81-C-2075	FPI
SSN 722	Newport News	6/87	N00024-81-C-2075	FPI
SSN 723	Newport News	3/87	N00024-81-C-2075	FPI
SSN 724	GD-Electric Boat	12/86	N00024-82-C-2055	FPI
SSN 725	GD-Electric Boat	6/87	N00024-82-C-2055	FPI
SSN 750	Newport News	5/87	N00024-81-C-2075	FPI
SSN 751	GD-Electric Boat	11/87	N00024-83-C-2039	FPI
SSN 752	GD-Electric Boat	3/88	N00024-83-C-2039	FPI
SSN 753	Newport News	5/88	N00024-84-C-2064	FPI
SSN 754	GD-Electric Boat	7/88	N00024-84-C-2063	FPI
SSN 755	GD-Electric Boat	12/88	N00024-84-C-2063	FPI
SSN 756	Newport News	5/89	N00024-84-C-2064	FPI
SSN 757	General Dynamics	6/89	N00024-84-C-2063	FPI
SSN 758	Newport News	9/89	N00024-84-C-2064	FPI
SSN 759	Newport News	1/90	N00024-84-C-2064	FPI
Hospital Ships				
TAH 19	NASSCO	2/87	N00024-83-C-2094	FPE
TAH 20	NASSCO	11/87	N00024-83-C-2094	FPE
Rapid Response Ships				
TAKR 290	Avondale Shipyards	3/86	N00024-82-C-2300	FPI
TAKR 291	Avondale Shipyards	11/85	N00024-82-C-2300	FPI
Aviation Support Ships				
TAVB 3	Todd Shipyards	3/86	N00024-84-C-2046	FFP
TAVB 4 (Option)	Todd Shipyards	n.a.	N00024-84-C-2046	FFP
Utility Landing Craft				
LCU (2)	Moss Point Marine	by 9/87	N00024-85-C-2135	FFP
Service Craft				
YFN (7)	Eastern Marine	by 9/87	N00024-85-C-2104	FFP
Battleship Reactivation				
BB 63	Long Beach NSY	4/86		
Carrier Modernization				
CV 62	Philadelphia NSY	8/87		
Replenishment Tankers				
T5 #3	Tampa Shipyards	11/85	Build/Charter	
T5 #4	Tampa Shipyards	2/86	Build/Charter	
T5 #5	Tampa Shipyards	5/86	Build/Charter	
Prepositioning Ships				
TAKX 3	GD-Quincy	11/85	Build/Charter	
TAKX 4	GD-Quincy	3/86	Build/Charter	
TAKX 5	GD-Quincy	5/86	Build/Charter	

Source: IMA Records

(continued)

FY 1985 CONTRACT WRAP-UP

Navy contracts exceeding $33 billion were awarded to 372 companies in FY 1985. Seventy-two percent of the value of these contracts were awarded to the 20 largest contractors.

Top Navy Contractors

Navy awarded in FY 1985 about 1,500 large contracts (i.e., contracts exceeding $3 million). A listing of the top 100 contractors and their reported Navy contract value is provided in Exhibit 2. The 50 largest individual contracts during FY 1985 are listed in Exhibit 3.

Shipbuilding Contractors

General Dynamics and Newport News head the list of shipbuilding contractors in FY 1985 as a result of continued submarine construction. GD received a $616-million contract for a Trident submarine and a $283-million contract for an attack submarine. Newport News received a $780-million contract for three attack submarines. Bath was third in contract value—with a $322-million contract for the lead DDG-51 and a $384-million contract for two Aegis cruisers. Avondale placed fourth with contracts to build three TAO fleet oilers and two LSD amphibious landing ships. In fifth place is Litton-Ingalls who received a contract to build one Aegis cruiser and provide lead yard services for the Aegis cruiser program. The list of shipbuilding contractors is shown in Exhibit 4.

Ship Ordnance and Electronics Contractors

General Dynamics heads the ship ordnance and electronics list for FY 1985. The firm's Pomona Division received more than $580 million in contracts for the close-in weapon system (CIWS) and $570 million in contracts for the Standard missile. GD's Convair Division last year received contracts exceeding $380 million for Tomahawk cruise missiles. Lockheed, sole supplier of the Trident ballistic missile, was second on

Exhibit 4
FY 1985 Navy Contract Awards For Shipbuilding (in millions of dollars)

General Dynamics	$991.1
Newport News	839.3
Bath	706.0
Avondale	627.8
Litton	437.3
PennShip	222.5
Bethlehem	132.8
Todd	126.6
FMC	101.9
Bell	86.4
Halter Marine	85.5
Marinette Marine	30.5
Lockheed	24.8
Seebeckwerft (used drydock)	22.6
Moss Point	8.6
RMI	4.2
Eastern Marine	3.3

Source: IMA Records

Exhibit 5
FY 1985 Navy Contract Awards For Ship Ordnance, Electronics and Supporting Equipment (in millions of dollars)

General Dynamics	$1,562.0
Lockheed	1,313.2
Raytheon	535.1
RCA	511.0
McDonnell Douglas	400.6
IBM	322.7
General Electric	303.3
Hughes	209.0
Westinghouse	194.7
Magnavox	163.4
Sperry	159.0
Sparton	158.7
Martin Marietta	153.9
Honeywell	138.3
Goodyear	114.6
Gould	110.4
FMC	107.3
AT&T	103.5
Litton	98.6
Rockwell	98.1
Interstate	89.6
Unidynamics	44.9
Atlantic Research	37.0
OTO Melara	36.3
Singer	35.0
Motorola	31.1
Sippican	31.0
Simplex	30.7
Canadian Commercial	30.2
Vitro	30.1
TRW	29.3
United Technologies	29.0
GTE	27.2
Bendix	25.6
B.F. Goodrich	25.3
ALS Electronics	24.7
Hercules	21.3
Tracor	19.5
Norden	18.0
ITT	17.6
Kollmorgen	16.3
Diagnostic Retrieval Syst.	15.6
E Systems	13.1
Dewey	12.9
Lundy	12.8
COMSAT	12.7
Hycor	11.6
Argo Systems	11.4
Thiokol	10.0
ISC	9.2
Harris	8.5
EG&G	7.9
Aerojet	7.8
Scientific-Atlanta	7.5
Emerson Electric	6.9
Eaton	6.1
Fairchild	5.9
Cost Engineering	5.8
Science Applications	5.5
Illinois Tool Works	5.0
Logicon	4.7
Microcom	4.5
Northrop	3.8
Entwistle	3.8
Spears	3.6
TEKNA	3.4

Source: IMA Records

the list. Last year the firm received Trident missile contracts exceeding $1.2 billion. Raytheon was the third largest ship ordnance and electronics supplier. Major contracts were received for Aegis fire control systems, sonar systems and electronic countermeasure systems. RCA is fourth—based on contracts exceeding $480 million to supply the Aegis weapon system. In fifth place is McDonnell Douglas, who (along with GD-Convair) supplies the Tomahawk cruise missile. The list of ship ordnance and electronics contractors is provided in Exhibit 5.

Ship Machinery

General Electric and Westinghouse are the major machinery sup-

(continued)

Navy

pliers. Both firms manufacture nuclear power plants for Navy. The Knolls Atomic Power Laboratory and Machinery Apparatus Operation of G.E. received naval nuclear plant contracts exceeding $540 million. Westinghouse's Bettis Power Laboratory and its Plant Apparatus Division received more than $490 million in naval nuclear plant contracts. Other than nuclear power plants, most machinery is supplied as contractor furnished material. Exhibit 6 lists ship machinery prime contractors.

Engineering and Design Services

The Charles Stark Draper Laboratory heads the list with Navy contracts exceeding $270 million to design a guidance system for the Trident missile. TRW is second with contracts exceeding $75 million for advanced electronics development and $24 million for support services to the amphibious ship program office. Vitro is third with contracts exceeding $40 million to provide support services to the Trident missile program. Sperry is fourth based on its contracts to provide engineering field services for patrol craft, frigates and logistics assistance. General Dynamics and Newport News are fifth and sixth due to their design work on the SSN-21. A list of engineering and design contractors is provided in Exhibit 7.

Ship Chartering and Operation

Marine Transport is the obvious leader in this area for FY 1985—with a $187-million contract to operate and maintain nine MSC sealift tankers and an $80-million contract to operate 12 MSC oceanographic ships. Sea Mobility is second with a $42-million contract to operate and maintain 12 T-AGOS ocean surveillance ships. Vessel Charters is third with its contract to charter a ship to the MSC. Fourth on the list is Bay Tankers, who received a contract to operate and maintain four T-AKR sealift ships. A list of contractors is provided in Exhibit 8.

Exhibit 6
FY 1985 Navy Contract Awards
For Ship Machinery
(in millions of dollars)

General Electric	$561.5
Westinghouse	497.8
Treadwell	16.9
Transamerica Delaval	10.3
Ingersoll Rand	9.3
GNB	9.3
MagneTek	6.3
General Motors	6.2
Aerojet	5.7
Superior Lidgerwood-Mundy	4.5
Dover	4.3
Dresser	3.9
Murdock	3.7
SMATCO	3.5
Solar Turbines	3.5
Western Gear	3.3
General Crane and Hoist	3.2

Source: IMA Records

Exhibit 7
FY 1985 Navy Contract Awards
For Engineering and Design Services
(in millions of dollars)

Charles Stark Draper	$292.8
TRW	101.3
Vitro	49.4
Sperry	46.5
General Dynamics	33.3
Newport News	32.9
Interstate Electronics	28.9
RCA	24.5
Tracor	22.4
Syscon	19.5
General Electric	18.0
Bell-Boeing	17.6
Research Analysis	16.3
Advanced Technology	12.1
Lockheed	11.2
Kaman	9.8
Analytic Sciences	9.8
Logicon	9.6
EG&G	9.2
Raytheon	9.1
Systems Development	9.0
VSE	8.6
SBA/Int'l. Business Services	8.6
Kay and Associates	8.5
Dynamics Research	8.4
CACI	8.2
IBM	7.8
M. Rosenblatt	7.8
Military Training	7.8
Control Data	7.1
ANADAC	7.1
Boeing	6.9
Advanced Marine	6.7
R.M. Vredenberg	6.3
Techplan	5.9
Data Design	5.6
Basic Technology	5.2
SBA/Information Network Syst.	5.0
Unified Industries	5.0
ORI	4.5
NFK	4.5
TAURIO	4.3
Atlantic Science	4.3

Exhibit 2—Top 100 Navy Contractors In Fiscal Year 1985

Rank	Company	Amount (millions of $)	Rank	Company	Amount (millions of $)
1.	McDonnell Douglas	5,324.7	51.	Vitro	79.5
2.	General Dynamics	2,962.3	52.	Teledyne	79.2
3.	Grumman	2,250.9	53.	Kaman	70.8
4.	General Electric	1,890.0	54.	General Motors	70.8
5.	Lockheed	1,711.0	55.	Loral	67.7
6.	Raytheon	1,030.8	56.	Garrett	60.7
7.	Newport News	1,017.4	57.	Western Gear	58.7
8.	Hughes	992.7	58.	Canadian Commercial	55.4
9.	United Technologies	812.6	59.	Systems Management	55.3
10.	Litton	784.2	60.	Cubic	50.2
11.	Texas Instruments	781.6	61.	Syscon	48.0
12.	Westinghouse	724.3	62.	Norden	47.1
13.	Bath	710.5	63.	AAI	45.6
14.	RCA	669.3	64.	Unidynamics	44.9
15.	IBM	648.7	65.	Beech	44.3
16.	Avondale	627.8	66.	Sundstrand	43.8
17.	Boeing	458.0	67.	Hercules	43.4
18.	Singer	400.3	68	Tracor	41.9
19.	Electronic Data	349.0	69.	Sea Mobility	41.7
20.	Martin Marietta	340.6	70.	Fairchild	37.7
21.	Bell	333.3	71.	Caddell	37.2
22.	Sperry	329.1	72.	Atlantic Research	37.0
23.	Johns Hopkins	323.7	73.	Thiokol	36.5
24.	Charles Stark Draper	292.8	74.	Serv-Air	36.3
25.	Marine Transport	266.8	75.	OTO Melara	36.3
26.	FMC	224.6	76.	Norfolk	36.2
27.	Sanders	224.1	77.	Kaiser	35.8
28.	Pennsylvania Shipbuilding	222.5	78.	Ted Bates	35.3
29.	Magnavox	205.3	79.	Vessel Charters	35.1
30.	Harris	186.7	80.	Hunt	32.5
31.	Rockwell	180.8	81.	Tyger Construction	32.3
32.	Todd	170.4	82.	Sippican	31.0
33.	Bendix	160.5	83.	Simplex	30.7
34.	Gould	158.8	84.	Bay Tankers	30.7
35.	Sparton	158.7	85.	Northwest Marine	30.6
36.	Honeywell	156.8	86.	Marinette Marine	30.5
37.	TRW	146.5	87.	GTE	30.4
38.	Control Data	145.2	88.	Trepte	29.9
39.	Bethlehem	132.8	89.	Gilbane	28.1
40.	Goodyear	128.6	90.	Ogden Bulk Transport	26.4
41.	Federal Data	127.6	91.	Newberg/Brinderson	26.0
42.	Interstate Electronics	118.5	92.	Jowett	25.8
43.	AT&T	115.2	93.	ITT	25.7
44.	Northrop	96.1	94.	Sante Fe Engineers	25.3
45.	Rolls-Royce	91.7	95.	B.F. Goodrich	25.3
46.	Motorola	87.7	96.	Airesearch	25.1
47.	Ford	86.2	97.	Hudson Institute	24.9
48.	Halter Marine	85.5	98.	ALS Electronics	24.7
49.	Williams	82.2	99.	Aerojet	23.6
50.	Pennsylvania State Univ.	80.8	100.	Amex	22.7

