MARITIME REPORTER
AND
ENGINEERING NEWS

OFFSHORE CANADA

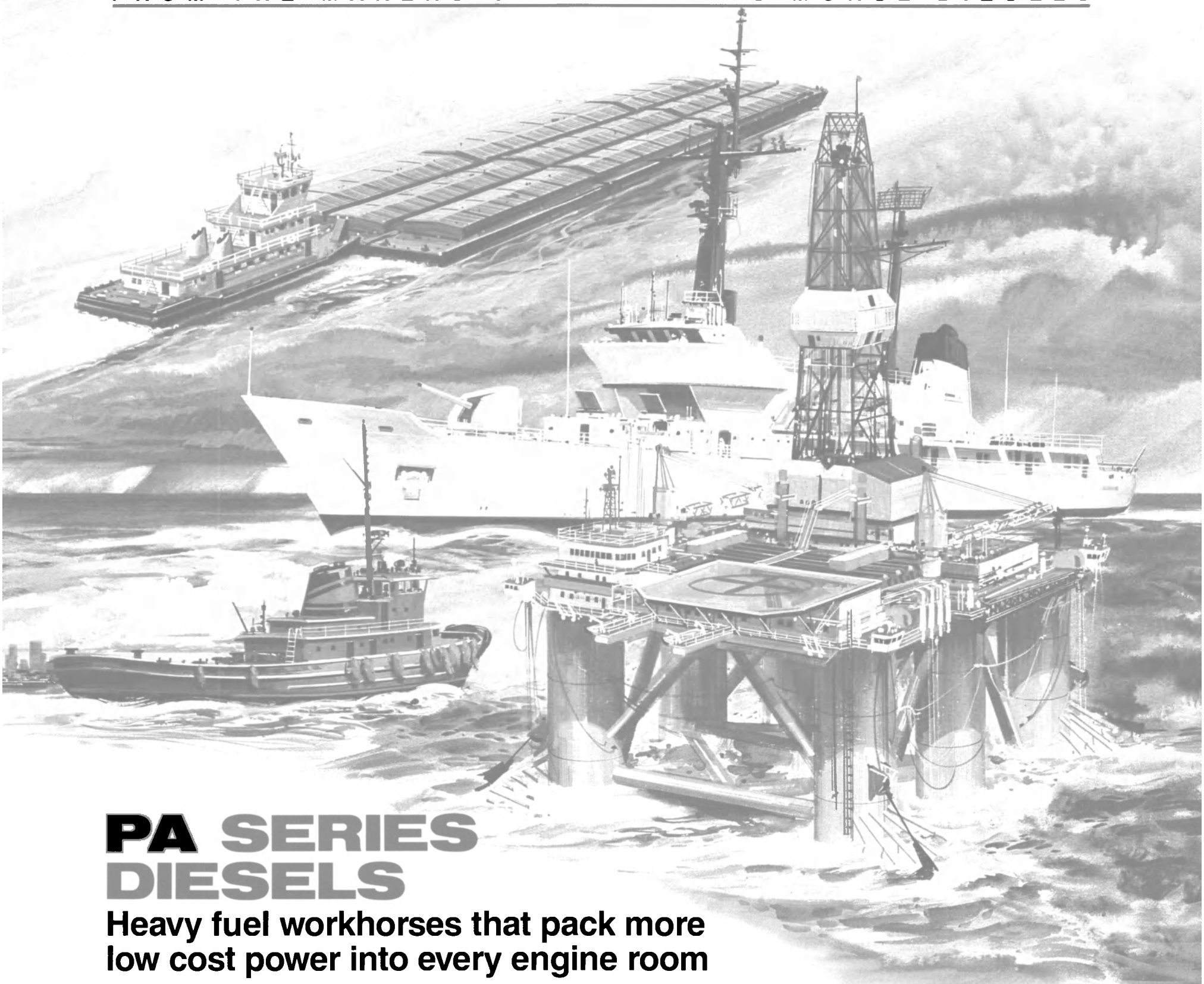
CSSRA Annual Meeting And First CSOE

Reducing Fuel Costs

(PAGE 4)

JANUARY 15, 1986

FROM THE MAKERS OF FAIRBANKS MORSE DIESELS



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Now, cut your fuel costs up to 50% and increase your engine room horsepower with the internationally proven PA Series diesels from Alsthom and S.E.M.T. Pielstick.* The PA Series of engines are compact and deliver high horsepower per cylinder with the capability to burn available residual fuels. In addition, they have an enviable record for low fuel consumption over their entire power range and long service life between major overhauls.

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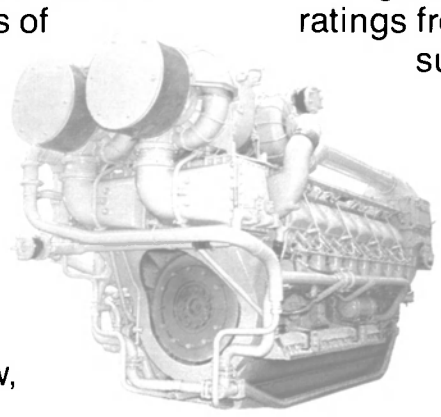

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Circle 181 on Reader Service Card

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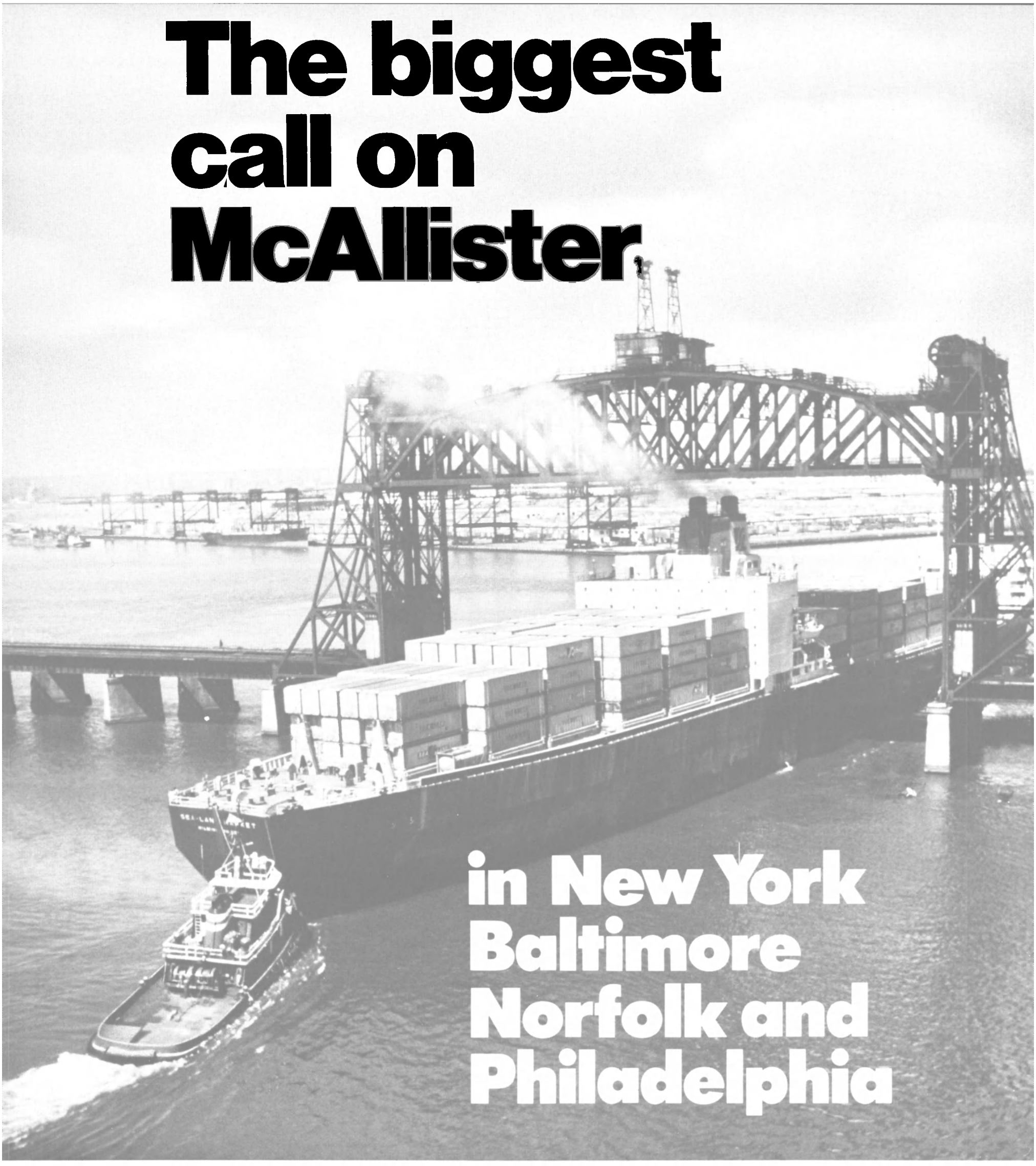
The biggest call on McAllister



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ON THE COVER

Cover: An exploration rig on the Grand Banks. Courtesy Newfoundland Department of Development and Tourism

Preview—38th Annual CSSRA Technical Conference/ 1st Canadian Shipbuilding & Offshore Exhibition
PAGE 12

Reducing Fuel Costs
PAGE 24

New Firm Applies To MarAd For Title XI On Six Passenger Vessels

Floating Through America Inc. (333 East 30th Street), New York City, plans to build six small passenger vessels to be used for cruising in domestic waters.

The company applied to the Maritime Administration for a guarantee of a construction loan to build the 175-foot vessels at Bender Shipbuilding, Mobile, Ala.

The total cost of the six vessels was estimated at $36 million. The company sought a government guarantee for 75 percent of the financing.

Delivery, according to the company, was expected between September 1986 and June 1988.

The intention is to use the 49-passenger craft, which were designed for a crew of 14, in the "waterways of America."

Purcell Appointed Manager Of Engineering At Interocean Management

Charles E. Purcell was appointed as manager of engineering at Interocean Management Corporation, Philadelphia, Pa., according to the company's chairman and president **George P. Steele.**

Mr. **Purcell,** who recently joined the vessel management firm, will be responsible for the engineering management of the corporation's fleet-managed vessels which presently consist of oceangoing tankers, RO/RO ships and specialized crane ships.

He was previously manager, fleet services with Shell Oil Company in Houston, Texas. He brings with him a varied background in vessel management, shipyard management and naval architecture.

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ALL MATERIAL FOR EDITORIAL CONSIDERATION SHOULD BE ADDRESSED TO ROBERT WARE, EDITOR.

Todd Pacific Shipyards Awarded $4.6-Million Navy Contract

Todd Pacific Shipyards Corporation, Los Angeles Division, San Pedro, Calif., is being awarded a $4.6-million firm-fixed-price contract for the post shakedown availability for the USS Vincennes (CG-49) and USS Valley Forge (CG-50) Aegis guided missile cruisers. Work will be performed in San Pedro, Calif., and is expected to be completed in January 1987. Twelve bids were solicited and three offers were received. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-2006).

Free Marine Bearing Comparison Chart From Thordon

A four-page bulletin entitled "Marine Bearing Comparison Chart," is now available from the Thordon Division of Thomson-Gordon Limited, Burlington, Ontario, Canada.

The bulletin enables shipowners, operators, ship repair yards, fleet managers and other users of propeller shaft and strut bearings to compare dimensions, styles, types, and grades of Thordon marine bearings with other products available on the market.

For a free copy,

Circle 26 on Reader Service Card

Bay Shipbuilding Expands Foreign Trade Zone

Bay Shipbuilding Corp., of Sturgeon Bay, Wis., was recently granted an expansion of its Foreign Trade Sub-Zone operations by the U.S. Commerce Department. The expansion will allow Bay Shipbuilding to utilize facilities at its parent company, The Manitowoc Company, Inc., Manitowoc, Wis.

The expansion was necessitated by the aggressive shipbuilding program now in effect at the company. Bay is presently constructing three oceangoing container vessels for Sea-Land Service Inc., a subsidiary of Sea-Land Corporation, America's largest ocean transport company.

The Foreign Trade Sub-Zone enables Bay to lower its costs by eliminating or lowering duties normally levied on imported materials and components. The expansion of the sub-zone to include designated buildings at The Manitowoc Company will allow Bay Shipbuilding to increase its storage capacity, thus enabling the company to have materials and parts readily available when needed.

Approval of the expansion was greatly expedited through the efforts of U.S. Congressman **Toby Roth** and his staff.

For free literature on Bay Shipbuilding's facilities and services,

Circle 34 on Reader Service Card

First of the Nichols Brothers Boat Builders, Inc., catamarans to go into scheduled commuter service was the M/V CataMarin.

Gladding-Hearn Shipbuilding To Build Large, Fast Passenger Catamarans On The East Coast

Matt Nichols, president of Nichols Brothers Boat Builders, Inc., and **George Duclos,** president of the Duclos Corporation that operates Gladding-Hearn Shipbuilding, have announced an agreement under which the two companies will share the task of building large, fast, passenger-carrying catamarans in the U.S.

Nichols Brothers, located on Whidbey Island, Wash., holds the U.S. license to build catamarans designed by International Catamarans Pty., Ltd., of Sydney, Australia.

Under a sublicensing agreement, Gladding-Hearn will join with Nichols Brothers to promote and build the catamarans in the U.S. Gladding-Hearn, located in Somerset, Mass., will build those vessels that are headed for the East Coast and contiguous areas. Nichols Brothers will build those vessels generally destined for the West Coast, Alaska, and Hawaii.

Nichols Brothers' catamarans are now in service along the U.S. West Coast and in Alaska. Recent deliveries include the 400-passenger, 30-knot CataMarin, now in scheduled commuter service, and the Gold Rush, in excursion service, both in San Francisco Bay. Nichols Brothers will christen a similar vessel in this month whose service will be split between San Diego and southeast Alaska. A catamaran designed to carry overnight diving parties to the Bahamas is now under construction in Florida. Nichols has also negotiated a contract for a 30-meter catamaran fitted with cruising accommodations, the seventh catamaran ordered since the program began in 1984.

The line of catamarans is based on designs developed by International Catamarans. The Australian firm some years ago originated its basic design for vessels in ferry and excursion operations in several areas of Australia, including the Great Barrier Reef. In addition to passenger carrying versions, the basic catamaran design has been applied to work and utility craft, fire and patrol boats, and offeshore oil well service boats.

Catamarans designed by International Catamarans span a range between 12-meter utility boats to boats longer than 30 meters and capable of carrying upwards of 500 passengers. They have also been designed for economy and simplicity of operation, maintenance, and overhaul.

Among other features, passenger cabins are mounted to the twin hulls with the use of rubber and steel shock connections. This method sharply reduces noise and vibration. The symmetrical, fine displacement hulls have been tested for speeds up to 40 knots, and for operation in heavy sea states.

Gladding-Hearn was founded in Massachusetts in 1955, with **George Duclos** as one of the founding partners. Over the years, the yard has specilized in aluminum fabrication, according to Mr. **Duclos.**

"We feel particularly fortunate in associating with another, strongly family-oriented enterprise in the Nichols Brothers firm," Mr. **Duclos** said. Mr. **Duclos's** wife, **Pauline,** is office manager.

Their son, **John,** a graduate of the Kings Point Maritime Academy and holder of a master's degree in naval architecture from the University of Michigan, manages the shipyard's operation.

Mr. **Duclos** said that about half of his firm's present business involves 60-foot aluminum yachts. He said that the yard will bring its experience in fine yacht finishing to building passenger-type catamarans. Galdding-Hearn also builds aluminum structures used on an OEM basis by Boston Whalers.

The yard has made a name for itself with pilot boats, recently delivering the Sandy Hook Pilot Boat. Mr. **Duclos** said that two similar boats are under construction in the yard—a 55-foot search and rescue boat for Bermuda, and a 52-foot pilot boat for the Corpus Christi Pilots in Texas.

Other recent passenger vessels turned out by Gladding-Hearn include a vessel operating in Newport, R.I., and a vessel operated by Cornell University, New York.

For further information,

Circle 17 on Reader Service Card

Raytheon Receives $5-Million Modification To Previous Contract

Raytheon Company, Equipment Division, Wayland, Mass., is being awarded a $5,000,000 modification to a previously awarded cost-plus-award-fee contract for incremental funding for the relocatable over-the-horizon radar system. Work will be performed in Wayland, Mass., and is expected to be completed in May of 1988. Twenty bids were solicited and three offers were received. The Space and Naval Warfare Systems Command, Washington, D.C., is the contracting activity (N00039-84-C-0049).

Navy Awards Rockwell $16.2-Million Navigation Systems Contract

Rockwell International Corporation, Anaheim, Calif., is being awarded a $16,223,000 cost-plus-fixe-fee contract for FY-86 technical support for the MK-2 Ships Intertial Navigation System (SINS) and the Electrostatically Supported Gyro Monitor (ESGM) and associated technical data and reports. Work will be performed in Anaheim and is expected to be completed in September 1986. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-4000).

Free Literature Describes New Repair Compounds From Philadelphia Resins

Three new materials have been formulated by Philadelphia Resins, Montgomeryville, Pa., to resist abrasion, impact, cavitation and corrosion at elevated temperatures and in adverse environments. Developed especially for high-temperature, high-friction aerospace, marine and industrial applications, these easy-to-use materials include an alloy paste, a ceramic repair liquid and a ceramic repair putty.

Phillybond® Super Alloy is a titanium-based compound, used to recondition compressor housings, propulsion shafting, valve bodies and other equipment which must operate in adverse environments with temperatures between −100° to 500°F. In addition to permanently repairing and protecting marine, industrial and aircraft components made from steel, aluminum, brass, carbides, zinc and zinc alloys, this new compound bonds dissimilar metals without galvanic corrosion problems. After curing for 18 hours at 72°F, it may be machined and finished with standard metalworking equipment.

Phillybond® Ceramic Repair Putty and Phillybond® Ceramic Repair Liquid are specialty repair compounds, developed for coating, lining and protecting pump casings, valves and other new or worn equipment subjected to friction, corrosion/erosion and cavitation. With convenient, long-term repairs of worn metal surfaces on-site, the brushable liquid and the nonsagging trowelable putty reduce downtime in repairing vital machinery. Their useful thermal envelope is also −100° to 500°F.

For free literature containing complete information on these products,

Circle 45 on Reader Service Card

ODECO Elects Kilpatrick Executive Vice President


James L. Kilpatrick

James L, Kilpatrick, a veteran of more than a quarter century of offshore oil and gas and contract drilling operations, has been elected executive vice president of Ocean Drilling & Exploration Company (ODECO).

Hugh J. Kelly, ODECO president and chief executive officer, said Mr. **Kilpatrick** will be responsible for all of the company's operating divisions and subsidiaries, including Sub Sea International, Inc., one of the world's largest underwater contractors.

Mr. **Kilpatrick,** a native of Haynesville, La., is a petroleum engineering graduate of Louisiana Tech University. He joined ODECO in 1960 as a production engineer after serving three years with Murphy Oil Corporation of El Dorado, Ark.

He subsequently served as assistant to the vice president in charge of the company's Drilling and Marine Division; coordinator of Foreign Operations, and general manager of the Drilling Department.

Mr. **Kilpatrick** was elected a vice president of the company in 1968 and senior vice president in 1971. He has served on ODECO's board of directors since 1974.

Headquartered in New Orleans, Louisiana, ODECO operates one of the world's largest fleets of mobile offshore drilling units, explores for and produces substantial oil and gas reserves and conducts worldwide diving operations through Sub Sea International.

Combustion Engineering Awarded $12 Million In Navy Boiler Contracts

Combustion Engineering, Inc. (C-E) has been awarded four separate contracts for boilers and related equipment to be installed on U.S. Navy ships, the company recently announced. The value of the contracts, booked in the third quarter, is approximately $12 million.

C-E will supply two propulsion boilers for an amphibious assault ship, nine waste heat boilers for three guided missile cruisers, and six auxiliary boilers for three dock landing ships. Delivery is expected in 1986 and 1987.

Six of the waste heat boilers will be supplied to the Bath Iron Works Corporation of Bath, Maine. Bath will install three boilers on each of two U.S. Guided Missile Cruisers (CG-60 & 61), with delivery scheduled for 1987.

The second contract calls for three shipsets of auxiliary boilers to be provided by C-E to Avondale Shipyards, Inc., of New Orleans, La., a division of Avondale Industries, Inc. Avondale will install the boilers on three U.S. Navy Dock Landing ships (LSD-45, 46 & 47). Two shipsets will be delivered in 1986, while the third will be delivered in 1987.

The two other contracts are with Ingalls Shipbuilding of Pascagoula, Miss., a division of Litton Systems, Inc. The first is for two C-E V2M main propulsion boilers to be installed aboard a U.S. Navy Amphibious Assault Ship (LHD-2). The second contract is for three waste heat boilers to be installed aboard a U.S. Navy Guided Missile Cruiser (CG-62).

The LHD-2 boilers are scheduled for a third quarter 1986 delivery. The three CG-62 waste heat boilers are scheduled for delivery in early 1987.

For more information on C-E boilers,

Circle 60 on Reader Service Card

Hägglunds Offers Elaborate 72-Page Full-Color Booklet On Cranes And Equipment

Hagglunds of Sweden is offering free an impressive 72-page full-color booklet on the company's extensive line of cranes and equipment, and on its organization, services and capabilities.

The handsome publication consists of some six brochures bound together to form a single elaborate volume that features outstanding full-color photographs of many of Hagglunds notable crane installations.

The first section, "Deck Cranes," describes the technical improvements in the Stevedore Crane Series representing, according to the manufacturer, the latest stage in the development of cargo-handling on the slewing and luffing principle. The Stevedore Series offers an extensive range of Hagglunds cargo-handling gear which, in addition to hydraulic deck cranes, includes gantry models of all sizes and the associated equipment required to create complete cargo-handling systems geared to optimum efficiency.

The second section, titled "High-Efficiency Cargo-Handling Gear," discusses service cranes, hydraulic cranes, gantry, twin and team cranes, and Hagglunds range of cargo-handling tools that add a complement to the range of cranes. Also mentioned is the company's network of service stations around the world that stock parts in order to deal with virtually all requests for service.

The third section discusses Hagglunds Viking Drives, new possibilities in sea-floor operations, and handling system for drilling operations.

Other sections cover hydraulic "slim" single cranes and offshore cranes.

A five-page fold-out section is included that features hydraulic service crane technical specifications and description, with schematic drawings and full-color photographs.

Also inserted in the package is the latest edition of "Hagglunds International," a company public relations publication that contains interesting and timely articles relating to the company and the equipment it produces.

For more information and a free copy of this informative booklet from Hagglunds,

Circle 46 on Reader Service Card

Rockwell International Awarded $12.7-Million Navy Order

Rockwell International Corporation, Anaheim, Calif., is being awarded a $12,762,088 cost-plus-fixed-fee contract for logistics technical assistance for the MK-2 Ships Inertial Navigation System (SINS) and the Electrostatically Supported Gyro Monitor (ESGM). Work will be performed in Anaheim and is expected to be completed in June 1988. This contract combines purchases for the U.S. Navy (92 percent), and for Great Britain (8 percent), under the Foreign Military Sales Program. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-4002).

Huthnance Consolidates Management Of Nine Offshore Drilling Rigs

Huthnance Offshore Corporation, formed in 1983 as the parent company of Huthnance Drilling Company and Huthnance International, Inc., has consolidated management of the nine offshore drilling rigs owned by these subsidiaries.

"The consolidation is a move designed to streamline operations," said **Bill Huthnance,** president and chief executive officer of Huthnance Offshore Corporation. "As our new operating company, Huthnance Offshore Corporation will be a strong partner to service the needs of offshore operators."

Huthnance Drilling Company, formed in 1975, is general partner of limited partnerships which own three jackup rigs, and Huthnance International, Inc., formed in 1976, owns four platform rigs and two jackup rigs. All nine rigs are currently working for major oil companies in the Gulf of Mexico, and Huthnance Offshore Corporation has maintained a utilization rate of 98 percent for the year for its nine rigs in a market which has had a utilization rate of 70 percent for jackup rigs and 48 percent for platform rigs.

For more information,

Circle 87 on Reader Service Card

Sridhar Appointed Manager Business Development At Versatile Pacific Shipyards

S. Sridhar

Versatile Pacific Shipyards Inc., formerly Burrard Yarrows corporation of Vancouver, British Columbia, Canada, has appointed **Sid Sridhar** to the new position of business development manager in their industrial Engineering Division.

This division has traditionally handled non-marine engineering and steel fabrication work in both the Vancouver and Victoria Divisions for a variety of British Columbian clients, including the pulp, paper and mining industries.

In appointing Mr. **Sridhar,** it is Versatile Pacific's intention to seek out new markets while revitalizing their traditional customer base.

For more information on Versatile Pacific Shipyards,

Circle 88 on Reader Service Card

Navy Ends Suspension; Tracor, Inc., Resumes Government Contracting

Frank W. McBee Jr., chairman and president of Tracor, Inc., has announced that the temporary suspension of the company by the Department of the Navy was lifted, effective November 22, 1985, and that Tracor has resumed contracting activity with government agencies.

Tracor was suspended October 16, 1985, in connection with an investigation relating to a product quality matter that occurred between 1981 and 1983 at a plant of one of its subsidiaries and which was corrected by the company nearly two years ago.

Mr. **McBee** said: "We are pleased that a resolution with regard to this matter has been reached. The interruption to our pursuit of new government business was unfortunate; however, it represented only a slight delay in achieving our objectives for new government business in 1986 and beyond.

"Costs associated with the settlement agreement with the Department of the Navy, along with other matters, will result in an additional charge to 1985 income of $7.5 million, net of income taxes. The charge will reduce 1985 net income per share by 38 cents. Included in the $7.5 million charge is a $2.1-million after-tax item which recognizes a potential overrun that has developed on a major program. In addition, Tracor management has determined that it is in the best long-term interests of the company to pursue the divestiture of certain nonprofitable businesses, which will result in a discontinued operations charge of $4.6 million after tax, or 24 cents per share.

"Even with these substantial charges, net income for the year should be approximately $16 million, compared to $33.2 million in 1984."

Tracor, Inc. is an international technological products and services company with headquarters in Austin, Texas. The company is a major technical contractor in sonar, communications, and aviation programs; a leader in the development and production of passive electronic countermeasures systems and military telecommunications terminals; and a major manufacturer of scientific instruments and electrical and electromechanical components.

For free literature and full details on Tracor's line of marine products,

Circle 42 on Reader Service Card

GTE Awarded $3.9-Million Navy Communication Systems Contract

GTE Government Systems Corporation, Communications Systems Division, Needham Heights, Mass., is being awarded a $3,949,792 modification to a previously awarded cost-plus-award-fee contract for the full-scale development of the Extremely Low Frequency (ELF) communication system. Work will be performed in Needham Heights, Mass., and is expected to be completed in March of this year. Twelve bids were solicited and three offers were received. The Space and Naval Warfare Systems Command, Washington, D.C., is the contracting activity (N00039-82-C-0241).

Aalborg Yard Launches Third Reefer For Delivery To USSR's Sudoimport

Aalborg Vaerft A/S in Denmark recently lauched its newbuilding No. 249, a refrigerated vessel with a capacity of about 10,000 cubic meters, for the Soviet organization V/O Sudoimport. The reefer, named the Akademik Zavaritskij, is the last in a series of three sister ships, and is scheduled for delivery in May this year.

Sponsor of the vessel was **Mrs. Taissia Ekimova,** wife of the leader of the Trade Representation of the USSR in Denmark, **Yuri V. Ekimova.** The ceremony was attended by many representatives from the USSR and Denmark.

The Zararitskij has an overall length of 453.4 feet, beam of 70.5 feet, depth of 43 feet, and draft (bananas) of 23 feet. Propulsion is by a two-stroke B&W 6 DKRN 67/170 diesel engine with a maximum output of 12,874 bhp at 123 rpm. The main engine, of the uniflow scavenging type, is coupled directly to a fixed-pitch propeller. Service speed is 20.3 knots. Four diesel generator sets each have an output of 720 kw.

The vessel is designed as a multipurpose reefer, capable of transporting fruit as well as frozen meat. She will have large open type cargo hatches, which with the reinforcement of tanktops and decks, provides the capability to carry both 40-foot and 20-foot containers, in cargo holds as well as the weather deck.

Shown with members of the launching party are (left) **Taissia Ekimova,** sponsor, and director **K.-E. Bengtsen.**

Three cargo holds are arranged forward of the engine room and accommodations, and one aft. The holds are via tweendecks divided into 14 sections, and eight independent temperature zones will be available with temperatures down to -25 C.

