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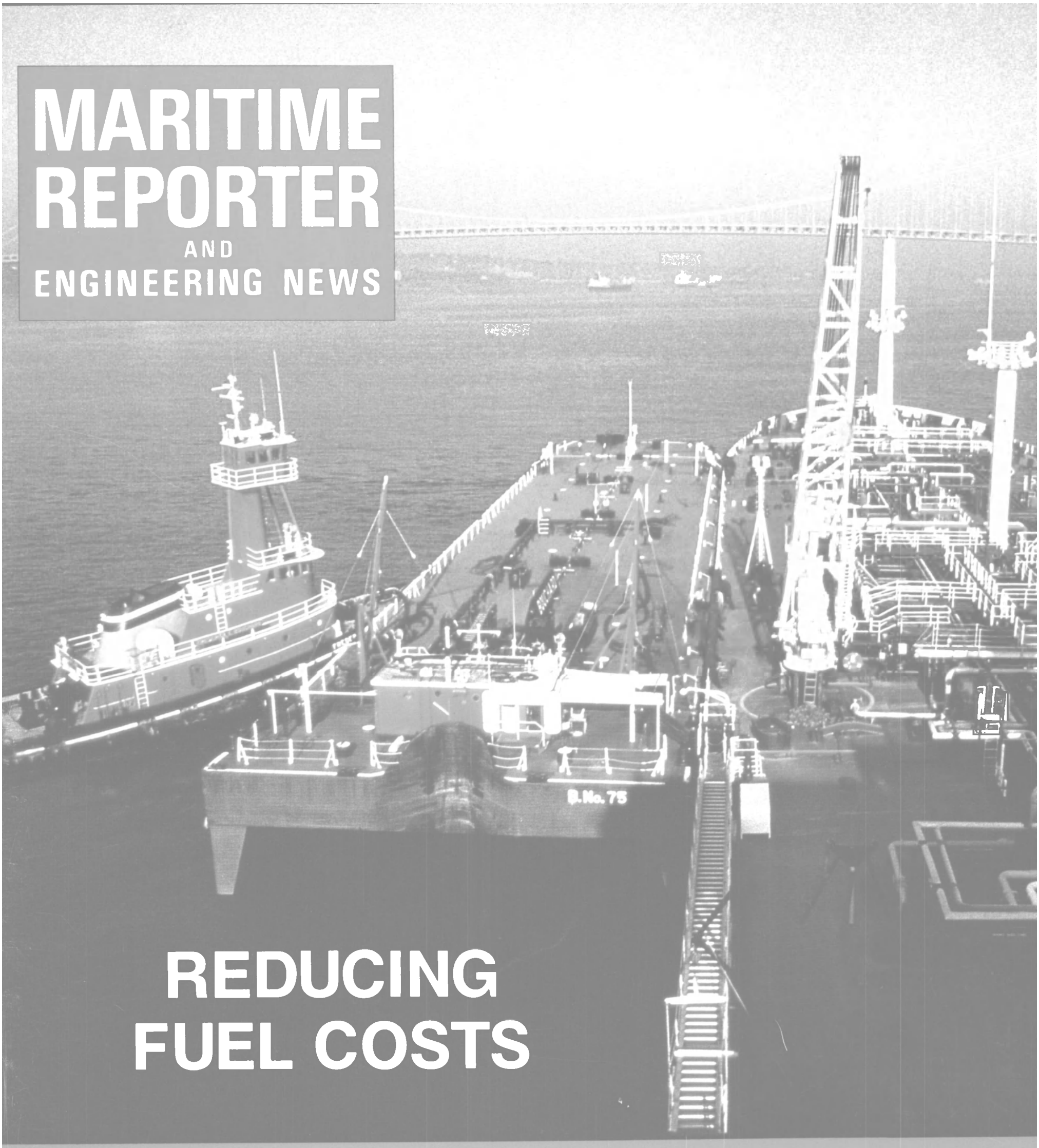

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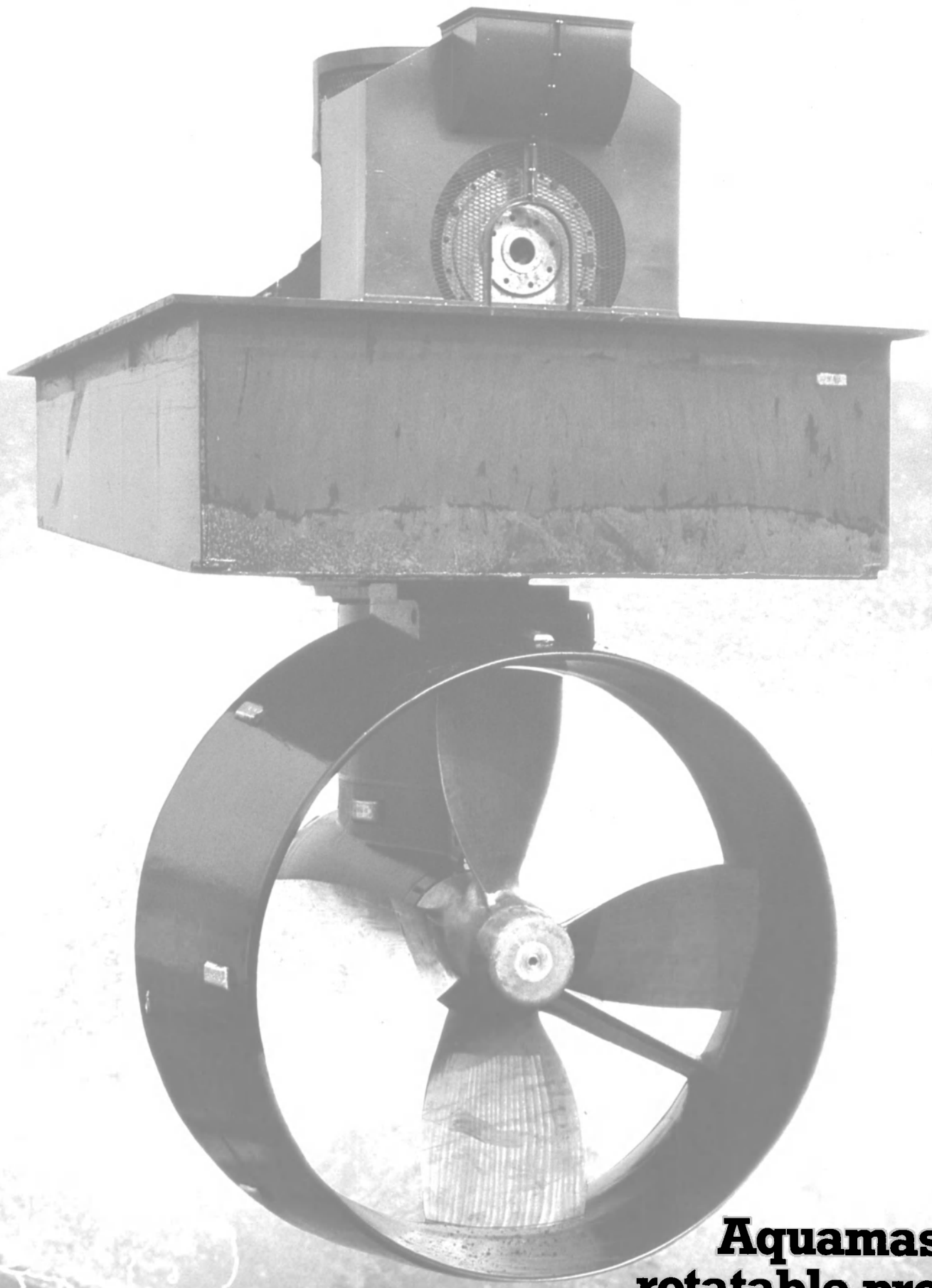

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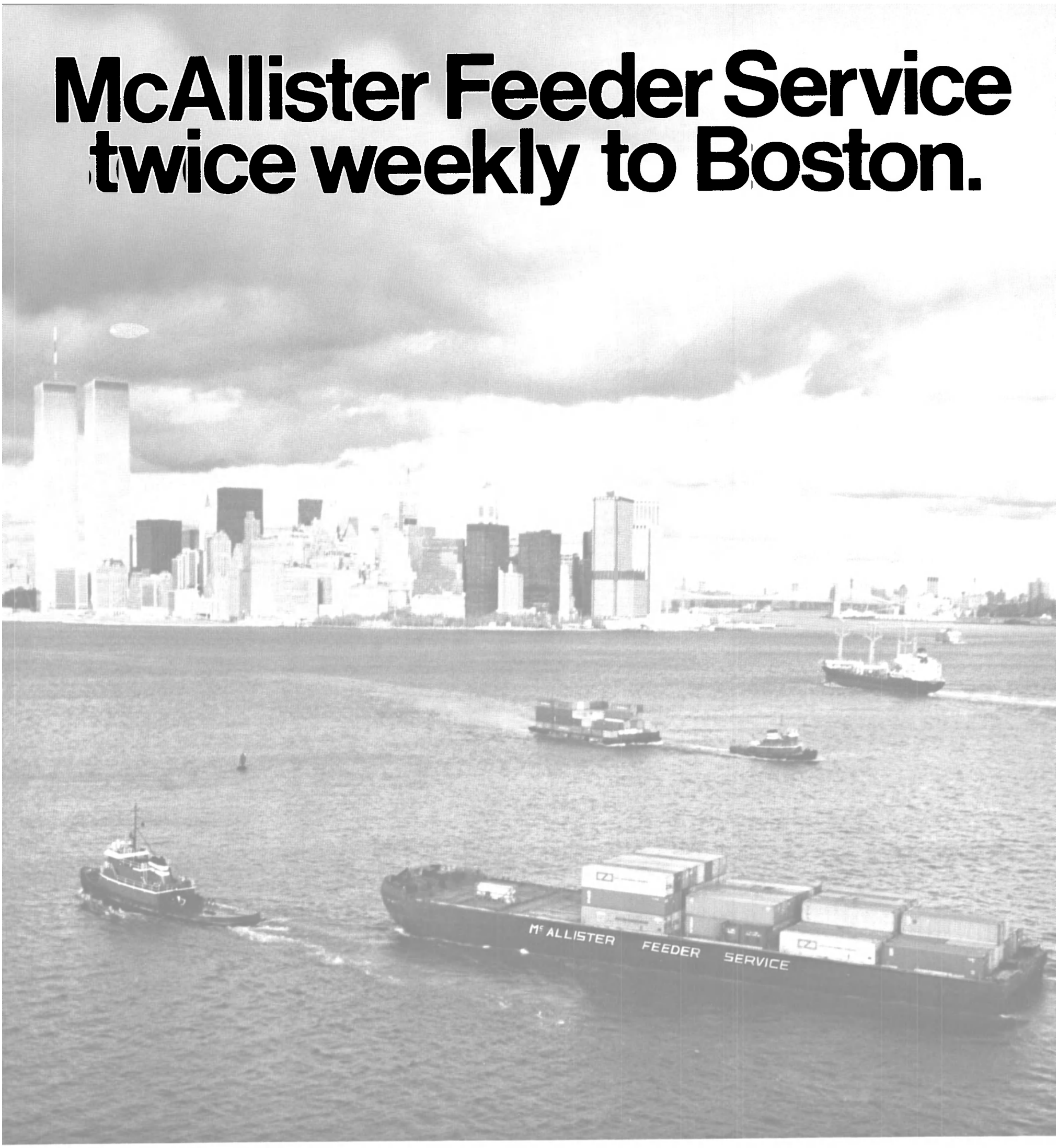

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ON THE COVER

Reducing Fuel Costs --Propulsion Equipment
PAGE 20

Ed Hood Named D.C. Representative For National Steel And Shipbuilding

Edwin M. Hood

Edwin M. Hood, who had been president of the Shipbuilders Council of America for 21 years until his retirement in mid-1983, has been appointed Washington (D.C.) representative for National Steel and Shipbuilding Company of San Diego, a subsidiary of Morrison-Knudson, Inc. **Alfred W. Lutter,** NASSCO's vice president-marketing who had served at times as the shipbuilder's Washington representative, will now be based full time in San Diego.

TRW Awarded $14-Million Increase By Navy For Support Services

TRW Incorporated, Defense Systems Group, McLean, Va., has been awarded a $14,016,173 face value increase to a previously awarded cost-plus-award-fee contract for support services for the Amphibious Ship Acquisition Project Office. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-83-C-2053).

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Brown & Root Inc. Forms Joint Venture In Holland With Two Dutch Companies

Brown & Root Inc. of Houston has formed a joint venture in Holland with its Netherland subsidiary and two Dutch shipyards to pursue work in the Dutch sector of the North Sea. Brown & Root, a Halliburton Company, is one of the world's largest and most diversified engineering and construction companies.

The new joint venture, Building Combination Nederlands B.V. (BCN) is composed of Brown & Root Nederland B.V., Nederlandse Scheepsbouw Maatschappij B.V. (NSM) and Constructiegroep Noord Nederland B.V. (CNN). The company will design, engineer, fabricate, install and hook up platforms in the Dutch sector of the North Sea.

BCN has an authorized share capital of 1 million Dutch guilders. Shareholding is divided equally among the three companies of the joint venture. BCN will operate from NSM offices at 73 Klaprozenweg, Amsterdam. NSM is a major Dutch shipbuilder and fabricator, and CNN is an amalgamation of two Dutch fabricators and shipbuilders in Northern Holland.

Managing directors of the new company are **V.F. Hill** of Brown & Root, **H. Ketting** of N.S.M. and **E.B. Schmied** of CNN.

Newport News Awarded $3.4-Million Navy Contract For Planning Yard Services

Newport News Shipouilding and Drydock Company, Newport News, Va., is being awarded a $3,418,359 cost-plus-fixed-fee contract for planning yard services for USS Enterprise (CVN-65) and USS Long Beach (CGN-9) in FY-84. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-80-C-4038).

Bethlehem Steel Signs Licensing Agreement For Tension Moored Platforms

Bethlehem Steel Corpration recently signed a long-term licensing agreement for highly advanced offshore oil production technology—tension moored platforms (TMP) with Fluor Engineers, Inc. The announcement was issued jointly by **David H. Klinges,** vice president of Bethlehem's marine construction group, and **F. Sweeney Tuck,** president of Ocean Services Division of Fluor Engineers.

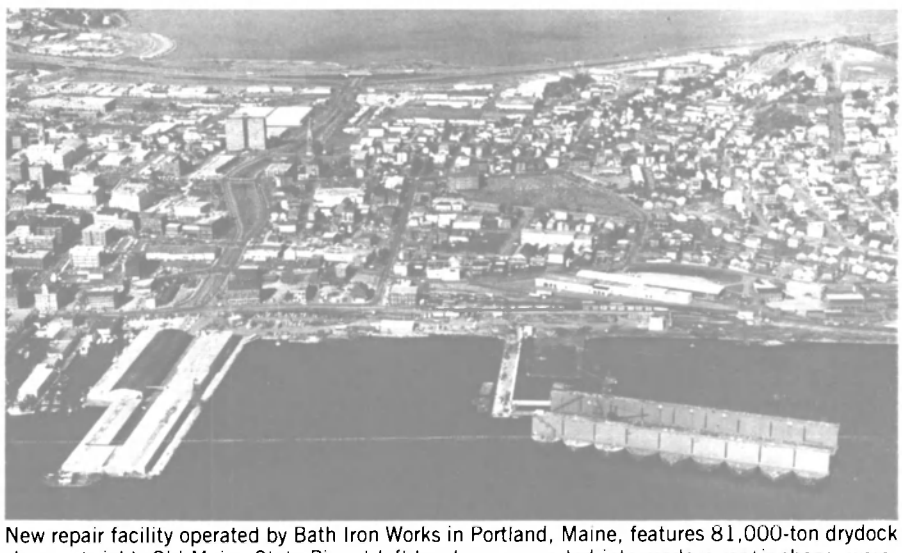
The agreement combines Fluor's design technology and extensive marketing experience in the offshore industry with Bethlehem's engineering and construction services which have been serving the offshore and marine industries since 1905.

Mr. **Klinges** said for production platform applications, "the TMP design offers a real cost advantage where its only competitors are the various and very costly rigid or guyed tower designs." These, he noted, become prohibitively expensive for depths over 1,200 feet.

The TMP design is a platform resembling a semi-submersible that is rigidly attached to several piled anchors through multiple tension legs of wire rope or tubing. The buoyancy of the platform at all times exceeds its weight, keeping the legs in tension. Mr. **Tuck** noted that his company holds several patents in tension moored platform technology and has been a leader in this field since the late 1960s.

The agreement gives Bethlehem Steel the exclusive right to build TMPs with Fluor technology on the East and Gulf Coasts of North and Central America and the Caribbean.

Although equipment sales to the offshore industry are currently stagnant, Mr. **Klinges** said that optimism and prices paid for recent leases in the Gulf of Mexico indicate real confidence on the part of the oil companies in a renewal of offshore activity. "We see this rise in activity," the Bethlehem executive continued, "occurring over the next two or three years, and we intend to utilize this period to place ourselves in a good marketing position, offering a broad line of equipment to the industry."



New repair facility operated by Bath Iron Works in Portland, Maine, features 81,000-ton drydock shown at right. Old Maine State Pier at left has been converted into modern repair shops, warehouses, and offices.

New Bath Iron Works Repair Facility Opens In Portland

A major East Coast ship overhaul and repair center, constructed at a cost of $46.7 million, was opened recently in Portland, Maine. The facility, jointly owned by the City of Portland and the State of Maine, will be operated by Bath Iron Works Corporation (BIW), which has maintained a shipyard 40 miles to the north in Bath for 100 years.

The voters of the City of Portland and the State of Maine each approved $15-million bond issues in November 1981 to convert the old Maine State Pier into the modern ship repair facility. The major installation at the facility is an 81,000-ton-capacity drydock that was awarded to the state by the General Services Administration.

Since the approval of the bond issues, BIW crews and private contractors have completely renovated the drydock and existing buildings and piers, and new piers and utility buildings have been constructed.

In addition to the large floating drydock, the facility features an average minimum water depth of 37 feet at the 600-foot and 1,000-foot piers, and will have 60- and 25-ton-capacity cranes on the piers. Each drydock wing wall will carry a 25-ton capacity crane. The facility, with 70,000 square feet of outside storage space and 25,000 square feet of inside storage, will perform both Navy and commercial conversion and repair work, with the capability of accommodating all commercial ships except VLCCs, and all Navy vessels except large aircraft carriers.

The U.S. Navy has already taken advantage of the facility by awarding BIW a $67.7-million contract to overhaul three Spruance Class destroyers. The first of the three ships, the USS Conolly, will arrive at the Portland facility February 15, 1984, to begin her overhaul.

Henry M. Stupinski, a vetern of more than 25 years in the shipbuilding and repair industry, is general manager of the new Portland yard.

Stambaugh Named Sales Manager At Borg-Warner's York International Unit

Tim Stambaugh

Tim Stambaugh has been promoted to sales manager for marine and Navy air conditioning and refrigeration equipment within Borg-Warner Corporation's York International unit. He is responsible for sales in the U.S. Gulf Coast region and for market development in the Far East.

Mr. **Stambaugh** joined Borg-Warner as a refrigeration mechanic apprentice in 1964. He was named engineering lab technician in 1968 and test facility design engineer in 1969. He joined the York International marine and Navy contract engineering department as a project engineer in 1975 and was named chief contract engineer in 1981.

Penske GM Power Head Discusses Service Support For Maritime Industry

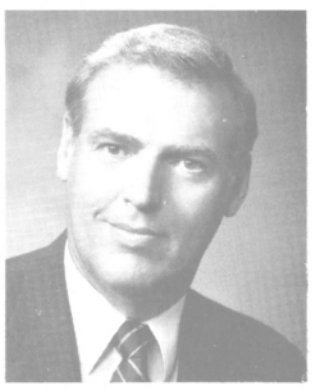
Roger S. Penske addressing recent luncheon meeting at the Whitehall Club in New York.

Penske GM Power, Inc. of Lodi, N.J., was host recently to some 25 New York area marine operating and engineering personnel at a Whitehall Club luncheon. Company president **Eugene Enlow** told guests that Penske has the desire and ability to provide service support for the marine industry. His presentation described the company as a significant force in transportation and applied power that has continued to be responsive to customer needs through commitment and leadership.

Richard Diegnan, executive vice president, discussed Penske GM Power's facilities, products, and, most important—people. His enthusiasm was obvious when he referred to the experience and demonstrated ability of Penske service technicians in the field. His philosophy echoed the remarks made by Mr. **Enlow** when he stated that "the salesman makes to first sale, but service sells the rest." Mr. **Diegnan** introduced **Herb Towers,** vice president of sales, who handled the Detroit Diesel Allison product update. "Advanced engineering and manufacturing technologies are sure to guarantee the reliability and integrity of the world's most popular engines," he said.

Roger S. Penske, chairman and chief executive officer, was in attendance to meet with guests and reaffirm his commitment to service excellence. He pointed out numerous examples of applied technology and manufacturing ability fielded by his company throughout the world. His clear understanding of effective communication, on-going training, and customer support reflected confidence in the ability of Penske GM Power to provide the competitive edge through quality repair and lasting value, with genuine products.

Roger Moore Appointed President Of American Manufacturing Company



Roger Moore

The board of directors of American Manufacturing of Honesdale, Pa., has announced the appointment of **K. Roger Moore** as president; he had been executive vice president. Prior to joining American, Mr. **Moore** was operations manager at the Union Wire Rope division of Armco Steel, and had additional experience in a variety of engineering, sales, and manufacturing positions with Pratt & Whitney, Chrysler, and Bendix.

Mr. **Moore** succeeds **Robert L. Stanton,** whose recent retirement climaxed a career spanning 43 years in the wire, rope, and cordage industry, the last 27 of which were at American Manufacturing Company. Mr. **Stanton** will continue to act as a consultant for the company.

Rockwell Awarded Navy Contract For $12+ Million For SINS And ESGM Work

Rockwell International Corporation, Anaheim, Calif., has been awarded a $12,384,000 cost-plus-fixed-fee contract for engineering technical support program of the Ship Inertial Navigation System (SINS) and Electrostatically Supported Gyro Monitor (ESGM), associated technical data and reports. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Gray Bunkering Services Provides Bunkers And Lubricants Worldwide

Gray Bunkering Services, Inc. of New York City has been established by **Peter H. Connor** and **Michael J. Kasbar,** whose experience in bunkers exceeds 18 years. **Paul H. Stebbins,** broker, and **Janet Youngs,** assistant broker, have also joined the firm. Gray Bunkering is a sister company to Gray Shipbrokers, Inc. headed by **Robert M. Gray,** who has been active in the New York shipping community for more than 35 years.

Gray Bunkering works the bunker market at ports worldwide through major, independent, and national oil companies and a network of correspondents. Its aim is to provide the best combination of prices, quality product, and service to improve the vessel operator's bunkering strategy and cost. Product prices, quality, and availability are monitored at more than 100 world ports. Lubricant supply and contract negotiation are also available.

For additional information on Gray Bunkering Services, Inc.,

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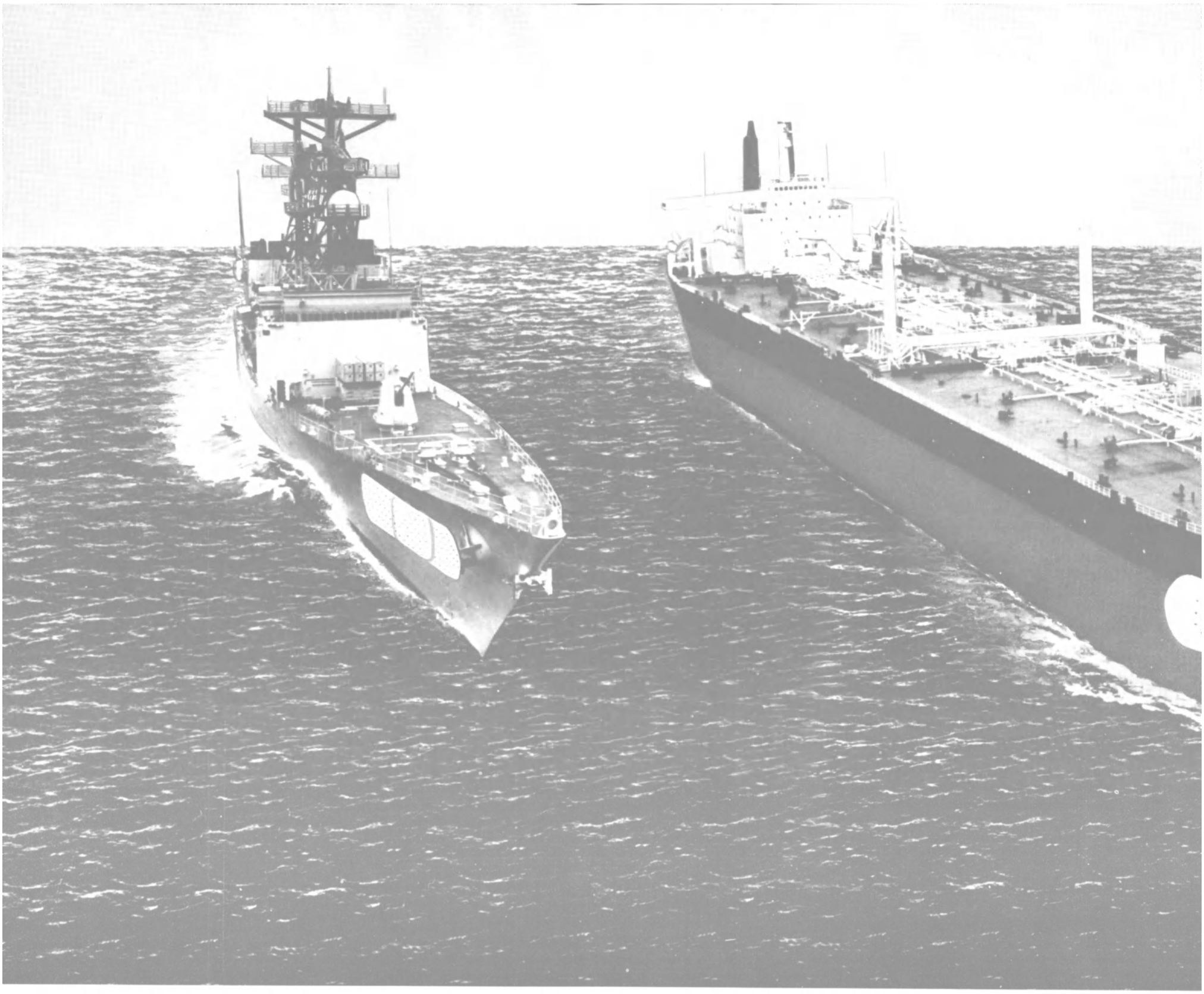
$165.4-Million Award To NASSCO For Second Navy Hospital Ship Conversion

The U.S. Navy has exercised its option with National Steel and Shipbuilding Company of San Diego for the conversion of a second San Clemente Class tanker into a 1,000-bed hospital ship at a cost of $165.4 million. The option was contained in a contract that the Navy awarded to NASSCO in June 1983 for conversion of the first tanker into a hospital ship at a cost of about $186 million.

When conversion is completed, each of the 894-ft ships will have 12 operating rooms and accommodations for 1,600 medical support personnel as well as the 1,000 patient beds. Conversion of the second vessel will begin in the second quarter of 1985, with completion scheduled for the second quarter of 1987.



