A black and white photograph of the New York City skyline, featuring several prominent skyscrapers including the Empire State Building and the Twin Towers. In the foreground, a ferry boat is visible on the water, with the words "PIER 17" on its side. The sky is clear and bright.

# MARITIME REPORTER

AND  
ENGINEERING NEWS

96th SNAME ANNUAL

7th INTERNATIONAL  
MARITIME EXPOSITION

NOVEMBER 1988 ISSUE

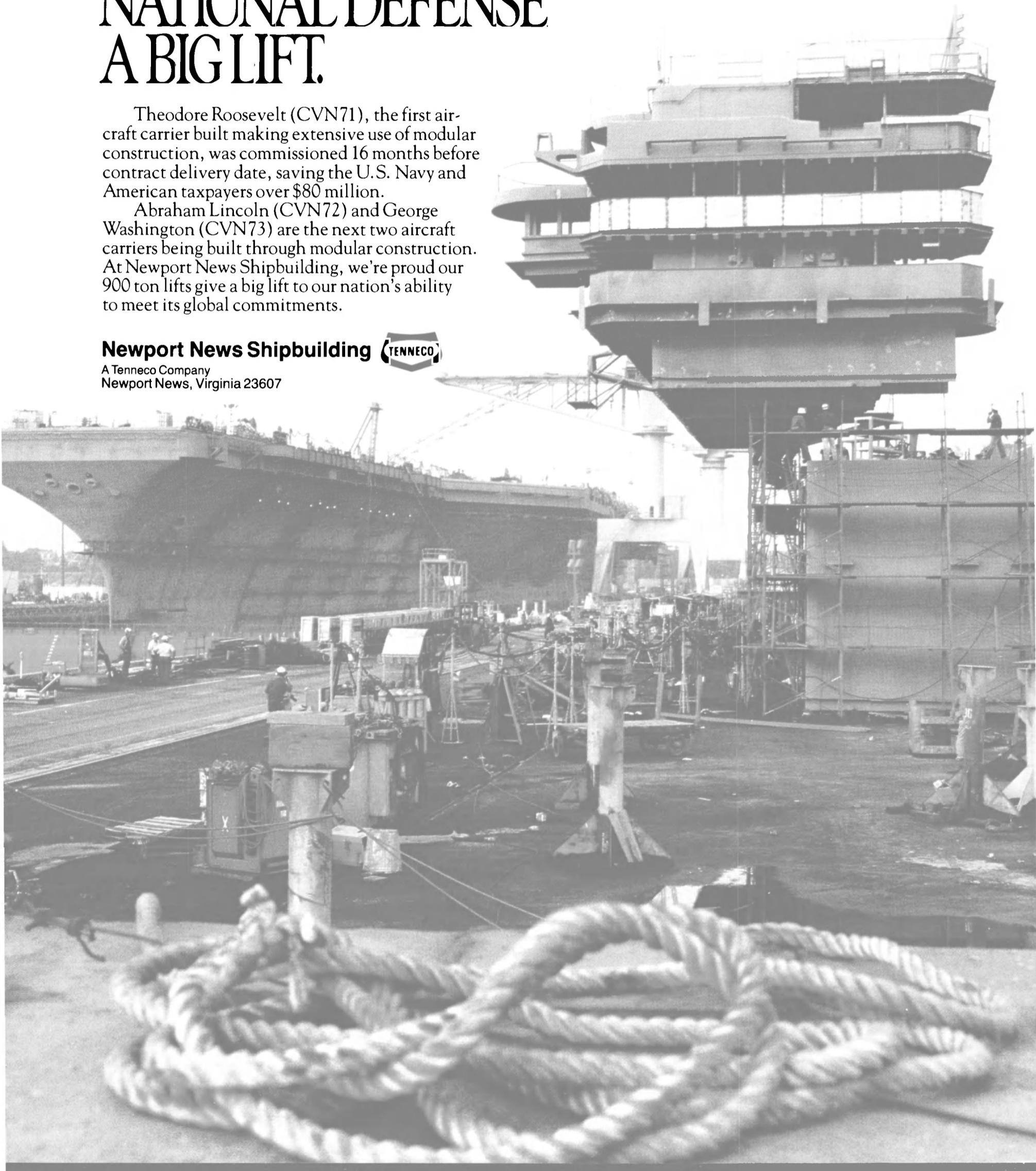
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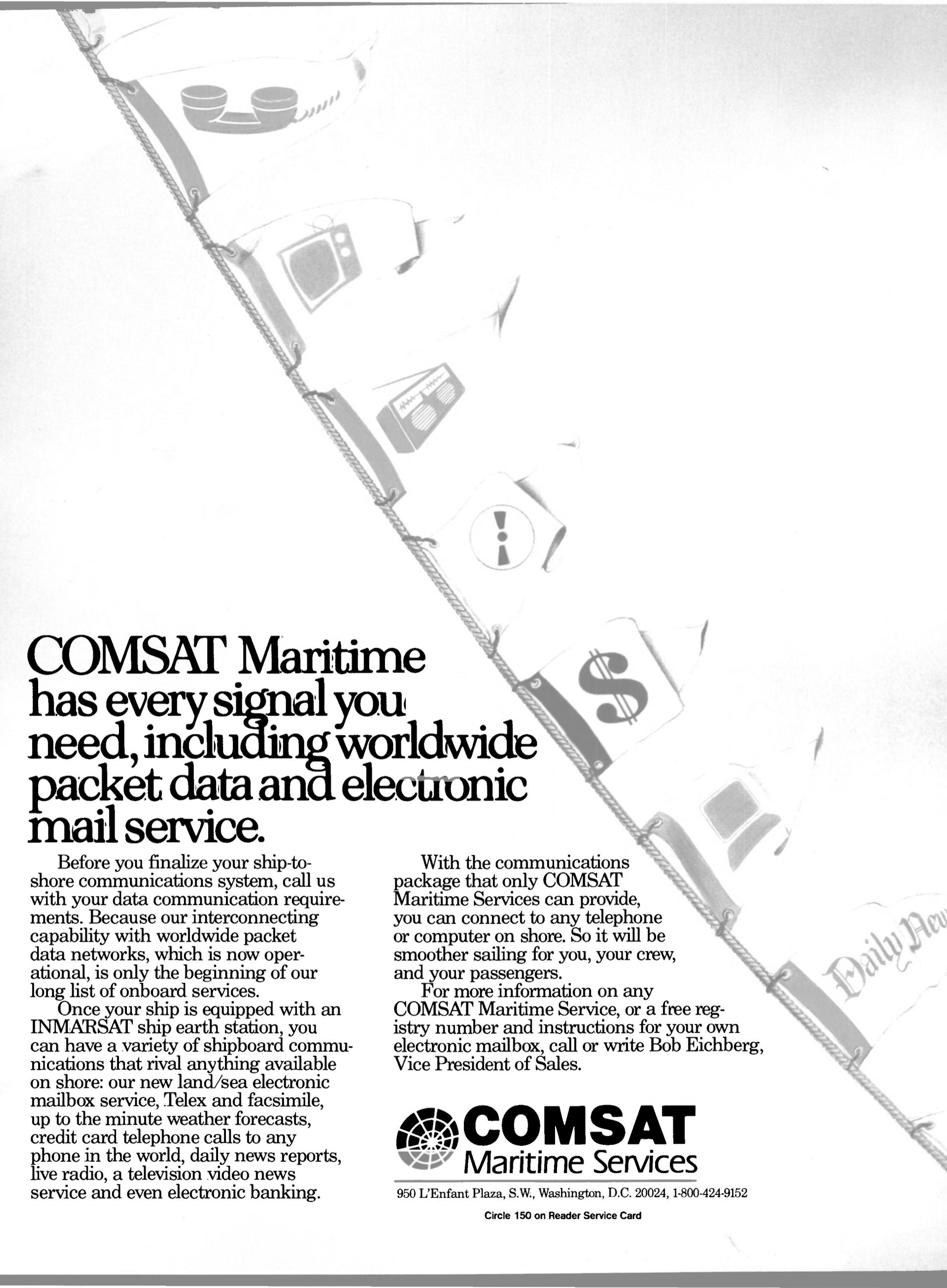
Theodore Roosevelt (CVN71), the first aircraft carrier built making extensive use of modular construction, was commissioned 16 months before contract delivery date, saving the U.S. Navy and American taxpayers over \$80 million.

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# ON THE COVER

Preview  
- 96th SNAME  
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PAGE 19

Outstanding Workboats Of  
1988

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## Southwest Marine Gets \$10-Million Navy Contract For Frigate Repairs

Southwest Marine Inc., San Diego, Calif., was recently awarded a \$10-million contract for the Dry-docking Selected Restricted Availability for the frigates USS Thach (FFG-43) and USS McClusky (FFG-41). The work is expected to be completed March 3, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Diego, Calif. (N00024-85-H-8221).

## Drew Offers New Brochure On Shipboard Chemical Product Line

With the consolidation of the Drew/Magnus Maritec™ product line by Drew Chemical Corporation, the Drew Ameroid® Marine Division has eliminated product duplication and now markets a unified marine chemical line under the Drew name.

The water treatments, fuel treatments and maintenance chemical products affected by this change are outlined in a new brochure available from Drew. Color-coded to differentiate each category, the brochure illustrates the previous product name, its use, and its replacement.

Drew Ameroid Marine, headquartered in Boonton, N.J., spent over a year of intensive research to determine the preferential product in each category.

For more information on Drew Ameroid Marine's product lines, and a free copy of the consolidation brochure,

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## Bender Shipbuilding Awarded Four MarAd Drydockings

Bender Shipbuilding & Repair Co., Inc. was recently awarded a contract for the drydocking, repairs and regulatory inspections of the S.S. Gulf Merchant. This is the fourth such contract awarded to Bender in four weeks by the Maritime Administration (MarAd) in Washington, D.C. Earlier contracts were for the S.S. Gulf Banker, S.S. Gulf Trader, and the S.S. Gulf Shipper. The vessels will be towed from the ready reserve fleet in Beaumont, Texas, to Bender's facility in Mobile, Ala.

Bender is a full-service shipyard that has been in operation for 60 years. The company builds, converts and repairs vessels for commercial and government owners and operators.

For free literature giving full information on the facilities and capabilities of Bender Shipbuilding & Repair Co.,

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## Program For U.S. Shipyard Revitalization Proposed By Shipbuilders Council

A proposed commercial shipyard recovery plan was presented at the Shipbuilders Council of America (SCA) board of directors meeting and Congressional seminar held recently in White Sulphur Springs, W.Va., according to a recent article in *Shipyards Weekly*.

A joint industry, labor, and government cooperative effort to make the U.S. commercial shipbuilding industry more competitive is the foundation of the program, which also aims to have modern, highly efficient shipyards in place that can capture 2-3 percent of the world market—the share required to sustain the domestic commercial shipbuilding base.

Since government subsidy programs supporting U.S. shipbuilders were denied funding in 1981, the industry has had to compete against subsidized foreign shipyards. Thus, the U.S. market share for building commercial ships dwindled as a consequence, and capital investments required to bring about productivity improvements have not been made.

Design standardization as the key to maximizing productivity improvements, with U.S. shipyards building a series of standard design ships for an interim assured market, is the main focus of the SCA program. Development of the standard design (or designs) would be driven by productivity considerations that would emphasize construction cost and schedule savings, as well as efficiency and economy of operations.

The U.S. Government would sponsor the temporary assured market of six to 10 ships, stimulating shipyard investment, providing the opportunities for shipyards to apply improved productivity methodologies and training, and sustain-

ing the U.S. shipbuilding industry while it is making the improvements necessary to become competitive.

Government-sponsored programs to create the temporary assured market include the following examples: (1) Replacement ships for sealift tankers required by the Military Sealift Command. (2) Sealift ships for mobilization acquired under a Procure and Charter program. (3) Ships ordered by U.S. federal agen-

cies, such as the Coast Guard, Army, National Oceanic and Atmospheric Administration, and the National Science Foundation. (4) Ships resulting from tighter enforcement of government-impelled cargo requirements. (5) Jones Act replacement tonnage.

The SCA shipyard recovery program also includes the conduct of continuing research into productivity improvements which would bene-

fit not only the commercial sector, but the yards engaged in U.S. Navy construction as well. No new shipbuilding capacity would be created; rather, current capability would be stabilized. The program would thus result not only in enabling the U.S. to take its place among other high-technology shipbuilding nations, but also preserve the shipbuilding mobilization base required for national defense.

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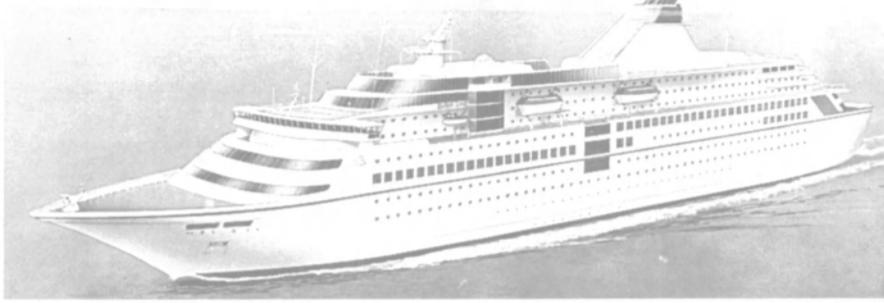
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Artist's conception of Birka Line's new cruise ship to be built at Wartsila Marine Turku Shipyard. The vessel will be put into service in the autumn of 1990.

## \$135-Million Luxury Cruise Vessel Ordered From Wartsila Marine By Finnish Shipowner Birka Line

Birka Line Ab and Wartsila Marine have signed a contract for a new \$135-million luxury cruise vessel to be delivered in the autumn of 1990.

The 32,000-gross-registered-ton vessel, with accommodations for

1,700 passengers, will be built at the Turku Shipyard.

This newbuilding represents a new type. The design and development are based on experiences gained from the owner's new de-

livery, the M/S Birka Princess, which will be used for cruising after a \$3-million conversion at HDW in Kiel, West Germany, next year. The newbuilding will replace the Birka Princess on the Stockholm-Mariehamn route.

Compared to the Birka Princess, the number of passenger cabins on the newbuilding has been increased by 36 percent, with considerably more spacious cabins and public spaces. Several single cabins have also been included, along with a discotheque, roundview bar, and a large sauna and fitness area adjacent to the sun decks.

The 568-foot-long by 91-foot-breadth newbuilding, which conforms to the highest international cruise and safety standards, is also designed and equipped for service in tropical waters.

The hull form is specifically designed to minimize the size of waves produced by the vessel and is also configured to reduce suction in proximity to the hull. Both features are of utmost importance for navigation in narrow channels and in proximity to beaches.

The cruise ship is capable of

speeds up to 21 knots. It is propelled by four medium-speed diesels providing a total power output of 21,000 kw which drive two controllable-pitch propellers through reduction gears. In addition, four auxiliary generators totaling 10,000 kw are installed to provide electrical power for hotel and accommodation services. Each diesel has its own exhaust gas boiler for waste heat to enhance the fuel economy of the vessel. Other features include the installation of fin-stabilizers to improve passenger comfort and modern water purification plants.

For free literature giving complete details on the facilities and capabilities of Wartsila Marine,

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## Alexander Industries Named To Represent Riley-Beard Maxim 'Watermaker'

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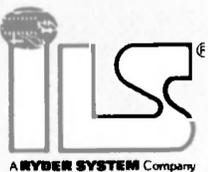
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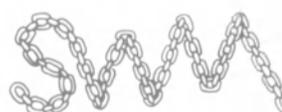
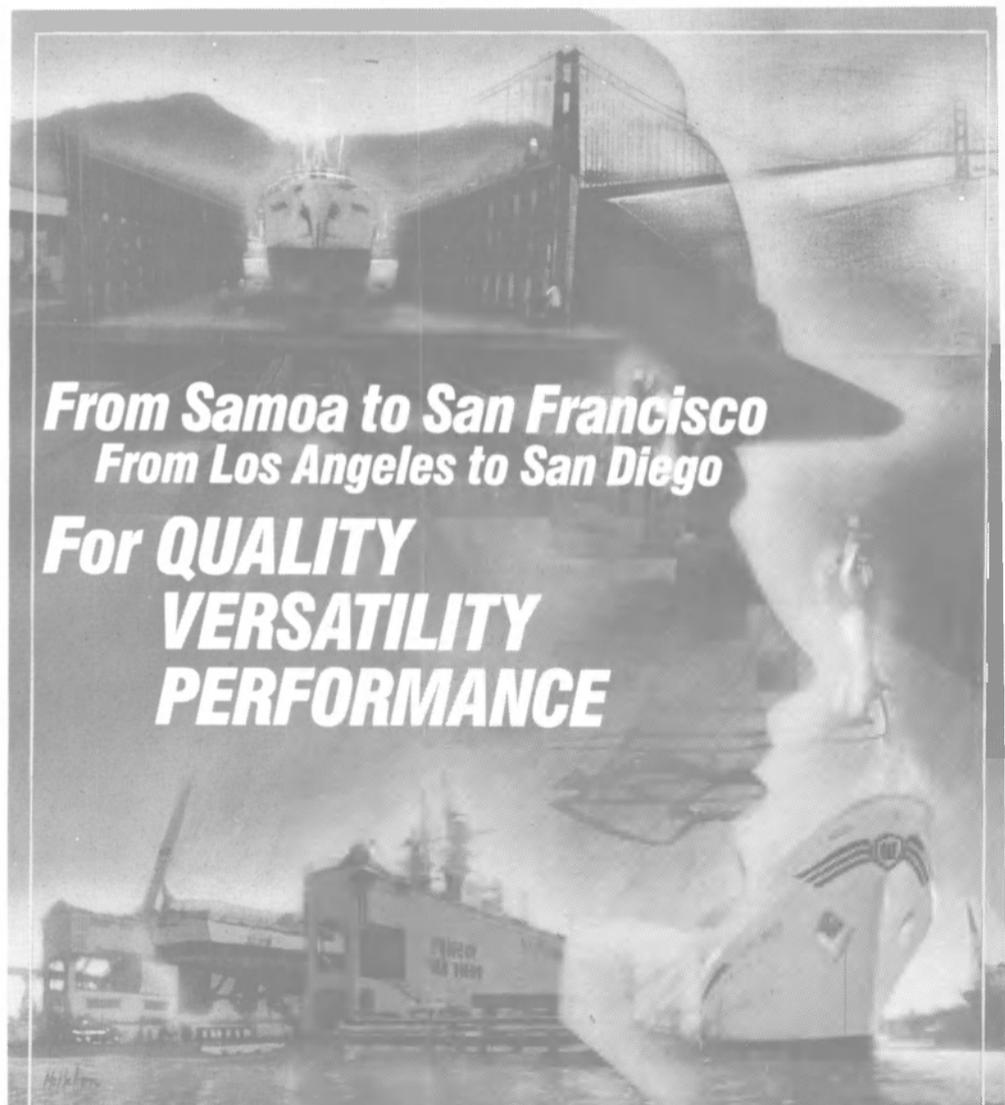
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Alexander Industries is headquartered in New Orleans, La., with offices in Houston, Texas. For more information and free literature,

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### Newport News Announces Management Restructuring

**Edward J. Campbell**, president and chief executive officer of Newport News Shipbuilding, Newport News, Va., recently announced a significant restructuring of the shipyard's top management.

**William R. (Pat) Phillips Jr.**, a 39-year employee of the shipyard and executive vice president, will take on added responsibilities. He will be responsible for all construction and repair operations at the shipyard, as well as all construction and test engineering efforts.

**Mr. Phillips** began his career at the shipyard in 1949 as an Apprentice School student and has worked his way up through the ranks of the shipyard. He has been manager of nuclear construction, vice president of yard operations, vice president of marketing, and senior vice president of engineering. In January 1987, he was promoted to executive vice president, with responsibility for engineering, material and quality.

**Mr. Phillips** is a graduate of Virginia Polytechnic Institute and the Harvard University Advanced Management Program.

In increasing **Mr. Phillips's** responsibilities, **Mr. Campbell** said, "**Pat Phillips** is one of the most experienced shipbuilders in the nation. He knows Newport News Shipbuilding, its people and its operations like the back of his hand. He will be responsible for ensuring that the 15 ships we now have under contract and those we will have in the future are constructed on schedule and with the kind of quality for which our shipyard is famous."

**William P. Fricks**, vice president-human resources, who joined Newport News Shipbuilding in 1966 after graduation from Auburn University, will be promoted to senior vice president.

**Mr. Fricks** will retain responsibilities for human resources, but will also be responsible for materials management, quality, facilities engineering, and industrial engineering.

**Mr. Fricks** holds a master of business administration degree from the College of William and Mary and is a graduate of the Harvard University Advanced Management Program.

The third senior management move announced was the promotion of **James A. Palmer Jr.**, director of engineering to vice president of engineering reporting directly to **Mr. Campbell**.

**Mr. Palmer** will be responsible for engineering relating to research and development, and new ship classes, including the Navy's new Seawolf Class attack submarines. He will also oversee all of the shipyard's engineering branch offices

and the integrated logistics support work at the shipyard.

**Mr. Palmer** is a 1958 graduate of the U.S. Naval Academy and holds a masters degree in naval architecture from the Massachusetts Institute of Technology. **Mr. Palmer** joined the shipyard in 1984 as director of engineering administration after 29 years of government service, nine years of which were spent as the Naval Reactors representative at

Newport News Shipbuilding. He was promoted to director of engineering at the yard in September 1986. He also is a graduate of the Harvard University Advanced Management Program.

In announcing the restructuring, **Mr. Campbell** emphasized that these moves are designed to address the most important objectives of the shipyard and that further personnel announcements will be made in the near future.

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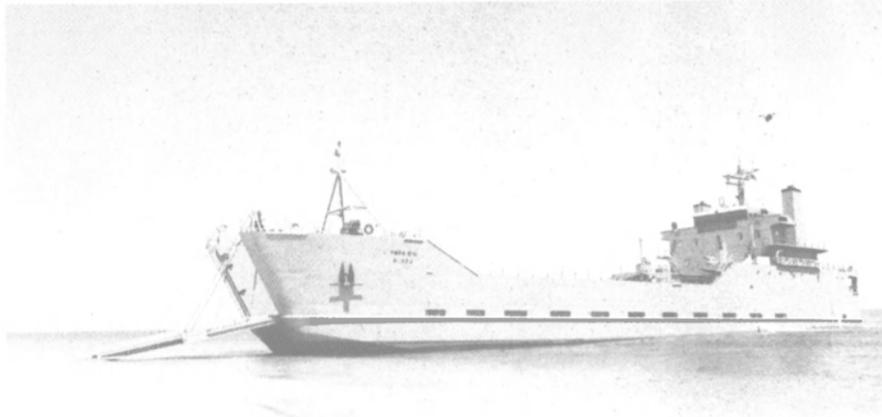


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Moss Point Marine's new General Motors-powered logistic support vessel is named in honor of Lt. Gen. **William B. Bunker**, a former Commander of the Transportation Supply and Maintenance Command who was also Deputy Chief of the procurement of ships, railway equipment and harbor craft in World War II.

## Moss Point Marine Completes Four-Ship U.S. Army Contract

Moss Point Marine, Inc. recently delivered the 273-foot logistic support vessel Lt. Gen. William B. Bunker (LSV 4) to the U.S. Army, completing a four-ship contract between the Escatawpa, Miss., shipbuilder and the Army.

The Bunker is one of a new class of landing craft which is capable of delivering large quantities of cargo to almost any beach or port facility in the world.

With ramps fore and aft, the Bunker has a drive-through capability and can assist in logistics over the shore operations. Containerized, break-bulk, and roll-on/roll-off (RO/RO) cargoes can safely and quickly be loaded, transported, and discharged. The new vessel is also equipped with a computer which links it to Army and Navy storage

facilities for spare parts and supply source information.

The \$10.2-million vessel was built at Moss Point Marine for the Army under a contract administered by the U.S. Navy and its Supervisor of Shipbuilding, Conversion, and Repair (SUPSHIPS) in Pascagoula, Miss.

The all-steel Bunker is 273 feet in length with a 60-foot beam and 16-foot 5-inch depth. She is powered by two General Motors EMD16-645-E2 diesel engines. The LSV can transport between 900 and 2,000 short tons of cargo, depending on the type of operation. The vessel is capable of approximately 12 knots sustained speed and has a range of over 5,500 nautical miles at loaded displacement. Her crew consists of six officers and 24 enlisted men.

The Bunker has been assigned to Forscom, 1099 TC, at Ft. Eustis, Va.

Moss Point Marine, Inc. is part of the Trinity Marine Group which is owned by Trinity Industries, Inc. of Dallas, Texas. Other members of the shipbuilding group are Halter Marine, Inc. 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 complete details on the facilities and capabilities of Moss Point Marine,

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## Joint Venture Formed To Build, Operate Passenger Submarines

A joint venture has been formed, Nautilus Submarines of America, Inc., Fort Pierce, Fla., to manufacture, market, and operate passenger tourist submarines throughout the world with primary emphasis on the U.S. and Caribbean markets.

The new firm was formed by a joint venture partnership between Fluid Energy, Ltd., of Scotland, one of the world's leading underwater engineering firms specializing in the design and manufacture of commercial and leisure submarines, and James B. Cain, a prominent Florida developer.

"This is a very exciting, exclusive opportunity for the leisure industry since it is an untapped market in the United States," said Ronald Bell, president of Nautilus Submarines. "We have considerable interest from a wide range of investors."

According to industry analysts in a recent *Time* magazine article,

more than 100 tourist submarines will be in operation by early next decade. They also foresee a \$250-million-per-year market being developed within the same time frame.

Nautilus Submarines is leasing 10,000 square feet of space in the Harbor Branch Oceanographic Institute, a non-profit foundation in Fort Pierce. The firm's facilities opened for operation in early August.

"We have had interest from cruise lines and resorts, which would form joint ventures with us to provide the submarine operations at several locations," said Mr. Bell. "Others have expressed a desire to develop facilities with us at state parks in Florida and California."

The submarines, which will be located at offshore sites and accessed by sub tenders, carry up to 62 passengers for one-hour underwater excursions.

For more information and free literature on Nautilus Submarines

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## Navy Awards \$4-Million PMA Job To Service Engineering

Service Engineering Co., San Francisco, Calif., was recently awarded a \$4-million contract for the Phased Maintenance Availability (PMA) of the ammunition ship USS Mauna Kea (AE-22). The work is expected to be completed January 16, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Francisco, Calif. (N00024-85-H-8217).

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## Port Of Miami Dedicates Cruise Ship Terminal

A new cruise ship terminal was recently dedicated by the Port of Miami. Designed to help Miami meet projections of an annual 4 million cruise passengers transiting Miami by year 2000, the \$5.2-million Passenger Terminal 12 and 14 has dual berths that can accommodate two of the cruise industry's futuristic new vessels at the same time.

## Anders Wilhelmsen Buys Royal Admiral

In a surprise announcement, a minority stockholder of Royal Admiral Cruises, **Arne Wilhelmsen**, has recently divulged that his company, the Anders Wilhelmsen & Co. group, has exercised its right of first refusal to purchase the balance of Royal Admiral. Royal Admiral is the holding company for both Royal Caribbean Cruise Line and Admiral Cruises.

In addition, Mr. **Wilhelmsen** chairman of Anders Wilhelmsen & Co. A/S of Oslo, Norway, also announced that they are negotiating the formation of a joint venture with an entity related to the **Pritzker** family, the owners of the Hyatt and Hyatt International chain of 144 hotels.

This now puts an end to months of speculation as to future ownership of the world's largest cruise line, including a recent \$561-million offer from Carnival Cruise Line, Inc. for 70 percent of the stock. Mr. **Wilhelmsen** had a deadline of October 10 to exercise his option and in the past months (since Carnival's offer) has arranged for financing for the purchase through Christiania Bank og Kreditkasse of Norway and Bank of Nova Scotia.

Currently the Royal Admiral fleet includes the new Sovereign of the Seas, the world's largest cruise ship, which has been named "Ship of the Year" and "World's Best" by the travel industry and was chosen as one of MARITIME REPORTER'S "Outstanding Ongoing Ships of 1987." A new 1,600-passenger vessel is under construction in France and negotiations are under way for one or possibly two more sister ships to the luxurious 2,300-passenger Sovereign of the Seas.

## Gladding-Hearn, LQMoffitt Develop Bearing Flange Design Solution —Literature Available

It has been more than four years since the specially designed water-lubricated bearing was first installed in Gladding-Hearn boats and its other custom vessels. To date, Gladding-Hearn Shipbuilding, The Duclos Corporation, reports not a single problem with the bearing's performance or availability.

The solution resulted from the

search for lower-cost, readily available bearings for Gladding-Hearn's aluminum-hull vessels. Gladding-Hearn's engineering staff contacted Marine Marketing Co. in Somerset, Mass., which led them to BFGoodrich Cutless® Commander® engineered composite-shell bearings, marketed by LQMoffitt. LQMoffitt designers and Gladding-Hearn devised the concept of adding an aluminum flange to the existing sleeve design of the Commander bearing. This not only solved the electrolytic

corrosion problem, it added strength with reduced weight and extended service life.

Since installation, none of the bearings have needed to be replaced, according to Gladding-Hearn. Engineering spokesmen also noted that with sufficient lubrication, the Commander bearing can be expected to last as long as 10 years, and in some cases to last the life of the vessel.

Standard installation methods are used. The Commander bearing

is installed in Gladding-Hearn vessels by bolting through the flange. Set screws or epoxy caulking are optional methods.

Specially designed Commander bearings and custom-engineering assistance are available from LQMoffitt, Inc., a subsidiary of BFGoodrich and the exclusive marketing arm for BFG marine industry products.

For more information and free literature,

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# TAKE A CLOSER LOOK

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The 78-foot shrimper/crabber Jamie Marie was recently delivered by Mid-Coast Marine of Coos Bay, Ore.

### Shrimper/Crabber Built By Mid-Coast Marine

Mid-Coast Marine, Coos Bay, Ore., recently delivered a 78-foot combination shrimper-crabber to Ron and Marie Miller of Grayland, Wash. Christened the Jamie Marie, the

fishing vessel has a beam of 25 feet 6 inches and a molded depth of 12 feet 2 inches. She is powered by a Cummins KT 38M diesel engine, which develops 800 hp at 1,800 rpm. She is fitted with a Twin Disc marine gear, Aquamet stainless steel shafting, a Cooper split type roller bearing and a Bird-Johnson-supplied Coolidge four-blade bronze propeller.

Auxiliary power is supplied by a Cummins NT855 engine fitted with a Lima 125-kw generator on the back end and twin double Vickers

#### JAMIE MARIE Equipment List

Main engine	Cummins
Marine gear	Twin Disc
Shafting	Aquamet
Propeller	Coolidge
Generator engine	Cummins
Generators	Lima
Hydraulic pumps	Vickers
Pump drive	Twin Disc
Grid coolers	Fernstrum
Mufflers	Harco
Refrigeration system	York
Trawl winches	Yaquina
Anchor	Danforth
Crab pot hauler	Marco
Circulation pumps	Demming

hydraulic pumps on the front, driven by a Twin Disc two pump drive. The second generator set is a John Deere 6414T with a Lima 50-kw generator and a single hydraulic pump drive. All three engines are cooled by Fernstrum grid coolers and the exhaust is handled by Harco mufflers.

The Jamie Marie was designed to operate along the coasts of Oregon and Washington.

For free literature detailing the boatbuilding, repairing and converting services of Mid-Coast Marine,

Circle 89 on Reader Service Card

### North Florida Wins \$3.6-Million Repair Job

North Florida Shipyards, Inc., Jacksonville, Fla., was recently awarded a \$3.6-million contract for repairs to the frigate USS Paul (FF-1080). The work is expected to be completed at the end of the year. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, Jacksonville, Fla. (N00024-85-H-8196).

### M.E.K. Equipment Offers 16-Page Catalog On Crane Bumpers

M.E.K. Equipment, Inc. of Newport News, Va., is offering a free catalog of a newly designed line of foamed polyurethane crane bumpers now available from the company.

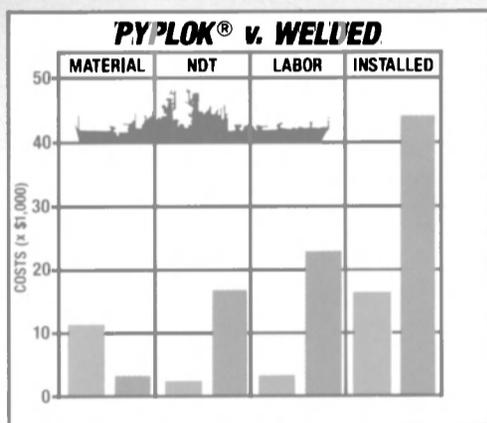
The bumpers have energy absorption capacities ranging from 300 to 712,000 ft./lbs. and will meet all OSHA, CMAA, AISE and other safety specifications.

Advantages, according to M.E.K., when compared with hydraulic or pneumatic-hydraulic bumpers, include: shorter length and therefore greater end approach, important for instance when several cranes unload a containership simultaneously; considerably larger impact/contact area; no leaks and no adjustments; and absolutely no maintenance.

For more information and a free copy of the catalog from M.E.K. Equipment,

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**Our competitors would prefer you read this chart...**



Deutsch PYPLOK® has proven cost saving benefits. Independent studies have shown PYPLOK® reduces installed costs by 63 percent over conventional pipe joining methods.

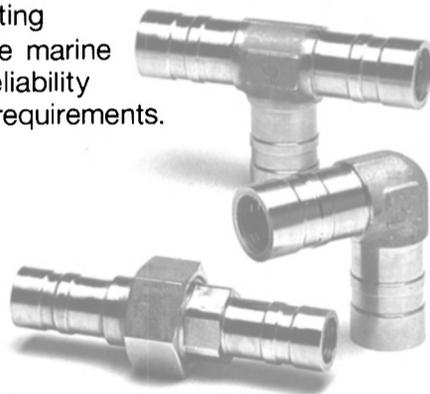
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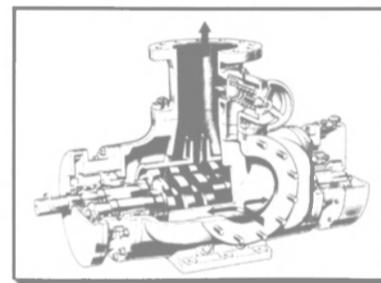
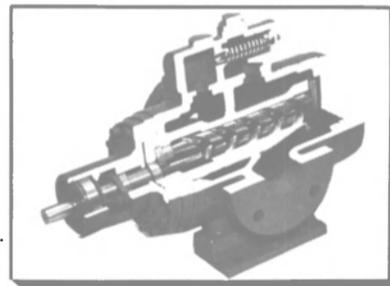
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## Bornemann pumps

### Screw pumps with internal bearings

For neutral, lubricating liquids. With low or high viscosity. Continuous, non-pulsating flow. Self-priming. Compact, space saving design. Noiseless running. High efficiency.

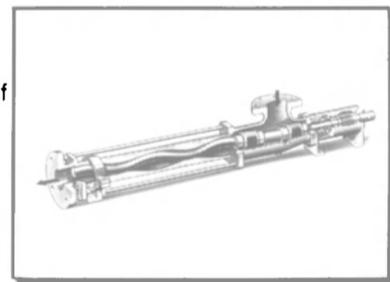


### Screw pumps with external bearings

For all liquids. Low or high viscosity. Neutral or aggressive. Non-pulsating flow. Self-priming. Compact, space-saving design. No contact between rotating elements. External bearings separately lubricated.

### Eccentric helical rotor pumps

They handle all kinds of liquids of both low or high viscosities, neutral or aggressive. Liquids containing solids. Liquids containing fibrous matter. Media with entrained gases or foaming. They operate continuously. They are self-priming.



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Marisys

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Telephone: (201) 725-8112 Fax: (201) 725-8511

Circle 202 on Reader Service Card

Maritime Reporter/Engineering News

## Improved Outlook Into Next Decade Seen By Canadian Shipyards

The Canadian Maritime Industries Association, which represents Canada's shipbuilding, ship repair, offshore and ocean industries, reported in its 1987 annual statistical report that the "outlook through 1988 into the next decade appears promising."

Several new contracts were awarded in this year's first quarter, the reported noted, and Canadian yards expect further contracts from the government and fisheries for new vessels or refittings and repairs this year. Naval contracts are also pending, the association said.

The association also cited reports of "significant" new hirings of employees since the beginning of this year.

## ZF-NA Names Stratkemper Service Manager, Heavy Duty Transmissions



Norbert Stratkemper

**Norbert H. Stratkemper**, a certified engineer (Dipl. Ing.), recently joined ZF of North America, Inc. He became service manager for manual on/off highway truck transmissions, marine gears and Ecomat heavy-duty automatic transmissions for bus and truck applications, produced in Friedrichshafen, West Germany, and Gainesville, Ga.

Previous positions include 9 years with O&K, a major European heavy equipment manufacturer, in their forklift and transmission development department; eight years with ZF; two years as test engineer for helicopter transmissions; five years as manager of Service Publication; and one year as ZF resident engineer at Ford Light Truck Engineering in Dearborn, Mich. He is currently a member of VDI, the Association of German Engineers.

## Omnithruster Waterjets Offer Maneuverability In Polar Regions —Literature Available

Omnithruster bow and stern thrusters installed aboard one of the Soviet Union's newest research vessels are providing excellent ice management and maneuverability, according to the Santa Fe, California-based company.

The 7,600-dwt Akademik Fedorov, operating in the harsh ice conditions of the Antarctic, is fitted with

Omnithruster bow and stern thrusters. The 1,300-kw aft Omnithruster unit, a model JT 1700, delivers a thrust of about 12 tons at 493 rpm and can propel the ship forward at about 3 knots and at lower speeds in other directions. The system sucks water from underneath the keel and directs the thrust in the required direction by steerable nozzles.

Some of the basic concepts of high velocity waterjet ice management were developed by the presi-

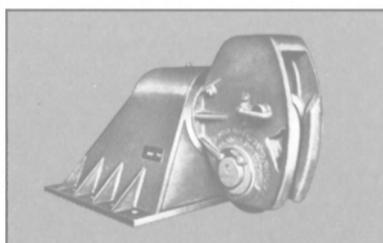
dent of Omnithruster, **C.M. Aker**. Some of those primary concepts include the use of a specially designed intake to reduce or virtually eliminate ice ingestion, the development of special shaped and positioned nozzles to deflect ice chunks that would otherwise impinge upon the ship's propellers, and the evolution of a two-phase flow air/seawater mixing device for ice lubrication, without the use of air compressors. The Omnithruster auxiliary propul-

sion system has also been redesigned to enable it to operate in ice regimes utilizing actuators and shock-absorbing devices combined with means of freeing ice in the actuating vanes, so that operation of the system is possible utilizing not only side thrust, but fore and aft auxiliary propulsion as well.

For free literature fully detailing Omnithruster bow and stern thrusters,

Circle 90 on Reader Service Card

# Smith Berger Marine offers Seaworthy choices.



### Naval Class Fairleads

Berger Fairleads have set the standards for quality and reliability for over 50 years. Berger Naval Class Fairleads are built to the exacting standards of the U.S. Navy and are designed for rugged offshore service.



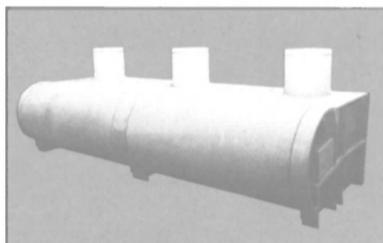
### Mariner Class Balanced Head

Designed and built to the same standards of quality and reliability as the Naval Class but new techniques of fabrication and manufacturing have been applied to provide a cost effective answer to civilian marine industry requirements.



### Mariner Class — Double Sheave

Berger quality in twin sheave fairleads for use in applications where the wire rope must be held in the center of the barrel or where directly in-line pulls are expected. All Berger Fairleads use tapered roller bearings throughout.



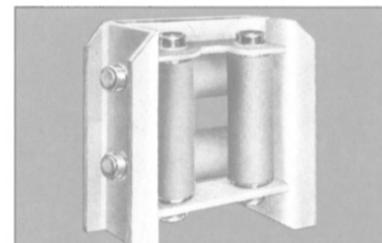
### Customized Towing Equipment

Stern Rollers, Pop up pins, tow pins and other equipment for new construction or retrofit can be custom designed for your vessel. Rugged, simple designs assure long life, low maintenance, and ease of operation.



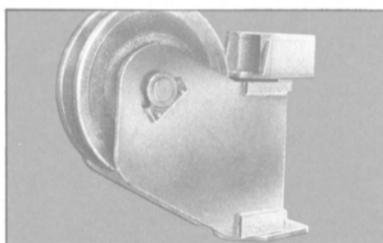
### Guide Sheaves

A full line of vertical and horizontal guide sheaves for wire ropes up to 5 inch diameter is available with optional bronze or anti-friction bearings. Special wide throat sheaves for Pusher tug lines can be provided.



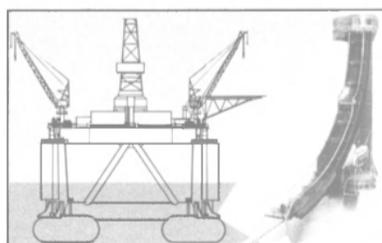
### Roller Fairleads

Berger Roller Fairleads are available in two, three or four roller versions for all rope sizes. Hardened steel rollers with bronze bearings are mounted on stainless steel shafts. Button head fairleads are also available.



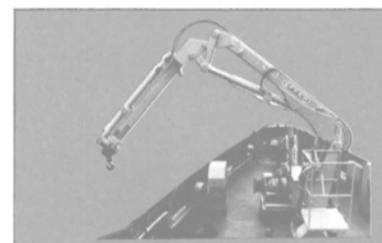
### Underwater Fairleads

As a leader in underwater fairlead technology, Berger offers custom engineering to meet your requirements. Hinged sheave or trunnion type fairleads for all sizes of chain or wire rope are offered with underwater bronze or sealed anti-friction bearings.



### Static Mooring Fairleads

Smith Berger is the exclusive supplier of the new static mooring fairleads with Monoloy rope or chain grooves designed to provide improved fatigue life of mooring lines on production platforms at an economical price.



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MagneTek components help run everything from electric lights and microwave ovens to service pumps and elevators on today's Navy vessels.

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## World Orderbook Highest In Two Years

The world orderbook has continued to increase, according to the latest figures released by Lloyd's Register. The total tonnage of ships under construction and on order at the end of the second quarter in 1988 increased by 754,464 gross tons to 23.97 million gt, the highest figure in two years.

For the quarter ending June 30, Lloyd's Merchant Shipbuilding Return, a statistical summary of all seagoing self-propelled ships of 100 gt and above, on order or under construction worldwide, reveals that South Korea had the largest share of the world orderbook at 27 percent—up by 359,236 gt to reach 6.46 million gt.

In second place with a total of 5.77 million gt or 24 percent of the world orderbook was Japan. Japanese shipbuilding orderbooks showed an increase of 302,134 gt in total tonnage under construction or on order since the end of the previous quarter.

Other countries showing significant increases in their orderbooks included the People's Republic of

China, Yugoslavia and the Federal Republic of Germany. The FRG showed a remarkable increase, jumping from 589,370 gt in June 1987 to 984,163 gt under construction or on order in June 1988.

## Westmont Receives \$24-Million Contract For Five Floating Cranes

Westmont Industries, Los Angeles, Calif., has received a \$24-million contract for the construction of five 100-ton floating cranes with options for two additional units. The floating cranes will be delivered to Mayport, Fla.; Norfolk, Va.; Port Jueneme, Calif.; Little Creek, Va.; and Newport, R.I. The work is expected to be completed June 1991.

The barge will be single-deck design, including a reinforced cargo deck area, boom rest, crew spaces, auxiliary diesel engine generator installation, shore power back-up, capstans and other accessories. The barge will also be designed for unmanned, open-sea towing.

The crane will be diesel-powered, fully revolving, with a luffing boom and three independent hook hoists.

The main hoist will be rated 100 long tons at an 80-foot radius.

The contract was awarded by the Naval Facilities Engineering Command, Northern Division, Philadelphia, Pa. (N62473-87-C-1455).

For free literature on Westmont cranes,

Circle 22 on Reader Service Card

## Colonna's Shipyard Elects Owen VP And GM



Richard H. Owen

W.W. Colonna Jr., president of Colonna's Shipyard, Inc., Norfolk, Va., and the shipyard's board of directors recently announced the election of **Richard H. Owen** as vice president and general manager. In his new capacity, Mr. Owen will assume responsibility for all shipyard activities. He joined Colonna's as general manager in August of 1987, bringing to the shipyard 27 years of shipbuilding and ship repair experience.

Colonna's, founded in 1875, is the

oldest ship repair facility in the U.S. continually operated by the same family. Mr. Owen's arrival at Colonna's coincided with a \$10-million shipyard expansion beginning in 1986 with the acquisition of a 16,500-ton fully certified floating drydock. Colonna's is currently working the drydock availabilities of the N/V Northern Sun, S.S. Cape Canso, USNS Vanguard, USS R.E. Byrd, and USS Papago. The continued progress and expansion at Colonna's is attributed in large measure to Mr. Owen's leadership skills which prompted his elevation to vice president and general manager.

For more information and free literature on Colonna's Shipyard,

Circle 63 on Reader Service Card

## Evergreen Marine Signs Berthing Contract With Port Of Portland

The Taiwan shipping company Evergreen Marine Corp., which operates a joint service with Japan Line to Portland, Ore., has signed a two-year berthing contract with the Port of Portland. The contract, which can be extended for a year, gives the company preferential berthing rights at the port's Terminal 6.

A minimum of 15,000 containers annually are to be shipped to Portland by Evergreen Marine.

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In the same tradition, FAST's Oil/Water Separator sets a new standard for disposal of oily wastewater. It is the only certified separator which will break chemical emulsions.

The Separator converts gray emulsions into clear water and black oil. The water will meet the most stringent requirements established by any known marine or land authority worldwide. The oil will support combustion.

With this unit aboard, machinery, decks and bilges can be cleaned with detergents with no danger of violating regulations.

## SALES AND SERVICE

We also offer you a comprehensive inventory of spare parts for quick delivery worldwide, plus expert field service personnel on constant call for on-the-spot assistance anywhere.

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## Training Video On Brazing Techniques Introduced By Flagg

Stanley G. Flagg & Co., Inc., Stowe, Pa., the leading manufacturer of Flagg-Flow bronze fittings and flanges for brazed joints, recently introduced a training videotape on the proper techniques of brazing.

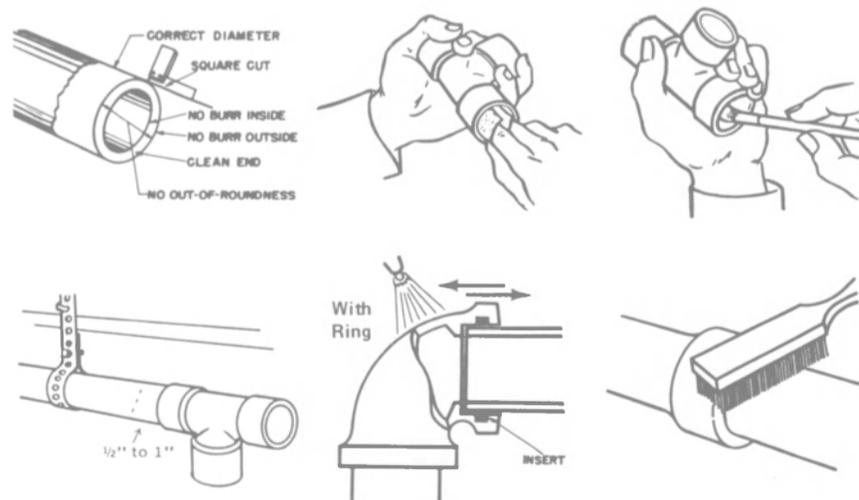
The 1/2-inch VHS tape, "Successful Brazing with Flagg-Flow Threadless Bronze Fittings," explains and demonstrates the six fundamental steps to proper brazing. The video presents: the proper fit

and clearance; thorough cleaning; proper fluxing; assembly and support; heating and alloy flow; and cooling and cleanup.

The videotape presentation is derived from Flagg's "Successful Brazing" handbook, which has been used as an industry reference manual for years. Now, both the videotape and handbook can be used as part of a training program.

For further details about the videotape and handbook, contact Flagg-Flow representatives **Jim Trout** or **Larry Wert** at (215) 326-9000 or

Circle 15 on Reader Service Card



The Flagg-Flow video demonstrates the six proper steps to brazing—1. Proper fit and clearance; 2. Thorough cleaning; 3. Proper fluxing; 4. Assembly and support; 5. Heating and alloy flow; and 6. Cooling and clean up.

## Bender Delivers Two Factory Ships—Receives Contracts For Two More—Literature Available

Bender Shipbuilding & Repair Co., Inc., Mobile, Ala., recently delivered two fishing trawlers to two affiliates of Arctic Alaska Fisheries Corporation, the largest fishing and at-sea processing company in the U.S., and received two contracts from the Seattle, Washington-based firm to convert two ships into factory trawlers.

Bender converted the offshore supply vessel Spring Mist into a 184-foot trawler/processor, the Unimak Enterprise. The factory trawler is able to catch cod and pollock, head and gut the fish, and freeze it in four Sabroe horizontal plate freezers.

Under the conversion, Bender installed a fixed kort nozzle and removed wood decks, pipe-racks, bulk mud compressors, and auxiliary diesels. The Mobile yard installed a complete shelter deck to accommodate the processing area, refrigeration machinery and two new Caterpillar 3508 DITA 715-kw diesel gensets. New electronic equipment, Rapp Hydema trawl winches, Rasmussen split-type net reels, Lantec and Pullmaster auxiliary winches and Alaska Marine straight boom telescoping cranes were also installed.

The Unimak Enterprise is the 10th offshore supply vessel to be converted by Bender for the commercial fishing industry in the last two years.

Just prior to the Unimak Enterprise's delivery to Unimak Enterprise, Inc., the shipyard delivered the newbuilding Arctic IV, a 155-foot refrigerated seawater trawler, to Arctic Fisheries, Inc. With a total capacity of just under 10,000 cubic feet, the Arctic IV is powered by an EMD 16-645 16-cylinder diesel engine developing 1,950 hp at 900 rpm coupled to a Reintjes VAL2250 reduction gearbox and fitted with a Berg CP propeller.

Other equipment includes Rapp Hydema hydraulic deck winches and net reels, Lantec and Pullmaster auxiliary winches, and an Alaska Marine straight boom telescoping crane.

Prior to delivery of these ships, Bender received two contracts from the same owners to convert a 295-foot cargo ship, the M/V Island Hope, and a 220-foot oil supply ship, the M/V Ocean King, to factory trawlers. Both ships will be operated by Arctic Alaska Fisheries, with deliveries scheduled for July and September 1989.