Source: IMA Records

Exhibit 3—Top 50 Individual Navy Contract Awards In Fiscal Year 1985

Rank	Company	Amount (millions of $)	Description
1.	Lockheed	1,014.7	Trident II (D-5) missiles
2.	Newport News	779.5	SSN 756, 758 & 759 attack submarines
3.	McDonnell Douglas	754.0	F/A-18 aircraft
4.	General Dynamics	616.4	Trident ballistic missile submarine
5.	McDonnell Douglas	470.7	F/A-18 aircraft
6.	Texas Instruments	462.1	HARM missiles
7.	Bath	383.6	CG 60 and CG 61 Aegis cruisers, support equip.
8.	McDonnell Douglas	375.0	F/A-18A aircraft & TF/A-18A aircraft
9.	Electronic Data	349.0	Computer systems (ICPRP)
10.	McDonnell Douglas	330.2	Harpoon missiles
11.	McDonnell Douglas	324.3	F/A-18A and TF/A-18A aircraft weapon systems
12.	Bath	322.0	DDG 51 Aegis destroyer
13.	Avondale Shipyards	321.0	Up to 3 TAO 187 class fleet oilers
14.	RCA	307.6	MK-7 Aegis weapon systems
15.	Avondale	306.8	LSD 45 & 46 amphibious ships
16.	General Dynamics	283.0	SSN-757 attack submarine
17.	McDonnell Douglas	282.6	Harpoon missile systems
18.	Raytheon	249.8	AIM-7M guidance & control sets
19.	General Dynamics	248.1	Standard missile 2 guidance & control systems
20.	Litton	238.6	CG 62 Aegis cruiser
21.	Pennsylvania Shipbldg.	222.5	Two TAO 187 class fleet oilers
22.	Charles Stark Draper	220.8	MK-6 guidance system for Trident program
23.	McDonnell Douglas	216.5	F/A-18 aircraft
24.	General Dynamics	212.7	JK-16 close-in-weapons systems
25.	Boeing	209.6	A-6 aircraft replacement wings
26.	Lockheed	207.4	Missile processing for FBM program
27.	General Dynamics	207.4	AIM-7M guidance & control sets
28.	General Electric	205.8	F404-GE-400 aircraft engines
29.	General Dynamics	191.6	Phalanx close-in-weapons systems
30.	Marine Transport	187.2	Operation & maintenance of 9 MSC tankers
31.	General Electric	184.1	F404A-GE-400 engines for F/A-18 aircraft
32.	General Electric	180.2	Nuclear propulsion components
33.	Westinghouse	169.8	Nuclear propulsion components
34.	McDonnell Douglas	165.0	F/A-18 aircraft
35.	RCA	153.7	MK-7 Aegis weapons system for CG 60, 61 & 62
36.	Martin Marietta	150.6	Computer systems & peripheral devices
37.	Martin Marietta	147.2	MK-41 vert. launching systems & cannisters
38.	McDonnell Douglas	146.7	AV-8B and Harrier aircraft
39.	General Dynamics	146.1	Tomahawk cruise missiles
40.	McDonnell Douglas	145.2	Tomahawk cruise missiles
41.	McDonnell Douglas	144.0	F/A-18A and TF/A-18A aircraft weapon systems
42.	McDonnell Douglas	141.5	AV-8B aircraft
43.	Westinghouse	140.9	Nuclear propulsion components
44.	Grumman	139.3	C-2A aircraft
45.	McDonnell Douglas	139.0	F/A-18A aircraft
46.	Sanders	136.2	AN/ALQ-126B countermeasure sets
47.	IBM	135.0	Submarine advanced combat systems (SUBACS)
48.	United Technologies	134.1	J52-P-8B, J52-P-408 & TF30-P-414A engines
49.	Singer	133.0	AH-64 2840 Apache simulators
50.	Grumman	133.0	F-14 aircraft

Source: IMA Records

American Management	4.2
American Systems	4.1
Information Systems	3.9
Planning Research	3.7
John J. McMullen	3.7
Reliability Services	3.5
Institute of Modern Procedures	3.5
Presearch	3.4
Research Facilities	3.4

Source: IMA Records

Exhibit 8
FY 1985 Navy Contract Awards
For Ship Chartering and Operation
(in millions of dollars)

Marine Transport	$266.8
Sea Mobility	41.7
Vessel Charters	35.1
Bay Tankers	30.7
Ogden Bulk Transport	26.4
Trailer	22.3
Automar III	17.1
United States Lines	14.2
Central Gulf	12.7
Zapata	8.2
Maritime Overseas	6.9
American Heavy Lift	5.6
Offshore Express	3.9
Transbulk Carriers	3.4

Source: IMA Records

$4.9-Million Navy Contract Awarded To Newport News For Sub Inactivation

Newport News Shipbuilding and Dry Dock Company, Newport News, Va., was awarded a $4,916,500 cost-plus-fixed-fee contract for the planning, inactivation and defueling of the USS Nathan Hale (SSBN-623).

The work will be performed in Newport News, and is expected to be completed in June 1986. The contract funds would have expired at the end of fiscal year 1985.

The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-C-2230).

Capt. **John Maudlin,** Staten Island Ferry, on bridge of MarineSafety Ship Simulator.

MSI Conducting Tests For Proposed Canadian Ferry With Voith Schneider Propulsion

MarineSafety International, New York, N.Y. is conducting tests for Transport Canada and the Northumberland Ferry Company for a proposed 100-meter-long ferry boat to operate between Prince Edward Island and Nova Scotia.

The new ferry will be powered by a Voith Schneider propulsion system, the same type that is used by the Staten Island Ferry which transports passengers between Manhattan and Staten Island. The unique Voith Schneider propulsion system enables a vessel to turn in its own length.

Capt. **John Maudlin** of the Staten Island Ferry is helping to fine tune the response of the simulated ferry boat to its control system and to wind and current forces.

Using a visual and hydrographic simulation of the Wood Island Terminal, MarineSafety conducted a series of tests with the simulated ferry boat to determine its ability to enter the breakwater and to turn around and enter its berth stern first. Over thirty trial runs were made by Northumberland captains with winds varying in velocity up to 80 mph and with currents across the breakwater entrance of up to three knots.

The ship simulator located at the LaGuardia Airport Marine Terminal, can replicate the handling characteristics of any type of vessel in any body of water in the world. In addition to research studies, the MSI ship simulator is used to provide refresher shiphandling training for over 300 ships' officers per year.

For additional information on MarineSafety International and their ship simulator,

Circle 20 on Reader Service Card

Or, for further information on the Voith Schneider propulsion system,

Circle 21 on Reader Service Card

Metropolitan Introduces Swing Check Valve Line —Literature Available

Metropolitan Master Machinists, Manufacturing Division of Metropolitan Plumbing Supply Corporation, has introduced a new line of swing check valves.

According to the manufacturer, the company has doubled its machine shop capacity and they are diversifying their line to include all types of regular and special valves and fittings, in various sizes and metals.

The new swing check valves will range in size from 2 to 48 inches, in standard and extra heavy pressure. The valves will be offered in such materials as cast iron, cast steel, bronze, aluminum, stainless steel, ductile iron, galvanized, carpenter alloy 20 and monel.

For more information and detail-filled literature on Metropolitan Master Machinists and their products,

Circle 36 on Reader Service Card

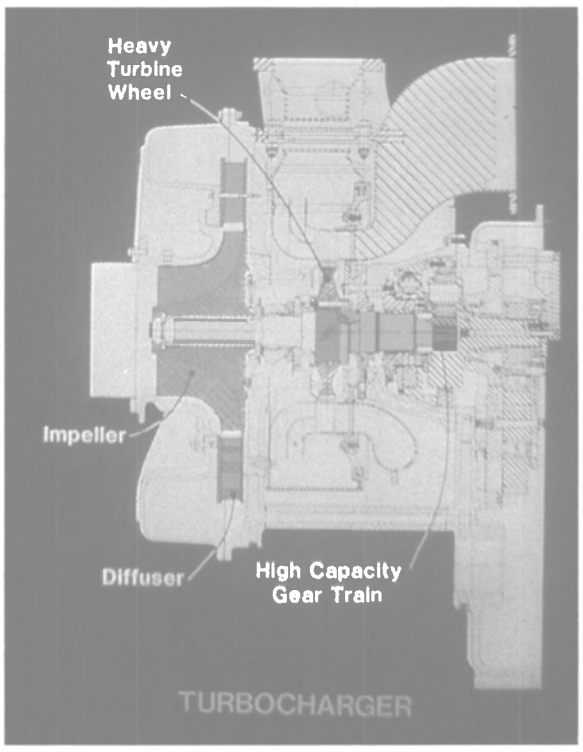
PROPULSION UPDATE

Design Improvements In EMD's 645FB Diesel Provide Higher Horsepower, Better Fuel Economy

A more efficient turbocharger, increased horsepower ratings, and traditional dependability mark the General Motors Electro-Motive Division Model "FB" Series diesels.

The 645FB is a turbocharged and aftercooled, two-stroke uniflow scavenged, open combustion chamber, poppet valve, 45-degree Vee diesel. Cylinder bore is 230.2 mm (9 1/16 inch) and stroke is 254 mm (10 inch).

EMD reports the 645FB develops up to 4,000 brake horsepower at 900 rpm. This is an increase of 400 brake horsepower over the predecessor 645EC engine. To achieve the higher horsepower, the "FB" Series engines contain the following design improvements:



• The turbocharger has been improved by strengthening the turbine wheel and by the addition of higher capacity gearing to the planetary gear train. The turbine is engine driven at light load when the energy level in the exhaust is relatively low. As exhaust energy increases at higher engine outputs, by use of an over-running clutch, the turbo becomes completely gas driven. Wider planetary gears with increased tooth contact area give the turbocharger a smooth torque output.

• The crankcase contains features that strengthen the main bearing support frame connection to the base rail and air box structures. The top deck section has also been strengthened. A wide foot "A" frame forging extends through the base rail, and an end bar area design provides additional strength.

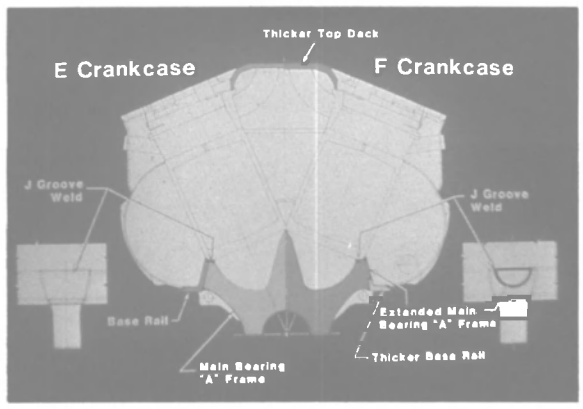
• The fuel injector has a .500-inch-diameter plunger that provides an increased injection rate for excellent combustion and thermal efficiency. The desired fuel output was achieved by revising the helices of the plunger. The injector also includes the "low sac" spray tip that reduces smoke and undesirable emissions.

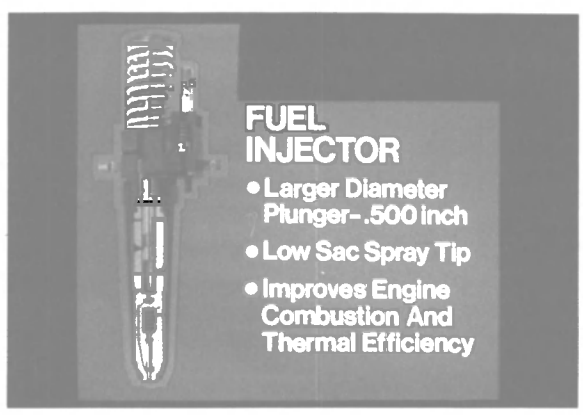
• The exhaust valve has been strengthened to provide additional protection.

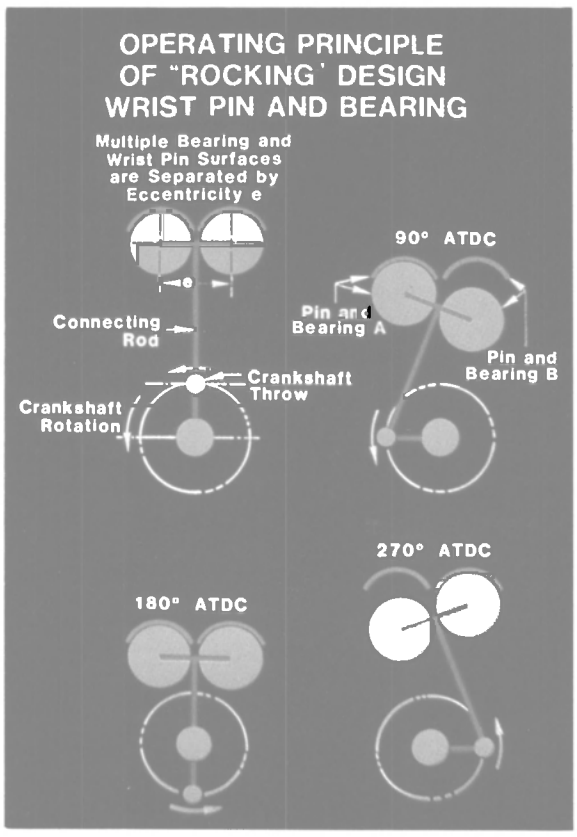
• The engine cylinder retainer system is redesigned and strengthened to increase the bolting load that retains the clyinder head and power assembly in the crankcase. As a result, the service time interval for retorquing the crab nuts has been significantly extended.

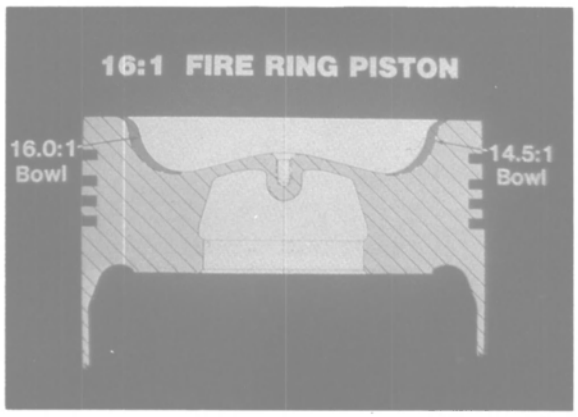
• The fire ring piston design moves the top compression ring from a position of 3.18 cm (1.25 in.) below the top of the piston to a closer 1.9 cm (0.75 in.) location from the top of the piston. The piston bowl design allows greater combustion efficiency. The piston bowl is narrower and shallower, giving a smaller piston bowl volume. Despite the higher firing pressure produced, the temperature of the piston crown is actually lower than in previous models, thanks to a new crown structure.

Many of the elements contributing to the "FB" Series' ability to generate higher horsepower have already been proven on predecessor engines. These include the rocking wrist pin and bearing assembly that alternately loads and unloads multiple bearing surfaces contained on a single wrist pin and bearing.









The cylinder of the "FB" Series is GM/EMD's laser hardened port relief and upper bore design. It makes use of the first known large-scale heat treatment process to use laser technology.

Starting performance is significantly improved by the higher compression ratio of the engine. The engine can start in an ambient temperature of −4 degrees C to −1 degree C (25 degrees F to 30 degrees F) range without starting aids.

EMD states the 645 "FB" Series is the result of painstaking research and development, with particular attention paid to retaining the GM/EMD diesel's reliability and maintainability while achieving new levels of horsepower output and fuel economy.

A full-color brochure detailing all the advantages offered by the 645FB Series and including full specifications is available at no cost. For your free copy,

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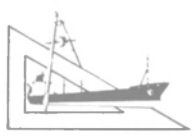

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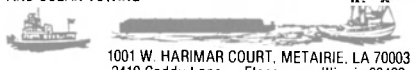

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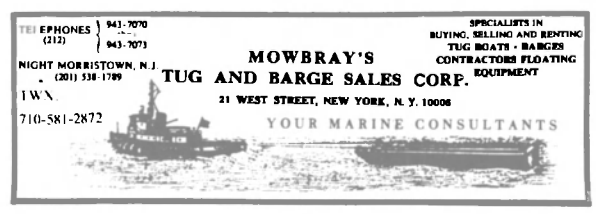

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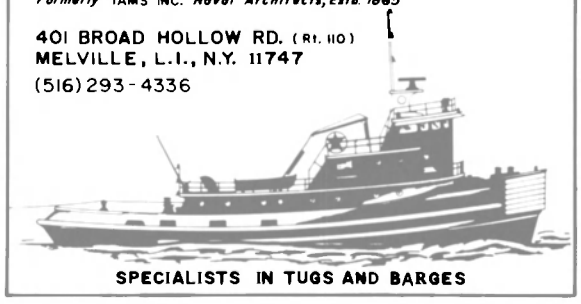

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The series, certified for sail or power-driven vessels up to 20 meters (65.6 feet), will be distributed by Perko, one of the world's largest manufacturers of marine lights, hardware and accessories.

