

MARITIME REPORTER

AND
ENGINEERING NEWS



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**Swiftships Delivers
Three Patrol Vessels
For West Indies Nations**

(SEE PAGE 4)

**RO/RO '84
SURVIVAL AT SEA
API TANKER CONFERENCE**

(SEE PAGE 4)

APRIL 15, 1984

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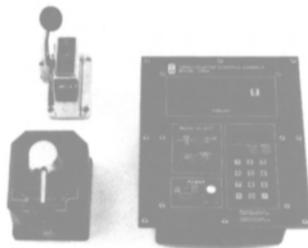
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ON THE COVER

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Survival At Sea A Review

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FMC Receives \$280-Million Increase For 491 LVT7A1 Amphibious Assault Vehicles

FMC Corporation, Ordnance Division, San Jose, Calif., is being awarded a \$280,914,514 face-value-increase to a previously awarded fixed-price-incentive contract for 491 LVT7A1 Amphibious Assault Vehicles. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

C\$9-Million Conversion Contract Award To Burrard Yarrows

The British Columbia Ferry Corporation has awarded Burrard Yarrows Corporation a contract for the heightening of the 140-meter-long truck ferry Queen of Alberni for the introduction of a new vehicle deck that will increase the carrying capacity by 150 passenger cars. An appropriate increase in passenger seating capacity is also envisaged.

Heightening will be achieved by jacking up 800 tons of superstructure using 68 hydraulic jacks.

The C\$9-million conversion that began at the end of February at Burrard Yarrows Corporation's Victoria Division is scheduled for completion on June 11, 1984.

Burrard Yarrows has, in the past, carried out similar capacity increases on the British Columbia Ferry Corporation vessels Queen of Vancouver, Queen of Victoria, Queen of Esquimalt, and Queen of Saanich.

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Editorial and Executive Offices
107 East 31st Street, New York, N.Y. 10016
(212) 689-3266 • ITT Telex: 424768 MARINTI

PUBLISHERS John E. O'Malley
Charles P. O'Malley

EDITORIAL DIRECTOR Charles P. O'Malley

EDITOR Robert Ware

SENIOR EDITOR Thomas H. Phillips

ASSOCIATE EDITOR Kathleen Reagan

EDITORIAL COORDINATOR Lilian Irvine

TECHNICAL EDITOR
L. Parke Adair, BSNA, PE

INTERNATIONAL EDITOR
Robin F. Burnett, MRINA, MNI,
London, England

BUSINESS MANAGER John E. O'Malley

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John C. O'Malley

ADVERTISING SALES MANAGER
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PRODUCTION MANAGER Katherine St. Onge

ART DIRECTOR Ellen Hemmer

CIRCULATION MANAGER M. Sottile

SALES OFFICES

New York, New York
Maritime Reporter & Engineering News
107 East 31st Street, New York, NY 10016
Telephone: (212) 689-3266

Houston, Texas
Robert Hawley
Gary Lindenberg
Mike Sullivan
11777 Katy Freeway, Suite 155, Houston, TX 77079
Telephone: (713) 870-0470

Italy
Mr. Vittorio F. Negrone
Ediconsult Internazionale
Piazza Fontane Marose, 3-16123 Genova, Italy
Telex: 211197 EDINT 1
Telephone: (010) 543.659-268.334-268.513

Scandinavia
Mr. Stephan R G Orn
Ab Stephan R G Orn
Box 184, S-271 00 Ystad, Sweden
Telex: 33335 ORN S, Telephone: 0411-184 00

West Germany
Wolf O. Storck
Schiffahrtswerbung Karl-Otto Storck
Stahlwiete 7, 2000 Hamburg 50,
Federal Republic of Germany
Telephone: 040/850 0071

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Maritime Reporter/Engineering News

**Moran Towing Names
Anthony Watt Manager
Construction And Repair**



W. Anthony Watt

W. Anthony Watt has been named manager of the construction and repair department of the Moran Towing & Transportation Co., Inc., it was announced recently by Thomas E. Moran, president.

Mr. Watt, whose appointment became effective April 1, 1984, has been active in the marine field since graduating from Paul Smiths College in New York in 1960.

With a strong background in shipyard management and as an executive of the Florida Towing Company, Mr. Watt joined the Seaboard Shipping Company in New York as its assistant manager in 1978.

He has been assistant manager of Moran's construction and repair department since 1980.

**Magnavox Receives
\$5-Million Contract For
Navigation Equipment**

Magnavox Government and Industrial Electronics Company, Torrance, Calif., is being awarded a \$5,192,800 modification to a previously awarded firm-fixed-price contract for 16 AN/WRN-5A(V)2 radio navigation sets and nine fault isolation modules with storage cases. The Naval Electronics Systems Command, Washington, D.C., is the contracting activity.

**Chevron Selects Elinca
System For 5 Ships
—Literature Available**

The Elinca marine growth and corrosion control system, marketed in North America by Blume Worldwide Services, Scarsdale, N.Y., has been selected by Chevron Shipping Company, San Francisco, for protection of the main seawater service systems and condensers on five VLCCs operated by the firm. The vessels selected for Elinca protection are C.W. Kitto, Chevron London, Howard W Bell, Chevron South America, and Chevron Burnaby.

The system is electrolytic in ac-

tion, using special copper anodes, and either aluminum or iron anodes, which are fitted in the scoop and the sea chests or special strainer housing. These installations utilize the copper-iron anode combination since protection of the Cu-Ni condenser tubes against impingement corrosion was a major concern.

Slow, controlled dissolution of the anodes on these vessels re-

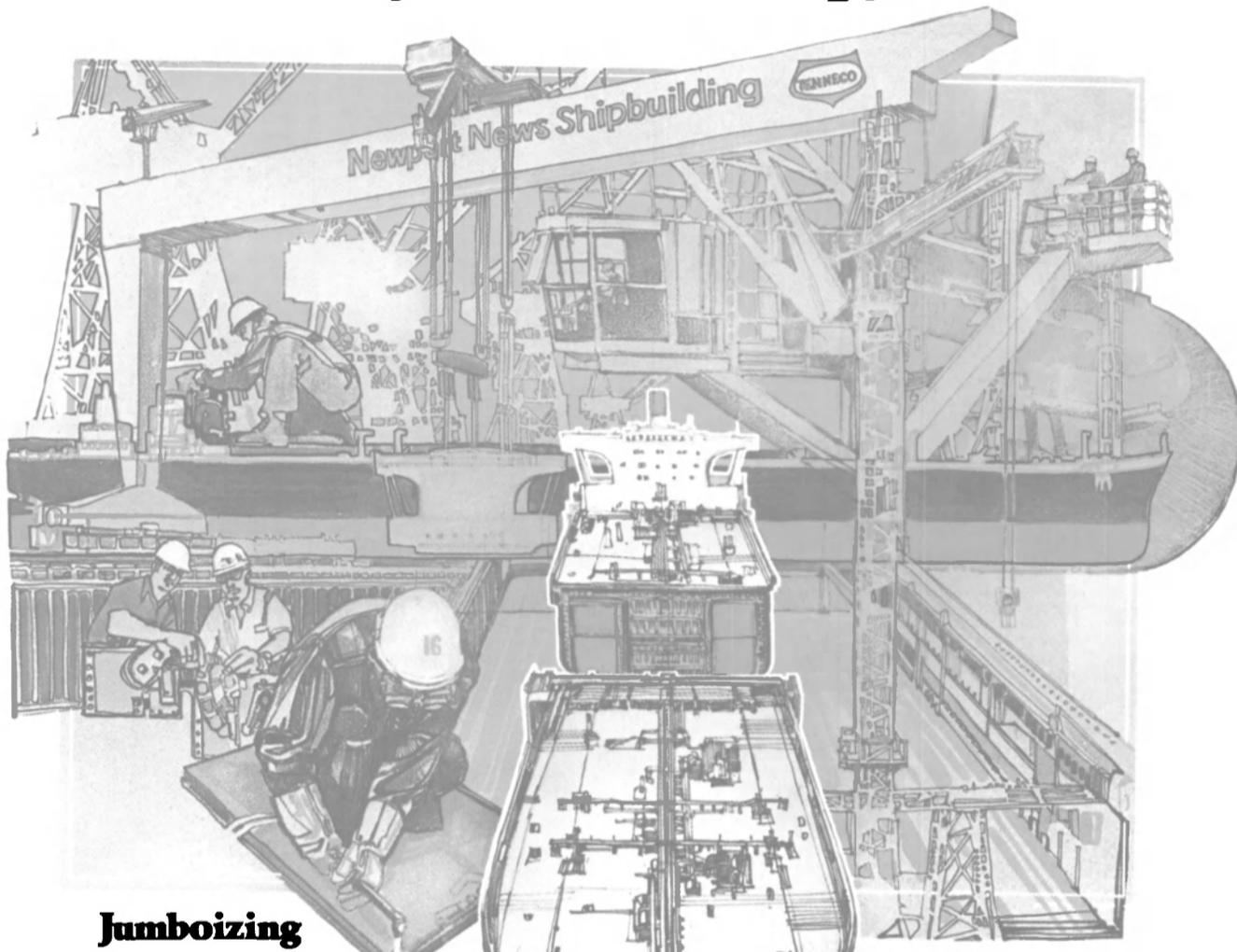
leases copper, which creates an environment which is hostile to the primary forms of marine fouling and iron, which forms an alkaline anodic coating on the piping and condensers thereby greatly reducing impingement corrosion potential in the condensers. Seawater flow past the anodes effects distribution of the anode products throughout the system, insuring entire system protection.

This order brings to over 50 the number of Elinca Systems which have recently been installed on U.S.A. ships, jack-up and semi-submersible drill rigs and drillships, offshore oil and gas platforms, and tug/supply boats for worldwide operation.

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Lykes Sign Letters Of Intent To Build Six Containerships

Lykes Bros. Steamship Co., Inc. New Orleans, has signed a letter of intent with shipbuilders in Japan and the United Kingdom for construction of six large, automated containerships.

One letter of intent is with a joint venture of Mitsui Engineering and Shipbuilding Co., Ltd. and Mitsubishi Heavy Industries, Ltd. in Japan for construction of four ships, with an option to build two more.

Another letter of intent is with the Harland & Wolff shipyard in Belfast, Northern Ireland, for construction of two ships, with an option to build four more.

Lykes and the shipbuilders are continuing negotiations toward actual contracts for construction of the ships. Under terms of the let-

ters of intent, the three shipbuilders will continue their joint contributions toward the drawing of final specifications and designs for the ships.

W.J. Amoss Jr., president and chief executive officer of Lykes, noted that he was optimistic that a contract would be signed soon. "Construction will begin promptly after the contracts are signed," he said.

These contracts will be subject to the approvals of the U.S. Maritime Administration and Japanese and U.K. Government authorities.

The new vessels will be automated, cellular containerships, each able to carry 2,500 twenty-foot-equivalent units (TEUs) of containers. Efficient diesel engines will give them 21-knot service speed.

The six new containerships are to be delivered in 1986. They will be deployed in Lykes's

trans-Pacific service between the U.S. Pacific Coast and the Far East.

Lykes now operates two modern roll-on/roll-off container ships in this trade, and is in the process of adding four German-built containerships with capacity of 1,100 TEUs each.

When the 2,500-TEU containerships are delivered, the ships currently in the trans-Pacific trade will be re-deployed on other routes.

Lykes, based in New Orleans, also operates American-flag cargo ships on trade routes linking five continents and covering the U.S. Gulf and South Atlantic Coasts and the Great Lakes and St. Lawrence Seaway. Lykes trade routes extend to Northern Europe and the United Kingdom, the Mediterranean, South and East Africa, the west coast of South America and the Far East.

Brogan And Sundaresan Promoted At MTL



Thomas M. Brogan

Sundar K. Sundaresan

Marine Transport Lines, Inc. recently announced the following appointments: **Thomas M. Brogan** to vice president-marketing and planning, where he will be responsible for MTL's marketing and planning activities. Mr. Brogan holds a bachelor's degree in mechanical engineering from Cornell University and a Master of Business Administration from the University of Chicago. He recently joined MTL and has held various operating and marketing positions in the transportation industry, most recently as vice president-operations for a bulk liquid storage company.

Sundar K. Sundaresan to vice president and assistant to the president, where he will be responsible for identifying and implementing changes in areas in which improvements in operating efficiency will be effected; and assisting in developing and pursuing new business opportunities. During his four years with MTL he has held a number of positions, most recently that of vice president-marketing and planning. He holds a bachelor's degree in naval architecture from the Indian Institute of Technology in India and a Master of Business Administration from European Institute of Business Administration in France.

In announcing these appointments, **James H. Rand**, MTL president, indicated that they would "enable MTL to intensify its marketing efforts, strengthen its internal procedures and continue its fleet removal program by taking advantage of new business opportunities."

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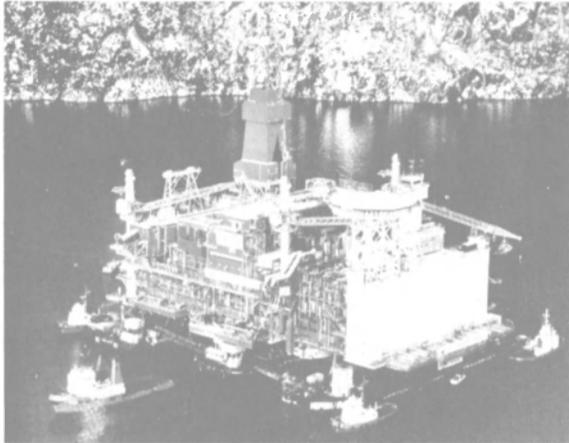
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Successful Transport Of Biggest-Ever Deck Structure Completed By Neptun/NC



The 40,660-ton Statfjord 'C' deck on arrival at the deepwater mating site carried by four Neptun submersible pontoons.

The 40,660-ton deck for the Statfjord 'C' production platform, reported to be the biggest structure ever moved by water, has been successfully transported from its building yard to the mating site by the Neptun/Norwegian Contractors joint venture.

The deck was fabricated by Moss Rosenberg Verft, Stavanger.

For this operation, Neptun deployed four big submersible pontoons. Two single pontoons flanking a further pair mounted "piggy-back" provided the lifting power to raise the huge structure from its building supports at the yard. The deck was then towed on the pontoons to the deepwater site at Vats.

The integrated deck was connected to the gravity base structure and the completed Statfjord 'C' production platform is planned to be ready for tow-out to the North Sea in June of this year. Operator for the Statfjord Group is Mobil.

The technique for this operation was developed by Neptun/NC for the transport of the similar Statfjord 'B' deck.

Navy Seeks Comments On Improving Pump Specifications

Recognizing that the formal process for review of specifications provides for only a short review period, the Naval Sea Systems Command is soliciting technical suggestions for improving several specifications which it plans to revise in the next several months. Those specifications are: MIL-P-21343, Pump, Centrifugal, Submarine Trim & Drain (Series Type Only); MIL-P-22302, Pumps, Centrifugal, Boiler-Feed, Single-State; MIL-P-24475, Pumps, Centrifugal, Sewage-Service.

These specifications require that the manufacturers qualify their products for inclusion in a qualified products list (QPL). When a purchase is contemplated, only those manufacturers whose equipment has previously been qualified will be solicited.

Beneficial comments (additions with suggested new wording and deletions) with associated justification and explanation as to how the changes are in the government's interest are solicited, as well as pertinent data that may be of use in improving these documents.

Single copies of the specifications may be obtained from the Commanding Officer, U.S. Naval Publication and Forms Center, 5801 Tabor Avenue, Philadelphia, Pa. 19120

Comments should be sent to Commander, Naval Sea Systems Command, SEA 56Y21, Department of the Navy, Washington, D.C. 20362, Attn: **A.A. Napoletano**, The telephone number is (202) 692-6826.

April 15, 1984

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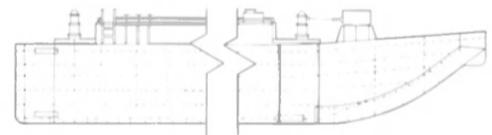
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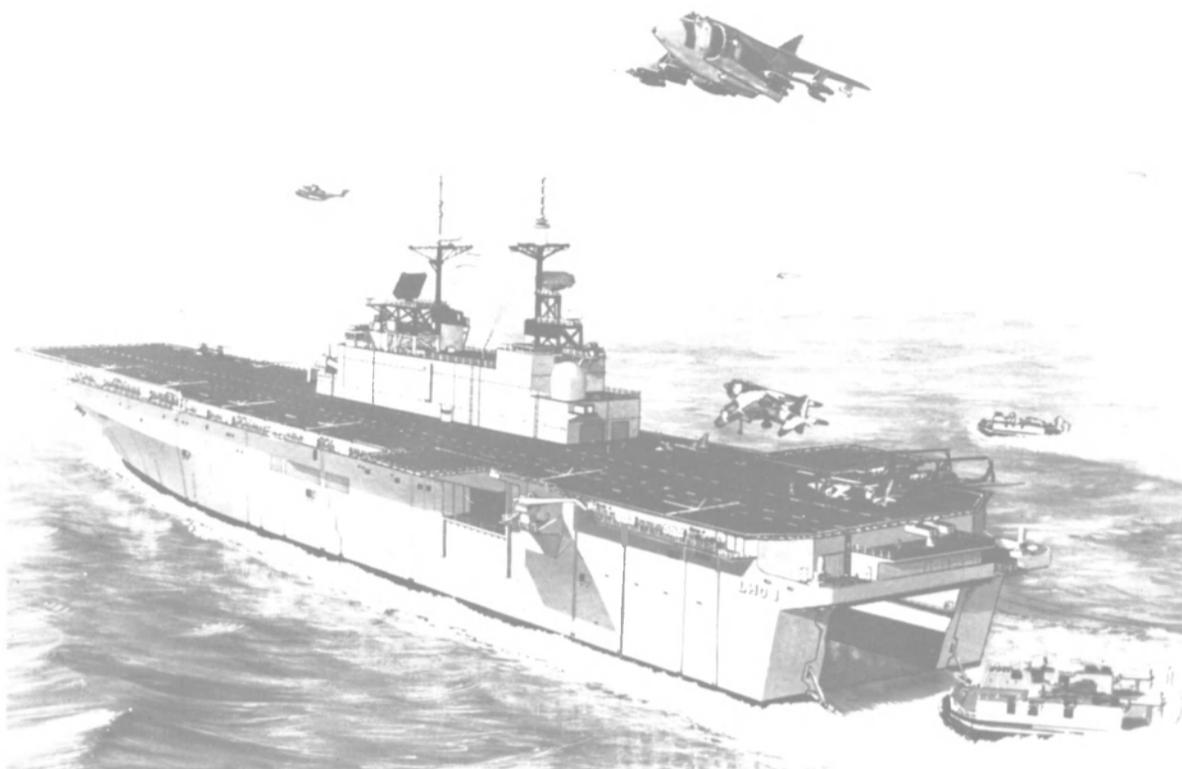
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Artist's conception of LHD-1, lead ship in the Navy's next class of amphibious assault ships

Navy Awards \$822 Million To Ingalls For Construction Of LHD-1 Assault Ship

The U.S. Navy has awarded Ingalls Shipbuilding division of Litton Industries an \$822,042,026 increase to a previously awarded \$140.9-million contract that will allow the shipyard to begin detail design and construction of the lead ship of a new class of multi-purpose amphibious assault ships, the LHD-1. This latest award converts a previously awarded cost-plus-fixed-fee contract for the procurement of long-lead-time materials and related engineering work on the new ship to a fixed-price, incentive contract.

The LHD-1 will be 844 feet long with a beam of 106 feet, and will displace approximately 40,500 tons. Powered by two steam propulsion plants developing a combined 70,000 shp, the ship will be capable of speeds in excess of 20 knots. Its primary mission will be embarking, deploying, and supporting elements of a Marine Corps landing force.

The new class is designed to accommodate

the Navy's new Landing Craft, Air Cushion (LCAC) and short-takeoff Harrier jet aircraft, in addition to the Navy's full range of helicopters and conventional landing craft. The ship's command and control arrangement, which will include a full range of electronic sensors, communications systems, and radar equipment, will allow the ship to serve a secondary mission as a command ship during amphibious operations. She will also be capable of controlling combat operations for other ships and aircraft.

Len Erb, senior vice president of Litton Industries and president of Ingalls, said the new ship will be a vital element to the future of Ingalls. "While it will not immediately increase our work force, LHD-1 will be a major factor in future employment levels," Mr. Erb said. Currently employing a work force of about 10,000, the shipyard expects to experience an employment dip this spring, but will begin in-

creasing later this year. As a result of the LHD-1 contract and activity at the yard in the construction of the CG-47 Class Aegis guided-missile cruisers, employment is expected to increase to 13,000 in late 1986. During peak construction periods, as many as 2,500 Ingalls employees will be involved in the construction of LHD-1. In addition to the lead ship, the Navy currently carries three additional LHD-1 Class assault ships in its five-year shipbuilding program. Ingalls will begin fabrication work on LHD-1 this summer, with delivery scheduled in 1989.

The new ships are similar in design to the five Tarawa (LHA-1) Class general-purpose amphibious assault ships built by Ingalls in the 1970s.

While LHD-1 will have a similar hull, propulsion equipment, and living spaces as the LHAs now in service with the Fleet, several key characteristics of the new ship will distinguish her from an LHA. One difference will be the enclosed well deck built into the stern and opened to the sea through a huge stern gate. This feature is specifically designed to accommodate air cushion landing craft that will "fly" into and out of the ship's dry well deck.

The ship also will be capable of ballasting down to permit wet-well operations with conventional landing craft. Cargo elevators, located in a center island within the ship, will be installed in the outer wing walls of the LHD hull. These will be capable of supporting hangar deck operations, as on the LHAs, as well as flight deck operations.

Armament aboard LHD-1 will include three 20-mm Phalanx close-in weapons systems mounts, and two 8-cell NATO Sea Sparrow missile launchers for defense against missiles and aircraft.

ASNE New England Section Hears Paper On Marine Salvage



Capt. **William Searle**, USN (Ret.) (left) was speaker at recent meeting of ASNE's Northern New England Section. With him is Section chairman **John Culver**.

Capt. **William Searle**, USN (Ret.), chairman of Searle Consortium, Ltd., an international consulting firm in the field of marine salvage, towing, and ship repair, was the guest speaker at a recent meeting of the Northern New England Section of the American Society of Naval Engineers.

Speaking to members and guest at the Portsmouth, N.H., Naval Shipyard Officers' Club, Captain **Searle** gave a presentation of the commercial marine salvage business. Emphasizing that the primary aim of the salvor is the saving of ships and their cargoes, his illustrated case histories ranged from burning tankers to grounded vessels and harbor-clearing projects. Audience reaction was such that only the need to adjourn the meeting put an end to questions.



LHD-1 Class will be similar in most respects to five Tarawa (LHA-1) Class general-purpose amphibious assault ships built by Ingalls in the 1970s. The 844-foot LHD-1 will displace approximately 40,500 tons.

**24-Page Color Catalog
On Marine Electronics
Free From Furuno**

Furuno U.S.A., Inc. has just published a new full color catalog of their 1984 complete product line. In it are marine electronics for commercial fishermen and work boat operators.

The 1984 catalog is arranged by product category, covering radars, echosounders, sonars and nav aids. Each product is illustrated and briefly described, with a full specification section to enable purchasers to choose among the many models.

Two new sections have been added for 1984. One covers a completely new line of radio equipment, while the second discusses how Furuno products may be combined into systems that provide integrated navigation packages.

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**New Division Formed
At General Electric Headed
By W.J. Cimonetti**



William J. Cimonetti

General Electric, Erie, Pa., has formed a new marketing organization, the International and Transportation Equipment Division (ITED). **William J. Cimonetti** has been named to head the division as vice president and general manager.

The appointment was announced by **Carl J. Schlemmer**, vice president and general manager of the company's Transportation Systems Business operations in Erie. ITED is a part of Mr. **Schlemmer's** operations.

The new division is responsible for domestic and international marketing of transportation products for the marine, oil drilling, mining, and general manufacturing industries as well as metropolitan transit systems; and for international marketing of railroad locomotives.

For six years prior to his present appointment Mr. **Cimonetti** was general manager of General Electric's Armament and Electrical Systems Department, located in Burlington, Vt.

April 15, 1984

In a related development, **Thomas C. Hovious** has been named manager of the Transportation Equipment Products Operation (TEPO), a major component of Mr. **Cimonetti's** division. Mr. **Hovious** had been manager of Reliability and Quality Assurance for General Electric's Aerospace Instruments Department in Wilmington, Mass.

TEPO is responsible for development and marketing of products that have evolved from railroad lo-

comotives to be used in other industries. These products include:

- GE7FDM marine diesel engines with eight, 12 and 16 cylinders, four-cycle, rated from 1,525 to 4,000 hp. These engines are in service on tugboats, towboats, ferries, drill ships and military craft.

- Diesel-electric power modules incorporating GE7FD 12 and 16 cylinder engines with ac generators. Ratings are from 1,800 kW to 2,650 kW.

- DC motors and generators

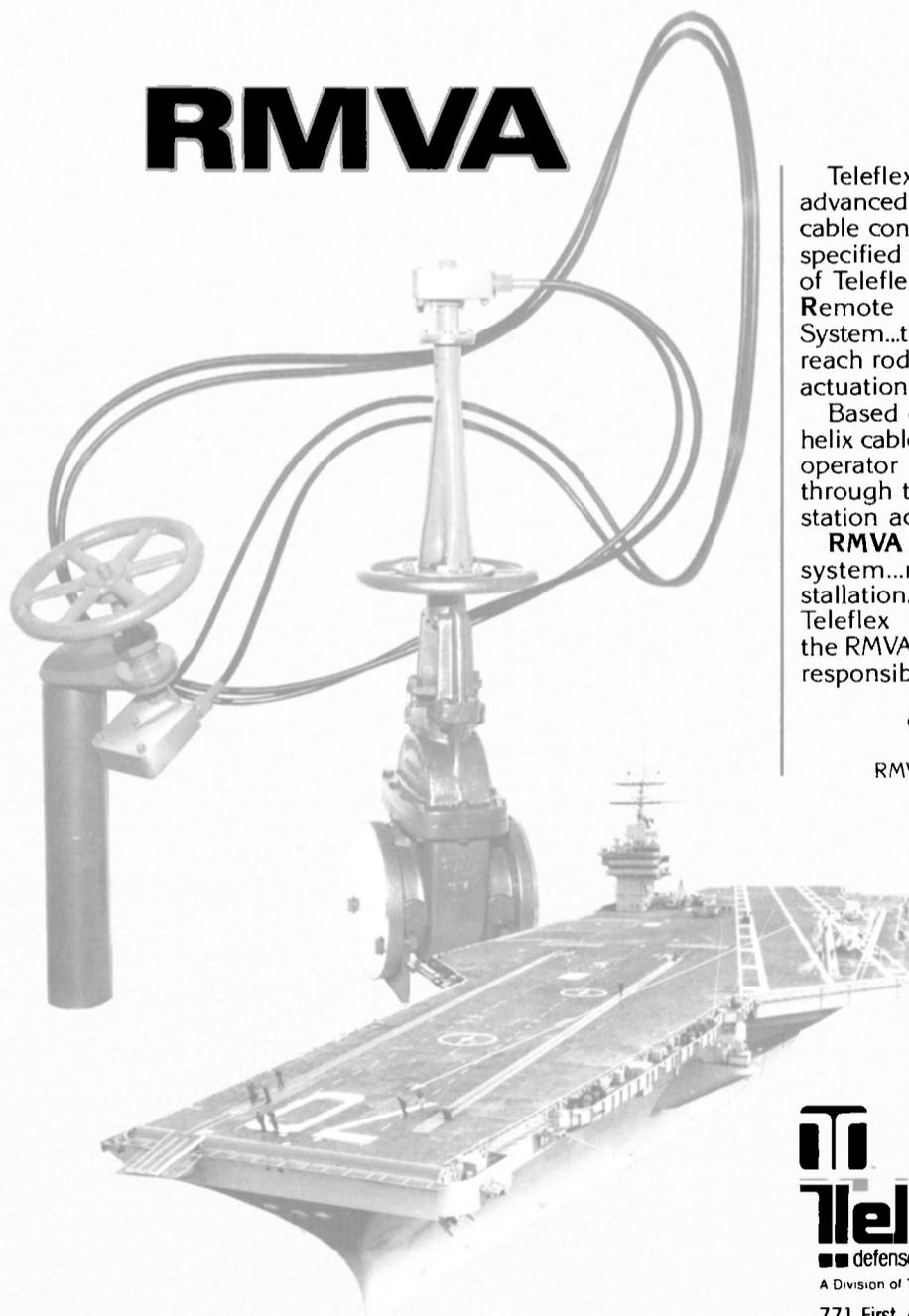
and AC generators for oil and gas drilling rigs.

ITED's major international marketing areas include Europe, India, Africa, Latin America, the Mideast and the Far East including China and Australasia.

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Circle 241 on Reader Service Card



Shrimper La Marseillaise, first steel boat built by Desco Marine, shown being readied for launching. Boat and sister vessel were delivered to owner in French Guiana.

Desco Marine Delivers Its First Boats Built Of Steel

The first steel boats built by Desco Marine were unveiled recently at a christening and launching ceremony at the shipyard in St. Augustine, Fla.

According to Desco Marine president **Tom Collins**, the shrimp boats La Marseillaise and L'Americaine were built for **Ljubisa Nalovic** and were scheduled for delivery to his company, Compagnie Francaise de Peche, in Cayenne, French Guiana, during March. Mr. Nalovic is a repeat customer at Desco, having previously purchased five 68-foot fiberglass shrimpers.

The two new vessels are 72 feet long and rigged for shrimping similar to the rest of Mr. Nalovic's fleet. Designed by **Rodney Lay** of Rodney Lay & Associates, naval architects of Jacksonville, each steel hull was built to American Bureau of Shipping standards and inspection to insure overall design integrity.

"As these were the first boats turned out by our new steel production line, we wanted them to be an example of the same Desco quality that has gone into all of our other boats through the years," said Mr. Collins. "We put great emphasis on all the small details like sandblasting and prime coating each section before it is welded



Desco Marine president **Tom Collins** welcomes guests at recent christening and launching of first steel boats built by the yard. In background is first of two steel shrimpers.

into place, using only certified ABS welders, and even specifying stainless steel cap rails."

La Marseillaise and L'Americaine are Desco Marine's initial entry into the highly diversified steel boat market. Desco's steel production line can handle boats up to 200 feet. In addition to steel, the yard has expanded its capabilities in fiberglass, from 60 feet to 90 feet, and held at 73 feet in wood. Also, Desco has expanded into conversion and repair of steel, fiberglass, and wood boats, and marine hardware and supplies.

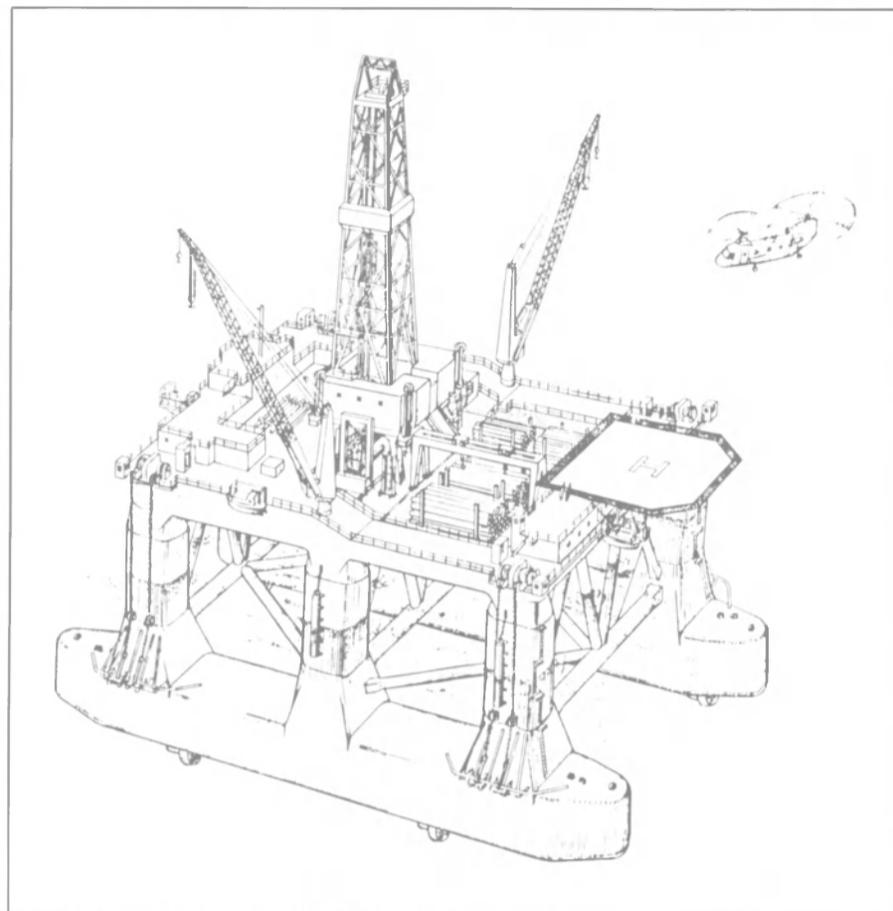
Cybernet Introduces New VHF-FM Radiotelephone —Literature Available

The Cybernet CTX-2050 is a fully synthesized 50-channel VHF-FM radiotelephone designed to the very highest standards of modern high-technology electronics. This new unit covers all U.S. VHF-FM marine channels including five U.S.; and Canadian weather channels. It features a Channel 16 quick-select emergency pushbutton and Dual Watch with Channel 16 priority.

