

# MARITIME REPORTER AND ENGINEERING NEWS



# FISH EXPO '88

Westward Wind

**DECK MACHINERY/CARGO HANDLING EQUIPMENT REVIEW**

**PREVIEWS FISH EXPO '88 • GASTECH '88**

**OCTOBER 1988 ISSUE**

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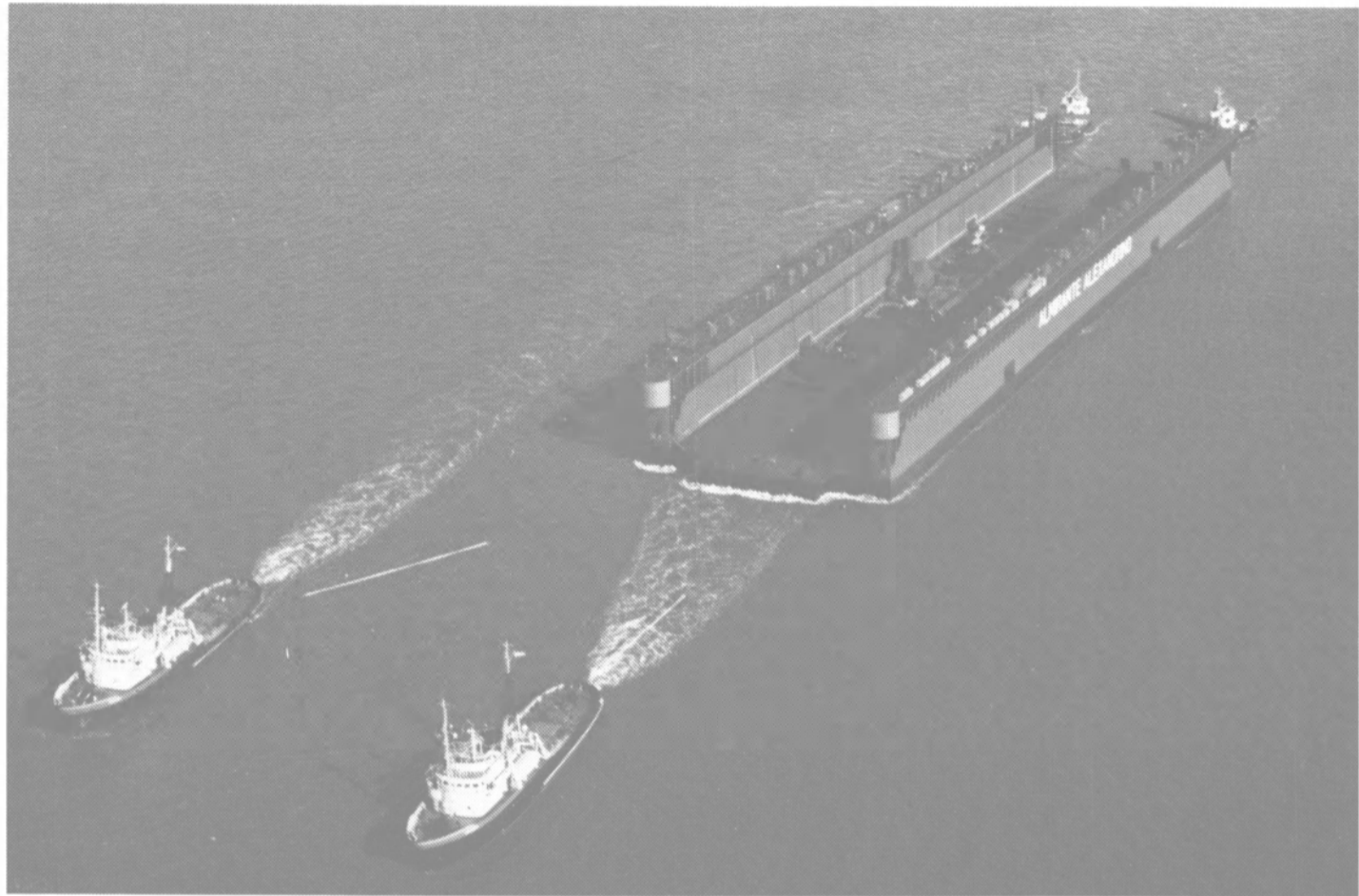
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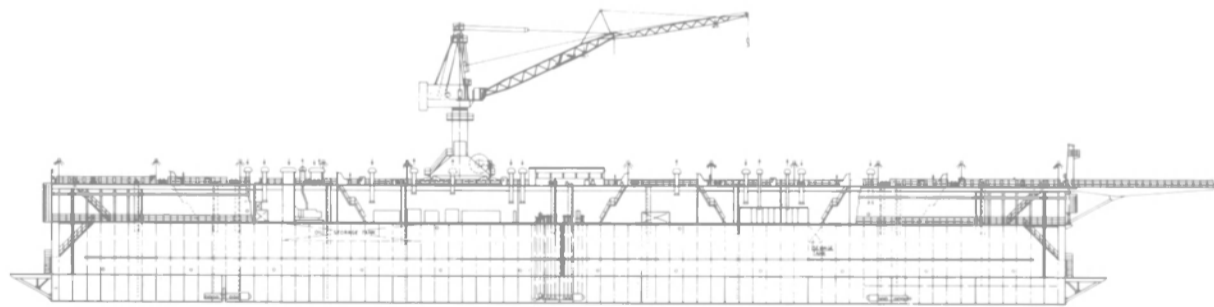
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# ON THE COVER

Cover Photo: The 160-foot crabber/longliner Westward Wind after conversion at MARCO-Seattle Shipyard. See story on page 41 for details. Photo by Lew Van DeMark.

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**GASTECH '88**  
-Preview-  
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## Newport News To Build Navy Dry Deck Shelters Under \$18-Million Pact

Newport News Shipbuilding & Drydock Co., Newport News, Va., was recently awarded an \$18-million contract to construct three dry deck shelters. The work is expected to be completed in July 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-5216).

## \$106-Million In Bonds To Fund Improvements At Virginian Ports

The Virginia Port Authority, Hampton Roads, Va., recently announced that it has been issued \$106 million in port revenue bonds. The bonds will be the funding source for expansion and improvement projects that will take place over the next two to three years.

The projects that will be funded by the bonds will include work at Newport News Marine Terminal, Norfolk International Terminals, and Portsmouth Marine Terminal and consist of land acquisition, development of container berths, entrance area improvements, storage area expansion, and the purchase of container-handling support equipment. Wharf and storage area construction at the Port of Richmond has also been slated as one of the projects.

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## Containership To Be Converted To US-Flag Fish Processor

Profish International Inc. of Seattle recently acquired the American President Lines (APL) containership President Wilson in order to convert it into a U.S.-flag at-sea fish factory vessel.

According to **Wally Pereyra**, president of Profish International, the 16,500-grt partial containership President Wilson, employed by APL in the Far East as a feeder vessel, will be converted at an as-yet-unnamed Pacific Northwest shipyard.

After her refit is completed in the fall of 1989, the 783-foot President Wilson will be operated in the Pacific as a processor of pollock into surimi, a fish paste, which is mostly used for export to Japan. She will also produce frozen filets for the domestic market, as well as processing fish meal.

Jensen Maritime Consultants of Seattle and Fiskertrana Eldoy of Norway are the naval architects involved in the project.

## Great Lakes Carriers Report Cargo Increases

Shipments of coal, stone, and iron ore on the Great Lakes during June were up 13.5 percent over June of 1987, according to the Lake Carriers Association. The steel industry, which is now operating at over 90 percent capacity, is responsible for the upturn in ore and limestone carriage, according to the association. The carriers' group also reported that 63 out of 70 U.S.-flag ships on the Great Lakes were in use, two vessels over May's total.

## Campbell Receives Order For Three 'Super Pacific' Tuna Purse Seiners —Literature Available

Campbell Shipyard, San Diego, Calif., has been awarded contracts to construct three more 1,500-ton-capacity "Super Pacific" Class tuna purse seiners in addition to two already on order. The 257- by 45- by 26-foot vessels have been ordered by a foreign fishing company which operates a large fleet of diversified fishing vessels in the Western Pacific.

The "Super Pacific Class Seiner" design represents more than four years of concentrated naval architectural and engineering effort, and encompasses many improvements and innovations.

The hydrodynamically advanced hull enables the vessel to attain greater speeds purely by virtue of dramatically reduced resistance and substantially improved propulsive efficiency attained by the utilization of new principles of after-body and propeller interaction. When operating at normal speeds, the vessels can save as much as 30 percent in annual fuel costs, according to the

company.

The time required to freeze the catch has been reduced to as little as one-third by increased refrigeration and a new circulation system. Sea-keeping properties have been enhanced by means of a larger, free-surface-type passive tank anti-roll system. The upper deck area is substantially larger, giving the vessel an increase in both net platform and working deck areas. General crew comfort has been upgraded by locating all personnel in one- and two-

man staterooms, all with private or semiprivate heads.

The vessels will be powered by a General Motors EMD 20-cylinder main engine developing 4,000 bhp with a single fixed-blade propeller. The fishing machinery will be driven by a Caterpillar 3508 DITA engine rated at 1,000 bhp at 1,800 rpm.

These vessels will feature Marco's new "Grand 1,000" tuna purse winch (Model WS550), which has a main drum capacity of 2,150 fa-

thoms of 1-inch (25 mm) wire with a ring-lifting-capacity of 30 tons.

One of the first of the new tuna super seiners, the M/V Sajo Victoria, was recently delivered by Campbell to Sajo Industrial Co., Ltd. of Seoul, Korea.

For additional information on Campbell tuna vessels, and for free literature describing the facilities and capabilities of Campbell Shipyard,

Circle 87 on Reader Service Card

The advertisement features a central image of a Marinefax TRI chart recorder displaying a weather chart. Surrounding this are several satellite and weather maps of the Pacific Ocean, each labeled with a major weather event:

- EAST COAST STORM MARCH 1980**
- HURRICANE ALLEN AUGUST 1980**
- BLIZZARD OF '78 FEBRUARY 1978**
- PRESIDENT'S DAY STORM FEBRUARY 1979**
- HURRICANE GLORIA SEPTEMBER 1985**

The chart recorder is labeled "02783 24971 GLORIA" and shows a detailed weather chart with various data points and lines.

# MARINEFAX IS PROUD TO HAVE BROUGHT YOU SOME OF THE WORST WEATHER IN HISTORY.

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For over a decade Marinefax has been bringing you the weather—in advance. Charts that help you plan your course around the worst weather—or into the best.

Over the years, Marinefax has changed with the times. Today's Marinefax TRI has fully automatic chart reception, and features an exceptionally precise radio which locks onto the frequency, eliminating the "drift" common to most other radio receivers. Our dry-paper charts are big and bright, with exceptional resolution, even in multi-contrast satellite photographs.

At Alden we specialize in the weather—only weather. So each Marinefax is built to the same standards of performance as our professional meteorological equipment. Standards which have won Alden Marinefax seven consecutive NMEA awards for performance and reliability.

For more information on how Marinefax TRI can bring you the weather, contact Alden Electronics, 136 Washington Street, Westborough, MA 01581. (617) 366-8851.

Circle 181 on Reader Service Card

**ALDEN MARINEFAX TRI**

## Workboat Division Of MonArk Boat Changes Name To SeaArk Marine—Key Personnel Changes Announced



Robert L. Trammel

John H. Smith

Willie Brennon

**Zach McClendon Jr.**, founder and chairman of MonArk Boat Company in Monticello, Ark., recently announced that the Workboat Division of MonArk has changed its name to SeaArk Marine, Inc.

MonArk Boat Company sold its Recreational Boat Division to the Brunswick Corporation, which also acquired the trade name MonArk, Mr. McClendon said. The Workboat Division was not a part of the Brunswick transaction.

"We will continue to sell and manufacture high equality mid-range workboats from 20 to 60 feet in length to our commercial, government and industrial customers throughout the world. The only change will be the name on the side, SeaArk," Mr. McClendon said.

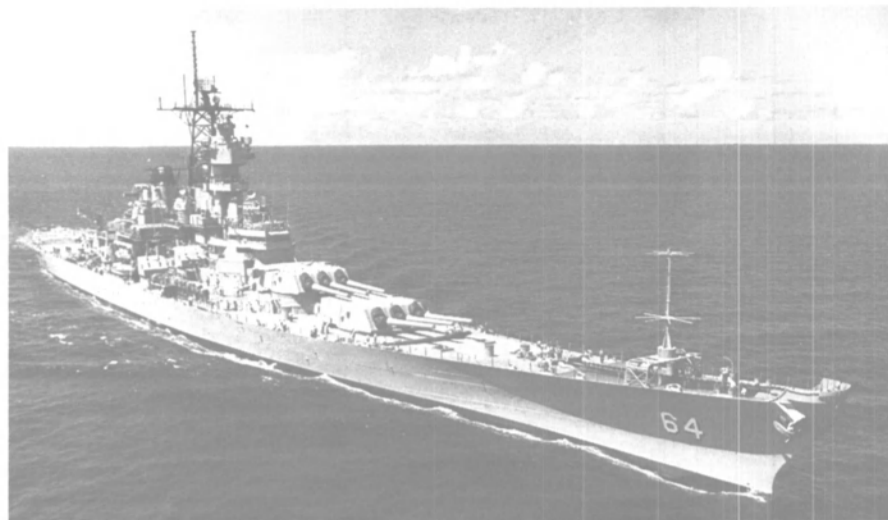
The company also announced the appointment of a new president and promotion of two other longtime employees.

**Robert L. Trammel** of Little Rock, a certified public accountant, has been named president of SeaArk; **John H. Smith** has been named vice president, sales and marketing of SeaArk and will be responsible for the sales and marketing of the standard boat product line and direct sales of custom vessels to domestic and foreign commercial and government accounts; and **Willie Brennon** has been promoted to vice president of manufacturing.

**James G. Eoff**, formerly vice president of finance with MonArk, will remain in the same position with SeaArk.

SeaArk will continue to manufacture workboats in the same Monticello, Ark., facility. For free literature giving full information on SeaArk Marine,

Circle 40 on Reader Service Card



**FULL SPEED AHEAD**—The battleship USS Wisconsin (BB-64) steams under her own power for the first time in 30 years during sea trials in the Gulf of Mexico. The battleship, which was deactivated in 1958, recently completed modernization and reactivation under a \$221.7-million contract at the Ingalls Shipbuilding Division of Litton Industries, Pascagoula, Miss. She will be recommissioned into the active fleet later this month.

### Norcontrol Simulation Wins French Order For Ship-Control Simulator

Norcontrol Simulation a.s. of Norway recently won an order from Thompson CSG, a French company, for the supply of an advanced ship-control simulator. The first stage of the contract is valued at 16 million Norwegian kroner (about \$2.4 million).

The order for a ship-control simulator is expected to be extended in 1989-90 to include additional facilities for the simulation of engine room and cargo-handling operations.

Norcontrol is considered to be one of the world market leaders in the supply of maritime training simulators.

For further information and free literature,

Circle 59 on Reader Service Card

## Columbian Rope Co. Offers Free Literature Detailing New Fiber Rope For Marine Use

The Columbian Rope Company, Guntown, Miss., is offering a number of free brochures, bulletins and literature on their new Columbian Eureka® Karat®, Columbian Yankee® Blend Karat® and Columbian Yankee® 101 Blend Karat® thermoplastic ropes as well as its other series of cordage and ropes for the marine industry.

The newly published literature from Columbian Rope provides extensive details and data, as well as specifications on the fiber EStalon®, which is used in the Columbian Eureka Karat, Yankee Blend Karat and Yankee 101 Blend Karat series of thermoplastic ropes. A strength-to-weight ratio chart of rope fibers is provided, as well as a detailed rope specification table.

According to the company, EStalon is the result of many years' intensive research and development. Its highly sophisticated formulation combines a specially extruded blend of polyester and polypropylene synthetic. The unique EStalon split-film yarn results in a rope with remarkable strength to weight qualities.

Columbian reports that along with tremendous strength, EStalon characteristics include a higher melting point, superior abrasion resistance, great flexibility, ultraviolet stability, low elongation, no water

absorbency, and a specific gravity of less than 1—which means that EStalon floats in salt water.

Columbian manufactures Eureka Karat rope from 100 percent EStalon, while Yankee Blend Karat and Yankee 101 Blend Karat are made of EStalon and another fiber.

Both Yankee Blend Karat and Yankee 101 Blend Karat are excellent for use aboard tugs, workboats and barges because of their high surface friction resistance, strength, durability, light weight and handling features.

In addition, Columbian also has introduced Eureka® Karat® mooring lines, and the company is offering literature fully detailing the product.

According to the company, Karat mooring ropes have been used by one major U.S. shipowner since 1984. The Karat synthetic mooring ropes, 7-1/2-inch and 7-inch-diameter lines, have replaced 1-1/4-inch and 1-1/8-inch wire ropes.

Eureka Karat rope is an arrangement of polyester polymers and polypropylene polymers in a combined extruded form.

For free literature detailing the full line of rope and cordage offered by Columbian Rope,

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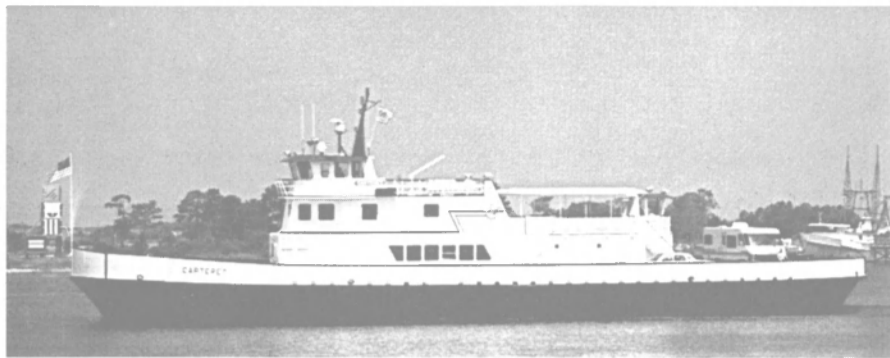
Attn: Mike Markey, Chief Engineer

P.O. Box 24788 Seattle, WA 98124

Phone: (206) 622-4697 FAX: 1-206-623-9839



Circle 34E on Reader Service Card



The Caterpillar-powered Carteret, built by Moss Point Marine for the State of North Carolina, will operate in Pamlico Sound between Cedar Island and Ocracoke Island.

## Caterpillar-Powered Passenger Ferry Delivered By Moss Point Marine To State Of North Carolina

Moss Point Marine, Inc., Esca-tawpa, Miss., has delivered the Carteret, a new 161-foot ferry to the State of North Carolina. The vessel can transport 200 passengers and 30 autos.

The \$2.7-million, all-steel Carteret is 161 feet long, with a 50-foot beam and 12.5-foot depth.

Built to U.S. Coast Guard standards from a design provided by the North Carolina Department of Transportation, the ferry features an "island" type superstructure with two decks dedicated to passenger seating, lounges, and rest rooms, topped by a pilothouse with fore and aft control stations.

Vehicles enter the main deck level from the bow or stern, park in two lanes on either side of the island superstructure, and exit from the opposite end.

The Carteret will operate in the Pamlico Sound between Cedar Island and Ocracoke Island.

The new ferry is powered by two Caterpillar 3412 DI-TA diesel engines developing a total of 1,249 bhp. They drive two 54-inch four-blade bronze propellers through Twin Disc reverse/reduction gears.

Electrical power is provided by two 120-kw generators driven by two Caterpillar 3306 BT engines. They power the Matthews Marine Systems electric/hydraulic steering gear which guides the boat. Additional maneuverability is provided by a Michigan Jastram 34-inch-diameter bow thruster driven by a Detroit Diesel 4-71 engine through Twin Disc reverse/reduction gears.

The main deck can accommodate 50 passengers and the upper deck has enclosed seating for 23 and open deck bench seating for 20. The upper deck also includes a crew lounge with a small galley.

A partial list of navigation and communications equipment in the pilothouse includes two Furuno ra-

dars, a Raytheon Fathometer, a North Star Loran, and two Horizon Voyager VHF radios.

Moss Point Marine, Inc. is one of the shipbuilders of the Trinity Marine Group which is owned by Trinity Industries, Inc. of Dallas, Texas. Other shipyards in the group are Halter Marine, Inc., with shipyards in Moss Point, Miss., and Lockport, La., Equitable Shipyards, Inc., with facilities in New Orleans and Madisonville, La., and Gretna Machine and Iron Works, Inc., Harvey, La.

For free literature giving full information on the facilities and capabilities of Moss Point Marine,

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### CARTERET Equipment List

Main engines	Caterpillar
Generators	Caterpillar
Steering gear	Matthews Marine
Bowthruster	Michigan Jastram
Bowthruster engine	Detroit Diesel
Reduction gears	Twin Disc
Main engine control system	Wabco
Fathometer	Raytheon
Radar	Furuno
VHF	Horizon Voyager
Loran	North Star
Public address system	Bogen
Telephone system	Hose-McCann
Eng. alarm system	
	Prime Mover Controls
Search, navigation lights	Perko
Floodlights	Pauluhn
Main switchboard	Ind. Power Systems
Keel coolers	Fernstrum
Bilge pumps	Flomax
Sewage treatment	Red Fox
Cathodic protection system	Engelhard
Anchor and chain	Danforth
Cleats	Deever Steel Casting
Doors & windows	Cornell-Carr
Watertight doors	Julius Mock & Sons
Deck covering	Crossfield Products
Joiner bulkheads & liners	Masonite
Passenger seats	C.E. White
Whistle & fog horn	Kahlenberg

gas-turbine-powered generator sets. The equipment will provide ship's service power for five Aegis class cruisers being built for the U.S. Navy.

Stewart & Stevenson Services, Inc. has previously been awarded the contract to deliver 66 generator sets for the first 22 Aegis cruisers.

## Stewart & Stevenson Awarded \$21.2-Million U.S. Navy Contract

Stewart & Stevenson Services, Inc. recently announced it has been awarded a \$21.2 million military contract for fifteen 2,500-kilowatt

## Lykes Bros. Sells 90 Seabee Barges To Two Companies

New Orleans-based Lykes Bros. Steamship Co. recently sold 90 of its Seabee hopper barges to two U.S. inland towing companies. The sale price was not disclosed.

Mid-South Towing Co. of Tampa,

Fla., bought 60 of 97-foot-long barges and Mon River Towing Inc. of Pittsburgh, Pa., bought the other 30. Both companies will most likely use the vessels for hauling coal.

The vessels were formerly used in a Lykes-patented barge-mother ship service which operated between the Gulf of Mexico, Europe and the Mediterranean Sea. The Seabee-type service was replaced by four 1,100-TEU ships in 1986.

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Heavy alloy compaction plate  
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	Model MP 30	Model MP 45	Model MP 70
Height - A	79 1/2"	77 1/8"	80 3/8"
Width - B	22 1/8"	28 1/8"	40 1/8"
Depth - C	22 1/8"	29 3/8"	29 3/8"
Service Weight	542 lbs.	740 lbs.	1,060 lbs.
Loading Chute Door Opening	18" x 15"	24" x 18 1/2"	36" x 20 1/2"
Size of Compaction Chamber	18 1/4" x 18 x 37-1/3"	40 3/4" x 24" x 24"	41 1/4" x 36" x 24"
Capacity	3.375 cu ft	6 cu ft. Ratio 20:1	9 cu. ft. Ratio 20:1
Cycle Time	11 seconds	18-22 seconds	20-25 seconds
Motor Size	1/2 hp	1/2 hp	1 hp
Electrical Requirements	120/240, 9/4.5 amps	120/240, 9/4.5 amps	120/240, 14/7 amps
Compaction Force	8,700 lbs	13,500 lbs.	24,000 lbs.
Working Space	22 1/8" x 44 1/2"	4'6" x 2'6"	5'6" x 3'6"



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Houston, Texas 77079

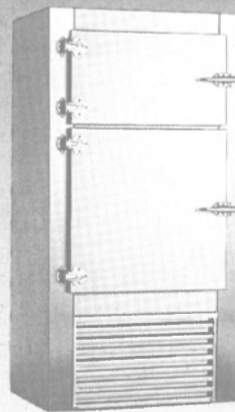
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Circle 180 on Reader Service Card

## General Ship Repair To Build Tender/Breaker Under \$921,320 Contract

The General Ship Repair Corporation, Baltimore, Md., recently was awarded a \$921,320 contract by the State of Maryland's Department of Natural Resources to construct an 80-foot-long steel buoy tender/icebreaker.

The new vessel, which is scheduled for delivery in December 1988, is custom-designed, combining two vessels in one. The new combination vessel will be able to operate as a buoy tender in 3 feet 6 inches of water and as an icebreaker in 4 feet of water.

A special design feature of the new vessel is its propeller tunnels. The design concept allows the vessel to break ice up to 12 inches thick without damage to the propellers or

the propeller shafts. The new vessel will be based in Matapeake, Maryland, and will be powered by twin-screw diesel engines capable of generating 700 horsepower.

The General Ship Corporation provides a full range of services for all kinds of vessels including new construction, repair, and conversion. The company offers 24-hour service anywhere in port or at sea.

For free literature fully detailing

the services of General Ship Repair,

Circle 70 on Reader Service Card

## Carnival Acquires Majority Of Admiral, RCCL For \$550 Million

Carnival Cruise Lines, Miami, Fla., recently paid about \$550 million to four shipping companies to acquire majority shares in both Admiral Cruises Inc. and Royal Caribbean Cruise Line (RCCL). The deal makes Carnival the world's largest operator of cruise ships.

Under the terms of the deal, Carnival acquired about 70 percent of the shares of RCCL and Admiral from Bermuda-based Gotaas Larsen Shipping Corporation; Effoa-Finland Steamship Co., Helsinki, Finland; I.M. Skaugen A/S, Oslo, Norway; and Johnson Line AB, Stockholm, Sweden.

Of the original partners in RCCL, only **Anders Wilhelmsen** remains. Under terms of the partnership, **Anders Wilhelmsen** has the right to exercise an option to buy the shares of his partners. At present, however, this seems a remote possibility.

According to **Mickey Arison**, president and chief executive of Carnival, the three cruise lines will not be merged and will be operated as separate brands. Carnival plans to introduce a fourth "brand name" in the future with its Project Tiffany program—the construction of three 700-passenger luxury cruise liners.

At present, the company operates seven cruise ships and has three 70,000-grt, 2,500-passenger superliners on order at Wartsila Marine of Finland. The newbuildings, the Fantasy, Ecstasy and Sensation, are scheduled for delivery from 1989-1991.

Royal Caribbean Cruise Line, which recently put the world's largest cruise ship—the 74,000-grt Sovereign of the Seas—in service, operates a total of five ships.

Admiral operates three ships and has a 44,300-grt, 2,000-passenger liner on order at Alstom's Chantiers de l'Atlantique, St. Nazaire, France.

Carnival Cruise Lines	Passengers
Ships	
Carnivale	950
Celebration	1,486
*Ecstasy	2,500
*Fantasy	2,500
Festivale	1,400
Holiday	1,452
Jubilee	1,486
Mardi Gras	906
*Sensation	2,500
Tropicale	1,022

Royal Caribbean Cruise Line	Passengers
Nordic Prince	1,038
Song of America	1,575
Song of Norway	1,196
Sovereign of the Seas	2,600
Sun Viking	740

Admiral Cruise Lines	Passengers
Azure Seas	780
Emerald Seas	980
Stardancer	1,000
*Luxury liner	2,000

\*Denotes under construction

# LICENSED TO KILL.



Something is living in your fuel system. Many types of bacteria and fungi thrive on fuel. Whether you operate diesels or turbines, these hungry microorganisms can fill your tanks with slime that clogs filters, plugs lines and corrodes metal surfaces.

BIOBOR<sup>®</sup> JF fuel fungicide helps you fight back. Registered with the Environmental Protection Agency, it's safe and effective when used as directed. BIOBOR JF measures up to military specifications, and it's been helping the U.S. military battle slime for more than 15 years. General Motors, Detroit Diesel Allison and General Electric all approve its use in their engines. So do Lockheed and McDonnell Douglas. In fact, more than half the world's commercial airlines rely on it.

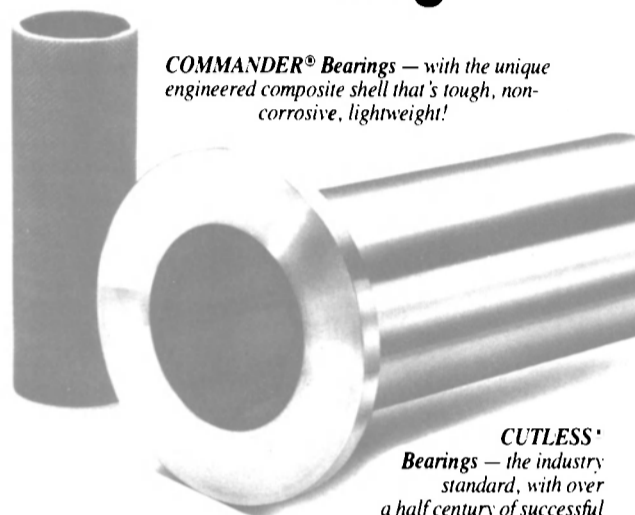
Before you employ a fungicidal agent, check its credentials. Get full details on EPA-registered BIOBOR JF from your distributor, or write to Industrial Chemicals Department, U.S. Borax, 3075 Wilshire Boulevard, Los Angeles, CA 90010.



Circle 312 on Reader Service Card

## The Name You Trust for Bearings

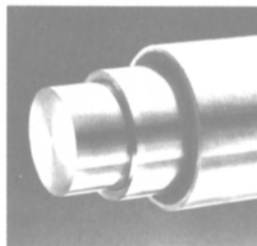
**COMMANDER<sup>®</sup> Bearings** — with the unique engineered composite shell that's tough, non-corrosive, lightweight!