Lucas Marine, world famous for producing high-quality navigation lights, will manufacture the series.

"The addition of the 200 Series completes a very important segment of our line of marine lights," said **Marvin S. Perkins,** president of Perko. "Based on our research and requests received from both the public and trade, we anticipate these lights to be among the most popular products in our entire line."

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Perko will offer 11 types of lights including starboard side lights, port side lights, masthead lights, stern lights, white all-round lights, tri-color lights, tri-color/white all-round lights and combination side lights. All units are constructed of high-quality, impact-resistant plastics, providing maximum strength and long life.

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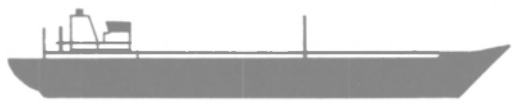

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Harris Corporation RF Communications Group announces the availability of a new brochure describing Harris's High-Performance Strategic Series of HF communications equipment. This six-page, three-color brochure presents Harris's full line of high-performance HF-SSB exciters, receivers, high-speed HF data modems and remote-control units.

These basic HF equipment building blocks, incorporating functionally common modules, are integrated into HF transmitting, HF adaptive communication and sophisticated HF data systems. This results in such key benefits as common operating and maintenance procedures, simplification of training, reduction of spare part complements, increased design compatibility and lower overall cost of ownership.

Harris Corporation is a $2-billion producer of state-of-the-art information processing, communication and microelectronic products for the worldwide information technology market. The company employs 30,000 people and operates 35 plants in the U.S. and abroad.

For a copy of the new brochure and further information,

Circle 78 on Reader Service Card

Perko Presents The 200 Series International Navigation Lights —Catalogs Available

Two of the world's leading marine manufacturers—Perko, Inc. and United Kingdom-based Lucas Marine Products—have combined efforts to offer in the U.S. the 200 Series International Navigation Lights.

The series, certified for sail or power-driven vessels up to 20 meters (65.6 feet), will be distributed by Perko, one of the world's largest manufacturers of marine lights, hardware and accessories.

Lucas Marine, world famous for producing high-quality navigation lights, will manufacture the series.

"The addition of the 200 Series completes a very important segment of our line of marine lights," said **Marvin S. Perkins,** president of Perko. "Based on our research and requests received from both the public and trade, we anticipate these lights to be among the most popular products in our entire line."

Engineered and manufactured to withstand severe environments, all models are internationally approved and carry the famous Perko warranty.

Perko will offer 11 types of lights including starboard side lights, port side lights, masthead lights, stern lights, white all-round lights, tri-color lights, tri-color/white all-round lights and combination side lights. All units are constructed of high-quality, impact-resistant plastics, providing maximum strength and long life.

Supplied complete with bulb, the lights will be offered in 12, 24 or 32-volt operation and a choice of base, top or rail mountings is available. A unique design permits simple bulb changing, requiring no tools.

"For over 75 years, Perko has been offering marine lights, hardware and accessories, and we feel this is one of the most sensational products to date," continued Mr. **Perkins.** "The specific type of lights, the quality, the selection and the cost will no doubt be the major factors in the success we perceive for this line."

For futher information, free literature, catalogs, etc., from Perko,

Circle 83 on Reader Service Card

CLASSIFIED AND EMPLOYMENT ADVERTISING

HOW TO PLACE CLASSIFIED ADVERTISING: Mail clearly written or typed copy to: MARITIME REPORTER, 118 East 25th Street, New York, NY 10010. Include any photos, drawings or logos if required. Specify size of ad and number of insertions . . . Classified Advertising — Per Issue Rate: Classified advertising is sold at a rate of $70 per column inch . . . MARITIME REPORTER'S classified section carries more advertising and sells more products than any other publication in the marine industry. MARITIME REPORTER is published the 1st and 15th of each month. Closing date for classified advertising is 20 days prior to the date of the issue. For further details contact John C, O'Malley at (212) 477-6700. Send all advertising material to MARITIME REPORTER and Engineering News, 118 East 25th Street, New York, NY 10010.

SALES AND MARKETING MANAGER

The Carleton Group of Moog Inc. is seeking a Sales and Marketing Manager for its Tampa, Florida Division. The Division is a key supplier of high-pressure life support systems for the marine industry and has established a strong position as a U.S. Navy supplier

Reporting to the Division General Manager, this position has overall accountability for marine sales and marketing efforts including planning, development, execution and results. Required are the creation and maintenance of strong customer relationships and participation in the development of new markets and product applications. Other responsibilities include management of sales engineers, sales representatives, internal sales administrators and sales support personnel.

The technical nature and complexity of the products underscore the need for a B.S. degree in an engineering discipline. An appropriate background would include a demonstrated record of sales/marketing accomplishments, preferably in a military marine life support environment. Additionally, program or sales management experience is desirable. Qualified candidates will have potential for growth to higher level general management.

Recently selected as one of the 100 best companies to work for in America, Moog offers a competitive compensation package and highly positive work environment. If you are interested in becoming a key contributor in a high performance organization, please send your resume (including salary history) in confidence to John Grabon, Human Resource Manager

MOOG

Carleton Group
East Aurora, NY 14052
An Equal Opportunity Employer

CAPTAIN & ENGINEER

Wanted—with 500 ton license for floating 160 ft. casino/disco/restaurant. ½ yr. Caribbean, ½ Mediterranean, some cruising. Apply with resume and photo for Jan. empl. Write: California Ships, Inc., 1409 W. 7th St., Berth 73, Long Beach, CA 90813

ENGINEERS

Independently-operated subsidiary of REXNORD, a controls & machinery conglomerate, has immediate needs for engineers to support Navy and commercial contracts. Current positions include:

- **Naval Propulsion Control**—Specifications, procurement program support, R&D, algorithm development, simulation.
- **Mechanical or Marine**—Mathematical modeling/system simulation for analysis of machinery system dynamics.
- **Electronics**—Detail design/development of hardware using analog/digital/microprocessor systems. 8088/86/68000 experience preferred.
- **Software**—Specification/design/development for real time monitoring and control systems for engines and machinery. C/Fortran experience preferred.
- **Technical Documentation**—Development of military technical manuals and training programs.

U.S. citizenship required. Competitive salary & excellent benefits. Send resume to:

Propulsion Dynamics, Inc.
2200 Somerville Road
Annapolis, MD 21401
(301) 224-2130

Attn: Personnel Director

MARINER OPPORTUNITIES

Standard Oil's pipeline operation is working to bring oil to domestic markets. Our worldwide marine transportation network offers exciting career opportunities for experienced mariners.

You must possess a BS degree in Marine Transportation and a United States Coast Guard Unlimited Master's License (or equivalent). In addition, ten years of on-sea experience is required, at least one of which must include command of an ocean-going oil tanker.

Your responsibilities will include directing other professional mariners, monitoring the financial and operating efficiency of our chartered fleet and maintaining liaison between Standard Oil and the world maritime industry. You will share in the accountability for the effective and economical operation of our marine transportation unit.

We offer an excellent opportunity to enhance your marine transportation career. **In addition to competitive salary and full benefit package, we offer homeowner relocation assistance, including third party home purchase, mortgage interest differential and other features normally restricted to internal transfers.**

For confidential consideration, submit resume to:

Rick Taylor
Mgr. Recruitment Operations (733MR)
THE STANDARD OIL COMPANY
200 Public Square – 10E2800 • Cleveland, Ohio 44114

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NO THIRD PARTY INQUIRIES, PLEASE

MASTER OF SCIENCE IN MARITIME MANAGEMENT

MAINE MARITIME ACADEMY, A COLLEGE OF ENGINEERING, TRANSPORTATION AND MANAGEMENT, offers a modular graduate degree program in management of marine-related organizations.

Designed for people who want to advance their careers in maritime industries.

Modular design allows study without career interruption.

For additional information call or write Mrs. Doris Richardson, Executive Secretary, Department of Graduate Studies (A-6), Maine Maritime Academy, Castine, Maine 04420 USA, telephone (207) 326-4311 extension 485.

PORT ENGINEERS

American Systems Engineering Corporation has openings for experienced Port Engineers. Our Port Engineers maintain selected U. S. Navy ships in a Phased Maintenance Program.

Applicants should be degreed Marine Engineers holding USCG Engineer's License. U.S. citizenship is required.

Send resume and salary requirements to:

American Systems
Engineering Corporation
Box 8988
Virginia Beach, VA 23452

PROJECT MANAGER/NAVAL ARCHITECT SEEKS POSITION

M.I.T. masters graduate with 12 years experience would like project or department management position in eastern U.S. Strong background in contract administration, shipyard fabrication, and computer simulations.

Reply to:

Maritime Reporter and Engineering News
Box 1201, 118 E. 25th Street
New York, NY 10010

MARKETING/PROMOTIONS MANAGER SEEKS POSITION

Washington, D.C. based marketing manager with maritime oriented firm seeks similar position. Strong Capitol Hill contact; familiar with legislative process. Marketing, advertisement, public relations background. Resume upon request.

Reply to:

Maritime Reporter and Engineering News
Box 1015, 118 East 25th Street
New York, New York 10010

Mt. Hope & Narragansett Bays
DOCKING & COASTAL TOWING
All Diesel Fleet
PROVIDENCE STEAMBOAT COMPANY
1 India St., Providence, RI 02903
401-331-1930

WANTED

Shrimp boats And Processing Boat. East Coast Operator looking for above equipment. Please contact:

David West
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New York, NY 10010
Call (212) 685-0833 P.M.

FOR SALE

FLOATING EQUIPMENT OF CANADIAN TOWING COMPANY

SEISMIC — OCEANOGRAPHIC — RESEARCH VESSEL

Canadian flag	
Fully classed Det Norske Veritas	+ 1A1 (1984)
Lenght overall	194.95 ft
Breadth	30'
Draught	16'
Engine	Deutz Diesel SBV8M 1500 BHP — 380 RPM

Bow thruster — variable pitch propeller
5 generators from 50 to 250 kw
Ready to go with full electronics.
Accommodation for 35.
VERY REASONNABLY PRICED.

HOME-TRADE II TUG

Lenght overall	104'
Breadth	27'8"
Draught	10'6"
Engine	Dominion Sulzer 1000 BHP
Towing winch	Almon Johnson Bollard 10 T.

Actually in operation in Gulf and River St. Lawrence.
FULLY CLASSED Canadian Coast Guard

SMALL TUG

Lenght overall	70'
Breadth	15'
Draught	8'6"
Engine	2 GM 610 in tandem 440 BHP
Actually in operation	St. Lawrence River

CHEMICAL/OIL BARGE

Dimensions	228' × 38' × 17'
Capacity	535 000 US Gallons

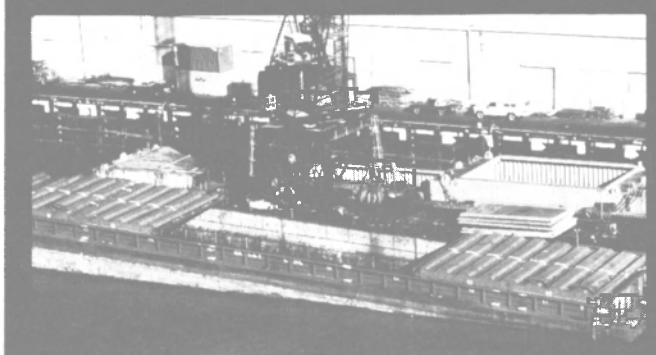
IN VERY GOOD CONDITION.

TWO DECK BARGES
120' × 44' × 12'6"

All equipment can be inspected at the Port of Quebec, Canada.

For information contact:
TECHNO-NAVIGATION LTD
Roger Raymond
418/688-8412 418/681-5791
Telex: 051-31659

Call the Barge People



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Our rental fleet of standard and jumbo hoppers can carry a great variety of cargos, ranging from bulk commodities to finished products, up to 2000 tons.

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New Orleans, LA 70186

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17500 Market St.
P.O. Box 233
Channelview, TX 77530

Parkersburg
(304) 485-4494
Telex 86-9412
P.O. Box 1825
Parkersburg, WV 26101

St. Louis
(314) 725-2224
Suite 1108
11 S. Meramec Ave.
St. Louis, MO 63105

ATTENTION Marine Equipment
MANUFACTURERS/SUPPLIERS
34 Yrs. Marine Engineering &
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Distributors—Reps wanted

A Chicago based rope and cordage manufacturer seeking exclusive quality representation for maritime industry, many territories still open. Please contact Sis. Mgr. AAM-STRAND CORP., 6641 S. Narragansett, Chicago, IL 60638.

Request For Proposals New Car Ferry

The Casco Bay Island Transit District is seeking proposals from qualified shipyards to build a 10 car, 350 passenger (minimum) vehicle/passenger ferry based on a standard design, for unrestricted service in Casco Bay, Maine.

This project will be jointly funded by the Urban Mass Transportation Administration, the Maine Department of Transportation, and CBITD.

There will be no geographical restrictions. Price of delivered boat is FOB Portland.

An RFP can be obtained by writing

Vehicle/Passenger Ferry
Casco Bay Island Transit District
PO Box 4656 DTS
Portland, Maine 04112

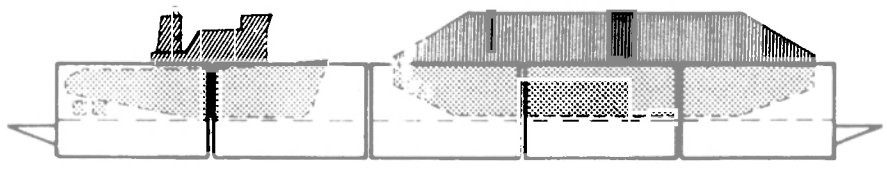
Detailed specifications can be obtained only by sending $30.00 to the above address.

Proposals complete with contractor prepared general drawings must be received no later than 2:00 p.m., February 15, 1986.

DRYDOCK FOR SALE

Length over keel blocks:
458 feet (139.6 meters).

Depth over keel blocks:
28 feet (8.5 meters).



Lift capacity: 9,000 long tons
(9,144 metric tons).

Length overall: 514 feet
(156.7 meters).

Clear width: 92.7 feet
(28.3 meters).

