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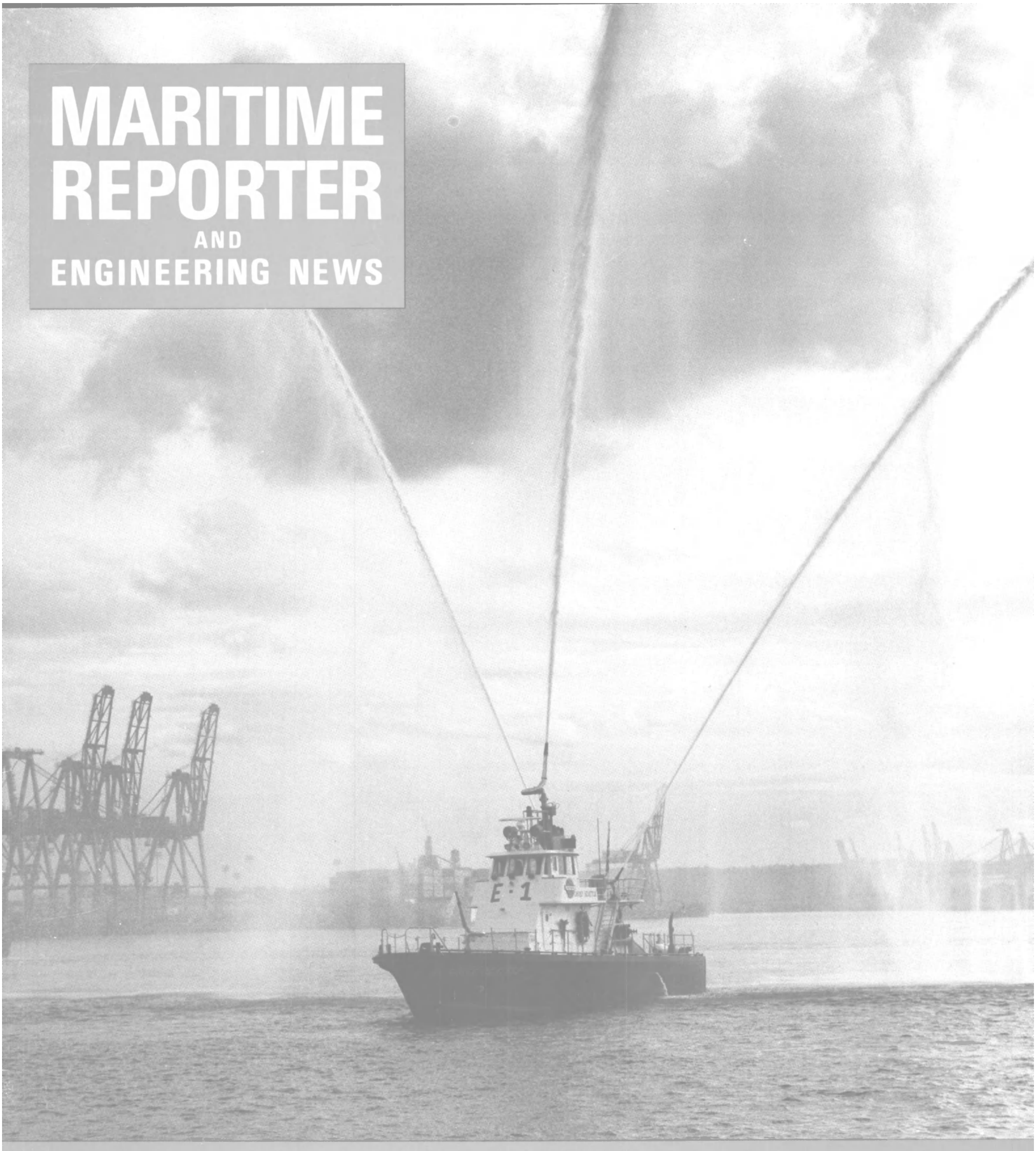


Chief Seattle Built By Nichols Brothers—see page 4

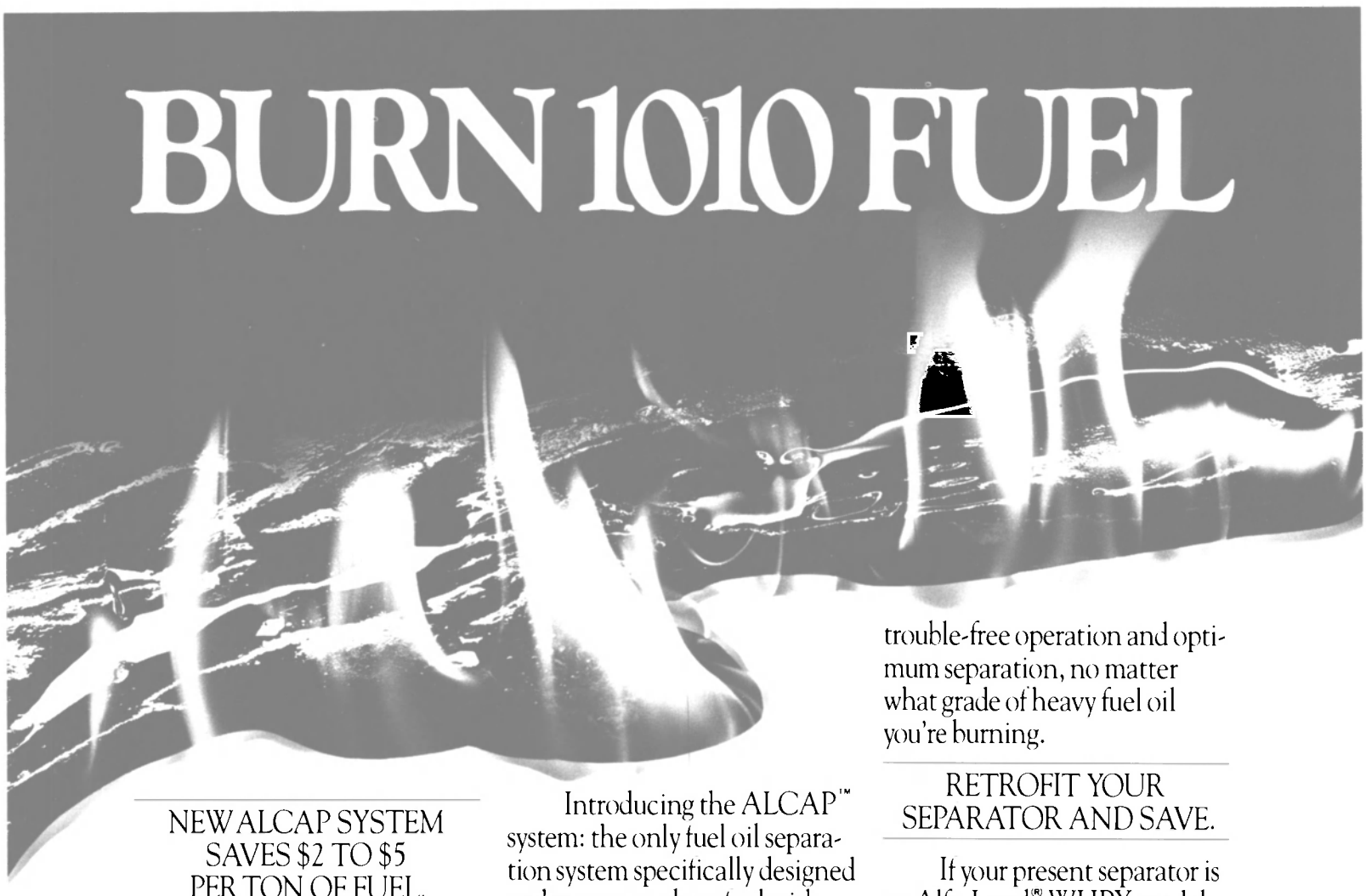
Computerized Ship Management – Review

(SEE PAGE 4)

REDUCING FUEL COSTS

JANUARY 15, 1985

BURN 1010 FUEL



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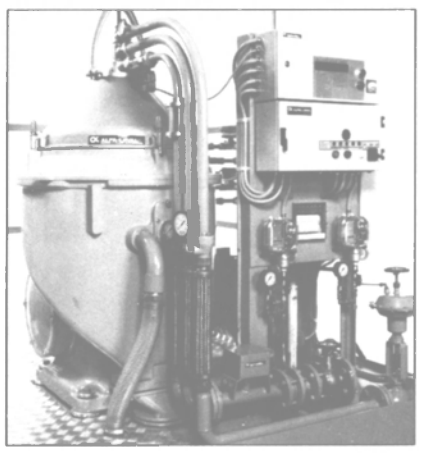

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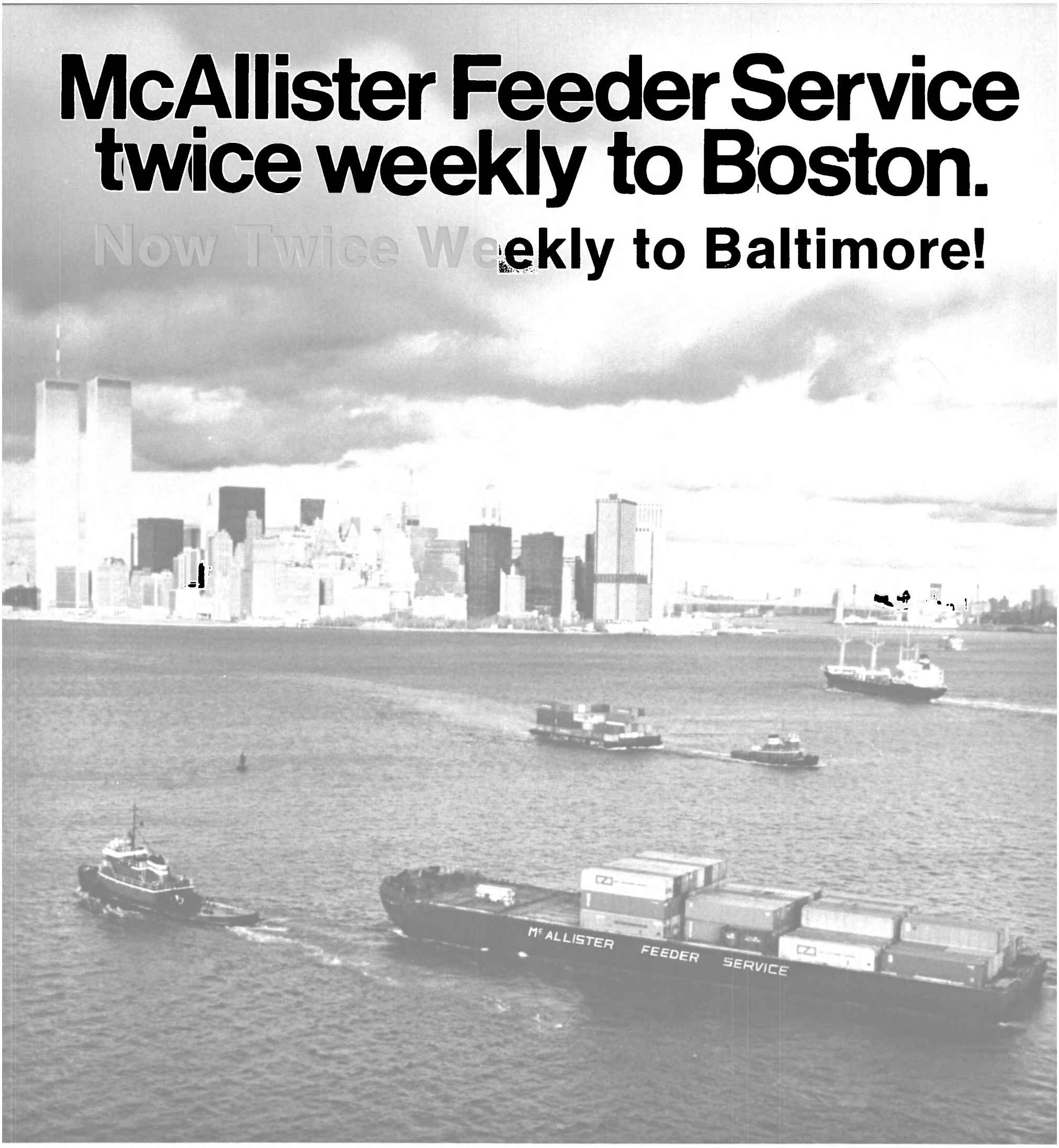

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ON THE COVER

Cover photo: Camera Craft. Seattle, Washington

Nichols Brothers Delivers Chief Seattle
PAGE 10

Computerized Ship Management Systems Review
PAGE 14

Reducing Fuel Costs
PAGE 30

Call For Papers Issued By SNAME New England For Computer Symposium

The New England Section of The Society of Naval Architects and Marine Engineers has issued a call for papers for "Marine Computers '86—A Symposium on Computer Applications in the Marine Industry," to be held April 16-17, 1986, in Boston, Mass. The goal of the symposium is to provide a forum for the presentation of current and future applications of computer hardware and software in the marine industry.

Authors are invited to submit abstracts and tentative outlines of their potential contributions. Deadlines are as follows: Abstract and Tentative Outline (6 copies), April 1, 1985; Tentative Acceptance Notice, May 15, 1985; Manuscript (5 copies), August 1, 1985; and Final Acceptance Notice, December 1, 1985.

The following areas of the marine industry and computer technology are of interest; related topics will also be considered.

Design and Engineering; Offshore Structures; Advanced Marine Vehicles; Planning, Fabrication & Construction; Cargo Handling, Route Planning, Monitoring; Computer Aided Design/Engineering/Manufacturing; Information Systems and Data Base Management; Robotics, Vision Systems; Numerical Control; and Expert Systems, Artificial Intelligence.

Complete information may be had by writing **Michael Triantafyllou**, Technical Chairman, Marine Computers '86, Massachusetts Institute of Technology, Room 5-323, Cambridge, Mass. 02139.

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Couch Named President Of Matson Navigation— Wasacz President Of A&B

John C. Couch

John C. Couch has been appointed president and chief operating officer of Matson Navigation Company, and also has been named executive vice president of Alexander & Baldwin, Inc., Matson's parent company. He had been Matson's executive vice president for the past year.

At the same time, **Michael S. Wasacz**, who had been senior executive vice president of A&B, becomes president and chief operating officer of that company, responsible for all operating and staff organizations of A&B and its subsidiaries.

Mr. **Couch** joined Matson in 1976 and was named a vice president in 1978. He became president of Matson Terminals, Inc. in 1979, and was named a Matson senior vice president before being promoted to executive vice president at the beginning of 1984.

Mr. **Wasacz** started with Matson in 1959. He became a vice president in 1976, senior vice president in 1978, and was named Matson's president and COO in 1981. That same year he was appointed executive vice president of A&B, and in January 1984 was promoted to senior executive vice president.

SecNav Lehman Announces Contract Awards Totaling Almost $2 Billion

Secretary of the Navy **John Lehman** recently announced that the Navy has awarded shipbuilding contracts to six U.S. shipyards totaling $1,958,000,000. The awards encompass 10 ships, including four nuclear attack submarines of the Los Angeles (SSN-688) Class, three Ticonderoga (CG-47) Class guided missile cruisers, two dock landing ships of the Whidbey Island (LSD-41) Class, and the lead ship of the new Cardinal (MSH-1) Class coastal minehunter. Through competitive bidding for the contracts, these ships were awarded at a total savings of $243,000,000 below President **Reagan's** FY-85 budget request.

The six shipbuilders that received contract awards were: Newport News Shipbuilding ($779,400,000); General Dynamics' Electric Boat Division ($282,900,000); Bath Iron Works ($383,600,000); Ingalls Shipbuilding ($238,600,000); Avondale Shipyards ($246,200,000); and Bell Aerospace Textron ($27,300,000).

Secretary **Lehman** said that he is extremely proud of the ability of the U.S. Navy to fulfill the Reagan Administration's objective of a modern, combat-ready 600-ship fleet while, at the same time, introducing to the government procurement process reforms that have achieved savings. The Secretary predicted that continued emphasis on the competition and sound business management will enable the Navy to achieve still more savings in future ship and aircraft procurement.

Western Gear Opens Norfolk Overhaul Center For Marine Equipment

Larry D. Philips, manager of product services for Western Gear Corporation's Western Gear Machinery Company subsidiary, has announced the establishment of an overhaul and repair center in Norfolk for military and commercial marine equipment. The center will specialize in providing factory-quality service for underway replenishment at sea equipment, steering gears, and deck machinery to the U.S. Eastern Seaboard. The company will also offer local onboard marine field support through Western Gear field service representatives stationed at the center.

Louis V. Hose will serve as manager of the Product Service Center, which is located at 3749 Progress Road, Norfolk, VA. 23502; telephone (804) 855-4484.

Hyde Names Two New Vice Presidents

Parker Hay

Kurt Gyllenhaal

Jamie Roehm

Hyde Products, Inc., designers and manufacturers of ship's deck machinery, steering systems, oil spill recovery equipment and other marine and industrial equipment, recently announced the appointment of two new vice presidents at its Cleveland headquarters.

Parker L. Hay has been named vice president, engineering with corporate responsibility for engineering, production and materials control. Mr. **Hay** has been Hyde's chief engineer since 1975 and has been a member of Hyde's engineering team since the company moved to Cleveland from Bath, Maine, in 1969. He has been involved in all aspects of Hyde's marine and industrial businesses and is a member of SNAME and ASTM Committee F-25 on Shipbuilding. Mr. **Hay** is the author of several SNAME technical papers and is currently chairman of the ASTM F-25 Deck Machinery Subcommittee Steering Gear Task Group.

Kurt Gyllenhaal is Hyde's new vice president, marketing with overall responsibility for Hyde's marine marketing, sales and service activities. He was formerly marine sales manager and was responsible for negotiating contracts with the Republic of Korea Navy and several Korean shipyards which have resulted in 19 shipsets of deck machinery and steering system orders being placed with Hyde over the past four years. He was also instrumental in obtaining recent orders for Hyde equipment for current U.S. Navy newbuilding programs.

The new appointments were announced by **Thomas P. Mackey,** Hyde president and CEO, who also announced the promotion of **Ms. Jamie Roehm** to the position of comptroller of the firm and manager of administrative services. She had been manager of the bookkeeping department and has been with Hyde in various accounting capacities since June 1973. In addition to her accounting management duties, **Ms. Roehm** will also be responsible for office, personnel and general administrative services.

Another Fast Delaware Pilots Boat Delivered By Gladding-Hearn Yard

The Delaware Pilots Association of Philadelphia recently took delivery of a new 51-foot, steel-hull pilot boat named the Philadelphia (shown above). Built by Gladding-Hearn Shipbuilding Corporation of Somerset, Mass., and designed by C. Raymond Hunt Associates of Boston, the twin-screw, 18-knot craft is an all-weather boat powered by two GM Detroit Diesel Allison 8V-92NA engines, each rated 350 bhp at 2,100 rpm. These drive two 30/28-inch Columbian propellers via Allison 1.97:1 reverse/reduction gears and Aquamet 17 shafts.