Accommodations will be provided for 40 persons (crew and passengers in a total of 35 cabins.

For more information and free literature on the yard and its facilities,

Circle 20 on Reader Service Card

'85 Sales Of Imperial Survival Suits Nears 100,000 —Literature Offered

Sales of cold-water survival suits by Imperial Manufacturing Company of Bremerton, Wash., approached 100,000 last year, according to production manager **Jim Skelly**. A big boost in sales for the company, which has been producing survival suits for 15 years, came last summer when new U.S. Coast Guard requirements became effective. Interest of the marine community in improving protection against drowning and hypothermia—death from loss of body heat—continues to increase both in the U.S. and abroad.

In a four-month period last summer, Imperial sold 8,500 survival suits, with the remaining production split among a handful of companies.

Imperial has worked with various governing bodies, including the Coast Guard and Underwriters Laboratory, in testing and developing safe standards, and is said to be the only U.S. manufacturer of survival suits to pass the Norwegian Maritime Directorate standards, the most stringent in the world. More than 300 individuals have reported incidents where their lives were saved through the use of Imperial survival suits.

For details and free literature on these suits,

Circle 104 on Reader Service Card

Consortium Acquires Halifax Industries' Assets

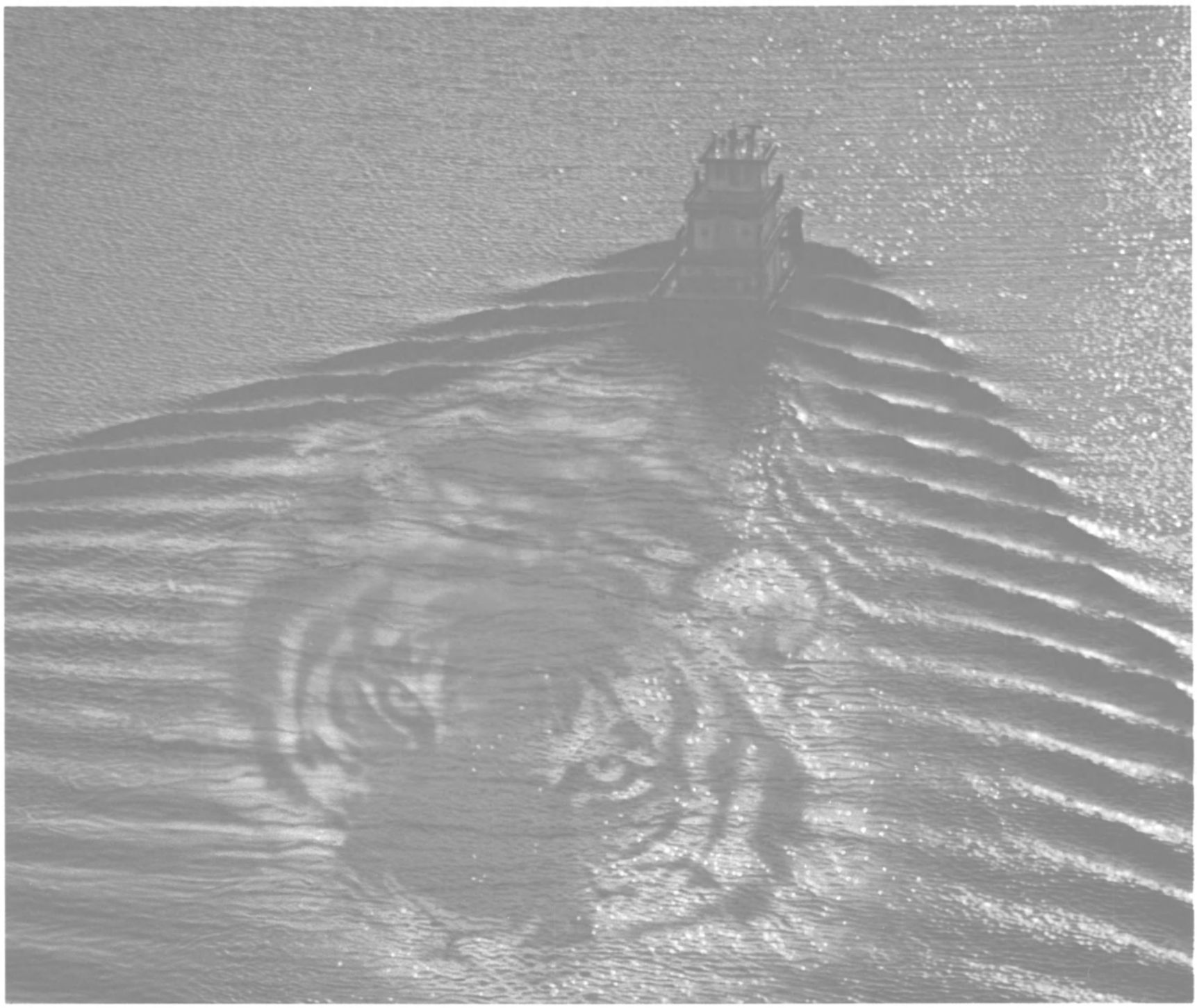
An agreement has been reached to acquire the C. $18-million assets of Halifax Industries Limited, a Nova Scotian shipbuilder, repairer and offshore fabricator, currently in receivership, according to an announcement. The business will be acquired by **Andrew McArthur,** former president of St. John Shipbuilding & Dry Docking Company Ltd., and a consortium of local investors.

A new company called Halifax-Dartmouth Industries Limited has been formed, and Mr. **McArthur** and his associates have taken over full day-to-day management of both HIL's two shipyards under a management contract.

Halifax-Dartmouth Industries will formally assume full ownership of all Halifax Industries Limited assets on January 1, 1986.

For further information on the new shipbuilder,

Circle 89 on Reader Service Card



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Circle 112 on Reader Service Card

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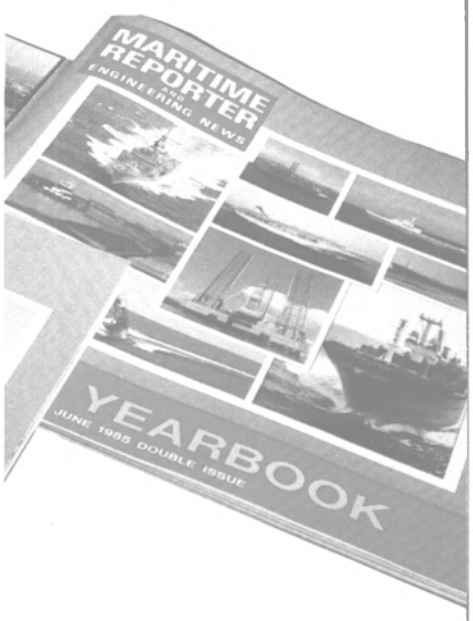
This entire increase consisted of only Buying Influence Readers. MARITIME REPORTER now delivers your advertising to an unequalled 21,609 buying influence readers . . . thousands more than any other Marine magazine in the entire world . . . and, more than any other two marine magazines combined.

THE UNITED STATES is the largest marine market nation in the world . . . offers greater potential for marine sales than any other country.

MR HAS THE LARGEST TOTAL U.S. CIRCULATION . . . thousands larger than No. 2, ME/Log . . . including thousands more U.S. marine buyers than ME/Log or any other marine magazine in the world.

YOUR MOST POWERFUL MARINE A



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WORLD'S LARGEST CIRCULATION TO BUYERS

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

COMPARE CIRCULATION TO BUYERS

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

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

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

RECORD SALES LEADS FOR ADVERTISERS

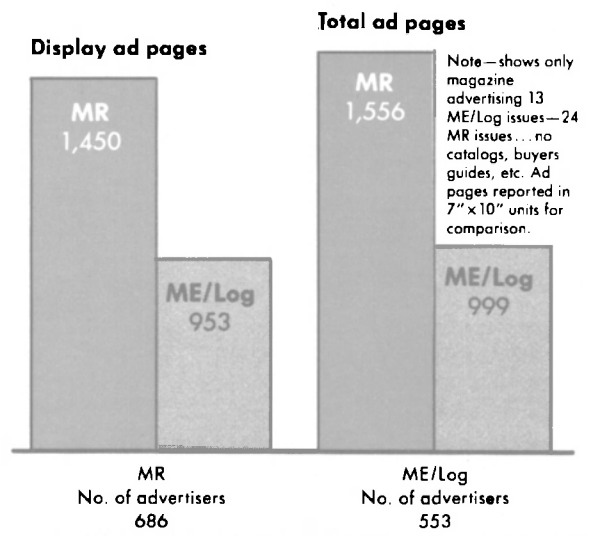
MARITIME REPORTER produces more and better sales leads than any other marine magazine...two times and three times more than the number 2 magazine. Each figure listed represents inquiries produced for an individual advertiser by MARITIME REPORTER in one year or less.

PAINT CORROSION CONTROL	SHIPBUILDING/REPAIR
1,033	2,147
714	613
655	570
DECK MACHINERY/ CARGO HANDLING	**DIESEL ENGINES**
545	1,533
415	1,352
477	1,168
NAVIGATION & COMMUNICATIONS	**OILY WATER SEPARATORS**
773	936
663	751
623	459

THE ADVERTISING LEADER

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

COMPARE 1984 ADVERTISING



NUMBER 1 THE WORLD'S MOST SUCCESSFUL MARINE MAGAZINE

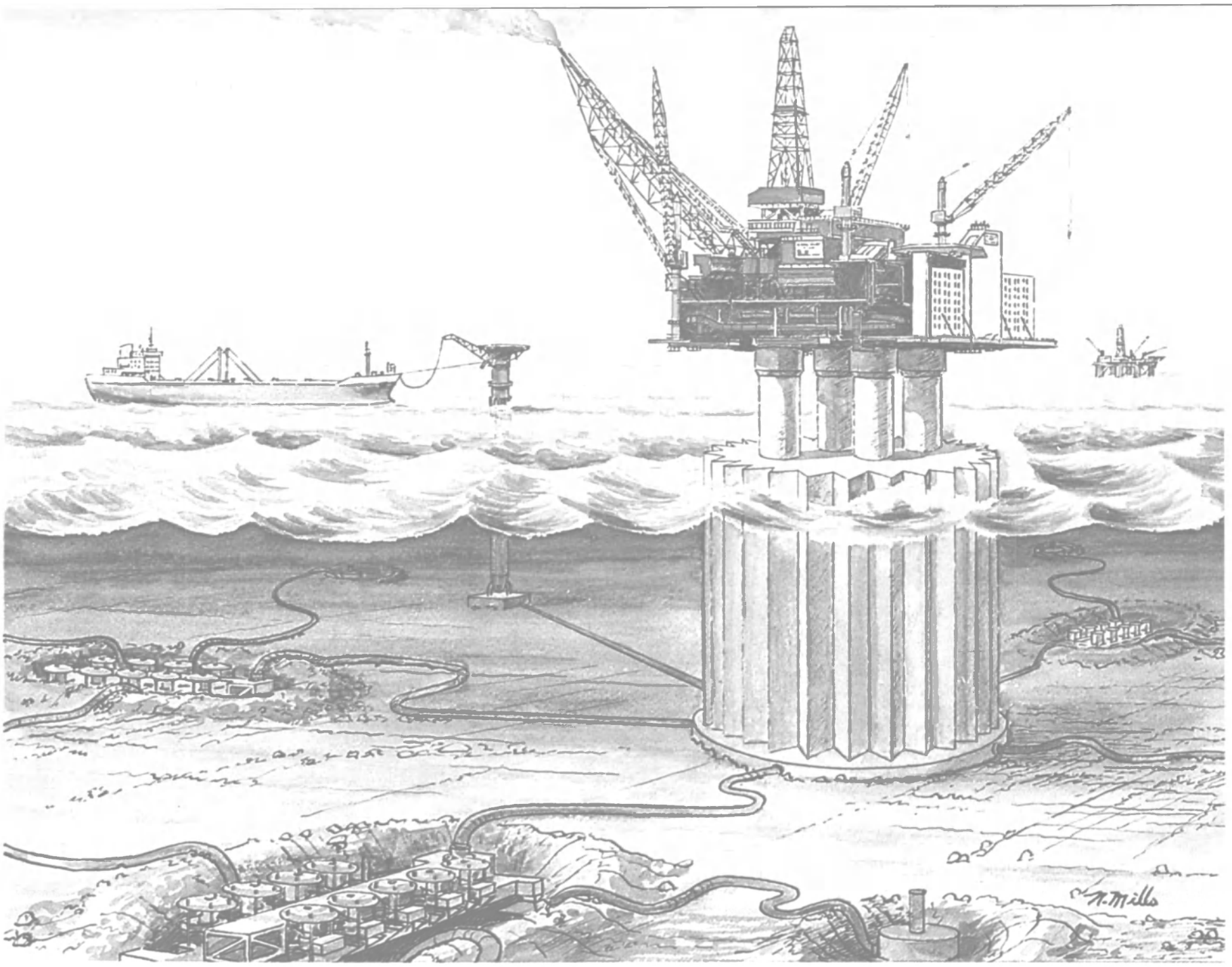
By their actions, the most important people in the marine industry – the readers and the advertisers – have voted MARITIME REPORTER NUMBER ONE.

- **WORLD'S LARGEST TOTAL REQUESTED CIRCULATION**
- **LARGEST TOTAL US. CIRCULATION**
- **THOUSANDS MORE BUYING INFLUENCE READERS**
- **LARGEST NUMBER OF ADVERTISERS**
- **LARGEST NUMBER OF AD PAGES**
- **BEST RESULTS—LARGEST NUMBER OF INQUIRIES FOR ADVERTISERS**

118 East 25th Street
New York, New York 10010
212-477-6700

MARITIME REPORTER
AND
ENGINEERING NEWS

DVERTISING SALES FORCE FOR '86



Artist's conception of Newfoundland's Hibernia Offshore Project.

38th Annual CSSRA Conference
And First Canadian Shipbuilding & Offshore Exhibition

Montreal, February 10-11

All speakers and topics have been confirmed for the open sessions of the 38th Annual Technical Conference of the Canadian Shipbuilding and Ship Repairing Association (CSSRA). To be held Monday, February 10 and Tuesday, February 11 in Montreal's Queen Elizabeth Hotel, the conference is expected to attract members of the marine community from across Canada and around the world, says CSSRA president **Henry Walsh.**

This CSSRA annual meeting is the largest and best-known marine technical event in Canada. Last year it drew an attendance of more than 800, including Canadian government officials and the international marine media.

Mr. **Walsh** notes that this year's conference will include the first-ever Canadian Shipbuilding & Offshore Exhibition (CSOE '86), which is expected to attract large numbers of exhibitors to display and demonstrate their products and services to the marine and offshore industries. The exhibition, to be held on the convention floor just outside the conference meeting rooms at the Queen Elizabeth, will be open from 3 to 7 pm on February 10 and from 10 am to 5 pm on February 11.

Of the estimated $5-billion cost of developing the Hibernia oil project offshore Newfoundland, some 50 percent will be marine-related. This demand, Mr. **Walsh** said, could mean employment opportunities and spin-off industrial benefits if sourced in Canada, as well as opportunities for companies in the U.S. and other countries in the form of joint ventures.

The technical conference begins at 9 am on February 11, and will be open to all interested parties. Concurrent presentations will continue throughout the day in the adjacent Duluth and Joilet meeting rooms. Copies of the papers presented will be available in bound form from the CSSRA registration desk at the hotel. The meeting will conclude with a banquet in the Grand Salon beginning at 7:30 pm.

Technical Conference
Tuesday, February 11
Duluth Room

Chairman: **M.J. Waters,** chairman, CSSRA Technical Section.

9:00 am: "Modern Shipbuilding Methods Applied to Construction of Canadian Coast Guard 1100 Navaids Vessels," by **Don Challinor,** president and CEO, Versatile Pacific Shipyards.

"Productivity's Essential Ingredient," by **Arthur J.R. Smith,** chief executive officer, Canadian Labour Market and Productivity Centre.

Coffee Break

10:30 am: "The Application of Advanced Design and Construction Techniques to the Canadian Patrol Frigate," by **Peter E. Jaquith,** vice president, Pre-Construction Activities & CPF program manager, and **Gilbert Snyders,** vice presi-

dent & general manager-shipbuilding, Saint John Shipbuilding Ltd.

"Canadian Patrol Frigate (CFP) Combat System Testing," by **Gerald M. Zutler,** vice president, Paramax Electronics Inc.

12 Noon: Lunch

2:00 pm: "NRC Institute for Marine Dynamics—Your New National Facility," by **N.E. Jeffrey,** director, and **D.C. Murdey,** assistant director, Insitute for Marine Dynamics, National Research Council.

"Development of the B2400 Engine," by **R. Dunton,** director, Engine R&D, Rail and Diesel Power Division, Bombardier Inc.

3:30 pm: "The Application of Advanced Techniques to Hull Form Design and Analysis," by **D.R. Patterson,** head of sales, British Maritime Technology Ltd.

Joliet Room

Chairman: **I.L. Bateman,** chairman, CSSRA Allied Industries Members.

9:00 am: "Reliability Assurance of Floating Production Systems," by **T. Nasseri, S.J. Gorman** and **I. Frazer,** Det norske Veritas (Calgary, Montreal and Oslo, respectively).

"Computer-Aided Ship Design Process within VSEI," by **Robert Leong,** Versatile Systems Engineering Inc.

Coffee Break

10:30 am: "Canadian Frontier Oil & Gas Plays—What the Immediate Future Holds," by **Ian M. Doig,** editor, Doig's Digest and president, Ian M. Doig & Associates Ltd.

"Fracture Control Plan in the Fabrication of Offshore Structures for the Canadian East Coast," by **Denis Larose,** head, Welding & Metallurgical Department, Versatile Davie Inc.

12 Noon: Lunch.

2:00 pm: "Building Canada's Frontier—The Materials Factor," by **J.W. Hotchkies,** manager-market development engineering, The Algoma Steel Corporation, Ltd.

"The Importance of Shipping in the Canadian Arctic," by **Charles Hetherington,** president, Panarctic Oils Ltd. (to be presented by **Lindsay J. Franklin,** vice president, Operations Division, Panarctic Oils).

6:30 pm: Cash Bar, Joilet Room.

7:30 pm: Annual Banquet, Grand Salon.

CSOE Exhibitors

Company	Booth No.
Algoma Steel	21
Bombardier	16
Brock Marine	59
Canadian General Electric	55-7
Cla-Val Canada	95
CMOP	31
Compagnie Aciers Slater	66
CompAir Canada	33
CTH Instruments Central	103
Cullen Canadian	102
Delaval Turbine Canada	52-3
East Coast Offshore	23
Eastern Precision Casting **Circle 90 on Reader Service Card**	104
Energy Mines & Resources	8-9
Envirovac	99
G.E.C. Diesels	96-7
Georges Nadeau	100
German Marine	93
German & Milne/Energy Conservation Systems	24
Hayward Industrial Products Canada	7
Hewitt Equipment	94
Hurum Marine	71
Idar Canada	54
Indal Technologies	2
Institute de marine du Cegep de Rimouski	5
International Paints (Canada)	70
Joiner Systems JSC Canada (1983)	75
K.W. Wilke Associates	51
Krupp MaK Canada	74
Leroy Somer Canada	43
MacGregor-Navire (Canada)	28-9
Marine Industrie	44
Merlin Gerin (Canada)	25-6
Ministere de l'Industrie du Commerce	67-8
Ocean Resources	76
Offshore Resources	72
Palco Welding Products Canada	6
Paramax Electronics	15
Peacock	22
Pratt & Whitney Canada	3-4
Raytheon Canada	61
Regional Industrial Expansion	41-2
Rivtow Industries	18-19
Saint John Shipbuilding	11-14
Seaway Review	32
Siemens Electric	49-50
Stork Werkspoor Canada	40
Strider Resource Agencies	69
Thomson-Gordon	10
Total Transportation Systems	17
Ulstein Maritime **Circle 91 on Reader Service Card**	98
Vale-Harmon Enterprises	91
Vereinigte Deutsche Metallwerk	27
Verreault Navigation	1
Versatile	36-9
Wartsila Arctic	58
Westinghouse Canada	101

DLI Engineering Awarded $1.2-Million Navy Contract For Vibration Surveys

DLI Engineering Corporation of Bainbridge Island, Wash., has been awarded the first year option of a three-year Navy contract with an estimated value of $1.2 million. The Machinery Condition Analysis (MCA) program will be conducted on aircraft carriers of both the Pacific and Atlantic Fleets. DLI will conduct vibration surveys of major machinery using the vibration spectra to diagnose machine problems; the program assists the Navy in its repair planning.

The contracting agencies for this contract are PERA(CV) and the Naval Supply Center, Puget Sound. For the past 10 years, DLI has been involved in the development of the MCA program.

Navy Awards Rockwell $10.3-Million Contract

Rockwell International Corporation, Anaheim, Calif., is being awarded a $10,333,000 cost-plus-incentive-fee contract for overhaul of Poseidon submarine navigation systems. Work will be performed in Anaheim, and is expected to be completed in October 1987. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-4001).

$5-Billion Hibernia Offshore Project Will Get Under Way Early This Year

First construction related to Newfoundland's $5-billion Hibernia offshore oil project is scheduled to begin in the first quarter of 1986, it was announced in New York recently by **Hal Barrett,** Minister of Development and Tourism for the Canadian Provence.

According to Minister **Barrett,** the Hibernia project offers opportunities for U.S. and other countries. "Joint venturing is the key to American involvement in Newfoundland," he said. "The international community has already started to enter the local scene, with major offshore players such as Norwegian Contractors and Moss Rosenberg of Norway; McDermott International and Brown & Root of the U.S.; and C.G. Doris of France all entering into agreements to form joint ventures."

The first major discovery in Hibernia Field was made in 1979 by Chevron while drilling on Mobil Oil's acreage. This field is said to be the third largest offshore oil discovery made in the world to date, with only two fields in the North Sea being larger. A total of nine wells have been drilled at this site, confirming the existence of a commercially exploitable field of close to a

(continued)

At recent luncheon meeting of World Trade Writers in New York, Newfoundland's Minister of Development and Tourism **Hal Barrett** points out features of huge concrete-based drilling platform that will be used by Mobil at Hibernia Field offshore Newfoundland, Canada. With him are **Sandra Zwerling,** president of World Trade Writers Association, and **Peter F. Greene,** editor of Marketing USA.

Hibernia Project

(continued)

billion barrels of recoverable oil and two trillion cubic feet of natural gas.

The Hibernia Field will be developed by Mobil Oil utilizing a concrete, gravity-based production platform; it is anticipated that oil will start to come ashore by 1991 or 1992. Prior to the production phase, however, an incredible amount of industrial activity is slated to occur.

The work that will begin this year involves the construction of two major facilities in Newfoundland for the fabrication, outfitting, and actual construction of a concrete production platform. It should take about 18 months to fully develop the construction site, and an additional three years to construct, outfit, commission, and situate the platform at the Hibernia Field. Approximately the same time frame is required to establish facilities for construction related to the above-water elements of the platform.

The concrete base of the production platform that Mobil will utilize in developing this oil resource is so massive that realistically it can only be built in Newfoundland. Such a structure is not designed to be towed a long distance. The entire project is comparable to constructing a 40-story building in a deep-water habor, floating it almost 200 miles offshore in the North Atlantic, and then resting it on the bottom of the ocean.

While there are concrete oil production platforms in use in the North Sea fields, none of those are comparable in size to the structure that will be built for Mobil's Hibernia project. The concrete base of the structure will be about 280 feet high with a diameter at the base of 344.5 feet. It will require 70,000 tons of cement and incorporate some 50,000 tons of reinforcing steel.

The above-water part of the structure, measuring about 300 feet on each side, will consist of three levels—a cellar deck, module deck containing accommodations, and weather deck topped by the drilling rig and helicopter platform. Water depth at the site is 262.5 feet (80 meters).

Of the $5-billion total cost of the Hibernia project, including the development of onshore facilities, some 50 percent is estimated by the Canadian Shipbuilding and Ship Repair Association to be marine-related. And this entire project is designed for the development of just one oil field.

There are several other commercial deposits of oil offshore Newfoundland that have been discovered in recent months, including a discovery at the North Ben Nevis Field by a Canadian company, Husky/Bow Valley Limited. Plans for the development of this field are now being formulated, and oil could be flowing from Ben Nevis as early as 1990 if the company decides to utilize a floating production system.

Several months ago Petro Canada, the national oil company, announced a discovery at another field known as Terra Nova. In addition, there are at least seven other commercially exploitable oil fields and several more natural gas deposits that have been identified off the coast of Newfoundland. In the interim, exploration, seismic work, and delineation drilling offshore are continuing apace.

All this offshore activity has spurred a considerable amount of development onshore in Newfoundland, especially in the capital city of St. John's. At present there are several major construction projects under way in the capital that total close to $100 million. A convention center/hotel complex is being built, Manufacturers Life Assurance Company has started the first phase of a three-phase office complex, a major Canadian bank is constructing a new office and banking complex valued at approximately $30 million, and another $8-million office building is under construction.

Outside the capital, onshore developments include an $11-million oil rig servicing facility and the sites being prepared for the construction of the Mobil concrete platform, as well as other major developments either planned or in progress estimated to total approximately $100 million in expenditures.

Almost $100 million has been invested recently in two major marine research establishments in Newfoundland—the $56-million Institute for Marine Dynamics, one of the largest hydrodynamic centers in the world featuring the largest ice tank in the world; and the $42-million Newfoundland Institute of Fisheries and Marine Technology.

Major Manufacturers Attend First Diesel Propulsion Conference Held In Seattle

Some of the foremost diesel engine manufacturers, shipping companies and engineering firms were represented at the first Diesel Propulsion Conference recently held in Seattle, sponsored by Trans Marine Propulsion Systems of Seattle and International Power Engineering, Copenhagen, Denmark.

According to Trans Marine Propulsion Systems president **Herbert Roeser,** the conference, which he hopes will become an annual event, was very successful.

The international panel of speakers from Japan, Switzerland, Germany, Norway, Denmark and the U.S., and the audience discussed such topics as: low- and medium-speed diesel engine development; turbocharger development; computerized, planned maintenance and performance; and modernization schemes of diesel engines and ships.

Representatives from such major companies as Sulzer Brothers, Brown Boveri, International Power Engineering, The East Asiatic Company, Caterpillar Engine Division, Trans Marine Propulsion Systems, Waukesha Engine Division and Mitsubishi Heavy Industries were all in attendance.

Roger Nejes Appointed Assistant To President, Todd Shipyards Corp.

Roger Nejes was appointed assistant to the president of Todd Shipyards Corporation at a recent board of directors meeting and will be responsible for facilitating and implementing the integration of the company's newly acquired subsidiary, formerly The Aro Corporation, into the Todd organization. As an officer of the corporation, he will report to the president, **Hans K. Schaefer**, on all matters concerning marketing, manufacturing and finance.

Aro is a multinational manufacturer of air-powered equipment with annual sales of $100 million. Aro offers a broad line of pneumatic air tools, hoists, fluid handling equipment, fluid power equipment and lubrication equipment.

Mr. **Nejes,** who joined Todd Shipyards in 1978 as director of financial planning and contract analysis, has been active in the Aro acquisition program through his responsibilities relating to corporate strategic planning. Prior to coming to Todd, he was employed by the Electric Boat Division of General Dynamics Corporation where, from 1965 to 1978, he successively worked as design engineer, cost estimator, long-range planner, and finally as chief of financial analysis for the division.

In addition to the Aro acquisition, Todd Shipyards Corporation, a leading shipbuilding and ship repair company, operates yards in Seattle, San Francisco, Los Angeles, Galveston and New Orleans.

Sperry Awarded $7.3-Million Navy Order

Sperry Corporation, Systems Management Group, Long Island, N.Y., is being awarded a $7,326,000 fixed-price man-day contract for services for the Trident logistics assistance program. Work will be performed in Great Neck, N.Y. (20 percent), and Reston, Va. (80 percent), and is expected to be completed September 20, 1986. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-4006).

Navy Awards Tracor MBA $5.5-Million Contract To Furnish Chaff

Tracor MBA, San Ramon, Calif., is being awarded a $5,571,201 firm-fixed-price contract to furnish 2,746,320 RR-170A/AL chaff and 3,334 rolls of RR-171/AL chaff. Work will be performed in Lillington, N.C., and is expected to be completed in April 1987. Two bids were solicited and two offers were received. The Navy Ships Parts Control Center, Mechanicsburg, Pa., is the contracting activity (N00104-86-C-A025).