For free literature detailing the shipbuilding, repairing and conversion services offered by Bender,

Circle 85 on Reader Service Card

## MMC International Announces New Tape And Valve Catalog

MMC International Corporation has released a new catalog titled "Keeping You In Control," featur-

ing the company's line of tank gauging tapes and vapor control valves.

MMC manufactures electronic hand-gauging tapes under the "Flexi-Dip" trademark. A complete selection is offered for both open and restricted gauging. Users may select single-function tapes, ullage or temperature; bi-mode units, ullage/temperature or ullage/interface and its trimode model for ullage/interface/temperature.

The MMC line of vapor control valves is also described in full detail in the new catalog.

MMC International Corporation is a leading manufacturer of electronic gauging tapes of all kinds, C-L couplings and covers and other specialty products for the marine and liquid handling fields. The company also has production and marketing facilities in Europe and the Far East.

For more information and a free copy of the new catalog from MMC,

Circle 38 on Reader Service Card

## Cargo Ship To Undergo \$19.8-Million Conversion At Bay Shipbuilding

Bay Shipbuilding Corporation, Sturgeon Bay, Wis., recently received a \$19,847,786 contract from the Maritime Administration (MarAd) to convert a Government-owned cargo vessel into a maritime training ship.

Under the contract, the cargo ship Mormactide, which is at present part of the National Defense Reserve Fleet (NDRF), will be fitted with new quarters, exercise facilities, galley, messrooms, classrooms, a machine shop and maintenance and repair facilities. Her deckhouse will be enlarged to accommodate 800 officers, crew and cadets.

After the conversion, which is expected to take one year, the Mormactide will be utilized by the cadets at the State University of New York Maritime College at Fort Schuyler. The present training ship, the Empire State, will be retired to the NDRF.

For free literature detailing the shiprepairing and conversion services of Bay Shipbuilding,

Circle 88 on Reader Service Card

## MHI, IHI Named Prime Contractors For Japan's First Aegis Ship

Mitsubishi Heavy Industries (MHI) and Ishikawajima-Harima Heavy Industries (IHI) were recently named the prime contractors for the Japanese Navy's first Aegis ship by the Japanese Defense Agency.

MHI will build the hull and IHI will supply the power plant, which it will purchase from General Electric in Fairfield, Conn.

The total cost of the ship will be about \$914.6 million, with \$472 million for the Aegis system alone, which is provided by the U.S. Navy under a foreign military sale agreement.

## New Generation Of Simrad Color Sounders Available—Free Literature Offered

Simrad, Inc. of Seattle, Wash., recently announced the arrival of their new color sounder line. The EC-205, EC-206 and EC-222 are full-function, high-powered and easy-to-operate color video sounders that feature large, tight resolution, high-intensity CRT screens.

The EC-206 and EC-222 have a special STD (Small Target Detection) function that allows the operator to better detail small fish size that on conventional sounders.

The new line is now available with matched transducers or as cabinet only for installation on existing transducers.

For more information and free literature from Simrad,

Circle 4 on Reader Service Card

## SEAARK. A NEW NAME FOR 30 YEARS OF QUALITY.

You've known us as MonArk for over 30 years.

Now we'd like you to get to know us even better as SeaArk

Even better because with our new name has come a renewed dedication to the quality of the workboats we build for you. As SeaArk, we're still building the industry's largest selection of aluminum



See our new 26' Protector at booth 1360 at the International Work Boat Show in New Orleans, Dec. 1-3.

crewboats, transporters, fireboats and patrol boats. If you want more than just a boat, try us now. **BUILT FOR WHAT YOU DO.**



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Since 1927

## WALTER KEEL COOLERS ECONOMICAL & COMPLETELY RELIABLE

3 Models to choose from; 2 with only 1 thru-hull fitting; greater flexibility in installation, reduces time and costs.

**BETTER MATERIALS!** Bronze fittings, monel fastenings, 70% Cu-30% Ni Turbo Tube—stronger & more corrosion resistant than 90-10. Grooved Turbo Tube design gives more heat exchange than smooth, round or rectangular tubing. Consequently, a shorter cooler is required.

**BETTER DESIGN!** Aircraft-type flexible double o-ring construction, proven for over 35 years, eliminates problem of cracked brazed joints & expensive repair. Tubes can twist axially & longitudinally to conform to hull curvature.

**BETTER ENGINEERING!** 50 years of experience allows us to publish over 700 computer-aided recommendations; hundreds more in our files. Complete line of models & sizes always in stock ensures fast delivery to cool any propulsion & generator engine, transmission, aftercooler & intercooler.

Streamlined design, unlike bulky box-type coolers, detachable in minutes without disturbing inboard plumbing.

Can be recessed into hull!

**THE WALTER MACHINE CO. INC.**

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## McDermott International Forms Executive Operating Committee

R.E. Howson, chairman of the board and chief executive officer of McDermott International, Inc., recently announced the formation of an executive operating committee.

Mr. Howson said the committee has two major goals: to make the company more competitive in all its markets and to more efficiently control the company's operations.

He said the committee will facilitate the exchange of ideas among McDermott operating groups, will be responsible for reviewing and assessing the corporation's major activities and commitments, and will assure that the company's operating groups support each other's marketing programs.

The committee consists of the following executives who report directly to Mr. Howson: J.A. Lynott, executive vice president, chief financial and administrative officer; J.P. Eckert, senior vice president and group executive, Defense and Nuclear Power Group; W.L. Higgins, senior vice president and group executive, McDermott Marine Construction; M.A. Keyes, senior vice president and group executive, Industrial Products and Services Group; and J.J. Stewart, senior vice president and group executive, Power Generation Group.

## Navy Awards \$3.6-Million Contract To National Forge

National Forge Co., Erie, Pa., has received a \$3.6-million contract for 12 propeller shafts for the DD-963 destroyer and CG-47 cruiser class ships. The work is expected to be completed October 1993. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-4339).

## PRC Offers Four-Color Brochure On Marine Products

Products Research & Chemical Corporation (PRC) is offering an eight-page, four-color brochure detailing the company's line of marine decking systems, protective coatings and sealants. PRC supplied the industry with corrosion resistant, abrasion resistant coatings for interior and exterior decks on military ships, large commercial ships, offshore rigs, towboats and small pleasure boats. A full line of one-part and two-part polyurethane and polysulfide sealants and caulking compounds are available for applications above and below the waterline.

For more information and a free copy of the eight-page brochure from Products Research & Chemical Corporation,

Circle 78 on Reader Service Card

## Nichols Bros. Wins \$8-Million Contract To Build Six Ferries

Nichols Brothers Boat Builders, Freeland, Wash., was recently awarded an \$8-million contract to build six 72-foot catamaran ferries over the next two years for the Port of Puerto Rico.

Each catamaran ferry, based on designs by International Catamaran Designs Ltd. Pty. of Australia, will be built to seat 167 passengers. The ferries will be operated on a 5-mile route across the Bahia de San Juan and adjacent waterways between "old" San Juan and the newer metropolitan section of the city.

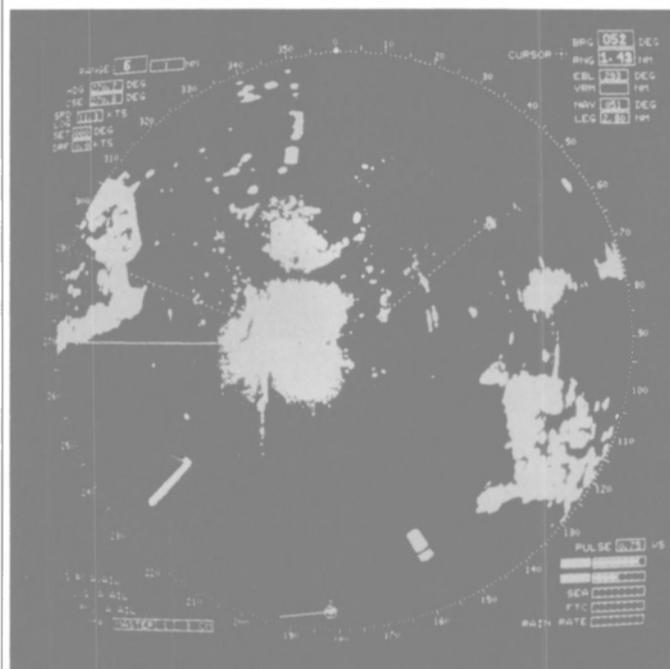
With service speeds of about 20 knots, each catamaran will be powered by 12V71 Detroit Diesel engines developing 465 hp at 1,800

rpm. These engines will drive propellers through 3:1 reduction gears.

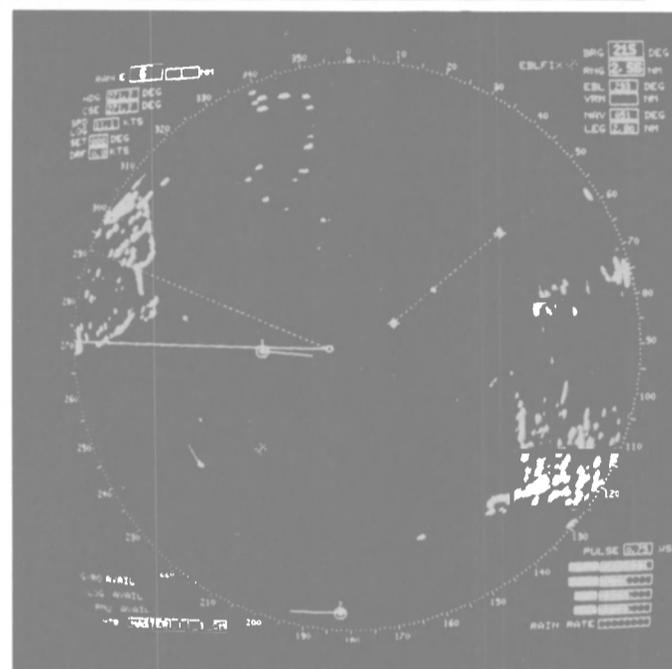
Under the contract, which is the largest ever received by the Whidbey Island, Wash., yard, Nichols Brothers will deliver two ferries in October 1989, two in January 1990, and two in June 1990.

For free literature detailing the boatbuilding services and facilities of Nichols Brothers,

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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.

## Non-Ferrous Offers Free Literature On Full Range Of Fasteners

Non-Ferrous Bolt & Mfg. Co., Las Vegas, Nev., specializes in producing standard and non-standard fasteners in high temperature and corrosion-resistant metals. The company is offering free literature on its full range of fasteners.

Non-Ferrous produces hex heads, nuts, sockets, carriage bolts, T-head bolts, square heads, penta heads, special studs, eyebolts, pipe plugs and many more styles from over 100 grades of stainless steel and exotic metals. In addition to standard head styles, they can produce "per print" items from some of the nation's most creative engineers. Because of its extensive tool and die department and raw material inventory,

Non-Ferrous is able to provide very fast deliveries. These capabilities along with extensive research and development facilities enable Non-Ferrous to offer high quality, reliable service.

The firm has supplied fasteners for applications in the petroleum and chemical industries; shipbuilding and repair industries; pulp and paper industries; and the food processing industry. Non-Ferrous has

supplied fasteners for such applications as heat exchangers, condensers and separators, evaporators, filters, oil and water separators, sanitation devices, water purification systems, deck equipment and dredging equipment.

For free literature detailing the full line of fasteners offered by Non-Ferrous,

Circle 81 on Reader Service Card

## Falk Brochure Details Concentric Shaft Reducers

"Concentric Shaft Reducers And Your Bottom Line—A Closer Look" is the title of a new eight-page brochure now available from The Falk Corporation. The full-color publication includes information on how to evaluate overall lifetime costs of concentric shaft reducers. It goes on to tell how speed reducer maintenance costs, parts replacement costs and lost production costs can add to the true lifetime costs of concentric shaft reducers.

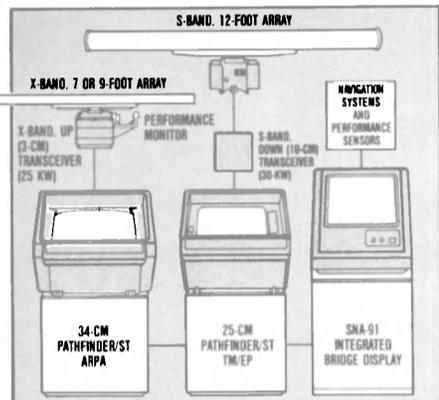
The brochure also details how Falk concentric shaft reducers are designed to keep lifetime operating costs down. According to Falk, the majority of concentric shaft reducer maintenance problems are lubrication related. Lack of proper lubrication causes failure of bearings or gear teeth.

The brochure includes application photos, diagrams and product cutaways.

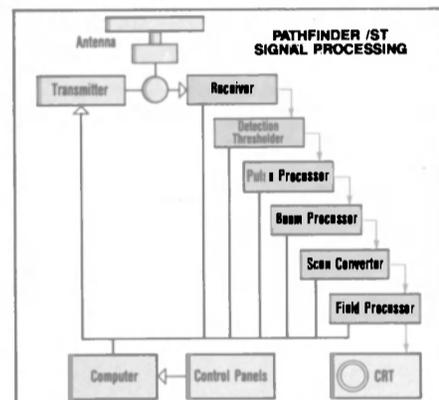
The guide also describes how Falk assists customers from the initial reducer selection process right through installation. Falk has 34 district sales offices, staffed by 60 sales engineers, ensuring experienced engineering support and fast service response. At the local level, 600 distributor locations offer customers close-at-hand expertise and service.

For a free copy of "Concentric Shaft Reducers And Your Bottom Line—A Closer Look,"

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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.

## 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

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AND SERVICE COMPANY  
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Denmark  
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Telex 855-31473  
Telefax: 45-1-574077

## \$100-Million Order For Three Carriers Won By Astilleros Espanoles

An order worth about \$100 million for three phosphoric acid/chemical carriers has been placed with the Sestao yard of Spain's Astilleros Espanoles SA by the Shipping Corporation of India.

Each of the three vessels, which will join the fleet of India's largest shipping company, will be of 30,800 deadweight tons, with an approximate length of 541 feet, breadth of 102 feet and depth of 30 feet. The main engines will be AESA-built MAN B&W units developing 12,560 bhp at 102 rpm. The vessels will have an operating speed of 15 knots, be classed by Det norske Veritas, and will be registered in India.

For more information and free literature on the facilities and capabilities of Astilleros Espanoles SA,

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# OVER 99% OF ALL SHIPLIFT OPERATIONS AROUND THE WORLD ARE ON SYNCROLIFTS®

There are very good reasons why Syncrolift is the world leader in shiplift technology with more than 160 installations in 59 countries. If you're planning a shipyard and comparing docking systems, find out why your best move is with Syncrolift.®

The largest shiplift platform in the world – 655 ft. long by 106 ft. wide at Todd Pacific Shipyards Corporation, Los Angeles Division.

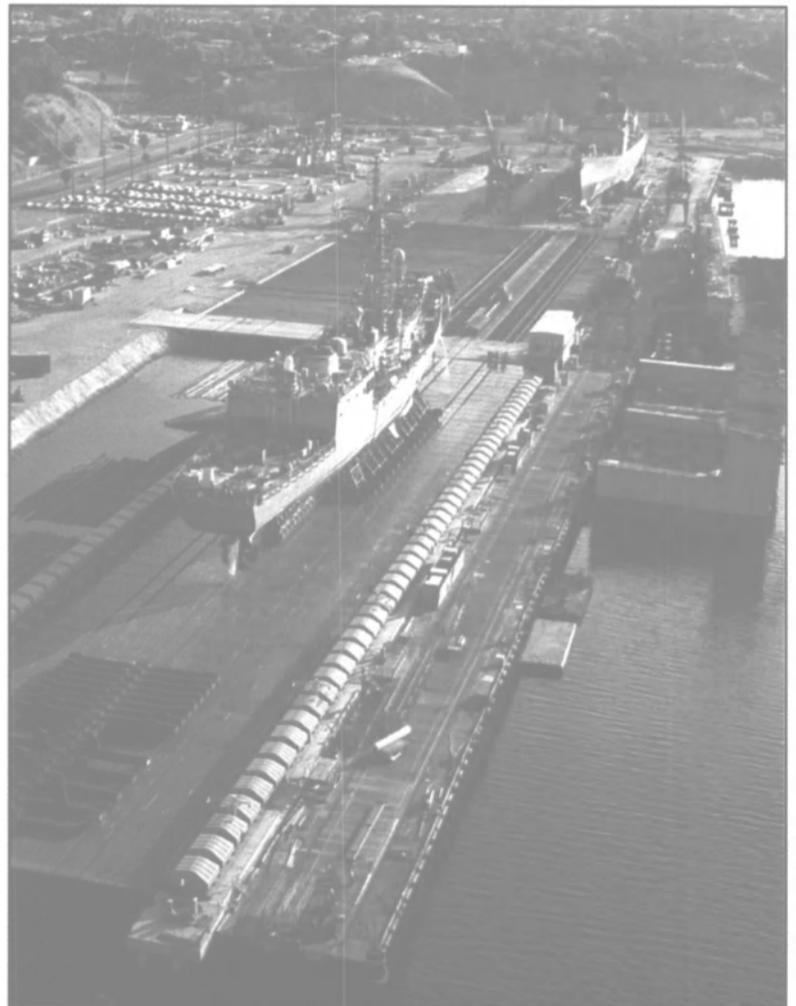


Photo by Joseph Ernest



The highest capacity per metre shiplift in the world – 200 tons per metre for launching concrete caissons at Yunotsu, Japan.

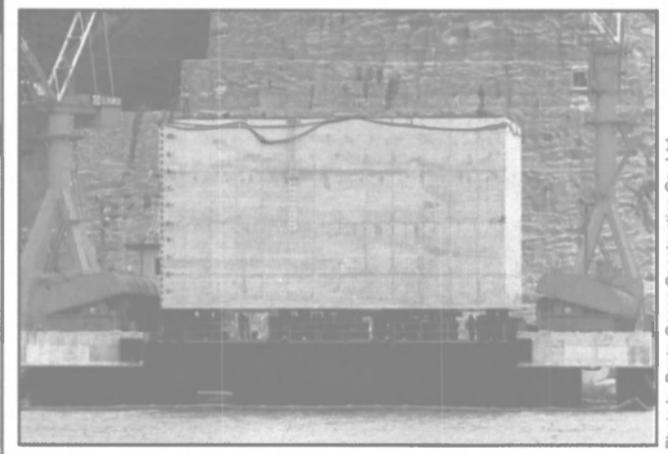


Photo by Penta-Ocean Construction Co., Ltd.

The greatest lifting capacity shiplift in the world – 24,000 tons for nuclear submarines at Barrow-in-Furness, England.

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Syncrolift Systems are patented in the United States and other countries.



# 96th SNAME ANNUAL



## **SNAME 95th Annual Meeting and 7th International Maritime Exposition**

**November 9-12, 1988**

One of the most important yearly events in the commercial marine industry, the 96th Annual Meeting of the Society of Naval Architects and Marine Engineers (SNAME) and the concurrent 7th International Maritime Exposition, will be held at the spacious New York Hilton Hotel, New York City, N.Y., from November 9 to 12, 1988.

Last year, the meeting and expo-

sition drew more than 2,000 attendees. With SNAME membership climbing to well over 12,000 industry leaders, the event promises once again to draw a high number of important attendees.

Besides the International Marine Exposition, the Society's Papers Committee, chaired by **Jack W. Abbott**, has slated an outstanding technical program which will consist

of 12 carefully selected papers. To be presented over a two-day period, Thursday, November 10, and Friday, November 11, the technical papers will cover the following topics: "Seakeeping and Extreme Tensions in Offshore Towing"; "Flexural Response of Foam-Cored FRP Sandwich Panels"; "Measurement of Ship Resistance, Powering and Maneuvering Coefficients from Simple

Trials During a Regular Voyage"; "Statistical Analysis of Stillwater Load Effects in Ship Structures"; "The Building and Operation of Vibration-Free and Trouble-Free Propulsion Plants and Ships"; "Potential Failure of Surface Ship and Submarine Drydock Blocking Systems Due to Seismic Loadings and Recommended Design Improvements"; "Structural Analysis of the



## Annual Meeting And Maritime Exposition

New York, N.Y.

U.S. Coast Guard Island Class Patrol Boat"; "New Models for Minimal Time Ship Weather Routing"; "A Procedure for the Structural Design of Icebreakers and Other Ships Navigating in Ice"; "Performance Analysis of a Small Racing Boat in Smooth Water and Its Design Application"; "Prediction and Measurement of the Performance of Free-Flooding Ship Anti-rolling

Tanks"; and "The Reconstruction of the SS Matsonia: Trailership to a Combination Container and RO/RO Ship."

The annual meeting will also include the traditional President's Luncheon, Annual Banquet and Dinner Dance.

### INTERNATIONAL EXPOSITION

At the Seventh International Maritime Exposition on the second floor of the New York Hilton, over 100 companies will display and demonstrate their marine products and services to a large cross section of the maritime industry. The exposition will offer a receptive environ-

ment in which to meet industry professionals from around the world. The Exposition's hours will be 2-6 p.m., Wednesday, November 9; 10 a.m.-6 p.m., Thursday, November 10; and 10 a.m.-4 p.m., Friday, November 11.

Registration for the 1988 Annual Meeting entitles you to free admis-

(continued)



## 96th SNAME Annual Meeting

— A Preview  
(continued)

sion to the Exposition. If you do not register for the Society's Technical Sessions, tickets for daily admission will be available at the Exposition Desk at \$7 each.

## MEETING COURSES

The Society's Education Committee is sponsoring two courses, "Fiber Optics Technology for Marine Engineers and Naval Architects" and "Forensic Engineering and the Expert Witness," on November 8 and 9 at the Hilton. Registrants are entitled to Annual Meeting room rates and a partial rebate on Annual

Meeting registration fees.

The "Fiber Optics Technology for Marine Engineers and Naval Architects" course will provide decision-makers with a better understanding of the capabilities of this new and growing technology, emphasizing realistic and practical marine applications.

A workshop type approach will be used for the course in "Forensic Engineering and the Expert Wit-

ness," which will instruct engineering professionals on how to better present their "expert witness" testimony in civil cases.

## PRESIDENT'S LUNCHEON

A general reception will be held in the East Ballroom Foyer of the Hilton beginning at noon on Thursday, November 10.

Seating for the President's Luncheon will begin at 12:30 p.m. in the Grand Ballroom on the third floor. Featured on the program will be the presentation of several important awards and an address by the Society's president, **Edward J. Campbell** of Newport News Shipbuilding & Drydock Co., Newport News, Va.

The luncheon is open to all registrants and their guests.

## ANNUAL BANQUET

The Society will hold its Annual Banquet on Friday, November 11, at 7:30 p.m. The affair is open to members and guests and will be held in the Hilton's Grand Ballroom.

Featured on the banquet program will be the presentation of the Davidson, Land and Taylor Medals and a significant address by Adm. **Carlisle A.H. Trost**, USN, Chief of Naval Operations.

## DINNER DANCE

The 96th Annual Meeting will conclude Saturday evening at 8:30 p.m., November 12, with a dinner dance and entertainment in the Grand Ballroom.

Prior to the dinner dance, at 7 p.m., a reception will be held for registrants and their guests in the Grand Ballroom Foyer.

## TECHNICAL PAPERS

Thursday, November 10  
Trianon Ballroom

9 a.m.—Seakeeping and Extreme Tensions in Offshore Towing," by **Jerome H. Milgram**, **Michael S. Triantafyllou**, **Fernando C. Frimm** and **George Anagnostou**.

A 12-degree-of-freedom seakeeping theory is developed and used for a tug, tow and towline in the open ocean. Statistics of nonlinear extreme tensions are determined and used. The principal non-linearity is due to mechanics of the towline. Examples are presented showing how speed and towline length can be adjusted to limit towline damage risk.

10:30 a.m.—"Measurement of Ship Resistance, Powering and Maneuvering Coefficients from Simple Trials During a Regular Voyage," by **Martin A. Abkowitz** and **Gengshen Liu**.

Data obtained by ship instrumentation from a few simple trials of the 75,000-dwt Exxon Philadelphia dur-

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# Want to Simplify Main Engine Power Tests?

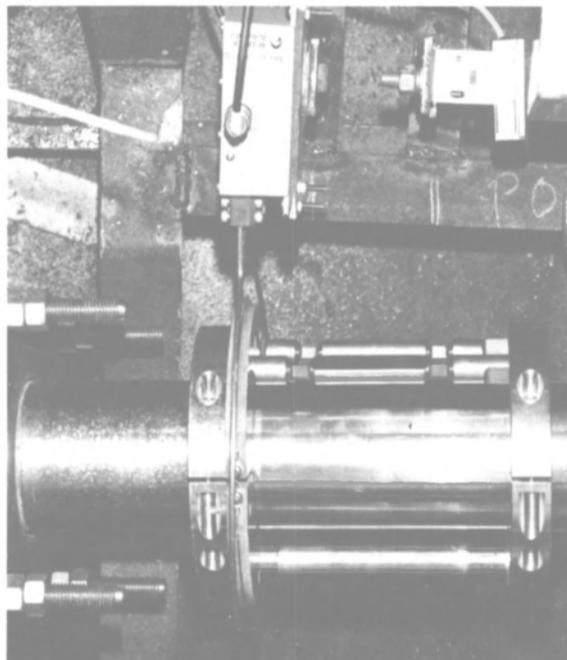
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No ship is too small...

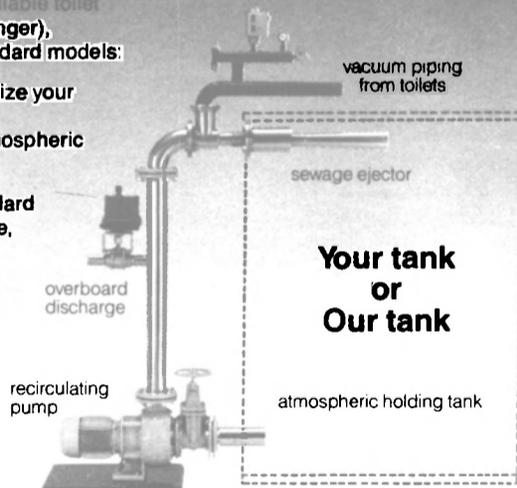
to install an EVAC vacuum toilet system.

If you need an economical and reliable toilet system for your ship (50 feet or longer), choose EVAC. EVAC has two standard models:

- Model 0111** — allows you to utilize your ship's hull tank, and;
- Model 1111** — includes our atmospheric holding tank.

Both models have the same standard design and components; therefore, you do not pay for special design engineering. You do receive high quality components with a proven history of reliability.

EVAC vacuum toilet systems already exist in over 2,000 ships worldwide. Model 0111 and Model 1111, with one or two pumps, are available from stock to expedite delivery.



### Benefits for both models:

- low volume fresh water flush toilet (2 pints/flush)...  
10 man crew produces 15 gals. of sewage/day
- small diameter piping...  
1-1/2" and 2"
- piping layout flexibility...  
with vertical lift
- reduced holding tank size...  
80% smaller
- toilet vents eliminated

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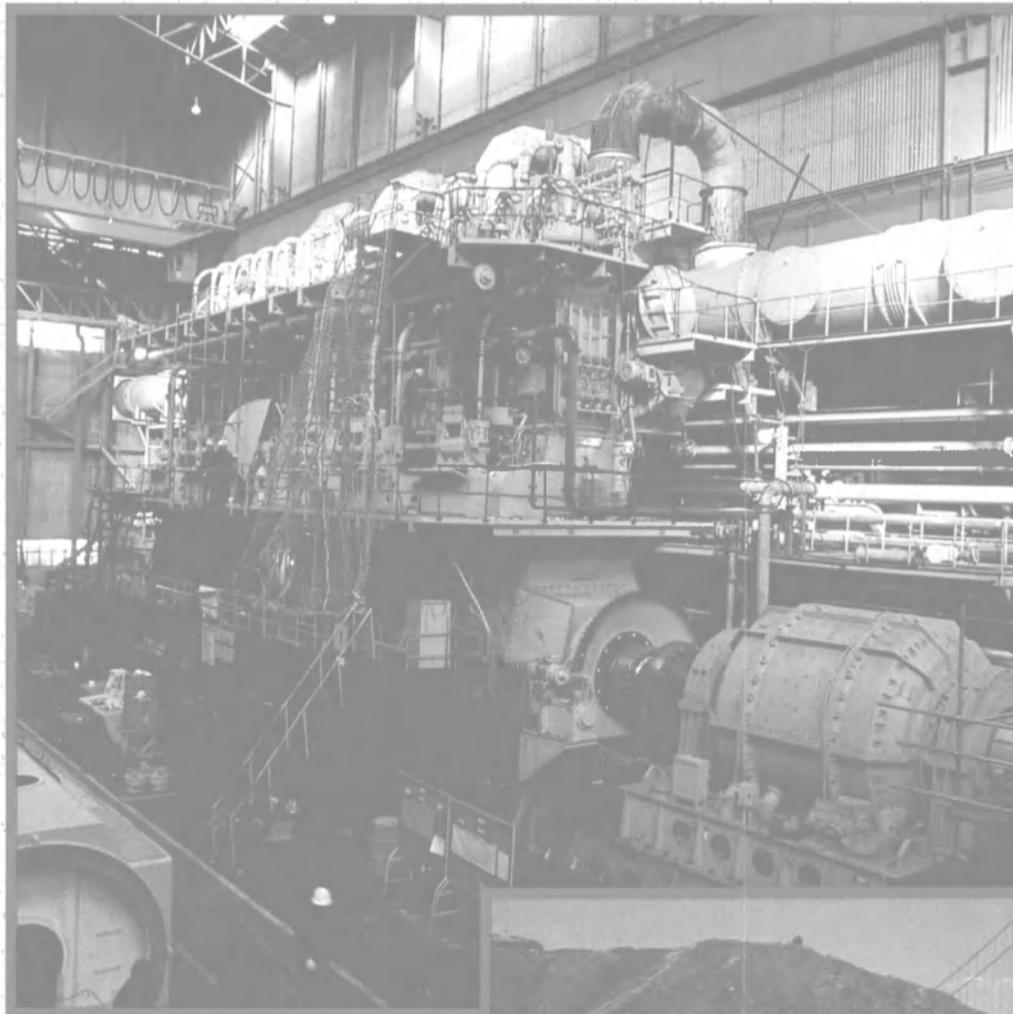
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# BP Marine International

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the world's most powerful engines now at sea.

**BP** Marine International has been selected as exclusive supplier of engine lubricants for three of the five new post-Panamax design containerships for American President Lines. These C10 vessels offer increased capacity and efficiency because of their 129-foot beam and improved cargo stowage configuration. And BP has the products and technical support to help APL meet the demands of its trans-Pacific customers.



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containership,  
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## 96th SNAME Annual Meeting

— A Preview  
(continued)

ing a routine voyage was analyzed using system identification techniques. This resulted in a reliable "measurement" of the full scale resistance, wake friction, thrust deduction factor, propeller thrust and

the linear and nonlinear coefficients in the maneuvering equations of motion. Comparison between these full-scale measurements and those obtained through scaled model tests indicate significant scale effect.

**3 p.m.**—"The Building and Operation of Vibration-Free and Trouble-Free Propulsion Plants and Ships," by **G.C. Volcy, M. Baudin** and **C. Guinard**.

Over the last 30 years, a tremen-

dous growth in problems with propulsion plant seizures, often accompanied by steel-work and machinery troubles, has been linked to incompatibility between ship structure flexibility and stiffness of line-shaftings manifested by forced vibrations. Simultaneous treatments of static and vibratory phenomena by use of 3-D FEM calculations has eliminated these difficulties. Several examples are presented.

## Mercury Ballroom

**9 a.m.**—"Flexural Response of Foam-Cored FRP Sandwich Panels," by **Deborah Weissman-Berman, George L. Petrie** and **Mo-Hwa Wang**.

The flexural response of an FRP foam-cored sandwich beam is predicted using two new closed form solutions and a finite element model. The comparative results are very good for all predictive methods for thick-skinned composites and all have excellent correlation to test data for both "linear" and cross-linked" sandwich-core materials. Therefore, the methods given in this paper will work well for composite structural analysis.

**10:30 a.m.**—"Statistical Analysis of Stillwater Load Effects in Ship Structures," by **C. Guedes Soares** and **T. Moan**.

Collecting data from the voyages of 100 vessels, this paper performs a statistical analysis of stillwater bending moment and shear forces to establish the variations of the maximum stillwater load effects that occur during operation of oceangoing ships. Identifying the effects of vessel size, type, and loading condition in addition to providing summary statistics, regression equations are proposed along with considerations due to longitudinal distribution of vessel load.

**3 p.m.**—"Potential Failure of Surface Ship and Submarine Drydock Blocking Systems Due to Seismic Loadings and Recommended Design Improvements," by **Richard D. Hepburn, James K. Luchs Jr., Dale G. Karr** and **Ross L. Haith**.

Many naval shipyards are located in regions where significant earthquakes occur. A method for analyzing the dynamic response of submarine drydock blocking systems is developed. Eleven systems are assessed for various failure modes using two site specific earthquake acceleration histories. Design improvements are recommended to significantly increase the survivability of submarine blocking systems subjected to earthquake ground motion.

## Friday, November 11 Trianon Ballroom

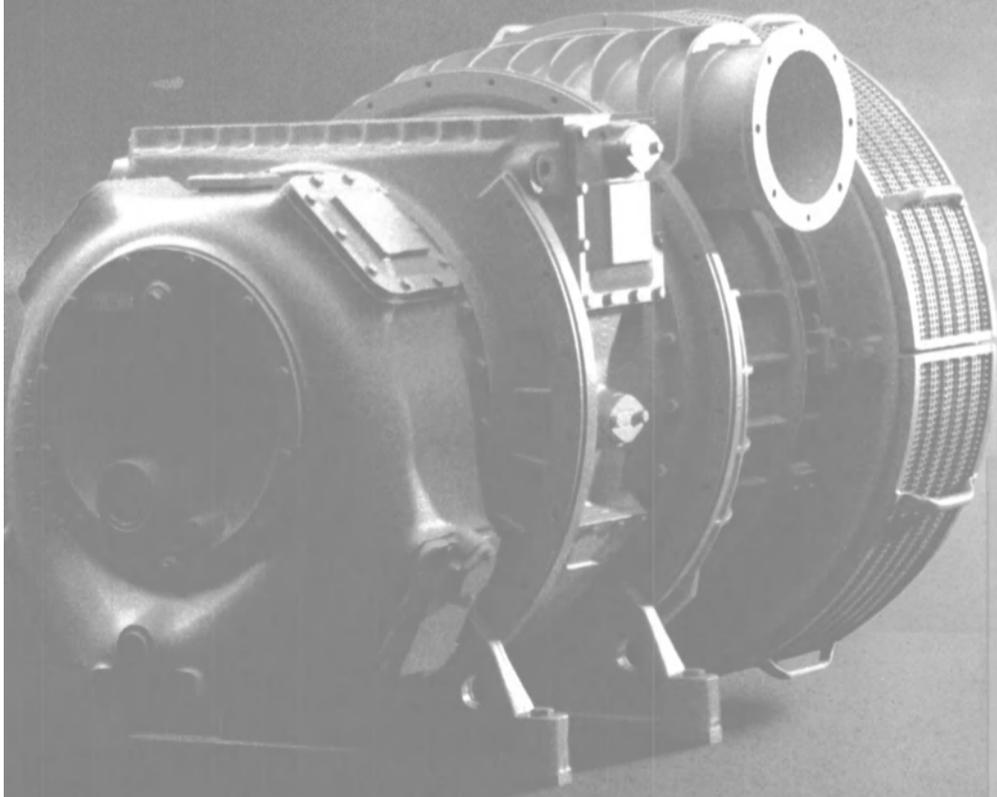
**9 a.m.**—"Structural Analysis of the U.S. Coast Guard Island Class Patrol Boat," by **Edward S. Purcell, Stephen J. Allen** and **Richard T. Walker**.

The U.S. Coast Guard recently deployed several 110-foot patrol boats of the Island Class. A structural analysis of the bottom plating of the vessel was conducted, including traditional calculations, finite element modeling, reliability analysis, tank testing, field testing and pressure calculations. Recommendations for structural improvements are made and data processing techniques are discussed.

**10:30 a.m.**—"A Procedure for the Structural Design of Icebreakers and Other Ships Navigating in Ice," by **John C. Daidola** and **Rubin Sheinberg**.

Reflecting the rising worldwide interest in icebreaking, this paper puts forth an original approach to (continued)

# Asea Brown Boveri service has the speed and skill to keep the ball in the air.



The great majority of diesel engines over 500 kW have BBC turbochargers, so an extraordinarily wide-spread, fast and efficient service organization to spare you nasty surprises will come as no surprise.

From the first (which we were) our aim has been to lead (which we do) in achieving the highest benefits at the lowest costs. And we do it most effectively. It's been proved by experience.

Every year we train over a hundred technicians in providing fast, flawless service at minimum cost. They are based at service centers strategically located all over the world. And backed by a central register containing instant, precise details about your turbocharger. Their job is to keep things running. To keep the ball in the air.

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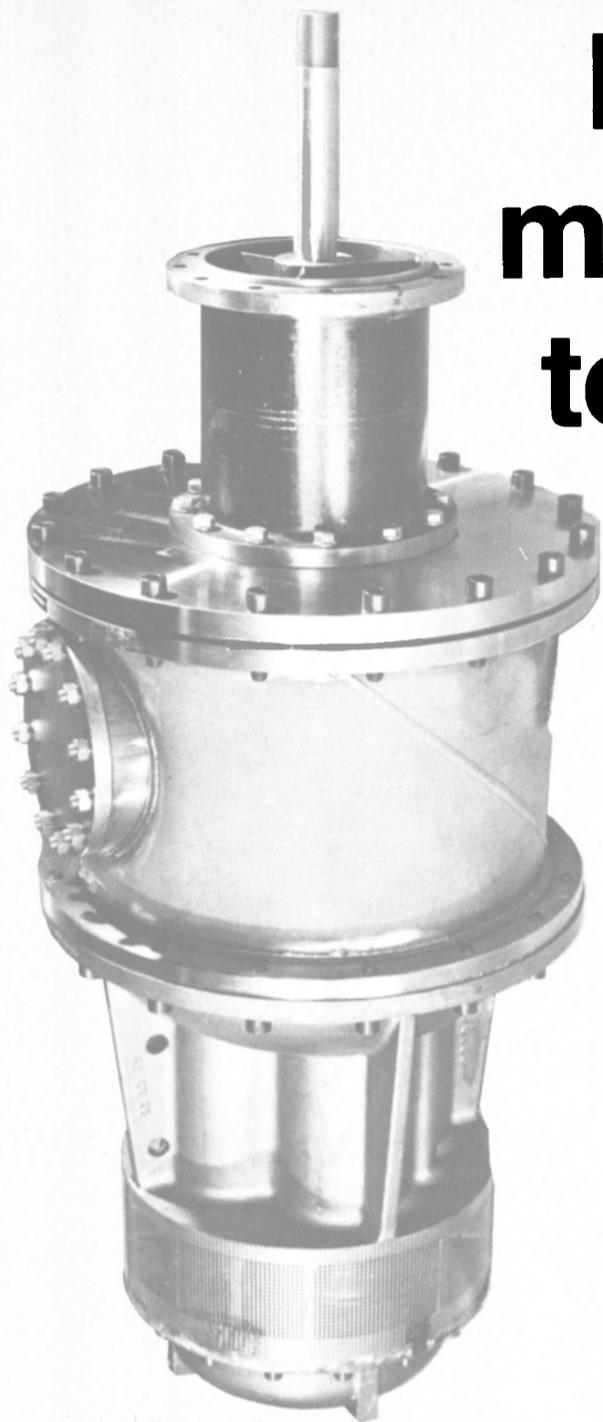
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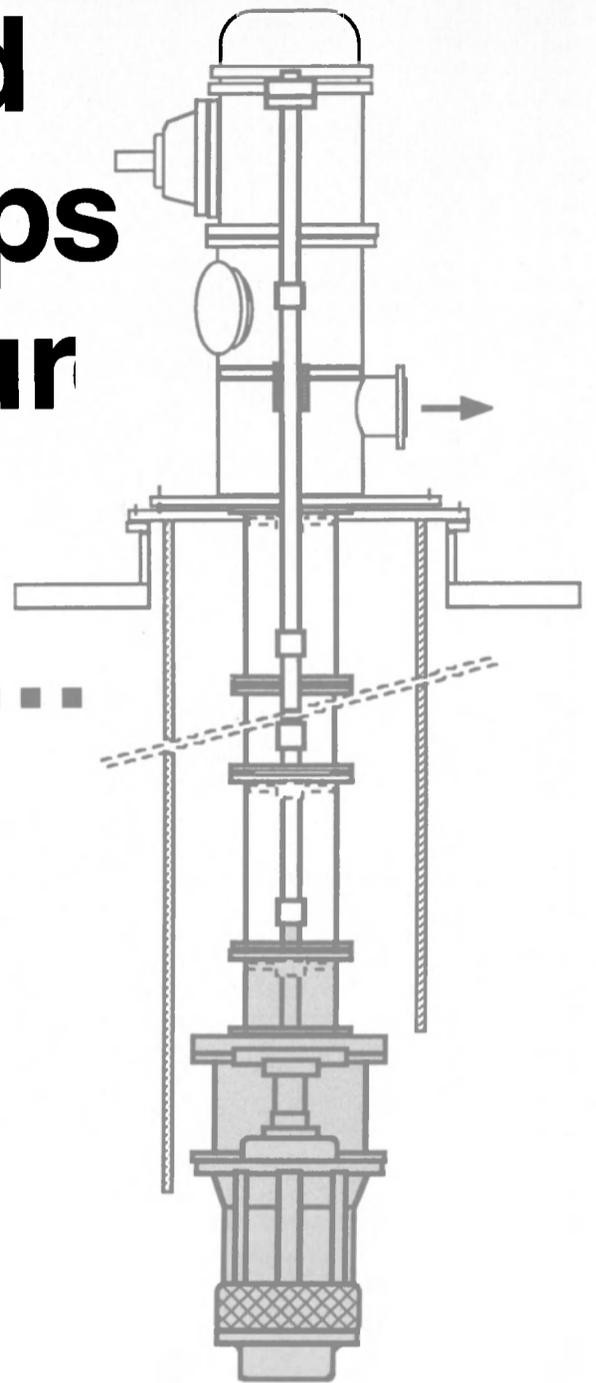
# Engineered marine pumps to solve your special problems...

The Leistriz five-rotor, single-flow screw pump on the left was specially designed to unload asphalt and #6 fuel oil from an ocean-going barge.

The pump is one of two we designed and built for an East Coast barge operator. These pumps, each with a capacity of approximately 5000 BPH, are the largest of their type ever installed aboard a U.S. vessel.

The diesel-driven pumps operate at 145 PSIG, at a viscosity of 3000 SSU and temperatures to 340° F.

The entire pump assembly, including the column assembly and discharge head, is shown in the schematic at right.



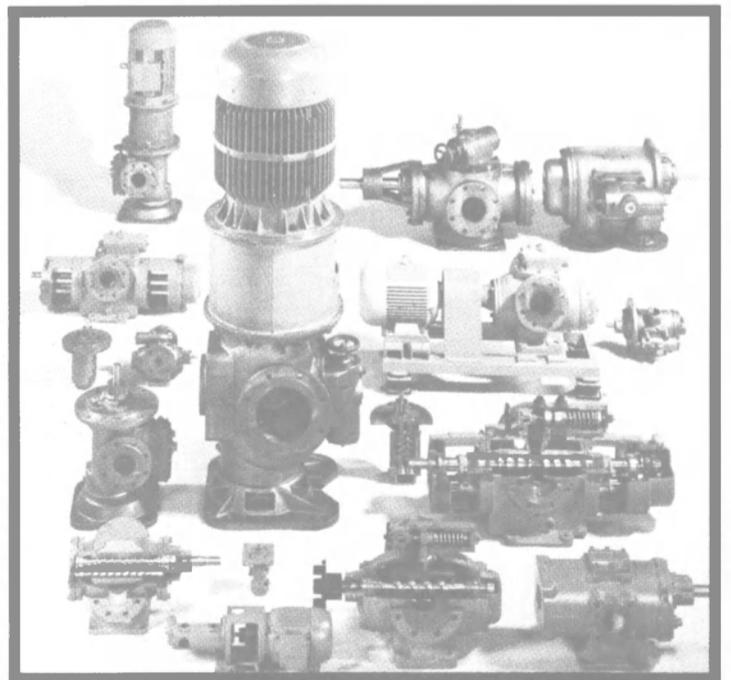
## plus a full line of standard units.

While engineering and manufacturing marine pumps to solve all kinds of fluid-handling problems has been a Leistriz specialty for more than 60 years—we make a full line of *standard* pumps, too.

The line includes two, three and five-screw pumps for lube-oil service, fuel-oil service, hydraulics, sludge handling, cargo loading and unloading. And these pumps serve both shipboard and off-shore applications worldwide.

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To find out more about Leistriz pumps and services for the marine industry, call Sven Olson at 201-934-8262, or write Leistriz Corporation, 165 Chestnut Street, Allendale, New Jersey 07401.



# Leistriz

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**96th SNAME  
Annual Meeting**

**— A Preview  
(continued)**

the design of such vessels. Applying environmental and operational loads and the analysis of structural response, the procedure has considerable potential for structural weight savings. Additionally, an ex-

tensive reference list is included as well as comparisons to existing vessels and codes.

**2:30 p.m.**—"Prediction and Measurement of the Performance of Free-Flooding Ship Antirolling Tanks," by **William C. Webster, John F. Dalzell and Roderick A. Barr.**

During the 1986-1987 CV-41 Motions Improvement Program, passive antirolling tanks were considered for ship roll motions reduction.

Ship arrangements dictated the use of free-flooding type tanks with water "cross-over" external to the ship. This presentation addresses the primary problems faced in the engineering assessment of such tanks, the lack of quantitative performance data and of methods of predicting tank performance and tank impact on ship resistance.

**Mercury Ballroom**

**9 a.m.**—"New Models for Minimal Time Ship Weather Routing,"

by **Anastassios Perakis and Niki-foros Papadakis.**

Three models for minimal time ship weather routing are presented, for stationary, time-dependent (but known) and probabilistic weather conditions, respectively. These models allow for prohibited sailing regions (land or other constraints), intermediate destinations with time delays, and updated weather information (for the probabilistic case). Mathematical techniques from the calculus of variations, dynamic programming and optimal control are used.

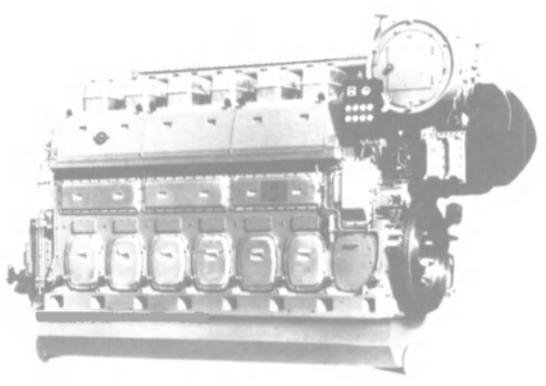
**10:30 a.m.**—"Performance Analysis of a Small Racing Boat in Smooth Water and its Design Application," by **Atsuo Yazaki, Suke-tou Wakamatsu, Tetsuo Tagori, Michio Nakato, Hiroharu Kato, Hiaku Tanaka and Mit-suhiro Abe.**

**2:30 p.m.**—"The Reconstruction of SS Matsonia: Trailership to a Combination Container and RO/RO Ship," by **Ronald F. Briggs, Christopher T. Clement and Peter A. Fisher.**

Originally designed as a pure trailership, the Matsonia was reconstructed as a combination container-RO/RO vessel to suit the West Coast-Hawaii trade, entering service in late 1987. This presentation traces the economic analysis, design evolution, reconstruction system, equipment reactivation and early operational experience of the ship and discusses many of its unique features.



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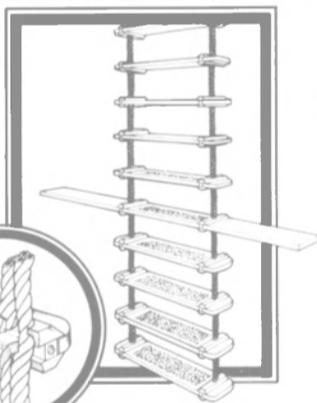
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**SNAME Exhibitors**

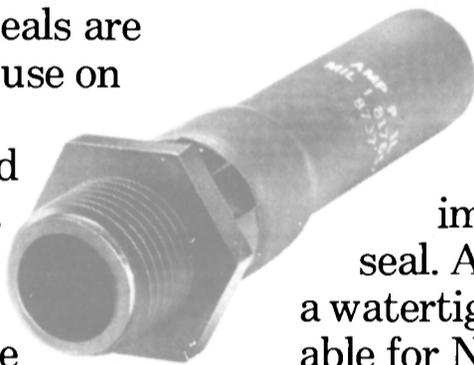
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Electromatic Equipment	838
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Gotaverken Arendal	227
Henri Systems Holland	642
Hitco	515
Ian Conrad-Bergen	813
IMO Delaval-Gem Sensors	724
In-Place Machining	805

(continued)

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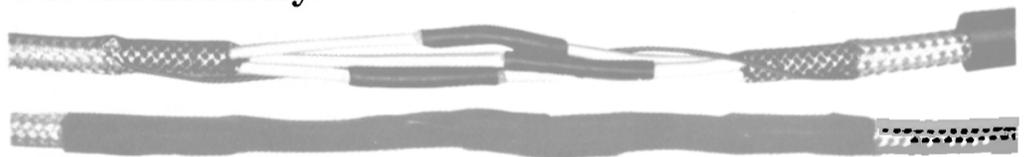
AMP AMPLISEAL cable entry seals are accepted for use on vessels built for the United States Navy. They are designed to protect single and multiple cables at various types of watertight junctions.



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For the full story on AMP AMPLISEAL cable entry seals or our Marine Cable Splice Kit contact your local AMP Representative. Or write AMP Products Corporation, Southeastern, Pa 19399-1776.

