MARITIME REPORTER
AND
ENGINEERING NEWS

96th SNAME ANNUAL

7th INTERNATIONAL MARITIME EXPOSITION

NOVEMBER 1988 ISSUE

GIVING NATIONAL DEFENSE A BIG LIFT.

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.

Abraham Lincoln (CVN72) and George Washington (CVN73) are the next two aircraft carriers being built through modular construction. At Newport News Shipbuilding, we're proud our 900 ton lifts give a big lift to our nation's ability to meet its global commitments.

Newport News Shipbuilding TENNECO

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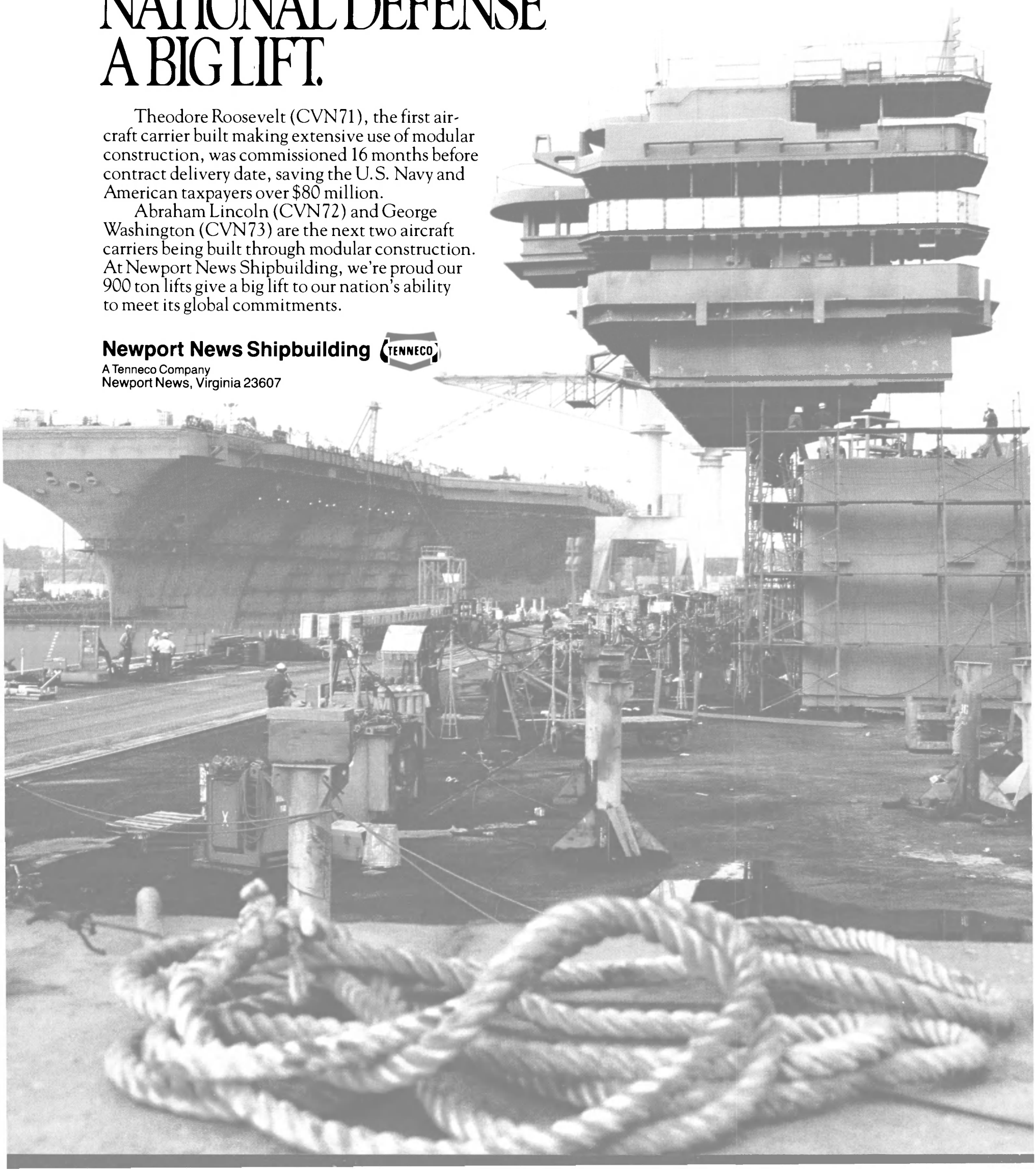

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ON THE COVER

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Annual Meeting
& 7th International
Maritime Exposition

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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 Drydocking Selcted 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,

Circle 73 on Reader Service Card

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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.,

Circle 24 on Reader Service Card

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 *Shipyard 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.

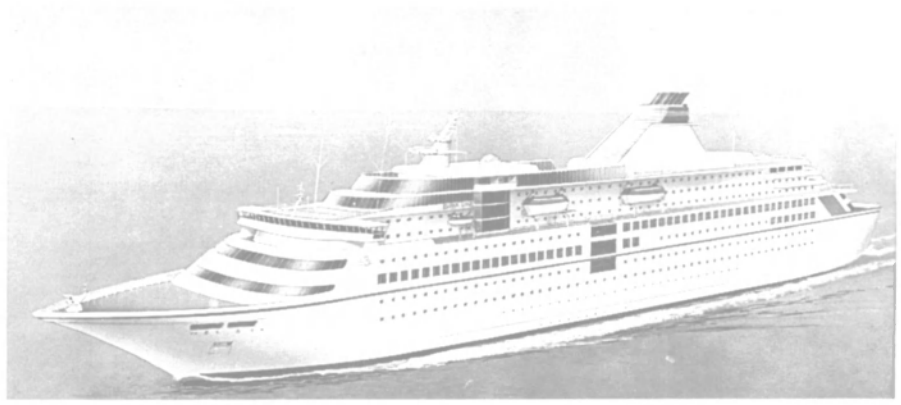
Since government subsidy programs supporting U.S. shipbuilders were denied funding in 1981, the industry has had to compete against subsidized foreign shipyards. Thus, the U.S. market share for building commercial ships dwindled as a consequence, and capital investments required to bring about productivity 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 sustaining 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: (l) 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 agencies, 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 benefit 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.



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 delivery, 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,

Circle 20 on Reader Service Card

Alexander Industries Named To Represent Riley-Beaird Maxim 'Watermaker'

Alexander Industries, Inc. has been appointed Gulf Coast distributor for the Riley-Beaird Maxim "Watermaker."

Manufactured by Riley-Beaird, Inc., the Watermaker provides

water for just about any purpose. Because it is spring fresh and soft the water is ideal for drinking, cooking, showering, and all other personal uses. It uses waste heat from engine cooling water or heated water from any source to convert raw salt water or otherwise impure water to pure fresh water.

Arthur J. Sevin Jr., president of Alexander Industries, said the complete line is available with capacities from 8 to 630 gallons per hour.

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

Circle 40 on Reader Service Card

Newport News Announces Management Restructuring

Edward J. Campbell, president and chief exceutive 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.

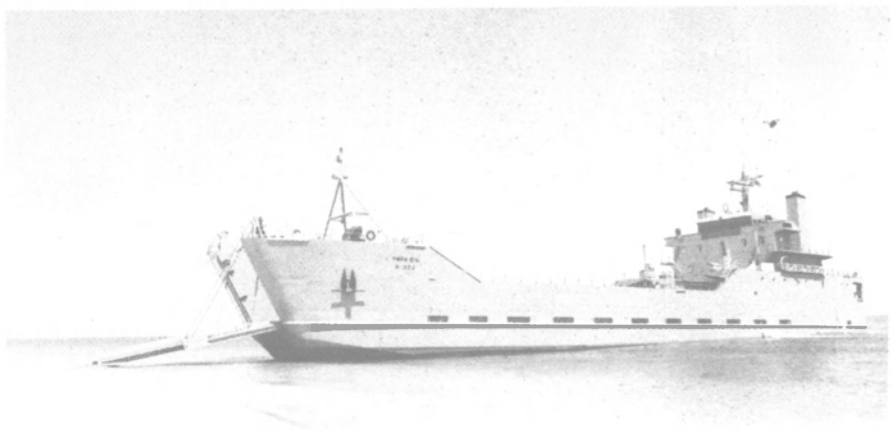
Mr. **Fricks** holds a master of business administration degree from the College of William and Mary and is a graduate of the Harvard University Advanced Management Program.

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.



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,

Circle 18 on Reader Service Card

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

Circle 92 on Reader Service Card

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).

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 fiancing 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 Oceangoing 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 caulkings 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,

Circle 61 on Reader Service Card

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 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

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

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,

Circle 3 on Reader Service Card

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

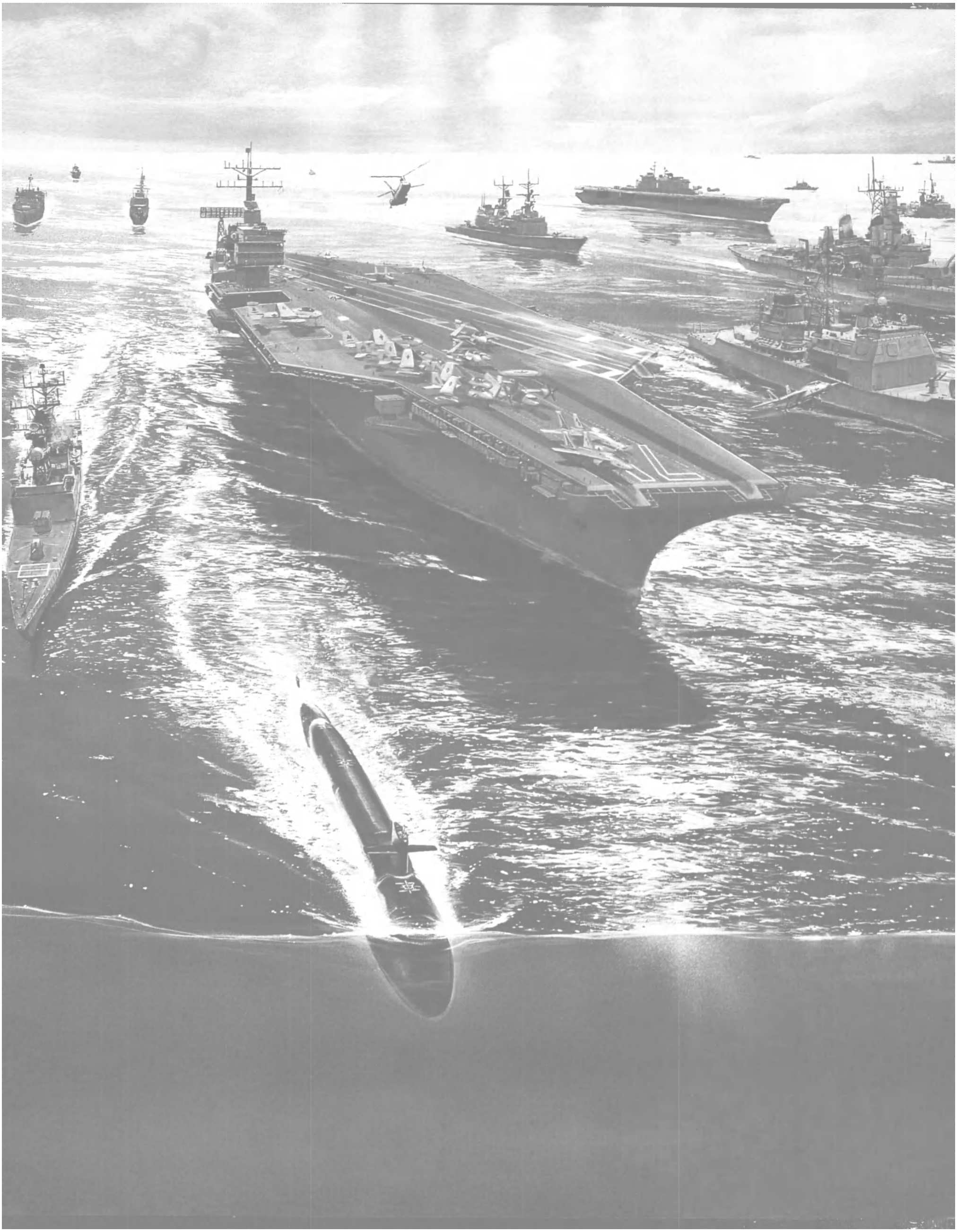
Omnithruster bow and stern thrusters installed aboard one of the Soviet Union's newest research vessels are providing excellent are ice management and maneuverability, according to the Santa Fe, California-based company.

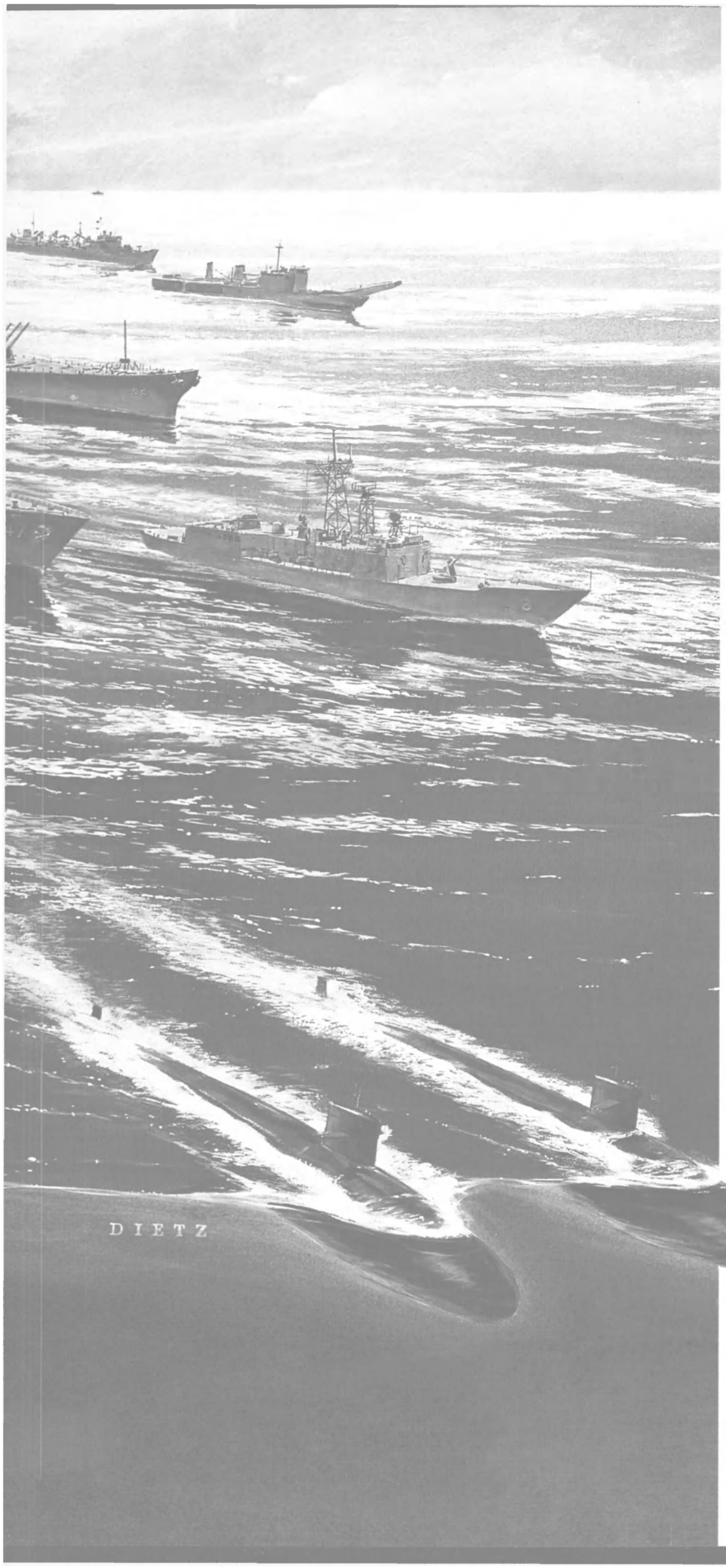
The 7,600-dwt Akademik Fedorov, operating in the harsh ice conditions of the Antarctic, is fitted with Omnithruster bow and stern thrusters. The 1,300-kw aft Omnithruster unit, a model JT 1700, delivers a thrust of about 12 tons at 493 rpm and can propel the ship forward at about 3 knots and at lower 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 devloped by the president 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 propulsion 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





MagneTek. On board every class of ship in today's navy.

