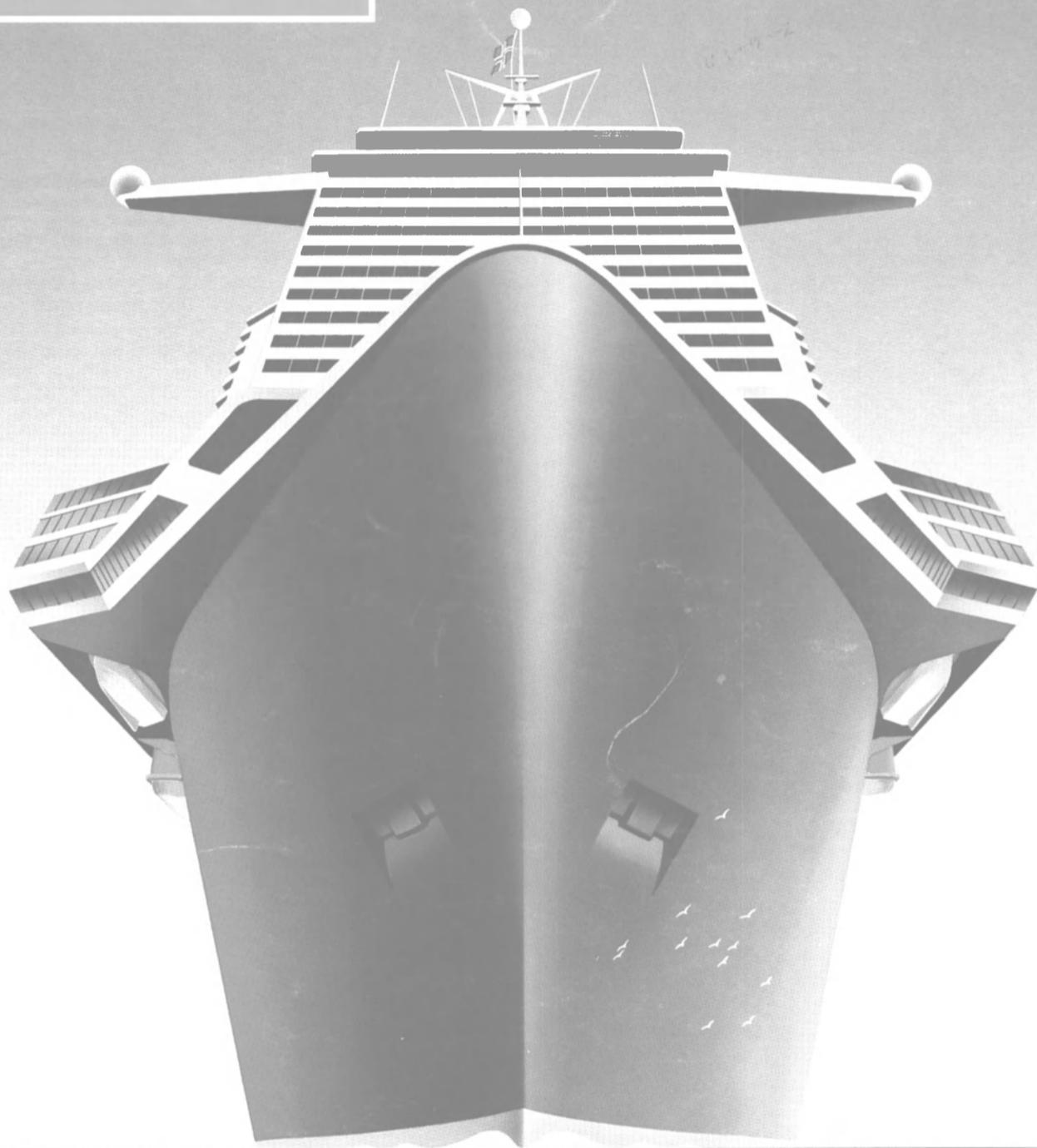


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ENGINEERING NEWS

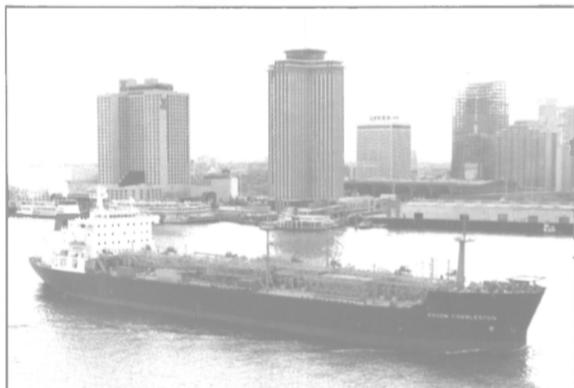
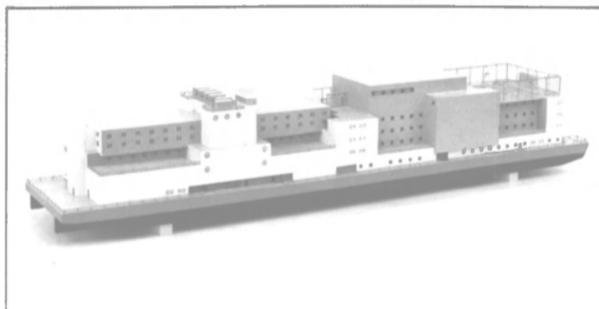
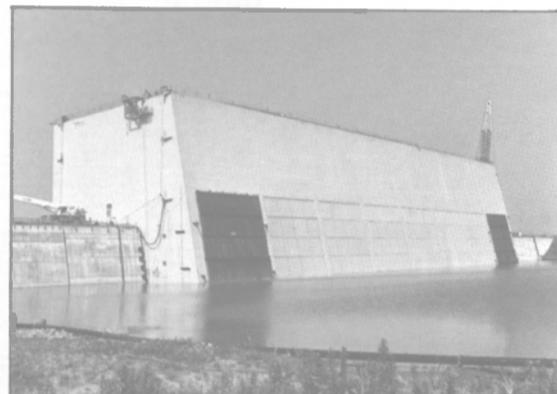


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Naval Technology & Shipbuilding

SEPTEMBER 1990 ISSUE



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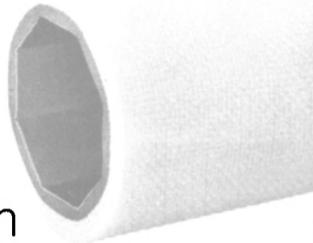
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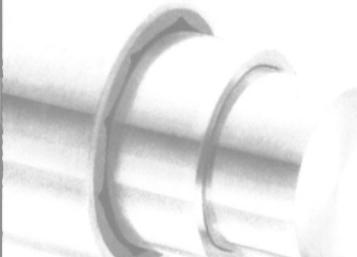

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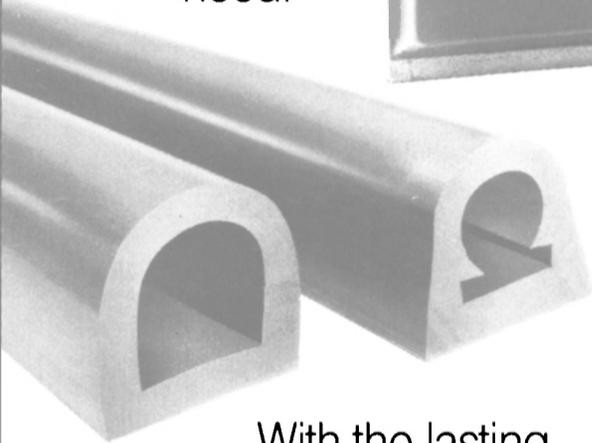
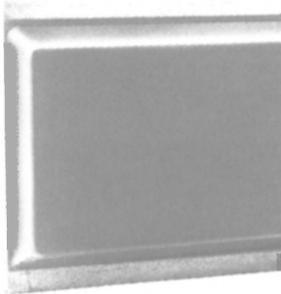
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Circle 237 on Reader Service Card

ON THE COVER

Artist's conception of the 5,600-passenger megaliner Phoenix World City. U.S. shipbuilder Avondale Industries is currently preparing a bid for the lucrative construction project.

INSIDE

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McDermott Awarded Shell TLP Contracts Worth \$200 Million

McDermott International, Inc., recently announced that McDermott Marine Construction, through the company's McDermott Incorporated subsidiary, received contracts from Shell Offshore Inc. for deck fabrication, mating of the deck and hull, and installation of the Auger Project Tension Leg Platform (TLP), its mooring system, and deepwater pipelines off the coast of Louisiana in the Garden Banks area of the Gulf of Mexico. Total value of the work is approximately \$200 million.

Shell's Auger TLP is the largest structure of its kind offshore and will be installed in 2,860 feet of water in Garden Banks Block 426. Installation is scheduled for completion in early 1993.

For more information and free literature on McDermott International,

Circle 58 on Reader Service Card

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The Shipbuilders of Spain

Circle 215 on Reader Service Card

Aeroflex Isolator Offers Shock Protection For Sensitive Equipment

Aeroflex International, Plainview, N.Y., is offering a new, patented, wire rope arch isolator which reduces the complexity and cost of high performance isolation systems needed in critical industrial environments, where severe shock and vibratory forces may effect sensitive

equipment such as electronics, instrumentation, etc.

The arch isolator provides nearly uniform spring constants along all three X, Y and Z axes. The arch isolator design consists of two groups of oppositely inclined, individual loop, arch-like, wire rope flexural elements that offer uniform stiffness along the three axes. The unit attenuates vibrations by damping from internal friction between the wire strands.

The all metallic isolators are

available in standard sizes ranging from 1/16 to 1-1/2-inch wire rope and in stiffness ranges to meet most commercial and military applications. The temperature range of the arch isolator is -400 F to 700 F, and it is designed to be interchangeable with existing wire rope isolators.

For free literature detailing the Aeroflex International wire rope isolators,

Circle 1 on Reader Service Card

Hitachi Zosen Completes VLCC 'Sea Prince'



The cargo oil pipes on the Sea Prince are arranged to allow simultaneous storage of three types of crude oil and are coated with high-grade paint to ensure corrosion protection. A stripping system shortens loading time and reduces labor costs.

The Sea Prince, a 275,782-dwt tanker, was recently completed at Hitachi Zosen's Ariake Works. The 1,070-foot-long by 185.7-foot-wide very large crude carrier (VLCC) was christened and delivered to the owner, Seatruth Shipping Company S.A.

The tanker is powered by an HZ MAN B&W 6S80MC type diesel engine with maximum continuous output of 23,090 hp x 73 rpm, producing a speed of 14 knots. It is equipped with a Hitachi Zosen-developed Super Stream Duct nozzle in front of the propeller and a large bulbous bow below the bow waterline and features self-polishing copolymer (SPC)-type antifouling paint which reduces the hull's frictional resistance and ensures long-term fouling prevention. Highly improved propulsion efficiency is thus achieved.

To cut fuel expenses, fuel consumption is greatly reduced by the use of a low-rpm, long-stroke, turbocharged diesel engine operated in a derated mode.

Remote-control level gauges for the cargo oil tanks and the water ballast tanks enable tank levels to be monitored even from the cargo control room.

The main engine can be operated from the wheelhouse with micro-computer-based remote control equipment. Automated monitors permit navigation without operator attendance in the engine room.

The Sea Prince has a complement of 30 persons and carries the classification NV.

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

Circle 31 on Reader Service Card

Moran Towing Appoints Muller Operations Manager For N.Y. Tugs, Barges

Moran Towing & Transportation Co. Inc. recently appointed William P. Muller as manager of operations of its New York tug and barge fleet.

Mr. Muller, who served previously as assistant operations manager in Greenwich, Conn., since 1989, joined Moran in its sales department in 1977. He subsequently was appointed general manager of Moran Towing of Florida in Jacksonville where he served from 1982 to January 1989.



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Circle 226 on Reader Service Card

Kvaerner Govan Receives \$89-Million Order To Build LPG Carrier

The U.K. shipyard Kvaerner Govan, located at Clydeside, recently received an order worth about \$89 million for the construction of a 56,000-m³-capacity LPG carrier.

Due to be delivered in 1992, the ship will be owned by Havgas Partners Ltd. of the Isle of Man, which is wholly owned by K/S Havgas Partners, a new company formed by Norwegian and other investors.

SEACOR Announces Key Promotions

Systems Engineering Associates Co. (SEACOR), Mt. Laurel, N.J., recently promoted **Richard D. Maha** to vice president, contracts/administration, and **John A. Razler** to director of contracts.

In his new position, Mr. Maha will oversee all contracts administration and purchasing functions for SEACOR, SEACOR Services, and Aquidneck Data Company. He joined SEACOR in 1986 as director of contracts.

Mr. Razler joined the company in 1987 as a SEACOR contract administrator, and recently served as senior contracts administrator for SEACOR Services.

Goodway Tools Offers 28-Page Catalog On Maintenance Equipment

Goodway Tools Corporation, Stamford, Conn., is offering a new 28-page catalog on its range of maintenance equipment. This 28-page publication introduces Goodway's expanded line of vacuums, pressure washers, pumps, leak detectors, and other maintenance equipment.

The company now offers a complete range of electric and air powered vacuums for industrial, commercial, and institutional use. Wet and dry pickup models are available from 6-gallon tank size to 55-gallon drum.

The catalog features electric, pneumatic and gasoline-operated Hi-Pressure washers with pressures from 500 psi to 3,000 psi. Washer accessories include extension hoses, drain/pipe cleaners, sand blasters, and multi-jet nozzles.

For more information on Goodway Tools,

Circle 94 on Reader Service Card

Service Engineering Completes Purchase Of Continental Maritime

Service Engineering Co. (SECO) has announced completion of the purchase of Continental Maritime of San Francisco and of Continental Maritime of San Diego.

The acquisition of the San Diego operation fulfills the company's goal of expanding its presence on the West Coast.

According to **Orlando Barsetti**, president of Service Engineering Co., the San Diego facility will continue to operate under the name of Continental Maritime of San Diego, Inc., while the San Francisco yard will be closed and its assets and key personnel incorporated into Service Engineering.

Mr. Barsetti also announced that **Jay W. Lamb**, former SECO vice president, has been appointed

as president/CEO of the San Diego yard, and that construction of a new 700-foot pier for that facility will commence in September and is scheduled for completion in early spring of 1991. The new pier is expected to double the present berthing capacity.

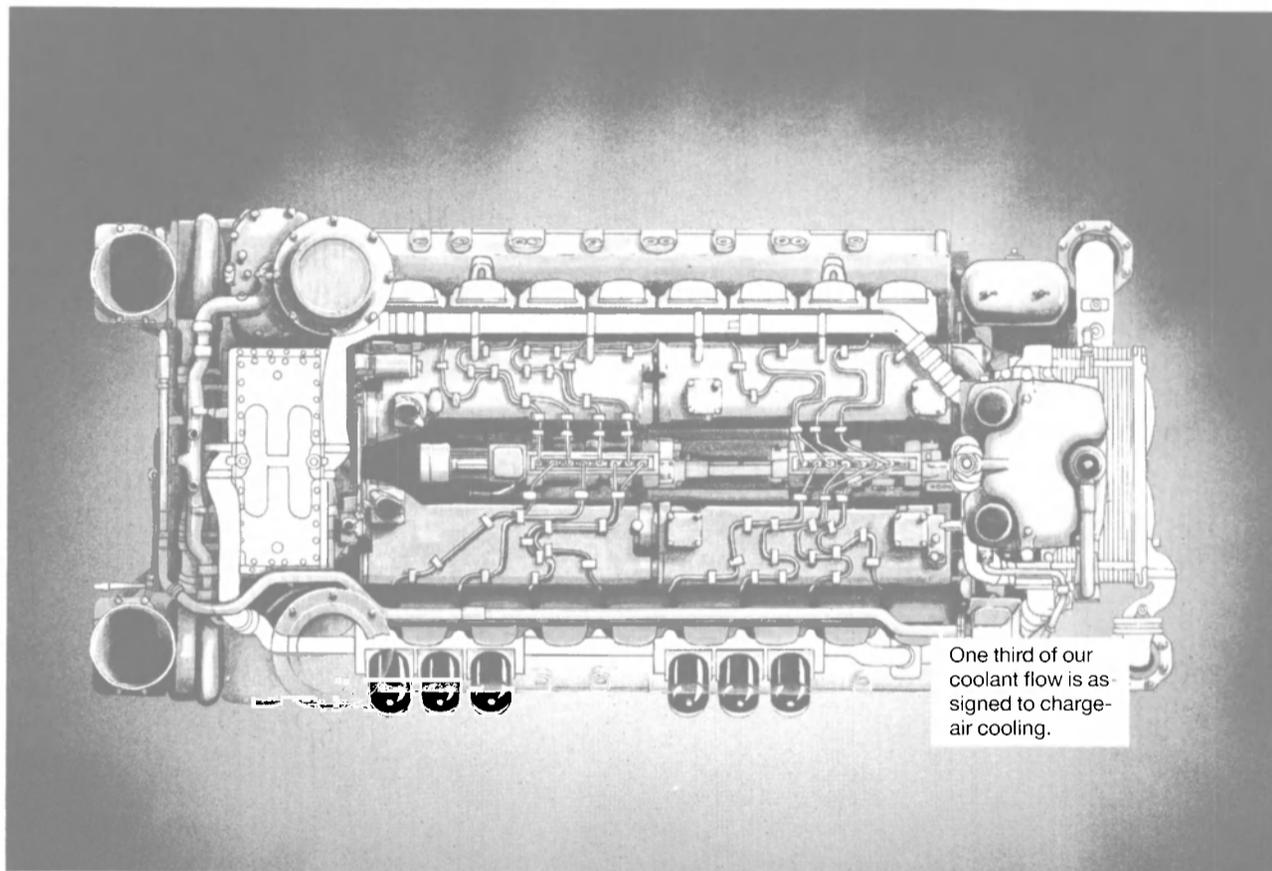
Service Engineering Co. has operated on the San Francisco waterfront since 1955 and remains one of the two major repair yards in the

Bay Area. With a combined workforce of 1,000 skilled craftsmen, extensive waterfront facilities, and a history of quality work and on-time performance, SECO and CMSD are ready to provide a complete range of services for commercial and naval vessels.

For further information and free literature,

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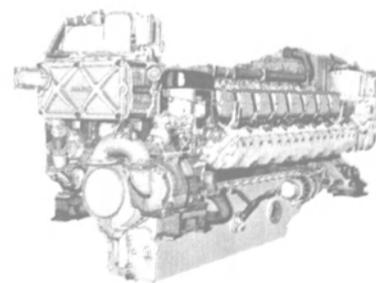
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Circle 295 on Reader Service Card

BOATS & BARGES

Aluminum Boats Delivers Sleek 140-Foot Dinner Yacht

Aluminum Boats, Inc., Crown Point, La., has delivered the Anita Dee II, an elegant, all-aluminum, 140-foot, 350-passenger dinner yacht to Tee Dee Enterprises, Inc., Chicago, Ill.

Looking more like a stylish megayacht than a commercial charter boat, Anita Dee II is available for group charters, private parties, wedding receptions, corporate functions, and other events from her berth at the Navy Pier.

Her owners have owned and operated smaller charter vessels in Chicago for over 12 years.

Tee Dee's president, **Anita Difiglio**, for whom the boat is named, said, "I wanted this boat designed and built to Coast Guard standards with the look and feel of a luxury megayacht, not that of a converted ferry or crew boat. That's why I chose Aluminum Boats, Inc. They have the design and construction experience, and **Sal Guarino** (general manager) really went out of his way to meet our requirements."

Designed by Aluminum Boats, Inc., its parent company, the Trinity Marine Group, and yacht design consultant **Alfred (Jay) Coyle Jr.**, Anita Dee II maximizes space on the two primary passenger decks by eliminating stanchions or supports.

The spacious main deck includes intimate and group seating, through-the-bulkhead bar, restrooms, large galley and owner's

stateroom. Additionally, the main deck also includes a full walk-around and a covered aft deck with seating and roll-up weather curtains.

The second deck has seating for 152 diners, a large buffet and waiter's station and additional restrooms. It also includes the pilot-house with port and starboard wing control stations, another double duty bar serving the diners inside and the covered aft deck outside, and stairs to the flybridge and main deck.

Atop is the flybridge which includes a lounge with seating for 62, an open dance floor and band stand, bar, and promenade area. A helipad is also on the flybridge along with a skylight to the dinner deck which doubles as a 16-foot long cocktail area.