The CTX-2050 is a compact VHF-FM radiotelephone with a full 25 watts of transmitting power, as well as a one-watt harbor setting for close range communication. The channel readout is a high visibility LCD display with mode flags, easy to read by day, night lighted with a variable dimmer control to preserve night vision.

For full information, and free literature on the Cybernet CTX-2050,

Circle 70 on Reader Service Card



NKK Super Semi-Submersible Rig Designed For Deep Sea Operations

Nippon Kokan (NKK), Tokyo, has developed a super semi-submersible drilling rig specially designed for oil and natural gas drilling operations in deep water and rough seas. The rig features a computer-controlled dynamic system to maintain position in deep-water operation in depths to 1,600 meters (about 5,250 feet). The system employs eight sets of 4,200-hp azimuth type thrusters.

The new rig can maintain optimum operating conditions with favorable motion characteristics, as well as withstand 110-knot winds, 18-meter (59-foot) waves, and three-knot currents.

The deck of the super semi is about 272 feet long with a beam of 231 feet. pontoons are 367 1/2 feet long, 50 feet wide, with a height of 37 feet; they are spaced 190 feet center to center. Operating draft is 90.22 feet and survival draft is 78.74 feet.

"This super semi has a higher payload of more than 13,000 tons in transit and a deck load of 5,300 tons under operation conditions," said **Minoru Hashimoto**, president of NKK America Inc., NKK's U.S. subsidiary. "And because of the rig's high variable deck load capacity and larger storage space, it is well suited for production use as well," he stated.

For winter operation, the rig has a special cover for the upper

operating deck to shelter workers from low temperatures. Also, to minimize icing effects, there is less vertical bracing used in the structure.

The super rig's design is based on an NKK/Trosvik Bingo-4000 design. A series of performance tests, such as wind tunnel and sea keeping using scale models was completed at NKK's Tsu Facilities. The rig also meets the latest worldwide regulations for mobile offshore drilling units, including the Norwegian Maritime Directorate, Det norske Veritas, American Bureau of Shipping, U.S. Coast Guard and Department of Energy.

By developing this and the Norwegian Yatzy type mini-size semi-submersibles, NKK now has the capability to build three different types of semi rigs—mini, large, and super sizes—to meet the wide range of requirements of the world's offshore drilling industry.

\$3-Million Contract Awarded AT&T For Oceanographic Systems

AT&T Technologies, Greensboro, N.C., is being awarded a \$3,100,000 cost contract for oceanographic systems. The Naval Electronic Systems Command, Washington, D.C., is the contracting activity.



Principals at recent joint SNAME-PNW Section and CIME-British Columbia included (L to R): Peter Hansen, chairman, CIME-BC; William Watson, author; Gordon Fenwick, chairman, SNAME-PNW Section; Adrian Evans, author; and Gregory Nordholm, author.

Joint SNAME/CIME Meeting Discusses Heavy Lifts And Drydock Operations

The Pacific Northwest Section of The Society of Naval Architects and Marine Engineers, and the Canadian Institute of Marine Engineers held their joint meeting recently at the Airport Inn Resort in Richmond, British Columbia.

Some 90 attendees heard **Adrian Evans**, vice president of Lackie Offshore Transportation, and **Gregory Nordholm**, vice president of Jensen Maritime, give a presentation titled "Modular Hydraulic Transporters and Their Role in Marine Heavy Lifts." Their paper described the engineering, planning, and special equipment utilized to transport and transfer several prefabricated modules, each weighing several hundred tons, from their erection site to a RO/RO ship for shipment to Japan. The movement was done in two steps—overland for several kilometers to a waiting barge, then by barge to the ship.

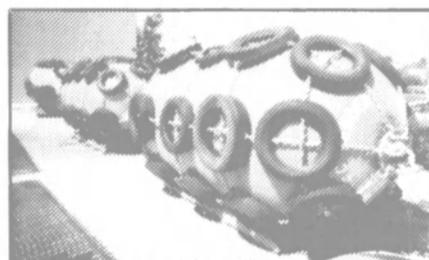
Mr. **Evans** described the unique design of the wheeled, hydraulically suspended transporter that maintains the module's clearance and keeps it essentially level by hydraulically compensating for grades and irregularities in the overland portion of the trip, and greatly facilitates transfer to the barge or ship over a simple ramp system by virtue of the transporter's ability to transfer its weight at a controlled rate and at the same time allow adjustment for differences in deck elevation.

Mr. **Nordholm** explained the methods used to insure that at all times during the movement of the modules, the structural loads and stability of the modules, the transporter, and the vessels were kept within the conservative parameters that were developed for the movement by the authors' firms and the Salvage Association.

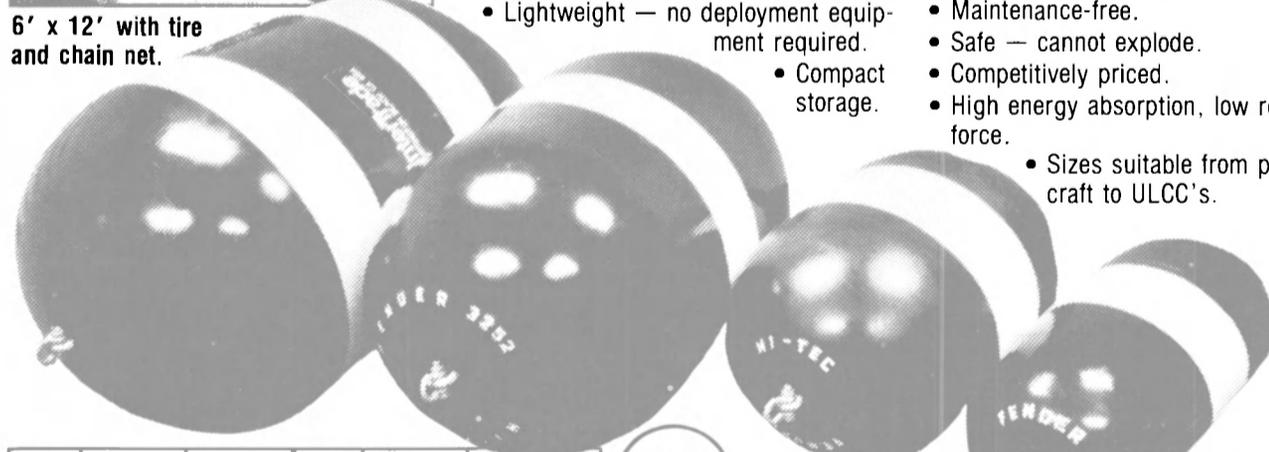
William Watson, ship manager for Burrard Yarrow Corporation, delivered a presentation titled, "Maintenance and Operation of

Panamax Drydock Facility," in which he explained the complexities of planning, preparation, and actual drydocking of a ship.

Mr. **Watson's** description of the actual workings of the drydock's ballast/deballast systems, its controls, hauling machinery, and block placement, and the close coordination required between the dock, the ship, and its tugs provided a valuable perspective on the many critical aspects of the drydocking operation, which, when done by professionals, gives the observer the impression that the routine operation of drydocking a large ship is a simple one, when in fact nothing could be farther from the truth.



6' x 12' with tire and chain net.



DIA.	LENGTH	WEIGHT	DIA.	LENGTH	WEIGHT
16"	36"	31 lbs.	32"	50"	172 lbs.
24"	36"	75 lbs.	36"	60"	211 lbs.
*24"	36"	80 lbs.	48"	88"	425 lbs.
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Ferryboat Playa del Carmen carries 600 passengers at 15.7 knots, and is powered by three GM Detroit Diesel 600-bhp engines. Vessel was designed by DeJong & Lebet.

St. Augustine Trawlers Delivers 600-Passenger Ferry For Mexico

In 1983 the Jacksonville, Fla., naval architectural firm of DeJong & Lebet, Inc. signed a contract with Transportes Maratimos de Yucatan y del Caribe S.A. to design a 600-passenger ferryboat for fast service between Cozumel and Playa del Carmen, Mexico. A combined effort with St. Augustine-based shipbuilder St. Augustine Trawlers, Inc. resulted in a remarkable elapsed time between contract signing and delivery of about three months.

The vessel was further designed to receive passengers from visiting cruise ships while at anchor at sea. Special hull construction and a high degree of maneuverability make this operation possible in complete safety under most sea

conditions.

The Playa del Carmen has an overall length of 121 feet, beam of 27 feet, depth amidships of 11 feet, and full-load draft of 6 feet. She is powered by three GM Detroit Diesel 12V92-TA engines, each rated 600 bhp at 1,800 rpm. Power is transmitted to the 4-bladed Columbian Bronze propellers through Twin Disc reduction gears. Shafting is 4-inch Armco Aquamet; engine controls are by Kobelt. The bow thruster is a Schottel Model S-51, driven by a Detroit 3-71N diesel. Cruising speed is 15.7 knots.

Two Lima generators are driven by Detroit 3-71N engines. The capstan was supplied by New England Trawler, and air supply fans are by Hartzell.

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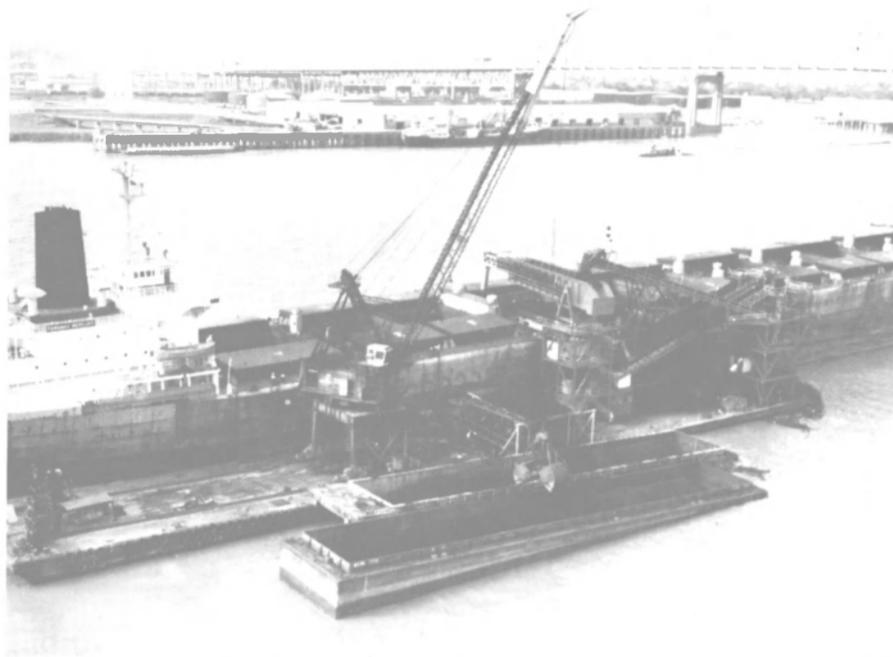
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Coal transfer vessel Coal Monitor One (the unit with the conveyors on board) made commercial debut recently at Ryan-Walsh's midstream buoys at Baton Rouge, La. Working in tandem with floating clamshell crane, the new vessel transferred 58,000 tons of export coal from barges to bulk carrier destined for Taiwan.

Transfer Vessel Coal Monitor One Christened In New Orleans

In ceremonies conducted recently at the Poydras Street Wharf in New Orleans, Ryan-Walsh Stevedoring Company, Inc., and P & C "Bituminous Coal" Inc. christened the Coal Monitor One, an innovative floating coal transfer vessel designed to bring industry-standard sampling and blending to midstream loading to export coal.

Built by Kenner Marine and Machinery of La Place, La., the vessel was designed by Ryan-Walsh to operate in tandem with a floating clamshell crane, with the crane transferring coal from river barges into one of two hoppers aboard the new rig. A series of conveyors carry coal from the blending hoppers to the rig's sampler, an automatic, continuous, mechanical three-stage unit built by James A. Redding & Company. From the sampler, the coal moves to the rig's slewing, telescoping and luffing shiploader that completes the transfer of coal from barge to ship.

Serving as sponsors at the christening ceremony were **Mrs. Eddie Pen**, wife of the president of P & C "Bituminous Coal," and **Mrs. John L. McCarron Jr.**, wife of the president of Ryan-Walsh. The Rev. **Paul S. Tipton**, president of Spring Hill College at Mobile, gave the invocation.



Other speakers on the program included: Hon. **J. Bennett Johnston**, U.S. Senator from Louisiana; **Robert J. Clement**, president of the Mississippi Valley Coal Exporter's Council; **Eddie Pen**; and **Thomas F. Faught Jr.**, president of Dravo Corporation, parent company of Ryan-Walsh.

Other distinguished guests included: Congressman **Robert Livingston**, Representative from Louisiana's First Congressional District; **James E. Fitzmorris, Jr.**, executive assistant to the Governor of Louisiana; **George Schiro**, president of the Board of Commissioners, Port of New Orleans; and **Robert Marak**, Deputy Director of Economic Development, City of New Orleans.

Following the christening, several hundred guests from the shipping and coal industries attended a reception at the Plimsol Club in the International Trade Mart Building.

The Coal Monitor One departed for Baton Rouge immediately after the ceremonies. Two days later, the rig made its commercial debut (photo) loading more than 58,000 tons of coal being shipped by P & C to Taiwan aboard the bulk carrier Panamax Mercury.



Co-sponsors at christening ceremonies in New Orleans were: **Mrs. Eddie Pen** (left), wife of the president of P & C "Bituminous Coal" Inc.; and **Mrs. John L. McCarron Jr.**, wife of the president of Ryan-Walsh Stevedoring Company.

Tampa Shipyards Awards Babcock & Wilcox \$1.4-Million Contract

Babcock & Wilcox, an operating unit of McDermott International, inc., announced that its Industrial Power Generation Division has received a \$1.4-million contract from Tampa Shipyards, Inc., Tampa, Fla., for the supply of five ship sets of marine, auxiliary, oil-fired, package boilers and diesel-engine, exhaust-gas, waste-heat boilers. These boilers will furnish steam for fuel-oil heating and hotel services.

The equipment is to be installed aboard five T-5 Tankers to be built for Ocean Carriers Inc. of Houston, Texas, for charter to the U.S. Navy's Military Sealift Command.

McDermott International, Inc., is a leading energy services company. The company and its subsidiaries provide engineering and construction services to the offshore oil and gas industry, and manufacture steam generating equipment, tubular products, insulating products, and process control systems for markets in the United States and around the world.

Los Angeles SNAME Meeting Discusses Floating Breakwater

A recent meeting of the Los Angeles Metropolitan Section of The Society of Naval Architects and Marine Engineers was held, as usual, aboard the early 20th-century passenger ship Princess Louise I. The technical session featured Dr. **Maxwell C. Cheung**, president of MCA Engineers, Inc. of Newport Beach, Calif. His presentation was titled, "Concrete Barges—A Floating Breakwater."

The concept of a sloping-float breakwater was developed in response to conditions present at the Oregon Inlet offshore North Carolina, though it can be applied to many locations and situations. A great deal of sand transported down the coast tends to block the inlet. The breakwater is necessary to protect a small dredge at the inlet and to reduce operations downtime. For a variety of reasons, permanent breakwaters and floating breakwaters constructed of steel were considered to be unfeasible.

Dr. **Cheung** presented a brief history of marine concrete technology, from ferro-cement to reinforced concrete to prestressed concrete. Prestressing serves to eliminate fractures and cracks that tend to otherwise develop in the portions of a structure under bending compression. The advantages of concrete include low cost, low labor skill, less corrosion, and less maintenance. Disadvantages include low tensile and shear

strengths, difficult quality control, creep and shrinkage, less flexibility for modification, and bulkiness. It was pointed out that bulk can, in some respects, be considered an asset.

Various types of mobile breakwaters were shown and described. These included a rigid raft, flexible raft, tethered float, sloping float, and any wave energy collection device. Disadvantages of the first three were pointed out. Basically, the sloping float pierces the sea surface at one edge, slopes away from the incident waves, and is moored to the seafloor at the opposite edge.

The author then explained in great detail the design structural loading and optimization of the general dimensions. Analyses progressed from a simple model to a finite element analysis to model testing. The major problem encountered here was in determining the structural loads imposed by wave-induced impact of the sloping barge edge onto the seafloor. The impacting is not a standard naval architectural problem. The results of various analytical models were correlated to those of model testing. Finally, construction and operations scenarios and details were discussed.

Dr. **Cheung's** talk was supported by many slides as well as a movie of the model testing.



In attendance at recent meeting of SNAME's LA Met Section were (L to R): **Carl Erikson**, Spring Meeting Committee; **Bill Watts**, Public Relations; **Max Cheung**, chairman and author; **Gary Cash**, vice chairman; **Peter Buckley**, Spring Meeting Committee; and **Herb Chatterton**, Spring Meeting Committee.

Nelson Named President Of M. Rosenblatt & Son



Perry W. Nelson

Lester Rosenblatt, chairman of the board of M. Rosenblatt & Son, the prominent naval architectural and marine engineering firm, has announced the appointment of Perry W. Nelson as president.

Mr. Nelson's marine career started with employment as a ship draftsman with the W.C. Nickum naval architecture firm in Seattle more than 30 years ago. A graduate of the U.S. Naval Academy, he spent five years at sea before attending Webb Institute of Naval Architecture where he earned degrees in naval architecture and marine engineering.

Subsequently, he held Navy positions as shipyard waterfront superintendent, design project manager for destroyers and hydrofoils, systems analyst, director of Navy new ship design, and commanding officer of the David W. Taylor Naval Ship Research and Development Center. He retired from the Navy with the rank of captain.

M. Rosenblatt & Son is one of the world's largest ship design organizations. Since joining the firm in 1975, Mr. Nelson has shared management responsibilities with Mr. Rosenblatt. The company's staff of about 1,000 persons operates out of 14 offices, with headquarters in New York City. The firm handles all phases of naval and merchant ship design and construction inspection, as well as shipyard and shipboard operations and support.

Mr. Nelson is an honorary vice president of SNAME and chairman of its Committee on Marine Technology. He is also active in and a member of council of ASNE.

Fishing Vessel Conference To Be Held May 10-12 In Melbourne, Florida

The International Conference on the Design, Construction, and Operation of Commercial Fishing Vessels is scheduled for May 10-12 at the Florida Institute of Technology in Melbourne. The Conference is sponsored by Florida Sea Grant, the Southeast Section of SNAME, and FIT.

Some 200 participants are expected from many countries. Jan-Olof Traung, former chief of the

Fishing Boat Section, FAO, will speak at the opening session and participate throughout.

Nine technical sessions will be held during the three-day meeting. Session topics will include World Fisheries Today, Fishing Vessel Operations, Fishing Vessel Design, Fishing Vessel Construction, Advanced Concepts, Safety, Sail Assistance for Fishing Vessels, Fishing Vessels for Developing Countries, and Small-Scale Fisheries.

The Conference fee is \$82, which includes lunch on three days, a reception on May 10, and a reception and dinner on May 11. It also includes one copy of the proceedings that will be published following the Conference, and pre-prints of papers.

For additional information contact Dr. John C. Sainbury, Professor of Ocean Engineering, Florida Institute of Technology, Melbourne, FL 32901; (305) 723-3701, extension 452.

SYSCON Awarded \$9.5-Million Navy Contract

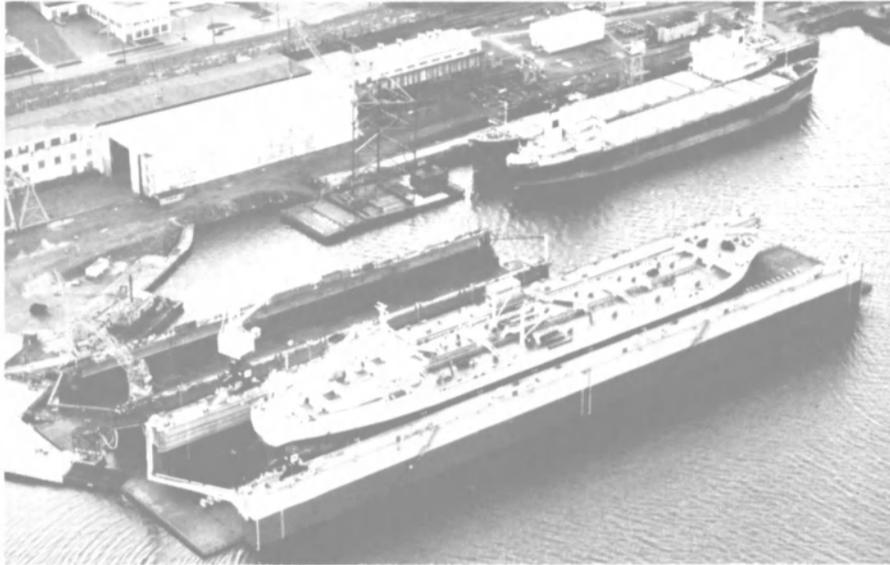
SYSCON Corporation, Washington, D.C., is being awarded a \$9,547,000 cost-plus-fixed-fee contract for professional, technical and engineering services in support of the Aegis Project Office. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

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Tanker Irving Eskimo was first ship to enter new drydock at Halifax Shipyard.

First Vessel Enters New Floating Drydock At Halifax Shipyard

Halifax Industries Limited in Halifax, Nova Scotia, recently received its first vessel in the newly commissioned, 100,000-dwt-capacity floating drydock. The Panamax size dock has a lifting capacity of 36,000 tons. Its overall length is 843.16 feet, width between fenders 124.67 feet, and draft over keel blocks 29.53 feet.

The first vessel in the new drydock was the Irving Eskimo, a 38,213-dwt tanker owned by Irv-

ing Oil Limited. The ship entered dock for repairs to shaft bearings. The propeller and intermediate shaft were removed and the tail-shaft pulled in. The forward and aft bearings were then rebabbitted and reinstalled.

In addition to the new Panamax size dock, Halifax Shipyard also operates a floating drydock 606.95 feet long and 82 feet wide, and a graving dock 567.76 by 78.74 feet.

John Hastie Steering Gear Parts/Service Available In U.S. From Jered Brown

Jered Brown Brothers is the American source for spare and repair parts manufactured by the internationally renowned John Hastie of Greenock Ltd., Scotland, including parts for the well-known Hele-Shaw pump, the company announced recently.

A separate facility in Auburn Hills, Mich., enables Jered Brown to provide expeditious service, minimize international communications, and reduce downtime.

Jered Brown Brothers, a member of the Vickers Marine Engineering Division, along with the other members, John Hastie, Brown Brothers, Michell Bearings, Stone Vickers and Vickers Marine Controls, now covers one of the most extensive product lines of any marine equipment manufacturer. From steering gears to specialized bearings, controllable-pitch propellers to stabilizers, and motion compensators/tensioners to electronic control systems, the Vickers Marine Engineering Division can bring virtually every aspect of motion control for the commercial and Navy markets to shipowners and operators.

Jered Brown has patterns and drawings and are capable of responding to almost any inquiry

and provide assistance for repair parts needs.

For complete details on Jered Brown's product line and services, including John Hastie steering gear repair, parts, and service,

Circle 57 on Reader Service Card

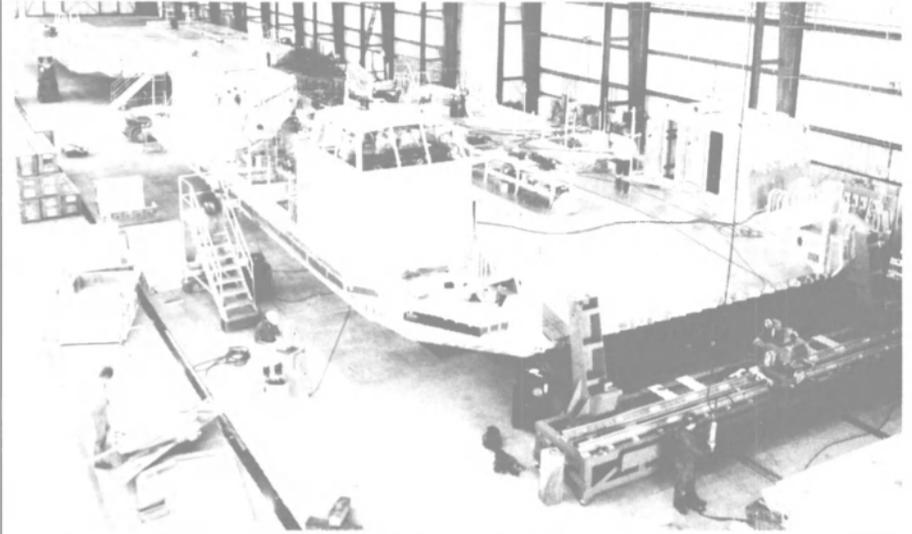
Richard Roe Elected Vice President At Moran Towing



Richard Roe

Richard H. Roe, controller of the Moran Towing & Transportation Co., Inc. since 1974, has been elected a vice president of the company by its board of directors.

Mr. **Roe**, a graduate of St. John's University at Hill Crest, Long Island, is a Certified Public Accountant and has served in various accounting and finance positions with other companies prior to joining Moran as a general accounting supervisor in 1972.



Construction of the LCAC-1 and LCAC-2 is progressing at the Bell Halter facility in New Orleans. These first two of 12 under contract are scheduled for 1984 completion.

Bell Aerospace Awarded \$102 Million To Build Six More LCACs For U.S. Navy

Bell Aerospace Textron, Division of Textron Inc., has just been awarded a \$102-million contract to construct additional air cushion landing craft for the U.S. Navy. The contract was announced by **John J. Kelly**, senior vice president and general manager of Bell Aerospace Textron, New Orleans Operations, and president of Bell Halter Inc.

This latest fiscal year 1984 contract authorizes production of six additional Landing Craft, Air Cushion (LCAC), to be delivered in 1986, and included a \$197-million option for another 12 craft for the FY '85 program. This \$299-million package provides for a total of 24 LCACs to be built at the Bell Halter production facility in New Orleans.

The LCAC is an amphibious, air cushion landing craft that can travel at speeds up to 50 knots and can quickly transport troops, equipment, and weapons from support ships over the horizon to dry landing points beyond the beach. The craft are designed to replace the Navy's fleet of WWII-era landing craft, and will improve dramatically the ship-to-shore capability of the Navy and Marine Corps.

The first six LCACs are now under construction (photo) at Bell Halter under a \$182-million production contract awarded to Bell Aerospace. Bell Halter, a company formed by Bell Aerospace Textron and Halter Marine Inc., is the manufacturing facility for Bell Aerospace. Rollout of the first two LCACs is scheduled for this year, with three more to be completed in 1985.

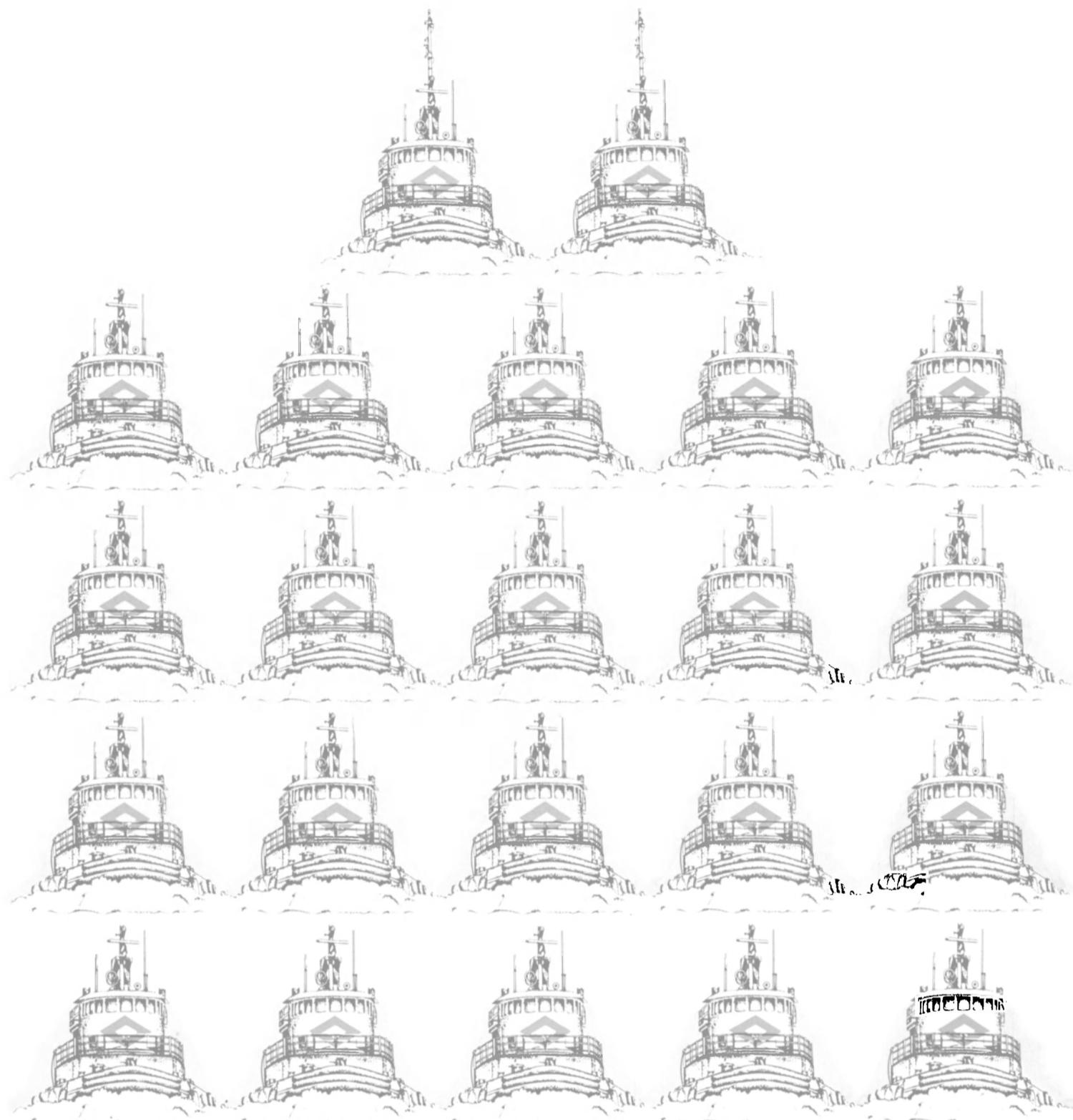
The new LCAC contract comes as Bell Aerospace Textron begins its 15th year of operation in the New Orleans area. A pioneer in

the advanced marine craft field, Bell established its New Orleans Operations in 1969 to design, develop, build, and test an experimental surface effect ship (SES) under U.S. Navy contract. Over the years, the New Orleans office has concentrated on the design and construction of air cushion vehicles and SESs for military and commercial use.

Beginning with only a handful of employees transferred from the company's facility near Buffalo, N.Y., Bell's New Orleans Operations has grown to 750 employees, including about 100 at the test site in Florida, and has established a strong engineering and production base for the new air cushion technology emerging in this country.

The Bell Halter shipyard, which grew out of an earlier joint venture between Bell Aerospace and Halter Marine, is currently dedicated to the production of air cushion vehicles and surface effect ships, thus establishing a new type of shipbuilding industry in the U.S. Centrally located in Louisiana, the shipyard currently has 330 employees, drawn largely from the Southern Louisiana and Mississippi labor markets.

The offsite support facility of the New Orleans Operations is the Bell Aerospace Textron Support Department located in Panama City, Fla. Established in 1973 with 30 employees, the facility has grown to a staff of more than 100. The Support Department has been used to test Bell ship designs, including the prototype for the LCAC. When completed, the first LCAC will undergo initial checkout, builder's trials, and U.S. Navy acceptance testing at the Panama City site.



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A.P.I. TANKER CONFERENCE

Boca Raton, Florida — June 3-6

The commandant of the U.S. Coast Guard, Adm. **James S. Gracey**, will address the American Petroleum Institute's 1984 Tanker Conference, which will be held in Boca Raton, Fla., June 3-6. This year's meeting, at the Boca Raton Hotel and Club, will have the theme, "Operating on the Sea of Reality." Adm. **Gracey** will speak at the luncheon on Monday, June 4.

Among the topics that will be discussed by speakers and panelists will be: tanker safety, the human element, vessel layups, technical operations, corrosion and maintenance, and computer applications.

On-site registration will be held in the hotel's Cafe Galeria on Sunday, June 3, from 3 to 6 pm and on the mornings of June 4 and 5. This

room will also double as a hospitality room for spouses and as a backup room for the Ladies' Coffees in the event of inclement weather.

General Sessions

Monday, June 4

9 am-12 n—Valencia Room
 Conference Opening: **F.J. Iarossi**, chairman, Central Committee on Transportation by Water
 Introductory Remarks: **C.T. Sawyer**, vice president-industry affairs, American Petroleum Institute

Tanker Safety

Moderator: **F.J. Iarossi**, Exxon Shipping Company
 "The Tanker Industry—Some Recent Developments," by **J.C.S. Horrocks**, International Chamber of Shipping

"Lessons Learned Since Enactment and Implementation of the Port and Tanker Safety Act of 1978," by Rear Adm. **Bobby F. Hollingsworth**, U.S. Coast Guard

The Human Element

"Principles of Manning," by **Phil B. Owen**, Shell International Marine Ltd.