We give your veterans more

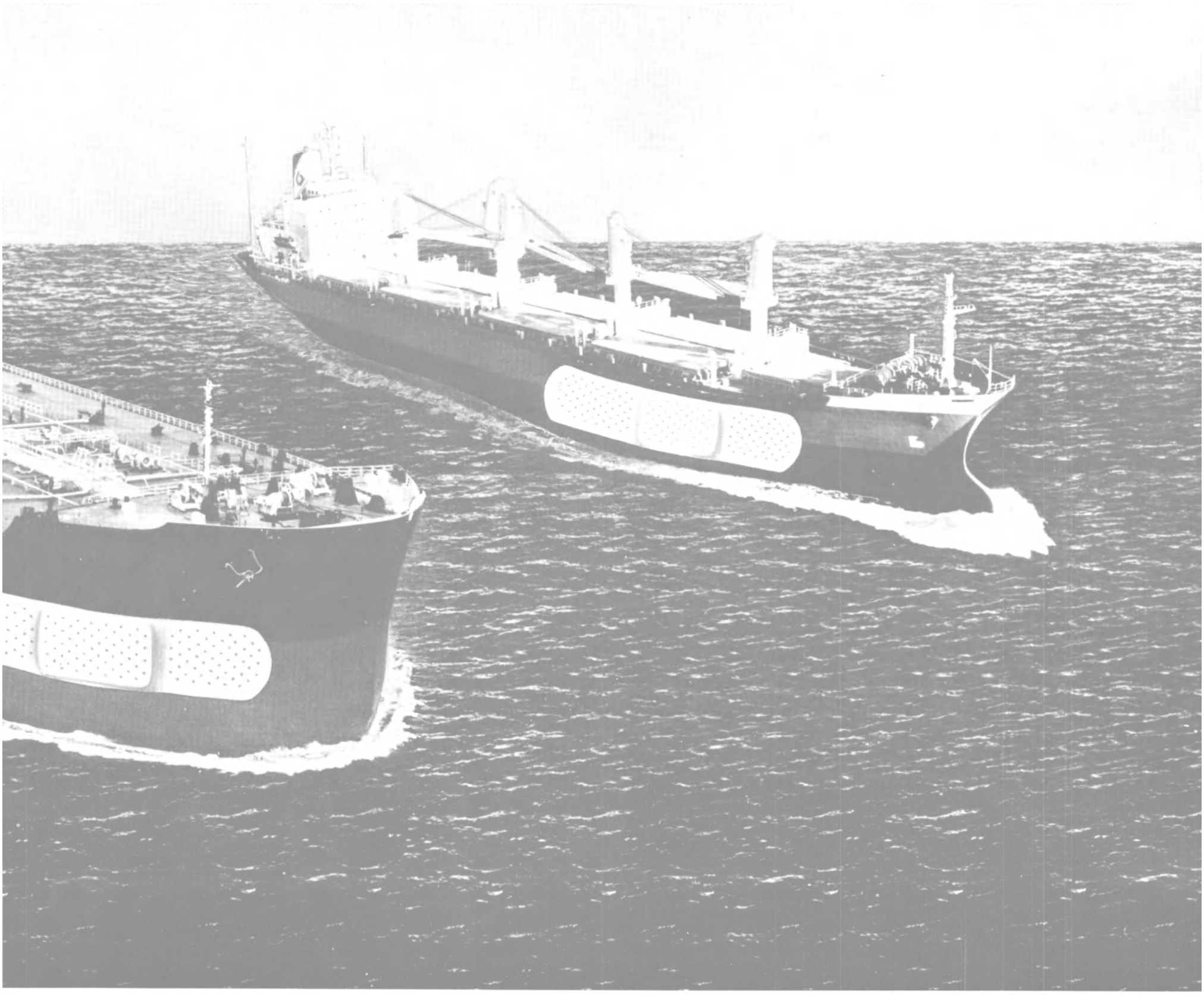
For years, Bath Iron Works has been one of the premier ship repair yards for the United States Navy

Now, with the opening of our new Portland Overhaul and Repair Facility, the Bath expertise is offered to the commercial shipping world. Our management knows the value of quick turn-around time, and our work force is as skilled and innovative as any in the world. We'll get the job done right... right on schedule...right on budget.

The new Portland facility is a well-equipped, self-contained shipyard just 40 minutes from our main shipyard, close to North Atlantic shipping lanes and situated in the deep-water harbor of Portland, Maine. Our facilities include:

Floating Dry Dock:

- 67,000 ton lift capacity
- 744 ft. length (267 meters)
- 137 ft. clear docking width (42 meters)
- Two 25-ton wingwall cranes



han a patch and a promise.

Piers:
- 1000 ft. (305 meters) and 600 ft. (183 meters)
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Floating Crane:
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With 70,000 sq. ft. (6,510 sq. meters) outside storage and 25,000 sq. ft. (2,325 sq. meters) inside storage, the facility is serviced by rail, water, highway and air transportation.

The Portland shipyard offers modern office accommodations at the site. And, of course, a Maine work ethic that will make "Bath rebuilt" a hallmark in the commercial shipping world.

Don't your veterans deserve the very best service, too?

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EMD-powered twin screw tug Chessie sliding down the ways at Jacobson Shipyard.

Jacobson Delivers Shipdocking Tug 'Chessie' To Chessie System

Jacobson Shipyard of Oyster Bay, N.Y., recently delivered the twin-screw tug Chessie, first of two under construction for the Chessie System. Specifically designed for shipdocking, they will service Chessie System's coal facilities at Newport News, Va. The tug Chessie has an overall length of 105 feet, beam of 33 feet, and design draft of 15 feet. The vessel has demonstrated a bollard pull in excess of 130,000 pounds.

The new tug is powered by twin GM Electro-Motive Division diesel engines, model R16-645-E6, each with an output of 1,950 bhp at 900. Each engine drives a Columbian Bronze propeller through a Reintjes reduction gear having a ratio of 4.947:1. Twin Kort nozzles and oversized rudders provide excellent maneuverability. The nozzles and propellers were designed by Kort Propulsion of England; Kort built the nozzles and Columbian manufactured the propellers. The Chessie has a special Morse Rubber fendering system to handle submarines. The tug's steering system was supplied by Hough Wagner.

Jacobson Shipyard is a full-service facility that specializes in the design, construction, and repair of tugs, ferries, fishing boats, oil skimmers, workboats, and other craft up to 235 feet and 1,500 long tons displacement.

CHESSIE
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Reduction gears (2)	Reintjes
Propellers (2)	Columbian Bronze
Kort nozzles (2)	Kort Propulsion
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Main engine accessory racks	EMD
Lube oil filters	Michiana Filter
Lube oil coolers	Young Radiator
Governors	Woodward
Pumps	Aurora/Goulds/Taiko Valley Group/Vickers/Weiman
Valves	Vickers
Strainers	Kraissl/Michigan Fluid Power Tate Temco
Filters	American Filter/Donaldson
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Air compressors	Curtis Toledo
Air receivers	Kahlenberg
Air start motors	Ingersoll Rand
Main switchboard	Seaboard Energy Control
Distribution panels	ITE Gould
Transformers	Federal Pacific
Aux. gen. sets	Detroit Diesel/ Int'l Electric
Heating systems	Electromode/Valad Electric
Hot water heater	State Industries
Pressure set	Goulds
Air conditioning	York div. Borg-Warner
Electric motors	Baldwin/Goulds/ Sieman Allis
Oil/water separator	Microphor
Supply fans	Buffalo Forge
Radar	Furuno
Depth finder	Datamarine
Compass	Ritchie
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VHF radio	Cybernet
VHF monitor	Electro-Monitor
Constavolt	Newmar
Air horn	Cunningham
Searchlight	Carlisle & Finch
Capstan	New England Trawler
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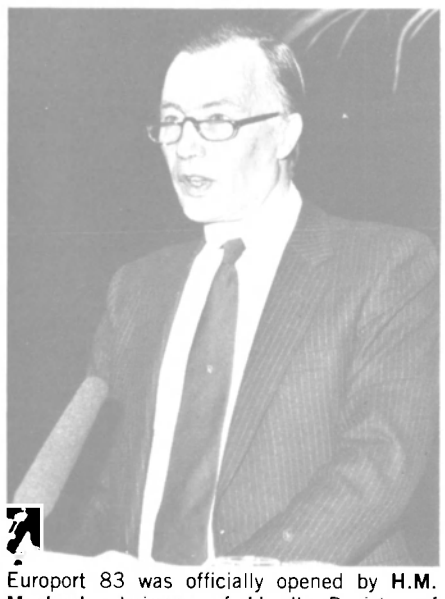
Heated windows	Singer Kearfott
Deck coverings	Asbestolith
Coatings	International Paint

Latest Europort Exhibition A "Resounding Success"



Europort 83 was officially opened by **H.M. Macleod,** chairman of Lloyd's Register of Shipping.

Europort 83, the 21st International Maritime Exhibition that was held recently at the RAI International Exhibition Centre in Amsterdam, was a resounding success in all respects, according to the organizer. At the close of the exhibition, many companies that had exhibited confirmed that they were well satisfied with the results they had achieved.

Europort is said to be the largest maritime exhibition in the world. The latest show, organized for the first time by RAI Gebouw BV, attracted just under 55,000 visitors from 74 countries.

The Europort Congress on International Maritime Finance was also attended by financial and maritime experts from all over the world. The many other special events held during Europort 83, such as the Maritime Technology Meeting Day, the meeting of the Royal Netherlands Shipowners Association, the CEDA Dredging Days, and a combined dinner and symposium for the fishing industry, were all regarded by their respective organizers as extremely successful.

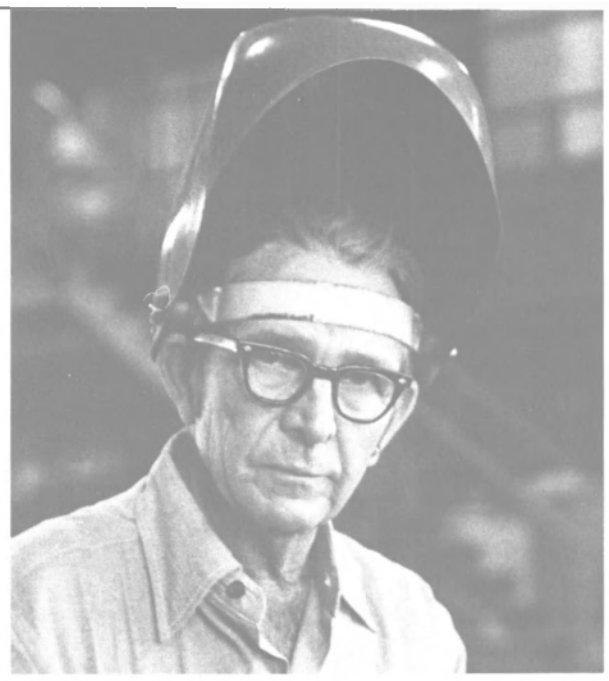
The last day of the exhibition was known as the Inland Waterways Day. The masters of more than 500 inland waterways vessels took part in a visit to the exhibition and a program on reducing fuel costs and other matters.

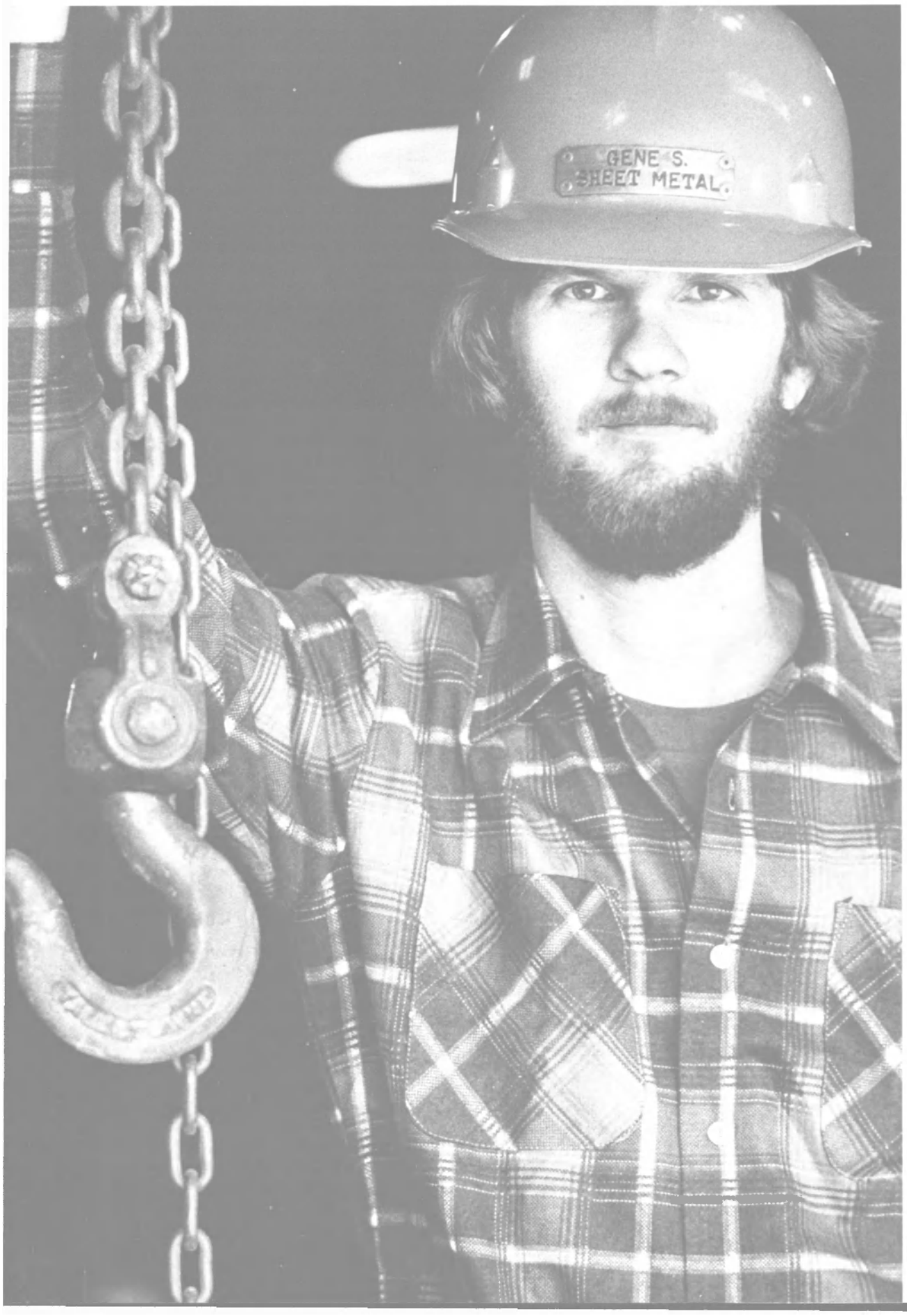
The next Europort exhibition will be held at the RAI Halls November 12–16, 1985.

Grow Group's Coatings Will Be Manufactured In Saudi Arabia

Two divisions of Grow Group, Inc.—Devoe Marine Coatings Company and Devoe-Prufcoat—have recently concluded an agreement for the manufacture of their complete product lines by the Saudi Industrial Paint Company, Ltd. (SIPCO) of Dammam, Saudi Arabia. SIPCO's associated company, Saudi Paint Company, Ltd. of Riyadh, is also a party to the agreement.

To support this major strengthening of Devoe's presence in the Middle East, Albwardy Marine Engineering of Dubai, United Arab Emirates, has been appointed as representative for the southern Arabian Gulf area. Albwardy will stock Devoe marine and industrial maintenance products and will draw on the nearby manufacturing facilities of SIPCO in Dammam.





"I KNOW HE'S GOOD, I TRAINED HIM."

James A. Greenwood Jr.

If you think the shipyard business is all nuts and bolts, you're wrong. It's a people business, plain and simple. The best yards are the ones with the most experienced supervisors, and the best-trained workers.

Bill Greenwood, top photo, is a great example. He's one of the last great Coppersmiths in our business. An artist with copper, galvanized and stainless. Like most of our key men, Bill's been with us almost forever – about 36 years.

Bill and our other senior people do more than just supervise jobs. They spend years as teachers. Passing on their skills to younger men like Gene Stafford. Gene is well on his way to being one of the best. In fact, Gene now does what Bill did, which gives Bill a little more time to fish.

What you get from us is a well-trained, intelligent, motivated work force. And that saves you and us hassles and, especially, money

Sure, we've got nuts and bolts too, and all the stuff the other yards have. And in Savannah we've got beautiful year-round weather, so there are fewer delays than up north. But the main reason to come to Savannah is Bill Greenwood, Gene Stafford and our other heavy hitters.

Remember, to do a job once – correctly – a yard needs skilled people. Because that is what saves you time and money on your voyage repairs, major conversions, alterations, or drydocking.

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THE SAVANNAH YARD

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Carmen Guide Appointed President Of Lake Shore —Malsack Named Chairman


Carmen Guide Jr.

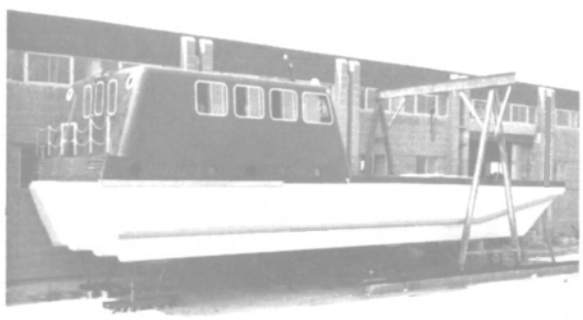

James T. Malsack

Carmen Guide Jr. has been named president and chief executive officer of Lake Shore, Inc. of Iron Mountain/Kingsford, Mich. He replaces **James T. Malsack,** who has been appointed chairman of the board of directors.

Mr. **Guide** began his Lake Shore career in 1961 as a sales manager for marine products, with headquarters in New York City. In 1965 he was transferred to the company's headquarters and appointed assistant manager of the Marine Division. He returned to New York in 1966 as marketing manager for all manufactured products. He became vice president-marine in 1971, was elected to the board of directors in 1972, and in 1973 was named executive vice president.

Mr. **Malsack** joined Lake Shore in 1951 as assistant to the president. He was named vice president in 1953 and in 1958 became treasurer. He was appointed executive vice president in 1959 and became president and chief executive officer in 1972. Former chairman of the board **B.W. Reeve** will continue to serve as a board member.

Mobile Marine Introduces Advanced-Design Workboat


Prototype of advanced-design workboat built by Mobile Marine of Malta has cabin aft and open deck forward.

Mobile Marine Ltd. of Corradino Heights, Malta, recently unveiled a new design of general-purpose workboat suitable for a wide range of duties.

Known as the Mobile-165 (the designation being derived from the craft's 16.5-meter overall length (about 54 feet), the boat is constructed of glass-reinforced plastic (GRP) and features air lubrication of the hull underbody to provide improved performance characteristics. In its prototype form, the Mobile-165 has a cabin aft and a bow ramp, but Mobile Marine has designs for a number of variations and can build vessels to specific requirements based on the standard hull and machinery layout.

Among the duties that the builder sees the basic vessel being able to perform are those of vehicle or passenger ferry, freight launch, harbor tug, anchor-handling vessel, survey launch, oil pollution control vessel, or diving boat.

The hull of the Mobile-165 is constructed of GRP using E glass chopped strand mat and woven roving with Lloyd's Register-approved boatbuilding polyester resin. The beam is 4.7 meters (15.4 feet), providing a deck width of 3.8 meters (12.5 feet). Loaded draft is 0.5 meters forward and 1.5 meters aft (1.64/4.92 feet). A sealed, foam-filled compartment below the vehicle deck provides 35 tons of positive buoyancy.

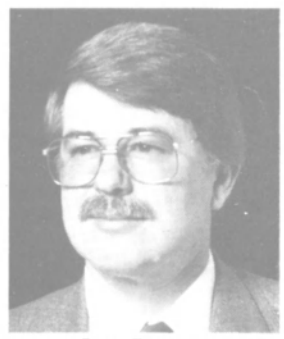
Mobile Marine recommends the use of twin six-cylinder, turbocharged marine diesels, each having a continuous rating of 200 bhp, and has installed Perkins TV8 540M units in the prototype. These will be offered as standard, but the design will accommodate other manufacturers' engines without difficulty. These engines, which drive separate propellers, provide a service speed of 14 knots but the hull design is suitable for greater speeds and higher-powered installations are possible; 20-21 knots with a payload of 20-25 tons is quite feasible, according to Mobile Marine.

In its prototype form with cabin aft, the Mobile-165 provides accommodations for 24 passengers. Forward of the cabin is the working deck with an area of 49.4 square meters (531.5 square feet) able to handle up to six cars, depending on size. The deck is served by a bow ramp 3.3 meters (10.8 feet) wide, which can be lowered at sea to facilitate diving or salvage operations. By modifying the cabin arrangement, two 20-foot containers could be carried.

A novel feature is the air lubrication of the hull that makes it easier to drive, Mobile Marine claims, thus providing greater speed or fuel economy, depending on priorities. Four skegs extending the full length of the hull create three equal-size tunnels in which air is trapped and thus forced under the hull as the craft is driven forward. The outermost skegs prevent escape to the sides, and most of the air exits at the stern. The entrapped air also provides a cushioning effect in choppy seas, giving greater comfort for passengers and crew. The design is capable of operating in relatively rough conditions, up to Force 4 or 5.

Cornwell Named Chairman And Ferguson President Of Gulf Radiotelephone


Glen W. Cornwell Jr.


Ross Ferguson

Gulf Radiotelephone & Electronics, Inc. of Pasadena, Texas, has announced recent changes in its executive staff. **Glen W. Cornwell** has been elevated to the position of board chairman and chief executive officer. He has been succeeded by **Ross Ferguson,** who has assumed the position of president and chief operating officer.

Mr. **Cornwell** has been with GR&E since 1955. Mr. **Ferguson** has been with Ferranti, P.L.C. of the U.K. for the past 24 years, having served the last seven years as general manager-operations of Ferranti Offshore, Ltd. in Aberdeen, Scotland.

Gulf Radiotelephone & Electronics serves the entire Houston and Gulf Coast marine and petrochemical industries in the fields of surface and satellite communications and navigation/positioning. Newly added products and services encompass microwave communication, tower erection, and computer products.

Westinghouse Awarded $118-Million Navy Contract For Propulsion R&D

Westinghouse Electric Corporation, Bettis Atomic Power Laboratory, West Mifflin Borough, Pa., has been awarded a $118,603,000 cost-plus-fixed-fee contract for naval nuclear propulsion research and development. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Financing Completed For U.S. Lines Containerships Building At Daewoo Yard

Daewoo shipyard of Seoul, Korea, reported recently that financing arrangements for construction of 12 containerships for U.S. Lines have been completed. **In-Kie Hong,** president of Daewoo Shipbuilding and Heavy Machinery Ltd., signed a co-financing agreement with **Thomas Charters,** vice president of Citibank, the syndicating bank of the group of seven banks that will participate in the financing.

The loan agreement totals $47.5 million, and applies to the first five of the U.S. Lines ships, the first of which is scheduled for delivery in the summer of 1984. The financing of the other seven vessels, totaling $66.5 million, has been arranged by Korea Development Bank.

In addition to Citibank, the participating banks are Nova Scotia Bank, Marine Midland Bank, Saehan Merchant Banking Corporation, Banque Nationale de Paris, Indian Overseas Bank, and Korea International Merchant Bank. The loan is for an eight-year period and will be provided at an interest rate of 1.125 percent over LIBOR (London interbank offered rate).

The total cost of the 12 containerships is $570 million. The construction contract calls for a down payment of 20 percent, to be provided by U.S. Lines; the first installment was made in April 1983. The Export-Import Bank of Korea will provide 50 percent, or $285 million, of the total cost.

Daewoo Shipbuilding and Heavy Machinery is a member of the Daewoo Group, founded in 1967 and today one of Korea's largest industrial organizations.

Navidyne Unveils New INMARSAT Ship Terminal —Literature Available

Navidyne Corporation of Newport News, Va., recently introduced the first in a new generation of marine satellite communications equipment, the ESZ-10000. The new unit is a Standard A, Class 1 INMARSAT ship earth station. It provides instant, clear telephone, telex, and data links between ship and shore through the global INMARSAT network of satellites and coast earth stations. It is said to be the first ship earth station to meet the new requirements established in Issue 2 of the INMARSAT Technical Requirements Document.

According to Navidyne president **A. Clifford Barker,** "The ESZ-10000 follows on the success of Navidyne's ESZ 8000 satellite communicator, which introduced numerous innovations in INMARSAT equipment. The ESZ-10000 retains the flexibility, expandability, and unmatched operating ease of its predecessor," said Mr. **Barker,** "and also offers new features never before available in any INMARSAT terminal at any price."

With the ESZ-10000, Navidyne introduces the smallest and lightest INMARSAT antenna on the market today. The antenna radome is only 51.5 inches high and 51 inches in diameter. The entire assembly weighs less than 209 pounds. The below-deck components are also significantly smaller. The central electronics unit is about the same size as Navidyne's well-known ESZ-4000 satellite navigator.

The new unit incorporates low-powered, solid-state circuits throughout, reducing failures and simplifying on-board repairs, and with a self-contained, uninterruptable power supply, it gives up to 30 minutes of full service in the event of a main power failure.

For further information and free literature on the ESZ-10000,

Circle 90 on Reader Service Card

Indikon Introduces New Web Deflection Indicator —Literature Available

A new series of battery-operated, digital web deflection indicators is now available from Indikon Corporation of Cambridge, Mass. The Indikon 4000 Series indicators feature bearing-mounted, live centers providing deflection readings over a plus or minus 20 mils range on diesel engines, pumps, and reciprocating compressors. Easy to operate, the system uses a measuring head placed in the crankshaft opening, connected by cable to a digital indicator outside the machine housing. The digital readout provides an indication of web deflection and of crank angle as the crankshaft is rotated.

The Indikon system permits measurements to be taken while the machine is hot. Measuring spans from 3.75 to 24.5 inches are available; the crank angle measurement encompasses 300 degrees of rotation. Metric versions are also offered.

For further information and a technical data brochure on the Indikon 4000 series,

Circle 96 on Reader Service Card

W.K. Tayler Appointed Marketing/Sales Director At American Abrasive

American Abrasive Metals Company of Irvington, N.J., has announced the appointment of **William K. Tayler** as director of marketing and sales, Coatings Division. The company is one of the nation's largest manufacturers of non-slip safety coatings and allied products for industrial, institutional and military use.

Mr. **Tayler** will direct corporate market and sales programming for the company's non-slip coatings and seamless decking systems sold to the U.S. Navy and through a worldwide marketing network. He was formerly vice president of marketing and sales for the General Abrasive Division of Dresser Industries, Inc. in Niagara Falls, N.Y. Prior to that he was vice president of Advance Abrasive Company of Minneapolis, Minn.

T C S Industrial Appointed Distributor for NABRICO —Literature Available

T C S Industrial Company of St. Paul, Minn., a subsidiary of Twin City Shipyard, Inc., has been named a stocking distributor for Nashville Bridge Company (NABRICO) in the Minneapolis-St. Paul area. In announcing the appointment, NABRICO vice president **T. Ray Jackson** said T C S will stock a wide variety of NABRICO products, including hatches, winches, and other marine deck hardware.