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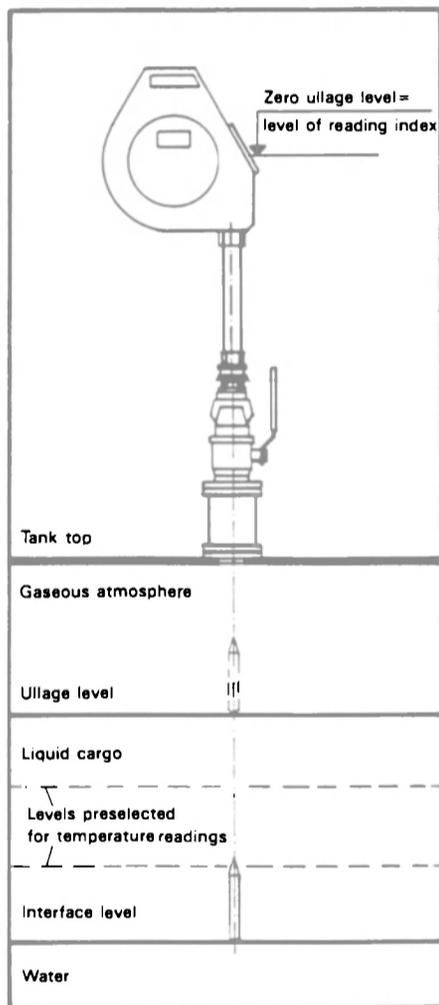
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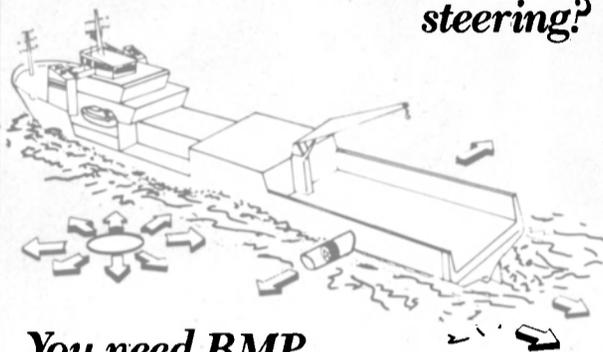
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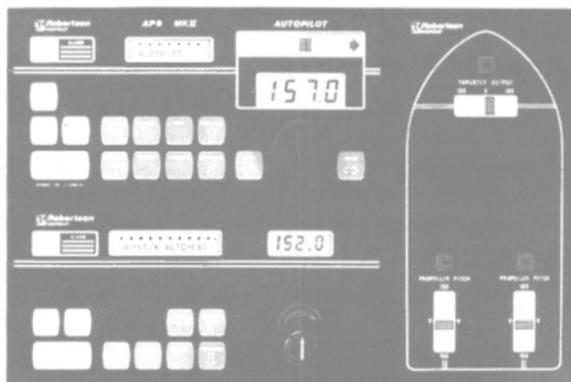


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The following section details the products and services that will be on display in company booths at the 7th International Maritime Exposition. The descriptions are based upon responses and information received as of press time.

**ACTION THREADED  
PRODUCTS  
Booth 317**

Action Threaded Products, Inc., Bedford Park, Ill., offers more than 30,000 items of stainless steel and noncorrosive fasteners in stock.

Besides standard sizes, Action Threaded Products can custom manufacture to a customer's needs. The firm's quality control manual meets MIL-S-45208A.

**ALLIED MARINE CRANE  
Booth 112**

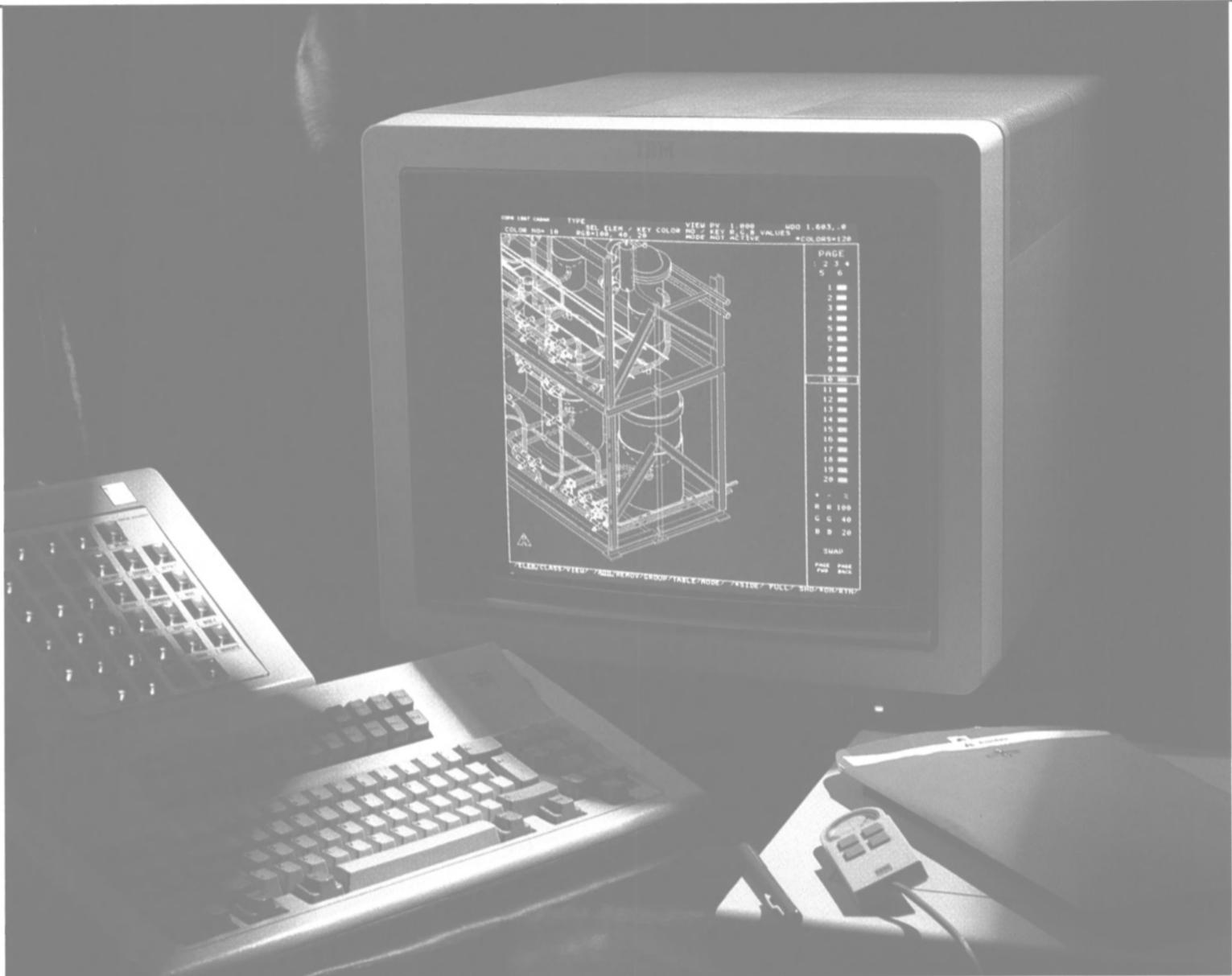
Allied Marine Crane designs, manufactures and distributes a product line of fully hydraulic marine cranes, both double tapered box boom and telescopic boom in capacities from 6 to 75 tons. These cranes are designed for applications in salt-laden atmosphere such as ships, barges, dock side, and energy-related industry such as offshore drilling rigs, production platforms and workboats. Other products furnished to the marine industry are diesel/hydraulic electrohydraulic power packages and single-point suspension davits for RIB boats.

**AMERICAN UNITED  
MARINE  
Booths 638-646**

American United Marine Corporation serves as exclusive agents in the U.S., Canada and Mexico for several European and domestic manufacturers. They provide a comprehensive range of marketing, sales, engineering and technical services.

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(continued)



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When heavy industry was being written off as passe in America, the executive team of Avondale Industries, Inc., went quietly about the business of securing a bright future in heavy, industrial manufacturing.

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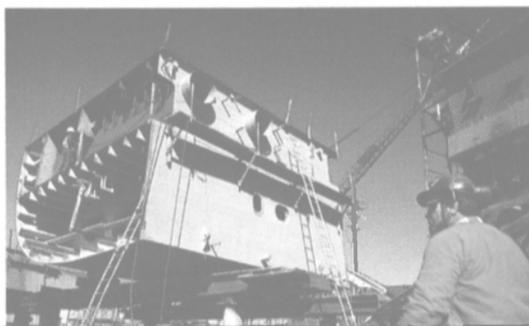
Because of extraordinary foresight and aggressive action, Avondale today provides components and complete facilities to upgrade the country's infrastructure quickly and inexpensively.

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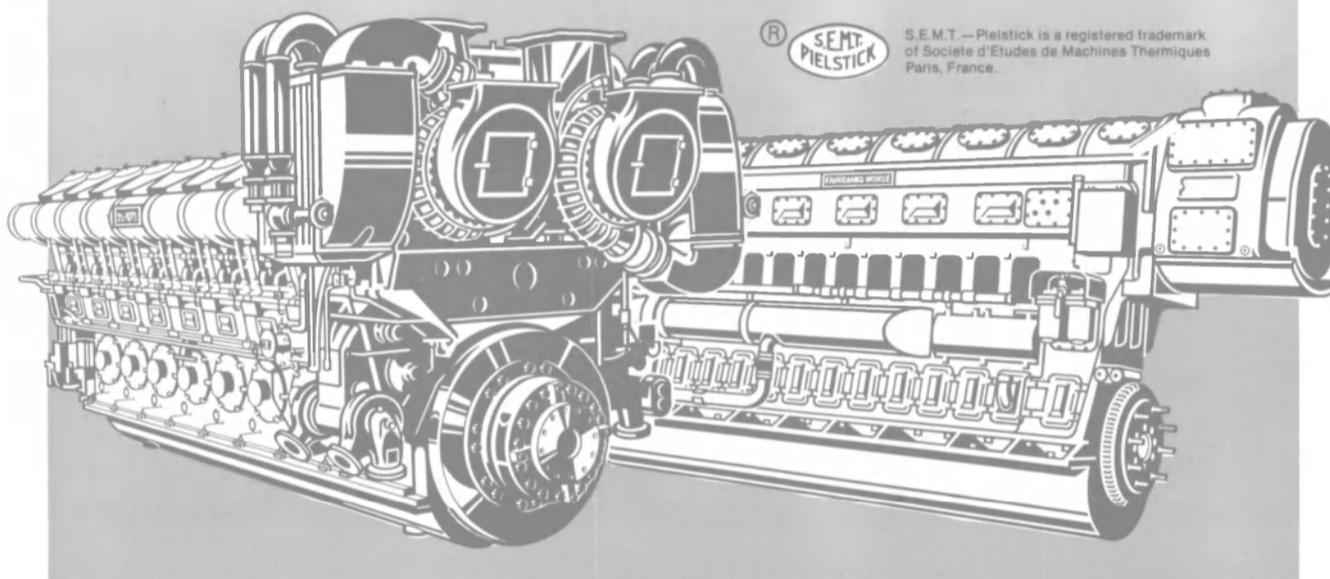
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— A Preview  
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Imperial, Tank Systems a.s., A/S Skarpenord, Maritime Protections A/S, MAR-TEC, Flebu, Vimex and Fox Compactors.

#### **AMP Booth 722**

AMP Inc., one of the world's largest manufacturers of electronic and electrical interconnection devices, will be displaying the latest in connection technology associated with the marine industry. Featured will be Ampliseal Cable Entry Seals, the AMP Marine Cable Splicing Kit, and AMP Silver-Plated Navy Terminals.

#### **APPLETON MARINE Booth 834**

Appleton Marine, Inc., Appleton, Wis., is a designer and manufacturer of marine deck machinery including cranes, winches, windlasses, capstans and UNREP equipment for both military and commercial applications. Marine cranes are available in capacities from 4,000 pounds to 200,000 pounds in box, telescoping and knuckle-boom models. Detailed specifications and data will be available at the booth.

#### **ARCTEC OFFSHORE Booth 831**

Arctec Offshore Corporation, Escondido, Calif., has been formed by the merger of Offshore Technology Corporation and Arctec Engineering, Inc. with their parent company, Arctec, Inc. The firm provides a single source of integrated engineering and technical services to support clients whose operations are conducted in hostile marine environments.

#### **ASEA BROWN BOVERI Booths 504 & 506**

ASEA Brown Boveri Turbocharger will be exhibiting two models from their extensive range of turbochargers—the type RR151 and VTR 214.

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(continued)

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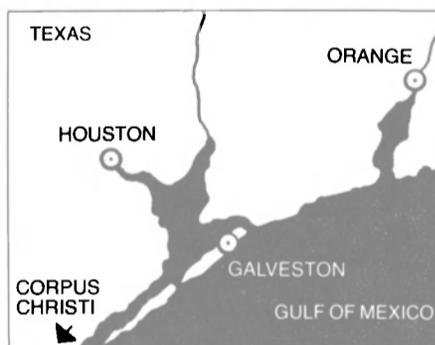
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## 96th SNAME Annual Meeting

— A Preview  
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low-cost design turbocharger, which has high efficiency. RR turbochargers are primarily used on high-speed engines with ratings between 200 to 1,500 kw (268 to 2,012 hp).

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Bornemann will offer a technical

paper entitled "Modern Cargo Pumps for Tankers and Barges," by **Heinrich Moller**, general manager and technical director of Bornemann Pumps, Obernkirchen, West Germany, and **Asmus W. Feck**, an international marine engineering consultant.

## BP NORTH AMERICA Booth 804

BP North America Petroleum, Inc., will once again be present at the exhibition representing a major oil company's products and technical services. On exhibit will be literature and displays covering BP Marine Lubricants' service within the U.S. and the worldwide network. Managers from BP's U.S. home office and regional coastlines will be on hand to answer technical and commercial questions. A feature of the display will be "Used Oil Analysis," which will highlight a BP oil test kit for on-board use, and the comprehensive UOA system, as well as a video on current industry topics.

## CATERPILLAR Booth 736

Caterpillar Inc., Engine Division, Peoria, Ill., manufactures modern marine propulsion and auxiliary engines from 60 to 6,000 hp. The firm's newest engine family is the 3600 engine series. Caterpillar marine engines deliver reliable, fuel-efficient performance and are backed by Caterpillar's extensive product support network.

## CISCO/TEC Booth 214

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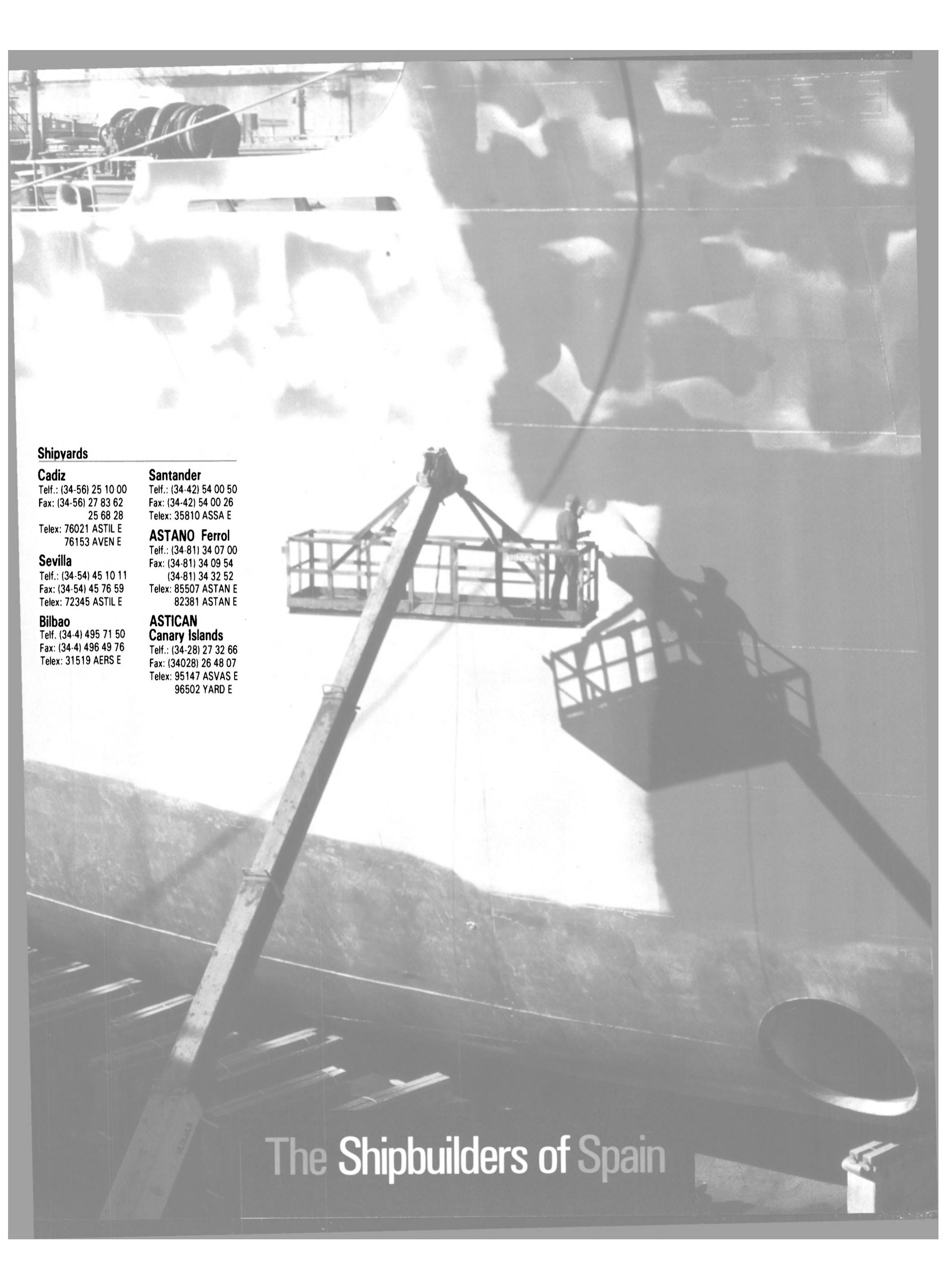
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Ask for the facts. Astilleros has successfully converted all kinds of vessels (we have just delivered 3 chemical tankers for Gotaas Larsen, and our recent contracts include the conversion of a 21.000 dwt Bulkcarrier into a molten Sulphur carrier for Navimin). And Astilleros is a well known leader in FPSO and FSU and in Internal Blasting and Coating.

✓ A spread of specialized yards.  
Along the long coastline of Spain, and covering all tonnages.

✓ And the Spanish weather...  
Last but not least: an excellent climate means that work is rarely held up by adverse weather.

As Astilleros offers, also, the best price and surprising financial packages, don't you think it's high time to check on us?

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ESPAÑOLES**

For further information:

Astilleros Españoles, S.A.

Padilla, 17

28006 Madrid

Tel. (341) 435 78 40

Telex. 27648 ASTIL-E

Fax. (341) 276 29 56

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## 96th SNAME Annual Meeting

— A Preview  
(continued)

### CUMMINS Booth 830

Cummins Engine Company, Inc., Columbus, Ind., will be exhibiting literature on their complete line of

marine diesel propulsion and auxiliary engines. Cummins offers a horsepower range of 30 to 9,999.

### CUNNINGHAM MARINE/ TENFJORD Booth 405

Cunningham Marine/Tenfjord, Inc. offers hydraulic systems, variable displacement hydraulic pump

manufacture, engineering service, sales and repair worldwide. They also offer hydraulic steering systems including rotary piston steering gears and emergency steering gears.

### DEUTSCH Booths 130-134

Deutsch Metal Components, Gardena, Calif., will be displaying its Pyplok DLP series pipe fittings.

The display will feature the Pyplok Swage marine fitting system, including the new 600 DLP Series for low pressure systems. These fittings are installed using new lightweight swaging tools and eliminate flushing, gas freeing and nondestructive testing.

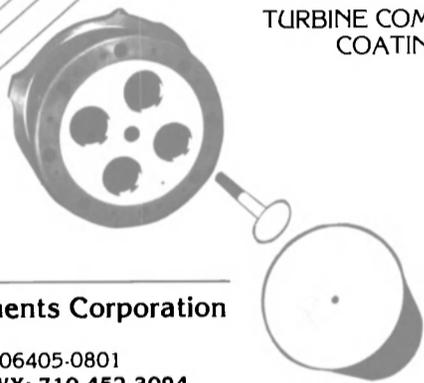
Pyplok fittings are also offered in 3,750 psi and 6,000 psi components including many different configurations. Pyplok is approved by NAVSEA and the USCG, as well as many

## Reduce Emissions & Fuel Costs Extend Component Life Reduce Maintenance Costs

— By —

### Ceramic Coating Diesel Engine Combustion Components

TURBINE COMPONENTS CORP., A PIONEER IN HIGH TEMPERATURE COATINGS FOR OVER 20 YEARS, IS APPROVED BY THE AMERICAN BUREAU OF SHIPPING (ABS)



- ★ Thermal Stresses Reduced
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### FCS Inc.

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The first choice in  
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- EXTRACTS 95% OF GREASE FROM AIR STREAM
- GREASE REMOVED BY AUTOMATIC WATER-WASH
- FAIL-SAFE FIRE DAMPER PROTECTING HOOD & DUCT
- MODELS FOR EVERY GALLEY APPLICATION
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With over 40 years experience in galley ventilation, Gaylord continues to meet the demands of the industry with advanced engineering and service.

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FAX: (212) 422-1102

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### OMNITHRUSTER® Thrust Is Forwards And Sideways And Backwards

CANADIAN COAST GUARD 237, ICE CLASS II, 1050 NAVALS UNDER EARL GREY, BUILT BY PICTON INDUSTRIES, LTD. OMNITHRUSTER SYSTEM, JTB06, 750 HP, HORIZONTAL, AC ELECTRIC DRIVE

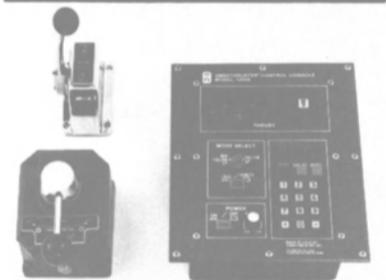


### 360° Maneuvering, Slow-speed Propulsion, Ice Management!

- ◆ Thrusts Underway
- ◆ Thrusts While Pitching
- ◆ No Reversing Impeller to Change Directions
- ◆ Minimum Buoyancy Loss
- ◆ Smaller Hull Penetration
- ◆ Fuel Savings

### OMNITHRUSTER DOES IT ALL!

- ◆ Thrusts with nozzles out of water in rough seas: vertical systems.
- ◆ No protrusions . . . no change in hull shape.
- ◆ Easily retrofitted.
- ◆ Small nozzles reduce drag . . . save fuel and passage time.



Micro-Processor Control System, Model 1200A . . . with gyro input . . . holds vessel's heading. System also accepts compatible NAV AIDS fore-aft and slow-speed propulsion and positioning.

OMNITHRUSTER JT/PV1700, 1500HP MODULE THRUSTER

ship control systems\* utilize individual module thrusters of up to 3000 HP in any combination to produce desired forward or lateral net thrust.

### ADVANTAGES FOR LARGE VESSELS . . .

- Incremental Thrust Capability
- Multiple Module Reliability
- Easily retrofitted or installed in new construction
- Minimum Maintenance

\*Covered by U.S. and Foreign Patents.

### OMNITHRUSTER INC.

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213/802-1818 Telex 194265 OMNI SFES  
Cable Address Omnithrust, FAX NO. 213/941-0309

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Maritime Reporter/Engineering News

other major approval agencies.

A free, full-color catalog will be available on all Deutsch Metal products.

**ENVIROVAC**  
**Booths 311 & 313**

Envirovac Inc., Rockford, Ill., will be exhibiting EVAC vacuum sewage systems and ORCA sewage treatment systems. Its vacuum sewage systems utilize only two pints of water per flush and feature upward flush capability, small diameter piping and noncontinuous slope requirement for piping. Its ORCA systems are Type II physical/chemical MSDs. Features include compact design, light weight and microprocessor control. Meet USCG and IMO approvals.

**EXXON**  
**Booth 324**

Exxon Company International will be displaying its new Exxcare® programmed marine lubricant service, which assists both ship's engineer and vessel operator with efficient care and maintenance Exxon lubricants in service. A free technical paper will be available at the booth fully detailing the features of Exxcare.

Exxcare is designed to speed testing and reporting while maintaining accuracy and reliability, provide computerized data processing and diagnosis of lubricating oil equality trends, and determine by spectrographic analysis any metallic elements in the lubricant, as may be required. A major feature of the service is that a computerized expert system is used to perform a comprehensive analysis of all test results and to provide specific operational advice relevant to the situation under study.

In addition, company salesmen and technical advisors will have information available on Exxon's new Exxmar line of marine lubricants for trunk piston and crosshead diesel engines.

**FCS**  
**Booth 404**

FCS Inc. is engaged in ceramic coating of diesel engine components exposed to the combustion gases. They consist of those areas of the piston crown, cylinder cover and valve faces exposed to the combustion process.

FCS Inc. will be exhibiting ceramic coated piston crown, cylinder cover, various gas turbine components and valves. Literature will also be available on high energy homogenizer/emulsifiers, lube oil and fuel oil skid-mounted filtering systems.

**FURUNO USA**  
**Booths 925 & 927**

Furuno USA will have a vast display of the very latest state-of-the-art marine radar, navigation, and communication equipment. The

product range is broad and suitable for all types of vessels. Featured will be the new FR-2000 color radar with combined nav-plot and mapping capabilities.

**GOLAR METAL**  
**Booth 815**

Golar Metal, Inc., Lionville, Pa., will exhibit: Golar Marine Incinerators for compliance with Annex V of Marpol 73/78; Golar Stripping Ejectors;

marine aluminum preengineered helideck; accommodation ladders and gangways; A-60 Safety Windows; all types of standard ships' windows; helicopter refueling systems; and accommodation systems (wall, ceiling and door elements).

**GOLTEN MARINE**  
**Booth 406**

Golten Marine, Inc., Brooklyn,

N.Y., more commonly known as Goltens, is one of the leading diesel repair companies in the world, with skilled engineers to repair main and auxiliary engines, overhaul valves, pumps, fuel injection equipment and precision in-situ crankshaft, main journal, crankpin reconditioning, grinding, lapping, polishing of shafting and thrust collars, as well as a full range of diesel spares.

(continued)



*New* **REASONS**

WHY

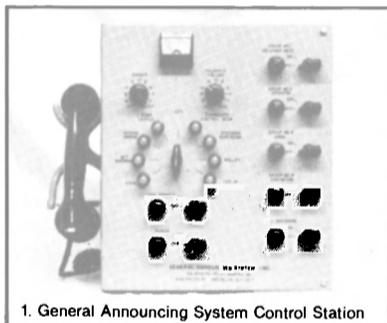
**GALBRAITH-PILOT MARINE™**

IS THE

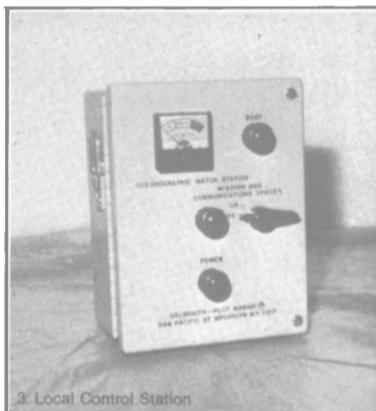
*Ultimate*

IN

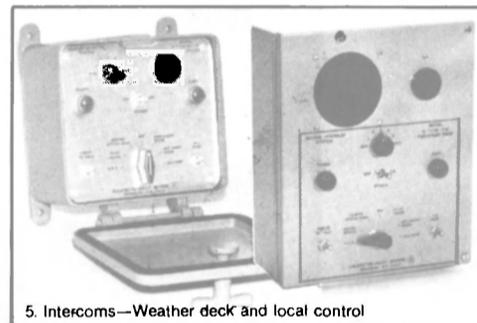
**SHIPBOARD COMMUNICATIONS**



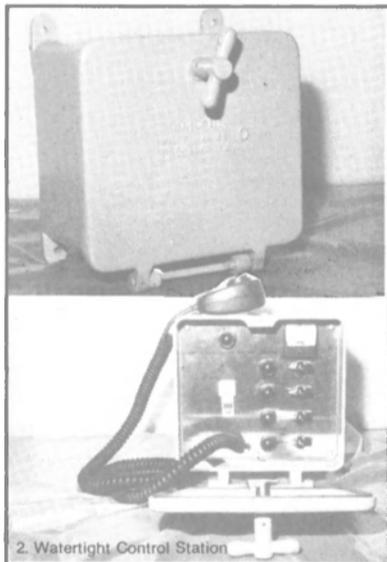
1. General Announcing System Control Station



2. Local Control Station



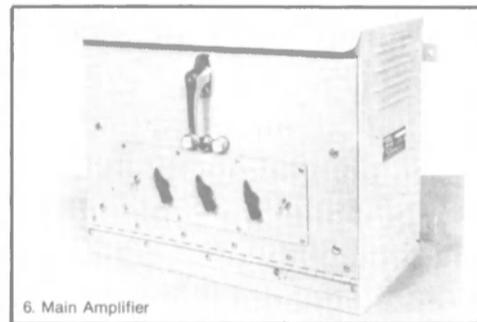
3. Intercoms—Weather deck and local control



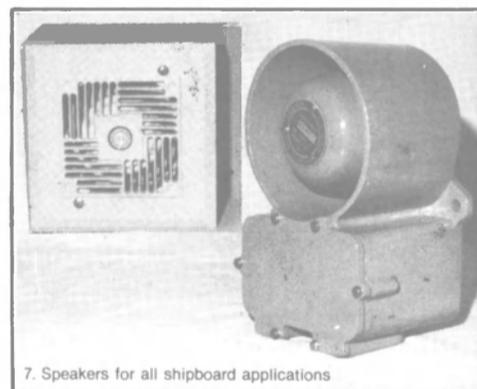
4. Watertight Control Station



5. Master Control Station



6. Main Amplifier



7. Speakers for all shipboard applications

Galbraith-Pilot Marine™ Shipboard Communications Systems organize every aspect of audio capability from general and emergency announcements, "loud-hailers", intercoms and entertainment, all in a centralized control system for small craft to large ocean-going vessels.

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## 96th SNAME Annual Meeting

— A Preview  
(continued)

### HAGGLUNDS MARINE Booth 228

Hagglunds Marine & Offshore will exhibit their full line of cargo-handling cranes, ranging in capaci-

ties from 8 to 50 tons. Additionally, literature will be available on its microprocessor-based automatic cargo-spotting system Steadyline, and Swing Defeater, which aids a crane operator's manipulation of cargo loads.

GmbH is one of the largest manufacturers of heavy fuel, medium-speed diesel engines in the world. The company produces engine types covering outputs from 750 to 14,000 hp.

pumps for the marine industry for more than 60 years. The company offers a wide selection of pumps with two, three and five rotors, suitable for lube oils, fuel oils and various viscous liquid cargoes, such as asphalt, crude and molasses.

### KRUPP MAK Booth 124

Krupp MaK Maschinenbau

### LEISTRITZ Booth 217

The Leistriz Corporation has been manufacturing rotary screw

### LINDGREN ASSOCIATES Booth 900

Lindgren Associates, Inc., will display marine propulsion systems including the 50-2,000 hp Elliot White Gill bow and stern thrusters; Ross Hill SCR Drive Systems for main and auxiliary propulsion, high hp drive systems; ACCU microprocessor-based, CRT-displayed engine room control and monitoring by Tracor Marcon; FAST ships' marine sanitation systems and oil/water separators and monitoring systems; and Marcelco marine corrosion control.

### MAN B&W DIESEL Booth 716

MAN B&W Diesel will exhibit their complete line of engines from 610 to 64,320 horsepower. In addition to the reliable and efficient MC Series, MAN B&W will have up-to-date information about their latest developments, including: CAPA (Computer-Aided Performance Analysis) for MAN B&W Diesel engines; L58/64, L40/54 and the just introduced L48/60 engines; and a CODAG (Combined Diesel and Gas) genset system that the company reports produces savings of up to 50 percent in shipboard electricity production costs.

Further information can be obtained by contacting MAN B&W Diesel, 50 Broadway, New York, N.Y. 10004; telephone: (212) 269-0980.

### MARCON ENGINEERING Booth 212

Marcon Engineering Inc., Baltimore, Md., will be exhibiting information on its non-ferrous pipes/tubes and custom fabricated fittings. The company also has heating coil specialists who design, draft, fabricate and install units.

Marcon Engineering offers a complete installation service on steering gear modifications, incinerators, CO<sub>2</sub> and halon systems. The company, in conjunction with Norclean Services, offers a shotblasting/coating/scaffolding service at sea, including deck painting.

### METRITAPE Booth 704

Metritape will be exhibiting their unique tank level indicating systems based on the proven resistance tape technology. Unique features of this system are integral temperature

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- MRU-35M**  
OUR NEW STATE-OF-THE-ART MARINE RADIO CONSOLE
- 2 to 30 MHz. Continuous
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INMARSAT Satellite Communications Terminal  
INSTANT ACCESS TO WORLDWIDE TELEPHONE & TELEX NETWORKS  
OVER 1200 SYSTEMS COMMISSIONED

- Direct connection to:
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  - Up to 6 remote phones
  - Existing on board telephone system
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- Complete control of terminal from telephone handset and printer
- Easy installation
- Simple to operate

- Exclusive U.S. Distributor.
- Extensive Worldwide Support and Service Available

**SKANTI TRP 8258S**  
HF/SSB RADIO

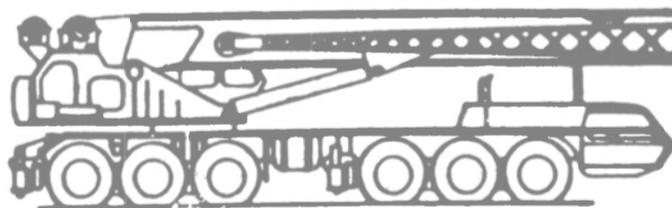


- Synthesized over 1.6 to 30 MHz frequency range
- 250 watt PEP SSB Radiotelephone
- All functions microprocessor controlled
- Can be used in the ARQ mode with an optional telex (SITOR) terminal
- FCC Type Accepted
- Flexible three unit system
- Optional dual control

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# PETTIBONE

## PETTIBONE-TIFFIN CORP.



**SUPPLIERS OF REPAIR PARTS FOR PETTIBONE  
HYDRAULIC TRUCK CRANES, MARINE CRANES  
AND ROUGH TERRAIN CRANES.**

**CALL US FOR THE NAME OF THE DEALER IN YOUR AREA THAT SUPPLIES  
GENUINE PETTIBONE REPLACEMENT PARTS.**

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monitoring, complete tank top accessibility, high reliability resulting from totally nonmechanical design and all teflon construction for resistance to almost all materials. Complete local and remote display system available.

**MINDECO**  
**Booth 814**

Mindeco Corporation, distributors of marine and industrial equipment, will be displaying pipe fittings and flanges produced from brass, copper-nickel, stainless steel and various other alloys. Bronze union-end and flanged valves will also be on display.

**MMC**  
**Booth 118**

MMC International Corporation, a leading manufacturer of electronic gauging tapes of all kinds, C-L couplings and covers and other specialty products for the marine and liquid handling fields, offers the "U" valve, a vapor control valve which is designed to fit directly on existing ullage hatches. Installation is easy, inexpensive and requires no hot work. The valve is approved by all regulatory bodies. The "U" valve is suitable for ullage, interface and temperature measurements, and also offers 1/2-liter sampling capabilities. This results in a very accurate means of hand-gauging under inert gas conditions.

**MMS**  
**Booths 310 & 312**

Marine Management Systems (MMS) Inc., Stamford, Conn., will exhibit computerized maintenance management systems designed specifically for the marine industry. Programs include Spare Parts Inventory Management (SPIM), Planned Maintenance (PMS) and Condition Monitoring (CMS) systems, all operating on MS DOS compatible personal computers. Integrated packages, including full hardware supply and support and engineering services are available.

**MOBILE TELESYSTEMS**  
**Booth 837**

Mobile Telesystems, Inc., Fairfax, Va., is a new company that provides mobile satellite products. The mobile business was previously part of COMSAT Corporation's product group. Microelectronics Technology, Inc. is the new parent company with COMSAT retaining a minority interest.

The mobile business includes the TCS-900 "earth station in a suitcase" and the MCS-9120 series maritime communications systems.

**M. ROSENBLATT & SON**  
**Booth 104**

The exhibit of M. Rosenblatt & Son, Inc., naval architects and ma-

rine engineers, will display literature describing the firm's work in R&D, preliminary, contract and details design, plan and approval, ILS, technical manuals, construction inspection for naval and commercial vessels of the widest variety—new construction, conversions, overhaul, maintenance and repair.

**NEWPORT NEWS**  
**SHIPBUILDING**

**Booths 816, 818, 820, 917,  
919 & 921**

Newport News Shipbuilding & Dry Dock Co., Newport News, Va., a Tenneco company, will highlight the firm's extensive engineering services and its capability to design, construct, overhaul, and repair, both nuclear and conventionally powered ships, and provide marine navigational products for the U.S.

Navy and commercial customers. Besides building Nimitz Class aircraft carriers and Los Angeles Class submarines, Newport News is the lead design yard for both the Los Angeles and the new Seawolf Class attack submarines.

**NEW WAVE SYSTEMS**  
**Booth 700**

New Wave Systems, Inc., James-

# Only Westfalia's On-Demand Purifying System Removes All the Dirt and Water from your 1010 fuel.

Whether your fuel oil is heavier or lighter than water, only Westfalia's two-stage Unitrol/Secutrol system assures maximum purity even under widely varying feed conditions. Here's why.

#### On-demand vs timer-controlled de-sludging.

Other oil purification systems are timer-controlled, which means they de-sludge only at pre-set intervals. If heavy seas stir-up the "muck" in your fuel tanks, the intervals may be too far apart. Result: dirt gets into your day tank and fuel lines, causing disastrous engine wear... In the Westfalia system, a unique sensor continuously monitors de-sludging intervals, discharging dirt and water only when the sediment-holding compartment is full. So there's no chance for dirt to get into your fuel because of too few de-sludgings — or fuel wastage from too-frequent de-sludgings.

And either stage can be operated independently, thus adding even more flexibility.

#### No water in fuel lines.

With Westfalia's unique design, there's no way water can enter the clean fuel line. With other systems, this is a distinct possibility.

#### Reliable purification.

No matter how wide the variations in density or feed characteristics, you get the most efficient, reliable purification. Automatically, with no need for gravity disc changes.

For maximum reliability we've substituted simplicity for complex electronics and intricate circuitry. Thus Westfalia purifiers are more dependable and much less likely to break down than other separators. Contact Centrico for the Westfalia system you need.

**Westfalia is proud to be part of the ongoing construction program of the new and growing U.S. Navy.**



Centrico, Inc., 100 Fairway Court, Northvale, NJ 07647 (201) 767-3900



## 96th SNAME Annual Meeting

— A Preview  
(continued)

town, R.I., will exhibit state-of-the-art computer-aided engineering, design and manufacturing systems for the marine industry. Products include a microcomputer-based set of integrated programs using interactive graphics to assist naval archi-

tects and builders with hull surface definition, fairing, production, and numerous engineering analyses.

### NORTHWEST MARINE SERVICES

Booth 720

Northwest Marine Services Corp. will have free literature available on

Liaaen controllable-pitch propellers and thrusters, C.W.F. Hamilton wtarejet propulsion units and mechanical, pneumatic, and electronic propulsion control systems.

### PHILADELPHIA RESINS

Booth 319

ITW Philadelphia Resins Corporation, Montgomeryville, Pa., lead-

ers in innovative technology with resin products, will feature numerous MIL SPEC adhesives, coatings and chocking compounds available worldwide.

### RACAL MARINE

Booth 936

Racal Marine Inc. will be exhibiting its new color rasterscan ARPA and 16-inch radar, and various other color radars as well. The firm will also show its "four-in-one" navigation system, the MNS 2000, which operates off of loran, satnav, omega and decca, with GPS upgrade capability expected in early 1989.

### RAYTHEON MARINE

Booth 824

Raytheon Marine's SNA-91 Integrated Bridge System, an ideal companion to the Pathfinder®/ST ARPA, interfaces with ship's navigation systems to provide complete navigation route planning, automatic steer-to-waypoint operation, ETA calculation, etc. Computer-generated electronic charts, stored on floppy discs, are presented on the SNA-91 high-resolution color display, and selected chart information is transmitted to the Pathfinder/ST ARPA.

New Raystar 920 GPS receiver, Raynav 780 Loran-C, Ray 90 VHF radiotelephone, plus satcom, navtex, speed log, radar and depth sounder will be shown. Yokogawa Navitec Gyrocompass and autopilots also will be introduced.

### RILEY-BEAIRD

Booth 108

Riley-Beaird, Inc. will exhibit Maxim® Silencers, heat recovery equipment, evaporators and heat exchanger products. Emphasis will be placed on the firm's standard designs, capability to design and manufacture custom equipment and experience with multi-effect evaporators. Information will be available on the company's total in-plant capability relating to fabrication of ASME code pressure vessels and other fabricated structures.

### SAAB TANK CONTROL

Booth 218

Saab Tank Control will introduce the Saab MaC 501 monitoring and control system to the U.S. market. The monitoring and control system is used for cargo handling on tankers. Also, Gunclean Fixed Tank Cleaning Machines and Ocean Motions Ship Loading Computers will be demonstrated.

### SOUNDCOAT

Booth 425

The Soundcoat Company will ex-

# RELY ON CTI

# WE DO.

**FOR COST EFFECTIVE  
CONDENSER, HEAT EXCHANGER  
AND COATING SERVICES.**

Save up to 80% on repair costs and get CTI's Quality Controlled, Guaranteed Service anywhere in the world.

CTI provides Full-Service, Turnkey Systems for all of your heat transfer and coating needs.

To learn why you too should rely on CTI, please call (203) 259-7179 or write for more details.

Be sure to visit our exhibit at the International Maritime Exposition in NYC, November 9-12.

## CTI

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**ELDEC**

# ***TIME FOR A SWITCH...***

***After 20,000 cycles, when most mechanical switches are through, ELDEC solid-state switches are just beginning.***

In fact, lifespans of over one million cycles are typical. But that kind of reliability is no good if the electronics can't survive the marine environment.

**ELDEC non-contacting switches can stand up to the sea.**

- Encased in non-corroding, stainless steel.
- EMI hardened to **exceed** MIL STD 461B, Class A4.
- Operating range from  $-30^{\circ}$  to  $+65^{\circ}\text{C}$ .
- Meets MIL STD 901C, Grade A, Class 1 for shock.

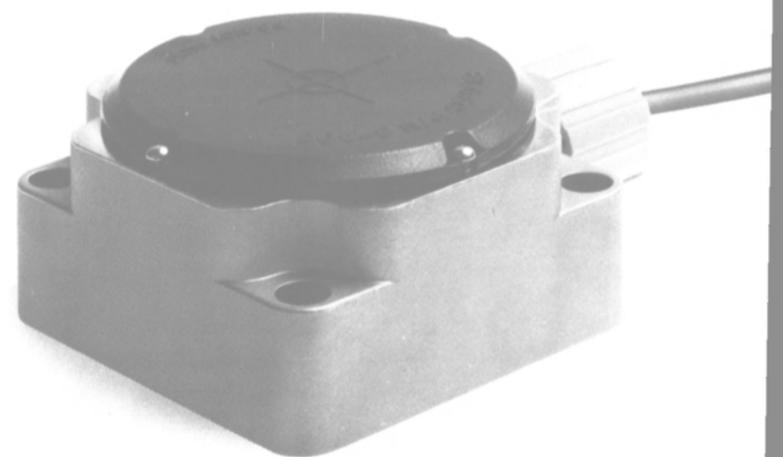
**Two wire AC and three wire DC switches for direct mechanical replacement.**

**The price is right.**

Purchase price is competitive with the best quality mechanical switches. And with less maintenance and replacements, life cycle cost savings are unsurpassed.

**Send for more information today.**

Once you compare, you'll agree, it's time for a switch.



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## 96th SNAME Annual Meeting

— A Preview  
(continued)

hibit all their noise and vibration control materials for the marine industry. Samples of materials used to solve acoustical problems on ships, pleasure yachts, submarines and

tankers will be available along with Soundcoat's engineering staff to answer questions.

## SPERRY MARINE

Booths 816, 818, 820, 917,  
919 & 921

Sperry Marine Inc. will exhibit the company's capability to manu-

facture rasterscan and conventional PPI radar systems, ARPA's, satellite communications and navigational systems, gyropilots, gyrocompasses, speed logs, ship stabilizer systems, vessel traffic systems and ruggedized marine computers and software for the marine electronics industry. Sperry Marine Inc., a world leader in marine systems technology, is supported by a sales and service network at over 250 locations worldwide.

## STEARNS Booth 113

Stearns Manufacturing Co., St. Cloud, Minn., manufactures a full line of flotation devices, including personal flotation vests, flotation coats, anti-exposure deck coveralls, cold water immersion/survival suits, meeting USCG and Solas 83 requirements. Additionally, the company offers a wide range of commercial rain gear and protective clothing.

## TANKSYSTEMS Booth 638

Tanksystems a.s. manufacture and design Hermetic Ullage/Temperature/Interface Detection and products and a full line of Hermetic equipment. Hermetic equipment offers dry tank detection, inert gas pressure/vacuum detection, multi-level cargo-sampling, tank overpressure alarm and part flow system. Flow meters are also available.

## TEXACO MARINE Booth 600

Texaco Marine Services, Inc. (TMSI) is a full service ship management company specializing in tanker and OBO management. Services offered include ship operations, maintenance and repair, manning, accounting and payrolls, safety and training, insurance and claims, purchasing, chartering, lay-up, supervision, consultancy, new construction supervision, vessel purchase and sale, and bunkering agency.

TMSI will be demonstrating a proprietary computerized inventory and maintenance management system (TIMMS) that is being marketed to shipowners both in conjunction with ship management and as a separate service.

## UNITOR SHIPS SERVICE Booth 624

Unitor Ships Service AS, a Norwegian company with more than 50 branch offices servicing the international fishing, shipping and shipbuilding industries, offers welding, air tool, gas system, refrigeration, air conditioning, fire, hospital and safety products, as well as a wide range of repair, maintenance and training services.

(continued)

# The Best Wet Workers You Can Get—Allied Fibers



Marine ropes get wet. It's expected. And if they lose some strength underwater, well that's expected too. What's not expected is that ropes manufactured with Allied Fibers keep working strong *even* when soaking wet. Select **Caprolan<sup>®</sup> 2000 SeaGard<sup>™</sup> Nylon**—advanced nylon with the proprietary SeaGard<sup>™</sup> finish that offers optimum wet strength. Choose new improved, lightweight, high strength **A.C.E. Polyester with Seagard<sup>™</sup>** for higher abrasion resistance than ever before.



Allied Signal wishes to acknowledge the leading manufacturers that utilize these Allied Fibers in their rope manufacturing.

New England Ropes  
Samson Ocean Systems, Inc.  
Yale Cordage Inc.

For optimum marine performance characteristics, select **Spectra<sup>™</sup>**—lighter than water, ten times stronger than steel with the lowest moisture absorption and highest abrasion resistance of any high modulus fiber.

Allied Fibers stand up to the most punishing abuse in every marine rope application: fishing, towing, mooring, docking and anchoring.

Expect the unexpected from Allied Fibers—the *best wet workers you can get*.

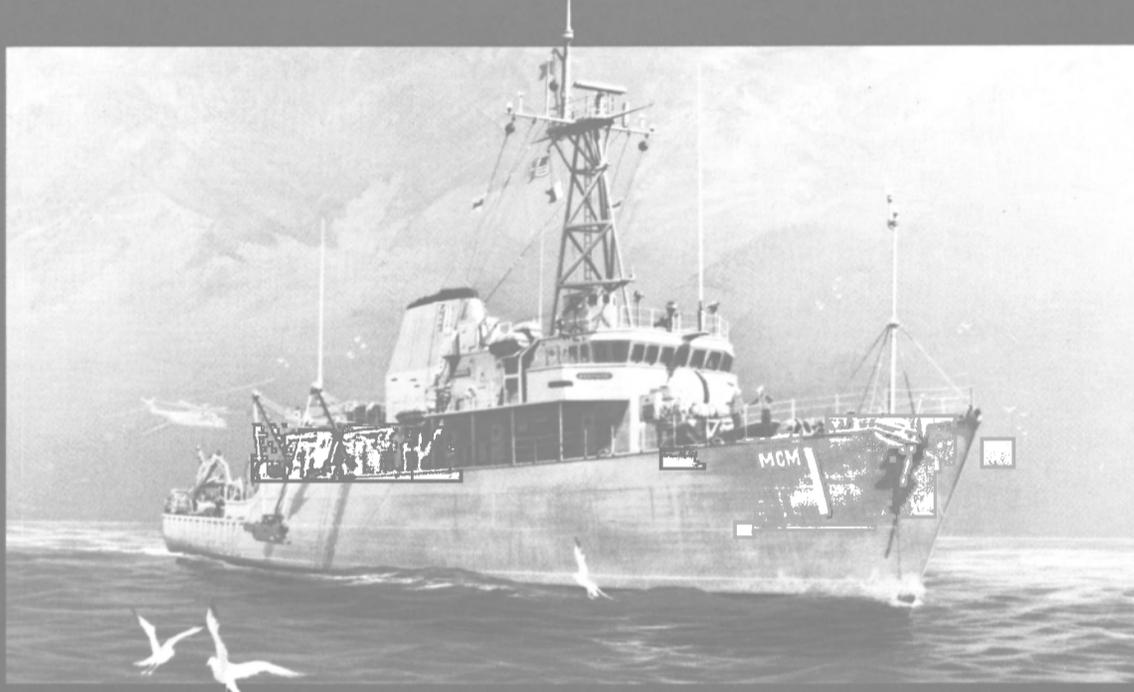
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## Allied Fibers

Allied  
Signal

Maritime Reporter/Engineering News

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There's one name in the Marine Industry you can definitely count on. Action Threaded Products.

At Action, you'll find an extremely service-oriented group of marine specialists with over 30,000 stainless steel and non-corrosive fasteners **IN STOCK!**

And not just the easy stuff either! We inventory all the tougher, hard-to-find items you need...long bolts, lag screws and many many more. While others talk, Action delivers. With fully computerized facilities in Illinois, Georgia, Minnesota and Wisconsin, you won't experience all that annoying "down" time while you wait

for a delivery. In most instances, we can fill and ship your order immediately.

Stainless Steel, Brass, Silicon Bronze, Nickel-Copper...we have them all! We can also custom manufacture our quality fasteners to suit your every need. And, of course, our Quality Assurance Procedures are in accordance with MIL-I-45208A.

So, for further information on a particular need, call us at (312) 599-9300 or fax us your drawings at (312) 735-4637. You'll wonder why you waited so long to take Action!