Armco Continues To Upgrade Speciality Steels Facilities —Literature Available

Armco's Specialty Steels Division has begun commercial operation of a $7-million Automated Pickle Line at its Baltimore Works. The new "tunnel" pickle line and accompanying pollution control facility is one of the most modern in the world.

The pickling cycle and bath temperature of the new unit are automatically programmed, while the bath chemistry is rigidly maintained. It is expected to produce a minimum of 80 tons per turn which will provide more than required capacity to satisfy internal needs for stainelss rod and wire products.

The totally enclosed system captures fumes and runs them through a scrubber. All acids are collected and neutraulized in an environmentally clean operation.

The new unit is part of a continuing modernization program begun in 1981 at Armco's Baltimore Works with installation of a 50-ton electric arc furnace, and includes a $24-million precision rotary forge, the first in operation in the U.S. for stainless production. It also includes the only two-strand horizontal continuous caster in use by a stainless bar, rod and wire producer.

The rolling and finishing areas have also been modernized with the additional of grit blasting facilities for improved surface conditioning, and installation of a large bar turner, automatic planishing facilities for small diameter bars, and rotary annealing furnace which increases capacity, size availability and product quality.

"Today's highly competitive market requires suppliers of specialty steels to continuously improve quality and customer service," said **Raymond E. Hein,** vice president and general manager of Armco's Baltimore organization, "and Armco is committed to being a viable supplier of specialty steel products which meet our customers' requirements for quality, dependability and service." Mr. **Hein** further stated, "Conversion orders from other specialty steel producers will be solicited for the excess capacity of our new pickle line."

The Baltimore Plant produces stainless steel bar, rod, wire and semifinished products and is part of Armco's Specialty Steels Division, headquartered in Butler, Pa.

For free copies of literature describing Armco's Specialty Steels facilities and products,

Circle 11 on Reader Service Card

Artist's rendering of how the passenger vessel Glacier Seas will look in service.

Westport Yard Building Fiberglass Passenger Vessel For TravAlaska

TravAlaska, the West family's cruise and tour firm headquartered in Seattle, will take delivery of a new passenger vessel from Westport Shipyard this spring. The 90-foot boat Glacier Seas will be the first commercial hull from a new adjustable mold the Westport, Wash., fiberglass vessel builder installed in 1985.

Following trials in April, TravAlaska will put the new boat into service on Prince William Sound. The firm maintains an operating base in Anchorage, and now has offices in all major Alaskan cities.

The first vessel to be owned by the Seattle travel firm, the Glacier Seas was designed by naval architect **Jack Sarin** of Bainbridge Island, Wash. TravAlaska president **Charles G. West** said the boat will be licensed to carry 130 passengers. She will be fitted with bars on both enclosed decks and a full galley for preparation of meals. Half of the seating will be integrated into banquettes—dinette type benches and tables; the other half will involve individual contoured chairs. A walkaround bridge, open to the top passenger cabin, will be equipped with extensive electronic equipment, including a large color radar.

Propulsion will be provided by twin 930-bhp Deutz B/AM 816 diesel engines driving Coolidge stainless steel propellers via Reintjes reduction gears supplied by Karl Senner, Inc. The vessel will incorporate a steel stem and strengthened laminations along the chine for ice protection.

Westport Shipyard builds Airex fiberglass vessels ranging from 55 to 120 feet in one of the most automated fiberglass yards in the U.S. The new mold used by the shipyard involves a standard but stylishly raked bow, and adjustable jigs that can produce modifiable hull lines and transom. The first hull out of the mold was a 108-foot yacht that went to British Columbia for completion.

Westport will also deliver another 90-foot passenger vessel this month to Catalina Express Lines in Southern California. This will be the fourth vessel Westport has built for that ferry and excursion boat operator.

For full information and free literature on Westport Shipyards services and capabilities,

Circle 15 on Reader Service Card

50-Page Selection Guide From Clemco Describes Abrasive Blast Equipment

Clemco Industries, San Francisco, Calif., has made available a 50-page guide to selecting proper, coordinated elements for new abrasive blast systems and for upgrading replacements in existing systems.

The illustrated selection guide first discusses the relationships of the various blast system components, and included selections on: blast machines; remote controls; operator safety equipment; nozzles; holders, couplings and hoses; and specialized equipment.

Also included is an extensive list of other catalogs, product studies and educational films and tapes available from Clemco. Dozens of black-and-white photographs show the different products offered by the company.

For a free blast equipment selection guide,

Circle 48 on Reader Service Card

Simrad, Inc. Opens U.S. East Coast Branch Office

Simrad, Inc., headquartered in Seattle, Wash., has announced the establishment of a branch office in the New York metropolitan area, which has been created in order to more efficiently promote Simrad products in the Eastern portion of the U.S. and Canada.

Simrad is a leading manufacturer of a complete line of marine electronics, navigation, instruments and systems for the commercial, offshore, fishing and naval markets.

The new office, in addition to the existing branch office in Houston, provides Simrad with three locations in the United States. Initial staffing will include **Bjorn Carlsen**, manager East Coast branch office, and **Philip Thompson**, manager hydrography.

The address of the new Simrad East Coast branch office is: Simrad, Inc., Suite 400, 50 Charles Lindberg Boulevard, Uniondale, NY 11553. Phone (516) 222-9246. Telex 6973229.

For complete literature on all Simrad marine products,

Circle 30 on Reader Service Card

Todd-Seattle Receives $6.5-Million Order For Vessel Overhaul

Todd Pacific Shipyard, Seattle, Wash., was awarded a $6,497,592 firm-fixed-price job order under a master ship repair agreement for the overhaul of the USNS Observation Island, a Military Sealift Command, U.S. Flag, missile range instrumentation ship.

The work will be performed in Seattle and is expected to be completed early this year.

Fifteen bids were solicited and two offers were received. The Military Sealift Command, Washington, D.C., is the contracting activity (N00033-85-H-0033).

IBM Awarded $45.5-Million Contract Modification

International Business Machines Incorporated, Manassas, Va., is being awarded a $45,532,820 modification to definitize a previously awarded cost-plus-fixed-fee letter contract for integration of thin line towed array functions into the AN/BQQ-5C(V) sonar. Work will be performed in Manassas (95 percent) and Owego, N.Y. (5 percent), and is expected to be completed in December of 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-84-C-6256).

Dedication ceremonies were recently held at Avondale Shipyards, New Orleans, La., for the USNS Altair. The vessel is the second of three Fast Sealift Ships being converted from SL-7 container ships by the yard.

Fast Sealift Ship USNS Altair Dedicated At Avondale Industries Shipyard Division

Another of the U.S. Navy's T-AKR Class of Fast Sealift Ships, the USNS Altair, was dedicated at Avondale recently and was delivered ahead of schedule.

The USNS Altair (T-AKR-291) is the second of its class to be dedicated at Avondale. It was converted from a Sea-Land (SL-7) commercial containership. A sister ship, the USNS Antares (T-AKR-294), was converted by the shipyard and delivered in July 1984. A third ship, to be named USNS Pollux (T-AKR-290), is currently being converted at Avondale for delivery in March. The T-AKR Class vessels are among the largest and fastest auxiliary supply ships in the Navy.

The principal speaker at the renaming ceremony was U.S. Representative **Robert L. Livingston** (R-La.) of the 1st Congressional District. The Congressman's wife, **Bonnie,** was the ship's sponsor. Others participating in the dedication were U.S. Navy Capt. **Paul D. Hurst**, Supervisor of Shipbuilding, New Orleans; **Albert L. Bossier Jr.**, president and chief executive officer, Avondale; **Eugene E. Shoults**, Program Manager, pms 377, Naval Sea Systems Command; and **Richard F. Brunner**, senior vice president, Avondale.

Monsignor **John Bendix** of St. Matthew the Apostle Church delivered the invocation. Miss **Brandy Ann Jackson**, daughter of Mr. and Mrs. **J.D. Jackson**, was the flower girl for the ceremony. Mr. **Jackson** is superintendent of rigging at the shipyard. Traditionally, the flower girl is a daughter of an Avondale employee. Music for the occasion was provided by the Grace King High School Band.

The mission of the USNS Altair and the other T-AKR Class ships is the rapid transport of military equipment and vehicles to any area in the world. The ship will carry tanks, jeeps, armored personnel carriers, helicopters and other wheeled equipment.

The USNS Altair, which successfully completed sea trials in September, is 944 feet long with a beam of 105½ feet, a depth of 66 feet, and a draft of 36 feet 8 inches. Displacement is 55,400 long tons and she is powered by two steam turbine plants of 60,000 shp per plant. Her service speed with full cargo underway is 33 knots.

Some of the major elements of Avondale's conversion of the SL-7 ships into T-AKR ships include the addition of several decks for vehicle and cargo stowage; a flight deck with a helicopter landing platform; two side-ports with hinged platforms and a portable ramp; restructuring of the cargo holds to carry containers, seasheds (open containers) and flat racks; and installation of twin cranes fore and aft, a new fuel system, and expanded fire protection.

The Shipyard Division is the largest group of Avondale Industries, Inc., a new corporation created recently under an Employee Stock Option Plan (ESPO). The new corporation is a diversified company with manufacturing facilities operating in the major markets of shipbuilding and metals.

Principals at the christening of the USNS Altair were (L to R): Congressman **Robert L. Livingston** (R-La); Mrs. **Robert L. Livingston**, sponsor of the vessel; **Richard Brunner**, senior vice president and senior operating officer—Avondale Shipyards; Monsignor **John Bendix; Wallace Sansone,** project manager PMS 377; Capt. **Paul D. Hurst**, USN, Supervisor Shipbuilding—New Orleans; **Eugene E. Shoults**, program manager PMS 377, Naval Sea Systems Command; and Miss **Brandy Ann Jackson**, flower girl.

Balehi Marine Christens Twin-Screw Harbor Utility Boat

The twin-screw harbor utility boat Pelican, was recently christened by Balehi Marine Inc. of Lacombe, La., for the vessel's owner Martin Marietta at a NASA slip.

The ceremonies were attended by **Mike Gnau**, project engineer; **Guy Keller**, contract administrator; **J.S. Checkan**, chief engineer; **Bill Knodles**, harbor master; **Kenny Miller**, project engineer; **Jay Heitzman**; and **Doug Fogg**, project engineer, all representing Martin Marietta/NASA. Also in attendance were Balehi Marine representatives, **David P. Levy**, designer; **Donald Arroyo**, president; **Dennis Frantz**, vice president, sales & administration; and **Donna Dunnegan**.

The Pelican has an overall length of 35 feet, width of 13 feet, depth of 5 feet 6 inches and normal operating draft of 3 feet 6 inches.

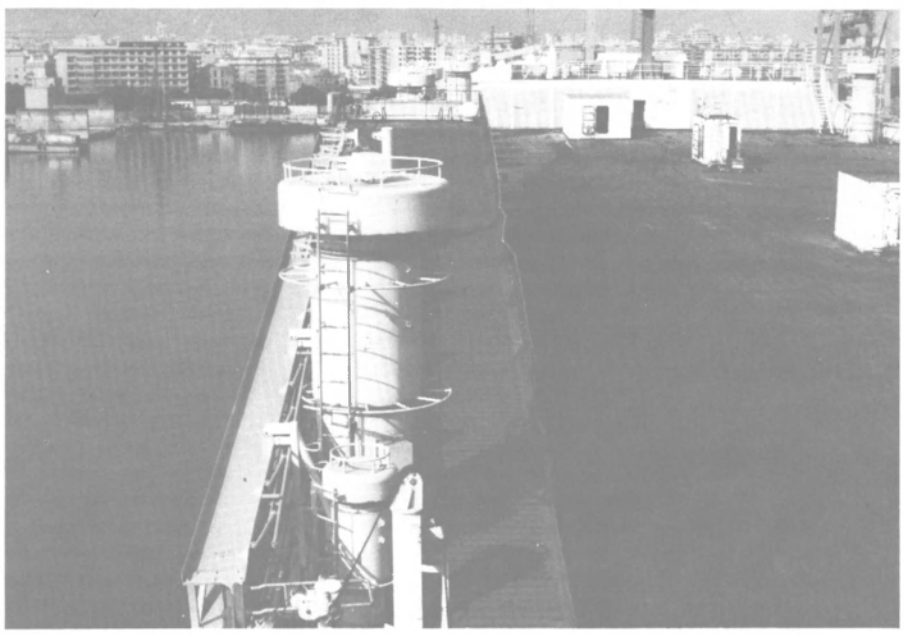
The vessel is powered by a GM671, which produces 174 hp at 1,800 rpm. She will be used to shift barges at the Michoud Assembly Facility in New Orleans, La.

For further information and detailed literature on Balehi Marine Inc.,

Circle 19 on Reader Service Card

PELICAN
Major Suppliers

Main Engine	GM
Reduction Gears	Twin Disc
Propellers	Columbian Bronze
Steering System	Hynautic
Radio Equipment	Motorola
Depth Finder	Simrad
Searchlights	Perko
Air Horn	Seatone
Shafts & Rudder Stocks	Aquamet
Clutch & Throttle Controls	Morse
Fire Monitor	Elkhart
Fire Extinguisher	Halon
Pilothouse Windows	Kearfott
Engine Gauges & Instruments	Stuart Warner
Bilge Pumps	Jabsco



The deck of the Amaranth Jolly.

Fincantieri Completes Major Overhauls On Two RO/RO-Containerships

Fincantieri-Cantieri Navali Italiani SpA in Italy has completed major conversion work on the roll-on/roll-off containerships Amaranth Jolly and Grey Jolly owned by Ignazio Messina. Without increasing the main dimensions, the cargo capacity of each ship was almost doubled—from 500 to 976 TEUs.

The ships, built in Japan, had void areas under the hangar deck that were converted to cargo holds. A fixed approach ramp from the hangar deck to the hold deck (double bottom top) was installed, along with a hydraulic door. A longer and wider ramp betweent he hangar deck and the upper deck was placed atop the existing one. Access to the middle deck was provided by a movable ramp.

Watertight bulkheads in the holds were removed and replaced with supports, and beams and new floors were arranged inside the double bottom. Beams, supports, and pillars were fitted under the upper deck.

A new lighting system and fire detector were installed in the lower hold, as well as a CO_2 system in the same area. An existing elevator going from the hangar deck to the upper deck was removed and the decks were closed off using prefabricated panels. A watertight bulkhead was fitted in the steering gear room to accommodate the increased draft. Trestles for the loading of containers were installed on the upper deck, and various other modifications were made to air vents, pipelines, fender supports, accommodation ladders, etc.

For more information on Fincantieri's facilities and services,

Circle 10 on Reader Service Card

Shelley To Succeed Holmes As President Of Raytheon

Raytheon Company of Lexington, Mass., has announced that **D. Brainerd Holmes,** president, will retire from the company effective May 31, 1986. On May 24 he will be 65, the traditional retirement age for senior executives of this diversified electronics company.

Thomas L. Phillips, chairman and chief executive officer, announced that the Raytheon board of directors has selected **R. Gene Shelley,** to succeed Mr. **Holmes** as president, effective June 1, 1986. A senior vice president, Mr. **Shelley** is both a group executive and the general manager of the Equipment Division headquartered in Wayland, Mass.

As group executive, he is also responsible for the Electromagnetic Systems Division in Goleta, Calif.; the Submarine Signal Division in Portsmouth, R.I.; Raytheon Service Company headquartered in Burlington, Mass.; and Sedco Systems, Inc. of Melville, N.Y.

Mr. **Shelley** joined Raytheon in 1964 as manager of the Goleta operation, and became general manager when the operation became the Electromagnetic Systems Division in 1969. He was named a vice president in 1973, group executive in 1978, and senior vice president in 1979.

NAVSEA Awards $4.4-Million Contract To Southwest Marine

Southwest Marine Incorporated, Terminal Island, Calif., was awarded a $4,365,000 firm-fixed-price contract for the selected restricted availability of the USS George Philip (FFG-12).

The work will be performed in Terminal Island and is expected to be completed March 28. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-H-8222).

Ingersoll-Rand Purchases Fafnir Bearing Division—Literature Available

Ingersoll-Rand Company has purchased Fafnir Bearing Division of Textron, Inc., and has merged the ball bearing manufacturer with The Torrington Company, a wholly owned subsidiary.

"This merger broadens the combined company's bearing product lines, strengthens our technology base and enhances our competitive position in global markets," said **Thomas E. Bennett,** president of Torrington.

In addition, Mr. **Bennett** announced that **Harold M. Brodsky** would remain to direct Fafnir's operations as a division of Torrington.

With the addition of Fafnir, Torrington becomes one of the largest broadline bearing manufacturers in the U.S., and fifth largest bearing supplier in the world.

Torrington, one of the world's largest needle bearings suppliers, serves a wide variety of markets, including automotive, consumer durables, oilfield and off-highway equipment, and metal and paper mills.

Fafnir, on the other hand, manufactures and sells precision ball bearings used in aerospace, machine tool, industrial and agricultural markets.

For complete detailed literature on Torrington,

Circle 44 on Reader Service Card

GE Receives $156-Million Contract For Naval Nuclear Propulsion Components

General Electric Company, Machinery Apparatus Operation, Schenectady, N.Y., is being awarded a $156,796,000 cost-plus-fixed-fee contract for naval nuclear propulsion components. Work will be performed in Schenectady, N.Y., and is expected to be completed in September 1990. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-C-4013).

McDermott Gets $48-Million Offshore Contract From Chinese Petroleum Corporation

McDermott International, Inc. has been awarded a contract worth approximately $48-million by the Chinese Petroleum Corporation of the Republic of China. The turnkey contract involves engineering, procurement, and construction of one drilling and production platform, two wellhead platforms, installation of four subsea wellheads, five platform completion wellheads, and laying 40 miles of pipelines in the CBK oil and gas field, 15 miles northwest of Hsin Chu, Taiwan, Republic of China.

The platforms, all four-legged, and subsea wellheads will be installed in water depths of approximately 200 feet. Fabrication will begin this month and is scheduled to be completed in July. The projected production rates for the field are 56 million cubic feet of gas and 10,000 barrels of oil per day.

The offshore pipelines to be laid include 15 miles of 12-inch gas lines, 15 miles of 6-inch oil lines, 4.5 miles of 8-inch flowlines, and 5.5. miles of 6-inch flowlines.

McDermott's combination derrick/lay barge DB-29 will be the primary piece of marine construction equipment used on the offshore portion of the project, which is scheduled to begin in May and be completed by August.

For literature containing complete information on McDermott International,

Circle 12 on Reader Service Card

Pool Arctic Alaska Orders Bardex Hydranautics Island Rig Skidding System

Pool Arctic Alaska Anchorage has contracted with Bardex Hydranautics for a rig skidding system which Pool Arctic Alaska will use for Sohio on the Endicot artificial island project in the Beaufort Sea. The system will perform transverse rig skidding over the wellheads on an Arctic wheel-mounted rig and will be required to operate in −60 degrees F conditions. The rig is skidded back onto the wheels for proper road balance.

The order comes on the 20th anniversary of the first use of such equipment on a major man-made island project—THUMS off Los Angeles. Bardex Hydranautics supplied the system, which is still in operatin there, that skids the derrick, triple-deck sub-base and casing rack on curved skid beams. The company has since been involved in many other cluster drilling projects around the world.

Bardex Hydranautics is headquartered in Goleta, Calif., with offices in London, Singapore, and Houston. The company designs and manufactures heavy-load moving equiment for offshore and shipyard-related activities.

For literature containing full information,

Circle 32 on Reader Service Card

Lavino Shipping Awarded $79.7-Million Contract For MSC Ship Operation

Lavino Shipping Company Incorporated, Philadelphia, Pa., is being awarded a $79,750,778 fixed-price contract plus cost reimbursables for the operation of 12 Military Sealift Command oceanographic ships. The contract period is three years beginning in February 1986. One hundred fifteen bids were solicited and four offers were received. The Military Sealift Command, Washington, D.C., is the contracting activity (N00033-84-C-4005).

Navy Awards $23-Million Modification To General Dynamics

General Dynamics Corporation, Electric Boat Division, Groton, Conn., was awarded a $23,000,000 modification to a previously awarded cost-plus-fixed-fee contract by the Naval Sea Systems Command for design engineering services and prototype hardware for the Submarine Improved Performance Machinery (SIPM) program.

The work will be performed in Groton and is expected to be completed September 30, 1986. The contract number is N00024-83-C-4181.

Bay Shipbuilding Lays Keel For Second Of Three Containerships

Keel-laying ceremonies were held recently for the second of three containerships being built for Sea-Land Service, Inc. by Bay Shipbuilding Corp. The laying of the keel of Hull No. 736 took place in Bay's large graving dock where all three vessels will be constructed. Each containership will be 710 feet in length, 78 feet in beam and have a design draft of 30 feet.

Sea-Land Service, Inc., a subsidiary of Sea-Land Corporation, will operate the three fuel-efficient diesel-powered containerships between the Pacific Northwest and Alaska. The 20-knot vessels, each capable of carrying over 700 containers, will significantly increase Sea-Land's cargo-carrying capacity in the Alaska trade.

The keel for the first containership, designated Bay Shipbuilding Hull No. 735, was laid in August of 1985.

Present at the keel-laying ceremony held for the second of three containerships being built for Sea-Land Service, Inc. by Bay Shipbuilding Corp. were, from left: **Dave Dettman,** superintendent construction/Sea-Land Project, Bay Ship; **John Tomkins,** chief estimator, Bay Ship; **Robert Miller,** vice president/director of engineering, Bay Ship; **Harry Taylor,** principal surveyor, American Bureau of Shipping, Sturgeon Bay; **Bruce Shaw,** director of operations, Bay Ship; **Per Von Der Fehr,** senior technical advisor, Burmeister & Wain, Denmark; **Robert Zimmerman,** shipyard representative for Sea-Land; **Alex Reid,** project manager/Sea-Land Project, Bay Ship; **Richard Lindemeyer,** shipyard representative for Sea-Land; **Charles Pitcock,** assistant director of operations, Bay Ship; Lt. Comdr. **Robert Arnett,** executive officer, USCG, Sturgeon Bay; and Comdr. **Daniel Struck,** OCMI, USCG, Sturgeon Bay.

Omnithrusters Delivered For Canadian Government Vessels

Omnithruster Canada Inc. of Sarnia, Ontario, a subsidiary of Omnithruster Inc. of Santa Fe Springs, Calif., in recent months has delivered four units for installation in Canadian government vessels.

The John P. Tulley, a 226-foot hydrographic survey vessel owned by the Canadian Department of Fisheries and Oceans, is fitted with an Omnithruster JT 8001 500-hp horizontal unit forward and a JT 700 350-hp unit aft.

The CCGS Narwhal, built by Canadian Vickers (now Versatile Vickers of Montreal) in 1963, is undergoing a complete refit at Halifax Industries. A full machinery upgrading includes an Omnithruster PV 700 unit.

The new Canadian Coast Guard Type 1050 navaids tender/light icebreaker being built at the Nova Scotia shipyard of Pictou Industries, a division of USL International, is being fitted with an Omnithruster JT 950 unit manufactured in Sarnia. Reliance Electric of Stratford, Ontario supplied the 750-hp motor for this unit, and Byron Jackson of Hamilton the pump.

Basically, the Omnithruster hydrojet unit consists of a protected intake in the bottom of the hull leading to a low-pressure, high-volume pump. This in turn delivers water through high-pressure directional nozzles in the ship's side. The low location of the intake is unaffected by the vessel's trim, and the relatively low velocity of the intake is less affected than conventional thrusters by the ship's speed in relation to the surrounding water. The action of the thruster being against the ship and not the outside water means that it operates efficiently whether submerged or not.

Changes in direction of thrust from port to starboard are activated by valves controlling the flow of water, not by reversing the motors. This greatly reduces vibration and noise potential. A bonus is that outflow, even without air injection that can be induced, can be used as hull lubrication for navigation in ice.

For free literature on Omnithruster's line of thrusters,

Circle 16 on Reader Service Card

Navy Awards Lake Shore $34-Million Contract For Salvage Cranes

Lake Shore Incorporated, Iron Mountain, Mich., was awarded a $34,151,807 firm-fixed-price contract for aircraft crash-salvage cranes for all ship-based naval aircraft.

The work will be performed in Kingsford, Mich., and is expected to be completed in October 1990. Three bids were received. The Naval Air Systems Command, Washington, D.C., is the contracting activity (N00019-86-0028).

Field, Wigham Appointed U.S. Representative For Naval Architecture Firms

Field, Wigham & Co., Inc. recently announced its appointment as U.S. representative of the following leading architecture and marine engineering companies: Arnessen, Christensen & Co., A/S of Norway; Bureau Voor Scheersbouw of the Netherlands; M.J. Doherty & Co. Pty. Ltd. of Australia; Graham & Woolnough, England; Knud E. Hansen APS, Denmark; Keel Marine Ltd., England; Salen Technologies, Sweden; and Skipskonsulent A/S, Norway.

The representation includes not only the sale of the design and engineering services of these companies, but extends to their library of existing designs for vessels of all types and sizes. All of the naval architects represented have prior experience in designs accomplished to applicable U.S. regulations and are able to quote for overseas requirements for plan approval and supervision.

Field, Wigham & Co., Inc. is located at 200 Middle Neck Road South, P.O. Box 2123, Great Neck, N.Y. 11021, phone (516) 466-5340.

VSE Awarded $8 Million In Navy Contracts

VSE Corporation (VSE) of Alexandria, Va., was recently awarded two contracts by the U.S. Navy to provide engineering and technical services in support of Planning and Engineering for Repairs and Alterations (PERA) of Amphibious Ships and Craft (ASC). The contracts, which total more than $8 million, continue VSE's participation in the advance planning or overhauls of East and West coast ships.

VSE engineers and technical personnel will provide professional services to assist PERA managers in preparing and monitoring ship overhaul plans and schedules. The work will require performing, as needed, worldwide travel to conduct tests and inspections onboard Navy ships and data preparation to develop alteration and repair requirements. Extensive use is made of advanced information processing systems to respond to changes in ship availability schedules and work requirements.

Ingram Barge Completes Organization Changes— Reports Rapid Growth

Ingram Barge Company of Nashville, Tenn., has completed a broad restructuring of its organization to enhance its marketing effectiveness and facilitate efficient administration of Ingram's growing fleet.

Neil N. Diehl, Ingram Barge Company's chairman, in announcing the changes said: "Ingram Barge has achieved great success during the past two years in expanding the size and scope of our dry cargo and liquid barge businesses. We are particularly gratified that this growth has allowed Ingram to participate in new markets while simultaneously preserving the same high quality, competitively priced service that has been our tradition. This restructuring is designed to more effectively channel these acquired capabilities toward our customers."

Personnel and administrative resources have been structured around two responsibility centers: The sales and customer service department, headed by **Peter E. Rumsey,** responsible for the daily and short-term development of the company's fleet logistics and customer solicitation; and the marketing department, reporting to **Craig E. Philip,** responsible for the company's long-term strategic initiatives, equipment and corporate acquisitions, and sales support.

Mr. **Diehl** noted that "the combined efforts of these two departments will provide improved continuity and timeliness of service for our customers, superior fleet utilization and precise identification of strategic marketing and acquisition possibilities. We ultimately expect this restructuring to enhance Ingram's profitability and to lay the groundwork for future growth."

Mr. **Rumsey** has been named vice president of sales and customer service for the dry cargo fleet. The department is organized around modules, located among Ingram's offices at Nashville, Pittsburgh, St. Louis, Chicago and New Orleans. Mr. **Rumsey** noted that "each module includes a sales manager with commodity responsibilities and an assistant manager with geographic responsibilities. By supporting one another's work on a daily basis these teams will bring sales and traffic decision-making closer together."

Michael Measells, as general manager, is directly responsible for the coordiantion of the dry cargo program among the various modules. **Orrin H. Ingram,** also a general manager, is responsible for Ingram's entire liquid fleet.

Craig E. Philip has been named vice apresident of marketing. The department includes marketing managers reponsible for cost analysis and fleet deployment, market planning and devolement, and acquisitions. Mr. **Philip** described these responsibilities in the context of the barge industry's principal strategic dilemma: "Our principal response to the industry's depressed condition has been to use Ingram's financial strength and reputation for service quality as the basis for rapid growth, and expansion into new markets.

"We have doubled in size each year since 1983 and our present operations, involving three dozen linehaul boats and more than 1,000 barges, allows us to more selectively pursue only those portions of the market where rate levels are compensatory.