API TANKER CONFERENCE PROGRAM SUMMARY

Sunday, June 3		
3-6 pm	Registration	Cafe Galeria
7-8:30 pm	Opening Reception	Cloister Garden
Monday, June 4		
9 am-12 n	General Session	Valencia Room
10:20-10:35	Coffee Break	Cafe Galeria
12:15-12:45	Reception	Cafe Galeria
12:45-2 pm	Luncheon	Cathedral Room
2-5 pm	General Session	Valencia Room
3:20-3:35	Coffee Break	Cafe Galeria
Tuesday, June 5		
8:45 am-12 n	General Session	Valencia Room
9:55-10:10	Coffee Break	Cafe Galeria
Afternoon	Free	
7-8 pm	Reception	Cafe Galeria
Wednesday, June 6		
8-11:30 am	General Session	Valencia Room

"EEO and Women at Sea," by **Martha Terry**, ARCO Transportation Company
 "Shipboard Management Skills for the Chief Engineer," by **John B. Arado**, Chevron Shipping Company

2-5 pm—Valencia Room

Economics

Moderator: **J.J. Ervin**, Trinidad Corporation
 "Experience with Cargo Loss Accountability," by **Richard L. Lutz**, ARCO Petroleum Products Company
 "Report on National Academy of Science Study on Effective Manning," by **Warren G. Leback**, Maritime Administration
 "Technical Aspects of Layup," by **David C. Warkman**, BP Shipping Ltd.
 "Layup and Reactivation of the Ready Reserve Tanker Fleet," by **Stanley Wheatley**, Maritime Administration

Tuesday, June 5
 8:45-12 n—Valencia Room

Technical Operations

Moderator: **J.T. Jacobson**, Standard Oil Company (Ohio)
 "42,000-dwt Product and Chemical Carrier," by **S. Paul Revere**, Exxon Shipping Company
 "Marine Considerations in the Exploration of Bering Sea Crude Oil," by **David B. Sucharski**, ARCO Oil and Gas Company, and **Paul A. Serafin**, ARCO Marine, Inc.
 "Combustion Experiments in Top-Vented Tanks and Application to In-Situ Burning of Tanker Cargo," by **Dr. David C. Miller**, Armcoc Oil Company
 "Offshore Barge Lightering of Alaskan Crude," by **George Grunthaler**, Sonat Marine Inc., and **Roger A. Gale**, The Standard Oil Company (Ohio)

Wednesday, June 6
 8-11:30 am—Valencia Room
 Moderator: **A.B. Kurz**, Keystone Shipping Company

Computer Applications

"On-Board Computerized Performance Monitoring—Engine, Hull, Propeller," by **W.F. Weyer**, Texaco Inc.
 "Shipboard Computer System Coupled with Satellite Communication," by **T.W. Gillette**, Exxon Shipping Company
 "Shipboard Applications of Computers—Their Potential and Reality," by **James H. Keyte**, Booz, Allen & Hamilton, Inc.

Corrosion and Maintenance

"Vessel Structural Condition—Who's Responsible?," by **W.O. Gray**, Exxon Corporation
 "Role of IACS and the Classification Societies in Vessel Maintenance," by **L.J. Bates**, American Bureau of Shipping
 "After Pits, Cracks and Hull Corrosion, What's Next?," by **John B. Arado**, Chevron Shipping Company

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 "After Pits, Cracks and Hull Corrosion, What's Next?," by **John B. Arado**, Chevron Shipping Company

Industry Outlook

"Future of the U.S.-Flag Tanker Industry," by **F.J. Iarossi**, Exxon Shipping Company

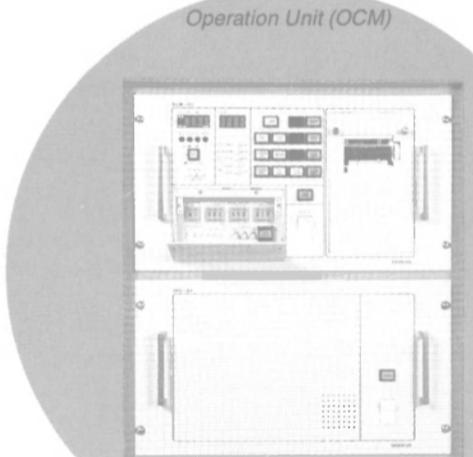
API LADIES' PROGRAM

Sunday, June 3	7-8:30 pm	Opening Reception	Cafe Galeria
Monday, June 4	9:30-10:30 am	Ladies' Coffee	Club Terrace
	10:30 am-4:30 pm	Lunch at the Breakers and Worth Avenue Tour	
Tuesday, June 5	9:30-10:30 am	Ladies' Coffee	Club Terrace
	7-8 pm	Reception	Cafe Galeria
Wednesday, June 6	9:30-10:30 am	Ladies' Coffee	Club Terrace



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Telex 21847 mapro n

Oslo office:
Box 6746, St. Olavs Pl.
Oslo 1, Norway
Tel. + 47-2-111255
Telex 18127 mposl n

Maritime Protection (Pte) Ltd., Singapore
12 Gul Lane, Jurong
Singapore 2262
Tel. + 2644255
Telex mpsing RS20385



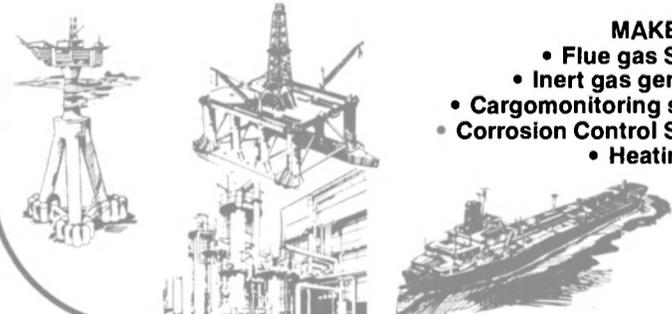
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Iowa Marine Delivers Towboat Betty Edwards To Morris Harbor Service

Iowa Marine Shipyard in Keokuk, Iowa, recently delivered the river towboat Betty Edwards to Morris Harbor Service of Morris, Ill. Both companies are wholly owned subsidiaries of Iowa Marine, which is also headquartered in Morris.

The new vessel is named after the mother of Tom Edwards, Iowa Marine's board chairman. She has a length of 50 feet, beam of 22 feet, and depth of 7 feet; the pilothouse has an eye level of 25 feet.

Twin Cummins NTA-855 main diesel engines develop a total of 650 bhp at 1,800 rpm. Two Twin Disc 5.17:1 reduction gears turn 54-inch Kahlenberg propellers through 5-inch shafts. Electrical power is provided by a 25-kw Lima generator driven by a 3-cylinder Duetz air-cooled diesel. Other equipment includes a Dayton air compressor, Humphrey sanitary system, hot water heater, air conditioners, electric range, and refrigerator.

The vessel has many innovative design features that add to her versatility and ease of maintenance. The pilothouse measures 8 by 8 feet and has deep windows that provide complete visibility to all four corners of the boat from the operator's seated position. The second deck is equipped with a full fleet deck, specially designed for strength and safety, allowing the vessel to handle empty barges with ease.

A new Iowa Marine design allows the 30-ton Patterson electric winches to be installed inside the tow-knees. This protects the winches from weather and provides a large, clear forward deck area. The raised stern deck is covered with rough-cut 2- by 8-foot oak planking, giving it a non-skid surface for safe access to rudders and steering mechanisms.

Heat is provided by 30,000-Btu

truck type heaters fed by the main engines and equipped with 12-volt fans. This heating system is backed up by 220-volt electric heaters. Two Carlisle & Finch incandescent searchlights are installed, one 120-volt and one 12-volt. The vessel has two all-channel Raytheon 53 VHF radios, a Raytheon 400 loudhailer/intercom, and complete engine alarm system. All navigation lights, pilothouse lights, and some deck and engine room lights are 12-volt operated.

The Iowa Marine-designed, full-follow-up steering system is driven by main-engine-powered hydraulic pumps, giving the vessel the ability to operate without the generator in case of emergency or for added economy.

The bilge pump is designed so that any compartment on the vessel can be either pumped or balled by using the sea cock. A 12-volt Jabsco automatic pump, separated from the engine room bilge, pumps the stuffing box drain water directly overboard even with the vessel completely shut down.

A spacious, paneled bunk room with a full head is located on the main deck, and a small, fully equipped galley is on the second deck. This gives the Betty Edwards the capability for operations between Lemont and Hennepin, Ill.

Advanced Technology Awarded \$5-Million Navy Contract

Advanced Technology Incorporated, McLean, Va., is being awarded a \$5,028,777 cost-plus-fixed-fee contract for engineering support for marine gas turbines, internal combustion engines and gas turbine ship engineering control systems.

The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Navy Awards E-Systems \$4.7-Million Contract

E-Systems recently received a \$4.7-million U.S. Navy contract to provide continuing systems engineering and technical support services for the downlink communications tracking set used with the Terrier SM-2 missile.

The contract with the Naval Sea Systems Command calls for a variety of engineering, technical and software tasks in connection with the AN/SYR-1 Tracking Set.

The AN/SYR-1 was designed by E-Systems ECI Division in St. Petersburg, Fla., and is produced and supported by that division. Engi-

neering and technical support services involve both the operational performance and maintainability of the system.

The AN/SYR-1 is a shipboard system which receives and processes data from missiles in flight. It can function with both the Terrier and Tartar missiles.

E-Systems is a major worldwide developer and producer of high technology electronic systems and products in the areas of intelligence and reconnaissance systems, command and control, electronic warfare, specialized aircraft maintenance and modification, guidance, navigation and control, communications and data systems.

MTL Announces Promotions



Joseph G. Drescher



Nicholas Orfanidis



Donald Hutton



W. Herschel Chittum



Joseph M. DiMarco



Anthony N. Citrola

Marine Transport Lines, Inc. recently announced the following promotions.

Joseph G. Drescher to vice president-operations, where he will be responsible for MTL's fleet of 37 vessels with an aggregate deadweight approximating 1,690,028 long tons. In his 14 years with MTL he has held positions as port engineer, marine superintendent and fleet director.

Nicholas Orfanidis to fleet director, where he will be responsible for one of the fleets within MTL that consists of 17 vessels with an aggregate deadweight approximating 854,250 long tons. In his 10 years with MTL he has held several operating positions.

Donald Hutton to fleet manager, where he will be responsible for the daily operations of one of MTL's fleets. In his 10 years with MTL he has held positions as port engineer and marine superintendent.

W. Herschel Chittum to assistant vice president-finance, where he will be responsible for financial and management system applica-

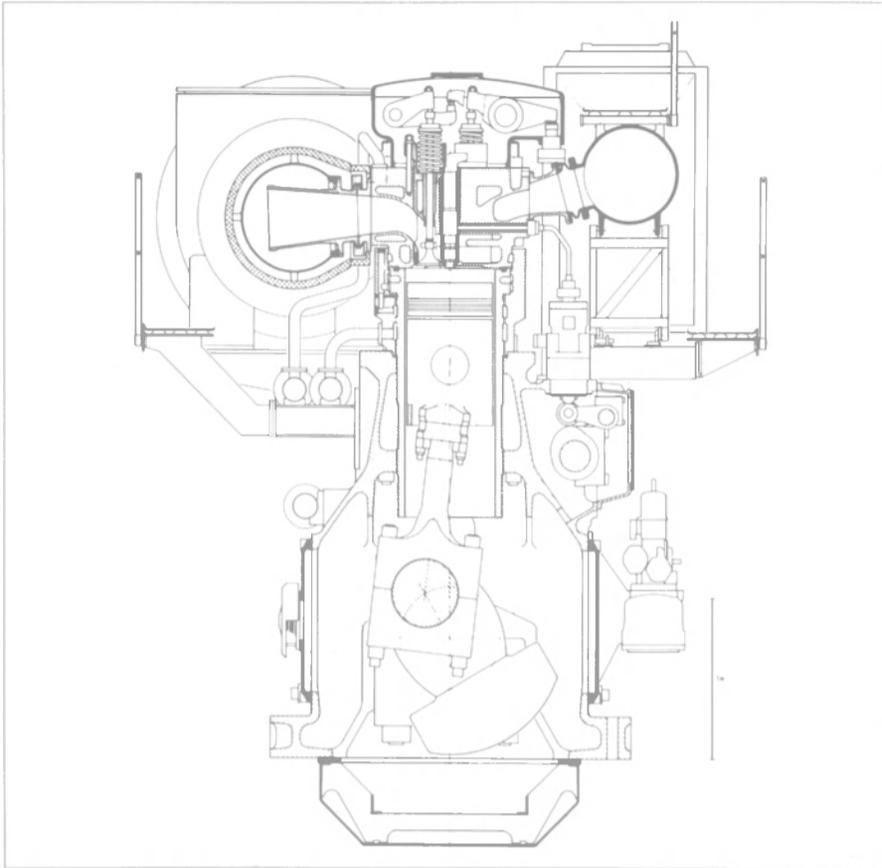
tions. In his two years with MTL he held the position of controller.

Joseph M. DiMarco to treasurer, where he will be responsible for MTL's accounting function. Since joining the company in 1976 he has held various positions in the finance area.

Anthony N. Citrola to controller, where he will be responsible for MTL's accounting function. Since joining the company in 1978 he has held various positions in the company's accounting area, most recently assistant controller.

In announcing these promotions, **Louis J. Conti**, chairman of the board, said: "MTL is pleased to be able to strengthen its management team with individuals who have contributed over the years to the success of MTL."

MTL is a leading owner and operator of oceangoing ships for bulk cargo transportation. MTL's fleet includes crude oil tankers, petroleum product tankers, chemical tankers, dry bulk carriers, molten sulphur tankers and liquefied gas carriers operating in both U.S. domestic and international trades.



Cross section of the L 58/64 diesel engine.

M.A.N.-B&W Diesel Introduces New Engine 64-Page Technical Report Available

M.A.N.-B&W Diesel has introduced their latest design, heavy fuel burning, four-stroke diesel engine, the L58/64, with a power rating from 8,000 to 15,000 bhp. M.A.N.-B&W reports the most noteworthy characteristics of this engine are that, at its optimum rating, it has an efficiency of 50 percent at the engine shaft, and is designed for burning future residual fuels up to 7,000 seconds Redwood No. 1 at 100° F, with a minimum of maintenance.

The first engine is currently going through its final testing program and is expected to exceed its design objective, burning less than 0.27 lbs/bhp (metric), corrected for ISO conditions, at 85 percent of its economy power rating.

In addition to a high operating efficiency, the engine also provides an excellent opportunity for high waste heat recovery with an exhaust gas temperature downstream of the turbocharger of 660° F over a broad operating range. In a number of marine applications, this means that the "at sea" electrical load can be produced by the waste heat recovery system instead of operating an auxiliary engine.

M.A.N.-B&W Diesel also produces a full line of two-stroke and four-stroke diesel engines with ratings from 500 to over 56,000 hp. In addition to main engines for marine applications they offer heavy fuel burning auxiliary en-

gine generator sets, complete propulsion systems with their own design of speed reducing gears and controllable-pitch propellers, stationary power plants and cogeneration packages.

An eight-page color brochure and a 64-page technical report on the new L58/64 engine are now available. These contain detailed technical data including specification tables, ratings, performance data, test results, photos, and cross-section color drawings of the new engine and key components.

For free copies,

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M.A.N.-B&W 3L 58/64 test engine with a cylinder output of 1,215 kw (1,650 hp) at a rated speed of 428 rpm.

Sigma Awarded MSC Contract For 40 Bilge Oily Water Separators

Sigma Treatment Systems, Inc. (Sigma) of Chester Springs, Pa., has received a contract from the U.S. Navy Military Sealift Command (MSC) to supply 40 bilge oily water separators with bilge alarms. The contract also contains options for the purchase of 40 additional units. Delivery of the first 10 units will be made in May 1984, with additional groups of 10 units to be delivered at six-week intervals.

The MSC oily water separators will be the standard Sigma S1-8 OWS (8 GPM size). These USCG/IMO-approved units are designed, manufactured and sold by Sigma around the world to commercial and government customers. Any approved bilge alarm can be used to monitor the S1-OWS effluent discharge of less than 15 ppm. The bilge alarm selected for the MSC unit is the BA-200 Oilarm as sup-

plied to Sigma by Biospherics, Inc. of Rockville, Md.

Sigma Treatment Systems specializes in shipboard pollution control equipment which includes oily water separators, sewage treatment systems and solid waste handling equipment.

Engineering and manufacturing are performed at the Chester Springs, Pa., facility, with sales and service representatives in the major marine localities of the world.

Sigma president **William F. Roberts** said: "The MSC contract represents the first significant production order for this type of equipment, and we are pleased that Sigma was selected." He also stated that Sigma has plans to offer this "MSC Package" to commercial customers, who can benefit in price and product confidence from the MSC production.

For free information on Sigma's "MSC Package" as well as literature on Sigma's range of oily water separators,

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Hampton Roads SNAME Reports On Ship Production Committee

The Hampton Roads Section of The Society of Naval Architects and Marine Engineers met recently at the Fisherman's Wharf Restaurant in Hampton, Va. The meeting featured a paper by **F. Baxter Barham Jr.** titled "The SNAME Ship Production Committee—An Overview." Section vice chairman **Robert L. Kelly** welcomed **Robert G. Mende**, SNAME national secretary and executive director, to the meeting.

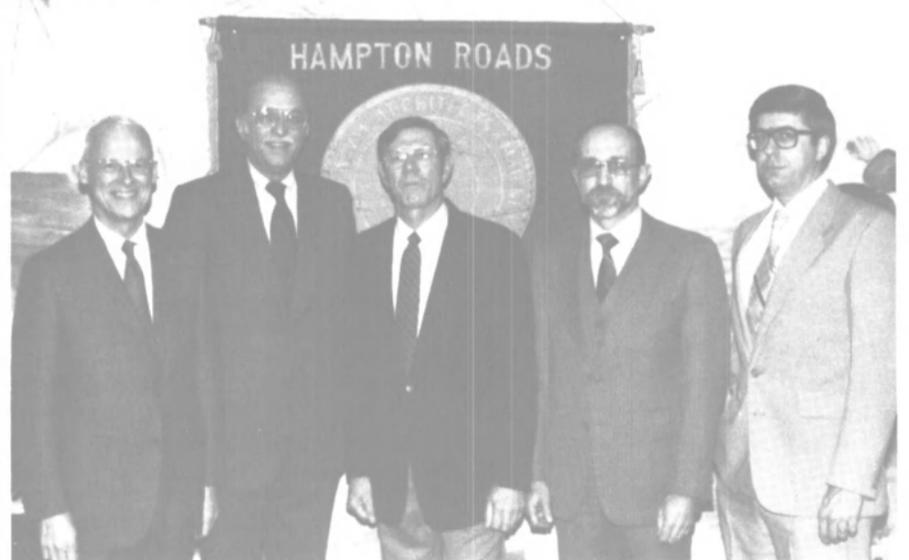
Mr. Barham is program manager for the Ship Production Committee Panel SP-4, Design/Production Integration, at Newport News Shipbuilding. He has represented NNS on a number of Navy and industry task groups dealing with integrated logistic support.

The presentation provided a brief history of the SPC and the Na-

tional Shipbuilding Research Program, noting the growing need for technical input to the program, and showed how the SPC is changing to meet evolving ship production research demands and opportunities. Particular attention was focused on the design-production integration program.

Mr. Barham, a member of SNAME since 1963, is a 1951 industrial engineering graduate of Virginia Polytechnic Institute, and has been with Newport News Shipbuilding since 1953.

Discussers of the paper included: **Louis D. Chirillo** of Todd Pacific Shipyards; **Ellsworth L. Peterson** of Peterson Builders; **Edwin J. Petersen** of Todd Pacific; and **Robert L. Kelly** of Newport News Shipbuilding.



In attendance at recent SNAME Hampton Roads Section meeting were (L to R): **Robert L. Kelly**, vice chairman; **Robert G. Mende**, national secretary and executive director; **F. Baxter Barham Jr.**, author; **William C. Ward Jr.**, secretary-treasurer; and **Samuel E. Bevins**, Technical Programs Committee chairman.

Simplex Wire Awarded \$16-Million Contract For Oceanographic Equipment

Simplex Wire and Cable Company, Newington, N.H., is being awarded a \$16,042,000 cost-plus-incentive-fee contract for oceanographic equipment. The Naval Electronic Systems Command, Washington, D.C., is the contracting activity.

Morris Guralnick Elects Richardson Vice President



Robert K. Richardson

Hubert E. Russell, president and chief executive officer of Morris Guralnick Associates, Inc., announced the election of Robert K. Richardson as vice president of the San Francisco-based firm of naval architects and marine engineers. Mr. Richardson has also assumed the duties of chief engineer, a post to which he was appointed by Mr. Russell recently. As chief engineer, his responsibilities include coordination of efforts of project managers and department chiefs as well as the firm's engineering staff on all projects undertaken by the company.

Robert K. Richardson joined MGA in 1979, and was soon appointed chief of the Hull Department, where he supervised naval architecture, structural design, and vessel arrangements. He also served as project manager on several assignments, both military and commercial, involving vessel and equipment design, engineering support, and maritime studies of various types.

Before joining MGA, Mr. Richardson served as an officer in the United States Coast Guard's Merchant Marine Technical Branch in New Orleans, where he reviewed ship designs and stability studies. Following that, he spent 12 years with Earl and Wright, Consulting Engineers of San Francisco, specializing in the design of offshore vessels and structures for the petroleum industry. He was also engaged by John J. McMullen Associates in Hamburg, Germany, where he was responsible for recommending present and future types of ship construction to a major European steamship company.

Mr. Richardson graduated with a B.S. degree from Webb Institute, New York City, in 1960, and received a master's degree in Engineering Science from the University of California at Berkeley in 1963. He holds memberships in the Society of Naval Architects

and Marine Engineers, American Society of Naval Engineers, and American Society of Civil Engineers.

In addition to headquarters in San Francisco, Morris Guralnick Associates, Inc., a leading firm in the naval architectural and engineering field, numbers associates and other offices in San Diego, Calif.; Charleston, S.C.; Pascagoula, Miss.; and Washington, D.C.

Carter Named National Director Sales/Marketing At Grant Manufacturing

Steven L. Carter has been named national director of sales and marketing for Grant Manufacturing & Alloying, Inc., of Souderston, Pa. Grant Manufacturing produces babbitt metal for turbine and marine engine repair. The

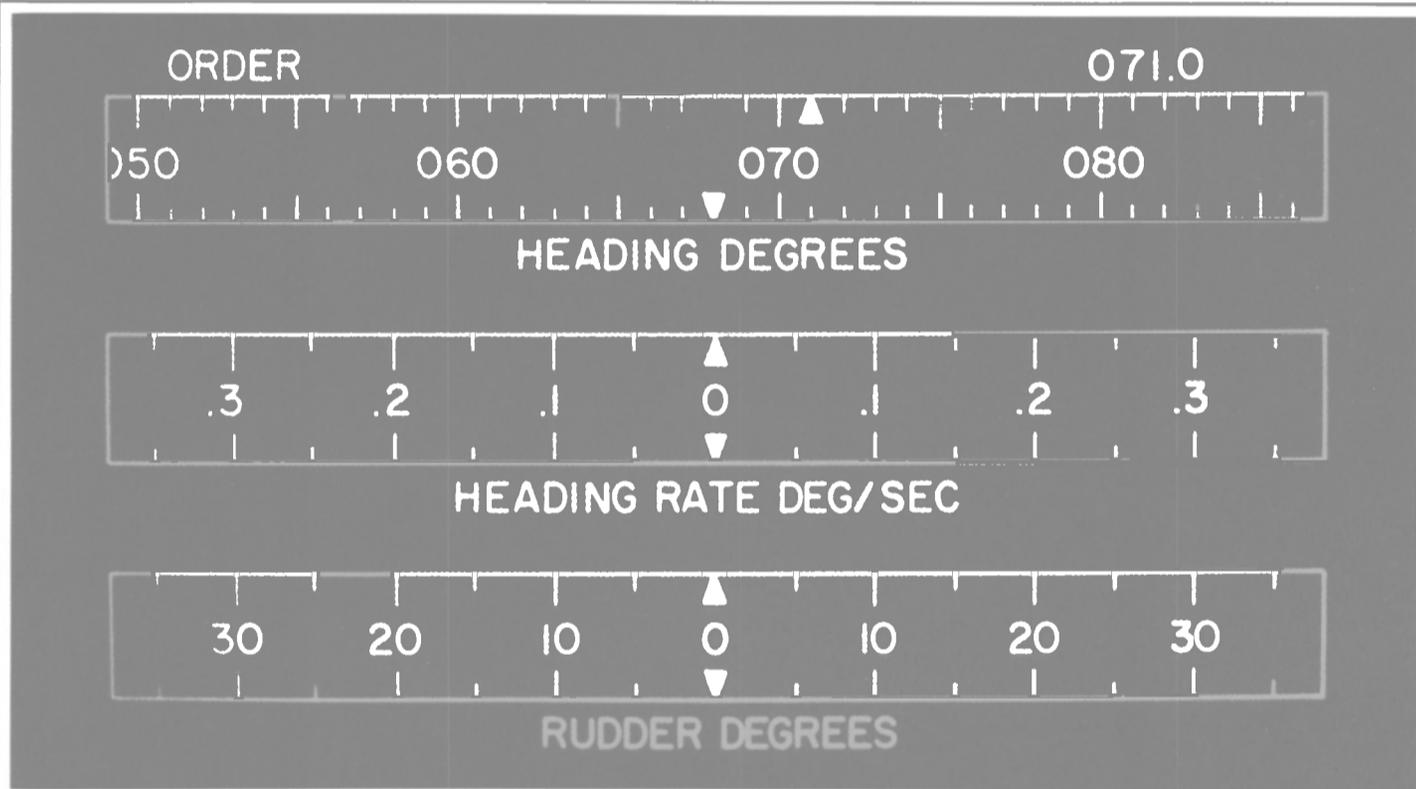
babbitt metal is produced to conform with USN specification QQ-T-390A. Grant is currently supplying bearing repair facilities throughout the U.S. and South America with babbitt metal and solder, and ballast lead.

For complete details on Grant Manufacturing babbitt metal for turbine and engine repair,

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SPERRY MARINE TECHNOLOGY:

'INTEGRATING TODAY



At Sperry, we know how important it is to listen. We've been listening to the marine industry around the world for over 70 years. As a result, we understand the challenges facing you today.

We understand the economic and competitive necessities to be ever more efficient, more cost effective, more profitable.

We understand the environmental and regulatory imperatives to sail cleanly and safely within tight, new operating parameters.

We understand that tomorrow these challenges will become even more formidable, more intense.

But most importantly, we understand the

advanced technologies required to develop the new systems your ships and fleets will need to meet these challenges successfully.

We understand because we've been listening.

**COMPUTERS AWEIGH!
A DECADE-PLUS
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Sperry developed the digital computer. And we've been a leader in developing computer-based systems for navigation, command and control ever since. We introduced the world's first family of computer-

based collision avoidance systems more than a decade ago. In their years at sea, these systems have proven themselves

in the only way that matters—helping merchant ships of every description pilot safely through the world's busiest harbors.

Moreover, our leadership in computer-based technology has proven itself versatile enough for a wide number of specialized applications—including cable



Top to bottom: Sperry Ship Control Display, Autopilot Keyboard, Radar Display, U.S. Coast Guard Medium Endurance Cutter.

Welded Beam Adds Custom Tee Shapes To Product Line

The ability to custom design and manufacture welded steel T-beams, in addition to conventional I- and H-beams, has recently been announced by Welded Beam Company, Perry, Ohio.

Among other applications, these new welded steel tee shapes are being offered in shipbuilding as

stiffeners for reinforcing bulkhead panels, decks, and hulls; railcar frame components; tank trailer circumferential rib stiffeners; and as flange members in open-web bar joists and trusses.

Initial production runs were made for consideration by Ingalls Shipbuilding Co., Pascagoula, Miss., and were witnessed by both Ingalls and U.S. Navy personnel. The 4x4x1/4 inch tees were fabricated from A710 nickel-bearing

HSLA steel and will be utilized as stiffeners in shipbuilding applications. Normal procedure had been to fabricate the tees from sheared and arc-welded plates. The HF welded beams eliminate this costly step.

The new welded T-beams, like the current line of I- and H-beams, are produced continuously from two coiled steel strips on a 500-foot-long welding mill at production speeds up to 200 FPM. The

mill employs high frequency (400 KHz) welding to produce forge-type welds with strengths equal to or greater than the parent material.

T-beams can be produced from a variety of materials, including A36, A710, and 80,000-psi yield HSLA steels. Sizes of tees can range from 3-inch to 12-inch stem heights, 3-inch to 6-inch flange widths, .090-inch to 1/4-inch thicknesses, and 7-foot to 40-foot lengths. Finished beams are cut to exact customer lengths on the fly to within ± 1/8-inch tolerance, eliminating waste and recut labor on site. And since the T-beams are fabricated from coiled strips, cross sections are flat and square, allowing easier fit-up in assembly.

The manufacturing process also allows the design engineer to specify the exact cross section to suit his particular loading requirements. For example, tees with offset or "noncentered" stems, thin stems to thick flanges, and even composites with flange and stem of two different steels are possible.

For further information and free literature on products and capabilities from the Welded Beam Company,

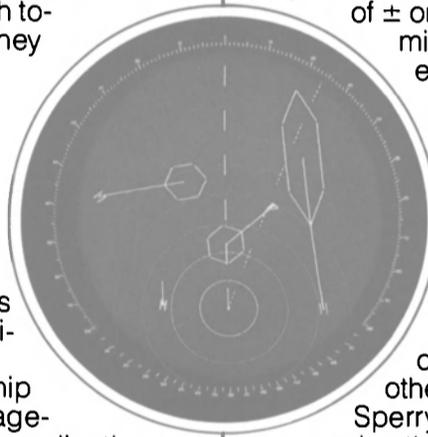
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WITH TOMORROW

and pipelaying, ocean-bottom surveying and undersea seismic research.

The step from collision avoidance to full ship control was a logical and easy one for Sperry technology. Today, Sperry ship control systems, like Sperry collision avoidance systems, are the most advanced in the world.

Microprocessor-based and widely adaptable, Sperry bridge systems are designed to integrate today with tomorrow. That is, they anticipate your need to have ever-increasing numbers of shipboard functions integrated and displayed at one central source. Functions ranging from navigation and communications to ship control and management. In all these applications, the value of Sperry marine technology on the bridge shows up clearly on the bottom line—in improved fuel economy and safety, and lower operating costs.



tems are continually evolving.

Take our development of baseband radar, for example. Simply stated, it's a breakthrough in sensing technology. A technology of the future.

The capability of baseband radar to provide sensing accuracy of ± one foot within a mile dramatically escalates Sperry's ability to provide a new generation of super-sensitive systems for precise offshore mooring and navigation in confined waterways.

Vessel traffic control is yet another area where Sperry technology is advancing the state-of-the-art, state-of-the-science and state-of-the-system.

Sperry's Vessel Traffic Systems (VTS) for harbor control incorporate advanced technology in computerization, communication, sensing, systems integration, command, control, display—and you name it. Once again, when you add it all up, vessel traffic surveillance is another area where Sperry systems promise big returns on the maritime industry's bottom line—in terms of port efficiency, safety and development.



you can be pretty certain it's proven itself with the world's navies.

For example, the same collision avoidance technology that goes into our commercial systems is helping U.S. Navy hydrofoils "fly" safely over the waves. And aboard the U.S. Coast Guard's new Medium Endurance Cutters, our integrated ship control systems put all information needed for effective command and decision-making at the watch officer's fingertips.

TECHNOLOGY BACKED BY TALENT, SYSTEMS SUPPORTED BY SERVICE.

The point is, when we apply a new technology or offer you a new system—no matter how advanced—it's been proven. And this can have a rewarding impact on your bottom line, too. That's because your ship doesn't risk being an expensive "test" bed for a "trial" case.

Sperry supports the shipping industry with more than 250 service facilities worldwide. And when you arrive at a Sperry port, you'll find skilled personnel ready to provide you with total service support.

Listening, a simple idea that's taken us a long, long way. It can do the same for you and your ships.

Write to Sperry Corporation, Electronic Systems, Great Neck, NY 11020. Attention: Marketing Department.



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NAVIGATING THE FUTURE: NEW TECHNOLOGIES AND NEW SYSTEMS.

Besides Sperry's expertise in adapting and advancing marine technologies from one system application to another, new Sperry technologies and sys-



WHAT ELSE IS NEW AT SPERRY? ASK THE NAVY.

Before any Sperry marine technology ever reaches the commercial maritime industry,

Top to bottom: Ship Control Helm Unit, Collision Avoidance Display, Control Room aboard Coast Guard Cutter.

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Circle 244 on Reader Service Card

Ed Toale Named Vice President-Sales Of Bailey Distributors

Bailey Distributors, Inc., a leading name in the refrigeration and air-conditioning fields has appointed Ed Toale to the position of vice president of sales.



Ed Toale

Mr. Toale joined Bailey as sales engineer in 1977. His previous experience included 21 years in sales and purchasing in the marine field.