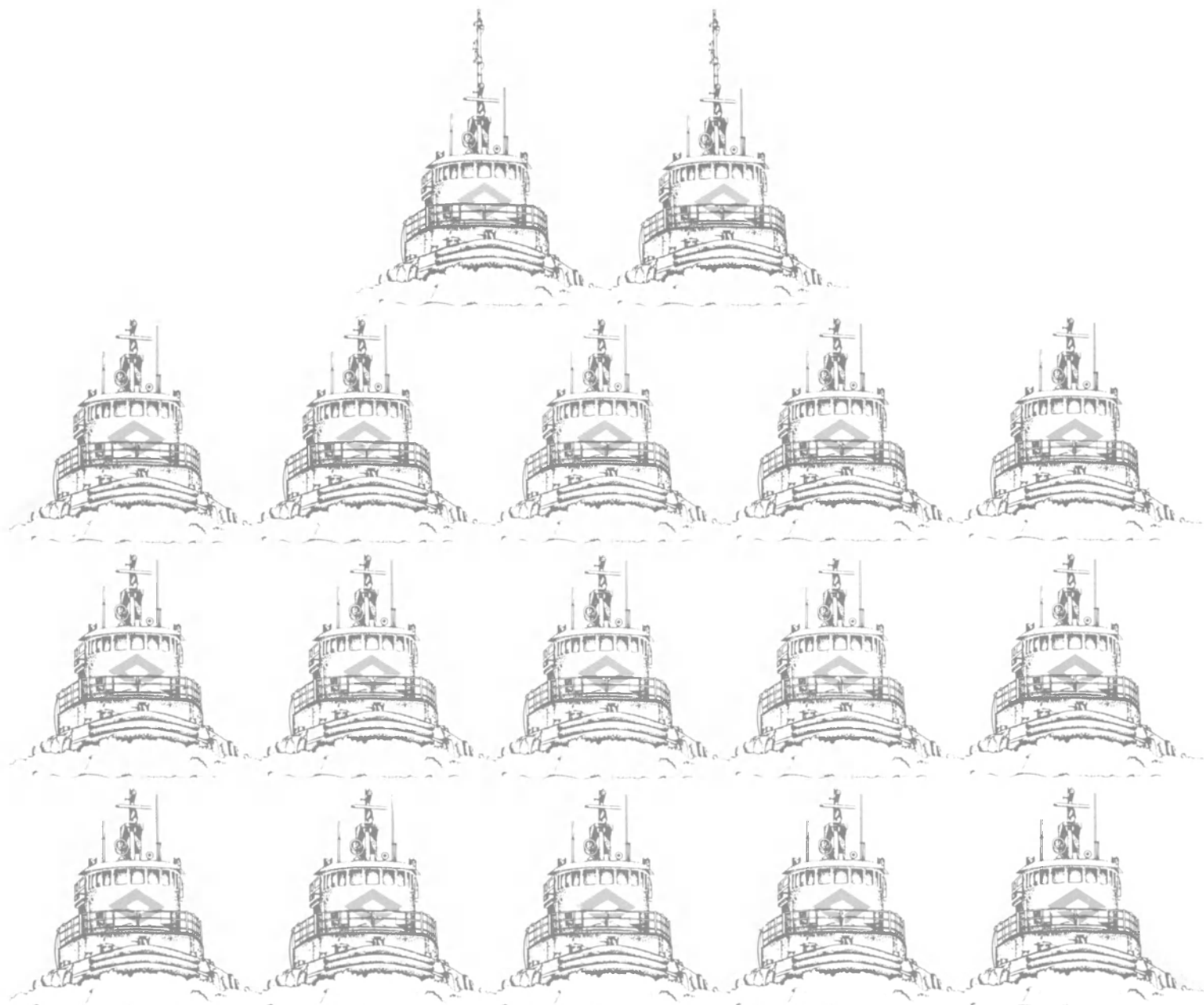
T C S Industrial sells and leases Portabarges® and other marine equipment. It also markets dredge hose, railcar movers and gate openers, winch and barge moving systems, as well as other material-handling equipment. **John Bursema** is president of T C S, and **Donald S. Seiford** is executive vice president and general manager; **Jack O. Pirozzolo** is director of sales and marketing.

T C S is the third new distributor to be announced by NABRICO during 1983; four others were named in 1982. "We are adding qualified distributors nationwide in order to better serve the entire marine industry," Mr. **Jackson** said. "New distributors are being added along the Gulf and Atlantic Coasts as well as along the inland waterways.

A wholly owned subsidiary of The American Ship Building Company of Tampa, Nashville Bridge is a major supplier of marine deck hardware to the entire marine industry. The company pioneered in the design and construction of much of the modern equipment used on rivers today. NABRICO has plants in Nashville and Ashland City, Tenn.

For more information and free literature on T C S Industrial and NABRICO products,

Circle 86 on Reader Service Card



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."

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Since 1910

Joint SNAME, IME And NYPE Meeting Discusses Use of Inexpensive Fuels

Principals at recent joint meeting of three technical societies were (L to R): **Ingmar Ahlqvist** of Wartsila, author; **Thomas J. Young,** president, The Society of Marine Port Engineers New York; **Joseph D. Connors,** chairman, SNAME New York Metropolitan Section; and **David Tawse,** chairman, IME Eastern U.S.A. Branch.

A recent joint meeting of the New York Metropolitan Section of The Society of Naval Architects and Marine Engineers, the Eastern U.S.A. Branch of the Institute of Marine Engineers, and The Society of Marine Port Engineers New York heard a paper titled, "How To Utilize Inexpensive Fuel Efficiently in Modern Marine Diesels." The authors were **Ingmar Ahlqvist,** technical section manager, and **Rolf Vestergren,** product manager, Wartsila Diesel, Finland. The paper and accompanying slides were presented by Mr. **Ahlqvist** to a large and obviously interested audience.

The author began by stating that the only advantage of using the intermediate fuel oils, which are approximately 40 percent cheapter than marine diesel oil, is its lower price. In all other aspects, he said, heavy fuel is disadvantageous. He went on to discuss the properties of heavy fuel, including density and water content, viscosity, sulphur content, ash content, carbon residue, asphaltenes, ignition quality, cracking catalysts, and compatibility. The author also evaluated the effects of each of these properties on the diesel engine and fuel handling system.

"The ability to burn heavy fuel successfully lies in a purpose-designed diesel engine and fuel handling system. General considerations would include increased preheating of the engine before starting, including jacket water, lube oil, charge air, fuel system on both the high- and low-pressure side, and fuel nozzles; increased filter capacity of both fuel oil and lube oil; and higher temperature and improved insulation of the injection pump control system."

FMC Awarded $3.5-Million Navy Contract For Design Support Services

FMC Corporation, San Jose, Calif. has been awarded a $3,555,000 cost-plus-fixed-fee contract for vehicle design support to LVT-7A1 family of amphibious vehicles. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-84-C-2007).

Michael Peterson Named Marketing Manager For Fairbanks Morse Division

T.V. O'Sullivan, vice president and general manager-parts and service of Colt Industries' Fairbanks Morse Engine Division, has announced the promotion of **Michael Peterson** to the newly established position of manager-marketing for the parts and service operation of the division in Beloit, Wisc.

Mr. **Peterson** will be responsible for developing and implementing marketing and sales programs for both parts and service. These areas have been expanded recently to better serve the domestic and foreign markets. He has been with Fairbanks Morse since 1980; his most recent assignment was sales project manager.

Westinghouse Awarded $112.8 Million By Navy For Propulsion Components

Westinghouse Electric Corporation, Plan Apparatus Division, Wilkins Township, Pa., has been awarded a $112,803,000 face-value-increase to a previously awarded cost-plus-fixed-fee contract for naval nuclear propulsion components. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-77-D-4002).

Lorain Electronics Introduces New Direct Dial Radiotelephone

After some seven years of research and development, Lorain Electronics Corporation of Lorain, Ohio, has introduced, at an affordable price, the M.A.P.-10, the Marine Auto Phone direct dial radiotelephone.

The M.A.P.-10 will allow mariners, both commercial and recreational, to make and receive direct dial calls through Lorain's 14 automated transmission sites located around the Great Lakes. The new unit is also a 55-channel VHF radio, making it a total communications installation for Great Lakes boaters. Lorain Electronics plans to expand its facilities to provide even better VHF coverage of the Great Lakes area.

For further information on the M.A.P.-10,

Circle 89 on Reader Service Card

MarAd Approves Title XI On $4-Million Tanker Refit For Falcon Tanker

The Maritime Administration has approved in principle an application by Falcon Tankers, Inc. of Houston for a Title XI guarantee to aid in financing the conversion of the 37,000-dwt tanker Neches to meet the requirements of the Port and Tanker Safety Act. The Neches is a 12-year-old, diesel-powered vessel built by Ingalls Shipbuilding at Pascagoula, Miss.

The conversion is being done by Bender Shipbuilding and Repair Co., Inc., at Mobile, Ala. The approved guarantee is for $3 million, and represents 75 percent of the cost of conversion. The Title XI guarantee is designed to assist the applicant in obtaining favorable financing for the project.

Hearing Scheduled On Barge Fleeting Facility For National Marine Service

An application for a permit to establish a barge fleeting facility near the confluence of the Illinois and Upper Mississippi Rivers is to be the subject of a public hearing in Portage Des Sioux, Mo., on January 26 this year. The U.S. Army Corps of Engineers, St. Louis District, has scheduled the hearing on an application by National Marine Service, Inc.

The location of the proposed fleeting facility is between Mason Island and Island No. 526, just downstream, opposite the town of Grafton, Ill. The facility, as requested, would be able to accommodate up to 150 barges and would consist of 12 fixed anchor-points to which barges could be moored by means of chains and cables.

Michigan Wheel Awarded Navy Contract For Carrier And Oiler Propellers

Michigan Wheel Gulf Coast, Inc. of Pascagoula, Miss., has been awarded a $898,714 contract by the Naval Sea Systems Command for the manufacture of four attack aircraft carrier propellers and an additional propeller for a Navy oiler.

The carrier propellers are five-bladed and will weigh approximately 68,500 pounds each. The oiler propeller is a seven-blade design that will weigh approximately 68,000 pounds. Both types will be cast in nickle-aluminum-bronze.

Navsea has also exercised an option for four additional guided-missile frigate (DLG-16 Class) propellers, bringing to 10 the total to be built by Michigan under a contract awarded in mid-1983. The DLG-16 propellers are a five-bladed design with an estimated finished weight of approximately 24,000 pounds each. Exercise of the option clause brought the value of that contract up to $1,081,769.

Michigan Wheel Gulf Coast, a wholly owned subsidiary of Michigan Wheel Corporation, operates a fully integrated foundry, machine shop, and finishing department at the Pascagoula complex, dedicated to the manufacture and repair of large-diameter propellers cast in nickle-aluminum bronze, manganese bronze, and stainless steel. The plant manufactures bronze wheels up to 110,000 pounds finished weight and stainless-steel wheels up to 14,500 pounds finished weight.

For additional information on Michigan Wheel,

Circle 85 on Reader Service Card

John Wessel Appointed Sales Vice President At American Hoist & Derrick

John J. Wessel

John J. Wessel has been named vice president, sales, for the American Crane Division of Amhoist, American Hoist & Derrick Company of St. Paul, Minn. A 17-year veteran at Amhoist, he will assume responsibility for sales of all American Crane products worldwide, and will report to **William B.R. Hobbs,** president.

Since joining Amhoist in 1966, Mr. **Wessel** has held a series of sales and sales management positions; most recently, he was vice president, international sales.

Tickle Appointed Chief Marine Engineer At York Engineered Machinery

Tom Tickle

Tom Tickle has been named chief marine engineer for the York Engineered Machinery unit of Borg-Warner Corporation. He is responsible for execution of the company's worldwide marine and Navy contracts for shipboard air conditioning and refrigeration systems.

Mr. **Tickle** had been quality manager for the unit since 1981. He joined Borg-Warner in 1963 in the York marine and Navy marketing department. He served as project engineer for various products within the marine and Navy contract engineering department between 1965 and 1976, and became chief contract engineer for the York marine and military products department in 1976. Prior to joining Borg-Warner he was a chief engineer aboard a U.S. Navy destroyer.

Brochure On Combustion Control Now Available From Westinghouse

A new 12-page, four-color brochure that outlines the benefits of automatic combustion trim control on small, jackshaft-controlled boilers is available from the Combustion Control Division of Westinghouse Electric Corporation.

The brochure, designated AD 107-020 explains the essentials of combustion, combustion control and proper control and maintenance of small, packaged boilers. The brochure also provides a graph that allows a boiler owner or operator to calculate the fuel savings available on his boiler using automatic combustion trim control.

To obtain a free copy of the brochure,

Circle 88 on Reader Service Card

Seaworthy Engine Systems Shortens Corporate Name

Seaworthy Engine Systems, Inc. of Essex, Conn. has announced a shortened corporate name. The new name, Seaworthy Systems, Inc., will better reflect the increased scope of company engineering activities, according to **David A. O'Neil,** president of the firm.

The 10-year-old company has become known as just "Seaworthy" within the industry and it is expected that use of the nickname will continue. Additionally, there has been some past confusion with the old name, in that it was sometimes assumed that the company was actually selling engines rather than performing engineering work pertaining to propulsion systems. The new name should clear up this possibility of confusion.

With their increase in clientele, Seaworthy has been steadily broadening their areas of expertise expanding from the engine, fuels, energy conservation, electrical and other mechanical systems areas to vessel stretching, reconstruction efforts, and preliminary contract and detail design. The company also plans to become more active in offering innovative design concepts to their shipowner customers where new business opportunities are being created within the industry. Seaworthy is also opening a "Chesapeake Office" to supplement their New York, Washington and Essex offices. Seaworthy Electrical Systems, an affiliated venture, will continue to use their present name.

For further information,

Circle 81 on Reader Service Card

Joel Alper Appointed President Of COMSAT World Systems Division

COMSAT recently announced a corporate reorganization designed to improve the firm's ability to organize and articulate its strategic business activities, and also announced the election of new senior officers.

John L. McLucas, president of COMSAT World Systems Division since 1980, has been elected to the newly created position of executive vice president and chief strategic officer, reporting to **Joseph V. Charyk,** chairman and chief executive officer. In this capacity, he will be responsible for the development and integration of COMSAT's strategic business planning, corporate outreach, marketing, ITU relations, and new business activities. Reporting to Dr. **McLucas** will the staff functions of corporate affairs and corporate development.

Joel R. Alper, who became executive vice president of the World Systems Division earlier in 1983, has been elected president, succeeding Dr. **McLucas**. COMSAT World Systems Division, the company's largest business, principally consists of units that provide international telecommunications services through the International Telecommunications Satellite Organization (INTELSAT); maritime communications services through the International Maritime Satellite Organization (INMARSAT); technical services under contract to INTELSAT; and research and development programs by COMSAT Laboratories.

ASMAR Completes Repairs To Sonap's OBO Carrier

ASMAR, Chile's leading ship repairer, recently completed repairs to the 30,282-grt OBO Makedonia Star, a vessel owned by Chile's S.A. de Navegacion Petrolera "Sonap." In addition to routine drydocking work, the vessel also underwent a special hull survey and line shafting.

Re-tubing of her Uraga Type D auxiliary boiler was also carried out, which involved the renewal of literally all the tubing. Altogether, a total of 2,233 curved tubes of 36 and 38-mm diameter were replaced. Refractory material was also completely renewed and boiler structural repairs were carried out.

Structural repair work was also carried out on the vessel's tanks. The vessel's hull was also sandblasted and an area of 14,000 cubic meters was painted.

TTS Offers New System For Moving Heavy Loads —Literature Available

Total Transportation Systems, Inc. of Newport News, Va., a specialist in custom-engineered production equipment and material-handling systems for shipyards, is offering a new system for transporting very heavy loads. The Dual Walking Beam (DWB) has the capability of moving and precisely regulating the position of ship sections, and even complete vessels. The system is said to allow a dramatic reduction in the time and cost of block construction techniques.

The DWB requires little or no ground preparation, and is not limited to a fixed rail system. It is capable of negotiating congested areas, and will transport a load up a 10-degree grade. The DWB can also be used for walking loads onto a barge or floating drydock.

For complete details and free literature on the Dual Walking Beam,

Circle 87 on Reader Service Card

$26-Million For Navy Propulsion Components Awarded To Westinghouse

Westinghouse Electric Corporation, Plant Apparatus Division, Wilkins Township, Pa., has been awarded a $26,073,000 face value increase to a previously awarded cost-plus-fixed-fee contract for naval nuclear propulsion components. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

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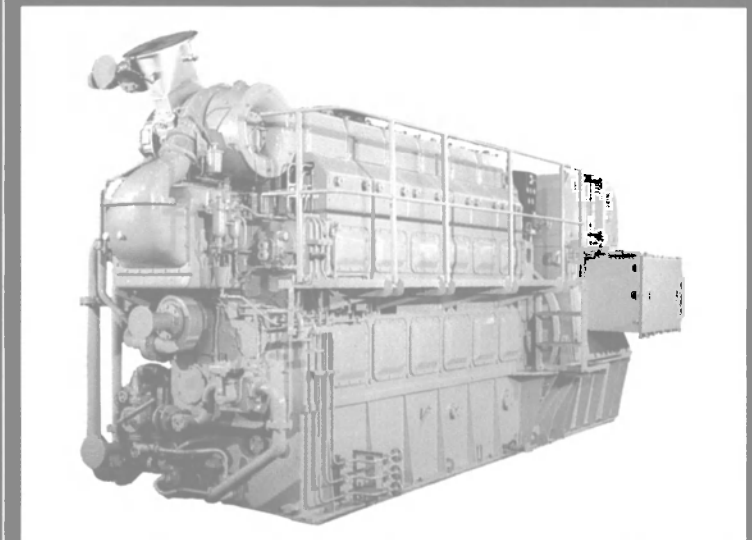

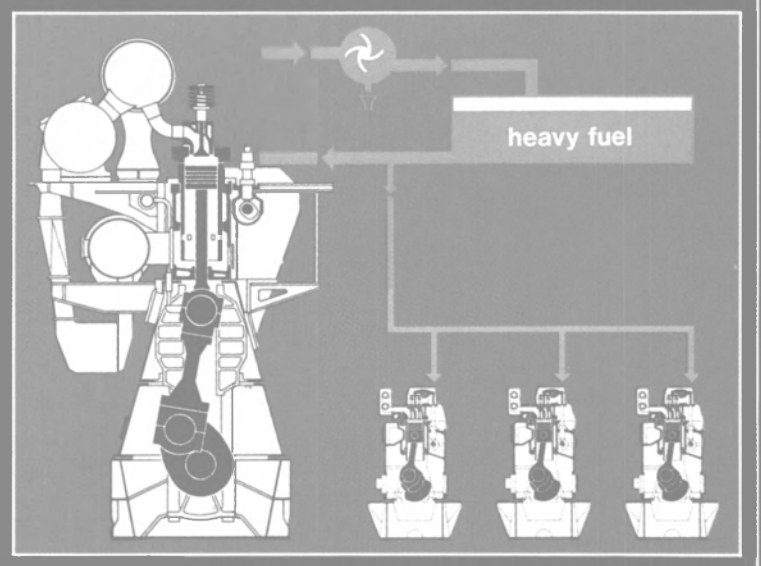

HFO Marine GenSets

M.A.N.-B&W Marine GenSets of to-day and for the future are based upon:

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AMOCO Tug Barge

REDUCING FUEL COSTS

First In A Series—Propulsion Equipment

Diesel Engine Manufacturers Continue To Improve The Fuel Efficiency Of Their Engines

Introduction By
Professor Jose Femenia
SUNY Maritime College
Ft. Schuyler, NY

In an effort to reduce fuel costs, the American marine industry has undergone a renaissance in marine engineering. The last decade has seen the deepsea U.S.-flag shipowners go from being unilateral proponents of steampowered merchant vessels to stalwart supporters of diesel power. The decade also saw significant changes in fuel characteristics and price structure. The principal change affecting marine fuels was the reduction in heavy fuel quality coinciding with the price structure, change that made it very attractive for vessel operators to use the lower quality fuels. These changes had the potential for adverse affects on the operation of diesel-powered vessels.

As expected, the diesel engine manufacturers did not stagnate during this period but rather met the challenges of the marketplace with new technological improvements. They have made the diesel engine a mechanical engineering marvel capable of satisfying the needs of the deepsea owners as well as the inland waterway operators. They have made this inherently efficient engine available in such a wide range of power, size, and weights that an appropriate engine is available for nearly all marine applications.

Of primary concern to all operators is the ability of diesel engines to operate with the most economical available fuels and still maintain their cycle efficiency and reasonable maintenance schedules. Diesel manufacturers, well aware of the basic constitutents of the heavy marine fuels, undertook design refinements to minimize the adverse affects of the harmful elements in the fuel. Nearly all engine manufacturers have taken the tack of using special materials and carefully controlled engine component cooling as the methods of minimizing the impact of vanadium on engine longevity. A review of manufacturers literature reveals that most manufacturers

claiming their engines are capable of burning the lower quality fuels boast of their special cooling features, especially relative to exhaust valves and seats. Sulfur attack of cylinder walls also seems to have succumbed to a commonly accepted remedy—insuring that cylinder wall temperatures are high enough to prevent sulfuric acid condensation and/or using sufficiently alkaline cylinder oils to neutralize the acid deposits on the cylinder walls. Obviously, if an engine manufacturer is designing an engine for a market intending to use a high-quality fuel, such as gas oil, it is not necessary to take these measures to insure engine compatibility with the vanadium and sulfur.

In addition to vanadium and sulfur, other fuel properties or constituents have a bearing on the operation of diesel engines. Some of these other properties or constituents are viscosity, density, Conradson carbon residue, asphalthenes, water content, ash, catalytic fines, and cetane number. Although some engines are more tolerant than others to fuel properties and/or contaminant variations, no engine is totally immune from highly degraded fuels.

The ingenuity of the modern-day diesel engine designer is further exemplified by the development and perfection of the super-long-stroke engines. These engines have not only resulted in relatively low crankshaft rpm's compatible with propellers of large dry bulk carriers and tankers but have resulted in thermal efficiencies heretofore unattainable in a thermo-mechanical energy conversion device—thermal efficiencies greater than 50 percent. **Nicolas Carnot** would have been proud of the modern diesel designer.

One casualty of the very high efficiency of super-long-stroke engines is a relatively low amount of usable heat in the exhaust gases. The very efficient expansion of the cylinder gases results in low exhaust gas temperature, which in turn results in low exhaust gas energy availability thereby reducing the amount and/or conditions of the waste heat produced steam. Manufacturers of four stroke cycle, medium/and high-speed engines have concentrated on improving engine volumetric efficienty and air-fuel mixing as the primary means of improving engine efficiency.

Design improvements of modern marine diesel engines go beyond thermodynamic cycle advances and into the realm of engine maintenance. The use of hydraulic devices for pre-tensioning of bolts, studs, and tie-rods, as well as custom rigging devices for easy handling of heavy components, are commonplace. Advanced designs of cylinder heads to include valve cages, which simplifies valve maintenance, are commonplace on four stroke cycle engines and two stroke cycle engines using uniflow scavenging, especially on those engines designed to burn the lower quality fuels.

The responsibility for a well operating diesel vessel does not rest solely with the engine manufacturer but must be shared with the ship designer, the onboard operators, and the ashore support effort. The design marine engineer responsible for the systems design must pay close attention to the vessel's intended operating mode and expected available fuel. On board systems should be engineered with sufficient margins to allow for service growth as well as the expected and unexpected that the future holds in store. One system in particular that design marine engineers should be liberal in defining system specifications is the fuel oil conditioning system. Equipment selected should not be expected to operate at the extremity of its operating range at design power. A liberal equipment selection policy might be slightly more expensive initially but most likely will result in lower life-cycle costs for the vessel.

Once the ship is designed, the fate of its machinery is mainly dependent on the operating crews

(continued on page 22)

Reducing Fuel Costs

(continued from page 21)

and shore support staff. Although modern diesel engines need only a bare minimum of supervision once operating, it is important to insure that the engine is well monitored by both automatic systems and a very competent cadre of marine engineers—individuals with a very thorough knowledge of diesel engines and the uncanny ability to detect problems before they become serious.

What follows is a synopsis of the technological activities and accomplishments of many diesel engine manufacturers addressing the challenges they face in designing marine diesel engines that will help usher in the 21st century.

B&W ALPHA

Circle 71 on Reader Service Card

B&W Alpha Diesel A/S of Frederikshavn, Denmark, is a company of the M.A.N.-B&W Group that designs, manufactures, markets, and services complete vessel propulsion systems. Last year the company completed the integration of the in-line and V version of the 20/27 M.A.N.-B&W diesel engine and the in-line version of the 32/36 M.A.N.-B&W engine with existing Alpha controllable-pitch propellers and gearboxes. This has resulted in four-cycle diesel propulsion systems developing as little as 680 bhp at 1,000 rpm, which can burn heavy fuel oil up to 2,100 sec. Redwood 1 at 100 F.

A new series being offered is the 20/27-VO propulsion system. While the engine itself is not new, the system incorporates the new Alphatronic I and Alphatronic II—the company's latest electronic remote control systems. Features of the new control systems include: reliable attainment of economical operation through the optimum combination of engine rpm and propeller pitch; simple controls requiring minimum attention of the watch officer; simple installation, basically a single electrical cable connection from the wheelhouse control panel to the engine room; easy maintenance, with as many functions as possible on easily replaceable, printed circuit boards; and a clear, easily understood display of essential information.

The Alpha Diesel product line now includes the following series: 20/27, 136 bhp per cylinder at 1,000 rpm; 23L, 155 bhp per cylinder at 825 rpm; 23/30, 170 bhp per cylinder at 825 rpm; L28/32, 285 bhp per cylinder at 775 rpm; and L32/36, 500 bhp per cylinder at 750 rpm.

B&W HOLEBY

Circle 72 on Reader Circle Card

B&W Holeby Diesel A/S of Denmark manufactures 4-stroke diesel engines in the power range from 450 to 5,500 bhp. The company also supplies diesel generator systems of shipboard use.

In addition to diesel engines, Holeby production includes major components such as crankshafts and connecting rods for use by licensees in the manufacture of 4-stroke B&W engines, as well as spare parts for its own engines. The company also manufactures fuel oil mixing units and other auxiliary equipment.

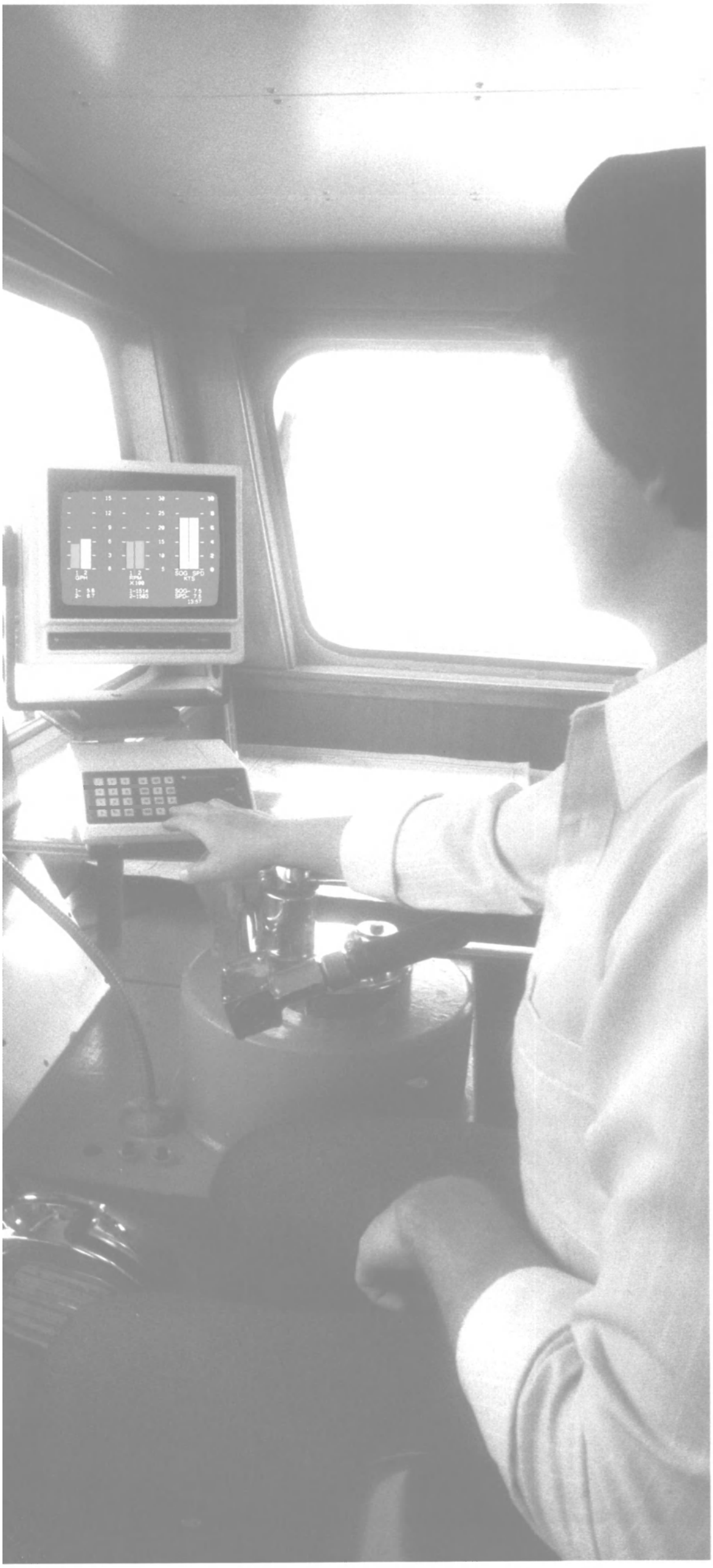
As a result of recent development projects, all types of Holeby engines can now be supplied in uprated, four-valve versions that can be operated efficiently on the same heavy fuel as the big main propulsion engines. Holeby calls this development its Unifuel system.