Peter J. Kopcsak, president of Ingram Barge, announced that **Robert H. Livingston** has joined the company as vice president of operations. Mr. **Livingston** joined Ingram from Dravo Mechling, where he held a similar position.

Optimizing Efficiency Levels Of Boiler Feed Turbo Pumps

By John J. Amicucci*

The majority of steam-driven ships now in service were built in an era of low fuel oil prices, with their steam plants designed at or near maximum performance ratings. In those bygone days, operating a ship at lower horsepower was not a practical consideration. However, with the escalation of fuel oil prices during the past decade or so, the need exists for slower steaming to reduce fuel consumption as much as possible. Derating of the boiler feed pump is a major, positive step in this direction.

The boiler feed pump is totally amenable to efficiency improvement through derating, and relatively easy to achieve (Figure 1). As about 90 percent of all steam-driven tankers and containerships employ either DEB-16 or DEB-22 Coffin® feed pumps, it is a simple matter for the installer to obtain the needed parts from the original equipment manufacturer, either directly or through a marine agent. The marine agent could also provide whatever field service that may be needed.

The less steam it takes to run the boiler feed pump, the less fuel is burned. Using a standard two-stage DEB-16 turbo pump operating at 532 hp, even a 10-percent saving effected through derating would be the equivalent of not having to run a 50-hp motor. All that the service specialist or the ship's engineer needs to know are the flow and pressure readings to begin the derating process. If, for example, the present pump steam flow is 900 gallons per minute, and 500 gpm is calculated to be an efficient level, the conversion might entail a new impeller, diffuser, diaphragm, or perhaps all of these parts.

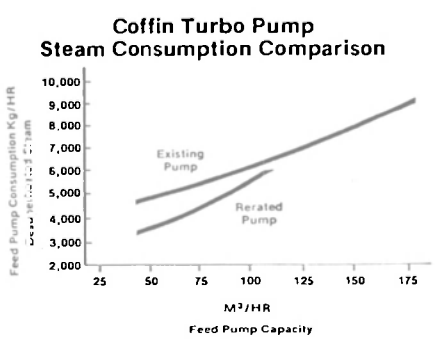


Figure 1.

Whenever a reduction in vessel speed is indicated, the steam plant and feed pumps operate at a lower capacity, and generally at lower efficiency. The reduction is such that exhaust steam from the feed pump normally returned to the deaerator tank goes back to the condenser and is wasted. The amount of water a feed pump must deliver to the boiler is an approximate function of the ship's speed (Figure 2). If, for example, a 35,000-shp VLCC requires some 160 cubic meters per hour of feed water to reach a speed of 16 knots, it would take approximately 60 m³/h of feed water to attain speeds of between 10 and 11 knots. Consequently, this capacity reduction could be even greater if derating is initiated.

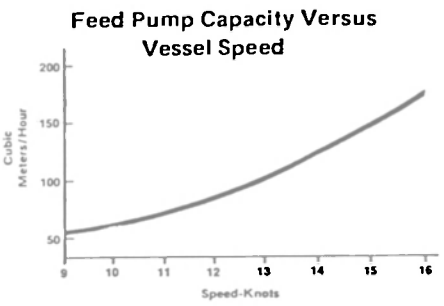


Figure 2.

It is possible to set up a curve (Figure 3) to show how effective derating can be when comparing a derated pump with an existing pump. These curves correspond to just two of a variety of possible internal configurations that can be fitted to either the DEB-16 or DEB-22 pumps to obtain a specific performance characteristic. Such characteristics are only approximate, and are intended to show the relationship between water flow and steam consumption. However, they also demonstrate how boiler feed pump efficiency can be improved to meet slower steaming conditions.

In terms of dollar outlay, in a typical situation where a shipowner or operator has a VLCC or ULCC fitted with a 35,000-shp power plant, operating at a reduced speed under 12 knots, a modified boiler feed pump can net an annual saving of between 0.25 and 1.0 percent in the fuel rate.

The payback period for this type of suggested modification averages about 18 months, based upon a formula calling for an assumed fuel cost of $175 per ton. In reality, the exact value of an efficiency gain depends on the type of steam cycle, and should be evaluated for each situation.

Reducing horsepower from 35,000 to 15,000 shp, the corresponding feed pump capacity of 60 m³/h achieved would permit a saving of about 1,200 kg/h of steam—some 228 tons annually. The saving could be more or less, depending on the type steam cycle and the original internal combination fitted in the pump.

If a standard turbo boiler feed pump is being used, very likely the modification would involve replacing the impeller/diffuser combination with the associated wearing parts. These replacement parts would differ from the original equipment in that the flow passages would be designed to achieve low flows with higher efficiency.

In a situation where the derating work calls for a major reduction in performance, the discharge head and associated diaphragm would undoubtedly need to be changed. Still, it would not be necessary to disconnect any of the piping to make external changes.

Whatever the modifications, the internals must maintain the highest optimum turbine speed for best results. One or both nozzle plates in the turbine should be replaced and, therefore, the most energy can be extracted for the available steam.

It is entirely feasible to perform all derating modifications within a day or two. The changes are also reversible; if a return to full steam capacity is desired at some point, the original parts can easily be retrieved from on-board storage. They can also be retained for emergency use and as replacement equipment. Marine agents are available on short notice to handle derating conversions throughout the world.

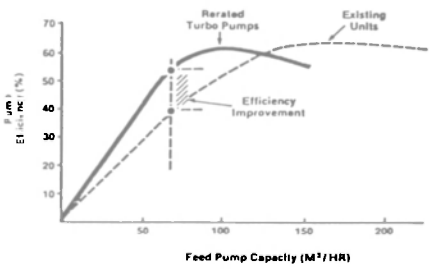


Figure 3.

Recirculation management is another means of effecting savings. To aid preventive maintenance, the recirculation system should be checked routinely for the following: system opened too early, system that is always open, leaking valves, and oversized orifices (caused by wear or excessive sizing in the original design).

There are other advantages to derating. At all reduced volume flows, the differential pressure system requires the least power and provides the boiler feed pump with the following: lowest rpm; lowest part stress levels; lowest NPSH required, providing additional NPSH margins; lowest recirculation rate required and less wear for the orifice parts; and lowest noise level.

Over the years, the boiler feed pump aboard ship has been a reliable performer. Even so, fuel oil prices are likely to remain high for some time to come, so any means at hand to improve the efficiency of fuel-consuming systems is a plus. By derating boiler feed pumps, shipowners and operators have an exceptional opportunity to boost efficiency, save on fuel, and reduce costly maintenance.

For full literature and complete information on FMC Coffin boiler feed pumps,

Circle 24 on Reader Service Card

*Mr. **Amicucci** is service manager, FMC Coffin Pump, Englewood, N.J.

MGA Gets $6.5-Million Navy Contract To Provide Technological Support

Morris Guralnick Associates, Inc. (MGA) has been selected by the United States Navy to provide naval architecture and marine engineering support to the Naval Ship Weapons Systems Engineering Station, Port Hueneme, Calif., it was announced by **Hubert E. Russell**, president and chief executive officer of the prominent San Francisco firm of naval architects and marine engineers. Approximate value of the contract to MGA is $6.5 million.

Under terms of the contract, which calls for technological support for weapons installations aboard naval vessels, MGA will develop ship feasibility studies and supporting documentation including drawings and reports. The firm will also develop studies and designs for installation of new or modified combat systems, conduct analyses including weights and moments, stability reliability assessments, and human engineering, and provide support assistance to fleet management for inspections, tests and trials.

Russellstoll Offers Full-Color Bulletin On Heliport Lighting System

A free full-color bulletin is being offered by the Russellstoll Division of Midland-Ross Corporation, on their new E-L Tru-Plane™ heliport lighting system which offers a major advance in depth perception.

The gate-fold bulletin explains that E-L Tru-Plane lamps are housed in tough, "vandal-proof," one-piece PVC assemblies. There are no sockets or bulbs and the entire lamp assembly is highly resistant to corrosion. The lamps can withstand the weight of a helicopter up to 350 psi, yet their lightweight construction allows for convenient portability when wired on a harness. The E-L Tru-Plane perimeter units are thin—only ½-inch thick—and lie flat against the deck surface, so that vehicles may roll right over them without damage to the equipment or units.

The advantages of the new Russelstoll product as stated by the bulletin are: enhanced visibility; all-weather capability; variable brightness; long life; durability; simplicity; economy; and portability.

The lamps use the principle of electroluminscence, they glow rather than shine, thus reducing the dangers of "false plane" or "white out" by enhancing depth-perception.

To obtain a copy of the bulletin on the new E-L Tru-Plane heliport lighting system.

Circle 43 on Reader Service Card

Catamaran to be named Glacier Express will be virtual twin to Gold Rush shown, built for Blue & Gold Fleet.

Nichols Brothers Delivering Catamaran To Glacier Bay Yachts

Glacier Bay Yacht Tours, Inc. of Seattle will take delivery this month of a Nichols Brothers Boat Builders 370-passenger catamaran, Glacier Bay president **Robert Giersdorf** has announced. Nichols Brothers is building the 86-foot, high-technology catamaran, designed by International Catamarans, Ltd. of Australia, at its Whidbey Island yard.

This order followed the highly successful introduction of a Nichols catamaran in Alaska's Inside Passage by Glacier Bay Yachts this past summer using the leased catamaran Gold Rush, which Nichols completed for the San Francisco-based Blue and Gold fleet last spring.

The new catamaran, a virtual twin of the Gold Rush, will be named Glacier Express. She will be certified to carry upwards of 370 people at speeds of more than 30 knots. The vessel will be fully air conditioned and have extensive galley facilities capable of handling both lunch and dinner on longer full-day excursions. She will accommodate up to 250 people for "sit-down" dinner service.

The Glacier express will operate out of Juneau, Alaska, from May to September, and will be based in San Diego during the fall and winter. Current plans call for one-day excursions between San Diego and Ensenada, Mexico, with the service called the Baja Express.

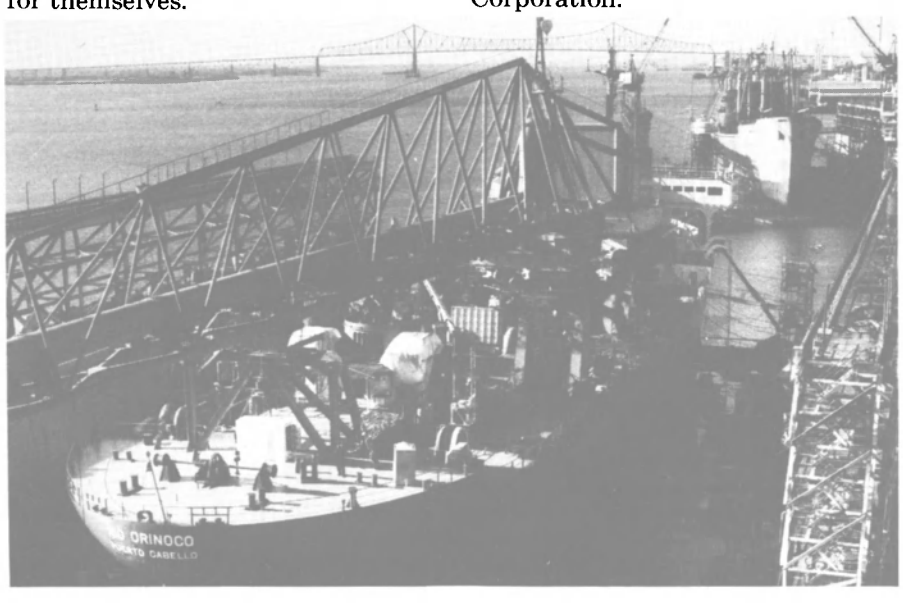
Simultaneous Drydocking Requires Separation Of 70,000-Ton Drydock At Penn Ship

The versatility of the Pennsylvania Shipbuilding Company was challenged as two vessels required drydocking at one time. The challenge was answered by separating the one drydock into two sections and drydocking both vessels.

According to **Joseph E. Wise,** senior vice president of marketing, "We have been telling everyone we could do it and now they can see it for themselves."

The ships drydocked were the dredge, Rio Orinoco, and the USNS Aide.

Pennsylvania Shipbuilding Company is one of the U.S.A.'s largest and most versatile shipyards engaged in the construction, conversion, overhaul and repair of all types and sizes of naval and commercial vessels. The company is a wholly owned subsidiary of Capital Marine Corporation.



Kriesels Named Manager Of Marine Sales For Falk Corporation

Peter C. Kriesels

Peter C. Kriesels has been appointed manager-marine sales for The Falk Corporation of Milwaukee. In his new position, he will report to **Terry L. Ball,** director of sales, marine and special products.

A graduate of Automotive College in Aspeldoorn, Netherlands, Mr. **Kriesels** joined Falk in August 1985. He brings with him 21 years of marine experience, most recently as director of sales, North America, for Krupp MaK Diesel, Inc.

The Falk Corporation, a subsidiary of Sundstrand Corporation, is a major manufacturer of marine and industrial power transmission machinery.

For complete literature on the full line of Falk marine gears,

Circle 25 on Reader Service Card

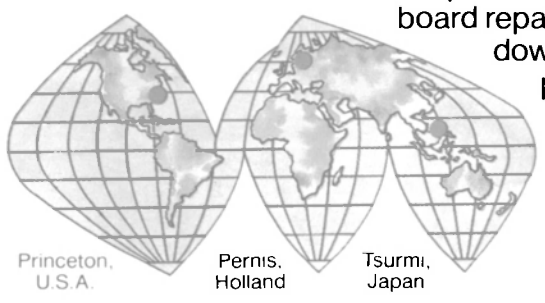
Triple 'A' Receives $4.1-Million Contract For Enterprise Hull Repair

Triple "A" Shipyard, Hunters Point Site, San Francisco, Calif., was awarded a $4,150,000 firm-fixed-price contract for drydock costs and services for the emergency hull repair of the USS Enterprise (CVN-65). The work will be performed in San Francisco and is expected to be completed early this year. The Supervisor of Shipbuilding, Conversion and Repair, San Francisco, is the contracting activity (N00024-85-H-8240).

Watch after watch after watch after watch the engines keep working.

Your marine engines and machinery are the heart of the multimillion dollar investment you have in your fleet. They deserve maximum protection against costly breakdowns and damage, and Mobil can provide it.

Because no shipowner can afford onboard repair costs, costly downtime and expensive overhauls, Mobil has developed PFA, Progressive Fast Analysis ... the ultimate in used oil analysis ... the ultimate in protecting your investment.



Three totally modern, automated PFA laboratories operating in different parts of the world can ensure that your oils are performing to peak standards. All three provide Wear Metals Analysis that identifies the type and percentage content of metal contaminants in order to give you a diagnostic measurement of equipment condition. And those labs work fast—turnaround from receipt of samples at a PFA laboratory to transmission of results is only two working days because computers process all

The Mobil® PFA program will keep an unbroken watch on their condition around the world.

collected data.

One reason PFA does an outstanding job in protecting shipowners is that it is progressive in nature. In addition to communicating current oil and equipment conditions, PFA generates a progress report that allows you to identify immediately potentially critical trends in wear or contamination. Because of this, you can take action before they reach a danger point.

The Unbroken Watch of the Mobil Progressive Fast Analysis transforms used oil analysis into an efficient, cost-saving system. Wherever in the world your ships sail, that system is ready and able to help you extend the life of your equipment ... reduce your maintenance and repair costs ... cut downtime ... and increase the intervals between overhauls.

For further information on the PFA program, call the Mobil Information Center toll-free: 1-800-634-3100.
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REDUCING FUEL COSTS

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

Though the recent failure of the OPEC nations to agree on limiting crude oil production may eventually result in lowering fuel costs somewhat, fuel expenses and consumption will continue to remain a major cost factor for all vessel owners. As a result, diesel engine designers and manufacturers continue development of their product lines with emphasis on further improvements in specific fuel consumption and improved capability to burn heavy fuel.

The diesel manufacturers are accomplishing the lower sfc in a number of ways, including more efficient turbocharger/compressor designs, larger bore-stroke ratios, higher injection pressures and BMEPs, and redesigned components.

As a result of aggressive research and design efforts on the part of the engine manufacturers, prudent decisions on fuel selection by vessel operators, and technological advances in shipboard fuel treatment, modern diesel-powered merchant ships are capable of operating on the low-grade marine fuels that are currently available.

It seems that the diesel engine design efforts in the near future will continue the trend to convert the maximum amounts of energy in the fuel to usable energy. Shipowners will continue to adopt the most efficient engines available and will develop system designs that will result in overall fuel consumption to such low levels a 50 percent of the levels common in the U.S. merchant fleet prior to 1973.

These systems will probably incorporate waste-heat steam generators, induction turbines for driving the ship's 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 lowered the immediate incentive for designing power plants for ultra-low fuel consumption, the maritime industry has been conditioned to expect engines and systems with the lowest possible sfc. Shipowners know that lower fuel consumption normally converts to lower required freight rates and, given the current depressed rates on most trade routes, will continue to order ships with the lowest possible annual fuel costs.

The following review is a compendium of engines, components, and systems for reducing fuel costs in powering modern vessels. For additional information and free literature on any manufacturer's product line, circle the appropriate number on the Reader Service Card bound into the back of this issue.

BMV MASKIN

Circle 81 on Reader Service Card

BMV Maskin A.S. in Norway (formerly Bergen Diesel) has a new heavy-fuel diesel engine for marine propulsion and auxiliary applications. The engine, designated the B type, underwent extensive testing at the Bergen factory, and met all design and operational expectations.

The B type engine development was the result of market research that indicated the need for a medium-speed engine with an output of about 500 bhp per cylinder. It is intended to augment the company's product line by offering an engine with twice the output per cylinder as its K type, which is BMV's most popular production engine. The market research also identified the need for the new engine to be compatible with the fuels that will be available to the marine market in the foreseeable future.

The B engine's design is based on fuels with a viscosity of 700 cSt at 50 C, and a specific weight of 1.01 grams per milliliter, assuming the fuel treatment system is compatible. The company relied heavily on the experience it had gained during the 20 years of delivering the heavy-fuel K type engines.

Design criteria for the B type gave low operating costs higher priority than lowest possible initial cost. The criteria included: high reliability and long overhaul intervals on lower-quality, heavy fuels; low fuel consumption; low wear rates; good component access; and easy servicing of components.

The B type engines are conservatively designed, four-stroke cycle diesels fitted with turbochargers and intercoolers. Their bore is 320 mm, with a stroke of 360 mm, engine speed of 720/750 rpm, BMEP of 18-20.3 bar, mcr of 425-500 bhp per cylinder, and maximum firing pressure of 150 bar. The in-line version is available with 6, 8, or 9 cylinders; the V version comes with 12, 16, or 18 cylinders. The output range is 2,550 to 9,000 bhp.

B&W ALPHA

Circle 82 on Reader Service Card

B&W Alpha Diesel A/S in Frederikshavn, Denmark, a company of the M.A.N.-B&W Group, designs, manufactures, markets, and services complete vessel propulsion systems. The company has completed the integration of the in-line and V versions of the 20/27 M.A.N.-B&W engine, and the in-line 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 of up to 2,100 sec. Redwood 1 at 100 F.

Another series being offered is the 20/27-VO propulsion system. While the engine itself is not new, this system incorporated the new Alphatronic I and Alphatronic II, the Danish company's latest electronic remote control systems.

BOMBARDIER/ALCO

Circle 83 on Reader Service Card

Alco Power of Auburn, N.Y., now a subsidiary of Bombardier of Canada, manufactures the Model 251 diesel engine. Latest improvements to the series are said to reduce fuel consumption, lower maintenance costs, and enhance engine/component reliability. Major components involved are pistons, cylinder heads, and camshafts.

In order to establish viability of production tooling, Alco has been offering preproduction sets of deep-bowl pistons in limited quantities, as well as cylinder heads and camshafts. Full production of these components is expected during 1986.

With a 12.5:1 compression ratio, the pistons can be used in all Model 251 engines that are equipped with 123-degree or 140-degree overlap camshafts. In laboratory tests, up to six percent fuel savings were realized under controlled conditions. While actual savings will vary according to engine ratings, average service throughout a typical duty cycle are predicted at about 2- to 2½-percent reduction in fuel consumption.

CATERPILLAR

Circle 84 on Reader Service Card

Caterpillar recently announced a horsepower increase of approximately 10 percent for its 3500 Series marine propulsion engines and marine generator sets. These higher ratings and a 3-percent improvement in fuel economy have been achieved by strengthening valves, cylinder blocks, heads, and fuel system components.

The 3500 Series engines, with a bore of 170 mm and stroke of 190 mm, are offered with 8, 12, and 16 cylinders V configuration, 4-stroke marine engines with ratings from 705 to 2,000 bhp for propulsion and from 700 to 1,090 kw for continuous electrical service. Operating success of the Series, which was introduced in 1981, is based on large displacement and conservative rating levels, high-strength components, fuel economy, fast response, reliable performance, and simple maintenance and repair procedures. Cat's newest engine line, the 280-mm by 300-mm 3600 Series, has been field tested in both marine propulsion and generator set applications. The in-line 3606 and 3608 are currently available, and will be followed by the V 3612 in mid-1986 and the V 3616 soon after.

The 3600 Series is a medium-speed engine with capability to burn blended or heavy fuel. Initital residual fuel specification is 1,500 seconds Redwood 1 viscosity, followed by 3,500 seconds capability in 1987. Continued development toward even higher viscosity levels is planned.

All 3600 models are turbocharged and aftercooled, four-stroke engines with unit fuel injectors providing pressures of 20,000. The marine propulsion rating at 1,000 rpm is 375 bhp per cylinder, with initial specific fuel consumption of 0.327 pounds per bhp hour, with two water pumps as well as lube oil and fuel pumps. Additional ratings of 350 bhp per cylinder at 900 rpm, 267 bhp at 750 rpm, and 207 bhp per cylinder at 720 rpm are also available.

COLT INDUSTRIES

Circle 85 on Reader Service Card

The Fairbanks Morse Engine Division of Colt Industries now offers the Colt/Pielstick PC-2.6 L and V, and the high-horsepower PC-4.2 V diesel engines. The PC-2.6, with 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 can burn all heavy fuels available on the market. It is fitted with water-cooled gages and exaust valves especially adapted to the fuel's vanadium content. The advanced technology of this engine enables it to burn the poorest foreseeable fuels without major modificaions.

The Fairbanks 38D8⅛ opposed-piston engine is offered in both blower-scavenged and turbocharged versions, with power 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, and sophisticated control and monitoring systems are providing even better fuel economy from them.

Fairbanks Morse continues to produce the Colt/Pielstick PC-2.3V and PC2.5V 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 Colt/Pielstick PC-4.2V, rated from 16,270 to 29,286 bhp, is able to burn residual fuels of up to 4,000 seconds Redwood 1 at 100 F, with a 400 ppm vanadium content.

CUMMINS

Circle 86 on Reader Service Card

The first marine models of its new B and C Series of lower horsepower diesel engines, introduced during 1985 by Cummins Engine Company of Columbus, Ind., expands the marine product line to 61 bhp at the low end.

The B Series will consist of four- and six-cylinder models with displacements of 3.9 and 5.9 liters, ranging from 75 to 152 bhp, rated 2,500 rpm for intermittent duty and 2,800 rpm for maximum duty. Now available, the B Series is capable of providing main propulsion in a wide variety of marine applications.

The C Series propulsion engines, which will be available in the second half of this year, comprises six-cylinder units with a displacement of 3.8 liters, ranging from 158 to 204 bhp.

Cummins has also increased engine horsepower ratings for its NT855-M and KT855-M marine models. The NT855-M is now available rated 360 bhp at 2,100 rpm, up from the former rating of 295 bhp at 1,950 rpm. Its continuous-duty rating has been increased from 270 bhp to 300 bhp at 1,800 rpm.

The KT19-M's intermittent rating of 510 bhp at 2,100 rpm has been available since 1984. Its continuous-duty rating has now been increased from 365 bhp to 425 bhp at 1,800 rpm.

Cummins' intermittent ratings are intended for continuous use in variable-load applications where full power is limited to six hours out of every 12 hours of operation. The continuous-duty rating is intended for applications requiring uninterrupted service at full power. These ratings can be certified to ABS design criteria.

DAIHATSU

Circle 61 on Reader Service Card

A new type of engine, the DL Series, which features low fuel consumption, low quality fuel burning capability, and low load operability, has been developed by Daihatsu Diesel Manufacturing Company Ltd. of Japan, represented in North America by Daihatsu Diesel (U.S.A.) Inc.

The DL Series engines—DL-20, DL-26, DL-28, and DL-32—are a medium-speed type of 600 to 1,000 rpm, with outputs covering the range from 750 to 3,000 bhp. They are suitable for both main propulsion and auxiliary generating applications.

Extensive testing under various conditions on all parts of these engines was carried out at the Daihatsu laboratory and factory in Osaka before they were placed on the market. The company's traditional design concepts—simple and sturdy construction, easy maintenance, and lower maintenance costs—are fully incorporated in the DL Series. The company reports an increasing number of orders for the DL engines from shipowners overseas.

DETROIT DIESEL

Circle 62 on Reader Service Card

Fuel savings of up to six percent over previous high-efficiency models, depending on the application, are claimed for an innovative air induction system available for its new Silver 149 Series engines by the Detroit Diesel Allison Division of General Motors.

Known as the bypass blower, here's how it operates. In a chamber between the entire intercooler and blower is a pressure valve. When blower work is required to increase air flow, as in engine start-up or as an aid in transient response, the valve is closed. As the engine speed and the ability of the turbocharger to provide the necessary air flow increases, the valve begins to open. This permits a portion of the blower discharge air to recirculate through the blower. This process continues until the valve is fully opened and the air pressure on the inlet and outlet sides of the blower has been equalized.

The engine blower is a gear-driven component that requires a certain amount of parasitic horsepower to turn and compress the incoming air. When the inlet and outlet pressures equalize, the pumping action of the blower has been eliminated, thus it continues to rotate or freewheel but does not work. It is here that the horsepower reduction realized by elimination of the blower compressing work results in increased fuel economy. As the horsepower previously required to operate the blower is taken off the flywheel, there is an increase in engine performance without an increase in fuel consumption.

DEUTZ/MWM

Circle 63 on Reader Service Card

Two major German diesel engine manufacturers, Klockner-Humboldt-Deutz AG of Cologne, and Motoren-Werke Mannheim AG of Mannheim, recently merged to form Deutz/MWM. The new engine group will offer one of the broadest power ranges of diesels in the world.

This merger brings together two engine builders with a total of more than 230 years of experience, as well as a combined reputation for quality, reliability, and service excellence.

The KHD Group's Engine Division will be restructed with all activities involving the water-cooled engine business being combined at Mannheim. KHD will relocate its medium and big engine activities in development, sales, and parts manufacturing to Mannheim in combination with the engine program of MWM. The medium-sized and big engine built in Mannheim and Cologne will be manufactured and marketed under the trade name Deutz/MWM.

The formation of Deutz/MWM will offer an expanded range of marine and stationary prime movers, for propulsion and electric power generation, to world markets including North America.

The North American headquarters of the new company is located in Montreal, with a division based in Atlanta.

ELECTRO-MOTIVE

Circle 64 on Reader Service Card

A continuing fuel economy fuel improvement program by the Electro-Motive Division of General Motors with its 645 Series two-stroke diesel engines during the past few years has achieved impressive reductions in specific fuel consumption.

A more efficient turbocharger, increased horsepower ratings, and traditional reliability mark EMD's latest engines, the FB Series. The 645FB is a turbocharged and aftercooled, two-stroke, uniflow-scavenged, 45-degree V diesel. It has a bore of 230.2 mm and stroke of 254 mm.

EMD reports that the 645FB develops up to 4,000 bhp at 900 rpm, an increase of 400 bhp over the predecessor 645EC engine. To achieve the higher horsepower, the FB Series incorporates design improvements involving the turbocharger, crankcase, fuel injector, exhaust valve, engine cylinder retainer system, and firing ring piston design.

Many of the elements contributing to the FB's ability to produce higher horsepower have already been proven on predecessor models. These include the rocking wrist pin and bearing assembly that alternately loads and unloads multiple

(continued)

Reducing Fuel Costs

(continued)

bearing surfaces contained on a single wrist pin and bearing.

EMD states that the 645FB Series is the result of painstaking research and development, with particular attention paid to retaining reliability and maintainability while achieving new levels of output and fuel economy.