In the early 1900s, a Louis Allis electric motor was fitted aboard a U.S. Navy vessel for the first time. And a tradition was born.

Today, MagneTek Louis Allis is a major supplier of Mil-Spec motors, generators, drives, secondary propulsion systems and ECM equipment to the Navy. MagneTek Jefferson Electric power transformers are specified for many shipboard electrical applications. And MagneTek ALS frequency converters provide reliable power for every AEGIS weapon system afloat.

And that's not all.

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

By many names we've been providing power solutions to the U.S. Navy for over half a century. By our new first name — MagneTek — we're prouder than ever to be in the Navy now.

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These ships represent more than 30 classes of U.S. Navy vessels on which MagneTek products are in service. A limited-edition poster-size print, suitable for framing, is available upon request. Mail your business card to: MagneTek, Poster Offer, 11111 Santa Monica Boulevard, Los Angeles, CA 90025.

Circle 203 on Reader Service Card

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 gerator 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.

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

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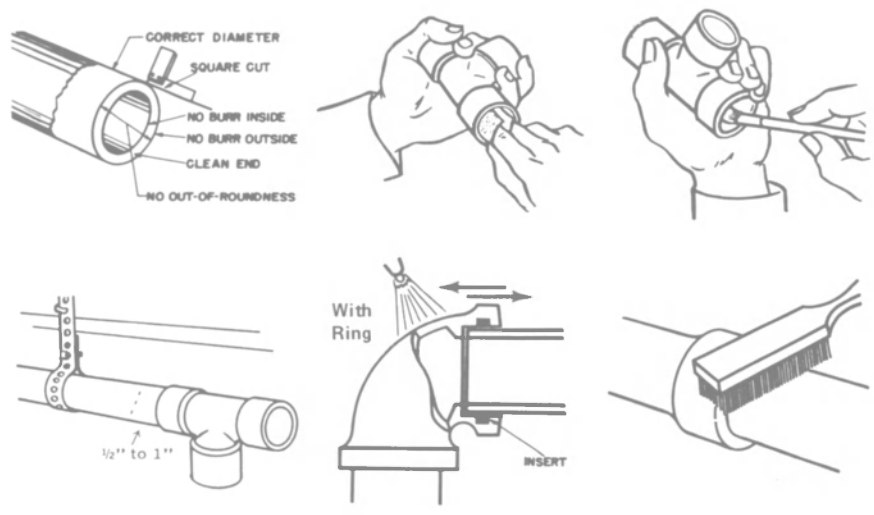

The Flagg-Flow video demonstrates the six proper steps to brazing—1. Proper fit and clearance; 2. Thorough cleaning; 3. Proper fluxing; 4. Assembly and support; 5. Heating and alloy flow; and 6. Cooling and clean up.

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 suppy 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 auxliairy 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," featuring 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 E C-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

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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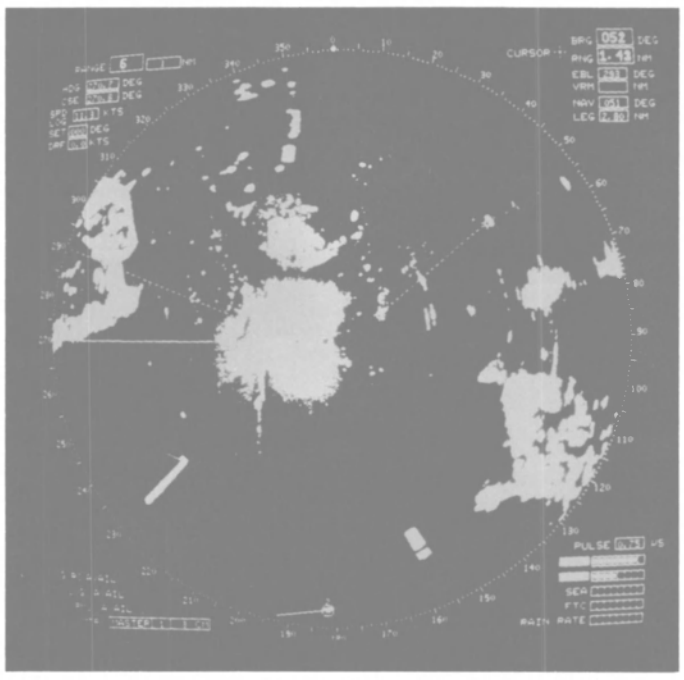
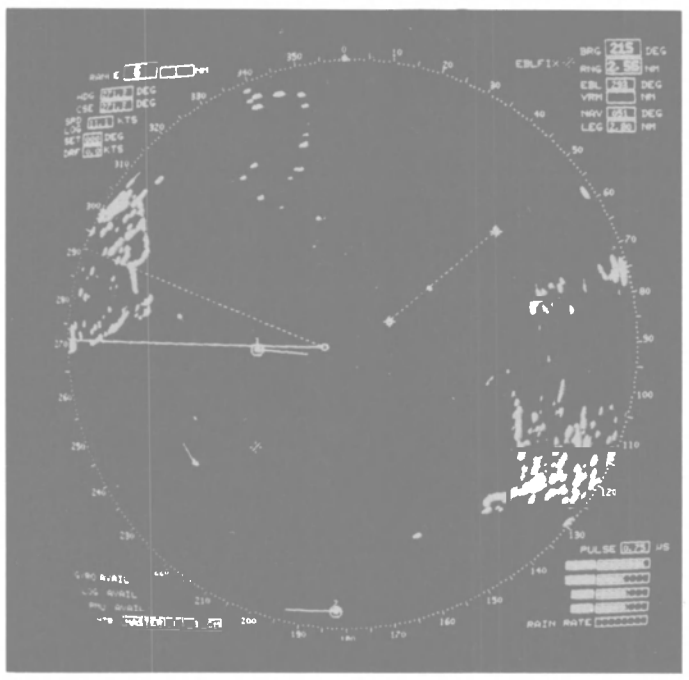


With rain and sea clutter circuits OFF on PATHFINDER/ST ARPA, sea clutter extends 1.8 to 2 miles from ship, ice floe belts appear 320° to 35°, additional ice clutter scattered beyond sea clutter 270° to 320° (Thick lines at 230° and 155° are RACONS).



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.

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 inustries; shipbuilding and repair industries; pulp and paper industries; and the food processing industry. Non-Ferrous has supplied fasteners for such applications as heat exchangers, condensors 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 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,"

Circle 72 on Reader Service Card

$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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30 YEARS OF PERFORMANCE

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.

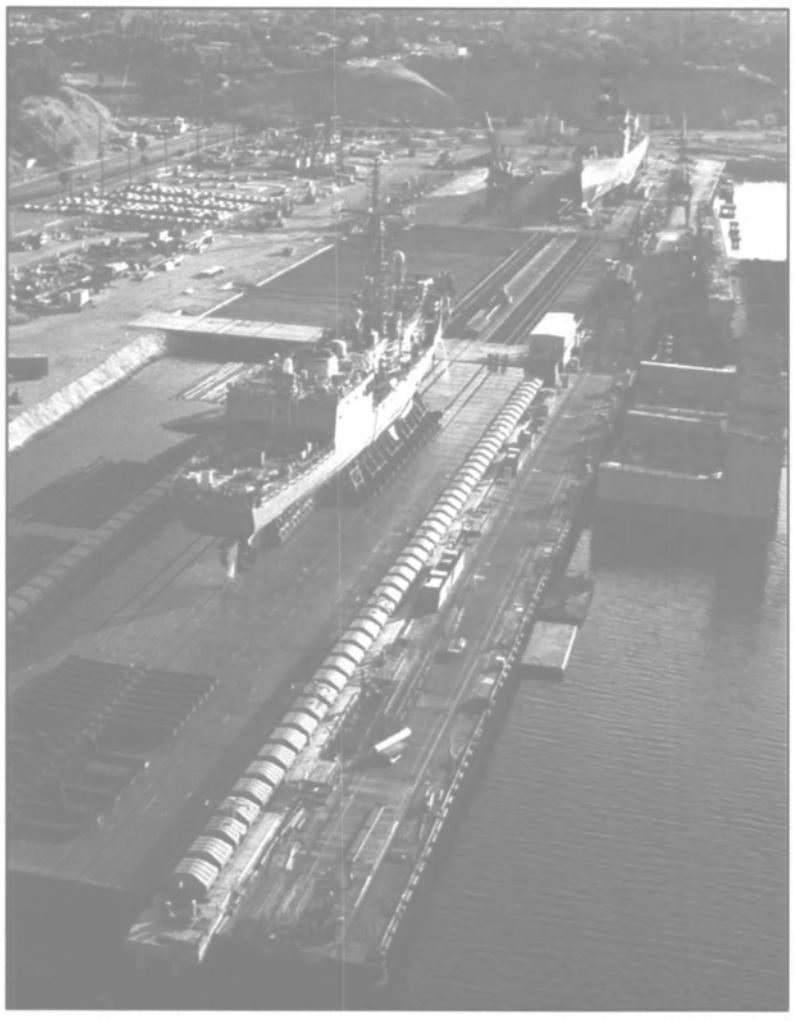
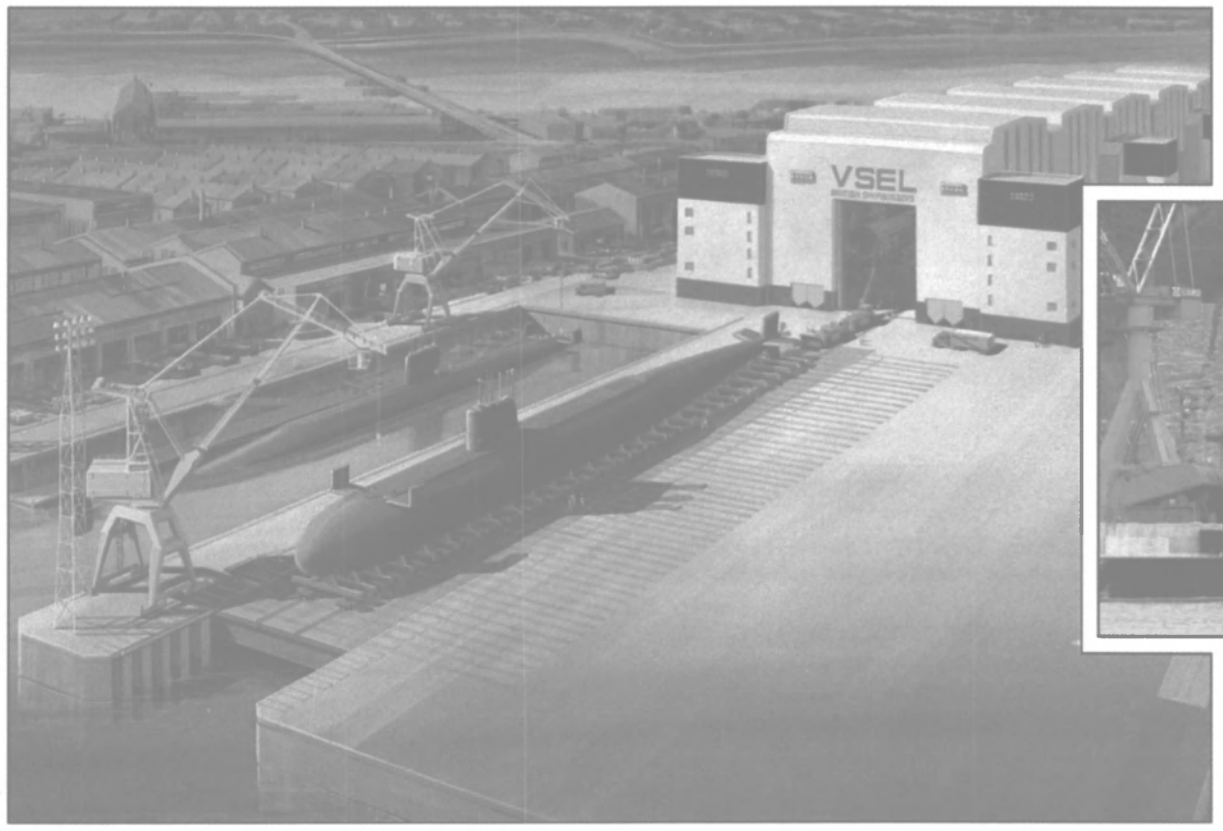


Photo by Joseph Ernest



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

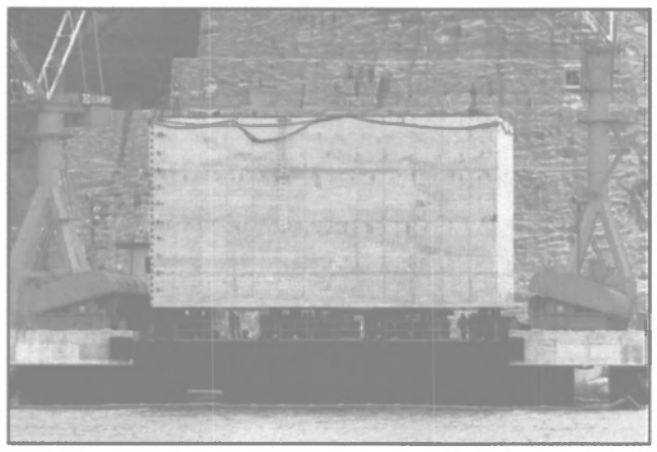


Photo by Penta-Ocean Construction Co., Ltd.