The Philadelphia is a virtual copy of the pilot boat Delaware, built for the Association by Gladding-Hearn in 1979, but the new boat incorporates some minor changes and improvements not found in her sister vessel. These include heated handrails, a second radar, and a slightly altered pilothouse. Aside from these added features, both vessels offer their operators identical performance and amenities.

It was in 1979, in a trend-setting move, that the Delaware Pilots brought their operations ashore. The delivery of the Delaware was an integral part of this innovative change in operations. She gave the pilots their first all-weather, high-speed craft for making the longer runs from shore to the rough waters off the Delaware Capes. Although the Delaware Pilots have four other boats, all built by Gladding-Hearn, they are not as fast as the Delaware and the new Philadelphia. Largely because of the versatility and performance of the Delaware, the move ashore has proved to be an outstanding success for the Delaware Pilots.

As the Delaware Pilots typically have two boats in service at any given time, it is reasonable to assume that these Gladding-Hearn twins will see the lion's share of Delaware Bay piloting service. While the older boats will still be used for their individual specialties, such as in heavy ice, the Philadelphia and the Dela-

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Main engines (2)	Detroit Diesel
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Propellers (2)	Columbian
Propeller shafts (2)	Aquamet
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Controls	Morse
Bilge pump	Jabsco
Wheel	Edson
Searchlight	Perko
Navigation lights	Aqua-Signal
Fending	Johnson Rubber
Muffler	Donaldson
Compass	Ritchie
Air horn	Raritan
Wipers	Cornell Carr
Seating	American Seating
Battery charger	Pro Mariner

ware can be expected to earn the continued popularity and respect of the Delaware Pilots. Now, when one boat is removed from service for maintenance, her dependable twin sister will remain on station to make the temporary loss easier on the pilots.

Hyundai To Build Four Rigs For ODECO At Total Cost Of $260 Million

Hyundai Heavy Industries Company, Ltd. of South Korea and Ocean Drilling & Exploration Company (ODECO) of New Orleans recently announced the signing of a letter of intent for the construction of four Ocean Odyssey Class self-propelled, semisubmersible drilling rigs at a price of approximately $260 million.

Hugh J. Kelly, ODECO president and CEO, and **Y.K. Eum**, executive vice president of Hyundai, said the first unit is scheduled for delivery during the third quarter of 1986.

Design of the four rigs will be patterned after ODECO's Ocean Odyssey, an advanced, super-class semisubmersible that has seen service in the Gulf of Alaska, offshore California, and is presently drilling in the Bering Sea offshore Alaska. The new rigs will be capable of drilling wells to 25,000 feet in water depths to 3,000 feet while moored with an eight-point windlass combination chain and wire mooring system.

To be constructed at the Hyundai shipyard in Ulsan, the new drilling units will be classed by the American Bureau of Shipping for unrestricted worldwide ocean service. The U.S.-flag units will be fully certified by the U.S. Coast Guard.

Moffitt Names Menge As Gulf Coast Representative For Goodrich Bearings

Lucian Q. Moffitt, Inc. of Akron, Ohio, a subsidiary of BFGoodrich, has named J.H. Menge & Company of New Orleans the Gulf Coast manufacturer's representative of BFGoodrich Cutless® brand bearings. The new sales territory covers the Gulf Coast of Texas, Louisiana, Mississippi, Alabama, and Northern Florida.

Moffitt marketing and sales manager **Robert L. Gilson** said, "The addition of J.H. Menge to the distribution network of Lucian Q. Moffitt represents our commitment to increase our direct presence in the marketplace."

Located in New Orleans and Houston, with bearing inventories available in Texas, Louisiana, and soon in Florida, J.H. Menge & Company specializes in the sale and distribution of custom-engineered products for the marine and oil industries. Lucian Q. Moffitt is the marketing arm of BFGoodrich Cutless brand bearings for marine and industrial applications.

For additional information,

Circle 48 on Reader Service Card

Circle 21 on Reader Service Card →

RDI Announces $15-Million Agreement With China For Electronic Shipping Safety Systems

Radar Devices, Inc. (RDI), San Leandro, Calif., recently announced the signing of an agreement valued at $15 million—the largest of its type—with the People's Republic of China for electronic maritime safety equipment.

"The immediate portion of the agreement is for $2.4 million," according to RDI president **Lawrence Anderson.** "In addition, the agreement includes provisions for additional systems, production kits and technical assistance over a five year period," he said.

The contract calls for the sale and assembly of RDI's maritime Satellite Communications System (Satcom I), and Automatic Radar Plotting Aid (ARPA) maritime collision avoidance systems.

The International Maritime Organization (IMO) requires the fitting of ARPAs on all vessels over 15,000 gross tons by September of 1989, representing over 10,000 ARPA installations by that time. RDI, holders of fundamental patents covering ARPA technology, has already installed Chinese-language ARPA Series I systems at the Dalian Marine Institute, one of the leading marine institutes in China.

RDI president **Lawrence Anderson** and Chinese Consulate member **Jinning Zhu** discuss features of "Chinese-speaking" Automatic Radar Plotting Aid (ARPA).

The Satcom I provides full telex and telephone communications to ships at sea via a satellite system accessible almost anywhere on the globe. Other available services include data fascimile, computer-to-computer data transfer, and slow-scan television. The Satcom I allows instant telex and voice communications in complete privacy with quality equal to that of terrestrial-based telephone systems, and is unaffected by any adverse atmospheric conditions.

RDI is one of a handful of companies throughout the world that have been awarded "type approval" for a satellite communications system from INMARSAT, the International Maritime Satellite Communications Organization.

Satellite communications systems are an essential component of the Future Global Maritime Distress and Safety System (FGMDSS), an automated network providing fast response to maritime emergencies, featuring automatic transmission of the location of the ship in distress, with broadcasting of rescue instructions to all other vessels in the area. Mandatory fittings of satellite communications systems to implement the FGMDSS are currently under consideration.

Radar Devices develops, manufactures and markets electronic marine navigational and communications equipment for use in commercial merchant and military vessels and pleasure craft. The equipment is developed under R&D contracts with Maritime Research Group Limited Partnerships.

For free literature describing the full line of RDI equipment,

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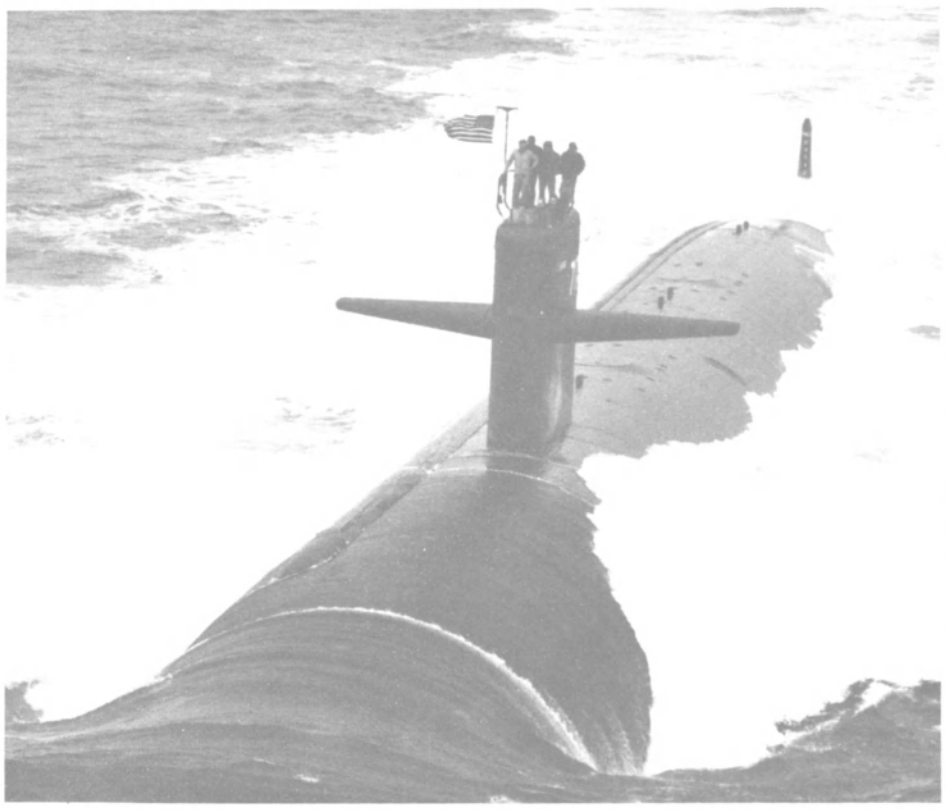

Newport News Shipbuilding Delivers Attack Submarine 'Olympia'

Newport News Shipbuilding in Virginia turned over its 12th Los Angeles Class (SSN-688) attack submarine to the U.S. Navy recently when it delivered the USS Olympia (shown above on sea trials). The new ship is the 36th submarine the Newport News yard has built for the Navy.

Olympia (SSN-717) was commissioned and officially entered the fleet shortly after delivery, during ceremonies at the Norfolk Naval Shipyard. The ship's keel was laid on March 31, 1981, and she was launched April 30, 1983.

The Los Angeles Class subs are 360 feet long, with a beam of 33 feet and submerged displacement of 6,900 tons. They accommodate 12 officers and 115 enlisted men. Newport News Ship currently is building six other attack submarines, along with three Nimitz Class aircraft carriers. One submarine, the Chicago (SSN-721), plus the aircraft carrier Theodore Roosevelt (CVN-71), were launched recently.

A 29,000-employee subsidiary of Tenneco Inc., Newport News Shipbuilding is the country's largest privately owned shipyard. Its 1983 sales totaled $1.6 billion.

Named executives at Hughes companies for current year were (L to R): **Joseph W. Hughes,** vice president of both Hughes Bros., Inc. and James Hughes, Inc.; **Robert J. Hughes Jr.,** president of James Hughes, Inc.; and **William J. Hughes Jr.,** president of Hughes Bros., Inc.

Fifth Generation Of Family Named To Executive Posts At Hughes Companies

At the recent annual director's meeting held in New Brunswick, N.J., **Robert J. Hughes Sr.,** chairman of James Hughes, Inc., and **William J. Hughes Sr.,** chairman of Hughes Bros., Inc., announced new appointments in the family-held marine businesses. The meeting also commemorated the 90th anniversary of the Hughes Barge Line, founded in 1894.

The Hughes roots go back to **Michael Hughes,** a barge builder, who arrived in New York in 1843 and relocated to New Brunswick in 1862. His son, **James Hughes Sr.,** worked in his father's shipyard and in 1894 began to operate barges on the Delaware and Raritan Canal, transporting coal from Pennsylvania to New York. In 1910, with his barge and tug fleet growing, he opened an office in New York City.

His son, **James Hughes Jr.,** expanded the business from canal to coastwise transportation, representing the third generation of the family. Known in marine circles as "The Captain," he led the business until his death in 1949. James Hughes, Inc. was incorporatecd in 1934, and became an ICC-certified water carrier in 1944. His three sons, **Bill, Bob,** and **Jim** (the latter died in 1965), joined the firm in the 1930s. With expanding business they set up the separate corporation of Hughes Bros., Inc. in 1945 to handle chartering and sales activities under the slogan "Clearing House for Marine Difficulties."

The Hughes organization continued to expand, operating and renting their fleet of barges, transporting oversize objects by tug and barge, and providing or selling all types of floating equipment and molded Uniroyal marine fenders through its Sales Department. **Bob Hughes Sr.** is widely known throughout the industry, having formerly served as chairman of The American Waterways Operators, Inc. **Bill Hughes** has long been active in the Moles and the Whitehall Club, of which he served as president.

While remaining as chairmen and chief executive officers of the two family firms, the Hughes brothers have revived a tradition observed for many years of rotating annually the presidency of the corporations. Accordingly, they have named for the current year, fifth-generation family members—**William J. Hughes Jr.** as president of Hughes Bros., Inc.; **Robert J. Hughes Jr.** as president of James Hughes, Inc.; and **Joseph W. Hughes** as vice president of both companies.

Butterworth Announces A New SCAMP Underwater Hull Cleaning Station —Literature Available

Butterworth, Inc., an Exxon affiliate, has announced a new station owned and operated by Seaward Marine Services, Inc. in Baton Rouge, La. to service the U.S. Gulf Coast. This division will be managed by **Cecil Achord**. Mr. **Achord** has 14 years' experience in the Gulf offshore industry with extensive knowledge of underwater husbandry and repair.

The Gulf Coast division of Seaward Marine Services, Inc. will provide the following services:

Butterworth's SCAMP underwater hull cleaning; propeller cleaning and polishing with 3M Scotch-Brite brand marine cleaning discs; underwater hull inspection using ABS approved computerized nondestructive testing equipment and procedures and underwater wet welding per WS D3.8-83.

Butterworth, Inc. has been a manufacturer of top performance marine maintenance systems for 54 years and now has SCAMP service stations in 15 ports worldwide.

A colorful, four-page brochure is available on the SCAMP® underwater hull cleaning machine with before and after photos and chart showing net savings over a 24-month period. For a copy of this detailed brochure,

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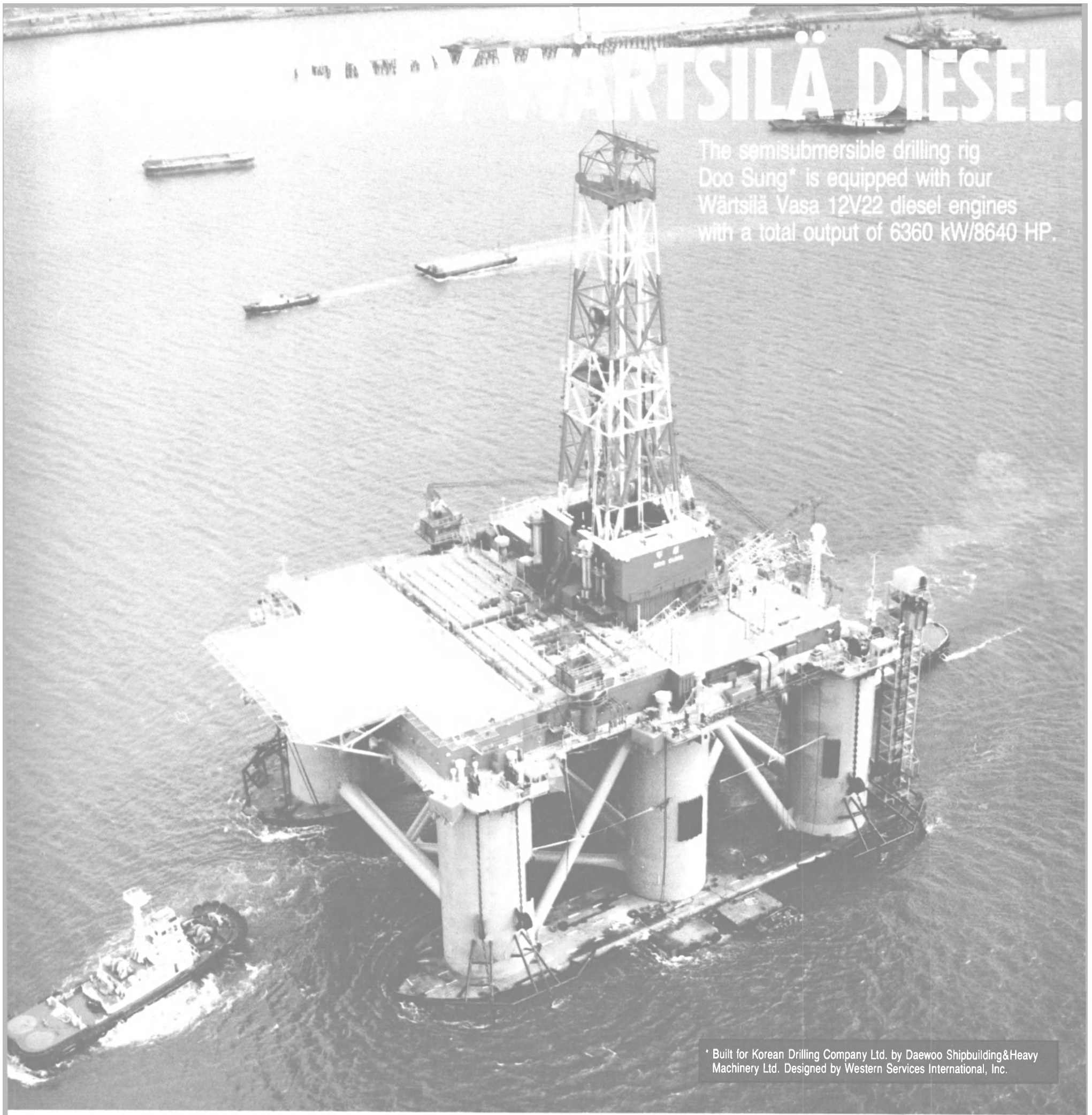

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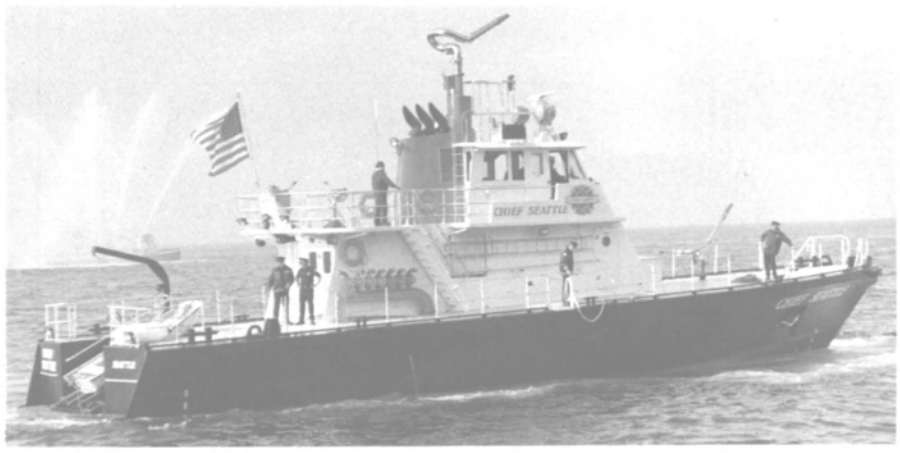

Chief Seattle constructed by Nichols Brothers Boat Builders, Inc.

New Chief Seattle Fireboat Provides High-Speed Response

The Seattle Fire Department in Washington recently completed the training of crews for its new 26-knot fire boat, the Chief Seattle. With three Detroit Diesel 16V92TI engines rated at 1,000 shp at 2,300 rpm, driving both propellers and fire pumps, the boat can reach waterfront fires in a hurry and deliver 7,500 gpm of water.

The Chief Seattle, which was designed by Nickum & Spaulding Associates, Inc., and built by Nichols Brothers Boat Builders, replaces the department's 1909 vintage fireboat, the Duwamish, which will now be retired.

Both the Duwamish and the Alki, built in 1927, will pump more water—the Duwamish 22,800 gpm and the Alki 18,200 gpm. But studies of the fire-fighting needs that preceded the designing of the Chief Seattle revealed that no fire in Seattle in the last 20 years had required more than 7,500 gpm capacity. On the other hand, the fireboat needed to get to fires quickly in the increasingly sprawling port, and to dampen wake while on patrol. These requirements dictated the relatively hefty horsepower and the planing hull of the boat.