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See us at Booth #317 at the International Maritime Exposition  
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## 96th SNAME Annual Meeting

— A Preview  
(continued)

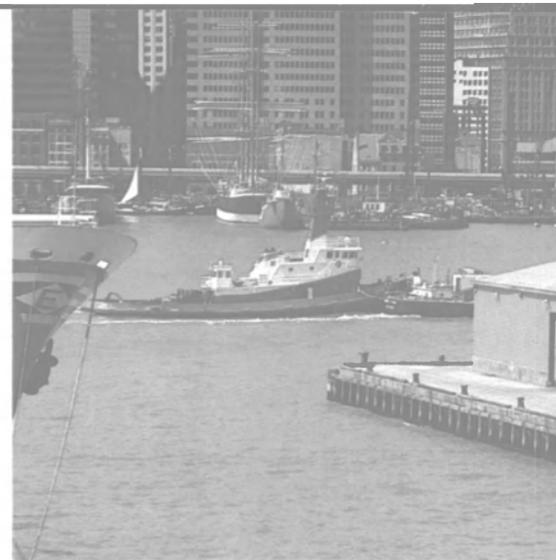
### VESON Booth 126

Veson combines shipping knowl-

edge with state-of-the-art technology to provide the complete marine computer solution. Developed in a joint venture with BP, Veson's distance and voyage estimating programs access the complete *BP World Distance Tables*. In addition, other packages include: operations, accounting, chartering, crew information/payroll and spare parts/maintenance.

### WALPORT USA Booth 408

Walport USA, Elizabeth, N.J., a leading supplier of video entertainment to the international shipping community, will be showing the latest video movies. Walport USA personnel will be available to discuss custom leasing arrangements with



shipowners.

### WARTSILA DIESEL Booth 114

Wartsila Diesel, one of the world's leading manufacturers of medium-speed diesel engines, will exhibit its new Wartsila Vasa 46 medium-speed diesel engine as well as the new Wartsila Vasa gas-diesel engine, the Wartsila Vasa GD. Also on display will be Wartsila Diesel's new powerful medium-speed Wartsila Vasa 22/26 engine as well as the popular Wartsila Vasa 22 and 32 heavy fuel engines.

### WAUKESHA BEARINGS Booth 238

Waukesha Bearing Corporation, Waukesha, Wis., offers a wide range of bearings and seals for marine propulsion systems. Some of the products offered by the firm include: sternline and stern tube bearings, sternguard Mark II aft seals, sternguard Mark II forward seals, custom design seals, line shaft bearings and main thrust bearings.

### XOMOX Booth 123

Xomox Corporation's exhibit will include a nickel aluminum bronze high performance butterfly valve to MIL-V-24624 specifications with an enclosed gear operator. Additionally, a B61 naval bronze full port sleeved plug valve (MIL-V-24509) will be on display.

Xomox manufactures valves to military specifications as well as for commercial use. Xomox valves are accepted by the U.S. Coast Guard and Lloyd's Register of Shipping.

### WAUKESHA BEARINGS Booth 238

Waukesha Bearings will be showing the Sternguard line and net cutter and Pres-Vac high velocity P/V valves.

Knowledgeable personnel will be available to discuss applications for thrust, line shaft and sterntube bearings and seals; tank venting systems and the use of Pres-Vac valves; and the Sternguard net and line cutter.

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wide range of standard designs or let Maxim design a unit to meet your specific requirements. Also available are reliable Maxim heat exchangers and deaerators. Become a part of a legend . . . insist on Maxim, the first name in reliability and service. Maxim backs it up! Riley-Beard, Inc., P.O. Box 31115, Shreveport, LA 71130-1115, Ph. (318) 865-6351, Telex 50-7472.

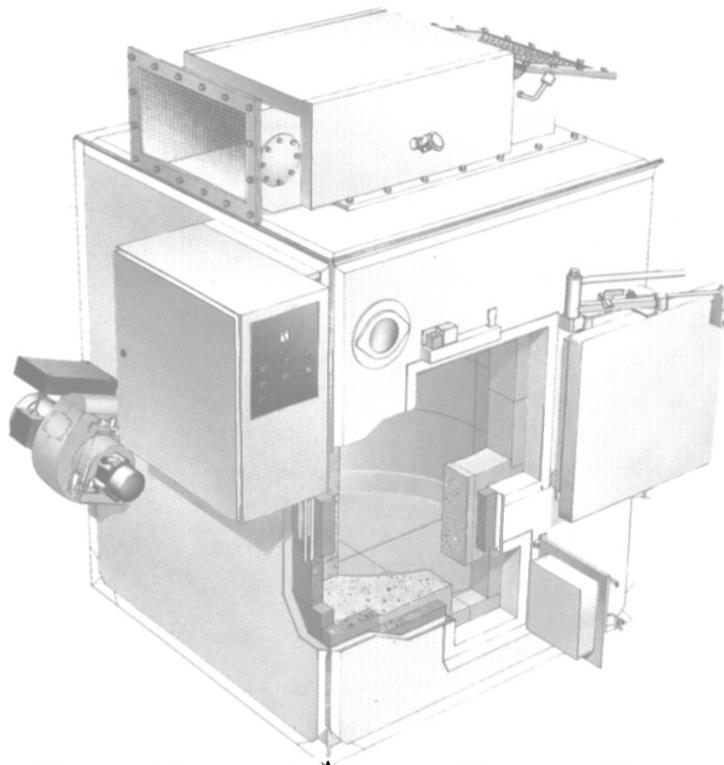


Nuclear submarine equipped with Maxim desalinator.  
General Dynamics Photo

**RILEY-BEARD, INC.**

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Nov. 9-11, 1988, New York Hilton, Booth #108

# From New Year's Eve, you have a bigger waste problem at sea.



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**A**nnex V of Marpol 73/78 takes effect on 31.12.88.

Its stringent standards will be enforced within the waters of all I.M.O. Members (who have ratified the Annex V) — *on vessels of any flag.*

The remarkable Neptune 20R and 40R 'cyclone' incinerators are the economical and effective way to stay the right side of Annex V — especially where space is severely limited.

They come complete, or in pre-fabricated kit form for easy installation in any ocean-going vessel.

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AJA 2882

## Mobile Telesystems Begins Operations

Mobile Telesystems, a new company based in Fairfax, Va., that provides mobile satellite products, recently began operations, **Kenneth A. Homon**, president and chief operating officer, has announced. The mobile business was previously part of Comsat Corporation's prod-

uct group. Microelectronics Technology, Inc. is the new parent company with Comsat retaining a minority interest.

Mr. Homon said, "The establishment of the new company will allow for expansion and growth of the mobile markets previously served by Comsat and the emerging unique market segments addressed by the transportable 'earth station in a suitcase' product."

The mobile business includes products used throughout the world. They are the TCS-9000 "earth station in a suitcase" and the MCS-9120 series maritime communications systems. The TCS-9000, a portable earth station, fits into two suitcases, weighs 140 pounds and can be assembled and made fully operational by one person in 15 minutes. The MSC-9102 is a rugged lightweight gyro-connected termi-

nal used aboard vessels at sea. Both products provide voice, data, and image communications throughout the world via the International Maritime Satellite Communications System (INMARSAT).

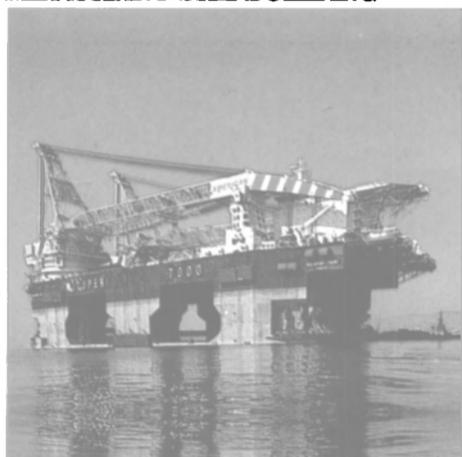
For more information and free literature from Mobile Telesystems,

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## Seebeckwerft Lays Keel For First Of Two Ferries Ordered By Olau-Line

Schichau Seebeckwerft AG of Bremerhaven, West Germany, recently laid the first prefabricated volume-section of the new combined passenger/cargo vessel Olau Hollandia, ordered by Hamburg-based Olau-Line, sister company of TT-Line which ordered the recently launched all-round combi-carrier Robin Hood.

The 528-foot-long by 95-foot-beam Olau Hollandia will be one of the largest passenger ships homeported in Hamburg. She has capacity for 1,600 passengers, 590 private cars and 120 trucks/trailers.

Commissioning of the vessel is scheduled for fall of 1989. Sister ship Olau Britannia, also ordered with Schichau Seebeckwerft, will follow in the spring of 1990.

For free literature describing the facilities and capabilities of Schichau Seebeckwerft AG,

Circle 56 on Reader Service Card

## New 42-Page Catalog On Flanged Ball Valve From Jamesbury

The broad Jamesbury line of reduced and full port Double-Seal<sup>®</sup> ball valves in sizes 1/2-inch through 20 inches in ANSI Class 150 and 300 designs for process and industrial requirements are described in a 42-page catalog.

All valves feature Jamesbury's flexible-lip polymeric seats that are self-adjusting for changes in pressure, temperature and for wear, assuring long-lasting, reliable shutoff. The catalog provide pressure/temperature ratings of five standard seat materials, including TFE, reinforced TFE (for abrasives and higher temperatures to 500 degrees F), FEP (for handling media such as butadiene or styrene), UHMW polyethylene (for superior abrasion resistance and radioactive services), and polyimide (for high temperature non-aqueous media to 700 degrees F).

The catalog includes flow data, dimensions and bills of material, "how-to-order" tables, and torque data for selecting Jamesbury pneumatic, hydraulic or electric actuators.

For more information and a free copies of the catalog from Jamesbury,

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ANOTHER POWERFUL IDEA:

**WE'RE USING WASTE  
HEAT TO MAKE THE  
OCEAN DRINKABLE.**



Reliable Combustion Engineering waste heat recovery boilers are helping the Navy cut the cost of turning seawater into drinking water aboard the *Ticonderoga* (CG-47) class guided missile cruisers.

And that's not all our waste heat recovery boilers do. They generate high-quality saturated steam for ship's heating as well as steam for the galley, laundry and de-icing system.

Annual projected fuel savings for a CG-47 class ship is estimated at more than \$200,000.

(Based on three waste heat boilers per ship, operating an average of 5,000 hours a year, with a steam usage of 7,000 pounds per hour; fuel at \$20 per barrel.)

Achieving savings like these obviously requires high reliability. And our boilers have proven they can deliver. With over 80,000 accumulated operating hours aboard the *Ticonderoga*, *Yorktown*, *Vincennes*, and *Valley Forge* and at the NAVSSES test facility in Philadelphia, our equipment has operated without a single boiler-related failure.

What's more, the boilers are designed with maintenance in mind by incorporating ample access to the gas and water sides. This has contributed to the excellent operating record.

Powerful ideas like our waste heat recovery boilers are typical of Combustion Engineering's commitment to the U.S. Navy.

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**COMBUSTION ENGINEERING**

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## Exxon Offers Exxcare— A Cost-Cutting Computerized Solution To Maintaining/Monitoring Oil

—Technical Paper Available—

Good lubrication contributes greatly to the efficient operation and long service life of machinery. In turn, good lubrication depends on two factors, i.e.—a proper selection of products and a sound care of the lubricants in service, which really means keeping any lubricant contamination that will occur during service to a minimum. To implement such care, it is necessary to have reliable monitoring of oil condition coupled with an effective system for maintaining the quality of the oil at the required level.

Exxon Company International's solution to monitoring and maintaining oil condition is Exxcare<sup>®</sup>, a programmed analysis system for efficient maintenance of Exxon lubricants in service, whether in diesel engines or in other machinery.

At first glance, Exxcare appears to be similar to other systems used for fast analysis of oils in service. Exxcare, like other systems, uses a Sampling Kit containing small plastic sample bottles, which can be air mailed to specialized laboratories for quick analysis. The Sampling Kit, of course, contains other related material to make the sampling and mailing operation both smooth and simple. Even at this first and simplest stage of the Exxcare system, special attention has been paid to provide the ship's engineer with specific advice on sampling tech-

niques aimed at ensuring that a representative sample is taken at all times.

However, what really singles out Exxcare is its computerized expert system designed to perform a comprehensive analysis of all test results obtained and translate that analysis in specific operational advice relevant to the situation under study.

Exxcare is primarily intended for main propulsion system oils in circulation. It can, however, also provide routine analysis of other large capacity installations and practically the entire range of machinery and systems on board ship. Since not all the tests performed within Exxcare are relevant to all situations, the number of tests to be carried out has been tailored to actual requirements and varies according to "testing programs," which link the type of product to its application. Of course, non-routine samples mailed by the ship personnel with a specific request for prompt analysis on account of a stated emergency condition will be accommodated.

Tests are performed according to well-established procedures, supplemented by special analytical techniques such as gas chromatography, emissions spectroscopy and others, as might be required.

The tests are categorized as: *Basic*—tests that are always per-

formed as a matter of course, in conformity with the "testing programs"; *Supplementary*—tests that are run anytime the results of Basic tests warrant a wider investigation; and *Optional*—tests that are performed if an operator specifically requires them.

On completion of testing related to a certain program, the computer carries out the trend analysis on the tests' results. This comprises:

(1) Comparing each quality characteristic of the oil in service against industry specified limits and when these are not stated, against desirable levels developed by Exxon through well-established field experience.

(2) Assessing the magnitude of change between consecutive analyses. This is a particularly useful indicator of type and urgency of corrective actions required for characteristics such as viscosity and Total Base Number (TBN).

(3) Analyzing the possibility of interdependence of significant changes of quality features such as viscosity and insolubles content, TBN and water content, flash point and fuel contamination.

The computerized expert system of Exxcare reliably analyzes cause-effect relationships through a network of critical paths in the computer evaluation of test results. This network leads to a range of key situations, each representing the outcome of laboratory and computer analysis, inclusive of specific advice for appropriate remedial actions. With the use of Exxcare, an overall trend analysis can be established based on an analytical history and the rate of change of physico-chemical characteristics of a lubricant in the recent past.

The overall condition of a system

oil can only be assessed through a combination of tests, the analysis of which is seldom easy and may be quite time consuming. The use of an Exxcare computerized expert system takes this chore away from the operator while at the same time offering him a reliable in-depth analysis, with the added bonus of consistency of diagnostic approach and advice as opposed to individual interpretations. The Exxcare trend analysis program covers 125 situations, large enough to cater to most, if not all, eventualities.

The importance of lubricant care from the standpoint of efficiency and safety of machinery operation cannot be overemphasized. A computerized expert system, such as that available through Exxcare, appears to offer the best chance of a reliable and consistent trend analysis, thus optimizing maintenance of lubricants in service. Of course, good purifying and handling practices on board ship remain an operational must.

Exxon Company International is offering a free technical paper detailing the Exxcare computerized expert system. The paper will be available at the Exxon display, Booth 324, at the 7th International Maritime Exposition of the Society of Naval Architects and Marine Engineers (SNAME) Annual Meeting in the New York Hilton, New York City on November 9-12. Additionally, the technical paper can be obtained by writing to: **Robert E. Berner**, Exxon Company International, 222 Park Avenue, Florham Park, N.J. 07932-1002.

For a free brochure on Exxcare,

Circle 11 on Reader Service Card

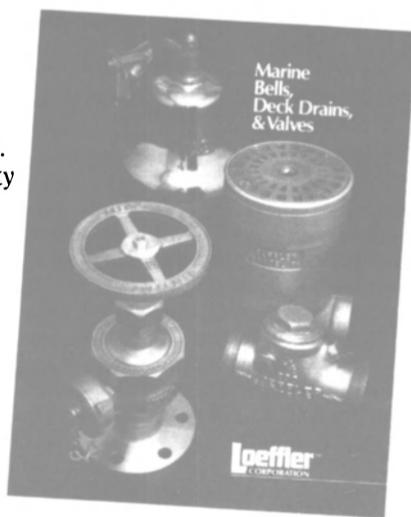
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## Tank Level Gauging Systems

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**ALL PNEUMATIC**  
King-Gage<sup>®</sup> All-Pneumatic System — a proven precision performer for industrial, chemical, food and marine applications. Indicates units of depth, weight and volume of liquids at the tank or remotely at control room.

as you require: pounds, gallons, feet and inches, meters, etc. Analog column or digital display.

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**DIGITAL** King-Gage<sup>®</sup> Digital Liquid Level Gauging System provides continuous, remote indication... on a 3/4" seven digit display... in units of weight, volume, depth, percent, or ullage (amount left until full).

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## Laid-Up Tonnage Falls To Record Low Level

According to Lloyd's *Monthly List of Laid-Up Vessels*, the volume of laid-up tonnage recently fell to one of the lowest levels in modern shipping history. A total of 458 ships (10.52 dwt) were idle at the end of August. One of the key reasons for the decline is the continuing reactivation of large tankers, but improvement in market prospects for old dry cargo tonnage is also a factor.

## Crandall Railway System Again Proves Its Versatility/Dependability

The docking of the U.S. Navy's DDG-2 Adams on Atlantic Dry Dock's new 4,000-ton Crandall dry-dock shows once again the versatility of today's modern railway dry-dock.

To accommodate the locations and projections of the vessel's two sonar domes, the cradle had to be modified with the installation of a pit within its deck area to provide access for the after dome, while a gap was provided between the forward end of the main cradle and a detachable pony cradle to accommodate the forward dome. The vessel was docked on 9-foot-high steel keel block towers to provide the necessary docking clearances. The cradle, being 60 feet between uprights, allowed the vessel to enter the dock between the 9-foot-high keel block towers and the retracted sliding bilge blocks to its predetermined forward docking position. Once reached, the vessel was centered in the dock and secured for grounding.

The ability of the cradle to be modified easily to suit particular dockings proves once again that today's railway is still one of the most economical and secure means of drydocking and transferring vessels of up to 6,000 tons displacement.

For further information and free literature on railway and transfer systems from Crandall Dry Dock Engineers, Inc.,

Circle 25 on Reader Service Card

## Versatile Pacific Awarded \$1.6-Million Contract For Collision Damage Repairs

As a result of a collision between the Panamanian-registered 23,000-dwt bulk carrier Ocean Fame and the Soviet fish-factory vessel Irtysk, Versatile Pacific Shipyards of Vancouver, British Columbia, Canada, has been awarded contracts worth Can.\$2 million (about \$1.6 million) to carry out permanent repairs to both vessels.

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

Circle 41 on Reader Service Card

## Marine Travelift Brochure Describes Benefits Of BFM Mobile Boat Hoist Design

Features of the beam forward design on Marine Travelift mobile boat hoists are described in a new color brochure published by Marine Travelift, Inc.

BFM features depicted in the literature include the pivot trunnion that permits side frames to oscillate

slightly on uneven terrain, neutralizing structural stress buildup; the large-diameter, grooved hoist drums that provide uniform cable spooling; and the precise and independent hoist control at all four corners.

Also described in the folder are the built-in mechanical, anti-two-block system; fast, precise hydraulic sling adjustment; sling block "hanger shaft" that rotates up to 15 degrees; direct alignment of hoist drums; unitized driving system;

tires; the optional four-wheel drive system; low positioned, enclosed power system; maintenance free hoist sheave design with heavy load capacity roller bearings; optional jib boom controls; two-speed drive with hand controlled levers; and many more.

For more information and a free copy of the literature from Marine Travelift,

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Circle 106 on Reader Service Card

## World's Largest Surface Effect Ships To Be Built By Norwegian Shipyard

An order for the world's largest high-speed surface effect ships (SES), the first of their kind to carry both cars and passengers, is soon to

be placed with a Norwegian shipyard by the Tonsberg shipping company Fekete.

The Bergen-based design company Cirrus will be responsible for designing the new large version, which is intended to measure about 177 feet in length compared to 114.8 feet for the company's present design, and SES specialist Brodrene

Aa will build the vessels. Delivery is scheduled for 1990-91.

Representing a cross between hovercraft-type air cushion units and catamaran hulls, these vessels are able to attain speeds in excess of 40 knots in regular traffic.

Cirrus has collaborated with Brodrene Aa, a yard at Hyen on the west Norwegian coast, since 1981.

For free literature containing full details on SES specialist Brodrene Aa,

Circle 46 on Reader Service Card

## Nalco Chemical Appoints Marine Service & Supply Distributor In Louisiana

Nalco Chemical Company of Naperville, Ill., has recently appointed Marine Service & Supply Company of Harvey, La., sole distributor for all Nalco marine products in the state of Louisiana. As a warehouse distributor for these products, Marine Service & Supply will be responsible for inventory requirements of all Nalco dealers, advertising and marketing of all Nalco Transportation chemicals including coolant additives, fuel treatments, coolant filters and aerosol maintenance products.

Marine Service & Supply recently added a new account executive, **Robert E. Garrett**, who will be responsible for the redistribution of all Nalco products. Mr. Garrett is a native of New Orleans and brings 29 years of marketing experience to the company, 16 years of which were spent in purchasing and advertising with several area marine supply houses.

For free literature detailing Nalco's marine products,

Circle 44 on Reader Service Card

## Warren Screw Pump Meets High Viscosity Demands

A versatile, positive displacement pump ideal for pumping high viscous liquids is available from Warren Pumps Inc., Warren, Mass.

Designed to efficiently pump liquids with viscosities to 150,000,000 ssu or more, the Warren 2200 series screw pump handles capacities to 9,000 gpm and discharge pressures to 700 psi, at speeds to 1,800 rpm. The pump is well-suited for use in a wide range of applications, including chemical processing, petroleum, petrochemical, power, barge, and vacuum system services.

The Warren 2200's ability to pump non-lubricating and highly viscous liquids, like polymers, adhesives, oils, lard, molasses, and synthetic rubbers, stems directly from its innovative pumping screw design.

Basically, the design consists of two sets of meshed rotating screws, timed and driven by externally lubricated, herringbone-style gears that are manufactured from heat-treated steel. The screws convey liquid toward the center of the pump where the discharge port is located.

The design creates a bi-directional pumping action that eliminates thrust and provides a hydraulically balanced pump. It also ensures a quiet pulseless flow, increasing the pump's efficiency.

For additional information and free literature from Warren Pumps,

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**MARLIN**  
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**PERISCOPE**

**Electronic Warfare System**

**Ring Network Ship Control System**

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**Autopilot**

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Rasterscan Collision Avoidance Radar

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**GPS/SATNAV**

**MK-37 Gyrocompass**

**Integrated Bridge**

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 SILICON BRONZE  
 NAVAL BRASS  
 BRASS  
 TITANIUM  
 ALUMINUM

PARTIAL LISTING OF FASTENER SPECIFICATIONS

MIL-S-1222  
 MIL-B- 857  
 FF-S-86  
 ANSI B18.2.1  
 ANSI B18.2.2  
 ASTM F 593  
 ASTM F 594

QUALITY ASSURANCE PROGRAM  
 IN ACCORDANCE WITH

MIL-I-45208  
 MIL-STD-45662  
 MIC LEVEL 1

## NICKEL-COPPER FASTENER STOCK PROGRAM

HEX HEAD CAP SCREWS									
Diameter Length	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
1/2	*	*							
5/8	*	*	*						
3/4	*	*	*	*	*				
7/8	*	*	*		*				
1	*	*	*	*	*	*	*	*	
1 1/4	*	*	*	*	*	*	*	*	
1 1/2	*	*	*	*	*	*	*	*	
1 3/4	*	*	*	*	*	*	*	*	
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5 1/2						*	*		
6						*	*	*	*
FINISH NUTS	*	*	*	*	*	*	*	*	*
THREADED ROD	*	*	*	*	*	*	*	*	*
FLAT WASHERS	*	*	*	*	*	*	*	*	*
LOCK WASHERS	*	*	*	*	*	*	*	*	*
SOCKET CAP SCREWS	*	*	*	*	*	*	*		

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### **Brazilian Yard Wins \$135-Million Order To Build Four Bulkers**

The Brazilian shipyard of Verolme do Brasil at Angra dos Reis, near Rio de Janeiro, has secured a \$135-million order to build four 68,000-dwt self-discharging bulk carriers, two for CSL Inc. (Canada Steamship Lines) and two for Vulica Inc. of the Bahamas. This latest contract increased Verolme's order book to 15 vessels worth a total of \$480.5 million.

For more information and free literature on Verolme do Brasil,  
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### **Kvaerner Side-Rolling Hatch Covers Specified For 8 Panamax Carriers**

Eight Panamax-size bulk carriers recently ordered by Korea's Hyundai Heavy Industries by owners in Switzerland and Denmark have been specified with Kvaerner side-rolling, hydraulic hatch covers. This type of cover is much favored by operators of dry bulk carriers for the weathertight closure of the hatches. The order was secured by Kvaerner Ships Equipment AB in Gothenburg, Sweden.

Kvaerner's contract for these eight vessels also calls for the supply of a hydraulic system for operation of the hatch covers on each vessel.

Delivery of the eight vessels is scheduled for 1989-90.

For free literature on Kvaerner cargo access equipment,

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### **Nalfleet, Bull And Roberts Introduces New Approach To Water Treatment**



The Orbeco-Hellige photometric analyzer.

New simplified and accurate chemical test procedures are now available from Nalfleet, Bull and Roberts, Springfield, N.J., with the Orbeco-Hellige photometric analyzer. This new portable unit covers 90 different tests (many using ASTM and EPA methods), for quick and accurate testing even by untrained personnel. The analyzer is precalibrated for all photometric tests; therefore, no standardization is required. Many tests take less than one minute, even for tests previous-

ly requiring samples to be sent to an analytical laboratory ashore.

Nalfleet, Bull and Roberts has also moved into the computer age with the introduction of Nalco's Trendcheck Data Management Program. Trendcheck serves as an electronic information center that stores, retrieves, evaluates and interprets logged-in water treatment data. According to the company, Trendcheck, when customized aboard a particular vessel, will pro-

vide better data management, a timely response to problems via "real time" feedback, and trend analysis via past-data retrieval. Both data and trend graphs are displayed and can be printed out. What this means to onboard engineers, the company says, is improved quality and consistency in maintaining their water treatment programs.

Nalfleet, Bull and Roberts continues to improve its expertise and

pass it along to its customers. With its long history of water treatment expertise, present products and worldwide service, and movement ahead into computer-based data management, it now offers an individual approach and cost-effective management of shipboard water chemistry.

For further information and free literature from Nalfleet, Bull and Roberts,

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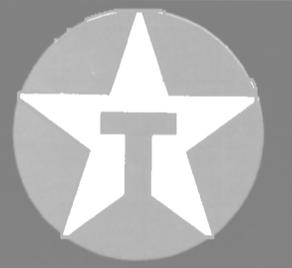
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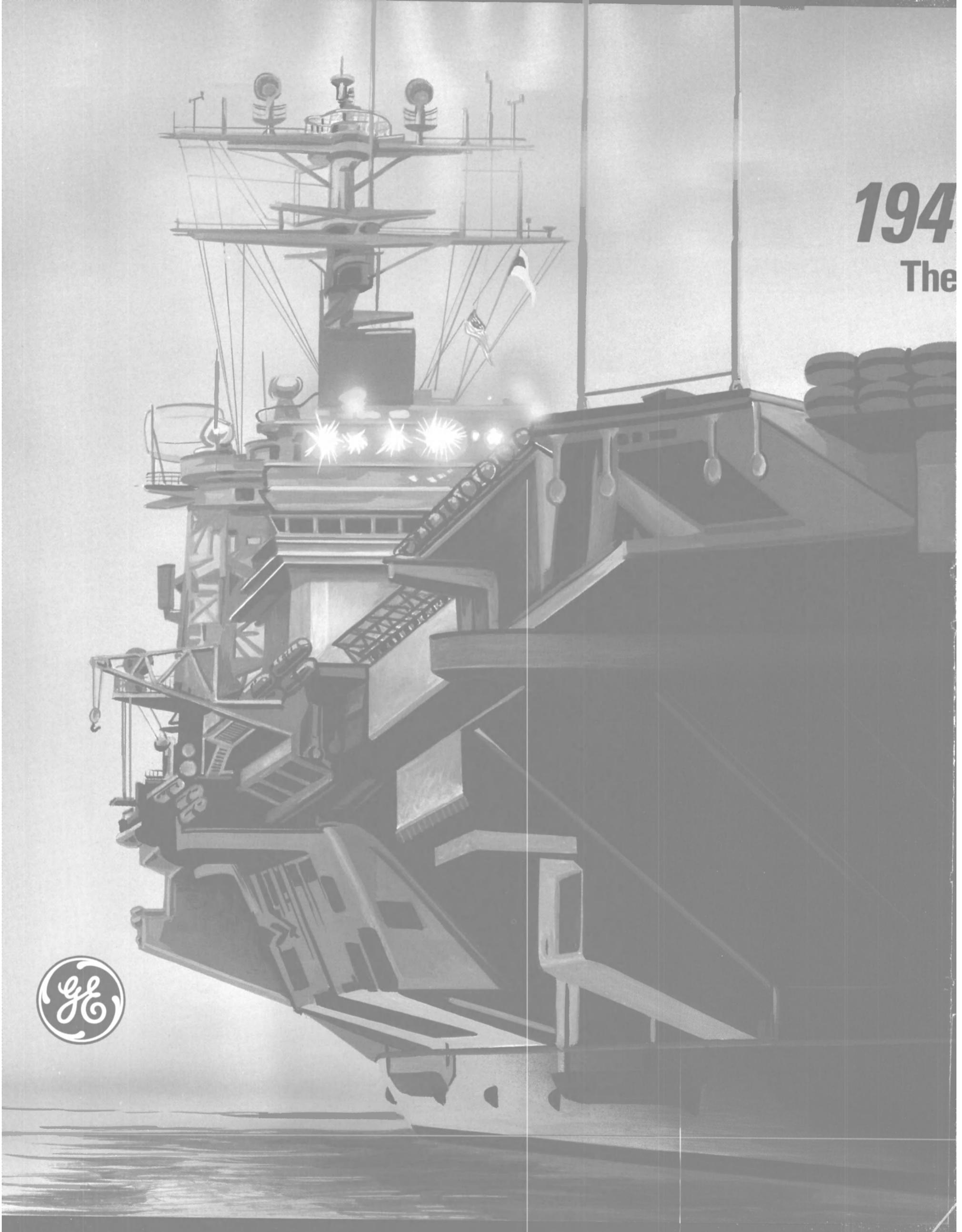
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***GE Naval & Drive Turbine Systems***

## SPD Technologies Expands Through New Acquisitions And Product Development

Since becoming an independent company as a result of a management buyout from Gould Inc. in the spring of 1987, SPD Technologies has experienced significant growth through new product development and important acquisitions under the guidance of **George M. Gordon**, the firm's president and chief executive officer.

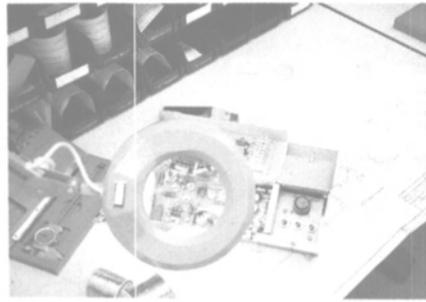
SPD, one of the world's largest manufacturers of military circuit breakers for Navy ships and a leader in electrical systems protection technology, has enhanced its leadership in the field with a series of developments during the past year.

Some of the milestones achieved by SPD include the development of the first electronically controlled 100-amp circuit breaker for military applications and a new state-of-the-art all-cell computerized battery monitoring system.



George M. Gordon

The company experienced significant growth by expanding internationally, with additional staff and representation worldwide, and by acquiring the Navy Switchgear Division of Brown Boveri, which increased capacity and cost efficiency in the production of electrical distri-



Precision assembly of electronic trip devices typifies advanced manufacturing techniques used by SPD Technologies.



SPD Technologies headquarters and principal engineering and manufacturing operations in Philadelphia, Pa.

bution switchgear for military applications.

The firm also established a nationwide network of service centers for the repair and overhaul of circuit breakers, switchgear and related electrical protection systems and installed new state-of-the-art automatic production machinery and test equipment to further enhance high quality product standards.

For more than 70 years, engineers at SPD and its predecessor companies have been responsible for a host of significant technological breakthroughs which have enhanced the

performance, functionality and cost-effectiveness of electrical protection systems on naval vessels.

From the original introduction of electronics in military circuit breakers to the discovery of new lighter weight, higher durability materials, SPD has a remarkable history of "firsts" in electrical protection systems technology.

Some of the significant company developments over the years have included: the first shock-hardened circuit breaker; spray-tight switchgear for use on submarines; an electronic sensing overload device for

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use on Navy combatant vessels; the first stored-energy, spring-charged breakers for naval vessels; the first use of glass reinforced polyester for insulation and support material in Navy switchgear; and a three-pole DC circuit breaker for low magnetic signature application.

In 1988, SPD introduced the Xactron 102, which provides a new level of reliability for Navy combatants, and paves the way for a whole new generation of circuit breaker technology.

The Xactron 102 offers a combination of shock and vibration resistance, reduced temperature sensitivity and protection selectivity. The Xactron 102 is interchangeable with Navy-type thermal-magnetic 100-amp breakers now in use.

The key to the development of the Xactron 102 is the application of a simplified electronic circuit which meets the demanding size restrictions of the 100-amp casing.

According to SPD, the integration of electronic controls also leads to a significant reduction in moving parts, which provides for increased reliability over thermal-magnetic breakers.

The development of Xactron 102 comes on the heels of another important breakthrough for SPD—an advanced new computerized all-cell battery monitoring system for use on diesel and nuclear-powered submarines and other critical battery power situations.

The advanced BMS-100 system offers a combination of functional and cost efficiency never before available in MIL-SPEC battery monitoring systems for submarine use, where precise measurement of power status is critical.

Key elements in the advanced system are a unique new digital transponder probe and proprietary computer software to provide a new standard in data acquisition, predictive capability, reliability and ease of operation.

Responding to increased worldwide demand for its products, SPD has expanded its international marketing and technical staff and added to its role of distributors around the world.

In 1988, SPD experienced a major breakthrough in the international market when the firm was contracted to develop a special design version of its new all-cell battery monitoring system for Canada's Department of National Defense.

In addition, SPD is working closely with the Norwegian Navy on the application of new advances in electronic circuit breaker design on their fleet.

SPD now has distributors and representatives in 15 countries around the world.

With a concentrated focus on serving the naval market and a strong capital position, SPD has mounted an aggressive acquisitions program.

The acquisition of Brown Boveri's Naval Switchgear Division in June 1988, adds significantly to SPD's total systems capabilities, solidifying its position as the nation's largest developer and producer of electrical distribution and protection systems for naval ships.

Additional capacity to produce

high-quality switchgear also enhances SPD's cost efficiency and provides additional opportunities to diversify.

Furthermore, the addition of repair and overhaul installations in San Diego, Calif., and Groton, Conn., established the framework for a nationwide complex to provide on-site services at primary U.S. Navy homeports.

Other SPD repair and overhaul installations are in Philadelphia,

Pa., and Virginia Beach, Va.

For free literature fully detailing SPD's circuit breakers and electrical systems protection equipment

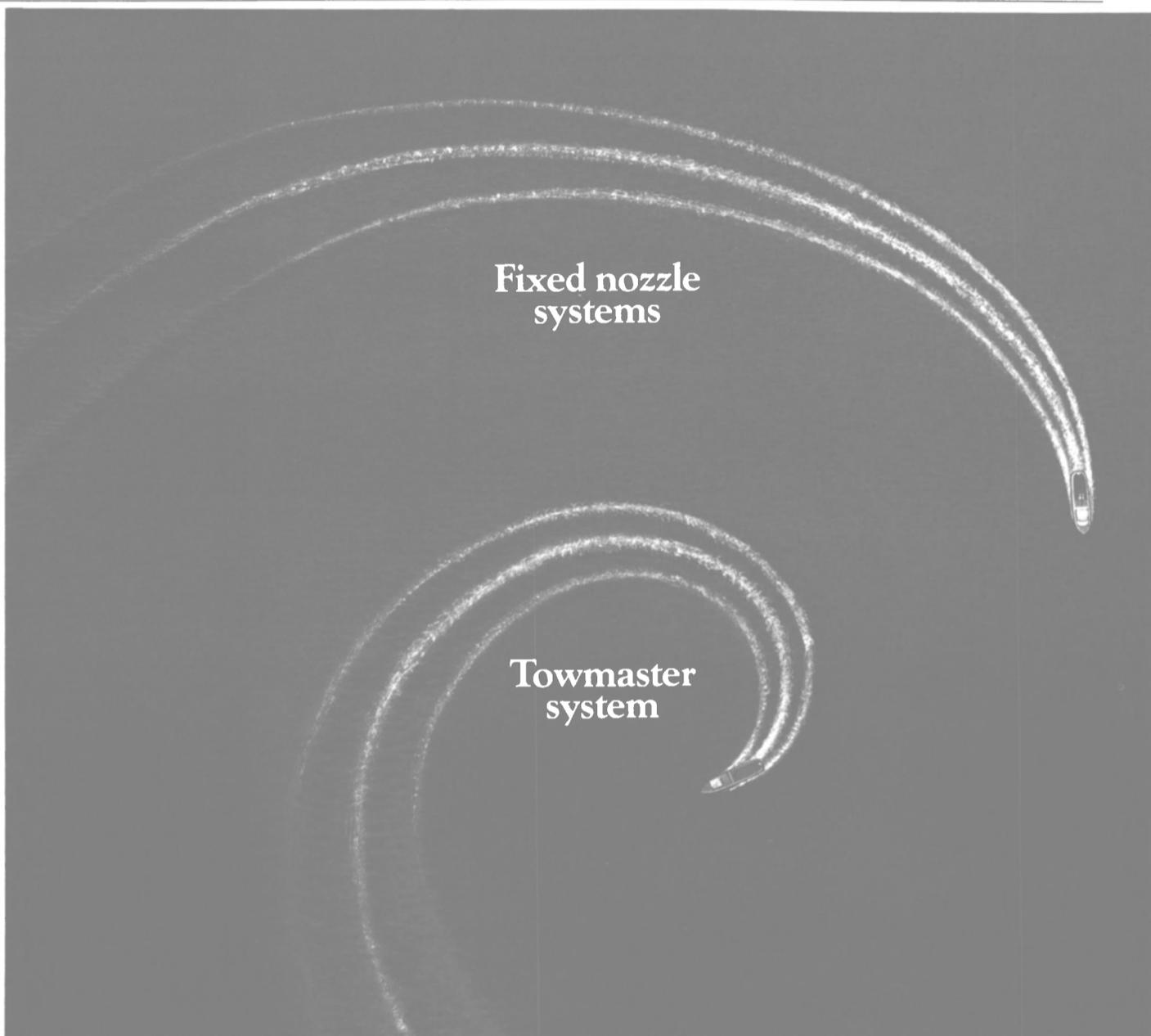
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## HAL Acquires Wind Star Sail Cruises

Holland America Line (HAL), which already had a 50 percent

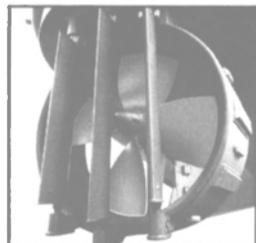
share in Wind Star Sail Cruises, recently took full control of the passenger line by purchasing the remaining 50 percent share of the company.

With the purchase, HAL acquires full control over three 148-passenger sailing ships—the Wind Star, Wind Song and Wind Spirit—which operate in the Caribbean and the Pacific. Combined with its own fleet, HAL will now be able to offer over 5,000 passenger berths.



# The Towmaster™ Nozzle/Rudder System can cut your turning circle by 70%

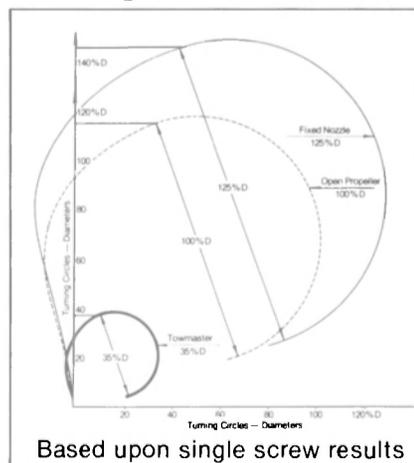
If your vessel has a ducted propeller system, Michigan Wheel's Towmaster Nozzle/Rudder System can give you a dramatic improvement in maneuverability and turning efficiency. In fact, if your vessel presently has a fixed nozzle system, tests prove the Towmaster Nozzle/Rudder System could reduce your turning circle by 70%. If yours is an open propeller system, you can expect an improvement of up to 60%.



The Towmaster can give you this kind of performance because of its unique triple-rudder design. Each rudder, by itself, produces a higher lift-to-drag ratio than conventional centerline rudders.

Together, they create a cascade effect that can allow 60° helm angles before rudder stall occurs.

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And because the Towmaster also reduces rudder torque and makes more efficient use of propeller thrust, vessel operation is easier and less fatiguing.

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## CALS Conference Slated For December 8 At USMMA-Kings Point

The U.S. Merchant Marine Academy, Kings Point, N.Y., will host a conference on Computer-Aided Acquisition and Logistic Support (CALS) on Thursday, December 8. The event is being cosponsored by the American Society of Naval Engineers and the Maritime Resource Center in cooperation with the Nav-

al Sea Systems Command.

Entitled "CALS—Value Added to Government and Industry?" the conference will focus on three themes—"What CALS is and What the Paybacks are"; "Where NAVSEA is Headed in CALS"; and "The Implications of CALS to Small Business."

Key participants at the conference will be: Rear Adm. **Guy H. Curtis**, Assistant Deputy Chief of Naval Operations, OPB-04B; **Clifford Geiger**, Deputy Chief Engi-

neer Logistics, NAVSEA; **Ted Lettes**, Department of Commerce, Director, Small Business Technology; **Alfred Skolnick**, president, ASNE; and **Stanley D. Myers**, CALS Industry Steering Group.

The conference will provide an excellent opportunity to find out about CALS and its implications to DoD and industry.

For further information, contact: **Sally Skolnick** at (703) 836-6727 or **Stan Meyers** at (516) 682-8552.

## PRMMI Names Giani And Antonelli To Operations Positions

Puerto Rico Marine Management, Inc. (PRMMI), operating company and agent for Navieras de Puerto Rico, recently announced the appointments in operations of **Robert Giani** and **William Antonelli**.

Mr. **Giani** joins PRMMI as director, marine operations, based in Edison, N.J.

Mr. **Antonelli** returns to PRMMI as Midwest operations manager based in Chicago.

## Six Passenger/Vehicle Ferries To Be Converted By Scandinavian Operators

Large-scale conversion projects involving six vessels are about to be undertaken by two major Scandinavian ferry operators.

Stena Line is to carry out two major conversion projects involving four of its passenger/vehicle ferries, and Tor Line is placing a contract for the conversion of two freight roll-on/roll-off vessels into specialized newsprint carriers.

No decision has yet been made on which shipyard will undertake the work for Stena Line, but it is believed the work for Tor Line will be placed in the hands of an undisclosed Dutch shipyard.

## Free Butterworth Brochure Details Types K/Super K Tank Cleaning Machines

Butterworth Tank Cleaning Machines, Inc. of Houston, Texas, is offering free color literature on Types "K" and "Super K" tank cleaning machines that are marketed by the company.

Available for both sale and rental on a worldwide basis, Butterworth tank cleaning machines incorporate the latest design technology. They are powered by an internal turbine that is driven by the flow and pressure of the cleaning fluid. To meet individual tank cleaning requirements and flow of the cleaning fluid, the machines are available with various nozzle sizes and gearboxes.

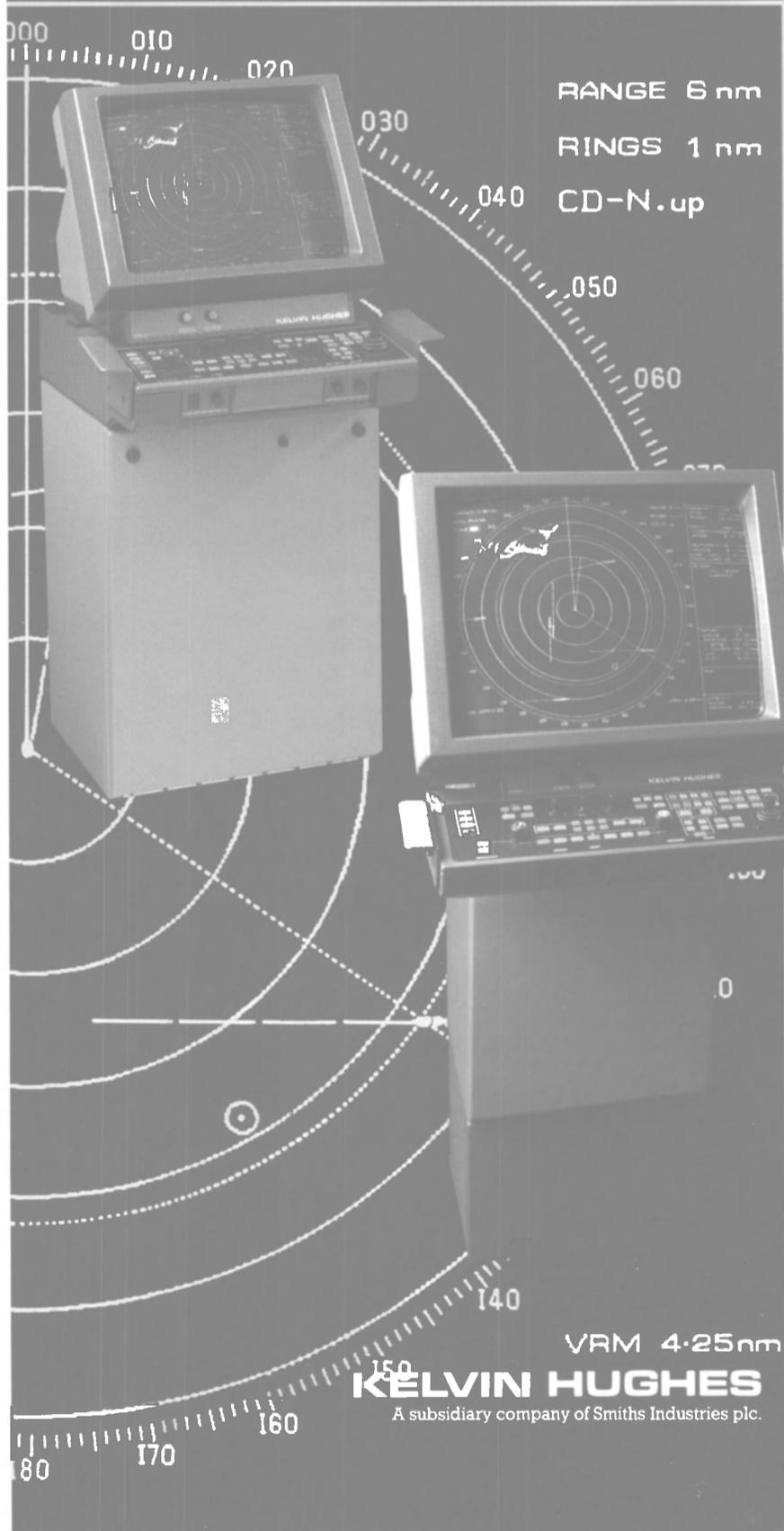
The literature explains that an installation on tankers using Butterworth tank cleaning machines consists basically of a pump, heater, water supply pipelines and hydrants, all discussed in the brochure. The hose and tank cleaning machine supported by a quadrant deck plate are inserted into the tank through openings in the deck.

Weighing less than 50 pounds, these machines are used both as portables and fixed-in-place units.

For more information and a free copy of the brochure, "Types 'K' and 'Super K' Tank Cleaning Machines," from Butterworth,

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*Concept* HR systems offer Relative Motion, True Motion and ARPA facilities, combined with E-Plot II, an enhanced version of the unique Kelvin Hughes electronic plotting program. Identical positioning of keyboard controls for these features throughout the range assists operational confidence and familiarity.

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## TBT-Containing Antifouling Paints —The Legislative Position—

In June 1988, the U.S. Senate passed the "Organotin Antifouling Paint Control Act of 1988" that controls the application of TBT antifoulings in the USA, as follows:

(1) Bans the application of TBT antifoulings on vessels less than 25 meters (about 82 feet) in length. Aluminum-hulled vessels are exempt if the application is carried out by an approved contractor.

(2) Vessels greater than 25 meters in length may only be applied with TBT antifoulings if (a) the average release rate of TBT from the antifouling three to five weeks after immersion is not greater than four micrograms of TBT per square centimeter of painted surface per day, and (b) the cumulative release during the first 14 days of immersion is not greater than 168 micrograms of TBT per square centimeter of painted surface per day.

(3) the EPA is required to issue a Water Quality Criteria Document on TBT by March 1989. Individual states can use the EPA's Water Quality Criteria to set legally enforceable Water Quality Standards which limit the concentration of TBT in seawater.

The State of Virginia has already imposed its own water quality standard of less than one part of TBT per trillion parts of salt water. A similar standard is being considered by the State of California.

The States of Alaska, Maine and Michigan, and New York Harbor are also considering tighter controls on the application of TBT antifoulings.

Existing and proposed U.S. regulations do not affect vessels coated with TBT antifoulings trading into the U.S. or continuously trading within U.S. waters. They only affect the application of TBT antifoulings in the U.S.

International Paint, in response to operator demand for continued efficient vessel operation within legislative controls, over the last few years, has gained experience on over 600 vessels worldwide with TBT-free polishing antifouling systems.

To meet the specific requirements of the U.S. market and to comply with existing and impending regulations, International Paint launched a range of TBT-free antifoulings in June 1988.

International Paint (USA) presently offers Interclene BRA500 series as the highest performing TBT-free antifouling available in the U.S. In the rest of the world International Paint offers International BQ series as the premier TBT-free polishing antifouling available. International BQ series is presently awaiting the registration in the U.S. before commercial introduction.

Since June 1988, Interclene BRA500 series has been applied to over 95 merchant vessels in the U.S.

Additionally, over 60 U.S. Navy and other U.S. Government-operated vessels have been coated with Interclene BRA500 series.

For more information and free literature from International Paint,

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## HDW To Build Four Containerships Under \$150-Million Pact

A \$150-million order for four new containerships has been placed with a West German shipyard by Zim Israel Navigation Co.

The new diesel-powered vessels, on order with Howaldswerke Deutsche Werft yard near Kiel, will be capable of carrying 2,700 twenty-

foot containers. The containerships, being built at a cost of \$37.5 million each, are slated to replace older and slower vessels that Zim uses in service linking Israel, Europe, the U.S. and the Far East.

Delivery is scheduled for early 1990.