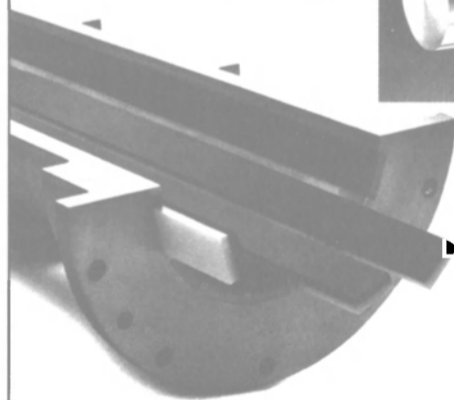
**CUTLESS<sup>®</sup> Bearings** — the industry standard, with over a half century of successful installations and performance.

## is Your Source for Staves, Sleeves,

**Nickel-Chrome-Boron Shaft Sleeves** — super hard and smooth against abrasion and corrosion for extended shaft-assembly life.



**ROMOR<sup>®</sup> Bearing Staves** — special nonmetallic design for longer sleeve life, noncorrosive for easy removal.



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Circle 227 on Reader Service Card



## Astilleros Espanoles Wins Major Order To Deliver 10 Freezer Trawlers

Astilleros Espanoles shipbuilding group of Spain has won a major order to deliver 10 freezer trawlers to Morocco for operation off the Canary Islands.

The vessels will have a length of 108 feet, a 29.5-foot beam and will be powered by a 1,160-bhp main engine.

The ten ships will be completed at the Vigo-based Barreras yard of the Astilleros Espanoles group. This contract brings the number of fishing vessels on the group's order books to 44.

For free literature giving complete information on the facilities and capabilities of Astilleros Espanoles,

Circle 65 on Reader Service Card

## Tidewater Doubles Fleet Of Inshore Tugs In Gulf Of Mexico

Tidewater Inc.'s marine division, Tidewater Marine Service, New Orleans, La., has signed an agreement with a subsidiary of Equilease Corporation to assume the management, marketing and operation of a group of 15 inshore tugs, with option to purchase. Equilease, a marine lender, is a wholly owned subsidiary of Henley Group.

According to Tidewater Marine president **Richard M. Currence**, the 15-tug package will effectively double the size of the company's inshore tug fleet. "These tugs will operate along with our existing fleet of inshore tugs, principally servicing the petroleum industry in the inland waters of south Louisiana," said Mr. Currence.

Tidewater Inc. owns and operates one of the largest fleets of vessels supporting the international offshore oil and gas industry.

For free literature on the services offered by Tidewater Marine,

Circle 96 on Reader Service Card

## HDW To Construct Four Containerships For Zim Line

Howaldtswerke Deutsche Werft (HDW) has received an order for four 2,700-TEU containerships from Zim Line of Israel.

The order is valued at about \$228.2 million and secures the employment of HDW's 4,500-person workforce into 1991.

When completed, the vessels will operate as part of the Zim Container Service (ZCS) which links North America with the Far East and the Mediterranean.

For free literature giving complete information on the facilities and capabilities of Howaldtswerke Deutsche Werft,

Circle 64 on Reader Service Card

## P&O Purchases Sitmar Cruises For \$210 Million

Peninsular & Oriental Steam Navigation Co. (P&O) recently purchased Los Angeles-based Sitmar Cruises for a reported \$210 million.

With the purchase of Sitmar Cruises, P&O, which already oper-

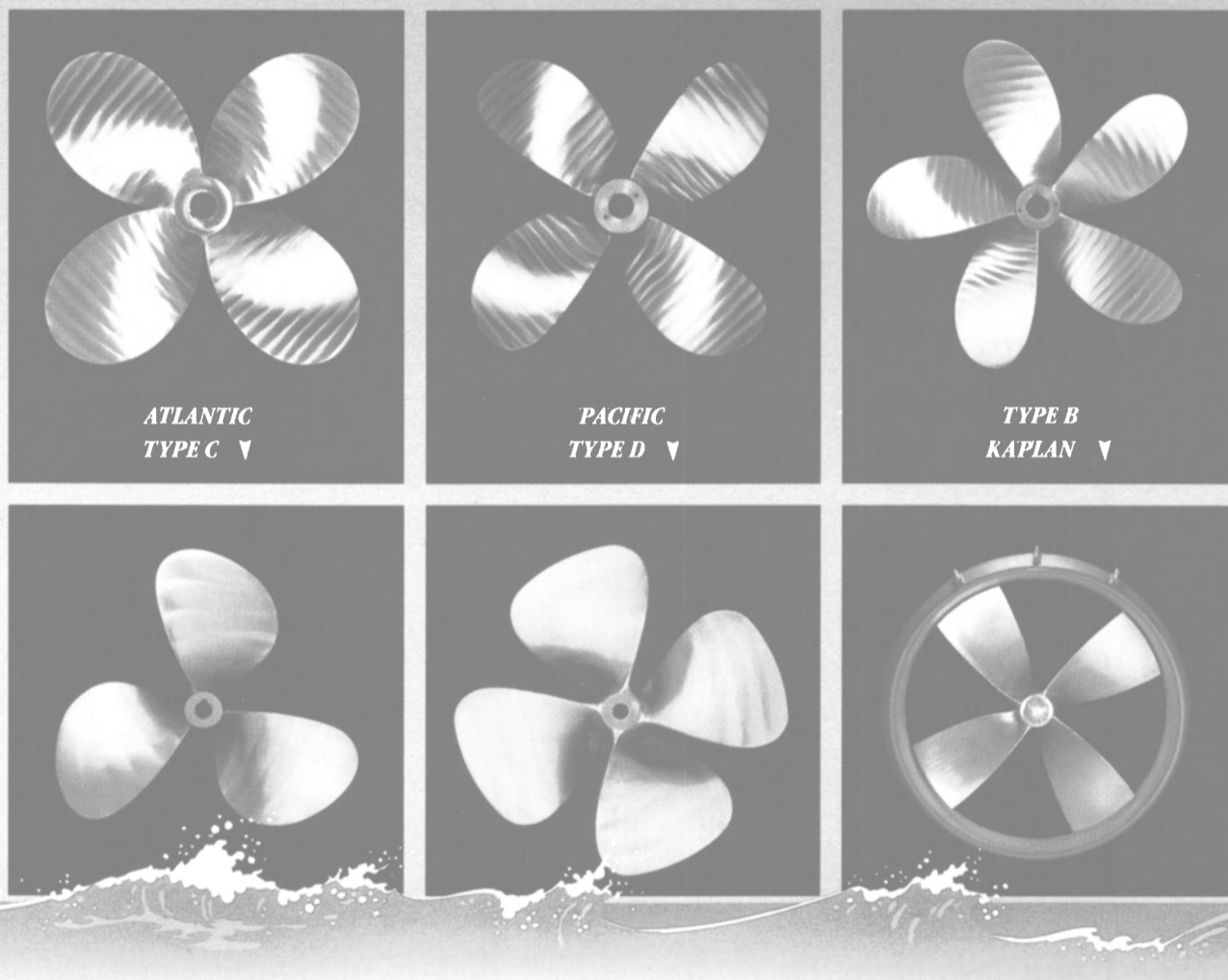
ates a fleet of six ships through its Los Angeles-based Princess Cruises subsidiary, will now be able to form one of the largest cruise fleets in the world. P&O's Princess operates the 1,702-passenger Canberra, Island Princess, Pacific Princess, Royal Princess, Sea Princess and Sun Princess.

At present, Sitmar Cruises operates the Fairsea, Fairsky, Fairstar

and Fairwind. The ship operator has two 1,800-passenger, 70,000-grt liners on order at Fincantieri-Trieste, and one 63,000-grt cruise ship on order at Alsthom's Chantiers de l'Atlantique.

By 1991, without any new orders or fleet changes, the combined P&O/Sitmar fleet will consist of 13 ships offering more than 15,000 passenger berths.

# WE WORK HARD TO MAKE YOUR JOB EASIER!



If you're operating a boat on the lakes, inland waterways, or ocean, you need a Bird-Johnson Company **Coolidge Propeller** or **custom designed fixed pitch propeller**. With over eighty years of experience, we are experts at analyzing vessel requirements and manufacturing propellers specifically designed to meet the needs of all types of boats and operating conditions. We build propellers in diameters from three foot and up, for any horsepower, and in stainless steel and nickle-aluminum-bronze or manganese bronze. If you're looking for the propeller that performs the best, you should be talking to Bird-Johnson.

We also supply shafting, nozzles, propeller accessories and back all of our products with complete machining, welding and servicing capabilities. Let Bird-Johnson work hard for you. Write, call or come in and see us.

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Circle 242 on Reader Service Card

## Intertrade Awarded Navy Contract To Supply Messenger/Position Buoys

Intertrade Industries, Marine Products Division, has been awarded a contract by the Naval Sea Systems Command for the supply of 128 Astern Fueling Messenger/Position Buoys to be delivered to NATO bases in Canada, Scotland, England, Gibraltar, Portugal and Holland, as well as various U.S.-based Navy facilities.

The newly designed buoys will be utilized as messenger and positioning buoys during at-sea astern fueling operations—the preferred fueling mode of NATO countries.

The buoys will be manufactured utilizing all stainless steel hardware and Intertrade's standard buoy construction of inner foam combination of rigid plus semi-flexible foams for positive buoyancy and impact absorption, covered with an outer layer of tough abrasion-resistant, filament-reinforced synthetic elastomer.

In addition to this contract, Intertrade recently received several other major contracts for its pipe support, chain support and pendant buoys and utility floats from NAVSHIPS, major oil companies and electric utilities.

For additional information on Intertrade products,

Circle 76 on Reader Service Card

## Kloster Consolidates Two Cruise Lines; Names Hegner CEO

Kloster Cruise Ltd., Coral Gables, Fla., recently consolidated its Norwegian Cruise Line and Royal Viking Line into a single operation. The two cruise operators, however, will retain their product lines.

Kloster named **Trygve Hegner** the company's new chief executive officer. He will oversee the management team that will handle operations for both Norwegian Cruise and Royal Viking in Coral Gables, Fla.

Upon the completion of the consolidation, the San Francisco office of Royal Viking will be closed down.

## J.P. Nissen Offers New Color Brochure On Feltip Markers

J.P. Nissen, Jr., Co. of Glenside, Pa., has published a color-illustrated brochure that describes the new Nissen(R) Feltip Markers which mark with enamel paint.

According to the company, these markers are as easy to use as felt tip pens, but make durable opaque enamel paint marks. They mark on wet or oily, rough or smooth surfaces. The markers are available in five colors: white, yellow, red, black and silver.

For a copy of the new brochure containing more information,

Circle 62 on Reader Service Card

## HHI Wins \$230-Million Offshore Project For ONGC In India

Hyundai Heavy Industries Co., Ltd. (HHI) of Korea recently won a mammoth offshore project from the Indian state-owned Oil and Natural Gas Commission (ONGC) on a turn-key basis.

The Offshore Division of HHI received a letter of intent for the

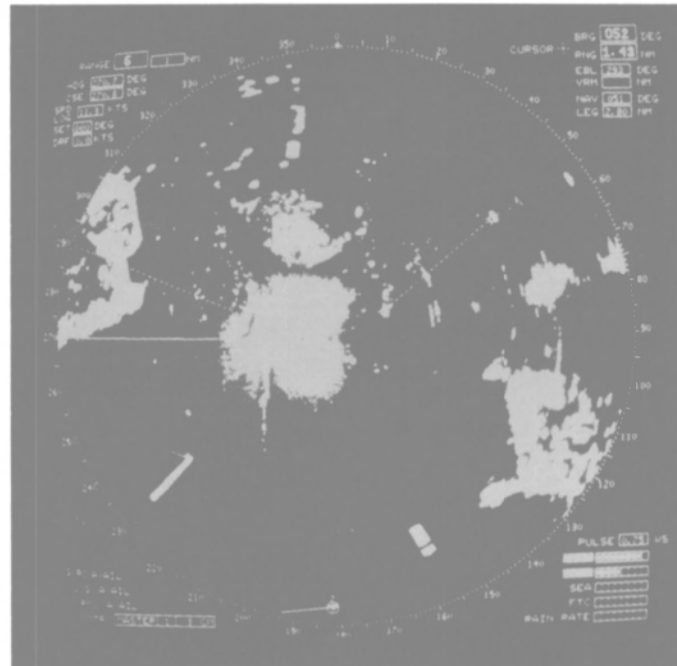
Heera Process Complex Project. Under the agreement, HHI will be responsible for the engineering, procurement, fabrication, transportation, installation, hookup and commissioning at a total cost of \$230 million on a cash basis. The project calls for one water injection platform with 160,000 bbl/d of seawater treatment capacity, one gas compression platform that can treat 2.4 million cubic meters of gas per day, construction of submarine pipeline, heliport, generating and communi-

cation facility, living quarters for 124 persons, and other attached facilities for oil process works.

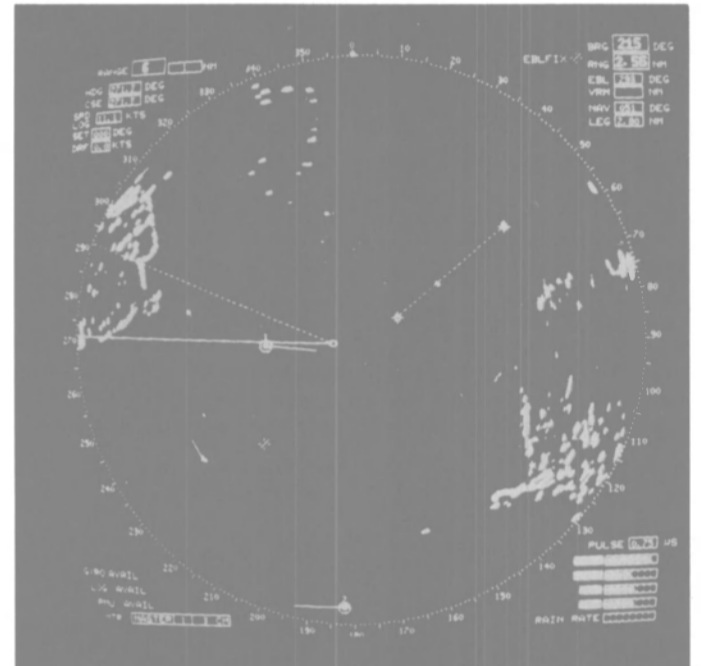
HHI will fabricate the facilities by using a total of 29,000 tons of steel at their fabrication yard in Ulsan and install in the Arabian Sea off Alubaugh, western India.

For free literature giving full information on the facilities and capabilities of HHI,

Circle 55 on Reader Service Card



With rain and sea clutter circuits OFF on PATHFINDER/ST ARPA, sea clutter extends 1.8 to 2 miles from ship, ice floe belts appear 320° to 35°, additional ice clutter scattered beyond sea clutter 270° to 320° (Thick lines at 230° and 155° are RACONS).



With rain and sea clutter circuits ON, the radar picture is absolutely "clean." Sea and ice clutter are gone. All targets previously masked are clearly visible.

## Raytheon PATHFINDER/ST. Superior Technology Provides Superior Target Detection.

### True Motion with Electronic Plotting or ARPA.

Raytheon sets radar performance standards for the 21st century with technology breakthroughs that virtually eliminate noise, interference and clutter, while recognizing and displaying even weak targets typically lost on other radars.

The heart of this improved radar system is Raytheon's exclusive five-stage signal processing...we call it Superior Technology.

ST for short.

Combined with higher performance transmitters and receivers, and the latest raster displays, ST provides performance levels never before available. Now, with PATHFINDER/ST, your vessels—and their crews—can have an important extra measure of safety and efficiency, including a unique Safety-Coded CPA Circle, which shows course selections for safest CPAs. PATHFINDER/ST is available as an ARPA or a True Motion/Relative Motion

display with Electronic Plotting. These displays can easily retrofit the displays in older Raytheon Bright Display Radar Systems, and can be high-performance repeaters for radars of most other manufacturers.

When interfaced with an SNA-91 Integrated Bridge Display, the PATHFINDER/ST ARPA also becomes a key sensor/decision-aid in a complete shipboard navigation and control system.

### Near-Perfect Target Detection.

Using increased signal-to-noise levels, high dynamic range, precisely matched pulse bandwidths, and exclusive Rain Rate circuits, PATHFINDER/ST receivers faithfully capture target returns even in severe clutter.

PATHFINDER/ST multistage processing analyzes, compares, tests, and samples the received signal so that all detected targets, no matter how weak in signal strength, are distinguished from clutter and clearly displayed.

## Trinity Marine Group To Build Navy Oceanographic Research Ship

The Trinity Marine Group has been awarded a \$20.9-million contract by the U.S. Navy to build a 263-foot oceanographic research ship. The 3,200-ton, diesel electric, dynamically positioned AGOR-23 will be operated by the University of Washington.

The design of the new class of research ship is a result of a national competition won by Trinity's Halter Marine, Inc., with assistance from Guarino and Cox, the New Orleans naval architecture firm.

The all-steel AGOR-23 will be 263 feet in length, with a 16.5-foot design draft, and 52-foot molded beam. Main propulsion power will be derived from a bank of diesel-driven generators.

The vessel will have trackline ca-

pability to maintain course within a 300-foot band. It will be served by a global reference system which electronically integrates with two azimuthing drives, or 360-degree rotating propellers and a 360-degree capable bow thruster. Trackline ability is enhanced because the azimuthing drives eliminate propeller drive shafts or conventional steering permitting the propellers to pivot in any direction.

AGOR-23 will include cranes,

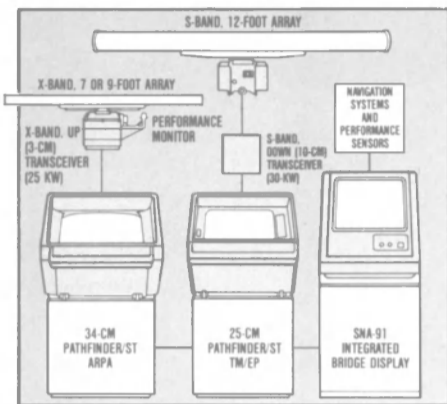
reels, and an A-frame for towing scientific equipment, dry and wet laboratories, and staterooms and galley for a crew of up to 70.

Completion of the vessel, which will be built at one of Trinity's two shipyards in the Moss Point, Miss., area, is scheduled around the end of 1989.

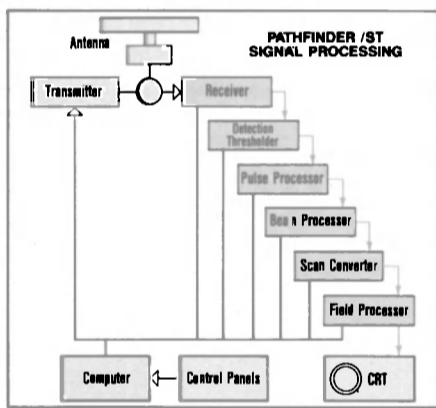
Two Halter-designed and built Navy oceanographic vessels, the Moana Wave, and the Gyre, are operated by the University of Hawaii, and Texas A&M, respectively. John Dane III, president of the Trinity Marine Group, said AGOR-23 will be able to reach 15 knots transit speed in sea state four, three knots faster than the previous research ships.

For more information and free literature on the Trinity Marine Group,

Circle 45 on Reader Service Card



Electronically switches up to 3 displays and transceivers, with CRT diagrams, for single/simultaneous 3 or 10-cm operation.



From the control panels through the computer, transmitter, and receiver—and then in five steps leading to the CRT—Raytheon's exclusive Superior Technology provides sharp, bright radar pictures virtually free of clutter.



PATHFINDER/ST ARPA: 34-cm or 25-cm PPI's (16" or 12" diagonal CRT IMO equivalents), provide automatic tracking of up to 40 targets with vectors and readouts for most dangerous 20. Have auto and manual acquisition, and unique trial maneuvers.

PATHFINDER/ST TM/EP: 34-cm or 25-cm PPI's (16" or 12" diagonal CRT IMO equivalents), have True and Relative Motion displays. Electronic Plotting, course, speed, bearing, CPA and TCPA for two selected targets.

## Peter Lapp Joins Mapeco Products As Staff Naval Architect

Peter Lapp has joined Mapeco Products, Inc., Glen Head, N.Y., as staff naval architect. He will be responsible for small craft and workboat applications of such products as Pilgrim propeller nuts, Morgrip Bolts and Uniflo diesel exhaust mufflers.

Prior to joining Mapeco, Mr. Lapp was a naval architect for Columbian Bronze Corporation, where he was known for his propeller selection expertise. He also held the same position for Blount Marine Corporation.

Mr. Lapp is a 1977 graduate of Webb Institute of Naval Architecture.

## Bombardier To Supply Engine Blocks For Detroit Diesel Engines —Literature Available

Roland Gagnon, president of the Rail and Diesel Products Division of Bombardier Inc., Montreal, Canada, recently announced that Bombardier will supply engine blocks for Detroit Diesel Corporation's 149 Series V8, V12 and V16 models under an agreement between the two companies.

Representing a minimum sales revenue of \$30 million, the first units will be delivered in June 1989. It will generate the equivalent of 350 man-years of work and will be carried out by Alco Power Inc., a Bombardier subsidiary located in Auburn, N.Y. The agreement will enable Bombardier to reorganize a section of its Auburn plant into a high-tech manufacturing center dedicated to this contract and is part of the restructuring of the firm's diesel engine manufacturing capability.

For free literature on the full line of marine diesel engines offered by Bombardier,

Circle 77 on Reader Service Card

## Comparison Tests Prove PATHFINDER/ST Radars See What Other Radars Can't.

In side-by-side comparison tests, a PATHFINDER/ST display and a conventional radar display were connected to the same radar system. PATHFINDER/ST consistently displayed targets not detected by the conventional display.

## Optimum Resolution Displays are Clearly Superior.

PATHFINDER/ST raster scan PPI images are refreshed 50 times each second. This eliminates the annoying "flicker" found in other radar systems. The number of pixels has been carefully chosen for optimum resolution. The result is an extremely sharp, ultra-bright image that is easy to view, day or night.

## Superior Technology Will Clearly Fit Your Needs.

PATHFINDER/ST Radars satisfy a very wide range of installation and operating requirements. Signal multiplexing reduces connections between PATHFINDER/ST receivers and displays. This, combined with electronic interswitching for dual systems, the ability to mount transceivers "up" in antenna pedestals, or "down" in separate cabinets, and keyboard entry of all set-up parameters, makes any installation straightforward, simple, and economical.

In addition to having the optional IMO-required, antenna-mounted performance monitors, PATHFINDER/ST Radar software provides menus for extensive self-testing of virtually every function.

## Worldwide Approval and Support.

Raytheon PATHFINDER/ST Radars are designed to meet or exceed all applica-

Circle 118 on Reader Service Card

ble commercial standards and reliability testing requirements, including those of IMO and the national regulatory agencies of countries worldwide.

They are backed by extensive worldwide support and service facilities, located in major ports everywhere.

Specifications subject to change without notice

## Raytheon

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## Deck Machinery And Cargo-Handling Equipment

To remain competitive in the world of shipping, vessel operators must keep their port time for loading and unloading operations to a minimum. Fast, reliable, and efficient cargo-handling gear, deck machinery, and cargo access equipment—all invaluable tools—can provide a competitive edge by reducing costly port time.

That is why the editors of MR/EN annually review the latest products and developments of the major manufacturers and suppliers of deck machinery and cargo-handling equipment. The following review is based on information received as of press time.

Free literature describing all the equipment featured in this review is available from the manufacturers. If you wish to receive additional information and brochures on any of the products described, circle the appropriate Reader Service number(s) listed below the companies' names on the post-paid Reader Service Card bound in the back of this issue.

### ALMON A. JOHNSON

Circle 26 on Reader Service Card

For over 50 years, the names Almon A. Johnson, Inc. and Johnson-Type have stood for quality, durability, excellence and safety of operation. AAJ Inc., Elizabeth, N.J., offers a wide line of deck auxiliary equipment, including automatic towing machines, towing winches, constant tension mooring winches, refueling hose reels, anchor windlasses and a completely redesigned line of capstans.

Johnson-Type deck equipment is available with electric, hydraulic or diesel drives to suit the unique of vessel owners and operators. Complete engineering and service personnel are available to insure that its machinery is designed, manufactured and maintained to meet the ongoing needs of its customers.

### APPLETON MARINE

Circle 12 on Reader Service Card

Appleton Marine, Appleton, Wis., is a full line manufacturer of marine deck machinery including cranes (box, articulated and telescopic booms), winches (mooring, topping, constant tension), anchor windlasses (vertical and horizontal shaft), capstans, and remotely operated vehicle (ROV) launch and retrieval systems. All equipment can be certified to ABS, API, USCG or Lloyd's Register regulations.

Quality assurance at Appleton Marine is approved for compliance with MIL-I-45208; NATO AQAP-4; and API Spec Q1.

Besides supplying a number of various cranes and winches for cargo and hose-handling applications in the commercial and offshore sectors, Appleton Marine has been involved in a number of Navy and Government projects. The firm has provided handling winches, capstans, and anchor windlasses for the T-AGOS program; cranes for the YTT program; anchor windlasses, mooring and warping capstans, slewing arm davits (SLAD), and sliding padeye (SPE) for the AOE-6 program; rigid inflatable boat (RIB) handling cranes for the WPB and LCU vessels; and UNREP winches for the MCDS program.

### CRANDALL DRY DOCK

Circle 24 on Reader Service Card

Crandall Dry Dock Engineers, Inc., Dedham, Mass., an established firm long associated with drydock hardware and chain, recently announced an agreement with Etablissements Marit of St. Amand-les-Eaux, France, to become its exclusive North American sales representative for Marit marine chain.

Ets. Marit, family-owned and op-

erated since 1904, manufactures high quality marine chains ranging in size up to 100 mm in diameter. Marit's philosophy has always been one of top quality at a reasonable price. To insure this, the latest manufacturing technology as well as constant monitoring of production procedures is employed. Marit chains meet the requirements of Veritas, Det norske Veritas, Lloyd's Register and ABS. Additionally, Marit has been awarded RAQ2 probate of quality by the French Navy.

Marit offers the following products: stud link anchor chain, anti-magnetic chain, carbon and special steel chain, chain with antiwear heat treatment, open-link chain (calibrated or uncalibrated), special swivels, shackles, connecting links, high efficiency anchors, quick release hooks and other marine chain-related items.

### CROSBY GROUP

Circle 31 on Reader Service Card

The Crosby Group, a division of Amhoist, comprises the companies of Laughlin, Lebus, McKissick, National and Western. The companies manufacture every conceivable kind of fitting and accessory for deck machinery, cargo handling and other applications, including forged fittings, hooks, blocks, sheaves, pulleys, load binders, chain, etc.

McKissick, a division of the Crosby Group in Tulsa, Okla., now has new roll forged sheaves available in the most complete range of sizes from 12 through 72 inches. The sheaves are an ideal choice for original equipment in self-unloading systems and as replacements.

McKissick sheaves are forged from controlled quality 1035 carbon steel which provides excellent welding and flame hardening characteristics. All incoming steel is tested by chemical and spectrographic methods to insure consistently high quality.

Steel sheaves have excellent flexi-

bility when choosing bearings and also provide better cold weather properties than nylon sheaves.

Crosby links and rings are manufactured in a complete line of sizes and types for almost any application, with working load limits from 1,600 to 232,500 pounds.

Lebus products include lever and ratchet type load binders, grab hooks and tail chains, snatch blocks, and hook latch kits. McKissick specializes in custom designed blocks to any specification, oil field blocks, crane and hook blocks, overhaul balls, swivel hooks, and snatch blocks, as well as many other products. Western manufactures sheaves and sleeves, wood and steel blocks, and cargo blocks and fittings, just part of its extensive product line. National's product line includes steel swaging sleeves, duplex sleeves, swage buttons and furrules, as well as swaging presses in capacities from 500 to 3,000 tons.

### FRITZ CULVER

Circle 32 on Reader Service Card

Fritz Culver, Inc. of Covington, La., manufactures a wide variety of deck machinery serving virtually every aspect of the marine market. Established in 1979, the company enjoyed immediate success in the Gulf Coast area for designing and producing rugged, dependable equipment.

Typical products include anchor windlasses, capstans, tugger winches, stern rollers, cable/chain stops, cable reels, and anchor-handling and towing winches. All equipment, except the low-pressure, anchor-handling/towing winches are completely designed in-house. Culver is the U.S. licensee of A/S Hydraulik Brattvaag, which has a complete line of low-pressure deck machinery for cargo ships, fishing vessels, and offshore structures.

Culver has introduced an upgraded deck machinery line to meet the requirements of larger vessels

being built to service and handle the deepwater drilling rigs. Included in this line are stern rollers, anchor windlasses, hydraulic tuggers, capstans, tow pins, cable/chain stops, and cable reels. For the most part, the basic design was not changed but the size of the components increased to facilitate handling of larger size wire and chain and the loads imposed by them.

## GEARMATIC

Circle 33 on Reader Service Card

Gearmatic, a division of PACCAR and a major supplier of quality winches to the marine industry, last year introduced a new winch in its GH Series of hydraulic planetary winches.

The GH15, rated at 15,000 pounds capacity, has been designed so that all moving parts run in oil and features highly efficient gear sets with anti-friction bearings throughout to provide smooth trouble-free operation. The new winch utilizes an internal automatic multi-disc, spring-applied hydraulically released safety brake. An over-running brake clutch permits free rotation through the brake while hoisting but immediately holds the load securely when the hoisting operation is complete. The load is held firm even if the engine dies or a hydraulic line breaks.

Compact size, low weight-to-horsepower ratio and a versatile mounting arrangement allows the GH15 winch to be installed in virtually any position.

The GH15 will soon be available with up to five different drum sizes and three different motor displacements.

The GH15's adaptability is further increased by the availability of high speed reverse which lowers at line speeds 3.4 times faster than hoisting. A free spool option is also available to provide a means of manual cable removal.