BERGEN DIESEL

Circle 58 on Reader Service Card

Reducing fuel expenses, which are representing an ever-increasing part of a ship's total operating cost, has always been one of Bergen Diesel's main endeavors. Generally, there are two ways to achieve that: (1) building engines

◄ Circle 18[illegible] on Reader Service Card



TI's new It puts all

Fuel-management data. Navigation data. Trip data. And vessel monitoring. Now there's a total vessel management system that provides all the vital data you need—at a single point.

There's never been anything like the new TI8000 Integrated Marine System from Texas Instruments.

The unique TI8000 offers you the key to more efficient and economical vessel operation. In the '80s and beyond. It saves time and money, and performs many complex tasks automatically.

Hundreds of readings available

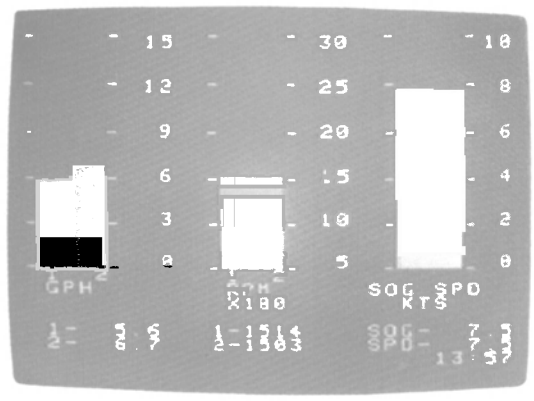
The TI8000 puts hundreds of critical readings at your command. All from a single keyboard.

Simply tell the TI8000 the data you want. And it will instantly display the data—all fully correlated—on a video screen.

Loran C, Transit Sat-Nav, fuel flow meters, fuel level meters, and other sensors all report to the TI8000. And it reports directly to you.

Saves costly fuel

Keeping your fuel costs down gets tougher each year. The TI8000 can help. In a big way.



The first fuel-management display shows the fuel burn rate of engines 1 and 2 in gallons per hour, the rpm of each engine, and speed-over-the-bottom compared with speed-through-the-water.

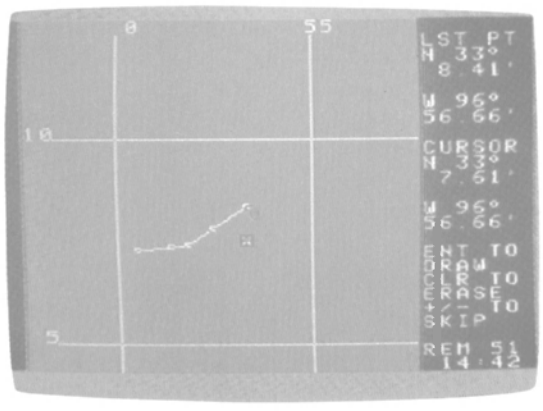
Its fuel-management system gives you an easy, accurate way to monitor, adjust, and control vessel fuel consumption. And in short, reduce your fuel and operating costs.

From helping you save fuel... to retracing a profitable fishing run... to alerting you to dangerous on-board conditions, the TI8000 provides the key to efficient vessel management.

integrated marine system. vital data at your command.

At your command, the TI8000 displays gallons used per hour. Miles per gallon. Speed-over-the-bottom. Speed-through-the-water. Fuel supply remaining. And range and running time remaining at present speed.

By monitoring the fuel consumption of each engine, the TI8000 also gives you an easy way to detect and prevent costly engine troubles.



The navigation plotter uses Loran, Dead Reckoning, Transit Sat-Nav, etc., and displays and logs vessel progress.

Simplifies navigation

The TI8000 also provides a color navigation plotter to help you chart the best course. It simply uses your navigation source: Loran C, Transit Sat-Nav, Dead Reckoning, etc.

When you enter the coordinates of your destination waypoints, the TI8000 will display range, bearing, course-to-steer, and cross-track error.

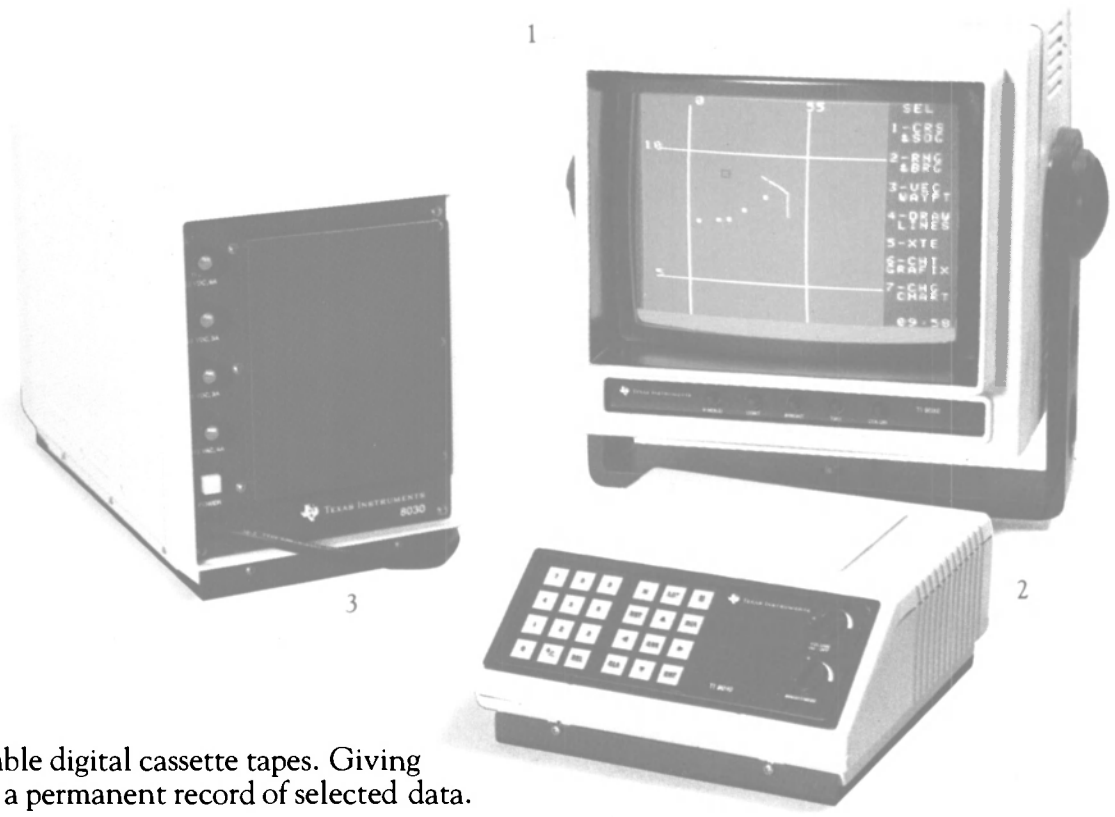
You can input the waypoints for a complete trip, either manually or with a preprogrammed tape. A whopping 100 waypoints can be stored in the system's memory, with virtually an unlimited number of waypoints stored on digital cassette tapes.

By using previous trip data stored on the tape, the TI8000 will help you return to a location. Retrace a good fishing run. Follow a recorded channel. And avoid recorded navigational hazards.

Automatic ship's log saves time and effort

Another TI8000 feature: A state-of-the-art electronic ship's log. This handy feature lets you recall information about prior trips.

It automatically records time, present position, and other selected items on reliable digital cassette tapes. Giving you a permanent record of selected data.



Compact design saves space

The TI8000 does a lot, but takes up little space.

It consists of three space-saving modules. Information is compiled, recorded, and stored by the Computer Module. The keyboard of the Command Module lets you access this data, which is then presented on the Display Module. What could be simpler?

Rugged to take all the sea can dish out

Built tough by experts, the TI8000 is designed to give you years of dependable service—in the harshest marine environment.

Non-corroding aluminum and stainless steel parts help assure reliable performance. And greater durability results from the use of high-impact plastic for the case and cabinets.

Customized to your vessel

You and your TI dealer together define the sensor inputs, units of measure, vessel requirements, and more. Temperature alarms and many other sensors all can be selected for display and recording.

Equally important, the TI8000 grows with you. It can be expanded easily to meet your future needs.

Three compact modules make up the TI8000:
1) Display Module—the size of a 10-inch television; 2) Command Module—a keyboard and cassette tape deck unit; and 3) Computer Module—8 × 10½ × 16 inches.

Complete, affordable, and fully supported

The value-packed TI8000 includes: Command Module, Display Module, Computer Module, heading reference, fuel flow sensors, and an event marker. The latter records vessel location data when pressed.

Fuel savings alone make the TI8000 a wise investment.

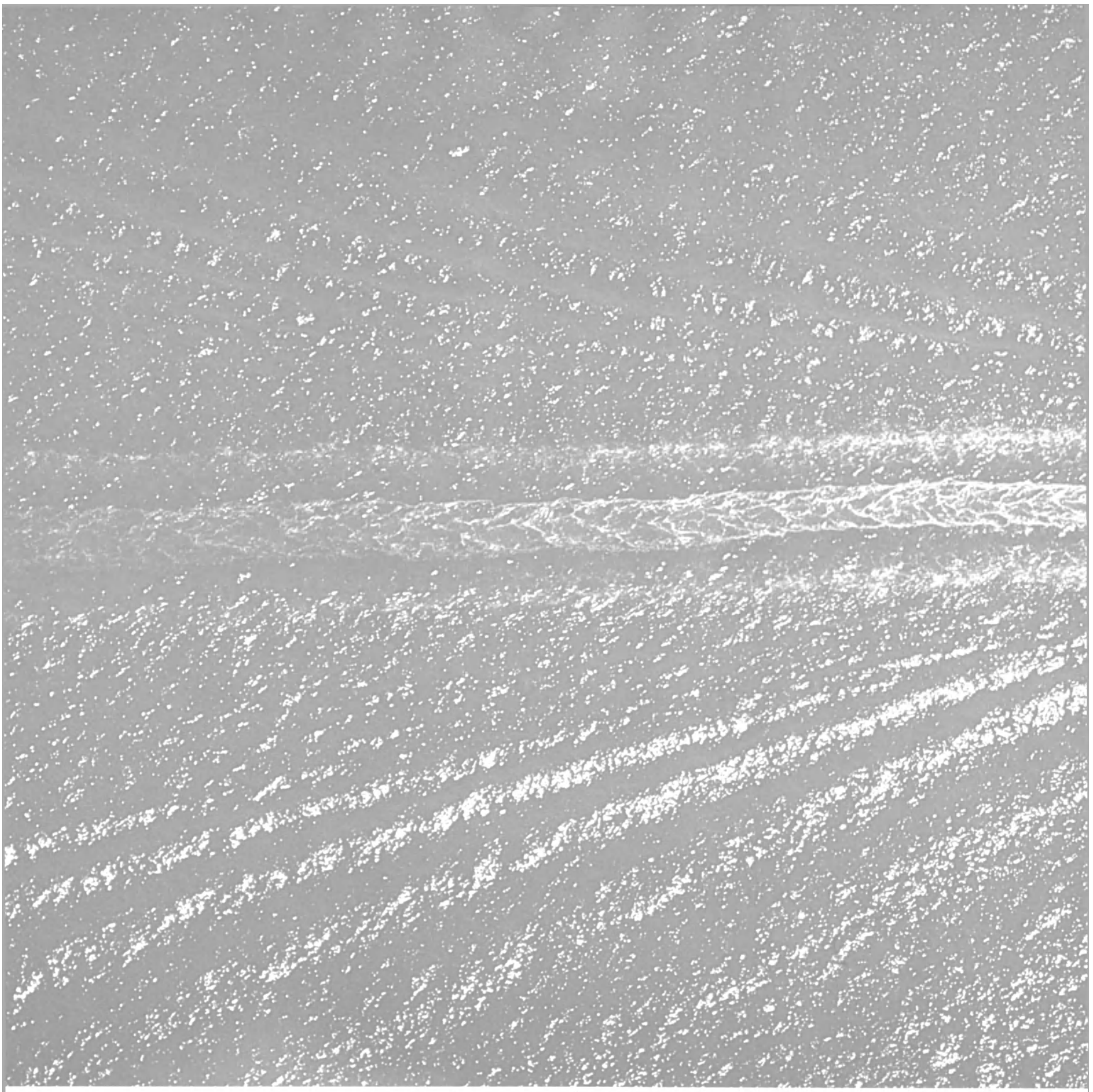
And you can rely on a specially trained, authorized TI dealer to install your TI8000. He is factory supported to provide you with installation, operating assistance, and service.

For more information, write Texas Instruments, Marine Products, P.O. Box 405, MS3438, Lewisville, Texas 75067.

Creating useful products and services for you.

TEXAS INSTRUMENTS

27-3859



Every day, EMD Diesel engines leave

Day after day, year after year, EMD Diesel engines prove their reliability where it counts.

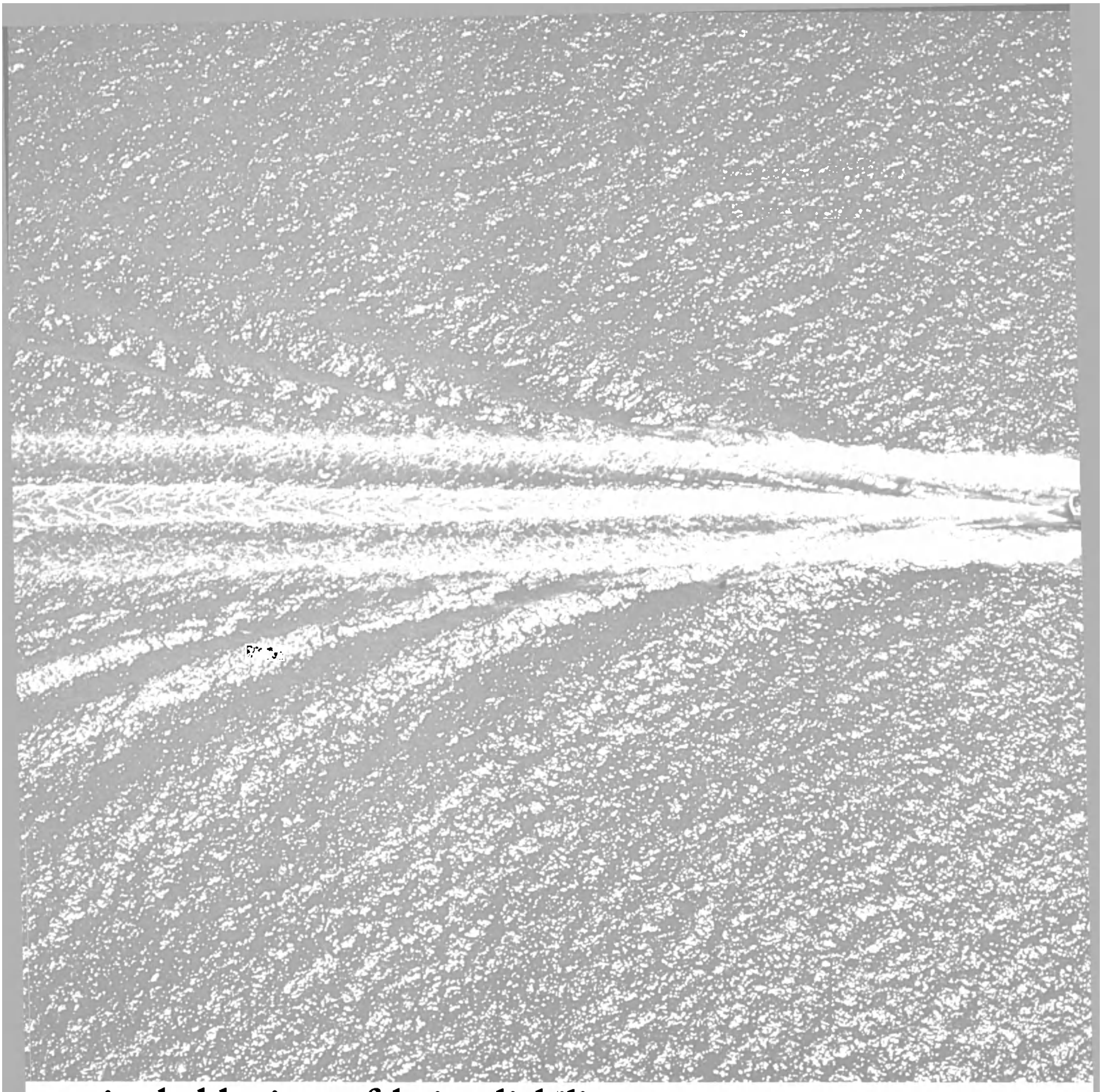
Out on the water.

And that's not just a stroke of luck. It took decades of refining and improving to make our marine Diesels as efficient and dependable as they are today.

Through years of research and development, EMD engineers have worked hard to make our engines run better without making them more complicated. And they've succeeded on both counts.

Today's EMD marine Diesel engines are our most fuel-efficient ever. At the same time, their simple de-

See the fuel efficient EMD engine



unmistakable signs of their reliability.

sign makes them easy to repair and service. In fact, our customers tell us that EMD engines consistently post the best in-service records of any engines in their fleets.

Taken together, the advantages of EMD engines add up to an overall benefit that can be described in simple terms: superior performance and superior economy. So contact us at the Electro-Motive Division, La Grange, Illinois 60525. Telex: 270041.

And ask us for more details.

Then, get an EMD. The marine Diesel engine that leaves everything else in its wake.

ELECTRO-MOTIVE
Division of General Motors Corporation

t the Work Boat Show - Booth 874

Reducing Fuel Costs

— Bergen Diesel

(continued from page 22)

that have the lowest possible specific fuel consumption and the ability to burn low-grade heavy fuels; (2) developing engine systems for ship propulsion and power generation that allow engine operation near the engine's and the system's point of optimum efficiency.

The thermal efficiency of Bergen Diesel's K-range of engines is as high as today's state of the art will allow, giving a realistically low specific fuel consumption over a wide load range. Furthermore, the K-type engine is the product of more than 20 years of heavy fuel operation experience, and is thus capable of burning low-grade, high-viscosity heavy fuels while maintaining extremely long component overhaul intervals and component life.

To be able to operate vessels at or near the point of optimum fuel efficiency, Bergen Diesel has designed sophisticated engine systems that have been put into successful operation. For fishing vessels, systems with high-output shaft generators, driven via two-speed gearboxes from engine front end power take-offs, allows the use of shaft generators at two engine speed modes, i.e., the free-running and the trawling speed, for inexpensive, main-engine-generated electric power. Hybrid power systems, being a combination of diesel-electric and diesel-mechanical power transmission to the propellers, give offshore supply and anchor-handling vessel operators the possibility to utilize the advantages of both systems.

Bergen Diesel generating sets operating on the same type of residual fuel as the main engines on larger vessels reduce the volume of distillate fuel consumed, and can enhance the economic performance of any vessel considerably.

CATERPILLAR

Circle 57 on Reader Service Card

Caterpillar 3500 Series marine engines have set new standards for fuel savings—savings that can actually allow repower with full payback in less than 1½ years. Fuel savings may in fact exceed 35 percent at all operating loads, not just within a limited range or at "rated" load.

Designed for tighter oil control than two-cycle engines and most four-cycle engines, the 3500s can save several thousand dollars a year in lube oil costs alone.

For simplified maintenance, front-mounted governor and side-mounted oil, water, and fuel transfer pumps improve accessibility. Fuel filters, oil, and oil filters can all be changed at the same time. Access covers near the camshaft and in the crankcase allows simple and effective visual inspection. These and other 3500 Series design features translate into less maintenance time and lower maintenance costs.

COLT INDUSTRIES

Circle 56 on Reader Service Card

Colt Industries' Fairbanks Morse Engine Division continues to offer both the Colt Pielstick and the Fairbanks Morse opposed-piston diesel engines. The Fairbanks 38D8-1/8 opposed-piston engine is offered in both blower-scavenged and turbocharged versions, with horsepower ranges from 708 to 3,500 bhp at 750 rpm, and 920 to 4,200 bhp at 900 rpm. These engines have always enjoyed high fuel efficiency, but today's sophisticated electronic control and monitoring systems are squeezing even better fuel economy from them.

Fairbanks Morse continues to produce the Colt Pielstick PC-2.3V and PC-2.5V diesel engines, with ratings from 6,420 to 11,700 bhp at 520 rpm. These engines are capable of burning heavier grades of residual fuels.

The Engine Division now offers the Colt Pielstick PC-2.6 L & V and the high-horsepower PC-4.2V diesel engines. The PC-2.6, with horsepower ratings from 4,422 to 13,266 bhp, is a development of the PC-2 series medium-speed engine with the same general dimensions. The PC-2.6 engine can burn

◄ Circle 189 on Reader Service Card

all heavy fuels available on the market. The engine is fitted with water-cooled cages and exhaust valves, especially adapted to the fuel's vanadium content. The advanced technology of the PC-2.6 engine enables it to burn the poorest foreseeable heavy fuel without major modifications.

The Colt Pielstick PC-4.2V, rated from 16,270 to 29,286 bhp, is able to burn residual fuels of up to 4,000 sec. Redwood #1 at 100 F with a 400 ppm vanadium content.

The Colt Pielstick engines are backed by SEMT Pielstick's ongoing research and development programs. The PC engine family has approximately 60 million hours of experience running on heavy fuels.

COMBUSTION ENGINEERING

Circle 55 on Reader Service Card

Combustion Engineering, Inc. is a leading supplier of steam generating equipment for the marine industry, both military and commercial. CE has designed and manufactured main propulsion, auxiliary, and waste heat boilers for more than 40 years. In addition to new product design and manufacture, CE offers after-market support including service and OEM parts.

In recent years, CE has been involved in various marine research and development projects including improved boiler reliability, development of improved oil atomizers, and development of low excess air burners.

While marine steam generators have always been capable of burning degraded fuels, many shipowners are looking for alternative fuels to reduce their operating costs. CE has been actively involved in the development of modern, coal-fired marine boilers, with four ships presently in service and two more scheduled for delivery in 1984.

As another alternative, some shipowners are interested in burning PETCOM (petroleum coke/oil slurry). Hereto, Combustion Engineering has been at the forefront of this new technology, performing atomization and combustion tests for marine boilers.

CUMMINS ENGINE

Circle 54 on Reader Service Card

Cummins Engine Company manufactures six series of marine diesel engines rated from 170 to 1,250 bhp, continuous-duty operation. Designed for heavy-duty workboat and fishboat applications, both main propulsion and ship service auxiliary power, Cummins engines have developed a reputation over the years for fuel-efficient power.

Since the mid-1970s, the Cummins K marine engines have developed a reputation for fuel efficiency as well as reliability. The KT/KTA-1150 series are in-line, six-cylinder models developing 400-475 continuous bhp at 1,800 rpm; displacement is 1,150 cubic inches (18.9 liters).

The KT/KTA-2300 and KTA-3067-M engines, introduced in 1978 and 1980, respectively, complete the Cummins product line with high horsepower, reliability, durability, and fuel economy. The 2300 series engines are a 12-cylinder, V configuration design with a displacement of 2,300 cubic inches (27.8 liters). The turbocharged engine has a rating of 800 bhp at 1,800 rpm, and the turbo/aftercooled version has a 940 bhp rating at 1,800 rpm.

The KTA-3067-M engine is rated at 1,250 bhp at 1,800 rpm for continuous-duty applications. It is a 16-cylinder engine with 3,067-cubic-inch (50.3-liter) displacement.

Recognized at their introduction as the most fuel-efficient marine diesel engines in their horsepower range, the K series engines have been improved continually to reduce specific fuel consumption. Over the past three years, Cummins has reduced the specific fuel consumption for these models an additional 2-3 percent.

DAIHATSU DIESEL

Circle 53 on Reader Service Card

With its extensive experience in the marine field, Daihatsu has developed a new type of engine, the

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Reducing Fuel Costs

— Daihatsu

(continued from page 29)

DL series, which features low quality fuel burning, low load operability, and low fuel consumption. These DL series engines—DL-20, DL-26, DL-28, and DL-32—are a medium-speed type (600-1,000 rpm) with outputs covering the range from 750 to 3,000 bhp (550 to 2,205 kw). They are suitable for both main propulsion and auxiliary generating roles.

Severe tests and experiments under various conditions on all parts of these engines were carried out at the Daihatsu laboratory and factory before they were placed on the market. Daihatsu's traditional design concepts—simple and sturdy construction, easy maintenance, and lower maintenance costs—are fully incorporated in the DL series engines.

Since the DL series was placed on the market, Daihatsu reports an increasing number of orders from many overseas shipowners.

EFFICIENCY SYSTEMS

Circle 52 on Reader Service Card

Efficiency Systems Inc., a subsidiary of Flowtron Industries, Inc., had developed and is marketing Fuel Log, a line of low-cost fuel management systems that enable operators to reduce fuel consumption by about 10-15 percent.

Fuel Log I consists of a slow-flow meter and engine performance sensors connected to each engine and wired to an electromechanical read-out that provides gallons per hour, total fuel used, and trip fuel. The more advanced Fuel Log II includes a microprocessor-based read-out that also provides shaft rpm, engine rpm, fuel remaining, time and date, and a printer.

The heart of the energy-conserving unit is the slow-flow liquid meter manufactured by Transamerica Delaval Inc. under an exclusive license from Flowtron covering Flowtron's patented technology. Information from the meter, when processed through the Fuel Log read-outs, enables marine operators to quickly determine maximum engine efficiency at any given moment, weather, sea condition, and on-board weight. Operators can then instantly adjust engine rpm and tank flow to yield maximum power using the least amount of fuel.

Fuel Log systems come in three sizes, for engines that consume up to 40, up to 360, or more than 360 gallons per hour, and are priced from $3,500 to $14,500, including installation and operator training.

DETROIT DIESEL

Circle 73 on Reader Service Card

The Detroit Diesel Allison division of General Motors offers advanced fuel economy models of its 149 Series diesel engines. The turbocharged and intercooled engines are said to be the most fuel-efficient heavy-duty diesels available in their power range.

The Detroit 149 engines in 12- and 16-cylinder, V configurations are expected to show fuel economy improvements of about 3.5 percent over previous engines at the same horsepower ratings. The 12-cylinder models are available up to 894 bhp, and the 16-cylinder versions up to 1,212 bhp. The fuel economy improvements are the result of a number of engineering developments, including new turbochargers, unit fuel injectors, and a new airflow system.

With the new system, the power required to drive the Roots type blowers used in Detroit two-stroke cycle engines is reduced significantly as the engine reaches operating speeds. As that happens, the increased airflow from the turbochargers takes over the function of providing the intake air needed to maintain combustion and scavenging in the cylinders. A special valve takes the load off the blower by equalizing the pressure on both sides of the rotors, reducing blower horsepower. The new turbochargers and unit fuel injectors have been carefully tailored to match the needs of the new system for optimum fuel efficiency.

Detroit Diesel 149 Series engines have been popular with the commercial fishing industry for many years.

ELECTRO-MOTIVE DIVISION

Circle 74 on Reader Service Card

A new, more fuel-efficient version of the popular 645 Series diesel engine was introduced in 1983 by the Electro-Motive Division of General Motors. Compared with previous 645 models, the new engine is said to provide a reduction in fuel consumption of about 3 percent.

The new EC engine series combines innovative design features that insure superior performance, extended operating service, and enable the engine to withstand higher operating pressures with state-of-the-art turbocharger technology. The 645EC uses a 16:1 compression ratio piston, increased from 14.5:1, producing the same power output with less fuel. A newly designed impeller and compressor have been incorporated into the turbocharger.

Last year EMD also introduced a heavier crankcase option, the 645F engine. This engine, designed for high horsepower outputs, is currently available in 16- and 20-cylinder models.

A new multi million-dollar, blended fuels, engine test facility is under construction by EMD. In addition to this investment, the company has expanded its computerized design and manufacturing capabilities into an integrated CAD/CAM system that allows engineering designs to be communicated directly to the shop floor. The Computer Aided Design/Computer Aided Manufacturing puts the factory of the future into EMD's operations today.

FLEET MANAGEMENT SYSTEMS GROUP

Circle 51 on Reader Service Card

The Vessel Management System (VMS) has been designed by Fleet Management Systems to provide the operator with the information required to maximize vessel profitability. The functional, display, and analytical capabilities of the VMS are combined to support fuel management, engine diagnostics, and maintenance management programs, custom designed for any particular business operation.