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

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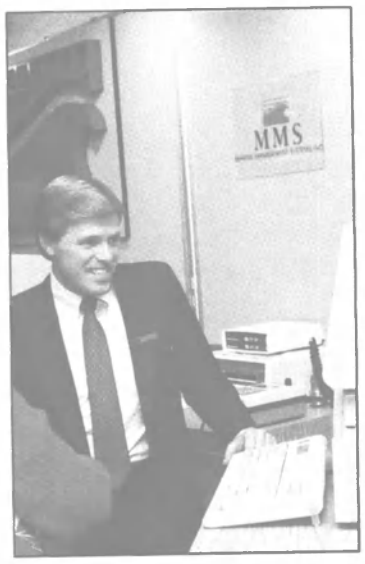


96th SNAME ANNUAL

SNAME 95th An
7th International M

November 9-12,

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 exposition 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

ual Meeting And aritime 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 environment 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. Registraints 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 Witness," 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 registraints 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 registraints 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**.

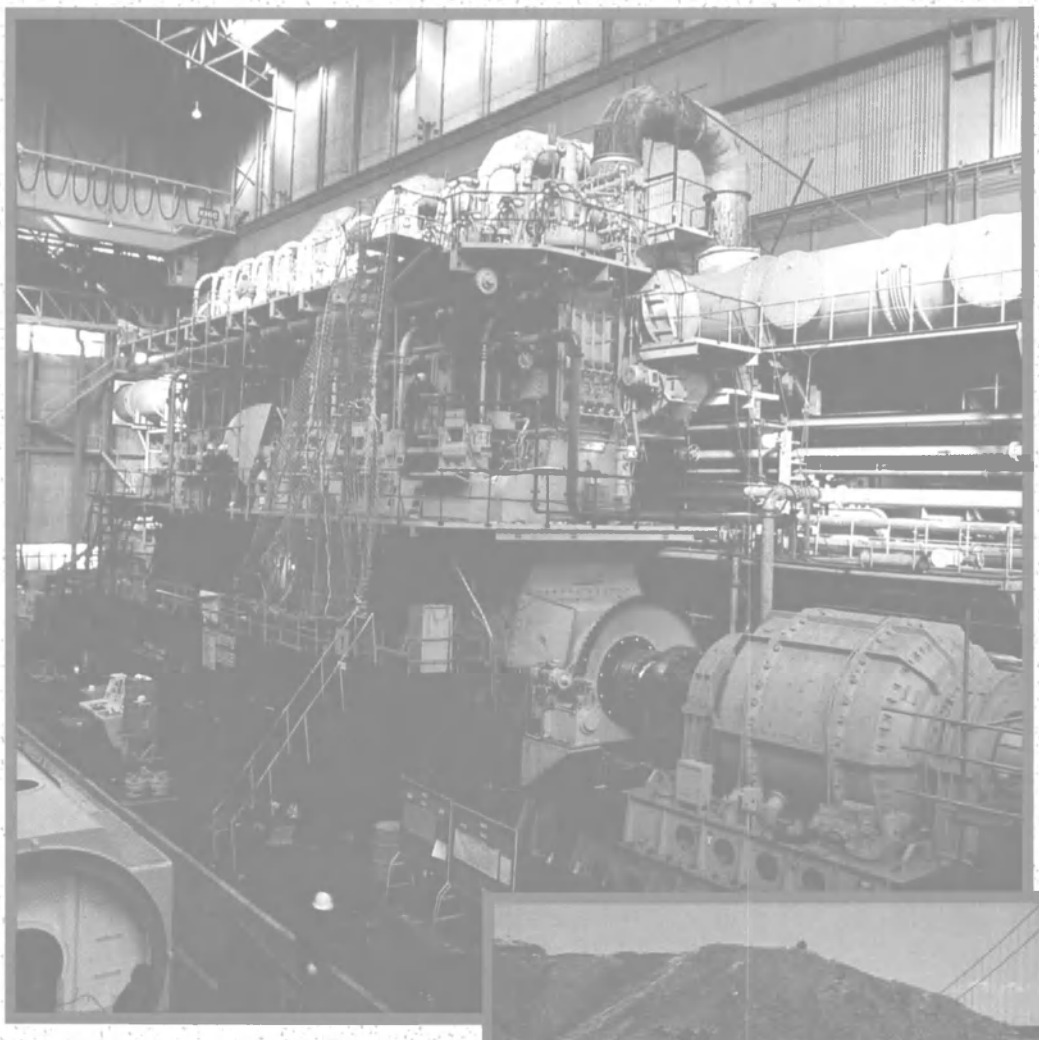
Data obtained by ship instrumentation from a few simple trials of the 75,000-dwt Exxon Philadelphia dur-

(continued)

BP Marine International

Supplying lubrication for 60% of 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.



◀ Sulzer 12RTA84 57,000 BHP of APL's containership, "PRESIDENT TRUMAN".

▶ APL's 53,648 dwt M/V PRESIDENT TRUMAN, first of a new class of 4,300 TEU containerships.

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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 tremendous 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 statitics, 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

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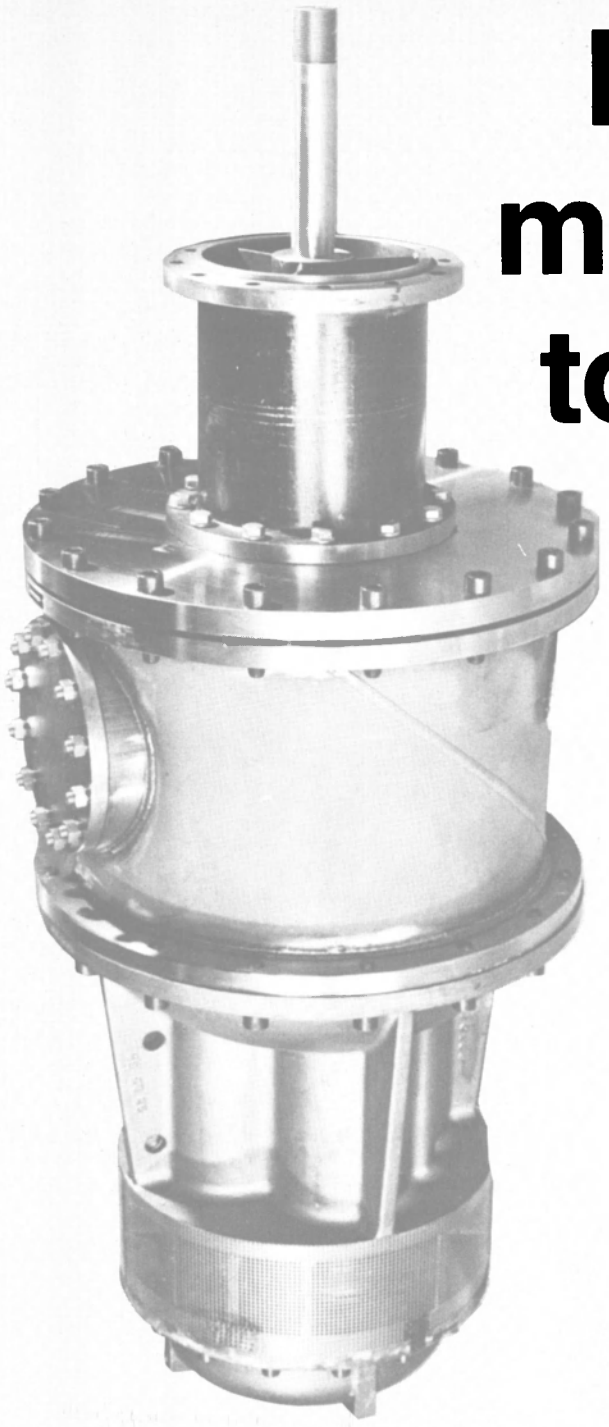
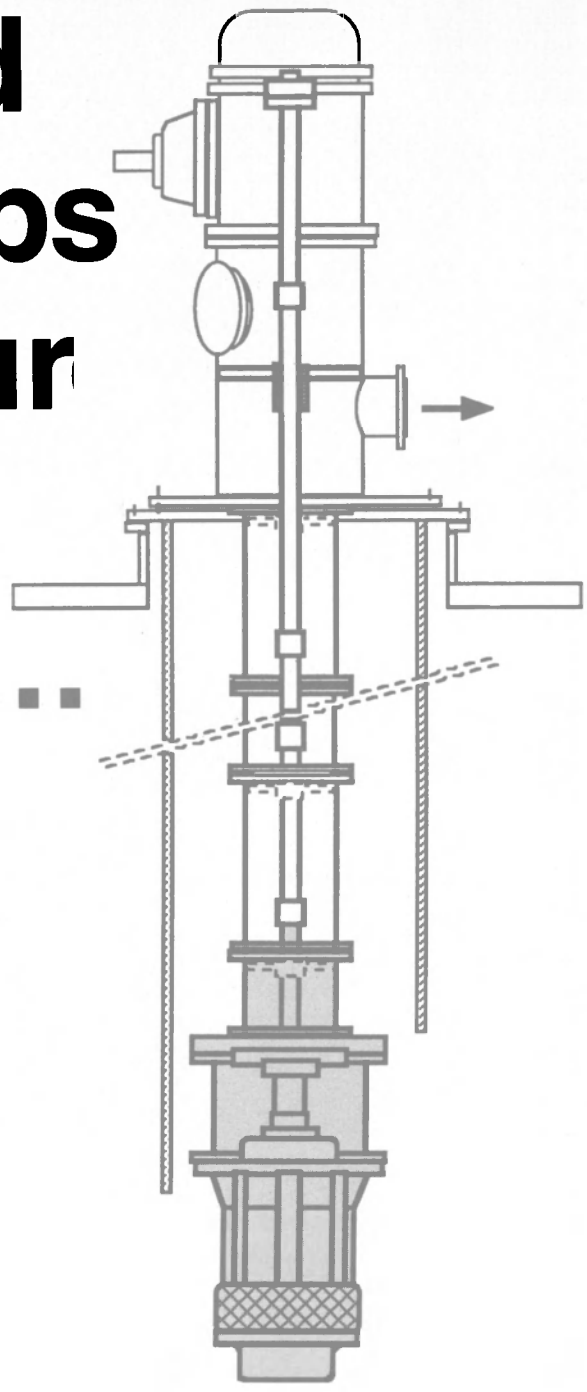
Engineered marine pumps to solve your special problems...





The Leistritz 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.

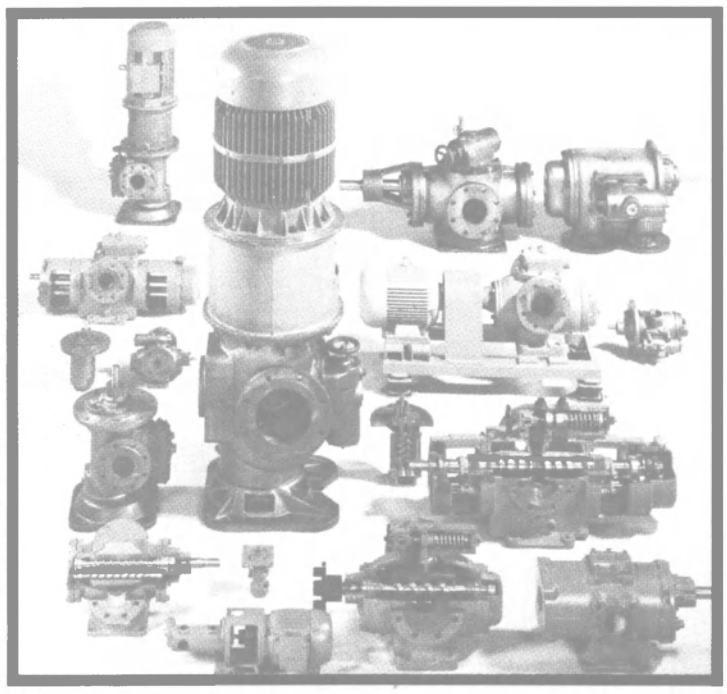
plus a full line of standard units.

While engineering and manufacturing marine pumps to solve all kinds of fluid-handling problems has been a Leistritz 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.

So whether you have a special pumping problem to be solved, or an application that a standard pump can handle, you can count on Leistritz for a pump design that will—without compromise—meet your exact pumping requirements. And at the same time, you'll get the quality, reliability and efficiency that Leistritz is known for.

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



Leistritz

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— A Preview

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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 extensive 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 **Nikiforos 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 infomration (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, Suketou Wakamatsu, Tetsuo Tagori, Michio Nakato, Hiroharu Kato, Hiaku Tanaka** and **Mitsuhiro 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.

SNAME Exhibitors

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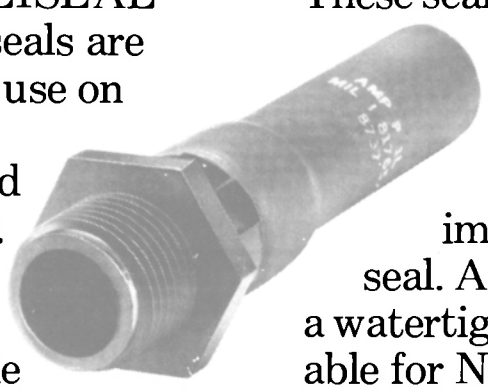
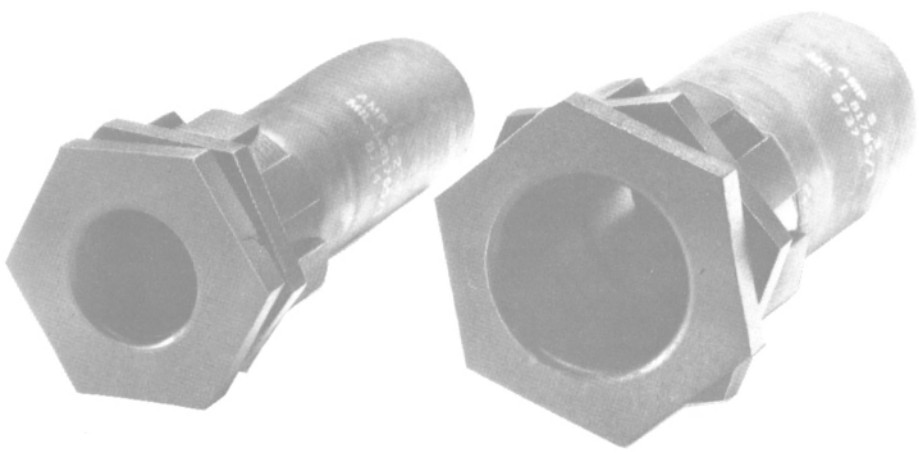
AMP AMPLISEAL. Cable entry seals for all Navy applications.

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 water-tight junctions.

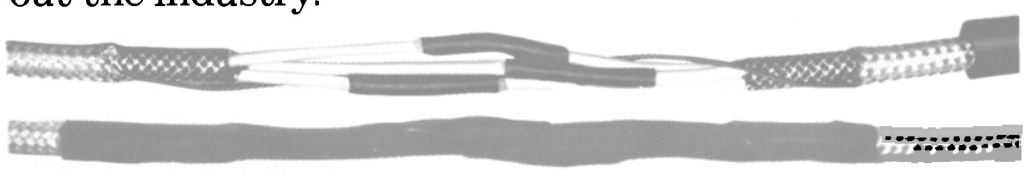


These seals are qualified per material specification MIL-I-81765/1 and meet the demands of MIL-S-19622 for shock, vibration, impact, and effectiveness of seal. A cost-effective way to form a watertight junction, they are available for NPT threads and bulkhead cutouts between ½" and 3¼".