Sectional pontoon design enables each of its five sections to operate independently. The dock is used primarily for tugs, barges, dredges, and small- to medium-sized vessels. Recent survey, located in U.S. Price negotiable. Contact:

John C. O'Malley
Telephone: 212/477-6700 Telex: 424768 MARINTI
Box 1202, **MARITIME REPORTER**/Engineering News
118 East 25th Street, New York, NY 10010

SEALED PROPOSALS

For furnishing, maintaining and operating self-propelled vessels and/or vessels requiring towing service (if vessels are not self-propelled) for the transportation and disposal of sewage sludge from the facilities of Bergen County Utilities Authority, Joint Meeting of Essex and Union Counties, Linden-Roselle Sewerage Authority, Middlesex County Utilities Authority, and Passaic Valley Sewerage Commissioners, to points at sea.

Notice is hereby given that sealed proposals will be received by the

BERGEN COUNTY UTILITIES AUTHORITY
JOINT MEETING OF ESSEX AND UNION COUNTIES
LINDEN-ROSELLE SEWERAGE AUTHORITY
MIDDLESEX COUNTY UTILITIES AUTHORITY
PASSAIC VALLEY SEWERAGE COMMISSIONERS
RAHWAY VALLEY SEWERAGE AUTHORITY

in the conference Room, Maplewood Municipal Building, 574 Valley Street, Maplewood, New Jersey at 3:00 o'clock p.m., Prevailing Time on Thursday, January 16, 1986 at which time they will be publicly opened and read aloud. **NO BIDS WILL BE RECEIVED BY MAIL OR PRIOR TO BID OPENING.**

Separate proposals will be for furnishing, maintaining and operating one or more self-propelled vessels and/or vessels requiring towing service (if vessels are not self-propelled), for the transportation and disposal of sewage sludge from the facilities of the Agencies mentioned above, to points at sea for:

A) a period of 20 months (5/1/86-12/31/87) with 25% of the total volume of sludge disposed at the 106 mile site and 75% of the total volume of sludge disposed at the 12 mile site, and

B) a period of 40 months (1/1/88-4/30/91) with 100% of the total volume of sludge disposed at the 106 mile site.

C) a period of 60 months (5/1/86-4/30/91) divided into two (2) periods as follows:

20 months (5/1/86-12/31/87)—25% of the total volume of sludge disposed at the 106 mile site and 75% of the total volume of sludge disposed at the 12 mile site, and

40 months (1/1/88-4/30/91)—100% of the total volume of sludge disposed at the 106 mile site.

Specifications may be obtained at the Offices of the Joint Meeting, 500 South First Street, Elizabeth, New Jersey. Bids must be accompanied by a guarantee payable to the six (6) Agencies that if the Contract is awarded to him the Contractor will enter into a Contract therefore and will furnish any performance bond or other security required as a guarantee or indemnification. The guarantee shall be in the amount of 10% of the bid but not in excess of $20,000.00 and may be given at the option of the bidders, by certified check, cashier's check or bid bond.

A bond with Surety's Consent in the form attached hereto in the sum equal to the product of the Unit Price multiplied by the estimated tonnage multiplied by the term (in years) that the respective Contract will remain in force, issued by a bonding company authorized to do business in the State of New Jersey, satisfactory to the Agencies involved and approved by Counsels will be required for the faithful performance of the Contract. Said bond in the form attached hereto shall be submitted and approved on or before the time set for the execution of said Contract.

The party to whom this Contract is awarded will be required to present to the agencies involved the approved performance bond duly executed and be prepared to execute the Contract, within fifteen (15) days of the date of notice of award.

Should the successful bidder, to whom the Contract is awarded fail to comply with the above provisions as to the performance bond, and to execute said Contract within the time above set forth, the Agencies may, at their option, declare the successful bidder in default, the Contract abandoned by it, and may further take such proceedings as it may deem necessary to protect the interest of the Agencies.

It is the purpose of the Agencies previously named not to award the Contract to any bidder who does not furnish evidence satisfactory to them, that such bidder is responsible, and has sufficient capital, ability, experience, and equipment to perform the task of sludge removal and disposal, and to fulfill all of the requirements of the Contract. Therefore the bidder, at the time of bidding, is required to present his plan for removal and/or storage of sludge from the Agencies involved in a timely manner to prevent a build-up of sludge.

The Agencies reserve the right to reject any or all proposals and also reserve the right to waive any informality in the bid and to accept the bid, which, in their judgement, best serves the interest of the Agencies.

The award of the Contract is subject to the following:

a) Approval by the appropriate regulatory bodies, including but not limited to the United States Environmental Protection Agency, the New Jersey Department of Environmental Protection, and the New Jersey Local Finance Board,

b) Execution by the Agencies of an Inter-Agency Agreement and approval of same by the New Jersey Local Finance Board.

c) Passage and approval of legislation authorizing the Agencies to enter into a joint bid for sludge disposal for a period of five years.

Failure to obtain the approvals as set forth above shall prevent the Agencies from awarding the within Contract.

During the Contract period the Contractor shall be required to comply with the provisions of N.J.S.A. 10:2-1 through 10:2-4 dealing with discrimination in employment on public contracts and the rules and regulations promulgated pursuant thereunto are hereby made a part of this Contract and are binding on them as well. Bidders will also be required to comply with the requirements of P.L. 1975, c. 127 relating to affirmative action.

BY ORDER OF

Bergen County Utilities Authority	Thomas J. Toscano, Chairman
Joint Meeting Of Essex And Union Counties	Robert H. Grasmere, Chairman
Linden-Roselle Sewerage Authority	George Gordon, Chairman
Middlesex County Utilities Authority	Frederick H. Kurtz, Chairman
Passaic Valley Sewerage Commissioners	Robert J. Davenport, Chairman
Rahway Valley Sewerage Authority	Theodore K. Torgersen, Chairman

Coast Guard Completes Installation Of Advanced Navigational Aid In N.Y. Harbor

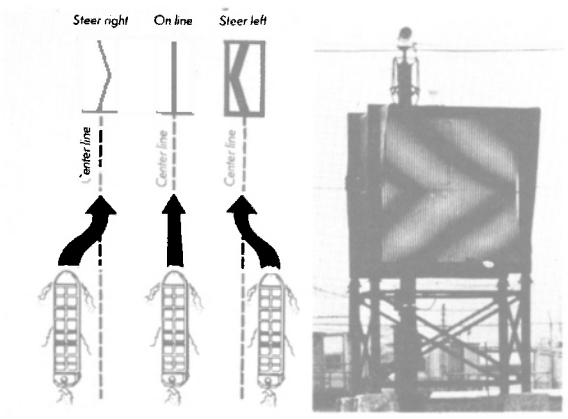
The U.S. Coast Guard has completed the installation in New York Harbor of the Inogon Leading Mark, a single station, short-range optical guidance system that directs vessels safely and accurately through narrow channels.

The system, which had previously undergone testing by the Coast Guard's Research and Development Center in Groton, Conn., is now fully operative in one of the nation's busiest commercial shipping lanes—the Constable Hook channel between Staten Island, N.Y. and Bayonne, N.J. in New York Harbor.

According to Inogon Corporation president **Robert J. Axel**, whose company supplied the device, the system uses a lighted moire optical effect to give a ship's pilot clear, easy-to-understand continuous indications of a ship's position with respect to the center of the channel; and precise information about how the ship should be steered to maintain its centerline position. It is usable by incoming pilots from as much as 35 degrees off center.

"The operation of the Inogon Leading Mark System," said Mr. **Axel,** "is based upon an optically safe visual effect caused by changes in the pilot's angle of vision. Light projected through two closely spaced superimposed lens gratings on the face of the beacon create an opaque black visual pattern on a brilliantly lighted background."

Mr. **Axel** added, "So long as the ship is in the center of the channel, the pilot will see a single black vertical line in the center of the Inogon Leading Mark. If the ship strays to the port or starboard of the centerline, the pilot will see a pattern of arrows pointing in the direction required to correct the position. The density of the arrow pattern indicates how large a correction should be made, as well as the rate of deviation from or toward center."



Drawing shows the operation of the Inogon Leading Mark.

Inogon Leading Marks have no moving parts or electronic components, and operate automatically without requiring any onboard equipment. They have been tested and approved for use in harbors, canals and channels by many European regulatory authorities, including the Swedish Administration of Shipping and Navigation and the West German Seezeichenversuchsfeld.

For additional information on the Inogon Leading Mark,

Circle 26 on Reader Service Card

Versatile Completes $2.7-Million Refit Of USN Tanker

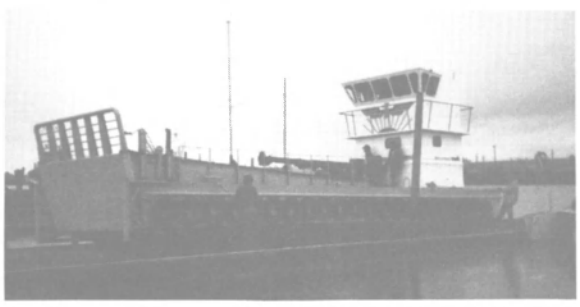
Versatile Pacific Shipyards of Vancouver, Canada, recently completed a 45-day refit of the USNS Kawishiwi, a tanker, under a contract valued at $2.7 million. It was the third refit contract completed this year for the Military Sealift Command by the Western Canadian yard.

The two previous contracts for the U.S. Military Sealift Command were the auxiliary supply ship, Spica, which underwent a 10-week refit at a cost of $3.5 million completed in June, and the Naval cable ship, Neptune, refitted in 60 days at a cost of $1.2 million and completed in January.

For further information on Versatile Pacific Shipyards and their services,

Circle 79 on Reader Service Card

Sea Trec Launches Converted U.S. Navy Landing Craft For Use In Alaskan Waters


Over the past five years, Sea Trec Enterprises has specialized in the conversion of U.S. Navy Landing Craft to commercial vessels, most of which are now working in Alaska.

Sea Trec Enterprises Inc. of San Diego, Calif., recently launched another in its series of refurbished U.S. Navy landing craft for Alaskan waters—the Morning Thunder. The owners, Smith Literage of Dillingham, Alaska, plan to use the vessel to haul freight and tow their new 120-foot fuel barge.

Since the Morning Thunder's primary use will be in shallow draft areas such as hard-to-get-to river villages, Sea Trec replaced her standard $\frac{3}{16}$-inch bottom with $\frac{5}{16}$-inch to stand up to the many anticipated beachings. Additionally, twin Detroit Diesel 8-71 engines were installed with 1:5-1 Twin Disc gearbox, and a 5-ton galvanized Anthony crane was installed just forward of the pilothouse. Other features include push knees, a special forward anchoring system, and Sea Trec's standard tire fender system.

With over 20 landing craft conversions currently working on the West Coast and Alaska and more on the drawing board, Sea Trec continues to play a major role in the specialized field of shallow draft vessles.

For further information,

Circle 84 on Reader Service Card

FOR MORE INFORMATION
ON
EQUIPMENT AND SERVICES ADVERTISED IN THIS ISSUE

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BUYERS DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all 20 issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR/EN assumes no responsibility for errors. **If you are interested in having your company listed in this Buyers Directory Section, contact John C. O'Malley at (212) 477-6700.**

AIR COMPRESSORS
Hamworthy Engineering Ltd., 10555 Lake Forest Blvd., Suite 5F, New Orleans, LA 70127
Squire-Cogswell Company, 3411 Commercial Ave., Northbrook, IL 60062

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Bailey Refrigeration Co., Inc, 2323 Randolph Avenue, Avenel, NJ 07001
Flakt AB, Box 8862, S-40272, Gothenburg, Sweden
Stal Refrigeration AB, Butangsgatan 16, S 601 87 Norrkoping, Sweden
Carrier Transicold Division, Carrier Corp., P. O. Box 4805, Syracuse, NY 13221

ANCHORS AND CHAIN
Baldt Incorporated, P.O. Box 350, Chester, PA 19016
G.J. Wortelboer Jr. B.V., Eemhavenstraat 4, P.O. Box 5003, 3008 AA Rotterdam, Netherlands

ANODES—Cathodic Protection
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Engelhard Industries Division, 2655 U.S. Route 22, Union, NJ 07083
Federal Harco, P.O. Box 40310, Houston, TX 77240
Thermal Reduction Company, 1 Pavilion Avenue, Riverside, NJ 08075
Wilson, Walton International, Inc., 66 Hudson St., Hoboken, NJ 07030

BALLASTS
Genstar Stone Products Co., Executive Plaza IV Hunt Valley, MD 21031

BASKET STRAINERS
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

BEARINGS—Rubber, Metallic, Non-Metallic
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, OH 44309
Norton Chemplast, 309-150 Dey Rd., Wayne, NJ 07470
Thomson-Gordon Limited, 3225 Mainway, Burlington, Ontario, Canada L7M 1A6
Waukesha Bearings Corp., P.O. Box 798, Waukesha, WI 53186

BLASTING—Cleaning—Equipment
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
E.I. DuPont De Nemours & Co., Inc., Starblast Division, Room X39186, Wilmington, DE 19898
Inventive Machine Corp., P.O. Box 369, Bolivar, OH 44612
Key Houston Division of Jacksonville Shipyards, 13911 Atlantic Blvd., Jacksonville, FL 32225

BOILERS
Combustion Engineering, Inc., 1000 Prospect Hill Road, Windsor, CT 06095
Industrial Engineering & Equipment Co., 425 Hanley Industrial Ct., St. Louis, MO 63144
Boiler Tube Company of America, P.O. Drawer 517, Lyman, SC 29365
Murray Tube Works, P.O. Drawer 517, Lyman, SC 29365
Senior Green Economizers, P.O. Drawer 517, Lyman, SC 29365

BOILER CLEANING
Asea Stal, 50 Chestnut Ridge Rd., Montvail N.J. 07645

BROKERS
Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, LA 70153
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Jack Faulkner, Inc., 1005 W. Harimaw Ct., Metairie, LA 70001
Mowbray's Tug & Barge Sales Corp., 21 West St., New York, NY 10006
Western Maritime, 701 B Street, San Diego, CA 92101

BRONZES—COMMEMORATIVE
Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707

BUNKERING SERVICE
Belcher Company, Inc., 8700 West Flagler, P.O. Box 525500, Miami, FL 33152
Gulf Oil Trading Co., 535 Madison Ave., New York, NY 10022
National Marine Service Inc. (Transport Div.), 1750 Brentwood Blvd., St. Louis, MO 63144

CARGO HANDLING EQUIPMENT
MacGregor-Navire International, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016

CASTINGS/FORGINGS
NKS Industria Pesada, Grupo Industrial, Reforma 404, 140 Piso, Mexico, D.F. 06600 U.S. REP.—Lexington International Trading, Inc., 551 Fifth Ave., Room 910, New York N.Y. 10017

CHOCKING SYSTEMS
Philadelphia Resins Corp., 20 Commerce Drive, Montgomeryville, PA 18936

CLAMPS
Inter Product, Inc., Avon Street Business Center, P.O. Box 1848, Charlottesville, VA 22903

CLOSURES—Marine
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

COMPUTERIZED INFORMATION SYSTEMS
Marine Management Systems, Inc., 102 Hamilton Ave., Stamford, CT 06902
Maritime Data Network, Ltd., 102 Hamilton Ave., Stamford, CT 06902
Military Contract Information Service, Inc. Dist. by Maritime Reporter/Engineering News, 118 East 25 St. N.Y. N.Y. 10010
TIMSCO, 622 Azalea Rd., Mobile, AL 36609
Veson Systems, 29 Broadway, Suite 1002, New York, NY 10006