Nichols Brothers Boat Builders of Whidbey Island, Wash., delivered the boat to Seattle in October. At the ceremonies at Waterfront Park in Seattle, during which the boat was turned over to the city, project supervisor Capt. **Richard A. Colombi**, said: "Our older fireboats were built primarily to fight fires in the lumber mills and wooden buildings that once ringed the Seattle waterfront. These boats pumped a lot of water but only traveled 12 miles per hour. The Chief Seattle not only can respond speedily to a fire at 30 mph, but can also drop a rescue boat over its stern and pick it up again. It also provides emergency medical treatment as complete as a Medic 1 van."

The new vessel also has a computer that can display information about hydrant locations and other data about waterfront docks. The computer can also report fire-fighting information about each of the Washington State ferries.

The Chief Seattle will be stationed at the city's waterfront Station No. 5 at Alaskan Way and Madison Street.

The vessel has a breadth of 23 feet; length at the waterline of 90 feet; a depth at the main deck of 10 feet 7 inches; and draws 7 feet fully loaded. She displaces 43.1 long tons and carries 1,400 gallons of fuel, 50 gallons of fresh water, and 300 gallons of foam.

Three Worthington 8LR20, 2,500-gpm, 150-psi pumps—powered through a take-off with Systems Engineering clutches by the main engines—provide a total pumping capacity of 7,500 gpm for the four monitors on deck and atop the wheelhouse. All deck and underwharf monitors were provided by Stang Hydronics of Orange, Calif. Two manually controlled 2,000-gpm, 4-inch monitors were installed on the aft bridge deck. The foredeck mounts a 6-inch, 3,400-gpm monitor. An 8-inch, 5,400-gpm "water cannon" atop the wheelhouse is controlled in azimuth and bearing from the wheelhouse. It is mounted on a telescoping tower that can be raised to 45 feet. The foam system was provided by National Foam. A 3-percent solution of Triple F foam can be delivered through the water cannon with a nozzle change.

Stang also provided the 4-inch underwharf monitors mounted port and starboard. Seven-valve hose manifolds manufactured by Duoseal International of Korea are mounted on the main deck port and starboard.

The 16V92TI Detroit Diesel engines, provided by Pacific Diesel Power Company, Portland, power the 42-by 55-inch four-bladed, stainless-steel Coolidge propellers through Twin Disc 3.13:1 MG530 Omega reduction gearing and Aquamet 4⅞-inch shafts. The variable ratio Omegas allow engines to run at a constant rpm to maintain pump speeds, while allowing the control of running or holding speed.

Systems Engineering provided propulsion controls. Two Northern Lights 40-kw M246 generators provide electrical power in the vessel. The hydraulic system is powered by "three-in-one" pumps from Commercial Shearing. Electrohydraulic steering system and controls were designed by Wagner Engineering and provided through W.E. Hough Marine of Seattle.

The electronics suite includes Aiphone push-button internal communications; Furuno radar; Raytheon RAY400 loud hailer, RAY 88 VHF-FM, 50A synthesized VHF-FM, and RAY F720D Fathometer; and Motorola MCX100 UHF. UHF radio is also installed in the aft medical room for communications with doctors and hospitals ashore when needed in medical emergencies.

The vessel has been classed as Maltese Cross A-1 for Harbor Service by the American Bureau of Shipping.

Nickum & Spaudling, designer of the Chief Seattle, is at work on two more fireboats. The Seattle naval architecture and marine engineering firm is designing an 83-foot, 15-knot fireboat for San Diego, Calif. This vessel will deliver 10,000 gpm of water. The firm is also doing a feasibility study of the fireboat needs for the harbors in Honolulu, Hawaii.

M/V CHIEF SEATTLE

Length Overall	96 ft., 6 in.
Length at waterline	90 ft.
Breadth	23 ft.
Draft at DLWL	7 ft.
Displacement	43.1 long tons
Horsepower	3,000 bph
Speed, trial	26 knots
Capacities:	
Fuel Oil	1,400 gallons
Fresh Water	50 gallons
Foam Tanks	300 gallons
Fire Pumping Capacity	7,500 gallons per minute at 150
Owner	City of Seattle Fire Dept.
Builder	Nichols Brothers Boat Builders
Designer	Nickum & Spaulding Assoc. Inc.
Main Engines	(3) Detroit Diesel 16V92TI
Reduction Gears	(3) Twin Disc 3.13:1 MG530 Omega
Power Takeoff Clutch	Systems Engineering
Propellers	Coolidge
Shafts	Aquamet
Propulsion Controls	Systems Engineering
Silencers	Harco/Maxim
Monitoring System	Sea-Land
Fuel Filters	Racor
Engine Room Fire Systems	Walter Kidde, Halon
Auxiliary Generators	Northern Lights from Alaska Diesel Electric (2) John Deere M246 diesels, 40-kw generators
Hydraulic Pumps	Commercial Shearing
Electrical Control Panels	Nichols Brothers
Steering System, Controls	Wagner/ W.E. Hough Marine
Pumps	Cascade Machinery
Rescue Boat	Boston Whaler
Wiring & Light Fixtures	Hardware Specialties
Weather Tight Doors & Windows	Pacific Coast Marine
Life Raft	Fisheries Supply
Anchor Winch	Fisheries Supply
Paint & Coatings	Devoe Paint
Aft Deck Boat Winch	Beebe
Galley Equipment	King
Hatches	Freeman & West Coast
Radar	Furuno
Compass	Danforth
Radio Telephones	Raytheon
UHF	Motorola
Fuel Tank Gauges	Gems
Fathometer	Raytheon
Navigation Light Panel	Hose McCann
Loud Hailer	Raytheon
VHF Radio Telephones	Raytheon
Fire Fighting Equipment	Walter Kidde, Worthington, Systems Engineering Stang, DuoSeal, Farady

Thomas E. Moran Acquires All Of Moran Towing Corporation Stock

Thomas E. Moran, president and chairman of the board of Moran Towing & Transportation Corporation, has announced that he has acquired all of the stock of the company from other family members.

Mr. **Moran** is the fourth generation of his family to head the New York based organization founded in 1860 by his great grandfather, **Michael Moran.** Mr. **Moran** has been a company director since 1954 and joined the firm in 1964 as president. Prior to coming to Moran, he was vice president in charge of operations and chartering at Marine Transport Lines, Inc., a prominent ocean shipping concern.

The Moran company has grown to be a leader in the tug and barge field, having operations in various ports from Maine to Texas. The Moran fleet has 66 tugs and operates primarily in the Atlantic, Gulf and Caribbean.

Mr. **Moran** is joined in the acquisition of the company by his younger brother, **Edmond J. Moran Jr.** and other senior management members.

Title XI Asked To Build $3-Million Barge

American Gulf I, Inc., New Orleans, La., has asked for a Title XI guarantee to aid in financing the construction of a 383-by 68-by 26-foot ocean hopper barge. The barge will operate between the U.S. Gulf Coast and Puerto Rico. Moss Point Shipyards of Moss Point, Miss., is the builder. The vessel is scheduled for delivery next April.

If approved, the Title XI guarantee would cover $2,250,000 or 75 percent of the estimated actual cost of $3 million.

Port Engineers' program chairman **John Antonetz** (center) discusses meeting arrangements with MarineSafety's director **Eugene Guest** (right) and chief engineering instructor **Luciano Germano.**

New York Port Engineers' Society Tours MarineSafety Simulators

A recent monthly meeting of The Society of Marine Port Engineers of New York was held at the facilities of MarineSafety International, located at the LaGuardia Airport Marine Terminal in New York City.

The group toured the four marine simulators at the firm's Training Center. The feature of the evening was a new ship's engine room simulator, which was demonstrated to the Port Engineers by **Luciano Germano,** MarineSafety's chief engineering instructor. This simulator is a replica of the control room and multi-level machinery space found in a large oil tanker or gas carrier.

The computer-controlled system uses actual shipboard equipment, and includes all of the noise, heat, and humidity found aboard a real ship. According to MarineSafety director **Gene Guest,** this degree of realism is necessary to produce a stressful environment for emergency decision-making training.

The Port Engineers' members were very impressed with the high degree of flexibility of the engine room system, which can simulate more than 150 single or multiple malfunctions with an infinite number of variations.

MarineSafety, a subsidiary of FlightSafety International, provides engine-room, cargo-handling, radar, and ship-handling simulator training for more than 40 shipping companies and government agencies.

In the control room of steam powerplant simulator, MarineSafety chief engineering instructor **Luciano Germano** points out some features of an automated burner management system to members of Society of Marine Port Engineers.

Todd Awarded $30 Million By Navy To Modify First Aviation Support Vessel

Todd Shipyards Corporation reports that the U.S. Navy has exercised options amounting to $30 million authorizing Todd's Galveston Division to proceed with modification of the first of two vessels into Aviation Logistic Support Ships (T-AVB), and with advanced procurement of major long-lead items for the second vessel. The award follows completion of the $2.8-million detailed engineering and design phase started in May 1984.

The action put 100-150 tradesmen to work within a week, and will later provide jobs for 350-400 skilled personnel until the summer of 1986. It is expected that the Navy will exercise the remaining $25-million option for modification of the second vessel late in 1985, which will provide a stable work load for another year.

The T-AVB program consists of conversion of two C5-6-78A Seabridge Class RO/RO-containerships into Aviation Logistic Support Ships. The ships have an overall length of 602 feet and a beam of 90 feet.

Adventure Cruise Lines Seeks Title XI To Build $24.5-Million Cruise Ship

The Maritime Administration has received applications for Title XI financing to aid in the construction of a passenger cruise ship and a hopper barge.

Adventure Cruise Lines, Inc., Miami, Fla., seeks a Federal guarantee to aid in financing a 401- by 54- by 23-foot passenger cruise ship that will accommodate 570 passengers and operate coastwise between Florida ports. The 4,650 brake horsepower, diesel vessel is to be built by Eastern Marine, Inc., of Panama City, Fla., and is scheduled for delivery in January 1987.

If approved, the Title XI guarantee would cover $18,375,000 or 75 percent of the estimated actual cost of $24,500,000.

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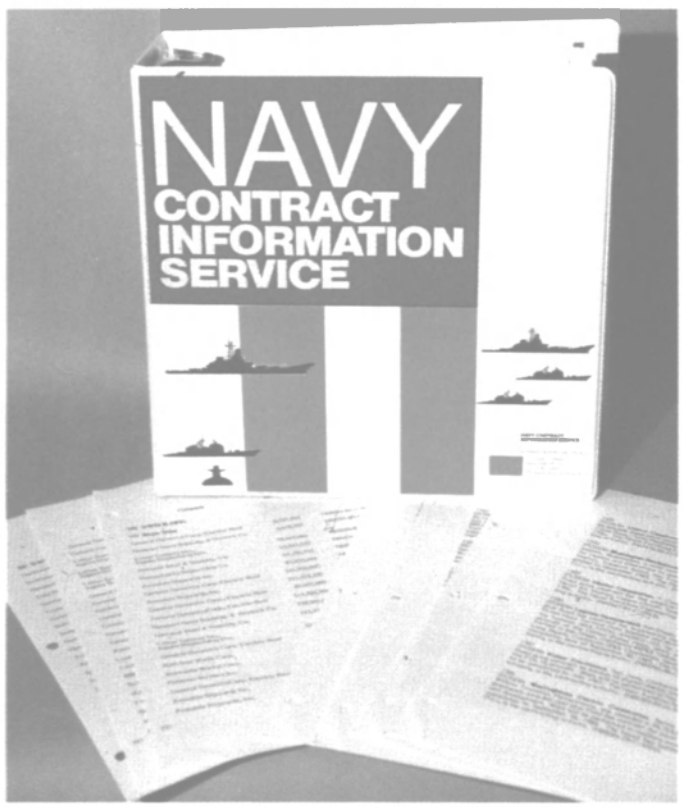

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COMPUTERIZED VESSEL MANAGEMENT SYSTEMS

A Preview Of The Latest Offerings Designed To Help Operators Reduce Costs

As in other areas, the computer is revolutionizing the maritime industry. Numerous new packages of hardware and software have become available for marine applications during the past year. Many of these were developed under the cooperative programs of the U.S. Maritime Administration's Office of Advanced Ship Operations.

MarAd's "Catalog of Computer Software Applications for Maritime Transportation" (June 1984) documents these programs and others that are currently available. The following survey is derived in part from that Catalog and from information provided by the vendors.

AGRI-TRANS CORPORATION

A variety of interrelated management information and control systems for towboat/barge operations are available from Agri-Trans. The Towboat Statistical System allows for the collection of towboat production information and subsequent analysis of this information. Towboat log information is entered by the operations group. The system gives reports of towboat service and towboat statistics for management analysis. The Contract Control System provides an automated means of recording, monitoring, and controlling purchase and sales freight contracts. It reports relative to the performance and profitability of each contract.

The Management Information Reporting System provides analytical, control, and status information related to contract activity for commitments, logistics, merchandising, managed barge, and general analysis. The Traffic/Billing System uses barge trip production coupled with contract information to generate invoices. Reports include invoice history; master file inquiry; point-to-point mileage inquiry; freight, demurrage, and towing revenue accrual; barge activity; TWX transmittals; and Army Corps of Engineers Reports.

The Insurance Claims System monitors, tracks, and records accident information; insurance claims activity; and status of open claims. All expenses related to insurance claims are recorded. The Barge Maintenance System is used for scheduling, tracking, and recording repairs for the barge fleet, and also provides for the recording of all expenses associated with the repair, inspection, survey, or drydocking of barges. All Agri-Trans programs are designed to run on IBM System 34 and System 36 minicomputers.

Circle 50 on Reader Service Card

AMERICAN COMMERCIAL BARGE LINE

ACBL has developed a computerized system for monitoring and analysis of vessel vital signs. Computer-based monitoring devices (Marcon PMS-6000) are used to gather data from several dozen locations on the main engine. The data are transferred to a shoreside mainframe computer that produces management reports on vessel performance.

ACBL will use this data to search for readings that indicate there are or will be serious mechanical problems with any engine. It has been estimated that ACBL will achieve three percent savings in controllable maintenance expenses and three percent in fuel economy.

Circle 51 on Reader Service Card

AMERICAN STEAMSHIP COMPANY

An on-board maintenance and operations management system has been developed by American Steamship, and has been installed on one diesel-powered self-unloader. The system uses software that is capable of being used interactively aboard ship for performing functions of maintenance management, including preventive maintenance scheduling, equipment history, and inventory. A shipboard payroll system has also been incorporated. The system operates on a Data General Nova/4 minicomputer.

Circle 52 on Reader Service Card

ANCHOR MARINE

The U.K. software development firm Anchor Marine (International) Ltd. offers numerous packages for computerized ship management designed to operate on Hewlett-Packard microcomputers. The Optrim system provides readouts of optimum draft and trim for a given speed. Anchor claims that savings of about five percent can be achieved using the system.

The Cargo Loading System, which is said to be installed in more than 60 ships worldwide, enables the user to simulate any loaded condition of the vessel, and computes displacement, deadweight, draft, trim, stress, and stability data. Shear force and bending moment graphs of up to 10 preloaded conditions can be stored in the system. A containership version stores details relating to each individual container.

The D-Ballast Monitor Control System provides automatic logging of oil content monitor and control of de-ballasting to comply with MARPOL. The computer is interfaced to an oil content monitor and can also be interfaced to the speed log and flow rate sensor. The Oceanmaster Performance Monitoring System analyzes manually entered data relating to speed, rpm, and fuel consumption, and indicates how the performance of hull, engine, and propeller is falling off as a function of time.

The Anchor Shipboard Administration System is designed for use either aboard ship or in the home office. It maintains all crew records, survey records, crew accounts, and other records in a standardized format.

Circle 53 on Reader Service Card

BETHLEHEM STEEL, MARINE DIVISION

The Marine Operations Planning and Scheduling System (MOPASS) is a model-based decision support system. It is used for voyage estimating, vessel assignment, vessel scheduling, and other functions. MOPASS is said by its developers to be unique in that the trade and vessel data used to "create" a voyage estimate are useable throughout the system.

Circle 54 on Reader Service Card

CARGO CARRIERS

The Vessel Tracking System (VTS) is used for vessel position reporting and for productivity and performance analysis. The system accepts data on boat movements and barge events, and produces on-line displays by boat, barge, or port. A complete history is maintained for all vessels. Reports are available on boat/barge ton-miles, load/unload notification, demurrage projection and position recap. The system operates on the IBM System 38 minicomputer.

Circle 55 on Reader Service Card

CENTRAL DESIGN AND DRAFTING

A suite of computer programs has been developed by Central Design and Drafting Ltd. to minimize fuel costs and optimize ship profitability. Data entered by users include gross receipts, fixed costs for the voyage, distance travelled, time in port, fuel price, and fuel rate curve. The system provides outputs of best speed, fuel rate at best speed, and profit earned per day. The company claims that 5-10 percent savings in fuel costs have been achieved using the system.

Circle 56 on Reader Service Card

DET NORSKE VERITAS

The Sprintman system from DnV is a comprehensive shipboard and

(continued on page 16)

Computerized Vessel Management

—Det Norske Veritas

(continued from page 14)

shoreside management tool. It is used for such applications as maintenance planning, machinery history, spares inventory control, cost control, and load calculations. It is available in two versions: one for shoreside fleet management of up to 15 ships, and the other for on-board management of a single vessel. It is offered either as a complete hardware/software package or as software only. The software is prepared for, but is not dependent on, satellite communications capability.

Circle 57 on Reader Service Card

KHD

Klockner-Humboldt-Deutz AG introduced a centralized service for marine diesel engines at the 1984 SMM exhibition in Hamburg. The Ship Information Service (SIS) is described as a "gateway" for ships at sea to save operating costs, improve operational reliability, and relieve shipboard personnel.

The engine plant is fitted with sensors that record operating data. This data is transmitted via satellite to the KHD computer center, where it is compared against figures recorded in the test report at the time of engine acceptance, and basic data entered during engine commissioning. A detailed engine status report with trend analysis is sent back to the shipowner, together with recommendations for necessary maintenance work. The system also included an individual maintenance schedule tailored to the actual operating conditions of a particular engine installation.

Circle 58 on Reader Service Card

GENERAL ELECTRIC

General Electric Information Services Company (GEISCO) introduced an integrated system for ocean shipping agents at the Expo-ship North America show during March 1984. This system uses GE's worldwide teleprocessing network for the integration of activities among agents, and between agents and carriers. To streamline an agent's activities, the Agent System processes information received from multiple sources, and produces import and export documents designed to the specific requirements of each user—all based on information captured only once by the agent himself. In addition, this interactive system tracks equipment within a local area, calculates freight charges, and communicates with global tracking systems.

The Agent System integrates the functions of an agent's operations into a modular system. Major modules include local equipment tracking, freight documentation, local accounting, and statistics. The system runs on minicomputers installed at agent locations to process local information. These minicomputers are linked to the GEISCO worldwide network to transmit information among other agents and carriers.

This network includes intelligent processing capability as well as highly reliable data communication, and is accessible from the world's major ports 24 hours a day via a local telephone call. It enables the agent to link his own local tracking system to the principal's corporate computer system, with automatic translation of different formats and standards. Therefore, the agent can quickly and accurately transmit export manifest data to ports of discharge, and receive manifest data from other agents, from which arrival notices are produced.