The VMS fuel management package collects engine and vessel operating data to build a speed-power curve for the vessel under actual operating conditions. From this, the VMS can recommend the optimal speed for minimum fuel consumption.

Should such variables as wind speed or direction, current velocity, or fuel quality change, the VMS will immediately recalculate the speed-power curve and recommend a change in throttle setting, if required. This provides a real time system that helps the crew maintain optimal vessel performance.

VMS offers a wide range of valuable management capabilities. Its software is designed in conjunction with the customer to meet his special needs. The shipboard VMS can load data on cassettes for post-trip analysis. An office software package provides for financial planning and life-cycle management.

The VMS fuel management package can be the foundation on which to build a complete fleet management system. In many cases, the VMS can be linked to existing shipboard monitors and/or sensors to provide a fully integrated system. Telecommunications capabilities are built into every VMS.

FOSTER WHEELER

Circle 50 on Reader Service Card

In this ever-changing world of ours, flexibility, availability, and economics are paramount to survival in the business world. Foster Wheeler Boiler Corporation proposes that in the marine trade, the above three elements are available when you take advantage of "Fuels of Opportunity."

To have to purchase a specific quality fuel or shut down your plant leaves you at the mercy of local and world conditions. To be able to buy "Fuels of Opportunity" leaves you able to apply the three elements of survival.

Foster Wheeler's fluidized bed steam generator design permits you to switch from one fuel to another at unmatched cost savings and fuel flexibility with efficient burning of petroleum coke, residual oil, lignite, anthracite, and bituminous and sub-bituminous coals. Fluidized bed boilers are available in sizes for installation on board a tug up through the largest oceangoing vessels.

GMT

Circle 75 on Reader Service Card

GMT of America Corporation has been formed as a subsidiary of Grandi Motori Trieste S.p.A. of Italy to promote and market GMT engines in the U.S. Besides commercial marine diesels, GMT is also a leading designer and builder of naval engines.

GMT has one of the world's most modern plants for the design, manufacture, and testing of diesel engines. Its product line includes: low-speed, two-stroke engines from 5,000 to 44,000 bhp; medium-speed, four-stroke models in two cylinder sizes for a power range from 3,500 to 28,000; and high-speed, four-stroke engines with bores of 210 and 230 mm covering the 800 to 7,000 bhp range.

GENERAL ELECTRIC

Circle 70 on Reader Service Card

While General Electric Company produces test data on burning low-grade alternative fuels in its diesel engines, it is producing electricity for use in its factory in Erie, Pa.—a new wrinkle for cogeneration. Three 16-cylinder GE7FD engines, each rated at 3,400 bhp, are run an average of 14 hours a day, five days a week, at 10 percent over their rating. Each engine is connected directly to a 3,000-kw generator that gives it a load to work against, and which produces the electric power.

The engine test facility, which cost $3.9 million, is contained in a 6,000-square-foot addition to the powerhouse building. The primary function of the new facility is to evaluate performance of newly developed engine components through life tests. These tests will be conducted in parallel with GE's continuing search for more economical fuels. And as fuel costs also have a major impact on engine testing, the powerhouse project has been developed to recover some or all of those costs.

It is expected that tests conducted in the new facility, along with tests currently being conducted on a workboat, will result this year in the issuance of a modified fuel specification to allow a blend of up to 30 percent residual content. Earlier work by the GE Transportation Equipment Products Department's Diesel Development Laboratory has already resulted in specification for a 10 percent blended fuel.

General Electric markets three sizes of diesel engine—8, 12, and

16 cylinders—with ratings ranging from 1,375 to 3,600 bhp.

GEORGE ENGINE

Circle 69 on Reader Service Card

As much as an 11.5-percent reduction in fuel consumption can be realized by George Engine Company's "bypass operation"—the upgrading of a Detroit Diesel 149 series engine from its normally aspired (NA) configuration to a turbocharged, intercooled, blower-bypass (TIB) configuration using the latest high-tech components from Detroit Diesel. Fuel savings provide a rapid payback of the cost of the conversion.

The blower-bypass is a simple butterfly valve arrangement that automatically diverts the incoming combustion air around the Roots blower when turbocharger boost has reached a sufficient level. With the Roots blower bypassed, it no longer imposes an accessory load on the engine; the horsepower that was previously required is now available at the flywheel to do useful work.

With a smaller fuel injector, the TIB configuration produces the same horsepower at the same rpm as the NA arrangement, but does it with significantly less fuel. Alternatively, the owner may elect to use larger injectors to achieve greater horsepower output, but still at a competitively low specific fuel consumption figure.

HITACHI ZOSEN

Circle 68 on Reader Service Card

In response to what it sees as the need for an integrated approach to saving energy, Hitachi Zosen has performed comprehensive research toward the realization of more fuel-efficient ships. As a result, Hitachi now offers an integrated energy-saving package consisting of four independent systems: improvement of hull performance; improvement of main propulsion plant; application of efficient measures for the machinery plant; and optimization of navigation and maneuverability features. These systems may be applied independently, in combination, or as an integrated, total energy-saving system. Among the items that may be included in the Hitachi package are the HZ bulbous bow; self-polishing type coatings; low-rpm, large-size propeller mounted in HZ nozzle; super-long-stroke, low-speed main engine; shaft generator; and 2- or 3-stage, pressure-type exhaust gas economizer.

KHD

Circle 76 on Reader Service Card

A range of weight- and cost-saving diesel engines has been developed by Deutz Engines Ltd., British subsidiary of Klockner-Humboldt-Deutz AG, in which new technology has made them safely operable well within Zone 2 minimum requirements, without the need for purge-pressurized enclosures.

Until recently, only a few small diesels have ever been adapted to operate free-standing in a Zone 2 environment, and these were extensively customized to suit particular applications. With this latest KHD development, it is now possible for Deutz 816 diesel engines in a variety of sizes and configurations with outputs ranging from 120 to 870 kw (163 to 1,180 bhp) to be operated safely in areas outside the protection of specially designed, purge-pressurized enclosures.

The Deutz 816 series is available as a package adapted for Zone 2, which calls for a maximum surface and gas temperature of 250 C. Deutz has gone beyond this requirement, with a maximum temperature of 180 C.

Development of the 816 to Zone 2 standards was carried out in response to a growing demand from oil companies. Building a purge-pressurized enclosure is costly, imposing a weight penalty and creating problems of accessibility to the engine.

In adapting the 816, Deutz

(continued on page 32)

Reducing Fuel Costs

— KHD

(continued from page 31)

started out with certain advantages. The engine was developed originally for mining applications and meets strict West German regulations. The temperature of most of the engine surface was already well below the Zone 2 requirement, the problem of cooling being limited to the exhaust system. Even in this respect some of the work had already been done, as the 816 had an option of water-cooled exhaust manifolds and turbochargers.

KRUPP MaK DIESEL

Circle 67 on Reader Service Card

According to MaK, there are different ways to improve the total economy of a vessel's propulsion plant. Items that can be fully influenced by the engine maker are: reduce the specific fuel consumption; design the engines for the lowest grades of heavy fuels that will be available in the future; and provide heavy-fuel engines for a wide output range in order to generate auxiliary power on board ships with engines using the same low-grade heavy fuels burned in the main propulsion diesels.

MaK offers heavy-fuel engines in the power range from 740 to 9,000 kw (about 1,000 to 12,240 bhp). Each power demand can be covered by in-line engines with a minimum number of cylinders.

Developments to reduce fuel consumption were introduced for MaK's large-bore, four-stroke M601 engine with 580-mm bore and 600-mm stroke. Improvements in the past two years regarding optimizing injection and scavenging brought the specific fuel consumption of an 8M601 engine with an output of 8,000 kw (10,880 bhp) down to 125 grams per brake horsepower-hour. Reliability of the engine was not affected because the measure of increasing the firing pressure was not yet used.

Besides the reduction of the fuel consumption of all engines, MaK delivers small auxiliary engines in the power range of 740 kw (1,006 bhp) and above for so-called "one-fuel" ships, where main and auxiliary engines both operate on unblended low-grade fuels such as CIMAC 12. Four such installations are now in operation, the first since 1981. Operating experiences are encouraging, and further orders have been received for 11 one-fuel ships with MaK main and auxiliary engines burning the same low-grade fuels.

Further improvements in economy are possible for the peripheral equipment, such as improvements in propulsion efficiency by means of low-speed propellers, and waste heat recovery by means of using exhaust gas and cooling water energy for generating electricity in turbogenerators.

M.A.N.-B&W DIESEL

Circle 66 on Reader Service Card

M.A.N.-B&W Diesel, as the world's largest designer of marine diesel engines, has successfully developed engines with the highest thermal efficiency available, while at the same time maintaining a very high level of service reliability.

With the introduction of the MC low-speed series, M.A.N.-B&W has brought the fuel consumption down to 118 grams per brake horsepower-hour, which, compared with the 156 g/bhph 10 years ago, means a reduction of about 25 percent. At the same time the corresponding revolutions of the direct-coupled propeller have been reduced from 114 rpm to 60 rpm, which has led to an increase in the propeller efficiency of 12–15 percent. These factors combined mean a total saving in the fuel oil consumption on propulsion engines alone of up to 40 percent.

Extensive research and development, coupled with M.A.N.-B&W's vast accumulated experience in medium-speed operation, has resulted in systematic optimization of the full line of the medium-speed diesel program. All this latest diesel technology is also being applied to the new L58/64 engine (1,215 kw per cylinder at 450 rpm) that is scheduled for testing this year. Expected specific fuel oil consumption of this engine is 123 g/bhph.

M.A.N.-B&W is committed to meet the challenges of a changing world of operating conditions and technology, to the benefit of the world's shipowners.

MTU OF NORTH AMERICA

Circle 77 on Reader Service Card

MTU of North America, Inc., is the American subsidiary of Motoren-und Turbinen-Union Friedrichshafen GmbH (MTU) of West Germany, which is owned jointly by Daimler-Benz and M.A.N. The U.S. company has devoted more than five years to building a sales and service organization that reflects the high standards of the MTU organization worldwide.

The MTU diesel engine line covers an output range from 440 to 10,000 bhp at speeds between 1,000 and 2,400 rpm. Basic design features common to the series are: V configuration, water cooling, exhaust gas turbocharging, and charge air cooling.

The model 20V 1163 TB 93 engine introduced in 1983 is evidence of MTU's continued success in its development program, which focuses on increasing engine power and power concentration, reducing fuel consumption throughout the entire speed range, extending operating range through higher pressures, and improving partial-load characteristics.

The major obstacle to fulfilling these goals, which also include the use of lower quality, heavier fuels with lower cetane numbers and higher impurity levels, is that the individual requirements are inter-

dependent and, therefore, require a common solution. MTU's solution is cylinder cutout, cylinder charge transfer, and sequential turbocharging; all three systems have been proven in actual service trials.

With the boost in power in the 1163 Series from 349 to 496 bhp per cylinder (an increase in mep from 305 to 426 psi), MTU's two-stage turbocharging is also employed for the first time, in addition to the systems mentioned above. This allows overall engine dimensions to be kept almost constant, and results in a power to volume ratio of 11.7 bhp per cubic foot, and a weight to power ratio of 4.4 pounds per bhp with the 20V1163 producing 9,920 bhp.

Output of the 396 Series engines has also been increased. With a maximum rating of 2,570 bhp and a weight of 10,475 pounds, the 16V 396 penetrates a power range previously served only by larger, heavier engines.

MTU's marine diesels are designed for a wide range of commercial and naval applications. These include continuous duty with a power range of 590 to 4,930 bhp for vessels with unlimited operating range and/or unrestricted continuous operation, and medium duty with a power range of 640 to 5,425 bhp for passenger vessels in seasonal service, patrol boats, and cruise engines for vessels with combined propulsion systems.

MWM-MURPHY

Circle 98 on Reader Service Card

In early 1983 Motoren-Werke Mannheim A.G. (MWM) announced an expansion of its U.S. sales and service network aimed at marketing the company's higher-output engine series in North America. The MWM-Murphy Large Bore Division, headquartered in Houston, has been organized to market MWM's 400 and 500 series multi-fuel engines.

The 400 series is a four-stroke, direct-injection design available in diesel oil, natural gas, dual fuel, intermediate, and heavy fuel versions. There are three basic model classifications in the 400 series—the 440, the 441, and the newest 444. The 440 and 441 models have the same 9.06-inch bore, 10.6-inch stroke, and swept volume of 684 cubic inches per cylinder. The new 444 model has the same bore but the stroke has been increased to 12.6 inches, giving a displacement of 812 cubic inches per cylinder.

The longer-stroke 444 is available in in-line 6- and 8-cylinder turbocharged-intercooled models, and has an operating speed up to 750 rpm. It was designed for optimum performance on lower grade and heavy fuels up to 3,500 sec. Redwood 1, which may be the norm in years to come. Redesign of the internal cooling circuit and new generation turbochargers has increased the overall efficiency of the basic engine design, producing an output significantly greater than 440 model with no detrimental effects on fuel consumption. For the introductory model 444, output on diesel fuel was 250 bhp per cylinder at 750 rpm—2,000 bhp for the 8-cylinder model.

Basic design features of the 400 series include individual cylinder heads with four valves per head in an overhead arrangement, and piston cooling on all turbocharged-intercooled models. All models, both naturally aspirated and turbocharged-intercooled, are oil-cooled.

The 500 series, the largest of the MWM product line, is divided into two separate engine families—the 510B and the 501. The 510B is comprised of four basic turbocharged-intercooled engines with a common bore of 13 inches and stroke of 14.2 inches. An in-line version is offered with six or eight cylinders and a V type with 12 or 16 cylinders. Like the 400 series, the 510B has been designed to operate on a variety of fuels, even the poorer grades with viscosity up to 3,500 sec. Redwood.

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Circle 19(on Reader Service Card ►

Reducing Fuel Costs — MWM Murphy

(continued from page 33)

Design characteristics of the 500 family allow operating speeds between 600 and 750 rpm. The 510B has a swept volume of 1,879 cubic inches per cylinder and an output of 525 bhp per cylinder, up to 8,400 bhp for the 16-cylinder model operating on diesel fuel. Currently, only the 6- and 8-cylinder models are available for operation on dual fuel and natural gas; output at 750 rpm is 1,890 bhp for the 6-cylinder model and 2,515 bhp for the 8-cylinder unit.

The 501 model is available in a turbocharged-intercooled in-line version with six or eight cylinders. Each has a bore of 14.2 inches and stroke of 17.7 inches; operating speed is between 428 and 514 rpm. Designed for operation on diesel and poorer grades of fuel, output at 514 rpm is 2,475 bhp for the 6-cylinder model and 3,300 bhp for the 8-cylinder version.

ONAN

Circle 91 on Reader Service Card

The Onan Corporation of Minneapolis recently introduced the L317D-M and the L423D-M marine propulsion engines. With ratings of 43.5 bhp and 60 bhp at 3,600 rpm, and weights of 475 and 549 pounds, respectively, the latest Onan engines are part of a family that will eventually offer models with ratings up to 150 bhp.

With a weight-to-horsepower ratio of about 11:1, the four-cycle L317D-M engine has a displacement of 105 cubic inches. The L423D-M has a weight-to-horsepower ratio of about 9:1 with displacement of 140 cubic inches. Both models have a common 3.5-inch bore and 3.62-inch stroke.

Onan has been a well-known supplier of marine machinery for more than 25 years. This experience has resulted in a number of features and options on the propulsion engines, including a marine cooling system, marine gear, marine alternator, and special mounting system.

OOSTERHUIS INDUSTRIES (MITSUBISHI)

Circle 65 on Reader Service Card

Oosterhuis Industries, Inc., marine engine distributor for Mitsubishi Heavy Industries America, Inc., has been marketing heavy fuel burning diesel engines for more than 20 years. Based on that long experience, the Oosterhuis firm feels that in the lower horsepower ranges and for inland vessels, blended fuel could be a better choice than heavy fuel oil.

Mitsubishi offers the 4-cycle SN-MTK and the SU-MTK marine propulsion and generator diesels suitable for operating on diesel fuel and on blended fuel oils. The SN-MTK is available for propulsion in a power range from 400 to 1,500 bhp at 1,550 rpm, and operates satisfactorily on a blended fuel of 16 cSt at 86 F with a sulfur content of less than one percent by weight. A mix of 50 percent marine diesel of 4 cSt and 50 percent heavy fuel of 350 cSt could provide such a blend.

The SU-MTK is available for propulsion applications from 1,500 to 3,000 bhp at 1,200 rpm, and operates on a blend of 30 percent marine diesel oil and 70 percent heavy oil. Oosterhuis offers a blending unit that blends the proper quantities while taking fuel on board, making separate storage tanks and heating coils unnecessary.

When operating on blended fuel, a fuel oil separator is required, and depending on lube oil capacity, a lube oil separator is recommended.

Oosterhuis Industries, through its affiliated Marine Engineering, Inc., can supply and install the entire propulsion package from engines and reduction gears to oil separators, electric oil heaters, tailshafts, and propellers.

PANDEL INSTRUMENTS

Circle 64 on Reader Service Card

A computer-based fuel management system, the FMS-3, was introduced recently by Pandel Instruments, Inc. The system compares the fuel burned versus the speed made for vessels in the 4,000-bhp range and up. It consists of two major components: flow and temperature sensing devices, and the main computer unit with the system display.

The FMS-3 monitors individual engine burns and vessel speed, and the computer calculates the fuel burned per mile of operation. Performance charts for the individual vessel may then be constructed to allow operation at known efficiency levels. The system is configured to function with marine diesel engines using low-pressure fuel supply pumps and return fuel circuits. It has hardware and software correction factors for fuel heating during recycling; aeration of the return fuel, and flowmeter calibration.

Speed inputs to the FMS-3 come from either the vessel's on-board knot log or from the Pandel Channel-Scan™ remote depth sounder. System outputs are displayed on a 12-inch CRT that is equipped with an amber display format that presents no degradation of night vision.

Display formats are readily changed in system software to meet any particular fleet requirements.

Several of these FMS-3 systems are now operating successfully on the inland waterways.

PENSKE GM POWER

Circle 63 on Reader Service Card

Penske GM Power, Inc. represents Detroit Diesel Allison and Electro-Motive Division products that have survived the test of time and consistently provided the kind of value and dependability that produces results. The company is authorized to carry all Detroit Diesel engines and also offers the EMD 645 Series.

The Penske-engineered Detroit Diesel 8V92TI, a high-performance marine power package, is a compact, heavy-duty engine with a horsepower-to-weight ratio of 6.4 pounds per shp, establishing a new standard for the industry. The 8V-92TI marine propulsion engine was developed using only field-proven components and thoroughly tested by Penske's own dynamometer.

Today's Detroit Diesel and EMD engines incorporate the latest state-of-the-art design modifications, such as low smoke injectors, bypass blowers, high-output turbochargers, aftercoolers, and refined engine timing. More importantly, these features are incorporated into the reliable and affordable engine design that has gained worldwide recognition and offers unsurpassed application and standardization potential.

Penske field engineers are ready to survey equipment for refurbishment or replacement, train operators and technicians, and establish comprehensive preventive maintenance programs to guarantee optimum reliability and equipment life.

SACM

Circle 92 on Reader Service Card

SACM (Societe Alsacienne de Constructions Mecaniques) of France manufactures medium- and high-speed, four-stroke, direct injection diesel engines known for their lower specific fuel consumption and compact size. The company is represented in the U.S. by F.W. Donnelly Company of Houston.

For the offshore drilling and production industry, SACM is one of Europe's leading suppliers of diesel generator sets with continuous, 60-cycle ratings from 100 to 4,000 kw. These compact sets are in use on one of the world's largest semi-submersibles, the Dyvi Delta, and on the production platforms Statfjord B and Statfjord C.

SACM engines ranging from 100 to 8,400 bhp are in use throughout the world in a variety of commercial and military high-speed vessels. These include the Bell-Halter BH 110 surface effect ship, the Westamarin catamaran, and SAR 33.

The French company is a leader in the development of reduced volumetric ratio (RVR), Hyperbar, and two-stage turbocharged engines that provide excellent power-to-weight ratios. The SACM 520 V12 S3 (Hyperbar) diesel has a top rating for fast patrol boats of 1,400 bhp at 2,500 rpm, and a dry weight with accessories and reduction gear of 7,480 pounds.

SACM is active in the development of intermediate fuel burning capabilities for its medium- and high-speed engines, with more than 13 years of experience with this type engine. For marine propulsion, these diesels range from 100 to 5,600 bhp, while for generator sets ratings from 100 to 3,600 kw are available.

SEAWORTHY SYSTEMS

Circle 62 on Reader Service Card

Seaworthy Systems, Inc. (formerly Seaworthy Engine Systems, Inc.) has prepared more than 100 energy audits on all types of vessels, many of which are older steamships operating in vastly different operating modes than their original design. In performing such audits, Seaworthy has found that many such vessels, because of their machinery and cycle arrangements, are operating at rates well off their economic optimum for present-day operating conditions.

As a result of these observations, some operators have reviewed their operations and performed, or had performed, detailed technical and economic evaluations of machinery and cycle arrangements. In addition, some have also evaluated present fuel systems, auxiliary components, and operational profiles to identify and rank various options and modifications for improving and/or restoring the thermal and combustion efficiency.

While many of the modifications are basic and common knowledge, their application to a specific vessel must be evaluated based on the required investment and projected economic payback of the specific ship.

The average steamship is operating with a fuel bill of $3–6 million per year. A savings of 3 to 7 percent is often obtainable from the application of certain modifications. It is generally understood that the less costly modifications will give the quickest paybacks, with others becoming economically attractive if extended operating life is projected.

SULZER

Circle 60 on Reader Service Card

The end of 1983 saw the commissioning of the first Sulzer RTA superlongstroke engines to be used for steam-to-diesel machinery conversions. Both the 1,813-TEU cellular containership Remuera Bay of Overseas Containers Ltd., and C.Y. Tung's 2,300-TEU Oriental Educator have each been equipped with a 9-cylinder RTA76 engine resulting in considerable fuel cost savings.

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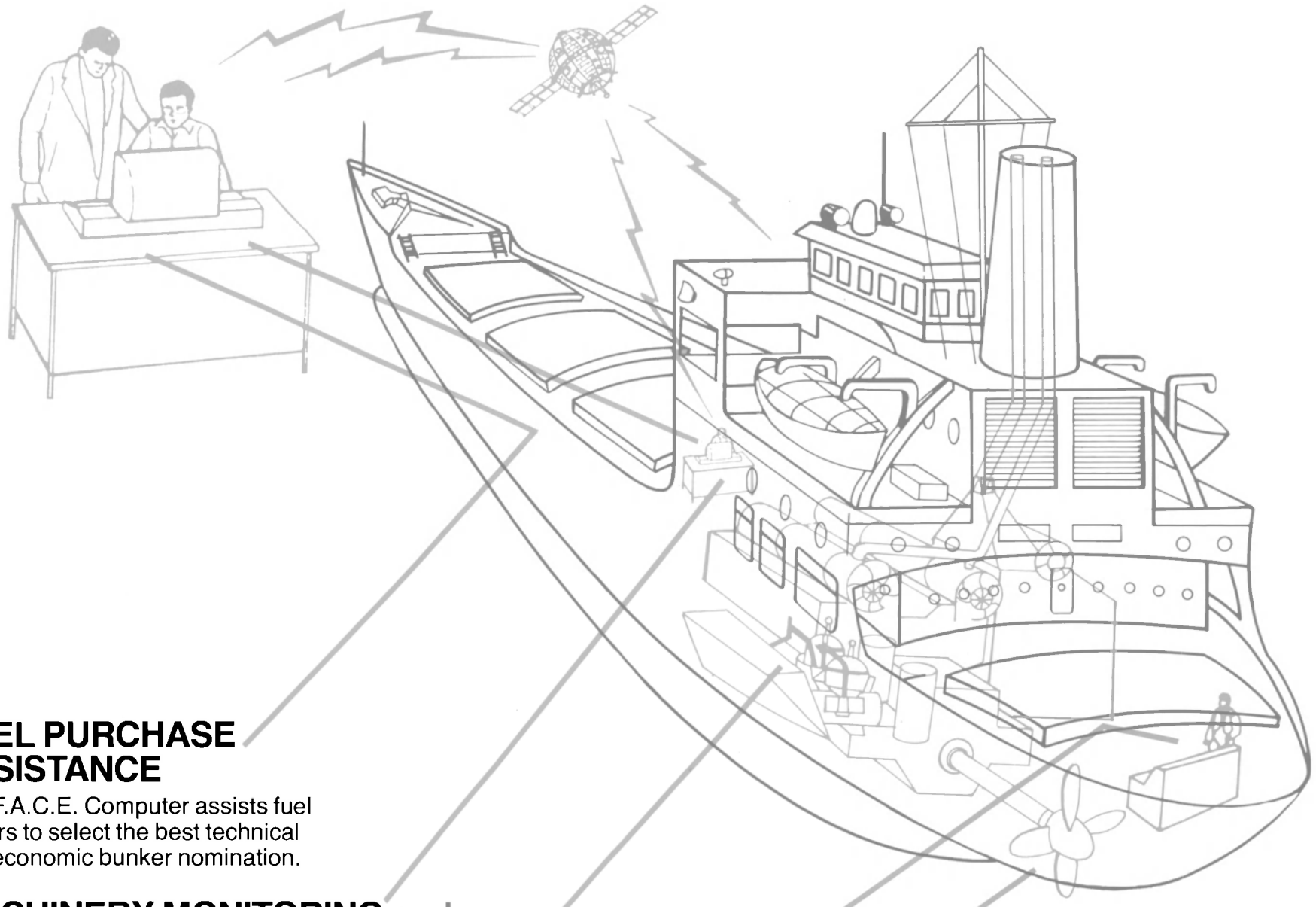
PRACTICAL
FUEL SAVINGS SERVICES



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330	620
Shipbuilding/Boatbuilding/Repair	**Navigation & Communications Equipment**
1,258	568
613	453
466	346
432	341
389	322
Deck Machinery/Cranes/Cargo Handling	**Rope/Chains/Mooring Systems**
405	502
296	233
288	220
247	159
231	115
Controls/Monitoring/Steering	**Oily Water Separators**
398	367
271	335
260	309
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233	225
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353	278
285	232
257	224
250	223

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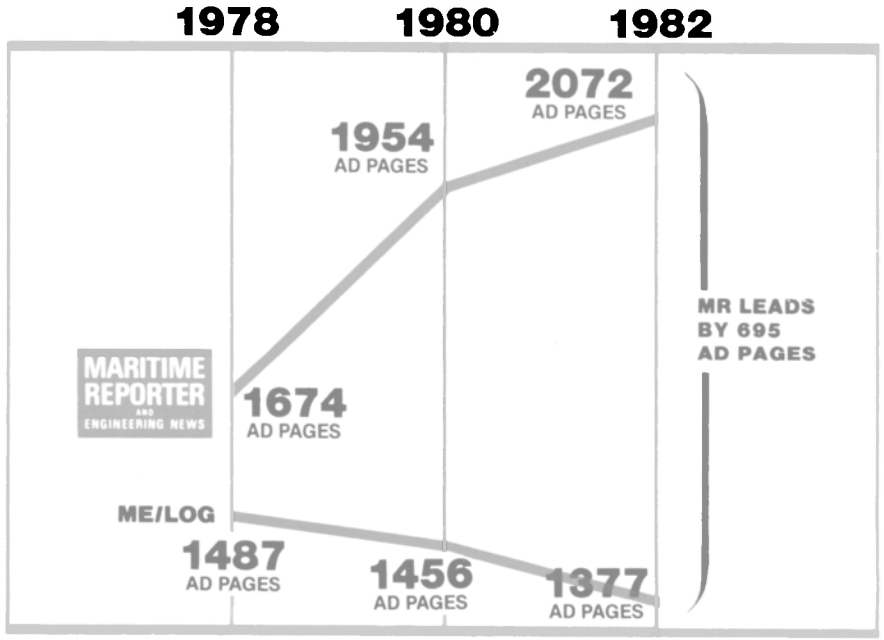

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Circle 19[illegible] on Reader Service Card

Reducing Fuel Costs

— Sulzer

(continued from page 34)

The new RTA engine series is now the world's best-selling, uniflow-scavenged, low-speed engine design, with current orders for more than 370 engines to be manufactured by the worldwide Sulzer family, representing a total output of just over four million bhp. The RTA provides for better fuel economy than previous engine generations by virtue of its optimum combination of extremely low specific fuel consumption and lower rotational speeds, permitting higher propeller efficiencies at modest first cost. Moreover, the improved fuel economy has been achieved without compromising Sulzer traditional reliability on poor-quality fuel oils. Six cylinder bore sizes, ranging from 380 to 840 mm, cover an engine power range from 1,720 to 35,520 kw (2,320 to 48,360 bhp).