Below decks, Anita Dee II has four staterooms with private baths which can accommodate eight guests. This deck also contains separate crew quarters.

The Anita Dee II is 140 feet in length, has a 33-foot beam, and draft of less than 5 feet 6 inches. Her shallow draft allows her to operate in the Intracoastal Waterway, normally inaccessible to vessels her size. A skegs protects her props and rudders.

Built to U.S. Coast Guard standards under subchapter T rules and regulations, the new boat is powered by two Caterpillar 3408TA diesel



The Caterpillar-powered Anita Dee II, built by Aluminum Boats, Inc., can cruise at speeds up to 12 knots.

engines driving through Twin Disc reverse reduction gears.

The boat's hull and superstructure were fabricated at Equitable Shipyards, Inc., New Orleans, a sister shipyard to Aluminum Boats, Inc., in the Trinity Marine Group.

The Anita Dee II will operate in Chicago during the summer to mid-

October and in winter from Bahia Mar Resort and Yachting Center in Ft. Lauderdale, Fla., from mid-November to mid-March.

For free literature detailing the building capabilities of the Trinity Marine Group,

Circle 92 on Reader Service Card

ANITA DEE II Equipment List

| | | | |
|------------------|------------------------|-----------------------------|------------------------|
| Main engines (2) | Caterpillar | Compass | Ritchie |
| Gears | Twin Disc | Navigation lights | Aqua Signal |
| Generators | Caterpillar | Engine room lighting | Pauluhn |
| Steering system | Al George | Horn | Kahlenberg |
| Engine controls | Kobelt | Fairing | All American Body Shop |
| Air compressors | Quincy | Blowers | Hartzell |
| Bowthruster | Arcturus | Potable water filter system | Pure-Pro |
| Shafts | Aquamet | Water closets | Kohler |
| Propellers | Federal | Sanitation flushing | Burks |
| Strainers | Groco | Macerator | Hydromatic |
| Bilge pump | Jabsco | Windows | B.J. Aluminum |
| Fire pump | Crown | Life floats | Jim Buoy |
| Freshwater pumps | Deming | Life jackets | Stearns |
| Sanitation pumps | Barnes | Bell | Perko |
| A/C & heating | Lemoine's | Pilot chair | Eacco Marine |
| Radar | Furuno | Batteries | Gould |
| VHF | Standard International | Battery chargers | Sentry |
| Fathometer | Datamarine | | |

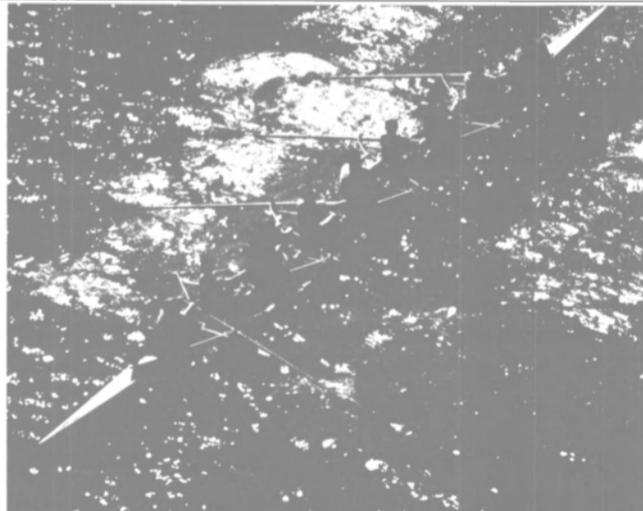
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Circle 223 on Reader Service Card

Maritime Reporter/Engineering News

A&P Appledore Wins Orders For LPG Carriers Worth \$57 Million

The North Devon yard of A&P Appledore Shipbuilders of the U.K. was recently awarded contracts from two shipowners totaling \$57 million for the construction of three 3,500-m³-capacity LPG carriers.

Contracts were awarded by Scottish company Liquid Gas Shipping for two of the ships and West Germany's Sloman Neptun for the other. The three ships will be utilized after their delivery in 1991 and 1992 in the Rotterdam-based Unigas gas carrier pool.

IMO Names Womack President And COO

William J. Holcombe, Imo Industries Inc. chairman and chief executive officer, recently announced that **Robert R. Womack** has been named president and chief operating officer of the company. In these newly created positions, Mr. **Womack** will report to the chief executive officer.

Mr. **Womack** has served since 1987 as president and chief operating officer of Ranco Incorporated, a unit of Siebe plc. He joined that producer of electronic, electrical and mechanical controls as executive vice president in 1982, and helped lead the company's growth from a revenue base of \$180 million annually in 1984, to \$900 million today.

IMO supplies analytical and optical instruments, electronic and mechanical controls, engineered power products and their support services to industrial and defense customers worldwide.

Ferry Simulation Available For Shiphandling Training At MarineSafety/CAORF

Two classes of ferryboats and two fully equipped terminals have been simulated by the Computer Aided Operations Research Facility (CAORF) which is operated by MarineSafety International (MSI) at Kings Point, N.Y. These detailed computer models of vessel response and terminal characteristics can be used in conjunction with simulated tides, currents and winds to provide visual shiphandling training for ferryboat masters and mates to help prevent collisions or groundings, and to assure cost-effective service.

The smaller of the two ferries which have been modeled is a multi-deck, single-ended type which is propelled by twin controllable-pitch propellers and has twin rudders and bow thrusters. It is approximately 130 meters (about 426.5 feet) in length and has a loaded displacement of 5,800 tons.

A precise hydrodynamic model also has been prepared for a much larger ferry capable of carrying close to 500 automobiles. The larger ferry, 170 meters (about 558 feet) in length and over 11,000 tons dis-

placement, uses twin high-lift rudders and a powerful bow thruster to make it highly maneuverable at low speeds.

One of the terminals has a clear approach with little protection from strong winds and has a strong cross-current. A ferry's approach is affected by tidal currents and winds during the transition from open to sheltered waters at this terminal. The simulated terminal has ranges, dolphins, wing walls and docking

ramps. Dolphin forces on the ferry are as they are in the real world.

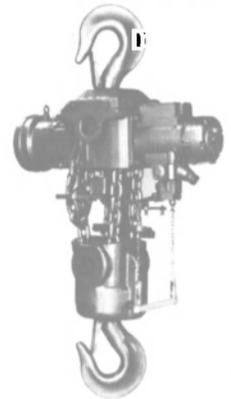
The second terminal that is simulated has a more difficult approach, with numerous navigational hazards. The approach and berthing procedure at this terminal requires a 180-degree turn to permit docking stern-to. Since these turns are done within the confines of the terminal, they can become tricky in the presence of strong ebb tides and winds, especially in restricted visibility.

Since the vessels and terminals embody many elements that are common to all ferry operations, the simulations can be used by all ferry operators for training masters and mates. Risk reduction courses can be conducted for experienced or newly promoted personnel.

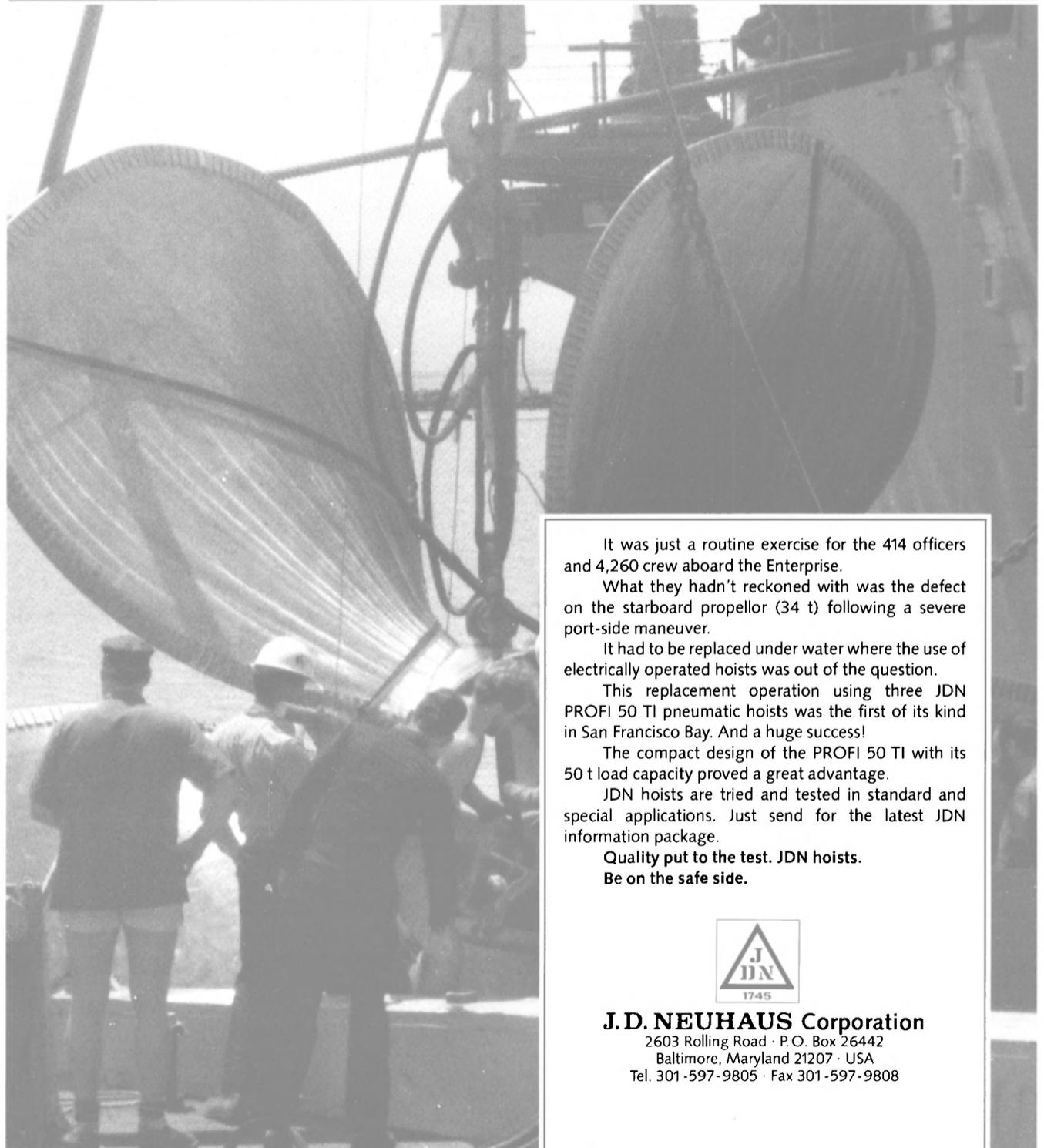
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It was just a routine exercise for the 414 officers and 4,260 crew aboard the Enterprise.

What they hadn't reckoned with was the defect on the starboard propellor (34 t) following a severe port-side maneuver.

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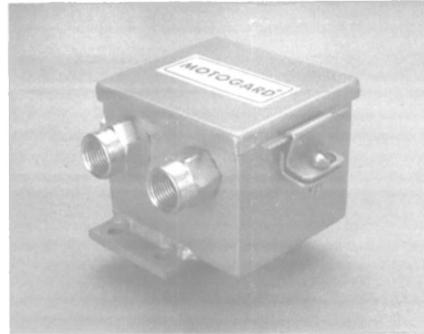
Circle 248 on Reader Service Card

MagneTek Defense Systems Offers Quality Power-Conversion Products For Today's Navies

MagneTek Defense Systems, a world leading electrical/electronic power supplier to the military and unit of MagneTek, Inc., manufactures a wide range of products from transducers and uninterruptible power supplies to one of the industry's most sophisticated solid-state power-conversion systems. The latter, the MK 84, powers Aegis, the highly sophisticated weapons system employed aboard all CG-47 Class guided-missile cruisers.

The MK 84 is often used as an example of truly advanced technology. Developed back in 1971, the MK 84 reflected the commitment of the company to transistorized power at a time when much of the industry had abandoned the use of solid state for high power requirements due to

supposed lack of reliability. MagneTek Anaheim (then ALS Corporation) engineers, however, conceived a way to use transistors at the middle of their power range which rendered them highly reliable, as well as very fast in response time, highly efficient, low heat producing and, of course, smaller by far than the older technology. Looking at the Navy's specification for a power system to operate a common bus—which many in the industry said was impossible to meet—MagneTek engineers were able to exceed every requirement with this transistorized power technology. The remarkable overload capacity, response time and other characteristics of that original MK 84 are still considered state of the art today. MagneTek



MagneTek Defense Systems' Motogard is an over-temperature protection device used on service "A" electric motors in the U.S. Navy fleet.

has gone on to improve that first model with a new air-cooled frequency converter which is the power-conversion system chosen in early 1990 for the DDG-51 Class Aegis guided-missile destroyer program. This new ACFC is lighter, more powerful and is being built at a significant savings to the Navy.

Just as MagneTek Anaheim brings to the company a wide range of expertise in surface vessel power applications, MagneTek EuroAtlas in Bremen, West Germany, has more than 25 years of experience developing static power-conversion equipment for submarines, ships, aircraft and tanks. With systems ranging from 3 w to 300 kw, MagneTek EuroAtlas is a supplier to a wide range of national and international military programs. One recent example is a contract with Kockums Marine AB of Malmo, Sweden, to provide power inverters and converters for the next generation of Royal Swedish Navy submarines, the A19.

MagneTek describes its military product line as providing the complete power cycle—generation, distribution, conversion, load management, motive power and support services. In addition to the MK 84 and ACFC high-power frequency converters, the company manufactures AC variable-frequency drives, AC/DC converters, DC/AC inverters, a split-bus controller and current-limiting device developed for protection of shipboard distribution

systems, sonar power supplies, auxiliary propulsion control systems, Motogard, motor over-temperature protection devices, pressure and position/velocity transducers and accelerometers.

The intensive testing program employed by MagneTek Defense Systems is exemplified by the computer-controlled test cell that emulates shipboard input power. Over two mega VA of dynamic load can be produced to assure that products can withstand actual battle conditions. To assure component and production quality, stress-testing laboratories subject components to controlled environmental conditions such as shock, vibration, humidity and extremes of temperature.

Total Systems Support and Integration (TSSI) is controlled through the MagneTek Integrated Logistic Support organization. ILS provides a turnkey system which integrates products into the customer's application and supports them through the life cycle.

Four separate business facilities provide the wide range of MagneTek military power products. In addition to MagneTek/Anaheim in California and MagneTek EuroAtlas in Bremen, there is MagneTek Transducer Products in Simi Valley, Calif., and MagneTek Specialty Products in New Berlin, Wis. The company employs vertically integrated manufacturing methods to assure interchangeability of parts within any alternate assembly. A majority of the parts for MagneTek power systems, from integral magnetic components to external machined and sheet-metal parts, are manufactured in-house. This approach gives MagneTek Defense Systems control of quality, delivery, and conformity to military standards. In addition, a short-run, zero-defect production discipline dictates hands-on, in-process product quality.

For free literature detailing MagneTek Defense Systems' electrical/electronic power supply products,

Circle 90 on Reader Service Card

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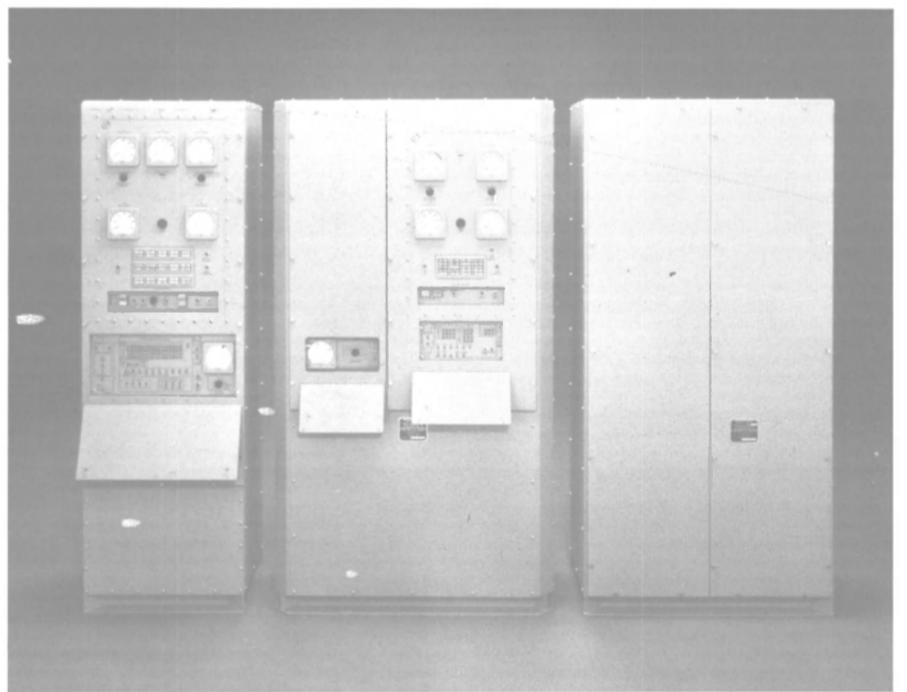
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MagneTek's MK 84 will be used on Aegis Arleigh Burke Class destroyers DDG-51 to -56.

Circle 90 on Reader Service Card

Maritime Reporter/Engineering News



The 379-foot Northern Victor, recently delivered by Eastern Shipyards following a major conversion, is one of the largest fish factory processors in the U.S.-flag fleet.

Eastern Shipyards Delivers Fish Processor 'Northern Victor' Following Complex Conversion

Eastern Shipyards, Inc., Panama City, Fla., recently delivered the Northern Victor, a huge U.S. owned and U.S. flagged fish processing vessel to an Alaska-based fishing group. The 379-foot former drill ship, the largest vessel ever worked on by the yard, underwent a complex conversion in a 10-month project.

The Northern Victor is 379 feet 6 inches long, with a beam of 70 feet and a depth of 28 feet 10 inches. There are accommodations for 130 personnel aboard.

Classed by ABS, "Fishing/Fish Factory, +A1, +AMS, Unrestricted," this sizable new processor is equipped to receive up to 350 metric tons of fish per day, and can store approximately 1,800 mt of frozen product in its refrigerated cargo hold. An off-loading elevator delivers product to the upper deck, which is equipped with a 30-ton-capacity cargo crane and two telescoping knuckleboom deck cranes.

The large processing space aboard the Northern Victor is equipped with Baader heading, filleting, skinning and mincing machines. Fish receiving and transfer pumps are by Ryan Engineering, with conveyors, tables, and bins by Flohr Metal Fabricators.

Supporting the processing activities are 16 RSW holding tanks. Refrigeration for both the RSW sys-

tem and product freezing/storage is by Kvaerner Kulde. In addition to cod and pollack table products, the Northern Victor will also produce fish meal in a plant largely equipped by Atlas Stord.

Diesel-electric propulsion for the processor is provided by three EMD 16-645 diesel engines, each fitted with an Electric Products 1,500-kw generator that provides both shipboard and propulsive power. Four 625-hp electric motors drive the ship's single propeller. Auxiliary power is provided by the main engine generators as well. The vessel is also equipped with two 400-hp electric motor-driven bowthrusters to aid in maneuvering.

Eastern Shipyards employed advanced modular fabrication techniques during the construction and conversion of the Northern Victor. This type of high-quality fabrication, according to the yard, ensures the ship's owners of a vessel which will be as dependable and maintenance-free as possible.

Eastern Shipyards is engaged in the design and construction of all types of steel and aluminum vessels, utilizing its advanced modular fabrication techniques. For free literature fully detailing the yards capabilities,

Circle 91 on Reader Service Card

ELECTRONICS UPDATE

Robertson Multipurpose Pilot Handles Complex Vessel Control Problems, Upgrades Vessel Performance

Robertson Marine Systems, Inc. of Metairie, La., is offering the Robertson Multipurpose Pilot (RMP), a family of intelligent vessel control systems designed for precision vessel maneuvering and dynamic positioning.

According to Robertson Marine,

the RMP can steer, position and maneuver any vessel in any trade. A unique combination of operating modes are available as standard: autopilot steering; manual joystick maneuvering with speed and position control; automatic heading control with manual joystick speed and

position control; automatic high-precision tracking; and dynamic positioning.