An external brake release port, standard on the GH15, makes the winch adaptable to special applications requiring intermittent or emergency cable/load release.

## HAGGLUNDS

Circle 25 on Reader Service Card

ASEA Haggglunds Inc., Montvale, N.J., is a subsidiary of the Sweden-based company Haggglunds Marine & Offshore AB. Haggglunds has been a major supplier of electrohydraulic cranes to the marine and offshore market for the past 30 years. Its product range spans from two-ton service and hose cranes up to 120-ton twin cargo cranes.

Research and development efforts during the past decade have resulted in the development of its own electronic crane control system as well as microprocessor-controlled cargo-handling systems. These systems, Steadyline and Swing Defeater, are capable of increasing cargo-handling productivity up to 40 per-

cent. Haggglunds also recently introduced port cranes.

All the major hydraulic components in Haggglunds cranes are manufactured by the firm, thus assuring strict quality control.

In 1987, Haggglunds acquired the Dutch offshore crane manufacturing company Kenz, strengthening Haggglunds's position in the offshore

market. At the same time, Haggglunds acquired a controlling interest in the Norway-based crane manufacturing company Marine Transport Technology A/S.

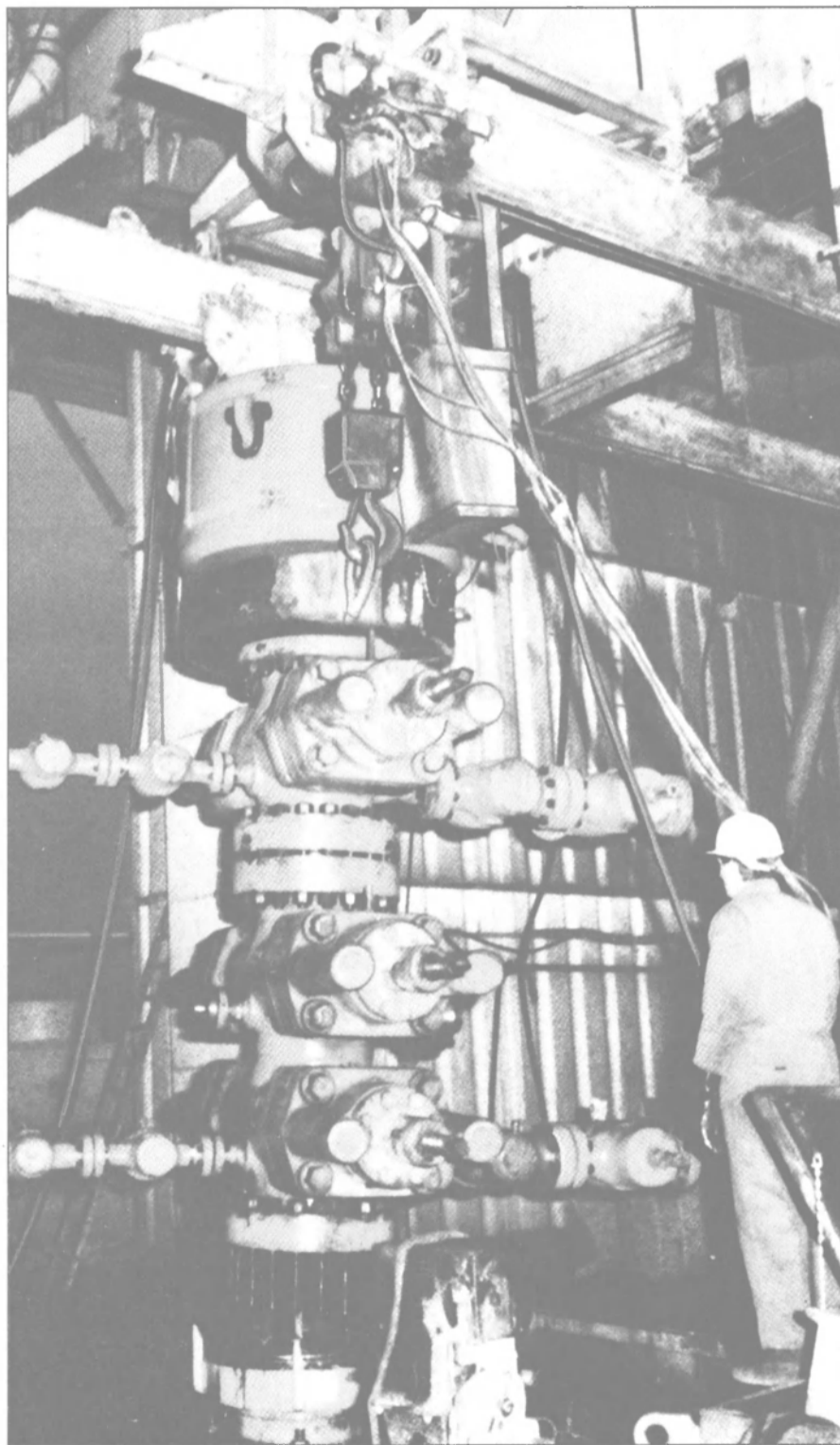
Haggglunds's worldwide service organization offers after sales support, with spare parts and service available 24 hours a day, 365 days a year.

## HIAB CRANES

Circle 34 on Reader Service Card

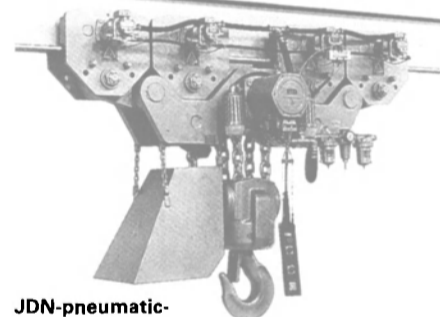
With its exceptional freedom of movement provided by the "knuckleboom" principle, the 110 Sea Crane from HIAB Cranes & Loaders, Inc., of New Castle, Del., has

# There are many reasons for using JDN-hoists.



They are for instance standard built for application in areas where there is a risk of explosion. Explosion proof requirements are especially high on drill platforms. For this reason increased sparking protection is possible as an optional extra. JDN-pneumatic hoists are available with carrying capacities from 0,1 to 100 tons.

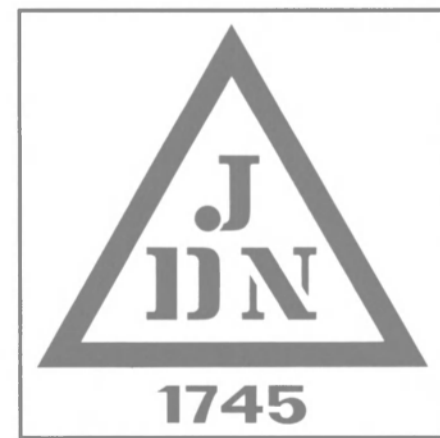
**JDN – The successful synthesis of tradition and progress**



JDN-pneumatic-monorail block

Available for carrying capacities up to 100 tons for 6 bar. Standard models have F-controls with emergency stop.

*Please, request our latest information material on the complete JDN-hoist programme!*



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Circle 170 on Reader Service Card

## Deck Machinery Review

(continued)

proven very successful on a number of documented cargo- and material-handling applications. These cranes are currently in worldwide use on many types of tugs, supply vessels, icebreakers, dredges, barges, research vessels, buoy- and light-tending boats, firefighting vessels, diving

support craft, and oil pollution recovery boats.

The knuckleboom crane is said to offer a wide range of desirable features for shipboard use including precise load handling, extra capacity and reduced reach, total overload protection, minimal storage and mounting space, and an abundant work area coverage.

Because of the flexible elbow or "knuckle," the HIAB 110 crane has

a low operating height. This feature prevents the crane from interfering or entangling with the vessel's rigging or other overhead obstructions. The simple but effective design, the sophisticated use of corrosion-resistant materials in its construction, and the high-pressure hydraulic system makes the 110 crane lighter in weight than conventional cargo-handling units; this weight difference also permits a bigger cargo

payload.

Designed specifically for use in the saltwater environment, the HIAB 110 is constructed with galvanized components, waterproof fittings, nickel/chrome-plated boom cylinders, and is protected further with special marine coatings for maximum corrosion resistance. Compact in design and extremely maneuverable, the 110 can be operated by one man.



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## A.C. HOYLE

Circle 35 on Reader Service Card

The A.C. Hoyle Company of Iron Mountain, Mich., has been a major supplier of deck machinery to the marine industry for about a quarter of a century. The company offers a complete line of deck equipment including anchor windlasses, constant-tension mooring winches, topping and vang winches, towing winches, fairleads, chocks, and bits to both the naval and commercial marine markets.

Though equipment can be built to numerous standard designs, the company specializes in custom building to customer specifications. Hoyle personnel are available to assist customers from preliminary design stages through final design, installation, and testing. Major considerations are given to providing the best equipment available to meet customer requirements at affordable and competitive prices.

Winches, windlasses, capstans, and cranes are available with all-electric, electrohydraulic, hydraulic, static DC, or diesel drives. All deck equipment, including fittings is available in conventional steel construction as well as in stainless steel and aluminum. The company offers new technology in weight-saving designs, materials, and performance.

Non-magnetic deck machinery has been introduced to the Hoyle product line under the Navy's Mine Countermeasure (MCM) ship program.

## HYDE

Circle 17 on Reader Service Card

Hyde Products, Inc., is a leading supplier of ship's deck machinery and steering gears, serving the marine industry since 1865.

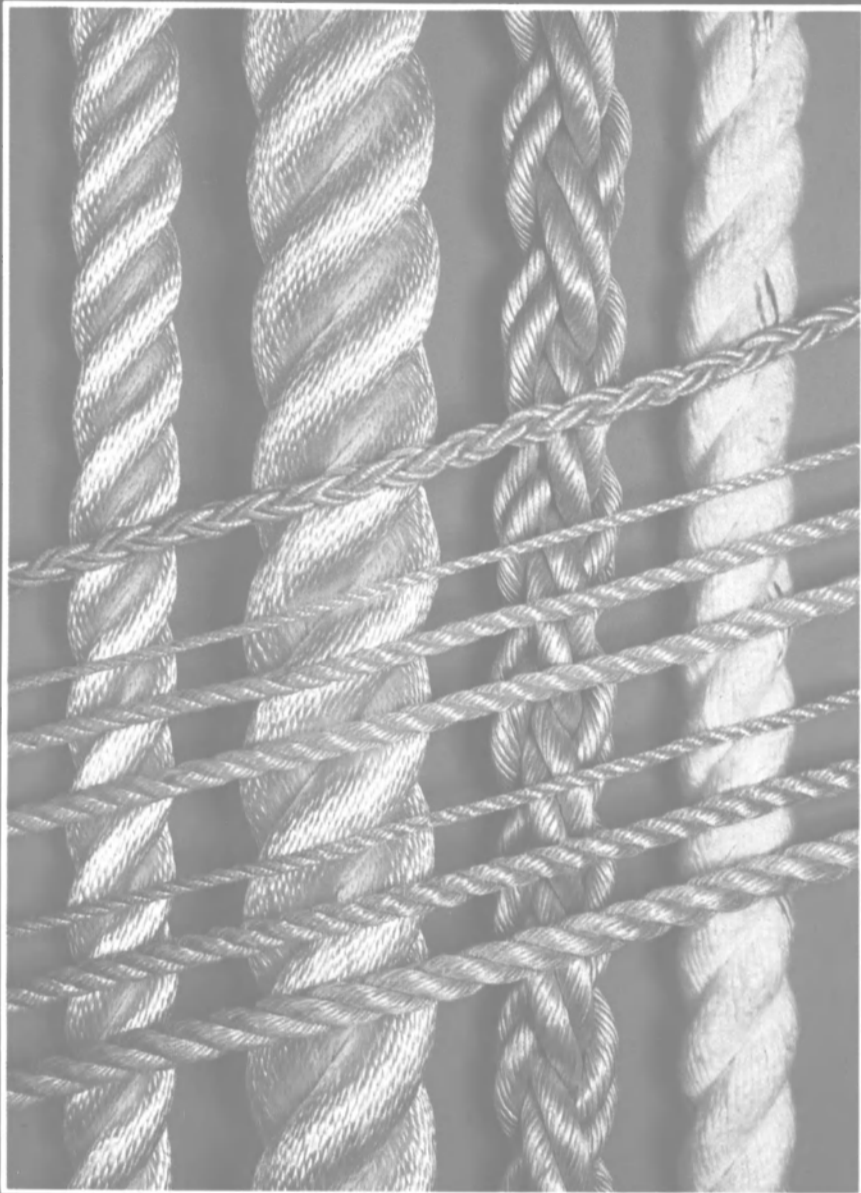
Equipment offered by Hyde includes complete steering systems, vertical and horizontal anchor windlasses, constant tension mooring winches, cargo winches, special purpose winches, capstans, mooring chocks, special pump systems, oil/water separators and oil spill recovery equipment.

While Hyde has a standard product line, custom-designed machinery is its specialty. Hyde equipment is installed on hundreds of naval, commercial and fishing vessels, as well as workboats and barges operating in the U.S. and throughout the world.

In addition to equipment manufacturing, Hyde offers replacement (continued)

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KARAT ropes' exceptional strength to weight ratio makes them superior in strength, *in equal sizes*, to nylon, polyester, polypro and blends thereof. This means that the user can safely down-size rope diameters, making KARAT working lines lighter, easier to handle, with half of nylon's elongation at working load levels.

For example, a 6" circumference (2" diameter) 100 ft. length of nylon weighs 94.4 lbs. with a 92,000 lb. tensile strength. The exact same KARAT rope weighs 76 lbs. with a 96,100 lb. tensile strength, making it not only lighter and stronger, but, at an equal cost per pound, 20% less expensive.

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With a melting point higher than polypro, KARAT ropes exhibit excellent anti-abrasion qualities and wear extremely well. Like polypro, with its low specific gravity, KARAT ropes float, but there the similarity ends. In equal diameters, KARAT ropes are 90% stronger. Flexible, with ultra violet stability, KARAT ropes do not absorb water, but are actually stronger when wet, by test.

### **TESTED AND PROVED**

KARAT ropes have been tested and proved in European waters since the late 1970s. In 1984 one of the United States' flag vessels successfully replaced its 1 1/8" and 1 1/4" wire mooring systems with 7" and 7 1/2" circumference KARAT ropes. Those replacements are still in use.

Columbian offers KARAT ropes that are 100% EStalon as well as various blends for fishing, river and work boat uses. For further information, including price, delivery, and technical field advice, write or call



### **Columbian Rope Company**

P.O. Box 270  
Guntown, MS 38849  
Phone 601-348-2241 in MS  
800-821-4391 Other

## Deck Machinery Review

(continued)

parts and service capabilities and maintains complete microfilm files of original equipment drawings to provide replacement parts that exactly match original specifications. Replacement parts, service and upgrades for Pine Tree Engineering Co. manufactured equipment are available as well. Hyde also offers

deck machinery overhaul and refurbishing services. Experienced Hyde service personnel perform installations, repair and overhaul work worldwide.

In recent years, the Korean Navy has installed Hyde steering systems, anchor windlasses and capstans on a total of 29 frigates, corvettes and other naval vessels. Several additional ROK orders are pending. The steering systems supplied for 22 ROK corvettes include an electronic

control system which eliminates the conventional differential control system. Hyde recently received an order for the steering gear on a new oiler to be built in Taiwan.

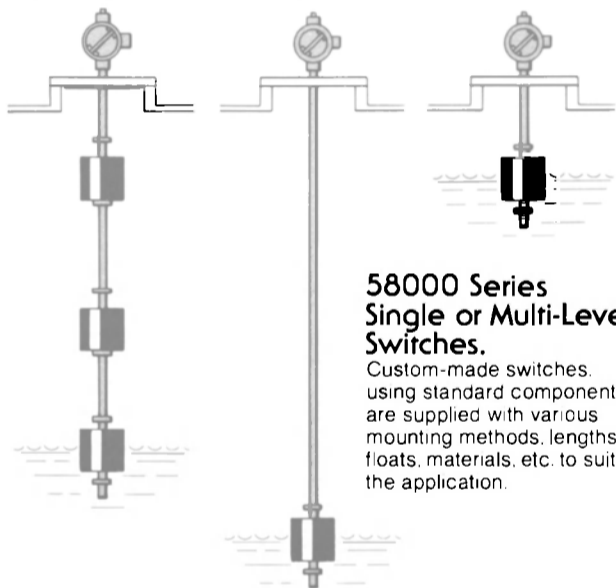
Hyde manufactured the anchor windlasses and several types of Refueling at Sea winches for the USS Wasp (LHD-1) and is currently building the same equipment for LHD-2 and -3. Hyde is also actively involved in many commercial and Navy projects, including upgrading

steering systems to meet the new SOLAS redundancy requirements. More than 100 Hyde Independent Steering Gear Power Units and controls have been supplied to tanker and passenger vessel operators worldwide.

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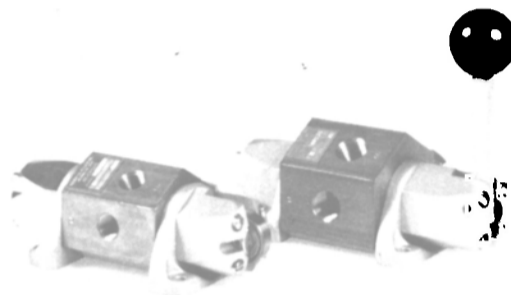
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L019

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Circle 225 on Reader Service Card

## IMO DELAVAL

Circle 19 on Reader Service Card

Imo Delaval Inc. offers a wide range of liquid cargo-handling equipment through its companies and divisions.

The IMO Pump Division of Imo Delaval Inc. has introduced a vertical deepwell barge pump designed to unload and strip liquid cargo tanks carrying heavy petroleum products at the rate of 1,500 gpm.

In addition to #6 fuel oil and asphalt, the positive displacement pump can handle products as light as #2 heating oil. Designed for use on new installations, refits and conversions, the new pump provides performance for all variations of cargo characteristics and dockside piping arrangements.

The Gems Sensor Division of Imo Delaval Inc. offers two liquid level subsystems which provide reliable liquid level indication where closed loading of shipboard cargo is a requirement.

The two subsystems—a Dipstick Liquid Level Indicator and a Self-Checking Level Switch—provide important "see, hear and feel" features for tankermen, barge operators and other ship personnel responsible for safe, accurate and reliable bulk transfer of cargo.

The Gems Dipstick Liquid Level Indicator is a compact, entirely self-contained liquid level indicating unit, designed primarily for use in storage drums, vats and tanks. It is excellent for "on-the-spot" level readout applications when electrical power is not available.

The Gems Self-Checking Level Switch provides a unique method of confirming, from outside the tank, the operational integrity of all vital components of the self-checking level switch.

The level switch was designed specifically for use in closed-loading crude and fuel oil tankers, chemical and other product carriers.

A new Hydraulic Liquid Cargo-Handling (HLCH) system for use on board chemical and product tankers has been introduced by IMO AB, an Imo Delaval company.

A complete system for cargo handling, the HLCH system is designed for dry installation on product tankers as well as crude oil tankers. Flows of 1,200 m<sup>3</sup>/h per pump at a maximum of 120 mlc can be reached.

The system allows remote control as well as local control. Additional functions can also be connected to the hydraulic system, e.g.—bow-thrusters, winches, fans, deck cranes and various types of pumps for slop tank, ballast, tank cleaning, fuel oil and emergency unloading.



## INTERCON

Circle 27 on Reader Service Card

Intercontinental Engineering-Manufacturing Corp. (INTERCON) of Kansas City, Mo., is a diverse engineering and manufacturing organization with established product lines in marine winches, hoists, custom drives and controls, marine cranes, and dredging machinery.

Currently in production are Twin Cargo Cranes to be included in the U.S. Navy's Auxiliary Craneship (T-ACS) Program. Each crane, singly operated, is rated at 30 long tons at 121-foot outreach; 60 long tons at 121-foot outreach in dual operation. All functions of the twin-boom pedestal cranes are electrohydraulically powered.

The first option of the Maritime Administration contract covers a lot of six Twin Cranes to be delivered to Tampa Shipyard for installation in T-ACS-7 and -8. Award for the second contract option was issued in July and calls for the manufacture of four cranes scheduled for installation aboard T-ACS-9 & 10 in late 1989. INTERCON completed its twin crane contract for T-ACS-4, -5 and -6.

Notable commercial winch contracts for 1988 include four model SD-200 anchor winches and fair-lead-ers for Santa Fe's new jack-up rig under construction at FELS-Singapore. These units will handle 2,300 feet of 2-inch wire rope. Three model SD-225H mooring units were completed and shipped to NKK of Japan for installation aboard ore ships. Two model DW-150 drag winches were recently delivered to McCormack Aggregates. INTERCON's model SD-175 towing winch with a hydraulic power source is scheduled for completion this fall for installation aboard Mobil Oil Corporation's tug Mobil 2.

INTERCON winches are sold and serviced worldwide for towing, mooring and anchor-handling applications. Ocean tugboat winches range in capacity from 50,000 to 500,000 pounds; single or multiple drum configurations are sized for wire ranging from 1 to 3 inches in diameter. Tug/supply boat winch packages include controlled-drop chain handlers, single lever anchor drum control, towing pins, and stern rollers. INTERCON's exclusive water-cooled brakes with solid state control are proved in handling anchors in over 2,500-foot ocean depths. Workboat deck machinery also includes a full line of windlasses and capstans ranging from 10 to 50 hp.

## KOCKS CRANE

Circle 29 on Reader Service Card

Kocks Crane & Marine Company of Pittsburgh, Pa., has received an order for three high-profile container cranes for the Port of Miami. The new cranes, which upon delivery,

will make a total of six Kocks cranes in operation at the port, are some of the largest ever built, having an outreach of 152 feet on the waterside and a backreach of 85 feet on the landside for prestowing of containers and placement of hatch covers. Design and engineering was done by Vulkan Kocks of West Germany.

The new cranes include the latest state-of-the-art features. The electrical control system is digital with fault-diagnostic computer readout. Additional features included are

heavylift operation of up to 85 tons and provision for a second trolley in the future.

The first crane recently arrived in Miami fully erected, with the second and third cranes scheduled to be delivered in December.

In addition, Kocks Crane & Marine recently received an order for two low-profile cranes from the Port of Oakland, Calif.

The award was made to Kocks on the basis of providing the best technical concept for a unique specifica-

tion—a low-profile crane with a maximum overall height of 129 feet and a full 100-foot lifting height between the bottom of the spreader and the dock. Design and engineering of the cranes was performed by Vulkan Kocks of West Germany.

The new Seventh Street Terminal cranes will be equipped with the latest digital electric system accompanied by a fault diagnostic computer. The cranes have been designed and

(continued)

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The 135 ton twin screw shrimper, "Roe Zan" during a lift by a 150AMO at Mt. Pleasant, SC

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## Deck Machinery Review

(continued)

provision has been made for future incorporation of a second trolley system.

The cranes will be shipped fully erected to the terminal aboard a special vessel and are scheduled to be delivered in May 1989.

### KVAERNER

Circle 20 on Reader Service Card

Gothenburg-based Kvaerner Ships Equipment AB is the design and sales center for the worldwide RO/RO cargo access equipment activities for the Kvaerner Ships Equipment international organization.

Among the many activities of the organization, Kvaerner Ships Equipment International's West German subsidiary, Kvaerner Brug (Deutschland) GmbH, Bremen, designed the cargo access equipment package for the recently delivered heavylift RO/RO vessel Ariana.

The J.J. Sietas-built 6,550-dwt self-sustaining RO/RO was designed specifically for the transport of components for the joint Northern Europe-South America Ariane IV rocket project.

The 377-foot vessel is fitted with a wide variety of Kvaerner equipment, including a 33-foot hydraulically operated stern ramp which has a rated maximum load of 400 tons. There are 14 Kvaerner Brug full width pontoon hatch covers fitted to the weatherdeck, which are rated for loads of 2 tons/m<sup>2</sup> and are equipped for carriage of 20-foot and 40-foot laden containers.

A new 5,000-grt passenger/train/vehicle ferry under construction at Denmark's Aalborg Vaerft will feature an extensive array of cargo access equipment designed by Kvaerner Ships Equipment AB.

The new ferry, which will serve an East German-Swedish route, will feature a 33-foot wide, 17-foot high visor-type stern door on Deck No. 3 for rail traffic access. The stern door will also form part of the vessel's stern hull section.

Among other equipment that will be installed on the vessel will include: two electrically operated roll-type stern doors and a starboard sited trailer door at midships for vehicle access; two hydraulically operated passenger doors for passenger access; an engine room hatch cover; and a variety of specialized doors.

Kvaerner Ships Equipment AB also has designed a special stern mooring system for the ferry. The system will be used to hold the ship to the shore-side rail ramp by hydraulic force.

### LIEBHERR-WERK

Circle 10 on Reader Service Card

Liebherr-Werk Nenzing specializes in the design and production of offshore lifting equipment and traditional deck cranes. The company recently introduced B/SM and BW/SM type deck cranes, which feature extremely slim construction with capacities ranging from five to 120 metric tons.

Liebherr-Werk recently added the RHM-type mobile harbor crane to its full range of mobile harbor cranes. This new compact mobile harbor crane is especially designed

for operation in inland harbors. The increased maneuverability and flexibility of the RHM-type mobile harbor crane provides added advantages for river port operators.

Liebherr-Werk's LHM-type mobile harbor crane, which is used for container-, general cargo-, bulk material and unit load handling operations, is popular in many seaports.

For offshore applications, Liebherr-Werk Nenzing offers the field-proven BOS type offshore crane, which has been used mainly in the harsh environment of the North Sea. Additionally, the company has a series of ram luffing offshore cranes, which feature low overall height and horizontal boom storage.

### MANITEX

Circle 28 on Reader Service Card

Manitex Inc., a subsidiary of the Manitowoc Company, Inc., designs, manufactures and markets pedestal-mounted box boom and lattice boom cranes at a modern, two-plant facility located near McAllen, Texas.

Ideally suited for dockside, marine, land-based, or pedestal-mounted applications, Manitex SeaCranes are constructed of marine-quality components, with complete material traceability available upon request. In addition, each crane features a versatile modular design to permit fast servicing and easy interchangeability of components from model to model.

The present family of Manitex SeaCranes includes five box boom models—the 15-ton-capacity MB-300; the 25-ton-capacity MB-600; the 40-ton-capacity MB-1200; the 60-ton-capacity MB-2400; and the 125-ton-capacity MB-7200.

Additionally, three telescopic-boom cranes are produced, the nine-ton Model 900 Series pedestal, the 11-ton Model 1100 Series pedestal and the 19-ton Model 1900 Series pedestal. Well suited for a wide variety of applications ranging from dockwork to dam and powerhouse maintenance.

Manitex complements its box-boom and telescopic-boom cranes by offering six lattice boom models, all available with full weather enclosures to permit operation in harsh environments. Current lattice boom models include: the 25-ton-capacity ML-600; 45-ton-capacity ML-1200; the 55-ton-capacity ML-2400; the 75-ton-capacity ML-4800; the 150-ton-capacity ML-9600; and 200-ton-capacity ML-14400.

Manitex SeaCranes exceed the operating codes of the major classification societies. Other advantages and features include all-modular designs, full 360-degree swing capability, auxiliary winch systems, single and double-taper box booms, onboard and remote control systems, onboard and remote power units, anti-two block systems and variable height gantry arrangements. In addition, Manitex's worldwide distributor network provides complete parts and service availability.

## MANNESMANN DEMAG

Circle 16 on Reader Service Card

Mannesmann Demag Baumaschinen of Dusseldorf, West Germany, was recently awarded a contract to supply six Demag MHC 190 telescopic mobile cranes to Poland for use in the harbor near Szczecin. The cranes will be used to assist in meeting the increased cargo-handling demands at the port.

Mannesmann Demag recently supplied the port with eight MHC 65 and seven MHC 190 telescopic mobile cranes for cargo-handling applications. The model MHC 65 has a capacity of 22-25 tons with a telescopic boom of about 80 feet.

The Demag MHC 190 has a lifting capacity of 65-70 tons. The three-section main mast is extendable to more than 121 feet. In addition to a main boom extension, Mannesmann Demag offers a luffing jib, which allows the main mast to be extended an additional 69 feet to a maximum sheave height of 190 feet.

## MARKEY MACHINERY

Circle 21 on Reader Service Card

The Markey Machinery Company, Inc., Seattle, Wash., has been designing and building custom deck machinery for the marine industry for more than 80 years.

Markey offers a wide range of towing, research and mooring winches, capstans, anchor windlasses, sheaves, chain stoppers and devil's claws.

The company's towing winches, which are offered in electric, hydraulic or diesel-torque converter drive designs, accommodate wire rope ranging from 3/4 to 2-1/2 inches in diameter and are available in single, double-drum side-by-side, or waterfall configurations.

Markey capstans have pulling capacities of up to 50,000 pounds and run at speeds of up to 120 fpm. On-deck, through-deck, under-deck or two-deck systems with air, hydraulic, electric or diesel drives are all available.

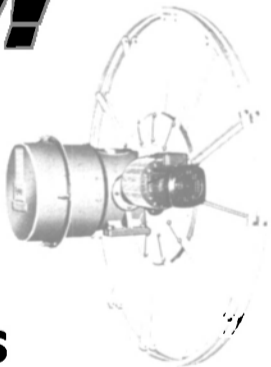
Available in both chain wildcat and wire rope drum designs, Markey anchor windlasses are built to accommodate chains from 1/2 to 3-1/2 inches in diameter, and wire up to 2-1/2 inches. Horizontal, vertical shaft and other configurations are available with hydraulic, electric or diesel drives.

Markey offers single or double drum scientific winches with drums heavy enough to resist spreading under packed cable expansion and which are easily removable for cable exchange.

As for mooring winches, Markey offers a complete line of dock-mounted ship and barge handlers, ship-mounted tie-up winches and tug-mounted soft-line winches with high speed capacities and heavy brakes.