GENERAL ELECTRIC

Circle 65 on Reader Service Card

The fuel-efficient, four-stroke 7FDM marine diesel engines manufactured by General Electric's Diesel Power Products Division in Erie, Pa., now offer ratings from 1,525 to 4,000 bhp. Its 8-cylinder model has an output of 1,525 bhp at 90 rpm, and a rating of 1,800 bhp at 1,050 rpm. The 7FDM 12-cylinder engines are rated 2,550 bhp at 900 rpm and 3,000 bhp at 1,050 rpm. The 16-cylinder models carry ratings of 3,400 bhp at 900 rpm and 4,000 bhp at 1,050 rpm.

GE's three-ring piston design is said to reduce lube oil consumption significantly. This design, using two compression rings and one oil control ring, also reduces ring wear for longer periods between overhauls.

The development of turbochargers that operate more effectively in marine service is said to improve accelerations characteristics and further improve fuel efficiency. The life expectancy 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 66 on Reader Service Card

George Engine Company's "bypass operation"—the upgrading of a Detroit Diesel 149 Series engine from its normally aspirated operation to a turbocharged, intercooled, blower-bypass configuration using the latest Detroit Diesel components—is said to provide a reduction in fuel consumption of as much as 11.5 percent. From its facilities in Baton Rouge, Morgan City, Lafayette, and Harvey, La., the company also provides custom power packages and a broad range of services for marine and offshore applications.

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

The TIB configuration, with a smaller fuel injector, 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, and still at a competitively low specific fuel consumption.

ISOTTA FRASCHINI

Circle 67 on Reader Service Card

Isotta Fraschini SpA, a company of the VM Group in Italy, designs and manufactures a broad range of diesel engines for various applications. The ID 32 Series for marine propulsion offers a power range from 180 to 400 bhp at 2,700 to 3,000 rpm.

The ID 38 Series is rated from 180 to 400 bhp at 2,700-2,900 rpm for workboat propulsion, and 500 bhp at 3,000 rpm in military applications. The ID 36 Series has a power range of from 300 to 1,320 bhp at 1,650-1,800 rpm for workboats, and up to 1,600 bhp at 1,900 rpm for military vessels.

The ID 36 engines are available in V configuration with 6, 8, 12, and 16 cylinders; a 10-cylinder version is 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 from 1,000 to 4,500 bhp at 1,600 rpm.

KRUPP MaK DIESEL

Circle 68 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 69 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 upgrading 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.

MITSUBISHI

Circle 70 on Reader Service Card

Mitsubishi Heavy Industries, Ltd. in Japan has developed two new types of its UE long-stroke diesel engines, the LS Series, and plans to market them soon. This new series, with the largest bore/stroke ratio in the UE engine line, meets the recent demand for low-speed, fuel-efficient diesels.

The new LS Series is composed of the UEC 60LS with a cylinder bore of 600 mm, and the UEC 52LS with a 520-mm bore. Their strokes (2,200/1,850 mm) have been extended even further than the LA Series, enabling a reduction in revolutions of about 10 percent compared witht the LA Series.

Maximum rated output has been improved by 13 or 14 percent, to 2,400 bhp per cylinder for the 60LS and 1,800 bhp for the 52LS. At maximum rating, fuel consumption for the 60LS is 122 grams per brake horsepower hour and for the 52LS 123 g/bhph. Mitsubishi quotes what it calls a "capable minimum fuel consumption rate" for these new engines of 116.5 and 117.5 g/bhph, respectively. The 60LS is capable of derating in the range of 75 to 100 rpm, while the 52LS ranges from 90 to 120 rpm.

With the development of the LS Series in addition to the four existing types of LA engines, users are offered a wider range to meet the requirements of varying sizes and types of vessels. The 60LS will be ready for delivery from August 1986, and the 52LS from November 1986.

MTU

Circle 71 on Reader Service Card

MTU of North America, Inc., is the U.S.-based subsidiary of MTU-Friedrichshafen of West Germany. The German parent company is jointly owned by Daimler-Benz AG and M.A.N. AG.

The MTU diesel line covers a power output range of 440 to 10,000 bhp at rated speed 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. All engines are the result of the collective experience gained by Maybach, Mercedes-Benz, and M.A.N. in the development of cost-effective, high-performance diesels.

The model 20V 1163 TB 93 engine, introduced in 1983, is evidence of MTU's continued success in its engine development program, which focuses on increasing engine power and power concentration to open new powering possibilities, reducing fuel consumption throughout the entire speed range, extending operating range through higher mean effective pressures, and improving partial-load performance characteristics. MTU employs cylinder cutouts, cylinder charge transfer, and sequential turbocharging in some of its engines.

Power in the 1163 series has been increased from 349 to 496 bhp per cylinder, corresponding to an increase in mep from 305 to 426 psi. MTU's two-stage turbocharging is also employed in addition to the other systems mentioned. This allows overall engine dimensions to be kept almost constant, and results in a power-to-volume ratio of 11.7 bhp per cubic foot, and a weight-to-power ratio of 4.4 pounds per bhp with the 20V 1163 producing 9,920 bhp.

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

PENSKE GM POWER

Circle 72 on Reader Service Card

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

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

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

SACM/UNI DIESEL

Circle 73 on Reader Service Card

SACM (Societe Alsacienne de Constructiones Mecaniques) in France has adopted a new marketing name, UNI Diesel, for its entire range of medium- and high-speed, four-stroke, direct-injection diesel engines with power ratings of 200 to 10,000 bhp. UNI Diesel is represented in the U.S. by the F.W. Donnelly Company of Houston.

UNI Diesel is a leader in the development of high-performance engines utilizing the RVR and Hyperbar turbocharging techniques, and in nonmagnetic engine versions up to 2,880 bhp. The high-performance engines are used in such applications as the Bell Halter BH-110 SES oil field supply boats, SAR 33 patrol boats, Westamarine catamarine passenger ferries, Statfjord B/C production platforms, ODOCO's Ben Ocean Lancer drillship, and Circle Class minesweepers.

It is UNI Diesel's philosophy to further the development of the performance qualities of its engine range without sacrificing the essential operational qualities, including low specific fuel consumption, long time between overhaul, and ease of operation/maintenance. This development philosophy has resulted in UNI Diesel's now well known RVR turbocharging technique. RVR (reduced volumetric ratio) engines provide significantly more power than conventional high-performance engines while maintaining or slightly reducing the engine's thermal and mechanical stresses. Additional attractive features of these engines include the wide ambient temperature range in which the RVR engines may operate without power derating, the simple single-circuit cooling system that is employed, and the elimination of condensed water formation in the air intercoolers.

SKINNER ENGINE

Circle 74 on Reader Service Card

Skinner Engine Company of Erie, Pa., recently announced that the first marine steam engines specified for a coal-fired ship in more than 30 years have been ordered for the main propulsion power in a Polish ferry that will operate in the Baltic. Delivery of the engine room package is scheduled for October this year.

Skinner reported that the multi-million-dollar contract involves two 4-mw multicylinder, compound Uniflow engine sets that will be installed in a train/car ferry being built by Kockums in Sweden for the Polish Baltic Steamship Company. The ferry will operate between Ystad in southern Sweden and Swinoujacie, Poland.

The entire engine room package will be manufactured by an Anglo-American consortium. In addition to Skinner it includes: Peter Brotherhood Limited of Peterborough, U.K., manufacturer of turbine generator sets; Romac Limited of Shoebury, Essex, consortium coordinator; and Senior Green Limited of Wakefield, producers of boilers and automated coal combusion equipment.

The Skinner marine compound engine, like most other steam engines, is highly regarded for its low operating maintenance costs and long life. Because it has no minimum continuous operating speed, full torque is available at a dead stall ahead or astern, allowing faster and more effective transfer of power to the propellers. Similarly, it allows rapid and complete reversibility for optimum response in emergency situations.

STORK-WERKSPOOR

Circle 75 on Reader Service Card

Stork-Werkspoor Diesel BV (SWDiesel) headquartered in Amsterdam is Holland's leading diesel engine manufacturer. Its production program covers an output range from 400 to 21,725 bhp, and consists of five models of four-stroke, medium-speed, heavy-duty engines, all capable of operating on heavy fuel.

The company's latest engine type, the SW280, is offered in an in-line configuration with six, eight, or nine cylinders, and in a 12-cylinder V-form version, with outputs ranging from 1,965 to 4,735 bhp.

Special attention in Stork's research and development program was given to the reduction in fuel consumption, resulting 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.

SULZER

Circle 76 on Reader Service Card

The highly successful Sulzer RTA low-speed engine program has been enlarged by the introduction of two additional bore sizes, the RTA52 and RTA62, as well as a complementary version of the RTA84 having a longer stroke, the RTA84M. These models will offer greater flexibility in engine selection to key market segments, combined with improved fuel economy.

The RTA 52 and RTA 62 engines cover a maximum continuous rating power range of 3,880 to 19,920 bhp at speeds of 73 to 122 rpm. Together with the well-established RTA58, they thus span the most popular power range for low-speed engines. In 1983, some 70 percent of the total marine low-speed engine market fell within the range of 7,000 to 15,000 bhp per ship.

With the widened choice of RTA engines in this key power range, both shipowner and shipbuilder are offered greater freedom in obtaining a truly optimum match between engine, propeller, and ship. Full benefit can thus be gained from the extremely low brake specific fuel consumption (BSFC) available from RTA engines, and also higher propulsive efficiencies at lower propeller speeds. The increased power/speed options given by these additional RTA bore sizes, combined with the highly cost-effective design of the RTA engines, also insure that ship requirements can be met with lower investment costs.

The RTA84M complements the existing RTA84 by offering lower propeller speeds, down to 55 rpm. Higher propulsive efficiencies will thus be possible in large bulk carriers and tankers that can accommodate larger propeller diameters. The RTA84M covers a power range of 10,120 to 55,200 bhp at speeds of 55 to 76 rpm. The BSFC is down to a minimum of 118 grams per bhp hour at normal service ratings, and 116 g/bhph when using the new Sulzer Efficiency Booster.

VOLVO PENTA

Circle 77 on Reader Service Card

Volvo Penta of America's full line of marine diesel engines now ranges from the top-of-the-line TAMD 121C rated at 408 bhp, to its lower-end TAMD 40 rated at 143 bhp. The TAMD 40B is also available with a light-duty rating of 165 bhp. Also available is the AQAD 40B/290 sterndrive with the well-known Volvo Penta Aquamatic outdrive, both standard and DuoProp.

Injection systems and turbochargers have been further optimized on the turbocharged and aftercooled TAMD 60C and TAMD 70E engines, resulting in lower specific fuel consumption and higher output in these 6- and 7-liter, in-line 6-cylinder engines. The TAMD 60C is rated at 250 bhp light duty, 210 bhp medium duty, and 177 bhp on continuous heavy duty. It uses 0.343 pounds of fuel per brake horsepower hour at the continuous rating. The TAMD 70E is rated at 300 bhp light duty, 270 bhp medium duty, and 211 bhp continuous duty, using 0.353 lb/bhph on its continuous rating.

Higher output and long-term economy characterize the TMD 100C and TAMD 121C. Redesigned components including cylinder heads, combustion chambers, and turbochargers have boosted output while retaining or improving economy for the 100 and 121 Series engines.

The turbocharged 10-liter TMD 100C engine is available with 283 continuous bhp, 258 medium-duty bhp, and 272 light-duty bhp. Fuel consumption is 0.345 lb/bhph at the 1,800 rpm continuous rating. A complete line of power takeoffs and engine accessories are available for both the TMD 100C and TAMD 121C models.

The turbocharged/aftercooled TAMD 121C is the largest engine currently produced by Volvo Penta. It is rated at 408 bhp for light-duty use, 388 bhp for medium duty, and 367 bhp for full-load continuous duty. At the continuous rating the specific fuel consumption is 0.352 lb/bhph. The TAMD 121C has quickly established a reputation for economical operation throughout the world's workboat fleets.

WARTSILA DIESEL

Circle 78 on Reader Service Card

Wartsila Diesel in Finland, a leading manufacturer of medium-speed diesel engines, is part of the Wartsila Group, which includes shipyards in Helsinki and Turku, Finland. Wartsila specializes in purpose-designed, heavy-fuel diesels for marine propulsion and auxiliary applications, and for power generation on offshore rigs.

The primary objective of the company's product development is to create diesel engines with good economy and safe operation even in the most demanding applications.

(continued)

Reducing Fuel Costs

(continued)

As a result of these efforts, Wartsila Diesel today is producer of two high-standard, medium-speed, heavy-fuel engines designed and developed from the very beginning for the poorest fuel qualities.

The Wartsila heavy-fuel engine types are the Vasa 32 and Vasa 22HF covering an output range of 760 to 9,180 bhp in a speed range of 720 to 1,200 rpm. The main features of these engines are: starting, stopping, and running on heavy fuel over the entire load range, with no limitations; heavy-fuel operation with the same safety and reliability as when operating on distillate fuel; good total economy due to built-in serviceability, low fuel and lube oil costs, and low spare parts consumption.

The technical features of the Wartsila heavy-fuel engines, such as pressure lubrication of the piston skirt, load-dependent cooling water system, and a turbocharging system developed for good low-load performance, combined with a longtime severe environment service experience, give an extra guarantee of reliable and economical operation with the Vasa engines.

WAUKESHA ENGINE

Circle 79 on Reader Service Card

An on-going product development program between Waukesha Engine Division of Dresser Industries in Waukesha, Wisc., and Sulzer Brothers Ltd., Winterthur, Switzerland, will result in substantially improved fuel rates for the AT25 Series diesel now being produced at Waukesha. The AT25 Series encompasses in-line 6- and 8-cylinder units and V-12 and V-16 models rated from 1,620 to 4,800 bhp. These engines are capable of operating on heavy fuels up to 500 cSt at 50 C.

Recent A Series orders placed at the Waukeska factory included 8-, 12-, and 16-cylinder models, both for distillate and heavy fuel applications. Other recent activity includes the addition of an 8.8-liter Scania 6-cylinder model, F517DS. The Scania product line now covers the range 167 to 450 bhp.

VHP Series diesel propulsion and auxiliary drive diesels offer a range of 404 to 1,636 bhp at speeds up to 1,215 rpm.

All of these Waukesha products are now completely described, with photographs, drawings, charts, and specification tables in a new publication, Bulletin 1088C. For your free copy, circle the Reader Service number listed at the top of this writeup.

WICHMANN

Circle 80 on Reader Service Card

Wichmann in Norway, represented in the U.S. by Wichmann Diesel, Inc. of Kenner, La., designs and manufactures diesel engines providing fuel efficiency, reliability, and high performance. Its latest model, the WX28, is a compact two-stroke, medium-speed diesel designed for heavy fuel and simple maintenance. An integral block and crankcase with fully forged crankshaft are dimensioned for 50-percent future uprating from the initial output of 408 bhp per cylinder.

The WX28 is a trunk piston, 600-rpm diesel with a bore of 280 mm and stroke of 360 mm, supplied in versions from four to 16 cylinders to give outputs in the 1,600-6,435-bhp range. This spectrum offers great flexibility, and most components are interchangeable between the inline and Vee versions. As with other Wichmann engines, a low rpm makes this series particularly suitable for operation on heavy fuels down to 3,500 sec Redwood 1 at 100 F.

Use of the latest design techniques during development has resulted in a very simple valveless configuration. All main components are computer-analyzed for stress and temperature distribution. Another feature that distinguishes this series is the large, high-efficiency turbocharger and scavenging air fan, giving excellent low-load running ability.

The WX28 has a low weight/power ratio, and the compact design provides vessels with higher cargo capacity. The new design also offers improved environmental conditions on board, and more space in the engine room.

Providing fuel efficiency, reliability, and high performance, the WX28 has been designed specifically to offer maximum power with the lowest possible fuel consumption.

New Debarkation Ladder Offered By A.L. Don—Literature Available

Peter Gronbeck, president of A.L. Don Co., Matawan, N.J., recently announced the introduction of the Erik II, a totally synthetic embarkation/debarkation ladder.

The new ladder recently completed drop tests successfully. Erik II, at 95 feet, is the longest length synthetic debarkation ladder ever approved by the USCG, and meets SOLAS specifications.

The steps of the ladder can be replaced simply in the exact same manner as the original construction, and the ladder is easy to fold and store. Erik II steps are international orange for safety and are made of Dupont® Hytrel® polyester elastomer.

For a free catalog, technical drawings, literature or additional information.

Circle 38 on Reader Service Card

BP Offers 60-Page Brochure On Facilities/Capabilities

A 60-page pamphlet is being offered by the BP Company Limited, on their facilities, capabilities and history.

The thorough publication contains text on the company's gas, shipping, pipeline, refinery, chemical, coal, nutrition and computer interests. Furthermore, BP's technical services, marketing, trading philosophy, research, employment policies, exploration and production are covered in the publication.

A list of principal BP companies worldwide in the back of the booklet includes: BP Chemicals group, BP Oil group, BP Gas Ltd., BP Detergents International, BP Exploration group, BP Ventures, BP Nutrition group, BP Minerals group and BP Overseas.

This impressive pamphlet is well organized and very informative. For a free copy of the pamphlet, "About BP,"

Circle 37 on Reader Service Card

Anixter Names Maze Manager, New Wire And Cable Facility

Anixter Bros., Inc., Skokie, Ill., has named **Jack Maze** manager of its new wire and cable sales and distribution facility in Maryland, it was announced by **Bob Wilson,** president of Anixter Wire and Cable.

Mr. **Maze** joined Anixter Bros. in 1980. Since that time he has held a wide variety of sales positions, most recently in Local Area Networks (LANs) out of Anixter's New Orleans wire and cable distribution facility. In assuming the responsibilities in his new position as manager, Mr. **Maze** has relocated to Washington, D.C.

For a free brochure and full information on Anixter products and services,

Circle 33 on Reader Service Card

Farboil Offers Two Free Directories On Marine Coatings and Systems

The Farboil Company of Baltimore, Md., has published a directory of their marine coating systems and a directory of their products. Both publications are available from the company without charge.

The directory of marine coating systems offers some insight into the protective coatings produced by Farboil. Special coatings are offered for weather deck, bottom, boottopping, topside, superstructure, and cargo space and ballast tank systems. Each coating system offered for the various parts of the vessel, is broken into the categories of conventional and high-performance. The specification charts listed under each category can be used to select the correct primer, antifouling, new construction, etc. coating from Farboil's wide range of products.

The recently published directory of products offers a listing of Farboil conventional, high-performance and military specification coatings, as well as solvents. Product code, packaging, color, viscosity, weight per gallon, solids percent volume, coverage, recommended film, drying time, potential life and thinner/solvent are given for each product listed.

For free copies of both the Farboil directory of marine coatings and directory of products,

Circle 47 on Reader Service Card

Navy Awards Vitro Corp. $4.9-Million Contract

Vitro Corporation, Silver Spring, Md., is being awarded a $4,945,000 modification to a previously awarded cost-plus-fixed-fee contract for engineering and support services for Italian Navy Audace class ships. Work will be performed in Silver Spring and is expected to be completed by December 1989. This contract is in support of a Foreign Military Sale to Italy. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-82-C-5232).

Todd Galveston Awarded $21.6-Million Modification Of Second T-AVB Vessel

Todd Shipyards Corporation reported recently that the U.S. Navy had exercised options amounting to $21.6 million authorizing Todd's Galveston Division to proceed with the modification of the S/S Great Republic, the second of two C5-6-78A Seabridge Class roll-on/roll-off (RO/RO) container cargo type vessels into Aviation Logistic Support Ships. The ships have an overall length of 602 feet and a beam of 90 feet.

The S/S Great Republic is scheduled to arrive in Galveston by tow from the James River Reserve Fleet in Virginia after Christmas but prefabrication work will start immediately on the major steel additions to the vessel. The action will return 100-200 tradesmen to work and will later provide jobs for 400 to 500 skilled personnel. Completion of the total conversion package is scheduled for late summer 1986.

The first vessel, the USNS Wright, is expected to be delivered by Todd Galveston to the Navy during March of 1986.

Todd Shipyards Corporation, one of the nation's largest independent shipbuilding and ship repair companies, operates shipyards in or near Seattle, San Francisco, Los Angeles, Galveston and New Orleans.

For further information on Todd Shipyards,

Circle 28 on Reader Service Card

Bogie train positioned under ship on shiplift elevator prior to movement into transfer area on way to repair berth.

PNOC Marine And Bardex Hydranautics Build World Class Shipyard

The PNOC Marine Corporation facility at Batangas Bay in the Philippines has experienced dramatic and rapid growth during its short five-year life. It has developed into a modern Lloyds-rated Class A shipbuilding and repair complex.

Strategically located on a 50-hectare site at San Miguel, Bauan, Batangas, PNOC successfully competes for business with the world's leading yards. In large measure, its position in the industry is based on an economical, tradition-breaking approach to yard outfitting which allows the yard to offer competitive prices for construction and repair work.

PNOC Marine Corporation (PMC) is a wholly owned subsidiary of the Philippine National Oil Company (PNOC). In 1974, PNOC acquired a shipping transport fleet to secure the movement of petroleum products. A repair and maintenance facility was planned to support the requirements of the fleet. In 1980, the support facility was completed as a fully equipped shipbuilding and repair yard. With its commissioning, the corporation increased the national capacity by nearly 20 percent. Today, PMC services the domestic shipping fleet as well as foreign requirements.

With its 1,000-plus work force, the yard undertakes construction and repair work (up to 23,000 dwt); dockside repairs of vessels with drafts of up to 40 feet; and engineering works and fabrication of components, modules and prefabricated structures. In total, PMC has constructed ten vessels and handled the repair of over 350 tankers, tug boats and barges since 1981.

When designing the facility, PMC consulted with Bardex Hydranautics of Goleta, California for the most cost-effective yard layout possible. The result has been an integrated facility that allows maximum scheduling flexibility, easily accessible work areas, and utmost utilization of available space. A two-fold savings was realized in the new yard construction: first, in initial installation costs and, then later, in costs associated with ship repair and maintenance.

The centerpiece of the yard is a hydraulic chain jack shiplift elevator and a hydraulic wheeled transfer system (bogie train) designed and supplied by Bardex Hydranautics. The lift is Lloyds-rated Class A with a maximum net lift capacity of 12,000 long tons. A total of sixty, 250-long-ton, hydraulic chain jacks lift the 28-meter by 172.5-meter platform in safe synchronized steps of one chain pitch at a time. The chain is a predictable tension member in terms of safety and long life. Using chain enables precise monitoring of any deterioration from salt water corrosion by simple measuring and visual inspection.

In designing the shiplift system, Bardex Hydranautics took into account the many classes of ships anticipated at the yard. As a result, the platform can accommodate varied load distributions. The platform is lifted or lowered by a single operator at a variable speed depending on the load.

One of the most important features of the yard is the "pitless" wheeled transfer system that operates in concert with the new shiplift system to service eight repair berths and a new construction/erection area having varying capacities up to 23,000-dwt tons.

The bogie train (which can be divided for smaller ships) rolls under the blocked ship in the platform and is hydraulically jacked up to lift the vessel from the platform blocks. The train then moves the vessel off the platform onto the land rail system. During this transfer, the lift cylinders serve a dual purpose, that of lifting and load limiting. If an overload occurs on a bogie due to yard variations, the hydraulic-operated cylinder on that bogie will retract to relieve and redistribute the load to the adjacent bogies, thus preventing damage to the wheels, bearings and vessels.

To change the movement from longitudinal to lateral under full load conditions, the bogie train and vessel are lowered onto plinths which are carried by the train. All bogies are rotated for lateral or longitudinal transfer. Under half-load conditions, the change from longitudinal to lateral movement is even easier since half the bogies can be arrayed for lateral and the other half for longitudinal transfer. All that is then required is hydraulic actuation to move the vessel into any one of the nine berths.

The hydraulic bogie system saved on the amount of tract and structural steel required and on wheel costs. Further, the cost of excavating a traditional side transfer area pit was completely avoided.

The Bardex system provides a hydraulic interface between the ship and the yard level and allows a much higher yard level tolerance. The hydraulic interface can accommodate tolerances of 2-inches. Allowing yard settlements in this range permits the use of crushed rock with ties for load spreading. In areas of settlement above tolerance, added rock can be worked in and under ties to return yard rail to within tolerance. Overall, the company estimates that a traditional transfer system could have cost PMC 70 percent more.

Foot and vehicular traffic can also move safely across the transfer area to any of the adjacent repair berths as well as to the new construction berth.

Another key design element in the lateral transfer scheme makes use of portable longitudinal track that is lifted by the bogie train and carried with the ship on the lateral rails in the transfer area. When the ship has been aligned with the desired berth, the portable track is lowered by the bogie train and becomes the longitudinal track on which the ship is moved into the berth.

A. G. Mackay, PMC's vice president and general manager noted. "PMC has entered new shipbuilding and repair markets in 1985 with optimism and confidence in its organization and equipment capability to meet the future."

For free literature fully describing PMC's facilities and capabilities,

Circle 92 on Reader Service Card

For free literature on the Bardex Hydranautics shiplift transfer system,

Circle 93 on Reader Service Card

White Named Senior Vice President At American Systems Engineering

Eugene E. White

American Systems Engineering Corporation, headquartered in Virginia Beach, Va., has announced the promotion of **Eugene E. White** to senior vice president in recognition of his major contributions to the firm's success and growth during the past four years. The announcement was made by **Carl M. Albero**, president and chairman of the board.

Mr. **White** is director of the Hampton Roads Division, managing $8 million in government and commercial contracts covering a variety of programs, from Navy ship overhaul and repair planning to training and technical assistance at public utilities and nuclear power plants. ASE's most recent award was a $2-million multiyear contract for engineering technical support to the Navy's Sea System Command Detachment (PERA CV) for aircraft carrier overhaul planning and repair.

Gems Sensors Expands Line Of Level Indicators— New Literature Offered

Gems Sensors, Plainville, Conn., a division of Transamerica Delaval, has made available an expanded line of liquid level indicators for virtually any tank gauging problem in the chemical and process industries.

The company is offering a full line of transmitters including all-stainless steel flange versions (compatible with most liquids) and PVC floats (for general use or high-viscosity liquids). These are available with 5-, 6-, or 10-inch flanges, or with 1⅞-inch threads. Also available are: miniature versions (up to 60 inches); and signal-conditioned versions (which interface with programmable controllers, microprocessors or with a J-box output) used with the Gems meter/receiver which provides high/low alarm contacts. All-PVC, polypropylene, PVDF or stainless steel versions are available.

Other level indicators include a solar unit for use where conventional AC/DC power is not available; a flexible roll-out linear insert for extra deep tanks; or externally mounted indicators.

For further information and complete literature on Gems Sensors' full line of liquid level indicators.

Circle 41 on Reader Service Card

PROPULSION UPDATE

Karl Senner Offers Sales And Service For Reintjes Marine Gears —Literature Available

Karl Senner, Inc., of Kenner, La., the North American distributor for Reintjes marine gears has been in business since 1972 and has sold nearly 1500 gearboxes ranging in size from 100-10,000 hp.

Reintjes/Karl Senner, Inc., has developed a strong position in the U.S. market by building a strong, reliable, proven product and providing exceptional after-sales support. Karl Senner offers owners a 24-hour parts and service system. Reintjes and Karl Senner build and sell only *marine* gearboxes and therefore are attuned to the needs and requirements of the marine market.

Reintjes gears are fully described in the full-color brochure available from Karl Senner, Inc.

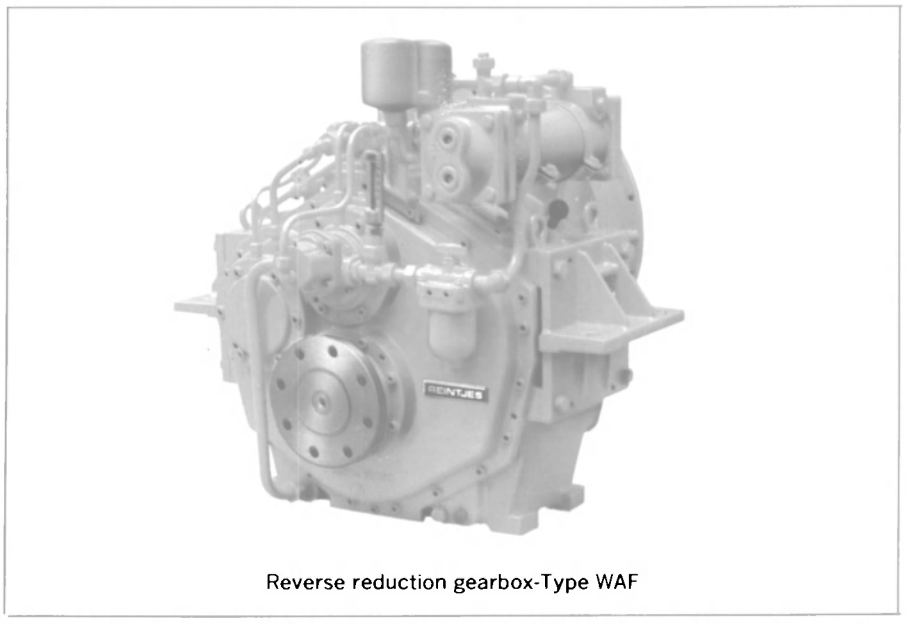
The colorful brochure offers information on Reintjes marine gearboxes, from reverse reduction gearboxes for fast vessels (Type WVS) to twin input/single output reduction gearboxes (Type DVAL). The literature contains text, configuration diagrams and color photographs of Reinjtes reverse reduction gearboxes for workboats (Type VA/SVA); reduction gearboxes with built-in hydraulically operated clutch for workboats (Type VAL); and twin input/single output reduction gearboxes for workboats (Type DVA).