Circle 59 on Reader Service Card

INTERACTIVE TRANSPORTATION SYSTEMS, INC.

A newly formed computer services company, ITS offers a wide range of data-processing services and support to the transportation and trade industries. The company's services provide a totally integrated alternative to the operational and accounting requirements of the air and ocean import, ocean export, air export, and warehousing industries. An on-line Interactive software system called F.A.S.T. (Fully Automated Systems for Transportation) permits users to access information directly and to generate documentation and reports on cargo movement. This permits changes to be made and documents to be generated at any location where a video terminal and printer are located.

The system is said to produce 95 percent of the documentation necessary to clear shipments into and out of the U.S., and eliminates the most common cause of delayed shipments—missing or inaccurate cargo information.

The F.A.S.T. system interfaces electronically with the U.S. Customs Service, Department of Commerce, carriers and other trade support systems, and an interoffice mail system provides instantaneous communications.

Circle 60 on Reader Service Card

KOCKUMATION

Kockumation AB offers a complete level-gauging system for virtually every shipboard application. The Kockumation NLM200 levelmaster system provides different types of sensors for specific vessel areas for maximum reliability. All information on alarm levels, temperatures, volumes and weights for all tanks are presented on a single display unit. Printouts can be ordered of all data. The level-gauging system can be connected to a cargo calculation instrument for simulation and on-line calculations.

Kockumation currently has free literature available describing the NLM200 system in full detail.

Circle 62 on Reader Service Card

KORKUT ENGINEERS

Korkut Engineers, Inc. offers computer programs for analysis of trim, stability, and strength of vessels or tug/barge combinations. The system can be operated on Hewlett Packard 250 minicomputers or on IBM-PC microcomputers. Draft, trim, stability, and strengths are calculated for specific stations for any loading conditions. The program is said to be "conversational" for ease of operation. It permits the user to see results step-by-step during loading to obtain minimum trim and strength variation. The version for integrated tug/barge combinations allows for tug-alone, barge-alone, or tug-barge combined cases. Liquid cargo, solid cargo, and grain loadings are treated separately.

Circle 61 on Reader Service Card

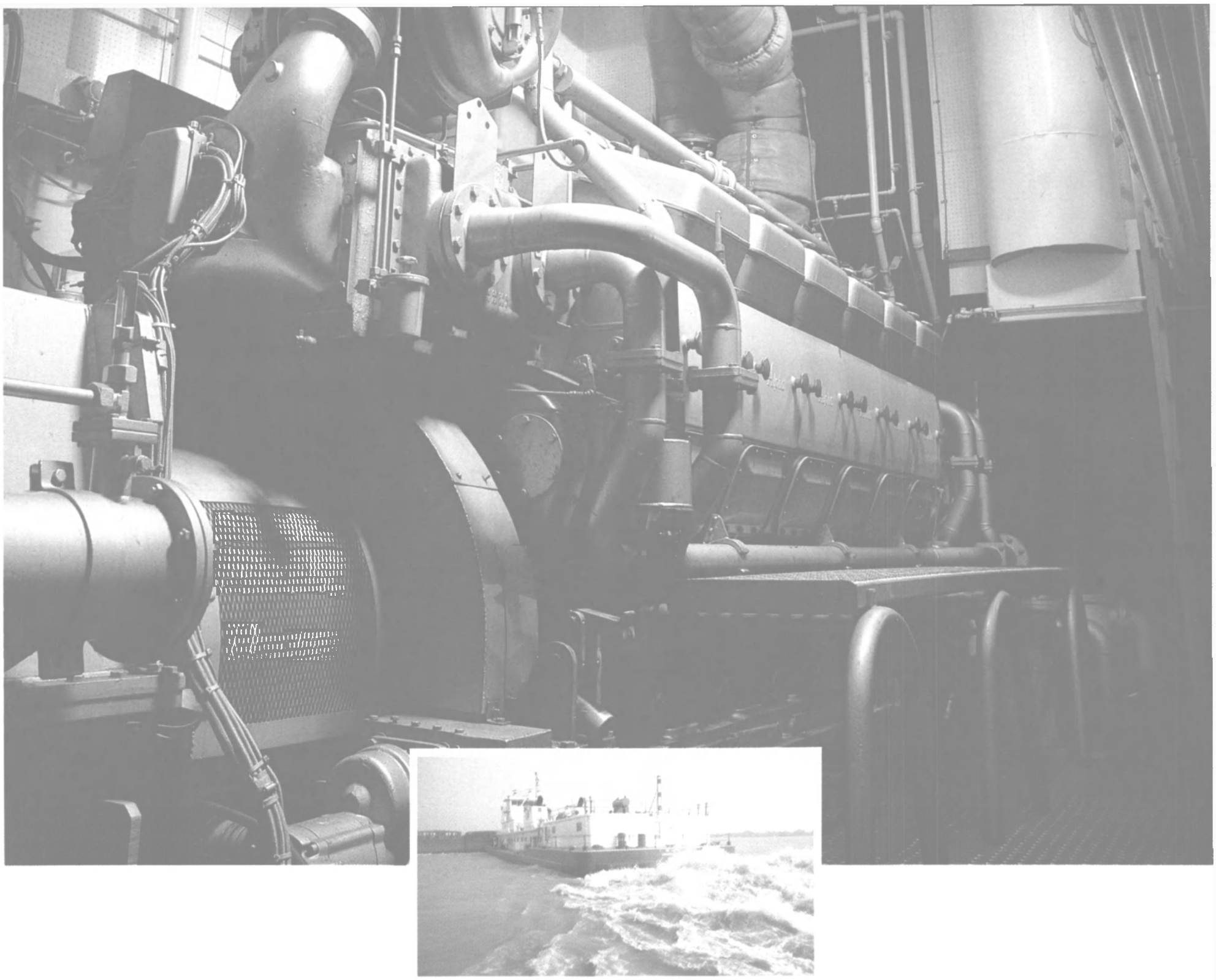
LOGISTICS RESOURCE, INC.

A series of programs for strategic and operations planning are offered for use on IBM or Hewlett Packard mainframe computers. The RouteAssist System evaluates routes and schedules that can be used to support dispatch functions. It is designed to optimize the route network as well as to evaluate operating costs and performance statistics.

The LANE (Lane Analysis and Network Evaluation) system is used to analyze freight flows within a distribution network and to identify transportation balances and imbalances within that network.

The TNET and CNET systems are used for evaluating transportation and consolidation networks.

(continued on page 18)



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Tests conducted by Midland/Ohio River Company on its four big Alpha-powered towboats proved considerable fuel savings when using No. 2 Diesel compared to the latest versions of conventional two-stroke engines in its fleet. Beyond that, the Alpha engines are routinely used for heavy fuel **up to 3500 seconds Redwood No. 1.**

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Computerized Vessel Management

—Logistics Resources

(continued from page 16)

TNET provides analysis of freight flows among various modes of transportation within complex transportation networks, while CNET is used to determine the most effective consolidation plan. TNET and CNET can be used independently or together.

Circle 63 on Reader Service Card

LYKES BROS. STEAMSHIP

A fleet operational control system has been developed by Lykes and installed aboard three SeaBee vessels, with an identical microprocessor installed in the New Orleans home office. The system encompasses ship loading, shipboard payroll, chart information retrieval, and barge rehandling. Originally designed for Columbia Model 900 computers, the system is being converted to operate on the IBM-PC microcomputer.

Circle 64 on Reader Service Card

MARINE MANAGEMENT SYSTEMS

The newest addition to the MMS extensive product line of marine software/hardware packages is the Maritime Work Station (MWS) introduced at the SNAME Maritime Exposition in New York during November 1984. Combining the industry knowledge of MMS and the

capabilities of the IBM Personal Computer, the MWS is an integrated microcomputer work station created specifically for the maritime business professional.

In one easy-to-use desktop package, the MWS combines basic office automation with specific industry functions, such as telex, electronic mail, word processing, electronic filing, time management, calendars, and personal planning, plus spreadsheet applications such as Lotus 1-2-3, with custom templates for MMS Voyage Estimator, MMS Ship Financials, and MARDATA Charter Fixture Reports.

The modular design of the MWS provides the flexibility to add software applications from the MMS Marine Business Series (Voyage Estimating, Voyage Reporting, Cargo Documentation) or the MMS Ship Management Information Series (Loading Calculations, Spare Parts Management, Planned Maintenance, Shipboard Administration) and programs from other vendors that run on the IBM PC. Subscribers to online industry databases such as the Maritime Data Network (MARDATA) can also use the MWS as an "electronic window" on the world of information, with automatic dial-up, log-on, and search procedures as standard features.

Circle 90 on Reader Service Card

MARITIME DATA NETWORK

MARDATA has developed software for IBM Personal Computers to provide enhanced access to its on-line shipping information services, and has also announced an agreement with Fairplay Publications to develop, test, and market a Sale and Purchase database.

The MARDATA Library Interface (MLI) is a powerful software package that combines sophisticated data communications with new automated features for on-line database access, reducing many complicated and time-consuming access and search procedures into simple "one-button" selections. The MLI offers automatic dial-up of communications networks, automatic log-on and password response, simple forms fill-in, video prompting and "help" screens, and automatic storage/recall of routine search scenarios.

In addition to MARDATA libraries, the MLI offers access to other services such as Dow Jones, CompuServe, tariff databases, and others. Current MARDATA libraries include Ship Movements, Ship Characteristics, Charter Fixtures, and Ships on Order. The new library to be developed jointly with Fairplay will provide up-to-date and complete information on all activities in the sale and purchase market for commercial shipping, updated daily from the Fairplay International Research Service (FIRS).

Circle 65 on Reader Service Card

MARITIME COMPUTERS AND TECHNICAL SERVICES

MCTS offers computer programs for on-board crew record keeping and cargo loading. CREWLIST is a computer-based record-keeping system, permitting information on each crewmember to be entered and updated as needed. A variety of reports can be produced, for alphabetical listings, IMO crew lists, vaccinations due, etc. TYPEMATE is a simple typing aid that gives the user the main benefit of a word processor while retaining the simplicity of a typewriter.

TASKMASTER is a multipoint loading instrument and cargo management system designed to perform trim, intact stability, and longitudinal strength calculations for a variety of ship loading conditions. According to the developers, it is different from other loading instruments in that it is designed for use on a general-purpose computer.

Circle 66 on Reader Service Card

MCDONNELL-DOUGLAS AUTOMATION COMPANY

The MCAUTO Freight Automated Rating and Routing System allows clients to maintain and retrieve freight rating and routing information through on-line CRT terminals. The system includes rate and route analysis, centralized rate and route data, up-to-date maintenance, immediate route/rate changes, handling of packaged and bulk shipments for all modes, order processing, freight bill audit and payment, customer invoicing, distribution cost optimization, vendor selection, and elapsed car credit allowance. Additional analysis reports and rate/route lists can be obtained through the MCAUTO Multiple Report Creation System (MRCS).

Circle 67 on Reader Service Card

JOHN J. MCMULLEN ASSOCIATES

Several computer programs are offered for shipping planning, voyage estimation, fleet planning, and other applications. The Ship Economics Analysis System (SEAS) is an interactive program for financial evaluation of marine transportation systems. Capabilities include single voyage profitabiity analysis using a multi-leg profile, discounted cash flow techniques, and the development of compounding, amortization, and depreciation schedules.

ARTRANS (Arctic Transportation Model) is a simulation model to evaluate the technical and economic performance of marine transportation systems originating in the Arc-

tic. The principal output of the model is the month-by-month summary for each route leg of maximum power required, fuel consumed, cargo delivered, attained speed, and cost per unit of cargo.

The Transportation Planning Tool (TPT) is a simulation model designed to assist shipowners/operators in optimizing the composition and deployment of a bulk fleet. The user of TPT specifies his required commodity flow pattern, lifting/delivery constraints, and the mix of owned or controlled tonnage he proposes to use. The model calculates the delivery capacity of the specified fleet, route-specific transportation costs, and the number of voyage-chartered vessels that may be needed to meet the specific delivery requirements.

Circle 68 on Reader Service Card

MCNAB, INCORPORATED

McNab's Fuel Management System is a self-contained package of dedicated hardware and software. It makes available a display of speed versus profit on a per-voyage basis for a particular ship. The system uses shoreside data containing accounting and scheduling information, as well as shipboard data relevant to vessel characteristics, and real-time data on the main shaft torque, rpm, and speed.

Circle 69 on Reader Service Card

MICRO MARINE LTD.

This U.K.-based firm offers several packages for computerized planning and analysis. The Broker System provides an information retrieval tool for brokers and owners. The database covers vessel details (characteristics and positions) and client information. Telexes can be generated automatically from the data files.

The Voyage Estimating and Analysis System consists of a sophisticated voyage estimating tool linked to a post-fixture voyage analysis program. It incorporates a distance table and historic port and canal cost data. The program calculates an optimum bunker plan automatically, and incorporates a steaming speed analysis feature. An Investment Appraisal program performs cash flow, equity, and risk analyses for investment projects. Micro Marine programs are designed to run on Apple II and IMB-PC/XT microcomputers.

Circle 70 on Reader Service Card

NATIONAL MARINE SERVICE

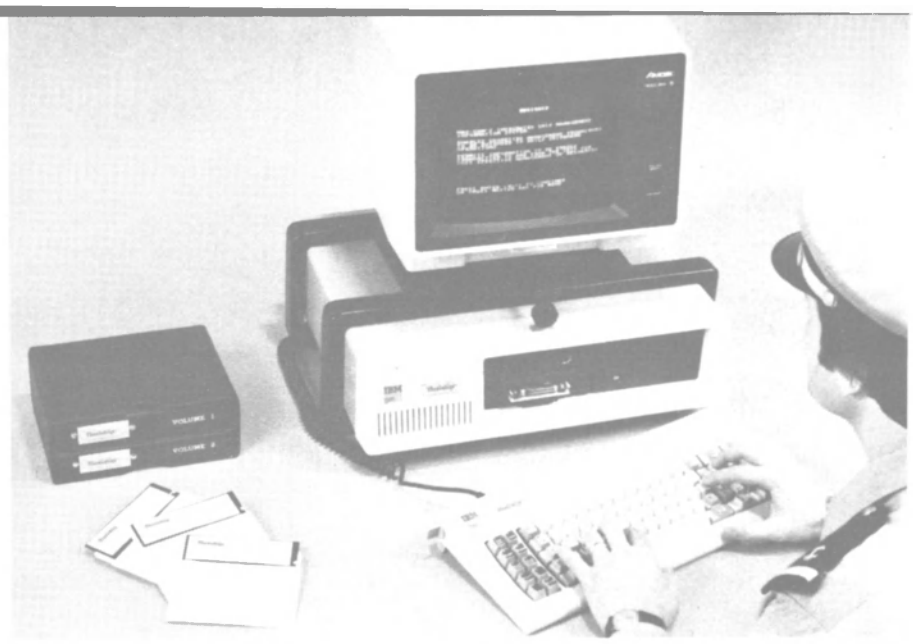
A Vessel Management Information System has been developed to track and report on a fleet of inland towboats and tank barges. It consists of programs and documentation for the physical and financial tracking of the fleet as well as maintaining information on vessel contracts, logistic support, and fleet planning requirements. It has been implemented so as to perform those functions that are of highest priority to a tank-barge operator, and has been developed to permit orderly expansion to other functions.

Circle 71 on Reader Service Card

NAV-COM INCORPORATED

The BUSISHIP system is built around a "marinized" IMB-PC microcomputer with 10-megabyte hard disc, digital cassette back-up, dot matrix printer, and internal 1,200-baud modem. Proprietary Nav-Com software handles a wide range of vessel business tasks, including position reporting, purchase requisitions, requests for medical assistance, electronic mail, data logging, word processing, and automatic access to subscriber databases. Other application modules include vessel inventory control, personnel management, voyage planning, and cargo loading calculations.

(continued on page 20)



Computerized Vessel Management

—Nav-Com

(continued from page 19)

The BUSISHIP work station can be integrated with the vessel's satcom terminal through Nav-Com's COMNET system to provide a direct interactive link with the home office computer. Built around a central electronic switching system, COMNET can be configured with as many internal extensions and outside trunk lines as necessary. Nav-Com states that its unique auto-access feature is an industry first, permitting all calls in either ship-to-shore or shore-to-ship direction to be routed automatically through the satcom terminal without operator assistance.

Circle 72 on Reader Service Card

OCEAN MOTIONS COMPANY

Ocean Motions Company of Barrington, R.I. has just completed delivery of another of its SHIP LOADING COMPUTER packages to SOHIO Cleveland.

The package includes a desk top microcomputer and printer/plotter. Custom programs for each ship are provided on disks running between $2-4,000 depending on vessel complexity.

Six pre-programmed loading conditions are provided for the user to select and modify until he has achieved the desired draft, stability margins and compliance with ABS shear and bending allowables.

Ocean Motions has experience covering some 280 ships worldwide and offers loading calculations for each ship in their intact, damaged and grounded conditions.

Knowing the times of high/low tide and the tidal range for a stranded ship allows the master and operations superintendent to predict whether the ship will retain positive stability and low hull girder stress levels. When the ship runs aground the computer calculates the position of ground contact on the hull and advises the master where to inspect for damage and flooding. Ocean Motions supplies traditional trim, stability and strength packages for all vessels including RO/RO, containerships, reefers, heavy lift ships, offshore supply ships, chemical carriers, bulkers, tankers, passenger and car ferries and all military vessels. Software comes in dedicated hardware or as fully documented disks of the IBM-PC.

Circle 74 on Reader Service Card

PACIFIC-GULF MARINE

Pacific-Gulf Marine has developed a shipboard/shoreside management system for preventive maintenance, machinery history, inventory control, requisitioning, and purchasing. The system provides online access to a database of shipboard machinery relevant to maintenance and spare parts information. Reports can be generated for spare parts inventory, requistioning, purchase orders, material receipts, machinery master list, machinery history, repair work order reports, preventive maintenance reminder reports, and ABS continuous survey status. The system operates on a Hewlett Packard HP-250 minicomputer.

Circle 73 on Reader Service Card

PUERTO RICO MARITIME SHIPPING AUTHORITY

PRMSA has developed an Operations Planning Model that forecasts container movements by equipment type and expected revenue for specified port-to-port and port-to-terminal combinations to plan for lower overhead and enhanced utilization of equipment. It provides short-term predictions of demand for container types and the benefits from short-notice reassignment of the container inventory according to demand. It permits users to determine in advance of sailing the container assignment mix to handle the expected load. Mid-range forecasts of cargo movements are used for planning sailing schedules, operational budgets, and marketing strategies.

Circle 75 on Reader Service Card

PUGH ROBERTS ASSOCIATES

A strategic planning model for liner shipping has been developed with the assistance of Lykes Bros. Steamship Company. This model contains equations that describe in detail the workings of the liner industry, including the acquisition, deployment, and scrapping of vessels; competition for trade among routes; types of vessels and carriers; financial flows; the managerial decisions of owners and operators; and the prevailing economic and regulatory environment. It is set up to simulate the performance of liner trades from the U.S. West Coast to the Far East over the past 10 years and for 10 years into the future.