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Circle 206 on Reader Service Card

# ELECTRONICS UPDATE

## New RAY-152 SSB Radiotelephone From Raytheon Provides Outstanding Long-Range Communication

The new RAY-152 SSB Radiotelephone from Raytheon Marine Company provides outstanding long-range communication over all 195 ITU marine channels, memory programming of up to 200 other operating frequencies, and scanning of up to 10 preprogrammed receiver channels, plus many convenient user features. This new 150-watt sing-sideband radiotelephone also offers marine telex interface capabilities for making hard-copy transmissions.

Designed for use with SITOR (Simplex Telex Over Radio) signal processing equipment, the RAY-152 can send and receive printed messages when used with an ARQ (Automatic Retransmission Request) modem to translate text to radio signals and vice versa. To send hard-copy messages, the operator types copy into a computer terminal and



Raytheon's new RAY-152 SSB Radiotelephone has a built-in noise blanker and built-in digital clarifier. Dual microprocessors assure precise, continuous tuning from 0.1 to 29.999 MHz (receive) and from 1.6 to 29.999 MHz (transmit).

calls a high seas marine operator who will forward the message to the receiving station. The transmission can also be sent directly to the receiving telex station. While this system has been used by commercial mariners for years, it is becoming more and more popular with yachtsmen and anyone offshore who

wants to stay in touch via printed transmissions.

The RAY-152 SSB can also be remotely controlled when used with the optional RS-232C interface. If, for example, you were equipped with a computer and printer, you could program the RAY-152 to receive printed weather broadcast reports, unattended.

The RAY-152 SSB Radiotelephone is 14.6 inches wide by 5.1 inches high by 13 inches deep, and weighs 22.8 pounds. It is supplied with microphone, power cable, mounting hardware, and owner's manual.

For more information and free literature on the new RAY-152 Radiotelephone from Raytheon Marine,

Circle 42 on Reader Service Card

## L'Orange Offers Free Literature On Engine Injector Systems

L'Orange GmbH, Stuttgart, West Germany, one of the leading manufacturers of injection systems for medium and large diesel engines, offers a full line of high-pressure injection pumps and injection valves, spare parts for all injection systems from the major engine manufacturers, and other testing and assembly equipment for the maintenance and repair of injection equipment.

A recently introduced innovation from L'Orange is a pilot injection system which improves the efficiency of diesel engines and enhances environmental compatibility.

L'Orange offers an injection system which has been perfected hydraulically on a test bench under similar conditions to those found in an engine. The engine manufacturer thus saves expensive engine test runs and reduces the time required to develop his engine. At the same time as this development work, L'Orange conducts endurance testing for the complete injection system. The system is only approved for use after it has been subjected to at least 10 million load cycles without a fault being detected.

Engine manufacturers' requirements for high injection pressures and short injection times have led to the development of completely new pump designs by L'Orange. The company introduced a new design principle featuring the monoelement. This means that high-pressure pumps from L'Orange, suitable for continuous operation at 1700 bar peak pressure, only have one high-pressure sealing face. Several thousand high-pressure pumps with monoelements have been proven in service and satisfy the highest requirements for reliability and efficiency.

For free literature detailing the full line of injection systems from L'Orange,

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### JIM'S PUMP REPAIR INC.

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Maritime Reporter/Engineering News

## Riley-Beaird Receives \$15-Million In Contracts From Newport News

W.E. Adams, president and general manager of Riley-Beaird, recently announced the receipt of contracts from Newport News Shipbuilding covering propulsion system equipment for the nuclear-powered Nimitz Class aircraft carriers CVN 74 and 75. Equipment is scheduled for delivery in 1990 and 1992. Orders total approximately \$15 million.

Similar equipment has previously been manufactured by Riley-Beaird for Newport News Shipbuilding. Manufacturing of the equipment will require several of the large Computer Numerically Controlled (CNC) machining centers installed by Riley-Beaird in the past few years. Installation and utilization of CNC equipment is a continuing long-term strategy to position the company for fabricating and machining large and heavy metal components with critical tolerances.

These orders will provide continuing employment for many works at Riley-Beaird during the next four years.

For more information and free literature on Riley-Beaird,

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## Ingalls Selected As Prime Contractor For Israelis —\$1.21 Billion For Three Corvettes And Two Subs

The Israeli Ministry of Defense has selected Ingalls Shipbuilding, Inc., as the prime contractor for three SAAR 5-type, Israeli-designed Corvettes and two Dolphin submarines. The contract, worth \$1.21 billion, will be paid by fully funded foreign military sales (FMS) credits.

Construction of the two submarines will be subcontracted by Ingalls to a West German shipyard, and special arrangements will be made to allow Israel to pay a West German shipyard with FMS money.

The U.S. Navy, citing reasons of national security, has repeatedly disallowed U.S. shipbuilders to build non-nuclear submarines for foreign governments.

## Unitor Offers Free 14-Page Brochure On Ship Services & Products

Unitor Ships Service AS of Norway is offering a free 14-page color brochure on their full range of products and services for the operational, maintenance and safety systems on vessels and offshore units.

With the extensive use of color photos and text, the brochure provides a history of Unitor—from its earliest beginnings as the Naval Arc and Gaswelding Company in 1936 to today's company with a network of branch offices and 160 agents covering 450 ports worldwide servicing the international fishing, shipping and shipbuilding industries.

The brochure is divided into four comprehensive main sections—"Unitor's Operating Philosophy,"

"Repair & Maintenance," "Fire & Safety," and "Refrigeration."

The 14-page publication thoroughly details Unitor's main products, which include: industrial gases; welding equipment; refrigerants; Danfoss controls; air tools; high-pressure cleaning systems; marine chemicals; firefighting, rescue and safety equipment; nitrogen inert gas systems; and hospital and first aid equipment.

In addition, Unitor also offers ser-

vice and training in many of their product areas. For example, more than 10,000 seamen have attended courses taught by Unitor professionals in the fields of welding, refrigeration and safety at Unitor training centers or onboard vessels while underway from one port to another.

For a free copy of this comprehensive color brochure on Unitor,

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## The Seaward dock fender. If the U.S. Navy thinks it's good enough for the 1990's maybe it's good enough for your facility now.

The U.S. Navy chose Seaward dock fenders to protect Pier Zulu, in Charleston, S.C. This new 20 million dollar pier is the prototype of the Navy's pier designs for the 1990's. Seaward's fenders have also been installed on new Navy berthing facilities in California, Florida, Virginia, Iceland, and the Philippines. These fenders are being included in the design of new home port facilities and are being used in the upgrading of Navy docks around the world.

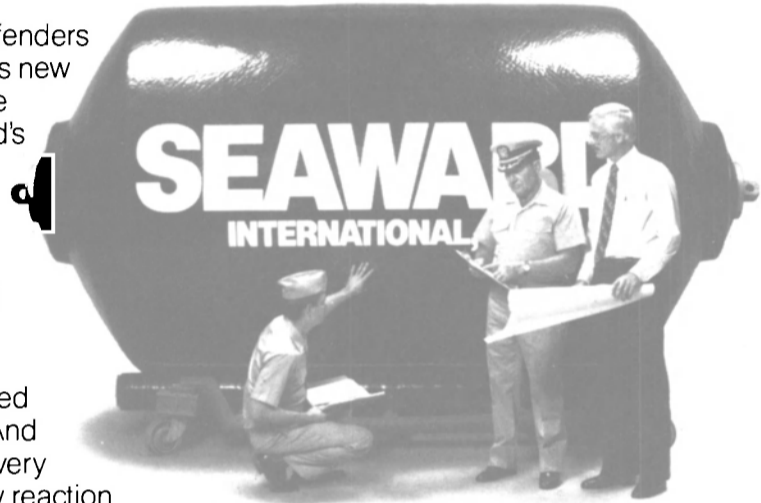
Seaward dock fenders are constructed of a tough, snag-free elastomer coating. And Seaward's closed-cell foam center has a very high energy absorption capacity but a low reaction force. These fenders provide stand-off and safely cushion the impact of approaching vessels, whether they're tugboats or battleships. Yet Seaward dock fenders are as easy to install as they are rugged.

The U.S. Navy didn't settle for an ordinary fender to protect Pier Zulu. So why should you?

For more information contact Seaward International, P.O. Box 98, Clearbrook, Virginia 22624. Telephone: (703) 667-5191, Telex: 275034 SEWARD UR.



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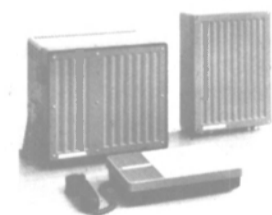
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# PROPULSION UPDATE

## Upgraded MAN B&W L28/32 Engine Offers Improved Fuel Economy, Reliability And Durability

The merits of MAN B&W Holeby's L28/32 auxiliary engine series—one of the world's most popular heavy fuel-burning genset drives—have been enhanced by some recent significant design modifications. The fuel economy has been substantially improved, and the reliability and durability of the new model promise to be even better than its market-leading predecessor.

The upgraded L28/32 is already in service or ordered for a number of prestigious auxiliary power installations. Market response is reflected in an order backlog totaling 125,000

bhp at the Holeby factory as of June 1 this year, with deliveries scheduled well into the summer of 1990.

The upgraded engine retains the basic design of the well-proven 280 mm bore/320 mm stroke series but now exploits constant pressure turbocharging in conjunction with the new generation of high efficiency turbochargers. The system gives a simplified exhaust manifold and reduces charge air renewal work, boosting overall thermal efficiency and yielding a reduction in specific fuel consumption of 4-5 gr/bhph.

A major contribution to improved performance and reliability also

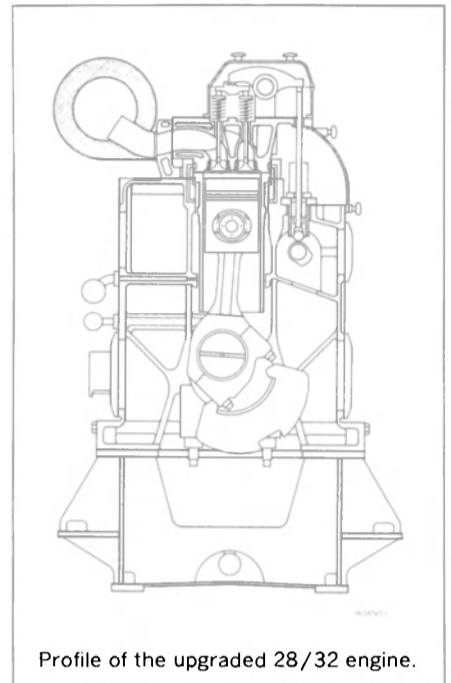
stemmed from redesigning key engine components for a maximum firing pressure of up to 150 bar. Production engines, however, will still be released for operation at the original 130 bar rating. The resulting higher safety factor ensures low maintenance demands and extended durability from a design running well within its margins: a desirable feature not shared by some other engine designs, which are required to operate at or near their design limits.

Components benefiting from redesign include the cylinder head (still of high strength cast iron but with an improved stud securing arrangement to accept higher pressures), engine frame, cylinder liner, piston and connecting rod. The crankshaft was also modified and the bearing area increased by approximately 6 percent.

The improved combustion chamber created by the new cylinder head and piston crown contributed significantly to fuel economy gains. Exhaust valve durability is enhanced by the higher thermal efficiency of the engine which yields valve temperatures some 50 degrees C lower than those of the original design.

The new L28/32 design supersedes the former '28 series' models in the streamlined MAN B&W Holeby GenSet program, which also embraces the '23 series' (L23/30 models). The upgraded 28 series is available in 5-, 6-, 7-, 8-, and 9-cylinder in-line versions to cover an output band from 1,190 to 2,570 bhp (875 to 1,890 kw) at 720 r/min for 60 Hz applications, and from 1,255 to 2,690 bhp (925 to 1,980 kw) at 750 r/min for 50 Hz applications.

The flexibility of the program is enhanced by MCR and ECR options already familiar on equivalent MAN B&W propulsion engines. The choice of an ECR output (about 80 percent of MCR) yields the minimum fuel consumption while retaining the capability to switch to MCR mode. Up to 30 percent spare capac-



Profile of the upgraded 28/32 engine.

ity can thus be integrated at the newbuilding stage, ready for tapping to meet higher electricity load demands at any time during the ship's service life. The conversion is simply effected onboard by re-matching the turbocharger and adjusting the valve gear.

Ships already benefiting from the new 28 series include the 3,900-TEU Marchen Maersk, the first of nine advanced containerships for A.P. Moller. The auxiliary power package includes three 8-cylinder 28/32-based generating sets. Among the order backlog are 5-cylinder sets (20 in all) for six Del Monte reefer vessels booked from Astilleros Espanoles.

Improved engine design is complemented by recent investment in sophisticated flexible manufacturing systems at the Holeby factory to promote economic and efficient production.

For free literature giving full information on MAN B&W Holeby's upgraded L28/32 auxiliary engine series,

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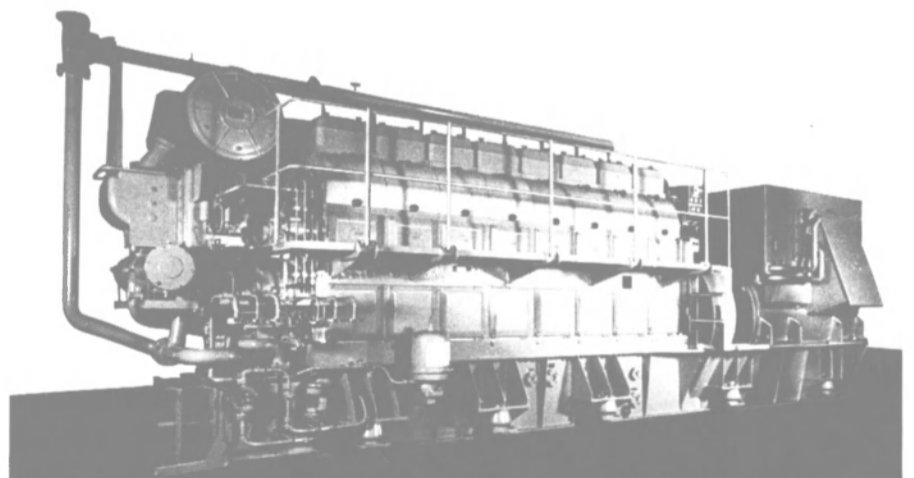
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MAN B&W Holeby's upgraded L28/32 engines allow for more compact installations. Optimization of mounting arrangements—for example, lube oil filtration—has reduced overall dimensions of the gensets.

## OMI Acquires Tanker; Orders Panamax Bulker

OMI Corporation, New York, N.Y., a major bulk shipping company, announced the recent acquisition of the 143,800-dwt tanker So-kolica from a Polish owner and the

placement of an order at Hitachi Zosen in Japan for the construction of a Panamax dry bulk carrier of 69,950-dwt, in which it will have a 50 percent interest. OMI joint venture companies now have four vessels on order in Japan, aggregating over 500,000 dwt, scheduled for delivery through 1991.

## AESA Wins Orders From Cuba, Sweden; Will Build Seven Ships

Spain's Astilleros Espanoles SA was recently awarded a five-vessel construction contract by Cuban shipping companies and a two-ship contract by a Swedish firm.

Under the Cuban contract, Empresa Navegacion Mambisa, the largest shipping line in Cuba, has ordered three 314-1/2-foot-long refrigerated cargo ships, and Empresa Navegacion Caribe (Navcaribe) has ordered two 1,600 m<sup>3</sup> LPG/ammonia carriers. The vessels will be constructed at the builder's Juliana yard for a 1990 delivery.

The Swedish order, which was awarded by Laurin Maritime AB of Gothenburg, calls for the construction of two 46,000-dwt chemical/products carriers. The vessels will be about 598 feet long, 105 feet wide and have a depth of 58 feet. The ships will be built at AESA's Sestao yard and delivered in December 1990.

The designs of all the vessels being built by AESA specify MAN B&W Diesel main propulsion machinery.

Each 262-foot LPG/ammonia carrier will be powered by MAN B&W main machinery which will develop 2,480 bhp at 250 rpm, while the three reefers will each be powered by MAN B&W main engines supplying 4,560 bhp at 200 rpm.

The Swedish ships will each feature MAN B&W engines developing 12,750 bhp at 102 rpm.

For free literature fully detailing the shipbuilding and ship-repairing services of AESA,

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For free literature completely describing the full line of MAN B&W diesel engines,

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## Free Literature Offered On High-Tech Multi-Pak Marine Trash Compactors

ICI Multi-Pak, Houston, Texas, is offering free literature on its latest state-of-the-art marine trash compactors for handling on-board waste.

New Marpol/Annex V regulations, which become effective January 1, 1989, are generating considerable interest in the three sizes of Multi-Pak compactors, which range from a closet-sized unit (MP-30) designed for the smallest of vessels to the larger unit (MP-70) which handles 21,000 pounds of waste per day.

A recent test installation of an MP-70 aboard the flagship of a major cruise line exceeded all their expectations, resulting in compactor orders for installation aboard six other vessels.

With worldwide attention on cleaning up the environment, the Multi-Pak Trash Compactor offers safe, clean, and cost-effective means for handling waste aboard vessels

serving the inland waterways, harbors and open seas. The user of the Multi-Pak has a choice of packaging the waste in tightly secured plastic bags stored for discharging at a port/terminal/marina or utilizing biodegradable, heavy-duty, watertight, cardboard boxes for longer storage.

For free literature detailing the three sizes of marine trash compactors offered by ICI Multi-Pak,

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## Crowley Division Moving To Jacksonville, Fla.

Headquarters for the Atlantic Division of Crowley Maritime Corporation is moving from Teaneck, N.J., to Jacksonville, Fla.

The move entails no reduction of employment at the Teaneck location and involves the relocation of only a handful of division-level managers to Jacksonville.

Transferring to Jacksonville are William B. Bru, Atlantic Division

president, Mark J. Morrison, vice president—finance and administration, Carl Fox, vice president—planning, and two other division staff members.

Teaneck continues to be the principal office for Crowley's American Transport Lines' (AmTrans) services between the U.S., South America, Europe and the Far East. These services are headed by Edward W. O'Donnell, senior vice president and general manager, who will remain in Teaneck.

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# 'Consolidation And Expansion' Will Be Theme Of Seatrade's Cruise Shipping '89

By Christopher Hayman\*

*\*Editor's Note: Mr. Hayman is the publisher of Seatrade Week, which is published weekly by Seatrade North America Inc.*

The 500 registered delegates at Seatrade's Cruise Shipping Conference and Exhibition, held in Miami in February of this year, were asked to give their opinions on how they expected the cruise industry to develop over the next 12-month period. The opinion sample, which was taken by Market Scope, asked a series of questions about passenger volumes and demand, profitability and the prospects for mergers and consolidation in the industry. To the question "Do you expect there to be more mergers between cruise lines?" The survey respondees, more than 30 percent of whom were cruise line executives, gave an overwhelming "yes" answer.

Despite this near unanimity, few observers would have expected this prediction to have been fulfilled as quickly as turned out to be the case. In the month of August, two major deals were announced which will make a significant realignment of the industry. In a \$210-million deal, Princess Cruises, the Los Angeles-based subsidiary of the Los Angeles P & O Group, acquired Sitmar Cruises, its four-ship fleet and three large newbuildings now under construction in France and Italy. Top cruise industry analysts such as Country NatWest's **Dan White**, who forecasts further consolidation, believes that price makes this a good deal for Princess. The newbuildings, the 1,470-berth Fair Majesty due for delivery next year from Chantiers de l'Atlantique, and two 1,600-berth ships building for delivery in 1990 and 1991 from Fincantieri in Trieste, were contracted at favorable prices and exchange rates. Princess, which plans to hold on to as many Sitmar employees as possible, says that the Sitmar deal does not affect plans to build a Royal Princess II which is now in discussion with several yards.

The second major consolidation move in August emerged in stages, starting with the news that Gotaas-Larsen had sold its cruise interests, consisting of a 30.72 percent stake in Royal Caribbean Cruise Lines and a 51 percent stake in Admiral Cruises for \$260 million to Carnival Cruise Lines. Before the industry had had a chance to digest this information, it became known that Carnival had also mopped up the 30 percent holding of I.M. Skaugen in RCCL and the 7 percent of Admiral owned by Johnson Line and EFOA. This leaves one of the original partners in RCCL, Norwegian owner Anders

Wilhelmsen, out on its own. At press time there was some indication that the company was seeking to form a consortium to buy out the Carnival interest, but it remains to be seen how this situation will ultimately be resolved.

Whatever the outcome, there is no doubting the strength of Carnival, or the determination of the company to move beyond the "contemporary" concept. President **Mickey Arison** has made it clear that the RCCL and Admiral deals do not preempt the company's plans for its "Tiffany" project, which will take it into the luxury end of the market and could involve the construction of three 45,000-grt newbuildings in Sweden.

This move towards further expansion of capacity is not confined to Princess and Carnival by any means. Holland America, which already expanded its fleet once this year through acquisition of existing capacity, is widely expected to confirm orders for newbuildings in the near future. Kloster Cruise takes delivery of two newbuildings this year, the Seaward for NCL and the Royal Viking Sun for RVL in December. Other notable additions to the fleet this year include the Spirit for Windstar. Royal Cruise Line expanded its fleet earlier in the year with the Crown Odyssey, American Star Lines added the Betsy Ross, and Clipper Cruise took delivery of the Yorktown Clipper. The delivery attracting the most attention this year was the Sovereign of the Seas for RCCL.

With an estimated 11 more ships to come in 1990 and 1991, is this rate of increase in capacity excessive? Certainly not, if demand keeps increasing at its present rate. **Kirk Lanterman**, president of Holland America and the current chairman of Cruise Lines International Association, was in no doubt about this when speaking at the Seatrade conference this year. "While capacity will grow by an average of 7.2 percent per year, passenger growth is exceeding 10 percent per year," he said. "If anything, the cruise industry today is scrambling to stay ahead of the game. Our biggest problem in the 1990s may be an UNDERsupply of quality and cost-efficient capacity," he told delegates.

Along with this expansion of capacity and optimism about demand, there are some entrepreneurs who believe that the time is right for the mega-cruise vessel. For some years, **Knut Kloster** has been the principal advocate of this type of vessel in his attempt to find finance for the



Wartsila Marine Industries of Finland, one of the world's leadingbuilders of cruise ships, was just one of the exhibitors at Seatrade's Cruise Shipping '88.

Phoenix project. This year he was joined by the Indian-born tanker magnate **Ravi Tikko**. His concept of the "Ultimate Dream" may not be as big as the Phoenix in terms of capacity but there are some similarities in the concept. It remains to be seen whether the viability of the mega-ship idea will be tested in practice.

The issues of consolidation and the expansion of demand, the role of the mega-vessel, etc., will be on the agenda for the next Seatrade Cruise Shipping Conference and Exhibition, which is scheduled to take place at the Miami Intercontinental from February 28 to March 4, 1989. A panel of experts, including Princess president **Tim Harris**, Holland America's **Kirk Lanterman**, Carnival's **Bob Dickinson** and Royal Cruise Line chairman **Pericles Panagopoulos** for the cruise lines, and major travel agents like **Bob Seckman**, managing director of travel agency services of the American Automobile Association, will give their views on these issues and the future direction of the cruise industry.

Even though the forecasts suggest an optimistic picture so far as demand is concerned, if the ships are to continue sailing full, then more imagination needs to be put into the range of onboard facilities available for cruise passengers and in the itineraries and destinations on offer. There is no doubt that lines both big and small are spending much more time on identifying new and attractive ports of call, both in the traditional cruise areas and further afield. Thus, while there is still a great deal of opportunity for the well-established products such as the Caribbean from Miami, Mexico, Alaska and the Mediterranean, new areas such as the Pacific and the Far East are attracting considerable attention. Regency Cruises chairman **William Schanz** and Exploration Cruise Lines president **Bob Giersdorf** are two of the speakers looking at this subject in the conference.

The 1989 Seatrade cruise conference will be expanded by an extra day to include two seminar sessions running in parallel for the benefit of delegates. One of these, comprising cruise line operations executives and technical experts, will look at cruise ship technology and vessel operations. The other, including

travel agents, marketing experts and tour operators, will look at the distribution systems for the cruise product. Other new conference topics will include U.S.-flag cruise operations by **James Kurtz** and **John Broughan** of Aloa Pacific, the concept of cargo-carrying cruise vessels by **James De Chant** from Ivaran Lines, the pioneers of this new concept, and the views of a major European ferry operator, **Thomas Lepisto**, president of Sally Lines, Finland, on what the cruise and ferry operators should be learning from one another. Keynote luncheon speakers will be Miami port director **Carmen Lunetta** and Adm. **Joel Sipes** of the U.S. Coast Guard.

Each year, the Seatrade conference is accompanied by an exhibition of products and services, destinations and onboard facilities, available to the cruise industry. Although the space has been doubled for 1989, the show is already 80 percent sold out.

The tremendous growth in the cruise industry over the past five years shows no sign of having been affected by the stock market collapse of last October. Most experts agree that the industry has moved into a maturing phase that will mean more consolidation of lines, more sophistication in marketing and product definition, and, perhaps, an influx of participation from nontraditional areas such as the airlines and the hotel industry. Above all, this increasing sophistication creates a tremendous challenge to the shipbuilders, designers and naval architects, marine engineers and other technical suppliers, to increase comfort and convenience for passengers while maintaining operational efficiency. That challenge is being met. The latest generation of cruise vessels represents one of the most exciting areas of marine technical development today.

For further information, contact: **Sharon Day**, the Seatrade Organization, Fairfax House, Causton Road, Colchester CO1 1RJ, United Kingdom; telephone: (0206) 45121; telex: 98517 DISOP G; telefax: (0206) 45190; or **Mike Kazakoff**, Seatrade North America Inc., Suite 1805, 40 Rector Street, New York, N.Y. 10006; telephone: (212) 393-1000; telex: 233629 SEA UR; and telefax: (212) 608-5874.

# ON THE COVER

## Fire-Damaged Crabber 'Reborn' After Conversion At MARCO-Seattle Yard



The "reborn" Westward Wind was converted by MARCO-Seattle from a 130-foot, fire-damaged crabber to a 160-foot crabber/longliner in less than 16 weeks.

The handsome 160-foot crabber/longliner that recently left the MARCO-Seattle Shipyard bore little resemblance to the fire-ravaged 130-foot crabber that had been towed in four months earlier. After her conversion, which included the addition of 30 feet to her hull, as well as a new multilevel deckhouse and longlining capability, the "reborn" Westward Wind was able to rejoin the Arctic Alaska Fisheries fleet for the fishing season.

"It was like one of those 'Phoenix rising from the ashes' stories," said shipyard vice president **Bob McMahon**. "I'm really proud of our people for pulling together such a complex job in such a short time," he said.

The conversion, originally planned as a 16-week project, was completed 10 days ahead of schedule.

The 30 feet of new hull provides the Westward Wind with an additional 10 feet of space at the forward end of her engine room and more than 4,000 cubic feet of refrigerated hold space. The refrigeration system consists of two Comlac Coil five-blower units and associated compressors, condensers, and receivers, all installed and piped by PSER Inc.

The ship's new deckhouse includes a spacious pilothouse, a new accommodations deck, and a shelter area for the new longline system. The fo'c'sle was also extended to provide space for two plate freezers to expand the existing processing line. A new crab cooker, four chill tanks and four brine tanks from Flohr Metal Fabricators were also added.

For her new role as a longliner, the Westward Wind now carries a MARCO automated longline system, including the CircleMatic automatic circle hook baiter and the MarcoMatic hauler/coiler. Baiting is done from the shelter area located

on the starboard side of the main deck aft.

In the engine room, the vessel's water-damaged Detroit Diesel 12E149 main engines and reduction gears were rebuilt by Emerson Diesel. Two of her auxiliary generator sets were scrapped, the other was rebuilt, and two new 8V-92TA units with Marathon 325-kw generators

were installed. She was fitted with two new 68-inch-diameter, four-blade Bird-Johnson bronze propellers.

A new switchboard, alarm panel, and complete rewiring of the Westward Wind's electrical system were designed and installed by Harris Electric. The pilothouse is outfitted with two Furuno radars, an Echotec

CV-950 color video sounder, a dual-frequency Furuno FCV-261 color video sounder, and Furuno's GD-180 color video plotter with remote control.

For additional information on conversions and other services provided by MARCO-Seattle,

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# GASTECH 88

## 13th International LNG/LPG Conference & Exhibition

Kuala Lumpur, Malaysia, October 18-21

The 13th International LNG & LPG Conference and Exhibition, Gastech 88, will be held in the Putra World Trade Center, Kuala Lumpur, Malaysia, from October 18-21, 1988. It will be the first Gastech meeting to be held in a major LNG exporting country.

The extensive conference program includes more than 50 papers in nine sessions. The sessions will cover virtually all aspects of the natural gas, LNG and LPG industries and provide an excellent opportunity for delegates to meet in a productive and business-like atmosphere in a part of the world where there continues to be a great deal of gas-related activity.

Malaysia is a thriving and dynamic democratic nation rich in natural resources including oil and gas. Kuala Lumpur, its capital, reflects the nation's inherently optimistic business climate, being among the most modern and advanced cities in South East Asia, but retaining much of the charm and attraction of the older Malay style.

The new \$200-million Putra World Trade Center is an excellent example of a wholly modern building which strongly reflects Malaysia's native architectural heritage. It is built in the style of the steep-roofed village long-houses still found throughout the country but the interior is—by any international standards—a superb conference and exhibition facility and possibly the finest of its kind ever used for a Gastech meeting.

The sessions in the current Gastech 88 program are: "World Gas

Supplies"; "LPG Production and Trade"; "Liquefied Gas Terminals and Storage"; "Safety and Training"; "Transportation, Technology and Operations"; "Gas Opportunities, Utilization and Trades"; "The LNG Trades"; "Petrochemical Gases: Trading Prospects and Developments"; and "Gases as Transportation Fuels."