Sigurd Nilsen, president of Bailey Distributors, Inc., stated that he "will be responsible for coordinating sales and sales personnel at Bailey Distributors, Brooklyn, N. Y., and Avenel, N.J."

Bailey supplies, inventories and services a full range of major manufacturers' refrigerator and air-conditioning systems, water coolers, ice cubers, beverage units and related products for vessels of all sizes.

For more information and free literature on Bailey's products and services,

Circle 73 on Reader Service Card

SURVIVAL AT SEA



The occasional sinking of ships and capsizing of offshore structures, especially in hostile, frigid environments, are reminders that the perils of the sea are still with us. In many of these disasters, official investigations have found that hypothermia (low body heat) was the primary contributing cause of death for some of the victims, who might have been saved if they had been wearing protective exposure suits when they were in the icy waters.

On February 7, 1984, the U.S. Coast Guard published a final Rule in the Federal Register that will require offshore drilling rigs and certain other vessels operating in frigid waters off the outer continental shelf of the United States to carry survival suits for workers to wear if they are forced to abandon the platforms because of an accident. This Rule becomes effective 180 days after the publication date.

The ME/EN editors asked manufacturers and suppliers of shipboard safety and survival equipment to tell us about their latest developments in products and services. The review that follows is based on the replies that had been received up to press time.

FOR MORE INFORMATION

If you wish to receive additional information on any of the products described in the following review, please circle the appropriate (immediately after the company name) number(s) on the Reader Service Card in the back of this issue. If you wish to receive information from *all* of the manufacturers and suppliers of safety and survival equipment included in this review,

Circle 30 on Reader Service Card

ALASKA DIESEL ELECTRIC

Circle 31 on Reader Service Card

Suitable for use as emergency fire-fighting equipment, Alaska Diesel Electric, Inc. markets the Northern Lights® EP-41 portable

gasoline-powered pump. With a dry weight of only 18¾ pounds and rubber-gripped, balanced carrying point, the unit is easy to tote to an emergency site. CDI ignition gives quick starts and reduces maintenance by eliminating contact points.

The EP-41's advanced engineering combines heavy-duty features with light-weight materials. The cast aluminum engine block of the 2.2-hp, air-cooled engine is heavily gusseted for strength, and has an integral cylinder liner of hardened steel. Cooling fins and a crankshaft-mounted fan efficiently dissipate heat.

The die-cast aluminum pump housing saves weight and stops corrosion. An open type impeller insures smooth operation even in muddy water.

Optional equipment available includes: kit with 10-foot suction hose, 25-foot discharge hose, nozzle, and fitting; kit with 25-foot suction hose, 25-foot discharge hose, nozzle, and fitting; and an adjustable hose nozzle, 1½-inch Lexan, fog to straight steam. The pump can deliver 80 gpm at 59 spi.

ANSUL FIRE PROTECTION

Circle 32 on Reader Service Card

Ansul Fire Protection is a division of Wormald U.S., Inc., part of the Wormald International Limited Group of companies. Ansul is a manufacturer of quality fire protection products and systems that are marketed through a network of more than 500 independent, authorized Ansul distributors throughout the world. Ansul also develops, manufactures, and supplies fire protection equipment to Wormald group companies worldwide.

Among the marine fire protection equipment and systems offered by Ansul are Halon 1301, carbon dioxide, twin-agent hand hose line, and Ansulite AFFF (Aqueous Film-Forming Foam) fire suppression systems, as well as smoke detection systems.

Ansul offers Halon 1301 fire suppression systems comprised of certain hardware and software elements that are designed and organized to provide a total integrated system. The Halon 1301 system can generally be divided into the following subsystems: Halon 1301 agent and agent storage modules; system operation and control; agent distribution; and technical documentation. These systems are designed in accordance with the National Fire Protection Association Standard 12A, "Standard for Halogenated Extinguishing Agent Systems," and listed by Underwriters Laboratories.

Ansul also offers Halon system designs in accordance with marine and offshore regulatory agencies such as the U.S. Coast Guard,

American Bureau of Shipping, Lloyd's Register of Shipping, Det Norske Veritas, U.K. Department of Energy, U.S. Geological Survey, International Maritime Organization, and the Norwegian Maritime Directorate.

The Ansul high-pressure carbon dioxide fire suppression system is designed for central storage of the agent as a liquid in pressurized cylinders. The cylinder valve re-

leases the CO₂ into fixed piping, terminated with specially designed discharge nozzles in the protected space. Several types of manual and automatic controls are available for actuation of the system. These CO₂ systems are also designed to meet the rules and regulations and all the agencies mentioned above for the Halon systems.

Twin-agent fire protection refers

to the "twin-attack" capabilities of dry chemical and foam fire-extinguishing agents. These Ansul systems consist of separate 'Purple-K' agent and Ansulite AFFF agent storage tanks, nitrogen cylinders to pressurize the tanks and expel the agents, hose lines to deliver the agents to the twinned nozzle assembly, and manual and/or pneumatic actuation devices.

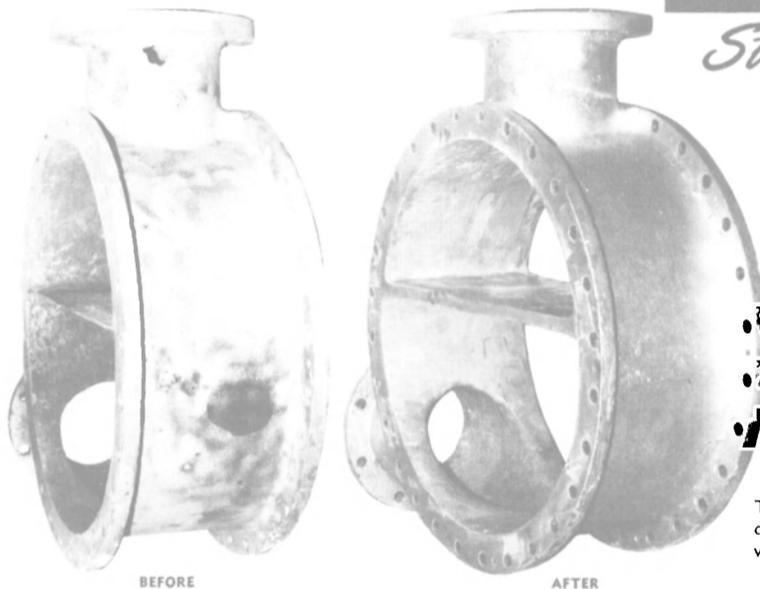
(continued on page 24)

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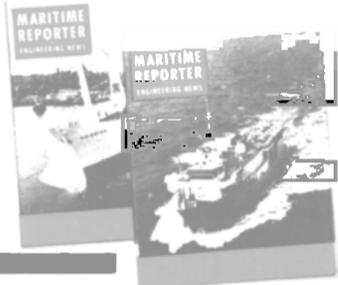
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Survival At Sea

(continued from page 23)

ARMTEC INDUSTRIES

Circle 33 on Reader Service Card

The Omniguard® Series 435/436 U/V fire detection system manufactured by Armtec Industries is designed for applications where shock and vibration are likely to occur. Wherever gases, vapors, or dust may exist in quantities sufficient to produce a flash fire, the U/V detection system has a clear-cut advantage over other types of detectors due to its speed of response. The fire detectors are explosion-proof per MIL-STD-810, and watertight per MIL-STD-108. Units are also qualified to MIL-STD-167 and MIS-S-901.

False alarms are minimized by the detector's insensitivity to black body radiation. Typical applications for the Omniguard Series 435/436 fire detection system are main propulsion systems, engine-driven auxiliaries, fuel storage, flammable gas storage, munitions, and cargo storage areas.

AUTOCATOR CONTROLS

Circle 34 on Reader Service Card

Autocator Controls' fire-detection system is entirely air-operated, using the ship's normal air supply or other available air supply. It is said to be the only pneumatic system that conforms to U.S. Coast Guard regulations (NVC 1-78, 46 CFR 161.002-4) and is listed by Underwriters Laboratories.

The pneumatic system provides the same sensitivity and instantaneous response provided by electric systems, but without the high maintenance characteristics of electrically operated equipment. The absence of switches, relays, and wiring eliminates electrical trouble-shooting and the periodic replacement of electrical components.

The Autocator system consists of a pressurized air line, which can be any length and which can accommodate any number of thermal sensors and zones needed for optimum protection. There are no standby batteries, chargers, regulators, power transfers, or other electrical equipment needed. The Autocator backup system automatically maintains enough air in an emergency tank to sound the alarm continuously for 45 minutes if the air supply fails.

Autocator's thermal sensors provide positive and accurate response to within two degrees of pre-selected temperature. When the critical temperature is reached, air escapes and the resulting pressure loss triggers the alarm. These special sensors, developed after more than two years of intensive research, are made to rigid quality control standards.

Maritime Reporter/Engineering News

Pneumatic logic, on which the system is based, has long been recognized for its positive action and easy maintenance, even in the most hostile and hazardous environments. There are no exotic electronic components or circuitry, only simple valves and tubing with on-line connections, familiar to marine engineers. A typical Autocator fire detection system controller incorporates separate indicators for engine room and auxiliary areas, with test and alarm silence controls for each, and a fire loop reset. Also built into the system's pneumatic logic is continuous self-monitoring. Every Autocator system is tested by "System Simulation" before delivery and tested under actual operating conditions after installation.

BEAUFORT AIR-SEA

Circle 35 on Reader Service Card

Beaufort Air-Sea Equipment Canada Ltd. is one of the world's leading manufacturers of survival equipment. During the past 40 years, the company has developed and manufactured a diverse range of equipment, now in worldwide use by some 300 shipping companies and 45 navies.

Beaufort manufacturing plants are located in the U.K., Canada, and Australia, and sales are supported by 250 government-approved service centers throughout the world. The firm's liferafts carry the approval of all major maritime nations, with the latest addition to this list of approvals being the United States.

A new range of liferafts are manufactured using two-ply nylon butyl coated fabric. This fabric possesses outstanding tensile and tear strength and carries a five-year warranty, with annual service carried out at an approved Beaufort service center. Traditional rubber-coated fabrics carry only a one-year warranty.

In addition to the standard throwover type liferafts, Beaufort manufactures davit-launched rafts. This model, designed and approved for deck davit launching, also has the advantage of being used if necessary as a conventional throwover raft. This dual-purpose liferaft is said to be ideal for existing offshore rig applications, and will comply with future intended changes.

BRIT-AM

Circle 36 on Reader Service Card

BRIT-AM Venture Marketing Ltd. supplies a fire-resistant lining board known as Ultra-Board that helps minimize the risk of ship fires spreading. The non-combustible board is 100 percent asbestos-free, and is suitable for lining bulkheads, accommodation spaces, and especially for use in engine rooms.

Ultra-Board is also moisture-re-

sistant, and is said to be easy to work with and install. The multi-purpose board is totally machinable, and suitable for drilling, nailing, stamping, bonding, and sanding. It does not shatter or break like asbestos board or other conventional products.

BRIT-AM says the economical new board is a cost-effective replacement for traditional asbestos lining, exceeding its durability and fire resistance while eliminating

the health hazards that the use of asbestos lining presents.

Ultra-Board is composed of cement, bonded with cellulose and other organic fibers to provide added strength. It is available in convenient sizes, in four thicknesses.

DU PONT

Circle 37 on Reader Service Card

No other hazard threatens the

loss of life aboard ship more than fire. That reality is a key reason for the marine industry's growing interest in fire systems that use Du Pont's Halon 1301 as the extinguishing agent. No other fire-extinguishing system stops fire faster than Halon 1301, which extinguishes fast-spreading flammable liquid fires in seconds.

Halon 1301 is a colorless, odorless, electrically non-conductive (continued on page 28)

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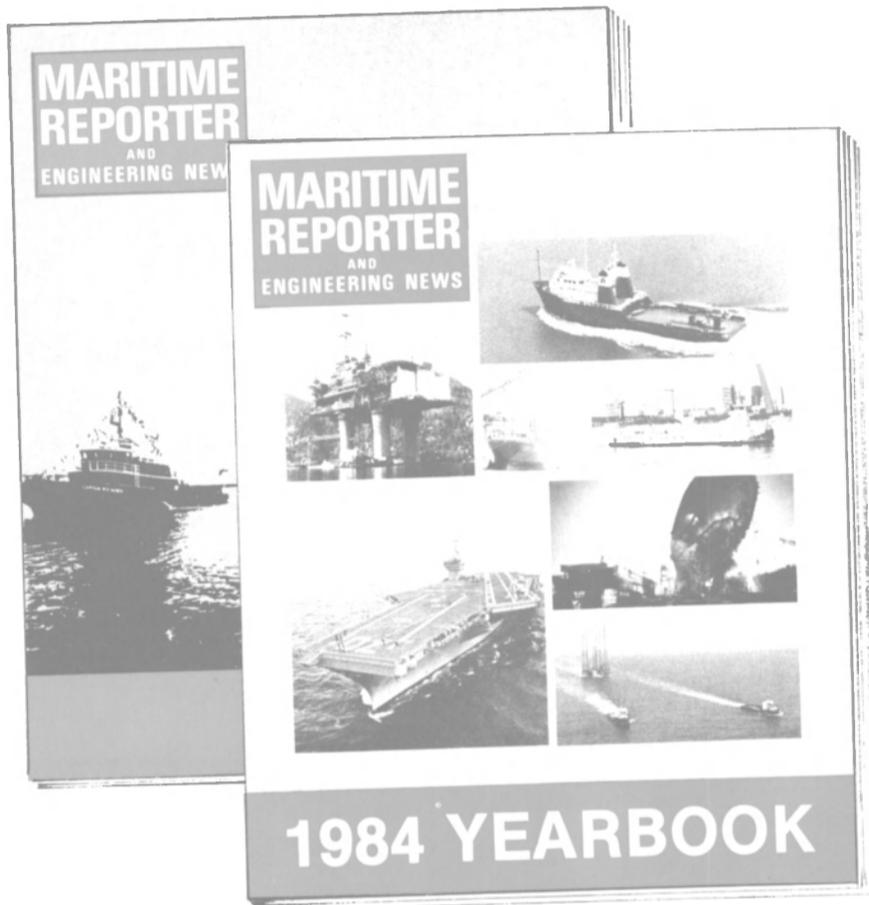
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Survival At Sea

(continued from page 25)

vapor that puts out fire differently than any other extinguishing agent. Most other extinguishants—carbon dioxide, water, or foam—work physically. They attack fire by smothering, cooling, or separating fuel from oxygen.

Halon 1301 works chemically to halt fire. It actually stops the combustion process itself—breaks the chain reactions that propagate from one fuel molecule to another. That's why Halon 1301 puts out fire faster, and it prevents rekindling or reflash as long as the initial concentration of Halon in the area's atmosphere is maintained. Furthermore, the Du Pont product is low in toxicity, does no damage to property, and leaves no residue behind to clean up. Nor does it rob oxygen from the air; trapped or injured personnel can depend on lifesaving minutes or breathable atmosphere for evacuation or rescue.

Today, Halon 1301 systems offer an unchallenged level of life safety to crews and shipyard workers in pump rooms, turbine rooms, machinery spaces, and electrical and electronic equipment areas aboard ship.

GAYLORD INDUSTRIES

Circle 38 on Reader Service Card

The submarine is the ultimate testing ground for components that make up a galley ventilation system. Though important in any situation, the quality of the air leaving the galley area of a submarine, which has 100-percent air recirculation, is a critical factor.

The ventilator must be capable of removing 95 percent of the grease from the air rising above the cooking surface. The air must be thoroughly cleansed of grease, smoke, and odor, and also be cooled and dehumidified. Following grease extraction tests by the U.S. Bureau of Standards, the Gaylord galley ventilator was found to meet the stringent requirements for use on the U.S. Navy submarine fleet.

This same high level of grease extraction that is maintained out of necessity in a submarine galley is standard in all commercial models of the Gaylord ventilator. With its integral fire protection system, the ventilator offers a safe and efficient solution to the problems unique to marine applications.

Gaylord Industries is one of the world's leading manufacturers of commercial galley exhaust systems. The company's equipment has been standard on U.S. Navy vessels since 1953. The ventilation systems have been designed for and installed in galleys on carriers, cargo ships, tankers, and cruise liners throughout the world.

HARVEY'S

Circle 39 on Reader Service Card

Survival time for an unprotected person immersed in extremely cold water is a matter of minutes. The exposure suit designed and manufactured by Harvey's Commercial Marine Division will provide at least 13 hours of protection from exposure to cold waters. Tested by the company's research and development department, the Harvey survival suit surpasses all technical specifications of the U.S. Coast Guard and Underwriters Laboratories[®], who have both tested and approved the suits.

The Harvey suit is constructed from 3/16-inch, nitrogen-expanded, closed-celled neoprene rubber. All components are manufactured in the U.S. The flotation is in the fabric; even while filled with water, the suit will not sink. It is one-piece construction, and only a small area of the face is exposed when the suit is worn.

The suit can be donned in less than one minute, and with practice the time can be reduced to 20 or 30 seconds. When the suit is unrolled from its weatherproof storage bag, the wearer simply climbs in and zips up, fully clothed. With the attached, standard flotation inflation ring, additional buoyancy is provided. A Firefly[®] strobe light, which may be placed in the hood, will provide night visibility for miles.

IMPERIAL

Circle 40 on Reader Service Card

Imperial Manufacturing Company's survival suits offer the two elements necessary for survival in cold water—flotation and insulation from hypothermia. Imperial suits can extend the survival time of victims of marine accidents and increase their odds for rescue.

The suit is designed for quick donning, even over the bulkiest work clothing. One size fits all, from 5'4" to 6'4" and up to 300 pounds.

Tests done by the U.S. Navy Clothing and Textile Research Unit indicate that survival times of 18 hours and more can be expected in temperatures of 35 F when worn over normal clothing. Normal survival time for victims not wearing survival suits in waters of that temperature is usually less than 30 minutes.

Imperial survival suits are made of closed-cell foam neoprene. The material is the flotation, not the air in the suit. So even if the suit is torn and filled with water, it will not sink. Neoprene is an excellent insulating material. The suit seals out cold and water while holding body heat inside. Even if the suit should be flooded, the water inside the zipped suit will warm and provide insulation from the cold outside. People have sur-

vived 13 hours in 34-F water and an additional 22 hours on land in frigid conditions while wearing Imperial survival suits.

WALTER KIDDE

Circle 41 on Reader Service Card

Walter Kidde marine fire protection systems include Halon 1301, dry chemical, carbon dioxide, and Lo-Ex and Hi-Ex foam concentrates. Kidde fire protection experts have the experience and technology to custom-tailor fire protection systems to meet each vessel's individual requirements.

On guard 24 hours a day, the Kidde smoke detection systems continuously monitor air samples within multiple zones of the vessel, to detect the presence of smoke and provide an early warning of a potential fire problem. Essentially, the system is comprised of three principal components: a smoke detection cabinet, a suction fan blower cabinet, and a repeater panel.

Using axial fans, the suction blower continuously samples air from each cargo hold or fire zone, passing the air through unique detection modules in the smoke detection cabinet. Air samples are continuously drawn from each zone and are inspected by a directed light beam. The presence of smoke in the viewing path of the light source causes the light to scatter and be seen by a photocell. Once the presence of smoke is detected in any zone, the appropriate announcement actions will occur to provide audible and visual warning of an impending danger.

As a result of its basic modular design, the system, when coupled to a carbon dioxide supply, can also provide a fast-acting, fire suppression capability. By incorporating a special three-way valve in each zone, CO₂ can be discharged through the "shared" detection discharge piping into the appropriate fire zone.

KOSAFE A/S

Circle 42 on Reader Service Card

Kosafe A/S of Norway, a member of the Kosmos Group, has developed a new horizontal revolving davit system called Debarko Safe[®] to provide safer emergency escape from offshore structures and vessels. The system is designed and manufactured to the rules and regulations of the Norwegian Maritime Directorate, which demand that a lifeboat must point away from the structure when reaching the water.

The lifeboat is boarded with the davit in the stowed position. Release and lowering are handled from the lifeboat by remote-control wire operation. The hydraulic lowering cylinder is operated by the dead weight of the system, generating power for the revolving cylinder. The cylinder stroke is controlled automatically by an inclinometer valve causing the davit to stop in a horizontal position.

The lowering of the lifeboat starts automatically before the outer frame is in position. At maximum speed, double centrifugal brakes are activated, and smooth lowering is insured by a hydraulic winch. The lifeboat is released from the lowering from within the boat. Lowering may be stopped with the lifeboat in any position by release of the remote control wire.

The hydraulic winch with its double drums, planetary gears, and hydraulic motors adds considerably to safety of the Debarko Safe system. For hoisting the lifeboat, the hydraulic motors are driven by a hydro-electric power pack.

LANE LIFEBOAT

Circle 43 on Reader Service Card

The origins of Lane Lifeboat go back more than a century, to 1863. Over the years lifeboat construction changed from wood to metal to fiberglass. Lane lifeboat, a division of Lane Marine Technology, Inc., is a pioneer in the construction of lifeboats of all fiberglass versus the metal and fiberglass combination.

In 1958 Lane built its first FRP lifeboat, which was placed aboard the USNS Patterson, an experimental gas-turbine-powered ship. When the Patterson was taken out of service, the lifeboat was turned over to the schoolship John Brown to be used in the training of students in the proper handling of lifesaving gear. From the John Brown it found its final resting place at the South Street Seaport Museum in Lower Manhattan.

Lane currently has under construction one of the largest fiberglass lifeboats ever built in the U.S. It is a diesel-propelled boat 37 feet long with a beam of 12 feet 6 inches.

Lane maintains complete facilities in Brooklyn, N.Y., for the construction, repair, and reconstruction of any lifeboat of fiberglass, steel, or wood. Boats are built and repaired according to the standards and requirements of the U.S. Coast Guard and Navy, the American Bureau of Shipping, Lloyd's Register of Shipping, and the maritime and naval arms of many foreign governments. Customers include most major oil companies and commercial cargo carriers.

MARINE SAFETY EQUIPMENT

Circle 44 on Reader Service Card

Since its inception in 1945, Marine Safety Equipment Corporation (MASECO) has been one of the largest manufacturers of U.S. Coast Guard approved lifeboats, davits, and winches for the marine and offshore industry. Over the years, MASECO has worked to provide tough, reliable equipment to meet the strictest standards.

Following in this tradition, MASECO has introduced to the American market the David Still line of

rigid hull, inflatable rescue boats. These superior inflatables have long been recognized as one of Europe's premier fast rescue boats. MASECO will now build them in the U.S. under license from Watercraft Ltd. of England.

In addition to its manufacturing capabilities, MASECO also serves as an authorized distributor for a wide variety of other marine life-saving products. These include sales and service of Switlik, B.F. Goodrich, Givens, RFD, Avon, Zodiac, and other inflatable liferafts. The company also offers a complete range of survival suits and life preservers, as well as EPIRBs, strobes, and other distress signaling devices.

In short, MASECO has the ability to provide a complete package of lifesaving equipment, from lifeboats and davits down to lifejackets and flares.

NELSON ELECTRIC

Circle 45 on Reader Service Card

Nelson Electric's Construction Products Division (CPD) recently introduced a new non-mechanical, fire-stop product called Flameseal™. Listed by Underwriters Laboratories, Flameseal is a pre-mixed putty that completely fills wall and floor openings to prevent spread of fire, smoke, and toxic gases through cable, pipe, and conduit runs. When exposed to heat, the intumescent product expands to provide a positive seal long after cable jackets have disintegrated.

GPD also markets a line of specialty products for marine, industrial, and commercial applications. These include cast aluminum enclosures for housing electrical controls in hazardous environments, penetration seals for electrical cables and conduits, and electrical resistance heating cables and control systems.

Nelson's Power Distribution Products Division manufactures load break oil switches and related products. These switches are suitable for a variety of switching functions, including making and breaking load currents, sectionalizing load switching capacitors, and disconnecting transformers. They are available with fault close ratings up to 64 ka, and continuous current ratings up to 1,200 amps. Nelson can provide a variety of designs including low profile, padmounted, and submersible models. Integral switch-fuse combinations and automatic transfer schemes are also offered.

PUSNES

Circle 46 on Reader Service Card

PUDES is a special type of flexible transfer and dry evacuation system developed by A/S Pusnes' Marine and Offshore Services of Norway to provide quick and safe evacuation of personnel from offshore drill rigs or platforms to any type of rescue vessel. The gang-

way can extend to a normal working radius of up to about 270 feet when at a height of almost 100 feet above the receiving craft. The unit is designed to accept an average wave height of 23 feet; the relative motion between the rescue vessel such as a supply boat and the fixed point is absorbed through the entire flexible length of the gangway, thus avoiding rapid movement that can be expected in

a rigid gangway. The rescue vessel can rotate within the confines of the structure or, in case of a corner location, this amounts to a 240-degree sector.

Evacuation is dry and continuous, avoiding the cyclic waiting periods that occur when using a crane-operated basket or helicopter. The flexible gangway is powered by an independent, self-contained, diesel/hydraulic power pack.

The receiving vessel requires only a small deck area and means of attaching the end of the gangway. This PUDES system was designed to meet 99 percent of the North Sea environment, and can be used for both routine and emergency transfer of personnel.

A/S Pusnes is represented in the U.S. by EMMI Corporation of Flemington, N.J.

(continued on page 30)

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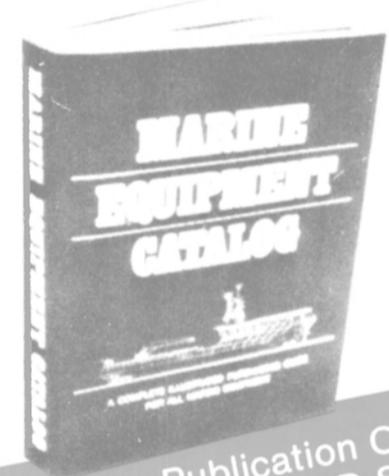
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Circle 157 on Reader Service Card

Survival At Sea

(continued from page 29)

PYROTRONICS

Circle 47 on Reader Service Card

A new voice alarm system that provides remote telephone communication, alarm annunciation, paging modules, and full supervision has been introduced by Pyrotronics, a Division of Baker Industries, Inc.

The emergency voice/alarm system is UL listed and provides one-way emergency voice paging. It features audible evacuation and alert signals, and a two-way firefighter's or warden's station telephone communication. Voice paging and evacuation signal sections may be configured to provide alarm or evacuation simultaneously throughout the entire installation, or on a selective speaker zone basis.

The telephone system offers a reliable, independent communication link between the fire command console and each telephone station. The system is fully supervised, modular in form, color-coded for easy recognition of each section, and functionally flexible. It is designed to interface with all UL-listed fire alarm control panels.

RFD

Circle 48 on Reader Service Card

RFD Ltd. has just introduced the Surviva liferaft range, the first to be specifically designed to comply with the 1983 revisions to the International Safety of Life at Sea Convention (SOLAS), which will be going into force shortly. Chapter III of the Convention, dealing with lifesaving equipment, has been almost completely rewritten. As a consequence, the Surviva liferaft features a number of significant technical advances that give it greater strength, better stability, better protection for the occupants, and longer life.

The result is a liferaft that is not only safer and more reliable, but also said to be the most cost-effective available. Its introduction confirms RFD's position as one of the world's leading manufacturers of inflatable safety and survival equipment.

Strength and durability are among the most important qualities for an inflatable liferaft. For the Surviva raft, RFD has developed a new material more hardwearing and robust than any previously used in liferaft production. This material not only increases the hardness of the Surviva raft, it also reduces to a minimum the amount of repair work required at mandatory service inspections.

Improved liferaft stability is something that the new SOLAS regulations specifically call for. It has been shown that a liferaft can

be particularly vulnerable to the wind immediately after inflation, before the occupants have boarded. The Surviva raft solves this problem with newly designed and more efficient water pockets attached beneath the buoyancy chamber. These new pockets are shaped and weighted in such a way that they fill almost immediately, keeping the raft under control while the survivors are getting aboard.

Once the Surviva is occupied, good stability is maintained by the sea anchor, or drogue, which again is of a new and more efficient design. Previously, certain drogues had shown a tendency to become entangled in their own shrouds as a result of the uneven tugging action of the liferaft, thereby losing most of their effectiveness. The Surviva's drogue incorporates a line sewn around the shroud lines at the forward end that prevents this from occurring.

The Surviva liferaft features a new lower-profile canopy design, the overall configuration of which gives improved performance in strong winds, and adds still further to improved stability. The canopy is opened and closed by means of a drawstring at its bottom edge, which can be pulled tight over the upper buoyancy tube. This arrangement results in a large opening, allowing for easier evacuation of the raft, but when closed provides a tight and secure haven for the occupants.

Other important features of the new raft include an inflatable ramp; a ladder and internal handholds to ease climbing aboard from the water; a new RFD drycell battery and light that is more reliable, longer lasting, and requires virtually no maintenance; and a stronger container, designed to give better protection to the raft when dropped into the water. The Surviva liferaft is available in a full range of sizes, with capacities from four to 25 persons.

RFD products are backed up by an extensive service network of more than 250 approved facilities throughout the world.

RTC

Circle 49 on Reader Service Card

Research & Trading Corporation (RTC) has developed a specific ladder-climbing assist, ladder-climbing protection, retracting lifeline, and emergency egress systems that will help solve many fall protection problems, as well as providing a continuity of worker protection.

RTC's climbing protection and lifeline systems provide freedom of movement while working; resist effects of salt air and chemically corrosive environments; have reliable, instant locking, minimizing free-fall distance; are designed to eliminate slack cable hazards; use body belts meeting ANSI and CSA Standards; and provide a wide range of cable lengths to meet specific applications.

The company's controlled-descent systems do not require any specific guide-cable angle for emergency egress; allow choice of three constant descent speeds; resist effects of salt air and chemically corrosive environments; provide a wide range of cable lengths; keep cable tensioned with spring-loaded drum; and may be used as ladder climbing systems.

SCHAT DAVIT

Circle 50 on Reader Service Card

The Schat Davit Corporation is the U.S. portion of the Schat Group of companies, an international leader in lifting and transfer at sea. The launching and handling components of survival systems are designed and manufactured to meet all regulatory agency requirements worldwide, with the American company concentrating on U.S. Coast Guard and Navy specifications.

Davits for launching of various size lifeboats, both open and enclosed (survival craft), are available. These davits include the Schat type B winches, featuring totally enclosed gearing, centrifugal and "deadman" brakes, and hollow pinion design for compact size and dependable operation. The Schat single-pivot gravity davit combines increased efficiency with simplification of mechanism, and is offered in various arrangements to fit ship layout and boats to be handled.

The Schat Miranda davit system is a recent development utilizing fixed arms and movable cradle. It provides the following advantages: boarding of boat in the stowed position and launch in one continuous operation; launch under adverse conditions of 30 degrees list and 15 degrees trim; launch and recovery with ship under way up to 8 knots; davit arms fixed—no moving parts other than sheaves; and boat will float free from davits when cradle is submerged.

Other davits and winches are available with wave compensation devices and means for self-tensioning and rendering of falls. These systems are particularly adaptable in handling rescue boats where quick retrieval of the boats in high-sea conditions is a requirement.

In addition to boat-handling davits, Schat provides liferaft davits for handling 20- and 25-person inflatable rafts. Many of these davits have been supplied for passenger vessels and drilling rigs worldwide.

STEARNS MANUFACTURING

Circle 51 on Reader Service Card

Because staying alive often requires more than just staying afloat, Stearns manufactures its Core-Guard[®] line of industrial hypothermia protection products. From its full line of industrial vests to a complete survival suit,

all Stearns items offer EHP—Extended Hypothermia Protection[®]. Products are tested and approved by Stearns Research and Development, the U.S. Coast Guard, and the Hypothermia-Water Safety Institute at the University of Minnesota.

Stearns work vests are designed for the worker who does not want bulk. They are constructed of a soft, flexible Ensolite[®] PVC foam that will move when and where the wearer moves. This foam does not rot, mildew, or become waterlogged, and it provides confidence to the wearer.

For total flotation and warmth, Stearns offers its model IFS-580, a constant wear work suit. This suit is designed to protect the vital heat-loss areas of the body, increasing survival time from minutes to hours. The suit is U.S. Coast Guard approved as a Type V PFD, and also as a Type III PFD for recreational activity.

A step up from the IFS-580 is the IFS-583, made with Nomex[®] flame-resistant fabric. This suit features the same full-flotation Ensolite PVC foam, plus the safety of flame-retardant material. Both suits provide ample pockets for tools or survival equipment.

For cold-water immersion, the Stearns ISS-590 survival suit is made of the finest closed-cell neoprene available, with stretch nylon on both sides. This suit has an airtight, waterproof front zipper. The fit of the suit is sufficiently loose throughout to allow room for donning over normal work clothing and shoes.

The ISS-590 suit is U.S. Coast Guard approved; model ISS-592 is approved by both the U.S. and Canadian Coast Guards.

UEDA IRON WORKS

Circle 52 on Reader Service Card

UEDA Iron Works Company of Japan has developed an automatic synchronizing davit that has proved successful on more than 100 patrol boats of the Japan Maritime Safety Agency, which has given UEDA an official commendation.

The system has a fully automatic synchronizing device that absorbs the difference between the wave and the hoisting wire length. Designed to maintain tension on the hoisting wire against the oscillation of the vessel, the system is capable of operating in winds of almost 40 knots, wave heights of 16.4 feet, and a 15-degree list of the vessel.