For free literature detailing the facilities and capabilities of Howaldswerke Deutsche Werft yard,

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November, 1988

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# AT LAST, A GOVERNMENT PROGRAM THAT CAN BENEFIT ALL

## Implication of CALS to Industry

By Eugene D. Story<sup>1</sup>

*\*Editor's Note: In the spring of this year, a Symposium on the CALS Initiative was sponsored by the U.S. Maritime Resource Center at the U.S. Merchant Marine Academy, Kings Point. This article gives a brief explanation of the subject and what its impact may be on industry. The author is Chairman of the U.S. Resource Center and president of Marine Management Systems of Stamford, Conn.*

### What is CALS?:

The acronym CALS stands for "Computer-Aided Acquisition and Logistics Support." If you are involved with the military systems and equipment area, these words will mean more to you than if you operate in the commercial/industrial area.

To better understand CALS, it is necessary to understand the problem confronting the defense establishment. The increase in the complexity of equipment and systems is well known. However, the major problem is not how to operate the systems, but rather how to maintain them. It is apparent that technical support has not kept pace with the complexity resulting in an increase

in non-availability of the equipment. While automation and automatic controls have allowed the systems to be operated by fewer people, the same tools have not been provided to allow maintenance by fewer people.

This lack of attention to technical support is a problem existing in industry as well. For example, ships are being built with automated bridges and unattended engine rooms, with crews of half their previous size. This requires more complex instrumentation and control equipment on the ship. But what innovations have been introduced to maintain the more complicated equipment? Some companies have installed shipboard computerized maintenance management systems which represents a significant step. However, the problem of equipment diagnostics and actual repair procedures are just being addressed.

The military presents a much larger problem in the technical support area.

The answer in the past was to produce more technical manuals and procedures, all based on more paper. It was found that the average

frigate carries over 21 tons of paper. A tank battalion requires a truck to carry the necessary technical manuals. If there was an identified technical problem, it automatically produced more paper. The production and distribution of the paper is a problem in itself with the documentation often arriving after the equipment is delivered and installed.

To solve this problem it is necessary not only to consider how the technical support data is created initially, but how the data will be transmitted, stored, modified and accessed.

CALS represents a major step in providing a solution to the technical support problem. It requires that all drawings and technical documentation for new systems and equipment be produced in a standardized digital form. This is a major undertaking and change from past practice.

Once this philosophy is accepted and developed, there are many other fallout benefits. Producing the technical design in a standard format can be of great benefit to the procurement process. The information submitted in a standard form is much easier to evaluate and analyze.

In fact, this is the first major objective of the CALS program.

### Other Benefits of CALS

These new systems should be able to convey large amounts of data in a usable form to the technician who must use it. The fact that the information is in digital form is a significant start. We can now use some of the new techniques of expert systems (artificial intelligence) to provide just the information that applies to the technical problem, but first there must be some determination of just what the problem is.

### Identifying a Root Problem

The solution to this very real problem of technical support lies in recognizing the magnitude of the problem and treating the root cause. This was recognized by the Department of Defense several years ago and was the start of the CALS initiative. It was found that very little attention was given to the requirements of logistics support (keeping the equipment operational) until after the equipment was designed and manufactured. Paper was then produced to describe the maintenance and spare parts requirements.

In simple terms, it was found that

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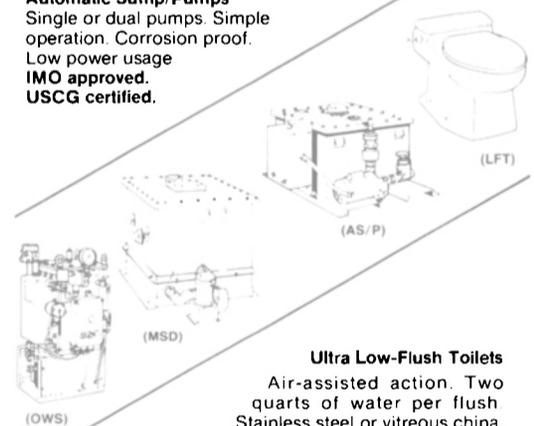
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Microphor Export Corp.  
2 South Street  
Hythe  
Southampton SO4 6EB  
England  
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waiting until the equipment or system was designed and even built was too late. The support (logistics) must be considered at the initial design time, since this is one of the critical factors affecting how it will function in the future. This brought about the need for more standardization in the documentation of the design at an early stage.

#### Application of New Technologies

What are some of the techniques or technologies that will bring this about? Going back to the initial design phase of the equipment or system, it will be necessary to develop the technical drawings in digital form using CAD/CAE (Computer Aided Design and Engineering) systems in a standardized format so that the data may be recorded, transmitted and later used and possibly modified by various support groups. In a similar manner, the technical specifications and parts lists must be in a standardized digital form. The DOD-sponsored CALS program is addressing these issues and setting the standards in cooperation with industry groups.

#### DOD Plans

The impact of this program on the military from both a cost and logistics capability standpoint is tremendous. DOD has recently issued a directive calling for all new systems development after October 1 to be compliant with the CALS standard.

Although there will be a cost to industry to convert to these standards, there should be significant savings in the production and support side, and even in the bidding process.

#### Impact on Industry

What will be the impact on this program to the commercial manufacturing area? If in fact the manufacturer is required to standardize the documentation to do business with the military, then in all probability it will be economical to standardize on all design documentation. This means that the maintenance management systems being developed and used in industry, for both commercial marine and shore-based industry, will be able to use standard interfaces to technical support documents. It can promote a whole new level of operations and maintenance support not economically practical today.

Just as the advent of a standard operating system for microcomputers dramatically reduced the cost of computer systems to industry, so could a standardization of technical documentation. As an example today, the cost of data collection, coding and entry for a maintenance management system is more than the cost of the standard hardware and software to process and maintain it.

With technical data provided in some standardized form from the manufacturer, it would be possible to integrate the maintenance and repair procedures directly into the maintenance management systems, at a relatively low cost.

#### The Future

It will be interesting to watch the progress of the CALS program in

the military procurement process. It will also be a shame if the commercial/industrial sector does not take full advantage of this much-needed technical advance. With the maintenance and repair information going to digital form, it opens up the use of other technical advances, particularly in the area of data collection devices for various types of equipment monitoring. An example of an application already being used is the

collection and analysis of vibration analysis trending data for machinery condition monitoring, although this has been limited by a lack of any standardization. Condition monitoring could be expanded to many more types of trending data in digital form, particularly if some standards are defined.

The continued reduction in ships' crews could lead to larger and more centralized monitoring and control

centers for large fleets of ships where the engineering expertise can be more economically maintained. This would be similar to the techniques used in the space program. It is one of the techniques that could help solve the noncompetitive crew costs of the industrialized countries. The implementation of the CALS program could do much to promote such advances in the future.



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November, 1988



## OUTSTANDING WORKBOATS OF 1988

*This special review highlights some of the most notable and important workboats delivered by U.S. boatyards during the past year. Each selection in this award-winning group features its own distinctive stamp of performance excellence and fine craftsmanship.*

### AARON MCCALL Gulf Craft

Gulf Craft, Inc., Patterson, La., delivered the world's second largest crewboat, the Aaron McCall during 1988.

The 155-foot, 84-passenger crewboat, the sister boat of the Blair McCall, which was delivered last year, was built for McCall Enterprises of Cameron, La.

Unlike her sister, the Blair McCall, which is equipped with five Cummins engines, the Aaron McCall is powered by six Cummins KT 1150M diesel engines coupled with Twin Disc MG-518 2.5:1 ratio reduction gears. Each engine produces 680 shp at 2,100 rpm. The Aaron McCall's propulsion equipment also includes Aquamet stainless steel shafts and Columbian Bronze four-bladed 40-inch by 36-inch propellers.

Electrical power aboard the Aaron McCall is provided by two 50-

#### AARON MCCALL Equipment List

Main engines (6)	Cummins
Reduction gears	Twin Disc
Propellers	Columbian
Shafts	Aquamet
Generators	KATO
Generator engines	Detroit Diesel
Steering	Charlynn Orbitrol
Engine room blowers	Cincinnati Fan
Keel coolers	Split Pipe
Fuel meter	Daniel
Stuffing boxes	Gulf Craft
Radar	Furuno
Loran	Raytheon
SSB	Stephens Engineering
VHF	Raytheon
Depth sounder	Data Marine
Compass	DAIKO
Autopilot	Comnav Marine
Horns	Buell
Searchlights	Carlisle & Finch
Running/navigation lights	Perko
Freshwater pressure set	Sears
Fire pump	Berkley
F/O transfer pump	Roper
F/O transfer meter	Tokheim
Oil transfer pump	Wilden Pump
Bilge pump	Peabody Barnes
Fire pump	Berkeley
Hydraulic pump	Hydreco
Sewage pump	Peabody Barnes
A/C	Carrier
Heating	Carrier
Air compressors	Quincy
Winch	Tulsa Winch
Anchor winch	McElroy Machine
Lifesaving gear	Billy Pugh
Life rafts	Billy Pugh

kw KATO generators driven by Detroit Diesel model 4-71 diesel engines. The main engines were supplied by Cummins Mid-South and the generator package was supplied by Kennedy Engine.

Besides a 180-long-deck-ton capacity, the aluminum crewboat features the comforts of luxury accommodations for both the crew and passengers. All interior living compartments are air conditioned and

heated by means of a water-cooled Carrier unit. Three staterooms provide sleeping accommodations for six crew members, while both passenger compartments yield seating for a total of 84 passengers.

The aft steering station, which is located just atop and behind the pilothouse, provides the captain with 360-degree visibility and effortless handling when unloading and loading supplies. All six Cummins engines are also controlled via the aft steering station by way of the Kobelt air controls. A Raytheon VHF radio and a Realistic P/A system, as well as the oil company's private radio in the aft steering station provide communications between the captain and platform and deck crews.

The Aaron McCall's pilothouse is fitted with a complete set of electronics. It features two Furuno radars, two Raytheon Loran plotters, a Comnav autopilot, a Raytheon VHF radio, a Stephens single side band radio and a Datamarine depth recorder.

### GUIA/LIDER Houma Fabricators

In the first quarter of this year, Houma Fabricators delivered the tractor tugs Guia and Lider to the Panama Canal Commission. The sister vessels both have Voith-Schneider cycloidal propulsion systems which feature 360-degree thrust for outstanding maneuverability. The tugs are used to assist and tow ships through the narrow Panama Canal and locks.

The 95-foot tractor tugs are powered by two 1,500-hp EMD diesel

engines that generate a bollard pull of 85,000 pounds. The tractor tug concept is enhanced by 58,000 pounds of side pull which allow the Guia and Lider to hip up to a ship and maneuver it into tight places that prove to be troublesome to conventional tugs.

The delivery of the Guia and Lider brings the number of vessels recently delivered by Houma Fabricators to the Panama Canal Commission to five. The 3,000-hp twin-screw harbor tug Esperanza was delivered in 1985, while the 3,000-hp Chagres was outfitted as a dredge tender and delivered in June 1987. In addition, a 130-foot salvage-diving barge complete with machine shop, salvage crane and decompression chamber was delivered in September 1988.

Houma Fabricators was recently awarded a contract by the Panama Canal Commission to build another tractor tug identical to the Guia and Lider. The contract contains an option for a sister vessel. The Commis-

#### GUIA/LIDER Equipment List

Main engines	EMD
Cycloidal propellers	Voith-Schneider
Gearbox	Voith-Schneider
Generator engine	GM-Kennedy
Generators	Delco
Engine controls	Wabco
Radar	Raytheon
Compass	Cassen & Plath
Loudhailer	Raytheon
Fire pump engine	GM-Kennedy
Fire monitors	Skum
Fire pump	Aroua
Hawser winch	Markey
Capstan	Markey
Hydraulic controls	Markey
Hydraulic engine	GM-Kennedy
Air compressor	Quincy
A/C	Carrier/Johnson Bros.
Main engine coolers	Fernstrum
Sewage treatment	ORCA II

Photos (clockwise from top left): U.S. Enterprise (Halter Marine), Sajo Victoria (Campbell Shipyard), SuperAmerica (Quality Shipyards), and the Seattle Enterprise (Bender Shipbuilding & Repair).

sion also awarded the Houma yard a contract to build a tender tug, identical to the 1987-built Chagres. Both will be 3,000 hp and are scheduled for delivery in the fall of 1989.

### NORTHERN ENTERPRISE Halter Marine

Halter Marine's Moss Point, Mississippi, shipyard completed the conversion of a 180-foot supply vessel, formerly used in the offshore oil and gas industry, into a crabber/processor for owners Arctic Alaska Seafoods of Seattle.

Halter removed the vessel's drilling mud tanks below decks and sandblasted, painted and insulated that area, turning those spaces into a 26,000-cubic-foot refrigerated hold. Miscellaneous offshore equipment and a wooden aft deck were removed and replaced with a 1,400-square-foot processing room.

Two hydraulically driven Alaskan Marine knuckle boom cranes with 50-foot booms on 12-foot pedestals, a hydraulic double pot launcher, a Marco power block, and a Halter-built picking boom were installed along with stability enhancing rolling chocks.

The Northern Enterprise's electrical system was also redesigned to support the extensive processing and refrigeration equipment. Two Detroit Diesel 8V71T diesel engines were added to drive two new 250-kw generators, and a Detroit Diesel 12V92T engine was installed to drive a 425-kw generator.

The boat's propulsion is provided by two EMD 12-567-BC diesels with Falk 2.98:1 reverse/reduction gears.

Halter Marine Inc. is one of six shipyards in the Trinity Marine Group, which is owned by Trinity Industries, Inc.

Photo right: Northern Enterprise built by Halter Marine.



marine engines coupled to Nomera 12 jet pumps, she can reach speeds in excess of 25 knots. The jets have diverter and check valves engineered by North American Marine Jet, Inc., to divert water flow into the firemain system.

The firemain system also oper-  
(continued)

#### NORTHERN ENTERPRISE Equipment List

Main engines (2)	EMD
Reverse/reduction gears	Falk
Generator engines	Detroit Diesel
Knuckle boom cranes	Alaskan Marine
Power block	MARCO
Picking boom	Halter

### PHOENIX III Munson Manufacturing

Earlier this year, Edmonds, Washington-based boatbuilder Munson Manufacturing, Inc. delivered the specially designed multi-purpose crash/fire/rescue boat Phoenix III to the San Francisco International Airport authorities for use in water rescue operations.

The waterjet-powered Phoenix III, designed for low-speed operation in shallow water, is 34-feet long with a beam of 13 feet. With a large pumping capacity and 100 gallons of AFFF foam, she is readily equipped for firefighting.

Driven by twin Crusader 350/454

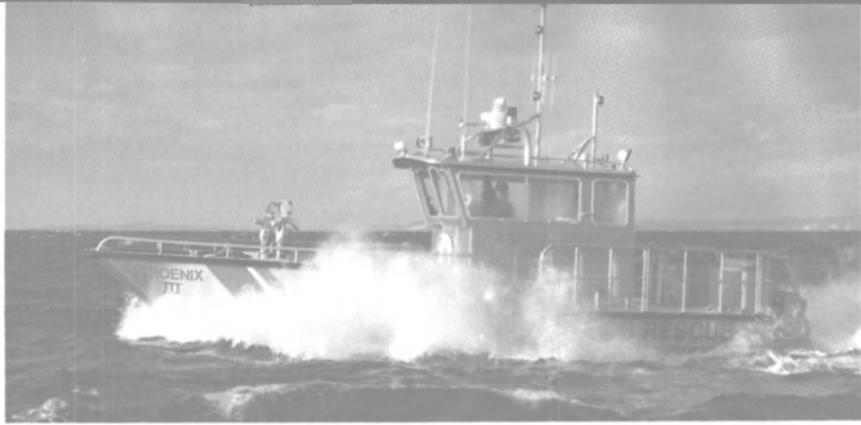
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## Outstanding Workboats

(continued)

ates valved bowthrusters to allow operators to maintain boat stability during pumping. One 12-volt 2,000 gph Rule bilge pump was installed in each watertight compartment.

Built to withstand working pressures up to 300 psi, the firemain sys-

tem was designed with a header to collect water from each of the main jet drives. The header was designed to reduce the turbulence in the system prior to discharging water into the firemain system.

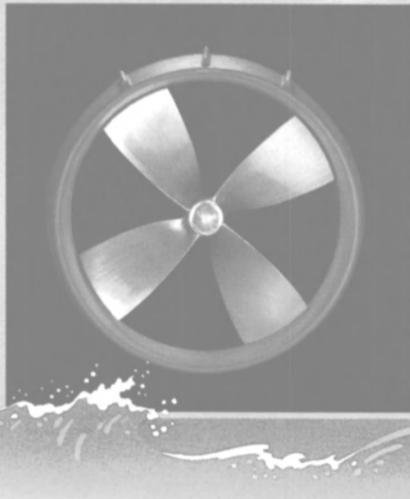
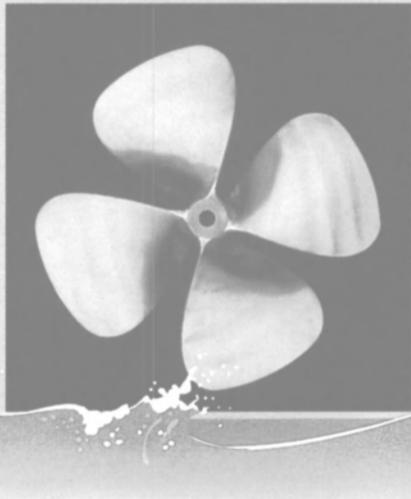
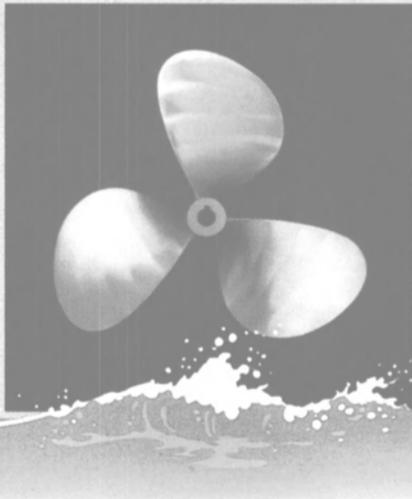
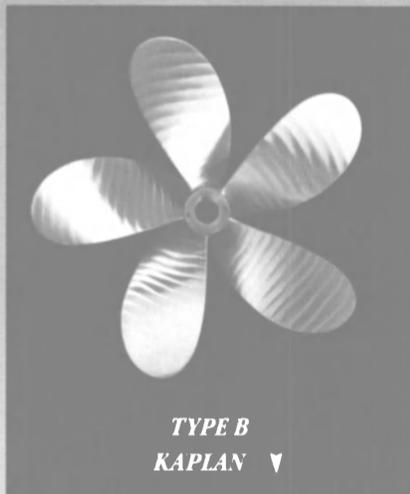
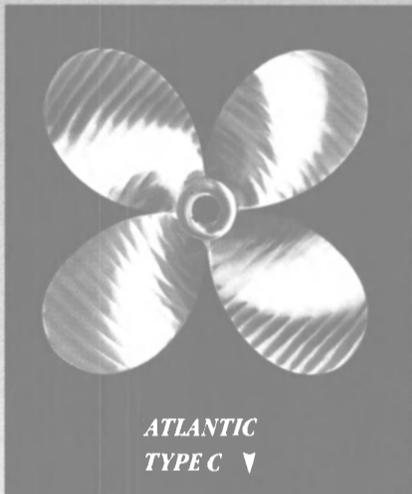
Two Ansul M-1 monitors are mounted on the bow and are controlled by joysticks near the operator's console. These monitors will deliver 240 gpm of foam and may also be used for water.

One mission of the boat will be to speed rafts to passengers who evacuate downed airplanes into the water. The boat carries 20 MRP-10S Switlik rescue platform type inflatable rafts on forward and aft decks. She is even equipped with some medical facilities.

### PHOENIX III Equipment List

Main engines (2)	Crusader
Waterjets	Nomera
Diverter & check valves	
North American Marine Jet	
Bilge pump	Rule
Fire systems	Halon
Fire monitors	Ansul
Strobe lights	Wahelen
VHF/ADF	Regency
Depth finder	Furuno
Loran & radar	Furuno
Depth sounder	Si-Tex
Siren	Federal
Fire alarm	Xzintex
Inflatable rafts	Switlik

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### PROTECTOR SeaArk Marine

This past spring, SeaArk Marine, Inc. (formerly MonArk Boat Co.), Monticello, Ark., delivered a 28-foot 6-inch aluminum patrol boat to the U.S. Coast Guard Base at Burlington, Vt.

The boat is based on SeaArk's Protector hull design, which features a shallow draft of about 1 foot 10 inches, rugged construction and

### PROTECTOR Equipment List

Main engines	Volvo
Propellers	Volvo
Reduction gears	Volvo
Engine controls	Volvo
Steering controls	Teleflex
VHF radio	Icom
Radar	Furuno
Compass	Richie
Depth sounder	Lowrance
Pump	Rule

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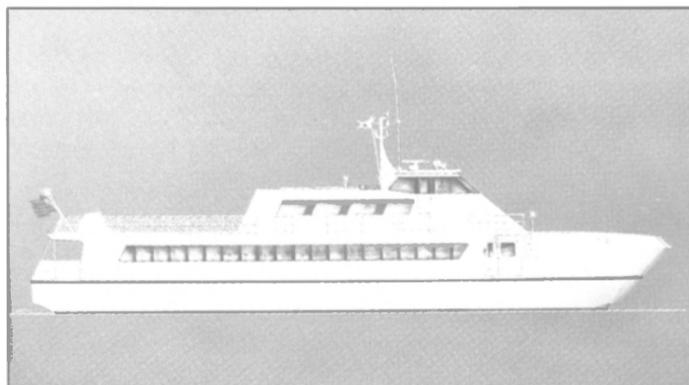
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## Outstanding Workboats

(continued)

other excellent performance characteristics. SeaArk has built Protector Class boats for the U.S. Coast

Photo left: Aaron McCall built by Gulf Craft (see page 62).

Guard Base at Governors Island, N.Y., and they are presently building another boat for a Coast Guard base in Portsmouth, Va.

Powered by two Yamaha V-6 outboard motors rated at 225 horsepower each, the boat is able to reach speeds of up to 42 knots.

Other features include a raised sheer forward for increased freeboard, bow deck safety railing, recessed after deck and shallow gunwales for small boat inspection, extruded rubber bumper installed at the sheer and on the hull sides, and a heavy-duty tow post for use in assisting disabled vessels.

## SAJO VICTORIA Campbell Shipyard

Campbell Shipyard, San Diego, Calif., made a significant breakthrough in the commercial fishing market when it delivered a 1,200-ton-capacity tuna purse seiner, the Sajo Victoria, to Sajo Industrial Co., Ltd. of Seoul, Korea.

The Sajo Victoria is a single screw steel hull tuna purse seiner, with a steel deckhouse and an aluminum pilothouse. She has 15 refrigerated fishwells, an anti-roll tank and a

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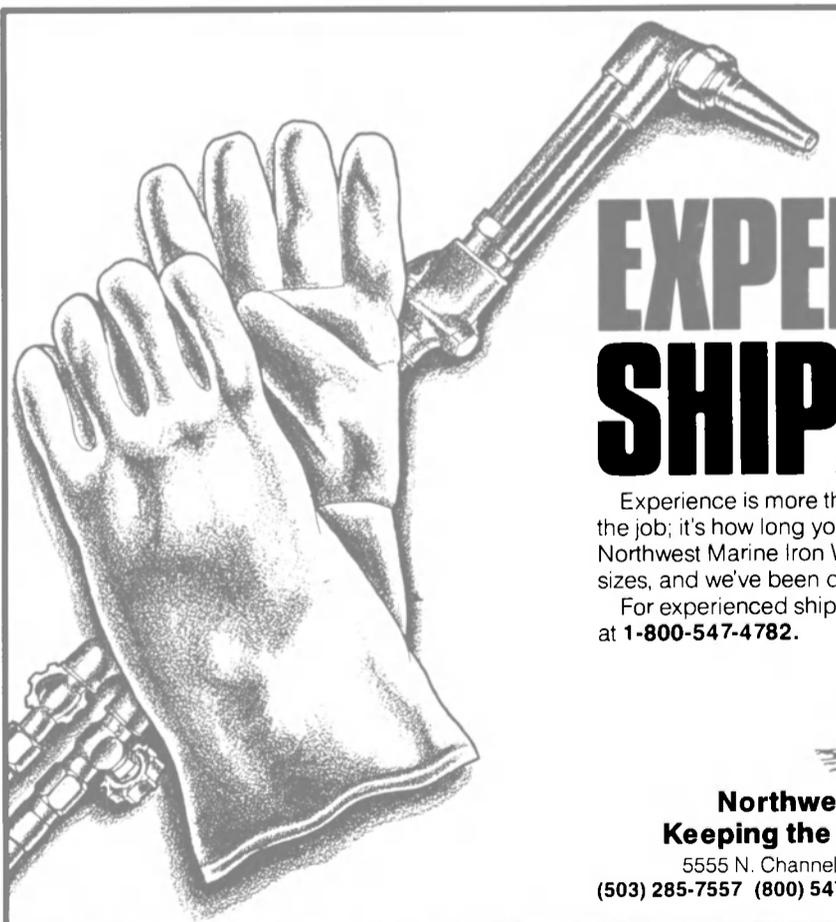
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### SAJO VICTORIA Equipment List

Main engine	GM-EMD
Reverse reduction gear	Falk
Generators (3)	KATO
Generator engines (3)	Caterpillar
Bowthruster	MARCO
Bowthruster engine	Caterpillar
Engine controls	Mathers
Steering controls	Sperry
VHF radios	Sailor
SSB radio	Sailor
SSB radio	Harris
CB-SSBs	Cobra
Radar	Furuno
Radar alarm	Furuno
Compass	Sperry
Gyrocompass	Sperry
Depth sounders	Furuno
Auto direction finder	Simrad-Taiyo
Auto direction finder	Furuno
Satnav	Furuno
Temperature indicator	Taylor
Bridge watch alarm	RDI
Weather facsimile recorder	Furuno
Power supply system	Newmar
Scanner receivers	Bearcat
PA system	Marine Electric
Hydraulic power supply	Caterpillar
Purse winch	MARCO
Power block	MARCO
Anchor windlass	MARCO
Power block inhaul winch	MARCO
Main boom topping winch	MARCO
Main boom vangs	Gearmatic
Cargo boom topping winch	Gearmatic
Main boom double winch	Gearmatic
Main boom single winch	Gearmatic
Chase boat davit	Campbell
Choker winch	Gearmatic
Cincher winch	Gearmatic
Brailing winch	MARCO
Corkline winches	MARCO
Jib crane	Campbell
Bow crane	National

free-standing king post to support the main boom, cargo booms and crew's nest.

The vessel, which has an overall length of 221 feet 7 inches, beam of 40 feet 3 inches and draft of 20 feet 1 inch, is powered by a single General Motors EMD 20-cylinder 20645 E7B main engine developing 3,600 bhp at 900 rpm with a single fixed-blade propeller. She has an approximate net tonnage of 475 tons and a gross tonnage of about 1,000 tons.

For maneuverability, the Sajo Victoria is fitted with a 350-hp, 47-inch MARCO model T350 bow-thruster powered by a Caterpillar model 3406 DITA engine. Her auxiliary power is provided by three KATO 300-kw generators driven by three Caterpillar Model 3412 DITA engines.



The twin-screw, 360°-rotating-nozzle, ship-docking tug Sally is powered by two G.M. Detroit Diesel Allison engines rated 900 shp at 2,400.

### SALLY Gladding-Hearn Shipbuilding

Gladding-Hearn Shipbuilding, Somerset, Mass., delivered the powerful docking tug Sally to Wilmington Tug and Launch, Inc., Wilmington, Del.

Powered by two Detroit Diesel 12V-149TI diesel engines rated at 900 shp at 2,400 rpm, the Sally has an overall length of 70 feet, beam of 30 feet and draft of 12 feet 6 inches.

The builder describes the Sally as having "the power of a bulldozer and the maneuverability of a sports car." She can handle vessels with deadweights ranging from 50,000 to 125,000 tons.

Like her sister boat Tina, she does not employ conventional rudder with fixed propellers. Rather, the Sally is fitted with a pair of

independent, high-thrust, fully rotatable propulsion/steering units that can be operated individually or together in any direction to put maximum power exactly where it is needed.

The Sally's pilothouse, high above the deck, offers excellent visibility. The helm station features dual unilever-type controls and a

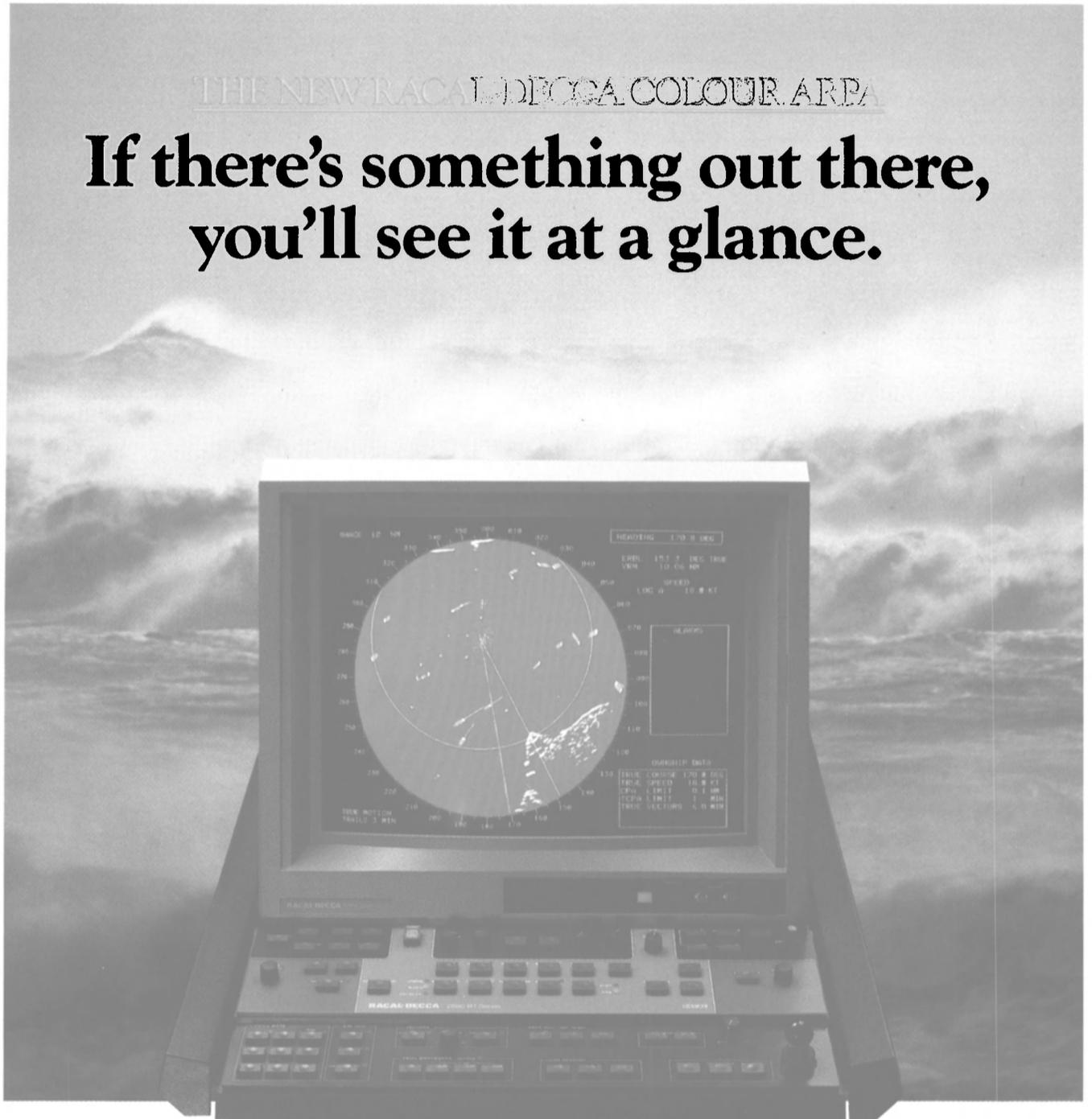
functional console with all necessary instrumentation. The tug is fitted with 12-inch bow and 16-inch aft towing bitts, two 40-ton hand-operated barge winches, and a hydraulic vertical capstan which is incorporated into the aft towing bitt. She is capable of a bollard pull of some 80,000 pounds. Schulyer 6-inch and 11-inch fendering borders the deck

edge, and 9-inch-thick fendering provides gripping action during ship-handling operations.

For ease of service and maintenance, the Ulstein angle drive units, including propellers and Kort nozzles, can be lifted through deck hatches without drydocking the vessel.

(continued)

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### SALLY Equipment List

Main engines (2)	Detroit Diesel
Generator set	Volvo Penta/Lima
Propellers	Ulstein Maritime
Steering	Ulstein Maritime
Controls	Ulstein Maritime
Compass	Ritchie
Radar	Raytheon
VHF radios	Raytheon
Depth sounders	Raytheon
Horn	Buell
Bilge pumps	Jabsco
Anchor	Danforth
Battery charger	Professional Mariner
Searchlight	Phoenix
Navigation lights	Aqua-Signal
Wipers	American Bosch
Fendering	Schulyer
Mufflers	Cowl

## Outstanding Workboats

(continued)

### SEATTLE ENTERPRISE Bender Shipbuilding

Bender Shipbuilding & Repair

Co., Inc. of Mobile, Ala., completed a major reconstruction of the at-sea fish processing vessel Seattle Enterprise for Arctic Alaska Fisheries Corporation of Seattle.

The redesigned Seattle Enterprise is one of only four at-sea U.S. vessels capable of transforming fish, primarily Alaskan pollock, into low-cholesterol fish paste (surimi), used to make imitation crab meat, shrimp and other products.

Originally a 220-foot steel-hull boat used for offshore oil and gas research, the Seattle Enterprise will be employed primarily for fishing and surimi production in the waters of the Pacific Northwest.

With the assistance of a team of maritime professionals, including Arctic Alaska chairman of the board **Francis Miller**, Bender's in-house engineering and design group severed the ship at its midsection and

inserted a 50-foot midbody to add a main fish net deck, processing deck, freezer compartments and freshwater processing area. The converted Seattle Enterprise now measures 270 feet from bow to stern with a 44-foot beam.

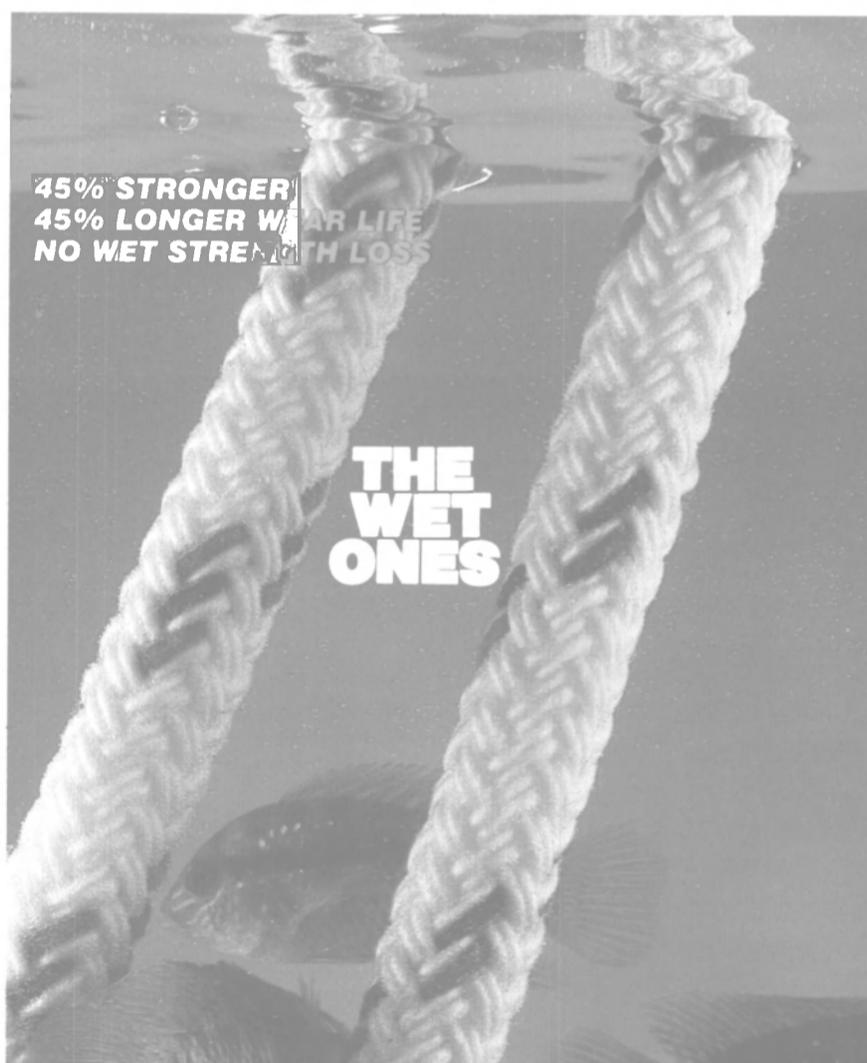
The Seattle Enterprise is equipped with a 47,000-cubic-foot freezer cargo hold and has the capacity to make 104,000 gallons of fresh water per day. The vessel is powered by two EMD main diesel engines rated at 1,950 hp each at 900 rpm. For maneuverability, she is fitted with a Caterpillar-powered 425-hp Bird-Johnson bowthruster. Four KATO generators provide power for the ship's processing plant and crew facilities.

Arctic Alaska owns and operates one of the largest American-owned catching and at-sea processing fleets in the North Pacific. The Seattle Enterprise, manned by a crew of 50, became the largest catcher/processor in the company's fleet when she was placed into service this year.

#### OUTSTANDING WORKBOATS OF 1988

VESSEL	TYPE	DIMENSIONS Lgth-Wdth-Dft (in feet)	BUILDER	MAIN ENGINES	OWNER
Aaron McCall	Crewboat	155x30x8	Gulf Craft	Cummins (6)	McCall Enterprises
Guia/Lider	Tractor tugs	95x34x9.75	Houma Fabricators	EMD (2)	Panama Canal Comm.
Northern Enterprise*	Processor	180	Halter Marine	EMD (2)	Arctic Alaska Fisheries
Phoenix III	Rescue boat	34x13	Munson Manufacturing	Crusader (2)	S.F. Int'l Airport
Protector Class	Patrol boat	28.5x11.6x2	SeaArk Marine	Yamaha (2)	U.S.C.G.
Sajo Victoria	Purse seiner	222x40x20	Campbell Shipyard	GM-EMD	Sajo Industrial
Sally	Docking tug	70x30x12.5	Gladding-Hearn	Detroit Diesel	Wilmington Tug & Launch
Seattle Enterprise*	Processor	270x44x18	Bender Shipbuilding	EMD (2)	Arctic Alaska Fisheries
SuperAmerica	Pushboat	150x45	Quality Shipyards	Caterpillar (2)	Ashland Oil
U.S. Enterprise	Processor	224x42x16	Halter Marine	EMD (2)	Arctic Alaska Fisheries

\*Denotes conversion



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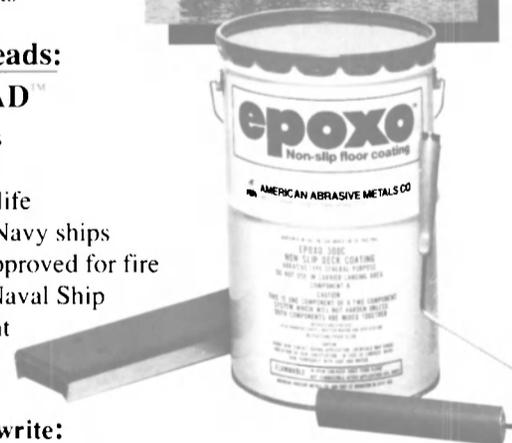
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**SEATTLE ENTERPRISE  
Equipment List**

Main engines	EMD
Bowthruster engine	Caterpillar
Generator sets	KATO
Propellers	Berg
Bow thruster	Bird-Johnson
Hydraulic system	Delevan
Cranes	Alaska Marine
Winches	Rasmussen
Refrigeration System	Sabroe
Sewage Treatment System	Red Fox
Fresh Water Maker	Atlas Danforth
Net reels	Rasmussen
Gilson winches	Lantec
Codend winch	Pullmaster
Process equipment	Baader

**SUPERAMERICA  
Quality Shipyards**

In the spring of this year, Houma, Louisiana-based Quality Shipyards delivered the SuperAmerica, the third in a series of three new 4,200-hp pushboats built for Ashland Oil, Lexington, Ky.

The SuperAmerica, with an overall length of 150 feet and breadth of 45 feet, is powered by a pair of Caterpillar 3606 diesel engines fitted to Falk 24MR40 reduction gears with a ratio of 4.48:1 turning 105-inch Columbian Bronze five-bladed propellers. For additional low-speed power, the SuperAmerica's propellers are fitted with Kort nozzles.

Electrical power is provided by two 155-kw generators each powered by a Caterpillar 3306TA diesel engine.

Some of the navigation and communications equipment featured aboard the pushboat includes two Standard Horizon VHF radios, a Motorola SSB radio, two Sperry Marine radars and an Elac depth sounder.

The SuperAmerica along with her sister vessels, the Paul B. Blazer and the Valvoline, cost \$10.5 million. The three pushboats replaced towboats in the Ashland fleet that were all more than 40 years old.

**SUPERAMERICA  
Equipment List**

Main engines (2)	Caterpillar
Generator engines	Caterpillar
Propellers	Columbian
Reduction gears	Falk
Steering system	Skipper Hydraulics
VHF radios	Standard
Radars	Sperry
SSB radio	Motorola
Depth sounder	Elac
Deck winches	Nabrico
Fuel purifier	Alfa-Laval
Searchlights	Carlisle & Finch
Airhorns	Kahlenberg
Fuel meters	Tokheim
A/C	Carrier
Fire detectors	EMI

**U.S. ENTERPRISE  
Halter Marine**

Besides its delivery of the con-

November, 1988

verted Northern Enterprise to Arctic Alaska Fisheries, Halter Marine, Inc., New Orleans, La., also delivered the first American vessel designed and built to catch pollock and process surimi to the Seattle-based company.

The 224-foot U.S. Enterprise is a floating factory vessel, which is able to catch up to 250 tons of pollock

per day and process 50 tons of surimi.

The boat, which was built at Halter's Moss Point, Miss., yard, was originally intended for use in the offshore oil and gas market. However, while the vessel was still under construction, **Francis Miller**, chairman of Arctic Alaska, saw the boat's potential use as a catcher/

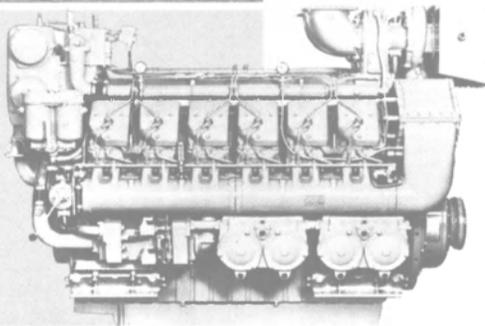
processor. Mr. Miller and the Halter design team redesigned the U.S. Enterprise for her present use.

Powered by two GM-EMD 16-645C diesel engines developing a total of 3,900 hp through Reintjes WAV 2660 reverse/reduction gears, she has a beam of 42 feet and a

(continued)



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## Outstanding Workboats

(continued)

depth of 16 feet. Her diesels drive two Coolidge, five-bladed, 118-inch-diameter by 130-inch pitch, stainless steel propellers in Kort nozzles. The catcher/processor is fitted

with an Atlas Danmark 110,000-gallon-per-day, three-stage evaporation-type watermaker, which provides more than double the water-making capacity needed for processing surimi.

In addition, electrical power for the vessel's Baader filleters, skinners and other processing equip-

ment, refrigeration and hotel service is provided by three Detroit Diesel 380-kw generators driven by three Detroit Diesel 12V71T diesel engines. A fourth 12V71T powers a Schottel S300L bowthruster.

The U.S. Enterprise is fitted with a Westfalia model OSA 7 centrifugal purifier from Centrico to clean the vessel's diesel fuel.

### US ENTERPRISE Equipment List

Main engines (2)	EMD	Muffler	Riley-Beard
Generators (3)	Detroit Diesel	Main switchboard	Continental
Generator engines (3)	Detroit Diesel	General alarm system	Henschel
Bowthruster engine	Detroit Diesel	VHF radios	ICOM
Reduction gears	Reintjes	SSB radio	Stephens
Bowthruster reduction gears	Twin Disc	SSB radio	Skanti
Propellers	Coolidge	Radars	Furuno
Strut, stern tube & rudder bearings	BF Goodrich	Compass	Sperry
Bowthruster	Schottel	Loran	Furuno
Engine controls	Hynautics	Autopilot/gyrocompass	Sperry
Steering controls	EMI	Depth sounders	Furuno
		Batteries	Delco
		Charger	Lamarche
		Net recorder system	Ross
		Clocks & barometer	Chelsea
		Air horn	Kahlenberg
		Waste heat boiler	Atlas
		Bilge & ballast-washdown pump	Durco
		Bilge, ballast, fire & F/O pump	Goulds
		F/O transfer pump	Viking
		F/O centrifuge	Centrico
		F/O strainers	Hayward
		Float gauges	Rochester
		O/W separator	Sigma
		Pressure set pump	Meyers
		Watermaker	Atlas
		Sewage pump	Hydromatic
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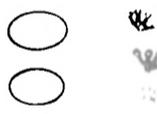
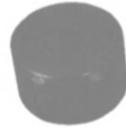
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<p>H-PLANE BEND</p>  <p>SX-1001, LX-1001</p>	<p>O RING KIT</p>  <p>SX-1002, LX-1002</p>	<p>90° TWIST</p>  <p>SX-1003, LX-1003</p>	<p>SX-LX TRANSITION</p>  <p>SX-1004</p>
<p>WAVEGUIDE PRESSURE GAGE</p>  <p>SX-1005, LX-1005</p>	<p>FLEXIBLE WAVEGUIDE</p>  <p>SX-1006, LX-1006</p>	<p>WAVEGUIDE STANDOFFS</p>  <p>SX-1007, LX-1007</p>	
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Maritime Reporter/Engineering News

Crane	Alaska Marine
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Air compressors	Quincy
Air receivers	Manchester
Searchlights	Carisle-Finch
Filleters & skimmers	Baader
Paint	International

### Velocity Marine Announces Opening Of New Marine/Industrial Fabrication Facility

Mark LeBlanc, president of Velocity Marine, Inc., recently announced the opening of the company's new marine/industrial fabrication facility.

The facility is located on two acres in Lakeshore, Miss. It is 10 minutes from highway 90, with direct access to I-10 for all oversized loads.

Velocity Marine, Inc. has the capability to handle all types of steel and aluminum fabrication. The facility can take a project from start to finish or to any phase that is required by the customer.

The company specializes in meeting government rules, regulations, and requirements.

For further information and free literature on Velocity Marine's new marine/industrial fabrication facility

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### MAN B&W Engines Continue To Make Impact —Literature Available

In recent weeks the largest engine in the MAN B&W's four-stroke engine program, the L 58/64, has achieved remarkable sales success, even in Japan.

The shipping company Nippon Yusen Kaisha has placed an order with Mitsubishi Heavy Industries (MHI) shipyard in Nagasaki for the construction of a 49,000-ton cruise liner. The 787.5-foot-long vessel has a diesel-electric propulsion system with four 8L 58/64 diesel engines (aggregate output, 47,000 hp). They give the cruise liner a service speed of 23 knots. The engines will be built under license by MHI.

The MHI shipyards in Kobe and Shimonoseki have also each received an order for a ferry from the Japanese shipping companies Higashi Nihon Ferry Co., and Taiheiyō

Ferry Co. Both ships are to be copies of ferries already in service. The sister ships now ordered will also each be propelled by two MHI-MAN B&W diesel engines.

These newbuilding orders confirm the dominant position occupied by large-bore MAN B&W four-stroke engines in the long-range ferry fleet. Seventy-five percent of the special-purpose ships currently in

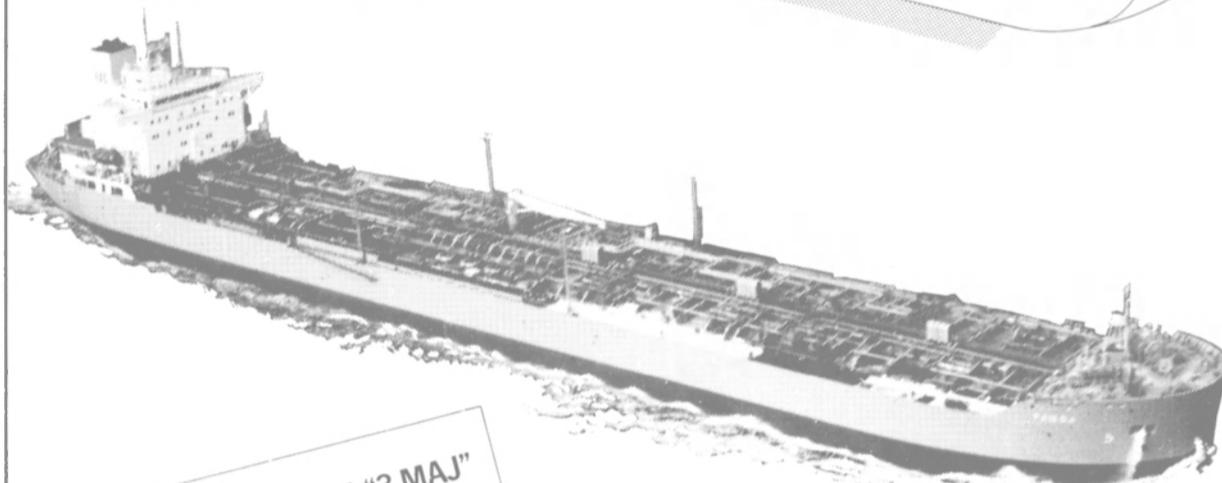
service are powered by license-built MAN B&W four-stroke engines. The engine models concerned are the 40/45, 40/54, 52/55, and the 58/64, covering the power range between 5,000 and 19,000 hp. Their reliability and the resultant increase in aggregate efficiency were decisive factors contributing toward their extraordinary success with Japanese ferry owners.

With the latest orders, fifty-two L 58/64 engines, developing a total of 680,000 hp, have now been sold and are in operation in ferries, cruise liners, passenger vessels, container-ships and bulkcarriers as well as in large diesel power stations.

For more information and free literature on MAN B&W engines,

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Breadth, mid.	32.20 m
Depth, mid.	19.35 m
Design draught	12.60 m
Deadweight at design draught	60,600 t
Trial speed	15.00 knots
Main propulsion engine	"3.MAJ-SULZER" 7 RTA 62
Main engine output	3760 kW at 86 r/min

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## HHI Receives Order For Belgian RO/RO

Ahlers Lines of Belgium has ordered a 13,000-dwt roll-on/roll-off (RO/RO) freighter from South Korean shipbuilder Hyundai Heavy Industries.