To benefit both the delegates and the exhibitors, a two-year cycle has now been established for Gastech meetings by the organizers. This year's conference and exhibition is expected to draw more than 2,000 participants.

For more information on attending the Gastech 88 conference and exhibition, contact: Gastech Secretariat, 2 Station Road, Rickmansworth, Herts WD3 1 QP England; telephone: 0923 776363; telefax: 0923 777206; or telex: 924312.

### Gastech 88 Exhibitor List

AE Industries Services  
AGFA-Gevaert  
AMRI  
Auxitrol  
Bergamo Export  
Biffi  
Boelwerf  
Bouygues Offshore  
Camere de Commercio Romagna  
Cameron Ironworks  
CEPI-Cepoil Division  
Chero Piping  
CNG Services of Pittsburgh  
Craddock

Cryodynamics—Ebara Group  
Douglas Chero  
Elpiji  
Elster Handel  
Energy Industries Council  
ETPM  
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Fasani  
Fasani  
FMC Europe  
Foxboro Canada  
Friedrichsfeld  
GAM Raccordi  
Gaz de France  
Gaz-Transport  
GEO-ASTEO  
George Kent (Malaysia) Berhad  
Germanischer Lloyd  
Handal Engineering  
Howmar International  
Hoyer  
Hungexpo-Chemokomplex  
Hydraulic Analysis  
Hyundai Heavy Industries  
ICE  
ICI Chemicals & Polymers  
IHI  
Industrial Control Services  
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LGA Gastechnik  
Liquid Gas Equipment  
Liquid Gas International  
Liverpool Energy, Univ. of  
M1 Engineering  
M.W. Kellog  
Malaysia Shipyard & Engineering  
Malaysian Oxygen Berhad  
MAN GHH

Mecomb Malaysia  
Mega  
MIB International  
Micoperi  
Mine & Energy, Dept' of  
Mitsubishi Heavy Industries  
Mitsui Shipbuilding & Engineering  
Moss Rosenberg Verft  
Nuova Giungas  
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NV Recticel Insulation Contracting  
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Sarasota Automation  
Schlumberger Industries  
SDIG  
Sembawang Shipyard  
SN Technigaz  
Society of International Gas Tankers & Terminal Operators  
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### Lehigh Portland Cement Awards JJH Inc. Contract For Jumboizing Design

JJH Inc., Cherry Hill, N.J., has been awarded a contract from Lehigh Portland Cement Co. for the design of a midbody, bid specification package and assistance in shipyard selection for jumboizing the barge Lehigh No. 1. This work will

increase the barge's current capacity from 2,600 short tons to 3,800 short tons.

JJH Inc. is a leading naval engineering company with facilities in Cherry Hill, N.J., Portsmouth, Va., Bath, Maine, Crystal City, Va., Panama City, Fla., and Long Beach, Calif.

For more information and free literature,

Circle 51 on Reader Service Card

### Sperry Marine Names District Managers

J. Scott Bartlett, manager of Sperry Marine Inc.'s U.S. field operations, recently announced that Mrs. R. Laverne Urie has been promoted to district manager, Pacific Central District, and that Linda I. Mullin has been promoted to district manager, Pacific Northwest District.

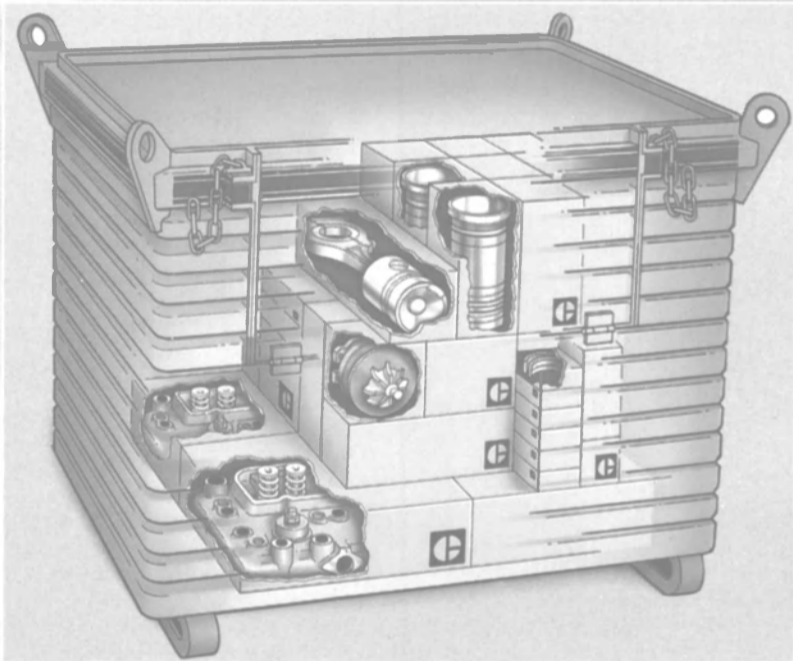
Mrs. Urie, who joined Sperry Marine Inc. in 1960, will be responsible for marketing and product support activity in northern California and Hawaii and for marketing activity in the Los Angeles area.

Ms. Mullin, who joined Sperry Marine in 1978, will be responsible for marketing, dealer sales, and product support activity in Alaska, Washington, and Oregon.

# Stay on Course with Cat In-Hull Overhaul Kits

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# SeaCare



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Circle 110 on Reader Service Card

## Advanced Deck Cranes From O&K Shorten Berthing Times, Cut Costs

### Free Literature Available

Increasing containerization in shipping has necessitated the development of a number of advanced ship-mounted loading systems to shorten berthing times in port and to make cargo-handling more cost-effective.

One of the developers of new and innovative cargo-handling equipment is Lubeck-based O&K Orenstein & Koppel AG Tagebau und Schiffstechnik. Building deck cranes since 1965, the West German company has developed a number of highly advanced cranes. The company offers single or double deck cranes and double joint and gantry cranes in electrohydraulic or all electric models with lifting capacities from 5 to 100 tons.

In 1975, O&K introduced its second generation of twin deck cranes.

Their patented design allows slewing assembly to serve all functions, and the slewing gears engage single and in twin crane operation.

The O&K Anlagen und Systeme division of O&K Orenstein & Koppel AG has received an order for crane equipment for two reefer ships being built at Bremer Vulkan AG's shipyard in Bremen.

The order comprises four Gemini double deck cranes with a hoisting capacity of 2 x 18 tons each, at 83.3 feet outreach. In double crane operation, loads of up to 35.4 tons per double crane can be lifted. This crane concept allows rapid handling of pallets, as well as 20- and 40-foot containers.

In a unique installation, two O&K container deck cranes were fitted aboard American shipowner Matson



Two double-joint O&K cranes in operation aboard the M/S Scan Dutch Edu, owned by Claus-Peter Offen and chartered by Scan Dutch. Both cranes have 45-ton capacities. An O&K single crane with a 22-ton SWL is in the background.

Navigation's recently delivered container barge *Islander*. Each of the cranes aboard the 387-foot barge has a lifting capacity of 40 metric tons at a working radius of 30 meters, and is equipped with a load turning device, telescoping spreader and computerized program control. The cranes will allow the handling of containers independent of quay-side facilities.

In 1982, O&K achieved a major technological breakthrough with the introduction of the double-jointed cranes for on-board container handling. The first installations of O&K double-joint deck cranes were fitted aboard three Indonesian-owned containerships, the *Majapahit*, *Jakarta* and *Gowa*, built by Flensburg's *Schiffbau-GmbH*, Flensburg, West Germany. Each of the vessels was fitted with two double-joint deck cranes with 35-ton capacities. The O&K double-jointed deck crane allow precise guidance of container, bulk and general cargo loads, reduce swinging heights and increase container-handling capacity. The essence of the O&K concept is that the two joints allow container movement through the arc of a circle, whereas standard luffing cranes move cargo around the circumference of a circle. O&K claims that its double-jointed cranes can achieve almost double the load cycles possible with standard cranes.

The unique design of the crane features a glare-resistant crane operator's cabin, which is attached under the articulated jib. This position provides the operator with an

excellent field of vision and enables him to handle cargo onboard and outside the ship without the assistance of auxiliary personnel.

The design of the double-jointed deck crane also offers excellent accessibility to machinery, electrical or hydraulic components.



O&K equipment aboard the M/S Maria Oldendorff, owned by Egon Oldendorff of Lubeck, includes one 35-ton-capacity single crane, one 25-ton-capacity single crane and one twin crane, with a 2 x 25-ton capacity or a 50-ton capacity in tandem operation.

The O&K production program includes models with lifting capacities of 25 and 35 tons under the spreader and maximum outreaches ranging from 79 to 144 feet.

The Ferrostaal Corporation is the exclusive agent for O&K in the U.S.

For free literature detailing the full range of deck cranes offered by O&K,

Circle 83 on Reader Service Card

### Gibbs & Cox Opens Office In Maine —Literature Available

**Richard M. Erlich**, chairman of the board of Gibbs & Cox, Inc., recently announced the opening of the Gibbs & Cox, Inc., Bath Division, located in Brunswick, Maine.

At present, the new Design Division is working on the DDG-51 Class destroyer design in proximity to the lead shipbuilder and Lead Yard Services Prime Contractor, Bath Iron Works.

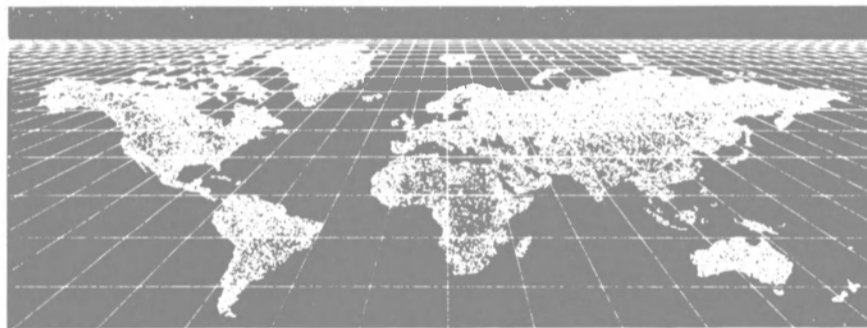
The facility, which is located at 1166 Church Road, Brunswick,

Maine, is staffed by engineers and designers selected from Gibbs & Cox's other design divisions. All of those relocated to the Brunswick facility have worked on the lead ship design for DDG-51. This office will continue to complete the detail design of the lead ship and is working on the detail design of the follow ship of the class.

Mr. Erlich noted that this Gibbs & Cox division will better serve the U.S. Navy and Bath Iron Works, in successful continuance of the DDG-51 Program.

For free literature detailing the design services offered by Gibbs & Cox,

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## Matson Navigation Requests Bids From Three U.S. Shipyards To Build RO/RO Containership

Avondale, Bethlehem-Sparrows Point & NASSCO To Bid

The domestic merchant marine shipbuilding industry recently received a boost when shipowner Matson Navigation Company, San Francisco, Calif., requested bids from three United States shipyards for construction of a combination lift-on, lift-off containership/roll-on, roll-off (RO/RO) carrier. The vessel would be delivered in late 1991, according to company president **M.S. Wasacz**.

Matson has requested bids from the Shipyard Division of Avondale Industries, Inc., Avondale, La.; Bethlehem Steel Company's Sparrows Point, Md., shipyard; National Steel & Shipbuilding Co., San Diego, Calif.

According to **Arthur J. Haskell**, senior vice president, engineering and marine operations, the three yards were selected based on their ability to submit design proposals to meet Matson's requirements, interest and intended approach to the project and financial capabilities.

Matson has asked for bids and specifications by January 18, 1989, for construction of a slow-speed diesel-powered vessel of about 780 feet in length, with a beam of 105-1/2 feet, and capacity for 1,600 containers (24-foot equivalents), 500 automobiles and 1,800 short tons of molasses.

The vessel is intended for Matson's West Coast-Hawaii service. Under the Jones Act of 1921, all vessels intended for use in the domestic market must be constructed in U.S. shipyards.

The single-screw vessel is ex-

pected to be powered by a diesel engine in the "40,000-horsepower range." She will have a service speed of about 22.5 knots and a maximum speed of 23.5 knots and will be able to carry 400 refrigerated containers. Based on developments in the container industry, the ship will have the flexibility to accommodate containers of various sizes up to 48 feet in length.

The RO/RO section at the after end will include a 500-car enclosed garage and capacity for trailers and oversized vehicles.

According to **Mr. Haskell**, Matson intends to construct the vessel with funds from the Capital Construction Fund, and they have informed the Maritime Administration of their intentions.

The Capital Construction Fund (CCF) Program was established under the Merchant Marine Act of 1970. It assists operators in accumulating capital to build, acquire and reconstruct vessels through the deferral of Federal income taxes on certain deposits, as defined in Section 607 of the Merchant Marine Act, 1936, as amended.

The CCF program enables operators to build vessels for the U.S. foreign trade, Great Lakes, noncontiguous domestic trade (e.g., between the West Coast and Hawaii) and the fisheries of the U.S.

Matson Navigation is a Capital Construction fund holder.

"This program is a logical add-on to the growth in our trade," said **Mr. Haskell**. "We will need the additional capacity based on our projections for 1991. She should take care

of our needs into the early 1990s," he said.

Matson currently operates a fleet of six modern vessels, including four containerships and the combination container-trailer carriers Matsonia and Lurline.

For free literature describing the services of Matson Navigation,

Circle 94 on Reader Service Card

## Massport Buys Shipping Terminal For \$3.4 Million

The Massachusetts Port Authority (Massport), Boston, Mass., recently purchased a 35-acre commercial shipping terminal for \$3.4 million from the General Services Administration.

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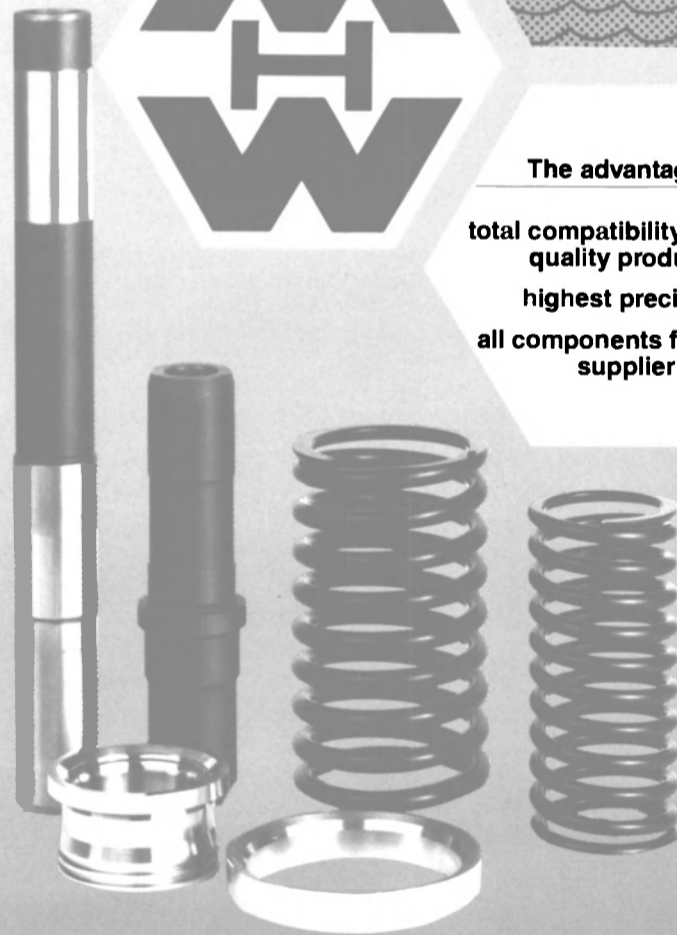
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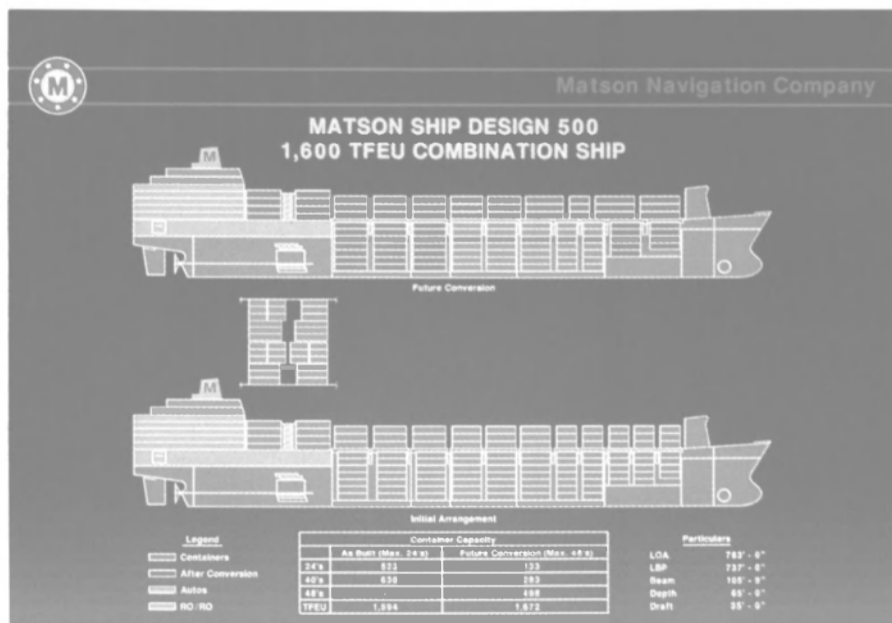
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Matson Navigation drawing of the proposed RO/RO containership the company plans to build in one of three U.S. yards—Avondale Industries, Avondale Shipyard Division, Avondale, La.; Bethlehem Steel's Sparrows Point, Md., yard; and National Steel & Shipbuilding Co., San Diego, Calif. The ship has also been slated for possible future conversion to accommodate larger sized containers.

## Port Of Montreal Plans Improvement Of Container Facilities

The second largest container port on the East Coast, the Port of Montreal, recently announced long-term plans to develop new container facilities on the outskirts of Montreal.

According to port officials, the new facilities would be located on the St. Lawrence River at Contrecoeur, about 25 miles from Montreal. The projected cost for a three-berth container terminal would initially cost about \$C40 million. The 300-acre site is expected to be developed within three to five years.

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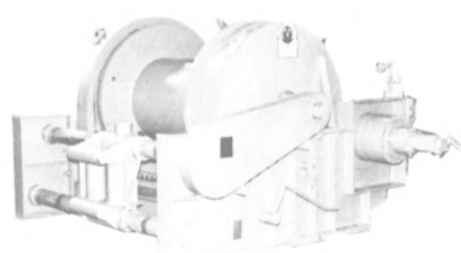
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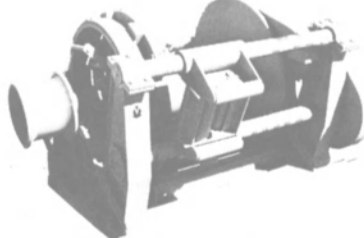
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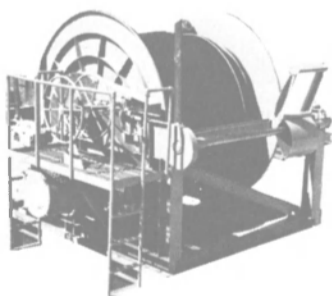


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Circle 225 on Reader Service Card



**BACK IN ACTION**—The Aegis guided-missile frigate USS Stark (FFG-31) has rejoined the U.S. Atlantic Fleet following a 10-month restoration completed by the Ingalls Shipbuilding Division of Litton Industries, Pascagoula, Miss. The frigate had sustained heavy damage in the spring of last year when she was struck by two Exocet missiles fired by an Iraqi jet in the Persian Gulf. The original estimates to repair the damage were sent at around \$142 million, but the Navy and Ingalls reportedly were able to hold costs under \$90 million.

## Cummins-Powered Crewboat Being Built At Matsumo Yard For Esso Resource Canada

An unusual crewboat for ferrying oil field workers across the Mackenzie River in Canada's Northwest Territories is nearing completion at Matsumoto Shipyard, Ltd., on the Dollarton waterfront of North Vancouver, British Columbia, for Esso Resources Canada Ltd. of Calgary, Alberta.

The 39-foot aluminum boat, named the R.W. MacKinnon, is unusual in several respects: power is provided by a pair of Cummins 6BTA5.9-M diesel engines, propulsion is furnished by Parker waterjet units manufactured in England, and equipment includes a bow ramp for transferring passengers directly to and from the river's sandy shores.

Designed for shallow water use, the 13-foot-beam 20,000-pound (fully outfitted) personnel carrier—capable of carrying 16 passengers—will be nosed onto the beach for rapidly accommodating drilling, construction and field operation personnel being shuttled between the mainland and artificial and natural islands where the wells are located.

The Cummins new 6BTA5.9-M diesel engine is a turbocharged, aftercooled engine of an in-line, six-cylinder configuration that weighs only 1,250 pounds with marine gear. The engine develops 220 horsepower at 2,500 rpm. Minimal weight and high horsepower were needed in this type of boat to achieve the 20 knots specified for performance.

Esso's new crewboat R.W. MacKinnon will be one of the last boats emerging from the yard. At the age of 70, Isami (Sam) Matsumoto



Isamu Matsumoto stands near the 39-foot Cummins-powered crewboat R.W. MacKinnon just prior to its completion. Mr. Matsumoto is retiring after 40 years of boatbuilding in the same location.

is retiring after building boats at the same location for four decades

For free literature giving full details on Cummins engines,

Circle 41 on Reader Service Card

## Triple A Awarded \$409,249 MarAd Contract

The Maritime Administration recently awarded a \$409,249 repair contract to Triple A Machine Shop, Richmond, Calif., for work on the Golden Bear, the training vessel of the California Maritime Academy. The contract covers upgrading of crew facilities.

Maritime Reporter/Engineering News

fitted with a Johnston 2,000-hp diesel-fired boiler capable of producing 69,000-pounds of steam an hour at 250 psi. The boiler capacity is sufficient to operate the largest pile driving hammers in use, including the Vulcan 6300.

Underwater hydraulic equipment includes an HBM 3000A power unit with dual 1,300-foot hoses mounted on a constant tension winch capable of accommodating a wide range of underwater hammers, including the Menck MHU 2100.

Living quarters on DB 50 are equipped to accommodate 237 people. All quarters are centrally heated and air conditioned. Lounges, cinema, game rooms and gymnasium are provided for off-duty personnel. One dining room, one cafeteria-style galley and complete laundry and hospital facilities are provided. Ample offices and a conference room are allocated for customers.

She has a deck area of 30,000 square feet and a cargo capacity of 20,000 tons.

"The DB 50 will bring some outstanding advantages for offshore work in the Gulf of Mexico," said **W.L. Higgins**, McDermott's vice president, North & South America and West Africa operations. "They (the advantages) include its heavy-lift capacity, large deck area, ability to be rapidly deployed and set up, deepwater capability, efficiency for salvaging large structures, ability to accommodate pipelaying operations, and its firefighting capability. The DB is a vessel ideally constructed for working in the Gulf of Mexico."

McDermott is leasing the ship from Lombard Leasing Ltd., which purchased the vessel from British Shipbuilders.

For free literature detailing the services offered by McDermott Marine Construction,

Circle 84 on Reader Service Card

### Pacific Ship Awarded Year Contract To Provide Flattop Maintenance

Pacific Ship Repair & Fabrication, Inc., San Diego, Calif., has been awarded a one-year contract to provide maintenance, upkeep and repair for aircraft carriers homeported in San Diego, Calif.

**David L. Bain**, president and chief executive officer of Pacific Ship Repair & Fabrication, Inc., was notified by the Naval Sea Systems Command, that the indefinite quantity contract would be initially funded for \$1,416,429 which is 5 percent of the firm's winning proposal price of \$28,328,585.

Pacific Ship, which is currently under contract for work on the USS Kinkaid, USS Constellation and USS Ranger, presently employs 250 workers. The firm plans to hire an additional 100 workers for this contract which provides for basic repairs to the carriers USS Ranger, USS Constellation and USS Independence.

### Bardex Views Contract Activity As Sign Of Offshore Improvement

A flurry of contract awards during the first half of 1988 has caused Bardex Corporation of Goleta, Calif., to view near-term recovery prospects for the offshore industry with optimism.

Recent contract activity contrib-

uting to the company's renewed growth includes designing and manufacturing rig skidding equipment for three Pemex platforms in the Gulf of Mexico, Conoco Hutton TLP (expanded system), Statoil Velsefrik, Shell Kittiwake and BP Gyda in the North Sea and for Phase 1 Stage 2 Platforms 06 and 08 in British Gas Corporation's Morecambe Gas Field in the Irish Sea. The company's most recent order calls for it to supply a very large rig

skidding system for Norsk Hydro Oseberg II with dedicated power supply.

The company, which designs and manufactures heavy load-moving equipment for offshore and shipyard-related activities, expects to be able to announce further contract awards shortly.

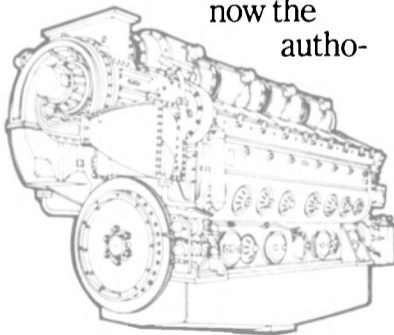
For more information and free literature on Bardex Corporation,

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The self-propelled McDermott Derrick Barge 50, reportedly the world's largest monohull crane vessel, has a Clyde main crane with a lifting capacity of 4,400 tons. With a whip hook, the crane's maximum height is 400 feet—the approximate equivalent of a 40-story building.

## World's Largest Monohull Crane Ship To Be Outfitted At McDermott Yard

The world's largest monohull Construction's new Derrick Barge crane vessel, McDermott Marine 50, has arrived in New Orleans for

final outfitting at McDermott Shipyard before she goes in service in the Gulf of Mexico.

A self-propelled dynamically positioned monohull vessel, DB 50 is designed for worldwide operation in a variety of marine construction roles. She is 495 feet long and 151 feet wide with a depth from keel to main deck of 41 feet. Four 3,000-hp electrically driven azimuthing, controllable-pitch thrusters provide propulsion, mooring assistance and full dynamic positioning. Dynamic positioning is controlled by a GEC Uni-Control Duplex DP System rated for all modes of construction work, including DP diving operations. A GEC Tams 80 mooring system monitors position and anchor lines and has computer-assisted thruster control. She can reach speeds of 11 knots.

The ship's main revolving crane is a Clyde Model 80-262-49-33. Its components include a fully active computerized motion suppression and heel compensation system. The crane has a 344.5-foot boom with the main block at 262.5 feet. It is mounted on an 80-foot diameter tub at the centerline aft of the vessel. At full revolving, it has a rated capacity

of 3,527 short tons at 82 feet. Her slewing capacity over the stern is 4,189 short tons at a 100-foot radius. The Clyde crane has a fixed rating over the stern of 4,400 short tons at 121-foot radius.

Five 2,700-kw, 6,600-V, three-phase, 60-cycle alternators powered by Allen Model S37 diesel engines provide ample electrical power to the entire vessel.

The vessel's mooring system is composed of eight 26,460-pound Delta Flipper anchors, each with 7,710 feet of 3-inch diameter 6 x 36 IWRCIPS wire rope on eight single-drum Hagglund anchor hoists. Power for the hoists is provided by four 225-kw electrohydraulic units.

The firefighting capacity of the DB 50 consists of four fire monitors located on the main crane mast. Each monitor is capable of sending a 7,900 gpm stream of seawater to a point 500 feet away to a maximum height of 230 feet. The ability to provide such a great volume of water, coupled with the mobility supplied by the dynamic positioning system, allows the DB 50 to furnish excellent firefighting capability to the Gulf of Mexico.