Marine Cable Splicing Kit.

Our AMPLISEAL cable entry seals are the perfect complement to our Marine Cable Splicing Kit, the cable splicing method approved by the Coast Guard (miscellaneous equipment list CCG 293) and by the ABS. It's fast, safe, and accepted throughout the industry.



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.

AMP Products Corporation

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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.

They represent Vesta, Parkway

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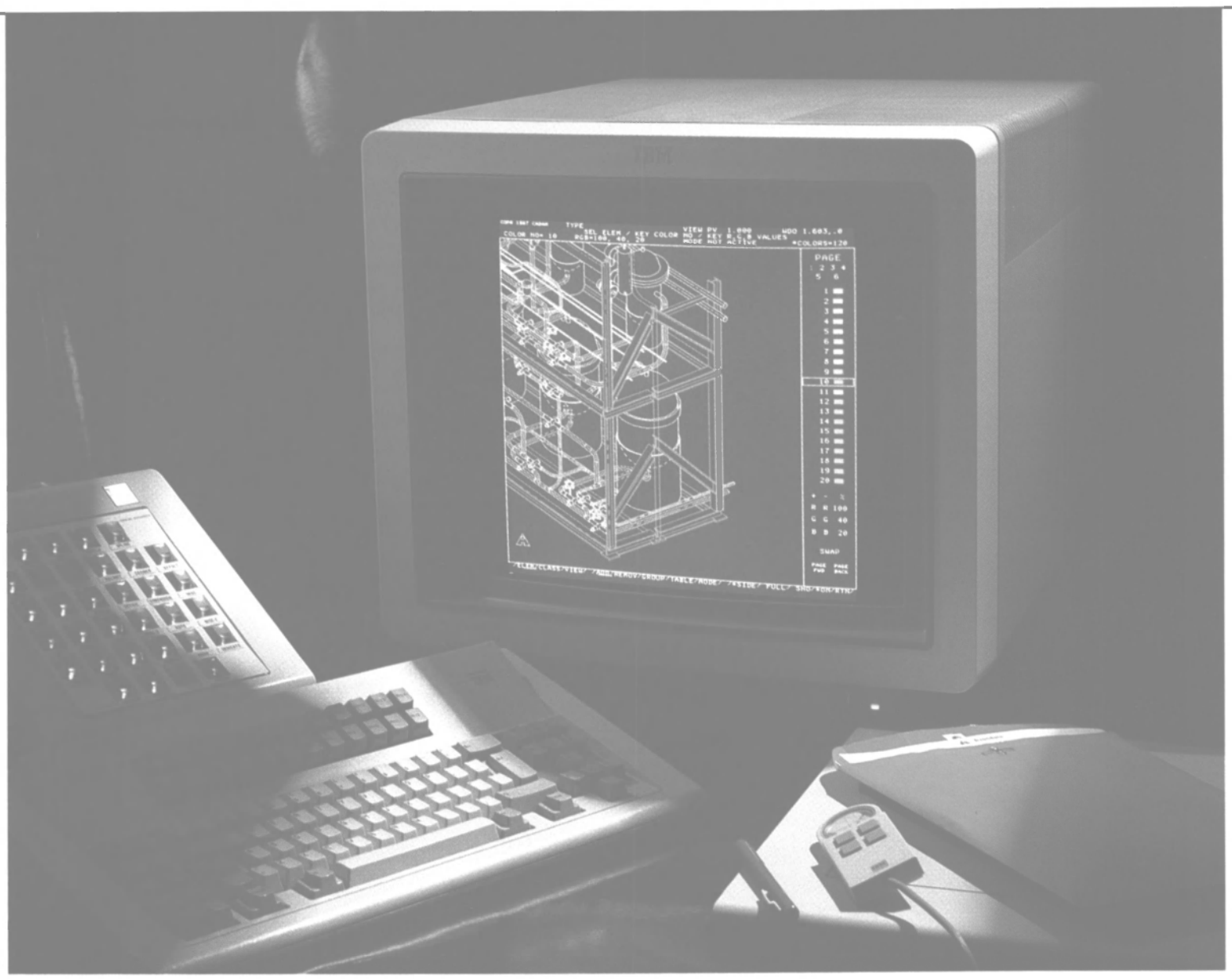


Avondale draws on its past to fabricate America's future.

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.

Avondale first strengthened its traditional leadership position as the nation's finest marine fabricator by adopting the leading edge technology...modular construction and assembly.

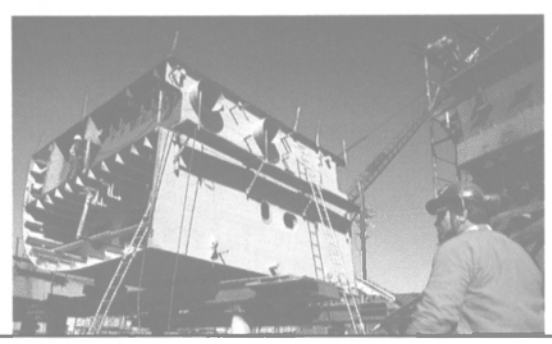
Avondale mastered the technology and then sought ways to maximize its value, applying it successfully to diverse land-based industries.

Today, heavy industry is back in style because critical systems for transportation, defense, electric power and environmental protection need upgrading and expanding...now.

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

Avondale is refabricating America.

Avondale



Avondale Industries, Inc.
P.O. Box 50280
New Orleans, La. 70150
(504) 436-2121

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(continued)

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.

The type RR151 is a lightweight,
(continued)

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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).

The VTR 214 turbocharger represents ABB's most extensive series, and is suitable for engines from 250 kw (335 hp) to the highest known outputs available.

BORNEMANN PUMPS
Booth 810

Bornemann has been a privately owned business since 1853 and in the positive displacement rotary screw pump business since 1934. Bornemann pumps can handle virtually any fluid with viscosities to 1,000,000 cst, flows to 8,800 gpm, and temperatures to 800 degrees F.

Bornemann two screw cargo pumps are manufactured to exacting quality control standards and are offered in amultitude of materials, from cast iron to high quality Cr-Ni-steel, bronzes and others. Bornemann is fast becoming a leading supplier of one, two and three screw pumps in the U.S.

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 aquestions. 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

Consolidated Industrial Skills Corporation (CISCO)/Torrech Enterprises Corporation (TEC), one of the nation's largest contractors of skilled craft support to the marine industry, can provide first class shipfitters, pipefitters, welders, turbine mechanics, boiler makers, inside and outside machinists, joiners, marine electricians, and virtually any other trade personnel to suit a customer's needs.

The firm offers complete marine subcontracting including turnkey estimating, planning, engineering, quality control, ptroject management and production on a fixed price or time and material contract basis.

CROSSFIELD PRODUCTS
Booth 138

Crossfield Products Corp., Roselle Park, N.J., is celebrating its 50th anniversary as the manufacturer of Dex-O-Tex "Performance Proven" troweled composition deck coverings, underlayments and other decking specialties to the marine industry.

Dex-O-Tex decking materials are in service on every type of vessel, ranging from harbor tugs to luxury liners, drill rigs to aircraft carriers.

(continued)

WHEN RELIABILITY MEANS MONEY

A ZF transmission is the best thing next to your engine.

Fishing boats, tow boats, passenger ferries, & crew boats all realize the benefits of performance & reliability inherent in ZF marine transmissions... the performance measured in bottom line dollars & cents plus the reliability to survive in demanding commercial boats.

ZF marine transmissions redefine the meaning of options; features include trolling valves, trailing pumps, PTO's, cast iron or light alloy housings, diagonal offset shafts, single & double reduction designs, identical performance in forward or reverse, mounting brackets, & transmission lube oil filters.

Simplicity and ease of maintenance are designed into every ZF marine transmission. Oil pumps, control units & clutches are easily serviced or exchanged without removing the transmission from the boat.

Quality is assured by ZF's strict quality assurance program, employing the latest inspection technology with a system approved by classification societies such as the American Bureau of Shipping (ABS) & Lloyd's Register of Shipping (LRS).

The combination of bottom line performance, reliability, ease of maintenance & a host of available, options, backed up by ZF's efficient after sales/service network assures you of the best...ZF!

Send now for full information on ZF marine transmissions including a free copy of ZF's marine transmission guide.

It costs no more to specify the best.

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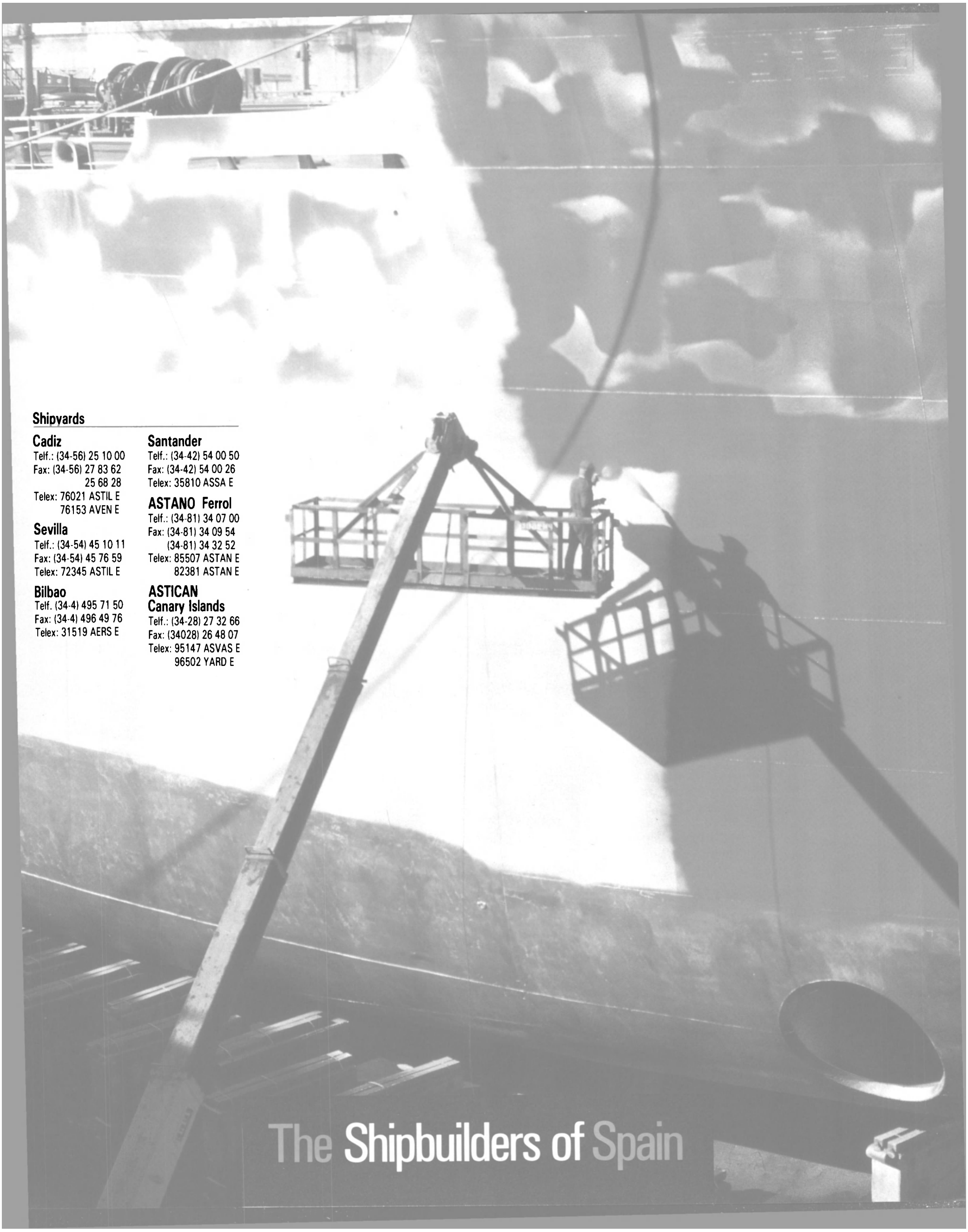


Shipyards

Cadiz
Telf.: (34-56) 25 10 00
Fax: (34-56) 27 83 62
25 68 28
Telex: 76021 ASTIL E
76153 AVEN E

Sevilla
Telf.: (34-54) 45 10 11
Fax: (34-54) 45 76 59
Telex: 72345 ASTIL E

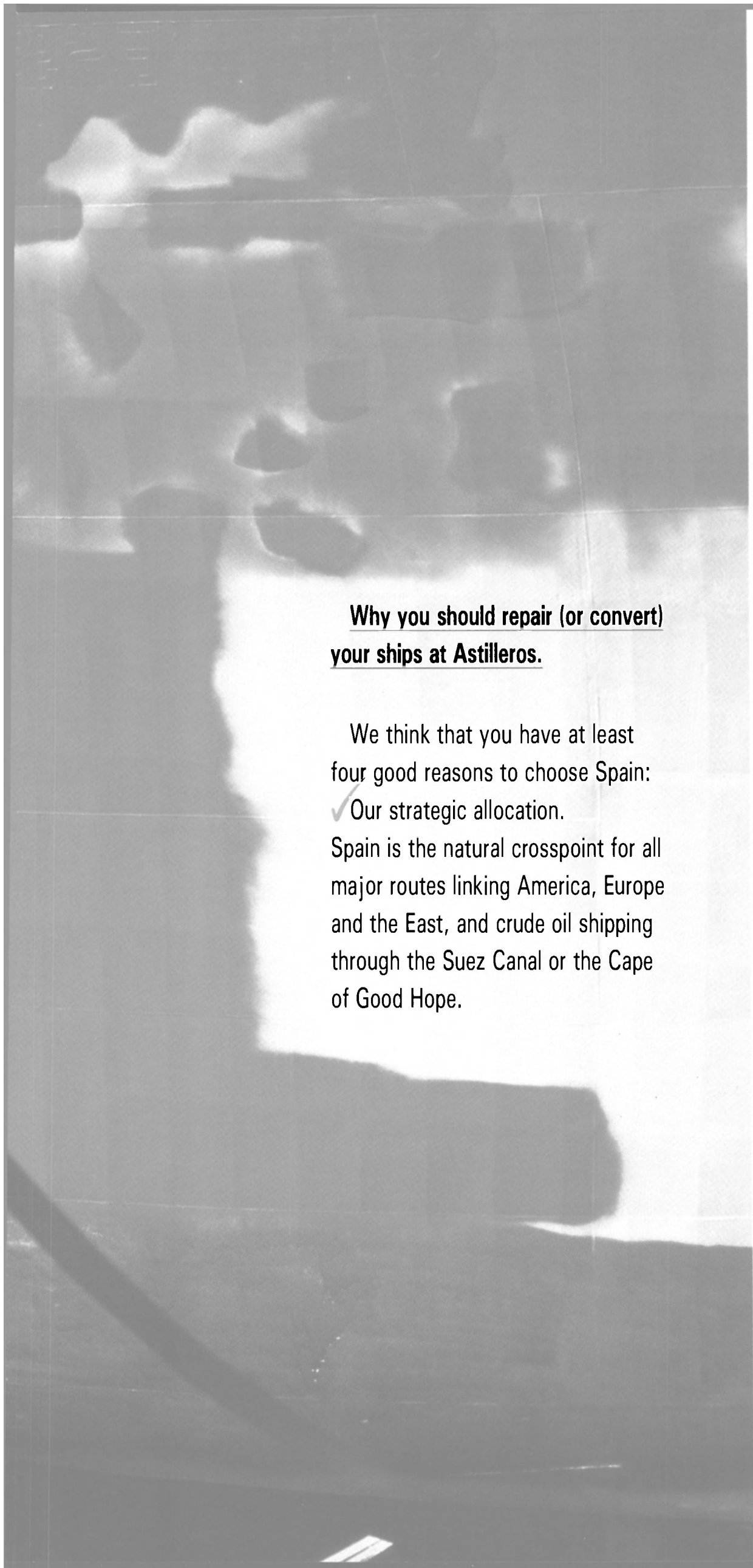
Bilbao
Telf. (34-4) 495 71 50
Fax: (34-4) 496 49 76
Telex: 31519 AERS E

Santander
Telf.: (34-42) 54 00 50
Fax: (34-42) 54 00 26
Telex: 35810 ASSA E

ASTANO Ferrol
Telf.: (34-81) 34 07 00
Fax: (34-81) 34 09 54
(34-81) 34 32 52
Telex: 85507 ASTAN E
82381 ASTAN E

ASTICAN
Canary Islands
Telf.: (34-28) 27 32 66
Fax: (34028) 26 48 07
Telex: 95147 ASVAS E
96502 YARD E

The Shipbuilders of Spain



Why you should repair (or convert) your ships at Astilleros.