The vessel, which is scheduled to

be delivered in the first quarter of 1990, will have a container capacity of 750 TEUs. She will be powered by a twin-engine "father-and-son" propulsion system, featuring two different Wartsila Vasa 46 model diesels.

Upon delivery, the RO/RO ship will be employed in service between the U.K. and Finland.

## Gladding-Hearn Announces Sale Of Its Fourth INCAT To New York City Ferry Service

Gladding-Hearn Shipbuilding, The Duclos Corp., which launched

its first high-speed passenger ferry designed by Australian marine architect Philip Hercus just over a year ago, has announced the sale of its fourth International Catamaran (INCAT) to TNT Hydrolines, Inc., a New Jersey-based subsidiary of TNT, Ltd. of Australia, one of the world's largest transportation companies.

The 82-foot, welded-aluminum, twin-hulled vessel is the first INCAT to service metropolitan area commuters. Beginning early next year, the 265-passenger catamaran will run twice daily from Atlantic Highlands in New Jersey's Bayshore area to New York City. The company also plans to run tourist excursions during midday hours.

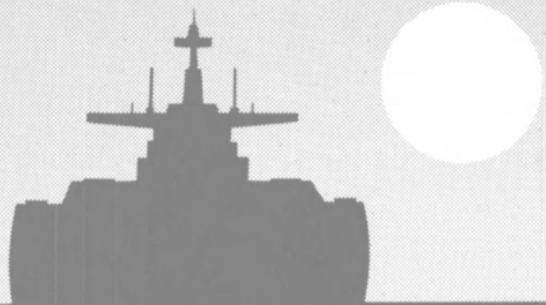
Powered by twin 12-cylinder diesel engines, the new vessel will reach speeds of 30 knots fully loaded.

George Duclos, president of Gladding-Hearn, which holds the East Coast license to build Mr. Hercus's INCATs, said the commuter boat will take between seven to eight months to construct, as each vessel is custom built. The commuter trip to Manhattan is expected to take about 45 minutes.

For more information and free literature on the facilities and capabilities of Gladding-Hearn Shipbuilding,

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## Volvo Penta Engines Stipulated For Each Of Two 'Hybrid' Ships

Four units of Volvo Penta's newly developed 16-liter marine diesel, TAMD 162 type, have been specified for the diesel-electric propulsion plant in each of two "hybrid" ships. The Volvo Penta engines stipulated for each of these vessels are individually rated at 470 bhp (345 kw) at 1,800 rpm and will be coupled to generators of as yet unnamed make.

The 287-foot-long vessels, intended for trade between Lake Vaner and Gothenburg, have been ordered by the Rotterdam company Van Nievelt Goudriaan from the Rabenstein yard, near Nijmegen. They combine RO/RO and LO/LO modes with an oil cargo-carrying capability.

The TAMD 162 was unveiled in Trondheim recently at the Nor-Fishing 88 trade fair. Derived from a high displacement truck engine, it represents an upgrading of the Penta marine range and is aimed primarily at the market for small vessels and workboats with power requirements between 4400 and 600 bhp.

For more information and free literature on Volvo Penta engines,

Circle 43 on Reader Service Card

## E-Systems Received \$2.3-Million Contract

E-Systems, Dallas, Texas, recently received a \$2.3-million contract option exercised by the U.S. Navy for continued production of AN/UGC-136 (AX) military teleprinters for use in the submarine fleet. The contract was awarded by the Space and Naval Warfare Systems Command for 110 teleprinters and ancillary services to be delivered in 1989. Work will be performed by the ECI Division, St. Petersburg, Fla. The initial contract was awarded to ECI in 1987.

## StartMaster Offers 75-Page Air Starter Selection Guide

StartMaster has announced the availability of its new air starter selection guide. The 75-page guide includes specifications on all StartMaster starters, system components, system kits and system schematics. The guide also includes information on air starter applications and electric starter replacements. Also included is an air starter cross-reference list.

For more information on the selection guide and StartMaster air starters,

Circle 98 on Reader Service Card

## Arthur Engel Honored By Mexican And American Foundation

Arthur Engel, president and chief executive officer of Southwest Marine, Inc., was presented with the Amigo de Baja California award at a monthly California Forum luncheon held recently by the Mexican and American Foundation.

Mr. Engel was honored for his highly established business relations with the fishing industry in Baja California. In addition, he was recognized for his local civic involvement and contributions to San Diego's economy.

## Port Of Iberia Acquires 70 Adjoining Acres In Master Development Plan

The Port of Iberia in Louisiana recently completed the purchase of 70 acres of prospective new industrial plant sites from Sterling Sugars, Inc. of Franklin, La.

Transfer of the acreage, which lies immediately east of the present port property, was completed by Rex Champagne, president of the port's board of commissioners, and Fred Clark, president and chief executive officer of Sterling Sugars, Inc., one of Louisiana's largest su-

gar-producing companies. The port paid \$500,000 for the property.

Work on the newly acquired land to convert it into commercial and industrial business tracts will begin immediately, according to John J. Oubre, executive director of the Port of Iberia, who noted that bids have already been asked for capital improvements to the property. He estimated the cost of proposed improvements at approximately \$1 million, adding that the project fol-

lows recommendations of the recently revised master development plan of the port. He added that the new Sterling land addition will expand current port-owned property by about 75 percent to a total of over 225 acres.

Coincident with the land purchase and advertising for improvement bids, Mr. Oubre noted that the U.S. Army Corps of Engineers at New Orleans has asked for public

comments on a proposal to extend the port's Commercial Canal across Vermilion Bay and into the Gulf of Mexico. If approved, the project would give the Port of Iberia a 12 x 150-foot channel connecting the port with deep water in the Gulf.

For free literature giving complete information on the facilities and capabilities of the Port of Iberia,

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For nearly 50 years, our complete line of sil-brazed products has been made to exact Navy specifications . . . made in America . . . and made to last.

Flagg Flow products are in stock now, at key locations across the country.

Plus, you can count on Flagg for a level of assistance, training and support no other supplier offers.

Specify Flagg Flow, and you'll make all the *right* connections.

### Marine Products

#### Threadless Bronze Fittings for Brazed Joints

- Fittings • Flanges • Unions
- Pressure Classes 200-3,000#
- Made to Commercial and Military Specifications
- U.T. Designs Available
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Now available! Step-by-Step Successful Brazing Video and Booklet.

Stanley G. Flagg makes brazing simple and successful. This new instructional video and booklet covers step-by-step techniques from proper fit and clearance, to cooling and cleanup.



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Circle 237 on Reader Service Card

## Employee Buyout Helps Seattle Yard Emerge From Bankruptcy

In one of the largest union-led buyouts in recent years, over 400 union and non-union shipyard workers became the owners of Seattle-based tug and barge builder WFI Industries, helping the company to emerge from bankruptcy. The firm

will now be known as Unimar International.

Donald Liddle, former president of the Inlandboatmen's Union, became chairman and chief executive officer of Unimar International. Mr. Liddle, head of one of the 12 unions involved in the buyout, was instrumental in arranging the help of Drexel Burnham Lambert, the investment banking firm, to formulate a buyout plan.

Under the reorganization plan, Unimar will have two operating subsidiaries—United Marine Shipbuilding, Inc. and United Marine Tug and Barge Inc. Richard Woeck, former owner of WFI, will head United Marine Shipbuilding, while Michael Woeck, will run United Marine Tug & Barge.

Employees will own 73 percent of the common stock of Unimar through an employee stock owner-

ship plan. The remaining common stock will be held by unsecured creditors, Richard Woeck and Drexel Burnham Lambert.

In a speech to the employees, Mr. Liddle said: "Although the past year has been extremely difficult and at times our cause seemed hopeless, this is the exciting moment we have worked so hard for. Today, we stand together not just as united workers but as partners and owners."

The shipyard plans to secure work from the commercial fishing industry. At present, a number of fish processor/trawler boats are being constructed or are planned for use off the coast of Alaska. Unimar also intends to secure U.S. Navy, Coast Guard and Department of Defense repair contracts.

## Robotic Vision Gets \$900,000 In Navy Funding For Propeller Project

Robotic Vision Systems, Inc., Hauppauge, N.Y., recently announced the restoration of \$900,000 by the U.S. Navy for the company's ongoing advanced propeller manufacturing program. So far, a total of \$1.9 million has been restored to the program in FY 1988. The funding relates to the automated adaptive machining of Navy propellers using 3-D machine vision-based measurements for guidance.

Robotic Vision Systems, Inc., designs, develops, manufactures and markets advanced three-dimensional vision-based intelligent robotic and inspection systems for industrial and military purposes.

## Hempel's Reports Good Response To New Cargo Barriers Coatings

Hempel's Cargo Barriers, a range of specialized coatings for the protection of cargoes/cargo tanks, has been well-received in the marketplace since it was launched in March 1987.

During that period, the company received 80 enquiries—37 for new-buildings and 43 for maintenance contracts. Of this total, 12 projects were not proceeded with by the owner; 21 were awarded to Hempel's (eight newbuildings, 13 maintenance); 16 were placed elsewhere, and 31 are pending awaiting a decision.

The 21 tank coatings contracts awarded to Hempel's were placed by owners in the USA, U.K., Norway, Denmark, the Netherlands, Greece, Singapore and Japan.

Cargo Barriers constitute a total of six organic and inorganic coatings plus two shop primers, which generate 10 different coatings systems, all of which are set out in an easy-to-read systemized selection chart.

In addition, the Range is backed by a computerized Cargo Protection Guide, which provides owners with detailed "tailor-made" information.

For free literature containing full details on Hempel's Cargo Barriers,

Circle 97 on Reader Service Card

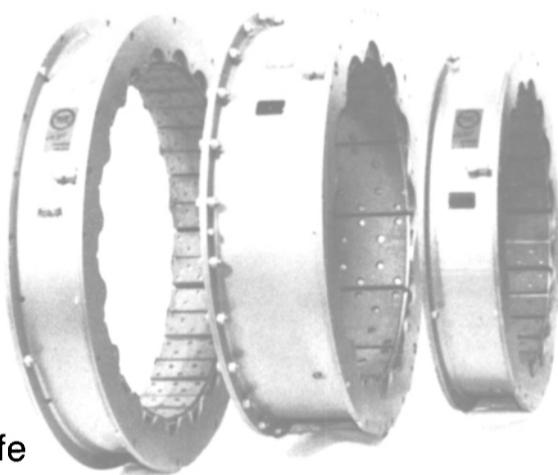
# HALEY IS TOUGHEST IN A CLUTCH!

## Here Are 5 Reasons Why



### 1 TORQUE BARS-HALEY

torque bars are constructed of heat treated steel pins embedded in a hard neoprene compound. This unique feature prevents excessive wear on the aluminum shoes and adds a torsional damping factor to torque bar arrangement, resulting in longer life



### 2 SIDE PLATES-HALEY

side plates are manufactured from a high carbon work hardening plate, with case hardened torque pin holes. Allowable yield stresses are 200% higher than material used by others.

### 3 FRICTION MATERIAL-

Is an asbestos free special compound with an exceptionally high coefficient of friction. The friction material has superior wear resistance, even in oily atmospheres.

### 4 AIR GLAND TUBES-

Air gland tubes are constructed from a special neoprene compound, developed by ARM-STRONG RUBBER COMPANY, with superior strength characteristics and good resistance to oils, fuels and solvent contamination. The tubes feature a

special liner for air retention and 50% greater strength. The extra high strength synthetic cord allows higher air pressures and increasingly higher horsepowers.

### 5 DRUMS-HALEY

drums are fabricated from high quality, high strength steel to provide excellent wear resistance and toughness. These characteristics eliminate catastrophic drum breakage typical of cast iron drums.



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Circle 266 on Reader Service Card

## Hyundai Australia Direct Formed Through Merger For U.S.-Australian Service

Hyundai Merchant Marine and Pacific Australia Direct Line recently merged their U.S. West Coast-Australian ship services to form a new joint company.

The new company, Hyundai Australia Direct Line, will be based in Hyundai's Portland, Ore., office. Pacific Australia and Hyundai will own equal shares of the new company, but Hyundai will be responsible for managing all of Pacific Australia's operations.

S.G. Lee was named president of the new service, while Capt. Y.J. Huang was named head of operations.

The line will operate six ships, calling at the North American ports of Long Beach and Oakland, Calif., Seattle, Wash., and Portland, Ore., and the Australian ports of Brisbane, Melbourne and Sydney.

## Gibbs & Cox Announces Key Appointments

Richard M. Erlich, chairman of the board of Gibbs & Cox, Inc., recently announced two key management appointments.

Peter Sollecito has been appointed division head of the new Bath Division located in Brunswick, Maine. Mr. Sollecito, a graduate of the New York State Maritime College, has been at Gibbs & Cox for 33 years and has served in various capacities as project engineer and department manager, and, most recently, as the firm's DDG-51 project manager.

Anthony J. Guido has been appointed division head of the HULL Division. Mr. Guido, who is a graduate of the Polytechnical Institute of New York, has been employed at Gibbs & Cox, Inc., for 37 years. His last assignment was as assistant division head of the Hull Division.

## Raytheon Division Gets \$12.3-Million Contract Sub Combat System Parts

The Submarine Signal Division of the Raytheon Co., Portsmouth, R.I., was recently awarded a \$12.3-million modification to a U.S. Navy contract for spares for the AN/BSY-1 (V) program. The work is expected to be completed in February 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-86-C-5216).

## Stauff-Test Pressure Check System Developed By Stauff Corporation

Stauff Corporation of Waldwick, N.J., has developed the Stauff-Test Pressure Check system for immediate measurement of system pres-

ures up to 8,500 psi.

Stauff-Test features include a built-in, spring-loaded check valve that is self-sealing and prevents the loss of fluids, which allows connections or releases to be made under system operating pressures without tools. All seal material is of viton material.

According to the company, all-steel construction assures long life

even under adverse conditions. System pressure measurements can be made by direct gage connection or by hose if test point is inaccessible.

Stauff-Test enables fast coupling for supervision and control of high pressure, low pressure and vacuum systems, as well as allowing for venting and media sampling.

Stauff Corporation, with headquarters in Waldwick, N.J., has

manufacturing facilities throughout the world. Stauff is a leading producer of superior quality hydraulic components and accessories. Stauff products are available via a network of distributors in all industrial countries.

For more information and free literature on the Stauff-Test Pressure Check system,

Circle 2 on Reader Service Card

## CUMMINS MARINE GENERATOR SETS... 37-925 kW

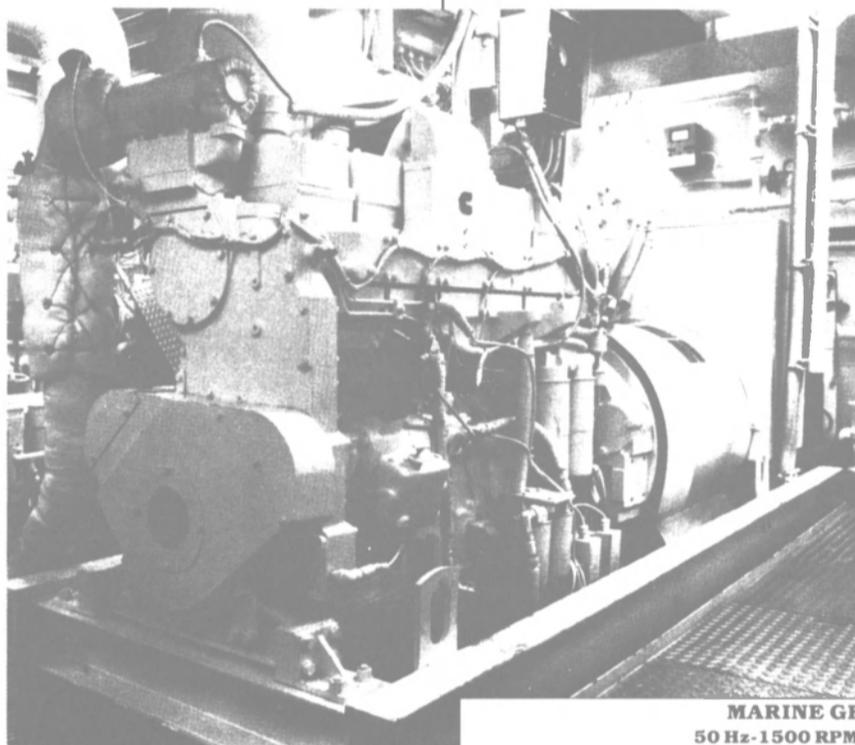
Cummins offers a complete line of marine generator sets designed for performance, reliability and durability in a broad range of 37 to 925 kW. And, with Cummins

you always get high quality, on-time delivery, and fast, dependable service.

Cummins marine generator sets are available with heat exchanger, radiator, keel or remote cooling. Other available optional equipment includes: base rails, isolators, mufflers, electric or air starting, engine control panel, generator control panel, manual or automatic paralleling, alarm system, and Cummins EFC, American Bosch or Woodward governors.

Cummins generator sets are available with Marine Agency Certification. For specific agency approved ratings, contact Cummins Engine Company.

Cummins has more than 300 Marine Distributors and branches located in over 160 countries. The Cummins Distributor can provide complete technical and pricing information on Cummins shipboard generator sets, or you may write: Cummins Marine Generator Sets, Cummins Engine Company, Inc., Box 3005, MC 60403, Columbus, IN 47202-3005, U.S.A.



MARINE GENERATOR SETS

Model	50 Hz - 1500 RPM		60 Hz - 1800 RPM		Weight kg. (lbs.)
	Rated BHP	max Cont.* kW	Rated BHP	Max Cont.* kW	
4B3.9G GC	52	33	61	37	658 (1450)
4BT3.9G GC	71	40	82	50	687 (1514)
6B5.9G GC	90	45	97	55	835 (1840)
6BT5.9G GC	113	65	134	72	865 (1905)
N-855G GC	160	110	195	125	2295 (5055)
NT-855G GC-2	265	175	320	215	2586 (5695)
NT-855G GC-3	310	205	355	235	2651 (5840)
NTA-855G GC	322	215	385	260	2747 (6050)
NTTA-855G GC-1	380	255	420	285	2851 (6280)
KT19-G GC	380	255	420	285	3330 (7335)
KTA19-G GC-1	425	285	505	335	3487 (7680)
KTA19-G GC-2	450	355	525	360	3575 (7875)
VT28-G GC	530	360	620	420	5008 (11030)
VTA28-G GC-1	614	410	690	465	5471 (12050)
VTA28-G GC-2	614	410	750	510	5650 (12445)
VTA28-G GC-3	745	510	—	—	5766 (12700)
KT38-G GC	750	515	910	625	7377 (16250)
KTA38-G GC-1	850	575	1030	700	7416 (16335)
KTA38-G GC-2	890	615	1085	750	7872 (17340)
KTA50-G GC-1	1180	815	1350	925	8989 (19800)

\*0.8 Power factor. KW rating may vary depending on voltage required. Ratings shown are approved by the various marine agencies.



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**NOBODY KNOWS DIESELS BETTER**

Circle 291 on Reader Service Card

## Safety Lifting Clamps For Plate And Structural Steel Featured In New Brochure

Inter Product Inc., manufacturer of the IP Safety Lifting Clamp, has released a new four-page color brochure featuring their three popular clamps for the handling of plate and structural steel.

The brochure describes the Type IP with straight hoisting eye in sizes from 0.5 metric ton through 30 metric tons. The clamp has a double locking safety latch, is test loaded at the factory at 200 percent above the safe working load, comes with a certificate of test, a two-year warranty, and repair parts which may be purchased separately.

The Type IPU has all the same features and benefits as the Type

IP. An additional feature is the universal hoisting eye which allows the clamp to be placed in any position on the load without reducing the safe working load. Both Type IP and IPU will turn plate completely over when needed.

Also featured in the brochure is the Type IPHTON for lifting plates in the horizontal position. This improved clamp, used in pairs, allows for a safe working load at 120-degree

top angle of the sling.

For more information and a free copy of the new color brochure,

Circle 5 on Reader Service Card

## Leslie Controls Offers New Service Brochure

A new color brochure highlighting the total service capabilities for industrial, commercial and marine control equipment is now available from Leslie Controls, Inc. of Tampa, Fla.

The six-panel brochure details the advantages of remanufacturing—on-site repair and installation, 12-month warranty, and genuine Leslie control valves, regulators, heaters, controllers and instrumentation. The material also offers preventive maintenance tips, discusses cost savings benefits and Leslie's stocking program, and lists all remanufacturing capabilities available at the five Leslie Service Centers nationwide.

For more information and free copies of the new total service brochure from Leslie,

Circle 74 on Reader Service Card

## G.A. International Names Perlowski Sales Manager



Walter Perlowski

Gunter Olbrich, president of G.A. International Electronics Corp., Staten Island, N.Y., recently announced the appointment of **Walter Perlowski** to the position of sales manager. Mr. Perlowski comes to G.A. from NavCom Inc., a subsidiary of Magnavox, where he most recently held the position of product manager of transportable Inmarsat Communication Terminals.

At G.A. International, Mr. Perlowski will be responsible for all aspects of sales and customer support.

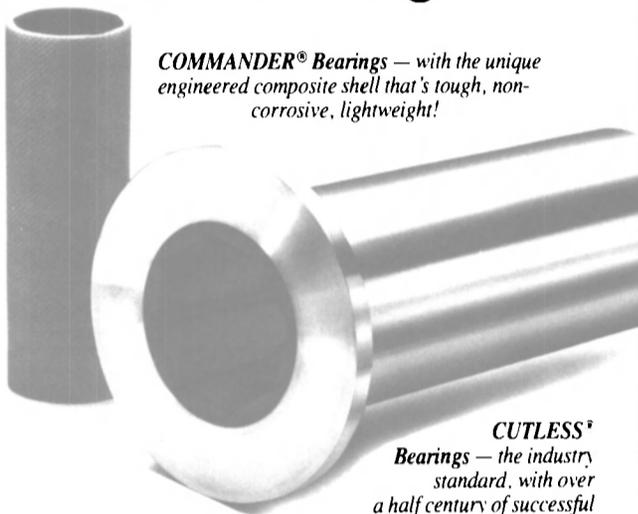
G.A. International, established in 1983, represents many leading marine electronics firms, including Debeg, Simrad, Krupp-Atlas, Digital Marine, Magnavox, C. Plath and Anschuetz, building a strong reputation for good service and product support.

Mr. Perlowski has established a sales office for G.A. International in Syosset, N.Y.

For more information and free literature on G.A. International Electronics,

Circle 54 on Reader Service Card

## The Name You Trust for Bearings

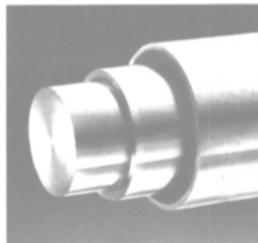


**COMMANDER® Bearings** — with the unique engineered composite shell that's tough, non-corrosive, lightweight!

**CUTLESS® 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® Bearing Staves** — special nonmetallic design for longer sleeve life, noncorrosive for easy removal.

## and Outstanding Value, for More Than 60 Years.

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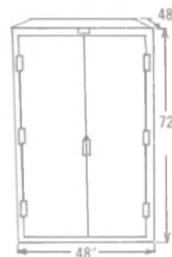
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## ★FIBERGLASS PRODUCTS★ ★GANGWAYS★

**SURVIVAL SUIT STORAGE CABINET**  
Available with or without window. Optional shelves. Stainless steel hardware and hinges; gel coat interior and exterior. Watertight. Safety yellow, red, emerald green, gray, white, blue, orange.



**24-HOUR DELIVERY ON MOST SIZES**

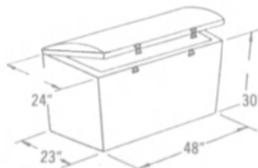
**STAGE GANGWAYS**  
\*8'-40', 750 lb. capacity  
\*Rope or aluminum handrails  
\*Anti-skid deck \*Specify width (standard 24" or 28")

**CURVED TREAD GANGWAYS** Safe climbing surface at any angle between ship and dock.

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\*Available with ropes, rails or all aluminum construction \*Aluminum anti-skid deck surface \*All stainless steel bolted and welded for maximum safety and trouble-free service \*Lengths up to 60 ft. \*RENTALS AVAILABLE IN STOCK 10'-50'

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## Man without toilet has no place to go



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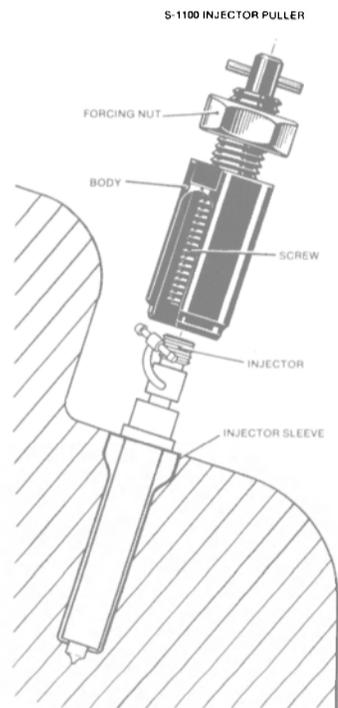
## Texaco And OMI Tankers To Be Chartered By Navy

Two privately owned product tankers will be chartered by the Navy's Military Sealift Command to serve with its prepositioning force and haul bulk petroleum for the Defense Department.

One charter, which went to Texaco Refining & Marketing Inc., involved the 42,000-ton Texaco New York, and was for a firm, fixed price, plus reimbursables, of \$36,261,573.

The other charter, which went to OMI Bulk Transport Inc. of New York City, for \$36,192,874, was for either the OMI Champion or OMI Charger, each of about 38,000 tons.

## Kiene Diesel Accessories' New Injector Puller Saves Time And Money



Kiene Diesel Accessories' S-1100 injector-puller saves time by preventing accidental removal of the injector sleeve. This means that draining of coolant and replacement of sleeves is eliminated.

Kiene Diesel Accessories, Inc. of Addison, Ill., has introduced a new diesel fuel injector puller that prevents accidental sleeve removal and coolant leakage. The compact, new S-1100 injector puller is especially effective for tight, in-chassis situations and is designed specifically for the Navistar DT 360 and 466 Series engines. Approved by Navistar, the S-1100 exerts pressure against the injector sleeve to remove even the most stubborn injectors quickly and easily. The versatile, heavy duty S-1100 can be used with a wrench or air-driven ratchet, in the shop, or in the field.

Maintenance engineers, shop foremen and fleet owners who want to save time and money on diesel maintenance can send for a specification sheet including key features and instructions for use.

For over 45 years, Kiene Diesel

Accessories, Inc., has been supplying and servicing specialized diesel engine and fuel injection tools for OEMs, independent service facilities, state and local governments and others involved in diesel engine maintenance.

For more information and free literature,

Circle 65 on Reader Service Card

## First Two Of Six 'Probos' Delivered By KSEC

The first two products/ore/bulk/oil carriers were recently delivered to Norway's Bulkhandling pool by Korea Shipbuilding & Engineering Corp. (KSEC).

The 48,000-dwt Probo Baro and Probo Bangor are joining the Nor-

wegian International Ship Register and will go into the pool's contract system. Four similar vessels are being delivered by KSEC during the next few months, with two being registered with NIS and two in Hong Kong. The six vessels will have Norwegian masters, with crew drawn from Norway, India and the Philippines.

# "Welcome back, Baldt."

It's nice to hear words of welcome. For Baldt, the past two years have been a rough voyage. We made it to 1988 by navigating tricky currents and uncharted waters.

Frankly, it wasn't easy. The world economy wobbled; Baldt wobbled with it. Oil prices plummeted; our off-shore business dried up.

We fought foreign competition all the way. Hanging tough, we won. Today, new orders have revived our basic chain and anchor business.

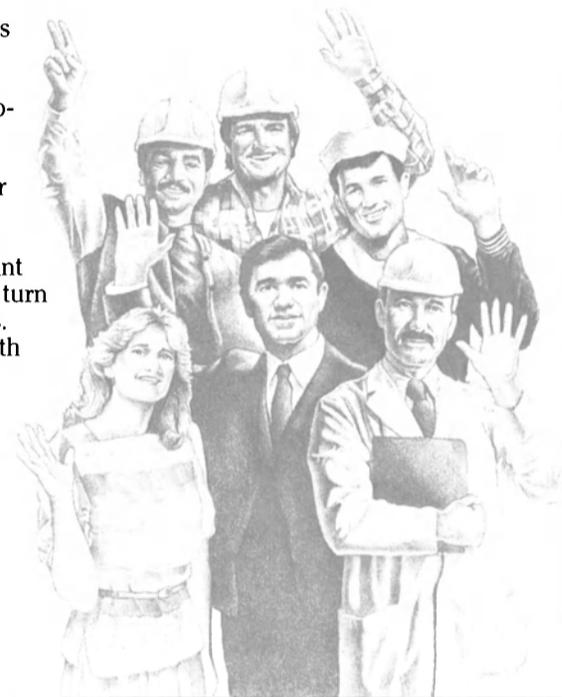
We've streamlined our company with a rededicated management team. We've divested our subsidiaries. We've renewed our plant modernization efforts, expanding our ability to do what we do best: turn out the world's strongest, longest-lasting chain and related products.

To all our friends on the seven seas, thanks for standing fast with us. With new direction, the word from Baldt is Full Speed Ahead.

*It's nice to be back.*

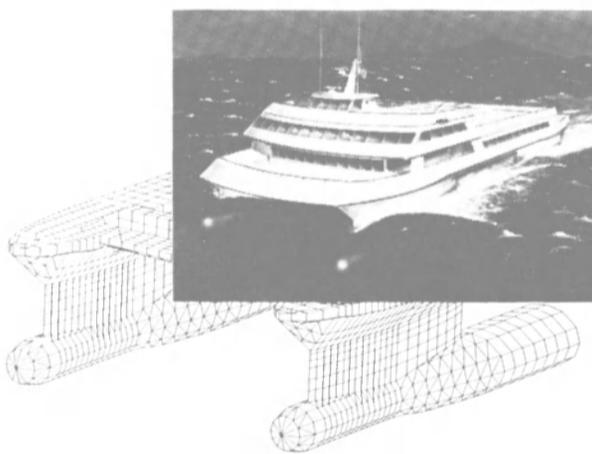


Baldt Incorporated, P.O. Box 350, Chester, PA 19106 215/447-5200  
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## Reliability in an Ever-changing World



**U**ncompromised Dedication to Promote the Security of Life and Property on the Seas.

Building with Integrity and Ingenuity on 126 Years of Service to the Marine and Offshore Industries.

Classification, Certification and Verification at its Finest.



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Circle 15 on Reader Service Card

## New ARQ Radio Telex Station Offered By Hull —Literature Available

Hull Electronics, a leader in the innovative design of state-of-the-art multipurpose HF-SSB transceivers, related equipment and systems, recently introduced a ARQ radio telex station.

This completely integrated and factory-tested station utilizes the Hull Model 230 SSB transceiver with a high-speed ARQ telex option kit installed and a Hull Model H-404Cu automatic antenna coupler. These are coupled to an ARQ modem with a keyboard, a video monitor and high-speed printer to complete the station.

Hull's ARQ station enables the user to send and receive error-free telex messages. Text is composed

using the keyboard and stored in memory. It can be edited by viewing it on the video monitor. If a hard copy of the text is required, it may be obtained by the use of a printer. The ARQ station's memory capability stores incoming messages which may be routed to either the monitor or the high-speed printer.

For free literature on Hull's affordable ARQ radio telex station,

Circle 82 on Reader Service Card

## GE Awarded Modification Worth \$20.2 Million For Nuclear Propulsion Work

GE's Machinery Apparatus Operation, Schenectady, N.Y., was recently awarded a \$20.2-million modification to a contract for naval nuclear propulsion components. The work is expected to be completed September 30, 1996. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-4035).

## Hans G. Nilsen Appointed Vice President Of JJH Inc.



Hans G. Nilsen

Richard R. Hopkins, president of JJH, Inc., a leading naval engineering firm, recently announced the appointment of Hans G. Nilsen to the position of vice president, Cherry Hill office.

In this new position, Mr. Nilsen will oversee the Cherry Hill operation. Most recently, Mr. Nilsen established and managed the company's Bath, Maine, office where he held the position of technical director.

## Schrader Offers Six-Page Color Brochure On Marine Propulsion Control Systems

Schrader Bellows of Akron, Ohio, is offering a free six-page, full-color brochure on Mariner Speed King® marine propulsion control systems and interchangeable components (with other control systems) which are precision-designed and engineered for virtually every vessel design.

Under "Ordering Information," the brochure lists part numbers and gives descriptions of Gear-Mate® Hydraulic Clutch Shipsets; Mark IV® Air Clutch Shipsets; Commandair Over Center Clutch Shipsets; Commandair Cable Replacement Shipsets; and Transfer Stations.

Part numbers and descriptions are also given for major components, service and repair kits, and accessories.

The publication is well illustrated with photographs, drawings, and diagrams of typical installations, along with descriptive text.

For more information and a free copy of the brochure on Schrader Bellows Mariner Speed King marine propulsion control systems and components,

Circle 6 on Reader Service Card

### Shiprepairing Facilities (for all kind of vessels)

#### Unlimited Drydocking Capacity ■

North Yard - Rocha, 4 Drydocks (up to 21 000 DWT)  
South Yard - Margueira, 4 Drydocks (up to 1 000 000 DWT)

#### Blasting and Painting (own equipment) ■

External: 5 000 sqm/day; Internal: 1500 sqm/day

#### Lifting Means (up to 300 tons) ■

20 Rail Cranes, 10 Mobil Cranes and 2 Floating Cranes

#### Well Equipped Mechanical, Piping and Plate Shops ■

#### Highly Skilled Manpower ■



North Yard - Rocha

### Other Services

- Gasfree Certificates; Cathodic Protection (GASLIMPO)
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- Electrical and Electronic Repairs (ENI)
- Industrial Cooling; Air Conditioning (FRINIL)
- Towing and Marine Services (REBOCALIS)
- Tankcleaning Storage and Bunkering Station (BOLIDEN)
- Reconditioning of Spare Parts (LISNAVE)
- Steel Fabrication (LISNAVE)

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Circle 107 on Reader Service Card

## Krupp MaK Wins \$21.6-Million Retrofit Contract For Canadian Icebreaker—Literature Available

Krupp MaK Maschinenbau GmbH of Kiel, West Germany, recently signed a 40-million Deutsche mark (about \$21.6 million) contract with the Canadian shipyard Halifax Dartmouth Industries Limited for the complete retrofit of the propulsion system of Canada's largest icebreaker, the Louis S. St. Laurent.

The turbine electric DC installation will be

replaced by a diesel electric AC/DC system. Total installed diesel power will be 31,560 kw from five diesel generator sets, type 16 M 453 C of 5,880 kw each, and two diesel generator sets type 6 M 282 of 1,100 kw each. In addition, the contract specifies the general overhaul of the DC-propulsion motors and testing of the propulsion system on a special test rig in Canada.

Krupp MaK is the general contractor for the whole propulsion system. The electrical part will be supplied by Siemens Electric Limited Canada.

Other contracts recently concluded by Krupp Mak include two containerships ordered by Chi-

nese state shipping company COSCO from Howaldswerke Deutsche Werft AG, which will have six Krupp MaK diesel generator sets (in all COSCO will then have eight ships with 24 MaK diesel generator sets); Dutch reefer owner Seatrade will have its third reefer built by Van Diepen Werft in Holland equipped with a 6 M 601 main propulsion engine of 6,600 kw; and a 6 M 601 main engine with 6,000 kw has been specified for a Spanish tuna seiner.

For free literature containing full details on the facilities and capabilities of Krupp Mak,

Circle 55 on Reader Service Card

## Navy Approves PPG Coating To Stop Cable Fires—Brochure Available

PPG Industries of Pittsburgh, Pa., has developed and commercialized a proprietary coating to stop shipboard fires that ignite cable systems. PITT-CHAR® 200 coating is the first of its type approved for use by the U.S. Navy to coat electrical cables and penetrators. The first commercial application was recently completed on the USS Kennedy aircraft carrier.

Shipboard fires that ignite cable systems spread rapidly, are virtually uncontrollable and threaten human life. According to the Naval Sea

Systems Command, Washington, D.C., "PITT-CHAR 200 has successfully passed testing conducted by the David Taylor Research Center (DTRC) and is approved for application to fire zone penetrations as a fire-stop method."

Although the cable systems in newer ships within the fleet are covered with material that minimizes smoke and gases during fires, more than 500 ships in the existing fleet contain millions of feet of combustible cable that can produce heavy smoke and toxic fumes when burned.

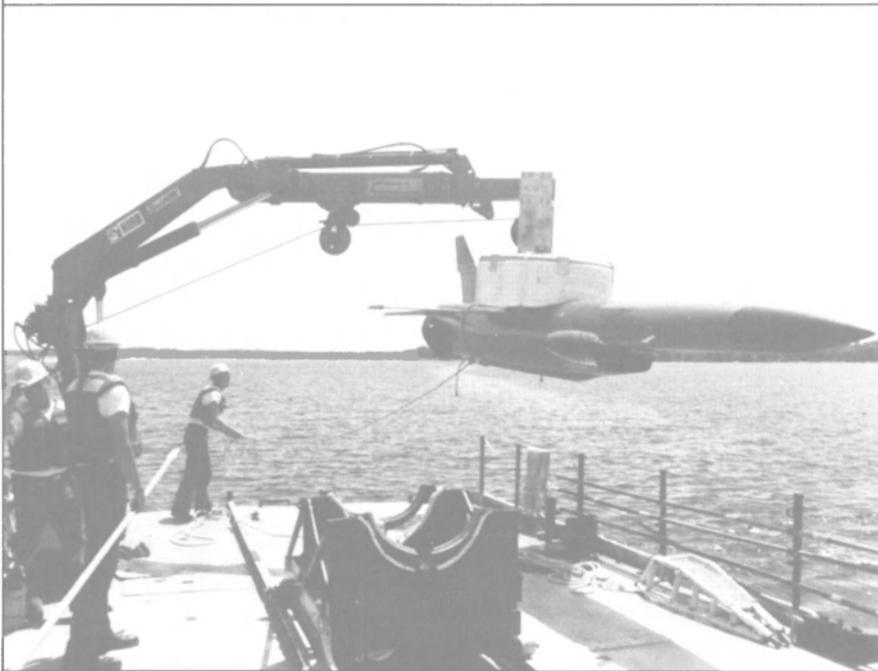
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Canada's largest icebreaker, the Louis S. St. Laurent, will have a new Krupp MaK diesel electric AC/DC system that is expected to reduce fuel consumption by more than 40 percent.

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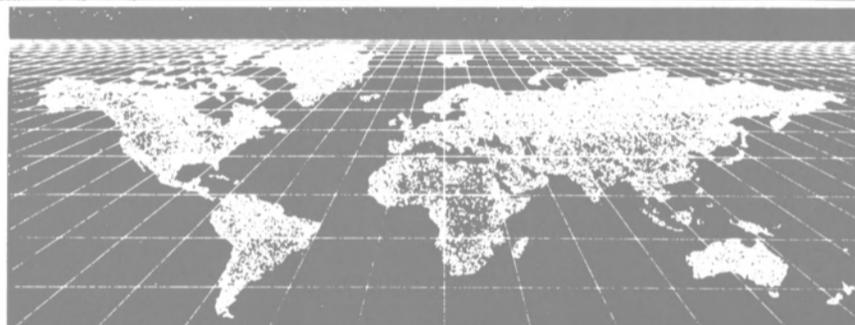
\*patent pending

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79

## \$12.3-Million Hyundai Import Facility To Be Built In Portland, Ore.

Hyundai Motor America and the Port of Portland recently announced that a \$12.3-million facility dedicated to the importation of Hyundai automobiles will be built in Portland, Ore. Construction of the facility is scheduled to begin

early next year, with completion set for February 1990.

A minimum of 100,000 cars a year are expected to be moved through the port each year by Hyundai, which imported some 65,000 cars through Portland last year.

The facility, which will be leased by Hyundai for 15 years with an option for two additional five-year leases, will include a dock, a 60,000-square-foot processing building and holding lot for incoming cars.



**"During the drought of '88, about all that flowed was communications."**

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## Modern Cargo Pumps For Tankers And Barges

by

Dipl. Ing. Heinrich Moller and Asmus W. Feck, P.E.\*

*\*Editor's Note:* Dipl. Ing. **Heinrich Moller** is general manager and technical director of Bornemann Pumps, Obernkirchen, West Germany. **Asmus W. Feck, P.E.**, based in Pawleys Island, S.C., is an international marine engineering consultant. This article has been excerpted from a technical paper written by Mr. Moller and Mr. Feck.

Accurate cost estimating is a fundamental part of operating a profitable vessel. Nowadays, sea voyage time can be estimated fairly accurately. However, one area that continues to defy accurate cost estimates is the time spent after the ship docks at a tanker terminal.

Generally speaking, the docking time of a tanker or barge is inherently dictated by the shore facilities and the design of the cargo pumping and loading systems, as well as the type and size of the main cargo pumps and drivers installed on board. Naturally, shipowners want to keep docking times as short as possible.

For this reason, every shipowner should guide the shipbuilder in selecting the best main cargo pumps for his needs. Ideally, they should be from a well-established, experienced manufacturer with an identifiable presence in the marine industry and a worldwide after-sale/service network. And, as we believe, the external gear two-screw pump is the pump all modern tankers and barges should be using for their main cargo loading/unloading and stripping services.

In practice, it is difficult to estimate the discharge time of a tanker or barge equipped with reciprocating duplex piston cargo pumps. One problem is the inherent cargo product vaporization of highly volatile solvents as benzene, benzol and similar fluids. This characteristic tends to vapor lock cargo pumps suction, and when it does, it automatically voids all unloading time estimates.

It is common marine engineering knowledge that piston-type cargo pumps cannot cope with high-volume percentages of vapors and air bubbles entrained in pump suction lines. From the very first moment of "lost suction" conditions, all reciprocating piston cargo pumps are exposed to "dry running" conditions if not stopped immediately. Continuous dry running operation wears piston rings, cylinder liners and pump valve chest suction valve services. It can take more than 30 minutes before a piston-type cargo pump is able to regain suction flow. Under these dry running conditions, i.e., with little or no suction flow passing through the piston pump liquid cylinders, it will be impossible to control or estimate the overall unloading time of the vessel.

Not all conventional centrifugal

cargo pumps are self-priming. This means that if exposed even momentarily to lost suction conditions, they will not be able to pick up suction quickly. Hence, continued cargo unloading is not possible. The end result in most of these lost suction cases is that unacceptable delays in cargo unloading have to be accepted.

However, there are modern cargo pumps available that offer more efficient, versatile and economical operation. Twin-screw main cargo pumps have been successfully used on board European motor tankers for many years.

The twin-screw cargo pump is a self-priming, positive displacement pump designed for cargo loading/unloading and capable of tank stripping service. They combine the characteristics of a piston pump (positive displacement) with the characteristics of a centrifugal pump (rotating, pulse-free delivery) but without the inherent operating disadvantages of both.

Twin-screw pumps can be operated at speeds of up to 2,000 rpm. Space requirements for them are relatively small, requiring as little as 50 percent of the space required for otherwise equal capacity piston pumps. And, equally important, the twin-screw pump offers absolutely continuous performance with suction line capability of up to 95 percent by volume of entrained air or gases. One of the biggest advantages a twin-screw cargo pump offers is the capability of extremely high suction lifts.

In the case of light viscosity cargoes, such as solvents, benzene, benzol, or even seawater, the two-screw pump can lift a suction vacuum of 24 in. Hg (about 27.5 feet). Furthermore, when pumping viscous cargoes, a viscous fluid film is formed around the pump screws. This film acts as a sealant and serves to increase the pump suction lift to 27.3 in. Hg (about 31 feet).

It is, of course, true that any amounts of entrained air or gas will reduce the actual flow at the pump discharge. These actual losses in discharge flow rates cannot be eliminated. However, even under these trying suction conditions, unloading with twin-screw cargo pumps will never be disrupted unless the volume percentage of air or gases exceeds 95 percent.

It is also important to note that with their inherently balanced design, two-screw cargo pumps are far quieter running than equivalently sized piston or centrifugal pumps operating under the same conditions. The observed noise level will be about the same as a well-balanced electric motor sized to drive the pump. And while it is possible to observe higher noise levels when pumping through too small suction

or discharge piping, or with high air or vapor bond fluids, the increase in noise levels from these conditions will be less for two-screw pumps than for the other types of cargo pumps mentioned.

At present, over 20,000 twin-screw pumps are in service on board modern European coastal tankers and barges.

What is generally not well known is that over 5,000 twin-screw cargo pumps are installed in Europe in land-based tanker off-loading terminals to serve river barges not equipped with their own cargo unloading pumps. These pumps are often driven by reversible rotation drivers and fitted with special piping so they can be used for both loading and unloading.

Many tankers and barges are equipped with independent main suctions and separate cargo stripping lines of smaller nominal diameters. In those cases, it is possible to switch twin-screw cargo pumps from the main lines to the cargo stripping lines and continue stripping the cargo tanks with the main cargo pumps. In essence, the main cargo pumps can be used as high-capacity strippers.

In the case of moderate-size tankers (about 50,000 dwt), when fitted with twin-screw cargo pumps, only three or four twin-screw cargo pumps are recommended per ship set. This excludes independent cargo stripping pumps but retains independent cargo stripping lines of smaller diameter, which are required for future tank cleaning services by the main cargo pumps.

Twin-screw cargo pumps can be driven by electric motors, diesel engines, steam turbines, gas turbines, turbo generators, hydraulic motors, PTOs from main engines or gear boxes.

They are preferably operated at speeds ranging from 1,000-2,000 rpm. Thus, shipboard 60 Hz AC power supply is suitable to operate electric motor-driven twin-screw pumps at 1,150- or 1,750-rpm speeds. In all cases, it is always recommended to provide ample driver bhp so in the event of lost cargo heating, when liquid viscosity and absorbed pump bhp gradually increase, adequate horsepower is still available.

In practice, cargo pump drivers are installed in the engine room or on the main deck in a deckhouse. The pumps, either in a pump room or submerged in a cargo tank-well, are driven by jack shafts or cardan shafts via the bulkhead or engine room flats. The drive shafts are sealed by gas-tight, self-aligning bulkhead stuffing boxes. It is not essential to place twin-screw pump suctions close to the ship's bottom, i.e., inside a pump room. It is, however, still good engineering practice to locate cargo pump suctions as low as possible in a pump room or cargo tank suction well so the main pumps can be used for tank cleaning and cargo stripping.

Twin-screw pumps can also be installed directly into a cargo tank. There may also be a choice between single- or two-speed motors, if so desired. Deck space required for

these arrangements are minimal.

For the transportation of heavy viscous crudes, Exxon Corp. installed aboard several existing 40-51,000-dwt steam tankers three to four horizontal twin-screw cargo pumps per ship set to replace centrifugal cargo pumps. The new units have a cargo discharge capacity of 5,000 gpm each, at 1,200 rpm pump speed driven by 1,000-hp geared steam turbines capable of speeds from 250 to 1,200 rpm. All units

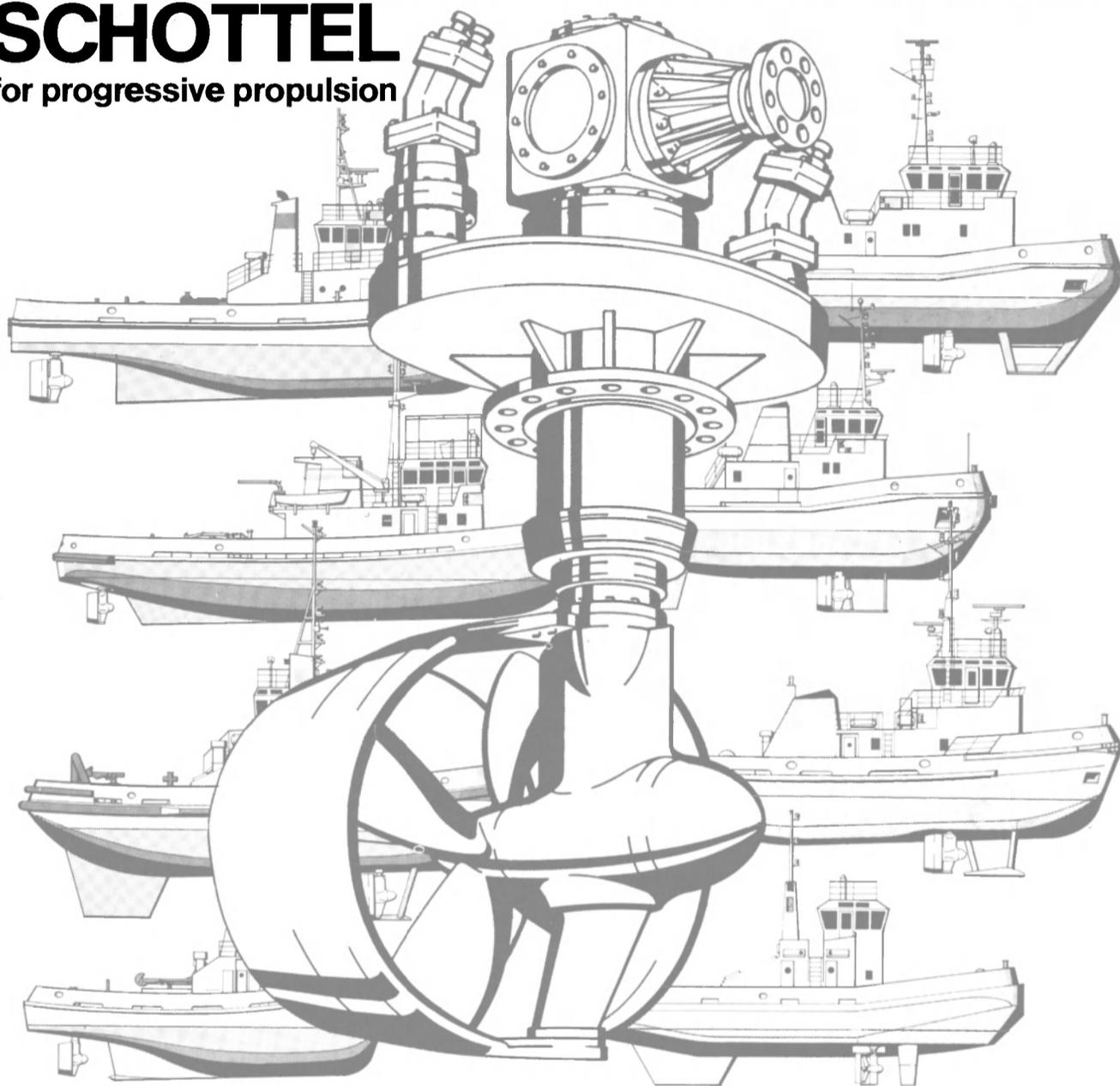
were retrofitted by a major East Coast shipyard in 1980/81. The large twin-screw pumps are also used to strip the cargo tanks dry at low pump speeds and eliminated the need for special self-priming air pumps. The cargo pumps were installed at the lowest possible level in the main pump room aft. By request of the shipowner, the ships were refurbished with vertical positive displacement cargo stripping pumps. The independent cargo

stripping pumps serve a separate cargo stripping piping system for cargo tank cleaning.