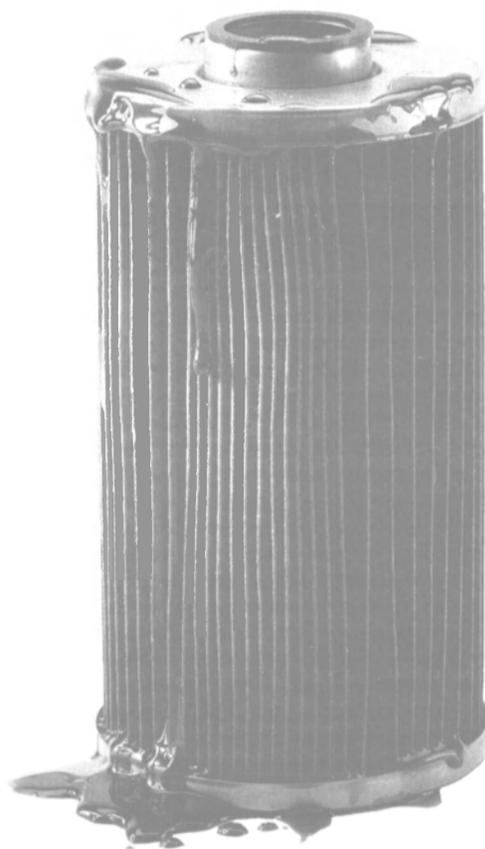
Operation of the RMP system is simple. The operating mode of the system is clearly shown in the alphanumeric displays and safety is ensured by a built-in self test and alarm system. Lengthy operator training is not necessary.

The RMP control panel consists of three modules: AP9 MKII autopilot; joystick control module; and thruster control module. These

modules can be supplied in one mounting frame, or individually to suit the bridge layout and the vessel's specific operational requirements.

Autopilot control—AP9 MKII is an autopilot designed for optimal automatic steering. Course selection is made using a rotating course selector and incremental course adjustments of 1 degree by push buttons. Set course is shown on a digital

(continued)



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(continued)

display. Deviation from set course is indicated on a separate analog bargraph. Direction of rudder commands are illustrated with arrows. The autopilot is easily adjusted to meet sailing conditions and each vessel's characteristics. Rudder, counter rudder, weather helm and rate of turn parameters are selected by using dedicated push buttons.

Joystick control—Precise vessel maneuvering at any speed is carried out from the joystick control panel. Standard operation features include: manual joystick control of vessel position, heading and speed; automatic heading control with manual joystick control of vessel position and speed; and selection of vessel's point of rotation at bow, midships or stern.

Thruster control—The thruster control is custom built for the ves-

sel's specific propeller and thruster configuration. The RMP system automatically allocates and calculates the command signals to the selected propellers, engines and rudders and displays the thrust direction and magnitude in analog form for operator conceptualization.

For free literature giving complete information on the Robertson Multipurpose Pilot,

Circle 52 on Reader Service Card

Hardware Specialty Appoints Berit Ships Division Manager



William Berit

Hardware Specialty Co. Inc., Long Island City, N.Y., distributor of fasteners and electronic hardware, recently appointed **William (Bill) Berit** ships division manager.

Mr. Berit, who has been with the company since 1978, "will bring broad experience in purchasing, sales and sales management to bear on the continuing growth of this vital division," said **Edward Kaufman**, president and chief executive officer of Hardware Specialty. "Bill has spent seven years honing his skills with the Ships Division, where he has contributed greatly to its development and recognition. His knowledge of and familiarity with the specific requirements of the shipbuilding maintenance, repair and retrofit industries is unequalled," he continued.

Assisting Mr. Berit will be **John Pappas** in a senior technical sales capacity. A former quality control manager, Mr. Pappas has more than 16 years of technical experience in the field, and is familiar with applicable specifications such as Level 1, subsafe, MIL-B-857, and MIL-S-1222.

Established in 1932, Hardware Specialty has facilities in eight locations throughout the U.S. and has sales worldwide to the aerospace, defense, commercial, computer, telecommunications and medical instrumentation industries.

For more information on Hardware Specialty,

Circle 95 on Reader Service Card

Port Director Named At Tampa Port Authority

Joseph L. Valenti has been named port director at the Port of Tampa, Fla. Mr. Valenti, formerly the senior deputy port director, was named to the position by the Tampa Port Authority board of commissioners at a special meeting. He replaces **Emmett C. Lee Jr.**, who recently resigned the position.

The new director has been at the Tampa Port Authority since 1985. Prior to this, he spent nearly 23 years in the Coast Guard where his final assignment was as captain of the Port of Tampa. His tenure in the Coast Guard included service on ships, specializing in port safety and security, and marine environmental protection.

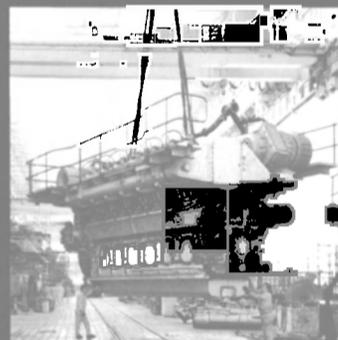
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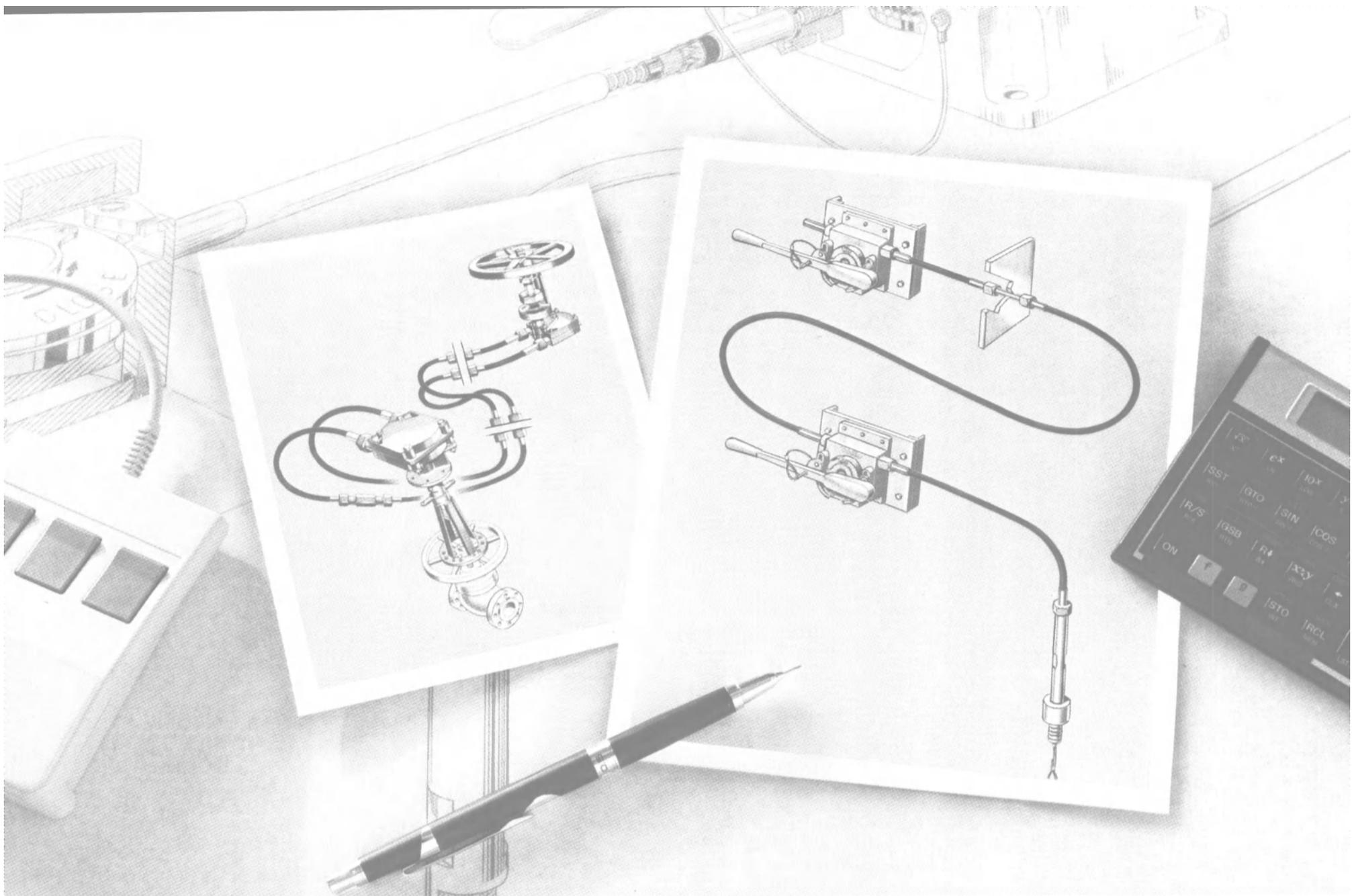
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Left: Remote Mechanical Valve Actuator. Right: Remote Trip Valve Actuator.

RMVA, and now RTVA Teleflex designs solutions for Remote Valve Operation

Engineering solutions aren't born. They're carefully designed. Consider RMVA, the Remote Mechanical Valve Actuator System from Teleflex, Inc. Naval Technologies Division.

The RMVA System serves as the industry standard for quality and performance in remote valve operation, and has been installed on virtually every ship class in the U.S. Navy.

Teleflex engineers solve problems using first-hand knowledge gained through years of experience on Naval vessels.

Teleflex has now found the solution to the problems long associated with Trip Valve Operators: the Remote Trip Valve Actuator System, or RTVA.

The RTVA System is designed first for survivability, as it eliminates shock-induced valve closures associated with the current cable/pulley systems.

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For RMVA Brochure, circle 319 on Reader Service Card. For RTVA Brochure, circle 320 on Reader Service Card.

ELECTRONICS UPDATE

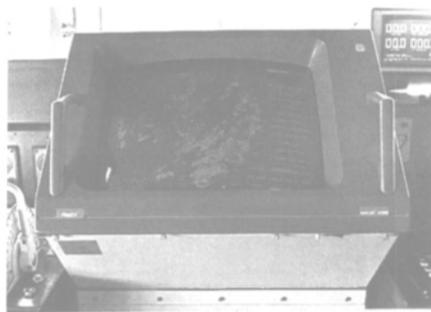
Sperry Marine Introduces New Stand-Alone ARPA

Sperry Marine has introduced a new stand-alone ARPA designed to fulfill IMO and SOLAS regulations which go into effect January 1, 1991.

IMO, in its Resolution A.422(XI) "The Recommendation on Performance Standards for Automatic Radar Plotting Aids (ARPAs)," recommended staged implementation of mandatory requirements to carry ARPA. This recommendation has been ratified and is now part of the Safety at Sea Regulations (SOLAS).

Prior to the IMO resolution, owners of many vessels had already installed collision avoidance equipment which does not fully meet the new performance standards. These ARPAs were "grandfathered" until January 1, 1991.

Sperry Marine's new stand-alone ARPA is designed to ease the cost and inconvenience of upgrading the noncompliant ARPA systems. The heart of the new stand-alone ARPA is a highly flexible Adaptive Interface. This interface module allows Sperry Marine's proven RASCAR



New Sperry Marine stand-alone ARPA.

Radar/ARPA display to work alongside almost all existing radar systems.

Owners of noncompliant ARPAs can now upgrade their systems to the same high resolution raster scan display with the easy-to-use touch-screen controls featured in Sperry Marine's award-winning RASCAR radar/ARPA. The RASCAR display becomes a fully compliant 20-target ARPA with the existing radar installation, avoiding the expense of replacing the vessel's radar system.

The Adaptive Interface even enables the RASCAR display to select which radar it is working with in a dual radar system.

Sperry Marine Inc., a leading developer and manufacturer of marine navigation, guidance and communi-

cations equipment, is a subsidiary of Newport News Shipbuilding, a Tenneco Company.

For more information about Sperry Marine's ARPA display,

Circle 15 on Reader Service Card

PROPULSION UPDATE

Orders Grow For MAN B&W Diesel's 'Mini-Bore' S26MC Engine

The merits of MAN B&W Diesel's "mini-bore" S26MC low-speed engine are being appreciated by a growing number of designers and operators of small-to-medium sized ships in varied inland, coastal and deepsea trades.

The 260-mm bore/980-m stroke design was introduced to extend the economic and technical advantages of the MC two-stroke engine series to vessels which before had been restricted to geared four-stroke propulsion machinery. The S26MC range consists of 4 to 8-cylinder models offering outputs up to 3970 bhp at 250 rpm, allowing direct coupling to a cp or fixed-pitch propeller.

The overall operational qualities of the design—notably high reliabil-

ity, low maintenance demands and impressive fuel economy on cheaper bunkers—have so far attracted orders for 41 engines totaling 118,488 bhp from owners/yards worldwide. The reference list includes dry cargo ships and tankers, and excellent service experience is reported from the 19 engines already at sea.

Typical applications for the compact S26MC-based propulsion plant are illustrated by the following recent installations:

•Mekhanik Makarin, the first of 10 river/seagoing timber carriers ordered for the Soviet Union's Northern Shipping Company from Austria's Oswag yard. Each 2,500-dwt shallow draft vessel is specified with a 6-cylinder S26MC engine developing 2,820 bhp at 237 rpm and driv-

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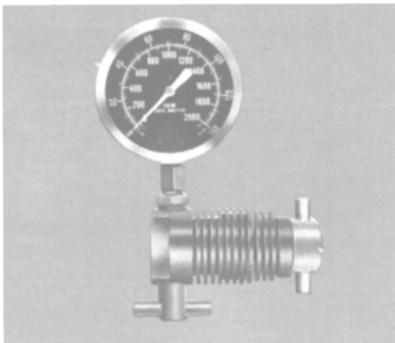
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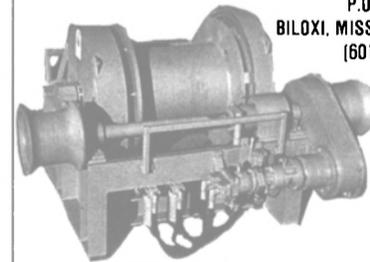
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Maritime Reporter/Engineering News

Circle 266 on Reader Service Card

ing a cp propeller for a service speed of 12.6 knots. The engines, supplied by USSR licensee Bryansk, are also arranged to drive a 265-kw shaft alternator. The multipurpose icegoing ships will be deployed from the owner's Archangel base.

•Three 3,400-dwt/270 TEU multipurpose cargo/containerships entering service with Stateships of Western Australia from Australian Shipbuilding Industries. Each is powered by a derated 6-cylinder S26MC engine with a rating of 2,230 bhp at 188 rpm, driving a cp propeller and a 450-kw shaft alternator. The 13-knot vessels are designed for operation in Australian and Southeast Asian services.

•Three 2,800-dwt/170,000-cubic-foot refrigerated cargoships completing at the Aarhus Dockyard Ltd. in Denmark for deployment with Copenhagen Reefers. Propulsion power is provided by a 6-cylinder S26MC engine developing 2,970 bhp at 250 rpm, which is arranged to drive a cp propeller and a 500-kw shaft alternator.

MAN B&W Alpha Diesel A/S of Frederikshavn, Denmark, which is geared up for the competitive production of smaller bore MC models, is delivering the propulsion packages for the Stateships and Copenhagen Reefers newbuildings. Each tailored package includes the S26MC engine, shafting, cp propeller and Alphasonic remote control system.

Overall sales of the MC series now number 1,822 engines aggregating some 24,401,000 bhp.

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

Circle 16 on Reader Service Card

KHI To Build Two LPG/Ammonia Ships For Kvaerner

Kawasaki Heavy Industries of Japan recently received an order to construct two 34,500-m³ LPG/ammonia carriers for Kvaerner Shipping Group.

The two ships are expected to be delivered in 1993 and 1994. Both will join the Myre Havtor Pool based in London, jointly operated by Kvaerner and the Norwegian Havtor group.

Bromination Systems From Everpure Provide Reliable At-Sea Water Treatment

Providing passengers at sea a safe, reliable potable water supply is critical. The U.S. Public Health Service and the National Sanitation Foundation, the leading organizations concerned with drinking water quality, have approved two methods of water treatment aboard ships: chlorination and bromination.

Everpure, Inc., Westmont, Ill., is a technological leader in the development and manufacturing of bromination equipment for use aboard ships. The company is currently supplying the second generation of

bromination feeders for the U.S. Navy's newest ships, such as the Abraham Lincoln (CVN-72), Nimitz Class aircraft carriers, the Coastal Minehunter MHC-51 Class, and the Fast Combat Support Ship AOE-6 Class.

According to Everpure, bromination equipment can be found aboard the U.S. Navy surface fleet and U.S. Coast Guard vessels, and on the majority of offshore oil platforms in

the Gulf of Mexico.

Bromine, the company contends, is virtually tasteless and effective over a wide pH range. Also bromine is supplied in easy to change cartridges, has a two-year shelf life and is not toxic or flammable in storage. No chemical measurement or physical handling of the product is necessary, since bromination equipment features an automatic feeder.

Manufactured of stainless steel,

brass and bronze components, bromination systems have an average 20-year service life. And although brominators are initially more expensive than other systems, Everpure believes that, because of lower maintenance and operating costs, future cost savings outweigh these differences.

For free literature detailing Everpure bromination systems,

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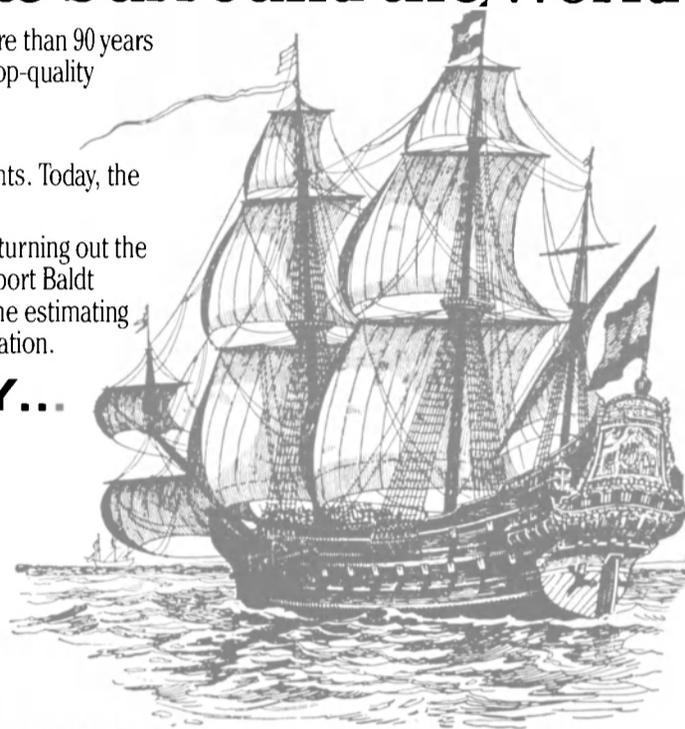
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Kawasaki Heavy Industries of Japan recently received an order to construct two 34,500-m³ LPG/ammonia carriers for Kvaerner Shipping Group.

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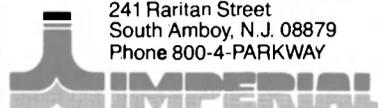
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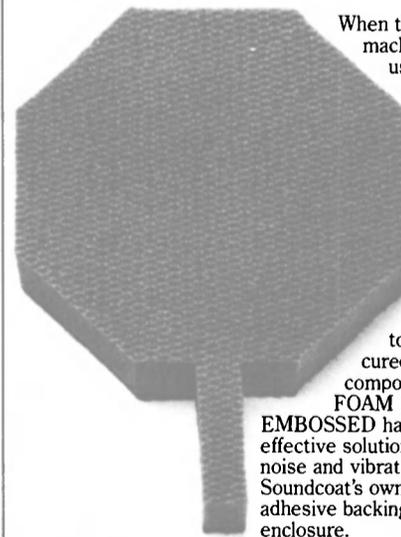
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Circle 342 on Reader Service Card

New HF Cradle System Offers Safer, More Cost-Effective Material Handling At BIW



Material handling is simpler and safer at BIW with the new HF Cradle System from Dwight Foote, Inc. The designs of the container and self-aligning and interlocking cradle system create a one-piece unit that can be handled from the floor by one man using an overhead crane and an HF system spreader beam.