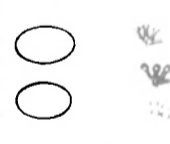







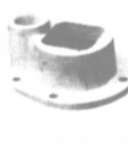

For pile driving, the vessel is out-

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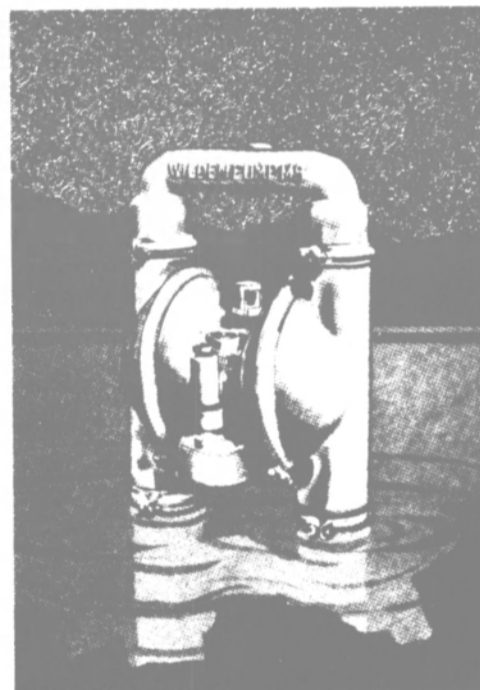
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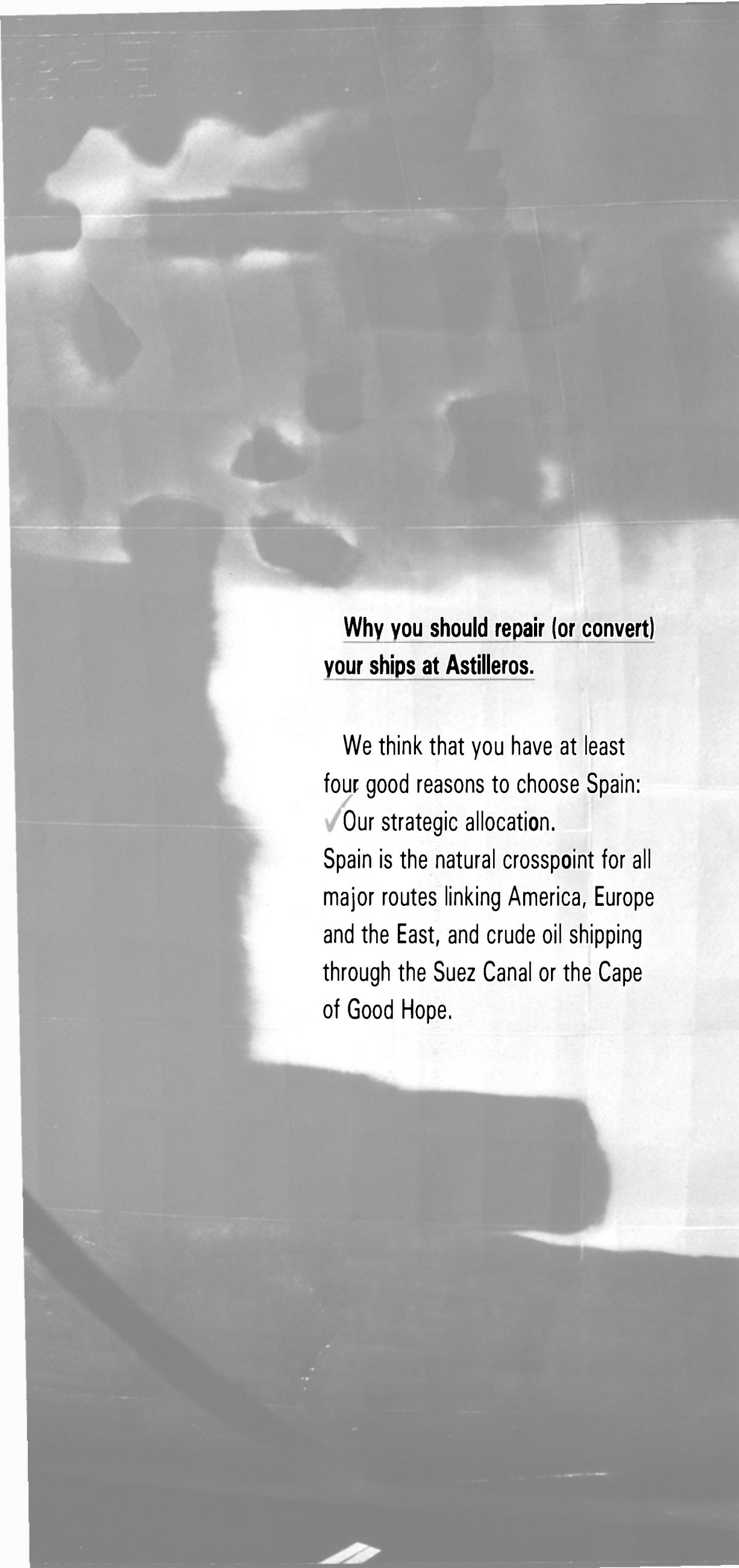
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Maritime Reporter/Engineering News



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G. Marine Diesel vice president **Manuel Martinez**, president **Carmelo Gomez**, and general manager **Joseph Eckhardt**.

## G. Marine Diesel Leases Brooklyn Navy Yard Facilities —Free Literature Offered

G. Marine Diesel Corporation, Brooklyn, N.Y., recently signed a long-term lease with the Brooklyn Naval Yard Development Corporation to operate graving docks No. 5 and No. 6 at the Brooklyn Navy Yard facility.

According to G. Marine, the two graving docks are the largest on the East Coast. Each dock is 1096 feet long by 150 wide and can accommodate ships up to 145,000 dwt.

At the facility, there are approximately 19 acres of land with support buildings and six gantry cranes with lifting capacities ranging from 25 to 200 tons. G. Marine also has installed two 4,160-volt transformers to supply shore power to the larger naval and commercial vessels. G. Marine also has a 50-ton mobile

crane and mobile equipment at the site.

In the past five months, the company has been upgrading the entire facility. The main pump room that controls graving docks 5 and 6 have been completely upgraded and automated to naval standard and have been Navy certified. The main fire-fighting system has been upgraded to supply 5,400 gmp.

In addition, G. Marine has a fully equipped machine shop in Brooklyn to support its shipyard operation.

Over the past three years, G. Marine has completed major overhauls on three U.S. Navy ammunition ships, the USS Suribachi (AE-21), USS Nitro (AE-23) and USS Butte (AE-27), at Earle, N.J. G. Marine has also completed a major overhaul

on the USS Boulder.

**C. Gomez**, president, and **M. Martinez**, vice president of G. Marine Diesel Corp., have upgraded their facility in order to better serve the U.S. Navy, Military Sealift Command, U.S. Coast Guard and other Government agencies as well as commercial ship operators.

**J.E. Eckhardt** has been promoted by the company to general manager/chief estimator in charge of operations at its shipyard.

For free literature fully detailing the ship-repair services and facilities offered by G. Marine,

Circle 82 on Reader Service Card

## Slaughter Joins Butterworth Tank Cleaning Machines



James E. Slaughter Jr.

**James E. Slaughter Jr.** has joined Butterworth Tank Cleaning Machines, Inc., Houston, Texas, as sales manager with responsibility for sales in North, Central and South America.

In keeping with the current marketing program in place at Butterworth, Mr. **Slaughter** plans to move forward with the company's appointment of qualified marine agents to serve domestic and inter-

national Butterworth customers.

At present, 14 international sales representatives and 20 supply centers comprise the worldwide network of Butterworth service and distribution centers for the rental of Butterworth tank cleaning machines. Additionally, supply centers stock Butterworth brand hose, marine equipment supplies and accessories.

A graduate of the U.S. Merchant Marine Academy, Mr. **Slaughter** has more than 14 years' experience in international marine product sales and management in positions with Ameron Fiberglass Pipe Division, Amermarine International, Amoco Shipping Company and General Electric Company.

## NYK Forms Two Cruise Subsidiaries

Japanese shipowner Nippon Yusen Kaisha (NYK) has recently formed two subsidiary companies to handle its future cruise activities.

The two new companies, Bahamas-based Crystal Ship (Bahamas) Ltd. and Crystal Cruises Inc., will be responsible for overseeing the operation of a 49,000-ton, 960-passenger ship currently under construction at Mitsubishi Heavy Industries (MHI) of Japan.

Upon her completion in 1990, the as-yet-unnamed ship, which will be registered in the Bahamas, will be 787 feet long, with a breadth of 97 feet and draft of 24.6 feet. Her propulsion machinery will be diesel electric, with four sets of MAN B&W medium-speed diesel engines each developing 11,750 bhp at 400 rpm. She would be the biggest cruise ship ever built in Japan.

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Circle 22 on Reader Service Card

## Okabe Offers Mil-Spec Fasteners Stocking And Mill Shipment Program

David V. White has been named sales manager of the Okabe Company, Inc. Non-Ferrous Division. This division, which specializes in the distribution of nonferrous

fasteners, is now stocking a full line of MONEL alloy fasteners, including hex head cap screws, hex nuts, threaded rod to MIL-2-1222, lock-washers to MS-35338 and flat washers to commercial standards. All items will have complete traceability to the original heat lot. The Quality Assurance Program conforms to the requirements of MIL-I-45208, MIL-STD-105 and MIL-STD-

45662, along with other government and commercial standards.

Having been audited and approved by the Department of Defense and other major defense contractors, Okabe is shipping broken package up to bulk quantities with complete chemical and physical test reports. Besides their stocking program on MONEL alloy fasteners, they are handling mill shipments in

18-8 stainless steel, 316 stainless steel and silicon bronze under the guidelines of the Quality Assurance Program. By early 1989, they plan to have the same stocking programs for these three materials as well as the MONEL.

For further information on this program

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### SAILOR Automatic Radiotelex Station

With the SAILOR Short Wave Programme 1000/B it is possible to have a fully automatic shipboard or point-to-point radiotelex station for world-wide communication, which conforms to CCIR Rec. 476-3 and the new CCIR Rec. 625 and complies with the Nordic Maritex regulations and with other requirements for automatic radiotelex systems in

- marine applications
- land mobile/point-to-point applications
- diplomatic applications

### Outstanding Facilities

- Error-correcting modem meeting CCIR Rec. 476-3 and the new 625 with 9-digit call codes and identification exchange.
- Unattended transmission and reception of telex messages - 24 hours a day.
- Full communications privacy using built-in high security on-line/off-line telex cipher.
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- IBM-PC/XT communications software.
- When the station shown above has been installed with two receiver aeriels it is possible to receive calls on telephony and at the same time continue telex correspondence.
- The station can be programmed to transmit a message when called. The message can be transmitted to all calling stations or be protected by a password to a dedicated caller.

### Reliable and Cost Saving

The SAILOR Automatic Radiotelex Station will not only give a more reliable MF/HF radiotelex system but will also decrease the manpower required due to the automatic operation facilities. Thanks to the unique module system the equipment is available as an automatic radiotelex station, or combined with an SSB short wave telephony station... or according to customer's specific requirements.

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# "SAILOR"

## Deck Machinery Review

(continued from page 21)

cludes power capstans which are available in several sizes and types. Each unit is custom designed for a specific application. The company offers capstans powered by electric, hydraulic or air motors. Line speeds of up to 100 fpm and ultimate line pulls of 60,000 pounds are available. Static base loading to as much as 100,000 pounds is also offered. The company offers both deck-mounted and through-the-deck-mounted power capstans, as well as capstan car pullers and a full range of hand-power capstans.

More than 75 patterns of deck fittings in various sizes and weights are available from Schoellhorn-Albrecht. The firm keeps a large stock of fittings for immediate delivery, but can also custom design its products to a customer's specifications.

Furthermore, Schoellhorn-Albrecht is a factory parts depot and warehouse stocking distributor for all Beebe Brothers products—from power and hand winches to car pullers, trolleys and hoists. A complete inventory of complete units and re-

placement parts are available in stock for immediate shipment.

## SMITH BERGER

Circle 11 on Reader Service Card

Smith Berger Marine, Inc. of Seattle, Wash., has been granted a U.S. patent for its exclusive new bending shoe fairlead design. Patents are pending in many foreign countries.

The new fairleads are intended for long-term mooring applications such as floating production platforms or vessels.

The first of these new fairleads was installed on the Penrod 72, which is operating in the Green Canyon sector of the Gulf of Mexico.

The new design provides a very large bending radius for any size of mooring line which reduces or eliminates the effect of wire rope fatigue. The effective ratio of groove diameter to rope diameter is greater than 70 to 1, which would not be practical

with conventional sheave type fairleads for very large diameter wire rope.

Another feature of the design is the special replaceable groove material which reduces wire rope wear due to fretting or minor movements.

Smith Berger bending shoe fairleads for long-term mooring are also very economical compared to conventional sheave designs.

Smith Berger Marine offers the new fairlead with custom designed mountings for ship, column, or turret mooring applications.

## Avondale Wins \$52.1-Million Contract To Jumboize Navy Oilers

Avondale Shipyards, New Orleans, La., was recently awarded a \$52.1-million U.S. Navy contract to jumboize two AO-177 Class fleet oilers, the USNS Merrimack (AO-179) and the USNS Willamette (AO-180).

Under the contract, Avondale will add 108-foot midbodies to the 592-foot-long oilers. The contract in-

cludes options for the jumboizing of three additional fleet oilers—the USNS Monongahela (AO-178), USNS Cimarron (AO-177) and the USNS Platte (AO-186). The work is expected to be completed in May 1993.

## Versatile Pacific Awarded Contracts To Drydock Two Cruise Ships

Versatile Pacific Shipyards Inc. (VPSI) of Vancouver, British Columbia, has been awarded contracts to drydock two cruise ships—the P & O/Princess's Island Princess and Sitmar Cruises' Fairsea.

At the conclusion of the 1988 Alaskan cruise season, the Island Princess was drydocked at VPSI's Vancouver Division for 12 days. The Fairsea was drydocked at VPSI's Victoria Division also for 12 days.

For free literature on the facilities and capabilities of Versatile Pacific Shipyards,

Circle 53 on Reader Service Card



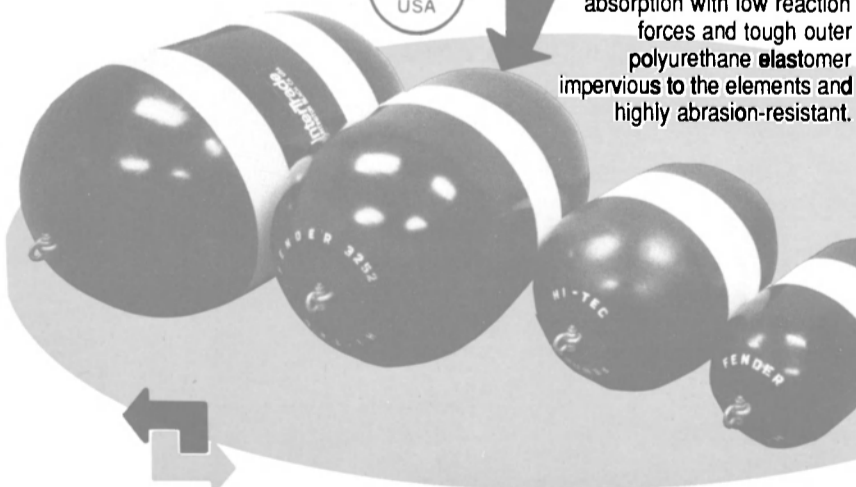
InterTrade's Marine Buoys and Floats are foam-filled, with an elastomeric, non-rusting, polyurethane outer skin, available in several standard configurations and sizes.

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Sizes shown above (left to right) 3' x 5', 32" x 50", 24" x 36" and 16" x 36". Other types and size available.


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# WHEN SECOND-BEST WON'T DO...



Deborah Hynes photo

Commercial fishing boats from coast to coast rely on rugged dependable REINTJES marine gears for years of trouble-free performance.

You'll find REINTJES WAV 1830 marine gears with a 3:1 ratio on the new 109' scalloper *Endeavor*, built by Main Iron Works, Houma, LA for Ray Starvish and Eric Hansen of New Bedford, MA.

The longliner/processor *Alaska Mist*, recently converted by Foss Shipyard for Deep Sea Fisheries (both of Seattle, WA), employs a propulsion package from Karl Senner, Inc. which includes: a REINTJES VAL 1840 marine gear on a 3.5:1 ratio, a Berg "D" type controllable pitch propeller and PTO, and a Berg SPF

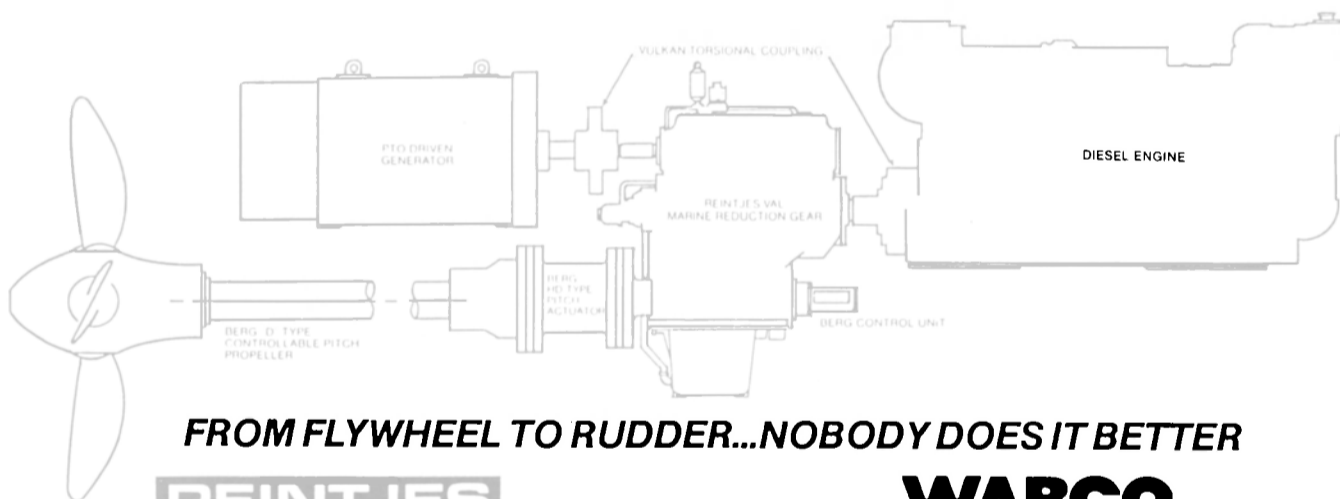
1.5 bowthruster with electronic remote control.

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The President Truman, the first of the C-10 Series containerships delivered to APL, operating in San Francisco Bay. Each of the five C-10 Series ships are fitted with a single 57,000-hp Sulzer 12-cylinder engine, one of the most powerful diesels ever built.

## Two More C-10 Containerships Delivered To APL By German Yards

American President Lines, Oakland, Calif., recently took delivery of the second and third of its new C-10 Class containerships from two West German shipyards for use in its Pacific Basin service.

The ships, the President Kennedy and the President Polk, have an overall length of 902 feet, beam of 129 feet, maximum draft of 41 feet, displacement of 75,862 long tons and a deadweight of 53,648 long tons. The vessels have been classed by the American Bureau of Shipping, '1 E, Container Carrier MS + ACCU. The vessels are propelled to speeds of up to 24 knots by some of the most powerful diesel engines

ever built. Each C-10 is propelled by a 57,000-hp, 12-cylinder Sulzer diesel engine.

The fuel-efficient C-10 Class ships, which are each capable of carrying 4,300 TEU containers, are the first container-carrying vessels to have a "post-Panamax" beam, meaning their width exceeds the limitations of the Panama Canal. As with the development of the wide-bodied aircraft, the increased capacity and efficiency requirements for these vessels led to the new design concept.

"These are the first ships to be designed specifically for trans-Pacific service," said **Timothy J.**

**Rhein**, APL president. "By removing the limitation on the ships' beam, we were able to significantly increase their capacity, while optimizing their speed, fuel efficiency and stability."

"This is traditionally a period of high demand for our eastbound services from Asia to North America," said Mr. **Rhein**, "and there is continued strong growth in demand for vessel space to carry U.S. exports to Asia. With their fast service speeds and large capacity, these ships will help us meet customer demand for fast, reliable transits," he said.

The President Kennedy was built by Howaldtswerke Deutsche Werft (HDW) of Kiel, while the President Polk was delivered by Bremer Vulkan of Bremen. The five-ship C-10 series will be completed when HDW delivers the President Jackson and Bremer Vulkan delivers the President Adams. Both of the ships were recently christened in separate ceremonies. All five ships are scheduled to be in service by November of this year.

For free literature detailing the shipbuilding facilities of HDW,

**Circle 79 on Reader Service Card**

For free literature completely describing the shipbuilding facilities

### APL C-10 CLASS Equipment List

Main engine	Sulzer
Propeller	Ostermann
Generator engines	Krupp MaK
Aux. generator engine	Caterpillar
Generators	A. von Kaick
Bowthruster	KaMeWa
Central automation	Siemens
Boilers	HDW
ARPAs	Raytheon
GPS Ioran	Trimble
SatNav & integrated navigation system	Raytheon
Doppler log & echo sounder	JRC
Gyrocompass & autopilot	Anschutz
Rudder angle	Stein-Sohn
Fog signal	Elaplan
Radio equipment	ITT Mackay
Distillation	Alfa Laval Nirex
Waste disposal	Format Chemie
Sewage treatment	Hamworthy
Cathodic protection	Electrocatalytic
Anchoring	Blohm & Voss
Anchor chain	Ramnas
Mooring winches	Norwich
Lifeboat	Fassmer
Davits	Schat
Life rafts	Viking
Monorail	ASEA Hagglund
Steering gear	Brown Brothers

of Bremer Vulkan,

**Circle 80 on Reader Service Card**

## Newport News Promotes Sanders And Blandford To Rank Of Vice President

Newport News Shipbuilding recently announced the promotion of two long-time employees to the rank of vice president.

**Franklin F. Sanders**, director of technical services and a 37-year

employee of the shipyard, will be promoted to vice president, submarine construction. He will report to **William R. Phillips Jr.**, executive vice president.

**A.C. Blandford**, director of materials management, will become vice president, human resources and will report to senior vice president **William P. Fricks**. Mr. **Blandford** has been with the shipyard since 1963.

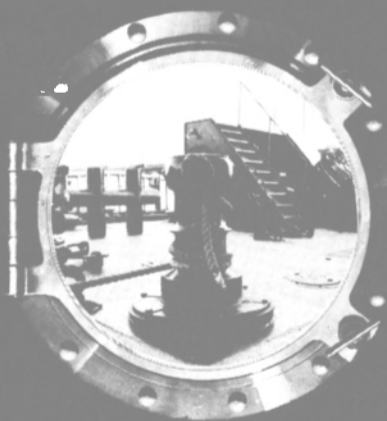
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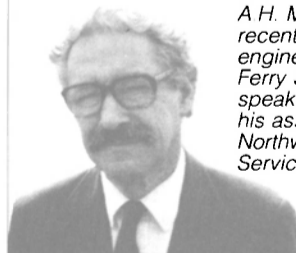
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A.H. McDonald, recently retired port engineer of Alaska Ferry Systems, speaks highly of his association with Northwest Marine Services

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COMPANY	BOOTH #
Perkins Engines	1002-04,1003-05
Perko	775
Pettegrow, Malcolm	1201
Phoenix Products	544,546
Pine Hill Equipment	444,446,448,450
Plastics Maritime	741
Plastiques S.L.	1420
Point Club	427,429
Polyform	565
Polyform US	764,766
Port Authority NY/NJ	1450,1452
Pullmaster Winch	633
RW Molner	883,885,887
Radair	1139
Racal Decca	1626,1628,1630
Racal Marine	1626,1628,1630
Radio-Holland	409,411
Ranpro	612,614
Rapp Hydema	1256
Rapp Hydema US	1256
Rappahannock Copper Paint	1224
Raytheon Marine	837-41,936-40
REFA Fiskeredskap	1256
Reidar's Manufacturing	1222
Reiser, Robert	1010-12,1011-13
Remco Products	424,426
Rice Refrigeration	1527
Richardson Electronics	1001
Riverdale Mills	539,541
Robertson-Shipmate	709,711,713
Rodriguez Boat Builders	231
Roffer Ocean Fishing Forecasting Service	334
Ropak Central	613,615
Rosborough Boat	1305,1307,1309
Ross Laboratories	222
Royce Div. of ECC	566
Rudox Engine	1533,1535
Sea	1443,1445
SGC	530
SMR Marine Electronics	330
Sabroe Refrigeration	866
Sandwich Ship Supply	225
Sasakura Engineering	1142
SAT Alert	1414
Scale Reproductions	1127,1129
Scandvik	531
Scanmar	1256
Scanmarin	708
Scotia Twines	741
Sea-Fab	1317
Sea-Tech Industries	618,620
Sea-Tex Div. of Si-Tex	636,638,640
Seaco	1436
Seamatrix	1155
Semco	576
Shepherd, CE	519,521
Shuster	918,920
Simrad	1360,1362,1364
So. Atlantic Fishery Mgmt Council	1143
Somethin' Fishy	1623
Sortaweigh	1155
Soundown	785
Southern Maine Vocational Tech	789
Spurs Marine Manufacturing	1338
Spyderco	1137
Standard Communications	624,626
Stearns Mfg.	1442,1444
Stormy Seas	325,327
Strait of Canso, Ind. Dev. Authority	312,314
Strapex	1416,1418
Stroudsburg Hoist	431
Sunderland Marine Mutual Ins.	427,429
Sunwell Engineering	828, 1/2 830
Swedfish Group	1356
Switlik Parachute	645,647
Systems West	217
TWT Trading	1256
TRW Ross Gear Div.	333
Teknor-Apex	770
Tex Enterprises	683
Hotsy	889
Therapeutic Products	209
Thermal-Tec	1233,1235
Thyboron Trawlbinderi	769
Torin	551,553
Toyo-Suisan-Kikai	1519-23,1620-24
Trawlworks	870
Trimble Navigation	715
Trinity Marine Group	784
Triple Fish	710
Tru Hone	733
Twin Disc	845-851,944-952
US Marine Safety Assoc.	513
US Army Corp of Engineers	1121

COMPANY	BOOTH #
US Coast Guard	1219
USS Packaging Systems	1124
Unified Systems	414,416
Unitor Ship Services	1234,1236
Vaughn	579
Volvo Penta of America	853-61,954-60
Wagner Marine (USA)	525,527
Washburn & Doughty Assoc.	635
Webber Cove Boatyard	1206
Wedgeport Boats	741
Weissenfels	632
Wesmar	808,810
Wharf Forging	532

COMPANY	BOOTH #
Wheway Becker	1155
Wilcox Marine Supply	310
Winninghoff Boats	1113
Wire Rope Industries	741
Wolf Marine Systems	1006-09
Women's Fisheries Network	533
World Plastics	1325
Wright & McGill	1333,1335
Xactics	1430
YKK (USA)	1324
Yacht-Lok	437
Young Bros. Boats	648
ZF of NA	1460,1462,1464

## Boston Whaler Completes Delivery Of USMC Craft

Boston Whaler of Rockland, Mass., recently completed the delivery of the last of 122 Raider rigid raiding craft to the United States Marine Corps under a \$5.2-million contract.

The 18-foot craft are designed to transport 10 combat-equipped troops to remote beachheads.

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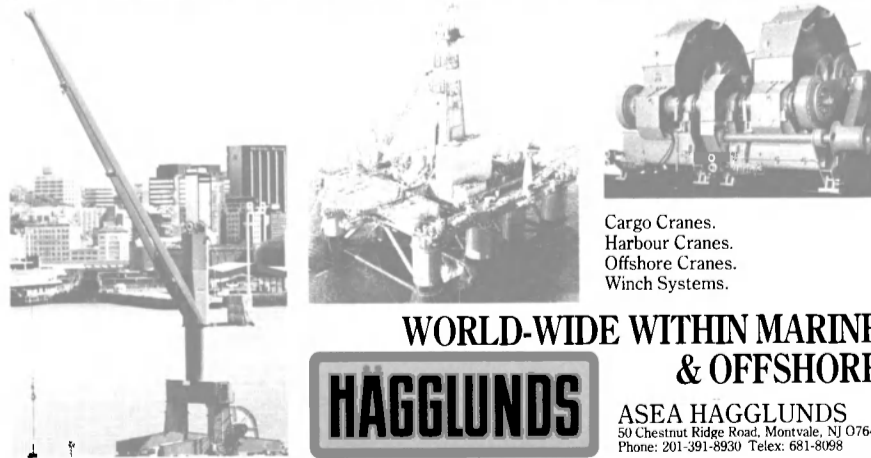
## Fish Expo

(continued)