We think that you have at least four good reasons to choose Spain:

✓Our strategic allocation.
Spain is the natural crosspoint for all major routes linking America, Europe and the East, and crude oil shipping through the Suez Canal or the Cape of Good Hope.

✓Our technical skills and facilities.
12 dry docks, 2 floating docks and one syncrolift, with capacities up to 400.000 d.w.t.

✓Our conversion experience
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 heald up by adverse weather.

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Telex. 27648 ASTIL-E
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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

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 advise 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.

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HAGGLUNDS MARINE
Booth 228

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

KRUPP MAK
Booth 124

Krupp MaK Maschinenbau 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.

LEISTRITZ
Booth 217

The Leistritz Corporation has been manufacturing rotary screw 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.

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_2 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

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 marine 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., NewportNews, 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-

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— 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 architects 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 electtronic propulsion control systems.

PHILADELPHIA RESINS
Booth 319

ITW Philadelphia Resins Corporation, Montgomeryville, Pa., leaders 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

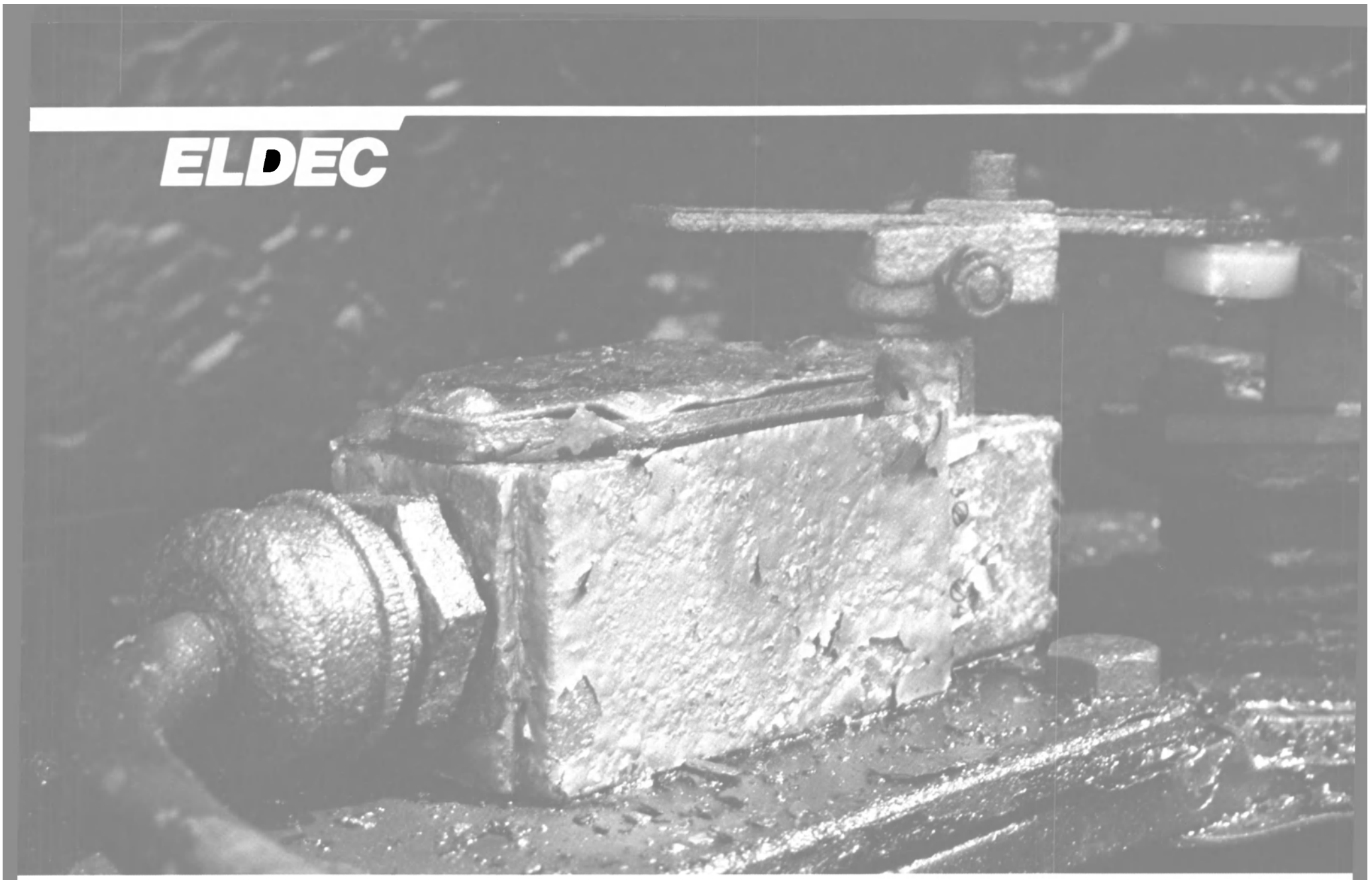
Riley-Beaird, Inc. will exhibit Maxim® Silencers, heat recovery equipment, evaporators and heat exchanger products. Emphasis will be placed on the firm's standard designs, capability to design and manufacture custom equipment and experience with multi-effect evaporators. Information will be available 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-



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.

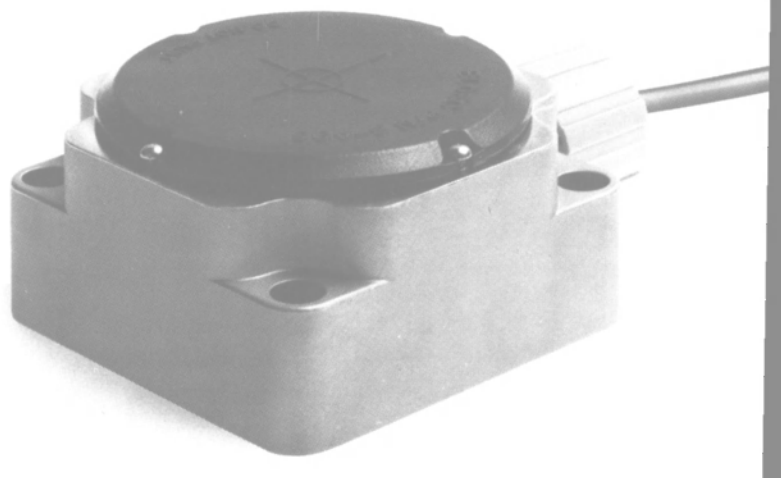
ELDEC non-contacting switches can stand up to the sea.

- Encased in non-corroding, stainless steel.
- EMI hardened to **exceed** MIL STD 461B, Class A4.
- Operating range from −30° to +65°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.



ELDEC®

COMMITTED TO PERFORMANCE™

Eldec Corporation, Lynnwood, Washington USA
Tel. 206-487-4000 • TWX: 910-449-0873

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(continued)

hibit all their noise and vibration control materials for the marine industry. Samples of materials used to solve accoustical 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 manufacture rasterscan and conventional PPI radar systems, ARPAs, 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, multilevel 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, layup, 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)

THERE'S ONLY ONE THING THAT WORKS HARDER THAN YOUR SHIP

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!

OUR FASTENERS

E X C E L L E N C E I N A C T I O N

ACTION THREADED PRODUCTS, INC.

6955 South Harlem, Bedford Park, Illinois 60638

See us at Booth #317 at the International Maritime Exposition

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(continued)

VESON
Booth 126

Veson combines shipping knowledge 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: sternlign 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.

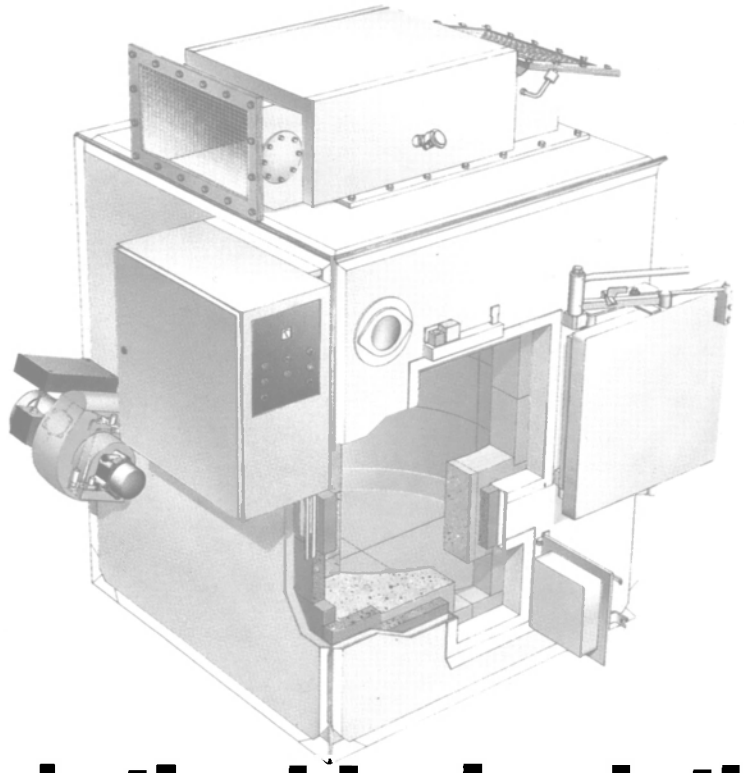
WAUKESHA BEARINGS
Booth 238

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.

← Circle 265 on Reader Service Card

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



Here's the ideal solution.

Annex 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.

Investing in Neptune brings an invaluable extra benefit: the matchless experience, resources and service-backing of Hamworthy Engineering — a name which stands for quality and innovation in many related sectors of engineering around the World.

For full details call or write to:

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pumps and compressors

Hamworthy Engineering Limited, Fleets Corner, Poole, Dorset. BH17 7LA
Telephone: 0202 665566 Telex: 41348 (HAMPAC G) Facsimile: 0202 665444.

AJA-2882

Circle 176 on Reader Service Card

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 product 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 terminal 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,

Circle 86 on Reader Service Card

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[R] 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 polymide (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,

Circle 75 on Reader Service Card

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.

For more information, write:
Combustion Engineering, Inc.
Dept. CEP1-MR
P.O. Box 500
Windsor, CT 06095-6052

COMBUSTION ENGINEERING

Circle 206 on Reader Service Card

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®, 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 techniques 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 performed 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

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 drydock shows once again the versatility of today's modern railway drydock.

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 Irtyshsk, 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,

Circle 77 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,

Circle 87 on Reader Service Card

← Circle 304 on Reader Service Card

OKABE

MANUFACTURER & DISTRIBUTOR OF STANDARD & CUSTOM FASTENERS

DIRECT MILL SHIPMENTS IN STANDARDS AND SPECIALS

QUALITY ASSURANCE PROGRAM
IN ACCORDANCE WITH

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

MATERIALS

CARBON & ALLOY STEEL
NICKEL-COPPER
NICKEL-COPPER-ALUMINUM
STAINLESS STEEL
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

NICKEL-COPPER FASTENER STOCK PROGRAM

HEX HEAD CAP SCREWS

Length \ Diameter	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	*	*	*	*	*	*	*		
2	*	*	*	*	*	*	*	*	
2 1/4	*	*	*	*	*	*	*	*	*
2 1/2	*	*	*	*	*	*	*	*	*
2 3/4		*	*		*	*	*	*	*
3	*	*	*	*	*	*	*	*	*
3 1/4						*	*	*	
3 1/2			*	*	*	*	*	*	*
3 3/4						*	*	*	
4			*	*	*	*	*	*	*
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FINISH NUTS	*	*	*	*	*	*	*	*	*
THREADED ROD	*	*	*	*	*	*	*	*	*
FLAT WASHERS	*	*	*	*	*	*	*	*	*
LOCK WASHERS	*	*	*	*	*	*	*	*	*
SOCKET CAP SCREWS	*	*	*	*	*	*	*		

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Circle 343 on Reader Service Card

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,

Circle 58 on Reader Service Card

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,

Circle 42 on Reader Service Card

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 previously 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 provide 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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OVER 9,000 VESSELS BUILT!

WE CAN BUILD ANY BOAT YOU NEED.

Since our first shipyard was founded in 1921, the four shipbuilding companies of the Trinity Marine Group have built over 9000 vessels! We've also converted and repaired hundreds more. You name it, we've built it.

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We build everything from tugs, supply and crew boats, to trawler/processors, patrol boats, ferries, and dinner/cruise vessels. We build landing craft, pilot boats, barges, dredges, fireboats and surface effect ships too. We build tow boats, small tankers, drillships, ocean surveillance ships, containerships, RO/RO's, reefer ships, research vessels, and just about any boat you can name.

We meet the rigid requirements of the U.S. Navy, Army, Air Force, Coast Guard, and Department of the Interior. And we build to the standards of the ABS, U.S. Coast Guard, Lloyds, Det Norske Veritas, and SOLAS.

We will build to your design, or you can use our complete in-house services from design and engineering to global warranty assistance. We also handle your spare parts requirements promptly and accurately.

Each of our six shipyards specializes in certain vessels and each is staffed by shipbuilding experts supported by advanced computer aided design and manufacturing.

You receive personal attention—whether your requirements are small or large. Our list of satisfied repeat customers includes some of the smallest, and largest operators in the world. That's because each shipyard is a separate cost center and self-reliant.