CONDENSERS
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

CONTROL SYSTEMS—Monitoring
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
ASEA, Inc., 4 New King St., White Plains, NY 10604
Bailey Controls, 29801 Euclid Avenue, Wickliffe, OH 44092
Barringer Research, 304 Carlingview Dr., Rexdale, Ontario, Canada M9W 5G2
Biospherics Inc., 4928 Wyaconda Rd., Rockville, MD 20852
Cooper Energy Services, Mount Vernon, OH 43050
Ergon, Inc., P.O. Drawer 1639, Jackson, MS 39205
Failsafe Motor/Generator Protector, Marine Safe Electronics Ltd., 101 Jardin Dr., Unit 24/25, Concord, Ontario, Canada L4K 1B6
Indikon Corp., 26 New St., Cambridge, MA 02138
Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
Leslie Co., 401 Jefferson Rd., Parsippany, NJ 07054
Marine Safe Electronics, 37 Staffern Drive, Concord, Ontario, Canada, L4K 2X2
Pandel Instruments Inc., 2100 N. Hwy. 360, Grand Praire, TX 75050
Propulsion Systems, Inc., 21213 76 Ave., Kent, WA 98032
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Thomas Products Ltd., Flow Switch Div., 987 West St., Southington, CT 06489-1023
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062
Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway

CRANE BUMPERS
Kastalon Inc., 4101 West 123rd St., Alsip, IL 60658

CRANES—HOISTS—DERRICKS—WHIRLEYS
Allied Marine Crane, P.O. Box 23026, Portland, OR 97233
Appleton Marine, P.O. Box 2339, Appleton, WI 54913
ASEA Hagglunds Inc., P.O. Box 7949, The Woodlands TX 77380
Davit Sales, Inc., P.O. Box 232, Jefferson Valley, NY 10535
HIAB Cranes & Loaders Inc., 258 Ouigley Boulevard, New Castle, DE 19720
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany
CMH Heleshaw, Inc., 201 Harrison St. Hoboken N.J. 07030
Cunningham Marine Hydraulics Co. Inc., 2030 E. Adams St. Jacksonville, FL 32202

DECK MACHINERY—Cargo Handling Equipment
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, WA 98134
McElroy Machine & Mfg. Co., Inc., Lorraine Rd., Industrial Seaway, Gulfport, MS 39501
Schoellhorn Albrecht, Div. of St. Louis Ship, 3460 So. Broadway, St. Louis, MO 63118

DECKING—GRATING
Alligned Fiber Composites, Highway 52, South Chatfield, MN 55923
International Grating, 7625 Parkhurst, Houston, TX 77028
Selby, Battersby & Company, 5220 Whiby Ave., Philadelphia, PA 19143

DIESEL ACCESSORIES—CYLINDER LINERS
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360
Haynes Corporation, P.O. Box 179, Jackson, MI 49204
Illman Jones, 1111 Green Island Rd., American Canyon, CA 94589
Stewart & Stevenson Services, Inc.—MWM, P.O. Box 1637, Houston, TX 77251-1637
Transamerica Delaval Engine & Comp. Div., 550 85th, Oakland, CA

DIESEL ENGINE—Spare Parts & Repair
Alban Engine Power, Inc., 6455 Washington Blvd., Baltimore, MD 21227
Alco Power Inc., 100 Orchard St., Auburn, N.Y. 13021
Caterpiller Tractor Co. 100 N.E. Adams Street, Peoria, IL 61629-2325
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Cummins Engine Co., Inc., Mail Code 40642, Box 3005 Columbus, IN 47202 3005
Goltens, 160 Van Brunt Street, Brooklyn, NY 11231
Granges Repair Service GMBH, Gutenbergring, 64 D-2000 Hamburg-Norderstedt TX:0215553
Schoonmaker Service Parts Co., Inc., P.O. Box 757, Foot of Spring St., Sausalito, CA 94966
Stewart & Stevenson Services, Inc.—MWM, P.O. Box 1637, Houston, TX 77251-1637
Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166
Transamerica Delaval Engine & Comp. Div., 550 85th, Oakland, CA
Volvo Penta of America, P.O. Box 927, Rockleigh, NJ 07647

ELECTRICAL EQUIPMENT
Midland-Ross Corp., Russellstoll Division, 530 W. Mt. Pleasant Ave., Livingston, NJ 07039
Newmar, P.O. Box 1306, Newport Beach, CA 92663
Sigmaform Corporation, P.O. Box 515, Richboro, PA 18954
Stewart & Stevenson Services, Inc.—MWM, P.O. Box 1637, Houston, TX 77251-1637
Ward Leonard Electric Co., 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

ELECTRONIC SYSTEMS
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 TX: 125327

EMULSIFICATION SYSTEMS
Cleanodan A/S, N. American Agents, American United Marine Corp., 5 Broadway, Route 1, Saugus, MA 01906
Sunbelt Energy Systems, Inc., Park Square, 2105 Park Ave., Suite 14, Orange Park, FL 32073
S/S Research & Development Inc., 1050 State St., Perth Amboy, NJ 08862
Todd Marine Systems, 61 Taylor Reed Place, Stamford, CT 06906

ENGINE TEST EQUIPMENT
General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360

EQUIPMENT—Marine
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94083
ASEA Hagglunds Inc., P.O. Box 7949, The Woodlands TX 77380
Band-It Division, Houdaille Industries, Inc., P.O. Box 16307, Denver, CO 80216
Beaver Tool Co., 1525 SE 29th St., Box 94717, Oklahoma City, OK 73143
Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202
Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
Fitz-Wright Suits Ltd., 17919 Roan Pl., Surrey, B.C., Canada V3S 5K1
Genstar Stone Products Co., Executive Plaza IV, Hunt Valley, MD 21031
Hamworthy Engineering Ltd., 10555 Lake Forest Blvd., Suite 5F, New Orleans, LA 70127
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, NY 10550
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
Nicolai Joffe, P.O. Box 5362, 9171 Wilshire Blvd., Beverly Hills, CA 90210
Raytheon Service Co., 100 Roesler Rd., Suite 103, Glen Burnie, MD
Republic-Lagun Machine Tool Co., 1000 E. Carson St., Carson, CA 90749
Viking Life Saving Equipment, 3305 N.W. 37th Street, Miami, FL 33142
Waterman Supply Co., Inc., 2815 E. Anaheim Street, P.O. Box 596, Wilmington, CA 90748

EVAPORATORS
Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Aqua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201
Atlas-Danmark Marine & Offshore, Baltorpvej 154, KD-2750 Blierup, Copenhagen DENMARK
Meco (Mechanical Equipment Co., Inc.), 861 Carondelet Street, New Orleans, LA 70130
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

FANS—VENTILATORS—BLOWERS
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Hartzell Fan Company, 901 Downing Street, Piqua, OH 45356
Joy Manufacturing Company, 338 So. Broadway, New Philadelphia, OH 44663
Jon M. Liss Associates, Inc., 411 Borel Ave., P. O. Box 5554, San Mateo, CA 94402

FASTENERS
Hardware Specialty Co., Ships Division, 48-75 36th St., Long Island City, NY 11101
Sales Systems Limited,7006, 700 Florida Ave., Portsmouth, VA 23707

FENDERING SYSTEMS—Dock & Vessel
InterTrade Industries, 15301 Transistor Lane, Huntington Beach, CA 92649
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Seaward International, Inc., 6269 Leesburg Ave., Falls Church, VA 22044

FILTERS
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Parker Filter Division, 16810 Fulton County Road, #2, Metamora, OH 43530

FINANCING—Leasing
Gulf Western Leasing Corp., 1500 City West Blvd., Suite 300, Houston, TX 77047
JMJ Marine Investors, P.O. Box 51509, New Orleans, LA 70151

FIRE PROTECTION, DETECTION & ALARM SYSTEMS
Walter Kidde, Walter Kidde Dr., Wake Forest, NC 27586

FUEL OIL/ADDITIVES—Analysis & Combustion Testing
Ferrous Corporation, 910-108th N.E., P.O. Box 1764, Bellevue, WA 98009
Hamworthy Engineering Ltd., 10555 Lake Forest Blvd., Suite 5F, New Orleans, LA 70127
McTigue Industries Inc., 1615 9th Ave., Bohemia, NY 11716

FURNITURE
Bailey, Carpenter & Insulation Co., 2323 Randolph Avenue, Avenel, NJ 07001
Comfort-Mate, Inc., 7988 NW 56th Street, Miami, FL 33166

GALLEY EQUIPMENT
Insinger Machine Co., 6245 State Rd., Philadelphia, PA 19135

GANGWAYS
Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960

HATCH & DECK COVERS—Chain Pipe
MacGregor-Navire Internatinal, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

GAUGES
Oil Recovery Systems, Inc., 1420 Providence Hwy., Norwood, MA 02062

HEAT EXCHANGERS
Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Industrial Engineering & Equipment Co., 425 Hanley Industrial Ct., St. Louis, MO 63144
Meco (Mechanical Equipment Co., Inc.), 861 Carondelet Street, New Orleans, LA 70130
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

HOLD LINERS
Himont U.S.A., Inc., 1313 N. Market St., Wilmington, DE 19894

HULL CLEANING
Aurand 1270 Ellis Street, Cincinnati, OH 45223
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223 9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Petroferm Marine, Route 2, Box 280, Amelia Island, FL 32034
Phosmarine Equipment, 21 Bd. de Paris, 13002, Marseille, France
Seaward Marine Service, Inc., 201 N. Union Street, Alexandria, VA 22314
Seaward Marine Service, Inc. 5409 Beamon Rd., Norfolk, VA 23513 TX-710-881-1182
Seaward Marine Service, Inc. 424 West 8th Street, National City, CA 92050
Taylor Diving & Salvage Co. Inc., 701 Engineers Rd., Belle Chasse, LA 70037

HYDRAULICS
Aeroquip Corp., 1130 Maynard Road, Jackson, MI 49202
Bardex Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta. CA 93116
Cunningham Marine Hydraulics Co., Inc., 201 Harrison St., Hoboken, NJ 07030; 2030 E. Adams St., Jacksonville, FL 32204, TX: 710-730-5224
CMH Heleshaw, Inc., 201 Harrison St. Hoboken N.J. 07030
Del Gavio Marine Hydraulics Inc., 207 W. Central Ave., Maywood. NJ 07607
Hydra-Dynamics, Inc., 2141 Greenwood Ave., Wilmette, IL 60091
Parker Hannifin Corporation, 17325 Euclid Avenue, Cleveland, OH 44112
Titeflex Corporation, P.O. Box 54, Springfield, MA 01109
Washington Chain & Supply, Inc., P.O. Box 3646, Seattle, WA 98124

INERT GAS—Generators—Systems
Maritime Protection A/S, N. American Agents, American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906

INSULATION—Cloth, Fiberglass
Bailey, Carpenter & Insulation Co., 2323 Randolph Avenue, Avenel, NJ 07001
Duracote Corp., 350 North Diamond St., Ravenna, Ohio 44266
Superior Energies, Inc. P.O. Drawer 386, Groves, TX 72619

INSURANCE
Adams & Porter, 510 Bering Dr., Houston, TX 77057-1408
Adams & Porter, 1 World Trade Center, Suite 8433, New York, NY 10048
Wm. Keith Hargrove, Inc., 1300 Post Oak Blvd., Suite 2050, Houston, TX 77056
United States P&I Agency, Inc., 80 Maiden Lane, New York, NY 10038

JOINER—Watertight Doors—Paneling
Advanced Structures Corp., 235 W. Industry Ct., Deer Park, NY 11729
Astech, 3030 S. Red Hill Ave., Santa Ana, CA 92711
Bailey Distributors, Inc., 2323 Randolph Avenue, Avenel, NJ 07001
Masonite Commercial Division, Dover, OH 44622
Megadoor Inc., 441 Lexington Ave., Suite 903, New York, NY 10017
Walz & Krenzer, Inc., 400 Trabold Road, Rochester, NY 14624

KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
Carlisle & Finch, 4562 W. Mitchell Avenue, Cincinnati, OH 45232
Midland-Ross Corp., Russellstoll Division, 530 W. Mt. Pleasant Ave., Livingston, NJ 07039
Perko Inc., P.O. Box 6400D, Miami, FL 33164

Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209

LINE BLINDS

American Piping Products Inc., Box 1056, New Hyde Park, NY 11040
Stacey/Fetterolf Corp., P.O. Box 103, Skippack, PA 19474

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING

A-C Brake Co., 308 E. College St., Louisville, KY
CMH Heleshaw, Inc., 201 Harrison St. Hoboken N.J. 07030
Cunningham Marine Hydraulics Co. Inc., 2030 E. Adams St. Jacksonville, FL 32202
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DEL-MARINE
Jered Brown Brothers Inc., 1300 Coolidge, P.O. Box 2006, Troy, MI 48007
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Goltens, 160 Van Brunt St., Brooklyn, NY 11231
Rosan, Inc., 2901 West Coast Hwy., Newport Beach, CA 92663