Some U.S.-flag shipowners have been looking for main cargo oil pumps suitable for handling an ever-increasing range of cargo products—from the lightest to the heaviest viscosities. Others are inter-

(continued)

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## Tanker/Barge Cargo Pumps

(continued)

ested in handling crude oils only, but with viscosities up to 35,000 SSU (7,600 cst) at low temperatures. Others still ask for pumps capable of handling alternately such cargoes as bitumen, asphalts, tar, bunker C, fuel oil, heating oil, marine diesels, benzene, benzol, solvents, molasses, caustics, alkalies, and fresh or seawater.

In this regard, it must be admitted that the existence of a "universal" tanker is not foreseen in the very near future. Nonetheless, interested shipowners ought to remember that the existing twin-screw cargo pumps have successfully demonstrated their unsurpassed capability in handling all of the aforementioned cargo products. They have also proven themselves aboard an offshore storage and treatment vessel, located on the U.S. West Coast, since 1981.

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## MSC Awards \$7-Million Contract To Jacksonville Shipyards

Jacksonville Shipyards Inc., Jacksonville, Fla., was recently awarded a \$7-million contract for the material and readiness upgrade of the USNS Marshfield (T-AK-282), a Military Sealift Command (MSC) dry cargo ship used for submarine resupply. The work is expected to be completed December 14, 1989. The contract was awarded by the Military Sealift Command, Washington, d.c. (N00033-88-C-3034).

# ELECTRONICS UPDATE

## Furuno Introduces High-Power FR-1500D Series Radar

Because changing conditions at sea may require higher radar transmitter power, Furuno U.S.A., Inc. of San Francisco, Calif., has introduced the 25-kw version of its popular FR-1500D series radar, the FR-1525D.

This radar offers 8-level quantized data on a bright, non-fading 15-inch diagonal CRT which produces a steady, accurate picture of all radar targets available. There is no fading, and highly sophisticated computer techniques, along with echo stretch and averaging, significantly improve target detection. The FR-1525D offers a variety of



Furuno's new FR-1525D Raster Scan Radar.

operating features like dual VRMs and EBLs, audible and visual alarm zone, on-screen target plot, and Furuno's exclusive low-noise microwave integrated circuit design for

long life and improved performance. Maximum range is 96 n.m. and there is built-in provision for the new RP-1 navigation plotter. Additionally, all system functions and modes are clearly shown on the CRT.

The FR-1500Ds provide two convenient features. One is the ability to off-center the radar picture by up to 75 percent of the screen size in any direction, making it easy to check potentially threatening targets ahead, to either side, or even astern. The other feature is the 2X zoom, where any portion of the screen picture can be instantly doubled in size by merely pressing a single button.

This new Furuno FR-1525D radar, with choice of 4, 6, or 8-foot antenna, meets the needs of shipowners everywhere, as well as being appropriate for larger yachts and work vessels.

For free literature giving complete information,

Circle 19 on Reader Service Card

## Acurex Introduces 'AutoNet'—Its Latest Portable Software System

—Literature Available—

The Autodata Division of Acurex Corporation recently introduced its latest software system—AutoNet.

Designed to work with PCs and Acurex's AutoFamily line of products, AutoNet provides a cost-effective means of gathering, organizing and displaying data from a variety of electronic sources. The Auto-

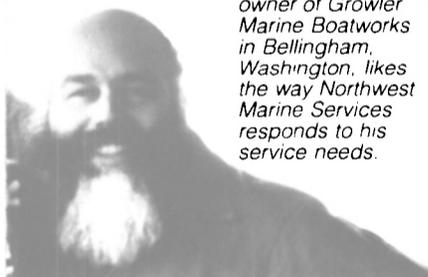
Family product line consists of the AutoGraph data recorder, the AutoCalc low-cost data logger and the AutoLink intelligent front-end. Up-to-the-second measurements from every unit within a complex production network can be directed to a single video screen where you can monitor alarm conditions, print



AutoNet software may be used with a single PC monitoring a single "front-end" AutoFamily device, or it may be expanded to a system of multiple computers monitoring thousands of data points from numerous AutoFamily front-ends at once.

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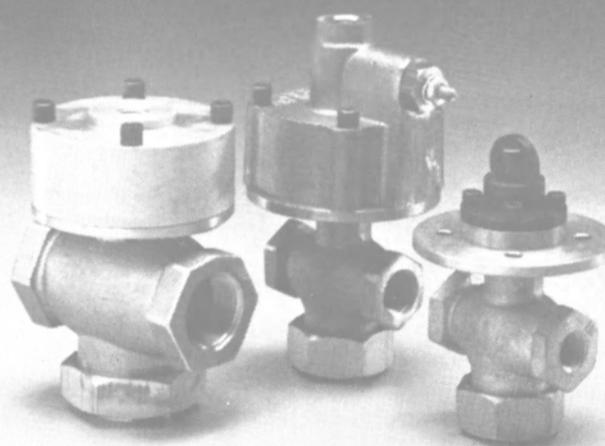
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data reports and graphically view current and historical operation.

AutoNet is portable and operates on a variety of computers that utilize the 8088, 80186, 80286, and 80386 processors. Additionally, PC DOS application software such as Lotus 1-2-3, word processing and database management programs may run concurrently under an optional operating system emulation package without interrupting the data acquisition process. AutoNet is menu-driven with each function in the main menu being accomplished by a "help" screen accessed at the touch of a key. AutoNet is ideally suited for most industrial applications, including manufacturing environments, electric and water utilities and chemical, food and pharmaceutical plants.

For more information and free literature giving full details on AutoNet from Acurex Corporation,

Circle 21 on Reader Service Card

### Morton Downie Appointed Assistant VP Of JJH Inc.



Morton S. Downie

**Richard R. Hopkins**, president of JJH Inc., a leading naval engineering firm, recently announced the appointment of **Morton S. Downie** to the position of assistant vice president, Bath, Maine, office.

In this position, Mr. Downie will oversee the management of the JJH Inc.'s Bath office. He brings to this position years of corporate expertise in management, marine design and construction, as well as on-site inspection and design liaison engineering.

Mr. Downie's career with JJH Inc. began in 1965 as a structural designer assigned to the Philadelphia Naval Shipyard. Throughout the years, he has worked on various liaison assignments, most recent being technical director, Great Lakes office.

### 75-Page Book On How To Survive Abandoning Ship Offered By Viking

Having the right safety equipment aboard is the most effective way of reducing the life-threatening aspects of abandoning ship at sea. Add a thorough knowledge of survival techniques and the possibilities of living to tell about such an adventure increase dramatically.

A new, highly authoritative source for information on both these subjects is now available. The booklet, "Safety at Sea," was originally

published by Viking Life Saving Equipment Co. for distribution in the Scandinavian countries, but requests for an international edition from authorities, training schools, shipowners and operators have resulted in the availability of an English-language version.

The author is **J.E. Uden**, Commander s.g. of the Royal Danish Navy. In 75 pages of factual text, and a multitude of photos and illustrations, he covers all facets of

emergency abandonment of ship and subsequent survival at sea. Included are methods of properly leaving the ship, launching and using life rafts, distress signals, cold water survival, surviving on emergency rations, preparing for helicopter rescue, as well as how to rescue survivors from life rafts and boats. Information and photos are also provided on modern, state-of-the-art lifesaving equipment and their proper use.

The information contained in "Safety at Sea" is applicable to the operation of commercial vessels and large pleasure craft.

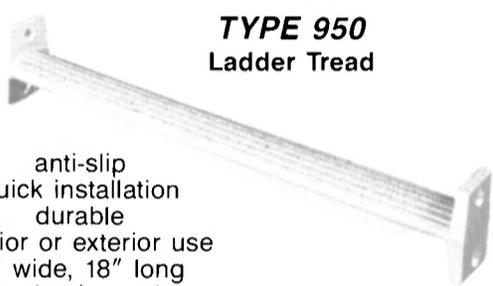
Copies of "Safety at Sea" are available from Viking Life Saving Equipment (America), Inc., 38 N.W. 11th Street, Miami, Fla. 33136. The cost is \$9.50, including mailing and service charges. Special quantity prices are available to accredited marine training schools and organizations.

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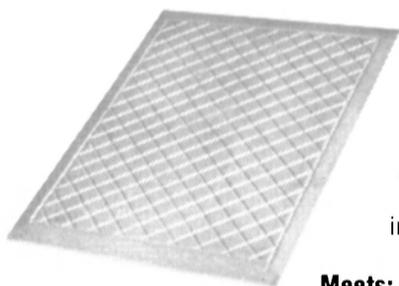
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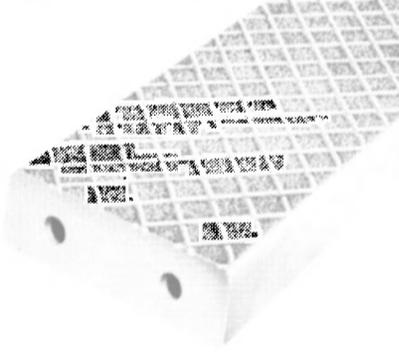
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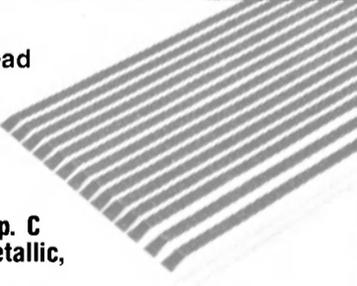
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## Tidewater Marine Adds Five MarAd Vessels To Worldwide Fleet

Tidewater Inc.'s marine division, Tidewater Marine Service, has acquired five vessels from the Maritime Administration at an aggregate cost of approximately \$4.4 million.

The five-vessel package includes

one towing-supply and four supply vessels. The vessels, originally delivered in 1981, have been in possession of the Maritime Administration for the past several years. According to Tidewater Marine president **Richard M. Currence**, they will enter service with Tidewater's domestic and international fleets upon completion of refurbishment.

This is Tidewater Marine's fourth vessel package purchase in the past

nine months, bringing the number of vessels the company owns worldwide to 264. "Since December 1987, Tidewater Marine has either purchased or assumed management of 34 vessels in an effort to continue to meet demand, predominantly in the U.S. Gulf of Mexico," Mr. Currence said. "Although offshore drilling activity appears to have leveled off in recent months, a substantial portion of our Gulf of Mexico

fleet is involved in production and development projects and we expect demand for our fleet to continue, based upon current conditions."

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

## Kockums Computer Acquires All Rights To Autokon Systems

Kockums Computer Systems AB of Malmo, Sweden, recently acquired all rights to Autokon Systems from Autokon Cim Systems A/S in Oslo, Norway.

For more than 10 years, Kockums Computer Systems has marketed and installed their CAD/CAM system, Steerbear, for the shipbuilding and offshore industries, mainly in Europe. Autokon Cim has marketed and installed their Autokon Systems worldwide to the same industries. Sales and marketing of the Autokon and Steerbear systems will now be handled by Kockums Computer Systems AB in Malmo.

The acquisition will strengthen the position of the two leading CAD/CAM systems, especially designed for the shipbuilding and offshore industries, by increased development resources, increased worldwide user base and a better coordination of sales and marketing activities.

For more information and free literature,

Circle 37 on Reader Service Card

## Goldstar Introduces Color Fish Finders

—Literature Available



The new FCC-800 color fish finder from Goldstar Precision Co., Ltd., is easy to operate and read.

Goldstar Precision Co., Ltd., recently introduced their two new easy-to-operate, multifunction color fish finders.

The new units, the FCC-800 and FCC-1000, feature eight-color presentation on a high-resolution, easy-to-read 8-inch diagonal color CRT. The fish finders have four display modes and are offered in single or dual frequency—28, 50, 75 and 200 kHz.

In addition, the FCC-800 and FCC-1000 offer an audible alarm for preset min/max depths, window and surface water temperature. Both units can interface with a Loran C receiver NMEA 0182/0183.

For free color literature fully detailing the new Goldstar Precision color fish finders,

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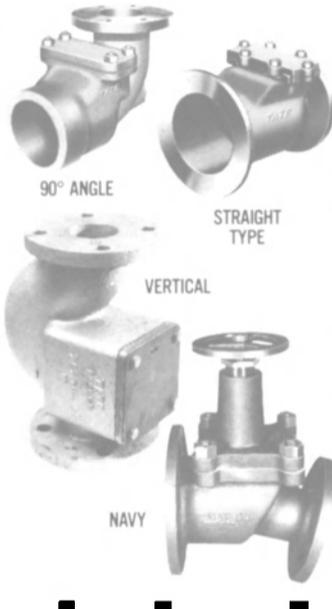
## DRAINS & TRAPS



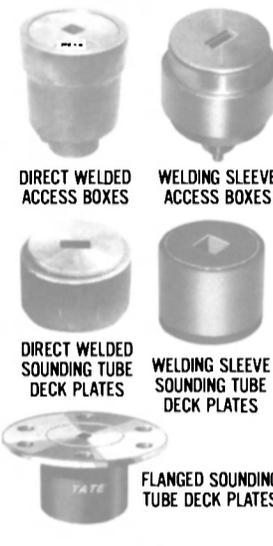
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# PROPULSION UPDATE

## MAN B&W Diesel Introduces Two More Large Bore Engines

### Popular MC Engine Series Sales Rise

Orders for MAN B&W Diesel's MC two-stroke series engines are on the rise, according to the company. By mid-September of this year, the company reported that 1,246 MC low-speed engines with an aggregate output of 16,056,900 bhp (nominal) were on order or in service, with installations aboard vessels ranging in size from large fishing vessels to state-of-the-art containerships and VLCCs.

MAN B&W Diesel has now introduced two more large bore model options—aimed at the container-ship sector—to the MC program. The new models, designated

K80MC-C and K90MC-C, are special versions of successful 800-mm and 900-mm bore engines. The 12-cylinder K90MC-C engine raises the upper limit of the MC program to 67,080 bhp. The new versions offer shipowners and shipbuilders the same benefits as other MC engines—high reliability and low operating and production costs.

Three 12-cylinder K90MC engines, each developing 64,320 bhp, have been ordered for a trio of large containerships which will be the most powerful single diesel-propelled vessels ever commissioned. Ten-cylinder, 900-mm bore engines,

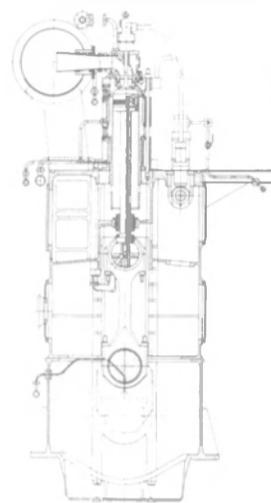
each with a maximum rating of 53,600 bhp at 90 rpm, were ordered for a series of nine containerships being built for Danish owner A.P. Moller. The last three of these ships will be fitted with the 12-cylinder engines, though originally ordered with 10-cylinder engines.

The popularity of the MC series reflects the scale of its power range, one of the widest on the market. Eight bore sizes ranging from 260 mm to 900 mm offer outputs from as low as 870 kw (1,190 bhp) to 49,320 kw (67,080 bhp). The operator's selection of an engine which most precisely matches his newbuilding or retrofit project is enhanced by a choice of three different stroke-bore ratios—2.875:1 (K-models), 3.24:1 (L-models) and 3.8:1 (S-models)—and optimum individual layout flexibility.

The opportunity to maximize operating economy in integrated propulsion/auxiliary plants is also promoted by MAN B&W Diesel's development of the exhaust gas power turbine-based Turbo Compound System to boost the propulsive or electricity generating effort.

The broad appeal of the uniflow

S26MC CROSS SECTION



Recent orders for the newly introduced S26MC diesel suggest that the 260-mm bore design might become a popular choice in the small-to-medium-sized ship sectors.

scavenged MC program is emphasized by a number of significant propulsion plant installations in recent months. Among them was the 3,900- (continued)

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## Large Bore Engines

(continued)

TEU Marchen Maersk, the first of A.P. Moller's 10K90MC-powered advanced containerships to enter service.

The other end of the power spectrum saw the seagoing debut of the S26MC design, the latest and smallest addition to the MC series, in the 126-TEU feeder containership Rok-

ku Maru. The six-cylinder S26MC develops 2,185 kw (2,970 bhp) at 250 rpm.

Orders for the S26MC for new-buildings in China and South Korea, as well as a great deal of interest from European customers, suggest that the 260-mm bore design will increase the low-speed engine's penetration of the small-to-medium-sized ship sectors—a market already successfully targeted by the 350-mm bore MC models.

The larger bore MC models are well suited for "new generation" VLCCs now entering service, as well as other larger tankers and bulk carriers. The 600-mm bore design remains a popular choice for medium-sized bulkers, tankers and containerships.

Besides the overall economy, reliability and durability engineered in to MAN B&W Diesel low-speed diesel engines, an operator's costs can be reduced further by using CAPA,

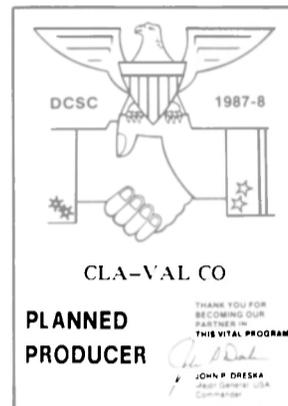
the company's new computer-based performance analysis and maintenance control system. Consumers will also benefit economically from the introduction of CIM (Computer Integrated Manufacturing) by MAN B&W Diesel engine licensees. Already, R&D and component simplification has reduced the number of production hours for an MC engine by around 20 percent as compared with earlier models, and assembly times have been cut even more significantly.

For free literature detailing MAN B&W Diesel's MC engine program,

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## Cospolich Develops Refrigerators With Extraordinary Capability

While working with the U.S. Coast Guard and commercial vessel owners on the problem of replacing existing failed equipment, Cospolich Refrigerator Co. Inc. of Kenner, La., engineered and constructed a series of modular refrigerators. The design of these units, which are comprised of a series of interlocking components, allowed for equipment upgrades without having to cut accessways in decks and bulkheads, or modify passageways.

The advantages of modular units are a drastic reduction in vessel downtime and real cost savings through elimination of modifications.

The model R10F10-2M-ADS (Modular) comes standard with a stainless steel finish on both the exterior and the interior. Polyurethane insulation is used to give the best insulating values. Models with a freezer feature an automatic defrost system. Other options available include aluminum finish for weight savings or nonmagnetic considerations.

In addition to the modular refrigerators, Cospolich manufactures standard models comprised of different capacities and various capabilities.

For more information and specifications on the modular refrigeration series, and a brochure on other available equipment from Cospolich Refrigerator Co.,

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## Penn Ship Awarded Navy Maintenance Pact Worth \$69 Million

Pennsylvania Shipbuilding Company, Chester, Pa., was awarded a \$69-million, five-year phased maintenance contract by the U.S. Navy for work on three ammunition ships.

The contract, which covers work on the USS Butte (AE-27), USS Nitro (AE-23) and USS Suribachi (AE-21), runs from FY 1989 to FY 1993 for nine availabilities of which six will be three-month topside jobs and the remainder will be for four-month drydocking work. The first ship will arrive at the shipyard in January.

Maritime Reporter/Engineering News

## New Rules To Mandate Sealing Of Barges

By John T. Lombard, Vice President, Sales,  
American United Marine Corporation,  
And Bruno Klaus, Managing Director, Tanksystem SA

As new rules now on the drawing boards go into effect—probably within the next two years—operators of barges carrying gasoline and other petroleum products will find it necessary to ensure that their vessels are vapor tight.

Oceangoing tankers for some years now have been required to keep cargoes of crude oil or oil products hermetically sealed from the atmosphere and blanketed with a protective inert gas which does not contain enough oxygen to permit ignition. The rules now being proposed for barges used on inland waterways do not include the use of inert gas, but are designed rather to protect workers and the environment from any emissions of hazardous or noxious fumes.

Various government agencies are included in promulgating the new directives. Principal among these is the U.S. Coast Guard's Chemical Transportation Advisory Committee (CTAC). This group is currently planning to issue an initial draft on hydrocarbon emissions in February 1989, with the Final Rule to follow around February 1990.

The Environmental Protection Agencies of several states are also working on similar rules, which may in some cases be more stringent and may come into effect earlier than those of CTAC. These states include New Jersey, California, and Louisiana. It is estimated that in 1987, four trillion gallons of gasoline were shipped from New Jersey alone.

One of the problems which can be foreseen in the conversion of liquid-carrying barges to vapor-tightness is the reluctance of employees to accept all of the changes in operating procedures that will be required. Barge operators are for the most part trained on the job, and often by their own fathers and grandfathers. This results in a great reverence for doing things "the way they've always been done."

Other factors to be considered before beginning the conversions include the four important ways in which barges differ from river boats or oceangoing ships. These are: 1) barges are unpowered; 2) they are unmanned; 3) their tank bulkheads are of relatively low strength; and 4) they are often laid up with little or no maintenance availability.

Therefore, the converted barge must be designed to operate simply, reliably, with little pressure differential between inside and outside, without any need for power, and—as much as possible—just as it was before being sealed.

The actual sealing up of the barge's tanks is a fairly straightforward engineering task. Obviously, all outlets to the atmosphere must be sealed off in some manner. This requires merely the closing of all openings and the judicious selection and proper installation of the most suitable cargo venting system, over and under pressure protection and level monitoring and sampling system.

Because of the flammable nature of gasoline and the other "White Products" covered by these regulations, proper grounding procedures must be followed at all points where static buildup might cause a spark. The system should be designed so that incoming cargo forces vapor displacement, keeping the tank pressure slightly above that of the atmosphere. This will assure that any gas movement will be toward the outside of the tank, rather than risking air leakage to the inside so as to create a potentially explosive mixture.

It is important that vapor headers should be routed so that all vapors (or vapors plus liquid, in the event of an overflow) will be discharged into an overflow containment tank rather than into the atmosphere or the surrounding water. All shore connections should terminate in a detonation arrestor and a stop valve.

A more complicated decision to be made is that of selecting a method of measuring the levels of the tank contents. Here the options present various degrees of complexity, and the goal must be to choose a reliable system which is not so complicated that it inspires resentment among the crew who must utilize it.

The most common method used today for determining the cargo level as the barge is being filled is known as "counting the rungs"—which is a literal description of the process. The tankerman merely opens a hatch and observes how high the liquid has risen on the access ladder. CTAC and the state EPAs are certain to take a dim view of the fire safety, operator working conditions, and environmental impact of this traditional mode of measurement.

Some acceptable systems, however, are not too drastically different from rung counting.

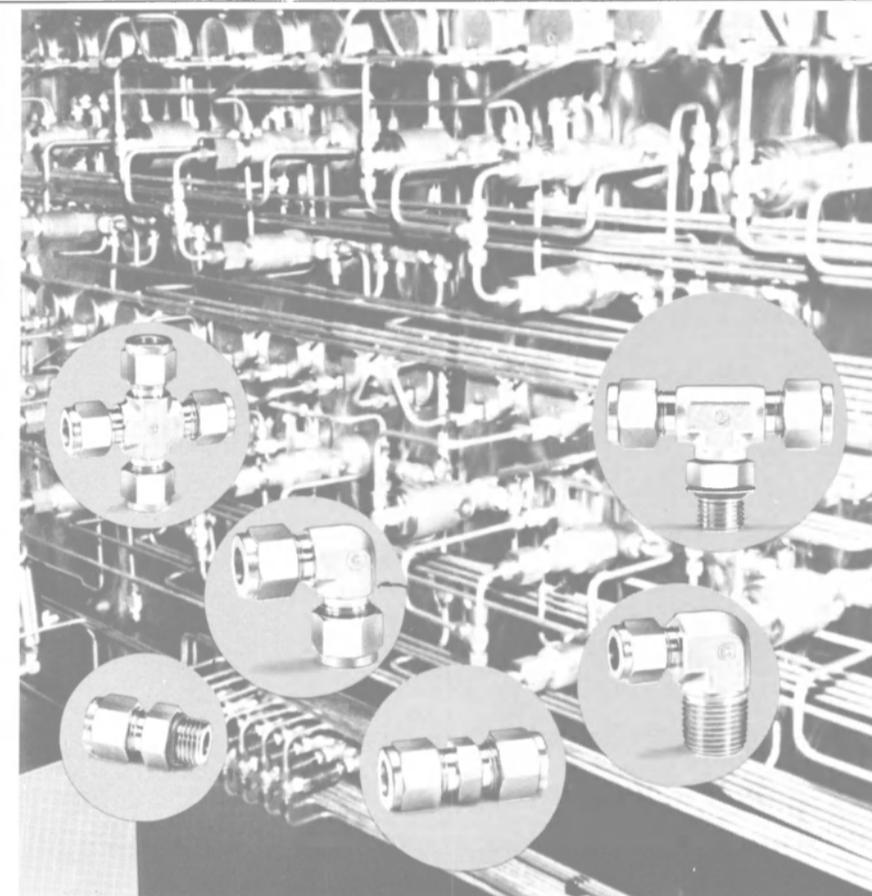
One solution is to install a dual set of sight glasses in the hatch over the cargo tank. This allows the tankerman to "count rungs" as before, but he is protected from the cargo vapors by a solid barrier. The dual glasses provide one for sighting

and one for introducing light. Each port should have a wiper assembly to remove condensed vapors on the cargo side, and a cover should be used to protect the ports when not in use.

A second, more efficient measuring method is one in which a portable, battery-operated electronic sensor is lowered through a sealed valve port on a measuring tape. The sensor produces different audible signals when its tip is in contact with air, liquid hydrocarbon, or water. It

can be introduced through valves as small as 1 inch in diameter up to 4 inches simply by selecting the proper fittings.

These systems—known as Hermetic UTI-GT (Ullage, Temperature, Interface Detector—Gas Tight)—are manufactured and distributed by Tanksystem SA of Bulle, Switzerland. The exclusive agent for the United States and North America is American United (continued)



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## Rules For Barge Sealing

(continued)

Marine Corporation (AUMC) of Saugus (Boston), Mass. With a little practice, these tapes are almost as easy to use as a sounding line for measuring water depths. The tapes are calibrated in both inches and centimeters. Temperature is displayed either in degrees, Fahrenheit or Celsius.

Barges routinely load cargoes for multiple destinations with specific volumes for each customer. To measure these volumes, "step gauging" is used. The ullage sensor bob is positioned in the tank at a level determined from tables on board, and cargo is unloaded until the liquid surface falls to the level of the bob.

The gauging tape is installed on top of a ball valve by means of a quick connector. The gastightness is

guaranteed up to 3 psi tank pressure, thus protecting the operator and the environment from any hazardous substances such as benzenes and toluenes.

Sampling containers are also available which can be used through the same 2-inch valve used with the measuring tapes and probes just described to provide removal under vapor-tight conditions.

A more sophisticated system is the high-level alarm and overflow

control system distributed by Vimex A/S of Tonsberg, Norway, which is also exclusively distributed by AUMC in North America. This equipment utilizes acid resistant stainless steel floats in contact with the liquid cargo. The floats carry magnets which activate reed switches when preset levels are reached. Audible and visual signals are presented by an alarm panel to the operators, either on board or at remote locations such as the terminal office.

In addition to warning with alarms, the panel can also be programmed to activate valves or pumps which will counteract the overflow situation. This is the same type of equipment which has been used on oceangoing chemical carriers and tankers carrying LNG and LPG since 1966.

For further information and descriptive literature on equipment for vapor-tight ullage measurement and high-level alarms.

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## Sperry Marine Names Edenzon Director Of Defense Marketing



Irwin F. Edenzon

C.R. Kenney, senior vice president and general manager of Sperry Marine Inc., has announced the appointment of **Irwin F. Edenzon** as director of defense marketing. Mr. Edenzon joined Sperry Marine in 1985 after 10 years with Perry Offshore. He is a member of the Navy League and the American Society of Naval Engineers, among other professional marine industry societies.

## Lisnave Wins Contract For Reactivation Work On Esso-Owned Tanker

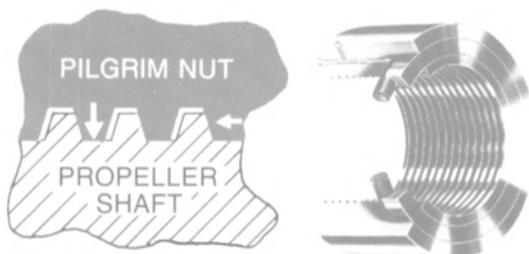
A contract for reactivation work on the 450,390-dwt ULCC Esso Mediterranean, last of the large Esso-owned tankers to be reactivated this year, has been won by the Portuguese yard of Lisnave. The vessel, which has been laid up since 1983, has been towed to Norway, where it is expected to be in the shipyard for at least four weeks. A similar operation on the 449,934-ton Esso Caribbean was recently completed by Lisnave.

For free literature detailing the facilities and capabilities of Lisnave,

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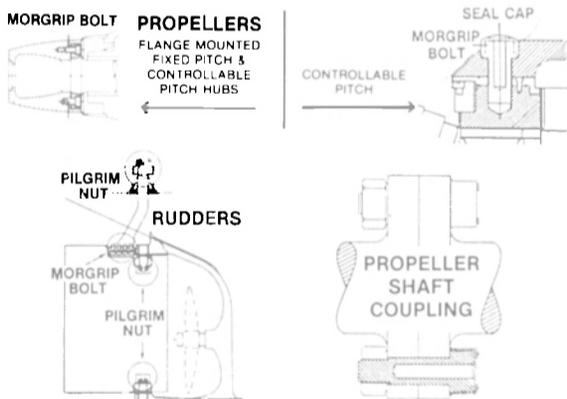
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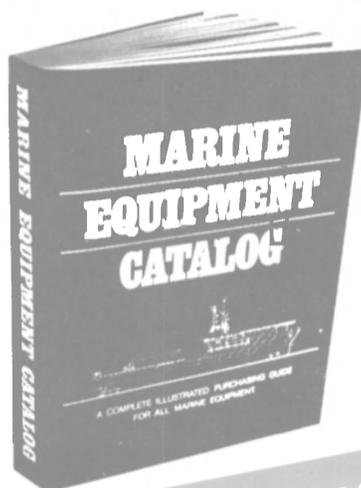


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## Brochures From Hagglands Describe Computerized Cargo Handling Systems

Efficient cargo handling plays a major role in the overall economy of cargo vessels. When working with slewing cranes, a large portion of the total crane cycle time is accounted for by spotting of the cargo. In container handling, for example, spotting may take as much as 40 percent of the cycle time. The Swedish crane manufacturer Hagglands Marine & Offshore AB has utilized a microcomputer to achieve appreciable reductions in spotting time.

The first of Hagglands new cargo spotting aids, named Steadyline, was introduced in late 1985. It was followed during 1986 by a complementary system, known as Swing Defeater. These tools constitute a major advance in cargo handling technology.

High-performance, high precision cranes are the basic requirement for fast, effective cargo handling. However, the attainment of maximum output is dependent on the skill of the crane

The multipurpose cargo ship Pauwgracht, built by Miho Shipyard in Japan for the Dutch company Spliethoff's Bevrachtingskantoor BV, is fitted with two Hagglands G type cranes.

operator. Even for the skilled operator it is difficult to compensate for the torque introduced into the crane during slewing and the unpredictable movements of the load caused by wind, heel or collisions with other cargo or the ship structures. With Steadyline, the microcomputer has been harnessed to solve these difficult dynamic control problems. The microcomputer, located in the crane housing, is linked with sensors and electronic transducers in the electrohydraulic power swivel at the hook or spreader. When picking up a cargo unit, the operator sets his control lever to the required final alignment relative to the ship. Steadyline speedily adjusts the unit to the alignment and maintains it regardless of crane movements and external disturbances.

Unless the cargo is perfectly plumb when the load is lifted, swinging is inevitably introduced. This pendulum effect is a leading time-wasting factor in cargo spotting. With Swing Defeater a microcomputer is used to analyze signals from a number of sensors which indicate the origin of the pendulum effects. By modifying the orders given by the crane driver, Swing Defeater counters pendulum effects before they arise.

Steadyline and Swing Defeater greatly improve the speed and safety of cargo handling, as

well as reducing the risk of damage to the cargo, the gear and the ship.

As one of the premier builders of marine and offshore cranes, Hagglands offers a wide range of products, from the smaller L type cranes, suitable for fast cargo handling, to the larger G type units for bulk and unit care goes.

In fact, since their introduction in 1974, more than 1,000 G type cranes have been ordered or delivered. The rugged G type, with capacities up to 50 tons in single mode, is a general purpose crane which can operate in some of the most severe environmental conditions.

For example, G type cranes have been fitted aboard several U.S. Coast Guard Polar icebreakers. A number of G cranes have also been fitted on Arctic bulkers and will be installed aboard Soviet nuclear icebreakers currently under construction.

For free copies of a full-color descriptive brochure from Hagglands on Steadyline,

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For free copies of the full-color brochure on the complementary system, Swing Defeater,

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Photos below show a four 10' x 20' SAFEGUARD™ Fender System for a 62,000 DWT tanker primarily used in the Gulf Coast area.



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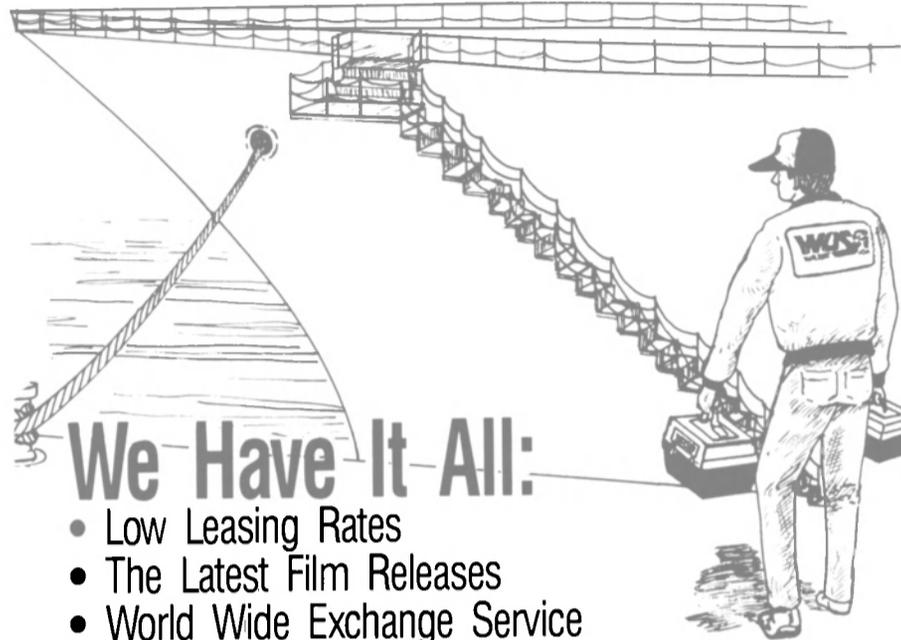
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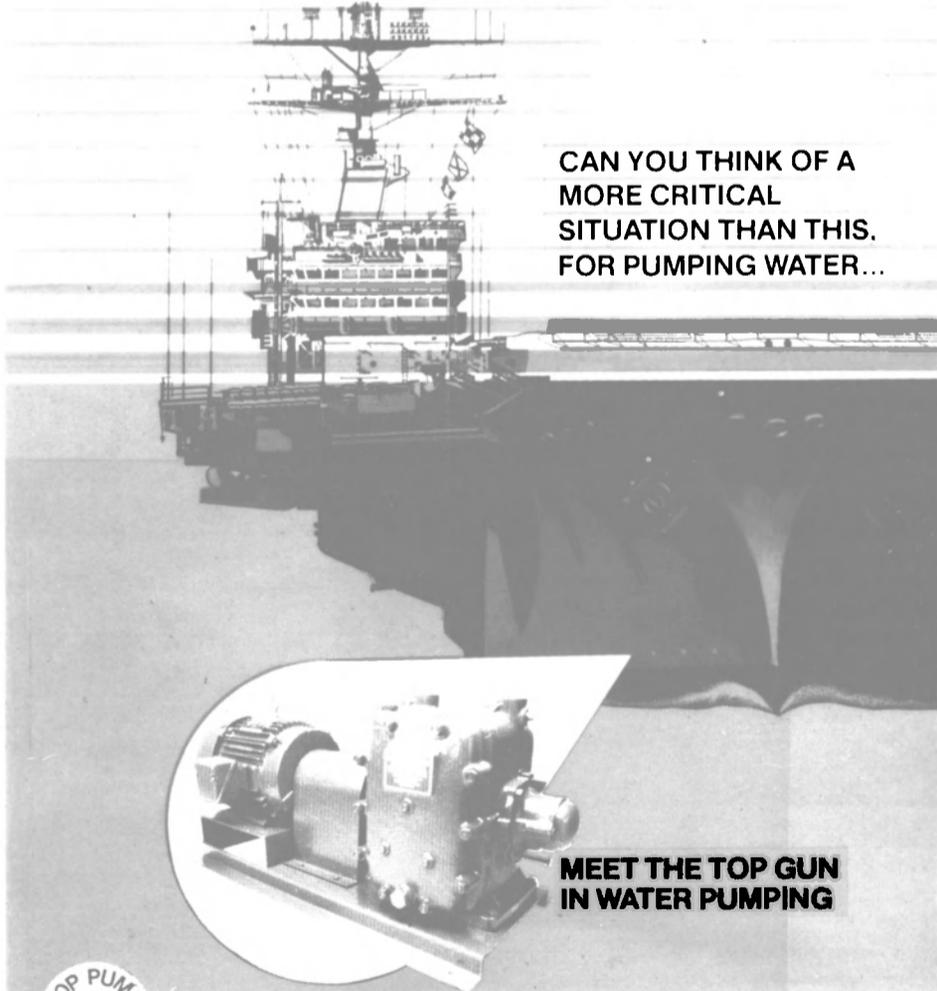
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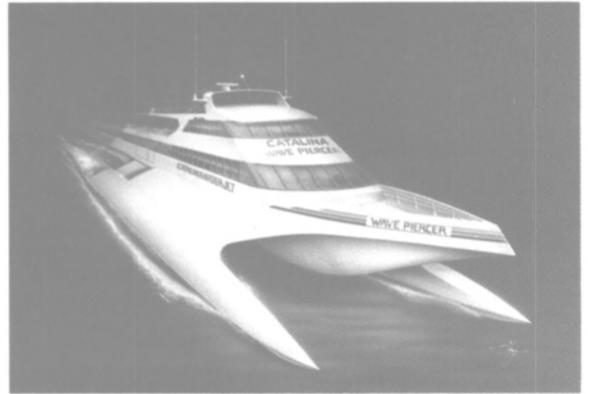


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Circle 345 on Reader Service Card

### Nichols To Build Advanced Technology 'Wave Piercer' For Fast Passenger Service



Artist's conception of the \$4-million, Deutz-powered Wave Piercer, to be built by Nichols Bros. Boat Builders.

Nichols Bros. Boat Builders, Inc. of Whidbey Island, Wash., recently announced that a \$4-million waterjet-powered "wave piercer"—an advanced technology vessel described as a cross between a catamaran and a hydrofoil—will be in service between San Diego and Catalina Island beginning next spring.

The "Wave Piercer" will be the 10th vessel designed by International Catamaran, Ltd., Australia, to be built under license in Nichols Brothers Boat Builders, yard. The 121.5-foot vessel will have a top speed of 32 knots with 300 passengers aboard.

Unlike a traditional catamaran, in which passenger cabins are mounted directly to two hulls, the Wave Piercer suspends the superstructure on angled struts attached to widely spaced, long, narrow hulls that "slip" rather than pound through waves. Each hull contains a high-speed diesel, generator, and fuel tank.

The new vessel will be powered by a pair of Deutz TBD604V-16 MMM diesel engines developing 2,340 hp at 1,800 rpm and driving Ka-MeWa Model 63 S-62/60 waterjets.

For free literature giving full details on the facilities and capabilities of Nichols Bros. Boat Builders,

Circle 54 on Reader Service Card

### Custom, Design-It-Yourself Continuous Liquid Level Indicators Introduced By Gems

Gems Express Service Catalog has introduced a method for specifying and ordering continuous liquid level monitoring sensors. Using a straightforward, step-by-step check list within the catalog, custom Gems AXMP-800 Series of plastic continuous level transmitters can be easily specified by the user in a choice of lengths, materials and mountings. Based on selections made, the price can be easily calculated by the customer.

According to Gems, the AXMP-800 Series continuous level transmitters are extremely rugged, and accurate to 1/4-inch of actual liquid level. A choice of PVC, polypropylene or Kynar materials provide a board range of chemical compatibility. They mount vertically within a tank and are connected (3-wire) to a remote receiver. As a float moves with liquid level along their tubular stem, it magnetically taps off a voltage with the action of tiny reed switches. The voltage is transmitted to an indicating meter in a receiver, and is directly proportional to liquid level.

The AXMP-800 plastic continuous level transmitters can be custom produced in lengths to 70 inches, with a choice of mountings

For more information and a free copy of the new 1988 Express Service catalog from Gems,

Circle 28 on Reader Service Card

Maritime Reporter/Engineering News

## State Marine Resumes Marketing And Full Operation Of All Its Offshore Supply Vessels

State Marine Corporation of Houston, Texas, has resumed the marketing and full operation of all its offshore supply vessels. Previously, most of the operations of State vessels were conducted by Hornbeck Offshore Services, Inc. State's main fleet consists of large 192-foot vessels with bulk and 2,000-bbl liquid mud capacity as well as 141-foot clear decks. State also operates smaller supply vessels in construction, diving, and cargo service.

For more information and free literature on State Marine Corporation,

Circle 32 on Reader Service Card

## Complicated RO/RO Conversions Completed By Danyard A/S

The Danish firm of Danyard A/S, shipbuilders and repairers, recently redelivered to the Mercandia Rederierne the second of two Ro/Ro ships adapted to the requirements of the Danish State Railways' service across the Great Belt. The two vessels, renamed Lodbrog and Kraka and bare-boat chartered from Mercandia Rederierne by Danish State Railways (DSB), were extensively converted by Danyard A/S to meet the exacting specifications prepared by the charterers.

In carrying out the modifications, the original main engine, a MaK 12M453AK rated at 3,600 kw (4,900 bhp) continuous, was retained but supplemented by twin Aquamaster azimuthing thrusters. An additional Brunvoll bow thruster was also fitted forward of the existing Jastram unit. Electric power is provided by three Caterpillar 3516 diesels each driving 1,800-kva Caterpillar generators, and additional Furuno color radars were fitted, with scanners at bow and stern.

Main dimensions of the vessels remain unchanged.

For free literature giving full details on the facilities and capabilities of Danyard A/S,

Circle 53 on Reader Service Card

## B&W To Build 84,000-Dwt Products Carrier

A Norwegian consortium recently confirmed a contract for a new 84,000-dwt products carrier to be built by Burmeister & Wain's Copenhagen shipyard.

Also agreed on was an option for a second vessel, with both carriers eventually entering service with London-based Shell International on a bareboat relet.

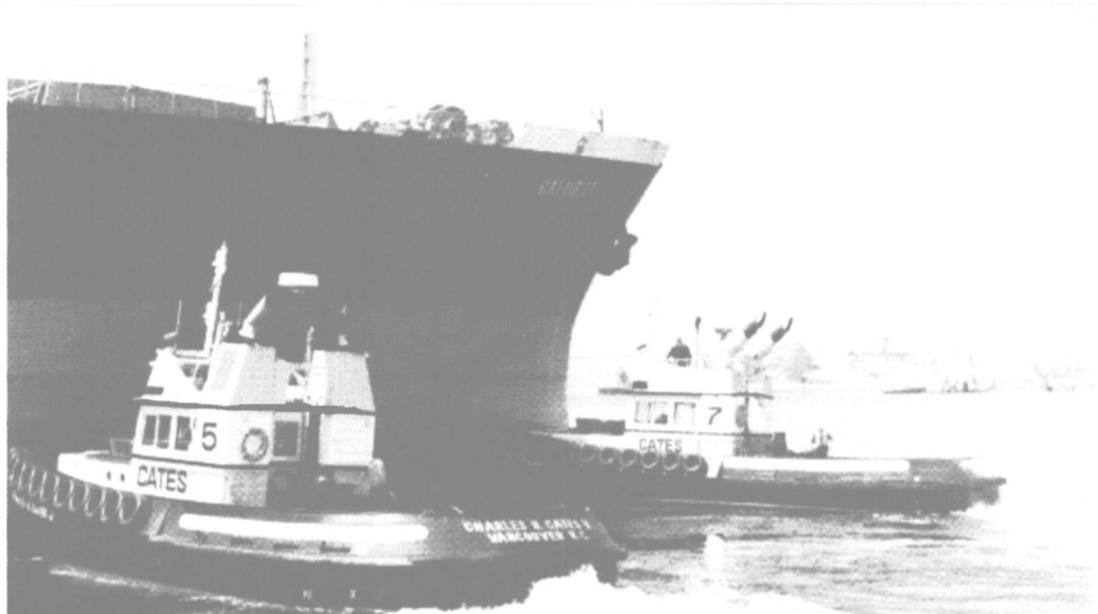
This represents the first time that a major oil company has been directly involved with an order for one of the CPT54E tankers from its inception. The series was first introduced in 1985 and the new orders, if both are confirmed, will bring the total contracted to 13.

Norwegian shipowner Naess, Jahre & Partners will operate the tankers on behalf of the company Nordan III, which has taken the vessels on a 15-year bareboat charter from Difko. Shell has agreed to subcharter each carrier for a five-year period with an option on a further three years.

The first vessel is scheduled to be delivered in August 1989, with the second, if confirmed, following some four months later.

For free literature giving complete details on the facilities and capabilities of Burmeister & Wain,

Circle 26 on Reader Service Card



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.

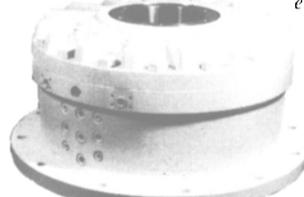
### Rotary Vane Steering

Model	Rudder Angle* (degrees)	Torque @ 1450 psi (lbs-ft.)	Rudder Stock Diameter (inches)	Size Height (inches)	Size Width (inches)	Weight Approx (pounds)
R1.6	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 - 6.89	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	35.43	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.

Wagner models R2.5 and R16 rotary vane steering gears



Wagner medium pressure rotary vane steering systems provide precise, dependable rudder response in all sea conditions



Wagner Engineering Ltd.,  
40 Gostick Place  
North Vancouver, B.C.,  
Canada V7M 3G2  
Telephone (604) 988-1111  
Telex 04-352755  
Telefax (604) 988-8809

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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.

Simple, rugged, compact and efficient, the Wagner rotary vane steering performs solidly in the most demanding applications.

There is a Wagner rotary vane steering system for virtually every vessel.



Wagner Engineering Ltd., 40 Gostick Place  
North Vancouver, B.C., Canada V7M 3G2

Please send information on Wagner's Rotary Vane Steering Systems.

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Title \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City/Country \_\_\_\_\_

Phone or Telex \_\_\_\_\_

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Circle 221 on Reader Service Card

# FOR MORE INFORMATION ON EQUIPMENT AND SERVICES ADVERTISED IN THIS ISSUE

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The listings above are an editorial service provided for the convenience of our readers.

## Bird-Johnson Names Vaughn Seattle Operation's Marketing And Sales Manager

The Bird-Johnson Company of Walpole, Mass., has named **Jon Vaughn** as marketing and sales manager for their Seattle operation in Seattle, Wash. Mr. Vaughn brings over 14 years of marine industry experience to his new position and was most recently a regional sales manager for Samson Ropes throughout the Pacific Northwest and Western Canada.

Mr. Vaughn will manage Bird-Johnson's marketing and sales efforts in connection with their Seattle operation marine propeller product lines and marine propeller repair services. The

Seattle operation includes the foundry and machine shop for stainless steel and bronze alloy Coolidge fixed-pitch propellers, custom-designed fixed-pitch propellers, shafting and various marine propeller accessories. They also offer extensive marine propeller and marine shafting repair services and are an authorized representative of Michigan Wheel products in the Pacific Northwest and Alaska.

Bird-Johnson Company, an Axel Johnson Inc. company, is a world leader in the manufacture of naval and commercial marine controllable pitch and fixed-pitch propellers. In addition to the Walpole, Mass., and Seattle, Wash., facilities, they also have a large propeller manufacturing plant in Pascagoula, Miss.

For more information and free literature on

marine propeller product lines and services from Bird-Johnson,

Circle 33 on Reader Service Card

## Kockums Marine Launches First Air-Independent Sub

Shipbuilder Kockums Marine AB of Sweden recently made a significant breakthrough when it launched the first air-independent fleet submarine propelled by a closed-cycle Sterling engine.

According to Kockums, the engine, which runs on liquid oxygen and diesel fuel, should enable the submarine to stay submerged for up to two weeks without surfacing.

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Don't take a chance on your cooling system. Crockett & McConnell use Fernstrum GRIDCOOLERS to keep their search and rescue crafts always ready.

Fernstrum GRIDCOOLERS are completely assembled and factory tested to assure dependable service. Fernstrum GRIDCOOLERS are available in copper-nickel 90/10 and 5000 series aluminum.

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- SHAPES AND SIZES: flush round 8, 14, 16, 18, 20, 22, 24, ovals flush plain or hinged, 13 1/2 X 20 1/2, 15 X 24. Coamings available for all sizes.

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Circle 243 on Reader Service Card

**Harris SSB Radio  
Has Noise Blanker  
—Literature Available**

An optional accessory, now available with the Harris RF-3200 HF-SSB radio, removes unwanted interference and provides clearer, static-free reception.

The noise blanker is designed to improve the received signal-to-noise ratio in environments which are

prone to impulse-type interference. It is especially useful on boats with gasoline engines, auxiliary generators and motor-driven deck equipment, which often create high levels of static in HF receivers.

The Harris RF-3200 noise blanker automatically self-adjusts for changes in received signal strength and is immune to false triggering by out-of-band signals. The noise blanker is controlled by a convenient front-panel switch. The option

can be factory installed at the time of order, or the radio can be upgraded in the field by a Harris service dealer.