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

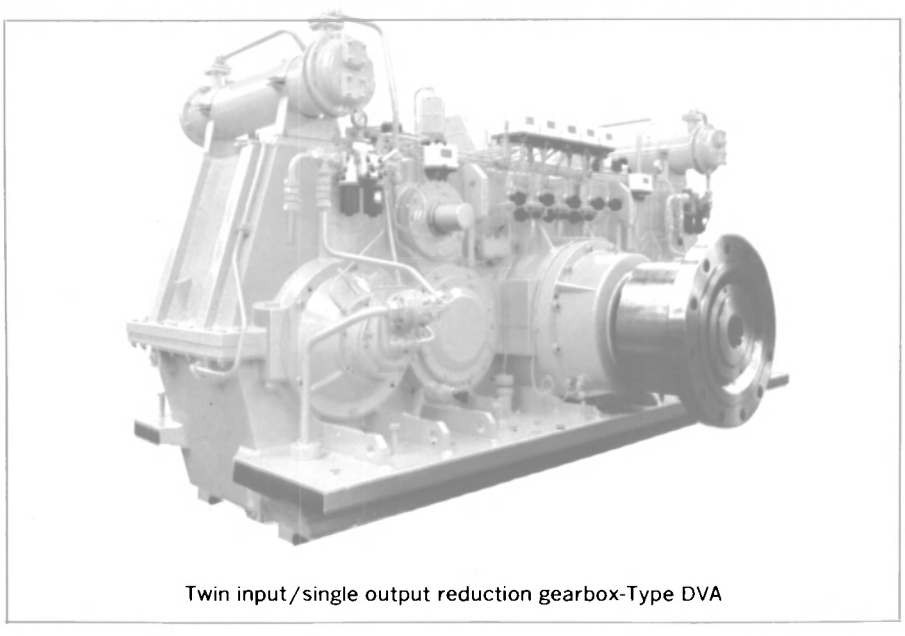
Karl Senner, Inc., is also a WABCO marine pneumatic control distributor and is the North American distributor for J.W. Berg controllable pitch propellers and bowthrusters.

For free information on Reintjes/Karl Senner gearboxes including the colorful Reintjes brochure,

Circle 95 on Reader Service Card



Reverse reduction gearbox-Type WAF



Twin input/single output reduction gearbox-Type DVA

DDA Offers Expanded Product Line And Streamlined Manufacturing Facilities—Literature Offered

The Detroit Diesel Allison Division of General Motors has announced a significant expansion of its product line by virtue of marketing agreement with Deere & Company, and has moved to streamline and tighten its manufacturing operations in North America.

"With these moves, DDA is making clear that it intends to be one of the top diesel engine producers in the world," said **Ludvik F. Koci,** DDA general manager and GM vice president.

To that end, DDA's marketing agreement with Deere & Company gives it s significantly broader base in the lower horsepower ranges. It will distribute John Deere engines ranging in horsepower from 50 to 250.

"In the past, these engines have been used mainly in off-highway, industrial and agricultural applications," Mr. **Koci** said.

The Deere engines in the 50- to 250-hp class will be designated as Detroit Diesel Series 30 and 40, which include 13 individual engines to fit a wide variety of applications. And with the integration of the John Deere Engine Distributor Group—per the marketing agreement—DDA has assumed responsibility for marketing the line and providing parts and service through its worldwide distributor network.

The availability of the Deer engines has also expanded DDA's diesel/electric generator set line. Slated for a variety of industries requiring portable or stand-by power, the new gensets will range from 35 to 160-kw output.

Typical of the John Deere engines now marketed by Detroit Diesel Allison is this model 4239T, a turbocharged, in-line, four-cylinder, four-cycle engine that develops 102 hp at 2,500 rpm. There are a total of 13 engines in the family, now designated as Detroit Diesel Series 30 and 40.

It marks the first time in nearly 15 years that DDA has offered a completely assembled genset and the line is expected to be expanded to include larger units up to 1,500 kw in the near future. In recent years, the packaging of generator components with Detroit Diesel engines has been done by individual DDA distributors.

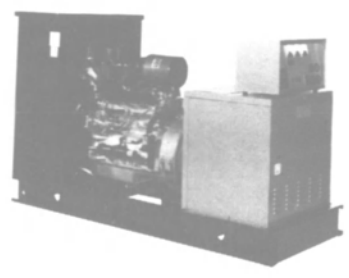
It is anticipated that the Series 30 and 40 diesels will also fit into DDA's own extensive and highly favored line of marine engines for both commercial and pleasure boat application. John Deere engines have been used in marine applications in the past and have acquired an excellent reputation for fuel efficiency, reliability and durability. DDA now has set its sights on expanding the sale of John Deere-based marine models which augment the present Detroit Diesel marine line.

The consolidation is planned to include the modernization of DDA's Redford, Mich. facility and the relocation of the division's parts machining and 8.2L medium-duty diesel operations from its current location in Romulus, Mich.

"As the consolidation gains momentum," Mr. **Koci** observed, "it will trigger other changes in our manufacturing operations, ranging from where and how we purchase our materials and components, to how we apply the most up-to-date technology available to the manufacturing process."

For free brochures containing complete date on the full line of Detroit Diesel Allicson Division engines,

Circle 14 on Reader Service Card



Representative of the prepackaged generator sets now available from Detroit Diesel Allison's Series 30 and 40 distributors worldwide, is this 55-kw standby unit, powered by a model 4239T engine—one of several John Deere diesels now being marketed exclusively by DDA. Fully backed by DDA, seven generator sets in the series range from 35- to 160-kw output.

Detroit Diesel Series 30 And 40 Generator Sets Electrical kw Ratings For 50/60 Hertz Operation

DD ENGINE	60-HZ GENERATOR SET KW RATINGS*		50-HZ GENERATOR SET KW RATINGS*	
	Standby	Prime Power	Standby	Prime Power
4239D	35	35	30	30
4239T	55	50	45	40
4276T	65	60	55	50
6359T	85	75	70	60
6414T	100	90	80	75
6466T	125	115	105	95
6466A	160	145	145	130

*Generator set electrical kw ratings include the fan loss and average generator efficiency.

Steamship Company Chief Given Top Federal Academy Alumni Award

Capt. **Leo V. Berger** (center) accepts U.S. Merchant Marine Academy Alumni Association's Alumnus of the Year Award from Academy superintendent Rear Adm. **Thomas A. King** (left) and alumni president **Eugene Story**.

Capt. **Leo V. Berger,** president of Avon Steamship Company and its affiliate, Apex Marine Corp., has been given the U.S. Merchant Marine Academy Alumni Association's highest honor in 1985, its Alumnus of the Year Award.

Recipients of this award are chosen on the basis of their career achievements and for their support of the Academy, which is operated by the Maritime Administration of the U.S. Department of Transportation. Past winners include labor leader **Lane Kirkland;** former deputy maritime administrator Capt. **Warren Leback;** and former U.S. Coast Guard vice commandant Vice Adm. **Robert Scarborough.**

When he graduated from the USMMA in 1943, Captain **Berger** already held a bachelor's degree from Cornell University. He had come to the United States from Hungary as a boy of eight. He remained at sea from 1943 to 1956, earning a master's license and obtaining a law degree from Cornell during intervals ashore. From 1956 to 1966, he served as operations manager for Triton Shipping, and left to found his own firm, Avon Steamship Co. Starting with only two small tankers, he developed a fleet that today is one of the most successful operations under the U.S. flag.

Captain **Berger** recently received his Alumnus of the Year trophy and medal from USMMA superintendent Rear Adm. **Thomas A. King** and Alumni Association president **Eugene Story.**

New Marine Overcoat Sea-Slide™ Increases Speed, Saves Fuel —Literature Available

Designed for the commercial market, Sea-Slide is a water-based urethane drag reducing overcoat. It is an easy-to-apply finish that reduces friction between the boat's hull and the surrounding water. It is based on the principle that a hydrophillic surface where water skins produces less drag than a surface that causes water to bead.

Sea-Slide actually absorbs some of the surrounding water in an ultra-thin coating that binds a layer of water around the hull. Because the contact angle between the coated hull and the surrounding water is close to 0 degrees, water turbulence and drag are greatly reduced. Specific results will vary with speeds, vessel weight, and hull design. An independently run test with a fiberglass and an aluminum power boat operated at a constant 3,500 rpm over a 2,000-yard course showed speed gains of 12.4 percent and 5.6 percent, respectively.

This confirms controlled experiments in which a weighted boat was towed around a quiet lake. A force gauge in the tow line indicated the force required to pull the boat before and after the coating was applied. At 20 knots, the coating reduced the hydrodynamic drag by a substantial 17 percent while at 10 knots, where less drag exists, the Sea-Slide coating provided an 11 percent benefit.

Tests for durability conducted at an independent marine laboratory demonstrated that Sea-Slide will withstand the effect of 40,000 miles of ocean travel. This was done with coated panels attached to large drums rotating at a constant 15 knots surface speed. The antifoulants functioned equally well with and without Sea-Slide. Adhesion and growth of algae and algae spores were somewhat reduced on the Sea-Slide coated panels.

Because Sea-Slide is a water based urethane coating, it's easy to use, and cleanup is easy with soap and water. There are no hazardous chemicals or complicated mixing requirements. It is applied directly from the can by brush, roller or spray. After curing (about 4 to 5 hours) the boat may be launched immediately or kept from the water indefinitely without losing its unique properties.

Sea-Slide may be applied over any hull, with or without an antifouling primary coat. Coverage is excellent. A quart can is sufficient for the average 25 ft. boat hull—750 sq. ft. per gallon.

Sea-Slide was developed by Hydromer, Inc. of Whitehouse, N.J., over a period of four years. The company has also developed similar technology that is licensed by various medical device manufacturers to facilitate insertion and movement through blood vessels or other small body ducts.

For complete information and literature from Hydromer, Inc.,

Circle 58 on Reader Service Card

Valley Line Reorganizes And Expands Marketing Department— Three New Executives Join Firm

Valley Line Company of St. Louis recently completed a broad restructuring and expansion of its marketing department to support an aggressive new strategy for profitable traffic growth.

Thomas J. Barta, president, said Valley Line "has achieved substantial reductions in operating costs. We are now prepared to take full advantage of our strength as a large, full-service barge operator."

David D. Jahnke John C. Brereton

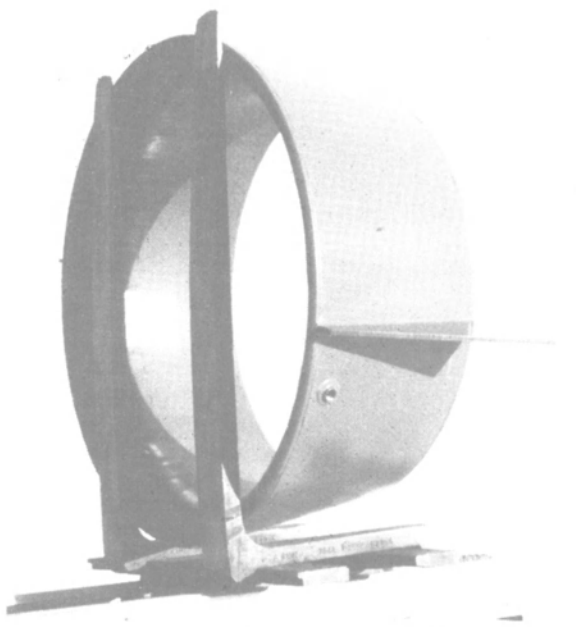
David R. Campbell, formerly president of SCF Transportation of Greenville, Miss., had earlier joined Valley Line as senior vice president of marketing, a new position. The department has been reorganized to orient marketing as a commodity rather than geographic basis, and to develop new business opportunities in such areas as the movement of intermodal freight with railroads and truck lines.

David R. Campbell Richard A. Kienitz

Mr. **Campbell** announced the appointment of three marketing executives to new positions at Valley Line: **John C. Brereton,** formerly regional sales manager in St. Louis for Illinois Central Gulf Railroad, is manager, intermodal marketing; **David D. Jahnke,** formerly director of marketing for ContiCarriers and Terminals, is manager, bulk marketing; and **Richard A. Kienitz,** formerly senior vice president of marketing, Federal Barge Lines, is manager, coal marketing.

Valley Line, one of the largest carriers on the inland waterways, operates 33 towboats and 1,200 barges with a total capacity of 1,750,000 tons.

First Lucander-Designed Tug Nozzle Built By Ideal Machine



Ideal Machine & Manufacturing, Inc. of Tacoma, Wash., has recently completed the first "Kort" type nozzle to a new design and construction system developed by Tacoma designer **Nils Lucander.** This nozzle was built for a new 41-foot tug also designed by Mr. **Lucander.** It has an inside diameter of 45 1/2 inches and will house a 45-inch Coolidge Kaplan style propeller.

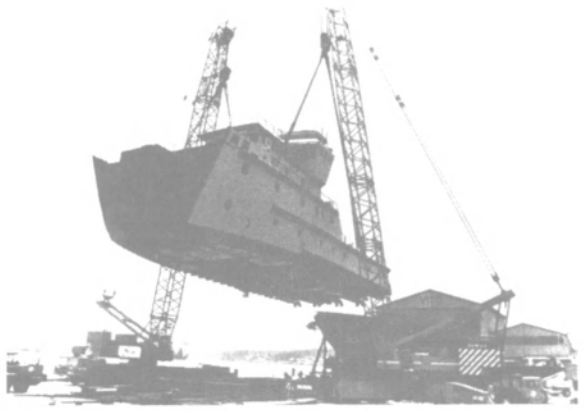
The new construction system is said to reduce forming costs, allowing Ideal Machine to build nozzles at considerably lower costs than industry standards, yet provide very high quality. While the first nozzle was made to fit a tug, all sizes from 16 inches to 15 feet inside diameter can be produced, to fit all kinds of vessels including offshore tugs, fishing trawlers, and yachts.

Both type 19-B and 37, the latter for better reverse, will be custom-designed and made to order. They are built of steel with stainless steel wear plate, sandblasted and prime painted ready to install.

For additional information on the Lucander nozzle,

Circle 52 on Reader Service Card

Demag Cranes Make Superlift At Canadian Vito Shipyard



The Vito Steel Boat & Barge Construction shipyard in Canada recently delivered a 230-foot auxiliary navigation and supply vessel to the Canadian Coast Guard. Economy considerations prompted the company to use a new approach to the assembly of the vessel. The complete superstructure, including the deck, was pre-assembled on the ground.

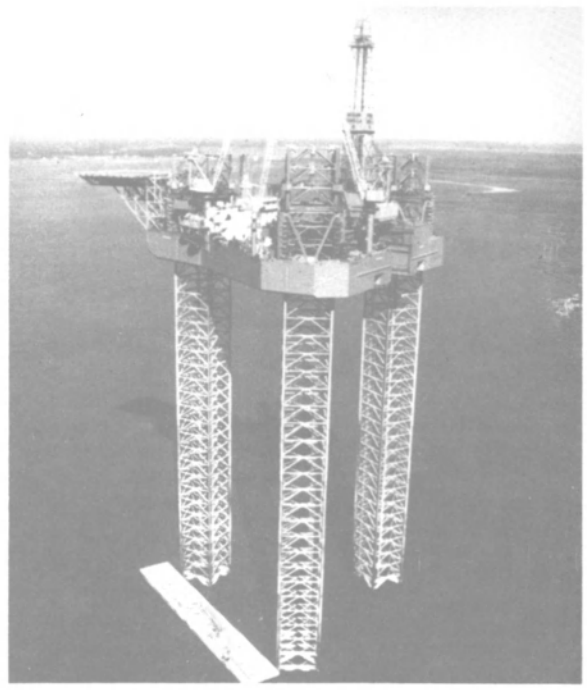
The shipyard used two Demag TC 2000 truck-mounted cranes (photo) to place the 500-ton superstructure onto the 35-foot-high hull. They first lifted the heavy load off the ground, rolled the hull under the superstructure, then did the precision lowering of the superstructure and joining of the assemblies. This method permitted the construction time to be reduced dramatically.

For further information on Demag cranes,

Circle 55 on Reader Service Card

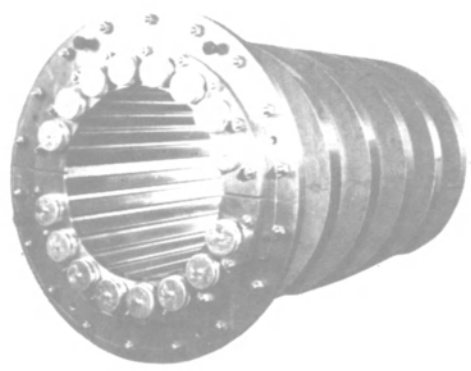
For further information on Vito Steel Boat,

Circle 56 on Reader Service Card



STRETCHING ITS 607-FOOT LEGS—A massive offshore jackup drilling rig, the Rowan Gorilla III, towers 437 feet above the surface of the water after its three steel legs had been extended an additional 100 feet. With its 607-foot tall legs, the Gorilla III is capable of drilling in water 450-feet deep in the Gulf of Mexico. The leg extension project was recently performed in an outfitting basin near Pascagoula, Miss., by 80 workers from Marathon LeTourneau's Vicksburg, Miss. rig yard.

American Metal Bearing's Rubber Bearing Staves Approved By Navy—Literature Offered



Large ship's propeller-shaft bearing with American Metal Bearing's all-rubber staves lining the inner surface.

All-rubber bearing staves designed and produced by American Metal Bearing Co. of Garden Grove, Calif., have been approved for use on U.S. Navy ships to replace other rubber and brass staves supporting propeller shafts.

The approval was announced by **Peter A. Pagan,** vice president and director of marketing for the 64-year-old marine equipment manufacturer.

AMB's staves will fit bearings with propeller shaft diameters of 6 to 36 inches. Grooves between the staves allow water to be channeled through the bearing for lubrication and to carry away sand and other abrasives.

American Metal Bearing's all-rubber staves utilize dual-hardness, low-friction nitrile rubber. The bearing surface is tough, but resilient, allowing abrasive particles to depress it rather than penetrating the bearing surface. This rubber is bonded to an even harder rubber backing, which takes the place of brass.

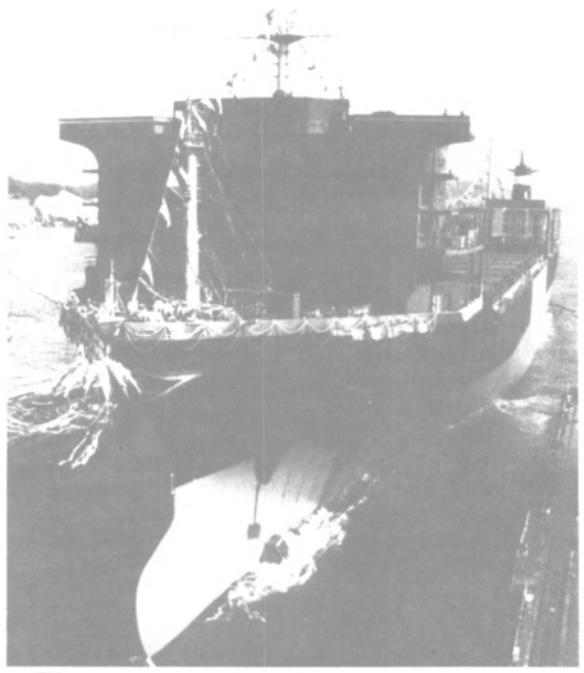
According to Mr. **Pagan,** the all-rubber stave has several advantages over older style staves, including: the hard rubber backing will not separate from the softer rubber bearing surface; easier to install; it weighs less; and cost savings.

The company's primary business is the design, manufacture, and repair of individual bearings and complete bearing systems for naval and commercial vessels, as well as a variety of uses in cement, petrochemical, rubber, steel, utilities, and heavy machinery industries.

For a copy of a brochure and complete literature on American Metal Bearing Company's all-rubber bearing staves,

Circle 57 on Reader Service Card

Mitsui Launches First Of Six Containerships For Lykes Bros. Steamship



The motor vessel Doctor Lykes, the first of six new 3,010-TEU Pacific Class containerships being contructed for Lykes Bros. Steamship Co., Inc., New Orleans, La., in Japan, was recently launched at the Tamano City works of Mitsui Engineering and Shipbuilding Co., Ltd.

The Pacific Class vessel, scheduled to enter Lykes' trans-Pacific service in April, is 850 feet long, 106 feet wide, with an operating draft of 33 feet 8 inches.

Brochure Explains New USCG Survival Suit Regulations

Survival International, Inc. has produced a new brochure that fully explains current U.S. Coast Guard regulations concerning use of survival suits.

Unlike some federal regulations published in the "Federal Register," this booklet is written in laymen terms—easy-to-understand language—and fully explains previous regulations and new laws inacted in December 1985 concerning who must carry survival suits aboard their vessels and why.

For example: Did you know the latest regulations require that your vessel carry two survival suits aboard for most crew members? Did you know that the latitude has been changed from 35 degrees to 32 degrees, meaning that if your vessel operates in these waters it must have survival suits on board.

Do you know if your vessels are required to carry such safety equipment? What type of survival suits are allowed under the law? Can you replace PFDs with survival suits?

These and many more questions are answered in this highly informative booklet. For your free copy,

Circle 53 on Reader Service Card

ELECTRONICS UPDATE

Saab Electronics Introduces TankRadar —Literature Available

Saab Marine Electronics AB of Gothenburg, Sweden, has been supplying radar-type level gauging systems for over ten years. Originally, the system's only function was to measure level. However, with the price of crude oil and refined products continually climbing, Saab realized the need for something more. Their newest addition is TankRadar.

TankRadar is built more accurately to compute the quantity (value) of an owner's "seagoing product inventory." This result is achieved with a combination of level measurement accuracy (plus or minus 5mm over 30 meters) and cargo temperature measurement in each tank. Level and temperature data is multiplexed from the radar transmitter to the processor unit in the control room via the same 3 pair cable. The processor takes the data, as well as an inserted cargo density figure and displays level, temperature, cargo weight and volume at the processor or on 20-inch color CRT(s). In that manner, data from all tanks and all products onboard can be computed. By connecting an on-line printer, a total cargo manifest can be prepared quickly and with great accuracy.

Safety considerations can also be handled by TankRadar. By feeding data into a loading computer, the ship's structural integrity is always assured. Inert gas pressures and high or low level and temperature alarms for each tank can be monitored via the same CCRT(s) or at the processor.

Saab TankRadar is also capable of performing control functions. Several systems have been installed where TankRadar is connected to cargo pumps and cargo/ballast valves. Control of the pumps and valves is accomplished via keyboard entries and CCRT monitoring. This can be set up to control digitally (on-off) or analog (0-100 percent) for both pumps and valves. The software is written in such a way that each command must be visually verified on the CCRT before it is initiated. That indicates the greatest possible margin of safety by always requiring operator input and always allowing operator intervention in the event of an equipment malfunction or a human error.

Recently, some very advanced systems have been offered which include the maximum automatic control. An operator can program parameters for desired cargo handling time, trim/list limits, cargo handling patterns, pumping rates, etc., and then initiate the sequence. From there, the software will control all aspects of cargo handling within the operator-entered parameters. Once again, the software is written with all safety considerations being given top priority. For all devices that are controlled by Saab's processor, a back-up panel can be provided. In the event of a micro-processor malfunction or a power failure, the panel will allow manual control of the connected pumps, valves, etc.

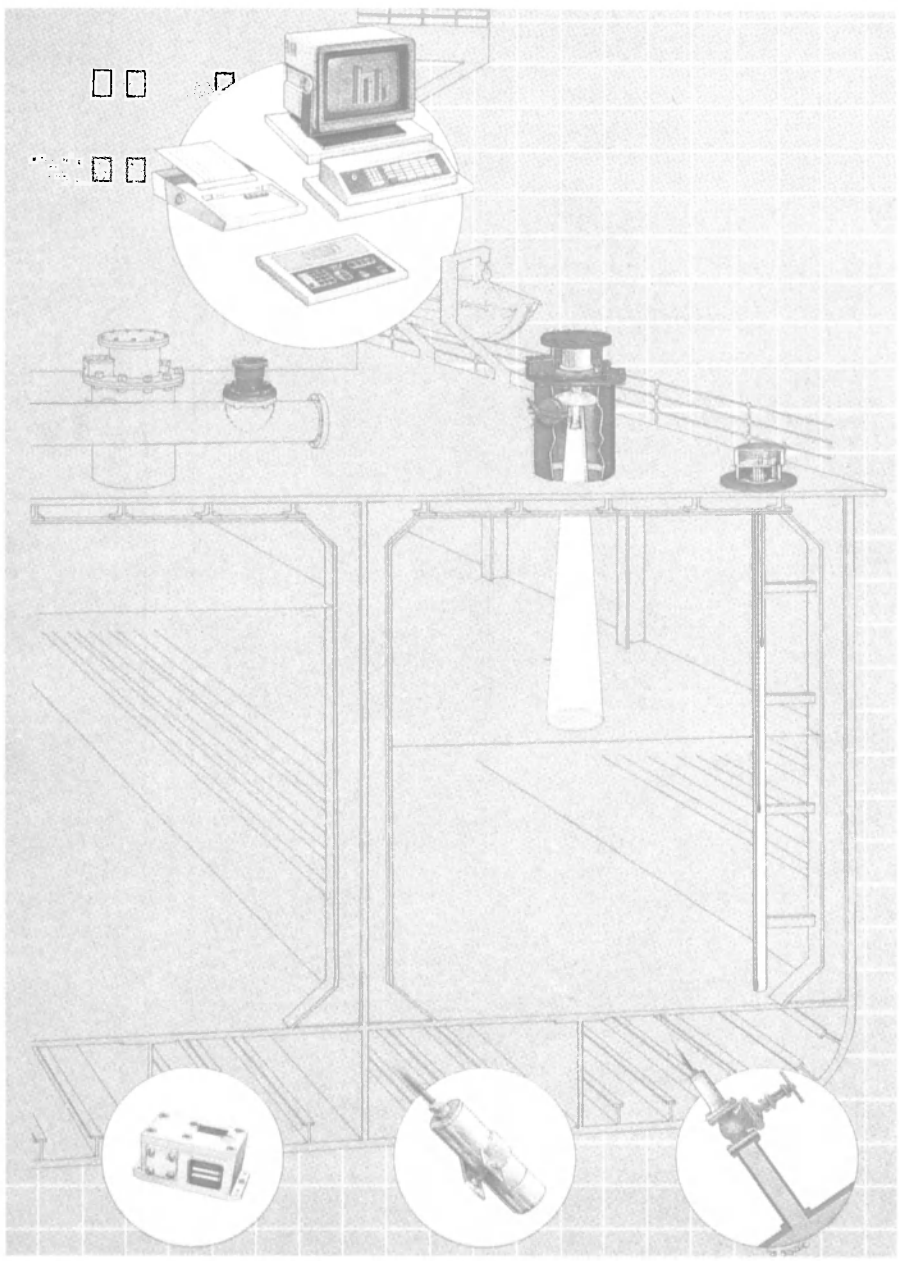
Adding capabilities has not added maintenance or repair costs. The system continues to require little or no maintenance and when repairs are necessary, they can be accomplished at the processor or from on deck. There is never a need to enter a tank and repairs are possible during any condition of loading, discharge or voyage.

In the economic climate surrounding tanker operations, any system that saves time, saves money. If an operator can project lower operating costs he can offer a more competitive rate to a potential charterer. If his rates are competitive enough, his ship keeps running.

Saab TankRadar offers measurement of a shipboard inventory with excellent accuracy, reliability and repairability. At the same time the system can reduce manpower requirements by using automation to any extent that the owner desires.