They do benefit from centralized administrative functions which reduce their costs—and yours. Our shipyards also gain from the considerable resources of our parent company, Trinity Industries, Inc.

The experience gained in building over 9000 vessels pays dividends in every boat we build. No other shipbuilder in the world can match our record in production, adaptability, innovation, stability, and quality.

Chances are we have already designed and built the kind of vessel you need. So if you need a boat, we can and want to build it for you. Ask us.

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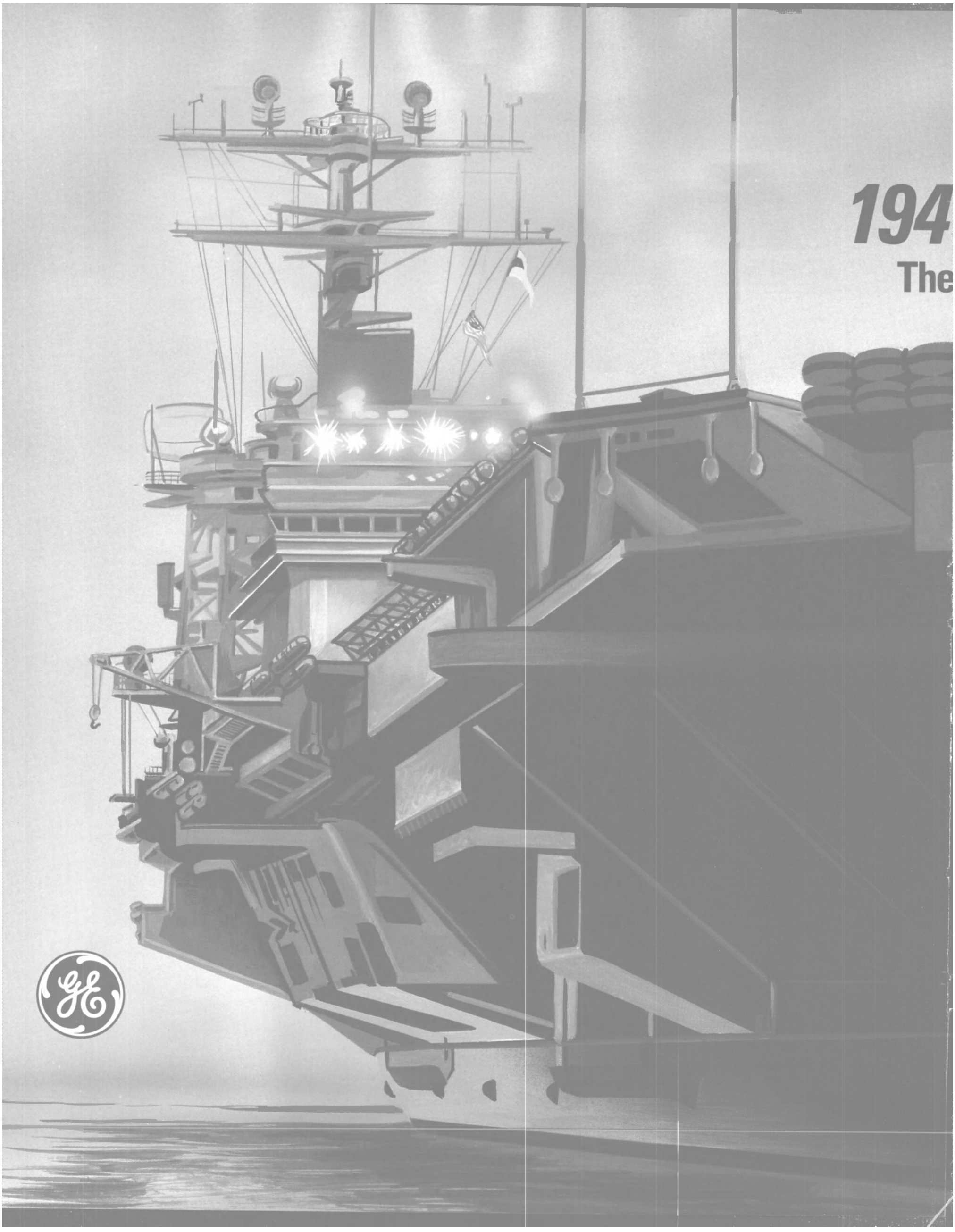
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Million Pounds At Over 30 Knots

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Proud leader. She's at sea, ready for missions anywhere on the globe. Aboard: close to 100 tactical aircraft, 4.5 acres of flight deck, more than 6,200 crewmen and enough fuel to keep her steaming into the Twenty-first Century.

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The CVN 71 bears a name that signifies greatness. Hunter, scholar, diplomat, naturalist, "rough rider", Nobel Prize winner, President—Theodore Roosevelt stood alone in many ways among American heroes. "For the protection of our own shores," he once said, "we need a great Navy." True to his word, he dispatched the Great White Fleet around the world as a symbol of democracy. It is fitting his legacy of seapower lives today in the newest, most technologically advanced carrier in the fleet.

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GE steam propulsion systems power the entire Nimitz Class, including the *U.S.S. Theodore Roosevelt*. No other class of vessel in U.S. Navy history has demanded more raw propulsion power and rugged durability. Why? Because flight operations demand extensive maneuvering at high power, which subjects propulsion systems to punishing duty cycles... day after day, year after year. That's where GE experience meets the challenge.

Proud Tradition

GE "flat-top" experience began with the world's first aircraft carrier, the *U.S.S. Langley,* in the 1920's, continued with the legendary *Lexington* and *Saratoga* in the 40's, and culminated with super carriers today. Already aboard the *U.S.S. Nimitz, Dwight D. Eisenhower* and *Carl Vinson,* GE recently delivered propulsion systems for the *Abraham Lincoln* and *George Washington* scheduled for commissioning within the next five years.

Experience Leader

From super carriers and super-quiet submarines to the smallest auxiliary ships, GE is the leading supplier of propulsion and ships service turbine generator systems to the U.S. Navy. At GE, the job begins with hardware design, manufacture and test, and continues with dedicated service as our engineers install, maintain and overhaul Navy vessels at major ports worldwide. We are proud of this historic, time-honored partnership. We look forward to building upon this experience in the future to advance the Navy mission into the Twenty-first Century. General Electric Company, 166 Boulder Drive, Fitchburg, MA 01420.

Circle 223 on Reader Service Card

GE Naval & Drive Turbine Systems

SPD Technologies Expands Through New Acquisitions And Product Development

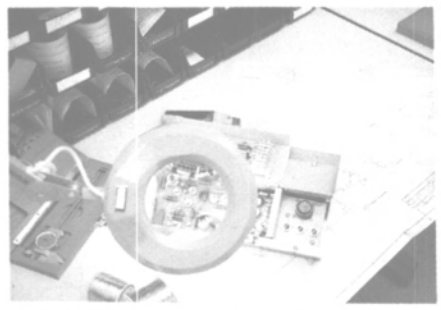
Since becoming an independent company as a result of a management buyout from Gould Inc. in the spring of 1987, SPD Technologies has experienced significant growth through new product development and important acquisitions under the guidance of **George M. Gordon**, the firm's president and chief executive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

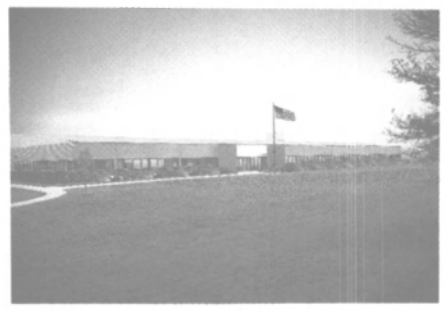
Some of the milestones achieved by SPD include the development of the first electronically controlled 100-amp circuit breaker for military applications and a new state-of-the-art all-cell computerized battery monitoring system.

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 distribution switchgear for military applications.



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.

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

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 100a-mp 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 oon 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 amd 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

Circle 14 on Reader Service Card

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.

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 Naval 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 Engineer 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,

Circle 76 on Reader Service Card

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 that 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 TBR 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 permier 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,

Circle 17 on Reader Service Card

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,

Circle 57 on Reader Service Card

AT LAST, A GOVERNMENT PROGRAM THAT CAN BENEFIT ALL
Implication of CALS to Industry

By Eugene D. Story*

**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

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.

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 craftmanship.

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-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.

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

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	Aroura
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

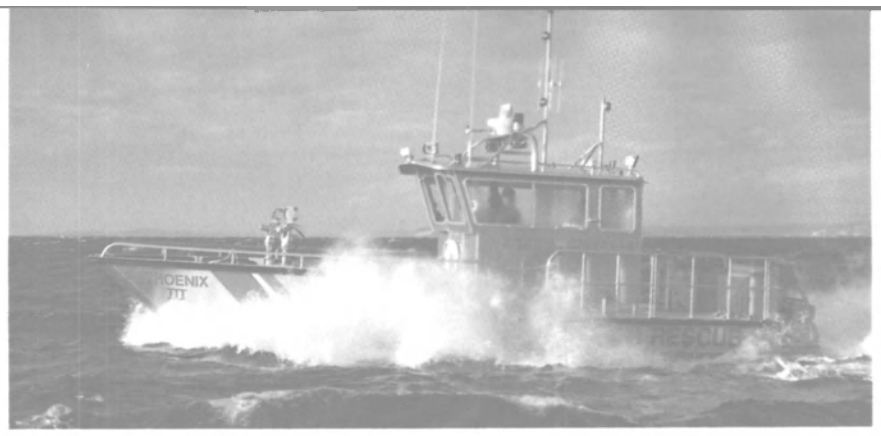
Main engines (2)	EMD
Reverse/reduction gears	Falk
Generator engines	Detroit Diesel
Knuckle boom cranes	Alaskan Marine
Power block	MARCO
Picking boom	Halter

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



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 system 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
Inflatible rafts	Switlik

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

(continued)

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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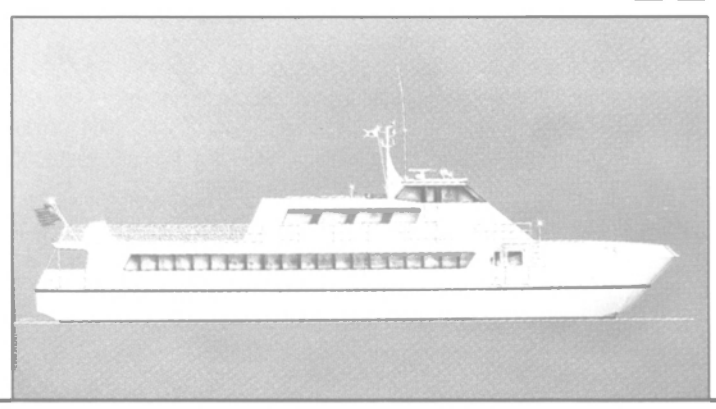


For details, Contact:
Barry Heaps
Avondale Boat Division
Avondale Industries, Inc.
P.O. Box 50280
New Orleans, LA 70150-0280
Telephone: (504) 366-7298

An Employee Owned
And Operated Company

Air Ride 109 Passenger Ferry, designed by Air Craft, Inc.

Circle 271 on Reader Service Card

Outstanding Workboats

(continued)

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

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

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

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 crow'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.

he twin-screw, 360°-rotating-nozzle, ship-docking tug ally is powered by two G.M. Detroit Diesel Allison engines ated 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 rotable 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)

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	Schuyler
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

SEATTLE ENTERPRISE
Equipment List

Main engines	EMD
Bowthruster engine	Caterpilllar
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

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)

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-

Photo left: Guia/Lider built by Houma Fabricators (see page 62).

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 watermaking capacity needed for processing surimi.

In addition, electrical power for the vessel's Baader filleters, skinners and other processing equipment, 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
Generators (3)	Detroit Diesel
Generator engines (3)	Detroit Diesel
Bowthruster engine	Detroit Diesel
Reduction gears	Reintjes
Bowthruster reduction gears	Twin Disc
Propellers	Coolidge
Strut, stern tube & rudder bearings	BF Goodrich
Bowthruster	Schottel
Engine controls	Hynautics
Steering controls	EMI
Muffler	Riley-Beaird
Main switchboard	Continental
General alarm system	Henschel
VHF radios	ICOM
SSB radio	Stephens
SSB radio	Skanti
Radars	Furuno
Compass	Sperry
Loran	Furuno
Autopilot/gyrocompass	Sperry
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
Hand winch	Olympic
Manholes	Halmar
Hatches, watertight doors & port lights	Centex

Crane	Alaska Marine
Chocking system	Philadelphia Resins
Fans	Hartzell
Trawl winches	Skagit
Cod end hoists	Geramatic
Net reels	Alaska
Gilson winches	Gearmatic
Anchor windlass	Fritz Culver
Ramp roller	Halter
Expansion joints	American Boa
Air compressors	Quincy
Air receivers	Manchester
Searchlights	Carisle-Finch
Filleters & skinners	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

Circle 31 on Reader Service Card

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 Taiheiyo 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, containerships and bulkcarriers as well as in large diesel power stations.

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

Circle 59 on Reader Service Card

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,

Circle 30 on Reader Service Card

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 sugar-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 follows 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,

Circle 99 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 ownership 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 newbuildings 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,

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 pressures 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

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 I PU 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

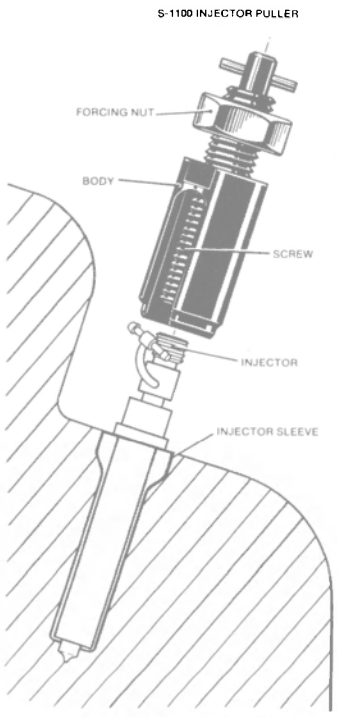
Texaco And OMI Tankers To Be Chartered By Navy

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 rachet, 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 Norwegian 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 twoin Hong Kong. The six vessels will have Norwegian masters, with crew drawn from Norway, India and the Philippines.

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

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 Chinese 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 60l 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

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.

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.

For more information and free literature from PPG Industries,

Circle 48 on Reader Service Card

$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.

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 suctions, 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 amble 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)

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.

Circle 96 on Reader Service Card

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 AutoFamily 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.

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. Unden**, 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.

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.

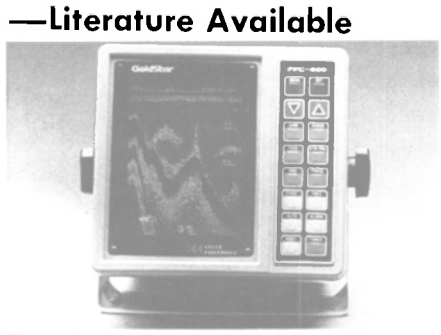
For more than 10 years, Kockums Computer Systems has marketed and installed their CAD/CAM system, Steerbear, for the shipbuilding and offshore industries, mainly in Europe. Autokon Cim has marketed and installed their Autokon Systems worldwide to the same industries. Sales and marketing of the Autokon 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 FFC-800 and FFC-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,

Circle 91 on Reader Service Card

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 containership 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.