METALS

Bayou Steel Corp., P.O. Box 5000, Laplace, LA 70068

MINING

Rocky Mountain Energy, 10 Longspeake Dr., Box 2000, Broomfield, CO 80020

NAME PLATES—BRONZE—ALUMINUM

Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS

ACB Industries, 3400 Camp Street Suite 100, New Orleans, LA 70130
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Highway (Suite 1300), Arlington, VA 22202
Aero Nov Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Hydromath Inc., Box 2450, Danby-Pawlet Road, Pawlet, VT 05761
American Systems Engineering Corp., P.O. Box 4265, Virginia Beach, VA 23454
Amirikian Engineering Co., Chevy Chase Center Bldg., Suite 505, 35 Wisconsin Circle, Chevy Chase, MD 20015
Art Anderson Associates, 148 First St., Bremerton, WA 98310
B.C. Research, 3650 Wesbrook Mall, Vancouver, B.C. Canada V6S 2L2
Del Breit Inc., 326 Picayune Place (Suite 201), New Orleans, LA 70130
C.A.C.I., Inc., 1815 No. Fort Myer Dr., Arlington, VA 22209
C.D.I. Marine Co., 5520 Los Santos Way, Suite 600, Jacksonville, FL 32211
C.T. Marine, 18 Church Street, Georgetown, CT 06829
Phillips Cartner & Co., Inc., 203 So. Union St., Alexandria, VA 22314
Century Engineering, inc., 32 West Rd., Towson, MD 21204
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, MA 02026
Crane Consultants Inc., 15301 1st Ave., So. Seattle, WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, Inc., 1725 Jefferson Davis Highway, Suite 700, Arlington, VA 22202
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
Capt. R.J. Fearson & Associates, P.O. Box 983, Tampa, FL 33601
Christopher J. Foster, Inc., 16 Sintsink Drive East, Port Washington, NY 11050
Gibbs & Cox, Inc., 119 West 31st Street, New York, NY 10001
John W. Gilbert Associates, Inc., 66 Long Wharf, Boston, MA 02110
The Glosten Associates, Inc., 610 Colman Bldg., 811 First Ave., Seattle, WA 98104
Phillip Gresser Associates, Ltd., 3250 South Ocean Blvd., Palm Beach, FL 33480
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
Hamilton Cornell Associates, Box 188, Snug Harbor Station, Duxbury, MA 02331
J.J. Henry Co., Inc., 40 Exchange Place, New York, NY 10005
Hi-Test Laboratories, Inc., P.O. Box 226, Buckingham C.H., VA 23921
HydroComp, Inc., 10 Cutts Road, P.O. Box 865, Durham, NH 03824
Intramarine, Inc., P.O. Box 53043, Jacksonville, FL 32201
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
Jantzen Engineering Co., 6655-H Amberton Drive, Baltimore, MD 21227
James S. Krogen & Co., Inc., 3333 Rice St., Miami, FL 33133
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
John J. McMullen Associates, Inc., 1 World Trade Center, New York, NY 10048
McLear & Harris, Inc., 28 West 44 Street, New York, NY 10036
Fendall Marbury, 1933 Lincoln Drive, Annapolis, MD 21401
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, OH 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, NY 11746
Marine Technical Associates, Inc., 95 River Rd., Hoboken, NJ 07030
Maritime Design, Inc., 2955 Hartley Rd., Jacksonville, FL 32217
George E. Meese, 194 Acton Rd., Annapolis, MD 21403
R. Carter Morrell, 715 S. Cherokee, Bartlesville, OK 74003
NKF Engineering Assoc., Inc., 8150 Leesburg Pile, Vienna, VA 22202
Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
Nickum & Spaulding Associates, Inc., 2701 First Ave., Seattle, WA 98121
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean-Oil Internatinal Engineering Corporation, 3019 Mercedes Blvd., New Orleans, LA 70114
PRC Guralnick, 5252 Balboa Ave., San Diego, CA 92117
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, FL 33156
S.L. Petchul, Inc., 1380 S.W. 57th Avenue, Fort Lauderdale, FL 33317
Q.E.D. Systems Inc., 4646 Witchduck Rd., Virginia Beach, VA 23455
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Sargent & Herkes Inc., 611 Gravier St., New Orleans, LA 70130
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, FL 33316
SEACOR Systems Engineering Associates Corp., 19 Perina Blvd., Cherry Hill, NJ 08003 (Publications Division at Cherry Hill location)
STV/Sanders & Thomas, Inc., 1745 Jefferson Davis Hwy., Arlington, VA 22202
Seaworthy Systems, Inc., 28 Main St., Essex Ct. 06426; 17 Battery Place, N.Y. N.Y. 10004, P.O. Box 205, Solomons, MD 20688
Seaworthy Electrical Systems, 17 Battery Pl. N.Y. N.Y. 10004
George G. Sharp, Inc., 100 Church St., New York, NY 10007
Simmons Associates, P.O. Box 760, Sarasota, FL 33578
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
J.F. Stroschein Associates, 666 Old Country Rd., Garden City, NY 11530
Richard R. Taubler, Inc., 610 Carriage La., Dover, DE 19901
Thomas Coudon Associates, 6655 Amberton Drive, Baltimore, MD 21227
Timsco, 622 Azalea Road, Mobile, AL 36609
Tracor Hydronautics, Inc., 7210 Pindell School Rd., Laurel, MD 20707
Thomas B. Wilson, Associates, 1258 North Avalon Blvd., Wilmington, CA 90744

NAVIGATION & COMMUNICATIONS EQUIPMENT

Atkinson Dynamics, Section 6, 10 West Orange Ave., South San Francisco, CA 94080
British Telecom International, The Holborn Centre, 120 Holborn, London EC1N 2TE
CMC Communications Inc., 5479 Jetport Industrial Blvd., Tampa, FL 33614
COMSAT World Systems, 950 L'Enfant Plaza, S.W., Suite 6151 Washington, DC 20024
A/S Elektrisk Bureau, P.O. Box 98, N-1360 Nesbru, Norway
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
General Electric Company, Mobile Communications Division, Lynchburg, VA 24502
Harris Communications (RF Communications), 1680 University Avenue, Rochester, NY 14610
Henschel, 9 Hoyt Drive, Newburyport, MA 01950
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07631
ITT Mackay, 441 U.S. Highway #1, Elizabeth, NJ 07202
Japan Radio Co., Ltd., Akasaka Twin Tower, 17-22, Akasaka 2-chome, Minato-ku, Tokyo 107, Japan U.S. Rep: 405 Park Ave., New York, NY 10022
Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
Kongsberg Vopenfabrikk, Norcontrol Division, P.O. Box 145, Horten 3191, Norway
Krupp Atlas-Elektronik, 1453 Pinewood St., Rahway, NJ 07065
Micrologic, 20801 Dearborn, Chatsworth, CA 91311
Nav-Com, Inc., 9 Brandywine Drive, Deer Park, NY 11729
Navigation Sciences Inc., 6900 Wisconsin Ave., Bethesda, MD 20815 TX: 705999
Perko Inc. (Lights), P.O. Box 6400D, Miami, FL 33164
Racal Marine Inc., 1 Commerce Blvd., Palm Coast, FL 32037-0029
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033
Raytheon Marine Co., 676 Island Pond Road, Manchester, NH 03103
Raytheon Ocean Systems Company, Westminster Park, Risho Avenue, East Providence, RI 02914
Raytheon Service Co., 103 Roesler Rd., Glen Burnie, MD 21061
Robertson Autopilot, 400 Oser Ave., Happauge, NY 11738
S.P. Radio A/S, DK 9200 Aalorg, Denmark
Sait, Inc., 33 Rector St., New York, NY 10006
Sperry Corporation, Rte 29 North, Charlottesville, VA 22906
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Telesystems, 2700 Prosperity Ave., Fairfax, VA 22031 USA
Texas Instruments, Inc., P.O. Box 405, 3438, Lewisville, TX 75067
Tracor Instruments Austin Inc., 6500 Tracor Lane, Austin, TX 78725

OILS—Marine—Additives

Exxon Company, U.S.A., Room 2323 AH, P.O. Box 2180, Houston, TX 77701
Gulf Oil Company—U.S. (Domestic Oils), 909 Fannin Street, Houston, TX 77001
Gulf Oil, New York District Sales Office (Domestic), 433 Hackensack Avenue, Hackensack, NJ 07601
Gulf Oil Trading Co., 535 Madison Ave., New York, NY 10022
Mobil Oil Corp., 150 East 42 Street, New York, NY 10017
Texaco, Inc. (International Marine), 135 East 42nd St., New York, NY 10017

OILY WATER ALARMS/MONITORS

Biospherics, Inc., 4928 Wyaconda Road, Rockville, MD 20852

OIL/WATER SEPARATORS

Alfa Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647
Hamworthy Engineering Ltd., 10555 Lake Forest Blvd., Suite 5F, New Orleans, LA 70127
Hyde Products, Inc., 810 Sharon Dr., Westlake, OH 44148
NALCO Chemical, Co., 2901 Butterfield Road, Oak Brook, IL 60521
Oil Recovery Systems, Inc., 1420 Providence Hwy., Norwood, MA 02062
Peck Purifier Sales Co., 3724 Cook Blvd., Chesapeake, VA 23323
Sigma Treatment System, Merry Meadows RD 1 Box 70, Chester Springs, Pa 19425

PAINTS—COATINGS—CORROSION CONTROL

American Abrasive Metals, 460 Coit Street, Irvington, NJ 07111
Ameron, 4700 Ramona Blvd., Monterey Park, CA 91754
Dampney Company, Inc., 85 Paris St., Everett, MA 02149
Devoe Marine Coatings Co., P.O. Box 7600, Louisville, KY 40207
Drew Ameroid Marine, One Drew Chemical Plaza, Boonton, NJ 07005
E.I. DuPont De Nemours & Co., Inc. Nemours Bldg., Rm. N-2504-2, Wilmington, DE 19898
DuPont Co. MPS , Room X40750, Wilmington, DE 19898
Esgard, Box 2698, Lafayette, LA 70502
Farboil Company, 8200 Fischer Rd., Baltimore, MD 21222
Hempel Marine Paints, Inc., Foot of Currie Ave., Wallington, NJ 07057; 6868 NorthLoop East, Suite 304, Houston, TX 77028; P.O. Box 10265, New Orleans, LA 70181
International Paint Company, Inc., 2270 Morris Avenue, Union, NJ 07083
Jaegle Paint Company, Inc., 1012 Darby Road, Havertown, PA 19083
Jotun Marine Coatings Inc., 175 Penrod Court N&O, Glen Burnie, MD 21061
Magnus Maritec International Inc., 150 Roosevelt Pl., P.O. Box 150, Palisades Park, NJ 07650
Products Research & Chemical Corp., 5454 San Fernando Rd., Glendale, CA 91203
Selby Battersby & Co., 5220 Whitby Ave., Philadelphia, PA 19143

PIPE-HOSE—Cargo Transfer Clamps, Couplings, Coatings

Amermarine International, P.O. Box 9205, Dundalk, MD 21222
Deutsch Metal Components, 14800 S. Figueroa St., Gardena, CA 90248
Hydro-Craft Inc., 1821 Rochester Industrial Dr., Rochester, MI 48063
Knights Piping Inc., 5309 Industrial Road, Pascagoula, MS 39567
Tioga Pipe Supply Co. Inc., 2450 Wheatsheaf La., P.O. Box 5997, Philadelphia, PA 19137

PLASTICS—Marine Applications

Hubeva Marine Plastic, Inc., 390 Hamilton Ave., Brooklyn, NY 11231
Norton Chemplast, 309-150 Dey Rd. Wayne NJ 07470

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines

Amarillo Gear Co., P.O. Box 1789, Amarillo, Texas 79105
Armco Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, LA 70150
Bergen Diesel Inc., 2110-10 Service Rd., Kenner, LA 70062
Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Caterpillar Engine Division, 100 N.E. Adams, Peoria, IL 61629
Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
Columbian Bronze Corporation, 216 No. Main Street, Freeport, NY 11520
Combustion Engineering, Inc., Windsor, CT 06095
Coolidge-Stone Vickers, Inc., 56 Squirrel Rd., Auburn Hills, MI 48057
Daihatsu Diesel (USA) Inc., 180 Adams Ave., Hauppauge, NY 11788
Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Elliott Company, 1809 Sheridan Ave., Springfield, OH 45505
George Engine Company, Inc., Lafayette, LA
General Motors, Electro-Motive Division, LaGrange, IL 60525
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Isotta Fraschini S.p.A., c/o Italian Aerospace Industries (U.S.A.), Inc., 1235 Jefferson Davis Hwy., Suite 500, Arlington, VA 22202
KHD Canada Inc., 180 Rue de Normandie, Boucherville, Quebec J4B 5S7, Canada
Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323
M.A.N.-B&W Diesel, 2 Ostervej, DK-4960 Holeby, Denmark
MTU of North America, One E. Putnam Ave., Greenwich, CT 06830; 10450 Corporate Dr., Sugarland, TX 77478; 2945 Railroad Ave., Morgan City, LA 70203; 180 Nickerson St., Seattle, WA 98109; 1730 Lynn St., Arlington, VA 22209
MWM-Murphy Diesel, 12 Greenway Plaza, Suite 1100, Houston, TX 77046
Michigan Wheel, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507
Mitsubishi Kakoki Kaisha LTD, Mita Kokusai Bldg. 4-28 Mita 1-chome, Minato-ku Tokyo 108 Japan
National Marine Service Louisiana, Inc., 222 Bayou Rd., Belle Chasse, LA 70037
North American Marine Jet P.O Box 1232 Benton, AR 72015
Omnithruster Inc., 9515 Sorensen Ave., Santa Fe Springs, CA 90670
Penske GM Power, Inc., 600 Parsippany Road, Parsippany, NJ 07054
Inland Water Propulsion Systems, Inc., 580 Walnut St., Cincinnati, OH 45201
Propulsion Systems, Inc., 21213 76 Ave. So., Kent, WA 98032
SACM (Societe Alsacienne De Constructions Mechaniques De Mulhouse) 1, Rue De La Fonderie, Boite Postale 1210, 68054 Mulhouse Cedex, France
Schottel of America, Inc., 8375 N.W. 56 St., Miami, FL 33166
Skinner Engine, Co., P.O. Box 1149, Erie PA 16512
Stewart & Stevenson Services, Inc., P.O. Box 1637, Houston, TX 77251-1637
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Tech Development Inc., 6800 Poe Ave., P.O. Box 14557, Dayton, OH 45414
Transamerica DeLaval Inc., Engine & Compressor Div., 550 85th Ave., Oakland, CA 94621
Transamerica DeLaval, Inc., Turbine & Compressor Div., P.O. Box 8788, Trenton, NJ 08650
Ulstein Maritime Ltd., 6307 Laurel St., Burnaby, B.C. Canada V5B 3B3
Ulstein Trading Ltd. A/S, N-6-65, Ulsteinvik, Norway
J.M. Voith GmbH Dept. WErung, Postfach 1940 7920 Heidenheim/Brenz, West Germany
Voith Schneider America, 159 Great Neck Rd., Ste. 200, Great Neck, NY 11021
Volvo Penta of America, P.O. Box 927, Rockleigh, NJ 07647
WABCO Fluid Power, an American-Standard Company, 1953 Mercer Rd., Lexington, KY 40505
Wartsila Power Inc., 5132 Taravella Rd., P.O. Box 868, Marrero, LA 70072
Waukesha Engine Division, Waukesha, WI 53187

PUMPS—Repairs—Drives

Allweiler Pump Inc., 5410 Newport Dr., Rolling Meadows, IL 60008 TX: 270-0444
CMH Heleshaw, Inc., 201 Harrison St. Hoboken N.J. 07030
Cunningham Marine Hydraulics Co., Inc., 201 Harrison St., Hoboken, NJ 07030; 2030 E. Adams St., Jacksonville, FL 32204, TX: 710-730-5224
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DEL-MARINE
Goltens, 160 Van Brunt St., Brooklyn, NY 11231
Hamworthy Engineering Ltd., 10555 Lake Forest Blvd., Suite 5F, New Orleans, LA 70127
Ingersoll—Rand Pump Group, Dept. B—346, Washington, N.J. 07882
Jim's Pump Repair, 48-55 36th St., Long Island City, NY 11101
Meco (Mechanical Equipment Co., Inc.), 861 Carondelet Street, New Orleans, LA 70130
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Sims Pump Valve Co., Inc., 1314 Park Ave., Hoboken, NJ 07030
Transamerica Delaval, Pyramid Pump Div., P.O. Box 447, Monroe, NC 28110
Vita Motivator Company, 200 West 20th St., New York, NY 10011
Warren Pumps Division, Bridges Avenue, Warren, MA 01083
Wilden Pump & Engineering Co., 22060 Van Buren St., P.O. Box 845, Colton, CA 92324

REFRIGERATION—Refrigerant Valves

Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, NY 11231
Grasso, Inc., 1101 N. Governor Street, P.O. Box 4799, Evansville, IN 47711-0799
United Technologies Carrier Transicold Div., Carrier Corp., P.O. Box 4805, Syracuse, NY 13221