The materials handling system used for years at Bath Iron Works pipe fabrication shop relied on corrugated containers to hold the irregularly shaped subassemblies. Getting the material from the pipe shop to the ship required six full-time workers to move the finished pipe four times, including loading it on a flatbed truck for transportation to the installation site. Because a material handler had to climb up on the units and manually attach chain slings to the container's four lifting eyes, they could only be stacked three high. This stacking limitation meant that a large floor area was needed for storage, staging and shipping.

When BIW built its new pipe and sheet metal fabrication facility in East Brunswick, Maine, with a total production and storage area of 117,000 ft² (including 3,800 ft² of finished pipe storage in three bays), one of their major objectives was to make their materials handling and storage system safer and more efficient.

BIW selected the patented HF Cradle System, manufactured by Dwight Foote, Inc., Berlin, Conn., for its material handling and storage system. The self-aligning, interlocking design of the HF System allows rapid, safe and accurate stacking of multiple units. Because they can safely be stacked up to four high, storage floor space requirements were cut by one-third, and BIW was able to transport more finished subassemblies per truck.

Just as important, the HF Cradle System has eliminated the need for riggers to climb up on loads to connect chain slings to the containers. HF units are easily selected and handled from the floor by one man. A safer, more open work environment has been created.

BIW's **Matthew Quail**, supervisor of scheduling, and **Mark McAuliffe**, plant superintendent, designed the material handling system used to retrieve, kit and ship the subassemblies. Both Bath Iron Works and Dwight Foote, Inc. designed the special containers for transporting and storing the finished pipe assemblies.

The HF Cradle System consists of 250 cradle containers, 12 feet by 4 feet by 2-1/2 feet, with a capacity of 6,000 pounds, a single hook crane, and an HF spreader beam. The system handles a range of pipes in various configurations, from 3/4 inch up to 10 inches in diameter, with fittings, valves and gauges in place, and miscellaneous components and hardware required for each assembly.

According to Dwight Foote, Inc. payback on the HF System calculated on labor alone is 30 months.

For free literature detailing the HF Cradle System from Dwight Foote, Inc.,

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Maritime Reporter/Engineering News

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Southwest Marine Appoints Watt VP, Business Development



Quintin Watt

Southwest Marine, Inc., San Diego, Calif., recently appointed **Quintin Watt** as vice president-business development.

He will operate from the company's Northwest Marine facility in Portland, Ore., and will be responsible for developing new commercial ship repair business, primarily from European and Asian sources, for Southwest marine facilities in San Diego, San Pedro, San Francisco, and Portland.

Wide Frequency Coverage Provided By Kenwood SSB Marine Transceiver

The model TKM-707 SSB marine transceiver offered by Kenwood U.S.A. Corporation, Long Beach, Calif., covers all marine bands between 2 MHz to 30 MHz. This is wider coverage than most single-sideband transceivers currently on the market. Additionally, it provides 150-watt RF output power and up to 198 memory channels.

Designed for simple operation, the TKM-707 allows direct keyboard entry of either ITU channels or frequencies. Other standard features include a 2.182 MHz emergency alarm, lower sideband and channel scan. A high frequency cooling system allows continuous transmission of full power output for several hours. A large, multi-function liquid crystal display provides optimum readability in bright sunlight or darkened conditions. Modes of operation include upper sideband, lower sideband, and AM.

For more information from Kenwood,

Circle 45 on Reader Service Card

FANA To Build Temporary Shelters For Iranian Earthquake Victims

A U.S. company that usually supplies boatowners with protective polyethylene coverings has volunteered its services to build temporary structures for Iranian earthquake victims.

FANA (Film Applicators of North America) recently applied for and was granted permission by the

Iranian Government to supply and build temporary shelters for earthquake victims in Iran.

According to the U.S. State Department and the Permanent Mission of the Islamic Republic of Iran to the United Nations, **Anthony Seraphin**, president of the Springfield, Pa., company, was the first American to receive permission to do post-earthquake work in Iran.

The FANA structures will be made of steel tubing and the compa-

ny's ArmorShield shrink film. The polyethylene film is shrunk over the steel tube frame using the company's propane-fired heat guns.

According to FANA, a shelter about 20 feet wide, 40 feet in length and 10 feet high, with doors and windows, is simple to construct, taking about 3 to 4 hours to set up. The structures, which can be built to any size, can be used for housing or storage of supplies.

Lead by Mr. Seraphin, the vo-

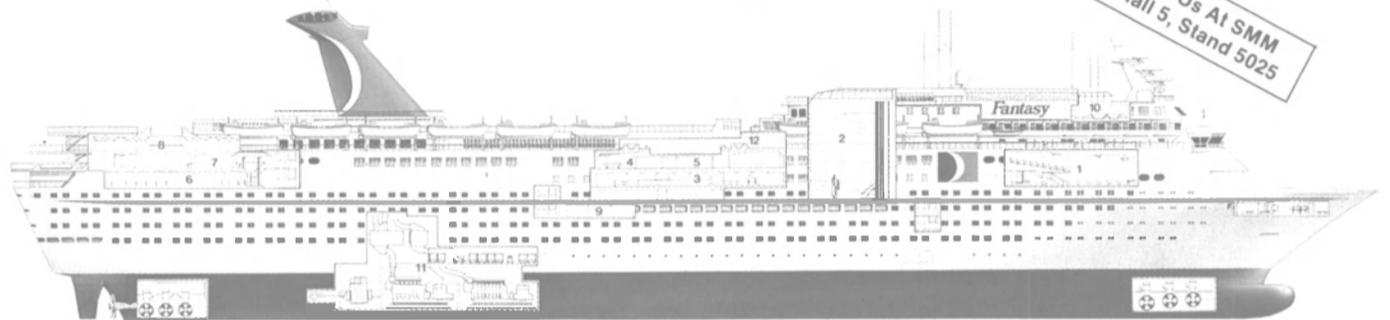
lunteers plan to build three to four structures and train others to construct them in one area and then move on to another site.

It is not the first time Mr. Seraphin has volunteered FANA's services. In 1988-89, FANA responded to the Armenian earthquake by building shelters.

For free literature detailing FANA protective covering,

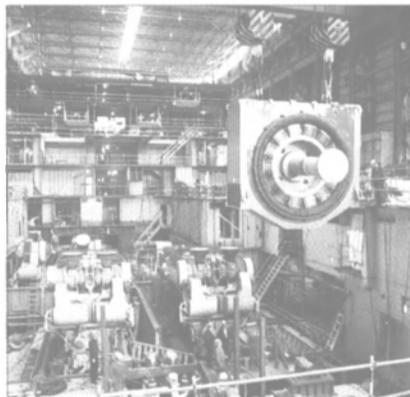
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Cyclo Propulsion



M/S FANTASY and M/S ECSTASY, cruise vessels constructed at MASA-Yards for Carnival Cruise Lines will each feature 2 x 14 MW CYCLO propulsion drives, 6.6 kV switchboards, four 10.3 MVA and two 6.8 MVA generators, plus six thruster motors and the main transformers, all engineered and supplied by ABB Marine, Helsinki.

Similar systems (propulsion power 2 x 12 MW), also including integrated machinery automation, was supplied by ABB Marine for *Crystal Harmony*, built for Crystal Cruises by MHI, and will be delivered for 3 cruise ships being built by Fincantieri for HAL.



The first of the two 14 MW synchronous motors being hoisted into M/S Fantasy.

Design for Maximum Profit

The propulsion system of a modern cruising vessel is designed as an integrated part of the total vessel, taking the actual service profile and total energy production and consumption into consideration. Other important criteria are system efficiency, operational safety, passenger comfort - and space utilization.

The Power Station Concept

In all these respects, the Power Station solution with Cyclo propulsion offers unquestionable advantages, compared to conventional diesel mechanic propulsion:

Increased Earning Capacity through:

- A simplified, compact engine room
- Flexible placing of the main generators
- Simplified L.O., C.W., and F.O. systems
- Better heat recovery arrangements

Reliability, Less Maintenance through:

- Redundancy
- Diesels running at optimum load

Cruising Quality through:

- Reduced noise and vibration
- Propulsion performance and control

CYCLO Propulsion Power

A Cycloconverter driven AC synchronous motor can be connected directly to the propeller shaft, eliminating the need for reduction gearing. It is also perfectly suitable for a fixed pitch propeller.

It provides smooth torque through the entire speed range, causing a minimum of vibration, even at very low speeds. Voltage distortion is exceptionally low, and the risk of inducing damaging resonance is minimal. Regenerative braking of the propeller is achieved without special arrangements.

The CYCLO control system provides flexible control and overload protection, and is easily adaptable for crash stop optimization etc.

The control system can be extended into an integrated automation system encompassing power management, machinery supervision and piping system control, featuring VDU terminals.

50 Years of Solid Experience

ABB Marine has provided electrical propulsion for more than 130 ships or offshore vessels; electrification for 110 passenger ships, 800 newbuildings and 1600 retrofits; power management systems for 600 vessels; integrated automation systems for 140 vessels.

ABB Marine

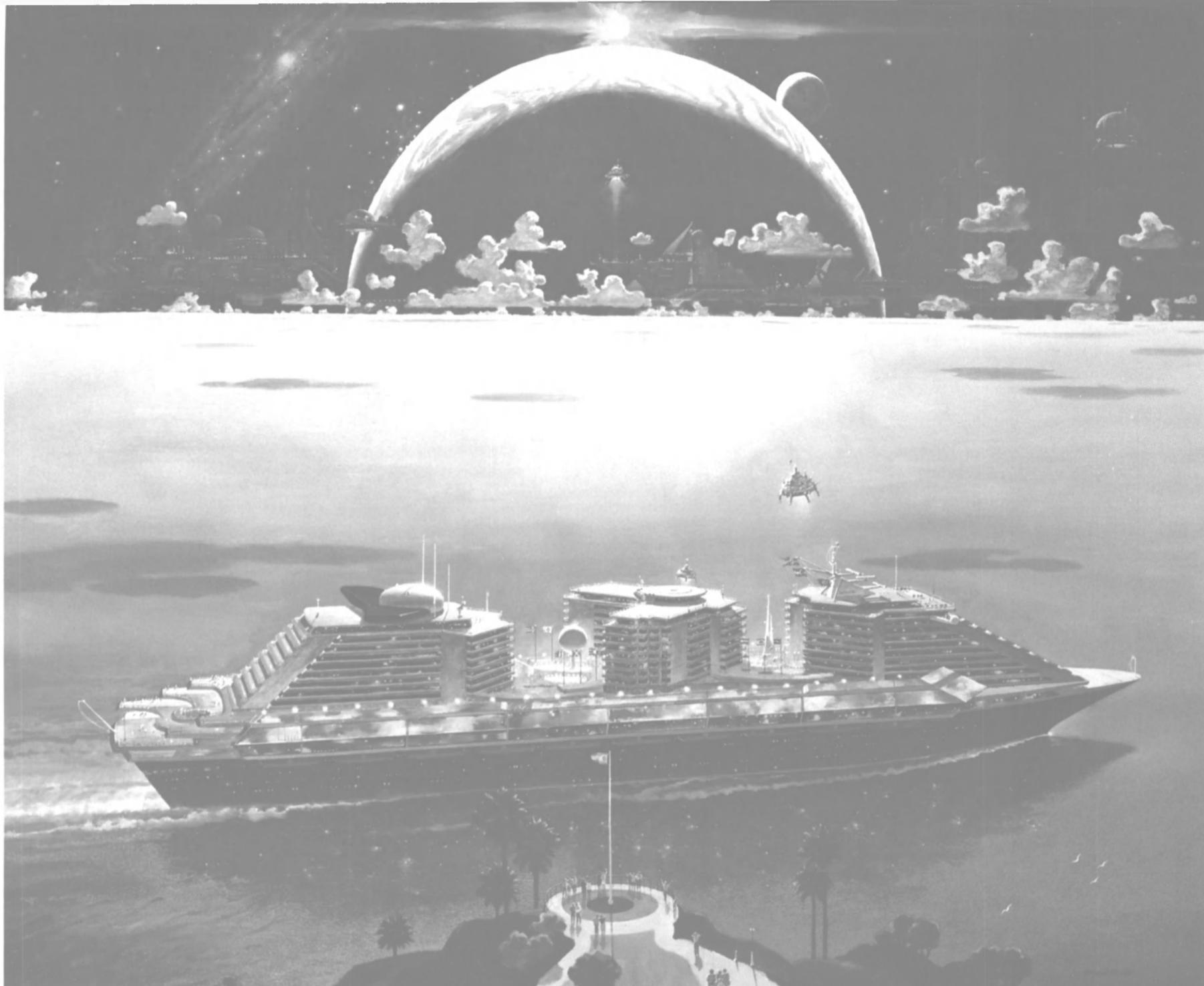
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PHOENIX WORLD CITY: Billion-Dollar Ship Project Takes Shape At Avondale

By John R. Snyder, Editor

Commercial shipbuilding in the United States recently received a vote of confidence in both its ability to construct commercial ships and competitiveness when New Orleans-based Avondale Industries outbid its European counterparts for the contract to complete final engineering and prepare a firm bid price and delivery date for construction of what would be the world's largest cruise ship. The initial contract was signed between Avondale and the shipowner, the World City Corporation, owned by the World City Foundation. The preparation of the contract bid package is expected to

be completed by October. An additional four months will be required for preparation of a firm-fixed price and delivery, and the quotation will be good for 120 days, at which time World City would secure financing.

One of the boldest and most ambitious projects ever conceived in cruise ship history, the construction of the colossal 5,600-passenger Phoenix World City—she would be longer than a U.S. Navy Nimitz Class aircraft carrier—in the U.S. would mean an influx of hundreds of millions of dollars to the builder or builders and equipment suppliers involved in the work. Industry analysts have estimated the value of the cost of construction at anywhere from \$800 million to as much as \$1.2 billion.

The billion-dollar brainchild of

Knut Utstein Kloster, chairman of the World City Corporation, pioneer in the Caribbean cruise market, the Phoenix World City would have a gross tonnage of 250,000—more than three of the world's most prestigious cruise ships, the Norway, QE2 and Sovereign of the Seas, combined. Lightweight tonnage of the megaliner would be 95,500 tons, with an overall length of 1,262.8 feet, maximum beam (at decks 8-11) of 252-1/2 feet, and a maximum draft of about 33 feet.

According to **Stan Wallace**, engineer, advance programs and marketing, Avondale Industries, the Phoenix World City will feature twin-screw diesel-electric propulsion, consisting of two 20-MW main propulsion motors per shaft, with

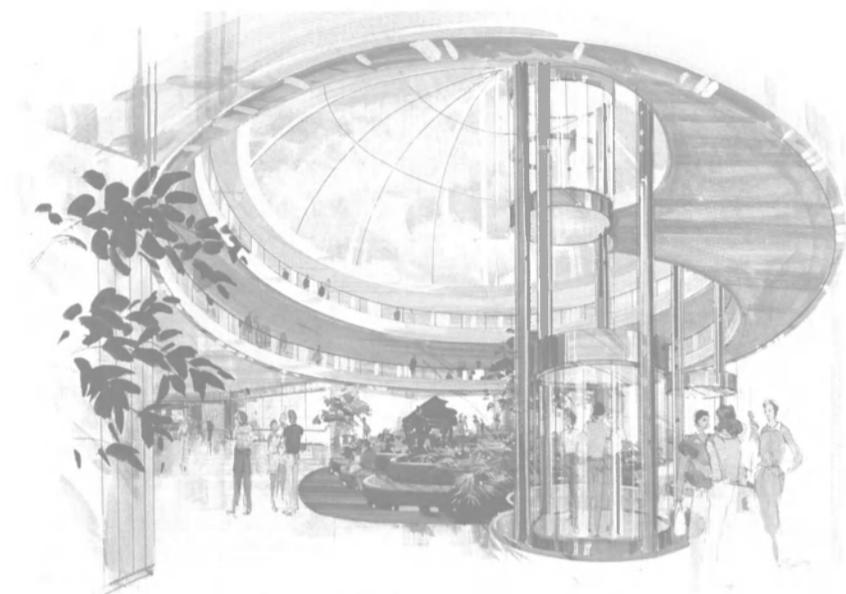
eight diesel generators of 9,600 kw each. The ship's stainless steel variable-pitch propellers would be 7 meters (about 23 feet) in diameter.

"We have worked with a number of companies," said Mr. Wallace, "but at this stage we have not decided on which diesel-electric propulsion system we will use."

Four 2,500-kw bowthrusters and four 2,500-kw stern thrusters with separate motors will provide the Phoenix World City with added maneuverability.

The Phoenix World City's passenger capacity of 5,600, with 600 additional berths for third and fourth passengers, would be more than twice that of Carnival Cruise Line's Fantasy or Royal Caribbean's Sovereign of the Seas. In fact, the Phoenix World City's complement

The painting "New World Voyage," by American artist **Robert T. McCall**, depicts Phoenix World City in a futuristic setting.



Depiction of "U.N. Plaza," which will be located on Main Street. This three-story-high area will serve as a primary meeting place aboard the ship.



The Royal Garden Restaurant, a large open-air dining facility, will be located at one end of Main Street.

of officers, crew and staff of 1,800 is almost as large as some of today's superliners' passenger capacities.

As explained by Mr. Kloster, the proposed Phoenix World City is: "The largest and most exciting passenger vessel on earth, a premier resort, a fabulous destination in and of itself, a world-class conference and business center. World City [is] an international city at sea, a cultural spaceship for education, exploration and enrichment, a global forum for the advancement of international cooperation, understanding and exchange."

Commenting on the recent contract signing between Avondale and the World City Corporation, Albert L. Bossier Jr., chairman and chief executive of Avondale, said: "Avondale is pleased to be included as part of the team working to bring this historic project to completion. Our company believes that its modular construction techniques and productive labor force will enable it to submit a firm offer demonstrating our capability of producing a vessel of this scale and complexity on terms which will be competitive in the world market."

John S. Rogers, vice chairman and chief executive officer of the World City Corporation, said, "World City Corporation is confident that U.S. yards can be competitive and, in fact, come in well below bids of European yards." He cited the low dollar, technological advances, competitive wage rates, ever

increasing productivity, experienced and skilled personnel as the main reasons for his company's confidence.

Mr. Kloster stated that: "the agreement with Avondale represents an important step in the development of the Phoenix World City. It provides for performance of the extensive shipyard work on which any firm offer for construction of a project of this magnitude must be based, and even more importantly, it now assures that World City will receive a timely offer and fixed delivery schedule, prerequisites for completion of financing arrangements."

Mr. Kloster also went on to state that the agreement raises the "very real possibility of both building Phoenix World City in the United States and operating her under the American flag."

The Phoenix World City has been designed by Tage Wandborg of the Knud E. Hansen firm of Copenhagen, Denmark, a noted ship architect and designer of more than 30 modern cruise ships.

More than five years in design, testing and market research, the Phoenix World City project, according to the company, heralds the future direction of the cruise and leisure market. The company claims that as such, it promises to be a highly successful commercial venture. The company bases these claims on the fact that the Phoenix World City is not only aimed at the

cruise market, but also the lucrative \$44 billion to \$50 billion per year convention/meeting market.

Besides her enormous size, a quick examination of the Phoenix World City reveals that she is a dramatic and bold departure from current ship design. She accommodates her 5,600 passengers (6,200 with third and fourth) in 2,800 staterooms and suites located primarily in three hotel towers which give her a distinctive profile. Each tower is a separate entity, providing passengers with the feeling of being on an island retreat rather than a cruise ship.

Massive portals in the stern of the vessel open to reveal a large marina within the ship. This is the port of arrival for World City's visitors when the ship is at anchor or underway.

Four day-cruisers, capable of speeds of up to 50 knots, each with a capacity of 400 persons, dock inside the ship. The vessels would be used to shuttle passengers to and from ports and a variety of destinations within a 50-mile radius of the ship. These day-cruisers might be similar in design to a previously built Surface Effect Ship (SES) delivered by Avondale.

The marina itself is a spacious and charming "harbor," complete with music, palm trees, cafe, shops, and even a tropical waterfall.