Circle 76 on Reader Service Card

RAYTHEON OCEAN SYSTEMS

Raytheon's LOADMAX digital loading computers are used for onboard trim and stability calculations. The system calculates and displays accurate draft, stability, and hull stress data for large vessels in any loading condition. It is programmed according to each ship's characteristics. Special programs are available for LNG/LPG carriers, integrated tug/barge combinations and containerships.

LOADMAX is a quick, easy way to plan optimum loading for any type of ship. It rapidly calculates and displays accurate draft, hull strength and stability data for any loading condition.

LOADMAX is as simple to use as a desk calculator—tonnage distribution and calculated results are read at a glance.

Designed for the particular operating requirements of each ship, LOADMAX combines numeric tonnage displays with an easily understood mimic diagram of the vessel. A separate graphic display shows whether the ship is in hogging or sagging condition and if shear force or bending moment limits are being exceeded.

Circle 77 on Reader Service Card

SEAWORTHY SYSTEMS

Developed jointly by Seaworthy and Marine Management Systems, the COMET system provides onboard performance monitoring and fuel accounting for steamships, plus long-term trending and analysis of performance. The system uses logbook data entered manually on a daily basis to determine the vessel's performance in terms of fuel and individual components. Daily output is formatted graphically and tabularly to inform the ship's engineer, and is stored on a diskette to be sent ashore for long-term trending and analysis. The system is designed to run on Hewlett Packard Series 80 microcomputers.

Circle 78 on Reader Service Card

STANWICK CORPORATION

Stanwick offers programs for onboard inventory control and preventive maintenance. The Spare Parts Inventory Program prints a list of spare parts according to a shipping company's numbering system, cross-referenced to a manufacturer's or vendor's part number, associated costs, quantities on hand, on order, order date, etc. The listing provides an interface between the ship's crew and the purchasing department ashore. Reports include stock status, reorder reports, excessive parts on hand, and inventory value.

The Maintenance Management System integrates preventive maintenance and repairs with a management information system. It provides preprinted maintenance work orders and collects cost and repair data for each item of equipment maintained. Complete machinery histories can be printed on command. Other reports include executive summaries of maintenance not accomplished, maintenance labor and material expended, and repair labor and material expended. Stanwick's programs are designed to run on IBM-PC microcomputers.

Circle 79 on Reader Service Card

SUN TRANSPORT

Sun has completed an automated system for inventory control and satellite transmission of data between ship and shore. The system uses an interface to an optical scanner for inventory management of spare parts, an on-board microcomputer for update and maintenance of the parts database and requisition database, and transmission of data between the shipboard microprocessor and the shoreside computer via INMARSAT satellites. The system is said to be undergoing evaluation aboard two Sun Transport vessels.

Circle 80 on Reader Service Card

TEMPLE, BARKER & SLOANE

The TBS Liner Financial Planning Model was designed to assist in evaluating alternative strategic planning decisions regarding the composition and deployment of a fleet of breakbulk, container, and semi-container vessels. Inputs are required to define the liner fleet, the types of cargo carried, expected freight rates, and costs and operating factors for up to 10 years.

The model computes expected revenues, expenses, tax liabilities, and profits for each year, and prepares pro forma reports containing an income statement, balance sheet, cash flow summary, and fleet capacity utilization report. The system is written in SuperCalc spreadsheet modeling language, designed to work with most microcomputers.

Circle 81 on Reader Service Card

TEXAS INSTRUMENTS

Texas Instruments has announced the new TI Marine Business System designed to give fleet managers a promising new home-office tool for improving vessel operating efficiency. Designed to utilize information logged by a TI 8000 Integrated Marine System installed on individual vessels, the system permits managers to download information to a Texas Instruments Professional Computer, and to apply advanced computer spreadsheet capabilities to the analysis of vessel operation.

With the TI Marine Business System interfaced to a Texas Instruments PC equipped with Lotus 1-2-3 software, fleet managers can use a variety of spreadsheet techniques to study a broad spectrum of vessel operating parameters—from speed and fuel efficiency to engine life and crew performance.

The company reports the system was created to help vessel owners and managers to make the most of the information logged by their TI 8000 Integrated Marine System. It provides a complete, easy-to-use system for monitoring and maximizing vessel operating efficiency, particularly with regard to fuel efficiency. TI also reported recent studies for some major fleet operators indicate a fuel savings of up to 25 percent.

Information can be analyzed and correlated in a variety of ways—by vessel, by captain, or by trip. Totals and averages can be calculated for each category. With the addition of word processing and file management software, the user can generate files, reports, charts and graphs for further study.

The new system consists of TI Marine Business System software, a TI 8010 Command Module, a power supply, cables, and operating manual. A TI Professional Computer with appropriate software and peripherals is also required.

Circle 82 on Reader Service Card

TIMSCO

Timsco offers a complete line of computerized systems for the maritime industry. The Management Information System is used for spare parts inventory control, consumables and expendables control, regulatory inspections, planned maintenance, damage survey, and other shipboard management applications. It is protected by a sophisticated security package developed by Timsco called TIMSECUR, which restricts which users have access to the system.

The Ship's Management System offers a tool for marine administrators to manage various types of ships. The user can access various data at the individual ship level or at the fleet level. The Timsco Spare Part Inventory Control System permits shipboard personnel to record and monitor the stock levels of all spare parts carried on board. Timsco systems are designed to make maximum use of data exchange via satellite links.

Circle 83 on Reader Service Card

TRANSPORTATION CONCEPTS AND SERVICES

A series of software systems for freight rate and related calcualtions is available from TCS. Compu-Rate IV is used for rate maintenance, rate distribution, and rate charge calculation for freight invoicing and freight bill audit. It calculates the lowest charge for each shipment as governed by official tariff rules. The modular systems are written in COBOL, licensed to the client for use on his own in-house computer.

Circle 84 on Reader Service Card

TWIN CITY BARGE & TOWING

The Marine Operations System is

Computerized Vessel Management

—Twin City

(continued from page 21)

used for position tracking, trip financial posting, barge contracts, barge and boat repairs, and management summaries. It is an on-line entry and retrieval tool that tracks barges and boats on any waterway system. Dispatchers, traffic clerks, and accounting clerks enter, inspect, and maintain their respective data in the system. Movement information, equipment location, contract status, and trip status are available for management decision-making. The Harbor Billing System is an on-line system for harbor transactions. It produces reports showing fleeting, switching, and harbor work by customer, by fleet, and by boat.

Circle 85 on Reader Service Card

ULTRA PRODUCTS SYSTEMS

The Ship Efficiency Analyzer provides instantaneous calculation of fuel rate, propulsion plant efficiency, and fuel consumption. Data is derived by real-time events, including actual torque and shaft horsepower values, shaft rpm, ship speed, and fuel consumption. It has the capability for computer-to-computer data transfer between the shipboard system and the home office microprocessor, Fleet Efficiency Analysis Terminal (FEAT).

Circle 86 on Reader Service Card

VESON MARINE COMPUTER SYSTEMS

Designed to run on the versatile and powerful Convergent Technologies computers, Veson programs cover the full spectrum of ship management tasks. The ACT-2000 System is a complete one-step accounting, bookkeeping, accounts payable, general ledger, and reporting package. The system can accommodate any number of ships and several hundred vendors. All the files expand automatically. PAY-2000 is a one-step, user-interactive system for office payroll. Any number of employees can be processed.

VOYAGE 2000 is an interactive voyage estimating package that includes an optional sensitivity analysis report. PERFORMANCE-2000 is a decision-support system that monitors voyage performance and makes comparisons with charter party or company standard performance. MAINTENANCE-2000 is an on-board vessel maintenance monitoring system that stores details of equipment and components, along with maintenance requirements, automatically projects maintenance requirements for upcoming periods, keeps maintenance logbooks, and prints reminders.

SPARES-2000 is an inventory control system that may be used either on-board or in the home office. CARGO-2000 is a charter information system for cargo brokers that can be interfaced with the VOYAGE 2000 system for selection of vessels that best fit a given cargo. DISTANCE 2000 contains distance tables on more than 1,050 ports, along with other information on each port. The system presents users with all possible routes between ports, and as a result more than 5 million in total can be retrieved. LUBE-2000 is a software package for monitoring vessel lubricants.

Circle 87 on Reader Service Card

VOCAM SYSTEMS

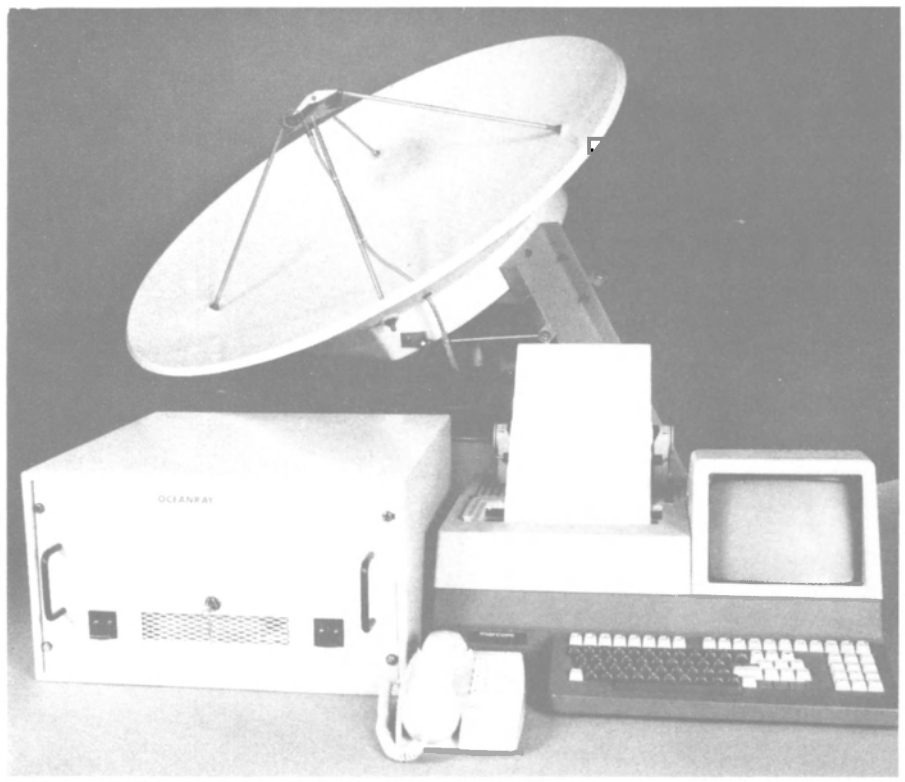
The Vocam Distribution Control System is an on-line, fully integrated program designed for recording shipment details, freight bill paying, linking to a manifest, and analyzing distribution factors. The system can record details of individual shipments, including the origin and destination, commodity, carrier, times and costs, and all transportation details can be recorded through an on-line link to the shipping manifest. The Freight Bill Payment System provides an interface with the business accounts payable function. The system operates on 2250 Prime hardware.

Circle 88 on Reader Service Card

HANS W. WYNHOLDS COMPANY

The Integrated Shipboard Information System (ISIS) contains modules for spare parts inventory control, preventive maintenance, shoreside purchasing, shipboard payroll, and satellite data communications. The Spare Parts Inventory Control System (SPICS) gives information on inventory status and stowage location for more than 8,000 parts. The Shoreside Purchasing System (SPS) takes requisitions from the shipboard system and processes them into purchase orders. Purchasing and delivery status is transferred back to the shipboard system. The Preventive Maintenance System (PMS) provides flexible scheduling of tasks, and facilitates and expedites tracking and record-keeping. A direct interface with the SPICS allows access to parts status and location. The Shipboard Payroll and Overtime Reporting System (SPORS) tracks and records payroll, overtime, disputed pay, allotments, advances, fines, and slopchest for all crewmembers. The Shipboard/Shoreside Data Communications System maintains a vital, efficient link between the computers at the corporate office and aboard ship.

Circle 89 on Reader Service Card



Marconi Introduces The New Oceanray SAT-COM

The INMARSAT Ship Earth Station is now a familiar aid to ship-to-shore communication, but the latest compact station from Marconi International Marine features several simplifications that make it an economic, easy-to-use and install system.

Full free literature is available describing the new unit in detail.

The Oceanray above deck unit incorporates a 0.9-m dish, gyrostabilized and only 150 cm high in the radome. The radio frequency package, including control unit and power supply, can be positioned either within the radome unit or separately, above or below deck.

On the bridge, or in the vessel's communications control area (for it is anticipated that the unit will be fitted to a range of vessel types and sizes with a variety of communications arrangements), a single cable connection from the above deck unit provides the input to a range of possible terminal hardware. In its simplest form as a ship-shore communicating device, the Oceanray uses a standard pushbuttom telephone and operating instructions are given via a voice synthesizing unit to allow operation by personnel with a minimum of specialized training. In this mode standard features of the terminal are: automatic routing of calls via the nearest satellite, though with a manual over-ride to allow selection of Coast Earth Station call routing; priority given to distress calls coming in, plus security system over-ride priority also given to outward distress calls. Terminal facilities also included allow use of future developments in the INMARSAT system, including Ocean Area coding and response to fleet and National Group Identity number which have recently been introduced in addition to ship's INMARSAT identity numbers. Further hardware can be added to give facsimile and high and low speed data transmission capability.

The Oceanray, priced under $30,000, is available through Marconi's U.S. distributor, CMC Communications, Inc.

For free copies of the Oceanray SAT-COM literature,

Circle 29 on Reader Service Card

Ingram Purchases Assets Of Ohio Barge Line And Mon-Valley Transportation

E. Bronson Ingram, president of Ingram Industries Inc., recently announced the purchase from United States Steel Corporation and its subsidiaries, Ohio Barge Line, Inc. and Mon-Valley Transportation Company, of substantially all their marine assets. OBL's 15 boats and 516 barges will almost double the size of Ingram Barge Company, the subsidiary of Ingram Industries, which will operate the combined fleet and assume the numerous Ohio Barge Line affreightment contracts.

"Ingram and OBL have complementary traffic patterns and complementary fleets. In combination we will be one of the largest and most efficient carriers in the industry." Ingram had previously doubled its dry cargo barge fleet in the last 18 months, thus establishing itself as a major carrier on the Upper Mississippi River. With the combined Ingram/OBL fleet, In-

gram will become a major carrier on the Ohio and Illinois Rivers as well. The OBL equipment will also provide Ingram with greatly expanded capability in the area of chemicals affreightment.

In addition to moving grain and petroleum products, Ingram Barge transports significant amounts of limestone rock, coal, fertilizer, scrap steel, steel products, and a wide variety of other products. The company is the river's largest carrier of residual fuel oil for industry and utilities.

Ingram Barge Company is a subsidiary of Ingram Industries Inc., headquartered in Nashville, Tenn. A privately held corporation, its diversified businesses include inland marine transportation and aggregates supply, consumer products distribution, coal production and sales, petroleum wellhead equipment manufacturing and insurance.

Litton Awarded $238-Million Navy Contract To Build Missile Cruiser CG-62

Litton Systems Incorporated, Ingalls Shipbuilding division, Pascagoula, Miss., has been awarded a $238,579,667 fixed-price-incentive Navy contract for construction of a guided missile cruiser (CG-62) of the Ticonderoga Class, with associated data, on-board spares and repair parts, equipage, tools, support test equipment, and engineering and industrial services. Work will be performed in Pascagoula and is expected to be completed in July 1990. Contract funds would not have expired at the end of the current fiscal year. Two bids were solicited and two offers were received. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-C-2035).

Bay-Houston Towing Offers 'Port Reference Handbook' For Six Gulf Ports

Bay-Houston Towing Co., with home office in Houston, Texas, has published a new 16-page edition of the popular "Port Reference Handbook" for the Gulf ports of Houston, Galveston, Corpus Christi, Freeport, Texas City, and Port Aransas. The handbook has long been in demand for its informative, easy-to-read maps that show, in addition to the ship channels, the location of docks, berths, terminals, warehouses, fireboat stations, bridges, ferry crossings, shipyards, etc.

The Bay-Houston Towing Co. has been in the water transportation and towing business along the Texas Coast for more than 100 years. The "Port Reference Handbook" traces the history of the company from 1877, when a young man named William Douglas Haden went to work as a cabin boy on the schooner "Mermaid." Captain Haden founded the company, which prospered and expanded over the years. Today, the Haden family still operates the towing company—Captain W.D. Haden's son, C.R. Haden, and grandson, W.D. Haden II, devote themselves to upholding the tradition of pride and performance in the towing, docking and off-docking services offered by the company, drawing on the "get-it-done" heritage of Captain W.D. Haden. "Our log books are a history of the Gulf ports," the text states. "If it floats, we've probably pushed it or pulled it."

The history of the company is followed in the publication by a numbered map of Houston showing, along with other important points of interest, the exact location of the home office of Bay-Houston Towing Company. This is followed by maps of the previously mentioned ports, printed in blue and black on white. The type is in large letters, and this uncluttered simplicity makes the handy maps easy to follow and extremely useful.

In addition, the booklet contains a Hurricane Map, as well as a table listing the approximate distances between Gulf ports. Houston Ship Channel distances are also included. A comparison of units of measure is given in the back to facilitate converting volume measure (liquid), weight measure, linear measure (small), and linear measure (large).

For a free copy of the new edition of the "Port Reference Handbook" from Bay-Houston Towing,

Circle 92 on Reader Service Card

Numb

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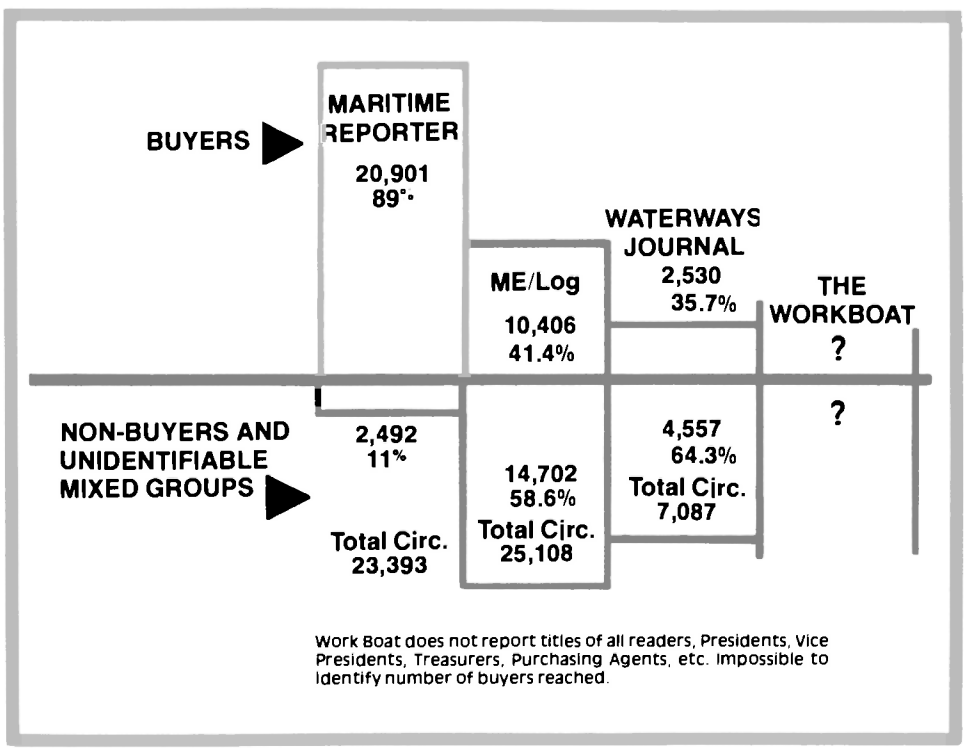

Work Boat does not report titles of all readers, Presidents, Vice Presidents, Treasurers, Purchasing Agents, etc. Impossible to identify number of buyers reached.