The conversion of the Remuera Bay, performed at IHI's Chita Yard in Japan, is of particular note because it involved remodeling the ship's afterbody from twin- to single-screw propulsion. The original steam plant had a combined output of 35,790 kw (48,660 shp) at 108 rpm. The new 9RTA76 diesel gives 21,780 kw (29,610 bhp) maximum continuous rating at 95 rpm, but the service speed is now only two knots less than before.

In the case of the Oriental Educator, and her two sister ships that are to be converted by the end of March and July this year, the single-screw steam turbine plant was originally rated for a maximum output of 27,850 kw (38,000 bhp) for 23.5 knots. In an effort to contain rising fuel costs, the ship had been slow-steaming at 19.5 knots with the service rating of 17,280 kw (23,500 bhp). The same speed is now maintained by the 9RTA76 at a service output of 18,510 kw (25,170 bhp) at 90 rpm, but with a 37 percent reduction in daily fuel consumption at that speed.

Sulzer low-speed diesel engines have already taken a major role in the wave of steam-to-diesel conversions of recent years. The large, fast containerships built in the early 1970s with powerful steam turbine plants had proved particularly vulnerable to the high fuel price levels of the past decade. After initially slow-steaming, many were re-engined with more fuel-efficient diesel machinery. For example, 10 ships trading between Europe and the Far East were each repowered with twin 8RND90 diesels, reducing their fuel costs by some 30 percent.

SW DIESEL GULF (STORK WERKSPOOR)

Circle 61 on Reader Service Card

SW Diesel Gulf, Inc. specializes in heavy-duty, heavy fuel engines in the power range from 1,000 to 20,000 bhp; all are of the 4-stroke type. The engines have been designed to use low-grade fuel and can be operated reliably on high-viscosity fuel containing 5 percent sulphur and 500 ppm vanadium. This is possible because of the many special, heavy fuel features, such as deep-cooled valve seats to avoid hot corrosion by vanadium pentoxide/sodium compounds.

The most modern member of the Stork family is the SW280 design with an output of 400 bhp per cylinder at 1,000 rpm. This engine is particularly fuel economic, with a specific fuel consumption of 194 grams per kw-hour (0.315 pounds per horsepower-hour). This engine series runs reliably at 900 rpm on heavy fuel.

Because of long inspection intervals, maintenance costs are low when burning heavy fuel and are further reduced by the use of special hydraulic tools to loosen and tighten the nuts of important engine parts such as cylinder heads, main bearings, and big end bearings. The use of these tools makes torque wrenches superfluous, and makes life for the crew and maintenance people a lot easier.

TRANSAMERICA DELAVAL

Circle 59 on Reader Service Card

The dramatic changes in marine power favoring slower-speed diesel engines offering more efficient operation on less expensive, heavy fuels presented technical criteria not at all new to Transamerica Delaval's Engine and Compressor Division. Unlike many of the foreign-built diesels whose "degraded fuel" experience is largely with straight-run residuals, Transamerica's Enterprise medium-speed engines have been burning a considerably lower quality, heavily cracked residual type oils for years.

The company's R4 diesels (450 rpm), and its recently introduced R5 units (514 rpm), have been evolved over the years with combustion systems that have the proper materials, systems techniques, and intensive cooling configurations to obtain the most efficient use of heavy fuels with minimum maintenance penalty.

Critical in heavy fuel operations are Enterprise design characteristics that discourage low-temperature sulphur corrosion, precisely control temperatures in the components exposed to the combustion gases of slow, hot-burning heavy fuels, and that avoid the need for performance degradation.

For example, cylinder heads are cast steel, providing the strength for the use of thin sections in critical areas to control thermal distortions. The Enterprise four-valve head is designed for maximum air and exhaust flow efficiency. Steel piston crowns with nodular iron skirts permit thinner walls between the combustion chamber and "cocktail shaker" action of the cooling oil for reduced thermal stresses. Compression rings are chrome plated and specially profiled for long life on residual fuel.

Recent evolutionary developments that led to the Enterprise R5 diesel (mcr range, 3,600 to 12,200 bhp) have brought the company's medium-speed family 40 percent more horsepower per cylinder and per square foot of installation space; the latest in heavy fuel efficiency; 3.5 percent lower specific fuel consumption; and the versatility afloat that often gives the medium-speed unit a net operating cost advantage over its competitors.

VOLVO PENTA

Circle 93 on Reader Service Card

Volvo Penta offers a marine version, the TMD 120, of its 12-liter diesel engine. Specifically designed for use as the main propulsion engine in workboats and other craft, it is said to have high output in relation to weight and installed dimensions, low fuel consumption, and a high level of reliability.

The B version of the TMD 120 features advanced control of the injection and combustion processes, with new injectors that provide more rapid injection at higher pressure, and with decreased combustion delay. Together with efficient turbocharging and a combustion chamber of a new design, these features are said to yield considerable improvement in efficiency.

Other technical refinements in Volvo's 12-liter diesel include piston cooling, a hoseless seawater system with heat exchanger, and thermostat-controlled cooling of the engine block, cylinder heads, turbocharger, and exhaust manifold.

The Swedish company's diesel line includes 2-, 3-, 4-, and 6-cylinder engines covering 12 different models; some are equipped with turbochargers and others with both turbochargers and aftercoolers.

Additionally, Volvo offers twin engines driving through a single compound gear, providing a single shaft output from 336 to 580 shp. This twin-engine/single-output package provides many advantages, including "take-home" capability on one engine.

The heavy-duty Volvo line in-

cludes the model MD 120A, a 6-cylinder engine with maximum continuous rating of 168 bhp at 1,800 rpm, and the 6-cylinder TMD 120A with mcr of 260 bhp at 1,800 rpm.

WARTSILA DIESEL

Circle 94 on Reader Service Card

Wartsila Diesel, one of the world's leading manufacturers of medium-speed diesel engines, has three production plants: the Wartsila Vasa factory in Finland, the Trollhattan factory in Sweden, and the recently opened Wartsila Power Singapore in Singapore.

Wartsila's product development program focused on the design of diesel engines capable of both maximum economy and safe operation even in the most demanding applications. As a result, the company now produces two high-standard, medium-speed engines designed and developed from the very beginning to operate on the poorest quality fuel.

The Vasa 32 engine is well established in the world's marine market, and is installed as the main or auxiliary power source on a variety of ships. This engine, with its seven different cylinder versions—4R32, 8R32, 9R32, 12V32, 16V32, and 18V32—covers an output range from 1,820 to 8,350 bhp at 720 to 800 rpm. The Vasa 32 can operate on fuel with a viscosity up to 380 cSt.

The second of the company's heavy fuel engines is the Wartsila Vasa 22HF, said to be the smallest engine in the world developed exclusively to operate on heavy fuel. The output range of the 22HF covers 720 to 3,480 bhp at 900 to 1,200 rpm. This engine is available in five different cylinder configurations—4R22HF, 6R22HF, 8R22HF, 12V22HF, and 16V22HF—and can run on the same viscosity fuel as the Vasa 32, 380 cSt.

Main features of these engines are: starting, running, and stopping over the entire load range on heavy fuel without any limitations; heavy fuel operation with the same safety and reliability as when operating on distillate fuel; and all engines can run on the same type of heavy fuel.

The ability to burn heavy fuel successfully lies in a purpose-designed diesel engine and fuel-handling system. Wartsila's heavy fuel engines feature: increased preheating of the engine before starting, including jacket water, lube oil, charge air, fuel system on both the high- and low-pressure side, and fuel nozzles; increased filter capacity of both fuel oil and lube oil; higher temperature and improved insulation of the injection pump control system.

Since 1980 Wartsila Diesel has been represented in the U.S. by Wartsila Power Inc., headquartered near New Orleans, with branch offices in New York, Houston, and Seattle.

WAUKESHA

Circle 78 on Reader Service Card

Waukesha Engine Division's AT25 Series 250-mm bore, medium-speed diesels operate economically and efficiently on heavy fuels. These high-output engines, built under a license agreement with Sulzer Bros. Ltd., are available in 6- and 8-cylinder in-line and 12- and 16-cylinder V models with a power range from 1,260 to 4,800 bhp (941 to 3,581 kw) at 720 to 1,000 rpm. Enginator® electric generating systems are rated to 3,040 kw, 60 Hz at 900 rpm.

The AT25 was designed specifically with heavy fuel operation in mind. The bore-cooled cylinder head and two-part piston insure lower induced stresses and moderate valve seat temperatures. Compared with the double-bottom cylinder head design used for most engines of this type, deformations with the bore-cooled head are 2½ times lower. In particular, this means greatly improved valve sealing conditions. Also, the use of valve rotators insures uniform temperature distribution, resulting in full-load valve seat temperatures of only 788 F (420 C)—important when running on heavy fuel.

Designed with a high degree of

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Reducing Fuel Costs — Waukesha

(continued from page 39)

parts interchangeability, all pistons, piston rings, connecting rods, cylinder heads and liners, injection pumps, and nozzles are interchangeable among all AT25 models. Main bearings, camshaft segments, and piping components are common within the in-line and V configurations.

Features for ease of maintenance include quick-access covers for camshafts and main bearings, and a provision for quick removal of rocker arm covers for valve adjustments. Water, lube oil, and fuel transfer pumps are located on the front of the engine for ease in maintenance. Hydraulic tensioning of main bearing studs and connecting rod studs is accomplished with specially designed tools to insure accurate loading of these critical joints.

WESTINGHOUSE

Circle 95 on Reader Service Card

Combustion trim control systems manufactured by Westinghouse Electric's Combustion Control Division are saving $168 a day in fuel costs aboard Moore McCormack Bulk Transport's 39,232-dwt tanker Mormacsun. Each system installed on the ship's two boilers consists of a Westinghouse Hagan Model 211 heavy-duty oxygen analyzer and a Model 1400 microprocessor-based oxygen trim controller.

Operating at an average speed of 15 knots, the 15,000-shp Mormacsun burns about 16,600 gallons of fuel oil per day. Prior to installation of the combustion control systems, the air-to-fuel ratio in the boilers was adjusted manually based on visual observation of flue gas and use of a hand-held flue gas analyzer. Though some excess air is necessary for smoke-free operation, the amount of oxygen in the flue gas is a good indication of combustion efficiency, as it is directly proportional to excess air. Too much excess air results in dollar losses because extra fuel is burned to heat the excess; too little excess air increases costs because unburned fuel goes up the stack.

The systems aboard the Mormacsun have consistently controlled the excess oxygen at levels ranging from 2.5 to 3 percent, a reduction of at least 1 percent from previous operation. Mormac engineers believe a 1-percent reduction of excess oxygen produces fuel savings of at least three barrels of oil per day in each boiler. Based on these calculations, Moore McCormack achieved a payback on the equipment alone in about eight months. Including the cost of installation, the payback on the total package was about 15 months.

IBM's Navy Contract For Sonar Systems Increased To $73+ Million

IBM Corporation, Federal Systems Division, Manassas, Va., is being awarded a $25,615,229 increase to a previously awarded firm-fixed-price contract for the AN/BQQ-5 sonar. The total value of the contract is increased to $73,889,499 by this action. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

New Literature Offered On Aqualer® Ultraviolet Purification Systems

Potable water is made safe for consumption with the new Aqualert® Ultraviolet Purification Systems from Bull and Roberts of Murray Hill, N.J. Designed in accordance with U.S. Public Health Service requirements, these low cost, economical, and compact systems are simple to install and range in size from 480-3,000 gph.

For free literature completely describing the new Aqualert® systems,

Circle 79 on Reader Service Card

Principals at recent NASSCO keel-laying ceremony were (L to R): Vice Adm. **William H. Rowden,** Commander, Military Sealift Command; Major Gen. **Ernest C. Cheatham Jr.,** Commanding General of 1st Marine Amphibious Force and 1st Marine Division, Fleet Training Force; **C. Larry French,** president of NASSCO; **Mrs. Ernest C. Cheatham,** matron of honor; and **Mrs. William H. Rowden,** sponsor.

NASSCO Begins Conversion Of First Maritime Pre-Positioning RO/RO

A recent keel-laying ceremony at National Steel and Shipbuilding Company (NASSCO) in San Diego initiated construction of a 126-foot midbody section for the first of three roll-on/roll-off (RO/RO) ships that are being converted into Maritime Pre-Positioning Ships for charter to the U.S. Navy's Military Sealift Command (MSC). The vessels are being converted for subsidiaries of Waterman Steamship Corporation. Upon completion, they will be time-chartered to the MSC in support of the U.S. Marine Corps.

The Maritime Pre-Positioning Ship Program is an integral element of the Rapid Deployment Force concept of operations. This concept forms the backbone of the U.S. immediate response capability throughout the world by providing for the rapid deployment of a large combat force with equipment and supplies for 30 days of sustained operations.

The keel-laying ceremony took place between the two halves of the RO/RO ship that had been cut in two and separated. Insertion of the 126-foot midbody will give the converted ship an overall length of 826 feet.

Principal speaker of the day was Vice Adm. **William H. Rowden,** USN, Commander, MSC. His wife, **Sarah Rowden,** served as sponsor. Major Gen. **Ernest C. Cheatham,** USMC, Commanding General of the First Marine Amphibious Force and Commanding General of the First Marine Division, Fleet Training Force, Camp Pendleton, also addressed the gathering, and his wife, **JoAnn Cheatham,** served as matron of honor.

Other participants included **Larry French,** NASSCO president; **James E. Jenkins,** deputy counselor to the President of the United States; **Andrew Prince,** deputy assistant secretary of the Navy, sealift and maritime affairs; **Edward P. Walsh,** president, Waterman Steamship Corporation; and Comdr. **Victor Krulak,** chaplain, U.S. Naval Training Center. NASSCO vice president of marketing **Alfred W. Lutter** served as master of ceremonies.

Each Maritime Pre-Positioning Ship will be named for deceased Marine Corps Medal of Honor recipients. NASSCO's first ship will be named Sergeant **Macej Kocak** for the marine who received the Medal of Honor posthumously for extraordinary heroism displayed in France during World War II.

Completion of the three-ship contract, which will maintain approximately 2,500 jobs at NASSCO during peak manning, is scheduled for April 1985.

Esercizio Cantieri Launches Tug/Supply Vessel Of New Design

An anchor-handling/tug-supply vessel with rescue and anti-pollution features, the Val Cadore, was launched recently at the Viareggio, Italy, yard of Societa Esercizio Cantieri (SEC). Built for Cispa Gas Transport S.p.A. of Trieste, the vessel is a new SEC design for the Italian flag, propelled by four medium-speed, heavy-fuel Wartsila Vasa diesel engines, type 8R22HF, developing a total of 6,400 bhp at 1,000 rpm. The engines are able to burn fuel oil of 1,500 seconds Redwood 1 without limitations. Speed at full load is expected to be 15 knots with all four engines operating, and 13 knots with only two engines in use.

Reduction gears were supplied by Tacke and controllable-pitch propellers in Kort nozzles by Berg. Two electro-hydraulic, Berg c-p bow thrusters, each of 300 hp, two Tenfjord rotary-vane, independent steering gears, and the two main propellers can be controlled remotely by an ASEA computerized "joystick" system.

The Val Cadore has an overall length of 65.25 meters, beam of 13.95 meters, and depth of 6.30 meters (214 by 45.77 by 20.67 feet).

Multi-purpose tug/supply vessel Val Cadore on the ways prior to recent launching at the Viareggio yard of Societa Esercizio Cantieri. Vessel is powered by Wartsila diesels.

New Marine Autopilots Introduced By Racal —Literature Available

Six new marine autopilots were introduced recently by Racal Marine Controls Limited. Designed to meet the requirements of shipowners worldwide, the new range includes two series—the Racal-Decca 80 Series of super-adaptive autopilots and the Racal-Decca 60 Series of conventional systems. Each series is designed on a modular basis enabling shipowners to build the exact system desired.

David Peacock, chairman of the Racal Marine group of companies, commented: "The six new Racal-Decca autopilots are the result of 37 years of experience in which more than 16,000 systems have been supplied throughout the world."

The 80 Series—consisting of the DP785, DP685, and DP585—uses the model reference electronics successfully developed for the company's existing autopilot, the DP780, now fitted or on order for more than 90 ships from 12 countries. This and the new systems are unique in distinguishing between course offsets caused by the ship itself and those resulting from the weather, allowing relaxed but highly economical course-keeping.

The new DP785 is the top-of-the-range autopilot and steering control system, similar to the DP780. The DP685 incorporates a simpler steering system, while the DP585 is an autopilot only. A substantial quantity of the latter have already been ordered for retrofitting.

The Racal-Decca 60 Series includes the DP763, DP663, and DP563. The DP763 is a sophisticated main steering control and autopilot system; the DP663 is a budget-priced version and replaces the company's well-known DP750 and DP760 models. The DP563 replaces the existing DP550 and DP560 systems.

All the new autopilots can control all known steering gear, including the modern single-loop and linear steering gear system.

For further information and free literature on the new line of autopilots.

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Steam Plant Optimization Topic At New York Port Engineers Meeting

Speaker at recent New York Port Engineers meeting was **Chester W. Stott Jr.** (center) of General Electric. He is flanked by Society president **Thomas Young** (right) and **John Antonetz,** chairman of Papers and Technical Committee.

The recent meeting of The Society of Marine Port Engineers New York, N.Y., Inc. heard a paper titled "Steam Propulsion Plant Optimization for Slower Steaming" presented by **Chester W. Scott Jr.,** senior thermal systems engineer at General Electric's Marine Turbine & Gear Department in Lynn, Mass. "Almost all steamships operating today can and have, over the past few years, improved fuel consumptions to some degree through various energy conservation opportunities and measures," Mr. **Stott** stated.

"The most effective measure for savings has been due to a complete overhaul, cleaning, repair, and tune-up of all plant equipment to restore the plant to near-design conditions. This has resulted in savings of 5 to as much as 15 percent, attesting to the neglect which some turbine plants have suffered while fuel was cheap. Despite their reduced efficiency, the ships have been reliable and operable, displaying a ruggedness to abuse and a tolerance to fuel degradation unmatched by any other propulsion machinery," he said.

"A subsequent measure requires strict observance of proper operating procedures for each vessel as determined by close cooperation between management and operating sea personnel. The lack of a dedicated modern program of maintenance and repair will defeat this opportunity and the previous losses will re-appear.

"A third measure is cycle improvement and equipment modification, especially for those lower-cost, higher-reliable, simple steam air heater/economizer cycles (SAH). In the United States, before the fuel crunch most shipyards offered and many owners desired only these less efficient plants. Overseas the price of fuel oil always has been higher than in this country; consequently, the economics favored the most efficient regenerative gas air heater cycle (RAH). As long as normal operation is in the range of 70 to 100 percent of design, maximum continuous rating, the fuel savings from this program could average 5 percent for the SAH cycle and about 2 percent for the RAH cycle.

"Another conservation measure involves slow steaming," the author said. "On an individual ship basis, this measure has the greatest potential for fuel conservation, regardless of the type of propulsion steam cycle. However, owners must balance fuel savings against related cost increases, revenue losses, and the overall transportation requirements of their entire fleet. The net fuel savings from slow steaming, when operating between 55 and 30 percent of original maximum continuous rating, will vary inversely as the power between 25 and 40 percent, respectively."

OMSA Elects Officers— Ogden Thomas Named Chairman For Two Years

The Offshore Marine Service Association, New Orleans, has announced the recent election of officers and members of the board of directors for a two-year term commencing January 1, 1984. Chairman will be **Ogden Thomas,** president, Seahorse, Inc.; vice chairman, **Otto Candies, Jr.,** vice president, Otto Candies, Inc.; secretary/treasurer, **Charles Burrell,** vice president-business development, Leevac. Board members include: **John Bissell,** president, Sealcraft Operators, Inc.; **F.C. Felterman,** president, Galaxie Marine Service, Inc.; **Curtis Taylor,** president, Zapata Marine Service, Inc.; **Richard Currence,** president, Gulf Fleet Marine Corp.; and **Burt Keenan,** president, Offshore Logistics, Inc.

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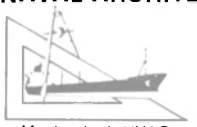

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The generator is S28LH Model, by Hitachi, Japan under license believed to be in 1974 or 5. It is rated at 1200 KVA, and has Nebb electrical ends. The specification can be obtained from Mr. John Debono of Malta Dry Docks and can be inspected during normal working hours.

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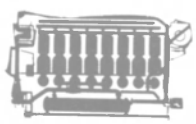

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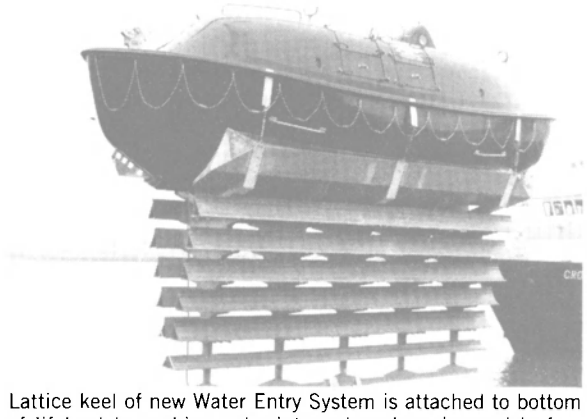

Lattice keel of new Water Entry System is attached to bottom of lifeboat to cushion entry into water when dropped in free fall from ship or offshore rig. Special bucket seats and harnesses protect occupants.

A significant addition to marine safety technology was announced recently by officials of SeaTek Corporation and MCR Technology, Inc. The new device, called the Water Entry System, enables lifeboats to be dropped in a free-fall mode from the deck of a burning or sinking offshore rig or ship.

In making the announcement, SeaTek president **Cam Sharr** pointed out that in many marine emergencies the conventional system of lowering lifeboats won't work. "There isn't enough time to crank the boats down, or the power to the winches is out, or the boats swing in the wind and crash against the hull," he said. "We hope the Water Entry System will do for sailors and drilling crews what the parachute did for fighter pilots," he added.

The principal component of the system is a lattice keel that can be attached to the bottom of any lifeboat. In the free-fall situation, the keel is the first thing to enter the water, and it cushions the landing of the lifeboat. Also, special bucket seats and harnesses protect the occupants from being thrown against the lifeboat bulkheads and capsule.

The new product has been under development for more than a year, but full-scale prototype tests were completed only recently. In those tests, the Water Entry System was installed on a 44-person Water Survival Craft supplied by Watercraft Corporation. Drops were made up to 60 feet. The tests used the full measurement techniques of the automobile crash tests to determine whether the procedure was safe.

Speaking of the test results, **Bob Schwarz,** head of MCR's Engineering and Design Department, said, "Even in the drop from 60 feet we should be looking at essentially zero probability of injury for the occupants." Additional confidence was gained from the close correlation of the results in full-scale to the predictions from model tests. In model scale, tests have simulated drops up to 90 feet and conditions of storm seas.

The product has generated a great deal of interest in the offshore drilling industry, which has been stunned by recent sinkings of both a semi-submersible rig and a drill ship, with the loss of all hands in each incident.

For further information and free literature on the Water Entry System,

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Amor And Frayling Get Promotions At Lister Diesels

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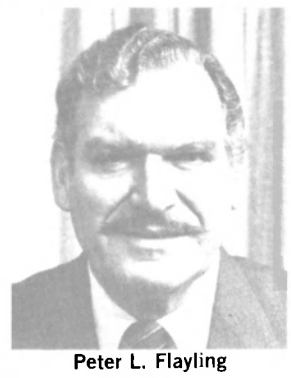

Peter L. Flayling

Two new vice presidents have been appointed by the board of directors of Lister Diesels Inc. of Olathe, Kan., according to company president **Peter S.Y. Jessop**.

J. Leo Amor, formerly national sales manager-distribution, has been elevated to vice president sales-distribution. **Peter L. Frayling,** who has been with Lister for 26 years, has been moved from national sales manager-OEM to vice president sales-OEM.

The appointments coincide with the recent introduction of the new T Series engines. The new engines, designated TS2 and 3 and TL2 and 3, will cover the power range of 12-45 bhp. Lister, a subsidiary of Hawker Siddeley, has been serving the U.S. market for nearly 50 years.

Contessa Awards Engineering Support Contracts To Giannotti & Associates

Subsequent to the contract signing in October 1983 for the construction of two 543-foot cruise ships with Marine Power of Seattle, Contessa Cruise Line has recently awarded additional contracts for engineering support to Giannotti & Associates, Inc.

The Giannotti firm, which prepared the feasibility studies and the preliminary designs for two sizes of cruise vessels, has been retained to carry out the final contract design for the 543-foot ships. Giannotti will also integrate final vendor selections and further contract requirements, and will represent Contessa during construction in the areas of support engineering, inspection, plan approval, and contract administration.

BIW Chief Engineer Addresses Northern New England ASNE

Principals at recent meeting of ASNE Northern New England Section included (L to R): Capt. **John Culver,** USNR, Section chairman; Capt. **William Lowell,** USNR, chief operating engineer at Bath Iron Works; and Comdr. **John Hallett,** USN (Ret.), chairman of the Board of Trustees, Kittery Historical and Naval Museum.

Capt. **William Lowell,** USNR, chief operating engineer at Bath Iron Works Corporation (BIW), was the featured speaker at a recent dinner meeting of the Northern New England Section of the American Society of Naval Engineers. The meeting was held at the Commissioned Officers Club, Portsmouth Naval Shipyard, Portsmouth, N.H.

Capt. **Lowell** stated that many private shipyards in the U.S. face uncertain futures. American goods are being shipped in foreign-built and foreign-operated ships for the most part. He recognized the predominance of Japanese shipbuilding and the rapidly growing Korean capability. Between government subsidies and lower labor rates in those countries, the U.S. cannot compete effectively. However, the recent launching of the Falcon Champion, a BIW product, may be a catalyst for the U.S. shipbuilding considering the ship's quality, reasonable cost, and being delivered ahead of schedule. While certain factors cannot be controlled, the U.S. can put out fine ships if given the opportunity, he said.

During the meeting Comdr. **John Hallett,** USN (Ret.), was presented a donation from the Section to the Kittery Historical and Naval Museum.