ROPE—Manila—Nylon—Hawsers—Fibers

A.L. Don Co., Foot of Dock St., Matawan, NJ 07747
Allied Fibers, 1411 Broadway, New York, NY 10018
American Mfg. Co., Inc., Willow Avenue, Honesdale, PA 18431
Atlantic Cordage Corp., 60 Grant Avenue, Carteret, NJ 07008
DuPont Co., KEVLAR Aramid Fiber, Room G-15465, Wilmington, DE 19898
Tubbs Cordage Company, P.O. Box 709, Orange, CA 92666
Tubbs Cordage Co., P.O. Box 7986, San Francisco, CA 94120-7986
Vermeire N.V. Industripark Zwaarveld, B-9160 Hamme, Belgium TX: 21687
Wall Industries, Inc., P.O. Box 560, Elkin, NC 28621

SANITATION DEVICES—Pollution Control

Davit Sales Inc., P.O. Box 232, Jefferson Valley, NY 10535
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
FAST Sewage Systems, Div. of St. Louis Ship, 611 East Marceau St., St. Louis, MO 63111
Golar Metal A/S, P.O. Box 70, 4901 Tvedestrand, Norway
Hamworthy Engineering Ltd., 10555 Lake Forest Blvd., Suite 5F, New Orleans, LA 70127
Marland Environmental Systems, 8188 Newington Road, Lorton, VA 22079

SCAFFOLDING EQUIPMENT—Work Platforms

McCausey Lumber Co., 7751 Lyndon, Detroit, MI 48238
Trus-Joist Corp., P.O. Box 60, Boise, ID 83704

SCUTTLES/MANHOLES

Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

SHAFT SEALS, MECHANICAL PACKING

Crane Packing Company, 435 Regina Dr., Clarksberg, MD 20734
EG&G Sealol Engineered Prod. Div. Marine Products Group, Warwick, RI 02888
Garlock Inc., Mechanical Packing Div., 1666 Division St., Palmyra, NY 14522
Norton Chemplast, 309-150 Dey Rd., Wayne, NJ 07470

SHIPBREAKING—Salvage

Fred Devine Diving & Salvage, Inc., 6211 N. Ensign, Swan Island, Portland, OR 97217
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

SHIPBUILDING EQUIPMENT

Bardex Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, CA. 93116
Cockatoo Dockyard Pty. Ltd., P.O. Box 1139, North Sydney, NSW 2060, Australia TX: 72086
M.A.N.—GHH Sterkrade Werfsrabe 112 D-4100 Duisburg 18, West Germany
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, FL 33156
Total Transportation System Inc., 813 Forest Dr., Newport News, VA 23606
Total Transportation Systems (International) A/S, Bjornegarden, P.O. Box 248, N 5201, Os, Norway

SHIPBUILDING STEEL

Armco Steel Corp., 703 Curtis St., Middletown, OH 45042
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
High Strength QA Steel, P.O. Box 40606, Houston, Tx 77240-0606
United States Steel Corp., Christy Park Plant, 2214 Walnut St., McKeesport, PA 15132
Welded Beam Company, P.O. Box 280, Perry, OH 44081

SHIPBUILDING—Repairs, Maintenance, Drydocking

Amsterdam Drydock Company, Post Box 3006, 1003 AA, Amsterdam, Hol-

Macmeter Offers Metering Protection—Literature Available

Macmeter®, a cost-effective metering device distributed by North American Marine Inc., Brooklyn, N.Y., features a rugged and reliable paddlewheel flow sensor used to verify deliveries, shippers documentation, billing and inventory control.

The self-contained unit has several important features including: tamper proof; noncontaminating; no flow restriction; weatherproof; simple installation; ±0.5 percent repeatability; ±0.5 percent full-range accuracy; digital solid state electronics; and chemical resistant.

Macmeter's flow sensors are made of PVDF, a very strong, tough fluorocarbon that is highly resistant to most acids, bases and severe operating and temperature extremes. The paddle free wheels on a polished Hastelloy shaft and does not affect flow characteristics.

Reportedly, Macmeter operates over a broad dynamic range and delivers precise volumetric measuring directly proportional to the paddlewheel rotation velocity which is interfaced with solid-state digital electronics.

Macmeter's housing can be aluminum, brass or stainless steel, and comes in diameter sizes 2 to 4 inches. The unit, which is powered by a 3.75 volt "AA" cell long life battery, has a temperature rating of 85°C maximum at 25 psig, and a pressure rating of 200 psig maximum at 20°C. The system can handle a maximum of 10 percent solids in a fluid volume.

For further literature and information on Macmeter,

Circle 49 on Reader Service Card

$1.9-Million LST Repair Contract Received By MHI

Marine Hydraulics International, Inc. (MHI) of Norfolk, Va., has been awarded a contract for repairs to the USS Harlan County (LST-1196). The Harlan County is an 8,342-ton amphibious tank landing ship of the Newport Class and is homeported at Little Creek, Va. Its arrival at MHI marks the first major Navy ship repair contract to be conducted at the shipyard's newly upgraded waterfront facility. The contract is due to be completed this month. The Supervisor of Shipbuilding, Conversion and Repair, USN, is the contracting activity.

MARDATA Named North American Agent For Lloyd's Information Services

Lloyd's Maritime Information Services, Ltd. of London—a joint venture of Lloyd's Register of Shipping and Lloyd's of London Press—has appointed the Maritime Data Network (MARDATA) of Stamford, Conn., to coordinate all of its sales and marketing activities in North America. The Connecticut company has changed its name to Lloyd's Mardata to reflect this appointment.

MARDATA was founded in 1976, and has since become a leading supplier of database services to the international maritime industry, providing essential marine shipping information online via terrestrial and satellite communications networks. Formerly minority shareholders in MARDATA, Lloyd's Register and Lloyd's of London Press recently acquired a majority interest in the firm, paving the way for an increased scope of activities in the U.S., Canada, Mexico, and the Caribbean.

In addition to continuing its international online database services, Lloyd's Mardata will be the North American representative for the other operating divisions of Lloyd's Maritime Information Services: Lloyd's Shipping Information Services, including data sales, Viewdata, and Seadata; and Sea Group, LLP's maritime consulting arm.

land
Arsenale Triestino-San Marco Shipyard, Trieste, Italy, U.S. Rep: Marine Technologies & Brokerage, 33 Rector St., New York, NY 10066
Asmar Shipyards Co., Astilleros y Maestranzs de la Armada, Prat 856, Piso 14, Casilla 150-V, Valpariso, Chile, S.A.
Astilleros Unidos De Veracruz, S.A. San Juan Ulua S/N, Apdo. Postal 647 Veracruz, Ver Mexico
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, LA 70150
Bardex Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, CA 93116
Bath Iron Works Corp., 700 Washington St., Bath, ME 04530
Bay Shipbuilding Corp., 605 N. 3rd Ave., Sturgeon Bay, WI 54235
Bender Shipbuilding & Repair Co., Inc., P.O. Box 42, Mobile, AL 36601
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
Blohm & Voss AG, P.O. Box 100720, D-2000 Hamburg 1 (In US)-Blohm & Voss CO, Springfield, N.J.
Blount Marine Corp., P.O. Box 368, Warren, RI 02885
Boston Whaler Commercial Div., 1149 Hingham St., Rockland MA 02370
Burrard Yarrows Corporation, P.O. Box 86099, North Vancouver, B.C., Canada
Cantieri Navali Riuniti, Via Cipro, 11, 16100 Geneva, Italy
Chesapeake Shipbuilding Inc., 710 Fitzwater St., Salisbury, MD 21801
Conrad Industries, P.O. Box 790, Morgan City, LA 70380
Coast Iron & Machine Works, 5225-7th Street E., Tacoma, WA 98424
Curacao Drydock (U.S.A.) Inc., 26 Broadway, Suite 741, New York, NY 10004
Dubai Drydocks, P.O. Box 8988, Dubai, United Arab Emirates—U.S.A. Agents: Keppel Marine Agencies, Inc., 26 Broadway, New York, NY 10040, 6240 Richmond Ave., Houston, TX 77057
Eastern Marine, Inc., P.O. Box 1009, Panama City, FL 32401
Genstar Marine, 10 Pemberton Ave., No. Vancouver, B.C., Canada V7P 2R1
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
HBC Barge Co. Brownsville, PA 15417
Hitachi Zosen Corp., 1-1-1 Hitotsubashi, Chiyoda-ku, Tokyo 100, Japan
Hong Kong United Dockyards Ltd., P.O. Box 534, Kowloon Central Post Office, Kowloon, Hong Kong
Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, KOREA
Industrial Marine Engineering Ltd., P.O. Box 172, Suva, Fiji
Jakobson Shipyard Inc., P.O. Box 329, Oyster Bay, NY 11771
Jeffboat Inc., Jeffersonville, Ind. 47130
Jered Brown Brothers, Inc., 56 S. Squirrel Rd., Auburn Hills, MI 48057
Keppel Shipyard Limited, 325 Telok Blangah Road, P.O. Box 2169, Singapore 0409
Koch Ellis Barge & Ship Service, P.O. Box 9130, Westwego, LA 70094
Kone Corp. P.O. Box 6 SF-05801 Hyvinkaa, Finland
Paul Lindenau GmbH, & Co., Schiffswerft u. Maschinenfabrik, D-2300 Kiel-Friedrichsort, West Germany
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, WA 98134
M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany
Main Iron Works, Inc., P.O. box 1918, Houma, LA 70361
Marathon LeTourneau Offshore, P.O. Box 61865, Houston, TX 77208
Marinette Maine Corporation, Marinette, WI 54143
Mitsubishi Heavy Industries, Ltd., 5-1, Marunochi 2-chome, Chiyoda-ku, Toyko, 100 Japan
MonArk Boat Co., P.O. Box 210, Monticello, AR 71655
Moran Shipping Agencies, 602 Sawyer, Suite 200, Houston, TX 77077
Moss Point Marine Inc., P.O. Box 1310, Escatawpa, MS 39552
National Marine Service (Shipyard Division), P.O. Box 38, Hartford, IL 62048
National Steel & Shipbuilding Corp., San Diego, CA 92112
Nautilus Surveys Inc., 10822 Sageleaf Lane, Houston, TX 77089
Neorion Shipyards Syros Ltd., Syros, Greece–U.S.A. Agents: Keppel Marine Agencies Inc., 26 Broadway, New York, NY 10004, 6420 Richmond Ave., Houston, TX 77057
Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607
Nichols Brothers Boat Builders Inc., P.O. Box 580, 5400 S. Cameron Rd., Freeland, WA 98249
Pennsylvania Shipbuilding, P.O. Box 442, Chester, PA 19016
Promet (PTE) Ltd., 27 Pandam Rd., Jurong Industrial Estate, Singapore 22
Promet Marine Services Corp., 242 Allens Ave., Providence, RI 02905
Samsung Shipbuilding & Heavy Industries Co., Ltd., Samsung Main Bldg. 250, 2Ka, Taepyong-ro, Chung-ku, Seoul, Korea
Southwest Marine, Inc., P.O. Box 13308, San Diego, CA 92113
Tampa Shipyards Inc., P.O. Box 1277, Tampa, FL 33601
Thomas Marine, 37 Bransford St., Patchogue, NY 11772
Todd Shipyards Corp., 1 State St. Plaza, New York, NY 10004
Tracor Marine, P.O. Box 13107, Port Everglades, FL 33316
Vanguard Services, P.O. Drawer A, New Johnsonville, TN 37134
Verreault Navigation Inc., Les Mechins, Quebec, G0J 1T0
Waller Marine, Inc. 11777 Katy Freeway/Suite 395, Houston, TX
Westport Shipyard, Inc., P.O. Box 308, Westport, WA 98595
Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201

SHIPPING—PACKING
Pilotage Consultants, Inc., P.O. Box 2046, New Hyde Park, NY 11040
Signet Corporation, 1800 West Loop South, Suite 1600, Houston, TX 77027

SIMULATOR TRAINING
Marine Safety International, Marine Air Terminal, LaGuardia Airport, NY 11371

SILENCERS
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

SMOKE INDICATORS
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, NJ 07928

STUFFING BOXES
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Smith-Meeker Engineering Co., 157 Chambers St., New York, N.Y. 10007

SURVEYORS AND CONSULTANTS
Advanced Technologies Dept. PZ-01, 7926 Jones Branch Dr., McLean, VA 22102
Francis B. Crocco, Inc., P.O. Box 1411, San Juan, Puerto Rico 00903
Frank Jeffrey & Assoc., 5201 Westbank Exp., Suite 206, Marrero, LA 70073
M.A. Stream Associates, Inc., 400 Second Ave. W., Seattle, WA 98119

TANK CLEANING
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Gamlen Marine Division, 375 Allwood Rd., Clifton, NY 07013
Gamajet Equipment Div., Sybron Chemicals Inc., 121 S. Maple Ave., So. San Francisco, CA 94080
Petrochemical Services, Inc., 3820 Dauphine St., New Orleans, LA 70117
SAAB Tank Control, 5 Marine View Plaza, Hoboken, NJ 07030

TANK LEVELING INDICATORS
American United Marine Corp., 5 Broadway, Route 1, Sagas, MA 01906
Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
Oil Recovery Systems, Inc., 1420 Providence Hwy., Norwood, MA 02062
SAAB Tank Control, 5 Marine View Plaza, Hoboken, NJ 07030
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062

TORSIONAL VIBRATION SPECIALISTS
T.W. Spaetgens, 156 W. 8th Ave., Vancouver, Canada, V5Y 1N2

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
Bay Houston Towing Co., 2243 Milford, P.O. Box 3006, Houston, TX 77253
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, MD 21202
Jack Faulkner, Inc., 1005 W. Harimaw Ct., Metairie, LA 70001
Jan Erik Dyvi A/S, P.O. box 454, Sentrum, Norway
McAllister Bros., Inc., 17 Battery Pl., New York, NY 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, LA
Midland Affiliated Co., 580 Walnut St., Cincinnati, OH 45201
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, NY 10048
National Marine Service, Transport Div., 1750 Brentwood Blvd., St. Louis, MO 63144
Port Allen Marine Service, Inc., P.O. Box 108, Port Allen, LA 70767; Walker Boat Yard, P.O. Box 729, Port Allen, LA
Suderman & Young Co., Inc., 918 World Trade Bldg., Houston, TX 77002
Turecamo Coastal & Harbor Corp. 1 Edgewater Plaza Staten Island, N.Y. 10305