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MARITIME REPORTER produces mo other Marine magazine...two tim number 2 magazine. Each figure lis for an individual advertiser by MA

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663
623

Oily Water Separators
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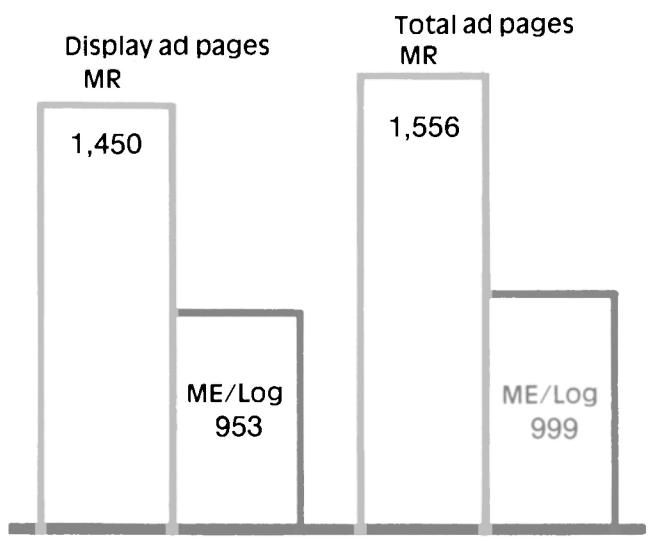
459
360

THE ADVERTISING LEADER

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

COMPARE 1984 ADVERTISING



Note — shows only magazine advertising 13 ME/Log issues — 24 MR issues . . . no catalogs, buyers guides, etc. Ad pages reported in 7" x 10" units for comparision.

MR clearly leads by a wide margin in advertiser acceptance.

/ERTISING RESULTS IN '85

January 15, 1985

MARITIME REPORTER AND ENGINEERING NEWS

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Eisert Named To Head General Electric's New Navy Programs Section

Robert M. Eisert

The General Electric Company's Turbine Business Group has formed a Navy Programs Section to focus on U.S. Navy business, and has appointed **Robert M. Eisert** to head the section. The announcement was made by **George C. Cox**, senior vice president and group executive of the Turbine Business Group.

The Navy Programs Section will be responsible for overseeing and providing support for all products produced for the Navy by the company's Steam Turbine Generator Operation. These products include steam propulsion equipment, ship's service generators, gearing for a variety of propulsion and auxiliary systems, and overall system design integration.

Mr. **Eisert** has been associated with GE for 15 years. He has managed engineering, manufacturing, and quality control activities for GE Navy work, and has served as plant manager at the company's Durham, N.C., facility.

Daewoo To Build Tanker For Norwegian Company For $40 Million

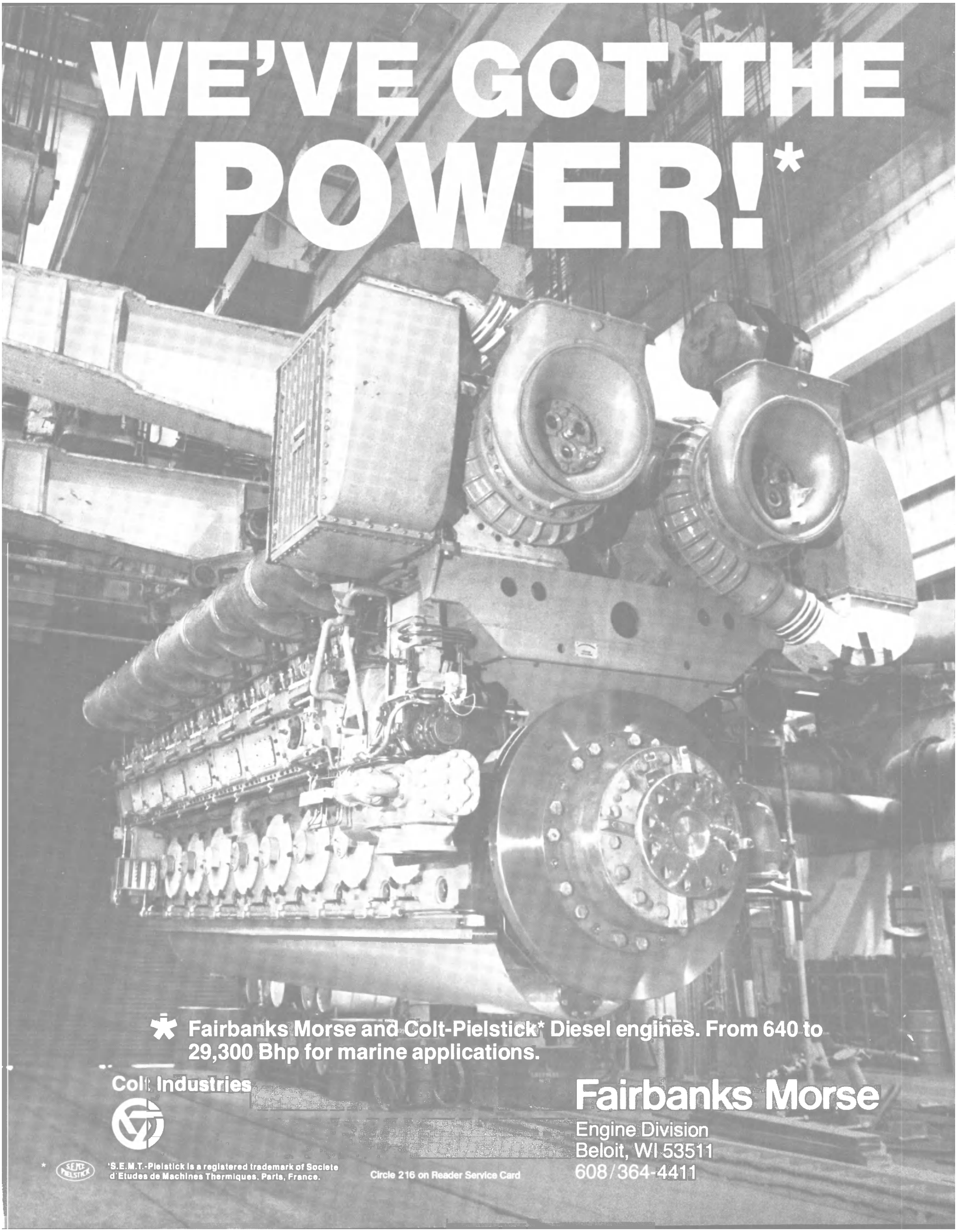
Ugland Rederi, a Norwegian shipping company, has commissioned Daewoo Shipbuilding and Heavy Machinery Ltd. to build a 117,000-dwt shuttle tanker. The contract includes an option for a second vessel.

The tanker will measure 260 meters in length and will have a breadth of 46 meters and a depth and draft of 21.8 and 14.8 meters, respectively. It will cost $40 million and will be delivered in mid-1986.

It will be chartered by Statoil, the Norwegian Government-owned oil company. The ship will carry crude oil from offshore oil production platforms in the North Sea to several onshore refineries.

Statoil previously chartered a Daewoo-built shuttle tanker, the Jarena, in December 1982. The Jarena has received "outstanding vessel" and "distinctive ship" citations from leading U.S. shipbuilding magazines.

The new tanker will feature a single-point bow loading and mooring system that permits loading from any direction. The tanker's twin-engine, twin-propeller, slow-speed propulsion system provides greater safety in rough weather as well as maximum fuel economy and operational flexibility.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Circle 216 on Reader Service Card

Tracor Marine Awarded $2.5-Million MSC Contract To Operate Research Ship

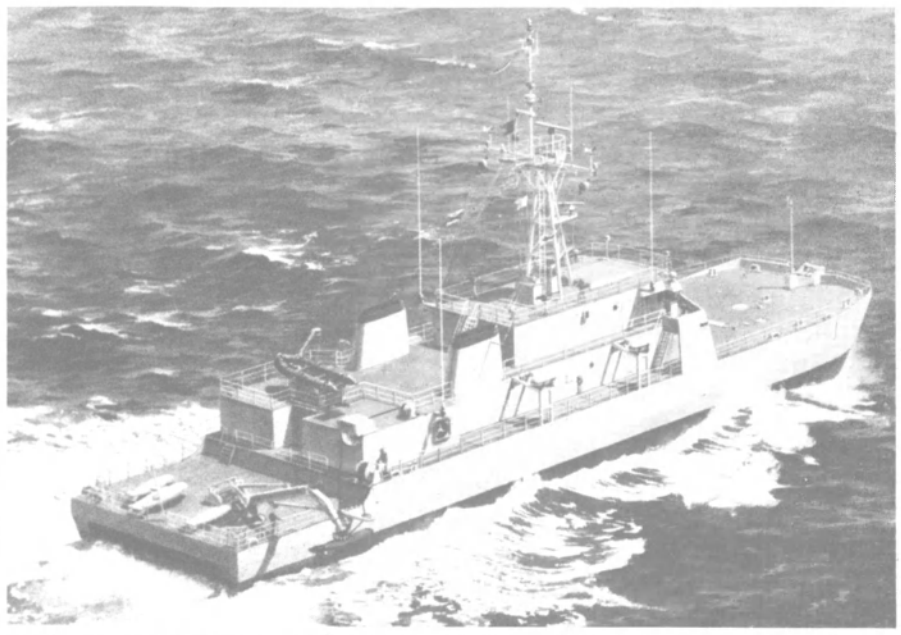
Tracor Marine, Inc. a subsidiary of Tracor, Inc., has received a contract from the Military Sealift Command to man, operate, and maintain the research vessel Lulu for Submarine Development Group One based in San Diego. The contract will bring the company in excess of $2.5 million over the next five-year period according to **William C. Moyer**, group vice president for Tracor Applied Sciences.

The Lulu is a 105-foot catamaran type vessel, serving as the support ship for two Deep Submergence Vehicles (DSV), the Turtle (DSV-3) and the Sea Cliff (DSV-4), which operate worldwide in pursuit of deep-ocean search, location, and recovery.

The contract will be administered through the Ocean Technology Division in the Fort Lauderdale offices of Tracor Marine in Port Everglades, Fla., said Tracor Marine president **Joseph D. Deal Jr.** Program manager will be **Owen A. Kidd**.

Newport News Awarded $779 Million To Build SSN-688 Class Submarines

Newport News Shipbuilding and Drydock Company, Newport News, Va., has been awarded a $779,467,300 face value increase to a previously awarded fixed-price-incentive Navy contract for the construction of the attack submarines SSN-756, SSN-758, and SSN-759 of the Los Angeles Class (SSN-688). Work will be performed in Newport News and is expected to be completed between May 1, 1989 and January 1990. Contract funds would not have expired at the end of the current fiscal year. Two bids were solicited and two offers were received. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-84-C-2064).



Artist's conception of the new Minesweeper Hunter to be built for the Navy by Bell Aerospace Textron.

Navy Awards Bell Aerospace Textron $27.3-Million Contract For New Minesweeper Hunter

Bell Aerospace Textron, Division of Textron, Inc., has been awarded a $27.3-million contract for detail design and construction of the first Minesweeper Hunter (MSH) for the U.S. Navy. The contract also provides the Navy with two additional options to acquire eight more MSHs at a cost of $126.6 million dollars. The additional ships would be awarded in groups of four in 1985 and 1986.

The MSH will be a new class of coastal minesweeper designed to ensure that access to U.S. ports and coastal waterways is maintained in the event of a mine attack.

The MSH will use a surface effect ship (SES) design in which the vessel will ride on a cushion of air. This design represents a new concept for minesweepers, which in the past have used conventional displacement hulls. Final design of the MSH will be conducted at the New Orleans Operations of Bell Aerospace and the lead ship will be constructed at its Bell Halter Inc. shipyard in eastern New Orleans. The MSH lead ship is scheduled for delivery in 1987.

Award of the MSH contract was announced recently by **John J. Kelly,** senior vice president and general manager of Bell Aerospace Textron, Division of Textron Inc., New Orleans Operations, and president of Bell Halter Inc. This competitive contract was won through a process that involved 17 companies and three years of intensive international competition, with Bell having offered the superior technical and most cost effective design. The MSH program is the second major Navy project won by Bell New Orleans in recent years. The company is currently building high-speed amphibious air cushion landing craft, known as LCACs (Landing Craft, Air Cushion), for U.S. Navy/Marine Corps missions. The first LCAC rolled off the Bell Halter assembly line in May 1984.

The Bell MSH design uses an air cushion to reduce the contact of the hull with the water surface, thus making the ship less susceptible to underwater shock from mine explosions. The air cushion also reduces the underwater acoustic, magnetic, and pressure signatures of the ship, making it less likely that today's sophisticated mines will be triggered before they can be detected and neutralized by systems carried aboard the MSH. This concept offers a dramatic improvement, reducing the risk and cost of minesweeping.

To prove the effectiveness of the SES design in resisting underwater shock, Bell conducted a series of underwater explosion tests on a Bell-designed 110-foot commercial SES. During the tests, explosive charges equivalent to 1,800 pounds of TNT were detonated at various distances to the ship. After the most severe test on cushion, the SES immediately departed the area with all systems operating. The tests, conducted in February and March 1984 in the Gulf of Mexico near Bell's facility in Panama City, Fla., provided the first data proving the superior shock resistance of the SES design.

A leader in the advanced Marine vehicle field, Bell Aerospace has pioneered air cushion vehicle (ACV) and SES technology during the last 20 years. **John Kelly** has been instrumental in the development of

air supported ships for almost two decades. He has led the successful development and introduction of the LCAC (Landing Craft, Air Cushion) which is the basis for the modernization of the U.S. Navy amphibious landing forces, and most recently the technological breakthrough leading to the Navy's selection of an air supported MSH. Bell designs are built at the Bell Halter shipyard, a company owned by Bell Aerospace Textron and Halter Marine, Inc.

Gerard M. McAllister 1910-1984

Gerard M. McAllister, retired executive vice president and general counsel of McAllister Brothers Inc. of New York City, one of the largest towing and marine transportation companies in the world, died recently at his home in Avon, Conn. He was 74 years old and also lived in Lost Tree, Fla.

Mr. **McAllister** was one of 10 children of **James P. McAllister**, the eldest son of Capt. **James P. McAllister** who founded the family company and put the first McAllister tugboat to work in New York Harbor in 1864.

Mr. **McAllister**, who joined the family company in 1936 and retired in 1974, was born in Brooklyn and graduated from Georgetown University and Fordham Law School. Before joining the company he was a partner in the law firm of Dow & McAllister. He was a former director of the New York Board of Trade, and a past chairman of the marine division of the Board's transportation section.

Mr. **McAllister** is survived by his wife, Claire Tierney McAllister; a daughter, Jered Ann Lynch; two sons, Peter B. and Steven M.; three sisters, Isabel Etzel, Joan Smith, and Justine Roach; a brother, James P.; and nine grandchildren.

Marinette Marine Awarded $23 Million To Build Seven More Patrol Boats

Marinette Marine Corporation of Marinette, Wisc., has been awarded a contract by the Naval Sea Systems Command for the construction of seven additional Yard Patrol Craft (YP). Total value of the latest award is approximately $23 million.

The seven-vessel option is a part of a previously awarded contract for the construction of six YPs that MMC received in August 1984. These craft will be utilized at the Naval Academy in Annapolis for instruction of midshipmen in seamanship, navigation, and marine engineering disciplines. The YPs are of wood hull construction with aluminum superstructure. They have an overall length of 108 feet, beam of 22 feet 9 inches, and full-load draft of 5 feet 9 inches. Contract delivery date for the first vessel is April 1987.

Moran Container Services Expands Routes To Include Philadelphia And Baltimore

Moran Towing Services Company, a subsidiary company of Moran Towing and Transportation Co., Inc., has announced the expansion of its trade routes to Philadelphia and Baltimore. The company loaded the first cargo for this service in New York on January 4, 1985 at the Global Marine Terminal for Northern Shipping Terminal in Philadelphia and Dundalk Marine Terminal in Baltimore.

Moran entered the feeder barge services in August 1984, operating between New York and Boston. The company's Barge 411, with a capacity of 748 TEUs is the largest LO/LO container barge now sailing under the American flag. Additional routes and barges will be added to the service by the company as customers' needs and market conditions dictate.

REDUCING FUEL COSTS

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

As we enter 1985, marine power plant designers continue the general practice that became common in the 1970's, that is the practice of designing power plants for high thermal efficiency. Low fuel consumption, over a wide range of operating powers, became and continues to be of paramount importance. The practice of designing for high thermal efficiency resulted in the nearly universal use of diesel prime movers for main propulsion. During this transition period, a period of approximately one decade, the marine community experienced a significant degradation of fuel oil quality which caused a level of trepidation relative to choosing internal combustion engines such as the diesel engine. As a result of aggressive research and design efforts undertaken by the engine manufacturer, prudent decisions concerning fuel selection by the operators, and advances in shipboard fuel treatment techniques, the modern diesel-powered merchant ships are very capable of operating economically on available marine fuels. During the decade, the engine manufacturer even succeeded in significantly reducing engine specific fuel consumption as demonstrated by the long stroke engines.

It appears marine engineering design efforts in the near future will continue the trend to convert the maximum amounts of the available energy in the fuel to usable energy. Marine engineers will continue to adopt the most efficient engines available to the industry and will develop system designs that will result in overall fuel consumption at such low levels that they nearly cut in half the levels common in the U.S. merchant fleet prior to 1973. These systems will probably incorporate multi-pressure waste-heat steam generators, induction turbines for driving the ship service generator and jacket water motivated auxiliaries such as distilling units and absorption type air conditioning systems. Although the recent stabilization, and lowering of marine fuel oil prices have reduced the immediate incentive for designing power plants for ultra-low fuel consumption, the industry has been forcibly conditioned to accept power plants with the lowest possible overall fuel consumption. Owners know that low fuel consumption normally converts to lower required freight rates and will continue purchasing vessels with the lowest possible annual fuel costs.

Concurrent with the operator's desire to keep overall fuel consumption to a minimum there exists the requirement to maintain high equipment reliability and system availability. High equipment reliability and system availability depend on two critically important criteria; sound design and intelligent operation. Sound design involves individual system components and system integration of the required components. Marine engineers need to augment conventional design considerations (thermal, fluid, material, strength requirements, etc.) by reliability and value engineering analyses in order to better serve the needs of the owner. Weak links in marine systems must be eliminated by improving specific component designs or eliminating components when appropriate. The design marine engineer must continually consider the shipboard environment—which includes the vessel, the sea and the crew—when developing the design. Intelligent operation includes basing normal operating decisions on sound engineering principles and thorough knowledge of components and systems. To achieve intelligent operation of modern power plants designed for minimum fuel consumption the owner must insure that pertinent technical information is aboard each vessel and that the crews understand how to use the technical information to optimize the plant's operation.