For additional information and free literature on Saab's TankRadar,

Circle 94 on Reader Service Card



Saab's TankRadar System

Alden Electronics Introduces Tactical Facsimile Receiver —Free Literature Available

Alden Electronics, Inc., Westboro, Mass., has recently introduced the Alden Tactical Facsimile Recorder, Model 9315TR. This new recorder is said to be the only unit designed to receive both teleprinter and facsimile data as a combined capability, making it useful for mobile and tactical applications. Small and compact, the 9315TR is lightweight and comes with its own hand carry case. Packed in the case with the 9315TR is its receive antenna for 2- to 30-MHz operation and operating supplies. With its built-in synthesized radio, the 9315TR is able to receive worldwide HF broadcasts.

The Alden 9315TR Tactical Recorder receives weather charts at World Meteorological Standards and radioteleprinter transmissions on dry thermal paper. To provide easy tuning, the recorder has a unique LCD screen that shows RTTY characters as they are received.

For complete information and free literature on the new recorder from Alden Electronics,

Circle 18 on Reader Service Card

Furuno Introduces Digitized Small Radar —Literature Available

The new Furuno Model 1700 is a technically advanced small radar combining a fully digitized non fading display with Furuno's microwave IC circuitry that significantly improves operating reliability and receiver sensitivity.

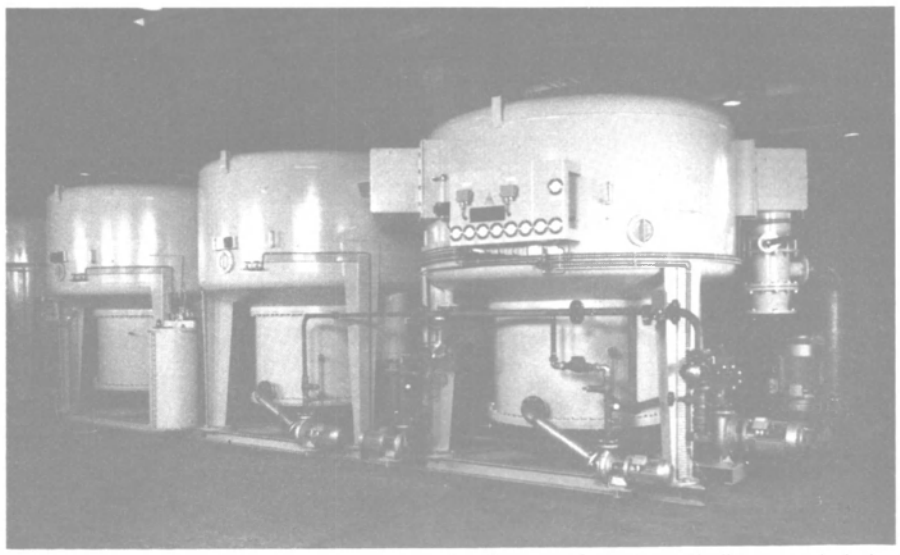
Furuno reports unequaled performance in this class of compact radar. The multilevel quantization circuits recognize four distinct signal return levels—not just one—that eliminate "broken up" picture problems. The 9-inch diagonal CRT and bright green phosphor provide crisp daylight viewing of radar targets throughout the ¼ to 16-mile range, as well as on-screen readout of all system operational data.

The Model 1700 is also compact and lightweight, making it the ideal radar for small commercial vessels. The display, at just 10 inches high by 12.2 inches wide by 10.4 inches deep including mounting bracket, will fit any installation requirement. The majority of controls are sealed membrane keypads for extra long life. The sleek, low windage radome is only 24 inches in diameter by 13.6 inches high and weighs only 24½ pounds so that it is almost unnoticeable up the mast.

Built-in electronic bearing line (EBL), electronic variable range marker (EVRM), interference rejection circuitry, sea and rain clutter controls, and automatic selection of pulse length/pulse repetition rate to optimize picture quality on any range are all standard features. Operation is from either 12 or 24 VDC systems, and power drain is 45 W.

For further literature containing full information,

Circle 22 on Reader Service Card



Three-effect plant installed on Carnival cruise liner M/S Holiday similar to unit being installed on Trendsetter Zane Barnes.

Robertshaw Literature Describes Versatile Diaphragm Actuators

Robertshaw Controls Company of Knoxville, Tenn., is offereing free literature describing VC-230/231 actuators that feature a 30-square-inch molded Buna-N diaphragm with nylon reinforcement and deliver dependable on/off or throttling action for control valves.

Actuated by pneumatic signals from any suitable temperature or pressure controller, the Model VC-230 provides air-to-close action and Model VC-231 air-to-open action.

With a maximum stroke of 1 inch (25.4 mm), these actuators offer a wide choice of valves. These include single-seated, double-seated two-way and single-seated three-way valves in ½-inch to 4 inches (6 inches in one three-way valve). Flanged, screwed and union end connections are offered.

High-quality alloy steel spring opposes the diaphragm, which is housed in an aluminum die-cast diaphragm case. The lower frame is cast iron, with an actuator stem of cadmium-plated steel in a self-lubricating bronze guide. Standard spring range is 20 to 100 kPa (3—15 psi), with other ranges available.

For literature giving specification details and application advice on Robertshaw Controls' versatile diaphragm actuators,

Circle 40 on Reader Service Card

Offshore Triple-Effect Water Makers From Atlas-Danmark Save Thousands In Operating Expenses

A new Reading & Bates semisubmersible oil drilling rig being constructed at Ishikawajima Harima Industries' Aichi Shipyard, will be equipped with two triple-effect Atlas Danmark water makers with a total production of 140,000 1/24 hours.

According to Atlas-Danmark, the offshore triple-effect distiller was developed in order to compensate for the reduced heat rejection of new diesel engines.

The new semisubmersible rig is a Friede & Goldman-designed Trendsetter. It has been said that the triple-effect water makers which will be installed on the Trendsetter Zane Barnes, will save two-thirds of the energy needed for an equal freshwater production in other types of distillers. The units will be hooked up to Wartsila Diesel engines, which are highly efficient and have low heat rejection, thus triple-effect distillers are required to produce the necessary quantity of fresh water by means of waste heat only.

Were the required 140,000 1/24 hours fresh water to be produced on a normal double-effect plant, a boiler plant would be needed to make up for the reduced waste heat rejection of the new generation of diesel engines. Therefore, the installation of triple-effect water makers saves thousands in annual expenses for heat production on a boiler plant.

The new triple-effect offshore plants require a small additional investment compared to conventional double-effect plants, and the payback period can be only a few months.

Another feature of the new triple-effect water makers is that the jacket cooling water system of each engine can be hooked up separately or when the engines are operated individually, and avoid mixing the jacket cooling water circuits of different engines.

During the past three decades, Atlas-Danmark has supplied more than 18,000 single- and double-effect water makers to the marine and offshore markets. Multi-effect water makers (up to six effects) producing up to 1,000 m^3/24 hours (265,000 gpd) per unit, have previously been installed in vessels requiring large amounts of fresh water, e.g. cruise and passenger vessels, livestock carriers and accommodation platforms.

For a free color brochure on Atlas-Danmark freshwater generators,

Circle 23 on Reader Service Card

Acoustical Barrier Material Data Sheet Available

A new Quiet-Flex Marine Barrier data sheet that provides technical specifications for the acoustically absorptive and thermally insulting materials is available from Vibration Mountings and Controls, Inc., Bloomingdale, N.J. Other specifications include: material thickness and weights; standard roll width, length, and color; breaking strength; tear strength; temperature range; and flame resistance, among others.

VMC's acoustical barrier material is used primarily for shipboard and power plant control of airborne noise and is available from Vibration Mountings and Controls, Inc. The material, either a lead modified or a loaded vinyl barrier bonded to a textile carrier fiberglass fabric, provides a strong, durable, chemically resistant material with excellent acoustical and flammability properties.

Quiet-Flex barrier material is approved for shipboard use by the U.S. Navy. It can be used by itself or in combination with fiberglass and other materials for engine rooms, pipe lagging, gearboxes, etc.

For a copy of the data sheet,

Circle 39 on Reader Service Card

Gladding-Hearn Delivers Two Tugs To Bermuda's Department Of Marine

Bermuda's Department of Marine and Ports Services is responsible for all maritime services in one of the world's most popular tourist ports. Its hectic work schedule comprises a long list of varied duties. Besides scheduling and providing pilot services. the department is responsible for handling the numerous daily dockings of tourist and commercial shipping in the island's busy harbors.

A double dose of needed relief for the department's overtaxed fleet arrived recently with the delivery of two new 38-foot line-handling tugs. Named the Princeton and Inspector (photo), they were designed and built by Gladding-Hearn Shipbuilding/The Duclos Corporation of Somerset, Mass. Both boats are of all-steel construction with heavy-built keels for added protection against possible grounding on the island's coral reefs.

Each vessel is powered by a GM Detroit Diesel 6-71N engine rated 174 bhp at 1,800 rpm, driving a Columbian propeller via a Twin Disc reduction gear with a ratio of 2.96:1 and Armco Aquamet shafting. Engine controls are by Morse and the steering system by Hynautic. The vessel has a top speed of 9.5 knots and bollard pull of about 4,000 pounds.

Both tugs have flush decks fitted with double 6-inch towing bitts aft, 6-inch bow bitts, and heavy Johnson Rubber fendering. Pilothouses are fully equipped and fitted with fixed windows on the house front and roof and sliding windows on the sides.

The Princeton is being used in the port of Hamilton primarily for ship-docking duty. The Inspector is in use in St. George, where her duties include ship-docking as well as navigation aid maintenance work, and yacht mooring inspections.

Princeton/Inspector Major Suppliers

Main engine	Detroit Diesel
Reduction gear	Twin Disc
Propeller	Columbian
Shafting	Armco
Engine controls	Morse
Steering system	Hynautic
Bilge pump	Jabsco
Anchor	Danforth
Fendering	Johnson
VHF radio	Raytheon
Depth sounder	Sandpiper
Air horn	Raritan
Navigation lights	Aqua Signal
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Wheel	Wilcox-Crittendon

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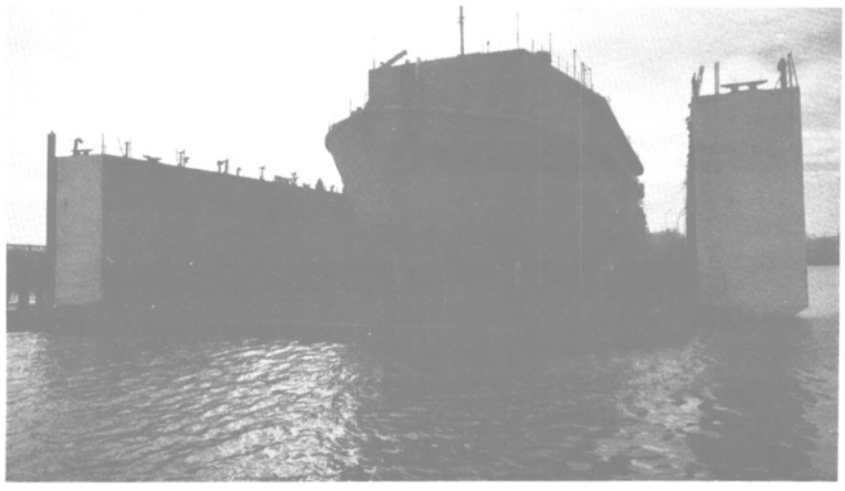

Built: In 1949, American Bridge built two (2) Railroad Carfloats, 326' x 40' x 10.8' ea. In 1979, the two (2) carfloats were joined together by Newport News Shipbuilding. In 1979, wingwalls fabricated by Tidewater Construction Co., and installed on the pontoons by Allied Repair Service.
Lifting Capacity: 5,500 Tons.

Remarks: There are thirty (30) compartments and four (4) rake compartments. Ballasting down can be completed in thirty (30) minutes with the dock empty. Average time for complete deballasting, allowing for temporary pump shut down during trimming, is two and one half hours. This drydock can be certified by the U.S. Navy for 2,900 Tons at a cost of approximately $100,000.00.

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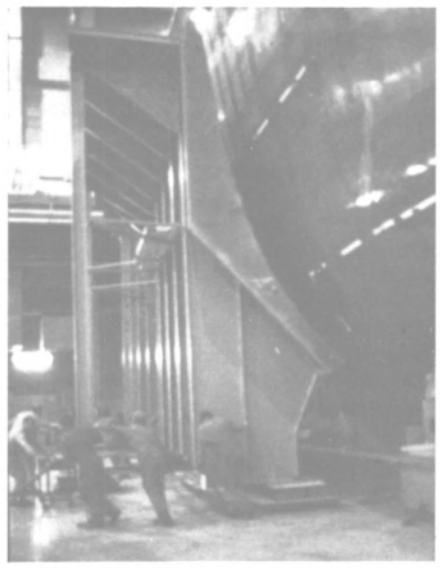
Belgian Shipbuilder 'Floats' Massive GRP Mold On Film Of Air

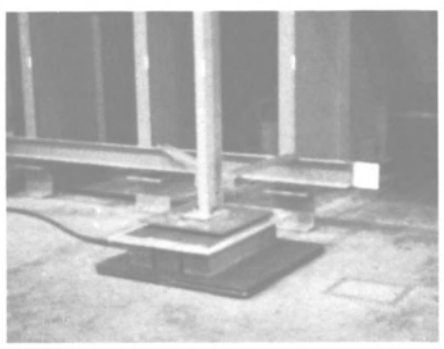
The 50-foot move of a 160-foot-long, 200-ton glass fiber reinforced polyester (GRP) mold is done safely in 3½ minutes on a film of air at the Mercantile-Beliard N.V. shipbuilding plant in Ostend, Belgium. Each of six mold sections are moved the same way by the yard, which is in the middle of completing a government contract to build 10 new GRP minesweepers—one every six months. Using the air bearing system, savings in labor time and equipment costs are considerable, according to **G. Delhasse,** technical assistant manager at the new plant.

As minesweepers must be nonmagnetic, GRP hulls were specified, requiring production of a special workshop to meet stringent Belgian military specifications. When the contract was signed, however, a plant for molding large hulls in GRP did not exist in Belgium, so Mercantile-Beliard began almost immediately to build one. One year later the 10,000-square-foot facility was completed, fully air conditioned, and equipped with extensive dust controls to accommodate polyester resin molding production.

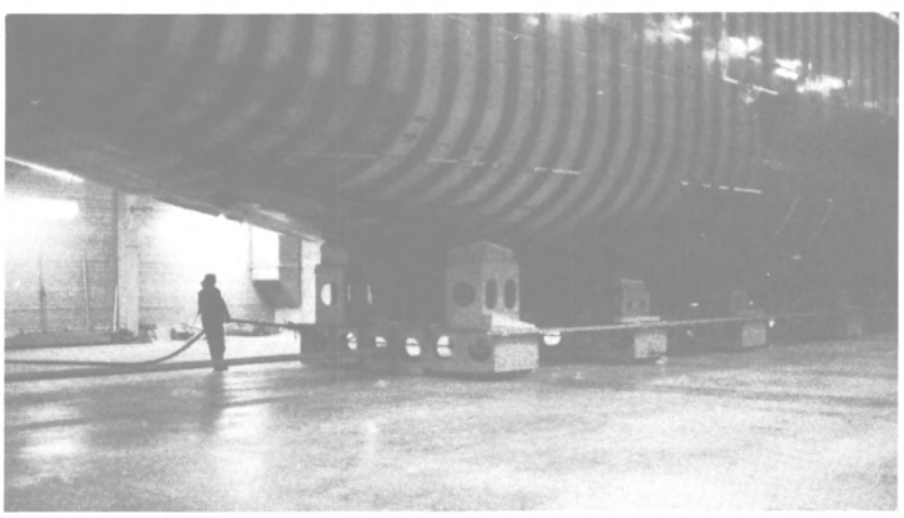
Erection of gantry cranes was first considered to handle the heavy mold, but proved to be too costly because of their limited use. Floor rails were also considered and rejected because of the desire for flexibility of movement and an unencumbered floor. Air bearings were finally selected for their limited load-bearing capacity, clean operation, omnidirectional travel, and low cost, according to company officials.



Six workers easily push 14-ton mold section away from GRP hull using air bearings manufactured by Aero-Go, Inc. of Seattle, which permit omnidirectional travel.



Individual 36-inch-square air bearings under post supporting weight of mold section.



GRP hull chocked on seven keel beams with air bearings underneath, in process of being winched sideways across floor. System is made up of 14 Aero-Go air bearings.

The ship's hull mold is made of 17 parts—four bottom parts, 12 side parts, and a transom flat panel. All are connected by bolted flange and centering pins. When the hull molding is completed and stiff enough to be moved without permanent distortion, the four bottom parts are removed and replaced by seven specially built keel beams. These beams are used with air bearings to raise the ship's hull a few inches out of the mold. This is done by inserting a modular load-handling system of 14 air bearings, designed and manufactured by Aero-Go., Inc. of Seattle, under each end of the seven keel beams and then applying shop air.

In seconds, the air bearings inflate, raising the keel beams and the ship's hull approximately 2 inches out of the mold form. Next, the keel beams are chocked to free the air bearings, allowing the bearings to be removed and used in a similar way to move the six mold parts on one side of the hull. These mold parts are easily pushed across the floor on a film of air and positioned out of the way by two to six workers. Approximately one pound of force will move 1,000 pounds on the air bearings. An average mold section requires 20 to 30 pounds of total pushing force by the workers to move it. The six female mold parts on the other side of the hull (against a wall) are kept in permanent position by hold-down bolts.

To remove the GRP hull itself, the 14 air bearings are again placed under the keel beams supporting the hull, and the beams are connected by cable to four side winches. Transport of the 200-ton hull across the floor on air bearings to the next work station 50 feet away is fast, easy, and safe, according to plant manager **E. De Winter.**

"The entire move is made at the rate of about 14 feet per minute with the side winches pulling, and six men helping guide and at the central control station," says Mr. **De Winter.** "When the hull mold arrives at the second work station, it is quickly and accurately aligned again, as GRP is a very flexible material."

Re-erection of the mold parts starts immediately by sliding the air bearings under the six mold parts, inflating the bearings, and pushing the mold parts into place so they are precisely positioned to form the next GRP hull. The air bearings are deflated in seconds, removed, and the mold is prepared for producing the next hull.

"The air bearings keep the shop floor free from any obstructions and make it easy to clean," says Mr. **De Winter.** "In addition to our use of the air bearing system to move heavy and cumbersome mold parts, which require gentle movement and accurate positioning, we use the air bearings to quickly move many other parts and equipment in the plant. The system is working out quite satisfactorily in our molding operation."

When the ships are completed, they will constitute part of a Tripartite Agreement between Belgium, France, and the Netherlands to build up to 40 GRP minesweepers. These vessels are intended to rejuvenate the mine countermeasure naval capability of each member country.

For additional information and free literature on the Aero-Go air bearings,

Circle 96 on Reader Service Card

Navigation Sciences Offers VIEWNAV® Master Mariner Brochure

A full-color "VIEWNAV® Master Mariner Electronic Chart Navigation System" brochure is available from Navigation Sciences, Inc. of Bethesda, Md. The four-page brochure describes and illustrates the VIEWNAV system used by operators of pilotboats, ferries, tugboats, and others who want to navigate more accurately in difficult harbor conditions.

Using proprietary software, the VIEWNAV system interfaces with onboard radar to provide a bright, true-motion radar display of surrounding activity, super-imposed on full-color, NOS-quality digitized Electronic Charts. Radar land clutter—one of the problems with standard radar displays, which can make target detection difficult—is completely masked out on the Electronic Charts. This makes radar interpretation easier and faster by more clearly defining radar images of vessel traffic, and other targets. Buoys, navaids, and channels are shown in actual chart colors in selected scales from one to 48 NM square.

Precise positioning is accomplished using differential Loran-C, accurate to five yards, and by advanced "radar map matching." The system can interface with onboard radar, gyrocompass, speed log and most Latitude/Longitude inputs, such as Loran, SatNav, Decca, Omega and GPS. The VIEWNAV system can also be interfaced with closed cirucit TV systems such as those found on cruise ships to allow crew and passengers to monitor the progress of the ship.

The VIEWNAV Master Mariner Electronic Chart Navigation System consists of a 14, or 20-inch Full-Color Display Monitor, a Control Console, Main Equipment Cabinet, and any number of remote monitors.

For free literature containing full information,

Circle 31 on Reader Service Card

Bailey Offers New Color Brochure On Recorders And Data Loggers

A new color brochure featuring the latest process recorders and data loggers is now available from Bailey Controls of Wickliffe, Ohio. Highlights of Bailey's line of modularly designed recorders include descriptions, functions, special features and options, and advantages of each recorder model.

Bailey recorders feature precalibrated, interchangeable, plug-in components for application versatility. They provide precise tracking, and come with easily accessible display charts or high-resolution windows.

Bailey Controls is a division of Babcock & Wilcox, and a leading supplier of instrumentatin, controls, and computer systems for power generation, process automation, and energy management in the petrochemical, electric utility, and process industries. B&W is a major operation unit of McDermott Incorporated, a subsidiary of McDermott International, Inc.

For a free copy of the High-Performance Recorders brochure,

Circle 35 on Reader Service Card

MARINE MACHINERY/ PIPING SUPERINTENDENT

The qualified applicant should have a minimum of seven years hands-on experience in stallation of piping systems, machinery, turbines, and propulsion systems. In addition, the applicant must have a significant amount of time in a supervisory capacity. A U.S. Naval background is highly desirable.

Excellent salary and fringe benefit package. For immediate consideration send resume and salary history to:

Marine Machinery/
Piping Superintendent

Box 115 Maritime Reporter
118 East 25th St. New York, NY 10010

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Has immediate openings in the following areas:

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N.C. LOFTING PROGRAMMER

Ideal candidate will have a minimum of 3 - 5 years N.C. programming experience within a shipyard environment, along with structural design/drafting experience.

SENIOR MARINE ELECTRICAL DESIGNERS

Requirements include: A minimum of 5 years marine electrical design experience in power and lighting distribution, I.C., radio and navigation systems; a working knowledge of ABS and U.S.C.G. rules, familiarity with U.S. Navy standards and CAD/CAE experience.

For confidential consideration, please send current resume to:

DESIGN GROUP MANAGER
BENDER SHIPBUILDING & REPAIR CO., INC.
P.O. BOX 42
MOBILE, ALABAMA 36601

POSITION WANTED

Management—Experienced P/L Manager with track record for turning around marine manufacturer while increasing profits 150%; BSEE, MSSM, 20 years experience. Respond to:

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118 East 25th St. New York, NY 10010

MARINE COMBUSTION ENGINEER

We have an opening for a marine engineer to support our bunker sales activities at our corporate headquarters in Miami, Florida.

This is an excellent opportunity for someone with an engineering background who is interested in expanding into sales.

The ideal candidate will have served as a licensed seagoing engineer on steam and motor vessels and be thoroughly familiar with the properties of bunker fuels and the intricacies of achieving optimum combustion. Experience with combustion controls and fuels and combustion analysis is desirable.

You will be responsible for interfacing with vessel's chief engineer, you will make suggestions on how to improve combustion efficiency, you will assist the chief engineer in solving combustion problems and help him with performance analysis and development of ongoing combustion monitoring programs. In addition you will be an integral part of our marketing team and the development and maintenance of our sales efforts.

If you meet our requirements and are equal to the challenges of this position we will offer you a superior compensation package and a full array of benefits. Please submit detailed resume, including salary history, to Personnel Manager, Belcher Oil Company, P.O. Box 025500, Miami, Florida 33102-5500.

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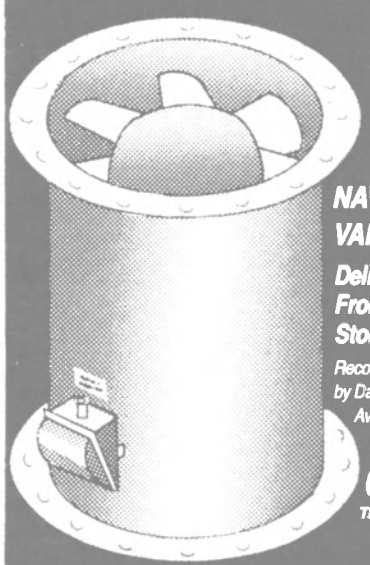

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PROPULSION UPDATE

Cummins Uprates B Series Marine Diesel Engines —Literature Available

Cummins Engine Company of Columbus, Ind., has announced uprated high-output marine propulsion ratings for its B engine models. These new 1986 ratings are primarily for recreational and approved commercial applications.

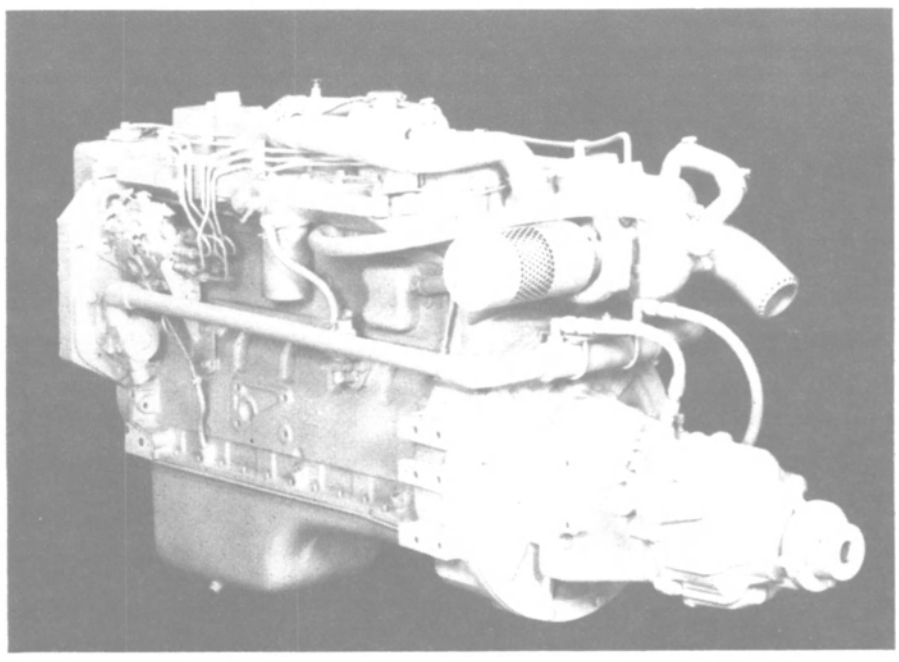
The model 4B3.9-M is now rated 80 bhp at 2,800 rpm, up from 76 bhp at 2,500 rpm. The new rating for the 4BT3.9-M is 150 bhp at 2,800 rpm, compared with the current intermittent rating of 100 bhp at 2,500 rpm. The biggest engine in the series, the 6BT5.9-M, has a high-output rating of 210 rpm at 2,600 rpm, up from 152 bhp at 2,500 rpm.

"These new uprates are not just the current ratings turned up," said marine marketing manager **Tom Stanley**. "The new higher ratings are achieved through design improvements resulting in new performance components including pistons, turbochargers, and the fuel system."

Cummins high-output B models offer a great number of advantages for various boat applications, including: high-output ratings for maximum performance; lightweight yet heavy-duty durability; fuel efficient; reduced emissions, quieter operation; complete technical, service, and parts availability; 40 percent fewer parts, no special tools for servicing, low maintenance costs; high reliability from a U.S.-made product; and cost effective.

For full details and free literature on the uprated B engines,

Circle 21 on Reader Service Card



Titeflex Offers 22-Page Catalog On Smooth Bore Teflon Hose

Titeflex Corporation, a Bundy Company, of Springfield, Mass., is offering a free 22-page catalog on their smooth bore Teflon™ hose, which is used for applications in the pressure ranges up to 8,000 psi.

The catalog offers dimensions and pressure ratings for the following Titeflex products: 130 Series—medium pressure (1,500 psi) hose assemblies; 130 Series hose fittings; 230 Series—high pressure (3,000 psi) hose assemblies—Uni-Braid™; 230 Series Hose Fittings; 660 Series—high pressure (3,000 psi) hose assemblies; 660 Series hose fittings; 370 Series—high pressure (4,000/6,000/8,000 psi) hose assemblies; and 370 Series hose fittings. Included with the specifications of each product is a cross-section diagram for illustration.

In addition, the Titeflex publication includes a section on "Typical Applications for Smooth Bore Hose," as well as complete ordering information for Titeflex medium and high pressure hose.