UEDA Iron Works is represented in the U.S. by Matsui Corporation of Los Angeles.

VIKING LIFE-SAVING

Circle 53 on Reader Service Card

Viking Life-Saving Equipment (America), Inc. recently announced that it has become the first foreign liferaft manufacturer to become U.S. Coast Guard-approved. After a 7-year waiting pe-

riod and much effort, both the Viking davit-launchable and the regular throw-overboard rafts now have USCG approval and are readily available in the U.S.

In addition to the 20- and 25-person liferafts that were available in the past, Viking now offers 12- and 16-person davit-launchable rafts, designed primarily for the smaller oil rigs and smaller cargo vessels that would not necessarily require the larger capacity rafts. Viking conventional throw-overboard type liferafts are available with capacities from four to 25 persons.

Viking (America)s parent company is Viking-A/S Nordisk Gummibaadsfabrik located in Esbjerg, Denmark's major West Coast port. A private company founded in 1960, Viking A/S has specialized in the production of life-saving equipment for the marine and aviation industries. The company's range of products includes automatic inflatable liferafts, fiberglass-reinforced lifeboats (open and totally enclosed versions), lifejackets, and other life-saving appliances. Viking products are recognized and approved by most of the national shipping authorities and classification societies worldwide.

To provide comprehensive service backup for the Viking products, subsidiary companies have been established in England, Netherlands, Norway, Singapore, and the U.S. In addition to the network of sales agents, there are 155 approved Viking servicing stations in major ports around the world; 22 of these are in the U.S.

Editor's note—Much of the marine survival and safety equipment purchased in the U.S. is marketed by manufacturers' representatives and authorized distributors. Among this type of firm that replied to our survey were those listed below. To receive information from these companies, circle the associated number on the Reader Service Card.

Alexander Industries
New Orleans and Houston
Circle 23 on Reader Service Card

Brailsford Associates
Ipswich, Mass.
Circle 24 on Reader Service Card

Coast Marine & Industrial Supply
San Francisco
Circle 25 on Reader Service Card

Datrex Inc.
Miami, Fla.
Circle 26 on Reader Service Card

EMMI Corporation
Flemington, N.J.
Circle 27 on Reader Service Card

Matsui Corporation
Los Angeles
Circle 28 on Reader Service Card

Uniroyal Delta Fender Systems Protect Pier And Ships At NORSHIPCO

By retrofitting its largest pier with a dual-mounted fender system, NORSHIPCO, Norfolk, Va., can easily work on ship sides more than 1,200 feet long without damaging or marking either the ship or the pier. The marine fendering system, called Delta, designed by Uniroyal, Inc., and installed by NORSHIPCO, satisfies high energy absorption and long life requirements.

George Curtis, NORSHIPCO vice president, Facilities Engineering, explained: "We needed a fendering system that could retrofit onto our existing pier and pilings. It had to withstand very high impact and pressure loads."

Uniroyal fendering specialists, working closely with Seaport Supply engineers, recommended Model 28A dual-mounted Delta fenders which provide double the energy absorption capability of single Delta modules without increasing the reaction force on the pier. This self-supporting, self-contained system, consisting of eight fender assemblies, was installed at the pier site in a period of less than six months.

The dual mount design enables complete access to a ship's hull because the fender modules have a 48-inch stand-off from the pier. "The fenders have provided the necessary protection to both the over-hauled ships and the pier," said Mr. Curtis.

The 12 dual-mounted Delta A fenders used at NORSHIPCO can service ships which have a displacement tonnage of 50,000 to 58,000 tons. The Delta dual-mounted fender provides an excellent Reaction to Energy (R/E Factor) of only .70. As a result, any fender pressure on the hull of a ship which has that displacement tonnage normally will not cause surface damage to the ship.

Each 12-1/3-foot-long fender assembly, consisting of three Model 28A dual-mounted Delta fenders, has an energy absorption rating of 458 kips/foot and can withstand a load of 31.5 kips/foot. The fenders are extremely flexible and will deflect more than 24 inches without permanently damaging or altering the Delta fender shape.

Uniroyal, Inc. manufactures the Model 28A Delta fenders used at the NORSHIPCO pier from a specially developed EPDM/butyl compound that combines butyl's excellent damping capabilities with EPDM's superior heat and weathering properties.

The Delta dual-mounted fenders consist of two single Delta fender modules, each two feet long and 3 1/4 inches wide. These two modules are bolted together with a 19-inch-long, 1 1/4-inch-diameter threaded steel rod.

The three dual-mounted fenders

used in each assembly are covered with 12-1/3-foot-long spaced-timber facings that evenly distribute a ship's load against the fender assembly.

For free literature on Uniroyal's Delta fendering system,

Circle 60 on Reader Service Card

Clow/Greenberg Offers Brochure On Bronze Valves And Fittings

The Marine Valve Division of Clow/Greenberg Valve Products, Carona, Calif., has available a free 24-page catalog containing detailed information on the major valves and fittings the company manufactures. All Clow/Greenberg valves and fittings are manufactured in accordance with military quality control specification MIL-1-45208A.

The brochure describes, with drawings and tables of specifications, globe, angle, check, gate, and hose valves. It also contains details on Macomb strainers, voice tube fittings, fueling spools, flanges, handwheels, and hub blanks, as well as a reference list.

The company dates back to 1854 when Morris Greenberg, newly migrated to California from his native Paris, opened his own foundry in San Francisco. From this humble beginning, the business prospered, and he manufactured nozzles for hydraulic mining and bronze spikes for sailing ships. One of Greenberg's most well-known products was the "California Type" fire hydrant that Morris Greenberg developed and manufactured with the aid of the San Francisco Fire Chief.

For a free copy of the Clow/Greenberg catalog,

Circle 78 on Reader Service Card

IBM Awarded \$25-Million Navy Contract For Sonar Conversion Kits

International Business Machines Corporation, Manassas, Va., is being awarded a \$25,441,817 letter contract for 18 AN/BQQ-5 sonar conversion kits. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

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Three Navy Patrol Boats Delivered By Swiftships

The Morgan City, La., yard of Swiftships, Inc. recently delivered to the U.S. Navy three 65-foot, all-aluminum patrol vessels. These boats were then presented by the Naval Sea Systems Command representative to the Governments of Antigua, Dominica, and St. Lucia for service in those West Indies nations.

Lt. Com. **Wayne K. Gibson**, U.S. Coast Guard liaison officer, Military Liaison Office Barbados, and coordinator for the project Technical Assistance Field Team, explained that he and his nine Coast Guard personnel would accompany the 18 West Indies personnel to their appointed destinations, acting in an advisory capacity on the trip. The West Indies crews spent four weeks at the shipyard training as part of the contract. The Morgan City yard has accommodations for 18 persons, which includes two single staterooms for

senior officers and two bunkrooms, each outfitted to sleep 18 personnel. The facility is equipped with a full kitchen and dining/training room.

The Coast Guard program includes a one-year training program in the West Indies nations upon the vessels' arrival. Lt. Com. **Gibson** stated that the vessels demonstrated quality design and workmanship, and were "a shining example of American industry." He said the boats would be put to work immediately after reaching their destinations, and would be a valuable asset in rescue and patrol operations.

With a beam of 18 feet 4 inches, depth of 10 feet, and full-load draft of 5 feet, each vessel is powered by twin GM Detroit Diesel 12V71TI engines producing a total of 675 bhp to drive two Columbian crewboat propellers through Twin Disc MG514C reverse/reduction gears.

Electrical needs are served by a 20-kw Detroit Diesel/International Electric generator set. The main engines, gears, and genset were supplied by Stewart & Stephenson.

Each boat has a capacity for 1,200 gallons of fuel oil and 500 gallons of fresh water.

Swiftships president **Jerry Hoffpauir** said that these are the type vessels that have established his company as a leader in the patrol boat field. Swiftships has long been known for its fast aluminum patrol craft ranging in size from 28 to 150 feet, and used by the U.S. armed forces, and naval, coast guard, and police forces in some 20 countries throughout the world.

In the Caribbean area, Swiftships has delivered vessels to Costa Rica, Honduras, Panama, Colombia, Jamaica, Venezuela, and Haiti. At present, the shipyard is in the completion stages of vessels for

Venezuela, El Salvador, and Dominican Republic.

In addition to its construction and logistic support capabilities, Swiftships provides retrofit and repair services both in the U.S. and overseas.

65-Foot Patrol Boats Major Suppliers

Main Engines (2)	Detroit Diesel
Reduction gears (2)	Twin Disc
Propellers (2)	Columbian
Generator	International Electric
Generator engine	Detroit
Steering system	Vickers/Charlynn
Engine controls	Panish
CO ₂ system	Safety & Health
Main switchboard	Power Panels
Coatings	International
Radar	Raytheon
VHF-FM	Sailor
SSB	Sunair
VHF/UHF/SAT	Motorola
ADF	Canadian Marconi
Fathometer	Lowrance
Speed log	Signet
Watchkeeper receiver	Intech

Society Of Maritime Industries Honors Jaeger



Gene Jaeger

Gene Jaeger, manager of marketing, Newport News Shipbuilding, Newport News, Va., is the latest recipient of the Distinguished Service Award from the Society of Maritime Industries. The award is presented annually to honor an individual's dedication to the maritime industry.

Mr. Jaeger's prominence in the ship repair industry coincides with his 48-year employment with Newport News Shipbuilding. It is the first time a person from the Virginia Peninsula has received the award.

The Society of Maritime Industries is an organization dedicated to furthering the goals of the maritime industry and the ports of Virginia. Membership is limited to one person from each of 60 different firms.

The award is on permanent display at the Hampton Roads Maritime Association office in Norfolk.

Spraco Introduces New Line Of Airmist Nozzles —Literature Available

Spraco, Inc. of Nashua, N.H., a manufacturer of a full range of industrial spray nozzles, recently introduced a new line of airmist nozzles. Major features of these newly designed air/liquid nozzles are: reduced air requirement, better atomization due to special design, fewer components, easy interchangeability and versatility, and lower unit cost.

The airmist range of products includes manual cleanout needles, pneumatically operated cleanout needles, manual regulating needles, and combined manual cleaning/shutoff needles.

For a free copy of Spraco's Nozzle User's Manual, which contains a 13-page section on the new product line,

Circle 79 on Reader Service Card

Trailer Marine Transport Awarded \$7.7-Million MSC Contract

The Navy's Military Sealift Command has awarded a two-year \$7.7-million contract to Trailer Marine Transport Corp. (TMT), of Jacksonville, Fla., for the transportation of military supplies to

the Naval Base at Guantanamo Bay, Cuba.

The contract calls for overland and ocean movement of containerized and breakbulk cargo principally between Norfolk, Va., and Guantanamo Bay beginning April 1, 1984. TMT currently has been transporting Defense cargo to the Naval Base under a series of one and two-year competitive MSC contracts since 1978.

The Navy command estimated that 141,365 measurement tons (40 cubic feet to each measurement ton) of containerized cargo and 19,790 measurement tons of breakbulk cargo will be transported between Norfolk and Guantanamo Bay during the two-year period.

In addition to contracting with shipper services to deliver DoD cargo, the mission of Military

Sealift Command is primarily to provide the required sealift to deploy and sustain the Armed Forces overseas, as quickly and for as long as requirements dictate. The command also operates auxiliary ships that deliver supplies to Navy combatant ships at sea, oceanographic and survey ships, and tankers and dry cargo ships that deliver Defense Department cargo worldwide.

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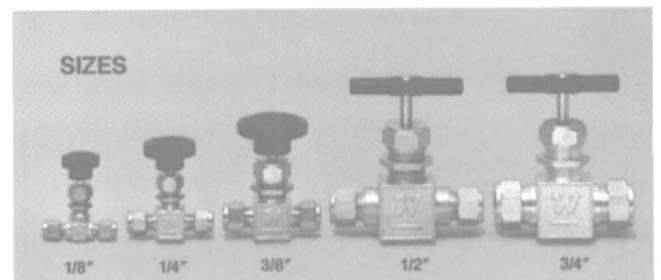
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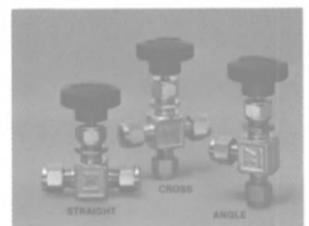
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PATTERNS



STEM TYPES



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Atlantic Container Line's RO/RO-container-ship **Atlantic Companion**, first of five that will enter service this year, is the largest and most technologically advanced vessel ever built for the North Atlantic trade. The Kockums-built ship has a capacity for 2,130 TEUs as well as space for 600 automobiles. Major features include the huge stern ramp and permanent cell guides on the weather deck, both supplied by MacGregor-Navire.

RO | RO 84

Nice, France — May 9-11

This year's 7th International Conference & Exhibition on Maritime Transport using Roll-on/Roll-off Methods—RO/RO 84—will be held on May 9-11 in Nice, France, at the invitation of the City and with the cooperation of the Chambre de Commerce et d'Industrie et des Alpes Maritimes and the Port of Nice.

RO/RO 84 will be held in the new Palais des Congres situated in the center of Nice, with the Old Town close by and the major hotels only a short walk away. This new center has been designed with full integration between the conference and exhibition areas, thus

permitting delegates to maximize their time at the event.

The 1984 Conference comes at a time that marks a new era for the RO/RO mode, with no fewer than 11 new 2,000-TEU-plus roll-on/roll-off ships currently coming into services on the world's deepsea routes. The main contenders in this league are Atlantic Container Line's third generation RO/RO containerships, Barber Blue Sea's Supercarrier II, and Merzario's enlarged tonnage, not forgetting the existing big ships of Saudi National Lines, Transatlantic Rederi, and Leif Hoegh.

It is against this scenario of new ships that the Conference will be

opened at 2:00 pm by the first session's chairman, **Nigel Tatham**, who is senior vice president of the Sea Containers Group. Under his direction, representatives of most of the shipping companies mentioned above will take up the debate with leading brokers in the RO/RO market.

The other sessions of the Conference will be guided by leading international figures from the shipping and port industries, including: **F. Bureau**, president of ICHCA and director general, Cie. de Navigation Denis Freres; **Y-P. Remond**, commercial director, Port of Marseilles Authority; **J. Penissard**, International Road Trans-

port Union; **J-E. Wahl**, technical director, Oivind Lorentzen Shipping A/S; and **G.N. Bowman-Shaw**, chairman, LancerBoss Group.

An important part of RO/RO 84 will be the Exhibition, where delegates will see the latest technologies, port developments, and transport services at first hand. During the meeting there will be an opportunity for participants to inspect one of the latest Mediterranean RO/RO ferries loading at the Port of Nice, and a post-congress visit on May 12 to the Port of Marseilles-Fos, which is served by 60 container lines, and which operates 36 RO/RO berths.

An official welcome reception for all delegates will be hosted by the City of Nice on the evening of Wednesday, May 9. All delegates and their ladies will be invited to the Official Buffet Evening of the Conference on May 10. It is intended that this reception will be held at the magnificent Villa Massena, which is built and furnished in the style of the Italian villas of the First Empire.

In all, the three days of RO/RO 84 promise to provide a packed program for all concerned with the improvement of through transport for general and unitized freight.

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Conference Program Wednesday, May 9

2:00 pm, Session 1:

"World RO/RO Trades and the Market Future," chaired by **N.J. Tatham**, senior vice presidentships, Sea Containers Ltd., London. Panelists and speakers:

B. Hultman, deputy managing director, Brostroms Rederi AB, Gothenburg.

E. Belloni, vice president, Andrea Merzario SpA, Milan.

J.E. Holvik, director, Parley Austusson & Company, Oslo.

J. Rasmussen, shipbroker, Sacomar-Barry Rogliano Salles SA, Geneva.

A.M. Briere, shipbroker, Barry Rogliano Salles (Affretements) SA, Paris.

P. Hogberg, shipbroker, Simsonship AB, Stockholm.

Thursday, May 10

9:00 am, Session 2:

"Computer Applications to RO/RO Transport."

Chairman: Prof. **J. King**, Department of Maritime Studies, University of Wales and Institute of Science and Technology, Cardiff.

"Operational and Design Requirements for Shipboard Software and its Applications for General/Unitized Cargo," by Prof. **King**.

"Computer Systems for Chartering and Operations: New Opportunities for RO/RO Operators," by **Erik Stavseth**, Management Consultants, Oslo.

"Trailer Stowage and Ship Stability—Microcomputers May Provide the Answer," by **N. MacWhirter**, naval architect, DMC Ltd., Chichester, U.K.

"Computers Open the Door-to-Door Information Concept for Ports and their Users," by **Christer Roos**, vice president-marketing, Gothenburg Stevedoring Company, Sweden.

9:00 am, Session 3:

"RO/RO's Role for the Developing Countries"

Chairman: **F. Bureau**, chairman

of ICHCA and director general, Compagnie de Navigation Denis Freres, Paris.

"Efforts to Promote Roll-on/Roll-off Technology in Africa," by **A. Kovalev**, United Nations Economic Commission for Africa, Addis Ababa.

"The Role of Intermodal Freight Terminals in Transport Network Planning in Developing Countries," by **C.F. de Castro**, The World Bank, Washington.

"To What Extent Should Developing Countries Utilize RO/RO Ships?," by **S. Gilman**, director, Marine Transport Centre, University of Liverpool, U.K.

"RO/RO Ships in Developing African Liner Trades," by **G.F.B. Cooper**, Ex-Commissioner for Shipping, Liberia; and **R.H. Baines**, director, OT Africa Line, managing director, Antrak Group of Companies, London.

"Low-Cost Ports for Developing Countries—the Role and Economics of RO/RO Operations," by **E.G. Frankel**, port and shipping adviser, The World Bank, Washington.

2:30 pm, Session 4:

"RO/RO Port Operations and Handling"

"The Adaptation of a 100% Breakbulk Port to an 80% RO/RO-StowRo Capability," by **K. Cooper**, chief executive, Medway Ports Authority, Sherness, U.K.

"New RO/RO Techniques for the Transfer of Heavy and Indivisible Unit Loads," by **G.M. Pinckaers**, director-general manager, SOMEF N.V., Antwerp.

"Developing a Management Information System for RO/RO Port Operation/Handling," by **J.T. Mors**, assistant director, Harbors, South African Transport Services, Johannesburg.

"Technology, Know-how, and Teamwork—the Vital Circle in a RO/RO Port," by **H. Assarsson**, general manager, Alvsborg Harbor, Port of Gothenburg, Sweden.

"Bolster Units vs StowRo for Handling Breakbulk Steel and Forest

Products," **U. Cramer**, Badische Waggonfabrik GmbH, Rastatt, West Germany.

2:30 pm, Session 5:

"Ship Design"

Chairman: **J-E. Wahl**, technical director, Oivind Lorentzen Shipping A/S, Oslo.

"The Structural Design of Bulkheads on PCTC Carriers," by **B. Rapo**, principal surveyor, Lloyd's Register of Shipping, London.

"Hull Forms and Propulsion Efficiency of RO/ROs—the Effect of Number of Propellers and Propeller RPM," by **S.A. Hellstrom**, Swedish Maritime Research Centre, SSPA, Gothenburg.

"Strength Analysis of Roll-on/Roll-off Ships Due to their Specific Loadings," by **P.J. Latreille**, senior principal surveyor, Bureau Veritas, France.

"Pusher-Barge Transportation System—A New Business Concept for the Cargo Shipping Market," by **K. Levander** and **T. Routa**, Wartsila Helsinki Shipyard, Finland.

"Aspects of Optimizing RO/RO Designs," by **E. Heirung**, director, Ship Division, and **P.O. Brett**, Research Division, Det norske Veritas, Oslo.

"RO/RO Ship Hull Form: Stability, Speed/Power, and Seakeeping Properties," by **U. Sjoeholm** and **A. Kjellberg**, naval architects, Kockums AB, Malmo, Sweden.

Friday, May 11

9:00 am, Session 6:

"Mediterranean RO/RO"

Chairman: **Y-P. Remond**, commercial director, Port of Marseilles Authority, France.

"Design Aspects of Railferry Cargo Access Equipment—Results after One Year's Service," by **R.J. Currie**, technical manager, Metallotecnica Veneta SpA, Venice, and **M. Vitiello**, naval architect, Italian State Railways.

"The Design and Operation of the New Mediterranean Ferries," by **T. Dedeyan**, manager-ship sales, Chantiers Dubigeon Chantiers de l'Atlantique, Paris. Panel: **D.**

Josso, deputy managing director, SNCM (Societe Nationale Maritime Corse-Mediterranee, Marseilles; **J. Le Padellec**, Project and Design Department manager, Chantiers Dubigeon, Nantes.

"Mediterranean-Far East Trade: Israel Land Bridge vs Suez Canal Services," by **D. Morgenstern**, director of Port Shipping and Freight Department, Ministry of Transport, Jerusalem.

"The Pros and Cons of a Central Transshipment/Distribution Terminal in the Mediterranean," by **K.J. Lorocho**, port/management consultant, Hamburg.

"Future Prospects for the Italian RO/RO Services," by **M. Monica**, **G.A. Pasquali**, and **R. Repetto**, Maritime Economics Department, Cetena, Genoa.

9:00 am, Session 7:

"RO/RO Safety—The Trailer on the Ship"

Chairman: **J. Penissard**, International Road Transport Union, Geneva.

"Operational Aspects of Cargo Securing," by **J. Telle**, principal surveyor, Det norske Veritas, Oslo.

"Lashing the RO/RO Trailer/Standardization/The French Experience and the ISO Development," by **F. Robin**, chairman of the French Standardization Committee for Lashing of Vehicles Aboard RO/RO Ships, AFNOR, Courbevoie, France.

"A Seagoing Road Trailer—A Proposal for Standardization," by **P. Andersson**, project manager, MariTerm AB, Helsingborg, and **P. Ottosson**, project manager, Swedish Maritime Research Centre, SSPA, Gothenburg.

"Report from the SAGIT Reference Group (Safety of Goods in Trailers)—Haulers / Operators / Underwriters," by **G. Hesselgren**, managing director, Ferrymasters AB, Gothenburg.

2:30 pm, Session 8:

"RO/RO Terminal Design"

Chairman: **G.N. Bowman-Shaw**,

(continued on page 36)

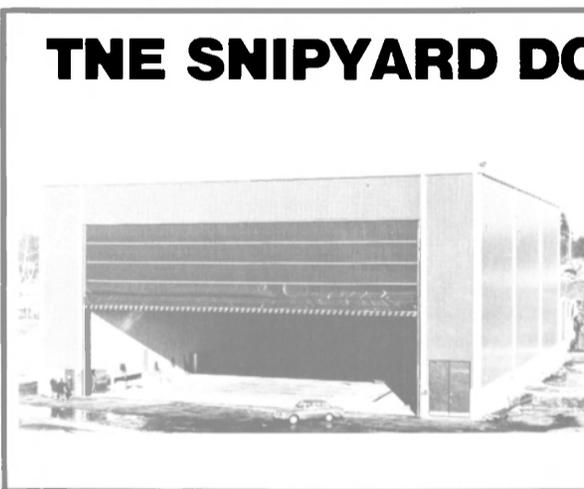
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(continued from page 35)

chairman, LancerBoss Group Ltd., U.K.

"The Commercial Aspects of Pavement Construction for RO/RO and Container Operation," by **N. Nixon**, partner, Nigel Nixon & Partners, Newcastle upon Tyne, U.K.

"Lift Trucks and their Effect on Terminal Operation and Construction," by **G.A. Stevens**, product manager, LancerBoss Group Ltd., Leighton Buzzard, U.K.

"Composite Construction in a Roll-on/Roll-off Floating Berth," by **A.C.G. Hayward**, CassHayward & Partners, Chepstow, and **F.I. Lees**, Butterly Engineering Ltd., U.K.

2:30 pm, Session 9:

Ship inspection of one of the latest Mediterranean ferries loading at the Port of Nice, arranged with the cooperation of the Port and the shipowner, SNCM, Societe Nationale Maritime Corse-Mediterranee.

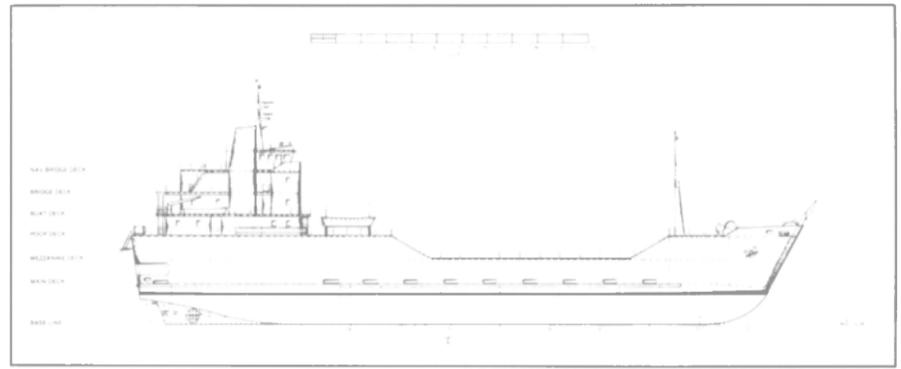
5:00 pm, Close of Conference

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LIST OF EXHIBITORS

AALBORG VAERFT A/S, DENMARK
 ANCRA INTERNATIONAL SARL, FRANCE
 PORT OF ANTWERP, BELGIUM
 LLOYD ANVERSIOIS, BELGIUM
 ATELIERS ET CHANTIERS DU HAVRE, FRANCE
 AZIENDA MEZZI MECCANICI, ITALY
 BADISCHE WAGGONFABRIK, WEST GERMANY
 BALGUERIE GROUPE, FRANCE
 BT BOLLNAS, SWEDEN
 BRITISH MARINE EQUIPMENT COUNCIL, U.K.
 BROSTROM SHIPPING COMPANY, SWEDEN
 CARGO SAFE SOE AB, SWEDEN
 CARGO SECURE, SWEDEN
 CATERPILLAR OVERSEAS SA, SWITZERLAND
 CHAMBRE SYNDICALE DES CONSTRUCTEURS DE NAVIRES, FRANCE
 CHANTIERS DE L'ATLANTIQUE, FRANCE
 CHANTIERS DU NORD ET DE LA MEDITERRANEE, FRANCE
 CONTAINERIZATION INTERNATIONAL/BRITISH SHIPPER, U.K.
 CONVER INGENIEUR-TECHNIK GMBH, WEST GERMANY
 THE DENHOLM GROUP, U.K.
 DOVER HARBOUR BOARD, U.K.
 FIARPLAY INTERNATIONAL SHIPPING WEEKLY, U.K.
 FASTING UK LTD., U.K.
 FERRANTI CONTAINER HANDLING LTD., U.K.
 FOSROC CONSTRUCTION CHEMICALS LTD., U.K.
 FOSROC INTERNATIONAL, U.K.
 FREDERIKSHAVN VAERFT A/S, DENMARK
 HENRI GAUSSIN SA, FRANCE
 PORT OF GHENT, BELGIUM
 GOOD SUCCESS CORPORATION, KOREA
 PORT OF GOTHENBURG, SWEDEN
 GOTHENBURG STEVEDORING, SWEDEN

HANSA, WEST GERMANY
 INTEMA SA, SPAIN
 INTER EQUIPOS NAVALES SA, SPAIN
 INTERING GMBH, WEST GERMANY
 INTERNATIONAL FREIGHTING WEEKLY, U.K.
 ISHIKAWAJIMA HARIMA HEAVY INDUSTRIES, JAPAN
 JOURNAL OF COMMERCE, U.K.
 KALMER LMV, SWEDEN
 KOCKUMS AB, SWEDEN
 KOMMERLING GEBRUDER KUNSTOFFWEKE GMBH, WEST GERMANY
 KVAERNER SHIPS EQUIPMENT AB, SWEDEN
 LANCERBOSS LTD., U.K.
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 LLOYD'S OF LONDON PRESS, U.K.
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 MAFI TRANSPORT SYSTEME GMBH, WEST GERMANY
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 PORT AUTONOME DE MARSEILLE, FRANCE
 MARITERM AB, SWEDEN
 MEDWAY PORTS AUTHORITY, U.K.
 MERCANDIA REDERIERNE, DENMARK
 MOORE'S OF CARNFORTH, U.K.
 MULTI-TERMINALS ROTTERDAM BV, NETHERLANDS
 OMF-OFF. MECC. FANTUZZI SPA, ITALY
 ORSA CHAIN, SWEDEN
 PLANMARINE, SWITZERLAND
 P.S.G., ITALY
 PORT RASHID AUTHORITY, UAE
 RAUMA REPOLA OY, FINLAND
 RAYGO INC., U.S.
 PORT OF ROTTERDAM, NETHERLANDS
 PORT OF ROUEN AUTHORITY, FRANCE
 SADOLIN INDUSTRI A S, DENMARK
 SEAPORT TERMINALS BV, NETHERLANDS
 SEASAFE TRANSPORT A/S, NORWAY
 OY SISU-AUTO AB, FINLAND
 SPANSET LTD., U.K.
 STENA LINE, SWEDEN
 STOCKHOMS HAMN, SWEDEN
 K.O. STORCH & COMPANY V&D GMBH, WEST GERMANY
 SWEDISH SHIPPING GAZETTE, SWEDEN
 TALLERES LUNA, SPAIN
 TRANSCONSULTANTS AB, SWEDEN
 VALMET OY, FINLAND
 VOLVO PENTA, SWEDEN
 WALLENUS LINES, SWEDEN
 WESTERN RO-RO EQUIPMENT, SWEDEN



Burness Corlett/Seaworthy Offer Unique RO/RO/Tanker Design

The British naval architecture firm of Burness Corlett through their Sydney, Australia, office have joined with Seaworthy Systems of Essex, Conn., to produce an engineering package for shipyards wishing to bid on the U.S. Army Logistic Support Vessel Program.

Under the RFP the LSV must be based on an existing design and the Sydney office of Burness Corlett has designed a similar vessel,

the Frances Bay, built in 1981. Under the joint B-C/Seaworthy effort, B-C has reconfigured the Frances Bay to an LSV as shown in the above profile, and Seaworthy has redesigned machinery and related systems to USCG and ABS standards.

The proposed vessel has an LBP of 246 feet, a beam of 60 feet, with an operating draft of 12 feet.

Seminar Marks Opening Of Wartsila Office In Vancouver, B.C., Canada

To mark the opening of a branch office in Vancouver, British Columbia, Wartsila, Finland's leading company in Arctic technology, held a one-day seminar of scientists and experts from Canada and the United States at the Hyatt Regency Hotel in Vancouver. Wartsila Arctic Inc. (WAI) invited some 80 experts in Arctic technology to provide a fresh outlook on the problems and prospects for the further development of the world's Arctic regions.

The world's leading builder of Arctic vessels, Wartsila decided to open the Vancouver branch office so that Canadian and American energy interests can be assisted by Finnish technology.

WAI now offers a variety of services in the field of Arctic marine technology, including design, feasibility studies, project management, ship and model testing, etc. The company believes, especially in regard to project management, it will be beneficial for the customer to have the entire project under one "umbrella." Wartsila's background as a designer and builder of Arctic ships should be very suitable for such projects.

For a number of years Wartsila has been promoting its Arctic marine technology products in North America, and now believes that a permanent presence on the Continent is timely. New solutions are now needed in offshore work in the Arctic, which the Finnish company is well qualified to research and meet.

Wartsila president **Tor Stolpe**, who came to Vancouver for the inauguration and who addressed the

seminar, said: "The development of energy resources in both the Canadian and U.S. Arctic will take place, exploration is well under way, production partly so, and it is in the field we believe we Finns have something to offer. The market is there both for software and hardware, the timing is still in doubt, but we usually take a long-term view on our projects."

Because all of Finland's harbors are covered by ice part of the year, the Finns have historically pioneered research and development in icebreaking techniques. This explains why a nation of only 4.8 million people is so well placed to interest Canadian and American customers in both its hardware and software concerned with icebreaking. These icebreaking techniques are backed up by a unique Arctic Research Centre in Helsinki, owned and operated by Wartsila.

As the world's leading builder of icebreaking tonnage, Wartsila has constructed, or has on order, more than 70 icebreakers and icebreaking merchant vessels. The company's production also includes offshore vessels, supply ships, diving support vessels, crewboats, dredges, and crane vessels as well as air cushion vehicles specially designed for Arctic areas.

WAI already serves Canadian and U.S. clients in Arctic technology, including oil companies, offshore operating companies, shipyards, government institutions, and consulting engineering firms, but the company is looking for an even greater client list as it continues to expand its international activities.

For further information on Wartsila Arctic Inc.,

Circle 59 on Reader Service Card

Xanthos Named Sales Manager For Renk's Bearings Division



Tony Xanthos

Werner Funke, president of Renk Corporation, has announced the appointment of **Tony Xanthos** as sales manager, bearings division.

Mr. Xanthos will be responsible for the sales and marketing of the bearings throughout the U.S. Prior to joining Renk, he was a regional sales manager for Applied Engineering Company in South Carolina. He also spent five years in Brazil as a sales and marketing manager for Ingersoll-Rand Industria E Comercio. He brings to Renk more than nine years of experience with international and domestic companies.

Mr. Xanthos holds a BA degree in mathematics from Queens College, and bachelor and master of science degrees from Columbia University.

Renk Corporation, the American member of the multi-national conglomerate, the GHH Group, supplies bearings, gears, and transmissions for the major capital goods industries. The South Carolina Renk plant was established recently to meet the increasing demand for Renk products and services in the U.S. market.