VALVES AND FITTINGS
Bailey, Division of CMB Industries, P.O. Box 8070, Fresno, CA 93747
Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202
Cajon Co., 9760 Shepard Rd., Macedonia, OH 44056
Crawford Fitting Company, 29500 Solon Road, Solon, OH 44139
Elliott Manufacturing Co., Inc. (Remote Valve Operating Equipment), P.O. Box 773, Binghamton, NY 13902
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Jamesbury Corp. 640 Lincoln St., Worcester, MA 01605
Nupro Co., 4800 E. 345th St., Willoughby, OH 44094
Parker Hydraulic Valve Didision, 520 Ternes Avenue, Elyria, OH 44035
Parker Actuator Division, 9948 Rittman Road, P.O. Box 450, Wadsworth, OH 44281-0450
Parker Systems Division, 651 Robbins Drive, Box 3500, Troy, MI 48007-3500
Pittsburgh Brass Manufacturing, Sandy Hill Rd., R.D. 6 Box 387-A, Irwin, PA 15642
Sno-Trik Co., 9760 Shepard Rd., Macedonia, OH 44056
Stacey/Fetterolf Corporation, P.O. Box 103, Skippack, PA 19474
Stockham Valves & Fittings, Box 10326, Birmingham, AL 35202
Swagelok Company, 5171 Hudson Dr., Hudson, OH 44236
Tate Andale Inc., 1941 Landsdowne Rd., Baltimore, MD 21227
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, NJ 07928
Waukesha Bearings Corp., 405 Commerce St., P.O. Box 798, Waukesha, WI 53186
Whitey Co., 318 Bishop Road, Highland Heights, OH 44143
William E. Williams Valve Corporation, 38-52 Review Avenue, Long Island City, NY 11101
Zidell Explorations, Inc., (Valve Division), 3121 S.W. Moody Avenue, Portland, OR 97201

VESSEL OWNER/OPERATOR
Wallenius Lines, P.O. Box 17086, S–10432 Stockholm, Sweden

VIBRATION ANALYSIS
DLI Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110

WATER PURIFIERS
Alfa Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Atlas-Danmark Marine & Offshore Baltorpej, 154 DK-2750 Ballerup, Copenhagen, Denmark, TX 35177 Atlas DK
Drew Chemical Corporation, One Drew Chemical Plaza, Boonton, NJ 07005
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Marland Environmental Systems, 8188 Newington Road, Lorton, VA 22079
MECO (Mechanical Equipment Company, Inc.), 861 Carondelet St., New Orleans, LA 70130
Oil Recovery Systems, Inc., 1420 Providence Hwy., Norwood, MA 02062
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
Sweetwater, 8188 Newington Road, Lorton, VA 22079

WEATHER CHART RECORDERS
Alden Electronics, 40 Washington St., Westborough, MA 01581

WELDING
KSM Fastening Systems Inc., 301 New Albany Rd., Moorestown, NJ 08057
Metallizing Co. of America, Inc., 321 So. Hamilton, Sullivan, IL 61951
Miller Electric Mfg. Co., P.O. Box 1079, Appleton, WI 54912

WELDING EQUIPMENT
Enerjee Ltd., 32 S. Lafayette Ave., Morrisville, PA 19067

WINCHES AND FAIRLEADS
Fritz Culver, Inc., P.O. Box 569, Covington, LA 70434
Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134
McElroy Machine & Mfg. Co., Inc., Lorraine Rd., Industrial Seaway, Gulfport, MS 39501
Nashville Bridge Co., P.O. Box 239 Nashville TN 37202
Schoellhorn Albrecht, Div. of St. Louis Ship, 3460 So. Broadway, St. Louis, MO 63118
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Seacoast Electric Supply Corp., 225 Passaic St., Passaic, NJ 07055
Seacoast Electric Supply Corp., 1505 Oliver St., Houston, TX 77007

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A.L. Don Company, Foot of Dock Street, Matawan, NJ 07747

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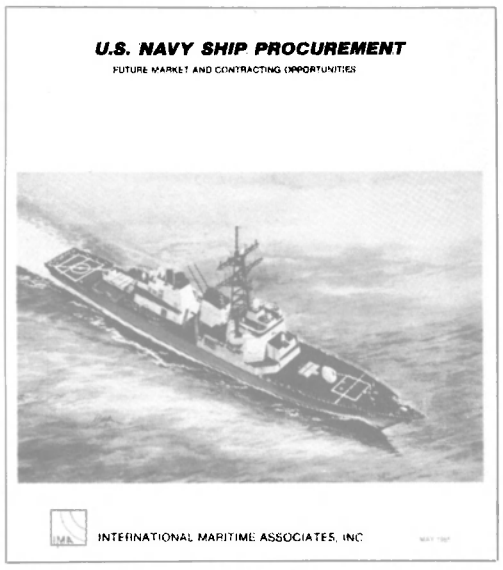

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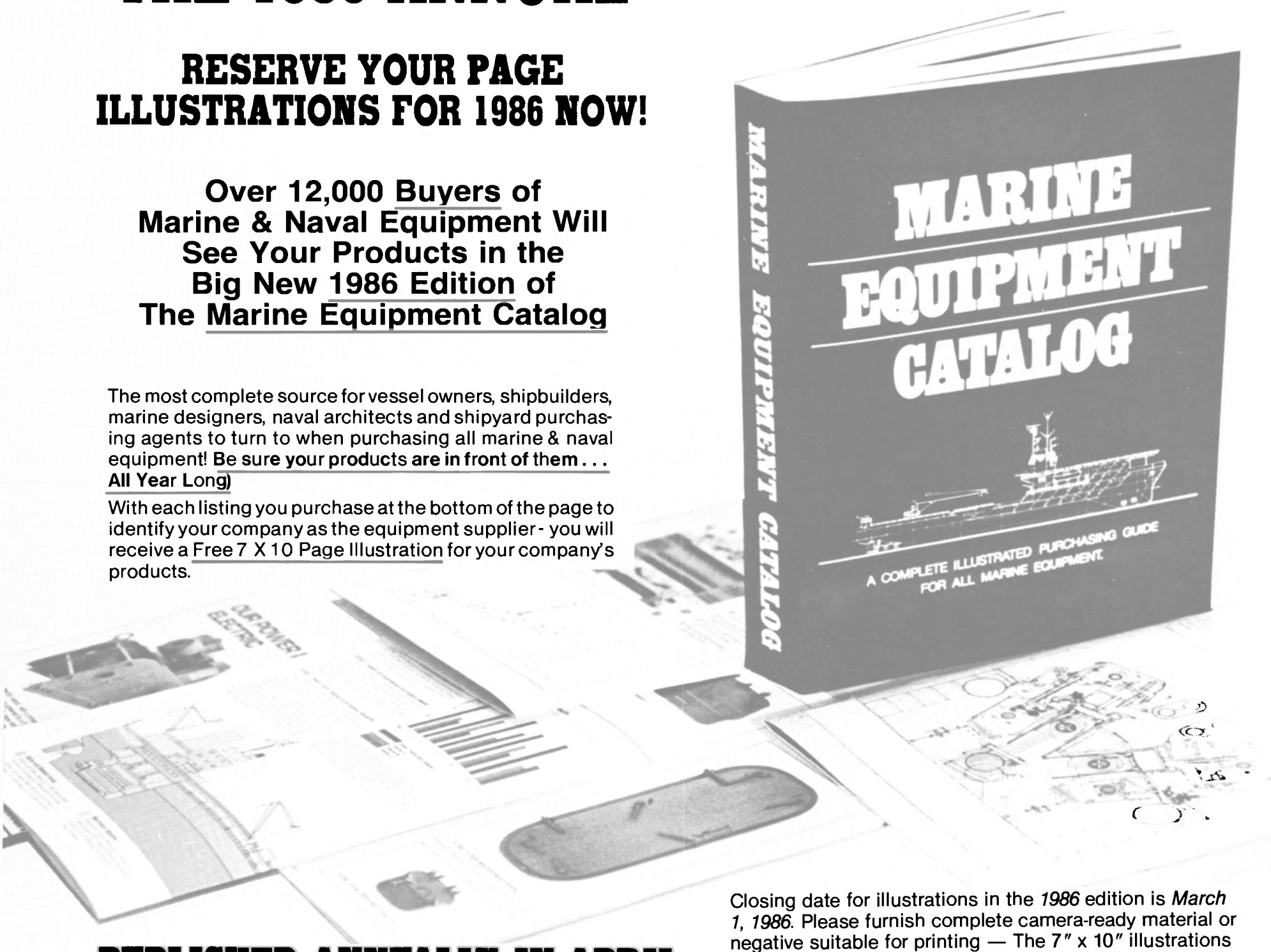

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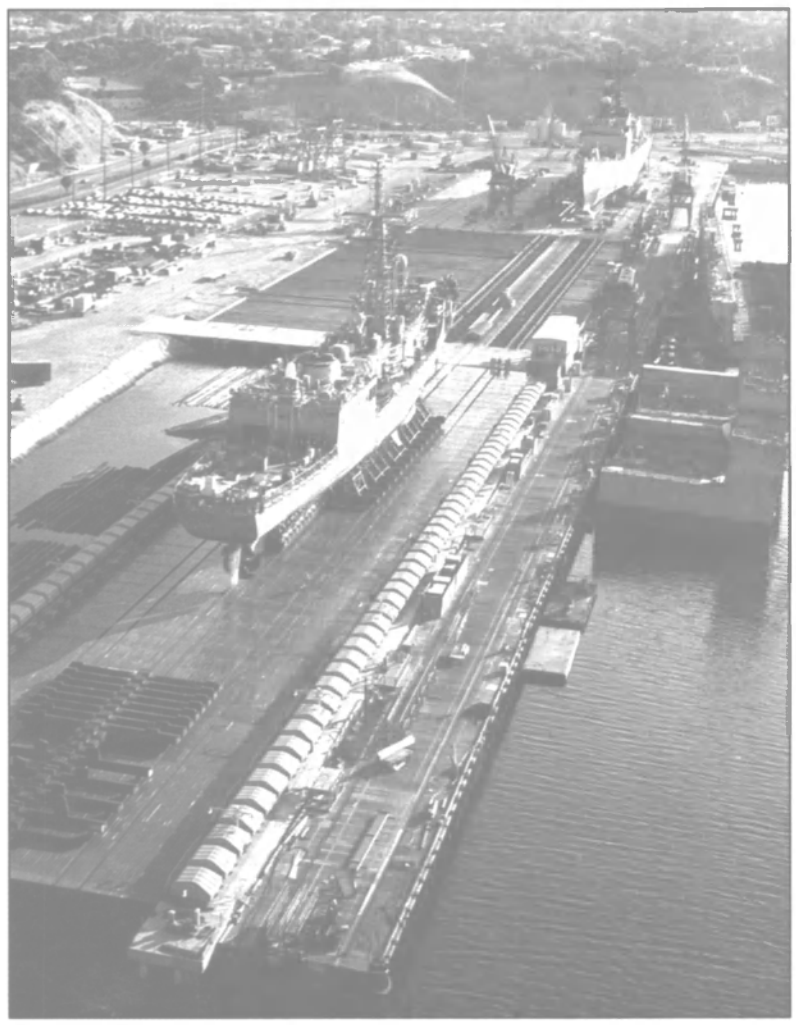

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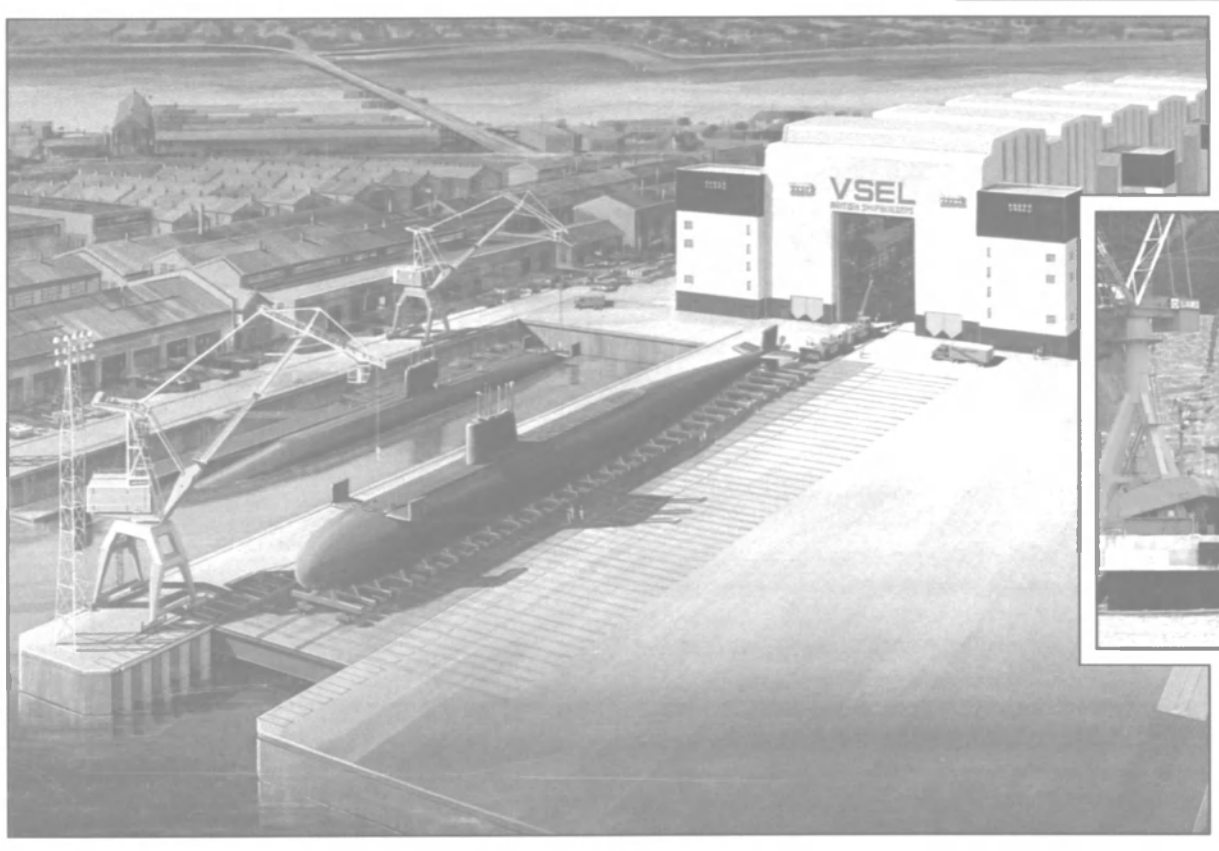

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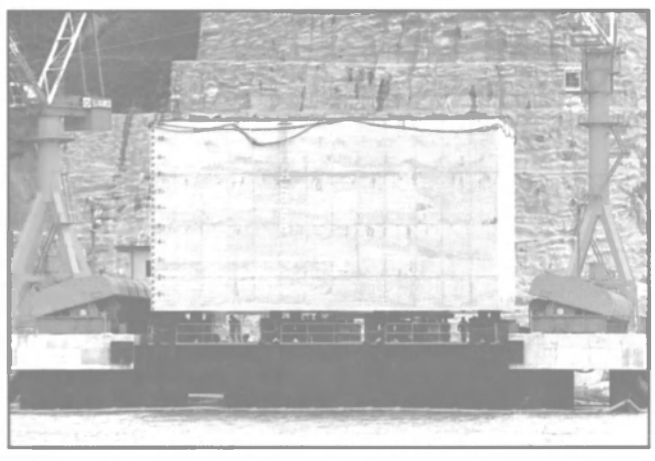

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