Lifesaving equipment on board the Phoenix World City will include twenty innovative, fully enclosed,

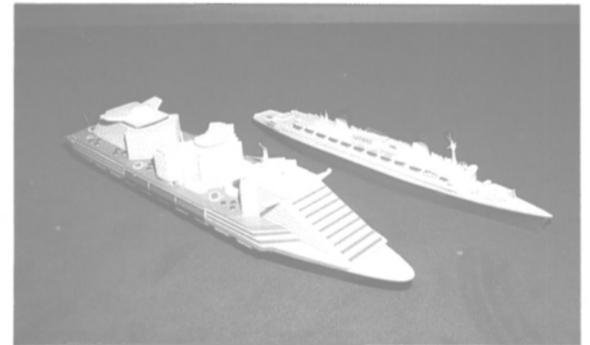
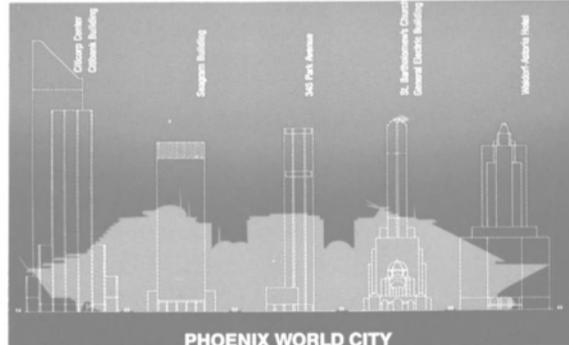
capsize-proof 400-passenger lifesaving craft. These diesel-driven, 6-knot vessels will each have an overall length of about 64 feet.

The 21-deck Phoenix World City has been designed to give passengers freedom and spaciousness without losing her sense of community: village squares, parks, a "downtown" area, Rendezvous Plaza, Main Street, galleries, museums, a interdenominational house of worship, tropical gardens, a sports arena, sidewalk cafes, nightclubs, cinemas, bistros, discos, six pools, six jacuzzis, university center, a 100,000-volume library, business center, brokerage office, arts complex, medical center, fire station, police station, and dozens of the world's most famous-name shops, boutiques and restaurants. The ship's 12 restaurants will occupy a total area of 4,800 m² (51,840 ft²). The 28 boutiques and shops aboard the Phoenix World City will occupy a total area of 2,300 m² (24,840 ft²), while her 12 bars and coffee shop, with a total seating capacity of 3,325, will have an area of about 840 m² (9,072 ft²).

The Phoenix World City will also have a sports complex, including squash and tennis, a state-of-the-art health spa and fitness center, and a half-mile jogging track.

The ship's 2,000-seat theater, with mezzanine, located on decks 7 and 8 will be large enough to stage

(continued)



Photo, left: World City Corporation's vice chairman and chief executive officer John Rogers with Knut Utstein Kloster, chairman, World City Corporation, and Tage Wandborg, chief architect, Phoenix World City Project, examine a breakaway model of the megaliner at a recent maritime symposium. Photo, center: Size comparison of the Phoenix World City with a stretch of blocks from 49th Street to 54th Street along Park Avenue in New York City. The Phoenix World City will have a maximum height of almost 243 feet above the keel (210 feet above the waterline). The Citicorp Center is 914 feet tall, the Citibank Building, 741 feet, the Seagram Building, 525 feet, the General Electric Building, 640 feet and the Waldorf-Astoria Hotel, 625 feet. Photo, right: Scale models of the Phoenix World City and the S/S Norway. The Norway has a length of 1,033.2 feet and beam of 110.5 feet. The proposed Phoenix World City would have a length of 1,262.8 feet and maximum beam (at decks 8-11) of 252-1/2 feet.

Phoenix World City

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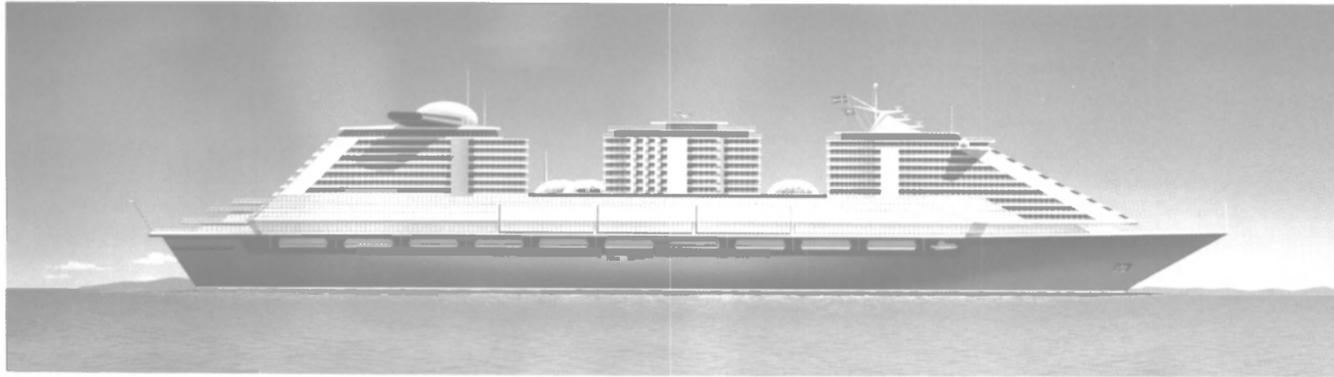
such events as a Broadway musical, or host the Bolshoi Ballet, the Royal Shakespeare Company, or the New York Philharmonic.

Both for onboard entertainment and for worldwide broadcasting of onboard activities and events, the ship will be equipped with a full television production studio and international satellite broadcast capability.

Plans for the casino on deck 8 call for a gaming room to rival many land-based facilities. The casino will have a total area of 14,000 ft² with an on-board commercial bank. Part of the casino, an area in excess of 5,000 feet², has been set aside as an "executive casino."

Other impressive statistics on the 1,262-foot-long Phoenix World City, which would be as long as the Empire State Building is tall (without TV tower) include: the capability to make 2,500 tons of freshwater per day; and a hotel load of 18,000 kw.

Phoenix World City also has been designed to meet the highest standards of environmental responsibility. All solid waste will be incinerated and converted to electrical energy or, in the case of glass and metals, will be compacted and stored for recycling. Water treatment will purify all effluent that is not recycled, and exhaust will be scrubbed. Bunker tanks will be fully separated from the outer hull to avoid oil pollution.



Artist's conception of the Phoenix World City showing her distinct profile.

By virtue of her size and innovative design, the Phoenix World City will be able to devote hundreds of thousands of square feet to World City's multifaceted recreational, educational, and cultural activities.

The Academic Inn will host the ship's visiting scholars, scientists, writers, poets, painters, sculptors, and musicians, who will work on various projects as guests of the ship, and periodically conduct workshops, recitals, and master classes for passengers as part of World City's cultural program.

World City will provide a new venue for business meetings, conferences and seminars. The facilities will range from rooms accommodating just 10, to a 1,600-seat conference center/ballroom, a 2,000-seat auditorium, and a large "exhibition deck." With a total area of meeting and convention space of 92,000 ft², rivaling many land-based resorts,

World City hopes to attract a significant share of the nation's \$50-billion annual meeting market. Conferencees will be able to meet with their peers from around the world on board.

The center hotel tower, complete with a helipad atop, will house an association of business organizations, the World Class Corporate 300, which are "committed to the shared task of creating a better future." The ship will offer business leaders a unique forum where they can advance their own corporate objectives, as well as those of the global community.

According to the World City Corporation, membership in the World Class Corporate 300 entitles corporate participants to substantial strategic marketing, sales, and promotional benefits, as well as exclusive use of a premium stateroom in the center hotel tower.

Plans for World Class Corporate 300 programs include an executive development component, with conferencees, workshops, and briefings conducted by leading figures from government, business, academia, media, and the research sciences.

And, although the Phoenix World City is primarily designed as a resort, its Global Business Center will provide teleconferencing and communications capability to permit corporate executives to keep in touch with their companies' headquarters and affiliates around the globe.

The World Class Corporate 300 tower will feature three hundred 376-foot² staterooms with private balconies. In addition, there will also be a number of deluxe apartments and penthouse suites, with balconies or roof gardens, ranging in size from 538 feet² to 753 feet².

Mr. Rogers said there are three

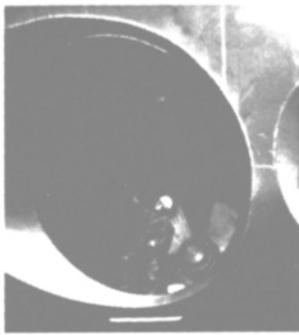
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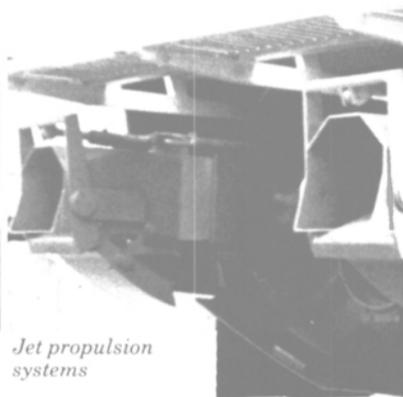
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- Training school
- Worldwide service



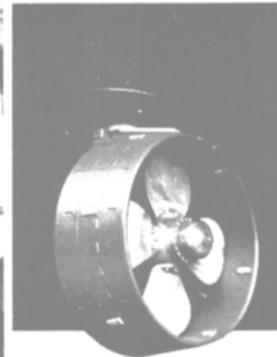
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key elements which would enhance the feasibility of the Phoenix World City project in the U.S. and operation under the U.S. flag, each of which depends upon the cooperation and support of Congress and Federal agencies.

One key element concerns current laws which prohibit gambling on U.S.-flag vessels. These statutes would have to be repealed for Phoenix World City to be fully competitive with foreign flag cruise ships, which are marketed primarily to U.S. citizens and which trade out of U.S. ports with casinos on board. A bill has already been introduced in the House, according to Mr. Rogers, which would repeal federal laws prohibiting gambling on board U.S.-flag vessels. The bill is an outgrowth of the growing interest of gambling on board riverboats, but the Phoenix World City would benefit—give considerable impetus to—greatly from any such legislation.

A second element involves current laws governing tax deductions on business meeting and convention expenses. While the present law limits such deductions to U.S.-flag ships, it carries an additional requirement that all ports of call of such an American vessel must be in the U.S. A bill is being drafted to remove this additional requirement, which, in its present form, has the effect of favoring many foreign resorts over U.S.-flag vessels. To date, this has been largely academic since there are no U.S.-flag cruise ships operating in the international trade.

The third advantage rising from U.S. construction and registry is the possibility of obtaining Federal Title XI guarantees, which would allow for long-term, low cost financing for the construction.

If the Phoenix World City is built in the U.S., she would serve as a showcase for U.S. technology and products, and, if she were U.S. flagged, would provide work for American mariners.

Furthermore, a U.S.-flagged Phoenix World City will also provide the nation with a significant defense and emergency capability.

As a hospital ship, she can be equipped to serve as a fully staffed and self-sufficient 9,000-bed hospital with four separate clinic, examination, treatment and operating facilities covering over 57,000 ft², gar-

age space for 124 ambulances and other vehicles, and capable of serving on station for two months at a time without replenishment.

In comparison, the Navy's newest hospital ships, the San Clemente Class USNS Comfort and USNS Mercy, are designed as 1,000-bed facilities.

As a troop transport, the ship would have a carrying capacity of over 24,000 troops, plus vehicles and supplies. She could thus transport a

complete army division, on a fully self-sustaining basis, for 28 days and over a range of 14,000 nautical miles. At destination, while underway or at anchor, the ship could rapidly deploy 10,400 troops at a time, using daycruisers and onboard landing craft.

According to Mr. Rogers, approximately 70 percent of the funds allocated to the shipyard would be used by the yard to purchase equipment from outside suppliers and

manufacturers. Equipment supply contracts for the construction of the liner would amount to hundreds of millions of dollars for manufacturers. A few examples of important categories of supply contracts with approximate dollar values involved are provided in Exhibit 1.

Last March, the World City Corporation nominated Port Canaveral,

(continued)



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Exhibit 1
Major Supply Contracts
In the Phoenix World City Construction

| Product | Estimated \$ (in millions) |
|---|-------------------------------|
| Main diesel | |
| propulsion machinery | 30+ |
| Electrical equipment (generators to light bulbs) | 136 |
| Communications | 10+ |
| Navigation systems | 3+ |
| 65,000 tons of steel | NA |
| Elevators & escalators | 16+ |
| Mainframe computers (excl. PC systems) | 5+ |
| Software systems (incl. ship operations, staterooms, instructional) | NA |
| Air conditioning | 56+ |
| Chemical & related products | 100+ |

PHOENIX WORLD CITY

(continued)

near Orlando, Fla., as homeport for the Phoenix World City. The Canaveral Port Authority has offered development rights to 95 acres of land within the port to the World City Corporation. Development plans to complement the ship in-

clude several hotels, recreational, entertainment and retail areas, a world space center, and an office, meeting and convention complex.

Ron McAlear, Avondale's Phoenix World City project team leader, said: "Detail design and engineering would begin immediately upon contract signing. If everything goes as planned, a contract can be entered into by July 1991. Physical construction would start in early to

mid-1992."

Mr. McAlear added: "Avondale is very capable of building the vessel and is extremely interested in the Phoenix World City project. This program is valuable to Avondale in the sense that it assists Avondale's corporate commitment to obtaining a larger percentage of commercial work. The Phoenix World City will provide work in a time when current programs are coming to a comple-

tion in the shipyard."

Avondale Industries has been involved in a number of naval, commercial and industrial projects over the years. Among its commercial shipbuilding projects are: the construction of all 22 LASH vessels built in the U.S.; six 164,000-dwt crude carriers for SOHIO and Exxon; two container vessels for APL; three multiproduct carriers for Exxon; and two chemical carriers for Ogden. At present, Avondale is in the midst of constructing 16 auxiliary fleet oilers and six Landing Ship Dock (LSD) ships for the U.S. Navy.

Among its latest industrial projects, the company has completed a 192-MW hydroelectric power plant for Vidalia, La., and now has under construction an 800-bed floating detention center for New York City. The company has also been involved in several offshore industry construction projects.

The construction and delivery of the Phoenix World City would have an immensely positive impact on the U.S. commercial shipbuilding industry, as well as open a new era in the cruise travel and leisure industry.

For free literature detailing the shipbuilding facilities and capabilities of Avondale Industries,

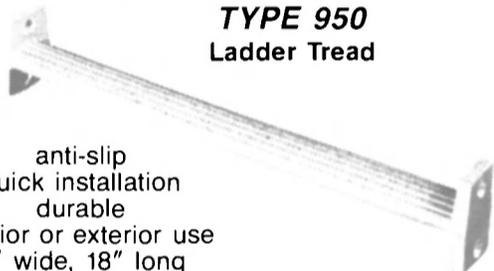
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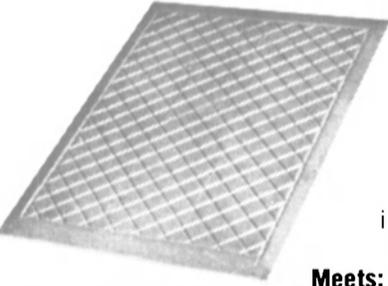
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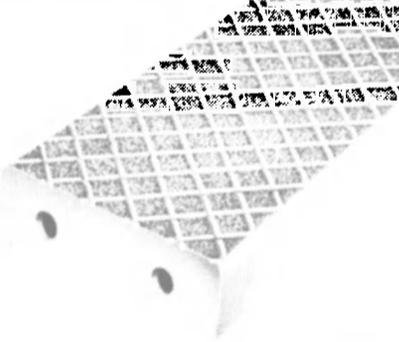
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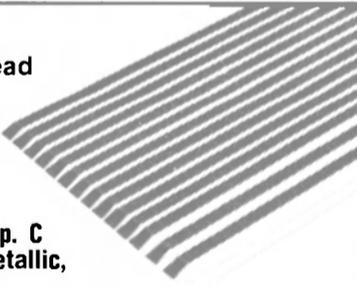
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New Committee Supports Use Of U.S. Products In World City Project

World City Corporation's contract with Avondale Industries is the basis of a "Build America" campaign aimed at maximizing use of American technology, products, and services from all 50 states in the building and outfitting of Phoenix World City and in her operation under the American flag.

Seventy percent or more of the labor and materials for cruise ship construction and outfitting is provided by companies other than shipyards, and in the case of Phoenix World City, these non-shipyard components will amount to hundreds of millions of dollars and millions of work hours during construction, not to mention maintenance services and parts over the life of the ship.

An additional objective of the Build America campaign is to utilize the building of Phoenix World City as a highly visible symbol of the "building" of America's resourcefulness and productivity, as well as a platform for addressing causes and conditions that are limiting national effectiveness.

The Build America Committee has invited expressions of interest from companies representing a broad range of products and from all 50 States, as well as from the Economic Development offices of the states themselves.

Interested companies may write to the Build America Committee, P.O. Box 1994, Cape Canaveral, Fla. 32920-1994, or to World City Corporation, 330 East 43rd Street, New York, N.Y. 10017.



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Southwest Marine Awarded Cruise Ship Conversion Contract Worth \$75 Million

Southwest Marine, Inc., San Diego, Calif., the West Coast's largest network of ship repair yards, has been awarded a \$75-million contract for the conversion and overhaul of Royal Caribbean Cruise Line's M.S. Viking Serenade. The work will take place at Southwest's San Diego facility, also the company's corporate headquarters, and is scheduled to begin January 27, 1991, and continue for 13 weeks, ending April 29, 1991.

According to **Herb Engel**, Southwest's executive vice president and chief operating officer, "The award of this contract repre-

sents the largest cruise ship conversion to be undertaken in the U.S. and has significant international implications for Southwest Marine and the ship repair industry. In the past, most commercial repair work on this scope has been conducted in Europe. This fact further emphasizes the importance of the award for Southwest Marine and serves to solidify Southwest's commitment to expand into the commercial repair marketplace. We are very pleased and proud to be entering into this partnership, along with the support of Wells Fargo Bank, and are looking forward to playing a key role in

the further success of Royal Caribbean Cruise Line's marketing efforts targeting Baja, Mexico. Our entire team will work diligently to assure the timeliness and quality of the repair work in order to enable the Viking Serenade to make her inaugural cruise from Los Angeles to Catalina Island and then on to Ensenada, Mexico."

This \$75-million refurbishment project was granted to Southwest Marine based on a track record of quality work, delivered on time, at a competitive price.

The entire work package to be performed on the ship includes the following: addition of 260 cabins; addition of a lounge on ship's funnel stack; creation of a new dining room, and expansion and upgrading of the existing one; addition of an indoor/outdoor cafe; expansion of the casino; new piano bar; new gift

shop area; construction of a conference center; new switchboard, telephone and public address system; new air conditioning and heating systems; overhaul of fire systems; and construction of new offices, hospital facilities and galleys.

"Southwest Marine was awarded this contract in the face of international competition, and we are looking forward to joining forces with Royal Caribbean. This association will establish Southwest Marine as a world class repair facility and will allow Royal Caribbean Cruise Line to remain at the forefront of the luxury cruise industry," stated **Arthur Engel**, president/CEO of Southwest Marine, Inc.

For free literature on the facilities and capabilities of Southwest Marine,

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BOATS & BARGES

New Coast Guard Rescue Vessel Built By Textron Marine Successfully Completes First Test

The newest addition to the U.S. Coast Guard fleet, a 47-foot rescue vessel designed and built by Textron Marine Systems (TMS), successfully righted itself in 5.3 seconds during its first test, conducted recently at the Textron shipyard in New Orleans. This patrol and rescue boat has the capability to roll over 360 degrees and self-right within 30 seconds.

"This prototype represents many technological innovations," said Textron Marine Systems president **John J. Kelly**. "The rugged aluminum hull is not only very strong, it is lightweight and efficient. It can withstand maximum winds of hurricane force, and this boat, which is capable of speeds in excess of 25 knots, is twice as fast as the existing steel hull 44-foot Coast Guard rescue vessel.

"Besides having the capability of a complete rollover, the boat can pitch-pole or lunge bow first, flipping end over end 360 degrees into the swells, and self-right in less than 30 seconds. The two-person operating crew is housed inside an enclosed bridge for added safety and better visibility. The 44-foot lifeboat which it replaced has an open bridge with its crew strapped in place," he continued.

The motor lifeboat was delivered in mid-August to the Coast Guard National Motor Lifeboat training school in Ilwaco, Wash.

The contract award totals over \$2 million for the design and production of the motor lifeboat prototype, and a five-boat option totaling over \$4.5 million. The success of this 47-foot rescue boat program will lead to the eventual procurement of 100 of these craft by the Coast Guard.