Puget Sound Section/ASNE Hears Presentation On Explosive Bonding

Where does the Navy, petroleum, or chemical industry go to find solutions to intermetallic bonding and reaction problems or unique powder metallurgy techniques? From the presentation made at a recent meeting of the Puget Sound Section of ASNE, the answer became evident that it's to **Al Hare** and his associates at Northwest Technical Industries of Sequim, Wash. Mr. Hare gave a presentation on Explosive Bonding before section members.

Mr. Hare started his program by challenging the group to think of what you could do with a process utilizing 3000°C and 10 million psi. Primary uses emerged in metallic bonding, forming, powder compaction and alloy formation, hole drilling, rock fracturing and shearing. Specific examples of the explosive bonding process were illustrated and discussed. Of partic-

ular interest to the group was Mr. Hare's work in the marine environment; bi- and trimetallic joints utilized in deckhouse to hull interfaces, steel aircraft tiedowns in aluminum flight decks, seamless aluminum/steel tubing made from flat plate, and 90/10 CuNi bonded to steel for protection from marine corrosion. An exciting, recent discovery made by Mr. Hare's company was the use of piano wire bonded to aluminum in the application of aircraft engine shielding and tank armor.

Mr. Hare concluded his program by showing the group the strongest metal alloy in the world, a powder compaction alloy of tungsten-hafnium-carbide. A question and answer period followed where the actual process of explosive bonding was described and production problems discussed.

Further comments at the meeting were presented by Section chairman **Stan Stumbo**.

Big 1984 MRO Catalog Now Available From Reliance Electric

Reliance Electric Company of Cleveland is offering its 1984 Maintenance, Repair, and Overhaul (MRO) parts catalog. The parts, tools, and services described in this 144-page book can help provide quick, efficient repair of motor and drive equipment. Chapters included describe control parts, motor parts and accessories, special products, test equipment, printed circuit board repair, and

exchange services offered by Reliance.

Plant technicians and maintenance personnel can request immediate action or information on any of the services or parts described in the catalog by filling out and mailing two postage-paid Action Cards located inside the front and back covers. Additional tear-out, postage-paid postcards are provided throughout the catalog for requesting specific services or literature. Full descriptions, many illustrated, are provided along with prices for all parts, equipment, and services listed.

To obtain a free copy of the Reliance MRO '84 catalog,

Circle 65 on Reader Service Card

Koch-Ellis Completes New RO/RO Facility —Literature Available

Koch-Ellis Barge and Ship Service recently announced the completion of a totally new RO/RO facility. This new department has been created to handle the increasing demand for cleaning, gas freeing and light repairs for all standard types of containers in both 20- and 40-foot lengths. Koch-Ellis also handles various sized tank trailers.

The facility is large enough to clean from 15 to 20 units a day, depending on size and needed cleaning procedures, and can work on as many as four units at one time. Koch-Ellis is EPA certified and is capable of handling most varieties of bulk liquid cargo.

Koch-Ellis's location, at mile 104 of the Mississippi River, or 2012 River Road, in Marrero, La., is easily accessible from the nearby New Orleans harbor area.

For full details and free literature on Koch-Ellis's services, including the new RO/RO facility,

Write 58 on Reader Service Card

ASEA STAL Announces Corporate Name Change

ASEA STAL Inc. is the new corporate name of ASEA STAL-LAVAL, Inc. This name change is effective March 1 according to the company's president, **P.R. Scordo**, and is consistent with the name change made by its parent company in Sweden, ASEA STAL AB, (formerly STAL-LAVAL Turbin AB).

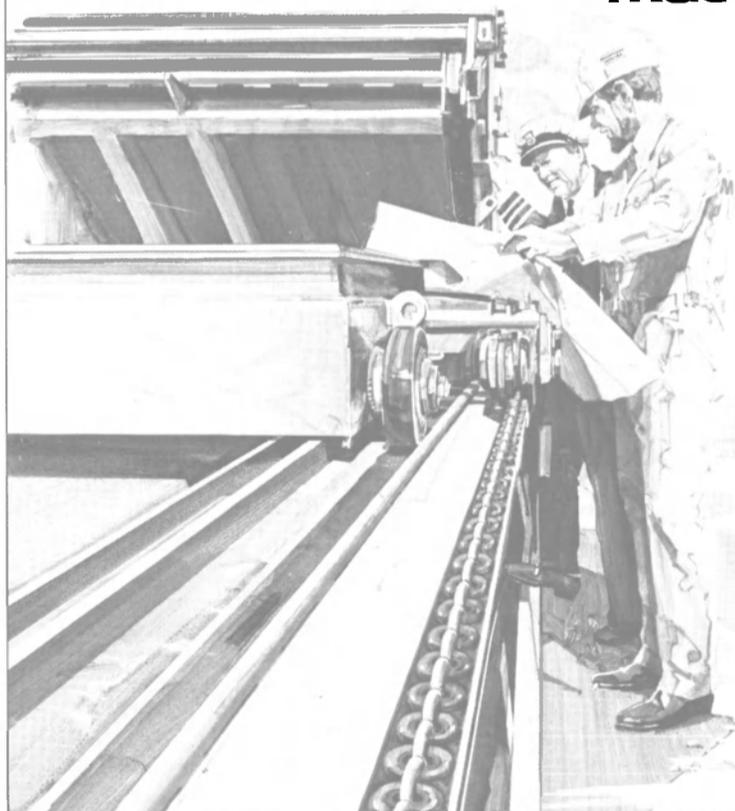
ASEA STAL Inc. remains a wholly owned subsidiary of ASEA STAL AB, Finspong, Sweden. There has been no change in the business, management or ownership of the corporation.

The change of name has been made to emphasize an extended product line and new markets in cogeneration and alternative energy equipment. ASEA STAL manufactures and sells a complete line of steam, gas, hydro and wind turbines, large heat pumps and multi-bed combustion boilers for coal and solid fuels. The company also develops and finances turnkey energy projects.

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Officers and author at recent meeting of IME Eastern U.S.A. Branch (L to R): **Howard C. Blanding**, honorary secretary; **J. Murray Wilson**, author; **David Tawse**, chairman; and **Alfred E. Deeble**, honorary treasurer.

IME Meeting Discusses Use Of Epoxy Resins In Ship M&R

A recent meeting of the Eastern U.S.A. Branch, The Institute of Marine Engineers, held at the American Bureau of Shipping in New York heard a paper titled "The Use of Epoxy in Ship Repair and Maintenance." The author was **J. Murray Wilson**, vice president of engineering, Philadelphia Resins Corporation.

Epoxy resins are familiar as coatings in the marine industry, but they have important mechanical applications also. During the past 25 years, the increase in specific power output of marine diesel propulsion engines has tended to produce problems with the chocks. The traditional iron or steel chocks often fretted and not only became loose but damaged the foundation and engine bedplate. To eliminate the difficult and expensive re-machining of these surfaces, epoxy resin chocks were developed and accepted in 1965 by the ABS as a permanent repair.

Initially, they were used principally on 3,000/4,000-bhp towboats, but in the early 1970s came into common use on large-bore, two-stroke engines. Epoxy chocks gradually became accepted not just as a quick, inexpensive way of re-chocking engines, but as the best method of chocking any engine. Today, resin chocks are accepted unreservedly by all except one engine manufacturer; however, this one manufacturer has designed its latest slow-speed engine specifically for epoxy chocks.

Resin chocks are equally suited to gearbox and thrust bearing use, though rechocking of this equipment is less commonly required. Epoxy chocks and fitted bolts transmitting thrust are compatible.

More recently, epoxy resins have come to be used to form the housing or fitting for sterntube and strut bearings.

To repair a loose fit caused by

corrosion or fretting the resin may be injected into the existing clearance, which might be only a few mils. Often the OD of the bearing or the ID of the housing is machined to give a radial clearance of up to 1/2 inch, which is then filled with resin. The procedure is suitable for oil- or water-lubricated bearings, and approved in principle by all classification societies. The repair or installation is permanent.

The method is equally suited to bearings in the steering gear and rudder. Resin has even been used as an actual poured-in-place pintle bearing on a large containership.

The use of epoxy repair pastes and laminating resins are well known for such things as casting repair, flange resurfacing, and erosion protection. A neglected application, however, is heating coil repair, for which specially made repair kits are available. These kits are also useful for repairs to steam, water, and fuel pipes up to 1,000 psi and 470 F working conditions.

Neptun Awarded Major Heavy-Lift Transportation Contract

Neptun Transport & Marin Service AB of Sweden was recently awarded a contract by Kuwait Oil Tanker Company for the transportation of a complete offshore deck structure from the Daewoo yard at Okpu, South Korea, to the installation site offshore Kuwait.

The 3,500-ton deck, to be carried on the heavily reinforced submersible pontoon Goliath 9, will be mated on delivery to the pre-installed jacket of the processing platform for Kuwait's first offshore gas field. This operation is scheduled to be carried out in the spring of 1985.

Navy Awards Ingalls \$822-Million Contract For LHD-1 Class Lead Ship

Ingalls Shipbuilding Division, Litton Systems Inc., Pascagoula, Miss., is being awarded an \$822,042,026 face value increase to a previously awarded cost-plus-fixed-fee contract for long lead time material which is being converted into a fixed-price-incentive contract for detail design and construction of the lead ship LHD-1 class of multi-purpose amphibious assault ships. The Naval Sea Systems Command, Washington, D.C. is the contracting activity.

Bulkfleet Incorporated Consolidates Under New Name

Bulkfleet, Inc., the Texas-based marine company that introduced heavy fuel-burning deep-notched vessels to the United States, has consolidated its interests, including a first-class passenger cruise line, under the name Signet Corporation, **J. Barry Snyder**, president and chief executive officer of the newly formed parent company announced recently. Operations consolidated through acquisition include cruise operations, bulk petroleum transportation, travel service entities as well as supply and steamship entities.

Signet Corporation will serve as the holding company for three wholly owned subsidiaries: BulkFleet Marine Corporation, Signet Travel Group, Inc., and Signet Transportation Support Company.

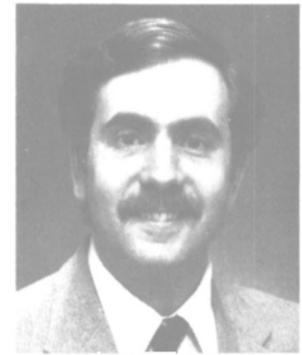
Under the new organization, Bulkfleet Marine Corporation will expand its petroleum vessel operation to a full-service shipping company.

In an effort to establish its interests in travel service management, Signet Corporation, through its subsidiary Signet Travel Group, Inc., has issued letters of intent for the acquisition of Harvey Travel, Inc. and Allegra Travel, Inc., both Houston-based travel service firms. Plans call for each company to retain its existing name and personnel.

"Signet will look to these firms' expertise in the leisure and commercial travel industry to support our many new business ventures, including a first-class cruise line," added Mr. **Snyder**, whose current strategy is to construct two luxury ships with the keels laid in the United States and outfitting to be completed in Europe within the next two years.

The third subsidiary of the parent organization, Signet Transportation Support Company, will service the marine industry through divisions including a steamship agency as well as a safety and supply company to be acquired before year end.

Larimer Named Chief Engineering Planning/Control Marinette Marine



Ralph Larimer

Ralph Larimer has been named chief, engineering planning and control of all MMC engineering operations and supervision of project engineering functions.

Mr. **Larimer** joined MMC in 1975 after completing active duty as a nuclear power qualified officer aboard the USS Grayling (SSN646). Assignments at MMC included chief of material control and supervisor of scheduling. He has been actively participating on recent SNAME Ship Producibility Committees.

MMC has expanded and developed its engineering department to provide an independent design capability. Contracts that are currently being supported with this design capability include Mine Countermeasure Vessels MCM-2 and MCM-4, Mine Sweeper Hunter (MSH) Design, Torpedo Weapons Retrievers (TWR), and 50-foot workboats.

SNAME Standards And Specification Panel To Meet May 17-18

The Standards and Specifications Panel of the Society of Naval Architects and Marine Engineers (SNAME Panel SP-6) will hold their next meeting at ASTM Headquarters in Philadelphia, Pa. on May 17-18, 1984 immediately following the May 14-16, 1984 meeting of ASTM Committee F-25 on Shipbuilding Standards.

The meeting will include detailed progress reports on standardization projects in areas of outfitting standards, mechanical construction standards, shipboard doors, functional design standards, and HVAC Design Configuration Standards, which will eventually be submitted to ASTM Committee F-25 as draft shipbuilding standards.

Another major topic of discussion at this meeting will be the Navy Document Conversion Program. Future projects, including standard format sheets for purchasing shipboard equipment and the accelerated standards publication project, will also be discussed.

For further information contact: **Thomas M. O'Toole**, Secretary SNAME Panel SP-6, c/o Bath Iron Works Corporation, 700 Washington Street, Bath, Maine 04530, (207) 443-3311, ext. 2943.



Officers and guests at recent meeting of the N.Y. Section of SNAME included (L to R): **John Higginbotham**, secretary-treasurer; **William Garzke**, vice chairman; **Nicholas Bachko**, honored guest; **Joseph Connors**, chairman; **Dr. Farrokh Mistree**, author; and **David Wiggins**, Papers Committee chairman.

New York SNAME Hears Paper On Computer-Based Preliminary Design

A recent meeting of the New York Metropolitan Section of The Society of Naval Architects heard a paper titled "A New Approach To Computer-Based Preliminary Ship Design." The authors were **Dr. Farrokh Mistree** and **Timothy D. Lyon**, both of the University of Houston. The following paragraph is a brief abstract of their discussion.

This paper presented a new computer-based method to carry out the preliminary design of ships using the latest advances in computer programming and optimization approaches. It uses an advanced, multiple objective, non-linear optimization package that can handle the most complete design problems. The program has consistently produced designs that

are superior to those using conventional methods. The new method makes an important contribution toward the automation of the preliminary design stages.

Nicholas Bachko was the honored guest at the meeting. Mr. **Bachko** graduated from the U.S. Merchant Marine Academy in 1942, and sailed as a merchant marine officer until 1946. He came ashore with United States Lines, rose through the ranks from assistant superintendent engineer to senior vice president for planning and development, and retired in 1979. He joined SNAME in 1950. He is a Life Member of the Society and serves as a member of the Technical and Research Steering Committee.

Raytheon Awarded \$8.6-Million Navy Contract

Raytheon Company, Portsmouth, R.I., is being awarded a \$8,600,000 firm-fixed price contract for five AN/BQQ-5 transmit subsystems and ancillary equipment. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Call For Papers Issued For 7th Chesapeake Sailing Yacht Symposium

Organizers of the Seventh Chesapeake Sailing Yacht Symposium have issued a call for papers for the one-day gathering, scheduled for January 19, 1985 in Annapolis, Md.

The symposium, which traditionally attracts more than 500 people, including some of the nation's top yachting figures, is soliciting papers on a variety of topics, including 12-meter developments, yacht design, performance, materials and construction, cruising, racing, historical subjects and sails and rigging.

The deadline for 400- to 500-word abstracts of proposed papers is May 1, 1984. Authors of selected proposals will be advised of acceptance by June 1 and will be expected to submit drafts of their papers by August 1. Final papers are due October 1, 1984, to allow time for printing in the book which each symposium-goer receives.

Abstracts and inquiries should be sent to **Otto Scherer**, chairman of the Papers Committee, Chesapeake Sailing Yacht Symposium, 5475 Greenbridge Road, Dayton, Md., 21036.

Baldt Introduces New Workboat Connecting Link —Literature Available

Baldt Inc., following two years of development, has just introduced an advanced, anti-corrosive connecting link. **Rocco Albertini**, Baldt's director of engineering, describes the new link: "Three exclusive features provide dramatically increased resistance to corrosion. One, a totally new steel alloy that is less sensitive to corrosion; two,

a unique new protective coating; and three, an added forging process called restrike that insures fit and increases fatigue life. This new Baldt Workboat Connecting Link is less susceptible to corrosion, so throughout the normal operating process the new link will reduce routine maintenance."

Mr. **Albertini** continued, "Not only is the alloy less corrosive, but it affords extended fatigue life. The alloy has high tensile impact properties, and Grade 3 load requirements as established by the American Bureau of Shipping."

Baldt modeled the Workboat Connecting Link after its own reliable U.S. Navy design. Like the Navy link, each section is individually fitted. Sections are not interchangeable, so in a real sense every link is custom made. Baldt is the largest supplier of anchors, chain, and hardware to the U.S. Navy.

The patented metallic ceramic coating Baldt as applied to the link gave the best results among six coatings evaluated and tested over a two-year period. Because Baldt feels the coating is far supe-

rior to other materials, the company will also offer custom coating for hardware items such as swivels and pear-shaped links.

Testing is equally rigorous during manufacture, and it exceeds ABS specifications. Every link is subjected to 100-percent magnetic particle testing, and all mechanical properties are evaluated.

Made exclusively in the U.S., Baldt Workboat Connecting Links are available in sizes ranging from 3/4-inch to 1-3/4 inches, and are quickly identified by Baldt's unique grey coating and red, white and blue label.

Baldt, Inc. designs, engineers, manufactures, and internationally markets a complete line of anchoring and mooring systems for the marine and offshore industries, and drag chain systems for the mining industry. With offices throughout the U.S. and the U.K., the firm provides extensive custom design and engineering services.

For more information and free literature on the new connecting links,

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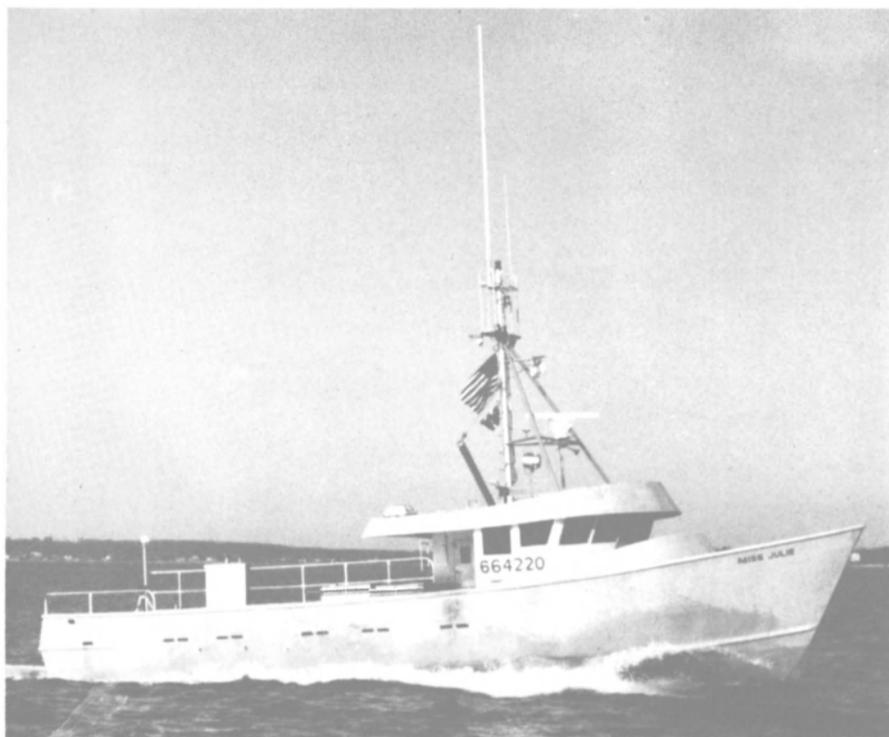
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Unique Lobster Boat Miss Julie Delivered By Gladding-Hearn

Designed by **Robert Henry** of Bay Marine, Inc. and built by Gladding-Hearn Shipbuilding Corporation for **Robert P. Stevens** of Buzzards Bay, Mass., the lobster boat Miss Julie is an all-aluminum, 65-foot single-screw vessel that combines speed, maintainability, economy of operation, and comfort in a lightweight but rugged boat.

The Miss Julie has some definite differences from the usual lobster boat design. Her unpainted aluminum hull is a rarity for offshore fishing vessels. An aft-mounted, 12-cylinder diesel, together with lightweight construction, provides significant speed and fuel-saving advantages. Up-and-down, amidships lobster tanks are designed for ease of unloading, and controlled water levels provide added weight savings. These features, among others, will provide longevity of service, speed enhancement, low maintenance requirements, and operational efficiency.

The vessel's M.A.N. diesel engine, model D-2543-MLE, is rated 515 bhp at 2,100 rpm. Cooled by a heat exchanger, the engine drives a Columbian Bronze 40-inch, 4-bladed stainless-steel propeller through a Twin Disc 3:1 reduction gear and Armco Aquamet-17, 3½-inch-diameter shafting. This efficient propulsion system moves the lightweight boat at speeds up to about 14.5 knots.

Topside, the Miss Julie has a 19-foot beam, with a spacious deck aft capable of accommodating 40-50 lobster traps. A 14-inch hydraulic pot hauler, driven off the main engine and controlled from the pilot house, is fitted to the aft bulkhead of the cabin. Amidships are two fully insulated holding tanks with a combined capacity of some 16,000

pounds of lobster. The tanks and their piping systems are designed so that the level of the holding water is held at just what is needed to cover the quantity of lobsters caught. Both tanks are fitted with bottom aluminum trays that are raised and lowered by an electric hoist to bring the catch to the surface for ease of unloading. A circulating water system, as well as a backup aeration unit that infuses filtered air into the holding water, serves both tanks.

In addition to her functional efficiency, the Miss Julie offers a full range of amenities for convenience of operation and crew comfort. She has a spacious, well-insulated and electrically heated pilothouse fitted with starboard control station, charting area, captain's berth, day galley, and locker area with access to the engine room. The front of the pilothouse is of "West Coast" design, with forward-slanting windows and protective visor. This arrangement allows more space for overhead mounting of electronics, and generally enhances visibility in bad weather. Crew quarters in the forecabin has accommodations for four hands and includes a galley area, mess table with settees, bunks, head/showers, and storage area.

Main engine	.....	American M.A.N. Corp.
Reduction gear	.....	Twin Disc
Propeller	.....	Columbian Bronze
Propeller Shaft	.....	Aquamet
Steering	.....	Wood Freeman Automatic
		Pilot, Ocean Marine Services
Controls	.....	Morse Controls
Compass	.....	Ritchie
Steering Wheel	.....	Edson
Radars	.....	Raytheon & Furuno
Fathometers	.....	Furuno
VHF Radios	.....	Raytheon
Anchor	.....	Danforth
Searchlight	.....	Perko
Navigation Lights	.....	Aqua-Signal

Todd Seattle To Refit Two Containerships For Lykes Bros.

John T. Gilbride Jr., vice president and general manager of Todd Pacific Shipyards, Seattle Division, announced recently that Lykes Bros. Steamship Co., Inc. has contracted with Todd Pacific Shipyards Corp.'s Seattle division to refit two containerships that Lykes will use in its expanded U.S.-flag trans-Pacific liner service.

The two ships, the Elbe Express and Alster Express, are among four German-built containerships which Lykes recently agreed to purchase from Hapag-Lloyd A.G. for use in Lykes' trans-Pacific service.

All four of the vessels will be refitted to meet U.S. Coast Guard and American Bureau of Shipping standards, and will be registered under the American flag.

Work to be performed on the ships includes drydocking and surveying as well as modernization of the vessels' radio equipment and various changes to comply with Coast Guard regulations.

Lykes has not announced which shipyard will convert the other two vessels, the Mosel Express and Weser Express.

The refitted ships will be renamed the Margaret Lykes, Sheldon Lykes, Charlotte Lykes and Adabelle Lykes. These names currently belong to four of 13 smaller breakbulk freighters which Lykes plans to retire.

The newly acquired containerships will join in service the Charles Lykes and Tyson Lykes, modern roll-on/roll-off containerships which Lykes now operates between the Pacific Coast and Far East.

The four containerships each carry up to 1,096 twenty-foot equivalent units of containers. Powered by fuel efficient MAN-K9Z78/155E diesel engines, the ships have a speed of 19 knots.

Lykes' trans-Pacific RO/RO vessels each carry up to 976 containers, in addition to their normal complement of RO/RO cargo.

Eleven Infracone Units Ordered From Stal-Laval

A prominent U.S. company has given Stal-Laval a bulk order for 11 Infracone units to be used for fleetwide installations on their main boilers. The decision was made after a three-month trial period on one boiler.

Infracone soot-removal equipment, which was introduced in the marine marketplace in early 1983, has now been tested successfully in both main boilers and exhaust gas economizers.

During 1983, Stal-Laval Marine in Sweden received orders for 22 units from different owners, and interest in the equipment is said to be growing rapidly. The latest

order, together with others, increases the present number of marine Infracone installations/orders to more than 40 units.

For additional information on Infracone units,

Circle 64 on Reader Service Card

Germinario Elected President Of Spill Control Association Of America

Sergio Germinario, manager of the Northeast Station of Ocean Salvors Company and its division, Moran-Crowley Environmental Services Company located in Carteret, N.J., has been elected as president and director of the Spill Control Association of America (SCAA), an organization which provides leadership for the responsible advancement of the entire oil spill control industry.

Ocean Salvors is an American Salvage firm offering a full range of salvage and environmental services throughout the Western Hemisphere with principal offices in New York, N.Y., and Carteret, N.J.

John Crane Offers Free Brochure On End Face Shaft Seals

End face shaft seals used in original equipment are described in a new, colorful brochure prepared by John Crane, one of the world's largest manufacturers of engineered sealing systems.

Designated as John Crane Type 1 and Type 2 Series, these seals are used in all types of rotary shaft equipment—pumps, mixers, blenders, agitators and compressors. Type 1 and Type 2 seals have been used in original equipment for more than 40 years.

They are self-aligning seals, adjusting automatically to compensate for abnormal shaft end play, primary sealing wear, and machinery tolerances. They are designed for field repair to minimize replacement costs and production downtime.

Components include a non-clogging, single coil spring for greater dependability, and flexible elastomer bellows. Standard bellows materials used include neoprene, buna, DuPont viton and ethylene propylene, with optional bellows available in kalrez and radiation resistant rubber. Temperature ranges for these John Crane Seals are minus 40° F to plus 550° F. They function in operational pressures to 1,200 psi and static pressures to 2,000 psi. They cover a wide range of service conditions from water and steam to corrosives and abrasive fluids.

For a free copy of John Crane's Bulletin No. S-2003-5 on Type 1 and Type 2 end face shaft seals,

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 • **Wash. Whirley**, Mod. 28, 43 ton, 10 ton aux., 105' boom • **Amer. 9299**, 75 ton at 23', 100' boom • **Manitowoc 4600 Vicon**, 160' boom, 200 ton, low hours • **80-ton Gantry**, 70' span, 70' lift, 125 HP hoist • (2) **Clyde Whirley 25-ton Travel**, Diesel electric, 90' booms • **Lima Rubber-Tired 45-ton Travel**, Mod. 45SC • **Colby 50-ton w/15-ton aux.**, 115' boom, (complete or parts)
 • **Wash. 45-ton w/15-ton whip**, 115' boom, (complete or parts) • **Osgood 825 Maxi-Mount**, 25-ton • **Link-Belt**, LS-90 • **Amer. 395 Maxi-Mount**, 20 ton

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Linde Burning Machine & Table, CM-100/UCNC-III-22, w/NC controls, 18' x 90', six torch, equipped for plasma torch & software included, scribing & machining cap., w/torch ignitors, 240" per min. • **Tanaka Burning Machine**, optical or manual tracing, 6 torches, KT-570
 • **Servograph Mod. K Plate Cutting Machine**, 6 heads, Stewart Warner tracer, 60 ft. rail, 51" x 110" platen table • Large quantity **Miller Welders**, 500S, 500 SP • **Lincoln Welders**, R3S, 400 amp • **Lincoln LN-22 Wire Feeders** • **MK Doodlebug** Mod. 12-E
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Jackup Sabine V Arrives Aboard Dan Lifter



Houston Offshore International, Inc.'s Sabine V drilling rig prepares to float off of the Dan Lifter in Cameron, La. ship channel after returning to Gulf waters recently from Singapore. The rig was built in Bethlehem Steel's shipyards there and remained in the Far East for almost a year before becoming the first of several rigs this year to return to the U.S. J.L. Heavyweight Transport A/S of Denmark and with offices in Houston, owners of the Dan Lifter, completed the journey around the Cape of Good Hope and on to the Gulf Coast in only 42 days. The Sabine V moved fully legged-up, greatly reducing outfitting time for the rig after its arrival. It is a mat-supported, canti-levered jack-up rig ca-

pable of working in water depths up to 200 feet. Unlike other Sabine class rigs, the Sabine V has crew accommodations for 80 men on three levels, making it approximately 2/3 larger than rigs of comparable class.

Sperry Navigation/Communications Equipment Delivered To British Steel Bulker

Sperry Corporation has delivered and installed all the navigation and communications equipment aboard a new British Steel 170,000-deadweight-ton bulker being built at Harland and Wolff in Belfast, Northern Ireland. The contract was awarded to Sperry by Furness Withy (Shipping) Ltd., which served as consultants for British Steel.

The Sperry systems include: Mk 4016 "X" and "S" band radars, a CAS II collision avoidance system, a dual Universal Gyropilot, an Mk 37 gyrocompass, a hydraulic power unit system for steering, and a SRN-501 satellite navigator. Sperry was also responsible for the provision and installation of a high-speed weather facsimile receiver, an echosounder, an electromagnetic speed log, an automatic direction finder, a magnetic compass, and the complete main radio station with satellite communications which were made by other manufacturers.

Genstar Uses Novel Technique To Launch Petrobras Drilling Rig

A novel technique using two of Seaspan's submersible heavy-lift vessels was used to launch a Petrobras drilling rig at the U.I.E. yard in Cherbourg, France. The 11,000-ton Petrobras XVI, measuring 302 by 226 by 130



Huge semi-submersible rig aboard two of Genstar Marine's vessels during unique launch at U.I.E. yard.

feet, with the 160-foot derrick erected, was skidded on board and successfully launched into its proper element in a joint effort between U.I.E., the builder, and Genstar Marine, offshore marine and equipment contractors.

Genstar used its identical sister vessels, Genmar 104 and Genmar 106, catamaran style to execute the task, which was performed in 10 days from skid-on to launch. The company's Offshore Division conceived the launching idea while transporting the two flotation pontoons for the drill unit from St. Nazaire to Cherbourg earlier in the year.

This unusual construction method, where large components of the drill rig are built at several places using Genstar Marine equipment and services for the assembly and launching, is a technique offering a modern, flexible alternative to traditional shipbuilding techniques.

Genstar believes the adoption of this technique can offer the builders and operators the benefit of shorter overall construction time at existing fabricating facilities, providing more cost-efficient solutions to building semi-submersible structures of all kinds for drilling, offshore construction, and early production systems.

INVITATION TO BID

The Scripps Institution of Oceanography, a branch of the University of California, San Diego, is interested in purchase, or receipt as a charitable donation, of an offshore supply vessel of the following approximate characteristics:

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Working Deck Area: At Least 1200 Square Feet
Propulsion: Diesel, Twin Screw

Candidate ships should be of recent construction (1979 or later), by a shipyard of known competence, be well-maintained and in good running condition, have good seakeeping qualities, have USCG certification and ABS loadline document, be built to compliance, and be suitable for conversion to use an oceanographic research vessel. Sea/day trial and condition survey in dock by owner will be required prior to purchase.

Buyer reserves the right to conduct negotiations as appropriate, to obtain the vessel which most closely meets Institution requirements, in accordance with procurement policies of the University of California.

This is a request for price estimate(s) and shall not be construed as obligating the University of California to award a purchase order or sub-contract, or to otherwise pay for the information solicited.

Information about available ships and pricing should be sent to:

Roy Brown, Senior Marine Buyer
 U.C.S.D.
 Mail Code: P-002
 La Jolla, California 92093

Technical questions should be referred to:
 Capt. J.G. Williams (619) 225-9609



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PORT ENGINEER

NEW YORK BASED STEAMSHIP COMPANY OWNERS & OPERATORS OF BULK CARRIERS AND TANKERS HAS OPENING FOR PORT ENGINEER. APPLICANT MUST BE LICENSED MARINE ENGINEER WITH SEA GOING EXPERIENCE ON LARGE BORE SLOW SPEED DIESEL ENGINES PREFERABLY OF SULZER OR B & W MANUFACTURE. ALL REPLIES KEPT STRICTLY CONFIDENTIAL. OUR EMPLOYEES ARE AWARE OF THIS AD. PLEASE SEND RESUME & SALARY REQUIREMENTS TO:

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A renowned leading heavy industries company in Korea, active in shipbuilding, offshore structure and industrial plant design and fabrication, is now looking for highly qualified research project managers and initial ship designers.

QUALIFICATIONS

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The successful applicants will be based in Korea for one or two years. Salaries renumerate with qualifications and experience. Accommodations and cars, and relocation expenses are provided. Outstanding fringe benefits. Applicants are requested to send their resumes with recent photo no later than April 30, 1984 to:

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FLOATING CRUDE OIL STORAGE VESSEL FOR SALE

Esso Production Malaysia, Inc. a contractor to Petronas, the national oil corporation of Malaysia, is planning to sell the Non-Flag Floating Storage Vessel "Esso Mercia," associated Single Anchor Leg System (SALS) and a Mooring Buoy for converting to a Single Anchor Leg Mooring (SALM) system.