For an owner to optimize his operation it is not enough to specify a vessel design with ultra-low fuel consumption, but it will be necessary to insure that the vessel is attended to properly. The ashore personnel's responsibility centers around supporting the sea-going personnel in achieving maximum fuel efficiency. Ashore personnel must analyze all suggestions thoroughly before making a decision to implement or not. Remember, not implementing a suggestion may result in reduced present expenditures but it may also eliminate long term savings. Another responsibility is to foster a climate of high technical awareness. It is only through sound technical awareness that operators can adapt to changing technical and operation requirements. A few thousand dollars spent on honing a chief engineer's technical skills may manifest itself as an annual fuel savings worth many times more. The prevention of the degradation of a plant's efficiency of a mere one percent, may save an owner $50,000 in annual fuel costs, let alone the potential maintenance costs resulting from poor operating practices.

The following is a compendium of the state-of-the-art components and systems available for powering modern vessels with reduced fuel costs.

ALCO POWER

Circle 1 on Reader Service Card

Alco Power Inc. is currently involved in a project that will add increased fuel efficiency to its model 251 diesel engine, as well as decrease the amount of time required to achieve rated horsepower and speed from engine idle speed. This is accomplished by the application of the model 131 turbocharger on the Alco 16-cylinder, model 251 CE diesel engine. This is now being tested in towboat service on the lower Mississippi and is receiving very favorable results.

Alco is also involved with the development of a new piston design to further increase fuel efficiency over its current valve-pocketed design. Although this is in its preliminary stages, Alco hopes to have it out in the marketplace shortly.

Other developments on the horizon include continued experimentation with heavy fuels, camshaft design changes, and experimentation with turbocharger application, all of which will add up to increased fuel efficiency.

B&W ALPHA

Circle 2 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.

BERGEN DIESEL

Circle 3 on Reader Service Card

A.S. Bergens Mekaniske Verksteder (Bergen Diesel) of Norway has used heavy fuel in its engines for more than 20 years and has very solid experience in this field. Some 500 engines, both propulsion and generator sets, are in operation on heavy fuel, with the longest running times in excess of 100,000 hours. The company's U.S. subsidiary, Bergen Diesel, Inc., is located in Kenner (New Orleans), La.

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.

CATERPILLAR

Circle 4 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.

When Caterpillar goes into production of its medium-speed 3600 series in 1985, the company will offer four additional models with a continuous output range from 1,700 bhp at 700 rpm to 6,000 bhp at 1,000 rpm.

The 3600 Series engines are expected to be among the most fuel-efficient and durable in their power and speed class—720-1,000 rpm. Initial rated fuel consumption of 0.327 pounds per horsepower-hour is achieved through system and component efficiency, including turbocharger match, unit injectors, precision injection timing, and high combustion pressure capability. The family is designed to operate on a range of blended fuels.

COLT INDUSTRIES

Circle 5 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 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.

CUMMINS ENGINE

Circle 6 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 7 on Reader Service Card

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

DETROIT DIESEL

Circle 8 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.

ELECTRO-MOTIVE DIVISION

Circle 9 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.

GENERAL ELECTRIC

Circle 10 on Reader Service Card

GE's fuel-efficient, four-stroke 7FDM marine diesel engines now offer ratings from 1,525 to 4,000 bhp. The 8-cylinder model is rated 1,525 bhp at 900 rpm and 1,800 bhp at 1,050 rpm. The 7FDM 12-cylinder engines are rated at 2,550 bhp and 3,000 bhp at 900 and 1,050 rpm, respectively, while 16-cylinder engines carry ratings of 3,400 bhp at 900 rpm and 4,000 bhp at 1,050 rpm.

To help reduce fuel costs, GE's Blended Fuel Testing Program is presently burning a blend of 50 percent #6 fuel with 50 percent #2 fuel in its new Engine Endurance Laboratory in Erie, Pa.

General Electric's recently introduced three-ring piston design significantly reduced lube oil consumption during field tests. This GE design, using two compression rings and one oil control ring, also reduces ring wear for longer life between overhauls.

The development of GE turbochargers that operate more effectively in marine service has greatly improved acceleration characteristics and can further improve fuel efficiency. The projected life of connection rod bearings and their crankshaft journals has been increased with the development of a grooveless upper rod bearing half, while welded-in, stainless steel 30-degree value seats improve cylinder head life.

GEORGE ENGINE

Circle 11 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.

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.

ISOTTA FRASCHINI

Circle 12 on Reader Service Card

Isotta Fraschini S.p.A. is a company of the VM Group, the diesel engine sector of Finmeccanica of Italy. Isotta has been designing and building engines continuously since 1909. It is headquartered in Saronna, about 15 miles from Milan, with a second major facility located in Bari on the Adriatic Sea.

Isotta designs and manufactures a broad range of diesel engines for diverse applications. The ID 32 engine series for marine propulsion has a power output range from 180 to 400 bhp at 2,700–3,000 rpm. The ID 38 series when used for marine propulsion is rated from 180 to 400 bhp at 2,700–2,900 rpm for workboat use, 500 bhp at 3,000 rpm in military applications. The ID 36 engine type is rated 300–1,320 bhp at 1,650–1,800 rpm for workboats, and up to 1,600 bhp at 1,900 rpm for military craft.

The ID 36 diesel engines are available in V-form models with six, eight, 12, and 16 cylinders; a 10-cylinder version is presently under development. All production engines in this series are available in amagnetic versions. Isotta also manufactures, under license, the Paxman Diesel model PV2000 engine, which has a power range of 1,000–4,500 bhp at 1,600 rpm.

The ID 36 SS6 V-AM amagnetic engine is being supplied to the U.S. Navy for its mine countermeasure ship program. This engine has a continuous power rating of 660 bhp at 1,800 rpm for ambient temperature of 78 F; when derated for 100 F, output is 620 bhp at 1,800 rpm. Parallel operation of two ID 36 SS6 V-AM engines into a common gearbox provides a continuous output power of 1,320 bhp at 78 F ambient.

Cost of ownership/life cycle costs for the ID 36 SS6 V-AM engine is reduced through high reliability and time between overhaul, and low maintainability. Because the engine's magnetic signature is permanent, it never needs to be

← Circle 110 on Reader Service Card

removed from the ship for periodic degaussing. ID 36 series engines have demonstrated mean time between overhaul in excess of 14,000 hours per engine on 134 units operating more than 1.9 million hours. The manufacturer reports, through use of Reliability Centered Maintenance, the need for periodic overhauls is non-existant, thus making MTBO in excess of 20,000 hours.

KHD

Circle 14 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 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 15 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.

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 16 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.

The new four-stroke, heavy-fuel L58/64 engine will be produced as in-line units with six, seven, eight, and nine cylinders, providing a power range (mcr) from 9,900 to 14,850 bhp.

The L58/64 is a logical up-grading of M.A.N. medium-speed engines that have rendered excellent service in operation on heavy fuel for almost 20 years. This early understanding of heavy fuel burning characteristics was further extended by the 40/45 engine type, which in the 1970s introduced a modern concept with high firing pressure, the basis for low fuel consumption.

During the development of the L58/64 engine, particular emphasis was placed on the following: low fuel consumption; high reliability in unrestricted operation; simple and easy maintenance; and adaptability to varying operating and environmental conditions as well as fuel ignition qualities.

MTU OF NORTH AMERICA

Circle 17 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 interdependent 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.

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

Circle 18 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. MWM Stewart * Stevenson, headquartered in Houston markets MWM's 400 and 500 series Multifuel 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.

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.

PENSKE GM POWER

Circle 19 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, by-pass 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 20 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.

STORK-WERKSPOOR

Circle 21 on Reader Service Card

Stork Werkspoor Diesel B.V., known as SWDiesel, with headquarters in Amsterdam, is the leading diesel engine manufacturer in the Netherlands, with a production program covering an output range from 300 to 16,200 kw (400 to 21,725 bhp). This program consists of five models of four-stroke, medium-speed, heavy-duty engines, all capable of operating on heavy fuel.

The recently introduced SW280 engine type, fully adapted to the demands of the present and future market, is offered in six-, eight-, and nine-cylinder in-line configurations, and in a 12-cylinder V-form version, with outputs ranging from 1,465 to 3,530 kw (1,965–4,735 bhp).

Special attention in Stork's research program was given to the reduction of fuel consumption, re-

sulting in lower figures for the SW280, F/SW240, and DR210 engines. R&D on the well-known TM410 and TM620 engine types, of which more than 650 have been delivered, has also been successful in meeting market demands for reduced fuel consumption; a reduction in fuel consumption of up to eight percent can be achieved. On a number of 18TM410 engines, a specific fuel consumption as low as 185 grams per kw hour has been recorded under full-load conditions.

These reductions in consumption have been achieved without increasing the combustion pressure. Further reductions are foreseen in the near future. This will be achieved by some increase in the maximum cylinder pressure. Major improvements on these engines include the application of new high-efficiency turboblowers, and valve timing in injection systems to give higher injection pressures.

Operation on heavy fuel is one of the strongest points of SWDiesel engines. The poorest quality fuels have been tested in TM and SW engines. When installed as auxiliary engines, the SW models can use the same heavy fuel as the main engine.

Over the past few years, SWDiesel has set up offices in New Orleans, Seattle, and Washington, D.C. in an effort to expand its sales in the U.S. market. SWDiesel Gulf Inc. (Stork-Diesel) in New Orleans is a member of the SWDiesel Group.

SULZER

Circle 22 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.

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).

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.

VOLVO PENTA

Circle 23 on Reader Service Card

Volvo Penta of America, Rockleigh, N.J., has introduced new configurations of its six-cylinder diesel engines. The new turbocharged/aftercooled version of the 5.48-liter six-cylinder engine is designated TAMD60C. Horsepower has been raised to 250 bhp at 2,500 rpm for the light-duty version, and 210 bhp at 2,500 for the medium-duty model. New this year is a continuous output rating of 177 bhp at 2,200 rpm.

The new Robert Bosch fuel injection pump is equipped with an aneroid smoke eliminator, and provides a specific fuel consumption of 156 grams per bhp hour at the 2,000-rpm continuous rating.

The latest configuration of Volvo's 6.73-liter, six-cylinder turbo/aftercooled engine is the TAMD70E, rated 300 bhp at 2,500 rpm. Also available is an intermediate rating of 270 bhp at 2,500 rpm, or 211 continuous bhp at 2,000 rpm. Both the TAMD60 and 70 are available with heat exchangers or in keel-cooled modes.

Higher horsepower with lower fuel consumption is the result of component redesign in the 9.6-liter TMD100C engine. A new turbocharger, in conjunction with a new injection pump and injectors, pistons, and liners, and a modified cylinder head results in 272 bhp at 2,000 rpm in the light-duty rating. The medium- and continuous-duty ratings are 258 bhp and 238 bhp, respectively, at 1,800 rpm. Specific fuel consumption has been improved to 153 grams per bhp hour.

Volvo's largest engine, the turbocharged and aftercooled 11.9-liter TAMD121C, has had a series of modifications that are designed to enhance its already substantial reputation for economy and longevity. The cylinder block has been reinforced in the liner ledge area to withstand higher outputs, while the crankshaft has been nitrided to resist fatigue. New cylinder heads with improved water flow support new injectors with improved spray patterns and higher pressures.

New pistons, liners, connecting rods, and turbocharger all contribute to the 121C's light-duty rating of 408 bhp at 2,000 rpm. Medium- and continuous-duty ratings are 387 bhp at 1,900 rpm and 367 bhp at 1,800 rpm. The engine uses 159 grams of fuel per bhp hour at the continuous rating.

A wide variety of transmissions and power takeoffs make both the TMD100C and the TAMD121C ideal power sources for fishing vessles or other boats where numerous PTOs are required.

WARTSILA DIESEL

Circle 24 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.

Wartsila Diesel is represented through its own subsidiaries and agents in 30 countries. The company's after-sales service is based on a worldwide network of trained specialists. Operators and maintenance engineers are trained on-site and at the Wartsila factories. Since 1980, Wartsila Diesel has been represented in the U.S. by Wartsila Power Inc., with offices in New Orleans, Houston, and New York. On the U.S. West Coast, the company is represented by Southwest Marine, Inc. of San Diego.

WAUKESHA

Circle 25 on Reader Service Card

Waukesha Engine Division of Dresser Industries, Waukesha, Wisc., has produced more than 40,000 horsepower of its new AT25 diesel since signing a license agreement with Sulzer Brothers Limited of Winterthur, Switzerland, several years ago.

This production follows a multimillion-dollar capital investment in plant renovation and new machine tools to build these heavy-duty, four-stroke, medium-speed diesels. They deliver from 1,140 to 4,800 bhp (metric) in in-line six- and eight-cylinder, and V-12 and V-16 cylinder configurations.

The AT25 is capable of operating on heavy, blended, and distillate fuels. This range is made possible through a design that incorporates oil-cooled injection nozzles, bore-cooled cylinder heads, exhaust value rotators, two-piece pistons, and turbocharger washing equipment.

A rugged yet compact engine, the AT25 is conservatively rated and offers excellent access to components for ease of service. Quick-opening access covers are provided for such components as camshafts and mail bearings. A provision for fast removal of rocker arm covers facilitates valve adjustments. Water, lube oil, and fuel transfer pumps are located on the front of the engine for easy access. For maintenance, hydraulic tensioning of main bearing cap studs, cylinder head studs, and connecting rod studs insures precise preloading and cuts assembly time.

WICHMANN DIESEL

Circle 26 on Reader Service Card

Wichmann Diesel, Inc., of Kenner, La., offers a line of fuel saving low speed diesels from 1,140 to 4,220 hp, with engine speeds from 300 to 475 rpm.

Wichmann states specific fuel consumption for their line of diesels is one of the lowest in the world. Simplicity of design reduces both planned and corrective maintenance. In addition, any necessary maintenance requires less time than with more complex propulsion systems.

All engines are two-stroke. Models are available for reduction gear application or as a complete system directly connected to a Wichmann controllable pitch propeller.

Of in-line design, models are available in four to 10 cylinder configurations. They are loop scavanged, have no exhaust valves, require only standard instrumentation and controls. Other common features include water cooling, direct injection and turbocharging.

Spare parts are interchangeable throughout the entire Wichmann engine line providing ease of maintenance and a minimum spare parts inventory.

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CIRCLE THE APPROPRIATE NUMBER ON READER SERVICE CARD OPPOSITE →

ADVERTISER	EQUIPMENT /SERVICE	CIRCLE NO.
ALFA-LAVAL, INC.	OIL/WATER SEPARATORS	103
AMERICAN UNITED MARINE CORP. TANK SYSTEM A.S.	PORTABLE CARGO/ CONTROL EQUIPMENT	242
CMC COMMUNICATIONS	TV/ANTENNA SYSTEMS	214
COLT INDUSTRIES FAIRBANKS MORSE ENGINE DIV.	DIESEL ENGINES	216
FRITZ CULVER, INC.	DECK MACHINERY	215
DEL GAVIO MARINE	HYDRAULICS	340
DEUTSCH METAL COMPONENTS	PIPE FITTINGS	164
FRED DEVINE DIVING & SALVAGE	DIVING/SALVAGE	212
DREW AMEROID MARINE	FUEL ADDITIVE	217
ENERJEE LTD.	WELDING FILTER	109
HAMWORTHY ENGINEERING, LTD.	POLLUTION CONTROL EQUIPMENT	218
HARRIS CORPORATION	RADIO TELETYPEWRITER SYSTEM	219
HUBEVA MARINE PLASTICS	CHOCKING & REPAIR COMPOUND	202
HYDE PRODUCTS INC.	OIL/WATER SEPARATOR	220
INGERSOLL-RAND	PUMPS	110
INTERNATIONAL MARITIME ASSOCIATION	MARKETING GUIDE	346
KSM FASTENING	WELDING GUN	221
LAWLESS ENTERPRISES	MARINE EQUIPMENT	173
McALLISTER BROS.	TOWING SERVICES	313

ADVERTISER	EQUIPMENT /SERVICE	CIRCLE NO.
MARINE EQUIPMENT CATALOG	ANNUAL MARINE/NAVY CATALOG	157
MARINE MOISTURE CONTROL CO. INC.	LIQUID LEVEL TRIPLE FUNCTION TAPE	318
MICROLOGIC	LORAN C TECHNOLOGY	259
MIDLAND AFFILIATED	ENGINES/PROPULSION SYSTEMS	131
NATIONAL MARINE SERVICE INC.	SHIPYARD SERVICES/ TOWING SERVICES	222
NAV-COM	SHIPBOARD COMMUNICATION SYSTEMS	324
OCEAN ROUTES	INFORMATION SERVICES	210
PECK PURIFIER SALES CO.	OIL PURIFIERS	256
PENSKE GM POWER	REPAIR PARTS/SERVICE	116
RAMPMASTER INC.	GANGWAYS	243
RAUMA-REPOLA	SHIPBUILDING	211
ROCKY MOUNTAIN ENERGY	DUST ABRASIVE	213
SMITH MEEKER	STUFFING BOXES	330
TURECAMO	TOWING/SHIPHANDLING	223
VESON, INC.	COMPUTER SYSTEMS	337
VOLVO PENTA	MARINE ENGINES	143
WARTSILA	DIESEL ENGINES	204

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, NY 11231
Flakt AB, Box 8862, S-40272, Gothenburg, Sweden
Marlo Coil/Nuclear Cooling, Inc., P.O. Box 171, High Ridge, MO 63049
Stal Refrigeration AB, Butangsgatan 16, S 601 87 Norrkoping, Sweden

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

ANODES—Cathodic Protection
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Engelhard Industries Division, 2655 U.S. Route 22, Union, NJ 07083
Federal Harco, P.O. Box 40310, Houston, TX 77240
The Platt Bros. & Co., Box 1030, Waterbury, CT 06721

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

BLASTING—Cleaning—Equipment
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Aurand, 1270 Ellis St., Cincinnati, OH 45223
Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
CLEMCO, P.O. Box 7680, San Francisco, CA 94120
E.I. DuPont De Nemours & Co., Inc., Starblast Division, Room X39186, Wilmington, DE 19898
Key Houston Division of Jacksonville Shipyards, 13911 Atlantic Blvd., Jacksonville, FL 32225

BOILERS
B&D Marine and Industrial Boilers, Inc., P.O. Box 5702, North Charleston, SC 29406
Combustion Engineering, Inc., Windsor, CT 06095
Foster Wheeler Boiler Corp., 110 S. Orange Ave., Livingston, NJ 07039

BOILER CLEANING
Asea Stal, 525 Executive Blvd., Elmsford, NY 10523-1296

BROKERS
S. Danoff U.S.A. Ltd., 2050 Coral Way, Miami, FL 33145
Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, LA 70153
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Western Maritime, 701 B Street, San Diego, CA 92101

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

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

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

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

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

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

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Maritime Data Network, Ltd., 102 Hamilton Ave., Stamford, CT 06902
Veson Systems, 29 Broadway, Suite 1002, New York, NY 10006