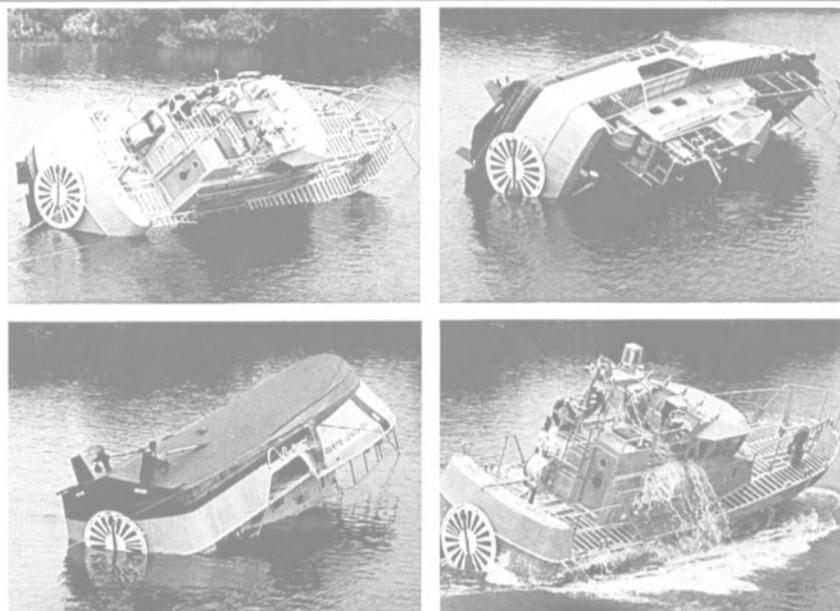
Recently, Textron Marine Systems was selected to provide high-speed rescue fireboats for the New

York City Fire Department.

Textron Marine Systems, a Division of Textron Inc., is based in eastern New Orleans and employs approximately 800 people. The company produces high-technology marine craft for both commercial and military applications.

For free literature on the facilities and capabilities of Textron Marine Systems,

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The first craft in the 47-foot rescue and patrol boat class successfully self-rights in 5.3 seconds during its recent rollover test at Textron Marine Systems in New Orleans, La.

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WESTECH
GEAR CORPORATION

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MTU To Unveil New Generation Engine, Series 595, At SMM '90

German engine manufacturer MTU Friedrichshafen recently announced it will present its new Series 595 diesel engine for the first time at the International Shipping

and Marine Technology Market, SMM '90, in Hamburg, West Germany.

The new Series 595 includes 12- and 16-cylinder models, with power ratings ranging from 1,980 to 4,320 kw (2,695-5,875 hp). Each cylinder in the engine will displace 5.95 liters. Both engines will be on display at MTU's stand.

J. Barry Dvoracek, manager

of marketing services, MTU North America, said: "Since MTU's incorporation in 1969, this [Series 595] is the first engine which truly has been conceived, designed and built by MTU. All of our others, including the popular Series 396, are based on engines which were in production prior to 1969."

"As a result," Mr. **Dvoracek** continued, "this new Series is the

outcome of MTU's many years of experience in the production of diesel engines—primarily for marine use—and as such will incorporate the most technologically advanced innovations in diesel engines today."

Complementing MTU's product line in the medium power range, this new series was designed with both high-performance operation and continuous-duty service in mind, and it is the outcome of consistent research, development and decades of experience in modern diesel engineering. Future demands for environmental compatibility, operating and maintenance economy, as well as operational reliability were given careful consideration in the design concept.

Some of the planned applications include fast ships, ferries and passenger boats.

MTU plans to reveal more details about the series after the exhibition.

For free literature detailing MTU's complete line of engines, including the new Series 595,

Circle 4 on Reader Service Card

12-Page Tank Coating File Helps To Make The Right Choice Of Sigma Product

Sigma Coatings recently published the Sigma Tank Coating File. This is No. 2 in a series of "system" files being dispatched by the company over the next few months. (An article on No. 1 in the series, Sigma Antifouling File, appeared in the July 1990 issue of MARITIME REPORTER/Engineering News, page 16.)

The new 12-page Tank Coating File contains a wealth of useful information on the choice and application of tank coatings. Included are chapters with advice on choosing the right system and the right choice of tank coating. Sigma's five basic tank coating systems capable of withstanding more than 5,000 liquid cargoes are discussed and their individual properties described. A tank coating specification chart is also included.

To further help customers make the right choice, detailed data sheets are available concerning the particular properties and benefits of all the various types of tank coatings produced by Sigma.

As part of a backup service, Sigma lists a great number of tank-cleaning chemicals from recognized manufacturers, which will not have any detrimental effect on their tank coating systems. An added advantage is that the smooth coating surfaces can be easily and effectively cleaned, so that subsequent cargoes are not contaminated.

The Tank Coating File, its associated fact sheets and close consultation with a Sigma Coatings representative assure making the right choice of a Sigma product.

For further information and a free copy of the new Tank Coating File from Sigma,

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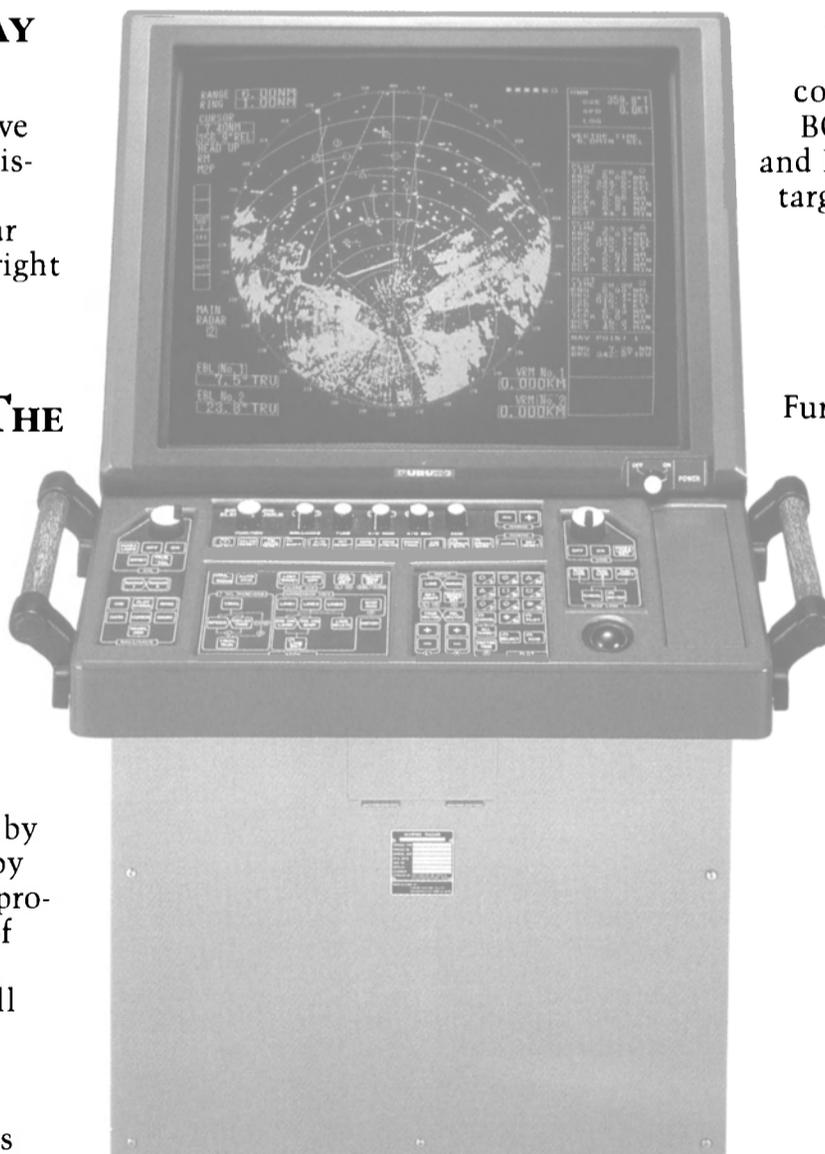
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SMM 90: THE HAMBURG SHOW

September 25-29, Hamburg, West Germany

The International Shipping and Marine Technology Market with Congress, SMM '90, will be held in Hamburg, West Germany, from September 25-29 at the Hamburg Exhibition Center.

Held biennially on the grounds of the Hamburg Messe, SMM, or the Hamburg Show as it is commonly referred to, is expected to draw more than 500 international exhibitors, a large percentage of which will be from the shipbuilding industry. Combined with the numerous equipment manufacturers in attendance, the shipyards will display not only their building programs, but also the latest innovations and advances in the fields of marine and offshore technology.

New developments in shipbuilding technology and techniques, ships' generators, diesel engines, electrical engineering and electronics applications, motor systems, pumps, compressors, pipe fittings, and port equipment will all be represented by the exhibits at SMM '90.

Photo: The Port of Hamburg is situated along the Elbe River.

With a strong and wide-ranging spectrum of exhibits, SMM has to be considered one of the leading international maritime market shows.

This year a parallel series of lectures, presented as part of the 2nd German Hydrographics Conference 1990, will be held in conjunction with the congress. The theme of the lectures will be "Hydrographics and Environmental Protection."

The first day of the conference will deal with the challenge faced by biological oceanography in the light of the changes to the environment and also present a comparison of the problems of the North Sea and the Baltic. In addition, there will be a report on the Seas Environment Data Bank.

The second day of the conference will address the implementation of practical measures, such as remote exploration of the seas using radar techniques and a hydrographic measuring system for coastal waters that is operated from and processed aboard helicopters. An additional topic will be marine environmental protection from the perspective of

industry. Numeric models will be presented as a possible way of simulating the spread of pollutants in the sea.

The observation of oil slicks in the North and Baltic Seas and their control from the air, as well as Naval cooperation in such measures, are other subjects that will be handled by the Hydrographics Conference.

One talk at the conference will address questions of environmental protection and the surveying of the "National Park," an extensive sea and coastal area stretching from the Danish to Dutch border. This area contains a great variety of bird sanctuary islands and protected mud flats.

The series of lectures closes with a talk on "Principles for Assessing the Need for Cleaning the Seas."

The location of the 2nd German Hydrographics Conference is the SAS Plaza Hotel Hamburg, which is situated next to the Fairground.

The SMM Congress, which is being managed by Prof. **Fritz Sandmann**, will discuss, "Technical Progress—Environment-Efficiency: A Challenge for Marine Technolo-

gies." Over 30 well-known speakers from the shipping ship construction industries will hold lectures.

The congress topics will focus on ship technology, operational technology, offshore and port technology, and will cover all of the latest developments in these fields. Particular emphasis will be on safety-related and environmental technology. The congress will try to demonstrate that the new standards being developed as a result of increasing levels of environmental pollution need not stand in the way of economic efficiency. Technical developments aim to achieve, in the near future, the required levels of safety and environmental protection despite reduced manning levels on ships and platforms.

As the global platform for shipbuilding, SMM will include a major presentation by German shipyards and equipment manufacturers. The exhibition will not only include West German yards and manufacturers, but also their East German counterparts.

Jurgen Begemann, director-general of the state-owned Ship-

2nd German Hydrographics Conference

September 26

1 p.m.—Welcome and introductory lecture.

"The Challenge for Biological Oceanography from the Changes in the Environmental Situation."

"North Sea and Baltic: A Comparison of Environmental Problems Between Seas."

"Sea Environment Bank."

Discussion of topics.

4 p.m.—End of session.

September 27

9 a.m.—"Remote Exploration of the Sea Using Radar Techniques."

"A Helicopter-Operated Hydrographic Measuring System for Coastal Waters."

"Marine Environment Protection from the Perspective of Industry."

"Numeric Models: An Instrument for Simulating the Spread of Materials in the Sea."

"Air Observation and Control of Oil Pollution in the North Sea and Baltic."

"Naval Assistance in Monitoring Waters and Fighting Accidental Oil Spills."

"National Park & Environmental Protection & Surveying."

"The Work of the 'Ludwig Prandtl' in Environmental Protection."

"Principles for Assessing the Need for Cleaning Seas."

"Concluding Remarks on the Hydrographics Conference."

4:30 p.m.—End of conference.

building Combine, referred to the fact that the DDR was participating at SMM for the fourth time since 1982. It was, he said, an important forum for the East German shipbuilding industry (which became an associate member of the German Association of Shipbuilding and Marine Technology this year), and the country's maritime transport and port sectors.

The DDR will be presenting three basic types of cargo ships at SMM: a 17,175-ton multipurpose container-ship, built by the Neptun-Werft in Rostock; a 17,050-ton container-ship, built by Warrow-Werft in Warnemunde; and a 14,190-ton universal containership, built by the Mathias-Thes-Werft in Wismar.

In addition, the DDR will be offering ship's equipment, rationalization concepts, a software package and lifesaving gear. At a press conference, **Helmut F.H. Hansen**, chairman of the Port of Hamburg marketing and public relations board and of the SMM exhibitors' advisory council, noted that this 30-year-old exhibition has grown into an event of international significance. Mr. Hansen cited the success of SMM '88: over 30,000 visitors from 48 countries and 450 exhibitors from 24 countries.

Dr. **Norbert Henke**, chairman of the German Association of Shipbuilding and Marine Technology, expressed his hope that there would be only one German shipbuilding industry in the future.

At the same press conference, Dr. **Norbert Kliemann**, managing director of C. Plath Navigation-Automation and a member of the board of the working group for the Marine and Offshore Equipment Industries in the German Machinery and Plant Manufacturers Association, pointed out that equipment manufacturers accounted for up to 70 percent of the value of a ship. Furthermore, the economic efficiency of ship's operations was largely dependent on the quality of the equipment manufacturers' technical concepts.

Besides an extensive display of shipbuilding and marine equipment, the congress will focus on the production and transportation of raw materials from an environmental standpoint.

A top international attendance is expected to be at the congress.

For further information, contact: SMM '90 Conference, C/O Hamburg Messe und Congress GmbH, Congress Organization, P.O. Box

302480, D-2000 Hamburg 36, West Germany; telephone: (40) 35 69-22 42; telefax: (40) 35 69-23 43.

For information on and registration for the 2nd German Hydrographics Conference, contact: **DHYG-Geschäftsstelle C/O Hans-Fr. Neumann**, Wetterstrasse 8, 2160 Stade; telephone: (04141) 45353; fax: (04141) 45342.

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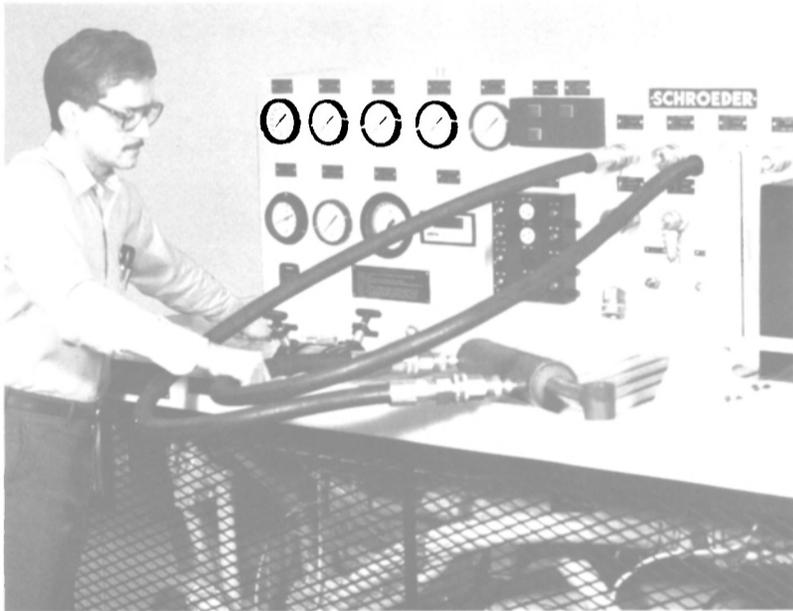
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Dr.-Ing. Geislinger
GEMO
Germanischer Lloyd
Gestra
Ghisalba
Giant Lion, Know-How
Gisma Steckverbinder
Glasner-Sandstrahltechnik
Ernst Gopert Armaturenfabrik
Goetze
Granges Metalock
Ing. Grimm Schweisstechnik
Gromex
Grosshandels & Lagerei
Berufsgenossenschaft
Gutierrez Ascune
C. Haacke & Sohne
Habegger AG Maschinenfabrik
Hagglunds Denison
Hafen Hamburg
Hagenuk Vertriebs. & Service
Hale, Hamilton (Valves)
Hamann Wassertechnik
Hamburgische
Schiffbau-Versuchsanstalt
Paul Hammelmann Maschinenfabrik
Hamworthy Engineering
Hanseatische Klebe &
Beschichtungstechnik
Hapag-Lloyd
Ernst Hatecke
Hatlapa
Hatz Motorenfabrik
Haux-Life-Support
Georg Hechelmann Nachf.
Ernst Heinrich
Helden Europe Couplings
Hempel Farben
Rolf Heun KG Mess-Pruf
und Regeltechnik
Hilbig Schweisstechnik
Hi-Pres
HKS
Holland Marine Equipment
Honeywell-Elac-Nautik
IPH Per Hornsved
Howaldtswerke Deutsche Werft
HDW-Isoliertechnik
HDW-Nobiskrug
Hamburger Rohren und Stahlhandel
Ludwig Hunger Werkzeug
und Maschinenfabrik
Hydac Technology
Hydomarine
HSB International
HTI Hoch-Temperatur Ind.
HTS Erich Kellerer Handel
m. Techn. Systemen
IBAK Helmut Hunger
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IMO
IMO Pumpen
Inmarsat International
IST Intercom Systemtechnik
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International Farbenwerke
Interschalt
Invest Import
Jastram-Werke
C.C. Jensen
Axel Johnson
Johnson Rubber/Maprom Eng.
Jovy Atlas Specht Stromrichter
M. Jurgensen
Jungheinrich Maschinenfabrik
Jutec Werkzeug
Kabelwerke Friedrich C. Ehlers
Fritz A. Kahler
A. van Kaick Neu-Isenburg
Dietmar-Kammer
Karberg & Hennemann
Karberg & Schmitz
Walter Kidde
Kiess Druckluft & Vakuumtechn.
Kirlan Engineering
Gunther Klein Industriebedarf
Klockner Stahl
Klockner-Wilhelmsburger
Gebr. Kluver
Kockum Sonics
Wilhem Kopp Zellkautschuk
Koster
Kolbenschmidt
Konus-Kessel Ges. fur Warmetechnik
Korea Trade Center Hamburg
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Krohne Messtechnik
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Kupke & Wolf
Kvaerner Brug Deutschland
KWW GmbH Depa-Via
Langere & Reich
Wilhelm Layher
Le Bronze Industriel
Lehmann & Michels
Leistriz Maschinenfabrik
Liebherr-Werk Nenzing
FAC van d. Linden
Littau & Sohn/L&S Elektronik
Lloyd Werft Bremerhaven
Willbrod Losing Filter-Technik
Loggers Schwingungstechnik
Loher AG Elektromotorenwerke
Lohmann & Stolterfoht
L'Orange
Lubke Möbelwerke
Soeren T-Lyngso
Maag Getriebe
MacGregor Navire
Markisches Werk
Mahle
Malling Kontrol
MAN B&W Diesel
Mannesmann Rexroth Pneumatik
Mar-Tec Marine Beratungs
& Handelsgesellschaft
Marilux
Marine Alignment
Marine Electronic
Schiffsausrustungen
The Institute of Marine Engineering
Marine Supply Handels Ges.
Marsum Boating Maack
Martimex
Meccanica Turbo-Diesel
ME Meerestechnik-Elektronik
Jos. L. Meyer
Miba Gleitlager
Minimax Preussag Anlagenbau
Mobile Telesystems
Modulux Bremen
Motor-Service
MP-Pesch Marinescheinwerfer
MTU
Muhlhan
Muller Schweisssaggregate
Mutec Mess & Regeltechnik
MWB
Nagel Marineelektronik
A.W. Naht
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Navimor Spotkka
Navitronic
Nelson Burgess
Nelson Industries
Neue Jadewerft
Neuenhauser Kompressorenbau
Manfred J.C. Niemann
Nieuwe Scheepswerven St. Barbara
Nippon Diesel Service
NIS
Nordisk Marine Hydraulik
Noris Tachometerwerk
Nova Werke
Kurt Oelsch
Officine Meccaniche Cazzago
O&K Anlagen & Systeme
Ostermann Metallwerke
Ernst Peiniger
J.H. Peters & Bey
Phoenix Contact
Hans-Ulrich Pillekamp
Anton Piller
Ing. Buro G. Pinnow
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C. Plath
Paul Pleiger Maschinenfabrik
Pohley & Gall
Polship Trading
Port of Stockholm
Pragoinvest
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Precetti
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Robert Prinz
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RAI Gebouw
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Rasmussen
Technisches Buro Jurgen Reese