ESSO MERCIA CHARACTERISTICS AS OF THIS DATE

LOA 307.93 M (Over Bulbous Bow)
167,000 DWT
1.2 Million Barrels Capacity
Cargo Metering System and Prover
2 Each 12 Inch Loading Hoses
2 Each Hose Handling Cranes

Inert Gas for Cargo Blanketing
6 Each Yokohama Fenders and Davits
Dual Oil and/or Gas Fired Boiler Generators of 1250, 700, 200 and 375 KW
Cargo Pumps, Crane 50,000 lb. Capacity
Helipad, Accommodation for 100 People

The Esso Mercia is attached to a SALS via rigid yoke, water depth 214 feet

Machinery is maintained under Lloyd's Classification and all surveys per Society's requirements.

If interested in submitting a proposal to purchase the facility write to the address below or send inquiry by telex

"ESSO MERCIA SALE"
ESSO PRODUCTION MALAYSIA, INC.
P.O. Box 10857, Kuala Lumpur, Malaysia
Telex No. MA 30180 and MA 31542

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1800 I.H.P. 1200 S.H.P. offshore model hull 75' x 25' x 10.6' Built Nov. 1978, 16-92 NA G.M.'s 5.15.1 gears, (2) 30 K.W. 3-71 generator sets, Smatco 44 DPS split drum winch anchor/towing, full electronics included.
Price: \$600,000

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Direct from owners we offer the following supply and A/H supply vessels for sale.

FILE NO	DIMENSION	BHP	BLT.	BT.	A/H	CLASS	L.L.	PRICE
281.	176'x38'x13'	2250	1972	YES	NO	ABS	ABS	\$750,000 USD
282	165'x36'x12.5	1700	1967	NO	NO	ABS	ABS	450,000
283	146'x36'x10'	1130	1962	NO	NO	NO	NO	175,000
285.	166'x38'x13	1700	1969	NO	NO	NO	ABS	500,000
287	166'x38'x13	1700	1972	NO	NO	ABS	ABS	750,000
288.	132'x28'x12'	1700	1968	NO	NO	NO	ABS	400,000
289.	165'x38'x12'	1700	1968	NO	NO	ABS	ABS	600,000
290.	166'x38'x13'	1700	1969	NO	NO	NO	ABS	600,000
291.	165'x38'x12	1530	1966	NO	NO	NO	ABS	400,000
292.	166'x38'x13'	1700	1972	YES	NO	ABS	ABS	700,000
293	176'x38'x13	1700	1972	YES	NO	ABS	ABS	775,000
294.	150'x35'x12'	1530	1964	NO	NO	NO	ABS	275,000
295.	176'x38'x13'	2250	1971	YES	YES	ABS	ABS	750,000
296.	185'x40'x17'	4300	1970	YES	YES	ABS	ABS	850,000
297.	176'x38'x13'	2250	1970	NO	YES	NO	ABS	700,000
298.	176'x38'x13'	2250	1969	NO	YES	NO	ABS	550,000
299	185'x40'x17'	4300	1971	YES	YES	ABS	ABS	850,000
300.	176'x38'x14'	3000	1970	NO	YES	ABS	ABS	775,000
301	176'x38'x14'	3000	1971	YES	YES	ABS	ABS	800,000
302	176'x38'x13'	2250	1971	YES	YES	ABS	ABS	700,000
303.	166'x38'x13'	1700	1972	NO	NO	ABS	ABS	700,000
304.	176'x38'x13'	2250	1971	YES	YES	NO	ABS	750,000

Above vessels, Files No. 281 through 295 inspectable U.S. Gulf. File 296 in Brazil; File 299 in Bombay, India. All others in West Africa. All above offers "as is where is" on cash basis.

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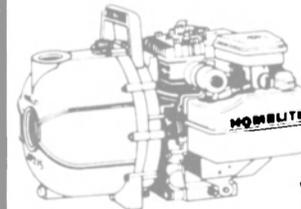
Particulars: Fully operational 800 H.P.
Length 80 ft. (24.3 m)
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Speed 11 knots
Steel hull, built in 1965
Last dry-docking December 1982

Vessel may be viewed at Pointe-a-Pierre, Trinidad, West Indies. Contact Texmarine, San Fernando, Trinidad, West Indies, TLX 366 or 367 for appointment.

Tenders should be enclosed in a sealed envelope and deposited by you or your agent at Texaco Trinidad, Inc., Comptroller's Division, Main Administration Office, Pointe-a-Pierre, Trinidad, West Indies. The closing date for receipt of bids is May 31, 1984.

Texaco does not bind itself to accept the highest or any offer.

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This equipment is new and unused and has never been installed. For more information, call or write:

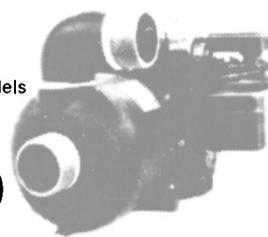
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DONATED VESSEL NEEDED FOR RESEARCH TO SAVE COASTAL WILD LIFE

Suncoast Seabird Sanctuary Inc. is fully deductible under IRS Code 501-C-3 for anyone donating a boat to this worthy marine wildlife sanctuary.

The Sanctuary started in December 1971 and has worldwide recognition for rescue-recuperation and release of injured birds caused by environmental pollution, oil slicks, pesticides and man made encroachments into what was once the wild birds' own natural habitat.

The facility is in vital need of a suitable work boat — approximately 100 feet — twin engine in reasonably good condition to carry out research projects to treat, rehabilitate and release thousands of injured birds every year.

If you want to donate a vessel, please contact:

SUNCOAST SEABIRD SANCTUARY

18328 Gulf Boulevard
Indian Shores, Florida 33535

Mr. Ralph T. Heath Jr.
(813) 391-6211



Ferrous Adds New FE-4 Manufacturing Facility
—Literature Available

Due to increasing demand, Ferrous Corporation (Bellevue, Wash.), manufacturer of FE-4 marine grade combustion catalyst since 1969, has added a manufacturing facility in Ridgefield, N.J. The new facility will provide faster and more efficient service for East Coast users and insures a constant supply of FE-4.

Ferrous currently supplies over 60 oceangoing vessels, many of which will be serviced by the new facility. FE-4 is also manufactured in New Lenox (Chicago), Ill., and in Seattle, Wash.

Ferrous has nine warehouse facilities for the combustion catalyst: Staten Island, N.Y.; North Charleston, S.C.; Miami, Fla.; New Orleans, La.; San Pedro and Oakland, Calif.; Honolulu, Hi.; St. Croix, Virgin Islands; and, Seattle, Wash.

For further information and free literature from Ferrous Corporation,

Circle 67 on Reader Service Card

Texas Instruments Unveils New Loran C Navigator
—Literature Available

Texas Instruments recently introduced the TI 9900 II Loran C navigator, a complete Loran C-based navigation system with the performance, features, and accuracy of the popular TI 9900, plus an exceptional array of additional capabilities.

The TI 9900 II features 100 waypoints that can be entered as time differences or latitude/longitude coordinates. Trips of up to 50 legs can be stored, with reverse capabilities. A unique trip planning function allows the user to compute course and distance between any two waypoints without receiving a Loran signal. Additional capabilities of the system include automatic waypoint sequencing and the display of range and bearing to the next waypoint as each one is passed.

According to Gary Howe, TI marine marketing manager, "The TI 9900 II has been designed with the user in mind. A sealed, fully backlit keyboard is provided, with oversized keys, not a membrane key pad. This makes entering information fast, sure, and easy, even with gloves on."

In addition, most of the TI 9900 II navigation functions—range to destination, course-over-bottom, cross track error, speed-over-bottom, time-to-go, ETA, velocity-made-good, magnetic variation, and many more—can be instantly displayed with only one simple key-press. A large, clear alphanumeric dot matrix display provides navi-

gation information in plain, easy-to-read English, eliminating confusion caused by similar-looking letters and numbers, such as "b" and "6."

Six highly advanced, electronic notch filters are built into the TI 9900 II, providing precise protection from signal interference no matter where the vessel is operated. The feature-oriented unit also includes three separate alarm systems for safer navigation.

For further information and free literature on the TI 9900 II,

Circle 61 on Reader Service Card

Campbell Chain Offers Free Literature On New Model Blocks

Doubling the pulling capacity of a winch is the main benefit of the new Brewer-Titchener heavy-duty drop side snatch block with becket made by Campbell Chain Division of McGraw-Edison Co. The new model 4198 block is an innovative approach to doubling up without threading or taking the block apart. A companion model 4199 block offers forged steel sides and hot dip galvanizing for long life in marine use.

For free literature on the Campbell Chain blocks,

Circle 68 on Reader Service Card

Lord Marine Fenders Are Manufactured In 22 Sizes
—Literature Available

High-efficiency energy absorption is the advantage claimed for the F Series of marine fenders manufactured by Lord Corporation. Intended for sheltered or exposed berthing facilities, these fenders are available in 22 sizes, with absorption capacities ranging from 1.4 to 124 foot-kips. They are used with wale or frontal systems, and capable of shear deflection with minimal change in energy capacity. F Series fenders are said to be maintenance-free; the elastomer used provides resistance to heat, cold, ozone, saline solution, and conforms to the ASTM D-2000 designation.

This fendering is a rectangular elastomer section with steel mounting plates permanently bonded to both ends. Used as a column under load, the long axis buckles, providing deflection and absorption of the energy imparted by a berthing vessel.

Some 7,500 F Series marine fenders are performing successfully at more than 200 facilities around the world. Shipowners and port authorities appreciate their performance, durability, economy, and maintenance-free dependability, the manufacturer says.

For further information and free literature on F Series marine fenders and other Lord systems,

Circle 63 on Reader Service Card

FOR MORE INFORMATION

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187	SQUIRE-COGSWELL COMPANY	AIR COMPRESSORS
241	TELEFLEX INC	VALVE ACTUATION SYSTEM
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211	ZIDELL EXPLORATIONS, INC	MARINE EQUIPMENT

BUYERS DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of **MARITIME REPORTER/Engineering News**. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all 24 issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR/EN assumes no responsibility for errors. If you are interested in having your company listed in this Buyers Directory Section, contact John C. O'Malley at (212) 689-3266.

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Marlo Coil/Nuclear Cooling, Inc., P.O. Box 171, High Ridge, MO 64049
Mechanical Resources, Inc., 210 West Side Ave., Jersey City, NJ 07305
Nance Industries, P.O. Box 1547, Beaumont, TX 77704-1547
Stal Refrigeration AB, Butangsgatan 16, S 601 87 Norrköping, Sweden
United Technologies Carrier Transicold, P.O. Box 4805, Syracuse, NY 13221

Unitemp Inc., 3590 Kennedy Rd., So. Plainfield, NJ 07080
York Division, Borg-Warner Corp., P.O. Box 1592, York, PA 17405

ANCHORS AND CHAIN

Baldt Incorporated, P.O. Box 350, Chester, PA 19016
Neptunia, Via Giovanni da Verrazzano, 12, 16165 Genova, Italy

ANODES—Cathodic Protection

American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Engelhard Industries Division, 2655 U.S. Route 22, Union, NJ 07083
Kaiser Chemical, Div., of Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Rm. 1128 KB, Oakland, CA 94643
The Platt Bros. & Co., Box 1030, Waterbury, CT 06721

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North Star Marine & Industrial Products, Inc., 84 Wall Street, Farmingdale, NY 11735

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

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Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
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Thomson-Gordon Limited, 3225 Mainway, Burlington, Ontario, Canada L7M 1A6

Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wisc. 53186

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Aqua-Dyne Inc., 2208 Karbach St., Houston, TX 77092
Atlantic Sandblasting & Coatings, Inc., 2700 Guy Verger Blvd., Tampa, FL 33605
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Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
CLEMCO, P.O. Box 7680, San Francisco, CA 94120
Complete Abrasive Blasting Systems, 18250 68th Avenue South, Kent, WA 98031
E.I. DuPont de Nemours & Co., Inc., Starblast Division, Room X39186, Wilmington, DE 19898
Genstar Stone Products Co., Executive Plaza IV, Hunt Valley, MD 21031
Rockwell International, Power Tool Division, 400 N. Lexington Ave., Pittsburgh, PA 15208
Schmidt Mfg. Inc., P.O. Box 37, Fresno, TX 77545

BOILERS

B&D Marine and Industrial Boilers, Inc., P.O. Box 5702, North Charleston, SC 29406
Combustion Engineering, Inc., Windsor, Connecticut 06095
Forney Engineering Co., P.O. Box 189, Addison, TX 75001
Foster Wheeler Boiler Corp., 110 S. Orange Ave., Livingston, NJ 07039
Howe-Baker Engineers, Inc. (Econoflex Burners), Combustion Systems Div., P.O. Box 956, Tyler, TX 75710
Way-Wolff Associates Inc., 45-10 Vernon Blvd., Long Island City, NY 11101

BROKERS

S. Danoff U.S.A. Ltd., 2050 Coral Way, Miami, FL 33145
Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, La. 70153
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004

BRONZES—COMMERCIAL

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

Alpha Technical Services, Inc., P.O. Box 446, Hamilton, OH 45012
MacGregor-Navire International, Box 8991, S-402 74 Göteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016

CHOCKING SYSTEMS

Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Philadelphia Resins Corp., 20 Commerce Drive, Montgomeryville, Pa. 18936

CLAMPS

Band-It Company, P.O. Box 16307, Denver, CO 80216

CLOSURES—Marine

Cornell-Carr Co. Inc., 63 Main St., Monroe, CT 06468

CONDENSERS

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

CONTROL SYSTEMS—Monitoring

American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Argo Marine, 140 Franklin St., New York, NY 10013
ASEA, Inc. 4 New King St., White Plains, NY 10604
Autronica Marine USA, 280 Industrial Pkwy., Northvale, NJ 07647
Avicon Corp., 7750 East Redfield Rd., Scottsdale, AZ 85260
Barringer Research, 304 Carlingview Dr., Rexdale, Ontario, Canada M9W5G2
Biospherics Inc., 4928 Wyaconda Rd., Rockville, MD 20852
Cooper Energy Services, Mount Vernon, OH 43050
Eldec Corp., P.O. Box 100, Lynnwood, WA 98036
Ergon, Inc., P.O. Drawer 1639, Jackson, MS 39205
Failsafe Motor/Generator Protector, Marine Safe Electronics Ltd., 101 Jardin Dr., Unit 24/25, Concord, Ontario, Canada L4K 1B6
Fluidyne, a Div. of Electrodata Inc., P.O. Box 11366, Santa Rosa, CA 95406
Grumman Aerospace, 111 Stewart Ave., Bethpage, NY 11714
Indikon Corp., 26 New St., Cambridge, MA 02138
Leslie Co., 401 Jefferson Rd., Parsippany, NJ 07054
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
Maritime Protection A/S, Box 100, N-4620 Vagsbygd, Norway
Megsystems, Inc., 1075 N.W. 58th Street, Boca Raton, FL 33431
National Control Systems, Inc., 827 Hanley Industrial Court, St. Louis, MO 63144
Nav-View, Inc., P.O. Box 1175, Huntsville, TX 77340
Norcontrol, 400 Oser Ave., Hauppauge, NY 11738
Norske Teletron A/S, Drammensveien 126, Oslo 2, Norway
Offshore Technology Corp., 578 Enterprise St., Escondido, CA 92025
Pandel Instruments Inc., 2100 N. Hwy. 360, Grand Prairie, TX 75050
Propulsion Systems, Inc., 21213 76 Ave., Kent, WA 98032
Seaworthy Systems Inc., 36 Main Street, Essex CT 06426

Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062

Wesmar Marine Systems Div., 801 Dexter Ave. N., Box C19074, Seattle, WA 98109

COUPLINGS

Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
SKF Steel, 20 Tower Lane, P.O. Box 745, Avon, CT 06001

CRANES—HOISTS—DERRICKS—WHIRLIES

American Hoist & Derrick Company (AMHoist), St. Paul, MN 55107
Appleton Marine, P.O. Box 2339, Appleton, WI 54913
ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Chester Hoist Division, Monogram Industries, P.O. Box 229, Lisbon, OH 44432
Grove Manufacturing Co., P.O. Box 21, Shady Grove, PA 17256
HIAB Cranes & Loaders Inc., R.D. 22 Interchange Place, York, PA 17404
Hertz Equipment Rental Corp., 7 Enin Rd., Bldg # 2, Parsippany, NJ 07054
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
National Crane Corp., 11200 North 148 St., Waverly, NE 68462
National Supply Company, 1455 West Loop South, Houston, TX 77027
J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany
Superior-Lidgerwood-Mundy Corp., 1101 John Ave., Superior, WI 54880

DECK MACHINERY—Cargo Handling Equipment

Argo Marine, 140 Franklin St., New York, NY 10013
Marine Technical Associates, 195 Patterson Avenue, Little Falls, NJ 07424
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
Murdoch Machine & Engineering Company of Texas, P.O. Box 2278, Irving, TX 75061

DECKING—GRATING

International Grating, Inc., 7625 Parkhurst, Houston, TX 77028
Selby, Battersby & Company, 5220 Whiby Ave., Philadelphia, PA 19143
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206

DIESEL ACCESSORIES—CYLINDER LINERS

B & W Marine Service, 50 Broadway, New York, NY 10004
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, Massachusetts 02360
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Haynes Corporation, P.O. Box 179, Jackson, MI 49204
Van der Horst Corp. of America, 314 Penn Ave., Olean, NY 14760

DIESEL ENGINE—Spare Parts & Repair

Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231

ELECTRICAL EQUIPMENT

Argo Marine, 140 Franklin St., New York, NY 10013
Jergens Inc., 19520 Nottingham Rd., Cleveland, OH 44110
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217
Valad Electric Heating Corporation, 162 Wildey St., Tarrytown, NY 10591
Ward Leonard Electric Co., 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

EMULSIFICATION SYSTEMS

Cleanodan A/S, N. American Agents, American United Marine Corp., 5 Broadway, Route 1, Saugus, MA 01906
Fire-Brite, Hoffer Manufacturing Co., Inc., 1700 E. Church St., Jacksonville, FL 32202

EQUIPMENT—Marine

American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Argo Marine, 140 Franklin St., New York, NY 10013
ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523
Band-It Division, Houdaille Industries, Inc., P.O. Box 16307, Denver, CO 80216
Thomas Coudon Associates, 6655 Amberlon Dr., Baltimore, MD 21227
Genstar Stone Products Company, Executive Plaza IV, Hunt Valley, MD 21031
Harvey's Commercial Marine Div., 2505 S. 252nd St., Kent, WA 98032
b.v. Holmatro Industrial Equipment, P.O. Box 33, 4940 aa Raamsdonksveer, Holland
Imperial Manufacturing Co., P.O. Box 4119, Bremerton, WA 98312
Juniper Industries Inc., 72-15 Metropolitan Ave., Middle Village, NY 11379
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, N.Y. 10550
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
John P. Nissen, Jr. Company, Glenside, PA 19038
Stal-Laval Turbin AB, S-612 20 Finspong, Sweden

EVAPORATORS

Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Aqua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201
MECO (Mechanical Equipment Company, Inc.), 861 Carondelet St., New Orleans, LA 70130

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

FANS—VENTILATORS—BLOWERS

American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Argo Marine, 140 Franklin St., New York, NY 10013
Hartzell Fan, Division of Casile Hills Corp., 901 S. Downing St., P.O. Box 919, Piqua, OH 45356
Joy Manufacturing Company, 338 So. Broadway, New Philadelphia, OH 44663
Zidell Explorations, 3121 S.W. Moody St., Portland, Ore. 97201

FENDERING SYSTEMS—Dock & Vessel

Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004
InterTrade Industries, 15301 Transistor Lane, Huntington Beach, CA 92649
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Samson Ocean Systems, Inc., 99 High St., Boston, MA 02110
Seaward International, Inc., 6269 Leesburg Ave., Falls Church, Va. 22044

FILTERS

Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Mueller Steam Specialty, P.O. Box 1569, Lumberton, NC 28359
Wm. W. Nugent & Co., P.O. Box 948, Skokie, IL 60076

FINANCING—Leasing

A.G. Becker Paribus Inc., 2 First National Plaza, Chicago, IL 60670
Yegen Marine, P.O. Box 25504, Ft. Lauderdale, FL 33320

FIRE PROTECTION, DETECTION, & ALARM SYSTEMS

EEV, Inc., 7 Westchester Plaza, Elmsford, NY 10523
Gulf Publishing Company Video (Firefighting Videotape), P.O. Box 2608, Houston, TX 77001
Walter Kidde, Walter Kidde Dr., Wake Forest, NC 27586
Wormald Fire Systems, One Stanton St., Marinette, WI 54143

FUEL OIL/ADDITIVES—Analysis & Combustion Testing

Ferrous Corporation, 910-108th N.E., P.O. Box 1764, Bellevue, WA 98009
Fuji Trading (America) Ltd., 17 Battery Place, New York, NY 10004
U.S. Borax, 3075 Wilshire Blvd., Los Angeles, CA 90010

FURNITURE

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

GALLEY EQUIPMENT

Argo Marine, 140 Franklin St., New York, NY 10013

GANGWAYS

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

HATCH & DECK COVERS—Chain Pipe

Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207

Marine Moisture Control Co., 60 Inip Dr., Inwood, N.Y. 11696
MacGregor-Navire International, Box 8991, S-402 74 Göteborg, Sweden
MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016
Julius Mock & Sons, Inc., 20 Vessey Street, New York, NY 10007
J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206

HEAT EXCHANGERS

Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
American Standard Inc., Heat Transfer Div., Buffalo, NY 14240
Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

HULL CLEANING

Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Gulf International Divers, P.O. Box 1342, Gretna (New Orleans), LA 70052
Performance Hull Cleaning Services, Inc., P.O. Box 655, New Orleans, LA 70059-0655
Petrachemical Services, Inc., 3820 Dauphine St., New Orleans, LA 70117
Seaward Marine Services, Inc., 6269 Leesburg Pike, Falls Church, VA 22044
Stork Services B.V., P.O. Box 2013, 7750 CA Hengelo, Holland

HYDRAULICS

Aeroquip Corp., 1130 Maynard Road, Jackson, MI 49202
HRS, Inc., 3334 Victor Court, Santa Clara, CA 95050
Hydraulics, 6338 Lindmar Drive, Goleta, CA 93017
Washington Chain & Supply, Inc., P.O. Box 3646, Seattle, WA 98124

INERT GAS—Generators—Systems

Camarc Corp., 186 Prescott St., Worcester, MA 01605
Foster Wheeler Boiler Corp., 110 So. Orange Ave., Livingston, N.J. 07039
Maritime Protection A/S, N. American Agents, American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906
Salwico Inc., 5 Marine View Plaza, Hoboken, NJ 07030

INSULATION—Cloth, Fiberglass

Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Superior Energies, Inc., P.O. Drawer 386, Groves, TX 77619
Waco Inc., P.O. Box 24347, Richmond, VA 23224

INSURANCE

Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Adams & Porter, 1 World Trade Center, Suite 8433, New York, N.Y. 10048
Assurance Foreningen Skuld, P.O. Box 1376 Vika, Stortingogaten 18, N-OSLO 1, Norway
R.A. Fulton & Company Insurance Services, 100 California St., San Francisco, CA 94111
MGA International, 419 Park Avenue South, New York, NY 10016
Midland Insurance Co., 160 Water St., New York, N.Y. 10038
United States P&I Agency, Inc., 80 Maiden Lane, New York, NY 10038

JOINER—Watertight Doors—Paneling

Bailey Distributors, Inc., 74 Sullivan St., Brooklyn, NY 11231
Isolamin Panels, c/o Consafe, Inc., P.O. Box 40339, Houston, TX 77040
Masonite Commercial Division, Dover, OH 44622
Megadoor Inc., 441 Lexington Ave., Suite 903, New York, NY 10017
Simpson Timber Company, Third & Franklin, Shelton, WA 98584
Walz & Krenzer, Inc., 400 Tralbold Road, Rochester, NY 14624

KEEL COOLERS

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

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights

ACR Electronics, Inc., P.O. Box 2148, Hollywood, FL 33022
Browning Marine Inc., (Aqua Signal) 33W 480 Fabyan Parkway, Ste 105, West Chicago, IL 60185
Keuffel & Esser/Kratos, 20 Whippany Rd., Morristown, NJ 07960
Midland-Ross Corp., Russellstoll Division, 530 W. Mt. Pleasant Ave., Livingston, NJ 07039
Oceanic Electrical Mfg. Co., 157 Perry St., New York, NY 10014
Oreck Corp., 100 Plantation Rd., New Orleans, LA 70123
Perko Inc., P.O. Box 6400D, Miami, Florida 33164
Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209
Port Electric Supply Corp., 157 Perry St., New York, NY 10014
SSAC Inc., P.O. Box 395, Liverpool, NY 13088

LINE BLINDS

Stacey/Fetterolf Corp., P.O. Box 103, Skippock, PA 19474

MACHINE TOOLS

Republic-Lagun Machine Tool Co., 1000 E. Corson St., Carson, CA 90749

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING

AMT Inc., 2400 N.W. 39th Ave., Miami, FL 33142
Amermarine USA Inc., P.O. Box 9205, Baltimore, MD 21222
American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080
Essex Machine Works, Essex, CT 06426
Golten Marine Co., Inc., 60 Van Brunt St., Brooklyn, NY 11231
Jered Brown Brothers Inc., 1300 Coolidge, P.O. Box 2006, Troy, MI 48007-2006
Scotchman Industries, Inc., P.O. Box 850, Philip, SD 57567-0850

METALS

Bayou Steel Corp., P.O. Box 5000, Laplace, LA 70068
Inland Steel Company, 30 West Monroe Street, Chicago, IL 60603
International Grating, Inc., 7625 Parkhurst, Houston, TX 77028

MOORING SYSTEMS

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

NAME PLATES—BRONZE—ALUMINUM

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

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS

Adams & Chute, Huntingtown Road, Newtown, CT 06470
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Highway (Suite 1300), Arlington, VA 22202
Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Systems Engineering Corp., P.O. Box 4265, Virginia Beach, VA 23454
Amirikon 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 Westbrook Mall, Vancouver, B.C., Canada V6S 2L2
Del Breit Inc., 326 Picayune Place (Suite 201), New Orleans, LA 70130
Bretagne ACB Corp., 344 Camp St., Suite 1000, New Orleans, LA 70130
Carl G. Brimmekamp & Co., Inc., 102 Hamilton Ave., Stamford, CT 06902
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
CADCOM, 107 Ridgely Ave., Annapolis, MD 21401
Phillips Cartner & Co., Inc., 203 So. Union St., Alexandria, VA 22314
Century Engineering, Inc., 32 West Rd., Towson, MD 21204
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
John P. Colletti & Associates, P.O. Box 13378, Pittsburgh, PA 15243
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, Mass. 02026
Grane Consultants Inc., 15301 1st Ave., So. Seattle, Washington 98148
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129

Designers & Planners, Inc., 1725 Jefferson Davis Highway, Suite 700, Arlington, VA 22202
ECO Inc., 1036 Cape St. Claire Center, Annapolis, MD 21401
Parker C. Emerson & Associates, 17935 Cardinal Drive, Lake Oswego, Oregon 97034
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
Fleetweather Ocean Services, Inc., Rd. # 2, Box 260, Hopewell Junction, NY 12533
Christopher J. Foster, Inc., 16 Sintsink Drive East, Port Washington, N.Y. 11050
Friede and Goldman Ltd., 935 Gravier St., New Orleans, LA 70112
GEOD Corporation, 73 Oak Ridge Road, NJ 07438

BUYERS DIRECTORY

(continued)

Giannotti & Associates, Inc., 703 Giddings Ave., Suite U-3, Annapolis, MD 21401
Gibbs & Cox, Inc., 119 West 31st Street, New York, NY 10001
John W. Gilbert Associates, Inc., 66 Long Wharf, Boston, MA 02110
The Glisten Associates, Inc., 610 Colman Bldg., 811 First Ave., Seattle, WA 98104
Phillip Gresser Associates, Ltd., 3250 South Ocean Blvd., Palm Beach, FL 33480
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
J.J. Henry Co., Inc., Two World Trade Center—Suite 9528, New York, N.Y. 10048
Hi-Test Laboratories, Inc., P.O. Box 226, Buckingham C.H., VA 23921
Hoffman Maritime Consultants Inc., P.O. Box 186, Glen Head, NY 11545
Intramarine, Inc., P.O. Box 53043, Jacksonville, FL 32201
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
Capt. Ernest James, 2849 Beavercrest Dr., Lorain, OH 44053
Jantzen Engineering Co., 6655-H Amberton Drive, Baltimore, Md. 21227
James S. Kragen & Co., Inc., 3333 Rice St., Miami, Fla. 33133
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
MacLear & Harris, Inc., 28 West 44 Street, New York, N.Y. 10036
Fendall Marbury, 1933 Lincoln Drive, Annapolis, MD 21401
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, N.Y. 11746
Marine Power Associates, 4475 Mission Blvd., Suite 235, San Diego, CA 92109
Marine Technical Associates, Inc., 95 River Rd., Hoboken, NJ 07030
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape Inc., P.O. Box 2366, Littleton, MA 01460
R. Carter Morrell, 715 S. Cherokee, Bartlesville, OK 74003
NKF Engineering Assoc., Inc., 8150 Leesburg Pike, Vienna, VA 22202
Nelson & Associates, Inc., 1405 N.W. 167th Street, Miami, FL 33169
New England Engineering & Marine Services, Rt. 2, Box 50, York, ME 03909
Nickum & Spaulding Associates, Inc., 2701 First Ave., Seattle, WA 98121
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean-Oil International Engineering Corporation, 3019 Mercedes Blvd., New Orleans, La. 70114
PRC Guralnick, 5252 Balboa Ave., San Diego, CA 92117
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Pet-hul, Inc., 1380 S.W. 57th Avenue, Fort Lauderdale, FL 33317
Precision Systems Engineering, 824B Eastgate Dr., Mt. Laurel, NJ 08054
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Florida 33316
SEACOR Systems Engineering Associates Corp., 19 Perino Blvd., Cherry Hill, NJ 08003 (Publications Division at Cherry Hill location)
STV/Sanders & Thomas, Inc., 1745 Jefferson Davis Hwy., Arlington, VA 22202
Seaworthy Engine Systems, 36 Main Street, Essex, CT 06426
Seaworthy Engine Systems, 17 Battery Place, New York, NY 10004
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
Simmons Associates, P.O. Box 760, Sarasota, FL 33578
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
J.F. Straschein Associates, 666 Old Country Rd., Garden City, NY 11530
Timsco, 622 Azalea Road, Mobile, AL 36609
Tracor Hydraulics, Inc., 7210 Pindell School Rd., Laurel, MD 20707
Uhlig & Associates, Inc., 8295 SW 188th St., Miami, FL 33157
Vevey Engineering Works Ltd., CH-1800 Vevey, Switzerland, U.S. Rep. Carl G. Brimmekamp & Co., Inc., 102 Hamilton Ave., Stamford, CT 06902
Thomas B. Wilson, Associates, 1258 North Avalon Blvd., Wilmington, CA 90744
Yacht Design Institute, 9 Main St., Blue Hill, ME 04614
NAVIGATION & COMMUNICATIONS EQUIPMENT
Alden Electronics, 1145 Washington St., Westborough, MA 01581
American Hydromath Co., Buckwheat Bridge Rd., Germantown, N.Y. 12526
Anschutz & Co. GmbH, Postfach 6040, D-2300 Kiel 14, West Germany
Atkinson Dynamics, Section 6, 10 West Orange Ave., South San Francisco, CA 94080
CMC Communications Inc., 5479 Jetport Industrial Blvd., Tampa, FL 33614
COMSAT World Systems, 950 L'Enfant Plaza, S.W., Suite 6151 Washington, D.C. 20024
Cybernet International, Inc., 7 Powder Horn Dr., Warren, NJ 07060
A/S Elektrisk Bureau, P.O. Box 98, N-1360 Nesbru, Norway
Electro-Nav Inc., 840 Bond Street, Elizabeth, NJ 07201
EPSCO Marine, 550 Wholesalers Parkway, Harahan, LA 70123
Fleet Marine, 1820 N.E. 146th Street, North Miami, FL 33181
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Harris Communications (RF Communications), 1680 University Avenue, Rochester, NY 14610
Henschel Corp., 14 Cedar St., Amesbury, MA 01913
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07631
Japan Radio Co., Ltd., Akasaka Twin Tower (Main), 17-22 Akasaka 2-chome, Minato-ku, Tokyo 107, Japan
King Radio Corporation, 400 North Rodgers Rd., Olathe, KS 66062
Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
Kongsberg Vapenfabrikk, Narcontrol Division, P.O. Box 145, Horten 3191, Norway
Krupp Atlas-Elektronik, 1453 Pinewood St., Rahway, NJ 07065
Lorain Electronics Corp., 2307 Leavitt Rd., Lorain, OH 44052
Magnavox Navigation Systems, 2829 Maricopa Street, Torrance, CA 90503
Magnum Distributors Inc., 1000 S. Dixie Hwy. #3, Pompano Beach, FL 33060
Nav-Com, Inc., 9 Brandywine Drive, Deer Park, NY 11729
Novidyne Corp., 11824 Fishing Point Drive, Newport News, VA 23606
Perko Inc. (Lights), P.O. Box 6400D, Miami, FL 33164
Racal-Decca Marine, Inc., 4200 23rd Avenue West, Seattle, WA 98199
Radar Devices, Inc., 2955 Merced Street, San Leandro, CA 94577
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033
Raytheon Marine Co., 676 Island Pond Road, Manchester, N.H. 03103
Raytheon Ocean Systems Company, Westminster Park, Risho Avenue, East Providence, RI 02914
Raytheon Service Co., 103 Roessler Rd., Glen Burnie, MD 21061
Rivertronics, P.O. Box 247, Godfrey, IL 62035
Robertson Auto Pilot, 400 Oser Ave., Hauppauge, NY 11738
Selesmar S.p.A., Casella Postale 9, 50020 Montagnana Val Di Peso, Firenze, Italy
Servo Corporation of America, 111 New South Road, Hicksville, NY 11802
Simrad, Inc., 2208 N.W. Market St., Suite 600, Seattle, WA 98107
Sperry Corporation, Great Neck, NY 11020
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Texas Instruments, Inc., P.O. Box 405, 3438, Lewisville, TX 75067
OILS—Marine—Additives
Gulf Oil Company—U.S. (Domestic Oils), 909 Fannin Street, Houston, TX 77001
Gulf Oil, New York District Sales Office (Domestic), 433 Hackensack Avenue, Hackensack, NJ 07601
Gulf Oil Trading Co., 535 Madison Ave., New York, NY 10022
Mobil Oil Corp., 150 East 42 Street, New York, NY 10017

Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Texaco, Inc. (International Marine), 135 East 42nd St., N.Y., N.Y. 10017
OIL/WATER SEPARATORS
Alfa Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Biospherics Incorporated, 5001 Forbes Blvd., Lanham, MD 20801
Butterworth Inc. (USA), 3721 Lopos Dr., P.O. Box 18312, Houston, TX 77223-9989
Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Hyde Products, Inc. 810 Sharon Dr., Westlake, OH 44148
Microphar, Inc., P.O. Box 490, Willits, CA 95490
Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
National Fluid Separators, Inc., 1239 Hanley Industrial Court, St. Louis, MO 63144
PACE Maine Systems, Div. of St. Louis Ship, 611 E. Marceau St., St. Louis, MO 63111
Phoenix Oil Refiner Co., Inc., 330 Hill Ave., Nashville, TN 37210
PAINTS—COATINGS—CORROSION CONTROL
American Abrasive Metals, 460 Coit Street, Irvington, NJ 07111
Ameron, 1967 Burgess Circle, Placentia, CA 92670
Argo Marine, 140 Franklin St., New York, NY 10013
Bareco, 6910 East 14th St., Tulsa, OK 74112
CLEMCO, P.O. Box 7680, San Francisco, CA 94120
"CONSOL" manufactured by Contact Paint & Chemical Co. Inc., 200 S. Franklinton Rd., Baltimore, MD 21223
Devac Marine Coatings Co., P.O. Box 7600, Louisville, KY 40207
E.I. Dupont De Nemours & Co., Inc., Nemours Bldg. Rm. N-2504-2, Wilmington, DE 19898
Esgard, Box 2698, Lafayette, LA 70502
Eureka Chemical Company, 234 Lawrence Avenue, So. San Francisco, CA 94080
Grow Group, Inc., 200 Park Ave., New York, NY 10017
Hempel Marine Paints, Inc., Foot of Currie Ave., Wallington, NJ 07057, 2425 Fountainview, Suite 340, Houston, TX 77057, P.O. Box 10265, New Orleans, LA 70181
International Paint Company, Inc., 2270 Morris Avenue, Union, NJ 07083
Jaegle Paint Co., Inc., 1912 Darby Rd., Havertown, PA 19083
Jolon Marine Coatings Inc., 840 Key Hwy., Baltimore, MD 21230
Magnus Maritec International Inc., 150 Roosevelt Pl., P.O. Box 150, Palisades Park, NJ 07650
Edison, N.J. 08817
Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Products Research & Chemical Corp., 5454 San Fernando Rd., Glendale, CA 91203
Salwico Glassflake, Inc., 5 Marine View Plaza, Hoboken, NJ 07030
Seaguard, 4030 Seaguard Ave., Portsmouth, VA 23705
Selby, Battersby & Company, 5220 Whiby Avenue, Philadelphia, PA 19143
SermeTel, Inc., 4401 SermeTel Dr., Mass Point, MS 39563
PETROLEUM SUPPLIES
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
PIER REPAIRS
Acquatic Marine Systems, Inc., P.O. Box 326, Williamsville, NY 14221
PIPE-HOSE—Cargo Transfer, Clamps, Couplings, Coatings
Caion Company, 9760 Shepard Rd., Macedonia, OH 44056
Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
Crawford Fitting Company, 29500 Solon Rd., Solon, OH 44139
Hydro-Craft, Inc., 1821 Rochester Industrial Dr., Rochester, MI 48063
Knights Piping Inc., 5309 Industrial Rd., Pascagoula, MS 39567
Metropolitan Plumbing Supply Corp., 5000 Second St., Long Island City, NY 11101
Penco Div./Hudson Engineering Co., One World Trade Center, Suite 3000 New York, NY 10048
Selkirk Metalbestos, Box 19000, Greensboro, NC 27419
Stauff Corporation, 21-31 Industrial Park, Waldwick, NJ 07463
PLASTICS—Marine Applications
Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231
PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
American Lahmann Corp., 1415 Chestnut Ave., Hillside, NJ 07205
Aquamaster, 4125 9th Ave., Seattle, WA 98107
Armco Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bergen Diesel Inc., 2110 1-10 Service Rd., Kenner, LA 70062
Bird Johnson Company, 110 Norfolk St., Walpole, Mass. 02081
Bombardier, 1051 Dickson, Montreal, Quebec, Canada H1N 2H7
Bormeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Caterpillar Engine Division, 100 N.E. Adams, Peoria, IL 61629
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
Columbian Bronze Corporation, 216 No. Main Street, Freeport, NY 11520
Combustion Engineering, Inc., Windsor, Connecticut 06095
Daihatsu Diesel (USA) Inc., 180 Adams Ave., Houppauge, NY 11788
Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Diesel Marine International, Ltd., c/o NORSHIPCO, P.O. Box 2100, Norfolk, VA 23501
Elliott Company, 1809 Sheridan Ave., Springfield, OH 45505
General Electric Co., Diesel Power Products, 2901 E. Lake Rd., Erie, PA 16531
General Motors, Electro-Motive Division, LaGrange, IL 60525
George Engine Company, Inc., Lafayette, LA
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Harbormaster, 36 Hancock St., Quincy, MA 02171
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
KaMeWa, P.O. Box 1010, S-68101, Kristinehamn, Sweden
KaMeWa, 1800 West Loop So., Suite 1620, Houston, TX 77027
Krupp Mak Diesels, Inc., 4329-33 Di Paolo Center, Glenview, IL 60025
Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323
Lufkin Industries, Inc., P.O. Box 749, Lufkin, TX 75901
M.A.N.-B&W Diesel, 2, Ostervej, DK-4960 Høleby, Denmark
MTU of North America, One E. Putnam Ave., Greenwich, CT 06830; 10450 Corporate Dr., Suarland, TX 77478; 2945 Railroad Ave., Morgan City, LA 70203; 180 Nickerson St., Seattle, WA 98109; 1730 Lynn St., Arlington, VA 22209
MWM—Murphy Diesel, 12 Greenway Plaza, Suite 1100, Houston, TX 77046
Mapeco Products, Inc., 20 Vesey St., New York, NY 10007
Maritime Industries Ltd., 6307 Laurel St. Burnaby, B.C., Canada V5B3B3
Michigan Wheel, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507
National Marine Service Louisiana, Inc., 222 Bayou Rd., Belle Chasse, LA 70037
National Propeller Exchange, P.O. Box 1444, Grafton, VA 23692
Omnihruster 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
Karl Senner, Inc., P.O. Box 10055, New Orleans, LA 70181
Skinner Engine Company, P.O. Box 1149, Erie, PA 16512
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Transamerica Delaval Inc., Engine & Compressor Div., 550 85th Ave., Oakland, CA 94621
Transamerica Delaval, Inc., Turbine & Compressor Div., P.O. Box 8788, Trenton, N.J. 08650
Turbine Specialties, Inc., P.O. Box 207, West State Street Road, Solina, KS 67401

Turbine Specialties/Gulf Coast, Inc., 1900 Industrial Blvd., Harvey, LA 70058
Ulstein Trading Ltd. A/S, N-6-65, Ulsteinvik, Norway
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
Welco Industries, Inc., 9027 Shell Rd., Cincinnati, OH 45236
ZF of North America, Inc., 3225 Commercial Avenue, Northbrook, IL 60062
ZF of North America, Inc. (Motive Power Corporation), P.O. Box 365, Mineola, NY 11501
PUMPS—Repairs—Drives
Argo Marine, 140 Franklin St., New York, NY 10013
Jim's Pump Repair, 48-55 36th St., Long Island City, NY 11101
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Penco Div./Hudson Engineering Co., One World Trade Center, Suite 3000, New York, NY 10048
Sims Pump Valve Co., Inc., 1314 Park Ave., Hoboken, NJ 07030
Transamerica Delaval, Pyramid Pump Div., P.O. Box 447, Monroe, NC 28110
Vita Motivator Company, 200 West 20th St., New York, NY 10011
Warren Pumps Division, Bridges Avenue, Warren, MA 01083
Wilden Pump & Engineering Co., 22060 Van Buren St., P.O. Box 845, Colton, CA 92324
REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Part Refrigeration Div., 157 Perry St., New York, NY 10014
ROLLING SYSTEMS
Hilman, Inc., 2604 Atlantic Ave., Wall (Belmar), NJ 07719
ROPE—Manila—Nylon—Hawsers—Fibers
American Mfg. Co., Inc., Willow Avenue, Honesdale, Pa. 18431
Atlantic Cordage Corp., 60 Grant Avenue, Carteret, NJ 07008
DuPont Co., KEVLAR Aramid Fiber, Room G-15465, Wilmington, DE 19898
Norton Chemplast, 309-150 Dey Rd., Wayne, NJ 07470
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
Tubbs Cordage Company, P.O. Box 709, Orange, CA 92666
Wall Industries, Inc., P.O. Box 560, Elkin, NC 28621
RUDDER ANGLE INDICATORS—STEERING
Hy-Drive America Corp., 3629 Verran Blvd., Long Island City, NY 11106
Marine Drive Systems, 519 Raritan Center, Edison, NJ 08817
Robertson, 135 Fort Lee Rd., Leonia, NJ 07605
SAFETY EQUIPMENT
Wormald Fire Systems, One Stanton St., Marinette, WI 54143
SANITATION DEVICES—Pollution Control
Argo Marine, 140 Franklin St., New York, NY 10013
Davitt 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
Marine Moisture Control Co., Inc., 60 Inip Dr., Inwood, L.I., N.Y. 11696
National Sanitation Foundation, P.O. Box 1468, Ann Arbor, MI 48105
SCAFFOLDING EQUIPMENT—Work Platforms
McCaussey Lumber Co., 7751 Lyndon, Detroit, MI 48238
Patent Scaffolding Co., One Bridge Plaza, Fort Lee, NJ 07024
Trus-Joist Corp., P.O. Box 60 Boise, ID 83704
SHAFT SEALS, REVOLUTION INDICATOR EQUIPMENT
Bird-Johnson Co., 100 Norfolk St., Walpole, MA 02081
Crane Packing Company, 435 Regina Dr., Clarksburg, MD 20734
EG&G Sealol, Engineered Products Div., Marine Products Group, Warwick, RI 02888
Penco Div./Hudson Engineering Co., One World Trade Center, Suite 3000, New York, NY 10048
SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
Fred Devine Diving & Salvage, Inc., 6211 N. Ensign, Swan Island, Portland, OR 97217
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201
SHIPBUILDING EQUIPMENT
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, FL 33156
Total Transportation System Inc., 813 Forrest 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, Ohio 45042
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
Tilene, P.O. Box 729, Albany OR 97321
Welded Beam Company, P.O. Box 280, Perry OH 44081
SHIPBUILDING—Repairs, Maintenance, Drydocking
Alabama Maritime Corp., P.O. Box 3026, Mobile, AL 36652
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 10006
Asmar Shipyards Co., Astilleros y Maestranzas de la Armada, Prat 856, Piso 14, Casilla 150-V, Valparaiso, Chile, S.A.
Astilleros Balboa, S.A., c/o Jackson Marine Corp., 17 Battery Place, New York, NY 10004
Atlantic Dry Dock, P.O. Box 276, Ft. George Island, Jacksonville, FL 32226
Atlantic Marine Inc., P.O. Box 138, Ft. George Island, Jacksonville, FL 32226
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bath Iron Works Corp., 700 Washington St., Bath, ME 04530
Boy Shipbuilding Corp., 605 North 3rd Ave., Sturgeon Bay, WI 54235
Bender Shipbuilding & Repair Co., Inc., P.O. Box 42, Mobile, AL 36601
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
Blomh & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Bormeister & Wain Skibsvaerft A/S, P.O. Box 2122, Refshaleoen-1015 Copenhagen K-Denmark
Burrard Yarrow Corporation, P.O. Box 86099, North Vancouver, B.C., Canada
Caneco Shipyard, Rua Carlos Seidl, 714, Caju, 20.931, Rio de Janeiro, RJ, Brazil
Contieri Navali Riuniti, Via Cipro, 11, 16100 Genova, Italy
Corrington Slipways Pty. Ltd., Old Punt Rd., Tomago NSW Australia 2322
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock Company Inc., 26 Broadway, Suite 741, New York, NY 10004
Daewoo International (America) Corp., 437 Madison Ave., New York, NY 10022
Daewoo Shipbuilding & Heavy Machinery Ltd., Ayangri, Changsung-PO, Kajie-Kun, Kyungnam, Korea
Davie Shipbuilding Ltd., P.O. Box 130, Levis, Quebec, Canada G6V6N7
Darbyl Ltd., Military Road, 1 Industrial Sites, West Bank, 5201 East London, Republic of South Africa
Dravo Marine Equipment Company, Neville Island, Pittsburgh, PA 15225
Eastern Marine, Inc., P.O. Box 1009, Panama City, FL 32401
Equitable Shipyards, Inc., P.O. Box 8001, New Orleans, LA 70182
FMC Corp., Marine & Rail Equipment Div., 4700 N.W. Front Ave., Portland, Oregon 97208
Far East Livingston Shipbuilding Ltd., 31 Shipyard Rd., Jurong Town, Singapore 2262
Genstar Marine, 10 Pemberton Ave., No. Vancouver, B.C., Canada V7P 2R1
Gladding-Hearn Shipbuilding Corp., 1 Riverside Ave., Somerset, MA 02725
Golten Marine Co., Inc., 60 Van Brunt St., Brooklyn, NY 11231
HBC Barge, Inc., Grant Building, Pittsburgh, PA 15219
Halter Marine, Inc., P.O. Box 29266, New Orleans, LA 70189
Hoboken Shipyards, Inc., 1301 Hudson St., Hoboken, NJ 07030
Hong Kong United Dockyards Ltd., P.O. Box 534, Kowloon Central Post Office, Kowloon, Hong Kong
Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, Korea
I.N.M.A. S.p.A., 19100 La Spezia, v. le S. Bartolomeo 362, Italy

Valmet's New Automation System Ordered For Two Product Carriers At Hyundai

A research project by the Royal Norwegian Council for Scientific and Industrial Research, "Ship of the Future," has led to an active cooperation between shipowners, suppliers, shipyards, and research institutions in the field of ship automation. The results of the project will now be implemented onboard two new ships being built by Hyundai Heavy Industries in South Korea for L. Gill-Johannesen & Company of Oslo.

In tough international competition—in the final round from Japan—Valmet Automation a.s. of Spikkestad, Norway, won the contract for the automation systems. This was made possible through close cooperation with the Oslo-based Data-Ship a.s. Together, the two firms were able to offer a systems package representing the most technically advanced applications available on the international market.

The Valmet system components are well-proven standard products. What is new in the ship automation field for the L. Gill-Johannesen ships is the actual system concept, i.e., internal data communication between sub-systems; extensive utilization of an advanced, microprocessor-based process control system (Valmet's Damatic); and an advanced administrative computer system with programs for maintenance, spare parts, purchasing, reporting, harbor information, and accounting.

The powerful data net to which the sub-systems are connected facilitates extensive data communication internally onboard the ship, as well as externally via the ship's satellite communications system.

The data net and the administrative computer system are being supplied by Data-Ship a.s. For a number of years this company has specialized in administrative computing for shipping, onboard as well as ashore. It has also participated actively in the development of data communications ship/shore.

Valmet's Damatic Marine Systems (DMS) will monitor and control the propulsion machinery and power supply, as well as the loading and discharging processes.

The process control system is based on the industrial version of DMS, which is already operating in 150 major industrial plants. When DMS was introduced in the marine market about a year ago, it embodied something genuinely new in the field.

Valmet has now obtained contracts for installations aboard 12 ships, of which seven are being built in South Korean yards. Three installations have already been delivered. The installations aboard the L. Gill-Johannesen ships are characterized by a high degree of utilization of the technical potential for a system of this type, and are considered to be a breakthrough for advanced process control systems for ships. Using the Damatic system, the crew can monitor and control, via color screens, a number of processes that traditionally require between seven and 10 separate automation systems, with resultant operation and maintenance problems.

Valmet Automation is said to be the only company, internationally, that has obtained type approval for a so-called "multi-function automation system" by a classification society (Det norske Veritas) for this kind of system.

For further information and free literature on Valmet's shipboard automation systems,

Circle 54 on Reader Service Card

Trimble Navigation Introduces The Model 300 LORAN Computer—Literature Available

The Trimble Navigation Model 300 LORAN Computer combines LORAN-C technology, state-of-the-art computer technology, and traditional dead-reckoning navigation in one small, easy to use package. It gives the navigational information rapidly and with accuracy. In its Dead Reckoning Mode it can compute dead-reckoning position when loran signals have been temporarily lost or when out of range of loran.

A Track Mode stores the latest loran and/or satellite position fixes in memory. This feature lets one retrace or review the vessel's course and is invaluable should one lose loran reception. It can provide an accurate starting position for dead reckoning.

Set and drift are computed by the Trimble Model 300 LORAN Computer and are available at the press of a key. Set and drift are calculated using speed and heading and loran position.

Waypoint switching can be manual or automatic, and one can be copied into another. Waypoint functions are the same whether used in dead reckoning or with loran.

When used with external transducers or other navigational aids, the Model 300 becomes the center of a complete navigation system coordinating information from a number of sources.

For complete details and free literature on the Trimble Model 300 LORAN Computer,

Circle 55 on Reader Service Card

Jakobson Shipyard Inc., P.O. Box 329, Oyster Bay, NY 11771
 Jeffboat, Inc., Jeffersonville, Ind. 47130
 Keppel Shipyard Limited, 325 Telok Blangah Road, P.O. Box 2169, Singapore 0409
 Koch Ellis Barge & Ship Service, P.O. Box 9130, Westwego, LA 70094
 Kane Corp., P.O. Box 6, SF-05801, Hyvinkaa, Finland
 Leevac Corporation, P.O. Box 2607, Morgan City, LA 70381
 Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
 M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany
 McDermott, Incorporated, 1010 Common Street, New Orleans, LA 77227
 Main Iron Works, Inc. P.O. Box 1918, Houma, LA 70361
 Marinette Maine Corporation, Marinette, WI 54143
 Jos. L. Meyer GmbH & Co., P.O. Box 2990 Papenburg 1, West Germany
 Mitsubishi Heavy Industries, Ltd., 5-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo, 100 Japan
 Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
 Moran Shipping Agencies, 10 Jefferson Blvd., Warwick, RI 02888
 Moss Point Marine Inc., P.O. Box 1310, Escatawpa, MS 39552
 Nashville Bridge Company, P.O. Box 239, Nashville, TN 37202
 National Marine Service (Shipyard Division), P.O. Box 38, Hartford, IL 62048
 National Steel & Shipbuilding Corp., San Diego, Calif. 92112
 Neorion Shipyards Syros Ltd., Syros, Greece—U.S.A. Agents: Keppel Marine Agencies Inc., 26 Broadway, New York, NY 10004, 6420 Richmond Ave., Houston TX 77057
 Newport News Shipbuilding & Dry Dock Co., 4101 Washington Ave., Newport News, Va. 23607
 North Florida Shipyards, P.O. Box 3863, Jacksonville, FL 32206
 O.A.R.N. (Officine Allestimento-Riprazioni Navi), P.O. Box 1395, Genoa, Italy 16100
 Overseas Shipyards, Inc., 21 West St., New York, NY 10006
 Patti Industries Inc., South B St., Pensacola, FL 32573
 Pennsylvania Shipbuilding, P.O. Box 442, Chester, PA 19016
 Port Allen Marine Service, P.O. Box 108, Port Allen, LA 70767
 Promet (PTE) Ltd., 27 Pandam Rd., Jurong Industrial Estate, Singapore 22
 Promet Marine Services Corp., 242 Allens Ave., Providence, RI 02905
 Puerto Rico Drydock & Marine Terminals, Inc., P.O. Box 2209, San Juan, Puerto Rico 00903
 Rauma-Repola, 26100 Rauma 10, Finland
 Samsung Shipbuilding & Heavy Industries Co., Ltd., Samsung Main Bldg. 250, 2Ka, Taepyeong-ro, Chung-ku, Seoul, Korea
 St. Louis Ship, 611 East Marceau St., St. Louis, MO 63111
 Savannah Shipyard Co., P.O. Box 787, Savannah, GA 31402
 Schiess Defries, Postfach 111146, Schiess-Str. 61, D-4000 Dusseldorf 11, West Germany
 Service Machine Group, Inc., P.O. Box 2664, Morgan City, LA 70381
 Southbay Boat Inc., P.O. Box 13308, San Diego, CA 92113
 Southern Oregon Marine Engineering and Construction, P.O. Box 1220, Coos Bay, OR 97420
 Southwest Marine, Inc., P.O. Box 13308, San Diego, Ca 92113
 Swiftships Inc., P.O. Box 1908, Morgan City, LA 70380
 Thomas Marine, 37 Bransford St., Patchogue, NY 11772
 Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
 Tracor Marine, P.O. Box 13107, Port Everglades, Fla. 33316
 Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087
 Veralmes Estaleiros Reunidos Do Brasil S.A., Rua Buenos Aires, 68, Rio de Janeiro—RJ—Brazil
 Vickers Cockatoo Dockyard Pty. Ltd., P.O. Box 162 Milsons Point, N.S.W. 2061, Australia
 Walker Boat, P.O. Box 729, Paducah, KY 42002-0729
 Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201

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

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

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

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

SURVEYORS AND CONSULTANTS
 Francis B. Crocco, Inc., P.O. Box 1411, San Juan, Puerto Rico 00903
 Frank Jeffrey & Assoc., 5201 Westbank Exp., Suite 206, Marrero, LA 70073
 M.A. Stream Associates, Inc., 400 Second Ave. W., Seattle, WA 98119

TANK CLEANING
 Butterworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
 Butterworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
 Penco Div./Hudson Engineering Co., One World Trade Center, Suite 3000, New York, NY 10048
 Petrochemical Services, Inc., 3820 Dauphine St., New Orleans, LA 70117

TANK LEVELING INDICATORS
 Kockumation AB, Box 1044, S-212 10 Malmo, Sweden
 Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
 Melritape, Inc., P.O. Box 2366, Littleton, MA 01460
 Norcontrol, 135 Fort Lee Rd., Leonia, NJ 07605
 Salwico Inc., 5 Marine View Plaza, Hoboken, NJ 07030
 Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062

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

VALVES AND FITTINGS
 Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
 Clow Corporation, 1375 Magnolia Ave., Corona, CA 91720
 Dover Corporation, Norris Division, P.O. Box 1739, Tulsa, OK 74101
 Elliott Manufacturing Co., Inc. (Remote Valve Operating Equipment), P.O. Box 773, Binghamton, NY 13902
 Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
 Jamesbury Corp., 640 Lincoln Street, Worcester, MA 01605
 Marine Moisture Control Co., 60 Inip Dr., Inwood, N.Y. 11696
 Metropolitan Plumbing Supply Corp., 50-09 Second Street, Long Island City, NY 11101
 Newmans Inc., 9 Joanna Court, East Brunswick, NJ 08816
 Pittsburgh Brass Manufacturing, Sandy Hill Rd., R.D. 6 Box 387-A, Irwin, PA 15642
 Stacey/Fetterolf Corp., P.O. Box 103, Skippack, PA 19474
 Stockham Valves & Fittings, Box 10326, Birmingham, AL 35202
 Tate Temco, Inc., 1941 Lansdowne Road, Baltimore, MD 21227
 Union Flonetics, P.O. Box 459, Clinton, PA 15026
 Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928

Waukesha Bearings Corp., 405 Commerce St., P.O. Box 798, Waukesha, WI 53186
 Westran Corporation, Valve Components Group, 4025 Remembrance Rd., N.W., Grand Rapids, MI 49504
 Whitey Co., 318 Bishop Rd., Highland Heights, OH 44143
 William E. Williams Valve Corporation, 38-52 Review Avenue, Long Island City, NY 11101
 Winel, Inc., 34655 Mills Road, North Ridgeville, OH 44039
 Zidell Explorations, Inc. (Valve Division), 3121 S.W. Moody Avenue, Portland, OR 97201

VIBRATION ANALYSIS
 DLI Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110

VIDEO TRAINING FILMS
 Gulf Publishing Company Video, P.O. Box 2608, Houston, TX 77001
 ICHCA Canada, P.O. Box 2366, Station D, Ottawa, Ontario, Canada K1P5W9

WATER PURIFIERS
 Alfa Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
 Aqua-Chem, Inc. P.O. Box 421, Milwaukee, WI 53201
 Bull & Roberts, Inc., 785 Central Ave., Murray Hill, NJ 07974
 Drew Chemical Corporation, One Drew Chemical Plaza, Boonton, NJ 07005
 Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
 Marine Moisture Control, 60 Inip Dr., Inwood, NY 11696
 MECO (Mechanical Equipment Company, Inc.), 861 Carondelet St., New Orleans, LA 70130
 Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

WELDING
 CRC Automatic Welding, P.O. Box 3227, Houston, TX 77253-3227
 Metallizing Co. of America, Inc., 321 So. Hamilton, Sullivan, IL 61951
 Miller Electric Mfg. Co., P.O. Box 1079, Appleton, WI 54912
 Oerlikon Welding Industries, Inc., P.O. Box 40964, Houston, TX 77240

WINCHES AND FAIRLEADS
 Braden Winch Co., 800 East Dallas, Broken Arrow, OK 74012
 CONMACO, Inc., 820 Kansas Ave., P.O. Box 5097, Kansas City, KS 66119
 Fritz Culver, Inc., P.O. Box 569, Covington, LA 70434
 Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134
 McElroy Machine & Mfg. Co., Inc., P.O. Box 4454, W. Biloxi, MS 39531
 Reel-O-Matic Systems, Inc., 418 Hellam Street, Wrightsville, PA 17368
 Smith Berger Marine Inc., 516 So. Chicago St., Seattle, WA 98108
 Stanspec Corp., 13600 Deise Ave., Cleveland OH 44110
 Superior-Lidgerwood-Mundy Corp., 1101 John Avenue, Superior, WI 54880

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

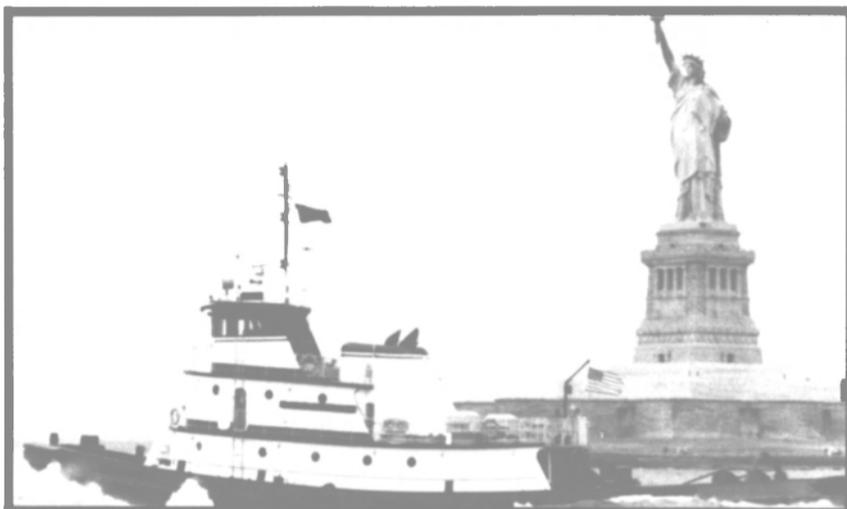
WIRE AND CABLE
 Anaconda Ericsson Inc., Continental Wire and Cable, P.O. Box 1863, York, PA 17405
 Anixter Bros., Inc., 4711 Golf Road, One Concourse Plaza, Skokie, Illinois 60076
 Atlantic Cordage Corp., 60 Grant Ave., Carteret, NJ 07008
 Delco Wire & Cable, Inc., 257 Rittenhouse Circle, Keystone Industrial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

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

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

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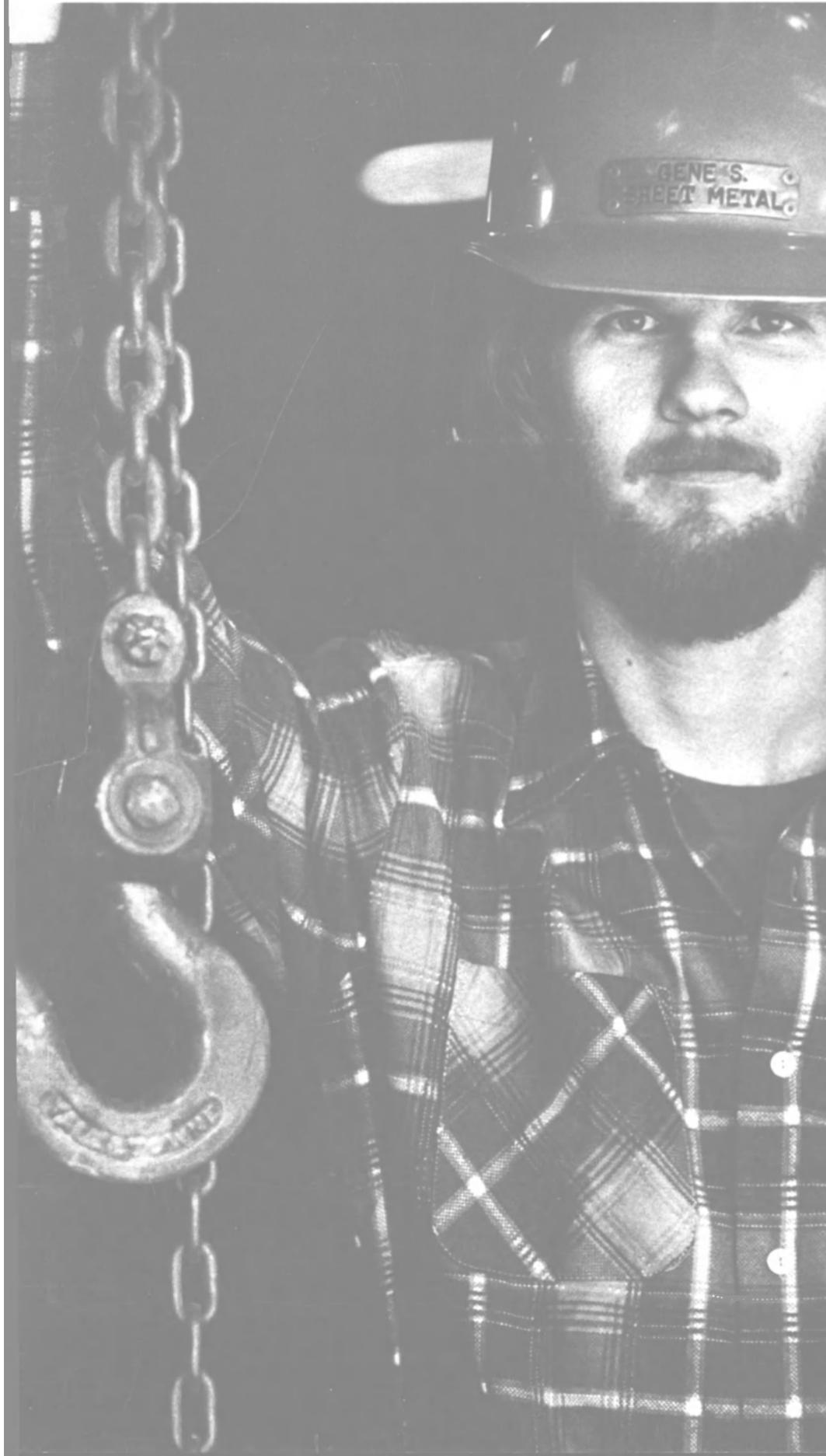
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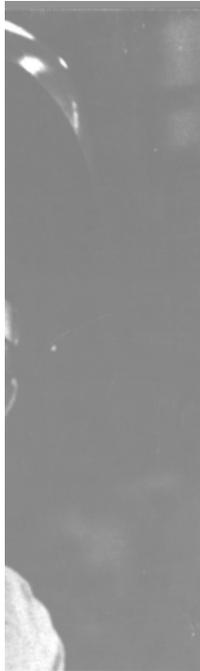
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