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

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ASEA, Inc., 4 New King St., White Plains, NY 10604
Autronica Marine USA, 280 Industrial Pkwy., Northvale, NJ 07647
Barringer Research, 304 Carlingview Dr., Rexdale, Ontario, Canada M9W 5G2
Biospherics Inc., 4928 Wyaconda Rd., Rockville, MD 20852
Bowmar/ALI, Inc., 531 Main St., Acton, MA 01720
Cooper Energy Services, Mount Vernon, OH 43050
Ergon, Inc., P.O. Drawer 1639, Jackson, MS 39205
Failsafe Motor/Generator Protector, Marine Safe Electronics Ltd., 101 Jardin Dr., Unit 24/25, Concord, Ontario, Canada L4K 1B6
Grumman Aerospace, 111 Stewart Ave., Bethpage, NY 11714.
Indikon Corp., 26 New St., Cambridge, MA 02138
Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
Leslie Co., 401 Jefferson Rd., Parsippany, NJ 07054
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
Marine Safe Electronics, 37 Staffern Drive, Concord, Ontario, Canada, L4K 2X2
Maritime Protection A/S, Box 100, N-4620 Vagsbygd, Norway
Megasystems, Inc., 1075 N.W. 58th Street, Boca Raton, FL 33431
Nav-Vue, Inc., P.O. Box 1175, Huntsville, TX 77340
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Pandel Instruments Inc., 2100 N. Hwy. 360, Grand Praire, TX 75050
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Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway

COUPLINGS
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SKF Steel, 201 Tower Lane, P.O. Box 745, Avon, CT 06001

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Machinoexport, 35 Mosfilmovskaya Ul., 117330 Moscow, U.S.S.R.
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J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany

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Murdock Engineering Company, P.O. Box 2278, Irving, TX 75061
Schoellhorn Albrecht, Div. of St. Louis Ship, 3460 So. Broadway, St. Louis, MO 63118

DECKING—GRATING
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DIESEL ACCESSORIES—CYLINDER LINERS
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General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360
Haynes Corporation, P.O. Box 179, Jackson, MI 49204
Illman Jones, 1111 Green Island Rd., American Canyon, CA 94589
Stewart & Stevenson Services, Inc.—MWM, P.O. Box 1637, Houston, TX 77251-1637

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Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Granges Repair Service GMBH, U.S. Rep: Field, Wigham and Co., Inc., 200 Middleneck Road South, P.O. Box 2123, Great Neck, NY 11021
Stewart & Stevenson Services, Inc.—MWM, P.O. Box 1637, Houston, TX 77251-1637
Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166

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Stewart & Stevenson Services, Inc.—MWM, P.O. Box 1637, Houston, TX 77251-1637
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, OR 97201

EMULSIFICATION SYSTEMS
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S/S Research & Development Inc., 1050 State St., Perth Amboy, NJ 08862

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Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
Fitz-Wright Suits Ltd., 17919 Roan Pl., Surrey, B.C., Canada V3S 5K1
Genstar Stone Products Company, Executive Plaza IV, Hunt Valley, MD 21031
Hamworthy Engineering Ltd., 10555 Lake Forest Blvd., Suite 5F, New Orleans, LA 70127
Harvey's Commercial Marine Div., 2505 S. 252nd St., Kent, WA 98032
Imperial Manufacturing Co., P.O. Box 4119, Bremerton, WA 98312
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, NY 10550
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
Raytheon Service Co., 100 Roesler Rd., Suite 103, Glen Burnie, MD

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Aqua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201
MECO (Mechanical Equipment Company, Inc.), 861 Carondelet St., New Orleans, LA 70130
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

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Gaylord Industries, Inc., P.O. Box 558, Wilsonville, OR 97070
Joy Manufacturing Company, 338 So. Broadway, New Philadelphia, OH 44663
Zidell Explorations, 3121 S.W. Moody St., Portland, OR 97201

FASTENERS
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FENDERING SYSTEMS—Dock & Vessel
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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

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Mueller Steam Specialty, P.O. Box 1569, Lumberton, NC 28359

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Gulf Western Leasing Corp., 1500 City West Blvd., Suite 300, Houston, TX 77047

FIRE PROTECTION, DETECTION & ALARM SYSTEMS
Gulf Publishing Company Video (Firefighting Videotape), P.O. Box 2608, Houston, TX 77001
Walter Kidde, Walter Kidde Dr., Wake Forest, NC 27586

FUEL OIL/ADDITIVES—Analysis & Combustion Testing
Ferrous Corporation, 910-108th N.E., P.O. Box 1764, Bellevue, WA 98009
Hamworthy Engineering Ltd., 10555 Lake Forest Blvd., Suite 5F, New Orleans, LA 70127
McTigue Industries Inc., 1615 9th Ave., Bohemia, NY 11716
U.S. Borax, 3075 Wilshire Blvd., Los Angeles, CA 90010

FURNITURE
Bailey Carpenter & Insulation Co., 74 Sullivan Street, Brooklyn, NY 11231
Comfort-Mate, Inc., 7988 NW 56th Street, Miami, FL 33166

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

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

HATCH & DECK COVERS—Chain Pipe
CamLock Flange Sales Corp./Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
MacGregor-Navire Internatinal, Box 8991, S-402 74 Goteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
Mack Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

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

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

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
Pacific Maine Services, TLX: 664540 seaserv, Long Beach, CA 90802
Petrochemical Services, Inc., 3820 Dauphine St., New Orleans, LA 70117
Petroferm Marine, Route 2, Box 280, Amelia Island, FL 32034
Phosmarine Equipment, 21 Bd. de Paris, 13002, Marseille, France
Seaward Marine Services, Inc., 6269 Leesburg Pike, Falls Church, VA 22044
Seaward International, 5409 Beamon Rd., Norfolk, VA 23513 TX: 710-881-1182
Taylor Diving & Salvage Co. Inc., 701 Engineers Rd., Belle Chasse, LA 70037

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Aeroquip Corp., 1130 Maynard Road, Jackson, MI 49202
Cunningham Marine Hydraulics Co., Inc., 201 Harrison St., Hoboken, NJ 07030; 2030 E. Adams St., Jacksonville, FL 32204, TX: 710-730-5224
Del Gavio Marine Hydraulics Inc., 207 W. Central Ave., Maywood, NJ 07607
Hydra-Dynamics, Inc., 2141 Greenwood Ave., Wilmette, IL 60091
Washington Chain & Supply, Inc., P.O. Box 3646, Seattle, WA 98124

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

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Adams & Porter, 1 World Trade Center, Suite 8433, New York, NY 10048
Wm. Keith Hargrove, Inc., 1300 Post Oak Blvd., Suite 2050, Houston, TX 77056
MGA International, 419 Park Avenue South, New York, NY 10016
United States P&I Agency, Inc., 80 Maiden Lane, New York, NY 10038

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Bailey Distributors, Inc., 74 Sullivan St., Brooklyn, NY 11231
Masonite Commercial Division, Dover, OH 44622
Megadoor Inc., 441 Lexington Ave., Suite 903, New York, NY 10017
Walz & Krenzer, Inc., 400 Trabold Road, Rochester, NY 14624

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

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
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Midland-Ross Corp., Russellstoll Division, 530 W. Mt. Pleasant Ave., Livingston, NJ 07039
Oreck Corp., 100 Plantation Rd., New Orleans, LA 70123
Perko Inc., P.O. Box 6400D, Miami, FL 33164
Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209

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A-C Brake Co., 308 E. College St., Louisville, KY
Jered Brown Brothers Inc., 1300 Coolidge, P.O. Box 2006, Troy, MI 48007
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Goltens, 160 Van Brunt St., Brooklyn, NY 11231
Rosan, Inc., 2901 West Coast Hwy., Newport Beach, CA 92663

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

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

MOORING SYSTEMS
Murdock Machine & Engineering Company of Texas, P.O. Box 2278, Irving, TX 75061
Samson Ocean Systems, Inc., 99 High Street, Boston, MA 02110

NAME PLATES—BRONZE—ALUMINUM
Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
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Aero Nav 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
C.A.C.I., Inc., 1815 No. Fort Myer Dr., Arlington, VA 22209
C.D.I. Marine Co., 5520 Los Santos Way, Suite 600, Jacksonville, FL 32211
C.T. Marine, 18 Church Street, Georgetown, CT 06829
Phillips Cartner & Co., Inc., 203 So. Union St., Alexandria, VA 22314
Century Engineering, inc., 32 West Rd., Towson, MD 21204
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, MA 02026
Crane Consultants Inc., 15301 1st Ave., So. Seattle, WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, Inc., 1725 Jefferson Davis Highway, Suite 700, Arlington, VA 22202
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706

Fleetweather Ocean Services, Inc., Rd. #2, Box 260, Hopewell Junction, NY

Texaco, Inc. (International Marine), 135 East 42nd St., New York, NY 10017

Transamerica Delaval, Inc., Turbine & Compressor Div., P.O. Box 8788, Tren-

Sea Data Corporation Introduces Deep Sea Instrumentation Cable —Literature Available

A new instrumentation cable, specifically designed to meet the needs of submersible instrumentation systems has been introduced by Sea Data Corporation of Newton, Mass.

The company announced the availability of the cable with strain and waterproof molded connectors to meet individual requirements. The new cable is built around a Kevlar core strength member manufactured by Philadelphia Resins, which is symetrically braided to minimize stretching and twisting. Break strength is

6,000 pounds with a working tension of 1,200 pounds. A dacron jacket and extruded polyurethane layer separate the core from 21 color coded No. 20 FEP insulated conductors. The conductor layer is covered with a foil shield and mylar wrap after which a heavy polyurethane jacket is applied.

The finished cable is flexible, lightweight, 565 inches in diameter and can be supplied in lengths up to 2,000 m. Temperature, conductivity and similar sensors can be readily spliced into the polyurethane jacket, affording the opportunity for easily achieved leak-proof molded joints, with smooth contours to minimize snagging. The Sea Data Thermistor Chain is a typical application. In addition to the thermistor chain, and finished cable with custom terminations, with or without sensors molded in at the factory, raw lengths of the cable can also be purchased.

For free literature and further information,

Circle 30 on Reader Service Card

Goodway Offers New Catalog On Tube Cleaning Systems And Pressure Washers

Goodway Tools Corporation of Stamford, Conn., has published a new 36-page catalog titled "Tube Cleaning Systems and Pressure Washers." The booklet functions as a guide to Goodway's tube cleaning equipment and air and electric-powered tube cleaners for boilers, condensers, and heat exchangers, which brush or scrape deposits with simultaneous vacuum recovery or water flush; and to electric or air-powered pressure washers that are available in compact designs for easy handling, transport and storage.

The new four-color publication contains an index that serves as a quick reference to the line of Goodway equipment that is offered. All of the products listed are liberally illustrated with photos, along with explanatory texts, specifications, accessory lists, prices, etc.

Covered in the catalog are the Soot-A-Matic, a lightweight, compact boiler tube cleaning system with an integrated vacuum that collects soot and scale as it is removed from the firetubes by Soot-A-Matic's interchangeable cleaning brushes; and Goodway vacuums for plant maintenance, powered for strong suction for cleaning boilers or any maintenance application.

Also discussed are two models of Ream-A-Matic, which use a flexible shaft to snake through the tubes while the rotating action of the cable allows the cleaning brush or cutting tool to loosen all deposits along the way as water transported through the shaft simultaneously and continuously flushes out the loosened deposits, leaving the tubes thoroughly cleaned; and the AWT-100 air-powered tube cleaner used for all types of tube cleaning applications where brushing or cutting of tube deposits with simultaneous water flushing action is desirable.

Included are descriptions of the PSM-500 heat exchanger/oil cooler cleaner, the Goodway Boiler Efficiency Tester used to determine if a burner needs adjustments or the boiler needs to be cleaned, and the Goodway Hi-Pressure Washers which offer economy and efficiency in a compact design for easy handling transport and storage.

The booklet contains detailed information on how to order tube cleaning systems, and information on tube sizes, with a chart to determine tube inside diameter.

For a free copy of the catalog "Tube Cleaning Systems and Pressure Washers" from Goodway Tools Corporation,

Circle 31 on Reader Service Card

Kastalon Offers New Brochure On Polyurethane Crane Bumpers

Polyurethane crane bumpers are the subject of a new brochure being offered free by Kastalon Inc. of Alsip, Ill.

The four-page folder says that Kastalon polyurethane crane bumpers outlast all other crane bumpers and, affording physical properties that surpass ordinary materials, they are more resilient, more durable, more economical and more capable of accommodating a wide range of applications, fitting virtually every bumper requirement. Only premium grade materials are used, yielding crane bumpers that provide optimum results in every application at reasonable costs.

Other points mentioned are: Kastalon polyurethane crane bumpers are engineered for both OSHA and AISE (steel mill) requirements; they are not affected by oil, grease, dirty environments, temperature changes or aging, thus providing for longer life; they have no moving parts, require no maintenance, require less room for installation, and are much less in cost. Advantages listed are longer life, less downtime, better results, and lower operating costs.

The publication contains a chart that lists the various models with such information for each as diameter, length, cubic inches, capacity, baseplate, bolt size, bolt centers and weight. Quick selection graphs are also shown for both AISE and OSHA parameters, and bumpers of extraordinary parameters can be engineered and quoted upon request. Kastalon provides a complete service package on custom-made polyurethane products.

For a free copy of the brochure and further information on Kastalon polyurethane products,

Circle 94 on Reader Service Card

U.S. Navy Ship Overhaul Market

A Marketing Guide To The $6.8 Billion Navy Ship Repair And Alteration Program

I. INTRODUCTION 1
1. Objective of Report 1
2. Scope 1
3. Definitions 2
4. Organization of Report 3
5. Updating 3

II. OVERVIEW OF THE BUSINESS 4
1. Market Drivers 4
Fleet Size 4
Average Age 8
Ship/System Technology 8
Government Policy 9
Annual Ship Maintenance Budget 9
2. Government Owned Maintenance Facilities 11
Naval Yards 11
Naval Ship Repair Facilities (SRF) 15
Navy Intermediate Maintenance Activities (IMA) 15
Other Navy Depot Maintenance Facilities 18
Ships Parts Control Center (SPCC) 18
3. Commercial Ship Repair Industry 19
Naval vs. Commercial Ship Repair 20
Types of Shipyards 20
Major Players 21
4. Recent Work Distribution 31

III. OVERHAUL AND MODERNIZATION PLANNING 35
1. Key Navy Organizations 35
Deputy Chief of Naval Operations (Logistics) 35
Fleet Commanders 35
Type Commanders 36
Military Sealift Command (MSC) 36
Naval Sea Systems Command (NAVSEA) 36
Planning and Engineering for Repairs and Alterations (PERA) 36
Planning Yards 37
Supervisor of Shipbuilding, Conversion/Repair (SUPSHIP) 37
Other Organizations 38
2. Types of Maintenance 38
Organizational Maintenance 39
Intermediate Level Maintenance 39
Depot Level Maintenance 40
3. Maintenance Strategies 41
Regular Overhaul Cycle (ROH) 41
Engineered/Extended Operating Cycle (EOC) 43
Progressive Maintenance 47
Phased Maintenance 48
Comparison of Maintenance Strategies 50
4. Planning Ship Maintenance and Modernization 52
Repair and Maintenance 52
Ship Modernization 53
5. Executing A Ship Overhaul 55
OPNAV 55
NAVSEA 55
TYCOM 56
Overhaul Planning Activity (Planning SUPSHIP) 56
Overhaul Activity (Executing SUPSHIP) 57
Ship Personnel 57
6. MSC Ship Maintenance 58
Maintenance Strategy 58
Navy vs. MSC Maintenance Practices 58
Chartered Ships 59

IV. PROJECTED MARKET 60
1. FY 1985 Navy Ship Maintenance and Alteration Budget 60
Navy Active Fleet 60
Navy Reserve Fleet 61
MSC Nucleus Fleet 62
Proposed Budget Impact on Private Shipyards 63
2. Projected Navy Ship Overhauls 63
Two Year Overhaul and SRA Projection 63
Projections Are Tentative 65
3. Navy SRA's And Overhauls To Private Sector 65
4. MSC Repair and Overhaul Plan 71

V. CONTRACTING POLICIES AND PROCEDURES 74
1. General Ground Rules 74
Private Sector Allocation 74
Homeport Policy 75
Small Business Set Asides 77
2. Contracting Methods 78
Advertised Procurement 79
Negotiated Procurement 80
Contract Types 82
3. Contractor Qualification 84
Master Ship Repair Agreements 84
Master Ordnance Repair Contracts (MOR) 87
Drydock Certification 89
4. Overhaul Contracting Process 89
General Description of Process 89
Specific Contracting Events 91
5. Subcontracting 95
Finding Market Leads 95
Small Business Subcontracting Plan 95
6. Rules Applicable To Foreign Firms 96
Ship Maintenance and Overhaul 97
Conversions 97
Special Buy American Provisions 98
Special Metals Restrictions 100
Technical Restrictions 101

VI. DOING BUSINESS WITH THE NAVY 102
1. Response Profile 102
2. Profitability of Navy Ship Repair 104
3. Future Market Opportunities And Planned Facility Improvements 104
New Business Opportunities 104
Improvements Planned 105
4. Performance And Selection Considerations 107
Factors Impacting Ability To Perform 107
Factors Influencing Contractor Selection 108
5. Source And Management Of Component Supply 109
Contractor Control Of Component Repair And Purchasing 109
Subcontractor Reliability 110
Subcontractor Competition 111
Role Of Original Equipment Manufacturers (OEM) 111
6. General Comments 112

VII. POINTS OF CONTACT 114

APPENDIX A -- Detailed Description Of Overhaul Planning Process ..... 17 pages
APPENDIX B -- Relevant DOD Contracting Forms ..... 22 pages
APPENDIX C -- Firms Holding Master Repair Agreements With Navy And/Or MSC ..... 17 pages

July 1984

Available From:

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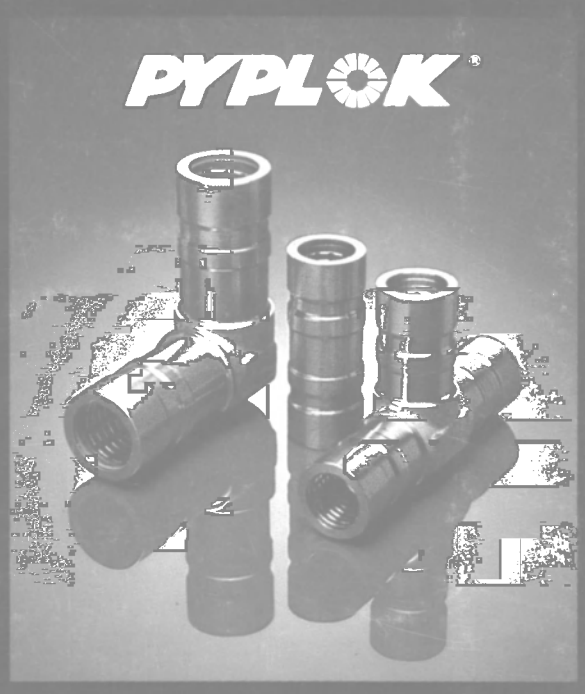

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