Reintjes
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 Renk Tacke
 Rochem-Chemie-Vetrieb
 Rudolf Otto Meyer
 Erich Rottmann
 RR Elektronische Gerate
 Ruston Diesels
 RWO Maschinenfabrik
 Saacke
 Sabroe Industriekalte
 Salzgitter Elektronik
 Wilhelm Sander Fretigung
 Santon Holland
 J.P. Sauer & Sohn
 Scan Parts Handels
 Scantrading Marine Equipment
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 Schichau Seebeckwerft
 Schiffahrts-Verlag Hansa C. Schroedter
 Schiffcommerz
 Schiffsdieseltechnik Kiel Off
 & Grosse-Hellweg
 W. Schmidt-Bretten
 Eugen Schmidt
 Schmitz & Schulte
 Armaturenfabrik Franz Schneider
 Schottel-Werft Josef Becker
 Otto Schumacher
 A.W. Schultze
 W.G. Schulz
 Seaward International
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 Selco
 Semco Odense
 Serck Como
 SET Software Engineering Tonguc
 Shipmate Robertson
 Siemens
 J.J. Sietas
 Sika Dr. Siebert & Kuhn
 Societe Europeene d'Engrenages
 Solidur Deutschland
 Sperry Marine
 Springer H.A. Marine
 Stal Refrigeration
 C. Wihl. Stein Sohn
 Nikolai von Stempel
 Stop-Choc Schwingungstech.
 Stork Services
 August Storm
 Karl Storz
 Stromag
 Stuwe
 Sudoexport
 Sulzer Diesel
 Sulzer-Escher Wyss
 Taxt Louis
 Technische Universitat Berlin
 Technocommerz
 Techolog
 Tecmo Schiffs & Hafentechnik
 Tecteam
 Teldix
 Tempelmann Feinwerktechnik
 Thermax Brandschutzbauteile
 Gesellschaft
 Thyssen Draht
 Tilia Europe
 Hans-Joachim Tilse
 Total Walther Feuerschutz
 Tradex Marine
 Trellex Bakker
 Trellex Fender
 Triton-Belco
 TRW Nelson
 Turbo-Technik
 Reparatur-Werft Dassler
 Peter Ueberall
 Ulstein International
 Umweltbehörde Hamburg
 Unid-U-Schreiber
 Universitat Kiel
 Uni-Safe Rettungsgerate
 Uraca Pumpenfabrik Urach
 VAF Instruments
 Valmet Automation
 Van West Holland
 VDM Nickel Technologie
 VDMA Schiffbau
 & Offshore Zulieferindustrie
 Vecom
 Verband fur Schiffbau
 & Meerestechnik
 J. Verhaar
 Versuchsanstalt fur

Wasserbau & Schiffbau
 Voith Turbo
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 Henner Wachholtz
 Wartsila Diesel
 Wago Kontakttechnik
 K-D Walden
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Circle 241 on Reader Service Card

BOATS & BARGES

Moss Point Marine Delivers Detroit Diesel-Powered Fire Boat For Use In Honolulu Harbor



The Moku Ahi is a fully automated firefighting and rescue vessel manned by a crew of five. All engines and firefighting systems can be operated from the pilothouse.

Moss Point Marine, Inc., Escatawpa, Miss., a member of the Trinity Marine Group, has delivered the Moku Ahi, a 110-foot fire boat, custom-designed for use in the Honolulu Harbor.

The vessel is equipped with four water monitors or nozzles with a collective capacity of up to 12,000 gallons per minute of water and foam.

One of the fire monitors is located atop a telescoping tower which can rise 50 feet above the water to allow placement of a stream on the deck of a large ship in ballast.

The Moku Ahi was designed by Guido Perla & Associates, Inc., Seattle, based on results of a study commissioned by the State of Hawaii, Department of Transportation.

That study, which included the option of refurbishing the 35-year-old Abner T. Longley, built for the same service, concluded that a new vessel should be built to protect major hazard areas in and around Honolulu, including tank farms, wooden piers, flammable cargo within the commercial port, nearby

yacht and private vessel moorages, offshore anchorages and a new oil unloading facility at Barber's Point, over 17 miles from the fire boat station inside Honolulu Harbor.

While the latter was considered too far away to receive first response coverage from the harbor, it did add a requirement that the boat would be capable of operating in the open ocean.

The resulting boat is 110 feet long, with a 22-foot beam, and 6.5-foot draft.

Propulsion and pumping power is provided by two Detroit Diesel 16V92TA engines developing 1,100 horsepower at 2,100 rpm. They drive fixed-pitch propellers through

Twin Disc marine transmissions. A 3,500-gpm fire pump is driven off of each propulsion engine through a Fawick air clutch.

Fire suppressant foam is supplied from stainless steel tanks located below decks.

The Moku Ahi's four fire monitors include one 5,000-gpm remote-operated unit mounted on the fore-deck, two 2,500-gpm manually operated water monitors on the bridge deck aft, and one 2,000-gpm remote-

operated foam/water monitor on top of the pilothouse.

Starting, operating, and stopping of the propulsion, electrical, and firefighting systems is automated for control from the wheelhouse, and the vessel and all systems can be operated by a crew of two.

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

Circle 54 on Reader Service Card

Sulzer Forms Diesel Joint Venture With Italian And German Shipyards

Sulzer Brothers Ltd. has agreed to sell a majority of the shares of its subsidiary Sulzer Diesel Ltd. in equal parts to Fincantieri-Cantieri Navali Italiani SpA of Trieste, Italy, and a German consortium of Bremer Vulkan AG of Bremen, and Deutsche Maschinen- und Schiffbau AG of Rostock. The remaining shares will be held by Sulzer Brothers Ltd. and the management of Sulzer Diesel Ltd.

According to Sulzer, the new shareholding structure provides a stable, long-term solution to maintaining the Sulzer Diesel name as a leading force in the world market for low- and medium-speed diesel engines for marine propulsion, marine auxiliary and stationary power plant applications. The company said the shareholding structure is strong and will be capable of providing the continuity required in an industry whose products are expected to have a long service life.

Sulzer also said the new shareholding structure will enable its diesel engines and their development

to become even more integrated into the world marine industry. The new shareholders will be able to impart a much greater understanding of the shipbuilding industry and its requirements for diesel engines.

The company name will be changed to New Sulzer Diesel Ltd., and Sulzer's traditional business in low- and medium-speed diesel engines for marine propulsion and diesel power plants will continue. The present management team will be retained, and the headquarters will remain in Winterthur, Switzerland. The engine products will also retain "Sulzer" as a trade name, and thus will be referred to as Sulzer diesel engines. New Sulzer Diesel Ltd. will have a share capital of 100 million Swiss francs.

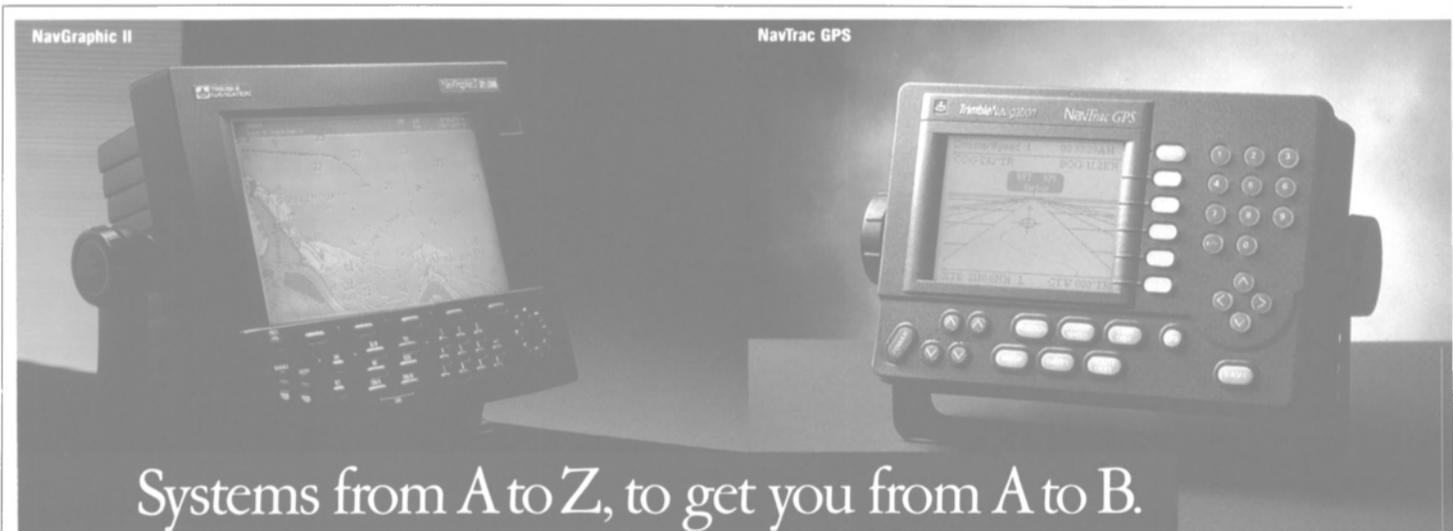
A research-and-development agreement was also established by New Sulzer Diesel Ltd. with its Japanese licensee, Diesel United Ltd.

For free literature giving full information on Sulzer diesel engines,

Circle 17 on Reader Service Card

MOKU AHI List Of Suppliers

| | |
|-----------------------------|--------------------------|
| Propulsion/Pump | |
| Engines | Detroit Diesel |
| Transmissions | Twin Disc |
| Propellers | Bird-Johnson Coolidge |
| Fire pumps | Goulds |
| Fire pump clutches | Eaton Fawick |
| Auxiliaries | Detroit Diesel |
| Propulsion controls | Systems Engineering |
| Steering | Wagner Engineering |
| Machinery alarms | Engine Efficiency Assoc. |
| Firefighting control system | Engine Efficiency Assoc. |
| Monitors | Stang |
| Foam pump | Viking |
| Work boat | Boston Whaler |
| Radar | Furuno |
| Marine radio | Regency |
| Fire department radio | Motorola |
| Fathometer | Datamarine |
| Intercom/loud hailer | Raytheon |



Systems from A to Z, to get you from A to B.

There's no more important job on any boat than navigation. And, at Trimble, we're making that job easier and more accurate than ever before—with four new products that will not only pinpoint you on a chart, but put you right at the leading edge of technology as well.

Each has a different specialty but they all have one important feature in common: they use the Global Positioning System (GPS)—the most accurate navigation system ever developed.

The NavGraphic II is a whole new way to look at navigation. Its high-resolution screen translates the complex

math of navigation into easy-to-understand diagrams.

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If you don't need charts, the new NavTrac GPS gives you many of the same

BOATS & BARGES



The new fiberglass hull design shares standard features unique to Gladding-Hearn pilot boats, including curved deckline and radiused transom corners for easy departure from ship side, wide 36-inch sidedecks, all-welded handrails inboard, and ship-grade windows, doors, piping and electrical systems.

Gladding-Hearn Adds Fiberglass Hull To Line Of Deep-V Steel And Aluminum Pilot Boats

Gladding-Hearn Shipbuilding, The Duclos Corp., has introduced a fiberglass hull to its line of deep-V steel and aluminum pilot boats.

Designed by C. Raymond Hunt Associates of Boston, the 50-foot one-piece molded hull, which has four watertight compartments, is designed to ABS rules with additional reinforcing in areas subject to high impact during boarding.

The hard chine hull design is based on the popular Delaware class first built by Gladding-Hearn in 1978; 12 pilot boats are in service on the East and Gulf Coasts.

The growing popularity of composite hulls for pilot service prompted the Massachusetts shipyard, which has built more than 300 commercial vessels including 50 pilot boats since its founding in 1955, to add fiberglass to its hull material choices, said company president **George Duclos**. The benefits of the fiberglass hull are a lower initial cost, quick delivery, low maintenance and simplicity of repair, he explained. The aluminum superstructure still allows custom operations and boarding details, including rooftop platforms or raised plat-

forms suspended from the foredeck. The thermal conductivity of aluminum decks and handrails makes de-icing from a separate waste heat, hot-water system very efficient.

At the deck edge is a welded-aluminum sheer strake, with an integral groove in which there is a generous wall of rubber fendering for absorbing heavy shock loads from boarding operations and eliminating leaks caused by conventional

through-bolted rubrails.

In addition to the pilothouse, accommodations include galley, head and up to four berths.

Power options range from 500 to 1,000-hp single and twin diesel engines reaching 30 knots, with fuel capacity up to 700 gallons.

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

Circle 12 on Reader Service Card

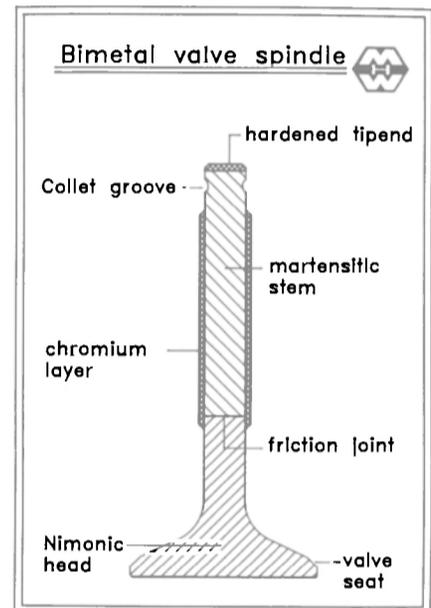
NWH Nimonic Valves Successfully Cope With Extreme Situations And Improve Valve Lifetime

For many years the German firm Markisches Werk Halver (MWH) has installed Nimonic valves in medium-speed diesel engines when standard valve spindles were no longer able to meet today's requirements. Both the trend toward higher peak pressures and the increasing use of residual fuels led to higher mechanical, thermal and corrosive stress as well as to additional strain on the valves due to noncombustible residues in these fuels.

In view of this situation, MWH faced the task of finding a material with such properties that it could stand an increased thermal stress (mechanical characteristics under higher temperatures) and show a better resistance against corrosion.

In the course of MWH tests with different material combinations, Nimonic proved to be the most appropriate material.

Nimonic is a nickel base alloy with high chromium content, which is also used for gas turbine



parts.

As Nimonic is much more expensive than traditional materials, MWH decided to use bimetal valves for economical reasons. The heat-exposed valve head is made out of Nimonic, while the valve stem is of standard valve steel having good sliding characteristics.

MWH proved by means of tests and applications that Nimonic is able to cope with the required extreme situations: hot corrosion at the head could be eliminated and corrosion damages on the seat minimized.

According to MWH, in some engines which are running at high temperature levels, the use of Nimonic valves is absolutely necessary to improve valve service life. Nimonic valves ensure an increase of TBOs (Time Between Overhaul) and consequently, lower operation costs.

The good results achieved with Nimonic exhaust valves on four-stroke engines convinced one of the leading manufacturers of two-stroke engines, Sulzer Diesel AG, to use Nimonic exhaust valves exclusively for the RT/RTA series. The engine manufacturer expects to reach lifetimes of 30,000-40,000 h with these exhaust valves.

For free literature containing full information on Nimonic valves from MWH,

Circle 14 on Reader Service Card



graphic features as the NavGraphic II, in a smaller, more economical package.

Its unique "perspective" view of your boat's progress makes navigating as easy as driving down a road.

For the ultimate in portability, our new *TransPak*, puts a complete three-channel GPS receiver with a four-line display, into a package the size of a pair

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Circle 30 on Reader Service Card



FDR was president, sulfa drugs were the miracle cure for infections, and kodachrome was the hottest new color film on the market. The year was 1935, the year that Eastern Stainless started selling stainless plate and sheet.

Since then, Eastern has supplied the highest-quality flat-rolled steels to diverse and demanding markets. Eastern offers customers one-stop convenience and reliability with the broadest range of grades, sizes, gauges and finishes available from any one source. And, we have a

90% on-time shipping record, the highest on-time delivery in the industry.

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Through the years we've also developed new technologies and techniques to assure the most prescription-precise materials available. Today, we're looking at new technologies and processes that will help our customers meet the new demands of the 1990s and the 21st century.

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*cut from plate

Circle 221 on Reader Service Card

Double-Hulled Tankers Ordered By U.S. Owners From Japan, Brazil

Three U.S. oil companies, Amoco, Mobil and Chevron, recently ordered a total of four double-hulled tankers from Japanese and Brazilian shipyards at a cost of about \$410 million.

Chevron, working through the Japanese trading house Mitsui & Co., ordered two 130,000-dwt Suezmax tankers from Ishikawajima do Brasil (Ishibras). The double-skinned vessels are expected to be delivered in 1993.

Amoco and Mobil each ordered one 280,000-dwt VLCC from Japanese yards. Mitsubishi Heavy Industries will build Amoco's tanker, while Sumitomo will construct Mobil's. Both ships are expected to be delivered in 1993.

Integrated Systems Offers 20-Page, Full-Color Brochure On Operations

Integrated Systems Analysts, Inc. (ISA) has published a 20-page, full-color brochure that describes in detail the operations of the company.

Since starting in 1981, ISA has established itself as a rapidly growing systems engineering firm that provides engineering, scientific and technical support to the Department of the Navy, Department of the Air Force, U.S. Coast Guard, and numerous commercial activities.

The brochure discusses ISA's organization, which is comprised of the corporate staff and Eastern and Western operations.

The Eastern region ISA team consists of two operations centers located in Alexandria and Norfolk, Va., with additional sites in New London, Conn., and Arlington, Dahlgren and Wallops Island, Va.

The Western region operations are centered in the San Diego area, with a second rapidly growing facility in the Oxnard/Camarillo area of California. ISA's demonstrated performance has resulted in the establishment of field offices in Long Beach, San Francisco, Seattle, and Honolulu.

The publication explains the structure and basic goals of the different regions, and includes photos of executive personnel, staff members, etc., involved with carrying out the efficient operation of each.

A map showing the location of ISA facilities is also included.

For more information and a free copy of the brochure on Integrated Systems Analysts,

Circle 48 on Reader Service Card

Lapeyre Brochure Details Features And Applications Of Alternating Tread Stairs

The logical alternative to ladders, ship's ladders and spirals, Lapeyre Alternating Tread stairs offer the optimum combination of safety, comfort and space savings. Product features and applications are ex-

plained in a new free brochure from Lapeyre Stair Inc. of New Orleans, La.

The distinctive alternating tread design permits comfortable face-forward descents at steeper angles than conventional designs even at 68 degrees to horizontal. The cushioned central stringer all but eliminates the possibility of hitting the nosing of a tread in the event of a fall (unlike ladders, ship's ladders and spirals).

A 1988 Virginia Tech study compared the 68-degree alternating tread stair to a 68-degree ship's ladder. Their conclusion: "Results from both the objective and subjective measures suggest that the alternating tread stair is safer and more comfortable than the ship's ladder. . . ." Complete copies of the Virginia Tech study are available from Lapeyre Stair.

Lapeyre Stair offers complimentary dimensional prints which are

mailed within 24 hours from the time of request, thus saving valuable engineering time.

The stairs are custom built to customer's specific height requirements, are quick and easy to install, and are available in carbon steel (painted or galvanized), stainless steel, aluminum or wood.

For a free brochure and more information on the Lapeyre Stair,

Circle 20 on Reader Service Card

Out-manoeuvre other rudders...



...out of sight.

The astonishing performance of Hamworthy Industramar MonoVec and VecTwin rudders is readily apparent to the eye. Less apparent are the extra benefits (beyond phenomenal handling) which make these single/twin Schilling rudders the obvious new-build or retrofit priority for any cost-conscious seagoing or offshore operator.

- No moving parts, yet outperforms complex mechanical rudders cost-effectively.
- Proven in over 300 vessels at sea.

- Applicable to most ship types. Ideal where extreme accuracy and control are required when manoeuvring.
- Suitability confirmed for ships of any size.
- Joystick controlled, VecTwin gives single-screw vessels a capability approached only by multi-azimuth propellers or cycloidal water-tractors. Including on-the-spot "hover" with fixed-pitch propeller. Stopping distance is half that of conventional ship...while heading is maintained under full control.