The RF-3200 is a 125-watt single sideband (SSB) radio introduced by Harris late last year. It is readily expandable to accommodate other new features and options as they become available. Advanced telecommunications capabilities, such as Digital Selective Calling and ARQ modem interface, can be

added by simply inserting printed circuit boards into empty slots built into the transceiver.

For more information and free literature from Harris Corporation,

Circle 39 on Reader Service Card

**Contract Management And  
Liability Avoidance  
Programs To Be Repeated**

A series of two-day training programs for contract management in the marine industry, and a series of one-day workshops in liability avoidance for marine design and construction will be presented by Fisher Maritime Transportation Counselors, Inc., in November and December.

The two-day contract management training program is being presented in New York City on November 14-15, and in San Diego on December 8-9, 1988.

The workshops on liability avoidance will be presented in Norfolk on November 21, Houston on November 30, San Francisco on December 6, and Fort Lauderdale on December 19, 1988.

Additional information about both programs is available from Fisher Maritime Transportation Counselors, Inc., 50 South Orange Avenue, South Orange, N.J. 07079, or by calling toll-free 1-800-SEA-FIRM.

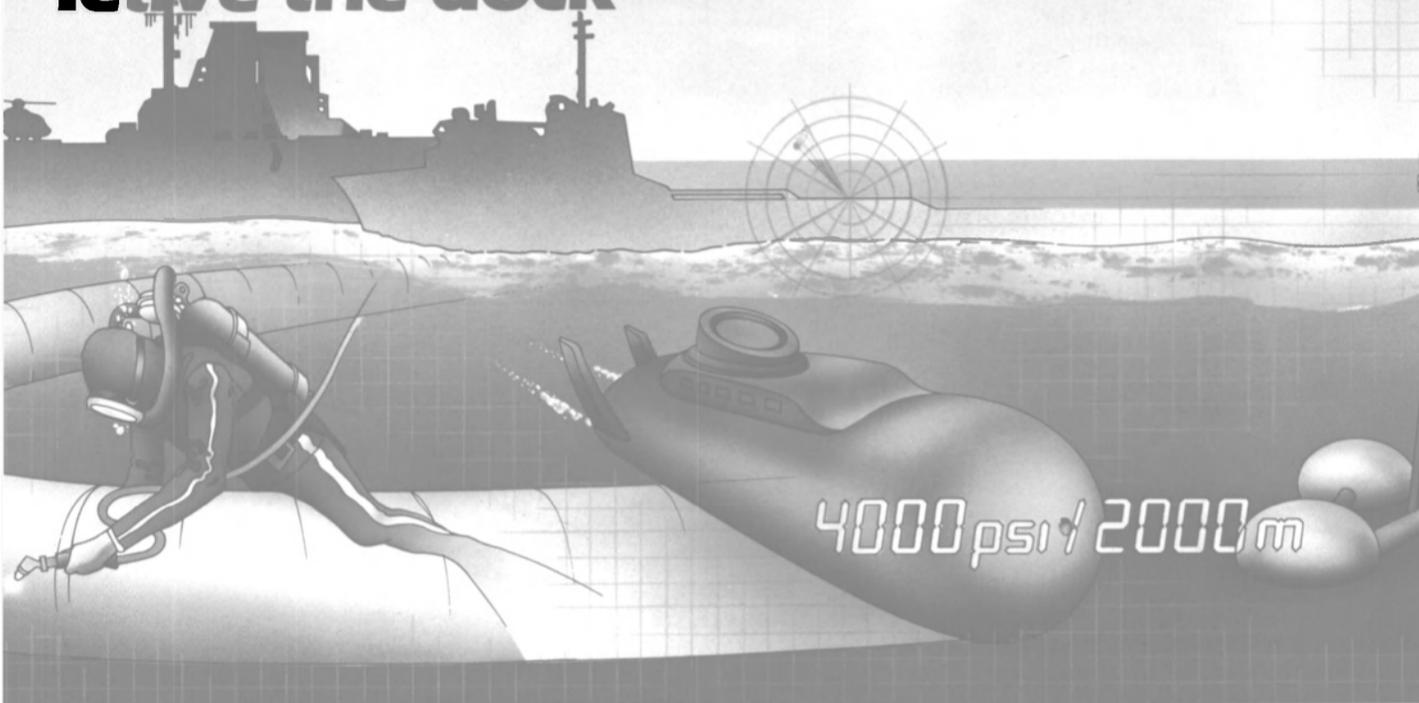
**Sulzer-Powered French  
Containership Is Designed  
For Minimum Crewing**

The recent delivery in South Korea of the 2,505-TEU CGM La Perouse by Samsung Shipbuilding and Heavy Industries marked an important stage in the evolution of French containership design. Operating systems on the 31,000-dwt vessel, which is the new mainstay of Compagnie Generale Maritime's (CGM) participation in the Europe/Australasia trade, were conceived for a minimum level of manning, said to be unprecedented in a French-owned ship of this type and size.

Automation aboard the La Perouse includes an integrated control, alarm and monitoring system, a computerized Con-air control and monitoring system, and a microprocessor-based ship management system. Her bridge outfit and layout, including a fully integrated navigation system from Japan Radio Company, makes the CGM La Perouse among the most advanced ships of her type. The 20.5-knot, Panamax vessel is powered by a seven-cylinder model of the largest bore two-stroke engine from Sulzer's RTA range. It is the first of three new-buildings for European partners in the Anzecs consortium.

For literature on Aeroquip products, circle the appropriate number of the reader service card: Hose & Fittings—Circle 121; T-J Cylinders—Circle 122; Teflon Hose—Circle 123; Quick-disconnect Couplings—Circle 124.

**Security at sea is using  
Aeroquip products before you  
leave the dock**



**RISIC Couplings**



Aeroquip RISIC 3 Rubber Insert Sound Isolation Couplings provide superior sound and vibration dampening. **RISIC 3 is approved on U.S. Navy surface and subsurface vessels.**

Consult Aeroquip for your application.

**Marine Hose and Fittings**

Aeroquip's FC300 AQP hose now has **NAVSEA** approval. FC300 hose has been engineered for demanding high-temperature shipboard applications and is available with a complete selection of fittings. FC300 exceeds SAE 100R5 specifications.

Request Catalog 306

**T-J™ Cylinders**

**Series TG hydraulic cylinders are fully approved by the American Bureau of Shipping (ABS).** They handle pressures



up to 3500 psi (5000 non-shock). And are available in 15 standard mounting styles.

Request Bulletin 4120

**Convuluted Teflon\* Hose**

Aeroquip Teflon hose designs are **USCG approved**, and are unsurpassed for lightweight, fluid compatibility, and flexibility.

Operating range from -65°F to +400°F.

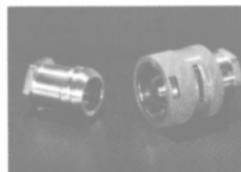
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This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers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

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## AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION

Adrick Marine Corp., 320 Cantor Ave., Linden NJ 07036  
Bailey Refrigeration Co., Inc., 2323 Randolph Avenue, Avenel, NJ 07001  
Stal Refrigeration AB, Butangsgatan 16, S-60187 Norrköping SWEDEN

## BALLAST

Genstar Stone Products, Executive Plaza IV, Hunt Valley, MD 21031  
Mineral Research & Recovery Inc., 4565 S. Palo Verde, Ste 203, Tucson AZ 85714

## BARGE BUILDING

HBC Barge, Brownsville PA 15417

## BARGES—Leasing

McDonough Marine Service, P.O. Box 1825, Parkersburg WV 26101

## BASKET STRAINERS

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

## BEARINGS—Rubber, Metallic, Non-Metallic

Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

Kingsbury Inc., 10385 Drummond Rd, Philadelphia PA 19154

Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, OH 44309

## BOILERS

Combustion Engineering, Inc., Windsor, CT 06095  
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928

## BOILER CLEANING

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Infrasonik AB (an ASEA Stal Co.), S-612 20 Finspong, SWEDEN

## BROKERS

Captain Astad Company, Inc., P.O. Box 350486, Ft Lauderdale FL 33335;  
P.O. Box 1093, Houma, LA 70360

Bergeron & Associates, P.O. Box 726, Chalmette LA 70044

Jack Faulkner Inc., 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422

Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960  
Ocean Marine Brokerage Services, P.O. Box 1257, Port Canaveral, FL 32927

## BULKHEADS

The Waugh Co./Rockment (TNF), 5111-6 Baymeadows Rd., Suite 394, Jacksonville, FL 32217

## BUMPERS (Crane)

M.E.K. Equipment, P. O. Box 2357, Newport News VA 23602

## CARGO ACCESS EQUIPMENT

Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E. Chestnut Ave., Santa Ana CA 92701

## CARGO HANDLING SYSTEM

Skarpenord A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906

## CHAIN

Baldt Inc., P.O. Box 350, Chester PA 19106  
Crandall Dry Dock Engineers Inc./Marit Chain, 21 Pottery Lane, Dedham MA 02026

Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020

## CHOCKING COMPOUND

Philadelphia Resins Corp., 130 Commerce Dr., Montgomeryville, PA 18936

## COMPACTORS

ICI Multi-Pak Inc., 14719 Carolcrest, Houston TX 77079

## COMPUTERIZED INFORMATION SYSTEMS

TIMSCO, P. O. Box 91360, Mobile AL 36691

## CONDENSERS/SEPARATORS

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

Wright Austin Co., 3250 Franklin St., Detroit MI 48207

## CONTROL SYSTEMS—Monitoring

ASEA, Inc., 4 New King St., White Plains, NY 10604  
Eldec Corporation, 16700 13th Ave. West, P.O. Box 100 Lynnwood, WA 98036

Imo-Delaval, Inc., Gems Sensors Division, One Cowles Rd., Plainville CT 06062

Indikon Division, Metravis Instruments Inc., 26 New St., Cambridge, MA 02138

NAMCO Controls, 7567 Tyler Blvd, Mentor OH 44060

Teleflex Inc., 771 First Ave., King of Prussia, PA 19406

Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway

WABCO, 1953 Mercer Rd., Lexington KY 40511

## CRANES—HOISTS—DERRICKS—WHIRLEYS

ASEA-Hagglund, Inc., 50 Chestnut Ridge Rd., Montvale NJ 07645

The Crosby Group, Inc., P.O. Box 3128, Tulsa OK 74101

Del Gavio Marine Hydraulics Inc., 207 W. Central Ave., Maywood NJ 07607

telex: 132610 DELMARINE

Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235

Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E Chestnut Ave., Santa Ana CA 92701

J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany

Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883

## DECK MACHINERY—Cargo Handling Equipment

Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013

Gearmatic—see 'Braden Carco Gearmatic' above.

Markey Machinery Co., Inc., 79 S. Horton St., Seattle, WA 98134

McElroy Machine & Mfg. Co., Inc., P.O. Box 4455, Biloxi MS 39535

Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E Chestnut Ave., Santa Ana CA 92701

Schoellhorn-Albrecht, P.O. Box 22110, St Louis MO 63116

## DIESEL ACCESSORIES—CYLINDER LINERS

Acurex Corporation, Autodata Division, 555 Clyde Ave., P.O. Box 7042, Mountain View, CA 94039

Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511

Diesel America Inc., 5217 River Rd., New Orleans LA 70123

FCS Inc., 22 Main St., Center Brook CT 06409

General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360

Kiene Diesel Accessories, 325 S. Fairbanks St., P.O. Box 386, Addison IL 60101

## DIESEL ENGINE—Spare Parts & Repair

Bergen Diesel A/S, P.O. Box 924, N-5001 Bergen NORWAY

Bergen Diesel Inc., 2701 Delaware Ave., Kenner LA 70062

Chrome Locomotives, P.O. Box 197, Silvis IL 61282

Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511

Cummins Engine Co., Inc., Mail Code 40642, Box 3005 Columbus, IN 47202-3005

Goltsens, 160 Van Brunt St, Brooklyn NY 11231

MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1, Federal Republic of Germany

MAN B&W Diesel, 50 Broadway, 18th Fl., New York, NY 10004

Markisches Werk GmbH, P.O. Box 1442, D-5884 Halver 1, Federal Republic of Germany

Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166

## DIVING & SALVAGE

H.J. Merrihue, P.O. Box 23123, New Orleans LA 70183

Muldoon Marine Services, P.O. Box 3221, Terminal Island, CA 90731

Parker Diving Service Inc., Berth 69, Los Angeles Harbor, P.O. Box 5272, San Pedro CA 90733

## ELECTRICAL EQUIPMENT

Eldec Corporation, 16700 13th Ave West, P.O. Box 100, Lynnwood WA 98036

SPD Technologies, 13500 Roosevelt Blvd, Philadelphia PA 19116

Ward Leonard Electric, 31 South St., Mt. Vernon, NY 10550

Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

## ELECTROMAGNETICS

Sentel Corp., 6713 Robinia Rd., Camp Springs MD 20748

## ELECTRONIC INFORMATION SYSTEMS

Inventory Locator Service Inc., 3820 Premier Ave., Memphis TN 38118

## ELECTRONIC SYSTEMS

Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 TX: 125327

## ENGINE TEST EQUIPMENT

General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360

## EQUIPMENT—Marine

Atlas Copco Rental, 70 Demarest Dr., Wayne, NJ 07470

Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227

Kearliff Marine Products, 550 South Fulton Ave., Mount Vernon, NY 10550

Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302

Space Machine & Engineering Corp., 2346 16th Ave North, St Petersburg FL 33713

## EVAPORATORS

Atlas-Danmark Desalination Systems A/S, Stamholmen 93, 2650 Hvidovre (Copenhagen), Denmark

Equipment Engineering, 666 Baker St., #265, Costa Mesa CA 92626

MECO (Mechanical Equipment), 861 Carondelet St., New Orleans LA 70130

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

## FANS—VENTILATORS—BLOWERS

Carling Turbine Blower Company, 10 Nebraska St., P.O. Box 88, Worcester MA 01613

Flebu A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906

Jon M. Liss Associates, Inc., 411 Borel Ave., P. O. Box 5554, San Mateo, CA 94402

## FASTENERS

Action Threaded Products Inc., 6955 S. Harlem, Bedford Park, IL 60638

Band-It Division, Houdaille Industries Inc., P.O. Box 16307, Denver CO 80216

Hardware Specialties Co., Ships Division, 48-75 36th St, Long Island City NY 11101

Lee Brass Company, P. O. Box 1229, Anniston AL 36202

Mapeco Products, Inc., 725 Glen Cove Ave., P.O. Box 6, Glen Head NY 11545

Non-Ferrous Bolt & Mfg Co., 4085 Nevso Dr., Suite C, Las Vegas NV 89103

Okabe Co., Inc., 175 Lively Blvd., Elk Grove Village, IL 60007

## FENDERING SYSTEMS/BUOYS—Dock & Vessel

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Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062

Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020

Schuyler Manufacturing, 16901 Woodinville-Redmond Rd, Woodinville WA 98072

Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook WA 22624

## FILTERS

Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928

Parker Filter Division, 16810 Fulton County Rd., #2, Metamora, OH 43540

## FUEL ADDITIVE

U.S. Borax, Industrial Chemicals, 3075 Wilshire Blvd., Los Angeles CA 90010

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## GANGWAYS, LADDERS

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National Specialty Products, 5727 Heffernan St., Houston TX 77087

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

Westmont Industries, 10805 Painter Ave., Santa Fe Springs, Los Angeles, CA 90670

Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

## HEAT EXCHANGERS

Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024

ITT Standard Heat Transfer Technology, Buffalo, NY 14240

MECO (Mechanical Equipment), 861 Carondelet St., New Orleans LA 70130

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

## HORNS/WHISTLES

Kohlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241

## HYDRAULICS

Aerogrip Corporation, 300 South East Ave., Jackson, MI 49203

Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken NJ 07030

Del Gavio Marine Hydraulics Inc., 207 W Central Ave., Maywood NJ 07607;

telex: 132610 DELMARINE

Parker Hannifin Corporation, 17325 Euclid Avenue, Cleveland, OH 44112

## INCINERATORS

Teamtec A/S, P.O. Box 100, N-4912 Gjevning, NORWAY

A/S Vesta, 27 Skudehavnsvej, DK-2100 Copenhagen DENMARK. US Agent: American United Marine, 5 Broadway, Rte 1, Saugus MA 01906

## INSTRUMENTATION

Technical Services Group, 2900 Main St., Alameda CA 94501

## INSULATION—Cloth, Fiberglass

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The Claremont Company, 174 State Street, P. O. Box 952, Meriden CT 06450

Duracote Corp., 350 North Diamond St., Ravenna, Ohio 44266

Soundcoat, One Burt Drive, Deer Park NY 11729

## JOINER—Watertight Doors—Paneling—Ceiling Systems

Astech, 3030 S. Red Hill Ave., Santa Ana, CA 92711

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Simpson Timber Co., Third & Franklin, Shelton WA 98584

Walz & Krenzer Inc., 1390 Mt. Read Blvd., Rochester NY 14606

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R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858

Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

## LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights

Carlisle & Finch, 4562 W. Mitchell Ave., Cincinnati OH 45232

Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209

## LINE BLINDS

American Piping Products Inc., Box 1056, New Hyde Park, NY 11040

Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474

## LOGISTICS

VL Logistic Consultants, Inc., 3008-C Bienville Blvd., Ocean Springs MS 39564

## LUBE-OIL CENTRIFUGES

Keith Dixon Warehouse Supplier, Authorized distributor for Spinner II, 650 Whitehead Rd., Lawrenceville NJ 08648

Hamworthy Engineering Ltd., Fleets Corner, Poole, Dorset, BH17 7LA ENGLAND

Spinner II Products, T.F. Hudgins, Incorporated, P.O. Box 920946, Houston, TX 77292

## MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING

AMT, Inc., 2400 NW 39th Ave., Miami FL 33142

Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DEL MARINE

Goltens, 160 Van Brunt St., Brooklyn, NY 11231

In-Place Machining Co., 1929 North Buffum St., Milwaukee WI 53212

## MARINE LUMBER

McCauley Lumber Company, 36325 Harper Ave., P.O. Box 46129, Mt Clemens MI 48046

## MEDICAL SUPPLIES

Universal Marine Medical Supply, 69-06 3rd Ave., Brooklyn NY 11209

## METAL MARKERS/LETTERS

Johnston Brothers Enterprises, Inc., P.O. Box 1138, Patterson, LA 70329

J. P. Nissen Company, P.O. Box 188, Glenside PA 19038

## NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS

Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202

Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356

American Professional Captains Association, P.O. Box 350398, Ft. Lauderdale FL 33316

American Systems Engineering Corp., P.O. Box 8988, Virginia Beach, VA 23452

Amirikian Engineering Co., P.O. Box 15210, Chevy Chase MD 20815

Amtech Services, Inc., P.O. Box 84148, Seattle WA 98124

Armcora Sales Inc., 2 Marineview Plaza, Hoboken NJ 07030

B.C. Research, 3650 Wesbrook Mall, Vancouver, B.C. Canada V6S 2L2

CDI Marine Co., 900 Regency Square Blvd., Suite 203, Jacksonville, FL 3221

Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112  
STV/Sanders & Thomas, Inc., 7900 Westpark Dr., McLean VA 22102  
Sea School, 3770 16th Street North, St. Petersburg, FL 33704  
Seaworthy Systems Inc., P.O. Box 338, Essex, CT 06426; 17 Battery Pl., New York, NY 10004; P.O. Box 205, Solomons MD 20688; 2 Skyline Pl., 5203 Leesburg Pike, Falls Church VA 22041.

Seaworthy Electrical Systems, 17 Battery Pl. N.Y. N.Y. 10004  
George G. Sharp, Inc., 100 Church St., New York, NY 10007  
T.W. Spaetgens, 156 W. 8th Ave., Vancouver BC CANADA V5Y 1N2  
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235  
Systems Engineering Associates (SEACOR), 200 East Park Dr., Suite 600, Mt Laurel NJ 08054

TIMSCO, P. O. Box 91360, Mobile AL 36691  
Tracor Hydraulics, Inc., 7210 Pindell School Rd., Laurel, MD 20707  
VSE Corporation, 1417 No Battlefield Blvd, Chesapeake VA 23320

#### NAVIGATION & COMMUNICATIONS EQUIPMENT

AT&T, 412 Mt Kemble Ave., Room N420, Morristown NJ 07960  
Atkinson Dynamics, 10 W Orange Ave., So San Francisco CA 94080  
Comsat Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024  
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080  
General Electric Company, Mobile Communications Division, Lynchburg, VA 24502

Harris Corporation, RF Communications Group, 1680 University Ave., Rochester NY 14610  
Henschel Corporation, 9 Hoyt Dr., P.O. Box 30, Newburyport MA 01950  
ITT Mackay, 441 U.S. Highway #1, Elizabeth, NJ 07202

Kelvin Hughes Ltd., New North Rd., Hainault, Ilford, Essex IG6 2UR England  
Mackay Communications, 441 US Highway #1, P.O. Box 331, Elizabeth NJ 07207

Marine Electric RPD Inc., Galbraith Pilot Marine Div., 666 Pacific St., Brooklyn NY 11217  
Naval Electronics, 5417 Jetview Circle, Tampa FL 33634

Norcontrol Simulation A/S, Bekkajordet 8A, P.O. Box 1024, N-3191 Horten NORWAY  
Ocean Satellite Television Ltd., Avmar House, 61 Brushfield St., London E1 6AA ENGLAND

Petroleum Communications Inc. (Petrocom) Head Office: 5901 Earhart Expwy., New Orleans LA 70123; 556 Jefferson St., Suite 100, Lafayette LA 70501; Allied Bank Plaza, Suite 5440, 1000 Louisiana St., Houston TX 77002

Racal Marine Inc., 70 Jackson Dr., Cranford NJ 07016  
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033

Raytheon Marine Company, 46 River Rd., Hudson NH 03051  
Raytheon Service Company, 5760 Northampton Blvd., Ste 102, Virginia Beach VA 23455

Robertson Shipmate Inc., 3000 Kingman St., Suite 207, Metairie LA 70006  
S P Radio A/S, DK 9200 Aalborg DENMARK

SPT Audio, 8928 Kirby Dr., Houston TX 77054  
Sperry Marine Inc., 1070 Seminole Trail, Charlottesville VA 22906

Standard Communications, P.O. Box 92151, Los Angeles CA 90009  
Telesystems, 2700 Prosperity Ave., Fairfax, VA 22031 USA  
Watercom Communications Systems, 453 E. Park Place, Jefferson IN 47130

**OILS—Marine—Additives**  
B P North America Petroleum, 555 US Route 1, So. Iselin, NJ 08830  
Chevron USA, 575 Market St., San Francisco, CA 94105  
Exxon Company International, 200 Park Ave., Bldg 222, Room A279, Florham Park NJ 07932

Texaco, International, 2000 Westchester Avenue, White Plains NY 10650

#### OIL/WATER SEPARATORS

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Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647

FAST Systems Inc., 1717 Sublette Ave., St. Louis MO 63110  
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928

Microphor, Inc., 452 E Hill Rd., P.O. Box 1460, Willits, CA 95490

#### PAINTS—COATINGS—CORROSION CONTROL

American Abrasive Metals Co., 460 Coit St., Irvington NJ 07111  
Palmer International, P.O. Box 8, Worcester, PA 19490

Unitor Ships Service, Unitor Marine Chemicals Division, 3 High St., Rickmansworth, Herts, WD3 1SW UNITED KINGDOM  
White Metals Inc., 6300 Midvale, Houston TX 77087

**PIPE-HOSE—Cargo Transfer Clamps, Couplings, Coatings, Supports**  
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Stauff Corporation, 21-23 Industrial Park, Waldwick NJ 07463

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Port of Iberia, P.O. Box 897, New Iberia LA 70561

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ASEA Brown Boveri, 1460 Livingston Ave., North Brunswick NJ 08902

Bird Johnson Company, 110 Norfolk St., Walpole, MA 02081  
Bergen Diesel A/S, P.O. Box 924, N-5001 Bergen NORWAY

Bergen Diesel Inc., 2701 Delaware Ave., Kenner LA 70062  
Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202

Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark  
Caterpillar Inc., Engine Division, 100 N E Adams, Peoria IL 61629  
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227

Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511  
Combustion Engineering, Inc., Windsor, CT 06095

Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340  
Fincantieri, Diesel Engines Division—GMT, Bagnoli della Rosandra 334, Trieste, ITALY

GE Naval & Drive Turbine Systems Department, 166 Boulder Dr., Fitchburg MA 01420  
General Motors, Electro-Motive Division, LaGrange, IL 60525

KHD Canada Inc., 180 Rue de Normandie, Boucherville, Quebec J4B 5S7, Canada  
KaMeWa, P.O. Box 1010, S-681 01 Kristinehamn, SWEDEN

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241  
Krupp MAK Maschinenbau GmbH, P.O. Box 9009, D-2300 Kiel 17, WEST GERMANY

Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323  
Marine Gears, Inc., P.O. Box 689, Greenville MS 38707

Markisches Werk, Halve, P.O. Box 1442, D-5884 Halver WEST GERMANY  
MAN B&W Diesel, 50 Broadway, New York, NY 10004

MAN B&W Diesel A/S, Ostervej 2, DK-4960 Hoelby, Denmark  
MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15, DK-9900 Frederikshavn Denmark

MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1 Germany  
MAN High Performance Diesels (Nurnberg), 160 Van Brunt St., Brooklyn NY 11231

Michigan Wheel Corp., 1501 Buchabab Ave., SW, Grand Rapids MI 49507  
Morrison-Knudsen Company, Power Systems Division, P.O. Box 1928, Rocky Mount NC 27801

MTK Magnetek Inc., 11111 Santa Monica Blvd., Los Angeles CA 90025  
North American Marine Jet P.O. Box 1232 Benton, AR 72015

Northwest Marine Services Corp., 6452 So. 144th St., Tukwila WA 98168  
Schottel-Werft, Josef Becker GmbH, KG, D-5401 Spay, WEST GERMANY

Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland  
Sulzer/Escher Wyss, Ravensburg WEST GERMANY

Ulstein International A/S, N-6065 Ulsteinvik, NORWAY

Ulstein Maritime Ltd., 96 North Bend Street, Coquitlam BC CANADA V3K 6H1

J.M. Voith GmbH, Marine Division, Postfach 1940, 7920 Heidenheim/Brenz, WEST GERMANY Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021

Wagner Engineering Ltd., 40 Gostick Pl., No Vancouver BC CANADA V7M 3G2

Wartsila Power Inc., 5132 Taravella Rd., P.O. Box 868, Marrero, LA 70072  
ZF of North America, Marine Sales, 500 Barclay Blvd, Lincolnshire IL 60069

#### PUMPS—Repairs—Drives

Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DEL-MARINE  
Goltens, 160 Van Brunt St., Brooklyn, NY 11231

Imo-Delaval, Inc., IMO Pump Division, Box 447, Monroe NC 28810  
Jim's Pump Repair, 48-55 36th St., Long Island City NY 11101

Leitritz Corporation, 165 Chestnut St., Allendale NJ 07401  
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238

Vita Motivator, 99 W Hawthorne Ave., Suite 622, Valley Stream NY 11580  
Wilden Pump & Engineering Co., 22060 Van Buren St., P.O. Box 845, Colton, CA 92324

#### REFRIGERATION

Bailey Refrigeration Co., 2323 Randolph Ave., Avenel NJ 07001

#### ROPE—Manila—Nylon—Hawsers—Fibers

Allied Signal Inc., Fibers Division, 1411 Broadway, New York, NY 10018  
American Manufacturing Co., Cordage Div., P.O. Box 52125, Lafayette LA 70505

Samson Ocean Systems, 2090 Thornton St., Ferndale WA 98248

#### SANITATION DEVICES—Pollution Control

Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111  
FAST Systems Inc., 1717 Sublette Ave., St. Louis MO 63110

Microphor, Inc., 452 E Hill Rd., P.O. Box 1460, Willits, CA 95490  
Research Products/Blankenship (Incinolet), 2639 Andjon, Dallas, TX 75220

#### SCALE MODELS

Sturgeon Bay Model Shop, 187 N Ninth Ave., Sturgeon Bay WI 54235

#### SCUTTLES/MANHOLE

L.S. Baier & Assoc., 7527 NE 33rd Dr., Portland OR 97211  
Juniper Industries, 72-17 Metropolitan Ave., Middle Village, NY 11379

Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

#### SHIPBREAKING—Salvage

The River Smelting & Refining Co., 4195 Bradley Rd Cleveland OH 44109  
The Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

#### SHIPBUILDING EQUIPMENT

American Marine, P.O. Box 8126, New Orleans LA 70182  
Eckold Ltd., CH-7203 Trimmis, SWITZERLAND

Hilmon Inc., 2604 Atlantic Ave., Wall, NJ 07719  
M.A.N.—GHH, Sterkrade Werfsrabe 112 D-4100 Duisburg 18, West Germany

MAN—GHH, P.O. Box 110240, D-4200 Oberhausen 11, West Germany  
NEI Sincrolift, Inc., 8970 S W 87th Ct., Miami FL 33176

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## Meyer Werft Delivers 1,900-Passenger Ship To Republic Of Indonesia

Meyer Werft's Papenburg, West Germany, shipyard recently delivered the 1,900-passenger ship Tidar to the Directorate General of Sea Communication, Republic of Indonesia.

Built in compliance with the regulations of the Indonesian classification society KI and under survey of Germanischer Lloyd to class, the Tidar has an overall length of 472.3 feet, molded breadth of 76.7 feet, draft of 19.3 feet and gross registered tonnage of 13,888. The nine-deck vessel is propelled by two Krupp MaK four-stroke 6Mu 601 main engines, with outputs of 8,700 hp at 428 rpm each, fitted to a reduction gear and fixed pitch propeller. Maneuverability is enhanced by a 1,000-hp bow-thruster system with a CP propeller.

The Tidar will be operated in Indonesian interisland service.

For free literature detailing the shipbuilding services offered by Meyer Werft,

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Newman's Inc., 7500 E Redding Place, Box 1856, Tulsa OK 74101

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Parker Hydraulic Valve Division, 520 Ternes Avenue, Elyria, OH 44035

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Skarpenord A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906  
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Gearmatic—see 'Braden Carco Gearmatic' above.  
Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134

Nashville Bridge Co., P.O. Box 239 Nashville TN 37202  
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## The Spirit Of Los Angeles Under Construction At Blount Marine

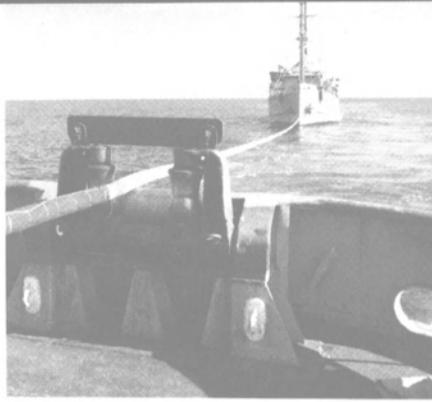
The Spirit of Los Angeles, the ninth ship in the "Spirit" fleet, is presently under construction at Blount Marine in Warren, R.I. **Richard D. O'Leary**, president and founder of Cruise International/C.I. Travel Centers, headquartered in Norfolk, Va., recently announced that the 600-passenger harbor cruise vessel would begin operation in April 1989 from the berth currently occupied by the Princess Louise in the World Cruise Center at Worldport LA.

The 192-foot Spirit of Los Angeles features a complete galley and three enclosed, carpeted, climate-controlled decks for dining and dancing.

Since 1982, Cruise International has built one new dinner cruise ship a year, making the firm one of the fastest growing harbor cruise businesses in the nation. Cruise International presently operates harbor cruise vessels in Boston, New York, Philadelphia, Washington, D.C., Norfolk, Va., and Chicago. The company estimates that the nine "Spirit" ships will carry more than 1.5 million passengers in 1989.

For free literature giving full details on the facilities and capabilities of Blount Marine,

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In addition to dock and anchor lines, commercial and military vessels that are "in tow" can also greatly benefit from Caprolan 2000 SeaGard's improved flexibility, wet strength and abrasion resistance. Photo courtesy of Samson Ocean Systems, Inc.



Single Point Mooring (SPM) systems designed for ropes made with Spectra high performance fibers from Allied-Signal Inc., offers extremely low water absorption, the highest resistance to the toughest abuse, as well as neutral buoyancy—it floats. Photo courtesy of Samson Ocean Systems, Inc.

## Advanced Fiber Technology From Allied-Signal Division Improves Marine Rope Performance

—Free Literature Available—

Two recent fiber innovations, Caprolan 2000 nylon with SeaGard™, and Spectra high-performance fibers are now available from leading rope manufacturers for heavy-duty marine applications. Both of these fibers are produced exclusively by Allied Fibers, a division of Allied-Signal Inc.

"SeaGard is a proprietary finishing process for Caprolan 2000 nylon," said **Earl B. Clark**, regional manager, Industrial Fibers Group, Allied-Signal Inc. "It offers dramatically improved wet strength and abrasion resistance."

Ropes manufactured with SeaGard are recommended for a variety of applications for naval engineering, commercial fishing and merchant marine operations. These include mooring, towing, anchoring, purse lines, lifter lines and others.

According to **Charles Smith**, vice president of Samson Ocean Systems, SeaGard technology significantly improves wet strength and abrasion resistance of ropes and virtually eliminates shock loading from surges, especially in rough weather.

Samson is marketing the SeaGard technology in two new double-braided rope constructions—Super Strong™ nylon, with a braided SeaGard cover and control core; and 2-in-1™ Super Strong nylon with a braided SeaGard cover and core. Both ropes claim a 45 percent increase in wear life with no wet strength loss.

"The Super Strong ropes have a high degree of dynamic elongation that smoothes out surges, prolongs rope life and reduces loads on fittings," added **Mr. Smith**.

New England Ropes, another leading rope manufacturer, is also offering ropes with the new SeaGard finish. Their selection includes double braids as well as the first three-strand line using Caprolan 2000 nylon with SeaGard.

According to **Jay Repass**, marketing manager for New England Ropes, the three-strand has the highest elasticity of any rope construction. Both braids and three-strand ropes undergo a special process to stabilize and preshrink the fibers. The ropes are easy to handle

(continued)

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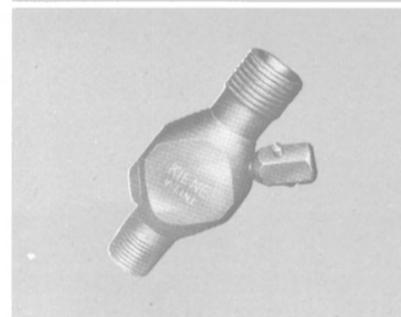
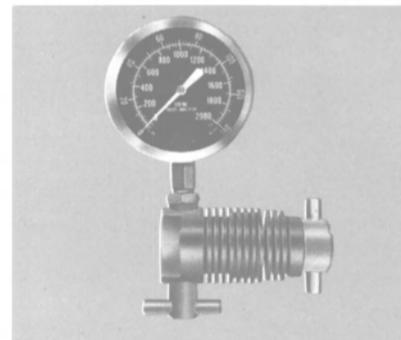
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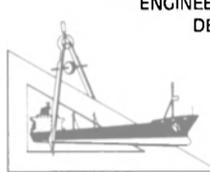
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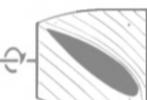
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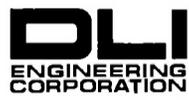
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## Advanced Fiber Technology

(continued)

wet or dry, knot and splice easily, and provide the high elasticity required to even out the strains of mooring and towing.

New England Ropes and Samson Ocean Systems are also marketing ropes made with Spectra high-performance fibers.

According to Allied-Signal, Spectra is the strongest fiber ever made, pound for pound, 10 times stronger than steel.

According to **Michael Hannon**, marketing manager of the High Performance Fiber Group of Allied-Signal, Spectra is engineered to provide outstanding lightweight strength and low-stretch characteristics. "These qualities provide a revolutionary alternative to the wire rope predominately used in tough marine applications," he said. "Spectra has the strength and positive control of wire rope, without the excessive weight and corresponding handling problems. Wire rope can weigh up to five times as much as Spectra with only equal strength or less," Mr. **Hannon** claimed.

Spectra is available in two fiber types—Spectra 900 for intermittent loading and Spectra 1000 for more continuous loading or greater strength. Suggested marine applications include: life lines, topping lifts, fall lines, purse lines, deepsea mooring, trawl net control lines, seine net lines, pendants, oceanographic array lines, winch lines, tow hawsers and many others.

"When matched for strength, Spectra weighs 65 percent less than nylon, 73 percent less than polyester and a whopping 83 percent less than wire rope," continued Mr. **Hannon**. "The benefits of lighter weight include high efficiency, easier handling and the considerable labor savings which result."

Samson Ocean Systems, manufacturing four Spectra lines under the trademark "The Power Braids," claims a number of other benefits including the fiber's neutral buoyancy, which means that Spectra floats.

"The low elongation provides wire-like control and the flex fatigue considerably reduces the ratio of sheave-to-rope diameter," stated Mr. **Smith** of Samson. The product's easy handling qualities provide better safety and its internal fiber

friction resistance, external abrasion and corrosion resistance provide it with long-lasting performance.

"Safety and performance are critical factors that must be considered in evaluating overall economy in marine ropes," concluded Mr. **Clark** of Allied Fibers. "To that end, Allied-Signal Inc. is working closely with key members of the Cordage Institute to jointly develop

products for the rope marketplace that truly reflect the cutting edge of fiber and finishing technology. Caprolan 2000 nylon with SeaGard and Spectra high-performance fibers are significant examples of this concern," he concluded.

For free literature fully detailing the high-performance fibers used in marine rope applications offered by Allied Fibers,

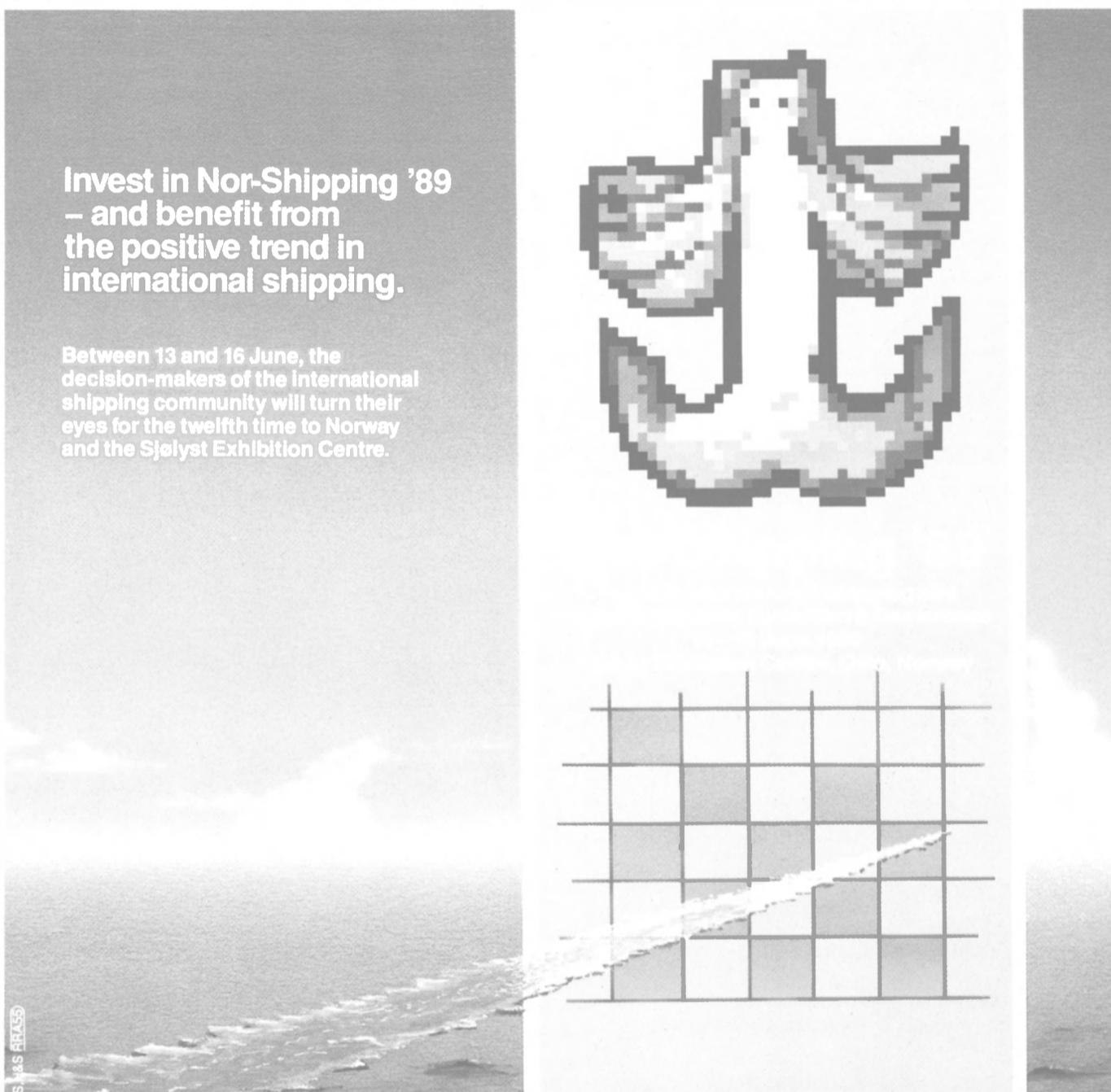
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## MHI To Build Three Product Carriers For BP Shipping

Mitsubishi Heavy Industries (MHI) of Japan recently signed a letter of intent with BP Shipping to build three 40,000-dwt products carriers. The vessels would be delivered during the second half of 1990. Negotiations between the two parties are continuing.

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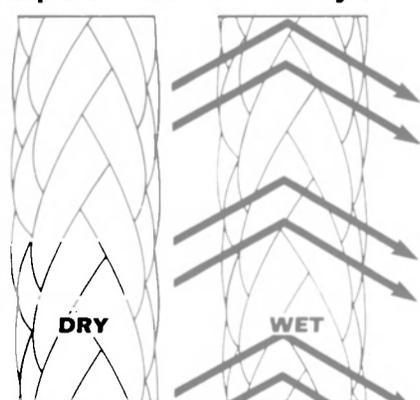
being to consider topics that can affect the operational efficiency of ships. A detailed conference programme will be available closer to the opening date.

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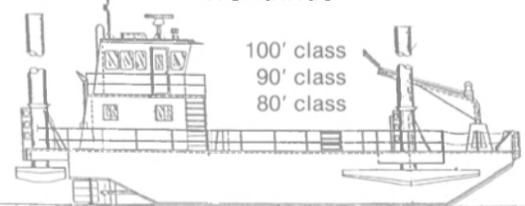
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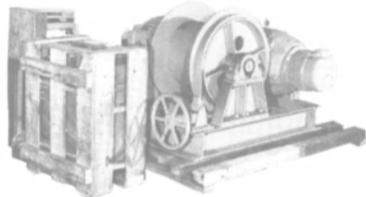
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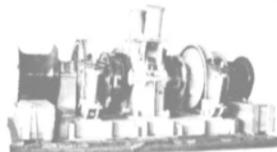
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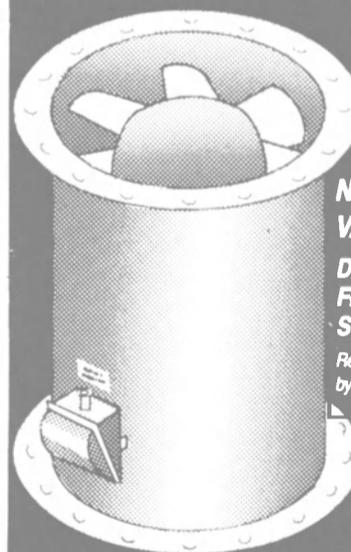
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## Munson Introduces Fast, Low-Wake Boat Designed For Harbor Commuter Routes

Munson Manufacturing Company of Edmonds, Wash., recently introduced a fast, fully enclosed, low-wake passenger boat for use particularly in harbor commuter runs. The 30-knot, 30-passenger vessel, the HST Reliable, was put into service by Harbor Trans, Ltd., between Marina Bay in Quincy and Boston's Long Wharf.

The boat traverses the course between Boston and Marina Harbor, a development of both residences and offices on the South Shore, in about 15 minutes.

The vessel is powered by Volvo/Penta in-



Fully enclosed and capable of high speed with a flat wake, the HST Reliable was specially designed for operation in harbors.

board/outboard engines, an arrangement that has already proven easy to service and repair.

**Bill Munson**, president of the Northwestern aluminum boat-building firm, said that the vessel developed for Harbor Trans should have wide application in many harbors. The Harbor Trans boat uses one of Munson's standard Hammerhead hulls, but the bottom configuration and layout were worked out with Munson engineers.

For free literature giving full information on Munson Manufacturing Company,

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## Alabama Maritime To Build Five Navy Oil Barges Under \$6.9-Million Pact

Alabama Maritime Corp., Mobile, Ala., has received a \$6.9-million contract for three oil barges (YON) and two oil storage barges (YOS). The work is expected to be completed April 1990. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-2212).

## 'Space-Age' Simulator Program At MarineSafety Prepares Officers To Handle Super Containerships

The first phase of a "space-age" program to prepare officers to handle a brand new class of super ships was recently completed in Newport, R.I. In a program not unlike NASA's recent Space Shuttle crew training, MarineSafety International (MSI), a professional training organization, conducted intensive simulator training for the deck officers who will command five new C-10 containerships.

The giant new containerships, now being phased into service by Oakland-based American President Lines (APL), can each carry the equivalent of 4,300 twenty-foot containers at a service speed of 24 knots with a cruising range of 22,000 nautical miles. They are over 900 feet in length and have a post-Panamax beam of 130 feet. The vessels are the biggest, fastest, and most powerful operated by APL.

The three-day C-10 shiphandling training program is being conducted for APL by MarineSafety at their simulator training complex in Newport. Two highly sophisticated ship simulators are used. In addition to simulating ship's handling characteristics, the simulators each generate a full color, realtime view of selected harbors as seen from a ship's bridge. Also the depth, bank, current and radar characteristics of the harbor are simulated.

MarineSafety, a wholly owned subsidiary of FlightSafety International (NYSE), operates training facilities at La Guardia Airport and Kings Point, N.Y., and Newport, R.I.

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## Munson Mfg. To Build Hydrographic Boats Under \$1.5-Million Contract

Munson Manufacturing Company, Edmonds, Wash., has been awarded a \$1,566,941 contract to build two 44-foot hydrographic vessels for the U.S. Army Corps of Engineers.

According to **Bill Munson**, president of Munson, the award is the largest single contract the company has ever won.

Besides their extensive array of sophisticated electronics, each vessel will be powered by twin 550-hp, 6V92 Detroit Diesel engines driving Hamilton 361 waterjets and will have service speeds of about 20 knots. The engines will be cooled by fresh water using Fernstrum keel coolers.

Munson expects to deliver both boats in the spring of 1989.

For free literature detailing the boatbuilding services of Munson Manufacturing,

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## Koden Purchases All Shares Of SI-TEX Marine Electronics —Literature Available

**F.Y. Ito**, president of Koden Electronics Co., Ltd. of Japan, has announced that he has purchased, through a newly formed Florida subsidiary, all of the shares of SI-TEX Marine Electronics from Smith Industries Inc. for an undisclosed amount.

Mr. Ito disclosed that a lease has been signed for the property now occupied by SI-TEX. He also stated that there are no present plans to merge SI-TEX and Koden International, but plans are now under way to add radar and loran to the Koden International product line.

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## Free Literature Available On Matrix 'Purepro' WaterPurification Systems

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November, 1988

## AESA To Build Three More Reefers For Del Monte

State-owned Astilleros Espanoles SA (AESA) of Spain recently received an order believed to be worth \$88 million for three refrigerated cargo vessels from Del Monte Fresh

Fruit International Inc. Last year, Del Monte ordered six reefer vessels from AESA.

According to reports, the three new reefers will be built at AESA's Sevilla yard. Each vessel will have a 580,000-cubic-foot capacity and will be powered by MAN B&W Diesel 6L60MC main engines producing a total of 13,750 bhp. The vessels are sister ships to two Del Monte reefers

being built at AESA's Puerto Real yard. The Puerto Real-built reefers, however, will have a total bhp of 10,550.

The Sevilla yard is building four smaller reefers for Del Monte under last year's order.

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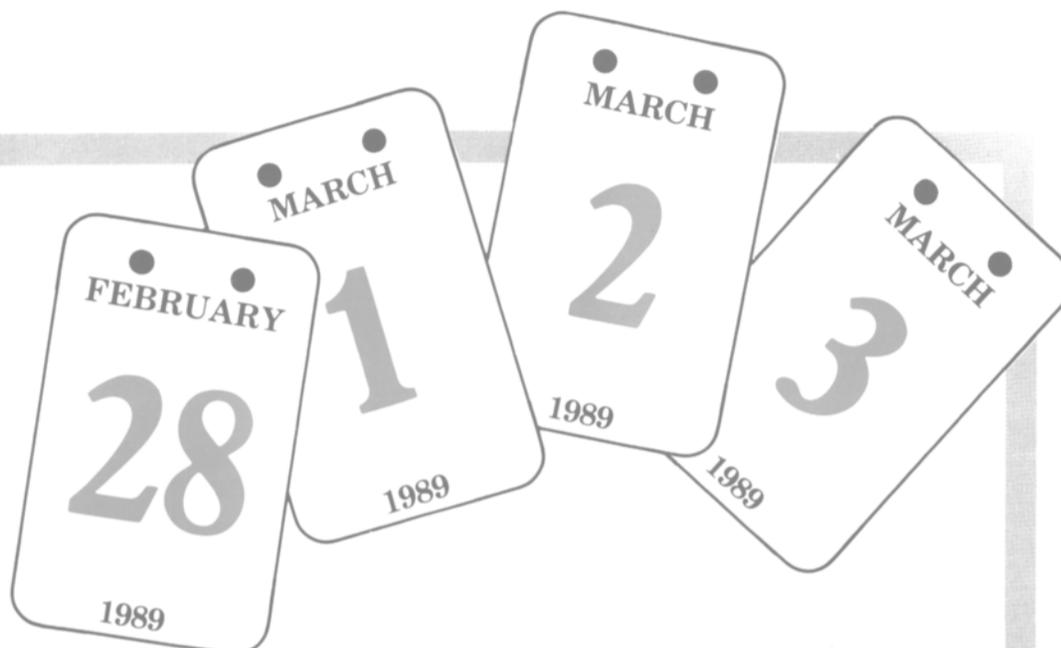
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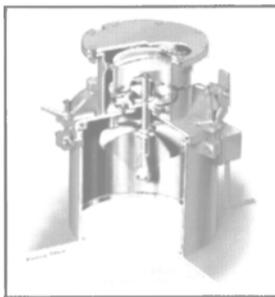
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