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 24 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) 689-3266.**

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Squire Cogswell Company, 3411 Commercial Ave., Northbrook, IL 60062
AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Cospolich Refrigerator Co., Inc., 949 Industry Rd., Kenner, LA 70062
Marlo Coil/Nuclear Cooling, Inc., P.O. Box 171, High Ridge, MO 64049
Nance Industries, P.O. Box 1547, Beaumont, TX 77704-1547
United Technologies Carrier Transicold, P.O. Box 4805, Syracuse, NY 13221
Unitemp Inc., 3590 Kennedy Rd., So. Plainfield, NJ 07080
York Division, Borg-Warner Corp., P.O. Box 1592, York, PA 17405
ANCHORS AND CHAIN
Baldt Incorporated, P.O. Box 350, Chester, PA 19016
Neptunia, Via Giovanni da Verrozzano, 12, 16165 Genovo, Italy
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
Kaiser Chemical, Div., of Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Rm. 1128 KB, Oakland, CA 94643
The Platt Bros. & Co., Box 1030, Waterbury, CT 06721
BASKET STRAINERS
North Star Marine & Industrial Products, Inc., 84 Wall Street, Farmingdale, NY 11735
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, Ohio 44309
Thomson-Gordon Limited, 3225 Mainway, Burlington, Ontario, Canada L7M 1A6
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wisc. 53186
BLASTING—Cleaning—Equipment
Apache Equipment, Inc., 10690 Shadow Wood Dr., Suite 112, Houston, TX 77043
Atlantic Sandblasting & Coatings, Inc., 2700 Guy Verger Blvd., Tampa, FL 33605
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223–9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX England
CLEMCO, P.O. Box 7680, San Francisco, CA 94120
Complete Abrasive Blasting Systems, 18250 68th Avenue South, Kent, WA 98031
E.I. DuPont De Nemours & Co., Inc., Starblast Division, Room X39186, Wilmington, DE 19898
Rockwell International, Power Tool Division, 400 N. Lexington Ave., Pittsburgh, PA 15208
Schmidt Mfg. Inc., P.O. Box 37, Fresno, TX 77545
BOILERS
Combustion Engineering, Inc., Windsor, Connecticut 06095
Forney Engineering Co., P.O. Box 189, Addison, TX 75001
Foster Wheeler Boiler Corp., 110 S. Orange Ave., Livingston, NJ 07039
Howe-Baker Engineers, Inc. (Econoflex Burners), Combustion Systems Div., P.O. Box 956, Tyler, TX 75710
Way-Wolff Associates Inc., 45-10 Vernon Blvd., Long Island City, NY 11101
BROKERS
Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, La. 70153
ECO Inc., 1036 Cope St. Claire Center, Annapolis, MD 21401
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
National Propeller Exchange, P.O. Box 1444, Grafton, VA 23692
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 Novire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
CHOCKING SYSTEMS
Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Philadelphia Resins Corp., 20 Commerce Drive, Montgomeryville, Pa 18936
CLAMPS
Band-It Company, P.O. Box 16307, Denver, CO 80216
CLOSURES—Marine
Cornell-Carr Co. Inc., 63 Main St., Monroe, CT 06468
CONDENSERS
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
CONTAINERS—Cargo Container Handling
Paceco Inc. (A division of Fruehauf), West Seaway Access Road, Gulfport, MS 39501
CONTROL SYSTEMS—Monitoring
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Argo Marine, 140 Franklin St., New York, NY 10013
ARMTEC Industries, Inc., Manchester, NH 03103
ASEA, Inc. 4 New King St., White Plains, NY 10604
Autronica Marine USA, 280 Industrial Pkwy., Northvale, NJ 07647
Avicon Corp., 7750 East Redfield Rd., Scottsdale, AZ 85260
Biospherics Inc., 4928 Wyaconda Rd., Rockville, MD 20852
Cooper Energy Services, Mount Vernon, OH 43050
Eldec Corp., P.O. Box 100, Lynwood, WA 98036
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
Fluidyne, a Div. of Electrodata Inc., P.O. Box 11366, Santa Rosa, CA 95406
Leslie Co., 401 Jefferson Rd., Parsippany, NJ 07054
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
Megasystems, Inc., 1075 N.W. 58th Street, Boca Raton, FL 33431
National Control Systems, Inc., 827 Hanley Industrial Court, St. Louis, MO 63144
Norcontrol, 400 Oser Ave., Hauppauge, NY 11738
Norske Telektron A/S, Drammensveien 126, Oslo 2, Norway
Pandel Instruments Inc., 2100 N. Hwy. 360, Grand Prairie, TX 75050
Propulsion Systems, Inc., 21213 76 Ave., Kent, WA 98032
Seaworthy Systems Inc., 36 Main Street, Essex CT 06426
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062
Wesmar Marine Systems Div., 801 Dexter Ave. N., Box C19074, Seattle, WA 98109
COUPLINGS
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
SKF Steel, 20 Tower Lane, P.O. Box 745, Avon, CT 06001
CRANES—HOISTS—DERRICKS—WHIRLEYS
American Hoist & Derrick Company (AMHoist), St. Paul, MN 55107
Appleton Marine, P.O. Box 2339, Appleton, WI 54913
ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Chester Hoist Division, Monogram Industries, P.O. Box 229, Lisbon, OH 44432
Grove Manufacturing Co., P.O. Box 21, Shady Grove, PA 17256
HIAB Cranes & Loaders Inc., R.D. 22 Interchange Place, York, PA 17404
Hertz Equipment Rental Corp., 7 Entin Rd., Bldg # 2, Parsippany, NJ 07054
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
National Crane Corp., 11200 North 148 St., Waverly, NE 68462
National Supply Company, 1455 West Loop South, Houston, TX 77027
Superior-Lidgerwood-Mundy Corp., 1101 John Ave., Superior, WI 54880
Washington Crane, Div. of Ederer, Inc., P.O. Box 24708, Seattle, WA 98124
DECK MACHINERY—Cargo Handling Equipment
Argo Marine, 140 Franklin St., New York, NY 10013
Marine Technical Associates, 195 Patterson Avenue, Little Falls, NJ 07424
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
DECKING—GRATING
nternational Grating, Inc., 7625 Parkhurst, Houston, TX 77028
Selby, Battersby & Company, 5220 Whiby Ave., Philadelphia, PA 19143
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206
DIESEL ACCESSORIES—CYLINDER LINERS
B & W Marine Service, 50 Broadway, New York, NY 10004
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, Massachusetts 02360
Golten Marine Co., Inc., 160 Von Brunt St., Brooklyn, NY 11231
Haynes Corporation, P.O. Box 179, Jackson, MI 49204
Van der Horst Corp. of America, 314 Penn Ave., Olean, NY 14760
DIESEL ENGINE—Spare Parts & Repair
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
ELECTRICAL EQUIPMENT
Argo Marine, 140 Franklin St., New York, NY 10013
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217
Valad Electric Heating Corporation, 162 Wildey St., Tarrytown, NY 10591
Ward Leonard Electric Co., 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201
EMULSIFICATION SYSTEMS
Cleanodan A/S, N. American Agents, American United Marine Corp., 5 Broadway, Route 1, Saugus, MA 01906
Fire-Brite, Hoffert Manufacturing Co., Inc., 1700 E. Church St., Jacksonville, FL 32202
EQUIPMENT—Marine
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Argo Marine, 140 Franklin St., New York, NY 10013
ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Band-It Division, Houdaille Industries, Inc., P.O. Box 16307, Denver, CO 80216
Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
b.v. Holmatro Industrial Equipment, P.O. Box 33, 4940 aa Raamsdonksveer, Holland
Imperial Manufacturing Co., P.O. Box 4119, Bremerton, WA 98312
Juniper Industries Inc., 72-15 Metropolitan Ave., Middle Village, NY 11379
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, N.Y. 10550
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
John P. Nissen, Jr. Company, Glenside, PA 19038
Stal-Laval Turbin AB, S-612 20 Finspong, Sweden
EVAPORATORS
Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Aqua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
FANS—VENTILATORS—BLOWERS
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Argo Marine, 140 Franklin St., New York, NY 10013
Hartzell Fan, Division of Castle Hills Corp., 901 S. Downing St., P.O. Box 919, Piqua, OH 45356
Zidell Explorations, 3121 S.W. Moody St., Portland, Ore. 97201
FENDERING SYSTEMS—Dock & Vessel
Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004
InterTrade Industries, 15301 Transistor Lane, Huntington Beach, CA 92649
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Samson Ocean Systems, Inc., 99 High St., Boston, MA 02110
Seaward International, Inc., 6269 Leesburg Ave., Falls Church, Va. 22044
FILTERS
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Wm. W. Nugent & Co., P.O. Box 948, Skokie, IL 60076
FINANCING—Leasing
A.G. Becker Paribus Inc., 2 First National Plaza, Chicago, IL 60670
Yegen Marine, P.O. Box 25504, Ft. Lauderdale, FL 33320
FIRE PROTECTION, DETECTION, & ALARM SYSTEMS
EEV, Inc., 7 Westchester Plaza, Elmsford, NY 10523
Walter Kidde, Walter Kidde Dr., Wake Forest, NC 27586
Wormald Fire Systems, One Stanton St., Marinette, WI 54143
FUEL OIL/ADDITIVES—Analysis & Combustion Testing
Ferrous Corporation, 910-108th N.E., P.O. Box 1764, Bellevue, WA 98009
Fuji Trading (America) Ltd., 17 Battery Place, New York, NY 10004
Rolfite Products Inc., 300 Broad Street, Stamford, CT 06901
U.S. Borax, 3075 Wilshire Blvd., Los Angeles, CA 90010
FURNITURE
Bailey Carpenter & Insulation Co., 74 Sullivan Street, Brooklyn, N.Y. 11231
Comfort-Mate, Inc., 7988 NW 56th Street, Miami, FL 33166
GALLEY EQUIPMENT
Argo Marine, 140 Franklin St., New York, NY 10013
Insinger Machine Company, 6245 State Rd., Philadelphia, PA 19135
Kiefer Corporation, W227 N546 Westmound Dr., Waukesha, WI 53186
GANGWAYS
Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960
HATCH & DECK COVERS—Chain Pipe
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Marine Moisture Control Co., 60 Inip Dr., Inwood, N.Y. 11696
MacGregor-Navire International, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Novire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
Julius Mock & Sons, Inc., 20 Vesey Street, New York, NY 10007
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206
HEAT EXCHANGERS
Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
American Standard Inc., Heat Transfer Div., Buffalo, NY 14240
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
HULL 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
Gulf International Divers, P.O. Box 1342, Gretna (New Orleans), LA 70052
Performance Hull Cleaning Services, Inc., P.O. Box 655, New Orleans, LA 70059-0655
Phosmarin Equipment, 21, Boulevard de Paris, 13002 Marseille, France
Seaward Marine Services, Inc., 6269 Leesburg Pike, Falls Church, VA 22044
Stork Services B.V., P.O. Box 2013, 7750 CA Hengelo, Holland
HYDRAULICS
Aeroquip Corp., 1130 Maynard Road, Jackson, MI 49202
HRS, Inc., 3334 Victor Court, Santa Clara, CA 95050
Hydronautics, 6338 Lindmar Drive, Goleta, CA 93017
INERT GAS—Generators—Systems
Foster Wheeler Boiler Corp., 110 So. Orange Ave., Livingston, N.J. 07039
Maritime Protection A/S, N. American Agents, American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Salwico Inc., 5 Marine View Plaza, Hoboken, NJ 07030
INSULATION—Cloth, Fiberglass
Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Superior Energies, Inc., P.O. Drawer 386, Groves, TX 77619
INSURANCE
Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Adams & Porter, 1 World Trade Center, Suite 8433, New York, N.Y. 10048
Assurance Foreningen Skuld, P.O. Box 1376 Vika, Stortingagaten 18, N-OSLO 1, Norway
R.A. Fulton & Company Insurance Services, 100 California St., San Francisco, CA 94111
Midland Insurance Co., 160 Water St., New York, N.Y. 10038
United States P&I Agency, Inc., 80 Maiden Lane, New York, NY 10038
JOINER—Watertight Doors—Paneling
Bailey Distributors, Inc., 74 Sullivan St., Brooklyn, NY 11231
Isolamin Panels, c/o Consafe, Inc., P.O. Box 40339, Houston, TX 77040
Masonite Commercial Division, Dover, OH 44622
Meaadoor 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
ACR Electronics, Inc., P.O. Box 2148, Hollywood, FL 33022
Browning Marine Inc., (Aqua Signal) 33W 480 Fabyan Parkway, Ste 105, West Chicago, IL 60185
Keuffel & Esser/Kratos, 20 Whippany Rd., Morristown, NJ 07960
Midland-Ross Corp., Russellstoll Division, 530 W. Mt. Pleasant Ave., Livingston, NJ 07039
Oceanic Electrical Mfg. Co., 157 Perry St., New York, NY 10014
Oreck Corp., 100 Plantation Rd., New Orleans, LA 70123
Perko Inc., P.O. Box 6400D, Miami, Florida 33164
Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209
Port Electric Supply Corp., 157 Perry St., New York, NY 10014
SSAC Inc., P.O. Box 395, Liverpool, NY 13088
LINE BLINDS
Stacey Fetterolf Corp., P.O. Box 103, Skippack, PA 19474
MACHINE TOOLS
Republic-Lagun Machine Tool Co., 1000 E. Carson St., Carson, CA 90749
MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
AMT Inc., 2400 N.W. 39th Ave., Miami, FL 33142
Amermarine USA Inc., P.O. Box 9205, Baltimore, MD 21222
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Essex Machine Works, Essex, CT 06426
Jered Brown Brothers Inc., 1300 Coolidge, P.O. Box 2006, Troy, MI 48007-2006
Scotchman Industries, Inc., P.O. Box 850, Philip, SD 57567-0850
METALS
Bayou Steel Corp., P.O. Box 5000, Laplace, LA 70068
Inland Steel Company, 30 West Monroe Street, Chicago, IL 60603
International Grating, Inc., 7625 Parkhurst, Houston, TX 77028
MOORING SYSTEMS
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
NAME PLATES—BRONZE—ALUMINUM
Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707
NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Adams & Chute, Huntingtown Road, Newtown, CT 06470
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 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
Bretagne ACB Corp., 344 Camp St., Suite 1000, New Orleans, LA 70130
C.D.I. Marine Co., Regency East, Ste 222, 9951 Atlantic Blvd., Jacksonville, FL 32211
C.T. Marine, 18 Church Street, Georgetown, CT 06829
CADCOM, 107 Ridgely Ave., Annapolis, MD 21401
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, Mass. 02052
John P. Colletti & Associates, P.O. Box 13378, Pittsburgh, PA 15243
Crondall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, Mass. 02026
Crane Consultants Inc., 15301 1st Ave., So. Seattle, Washington 98148
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, Inc., 1725 Jefferson Davis Highway, Suite 700, Arlington, VA 22202
Donhaiser Marine, Inc., 11511 Katy Freeway, Houston, TX 77079
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Parker C. Emerson & Associates, 17935 Cardinal Drive, Lake Oswego, Oregon 97034
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
Express Engineering Inc., 4122 87th Ave. N.W., Gig Harbor, WA 98335
Christopher J. Foster, Inc., 16 Sintsink Drive East, Port Washington, N.Y. 11050
Friede and Goldman Ltd., 935 Gravier St., New Orleans, LA 70112
GEOD Corporation, 73 Oak Ridge Road, NJ 07438
Giannotti & Associates, Inc., 703 Giddings Ave., Suite U-3, Annapolis, MD 21401
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
J.J. Henry Co., Inc., Two World Trade Center—Suite 9528, New York, N.Y. 10048
Hi-Test Laboratories, Inc., P.O. Box 226, Buckingham C.H., VA 23921
Hoffman Maritime Consultants Inc., P.O. Box 186, Glen Head, NY 11545
Intramarine, Inc., P.O. Box 53043, Jacksonville, FL 32201
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
Capt. Ernest James, 2849 Beavercrest Dr., Lorain, OH 44053

Jantzen Engineering Co., 6655-H Amberton Drive, Baltimore, Md. 21227
James S. Krogen & Co., Inc., 3333 Rice St., Miami, Fla. 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, N.Y. 10048
MacLear & Harris, Inc., 28 West 44 Street, New York, N.Y. 10036
Mampaey Marine Engineering B.V., P.O. Box 667, 3300 AR Dordrecht, Holland
Fendall Marbury, 1933 Lincoln Drive, Annapolis, MD 21401
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 401 Brood Hollow Road, Rte. 110, Melville, N.Y. 11746
Marine Power Associates, 447 Mission Blvd., Suite 235, San Diego, CA 92109
Marine Technical Associates, Inc., 95 River Rd., Hoboken, NJ 07030
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape Inc., P.O. Box 2366, Littleton, MA 01460
R. Carter Morrell, 715 S. Cherokee, Bartlesville, OK 74003
NKF Engineering Assoc., Inc., 8150 Leesburg Pike, Vienna, VA 22202
Nelson & Associates, Inc., 1405 N.W. 167th Street, 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 International Engineering Corporation, 3019 Mercedes Blvd., New Orleans, La. 70114
Offshore Power Systems, 8000 Arlington Expressway, Jacksonville, FL 32211
PRC Guralnick, 5252 Balboa Ave., San Diego, CA 92117
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 1380 S.W. 57th Avenue, Fort Lauderdale, FL 33317
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Florida 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 Engine Systems, 36 Main Street, Essex, CT 06426
Seaworthy Engine Systems, 17 Battery Place, New York, NY 10004
George G. Sharp, Inc., 100 Church St., New York, N.Y. 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. Toubler Inc., 8 Columbia St., Milford, Del. 19963
Timsco, 622 Azalea Road, Mobile, AL 36609
Trocor-Hydronautics, Inc., 7210 Pindell School Rd., Laurel, MD 20707
Uhlig & Associates, Inc., 8295 SW 188th St., Miami, FL 33157
VeVeY Engineering Works Ltd. U.S. Rep: Carl G. Brimmekamp & Co., Inc., 102 Hamilton Ave., Stamford, CT 06902
Thomas B. Wilson, Associates, 1258 North Avalon Blvd., Wilmington, CA 90744
Yacht Design Institute, 9 Main St., Blue Hill, ME 04614

NAVIGATION & COMMUNICATIONS EQUIPMENT

Alden Electronics, 1145 Washington St., Westborough, MA 01581
American Hydromath Co., Buckwheat Bridge Rd., Germantown, N.Y. 12526
Anschutz & Co. GmbH, Postfach 6040, D-2300 Kiel 14, West Germany
Atkinson Dynamics, Section 6, 10 West Orange Ave., South San Francisco, CA 94080
CMC Communications Inc., 5479 Jetport Industrial Blvd., Tampa, FL 33614
Cybernet International, Inc., 7 Powder Horn Dr., Warren, NJ 07060
A/S Elektrisk Bureau, P.O. Box 98, N-1360 Nesbru, Norway
Electro-Nav Inc., 840 Bond Street, Elizabeth, NJ 07201
EPSCO Marine, 550 Wholesalers Parkway, Harahan, LA 70123
Fleet Marine, 1820 N.E. 146th Street, North Miami, FL 33181
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Harris Communications (RF Communications), 1680 University Avenue, Rochester, NY 14610
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07631
Japan Radio Co., Ltd., Akasaka Twin Tower (Main), 17-22 Akasaka 2-chome, Minato-ku, Tokyo 107, Japan
King Radio Corporation, 400 North Rodgers Rd., Olathe, KS 66062
Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
Kongsberg Vapenfabrikk, Norcontrol Division, P.O. Box 145, Horten 3191, Norway
Krupp Atlas-Elektronik, 1453 Pinewood St., Rahway, NJ 07065
Lorain Electronics Corp., 2307 Leavitt Rd., Lorain, OH 44052
Magnavox Navigation Systems, 2829 Maricopa Street, Torrance, CA 90503
Nav-Com, Inc., 9 Brandywine Drive, Deer Park, NY 11729
Navidyne Corp., 11824 Fishing Point Drive, Newport News, VA 23606
Perko Inc. (Lights), P.O. Box 6400D, Miami, FL 33164
Racal-Decca Marine, Inc., 4200 23rd Avenue West, Seattle, WA 98199
Radar Devices, Inc., 2955 Merced Street, San Leandro, CA 94577
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033
Raytheon Marine Co., 676 Island Pond Road, Manchester, N.H. 03103
Raytheon Ocean Systems Company, Westminster Park, Risho Avenue, East Providence, RI 02914
Raytheon Service Co., 103 Roesler Rd., Glen Burnie, MD 21061
Rivertronics, P.O. Box 247, Godfrey, IL 62035
Robertson Auto Pilot, 400 Oser Ave., Hauppauge, NY 11738
Selesmar S.p.A., Casella Postale 9, 50020 Montagnana Val Di Pesa, Firenze, Italy
Servo Corporation of America, 111 New South Road, Hicksville, NY 11802
Simrad, Inc., 2215 NW Market St., Seattle, WA 98107
Sperry Corporation, Great Neck, NY 11020
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Texas Instruments, Inc., P.O. Box 405, 3438, Lewisville, TX 75067

OILS—Marine—Additives

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
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Texaco, Inc. (International Marine), 135 East 42nd St., N.Y., N.Y. 10017

OIL/WATER SEPARATORS

Alfa Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Biospherics Incorporated, 5001 Forbes Blvd., Lanham, MD 20801
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
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Microphor, Inc., P.O. Box 490, Willits, CA 95490
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
National Fluid Separators, Inc., 1239 Hanley Industrial Court, St. Louis, MO 63144
Phoenix Oil Refiner Co., Inc., 330 Hill Ave., Nashville, TN 37210

PAINTS—COATINGS—CORROSION CONTROL

American Abrasive Metals, 460 Coit Street, Irvington, NJ 07111
Ameron, 1967 Burgess Circle, Placentia, CA 92670
Argo Marine, 140 Franklin St., New York, NY 10013
Bareco, 6910 East 14th St., Tulsa, OK 74112
CLEMCO, P.O. Box 7680, San Francisco, CA 94120
"CONSOL" manufactured by Contact Paint & Chemical Co. Inc., 200 S. Franklintown Rd., Baltimore, MD 21223
Devoe Marine Coatings Co., P.O. Box 7600, Louisville, KY 40207
E.I. Dupont De Nemours & Co., Inc., Nemours Bldg. Rm. N-2504-2, Wilmington, DE 19898
Esgard, Box 2698, Lafayette, LA 70502
Eureka Chemical Company, 234 Lawrence Avenue, So. San Francisco, CA 94080
Grow Group, Inc., 200 Park Ave., New York, NY 10017
Hempel Marine Paints, Inc., 65 Broadway, New York, NY 10006, 2425 Fountainview, Suite 340, Houston, TX 77057, P.O. Box 10265, New Orleans, LA 70181
International Paint Company, Inc., 2270 Morris Avenue, Union, NJ 07083
Jaegle Paint Co., Inc., 1912 Darby Rd., Havertown, PA 19083
Jotun-Baltimore Copper Paint Co., 840 Key Highway, Baltimore, MD 21230
Magnus Maritec International Inc., 150 Roosevelt PL, P.O. Box 150, Palisades Park, NJ 07650
Edison, N.J. 08817
Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Products Research & Chemical Corp., 5454 San Fernando Rd., Glendale, CA 91203
Salwico Glossflake, Inc., 5 Marine View Plaza, Hoboken, NJ 07030
Seaguard, 4030 Seaguard Ave., Portsmouth, VA 23705
Selby, Battersby & Company, 5220 Whiby Avenue, Philadelphia, PA 19143
SermeTel, Inc., 4401 SermeTel Dr., Moss Point, MS 39563

PETROLEUM SUPPLIES

Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002

PIER REPAIRS

Acquatic Marine Systems, Inc., P.O. Box 326, Williamsville, NY 14221

PIPE-HOSE—Cargo Transfer, Clamps, Couplings, Coatings

Cajon Company, 9760 Shepard Rd., Macedonia, OH 44056
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
Crawford Fitting Company, 29500 Solon Rd., Solon, OH 44139
Hydro-Craft, Inc., 1821 Rochester Industrial Dr., Rochester, MI 48063
Knights Piping Inc., 5309 Industrial Rd., Pascagoula, MS 39567
Kubota Ltd., 2-47, Shikit Suhigashi 1-Chome, Naniwa-Ku, Osaka 556-91, Japan
Metropolitan Plumbing Supply Corp., 5000 Second St., Long Island City, NY 11101
Penco Division/Hudson Engineering Co., P.O. Box 68, Bayonne, NJ 07002
Selkirk Metalbestos, Box 19000, Greensboro, NC 27419
Stauff Corporation, 21-31 Industrial Park, Waldwick, NJ 07463

PLASTICS—Marine Applications

Hubevo Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231

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

American Lohmann Corp., 1415 Chestnut Ave., Hillside, NJ 07205
Aquamaster, 4125 9th Ave., Seattle, WA 98107
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 1–10 Service Rd., Kenner, LA 70062
Bird Johnson Company, 110 Norfolk St., Walpole, Mass. 02081
Bombardier, 1051 Dickson, Montreal, Quebec, Canada H1N 2H7
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, Connecticut 06095
Daihatsu Diesel (USA) Inc., 1211 Ave. of the Americas, New York, NY 10036
Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Diesel Marine International, Ltd., c/o NORSHIPCO, P.O. Box 2100, Norfolk, VA 23501
Elliott Company, 1809 Sheridan Ave., Springfield, OH 45505
General Electric Co., Diesel Power Products, 2901 E. Lake Rd., Erie, PA 16531
General Motors, Electro-Motive Division, LaGrange, IL 60525
George Engine Company, Inc., Lafayette, LA
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Harbormaster, 36 Hancock St., Quincy, MA 02171
Krupp Mak Diesels, Inc., 4329-33 Di Paolo Center, Glenview, IL 60025
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
Mapeco Products, Inc., 20 Vesey St., New York, NY 10007
Michigan Wheel, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507
National Marine Service Louisiana, Inc., 222 Bayou Rd., Belle Chasse, LA 70037
Omnithruster Inc., 9515 Sorensen Ave., Santa Fe Springs, CA 90670
Penske GM Power, Inc., 600 Parsippany Road, Parsippany, NJ 07054
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
Karl Senner, Inc., P.O. Box 10055, New Orleans, LA 70181
Skinner Engine Company, P.O. Box 1149, Erie, PA 16512
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Transamerica DeLaval Inc., Engine & Compressor Div., 550 85th Ave., Oakland, CA 94621
Transamerica Delaval, Inc., Turbine & Compressor Div., P.O. Box 8788, Trenton, N.J. 08650
Turbine Specialties, Inc., P.O. Box 207, West State Street Road, Salina, KS 67401
Turbine Specialties/Gulf Coast, Inc., 1900 Industrial Blvd., Harvey, LA 70058
Voith Schneider America, 159 Great Neck Rd., .Ste 200, Great Neck, NY 11021
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
Welco Industries, Inc., 9027 Shell Rd., Cincinnati, OH 45236
ZF of North America, Inc., 3225 Commercial Avenue, Northbrook, IL 60062
ZF of North America, Inc. (Motive Power Corporation, P.O. Box 365, Mineola, NY 11501)

PUMPS—Repairs—Drives

Argo Marine, 140 Franklin St., New York, NY 10013
Jim's Pump Repair, 48-55 36th St., Long Island City, NY 11101
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Penco Division/Hudson Engineering Co., P.O. Box 68, Bayonne, NJ 07002
Sims Pump Valve Co., Inc., 1314 Park Ave., Hoboken, NJ 07030
Transamerica Delaval, IMO Pump Division, 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, N.Y. 11231
Port Refrigeration Div., 157 Perry St., New York, NY 10014

ROLLING SYSTEMS

Hilman, Inc., 2604 Atlantic Ave., Wall (Belmar), NJ 07719

ROPE—Manila—Nylon—Hawsers—Fibers

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
Norton Chemplast, 309-150 Dey Rd., Wayne, NJ 07470
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
Tubbs Cordage Company, P.O. Box 709, Orange, CA 92666
Wall Industries, Inc., P.O. Box 560, Elkin, NC 28621

RUDDER ANGLE INDICATORS—STEERING

Hy-Drive America Corp., 3629 Vernon Blvd., Long Island City, NY 11106
Marine Drive Systems, 519 Raritan Center, Edison, NJ 08817
Robertson, 135 Fort Lee Rd., Leonia, NJ 07605

SAFETY EQUIPMENT

Elkhart Brass Manufacturing Co., Inc., P.O. Box 1127, Elkhart, IN 46515
Wormald Fire Systems, One Stanton St., Marinette, WI 54143

SANITATION DEVICES—Pollution Control

Argo Marine, 140 Franklin St., New York, NY 10013
Envirovoc Inc., 1260 Turret Dr., Rockford, IL 61111
Marine Moisture Control Co., Inc., 60 Inip Dr., Inwood, L.I., N.Y. 11696
National Sanitation Foundation, P.O. Box 1468, Ann Arbor, MI 48105

SCAFFOLDING EQUIPMENT—Work Platforms

McCausey Lumber Co., 7751 Lyndon, Detroit, MI 48238
Patent Scaffolding Co., One Bridge Plaza, Fort Lee, NJ 07024
Trus-Joist Corp., P.O. Box 60 Boise, ID 83704

SHAFT SEALS, REVOLUTION INDICATOR EQUIPMENT

Bird-Johnson Co., 100 Norfolk St., Walpole, MA 02081
Crane Packing Company, 435 Regina Dr., Clarksburg, MD 20734
EG&G Sealol, Engineered Products Div., Marine Products Group, Warwick, RI 02888
Penco Division/Hudson Engineering Co., P.O. Box 68, Bayonne, NJ 07002