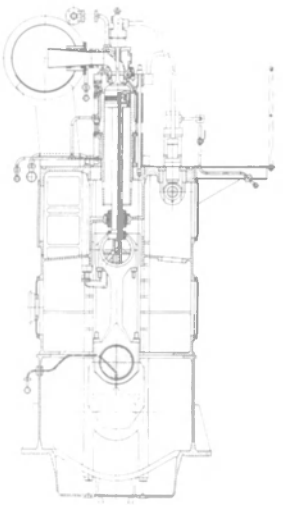
The popularity of the MC series reflects the scale of its power range, one of the widest on the market. Eight bore sizes ranging from 260 mm to 900 mm offer outputs from as low as 870 kw (1,190 bhp) to 49,320 kw (67,080 bhp). The operator's selection of an engine which most precisely matches his newbuilding 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 scavenged MC program is emphasized by a number of significant propulsion plant installations in recent months. Among them was the 3,900-

(continued)

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.

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 Rokku Maru. The six-cylinder S26MC develops 2,185 kw (2,970 bhp) at 250 rpm.

Orders for the S26MC for newbuildings 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 sucessfully 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,

Circle 12 on Reader Service Card

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.,

Circle 62 on Reader Service Card

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.

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 overfill) 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)

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.

Circle 94 on Reader Service Card

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 socities.

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 Portugese 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,

Circle 47 on Reader Service Card

The multipurpose cargo ship Pauwgracht, built by Miho Shipyard in Japan for the Dutch company Spliethoff's Bevrachtningskantoor BV, is fitted with two Hagglunds G type cranes.

Brochures From Hagglunds 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 Hagglunds Marine & Offshore AB has utilized a microcomputer to achieve appreciable reductions in spotting time.

The first of Hagglunds 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 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, Hagglunds 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 Hagglunds on Steadyline,

Circle 50 on Reader Service Card

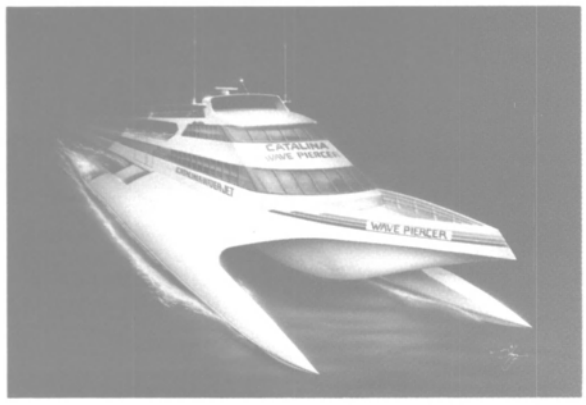
For free copies of the full-color brochure on the complementary system, Swing Defeater,

Circle 51 on Reader Service Card

For a free 12-page, full-color descriptive brochure on cargo cranes from Hagglunds,

Circle 52 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

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

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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.

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 newbuildings 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.**

BUYERS DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all 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.**

AIR COMPRESSORS
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928
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 Norrkoping 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-Beaird, P.O. Box 31115, Shreveport, LA 71130
BEARINGS—Rubber, Metallic, Non-Metallic
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
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
Asea Stal, 50 Chestnut Ridge Rd., Montvail N.J. 07645
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-Beaird, 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, Metravib 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
Goltens, 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, Lynwood 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
Kearfott 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-Beaird, 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
Intertrade Ltd., Marine Products Div., 15301 Transistor Lane, Huntington Beach CA 92649
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 VA 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
FURNITURE
Bailey, Carpenter & Insulation Co., 2323 Randolph Avenue, Avenel, NJ 07001
GALLEY EQUIPMENT
Gaylord Industries, 10900 S W Avery St, P.O. Box 1149, Tualatin, OR 97062
GANGWAYS, LADDERS
A.L. Don, 1 Don Plaza, Dock St., Matawan NJ 07747
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-Beaird, P.O. Box 31115, Shreveport, LA 71130
HORNS/WHISTLES
Kohlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241
HYDRAULICS
Aeroquip 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 Gjeving, 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
Bailey, Carpenter & Insulation Co., 2323 Randolph Avenue, Avenel, NJ 07001
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
Bailey Distributors, Inc., 2323 Randolph Avenue, Avenel, NJ 07001
Simpson Timber Co., Third & Franklin, Shelton WA 98584
Walz & Krenzer Inc., 1390 Mt. Read Blvd., Rochester NY 14606
KEEL COOLERS
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
McCausey 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
Armorica 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 32211
C.T. Marine, 18 Church Street, Georgetown, CT 06829
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, MA 02026
Crane Consultants, 15301 First Ave S., Seattle WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
Arthur D. Darden, 3100 Ridgelake Dr., Suite 101, Metairie LA 70002
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
E.Y.E. Marine Consultants, Belmont House, 33 Alderney Dr., Suite 350, Dartmouth, NS CANADA B2Y 2N4
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
Christopher J. Foster, Inc., 16 Sintsink Drive East, Port Washington, NY 11050
GHM Inc. (Industrial Measurement Consultants), P.O. Box 1836, Newport News, VA 23601
Gibbs & Cox, Inc., 119 West 31st Street, New York, NY 10001
John W. Gilbert Associates, Inc., 66 Long Wharf, Boston, MA 02110
The Glosten Associates Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
Hi-Test Laboratories, Inc., P.O. Box 226, Buckingham C.H., VA 23921
C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110
Hydrocomp, Inc., 45 James Farm-Lee, P.O. Box 865, Durham, NH 03824
Intramarine, Inc., P.O. Box 53043, Jacksonville, FL 32201
JJH Inc., No. 4 Executive Campus, Culbert Blvd. & Route 70, P.O. Box 5031, Cherry Hill, NJ 08034
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
James S. Krogen, 1515 NW 7th St., Suite 124, Miami FL 33125
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Clyde Leavitt Inc., 13901 Puerto Dr, Ocean Springs MS 39564
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
John J. McMullen Associates, Inc., 1 World Trade Center, New York, NY 10048
MacPherson Maritime Services, 141 Jefferson Ave., Westfield NJ 07090
Fendall Marbury, 9 Neal Street, Annapolis MD 21401
Marine Management Systems Inc., 102 Hamilton Ave., Stamford CT 06902
Marine Power Associates, 1010 Turquois St., Ste 217, San Diego, CA 92109
Maritime Design, Inc., 2955 Hartley Rd., Jacksonville, FL 32217
R.J. Mellusi & Co., 71 Hudson St, New York, NY 10013
Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
Nord Marine Inc., P.O. Box 305, Fair Haven NJ 07701
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean Oil International Engineering Corp., 3019 Mercedes Blvd, New Orleans LA 70114
Capt. H.L. Olsen, Marine Surveyors Company, P.O. Box 283, Port Jefferson NY 11777
Q.E.D. Systems Inc., 4646 Witchduck Rd., Virginia Beach, VA 23455
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105

Sargent & Herkes, 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 Hydronautics, 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 1G6 2UR England
Mackay Communications, 441 US Hightway #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 Televion 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 Lousisian 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
Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024
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
Aeroquip, 300 South East Ave., Jackson, MI 49203
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
Stauff Corporation, 21-23 Industrial Park, Waldwick NJ 07463

PORT SERVICES
Port of Iberia, P.O. Box 897, New Iberia LA 70561

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
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 In., 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
Leistritz 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/MANHOLES
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 Syncrolift, Inc., 8970 S W 87th Ct., Miami FL 33176
Portable Gun Drilling Systems Inc., P.O. Box 123, Auburn WA 98071

SHIPBUILDING—Repairs, Maintenance, Drydocking
Aluminum Boats Inc., 304 Midway Dr., River Ridge LA 70123
Astilleros Espanoles S.A., Padilla 17, 28006 Madrid, SPAIN
Avondale Industries Inc., P.O. Box 50280, New Orleans LA 70150
Bay Shipbuilding Corp., 605 N. 3rd Ave., Sturgeon Bay, WI 54235
Blount Marine, Box 368, Warren RI 02885
Bollinger Lockport & Larose, P.O. Box 250, Lockport LA 70374
Brodosplit Shipbuilding Industry, Put Udarnika 19, P.O. Box 17, 58000 Split YUGOSLAVIA
Burmeister & Wain Skipsvaerft A/S, P.O. Box 2122, Refshaleoen, DK-1015 Copenhagen, DENMARK
Curacao Drydock (U.S.A.) Inc., 26 Broadway, Suite 741, New York, NY 10004
Danyards A/S, P.O. Box 719, DK-9900 Frederikshavn DENMARK
Equitable Shipyards Inc., Trinity Marine Group, Box 29266, New Orleans LA 70189
Fincantieri SpA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530
Hyundai Corporation, ShipSales Dept., 140-2 Kye dong, Chongro-ku, Soeul, KOREA
Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, KOREA
Keppel Shipyard Limited, 325 Telok Blangah Road, P.O. Box 2169, Singapore 0409
Koch Ellis Barge & Ship Service, P.O. Box 9130, Westwego, LA 70094
Paul Lindenau GmbH, & Co., Schiffswerft u. Maschinenfabrik, D-2300 Kiel-Friedrichsort, West Germany
Lisnave, Apartado 2138, 1103 Lisbon, Codex PORTUGAL
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, WA 98134
M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany
Marco, Inc., 2300 W Commodore Way, Seattle, WA 98199
Marinette Maine Corporation, Marinette, WI 54143
Munson Manufacturing, 150 Dayton, Edmonds WA 98020
Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607
Northwest Marine Ironworks, P. O. Box 3109, Portland OR 97208
SeaArk, P.O. Box 210, Monticello AR 71655
Service Marine Industries, P.O. Box 3606, Morgan City LA 70381
Southwest Marine, Inc., P.O. Box 13308, San Diego, CA 92113
3 Maj Associates Shipbuilding Industry, P. O. Box 117, 51001 Rijeka YUGOSLAVIA
Trinity Marine Group, Box 29266, New Orleans LA 70189
Versatile Pacific Shipyards, Inc., P. O. Box 86099, North Vancouver BC Canada
Wartsila Marin Industri AB, P.O. Box 1090, SF 00101 Helskini, FINLAND
Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201
Zodiac of North America Inc., Thompson Creek Rd., P.O. Box 400, Stevensville, MD 21666

SHIP MANAGEMENT
Texaco Marine Servcies Inc., P. O. Drawer 1028, Port Arthur, TX 77641

SIMULATOR TRAINING
Marine Safety International, Marine Air Terminal, LaGuardia Airport, NY 11371

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

STUFFING BOXES
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

SURVIVAL EQUIPMENT
Parkway/Imperial, 241 Raritan St., So. Amboy, NJ 08879
Viking Life Saving Equipment (America) Inc., 38 NW 11th St., Miami FL 33136

TANK CLEANING
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928

TANK LEVELING INDICATORS
Imo-Delaval, Inc., Gems Sensors Division, One Cowles Rd., Plainville CT 06062
King Engineering Corp., P.O. Box 1228, Ann Arbor MI 48106
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696
Saab Tank Control, 201 W Passaic St., Rochelle Park NJ 07662

TORSIONAL VIBRATION SPECIALISTS
T.W. Spaetgens, 156 W. 8th Ave., Vancouver, Canada, V5Y 1N2

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
Curtis Bay Towing, World Trade Center, Suite 800, Baltimore MD 21202
Jack Faulkner, 1005 W. Harimaw Ct., Metairie, LA 70001
McAllister Bros., Inc., 17 Battery Pl., New York, NY 10004

VALVES AND FITTINGS
Aeroquip, 300 South East Ave., Jackson, MI 49203
Cajon Co., 9760 Shepard Rd., Macedonia, OH 44056
Chemiquip Products Co., Inc., 3 W. 18th St., New York, NY 10011
Circle Seal Controls, Brunswick Corporation, P.O. Box 3666, Anaheim, CA 92803
Cla-Val Co., P.O. Box 1325, Newport Beach, CA 92663
Crawford Fitting Company, 29500 Solon Road, Solon, OH 44139
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
Elliott Manufacturing Co., Inc. (Remote Valve Operating Equipment), P.O. Box 773, Binghamton, NY 13902
Stanley G. Flagg Co., 1020 W High St, Stowe PA 19464
Lexair Inc., Airmatic/Beckett, 299 Gold Rush Rd., Lexington KY 40503
Loeffler Machine, US #1 & Robbins Ave., Penndel PA 19047
Newman's Inc., 7500 E Redding Place, Box 1856, Tulsa OK 74101
Nupro Co., 4800 E. 345th St., Willoughby, OH 44094
PBM Inc., RD 6, Box 387A, Sandy Hill Rd, Irwin PA 15642
Pancoast Marine Division, Front & Porter St., Philadelphia, PA 19148
Parker Hydraulic Valve Division, 520 Ternes Avenue, Elyria, OH 44035
Parker Actuator Division, 9948 Rittman Road, P.O. Box 450, Wadsworth, OH 44281-0450
Parker Systems Division, 651 Robbins Drive, Box 3500, Troy, MI 48007-3500
Skarpenord A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474
Swagelok Company, 5171 Hudson Dr., Hudson, OH 44236
Tate Andale Inc., 1941 Landsdowne Rd., Baltimore, MD 21227
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Whitey Co., 318 Bishop Road, Highland Heights, OH 44143
Williams Valve Corp., 38-52 Review Ave., Long Island City NY 11101

VIBRATION ANALYSIS
DLI Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110
Vibranalysis Engineering Corp., 4380 S. Wayside, Suite 100, Houston TX 77087

WASTEWATER TREATMENT
EES Corporation/Omnipure, An Eltech Systems Company, 12850 Baurnewood Dr., Sugarland TX 77478

WATER PURIFIERS
Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024
Atlas-Danmark Desalination Systems A/S, Stamholmen 93, 2650 Hvidovre (Copenhagen), Denmark
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

WEATHER CHART RECORDERS
Alden Electronics, 40 Washington St., Westborough, MA 01581

WELDING
Miller Electric Mfg. Co., P.O. Box 1079, Appleton, WI 54912
Welding Consultants of Wisconsin, 6517 Radburn Lane, Greendale WI 53129

WIRE ROPE
Atlantic Cordage Corp., 60 Grant Ave., Carteret NJ 07008
Sling Max, P.O. Box 2068, Aston PA 19014

WIRE ROPE LUBRICATION SYSTEMS
Atlantis Services, 1057 Kings Ave., Jacksonville FL 32207
Dynalube, The Kirkpatrick Group, 415 N. Loop 12 at Pioneer Dr., P.O. Box 150907, Irving TX 75014

WINCHES AND FAIRLEADS
Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013
Fritz Culver, Inc., P.O. Box 569, Covington, LA 70434
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
Smith Berger Marine Inc., 516 S. Chicago St., Seattle, WA 98108

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

WINDOW WIPERS
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928

WIRE AND CABLE
Seacoast Electric Supply Corp., 225 Passaic St., Passaic, NJ 07055
Seacoast Electric Supply Corp., 1505 Oliver St., Houston, TX 77007

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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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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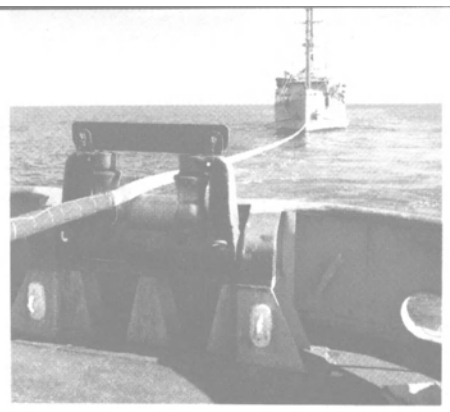


In addition to dock and anchor lines, commercial and military vessels that are "in tow" can also greatly benefit from Caprolan 2000 SeaGard's improved flexibility, wet strength and abrasion resistance. Photo courtesy of Samson Ocean Systems, Inc.