COMPANY	BOOTH #	COMPANY	BOOTH #	COMPANY	BOOTH #
Admiral Marine	233	Bock Marine Builders	433	Cosalt	1155
Alaska Diesel Electric	825,827,924,926	Bonar Plastics	1334,1336	Crosby Group	984
Alden Electronics	1440	Borg-Warner Automotive	819,821	Crowe Rope	529
Alfa-Laval Separator	727	Boss Manufacturing	509	Cummins Engine	625-631,724-730
Alupower	882	Bridon American	1237,1239	Custom Sea-Gear	1345
American Cynamid	514	Bridport-Brownell	829	DMT	1351
American International Marine	1529	British Marine Equip. Assoc.	1147-55,1148-56	Dahl Products/Baldwin Filters	528
American Manufacturing	1342	Brookline Machine	1140	Danish Export Group	765,767,769
American Pioneer	410	Brownell & Co.	831	Dantrawl	765,767
Anchor Electronics	1126,1128	Bruce's Splicing & Rigging	981,983	Dantronics	1446
Anchor Insulation	1344	Byrne, Rice & Turner	1525	Datamarine International	1441
Aqua Signal	1340	C-Tech	617,619,621	Datrex	319
Aquatronics	575	C. Plath	1241	Deep Sea Fishermen's Union	788
Akron Safety Equipment	511	Cape Fishermen's Supply	311	Dennis K. Burke	1341
Atlantic Hardchrome	741	Capitol Gears	1000	Detroit Diesel	755-61,854-60
Atlantic Hydro Jet	1631	Caterpillar	1459-63,1560-64	Diamond Rubber Products	628
Atlantic Marine Expo	1629	Cerfil/Euronete/Oliveira	814,816	Dickson Stern Thrusters	1318
Atlantic Marine	535	Cetec Benmar	750,752,754	Diesel Research	1120
Atlantic Marketing	772	Cetrek Navstar	1337,1339	Digital Marine Electronics	545,547
Atlantic Offshore Fishermen's Assoc.	1221	Channel Trap	1226	Dipietro Kay	1264
Atlas Industries	864	Chicago Cutlery	569	Dixon's Boatbuilders	1144
BFGoodrich	227,229	Cintex of America	1314,1316	Dole Refrigerating	786
Baader North America	1353-55,1454-56	Clifford & Snell	1156	Down East Machine	616
Baltek	1209,1310	Coastal Boatworks	1608	DuPont	1433,1435
Barco	835	Coastal Hydraulics	221	Duffy & Duffy Fiberglass Boats	445,447
Batteries	235	Cofish International	811,813	Dugas Fab	1428
Baybank Southeast	1240,1242	Columbian Rope	1328	EEV	717
Bender Shipbuilding	413,415	Commar	749,751	East Coast Embroidery	508
Blancke Marine	1326	Commercial Trap Supplies	1119	Eastern Boatworks	1607
		Compunav Systems	1320	Edwards, C.G.	883,885
		Cosat Maritime Services	1259	Elco Marine Electronics	874,876,878
		Container & Trailer Services	741	Enviro-Pak	1134
		Cornell-Carr	1633,1635	Eze-Lap Diamond Products	548
				F&B Rubber	515
				Fish Expo '89	1629
				FPPF Chemical	732
				Falk	1553-55,1644-46
				Farm Credit Services	833
				Fehr Bros.	337
				Fernstrum, R.W.	817
				Fishmac Services	1319,1321
				Fitzwright Survival Systems	1534,1536
				Flexabar	979
				Flye Point Marine	1404
				Forsea	1426
				Freeman Marine Equipment	932,934
				Friendship Trap	650
				Fuji Ice of N.A.	682
				Fujinon	1136
				Furuno USA	1559-63,1660-64
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				GPG International	1155
				General Marine	1105
				Givens Buoy Life Raft	865,964
				Gladding Braided Products	729
				Global Marine	886
				Goldstar Precision	617,619,621
				Golden Needles Knitting	1220
				Gov't New Brunswick	1424
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				H&H Propeller	928,930
				Hagglunds Dennison	610
				Hall, R.E.	338
				Hamilton Marine	910,912
				Hammonds Technical Service	787
				Hansen Marine Engineering	206,208,210
				Harris	731
				Headhunter	1216
				Hella Marine	1145
				Helly Hansen	524,526
				Henley Division	435
				Hi-Seas Industries	1347,1349
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				Hinriksson, J.	981,983
				Hondex Marine Electronics	418,420
				Houston Marine Exam-Prep Centers	336
				Howe	572
				Howes Lubricator	1228
				Hull Electronics	425
				Hynautic	768
				IMP Fishing Gear	451,453
				ICOM America	744,746,748
				IMTRA	237
				IPL Products	634
				ITT Jabsco	609,611
				Iceland, Export Council of	664-678,665-679
				Innovac Technology	719,721,818,820
				Iveco Aifo	1159-63,1260-64
				JC Boat Sales	103-105
				Jack Prince	449
				Jarvis Newman	784
				Jelleau's Boat Shop	1407
				Jersey Cape Boats	1601
				Johnson Pump International	774
				Johnson Rubber	776,778
				Jotun Henry Clark	1155
				KEM Equipment	1133,1135
				KYB of America	637,639,641
				Kahlenberg Bros.	646
				Kaino Rescue Ring	1322
				Kelly, DN & Son	712,714
				Kelvin Hughes	1155
				Kennebec Marine	716
				King Marine Electronics	236,238,240
				King Neptune/Parkway/Imperial	848,850,8522
				Kingsborough Community College	987
				Kobelt Manufacturing	306,308
				Koden International	1453-55,1544-46
				Kodiak Chamber of Commerce	517
				Kraft, W.A.	537
				Kvaerner Kulde	1256
				LFS	783
				Lamarche Manufacturing	649
				Lambeth	1230
				Landrigan/Viking	1123,1125
				Lario Pump	321
				Laser Plot	430
				Legay Fiberglass	1323
				Lindgren-Pitman	1634,1636,1638
				Lister-Petter	745,747,844,846
				Lokata	1538
				Longline Fishermen's Supply	578
				Lowrance Electronics	101,102
				LQ Moffitt	838,840
				Lunenburg Foundry	741
				M&G USA	434
				MAN B&W Diesel	1359,1361
				MP Pumps Division	340
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				Marathon/Lima Electric	428
				Marco Seattle	1014-1017
				Mari-Dyne	583
				Marine Hydraulics	538,540
				Marine Travelift	652
				Maritime Reporter	1238
				Markussens, BRDR. Metalvarefabrik	868
				Massachusetts Maritime Academy	412
				Mass. Div. of Marine Fisheries	988
				Master Marine	1434
				McCal Enetrprises	577
				McElroy Machine	1213,1215
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				Michigan Wheel	914,916
				Micro Weighing Systems	630
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				Mobil Oil	580
				Morad Electronics	1343
				Morrow, II	212
				Morty the Knife	720
				Motorola	718
				Mullion Manufacturing	1155
				Murphy, Frank W.	824,826
				Mustad, O. & Son	1256
				Mustang	968,970,972
				N.C. Twine & Cordage	313
				NOAA	1223,1225,1227
				NPVOA Vessel Safety Program	1217
				NYNEX Boaters Directory	884
				Napier (Arbroath)	1138
				National Fisherman	417-421,516-20
				National Weather Service	1227
				Nauset Marine	1104
				Nelson A. Taylor	239,241
				Neptune International	879,978
				Neptune Research	1214
				Network	1117
				Newage Transmissions	815
				Newfoundland & Labrador Gov't	1419-29,1520-30
				Newmar	1448
				Nick's Hydraulics	339,341
				Nor'eastern Trawl System	512
				North Amer. Fishing Insurance Assoc.	315,317
				North Amer. Marine Jet	1330
				Northeast Ford Engines	832, 1/2 830
				Northeast Isuzu	439,441
				Norway Export Council	1244-56,1243-55
				Nova Scotia Dept. of Development	735-41,734-40
				Oceantech	219
				Pacer Pumps	777,779
				Pacific Coast Marine	534
				Pacific Fishing	549
				Pacific Marine Expo	1629
				Pall	1120
				Panish Controls	1363
				Panther Plast Aktieselskab	872
				Parker Hannifin	324,326
				Parker Merrick	1132
				Parkway/Imperial	848,850,852



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## FISH EXPO '88

### Boston, Massachusetts, October 12-15

One of the world's largest fishing expositions featuring the latest fishing gear and equipment, marine electronics, engines and boats, Fish Expo '88, will be held at the Bayside Exposition Center in Boston, Mass., October 12-15, 1988.

Sponsored by National Fisherman Expositions, Fish Expo returns to Boston after its record-breaking showing last year in Seattle, when it drew over 24,000 marine industry representatives from over 60 countries and more than 800 exhibit booths. The trade show alternates between Seattle and Boston.

This year, over 700 exhibitors from 20 countries are expected to be displaying their products to the international fishing community. Fish Expo '88, which is being held for the 22nd time, is expected to be the largest on the East Coast in many years. The show organizers expect

**Photo:** The M/V Sajo Victoria, one of the first of a new class of tuna purse seiners, built by Campbell Shipyard, San Diego, Calif., for a Korean owner. See page 5 for details.

Photo By Jim Boyd.

more than 15,000 visitors to attend the four-day event.

Among the exhibitors will be Robertson-Shipmate, who is expected to introduce its AP-45 fishing boat autopilot, which features a unique "work" mode designed specifically for fishing use. The company will also display its award-winning AP200DL and AP-9 top-of-the-line autopilot.

In addition, the Robertson-Shipmate SatNav/GPS integrated package will be operating live. Two new VHF radio systems, the RS8100 "cellular look" dual station VHF and the RS7100 commercial full duplex will also be on display.

At Booth 319 at Fish Expo, Alfa-Laval will introduce two new pieces of equipment for smaller vessels—the JWP-16-C40 freshwater distiller and an ice machine for trawlers and fishboats. The flake ice produced by the Alfa-Laval ice machine keeps the fish at an ideal temperature without freezing it.

Exhibitors from Fish Expo '87 reported that sales exceeded all their expectations. **John Sackton,**

marketing manager for Baader North America Corporation, said "Excellent show. Fish Expo was the best in years. We are very pleased with the quality and quantity of the attendance and with the traffic through our booths."

According to **Paul Brunette**, director of marketing for North American Marine Jet, Inc., Fish Expo '87 was a success. "We used the show to introduce our new TraktorJet propulsion system and sold 24 units at the show amounting to over \$400,000 in sales and we took 140 solid leads," he said.

As in the 1987 show, the editors of *National Fisherman* have developed an interesting free seminar program which focuses on issues directly affecting fishermen. The seminars will cover the following topics: "Fisheries Enforcement," examines the problems of illegal fishing; "Fish Farming," looks at the boom in aquaculture; "Marine Weather Service Forum," offers fishermen an opportunity to voice their recommendations to the 19th New England Marine Users Forum for im-

proving marine weather services; "Drugs," examines the Government's Zero Tolerance program and the possibility of future drug testing; "Ocean dumping," the battle by fishermen and environmentalists to close various ocean dump sites which are polluting beaches and killing marine life; and "Marine Mammals," examines the regulations protecting certain species.

For more information on Fish Expo '88, contact: National Fisherman Expositions, 5 Milk Street, P.O. Box 7437 DTS, Portland, Maine 04112; telephone: (207)772-3005; or telex: 322721.

#### FISH EXPO '88 Exhibitor List

Company	Booth #
ACR Electronics	653
AGB Heighway	1155
AP-Chem	207
ARY	510
AT&T	224,226,228,230,232
Aalesund Oljekledefabrikk	1256
Acadian Custom Rubber	725

(continued)

is durable and insensitive to environmental conditions. The star handle control can be fitted to hoists with carrying capacities of up to 15 tons.

J.D. Neuhaus offers pneumatic monorail hoists with lifting capacities of up to 100 tons with 6 bar working pressures. JDN pneumatic hoists use compressed air, as opposed to electricity, as their working medium and are suitable for operation in areas where there is danger of explosion.

Furthermore, all JDN pneumatic hoists can be built into trolleys for the lifting and traversing of loads. JDN trolleys are available with lifting capacities of up to 100 tons.

## ORENSTEIN & KOPPEL

Circle 23 on Reader Service Card

O&K Orenstein & Koppel AG Tagbau und Schiffstechnik, Lubeck, West Germany, has been building deck cranes for over 20 years. The company offers single or double deck cranes and double joint and gantry cranes in electrohydraulic or all electric models with lifting capacities from 5 to 100 tons.

O&K achieved a major technological breakthrough with the introduction of the double-jointed cranes for on-board container handling. The essence of the O&K concept is that the two joints allow container movement through the arc of a circle, whereas standard luffing cranes move cargo around the circumference of a circle. O&K claims that its double-jointed cranes can achieve almost double the load cycles possible with standard cranes.

The O&K Anlagen und Systeme division of O&K Orenstein & Koppel AG has received an order for crane equipment for two reefer ships being built at Bremer Vulkan AG's shipyard in Bremen.

The order comprises four Gemini double deck cranes with a hoisting capacity of 2 x 18 tons each, at 83.3 feet outreach. In double crane operation, loads of up to 35.4 tons per double crane can be lifted. This crane concept allows rapid handling of pallets, as well as 20- and 40-foot containers.

In a unique installation, two O&K container deck cranes were fitted aboard American shipowner Matson Navigation's recently delivered container barge Islander. Each of the cranes aboard the 387-foot barge has a lifting capacity of 40 metric tons at a working radius of 30 meters, and is equipped with a load turning device, telescoping spreader and computerized program control. The cranes will allow the handling of containers independent of quay-side facilities.

The Ferrostaal Corporation is the exclusive agent for O&K in the U.S.

## PETTIBONE

Circle 99 on Reader Service Card

Pettibone Corporation of Chicago manufactures a full line of pedestal-mounted Marine Kranses for use on

docks and offshore platforms, as well as on shipboard. Capacities range from 5 to 100 tons. Hydraulically extendible knuckleboom and fixed booms, both box and lattice, are available. With special features such as inorganic paint to withstand salt-laden, corrosive environments, they are built to provide years of trouble-free service.

Pettibone has been building and improving cranes for the marine industry since 1964, so built-in features are the result of more than 20

years of design work. Today, as part of a continuing research and development program, the company has a list simulator for safety testing of cranes manufactured for shipboard applications.

## SCHOELLHORN-ALBRECHT

Circle 18 on Reader Service Card

St. Louis-based Schoellhorn-Al-

brecht Machine Co., one of the nation's oldest marine deck equipment manufacturers, was organized in 1887 and has been serving the marine industry with a complete line of high quality products for over a century.

The firm offers a wide range of quality capstans, winches and deck fittings to customers worldwide.

The Schoellhorn-Albrecht line in-

(continued on page 28)

# Liebherr Deck Cranes keep pace with the times.

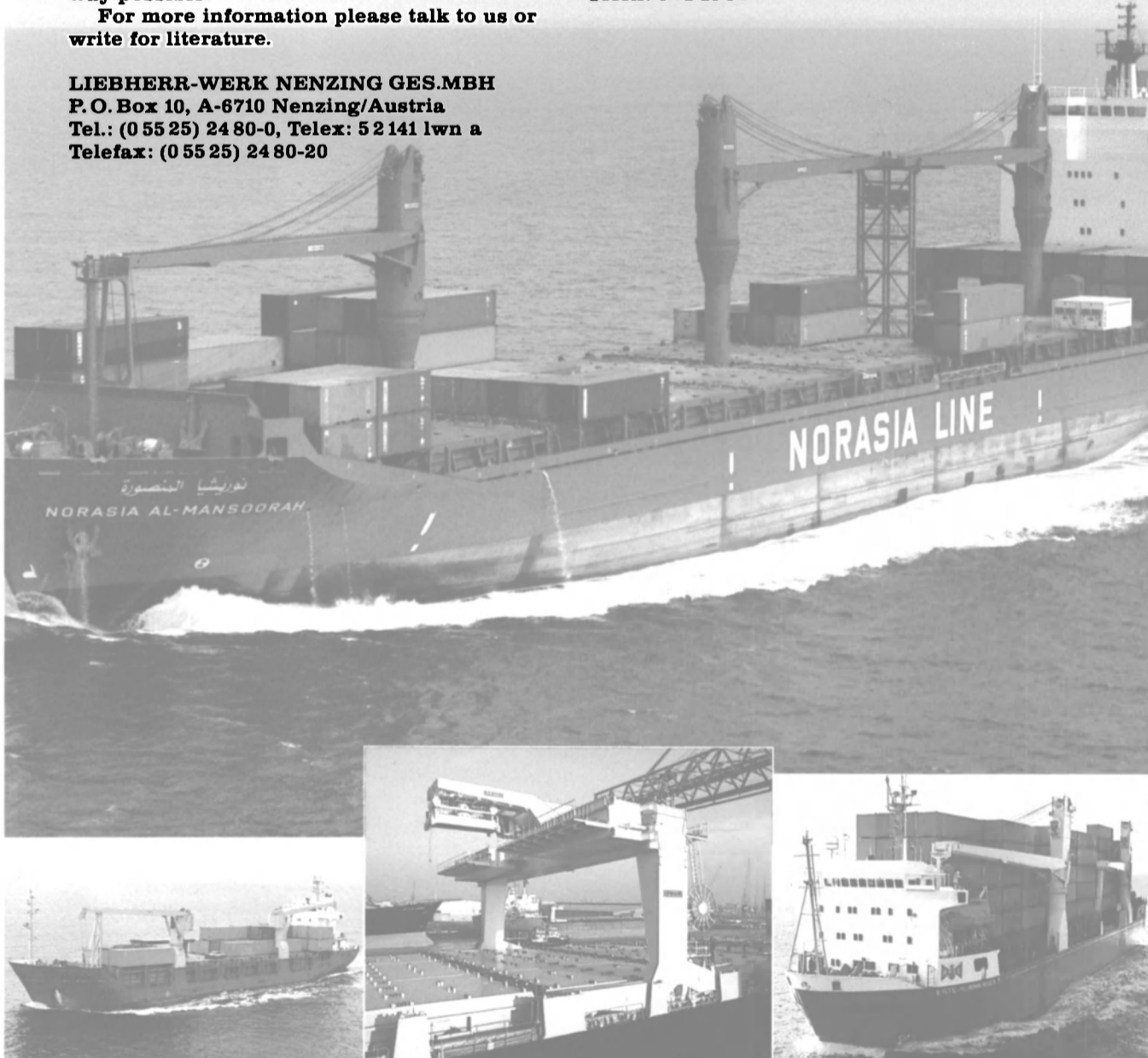
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# LIEBHERR

The name for cranes

Circle 315 on Reader Service Card

## Deck Machinery Review

(continued)

**Jackson**, the company's vice president-materials.

One attractive feature of the new winch is its mini-profile design, which makes it an excellent choice for applications where space is limited.

The new winch employs many features of the original NABRICO hand winch, including a quick release action, a hand wheel for fast

take up and a foot brake for run-out control. Many parts for the new winch are interchangeable with parts for other NABRICO winches for easy repair or replacement, and all parts are available from NABRICO and many of its distributors.

NABRICO is a wholly owned subsidiary of the American Ship Building Company, Tampa, Fla. The firm has been in the marine field for more than 70 years, and offers a complete line of deck hardware for towboats, barges and terminals serving the marine industry.

## NATIONAL CRANE

Circle 14 on Reader Service Card

National Crane Corporation, Waverly, Neb., has designed and built a number of pedestal-mounted telescoping hydraulic cranes for use aboard ships, offshore, docks and other marine sites.

The National marine line includes: the Series 200, with 10,700-pound maximum capacity and 28-

foot maximum boom length; the Series 400, with 16,000-pound maximum capacity and 55-foot maximum boom length; the Series 600B with 28,000-pound maximum capacity and 66-foot maximum boom length; and the Series 800B, with 35,000-pound maximum capacity and 75-foot maximum boom length. The latter three feature planetary, 375-degree rotation, while the Series 200 offers rack-and-pinion, 390-degree rotation.

High-performance planetary winches are standard on the Series 400, 600B and 800B, while the Series 200 has a worm-gear winch. Rotation-resistant wire rope is standard on all.

## NEI CLARKE CHAPMAN

Circle 15 on Reader Service Card

Northern Engineering Industries (NEI) recently won a major British defense order worth more than £50 million to supply its unique Syncrolift for the shiplift being constructed in behalf of the Property Service Agency at the Clyde Submarine Base, Faslane, Scotland.

The contract was awarded to NEI plc and manufacture will start immediately. A majority of the work will go to NEI's mechanical handling division NEI Clarke Chapman Ltd., at Gateshead, U.K., which will also subcontract to other NEI companies.

The Syncrolift system, conceived and developed by NEI Syncrolift, a unit of NEI Clarke Chapman Ltd., enables vessels to be lifted straight into and out of the water. At Faslane, it will be used to dock Royal Navy submarines including the latest Vanguard Class Trident missile submarines. These subs are being built at Barrow where they will be launched on a similar Syncrolift which was completed in December 1986.

The new contract will be one of the largest and most important Syncrolifts installed so far. It will have a lifting capacity of 24,000 tons and will be the 175th Syncrolift built. This unique system is at present installed in 63 countries and serves 32 Navies.

## J.D. NEUHAUS

Circle 98 on Reader Service Card

J.D. Neuhaus, a leading manufacturer of pneumatic hoists, has developed a star handle control for their pneumatic hoists. The handle control offers precise, direct control, even in severe working conditions because the operating element of the control can be positioned to an angle of about 180 degrees to the center line of the motor.

The construction of the unit is simple as well as effective, since the hoist is controlled by turning the star handle which, through a rod by means of a flexible hose, directly works onto the control piston in the hoist.

In addition, the control variation

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Circle 278 on Reader Service Card

## MCELROY MACHINE

Circle 22 on Reader Service Card

Harold S. Catchot, president of McElroy Machine & Mfg. Co., Inc., recently announced that McElroy Machine & Mfg. has been awarded a contract to supply a triple drum, diesel powered waterfall winch to the U.S. Army Corp of Engineers, New Orleans District.

The winch, model TW37-100D, is powered by a Detroit Diesel 4-71 engine through a Spicer manual transmission. All controls are mechanical and are centrally located for ease of operation. The winch develops 24,000 pounds line pull at 115 feet per minute (full drum) and has a spool capacity of 1,000 feet of 7/8-inch diameter cable on each spool.

Other current work includes the bow anchor windlasses and stern anchor winches for 22 U.S. Army LCU (Landing Craft, Utility) being constructed at Lockheed Shipbuilding's Savannah, Ga., shipyard.

Also in process are the tow winches and anchor windlasses for two tugboats being built by Moss Point Marine for the Jordanian Government. The model 544 tow winches develop 44,000 pounds line pull and have a brake rated at 110,000 pounds. The winches are powered by a self-contained 100-hp electrohydraulic power unit. The bow anchor windlasses are model MDW-100 which handle 1-inch stud link anchor chain on each of its cast steel wildcats.

Recently completed contracts include an anchor windlass for Pacific Marine of Honolulu, Hawaii. The windlass will be installed on a SWATH (Small Waterplane Area Twin Hull) type excursion vessel being built at Thompson Metal Fabricators of Vancouver, Wash.

McElroy has supplied capstans to Halter Marine, Lockport, La., for installation aboard a Chevron tug. The forward capstan is a model MC-20-H which develops 18,000 pounds line pull and the aft unit is a model MC-24-H which develops 23,000 pounds line pull. Each was supplied with an electrohydraulic power unit.

Mari-Trans, Tampa, Fla., has taken delivery of two McElroy model MC-24-H capstans for installation aboard two Ocean Cities barges.

## MORGAN CRANE

Circle 97 on Reader Service Card

The Morgan Crane Company, Inc. of Santa Ana, Calif., is the exclusive distributor for HIAB Sea Cranes, according to an announcement by HIAB Cranes and Loaders, Inc. of New Castle, Del.

This provides a centralized U.S.-based distribution center for HIAB Sea Cranes, parts, and service. Morgan Crane Company, Inc., a HIAB distributor for seven years, provides the expertise necessary to design, engineer, and service standard or complex handling systems.

Morgan supplies HIAB cranes to all sectors of the commercial maritime industry and also continues to supply the Navy with mine retrieval, drone retrieval, and target handling cranes.

Morgan Crane Company offers 24-hour-a-day, year-round service for its marine customers. Morgan Crane Company also provides specialty engineered packages, for lease or purchase, such as skid-mounted

packages with power pack included for easy installation and removal from any deck or platform.

## NABRICO

Circle 30 on Reader Service Card

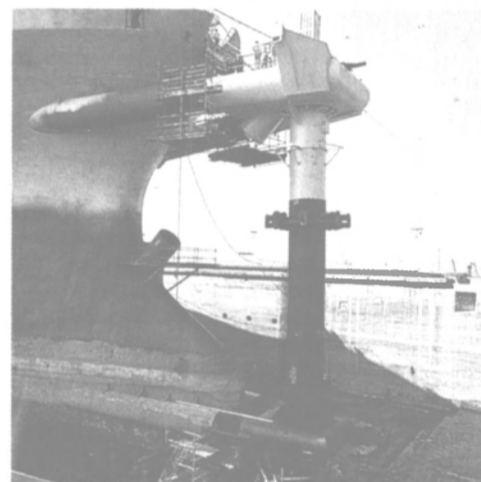
An all-new hand winch especially designed for use on barges, small harbor boats and for other winch

applications requiring a significant holding capacity, has been introduced by the Nashville Bridge Company (NABRICO), Nashville, Tenn.

Of all-steel construction, the mini-profile design winch has a 40-ton-holding capacity. Additionally, both right- and left-hand models are available for the increased safety of the operator, according to T. Ray (continued)

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Circle 128 on Reader Service Card

## Liquefied Gas Shipping— New Drewry Report Predicts Continued Improvement

The liquefied gas shipping industry (LNG and LPG) has staged a fairly remarkable recovery in the last couple of years, both in terms of the volume of cargo moved by sea, and the operating profitability of ships involved in these trades. Now, a new Report from Drewry Shipping Consultants—"Liquefied Gas"—suggests that even better times may be ahead for gas shipping. This optimism is based on a thorough analysis of both market sectors, including the outlook for the main chemical gases.

Taking LNG first, it is clear that the market has responded positively to the collapse in oil prices in 1986. Indeed, some significant changes have taken place in pricing formulae and contract terms which have had a beneficial impact on trade. To the extent that several dormant LNG contracts are likely to be reactivated, while other existing agreements could be expanded. As such, seaborne movements of LNG, which were 87 million cubic meters in 1987, are forecast to rise to 116 million cubic meters by 1992. Beyond 1992 trade should continue to expand as new exports schemes, such as the Nigeria project, come on stream. Already one major ship operator—Shell—has bought or taken purchase options on seven vessels which are currently idle, and the pool of tankers available for new trades has contracted sharply in recent months. In short, the existing LNG fleet will be unable to cope with the additional demand for shipping services, particularly if imports to the United States rise as quickly as forecast. Newbuilding orders across the LNG carrier size spectrum therefore cannot be ruled

out, and the Report indicates where and when tonnage will be required.

For LPG, the picture is much the same. Seaborne movements have increased every year since 1980 (with the sole exception of 1983), rising from 16.3 million tons in 1980 to 27 million tons in 1987. While increasing trade is a key factor in the current buoyancy of the freight market, it is not the whole explanation. At least part of the reason for the improvement in market conditions comes from the supply side, as there has been a conspicuous lack of newbuilding activity since 1984. Also, the number of companies operating LPG tankers has contracted sharply and this has been a further factor pushing freight rates in the right direction. For example, time-charter rates for a 50,000-cubic-meter ship averaged \$490,000 a month in 1987 compared with \$350,000 a month in 1986.

In the future, seaborne movements of LPG are expected to continue growing because of increasing demand for imported LPG in Japan and the United States. Drewry's figures suggest that trade will grow by 4-6 percent per annum, depending on the year in question, in the period up to 1992. At this rate of increase, newbuildings will be required, as the LPG tonnage surplus declined to a mere 0.5 million cubic meters in 1987, compared with 2.6 million cubic meters in 1984.

"Liquefied Gas Shipping—are there Even Better Times Ahead?" is published by Drewry Shipping Consultants Ltd. and is the fourth in a series of 10 reports produced under the "Seaborne Trade and Transport" (STAT) title in 1988. Individ-

Quarterly Timecharter Rates 1Q 1986-1Q 1988  
(\$'000/month)

	75,000 CU.M.	50,000 CU.M.	30,000 CU.M.	12,000 CU.M.	8,000 CU.M.
1986 1Q	255	265	240	n.a.	180
2Q	207	295	325	227	175
3Q	n.a.	420	272	191	150
4Q	558	449	351	260	230
1987 1Q	620	445	336	274	245
2Q	525	442	260	310	288
3Q	506	487	385	303	280
4Q	670	575	n.a.	435	280
1988 1Q	755	n.a.	n.a.	440	330

Source: Drewry Shipping Consultants Ltd.

Abbreviated Trade Matrices For LPG: 1987  
(Million Tonnes)

Destination	Source:	West Europe	Africa	Middle East	Other	Total
United States		0.3	1.0	0.4	0.8	2.5
West Europe		4.0	1.6	1.9	0.5	8.0
Far East		—	0.4	11.6	1.9	13.9
Other		0.7	0.2	0.5	0.9	2.3
TOTAL		5.0	3.2	14.4	4.1	26.7

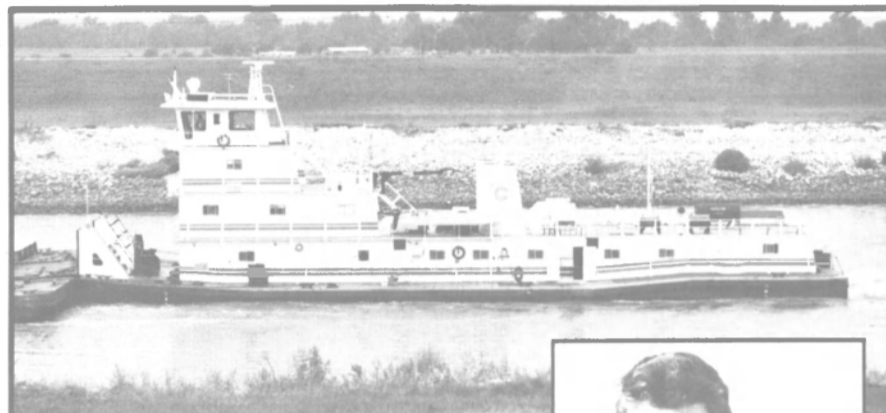
Source: Drewry Shipping Consultants Ltd.

ual copies of this Report are available at £160 or US\$300 (North America only). Alternatively, the whole series is priced at £590.

For more information on this report, contact either **Nigel Gardiner** or **Paul Dewison** at: Drewry Shipping Consultants Ltd., 11 Heron Quay, London E14 9YP, Tel 01-538-0191, Telex 21167 HPDLDN G, Fax 01-987-9396.

## Textron Marine Systems Wins Navy Contract

New Orleans-based Textron Marine Systems (TMS), Division of Textron Inc., has been awarded a \$2.9-million contract to furnish training equipment for the Landing Craft, Air Cushion (LCAC) program, TMS president **John J. Kelly** recently announced.



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*Gerry Brown  
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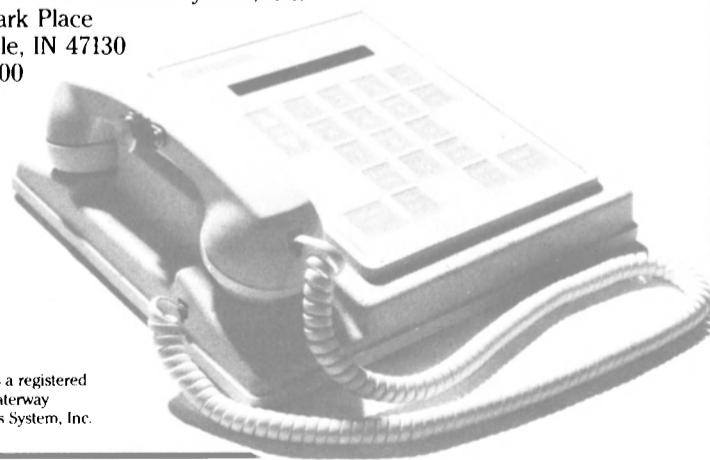
Maybe Gerry Brown said it best: "WATERCOM is good in the good times. And they're great in the bad times. That's why it's on all our boats."

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Circle 244 on Reader Service Card

## Rados-Designed Research And Monitoring Vessel Being Built By Knight & Carver In San Diego

Rados International Corporation, naval architects and marine engineers of San Pedro, Calif., has been awarded a design contract for furnishing the complete design, engineering, and construction inspection of a new 84-foot twin-screw, full secondary research and monitoring vessel for the City of Los Angeles.

The vessel, named Lamer (Los Angeles Marine Environmental Research), will be responsible for collecting water quality samples, and various other biological samplings, etc., primarily in the Santa Monica Bay.