SHIPBREAKING—Salvage

The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
Fred Devine Diving & Salvage, Inc., 6211 N. Ensign, Swan Island, Portland, OR 97217
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

SHIPBUILDING EQUIPMENT

Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, FL 33156
Total Transportation System Inc., 813 Forest Dr., Newport News, VA 32606
Total Transportation Systems (International) A/S, Bjornegarden, P.O. Box 28, N5201, Oslo, Norway

SHIPBUILDING STEEL

Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
Tiline, P.O. Box 729, Albany OR 97321
Welded Beam Company, P.O. Box 280, Perry OH 44081

SHIPBUILDING—Repairs, Maintenance, Drydacking

Alabama Maritime Corp., P.O. Box 3026, Mobile, AL 36652
Amsterdam Drydock Company, Post Box 3006, 1003 AA, Amsterdam, Holland
Asmar Shipyards Co., Astilleros y Maestranzs de la Armada, Prat 856, Piso 14, Casilla 150-V, Valpariso, Chile, S.A.
Astilleros Balboa, S.A., c/o Jackson Marine Corp., 17 Battery Place, New York, NY 10004
Ateliers et Chontiers de Bretagne—ACB, 44040 Nantes Cedex, France
Atlantic Dry Dock, P.O. Box 276, Ft. George Island, Jacksonville, FL 32226
Atlantic Marine Inc., P.O. Box 138, Ft. George Island, Jacksonville, FL 32226
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bath Iron Works Corp., 700 Washington St., Bath, ME 04530
Bay Shipbuilding Corp., 605 North 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 Company, 55 Morris Avenue, Springfield, NJ 07081
Burmeister & Wain Skibsvaerft A/S, P.O. Box 2122, Refshaleoen-1015 Copenhagen K-Denmark
Burrard Yarrows Corporation, P.O. Box 86099, North Vancouver, B.C., Canada
Caneco Shipyard, Rua Carlos Seidl, 714, Caju, 20.931, Rio de Janeiro, RJ, Brazil
Cantieri Navali Riuniti, Via Cipro, 11, 16100 Genova, Italy
Carrington Slipways Pty. Ltd., Old Punt Rd., Tomago NSW Australia 2322
China Shipbuilding Corp., 3 Chung Kang Rd., Hsia Kang, Kaohsiung, Taiwan, Republic of China
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock Company Inc., 26 Broadway, Suite 741, New York, NY 10004
Daewoo International (America) Corp., 437 Madison Ave., New York, NY 10022
Daewoo Shipbuilding & Heavy Machinery Ltd., Ayangri, Changsung-PO, Koje-Kun, Kyungnam, Korea
Dorbyl Ltd., Military Road, 1 Industrial Sites, West Bank, 5201 East London, Republic of South Africa
Dravo Marine Equipment Company, Neville Island, Pittsburgh, PA 15225
Eastern Marine, Inc., P.O. Box 1009, Panama City, FL 32401
FMC Corp., Marine & Rail Equipment Div., 4700 N.W. Front Ave., Portland, Oregon 97208
Far East Levingston Shipbuilding Ltd., 31 Shipyard Rd., Jurong Town, Singapore 2262
Genstar Marine, 10 Pemberton Ave., No. Vancouver, B.C., Canada V7P 2R1
Gladding-Hearn Shipbuilding Corp., 1 Riverside Ave., Somerset, MA 02725
HBC Barge, Inc., Grant Building, Pittsburgh, PA 15219
Halter Marine, Inc., P.O. Box 29266, New Orleans, LA 70189
Hoboken Shipyards, Inc., 1301 Hudson St., Hoboken, NJ 07030
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
I.N.M.A. S.p.A., 19100 La Spezla, v. le S. Bartolomeo 362, Italy
Jakobson Shipyard Inc., P.O. Box 329, Oyster Bay, NY 11771
Jeffboat, Inc., Jeffersonville, Ind. 47130
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
Leevac Corporation, P.O. Box 2607, Morgan City, LA 70381
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany
McDermott, Incorporated, 1010 Common Street, New Orleans, LA 77227
Main Iron Works, Inc. P.O. Box 1918, Houma, LA 70361
Marinette Marine Corporation, Marinette, WI 54143
Marystown Shipyard Limited, P.O. Box 262, Marystown, Newfoundland, Canada AOE 2MO
Jos. L. Meyer GmbH & Co., P.O. Box 2990 Papenburg 1, West Germany
Misener Industries, Inc., 5353 Tyson Avenue, P.O. Box 13625, Tampa, Fla. 33681
Mitsubishi Heavy Industries, Ltd., 5-1, Marunochi 2-chome, Chiyoda-ku, Tokyo, 100 Japan
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
Moran Shipping Agencies, 10 Jefferson Blvd., Warwick, RI 02888
Moss Point Marine Inc., P.O. Box 1310, Escatawpa, MS 39552
Nashville Bridge Company, P.O. Box 239, Nashville, TN 37202
National Marine Service (Shipyard Division), P.O. Box 38, Hartford, IL 62048
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newport News Shipbuilding & Dry Dock Co., 4101 Washington Ave., Newport News, Va. 23607
North Florida Shipyards, P.O. Box 3863, Jacksonville, FL 32206
O.A.R.N. (Officine Allestimento-Riprazioni Navi), P.O. Box 1395, Genoa, Italy 16100
Overseas Shipyards, Inc., 21 West St., New York, NY 10006
Patti Industries Inc., South B St., Pensacola, FL 32573
Promet (PTE) Ltd., 27 Pandam Rd., Jurong Industrial Estate, Singapore 22
Promet Marine Services Corp., 242 Allens Ave., Providence, RI 02906
Puerto Rico Drydock & Marine Terminals, Inc., P.O. Box 2209, San Juan, Puerto Rico 00903
Rauma-Repola, 26100 Rauma 10, Finland
Samsung Shipbuilding & Heavy Industries Co., Ltd., Samsung Main Bldg. 250, 2Ka, Taepyong-ro, Chung-ku, Seoul, Korea
St. Louis Ship, 611 East Marceau St., St. Louis, MO 63111
Savannah Shipyard Co., P.O. Box 787, Savannah, GA 31402
Schiess Defries, Postfach 111146, Schiess-Str. 61, D-4000 Dusseldorf 11, West Germany
Service Machine Group, Inc., P.O. Box 2664, Morgon City, LA 70381
Southbay Boat Inc., P.O. Box 13308, San Diego, CA 92113
Southern Oregon Marine Engineering and Construction, P.O. Box 1220, Coos Bay, OR 97420
Southwest Marine, Inc., P.O. Box 13308, San Diego, Ca 92113
Swiftships Inc., P.O. Box 1908, Morgan City, LA 70380
Thomas Marine, 37 Bransford St., Patchogue, NY 11772
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Tracor Marine, P.O. Box 13107, Port Everglades, Fla. 33316
Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087

BUYERS DIRECTORY

(continued)

Verolme Estaleiros Reunidos Do Brasil S.A., Rua Buenos Aires, 68, Rio de Janeiro—RJ—Brazil
Vickers Cockatoo Dockyard Pty. Ltd., P.O. Box 162 Milsons Point, N.S.W. 2061, Australia
Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201

SHIPPING—PACKING
Pilotage Consultants, Inc., P.O. Box 2046, New Hyde Pork, NY 11040

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

SMOKE INDICATORS
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928

STUFFING BOXES
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Smith-Meeker Engineering Co., 157 Chambers Street, New York, NY 10007

SURVEYORS AND CONSULTANTS
Francis B. Crocco, Inc., P.O. Box 1411, San Juan, Puerto Rico 00903
Frank Jeffrey & Assoc., 5201 Westbank Exp., Suite 206, Morrero, 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
Penco Division/Hudson Engineering Co., P.O. Box 68, Bayonne, NJ 07002

TANK LEVELING INDICATORS
ARMTEC Industries, Inc., Manchester, NJ 03103
Kockumation AB, Box 1044, S-212 10 Malmo, Sweden
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
Norcontrol, 135 Fort Lee Rd., Leonia, NJ 07605
Solwico Inc., 5 Marine View Plaza, Hoboken, NJ 07030
Transamerica Delovol, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
Atlantic Towing Ltd., 300 Union Pl., St. John, N.B., Canada E2L 1B6
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Bulkfleet Marine Corporation, 1800 West Loop So., Houston TX 77027
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, 21 West Main St., Oyster Bay, N.Y. 11771
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
International Transport Contractors Holland B.V., 5 Kenaupark, P.O. Box 21, Haarlem, Holland
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Midland Affiliated Co., 580 Walnut St., Cincinnati, OH 45201
Moron Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
National Marine Service, Transport Div., 1750 Brentwood Blvd., St. Louis, MO 63144
Suderman & Young Co., Inc., 918 World Trade Bldg., Houston, Texas 77002
Turecamo Coastal & Harbor Towing Corp., One Edgewater St., Clifton, Staten Island, N.Y. 10305

VALVES AND FITTINGS
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
Clow Corporation, 1375 Magnolia Ave., Corona, CA 91720
The Crosby Group, Inc., P.O. Box 3128, Tulsa, OK 74101
Dover Corporation, Norris Division, P.O. Box 1739, Tulso, OK 74101
Hoyward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Jamesbury Corp., 640 Lincoln Street, Worcester, MA 01605
Marine Moisture Control Co., 60 Inip Dr., Inwood, N.Y. 11696
Metropolitan Plumbing Supply Corp., 50-09 Second Street, Long Island City, NY 11101
Newmans Inc., 9 Joanna Court, East Brunswick, NJ 08816
Pittsburgh Brass Manufacturing, Sandy Hill Rd., R.D. 6 Box 387-A, Irwin, PA 15642
Stacev Fetterolf Corp., P.O. Box 103, Skippack, PA 19474
Stockham Valves & Fittings, Box 10326, Birmingham, AL 35202
Tate Temco, Inc., 1941 Lansdowne Road, Baltimore, MD 21227
Union Flonetics, P.O. Box 459, Clinton, PA 15026
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928
Waukesha Bearings Corp., 405 Commerce St., P.O. Box 798, Waukesha, WI 53186
Westran Corporation, Valve Components Group, 4025 Rememberonce Rd, N.W., Grand Rapids, MI 49504
William E. Williams Valve Corporation, 38-52 Review Avenue, Long Island City, NY 11101
Winel, Inc., 34655 Mills Rood, North Ridgeville, OH 44039
Zidell Explorations, Inc., (Valve Division), 3121 S.W. Moody Avenue, Portland, OR 97201

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
Bull & Roberts, Inc., 785 Central Ave., Murray Hill, NJ 07974
Drew Chemical Corporation, One Drew Chemical Plaza, Boonton, NJ 07005
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Marine Moisture Control, 60 Inip Dr., Inwood, NY 11696
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

WELDING
CRC Automatic Welding, P.O. Box 3227, Houston, TX 77253-3227
Metallizing Co. of America, Inc., 321 So. Hamilton, Sullivan, IL 61951
Oerlikon Welding Industries, Inc., P.O. Box 40964, Houston, TX 77240

WINCHES AND FAIRLEADS
Braden Winch Co., 800 East Dallas, Broken Arrow, OK 74012
CONMACO, Inc., 820 Kansas Ave., P.O. Box 5097, Kansas City, KS 66119
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., P.O. Box 4454, W. Biloxi, MS 39531
Reel-O-Matic Systems, Inc., 418 Hellam Street, Wrightsville, PA 17368
Smith Berger Marine Inc., 516 So. Chicago St., Seattle, WA 98108
Stanspec Corp., 13600 Deise Ave., Cleveland OH 44110
Superior-Lidgerwood-Mundy Corp., 1101 John Avenue, Superior, WI 54880

WINDOWS
Kearfott Marine Products, A Singer Co., 550 South Fulton Avenue, Mt. Vernon, N.Y. 10550

WIRE AND CABLE
Anaconda Ericsson Inc., Continental Wire and Cable, P.O. Box 1863, York, PA 17405
Anixter Bros., Inc., 4711 Golf Road, One Concourse Plaza, Skokie, Illinois 60076
Atlantic Cordage Corp., 60 Grant Ave., Carteret, NJ 07008
Delco Wire & Cable, Inc., 257 Rittenhouse Circle, Keystone Industrial Park, Bristol, PA 19007
Seacoast Electric Supply Corp., 225 Passaic St., Passaic, NJ 07055
Seacoast Electric Supply Corp., 1505 Oliver St., Houston, TX 77007

WIRE ROPE—Slings
AISCO, 60 Grant Ave., Carteret, NJ 07008
Atlantic Cordage Corp., 60 Grant Ave., Carteret, NJ 07008
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
A.L. Don Company, Foot of Dock Street, Matawan, NJ 07747
I & I Sling Company, 2626 Market Street, Dept. D, Aston, PA 19014

ZINC
The Platt Bros. & Co., Box 1030, Waterbury, CT 06721
Smith & McCroken, 153 Franklin St., New York, N.Y. 10013

Scholarship For Panamanian Students At Kings Point Funded by Justin Bonanno

Capt. **Justin Bonanno,** chairman of the Board of Local Inspectors of the Panama Canal Commission, has established a scholarship fund at the U.S. Merchant Marine Academy to benefit Panamanian students enrolled there.

The scholarship was established in memory of his late wife, **Jeanne**. It consists of a $500 stipend awarded annually to an Academy freshman, or plebe, from the Republic of Panama who needs financial assistance and has demonstrated the potential for successful completion of the Academy program. Panamanian and other foreign students may attend the Academy under provisions of the Maritime Education and Training Act of 1980. Eleven Panamanians entered the Academy with the current plebe class last July.

Capt. **Justin Bonanno** (left) of the Panama Canal Commission presents a donation to USMMA Foundation president **Charles Cushing** to establish a scholarship for Panamanian students at the U.S. Merchant Marine Academy. Joining in the ceremony are Academy superintendent Rear Adm. **Thomas A. King** and **Mrs. Margaret Bonanno**.

To be eligible for the scholarship a midshipman must be a citizen of the Republic of Panama, in good academic and regimental standing at the Academy, and must have a legitimate need for financial aid as determined by the Academy's financial aid officer. The Jeanne M. Bonanno Memorial Scholarship will be funded from the annual interest derived from Capt. **Bonanno's** recent $5,000 contribution to the USMMA Foundation, which has been placed in an interest-bearing account.

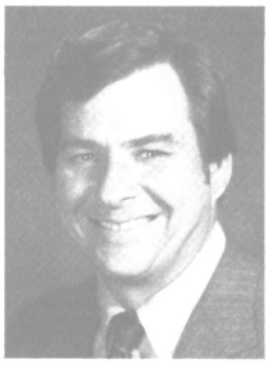
Capt. **Bonanno,** a 1943 Academy graduate, has been active in alumni affairs and has played a leading role in developing a Panamanian student program at the Academy. The scholarship he has established will perpetuate his family's longtime interest in and commitment to the welfare of the Panama Canal and the Republic of Panama.

Wartsila Diesel Relocates Its New York City Quarters

Wartsila Power, Inc. has moved its New York office to larger quarters located at 420 Lexington Avenue, New York, N.Y. 10017; telephone (212) 599-1360, telex 752707 WPI NYK.

The office will continue to be staffed by **Tage Blomberg,** technical sales manager; **Edward A. Waryas,** area sales manager; and **Karl Yannes,** technical project manager. The move reflects Wartsila's continuing long-term commitment to serve the U.S. diesel engine market.

O'Boyle Firm Appointed Exclusive U.S. Agent For Astilleros Espanoles



Richard F. O'Boyle

Don Juan Trujillano, commercial director of Astilleros Espanoles, the largest group of Spanish shipyards comprising major facilities at Cadiz, Santander, Bilbao, Sestao, and elsewhere, recently announced the appointment of Richard F. O'Boyle, Inc. of New York City and Aberdeen, N.J. as its exclusive agent in the United States. **Richard O'Boyle,** president of the firm, stated recently in an interview that it showed Astilleros' commitment to the U.S. market, and pledged to renew the emphasis of the Spanish group on this area.

The Spanish shipyards, especially the facilities near Cadiz, are engaged in major conversion work such as that completed recently on the Sibig Venture, a VLCC converted to a heavy-lift, submersible vessel; large offshore barges for customers such as McDermott; major repairs for international owners; as well as routine drydocking for hundreds of clients around the world. The four drydocks at ASEA-Cadiz can handle ships up to 380 meters long and 66.6 meters wide (1,246.7 by 218.5 feet).

The O'Boyle firm now represents ship repair organizations located in nine countries around the world. Mr. **O'Boyle** has been involved in marine sales work for more than 15 years. He is an engineering graduate of the U.S. Merchant Marine Academy, a member of SNAME, and was recently elected a director of the The Society of Marine Port Engineers New York.

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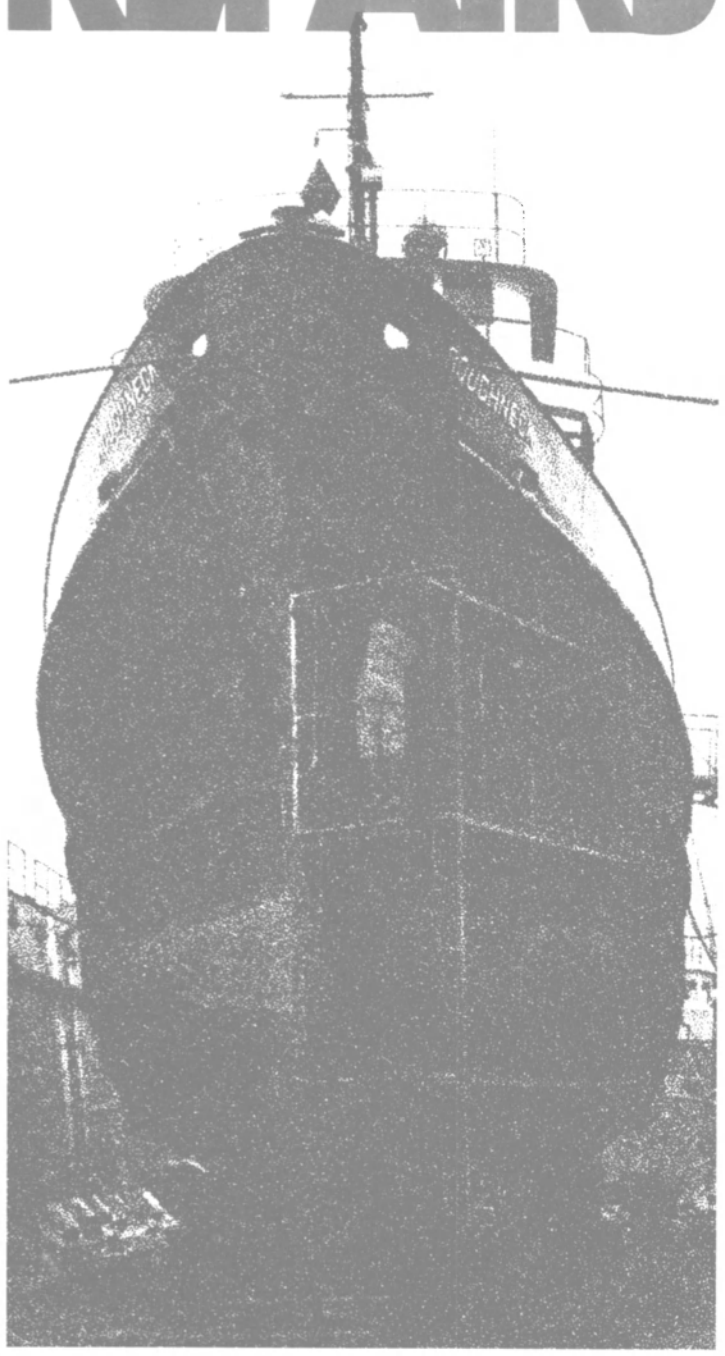
For tug and barge repairs done quickly with precision and efficiency, *SOMAR* is the name to remember.

If you need new construction, contact us. Our marine engineers will work with you to design and build either tugs or barges to your specifications.



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Which heavy fuel purifier belongs on your boat?

Here's some helpful advice about getting the most from your investment in a heavy fuel engine.

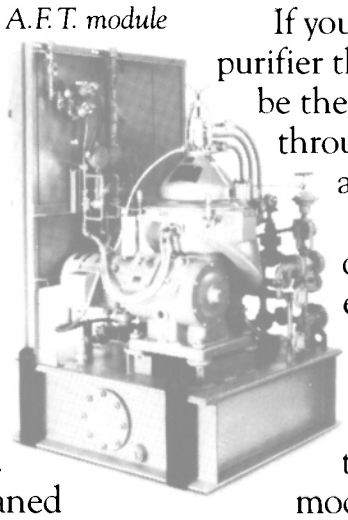
Let's say you've decided to switch to lower cost, heavier fuel.

Now what?

After selecting your engine, you have another key decision to make. Your fuel treatment system.

Which means you should talk to the people at Alfa-Laval. Because from now on, you'll need to purify fuel, on board, with a centrifugal purifier.

A.F.T. module



Not the manual-cleaned centrifuge you're already familiar with. But an Alfa-Laval self-cleaning unit. The purifier choices:

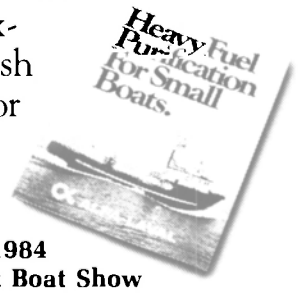
If you need a small heavy fuel purifier with a capacity of up to 320 gph, at 600 SRI, the Alfa-Laval MAPX 204 is your best choice. This unit, as with all self-cleaning centrifuges, automatically ejects sludge every few minutes. There's no need for frequent clean-up.

If you need a larger capacity purifier the MOPX 205 could be the answer. It handles throughputs of up to 575 gph, at 600 SRI.

If you simply want one of the finest purifiers ever made, you'll order an Alfa-Laval WHPX controlled discharge purifier. Unlike conventional self-cleaning models, which allow up to two gallons of fuel to escape with every ejection of sludge, the WHPX eliminates losses of fuel. Result: you can save thousands of dollars each year on fuel and haulage costs. WHPX 505 capacities range to 660 gph, at 600 SRI.

A final important point. Each purifier above can be incorporated into an A.F.T. (Alfa-Laval Fuel Treatment) module, ready for installation. The units are pre-piped and pre-wired, and contain the following components: sludge tank, pumps, controls and complete alarm protection.

To help you decide on the right purifier for your boat, why not do this? Simply call or write Marine Division, Alfa-Laval, Inc., 2115 Linwood Avenue, Fort Lee, NJ 07024. Tel: (201) 592-7800. Alfa-Laval supplies oil purifiers, heat exchangers and fresh water distillers for any size vessel.



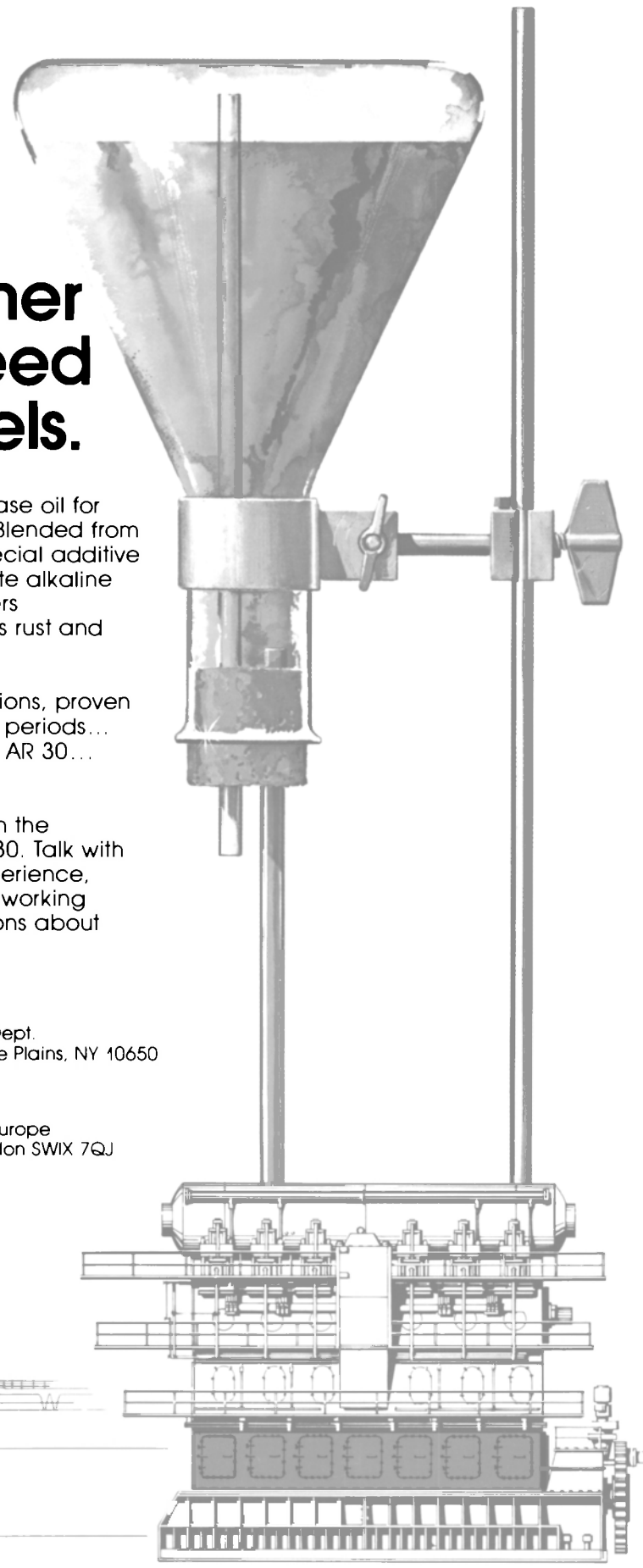
Free Guide.

Booth #1258, The 1984 International Work Boat Show

ALFA-LAVAL

Circle 206 on Reader Service Card

DORO AR 30: The star performer in large low-speed crosshead diesels.



DORO AR 30 is Texaco's premium crankcase oil for service in large low-speed diesel engines. Blended from highly refined solvent neutral oils plus a special additive package, DORO AR 30 provides a moderate alkaline reserve and good water separability. It offers dependable anti-wear properties as well as rust and oxidation inhibition.

Protection under severe operating conditions, proven performance and cost efficiency over long periods... that's what you can depend on with DORO AR 30... available in ports worldwide.

When your ships put out to sea, give them the protection of the star performer, DORO AR 30. Talk with your Texaco Marine Representative. His experience, and Texaco Star marine lubricants, are the working combination to help you make your decisions about the right lubricant for the right purpose.

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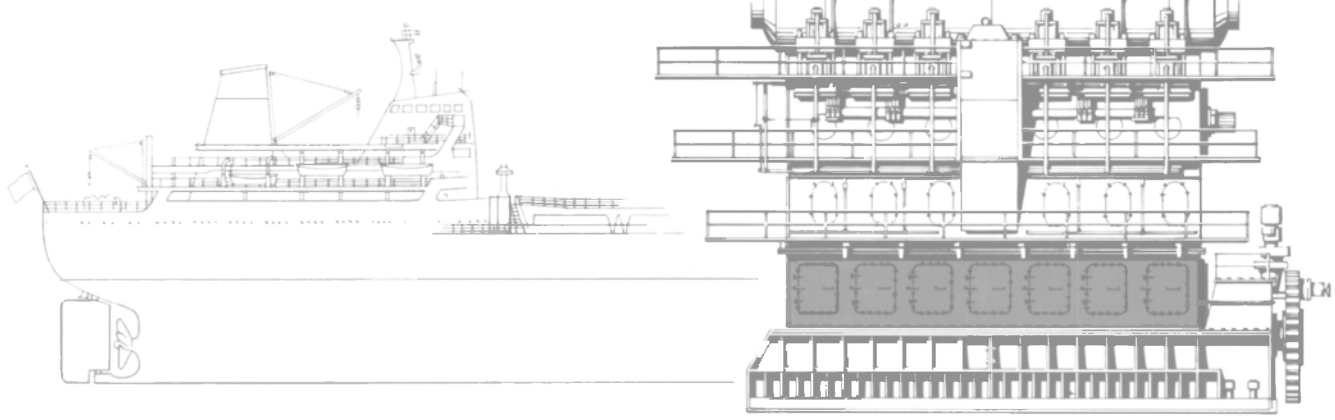

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