According to the catalog, Titeflex manufactures the most complete family of Teflon and stainless metal hose products within the aerospace industry.

For a free copy of the Titeflex Smooth Bore Teflon Hose Catalog,

Circle 93 on Reader Service Card

FOR MORE INFORMATION ON EQUIPMENT AND SERVICES ADVERTISED IN THIS ISSUE

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Cincinnati Gear Offers Free Color Brochure On Large Gears And Parts

The Cincinnati Gear Company is offering a free full-color brochure on the large gears and fabricated parts manufactured at their Lebanon, N.J. facility, Plant III.

According to the publication, the Lebanon plant will extend Cincinnati Gear's ability to efficiently produce large hardened and ground precision gears.

Structural components, pressure vessels, holding tanks, towers, heat exchanger shells, etc., are all produced at Plant III from mild steel or exotic materials such as stainless steel, titanium, monel and aluminum. And, according to the manufacturer, Plant III's temperature-controlled hobbing and grinding area features the largest ultra-precision grinder in the U.S., capable of producing AGMA quality 15 gears up to 13 feet in diameter.

With the use of almost two dozen color photographs and explanatory text, the brochure gives a thorough insite into the design, fabrication, inspection and assemblage of Cincinnati Gear Company products.

A special feature of the brochure is a full-color enclosure of a recent article on Plant III that appeared in *American Machinist*.

For a free copy of this detailed color brochure from Cincinnati Gear,

Circle 36 on Reader Service Card

Baldt Offers New 12-Page Full-Color Facilities Brochure

Baldt Inc., Chester, Pa., has published a new 12-page four-color facilities brochure detailing the company's recent reorganization.

Entitled "Baldt Charts a New Course," this brochure highlights the responsibilities and long-term goals of Baldt's three new operating divisions. These new divisions are marine products, safety products and systems, and distribution.

James Palmer, Baldt president, said: "For most of its history, Baldt has manufactured and sold high-quality proprietary marine products to the U.S. shipbuilding industry, and most recently to the offshore drilling industry. This brochure reflects our commitment to these traditional markets. It also emphasizes our goal to aggressively seeks new markets to expand our capabilities."

The brochure also details Baldt's product lines, testing capabilities, application data, and product certifications.

For a free copy of the brochure,

Circle 27 on Reader Service Card

BUYERS DIRECTORY

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

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AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Bailey Refrigeration Co., Inc, 2323 Randolph Avenue, Avenel, NJ 07001
Borg-Warner Air Conditioning, P.O. Box 1592-361C, York, PA 17405
Flakt AB, Box 8862, S-40272, Gothenburg, Sweden
Stal Refrigeration AB, Butangsgatan 16, S 601 87 Norrkoping, Sweden
Carrier Transicold Division, Carrier Corp., P. O. Box 4805, Syracuse, NY 13221

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CONTROL SYSTEMS—Monitoring
American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
ASEA, Inc., 4 New King St., White Plains, NY 10604
Bailey Controls, 29801 Euclid Avenue, Wickliffe, OH 44092
Barringer Research, 304 Carlingview Dr., Rexdale, Ontario, Canada M9W 5G2
Biospherics Inc., 4928 Wyaconda Rd., Rockville, MD 20852
Cooper Energy Services, Mount Vernon, OH 43050
Ergon, Inc., P.O. Drawer 1639, Jackson, MS 39205
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
Pandel Instruments Inc., 2100 N. Hwy. 360, Grand Praire, TX 75050
Propulsion Systems, Inc., 21213 76 Ave., Kent, WA 98032
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Thomas Products Ltd., Flow Switch Div., 987 West St., Southington, CT 06489-1023
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062
Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway

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

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

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

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

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

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Todd Marine Systems, 61 Taylor Reed Place, Stamford, CT 06906

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Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
Genstar Stone Products Co., Executive Plaza IV, Hunt Valley, MD 21031
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, NY 10550
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
Nicolai Joffe, P.O. Box 5362, 9171 Wilshire Blvd., Beverly Hills, CA 90210
Raytheon Service Co., 100 Roesler Rd., Suite 103, Glen Burnie, MD
Republic-Lagun Machine Tool Co., 1000 E. Carson St., Carson, CA 90749
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Meco (Mechanical Equipment Co., Inc.), 861 Carondelet Street, New Orleans, LA 70130
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

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Joy Manufacturing Company, 338 So. Broadway, New Philadelphia, OH 44663
Jon M. Liss Associates, Inc., 411 Borel Ave., P. O. Box 5554, San Mateo, CA 94402

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MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

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

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

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

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

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

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

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

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

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

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
Carlisle & Finch, 4562 W. Mitchell Avenue, Cincinnati, OH 45232
Midland-Ross Corp., Russellstoll Division, 530 W. Mt. Pleasant Ave., Livingston, NJ 07039
Perko Inc., P.O. Box 6400D, Miami, FL 33164
Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209

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

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
A-C Brake Co., 308 E. College St., Louisville, KY
CMH Heleshaw, Inc., 201 Harrison St. Hoboken N.J. 07030
Cunningham Marine Hydraulics Co. Inc., 2030 E. Adams St. Jacksonville, FL 32202

Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DEL MARINE
Jered Brown Brothers Inc., 1300 Coolidge, P.O. Box 2006, Troy, MI 48007
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Goltens, 160 Van Brunt St., Brooklyn, NY 11231
Rosan, Inc., 2901 West Coast Hwy., Newport Beach, CA 92663

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

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

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Hydromath Inc., Box 2450, Danby-Pawlet Road, Pawlet, VT 05761
American Systems Engineering Corp., P.O. Box 4265, Virginia Beach, VA 23454
Ameritech Corporation, 7 Belver Avenue, Suite 215, N. Kingston, RI 02852
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
Century Engineering, inc., 32 West Rd., Towson, MD 21204
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, MA 02026
Crane Consultants Inc., 15301 1st Ave., So. Seattle, WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, Inc., 1725 Jefferson Davis Highway, Suite 700, Arlington, VA 22202
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
Capt. R.J. Fearson & Associates, P.O. Box 983, Tampa, FL 33601
Christopher J. Foster, Inc., 16 Sintsink Drive East, Port Washington, NY 11050
Gibbs & Cox, Inc., 119 West 31st Street, New York, NY 10001
John W. Gilbert Associates, Inc., 66 Long Wharf, Boston, MA 02110
The Glosten Associates, Inc., 610 Colman Bldg., 811 First Ave., Seattle, WA 98104
Phillip Gresser Associates, Ltd., 3250 South Ocean Blvd., Palm Beach, FL 33480
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
Hamilton Cornell Associates, Box 188, Snug Harbor Station, Duxbury, MA 02331
J.J. Henry Co., Inc., 40 Exchange Place, New York, NY 10005
Hi-Test Laboratories, Inc., P.O. Box 226, Buckingham C.H., VA 23921
HydroComp, Inc., 10 Cutts Road, P.O. Box 865, Durham, NH 03824
Intramarine, Inc., P.O. Box 53043, Jacksonville, FL 32201
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
Jantzen Engineering Co., 6655-H Amberton Drive, Baltimore, MD 21227
James S. Krogen & Co., Inc., 3333 Rice St., Miami, FL 33133
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
John J. McMullen Associates, Inc., 1 World Trade Center, New York, NY 10048
McLear & Harris, Inc., 28 West 44 Street, New York, NY 10036
Fendall Marbury, 1933 Lincoln Drive, Annapolis, MD 21401
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, OH 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, NY 11746
Marine Power Associates, 1010 Turquois St., Ste 217, San Diego, CA 92109
Marine Technical Associates, Inc., 95 River Rd., Hoboken, NJ 07030
Maritime Design, Inc., 2955 Hartley Rd., Jacksonville, FL 32217
George E. Meese, 194 Acton Rd., Annapolis, MD 21403
R. Carter Morrell, 715 S. Cherokee, Bartlesville, OK 74003
NKF Engineering Assoc., Inc., 8150 Leesburg Pile, Vienna, VA 22202
Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
Nickum & Spaulding Associates, Inc., 2701 First Ave., Seattle, WA 98121
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean-Oil Internatinal Engineering Corporation, 3019 Mercedes Blvd., New Orleans, LA 70114
PRC Guralnick, 5252 Balboa Ave., San Diego, CA 92117
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, FL 33156
S.L. Petchul, Inc., 1380 S.W. 57th Avenue, Fort Lauderdale, FL 33317
Q.E.D. Systems Inc., 4646 Witchduck Rd., Virginia Beach, VA 23455
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Sargent & Herkes Inc., 611 Gravier St., New Orleans, LA 70130
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, FL 33316
SEACOR Systems Engineering Associates Corp., 19 Perina Blvd., Cherry Hill, NJ 08003 (Publications Division at Cherry Hill location)
STV/Sanders & Thomas, Inc., 1745 Jefferson Davis Hwy., Arlington, VA 22202
Seaworthy Systems, Inc., 28 Main St., Essex Ct. 06426; 17 Battery Place, N.Y. N.Y. 10004, P.O. Box 205, Solomons, MD 20688
Seaworthy Electrical Systems, 17 Battery Pl. N.Y. N.Y. 10004
George G. Sharp, Inc., 100 Church St., New York, NY 10007
Simmons Associates, P.O. Box 760, Sarasota, FL 33578
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
J.F. Stroschein Associates, 666 Old Country Rd., Garden City, NY 11530
Richard R. Taubler, Inc., 610 Carriage La., Dover, DE 19901
Thomas Coudon Associates, 6655 Amberton Drive, Baltimore, MD 21227
Timsco, 622 Azalea Road, Mobile, AL 36609
Tracor Hydronautics, Inc., 7210 Pindell School Rd., Laurel, MD 20707
Thomas B. Wilson, Associates, 1258 North Avalon Blvd., Wilmington, CA 90744

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

OILS—Marine—Additives
B P North America Petroleum, 555 US Route 1, So. Iselin, NJ 08830
Exxon Company, U.S.A., Room 2323 AH, P.O. Box 2180, Houston, TX 77701
Gulf Oil Company—U.S. (Domestic Oils), 909 Fannin Street, Houston, TX 77001
Gulf Oil, New York District Sales Office (Domestic), 433 Hackensack Avenue, Hackensack, NJ 07601
Gulf Oil Trading Co., 535 Madison Ave., New York, NY 10022
Mobil Oil Corp., 150 East 42 Street, New York, NY 10017
Texaco, Inc. (International Marine), 135 East 42nd St., New York, NY 10017

OILY WATER ALARMS/MONITORS
Biospherics, Inc., 4928 Wyaconda Road, Rockville, MD 20852

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

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

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

PLASTICS—Marine Applications
Action Threaded Products, Bridgeview, IL 60455
Hubeva Marine Plastic, Inc., 390 Hamilton Ave., Brooklyn, NY 11231
Norton Chemplast, 309-150 Dey Rd. Wayne NJ 07470

PROPELLER POLISHING
Pacific Marine Services, P.O. Box 3400, Terminal Island, CA 90731

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
Allison Gas Turbine Division, General Motors Corp., P.O. Box 420 Speed code U6, Indianapolis, IN 46206
Amarillo Gear Co., P.O. Box 1789, Amarillo, Texas 79105
Armco Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, LA 70150
Bergen Diesel Inc., 2110-10 Service Rd., Kenner, LA 70062
Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Caterpillar Engine Division, 100 N.E. Adams, Peoria, IL 61629
Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
Columbian Bronze Corporation, 216 No. Main Street, Freeport, NY 11520
Combustion Engineering, Inc., Windsor, CT 06095
Coolidge-Stone Vickers, Inc., 56 Squirrel Rd., Auburn Hills, MI 48057
Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Elliott Company, 1809 Sheridan Ave., Springfield, OH 45505
George Engine Company, Inc., Lafayette, LA
General Motors, Electro-Motive Division, LaGrange, IL 60525
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Isotta Fraschini S.p.A., c/o Italian Aerospace Industries (U.S.A.), Inc., 1235 Jefferson Davis Hwy., Suite 500, Arlington, VA 22202
KHD Canada Inc., 180 Rue de Normandie, Boucherville, Quebec J4B 5S7, Canada
Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323
M.A.N.-B&W Diesel, 2 Ostervej, DK-4960 Holeby, Denmark
MTU of North America, One E. Putnam Ave., Greenwich, CT 06830; 10450 Corporate Dr., Sugarland, TX 77478; 2945 Railroad Ave., Morgan City, LA 70203; 180 Nickerson St., Seattle, WA 98109; 1730 Lynn St., Arlington, VA 22209
MWM-Murphy Diesel, 12 Greenway Plaza, Suite 1100, Houston, TX 77046
Michigan Wheel, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507
Mitsubishi Kakoki Kaisha LTD, Mita Kokusai Bldg. 4-28 Mita 1-chome, Minato-ku Tokyo 108 Japan
National Marine Service Louisiana, Inc., 222 Bayou Rd., Belle Chasse, LA 70037
North American Marine Jet P.O Box 1232 Benton, AR 72015
Omnithruster Inc., 9515 Sorensen Ave., Santa Fe Springs, CA 90670
Penske GM Power, Inc., 600 Parsippany Road, Parsippany, NJ 07054
Inland Water Propulsion Systems, Inc., 580 Walnut St., Cincinnati, OH 45201
Propulsion Systems, Inc., 21213 76 Ave. So., Kent, WA 98032
SACM (Societe Alsacienne De Constructions Mechaniques De Mulhouse) 1, Rue De La Fonderie, Boite Postale 1210, 68054 Mulhouse Cedex, France
Schottel of America, Inc., 8375 N.W. 56 St., Miami, FL 33166
Skinner Engine, Co., P.O. Box 1149, Erie PA 16512
Stewart & Stevenson Services, Inc., P.O. Box 1637, Houston, TX 77251-1637
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Tech Development Inc., 6800 Poe Ave., P.O. Box 14557, Dayton, OH 45414
Transamerica DeLaval Inc., Engine & Compressor Div., 550 85th Ave., Oakland, CA 94621
Transamerica DeLaval, Inc., Turbine & Compressor Div., P.O. Box 8788, Trenton, NJ 08650
Ulstein Maritime Ltd., 6307 Laurel St., Burnaby, B.C. Canada V5B 3B3
Ulstein Trading Ltd. A/S, N-6-65, Ulsteinvik, Norway
J.M. Voith GmbH Dept. WErung, Postfach 1940 7920 Heidenheim/Brenz, West Germany
Voith Schneider America, 159 Great Neck Rd., Ste. 200, Great Neck, NY 11021
Volvo Penta of America, P.O. Box 927, Rockleigh, NJ 07647
WABCO Fluid Power, an American-Standard Company, 1953 Mercer Rd., Lexington, KY 40505
Wartsila Power Inc., 5132 Taravella Rd., P.O. Box 868, Marrero, LA 70072
Waukesha Engine Division, Waukesha, WI 53187

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

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

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

SANITATION DEVICES—Pollution Control
Davit Sales Inc., P.O. Box 232, Jefferson Valley, NY 10535
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
FAST Sewage Systems, Div. of St. Louis Ship, 611 East Marceau St., St. Louis, MO 63111
Golar Metal A/S, P.O. Box 70, 4901 Tvedestrand, Norway
Marland Environmental Systems, 8188 Newington Road, Lorton, VA 22079

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

SCUTTLES/MANHOLES
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

SHAFT SEALS, MECHANICAL PACKING
EG&G Sealol Engineered Prod. Div. Marine Products Group, Warwick, RI 02888
Garlock Inc., Mechanical Packing Div., 1666 Division St., Palmyra, NY 14522
Norton Chemplast, 309-150 Dey Rd., Wayne, NJ 07470

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

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

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

SHIPBUILDING—Repairs, Maintenance, Drydocking
Amsterdam Drydock Company, Post Box 3006, 1003 AA, Amsterdam, Holland
Arsenale Triestino-San Marco Shipyard, Trieste, Italy, U.S. Rep: Marine Technologies & Brokerage, 33 Rector St., New York, NY 10066

New Compact Thermocoil Diesel Fuel Heater From Racor —Literature Offered

The Racor Division of Parker Hannifin has introduced the Thermocoil™, a compact, self-regulating diesel fuel heater that can be installed in-line between the fuel tank and the primary filter.

In the Thermocoil, fuel flows along and around a coil heating element in a sealed chamber, achieving maximum heat exchange in the minimum amount of space. The Thermocoil heater incorporates polymer technology that makes it self-regulating, thus no thermostat is required.

Electricity is conducted between two bus wires running through the core of the heating coil. Heat is then generated when current flows between the wires, increasing the temperature and the electrical resistance of the core material. This progressively reduces the current flow and, therefore, heat generation.

The Thermocoil has no moving parts. It is controlled by a switch installed in the dash or panel and, because it is an electrical device, no modifications to the cooling system are required.

The Thermocoil prevents power loss and stalls due to fuel waxing and assists in cold weather starts and operation in termperatures down to −40°F (−40°C). Also, engines fitted with the Thermocoil heater can be operated on less expensive, higher BTU No. 2 diesel fuel all year.

A Thermocoil diesel heater along with the in-cab control switch can be installed in about one hour. The factory-assembled, pre-wired kit comes along with all the necessary hardware and installation instructions. An optional frame rail mounting bracket can be ordered to avoid any drilling or welding.

For more information and a free color catalog or brochure on the Thermocoil diesel fuel heater,

Circle 54 on Reader Service Card

Far East Bearings Warehouse Established By Thomson-Gordon

To better serve both the internatinal marine repair industry and provide backup inventory to Far Eastern industry, Thomson-Gordon Limited of Burlington, Ontario, Canada, has established a stocking warehouse in Singapore.

Shared and using leased facilities from Engtek, Thomson-Gordon's Singapore distributor, the warehouse will carry a full stock of eleastomeric marine bearings and bearing materials for use by the company's international distributors located in the Far East and South Pacific, i.e., Australia, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Taiwan and Thailand.

For further information,

Circle 51 on Reader Service Card

Bardex Hydranautics Receives Contract For Rig Skidding And BOP Handling Systems

Dual Drilling Company, Dallas, Texas, contracted with Bardex Hydranautics for a rig skidding system and BOP handling systems for use on Chevron's Hermosa platform off California's central coast. The systems were delivered recently.

Bardex Hydranautics is headquartered in Goleta, Calif., with offices in London, Singapore, and Houston. The company designs and manufactures heavy-load moving equipment for offshore and shipyard-related activities.

For further information and detail-filled literature on Bardex Hydranautics and their products.

Circle 50 on Reader Service Card

Asmar Shipyards Co., Astilleros y Maestranzs de la Armada, Prat 856, Piso 14, Casilla 150-V, Valpariso, Chile, S.A.
Astilleros Unidos De Veracruz, S.A. San Juan Ulua S/N, Apdo. Postal 647 Veracruz, Ver Mexico
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, LA 70150
Bardex Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, CA 93116
Bath Iron Works Corp., 700 Washington St., Bath, ME 04530
Bay Shipbuilding Corp., 605 N. 3rd Ave., Sturgeon Bay, WI 54235
Bender Shipbuilding & Repair Co., Inc., P.O. Box 42, Mobile, AL 36601
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
Blohm & Voss AG, P.O. Box 100720, D-2000 Hamburg 1 (In US)-Blohm & Voss CO, Springfield, N.J.
Blount Marine Corp., P.O. Box 368, Warren, RI 02885
Boston Whaler Commercial Div., 1149 Hingham St., Rockland MA 02370
Burrard Yarrows Corporation, P.O. Box 86099, North Vancouver, B.C., Canada
Cantieri Navali Riuniti, Via Cipro, 11, 16100 Geneva, Italy
Chesapeake Shipbuilding Inc., 710 Fitzwater St., Salisbury, MD 21801
Conrad Industries, P.O. Box 790, Morgan City, LA 70380
Coast Iron & Machine Works, 5225-7th Street E., Tacoma, WA 98424
Curacao Drydock (U.S.A.) Inc., 26 Broadway, Suite 741, New York, NY 10004
Dubai Drydocks, P.O. Box 8988, Dubai, United Arab Emirates—U.S.A. Agents: Keppel Marine Agencies, Inc., 26 Broadway, New York, NY 10040, 6240 Richmond Ave., Houston, TX 77057
Eastern Marine, Inc., P.O. Box 1009, Panama City, FL 32401
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
HBC Barge Co. Brownsville, PA 15417
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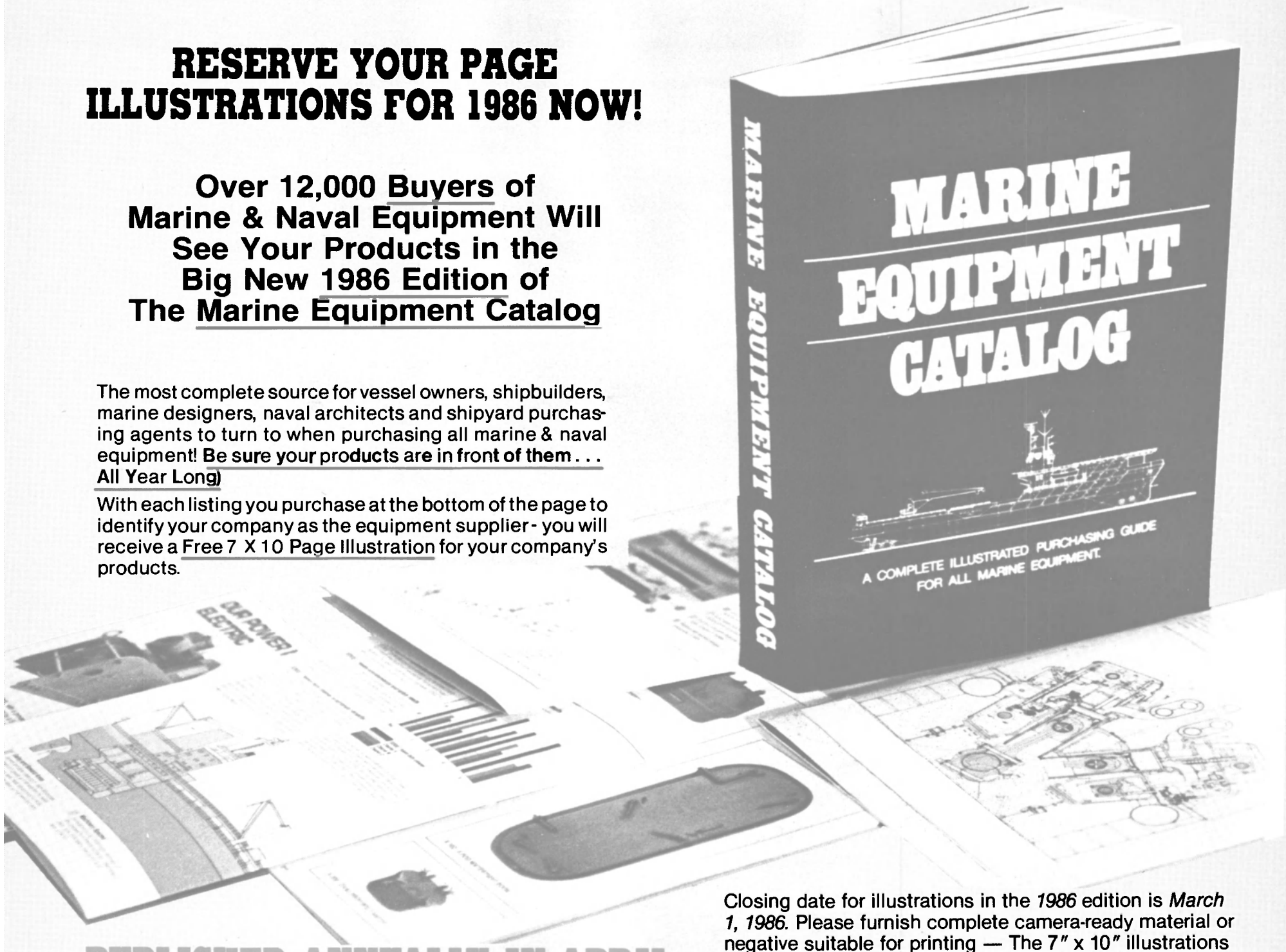

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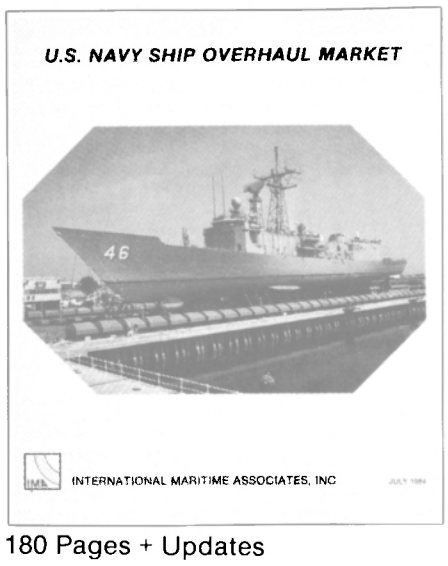

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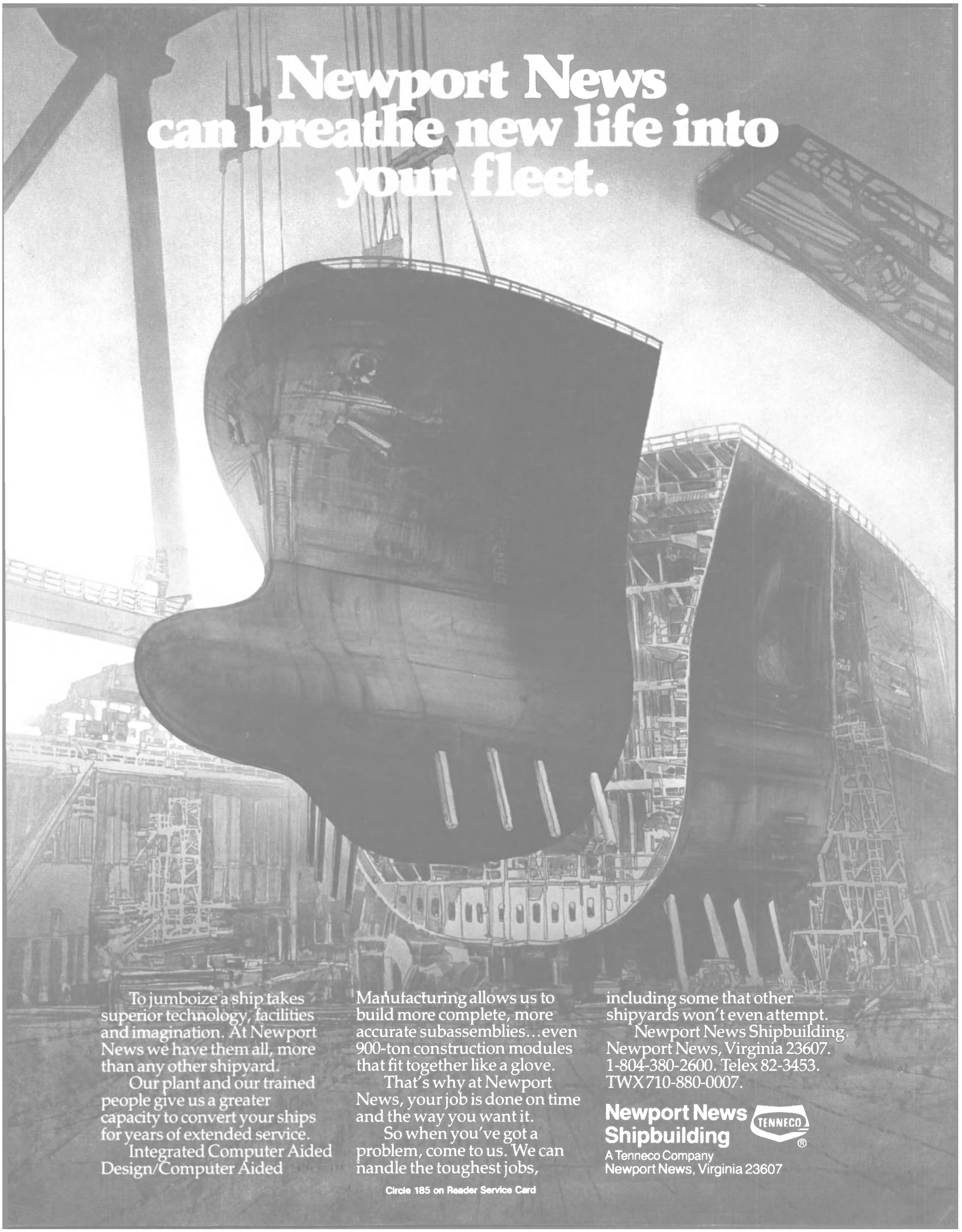

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