Principal characteristics include an overall length of 84 feet, a beam of 22 feet, a 5-foot draft, and a displacement of 56 long tons. The propulsion calls for two diesel engines with 764 bhp each and two auxiliary generators with 40-kw capacity each.

The vessel, a twin-screw, semi-planing hull of fiberglass reinforced construction, will have a total crew and scientific complement of eight persons. It will be equipped with onboard laboratories, active and passive stabilization systems and deck equipment which will include "A" frames, oceanographic winches, and sea cranes. The latest in specialized scientific equipment, electronic and navigation equipment will also be provided. The vessel will be designed and built in accordance with the rules and regulations of the American Bureau of Shipping.

Knight & Carver, yacht and shipbuilders of San Diego, Calif., were awarded the construction contract for the 84-foot vessel. Specialists in the use of multi-laminates and Airex closed-cell foam core, Knight & Carver anticipates a delivery date in late 1989.

For more information and free literature on Rados International Corporation

Circle 36 on Reader Service Card

For free literature describing the facilities and capabilities of the yacht and shipbuilding firm of Knight & Carver

Circle 37 on Reader Service Card

## Rauma-Repola Deck Machinery And Aquamaster Propulsion Join Forces In New Company

Hollming Ltd. and Rauma-Repola Oy, two Finnish marine companies, have joined forces to make the best use of their trade names. In the future, the production of Aquamaster propulsion units and Rauma-Repola winches will take place under the same roof.

Aquamaster-Rauma Ltd. is the name of the new company, and it will be owned 50/50 by Hollming Ltd. and Rauma-Repola Oy. It will acquire the Aquamaster business from Hollming and the deck machinery business from Rauma-Repola.

Rauma-Repola Deck Machinery Works has designed and manufactured deck equipment since the 1940s, first to satisfy the needs of the company's Shipbuilding and Marine Technology Division, exporting most of its production. At present, the total number of units manufactured amounts to nearly 6,000.

Aquamaster production began in 1965 with 50-hp units, but already the intention was to develop a unit for professional heavy-duty operation. Now, Hollming's Aquamaster azimuth thruster has 20 percent of the world market for

this type of propulsion system. More than 1,000 units in the 120/3,000-kw range operate in various oceangoing, coastal and inland waterways vessels.

For additional information and free literature on Aquamaster propulsion units and Rauma-Repola winches from Aquamaster-Rauma Ltd.,

Circle 2 on Reader Service Card

## Literature Available On Radar Performance Monitors Marketed By Richardson

Regulations have been passed in the United Kingdom, West Germany, Holland, and soon Japan and the United States, mandating large vessels to be equipped with a radar performance monitor (RPM).

NJRC's NJF5907 (X-Band) and NJF5303 (S-Band) RPMs, sold and marketed by Richardson Electronics, Ltd., LaFox, Ill., are designed to satisfy such requirements with their unique total performance monitoring system. They consist of a local oscillator, pin modulators, programmable pulse signal block and antenna coupling to provide stable, precise and thorough monitoring of radar performance.

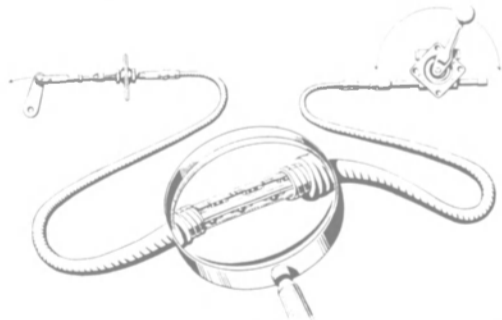
These RPMs are active units which check the overall performance of radar sets, such as the transmitting output, receiving sensitivity and others, including the scanner, by installing it at the front of the scanner.

These systems can be installed on existing radar systems or new equipment.

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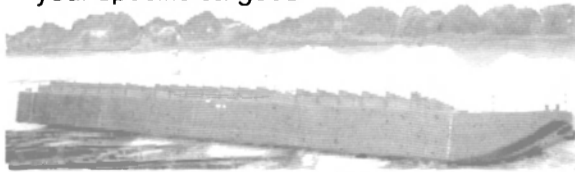
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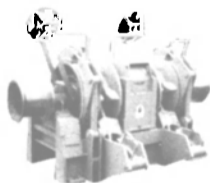
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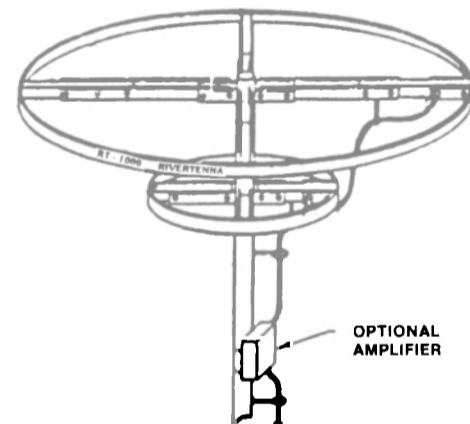


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Maritime Reporter/Engineering News



## Polish Yard Awarded \$120-Million Order

Despite recent strikes by Polish workers, the Gdansk Shipyard recently received a reported \$120-million order for two refrigerated cargo vessels with options for four more ships.

The order was placed by Reksten (Overseas) Inc. for unidentified private investors.

The reefers will each have a capacity of 490,000 cubic feet and will be powered by Sulzer-Cegielski main engines.

## Golar Marine Incinerators Detailed In Free Literature

Pego Systems Inc., Long Beach, Calif., is offering free color literature on the full line of Golar Marine incinerators manufactured by Team Tec AS of Norway.

According to the literature offered by Pego Systems, U.S. representative of Team Tec AS, Golar Marine incinerators have been market leaders since 1972. Golar Marine reached a significant milestone recently when Pennsylvania Shipbuilding installed a Golar GS500 incinerator aboard the USS Benjamin Isherwood (T-AO-191). It marked the 1,000th installation of a Golar Marine incinerator.

The four units detailed in the literature include: the Golar Marine OG 120, a compact unit for waste problems of small and medium-sized vessels; the Golar Marine OGS 200 and OGS 400 models, which combine the convenience of a batch feed operation with the advantages of continuous feeding through a revolving sluice; and the Golar Marine GS 500, a high-capacity model which is used to burn solid waste, sewage and sludge oil aboard passenger vessels, offshore platforms, naval ships, etc.

Full-color photographs of each unit, along with schematic and dimensional drawings, as well as technical data are included in the literature.

For your free copies of the literature offered by Pego Systems on Golar Marine incinerators,

Circle 92 on Reader Service Card

## Barco's '88-89 Catalog Of Impellers Includes 2 New Elastomer Cam/Pumpliners

The new 1988-89 catalog of impellers, published by Barco Corporation of Tampa, Fla., includes two new elastomer Cam/Pumpliners. According to the company, the Barco elastomer products are extremely resistant to sand abrasion and friction caused by dry running.

The Cam/Pumpliners 457 and 613, listed on page 1 of the catalog, are for the Jabsco 17000 and 18000 seawater pumps used on various

Caterpillar, Cummins and Detroit Diesel marine engines.

The 12-page catalog, which is effective September 1, 1988, includes the Barco Impeller Cross Reference Index and Silhouette Guide. A new retail price list, also effective September 1, 1988, is inserted.

Included in the publication are tables listing model numbers, impeller dimensions, shaft diameter dimension and number of blades. Also included are disassembly and

assembly instructions for changing Barco impellers.

According to Barco, their impellers are the only flexible impellers guaranteed to run dry 15 minutes.

Barco elastomer products are now used by the United States Coast Guard.

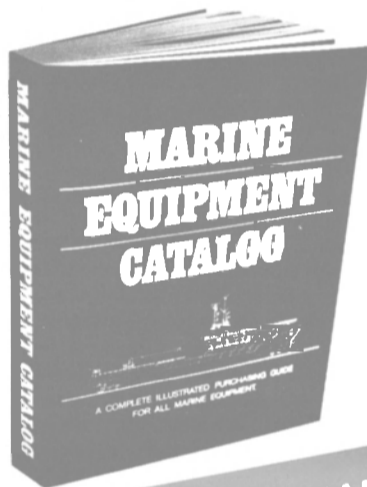
For more information and a free copy of the new 12-page catalog from Barco Corporation,

Circle 89 on Reader Service Card

## MarAd Awards \$689,000 Contract To Stevens Technical

The Maritime Administration (MarAd) recently awarded a \$689,000 contract to Stevens Technical Services, Inc., Brooklyn, N.Y., for repairs to the Patriot State, the training vessel of the Massachusetts Maritime Academy.

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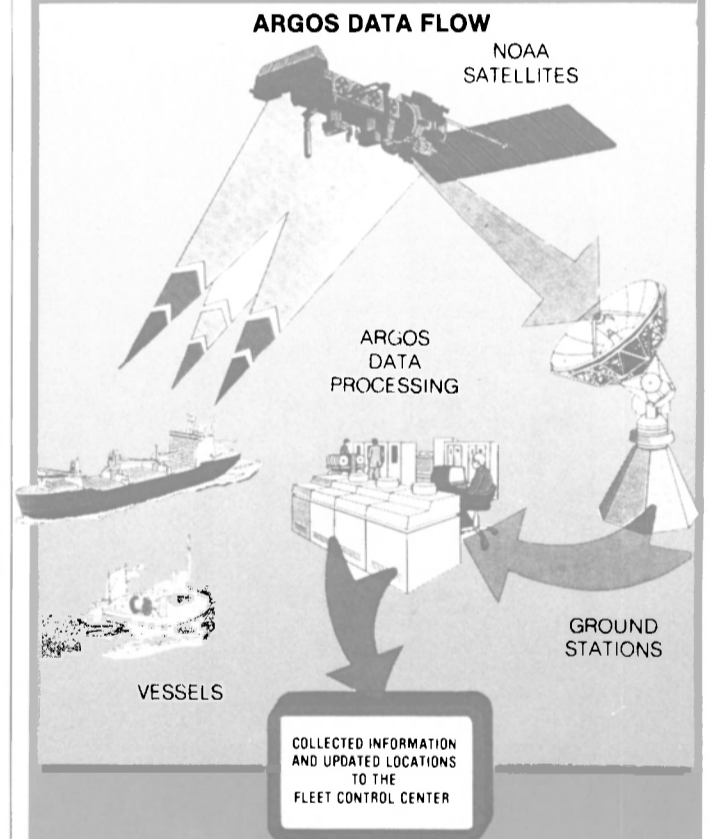
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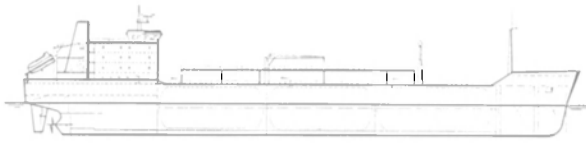
Circle 200 on Reader Service Card

## Meyer Werft To Build Six Gas Tankers For USSR

Meyer Werft of Papenburg, West Germany, recently received orders from AKP Sovcomflot of Moscow, a joint stock commercial enterprise of the USSR, for the construction of six 15,000-cubic-meter LPG/Ammonia carriers.

The vessels, which are to have a length of about 518 feet and a breadth of about 69 feet, are scheduled to be delivered between 1989 and 1991 and will increase the number of gas tankers built by the shipyard to a total of 45.

This is the second large order from the USSR.



Profile drawing of the 15,000-cubic-meter LPG tankers, for the USSR.

The yard delivered six gas carriers with a capacity of 12,000 cubic meters each during the 1970s.

For free literature giving complete details on the facilities and capabilities of Meyer Werft, Circle 58 on Reader Service Card

## AMSEA Promotes Alexandrakis And Knox

Capt. B.J. Fennick, president of American Overseas Marine Corporation (AMSEA), has named **Alkibiades (Alkis) Alexandrakis** director of engineering and **Scott V.S. Knox** director of safety, training and information systems.

Mr. Alexandrakis became a member of the AMSEA startup team in 1988 and has brought a strong background in marine engineering and naval architecture to AMSEA.

Mr. Knox, who is also a member of the startup team, brings to AMSEA over 14 years' exten-

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sive experience in the marine industry.

AMSEA is a wholly owned subsidiary of the General Dynamics Corporation, formed to manage and operate five Maritime Prepositioning Ships (MPS) which were constructed by the former Quincy Shipbuilding Division.

AMSEA was recently awarded three contracts to be the ship's manager of 12 Ready Reserve Force (RRF) ships.

## Fourth Canadian Shipbuilding And Offshore Exhibition (CSOE) Included With CMIA In 1989

The 41st Annual Technical Conference of the Canadian Maritime Industries Association (CMIA) (formerly the Canadian Shipbuilding and Ship Repairing Association) to be held at Montreal's Queen Elizabeth Hotel, February 20 and 21, 1989, will include the fourth Canadian Shipbuilding and Offshore Exhibition (CSOE), CMIA president **Jim Clarke** recently announced.

CSOE '89 will give exhibitors an opportunity to display or explain their goods and services at the largest technical marine conference in Canada. Exhibitions such as CSOE '89 help bring together all interested parties in the marine industry. CSOE has developed into a major component of the technical conference.

The CSOE '89 exhibition will be located on the convention floor opposite the technical conference meeting rooms. Exhibition hours will be 2 p.m. to 6 p.m. on Monday, February 20, and 10 a.m. to 5 p.m. the following day.

## Hitachi Zosen Delivers 755-Foot Containership



The Yamaaki Maru, powered by a Hitachi Zosen B&W diesel engine with a maximum continuous output of 32,310 horsepower by 88 rpm, achieved a maximum trial speed of 25.315 knots.

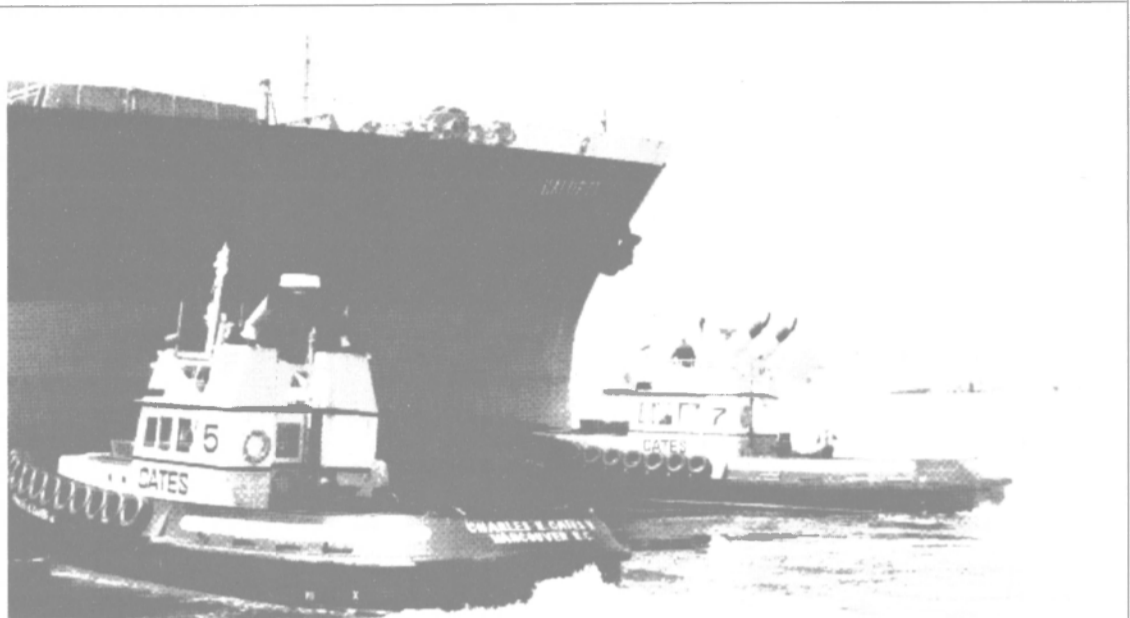
Hitachi Zosen Corporation's Ariake Works recently completed the containership Yamaaki Maru and delivered it the same day to its owner, Palace Container Shipping Corporation.

The ultramodern Yamaaki Maru, approximately 755 feet long, 104.9 feet wide and 70.5 feet in depth, is capable of carrying 2,832 TEU containers and 249 forty-foot air-cooled refrigeration containers in four tiers on deck. A specially designed bulbous bow is adopted to save fuel costs, while a stern bulb is fitted to reduce hull vibrations.

The main engine is a Hitachi Zosen B&W 9L80MC diesel, the most advanced of its type. Navigation equipment includes automatic radar plotting aids (ARPA) and a satellite navigation system.

For free literature giving full details on the facilities and capabilities of Hitachi Zosen,

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The Cates #5 and #7 60-foot 1800 bhp twin screw berthing tugs (shown above) maintain effective control over vessels in the 30,000-40,000 deadweight ton class with Wagner rotary vane steering systems. Using the Wagner R6.3 rotary vane steering system driving 4 rudders through rudder angles up to 55 degrees at hardover-to-hardover times of 5 seconds, these Robert Allan Ltd. designed tugs have exceptional maneuverability and a turning circle of 90 feet under full power.

## Rotary Vane Steering Systems

High performance steering for control and maneuverability when you need it most.

Wagner Rotary Vane Steering provides precise, dependable rudder control. These compact, efficient steering systems are proven performers in applications demanding high torque ratings in a small package.

The compact size, rugged design, and low inertia make the rotary vane suitable for high performance applications where fast response to steering controls is needed.

Smaller than rapson slide or cylinder-and-tiller steering systems having comparable torque ratings, the Wagner rotary vane actuator conserves space and allows the designer greater utilization of available hull and deck areas. The Wagner rotary vane typically requires only 20% of the deck area of equivalent rated cylinder-and-tiller system; and only 14% of the area of an equivalent rated rapson slide actuator.

### Rotary Vane Steering

Model	Rudder Angle* (degrees)	Torque (at 450 psi) (lbs-ft.)	Rudder Stock Diameter (inches)	Size Height (inches)	Size Width (inches)	Weight Approx (pounds)
R 1.6	2x35 45 60	11,570	4.53 5.12	10.63	15.75	430
R 2.5	2x35 45 60	18,080	5.12 5.91	13.39	18.90	650
R 4.0	2x35 45 60	28,930	5.91 7.89	15.55	19.53	1,100
R 6.3	2x35 45 60	45,470	6.89 7.87	17.72	22.44	1,600
R 10.0	2x35 45 60	72,330	7.87 9.25	20.24	25.98	2,000
R 16.0	2x35 45 60	115,700	9.25 10.83	24.41	30.31	3,500
R 25.0	2x35 45 60	180,800	10.83 12.40	27.36	35.41	5,600
R 40.0	2x35 45	289,300	12.40 14.57	31.50	38.19	7,400

\*Rudder Angle can be selected from 2 x 35 degrees to 2 x 60 degrees

Maneuverability is obtained from the wide range of rudder angles that are standard with the Wagner rotary vane actuator. Rudder angles up to 2 x 60 degrees are standard; and angles up to 2 x 70 degrees are optionally available depending on model.

And unlike cylinder-and-tiller and rapson slide steering systems, the torque output is not dependent on rudder angle. So the full capability of the steering system is always available when needed.

Reliable and maintainable. The simple, rugged design incorporates self-lubricating rudder thrust and radial bearings, and integral rudder stops within the unit. Torque is applied symmetrically for a balanced loading of the rudder stock. And the Wagner rotary vane has external protective valving and long-life dynamic seals to minimize down-time and maintenance during servicing and operation.

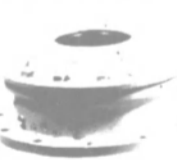
Seal technology is the greatest challenge for rotary vane actuators. Through on-going research the Wagner rotary vane design has advanced seal technology to achieve low internal leakage at operating pressures of 1500 psi, allowing higher torque-to-size performance and lowering the total cost of the steering system.

The Wagner rotary vane steering system can be obtained with a wide variety of control systems appropriate to the application and customer's requirements. Control systems available include hydraulic or electric full-follow-up steering for accurate high performance systems, electric non-follow-up steering for fast maneuvering, and manual hydraulic steering for low cost applications on smaller vessels. And of course, Wagner rotary vane steering is easily interfaced to all makes of marine autopilots and steering control systems.

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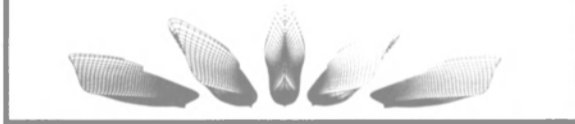
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## Trinity Marine Group Acquires Assets Of Guarino & Cox, Naval Architects



Salvatore Guarino

Gregory Cox

The Trinity Marine Group has acquired the assets of Guarino & Cox, Inc., a New Orleans naval architecture and marine engineering firm.

The principals, **Salvatore Guarino**, president, **Gregory Cox**, vice president, and their employees have moved to Trinity Marine's corporate offices in eastern New Orleans.

Mr. Guarino is vice president of research and development, and Mr. Cox serves as Trinity Marine's chief naval architect.

Both Mr. Guarino and Mr. Cox had been employed by Halter Marine prior to its acquisition of Trinity Industries, Inc. Mr. Guarino joined Halter in 1960 and rose to vice president, engineering, and Mr. Cox joined the company in 1971 and later became chief naval architect. They formed Guarino and Cox Inc. in 1980.

In making the announcement, **John Dane III**, president of the Trinity Marine Group, said: "The acquisition of Guarino and Cox, Inc., greatly enhances our design and engineering capacity at a time when we are faced with a major engineering challenge with the award of AGOR-23, a new class Navy oceanographic ship. This also gives us the ability to respond more rapidly to a greater variety of inquiries and requests for proposals."

Guarino & Cox, Inc., is best known for numerous designs of workboats successfully employed

worldwide by the offshore drilling and exploration industries. It is one of the few firms of its type proficient in the design of high-speed vessels for civilian and military applications. Recent work included assisting the Trinity Marine Group with the design and proposal for the AGOR-23.

**John Moreau**, who has served as engineering manager since 1982, will continue in that position.

## Hornblower Dining Yachts Acquires Marina Cruise Line

Hornblower Dining Yachts has acquired Marina Cruise Line from Real Property Management, the largest holder of real estate and marine properties in Marina del Rey. Located at Fisherman's Village, the new acquisition currently operates three vessels in the sheltered harbor and coastal environs. Hornblower Dining Yachts also operates group charters and individually ticketed cruises out of Newport Beach, San Diego, Berkeley, and San Francisco.

The San Francisco-based firm's entry into Marina del Rey is part of a long-term expansion plan in southern California. The company was recently selected by Worldport LA to begin operating out of the port's cruise ship terminal in spring 1989. A 1,000-passenger yacht, an enhanced version of Hornblower's largest yacht City of San Francisco, is being built for this location.

## World Yacht Enterprises To Be Bought For \$35 Million By Circle Line Sightseeing Yachts

According to a recent announcement, World Yacht Enterprises is to be bought for \$35 million by Circle Line Sightseeing Yachts Inc. The two companies both operate cruise vessels in New York Harbor.

Circle Line, with a fleet of eight vessels, specializes in day and night cruises around Manhattan Island and to the Statue of Liberty.

Five years ago, World Yacht Enterprises introduced the floating restaurant and nightclub ship to New York Harbor and now operates five vessels in the business.

The deal is said to be in the final stages of negotiation.

## Unitor Introduces Nonpollutant Cleaner 'Enviroclean,' Developed Jointly By Gamlen And Perolin

The Norwegian firm Unitor Ships Service AS recently introduced a newly developed water-based cleaner for onboard usage. The new product, called 'Enviroclean,' was developed jointly by Gamlen and Perolin as part of Unitor's marine chemical program.

Enviroclean has been developed without the use of petroleum or chlorinated solvents, using all natural citrus oil solvents linked with an advanced scientific surface active agent formulation. It is an all-purpose engine-room cleaner degreaser, cargo tank cleaner, and general purpose degreaser.

Unitor describes Enviroclean as nontoxic, completely biodegradable, no flash point, non-polluting, pleasant odor, suitable for oily water separators, and splits into an oil/water phase after cleaning. The company states further that Enviroclean is a right step toward providing complete safety to the environment and persons handling marine chemicals.

For more information and free literature on Enviroclean from Unitor,

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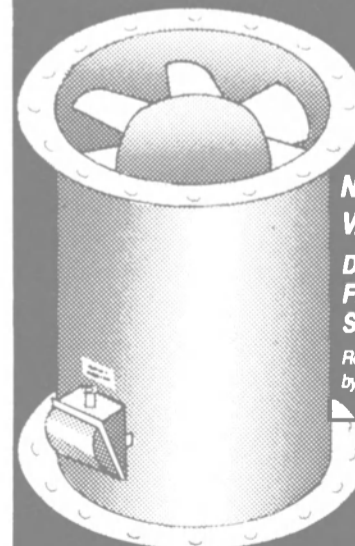
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**ALOHA, HAWAII**—Matson Navigation Company's new container barge Islander heading down the Neches River from Bethlehem's Beaumont, Texas, yard bound for Hawaii to enter service between Honolulu and the mid-Pacific isles of Johnston Island, Ebeye, Kwajalein and Majuro. The 387-foot Islander, with capacity for 312 containers, is replacing a smaller, older barge. She is fitted with two 40-ton-capacity O&K Orenstein & Koppel AG container deck cranes. The barge was towed to Hawaii by the Sause Bros. tug Salishan.

### Wartsila Diesel Announces Personnel Appointments

**Par Holmstrom** has been appointed service superintendent for Wartsila Diesel, Inc.'s new service station in San Juan, Puerto Rico. He will supervise and coordinate the company's service activities in the Caribbean. Mr. **Holmstrom** was previously service engineer with Wartsila Diesel, Inc. in New Orleans.

**Paul Glandt** has been appointed field service manager for Wartsila Diesel, Inc. in New



Par Holmstrom

Paul Glandt

Orleans. He will supervise all field service personnel for the company from the New Orleans office. Mr. **Glandt** was previously customer service coordinator for Wartsila Diesel, Inc. in New Orleans.

**Dave Morgan** has been appointed technical service manager for Wartsila Diesel, Inc. in New Orleans. He will head the technical service department, which is responsible for engine upgrades, modernization, in-situ measuring and machining, repower projects and the machine



Dave Morgan

Earl Orgeon

shop in New Orleans. Mr. **Morgan** was previously service engineer with Wartsila Diesel, Inc. in New Orleans.

**Earl Orgeon** has been appointed administration manager for Wartsila Diesel, Inc. in New Orleans. He will be responsible for accounting, personnel and computer functions. Mr. **Orgeon** was previously controller with Mexic Brothers in New Orleans.

With offices in Greenwich, Conn., New Orleans, La., and San Juan, Puerto Rico, Wartsila Diesel, Inc. is a part of Wartsila Diesel, one of the world's leading manufacturers of medium-speed diesel engines. Wartsila Diesel has production plants in Finland, Sweden, Norway, France, Spain and Singapore. The company also has a worldwide network of sales and service activities.

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## HHI Wins Contract To Build LPG Carrier For Kosan Fleet Of Denmark

Hyundai Heavy Industries (HHI) recently signed a contract with Kosan Tankers A/S of Denmark to build a semi-pressurized and fully

refrigerated 4,300-cubic-meter LPG carrier. The vessel will be about 322-1/2 feet long, 53 feet wide and will have a depth of 33.7 feet. When delivered in the second half of 1989, the carrier will be the largest in the present Kosan fleet of gas tankers.

The new carrier, to be propelled by a MaK 6M 551-type main engine

developing a MCR of 4,500 bhp with controllable pitch propeller, will achieve a speed of 14.1 knots. It features bilobe tanks constructed of low carbon fine-grain steel and insulated with 120-mm polystyrene foam.

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 Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, KOREA  
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IMA has just released a new report assessing DARPA programs. This report describes DARPA activities, assesses future program direction and provides a roadmap for developing business in this area.

### OUTLINE OF REPORT

#### 1. OVERVIEW OF DARPA

History	.....
Initial charter	.....
Changing program focus	.....
Recent events	.....
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Trend in funding	.....
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Strategic technology	.....
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Machine intelligence	.....
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Networking/C31	.....
Defense Sciences	.....
Materials	.....
Electronics	.....
Computers/Mathematics	.....
Directed Energy	.....
Lasers	.....
Particle beams	.....
Naval Technology	.....
Anti-submarine warfare	.....
Submarine design	.....
Submarine communication	.....
Other activities	.....
Nuclear Monitoring	.....
Tactical Technology	.....
Armor/anti-armor	.....
Smart weapons	.....
Tactical surveillance	.....

#### 4. STATUS OF KEY PROGRAMS

High Performance Computing	.....
Artificial intelligence	.....
Networking/C31	.....
Microelectronics Manufacturing	.....
Advanced Materials Manufacturing	.....
New Submarine Technology	.....

#### 4. STATUS OF KEY PROGRAMS

Armor/Anti-Armor	.....
Smart Weapons	.....
Smart Skin	.....
Unmanned Air Vehicles	.....
Advanced Technology Tactical Transport (AT3)	.....
Advance Torpedo Technology	.....
Anti-Submarine Warfare	.....
Blue-Green Laser Communications	.....
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Lightsat	.....
X-31 A Enhanced Fighter Maneuverability	.....
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#### 5. LISTING OF DARPA CONTRACTS—FY 1987-1988

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DARPA/Army Contracts	.....
DARPA/Navy Contracts	.....
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Restrictions on foreign involvement	.....
Competitive position of foreign firms in DARPA research	.....
European Office	.....
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# WorldPort LA 2020 Program



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The MarineSafety Computer Aided Operations Research Facility (CAORF) has assisted in designing optimum channels and waterways for many ports including Oakland, Miami, Norfolk, Tampa and Mobile.

*"Real-time simulation by MarineSafety of the proposed channel and harbor designs has enabled us to predict the operational realities of ship maneuver requirements ten to twenty years in the future. The design refinements derived from these invaluable simulation studies will enhance the safety and operational efficiency of WorldPort LA's '2020 Program'."*



Vernon Hall  
Chief Harbor Engineer  
Port of Los Angeles

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