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 SeaGuard 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)

PROFESSIONAL

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.

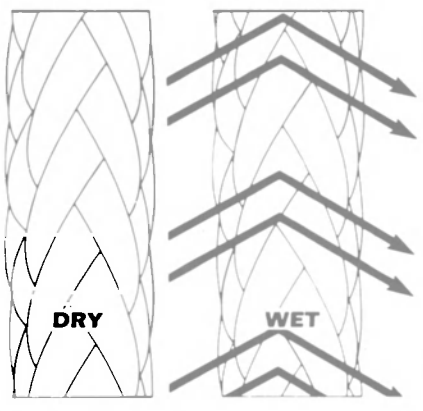
"The low elongation provides wire-like control and the flex fatigue considerably reduces the ratio of sheave-to-rope diameter,"stated Mr. **Smith** of Samson. The product's easy handling qualities provide better safety and its internal fiber friction resistance, external abrasion and corrosion resistance 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,

Circle 10 on Reader Service Card

Caprolan 2000™ SeaGard™ Nylon



The special SeaGard process prevents water penetration which enables the fibers to retain 95 percent of their dry strength and increase their abrasion life 20 times.

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.

New Sperry SatCom Antenna Passes Wind Tunnel Testing

The Glen L. Martin Wind Tunnel at the University of Maryland was the site of extensive testing of the new Sperry Marine MCS2 Satellite Communicator antenna recently. Sperry Marine program manager **Thom Lewis** established stringent test criteria which exceeded Inmarsat specifications by 25 percent.

Measurements were made by distributing 94 pressure taps over the antenna dome surface and the wind tunnel balance system was used to measure drag. The test was videotaped to detect dome deformation under stress conditions.

According to Mr. **Lewis**, no damage or dome deformities resulted at any point during the testing cycle. The antenna, mounted on a stub mast, was subjected to 65, 100, and 125-knot winds, each for a 30-minute duration during which the antenna was rotated through 240 degrees of azimuth

Similarly, the strenuous rain tests disclosed no harmful water intrusion.

The new antenna design with its documented reliability is supplied as standard equipment with all Sperry Marine MCS2A and MCS2B satellite communicators.

For more information and free literature from Sperry Marine,

Circle 29 on Reader Service Card

SeaArk Marine Delivers Two Transport Barges To State Of New Mexico

SeaArk Marine, Inc. (formerly MonArk Boat Company) recently delivered two 20-foot transport barges to the New Mexico State Parks and Recreation Division for use as anchor and buoy placement and retrieval boats. The boats are used while maintaining anchors and buoys that identify shallow areas in two New Mexico lakes. In New Mexico the water levels rise and fall so often that the state parks officials regularly move the buoys to mark safe operating areas for recreational boat owners. The boats are also used to relocate courtesy docks.

The barges, SeaArk's Model 2408-B, are powered by single 100-horsepower Johnson commercial outboard motors and are capable of cruising at up to 35 miles per hour. They feature an "A" frame electric winch operated boom off the forward deck to allow the operator to retrieve buoys for maintenance.

For free literature giving full details on SeaArk Marine,

Circle 68 on Reader Service Card

Parkway/Imperial Survival Suits Appoints New Sales Agent

Frank Sanger, president of Parkway/Imperial, a leading manufacturer of immersion suits, recently announced the appointment of American United Marine Corporation, Saugus (Boston), Mass., as its exclusive sales representative to all shipping companies in the Eastern United States and in Canada and Mexico.

Imperial was the original manufacturer of the immersion suit in 1974, and currently has 110,000-plus units in the field worldwide. Repair stations are maintained by Imperial in Norway, Washington and New Jersey.

The Imperial suits have the following approvals, according to the Solas 74/83 Requirement: U.S., Canada, Denmark, Norway, Belgium, Italy and the Netherlands.

The line is the result of 14 years of experience in the design, testing, manufacture and sales for a variety of users throughout the world.

For more information and free literature,

Circle 34 on Reader Service Card

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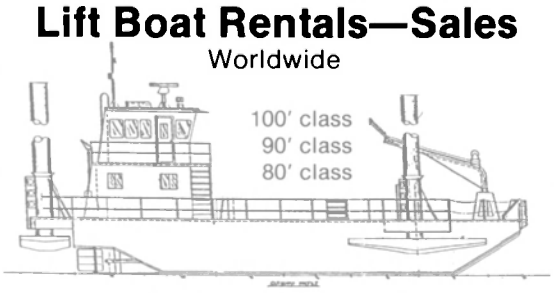

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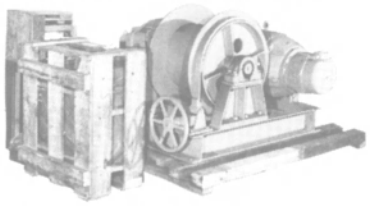

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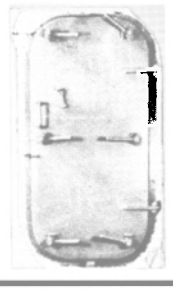

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24″x24″ — 12″ coaming = 3/8″ Cover — ¼″
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Typical example, except ours have 16 Bolts

8 pieces — sizes 66″x72″ - with 12″ coaming $1766.00
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½″ Coaming & 5/16″ Cover. Stainless Steel pins & washers & bronze wingnuts -- 3 hinges on long side — 2 lifting handles

Above hatches are not spring loaded.

Weight = 66″x72″ - about 1500 lbs
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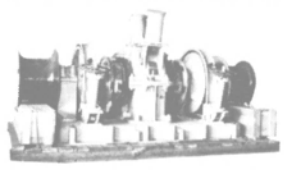

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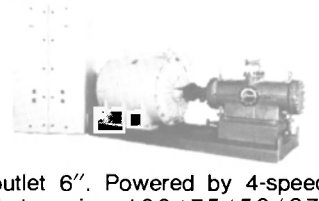

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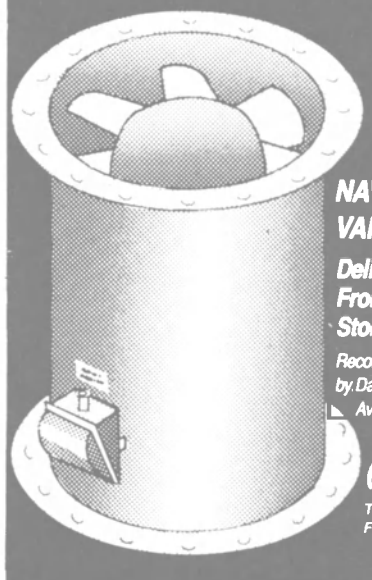

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Munson Introduces Fast, Low-Wake Boat Designed For Harbor Commuter Routes

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-board/outboard engines, an arrangement that has already proven easy to service and repair.

Fully enclosed and capable of high speed with a flat wake, the HST Reliable was specially designed for operation in harbors.

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,

Circle 27 on Reader Service Card

Alabama Maritime To Build Five Navy Oil Barges Under $6.9-Million Pact

Alabama Maritime Corp., Mobile, Ala., has received a $6.9-milllion 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.

For free literature giving complete information,

Circle 35 on Reader Service Card

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,

Circle 83 on Reader Service Card

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.

For free literature detailing the full line of marine electronic equipment offered by SI-TEX,

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Free Literature Available On Matrix 'Purepro' WaterPurification Systems

Purepro™ water purification systems from Matrix Desalination, Inc. of Ft. Lauderdale, Fla., are described in literature being offered free by the company.

The Purepro purification systems are designed to remove displeasing taste, dirt, odor and color from the fresh water supply. The Purepro also reduces the risk of illness and liability due to bacterial or viral contamination of fresh water, and no chemicals are ever required.

The Purepro is a complete three-step water purification system and, according to the company, is ideal for yacht, ship, home or R.V. Sizes are available for 2-75 gallons per minute to fit any marine or land-based applications.

For additional information and free literature from Matrix,

Circle 8 on Reader Service Card

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.

For free literature detailing the shipbuilding and repairing facilities and services of AESA,

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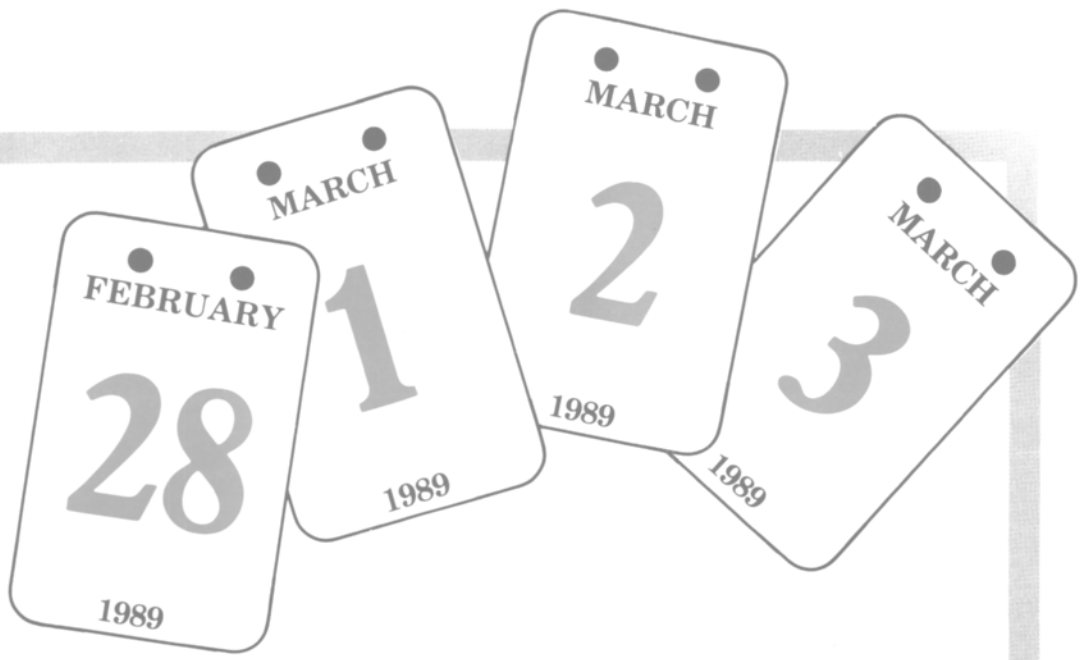

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If you're involved in the cruise shipping industry, then February 28 – March 3 1989 are important dates for you to set aside in your diary . . . Because this is when the Seatrade Cruise Shipping '89 Conference and Exhibition will take place at the Hotel Inter-Continental, Miami, Florida, USA.

Each year since 1985, the Seatrade Cruise Shipping Conference and Exhibition has provided members of the cruise shipping community with the ideal opportunity to assemble under one roof and exchange ideas. It has proved so successful that it is now recognised as an event not to be missed. And . . . in 1989 it's set to be even bigger and even better than before!

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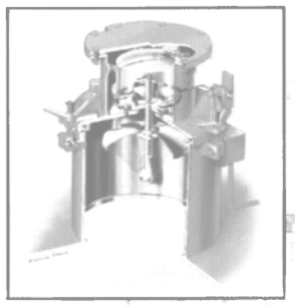

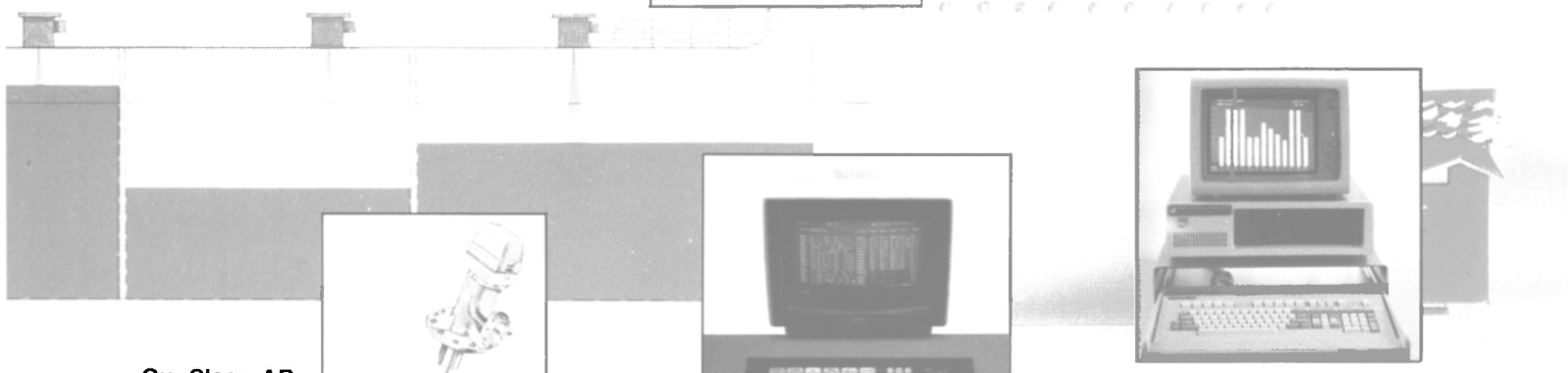

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FOR THE 1990's • FROM SERVICE MARINE

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Service Marine designers evolved his ideas into a new sophisticated class of ultramodern dinner/excursion boat.

The new boat is 175′ x 35′ x 9′10″ and accommodates 492 passengers with whisper-quiet spacious seating.

Her modern interiors were designed by Barbara O'Leary to carry out the sophisticated theme of the boat and includes a unique seating design that insures each passenger an unobstructed view of the show and dance review for which Cruise International is famous.

Sixty tons of air-conditioning provides plenty of fresh air and keeps each cabin cool, dry and clean. The galley is extraordinarily large for a vessel of this size and contains all the equipment a haute cuisine chef could imagine, from a giant walk-in cooler to the latest in dishwashing equipment.

A ten knots cruising speed is easily achieved with her sleek hull lines together with two Caterpillar Model 3408 DITA "B" Series 430 engines. Two Caterpillar Model 3306 DITA "B" Series Marine Gensets with Caterpillar galley, air-conditioning and related uses.

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