Full details, free brochure from:



Hamworthy Industramar Limited, Oak Ridge Road, High Wycombe, Bucks. HP11 2NU United Kingdom
Tel: (0494) 35111 Fax: (0494) 436133 Telex: 838787

Circle 257 on Reader Service Card

New High-Performance Turbocharger Offered By ABB Turbo Systems

ABB Turbo Systems Ltd. recently announced plans to expand the RR.1 turbocharger product family with the introduction in spring 1991 of the RR 131, the smallest frame-size BBC Turbocharger. The company already markets the RR 151,

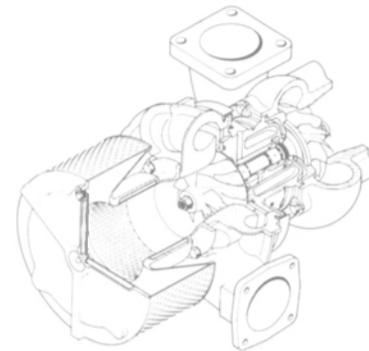
RR 181, and RR 221.

The RR 131 is designed for engines with output ranges as small as 290 to 760 kW per turbocharger. With the new unit, ABB said typical high speed diesel engines will run with up to 20 bar brake mean effective pressure at outstanding brake specific fuel consumptions as well as moderate exhaust gas temperatures.

During the first trials of the RR 131 on the test bed, ABB engineers

measured an overall turbocharger efficiency of 60 percent at compressor pressure ratios between 1.8 and 2.6.

According to ABB, the RR 131 will handle air volume flows between 0.45 and 1.30 m³/sec. at a 3:1 compressor pressure ratio. The overall turbocharger efficiency level will be around 60 percent while compressor pressure ratios will be about 3.2 for large trims and 3.7 for small trims. Turbine inlet tempera-

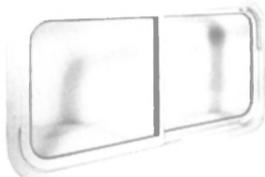


Cutaway drawing of the new RR 131 turbocharger from ABB Turbo Systems, which will be introduced in the spring of 1991.

Proven Engineering and Dependability

stand behind the world's finest shipboard windows, windshield wipers and doors by...

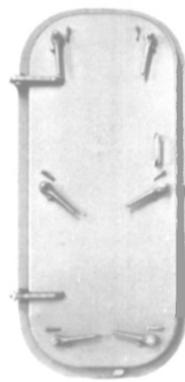
ES MARINE SYSTEMS CORP.—Formerly Singer Kearfott



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Hatch



Water Tight Door



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Window Wiper and Fixed Window



Clear View Screen

WINDOWS: heated, fixed, double sash, sliding and crank-operated.
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DOORS: watertight, individually dogged or quick-acting.
HATCHES: quick-acting or dogged.
SCUTTLES: quick-acting or dogged.
CLEAR VIEW SCREENS.

Write for catalog:

ES Marine Systems Corporation

550 South Fulton Avenue, Mount Vernon, N.Y. 10550

Telephone: 914-664-6033

FAX: 914-667-2311

Circle 212 on Reader Service Card

ture limit will be 1,382° F.

The RR 131 will include the same design features as the larger types of the RR series, which include one piece, forged aluminum compressor wheel; backward curved compressor and splitter blades; mixed-flow turbine wheel; watercooled bearing housing as an option; tapered-land thrust bearing and a large variety of different matching hardware.

For free literature detailing the ABB Turbo Systems' RR 131,

Circle 2 on Reader Service Card

J. Barry Snyder Elected New President And CEO Of American Heavy Lift

The board of directors of American Heavy Lift Shipping have elected **J. Barry Snyder** as president and CEO.

American Heavy Lift owns and operates oceangoing tankers, the SS King, Knight, Spray and Solar. Privately held, American Heavy Lift began operating in 1985 and is headquartered in Houston, Texas.

Mr. Snyder will succeed Capt. **Henry A. (Boe) Downing**, who retired after 40 years in the maritime industry. Captain Downing will continue as a consultant to the board of directors, according to American Heavy Lift chairman **J. Kevin Murphy**.

Mr. Snyder was founder and CEO of Signet Corporation, a Houston shipping and transportation company engaged in bulk and petroleum distribution and ship management.

Prior to the organization of Signet in 1976, Mr. Snyder was with Texaco's marine division.

Klaus P. Bleyer Elected New Chairman Of ZF-AG

The supervisory board of Zahnradfabrik Friedrichshafen recently announced the election of Dr. **Klaus P. Bleyer** as chairman of the board.

Dr. **Friedrich Baur**, whom Dr. Bleyer succeeds, will remain with the company as a member of its supervisory board.

Formerly president of the Electrical Systems Group of ITT Automotive, Inc., and president of SWF Auto-Electric Group in Bietigheim-Bissingen, Dr. Bleyer first joined ZF-AG as deputy chairman of the board in 1989. He assumed his new responsibilities as chairman early this year.

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Status Report On U.S. Navy Ship Maintenance And Repair

NAVY TO SPEND \$5.9 BILLION OVER NEXT TWO FISCAL YEARS

By Jim McCaul, President,
IMA Associates, Inc.

IMA has recently published the 17th in a series of business reports on U.S. Navy ship maintenance and modernization. These reports detail future ship maintenance plans and examine the impact of scheduled changes on the industry workload. Excerpts from the latest report are provided in this article.

Planned Job Starts

The U.S. Navy plans to spend \$3.4 billion on ship depot maintenance in Fiscal Year 1990 and \$2.5

Photo: USS Vicennes (CG-49) firing antisubmarine rocket on sea trials; Cover: USS Bainbridge (CGN-25) in the Mediterranean Sea.

billion in Fiscal Year 1991. Analysis of the most recent maintenance plan indicates the Navy has scheduled 17 percent fewer ship maintenance jobs in FY 1991 as a result of budget pressures and ship retirements.

Exhibit 1 shows the number of scheduled Navy ship maintenance job starts planned for FY 1990 and 1991. As shown, the Navy has scheduled 234 ship maintenance availabilities in FY 1990 and 194 availabilities in FY 1991. Importantly, 11 fewer overhauls and other major job starts are scheduled in FY 1991—work which is generally bid coast-wise.

Geographical Distribution Of Future Work

The total number of short duration jobs (i.e., less than six months) over the FY 1990-91 period will be divided roughly 50/50 between the East and West Coasts. The East Coast is expected to perform 186 short term availabilities over the two-year period, while the West Coast is scheduled to handle 187. A somewhat larger number of major availabilities will be performed on the East Coast over the two-year period. The East Coast is scheduled to perform 29 major jobs, while the West Coast is scheduled to handle 26.

However, cuts in FY 1991 will have an unbalanced geographical impact. As indicated in Exhibit 1, overhauls and other major ship repair jobs next year will be reduced by 39 percent on the East Coast, 27 percent on the West Coast. The number of short duration jobs will fall by 17 percent on the East Coast, 12 percent on the West Coast. Importantly, work requiring drydocking will fall 32 percent on the West Coast, 10 percent on the East Coast.

Homeport Restricted Work

An important consideration is the extent to which future work will be
(continued)

U.S. Navy

(continued)

restricted to homeport area shipyards. The Navy generally restricts depot maintenance which can be completed within six months to shipyards in the homeport area. Yards outside the homeport area are not invited to bid for the contract.

IMA's analysis indicates that the number of homeport restricted jobs requiring drydocking will fall 54 percent in the San Diego area. Short term scheduled drydockings in Pearl Harbor will fall 50 percent.

However, in contrast, homeport restricted scheduled drydockings will grow 10 percent in Norfolk, 17 percent in Charleston and 20 percent in Mayport.

Ship Retirements

As a result of the ongoing DOD review of defense requirements, the Navy active fleet will be substantially downsized over the next several years. According to recent reports, DOD plans to reduce the number of aircraft carriers from 14 to 12—and reduce the size of the Navy deployable forces from 542 to 488 ships over the next five years. Included in this reduction is the retirement of FF 1052 Class of frigates, 46 ships in all.

Exhibit 2 lists ship activations and retirements planned for FY 1990 and FY 1991. Additional retirements could take place in FY 1991 due to budget pressures. Particularly noteworthy are the planned retirements of two relative-

ly modern attack submarines. The Navy, in 1991, plans to retire the 24-year-old Queenfish and 21-year-old Sea Devil. These submarines normally have a 30-year operating life.

IMA can provide an analysis of the future Navy ship repair market tailored to your specific requirements. IMA has been tracking this business sector for 14 years—and has a unique capability to identify

likely developments and assess their impact on a company's business base.

IMA's full 50-page July report on U.S. Navy ship maintenance and modernization is available for \$200 and can be ordered by contacting IMA Associates, 2600 Virginia Avenue, N.W., Suite 901, Washington, D.C. 20037; telephone: (202) 333-8501.

Exhibit 1

Scheduled Navy Ship Maintenance in FY 1990 and 1991 (as of July 1990)

| Ship Type | FY 1990 | | | | | |
|-------------------|--|-----------|--|-----------|--|-----------|
| | Number of Short Term Job Starts Not Requiring Drydocking | | Number of Short Term Job Starts Requiring Drydocking | | Number of Overhauls and Other Major Job Starts | |
| | EC | WC | EC | WC | EC | WC |
| Carriers | 1 | 2 | 1 | 2 | — | 2 |
| Submarines | 8 | 1 | 14 | 6 | 7 | 2 |
| Cruisers | 9 | 6 | 3 | 1 | 1 | 3 |
| Destroyers | 5 | 7 | 2 | 1 | 4 | 1 |
| Frigates | 12 | 18 | 7 | 8 | 1 | 1 |
| Battleships | 1 | — | — | 1 | — | — |
| Amphibious ships | 7 | 18 | 5 | 7 | — | — |
| Support ships | 8 | 13 | 8 | 6 | 1 | 3 |
| Minesweepers | — | — | 4 | 5 | — | — |
| PHM | — | — | 3 | — | — | — |
| Other (incl. AVT) | — | — | 1 | — | 4 | 3 |
| Total | 51 | 65 | 48 | 37 | 18 | 15 |

| Ship Type | FY 1991 | | | | | |
|-------------------|--|-----------|--|-----------|--|-----------|
| | Number of Short Term Job Starts Not Requiring Drydocking | | Number of Short Term Job Starts Requiring Drydocking | | Number of Overhauls and Other Major Job Starts | |
| | EC | WC | EC | WC | EC | WC |
| Carriers | 2 | 4 | 2 | — | — | 1 |
| Submarines | 7 | — | 6 | 5 | 1 | 2 |
| Cruisers | 5 | 8 | — | 3 | 2 | 2 |
| Destroyers | 2 | 5 | 2 | 2 | 3 | 1 |
| Frigates | 7 | 12 | 8 | 6 | 1 | 1 |
| Battleships | 1 | 1 | — | — | — | — |
| Amphibious ships | 6 | 14 | 12 | 2 | — | 1 |
| Support ships | 11 | 13 | 7 | 4 | 1 | 1 |
| Minesweepers | 3 | 3 | 5 | 3 | — | — |
| PHM | — | — | 1 | — | — | — |
| Other (incl. AVT) | — | — | — | — | 3 | 2 |
| Total | 44 | 60 | 43 | 25 | 11 | 11 |

Source: IMA Associates

Exhibit 2

Planned Navy Ship Activations and Retirements: FY 1990-91

| Ship Additions | Ship Deactivations |
|---|--|
| FY 1990 Abraham Lincoln (CVN 72) Normandy (CG 60) Chancellorsville (CG 62) Monterey (CG 61) Comstock (LSD 45) Tortuga (LSD 46) Champion (MCM 4) Guardian (MCM 5) Devastator (MCM 6) West Virginia (SSBN 736) Albany (SSN 753) Topeka (SSN 754) Miami (SSN 775) Bold (TAGOS 12) Relentless (TAGOS 18) John Ericsson (TAO 194) Pecos (TAO 197) | FY 1991 Supply (AOE 6) Cowpens (CG 63) Gettysburg (CG 64) Chosin (CG 65) Hue City (CG 65) Arleigh Burke (DDG 51) Rushmore (LSD 47) Ashland (LSD 48) Patriot (MCM 7) Scout (MCM 8) Kentucky (SSBN 737) Scranton (SSN 756) Alexandria (SSN 757) Asheville (SSN 758) Victorious (TAGOS 19) Able (TAGOS 20) Isherwood (TAO 191) Kanawha (TAO 196) |
| FY 1990 Caloosahatchee (AO 98) Canisteo (AO 99) Coral Sea (CV 43) Charles F. Adams (DDG 2) John King (DDG 3) Lawrence (DDG 4) Claude V. Ricketts (DDG 5) Henry B. Wilson (DDG 7) Sellers (DDG 11) Joseph Strauss (DDG 16) Richard E. Byrd (DDG 23) Farragut (DDG 37) Coontz (DDG 40) Dewey (DDG 45) Spiegel Grove (LSD 32) Alamo (LSD 33) Hermitage (LSD 34) Darter (SS 576) Barbel (SS 580) James Monroe (SSBN 622) Henry Clay (SSBN 625) Daniel Webster (SSBN 626) Skipjack (SSN 585) Sculpin (SSN 590) Shark (SSN 591) Plunger (SSN 595) Barb (SSN 596) Haddo (SSN 604) | FY 1991 Jack (SSN 605) Glenard P. Lipscomb (SSN 685) Mispillion (TAO 105) Waccamaw (TAO 109) |

Source: Department of the Navy

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Maritime Reporter/Engineering News

THE PROPULSION SYSTEM: HEART OF TODAY'S NAVY VESSEL

The heart of today's Navy vessel, whether it is a cruiser, destroyer, frigate, corvette, minehunter or support craft, is the propulsion system. Many of these warships and naval auxiliaries demand high-performance, flexible and durable propulsion systems. A significant number of new surface combatants are being fitted with marine gas turbines because of their excellent power-to-weight ratios, simplicity and reliability. Diesels remain a popular choice in both diesel and diesel-electric applications. In addition, through technological advances, major naval equipment manufacturers of propellers and gears, for example, are constantly improving their propulsion system products and components in an effort to provide the international naval market with the most durable, quietest, most powerful and most fuel-efficient propulsion systems.

This article, based on information received as of press time, offers a brief review of some of the latest propulsion systems that are in use by the world's naval fleets.

FREE LITERATURE AVAILABLE

Technical reports, product literature and brochures are available free of charge from the manufacturers included in this review. If you would like additional information, just circle the appropriate Reader Service Number(s) on the postpaid card bound into the back of this issue. See Table 1 in this review for the proper Reader Service Number for each manufacturer.

DIESELS

For well over a half a century, **Paxman Diesels Ltd.** has been a major supplier to the British Royal Navy.

Paxman has supplied low magnetic signature marine diesel engines for the Sandown Class single-role minehunters, developed and built for the Royal Navy by the U.K.'s Vosper Thornycroft. These

| Manufacturers | Reader Service # | Manufacturers | Reader Service # |
|----------------------------------|------------------|--------------------|------------------|
| ABB Marine | 62 | Isotta Fraschini | 77 |
| Allison Gas Turbines | 63 | KaMeWa | 78 |
| Bird-Johnson | 64 | Kato | 79 |
| Cincinnati Gear | 66 | Krupp MaK | 80 |
| Coltec | 67 | Lips | 81 |
| Combustion Engineering | 68 | MAN B&W Diesel | 101 |
| Cummins | 65 | MTU | 82 |
| Detroit Diesel | 69 | National Forge | 83 |
| Deutz MWM | 70 | Omnithruster | 84 |
| Electro-Motive | 71 | Paxman Diesels | 85 |
| GE ALCO Power | 60 | Rolla Propellers | 100 |
| GE Marine & Industrial | 72 | SSS Clutch | 86 |
| GE Naval & Drive Turbine Systems | 73 | Sulzer-Escher Wyss | 87 |
| GMT | 74 | Westinghouse | 88 |
| Hamilton Marine | 75 | ZF | 89 |
| Hedemora Diesel | 76 | | |

GRP-hulled vessels are each powered by two Paxman Valenta 6RP200E propulsion engines. These Valenta six-cylinder engines have a continuous rating of 500 kw (670 bhp) at 1,200 rpm. When installed in minesweepers, the power rating of these engines is raised to 755 kw (1,012 bhp) at 1,460 rpm.

In other work for the British Royal Navy, Paxman has provided diesel power modules for the combined diesel and gas turbine (CODLAG) propulsion system in the new Type 23 Antisubmarine Warfare frigates. Twelve of these ships are now under construction or on order. The first of the class, the HMS Norfolk is due to be commissioned shortly.

The ASW frigates will each be fitted with four Paxman Valenta 12RP200CZ power modules each having a continuous power output of 1.3 mw 440/600 v at 1,200 rpm. The modules will provide power for the propulsion system and ship's electrical supplies.

Earlier this year, NAVSEA gave its formal approval for three of Paxman's Valenta range of diesel engines to be "Qualified in Accordance with MIL-E-24455" for consideration in U.S. Naval applications.

The three Valenta engine models involved are the 12-, 16- and 18-cylinder versions.

Paxman paved the way for future U.S. Navy use when its Valenta 16RP200CM engines were used in

37 of the U.S. Coast Guard's Island Class patrol boats. Some of these vessels have now been operating for four years.

Fincantieri's GMT (Grandi Motori Trieste) engine division produces the medium-speed B/BL 230 diesel, a typical "naval" engine used in the Italian Navy. The series has a wide selection of models (six to 20 cylinders) and power ranges (1,000 to 5,600 kw), enabling the use of a standard cylinder for all types of vessels, ranging from minehunters, patrol craft and corvettes to frigates, destroyers and cruisers.

The main characteristics of the B/BL 230.8M (low magnetic signature and short stroke version) are: a piston bore of 230 mm, piston stroke of 270 mm, and engine speed of 1,200 rpm in an eight-cylinder, turbocharged and intercooled model. The long-stroke version of this engine has the a piston stroke of 310 mm and an engine speed of 1,050 rpm.

Fincantieri's Isotta Fraschini engine division produces ID 36 diesel engines, designed to achieve maximum power-to-weight ratios, while maintaining the original characteristics of reliability and long TBO.

The compact engine, well-suited for use in small engine rooms, exhibits very low noise emissions.

In fact, the propulsion or power generation sets driven by ID 36 engines can be easily contained in

acoustic enclosures and fitted on a double system of elastic mountings.

This high-speed engine has a piston bore of 170 mm, stroke of 170 mm and engine speed of 1,200 rpm.

The modular design of the ID 36 engine series ensures simple installation as a propulsion or power generation unit.

Shock testing on ID36SS8V-AM diesels was recently completed on behalf of the U.S. Navy. One propulsion and one generating set utilizing ID36SS8V-AM engines will be installed aboard the Navy's new minehunter ship USS Osprey.

Cummins marine diesels, supplied by **Cummins Engine Company, Inc.**, Columbus, Ind., provide all on-board power for the U.S. Army Troop Support Command's new Utility Landing Craft, LCU-2000. Built by Trinity Marine Group, Gulfport, Miss., the LCU-2000 features two Cummins KTA50-M main propulsion engines, rated at 1,250 hp at 1,800 rpm, two NTA-855-GC generator sets, rated at 250 kw at 1,800 rpm, one 4BT3.9-G emergency generator, rated at 40 kw at 1,800 rpm, and one NT-855-M bowthruster engine, rated at 300 hp at 1,800 rpm.

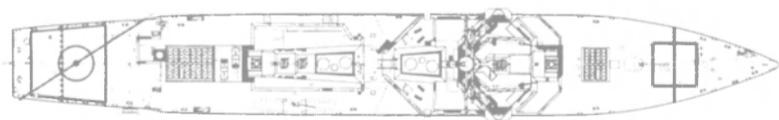
Detroit Diesel Corporation's military marine engines, in the power range of 105 to 2,200 horsepower, have been fitted aboard such military craft as minesweepers, motor lifeboats, torpedo weapons retrievers, and landing craft.

A recent government project undertaken by DDC is the U.S. Coast Guard's 47-foot motor lifeboat program, which utilizes the firm's 6V-92TA (model 8062-7404) diesel, rated at 450 hp at 2,300 rpm).

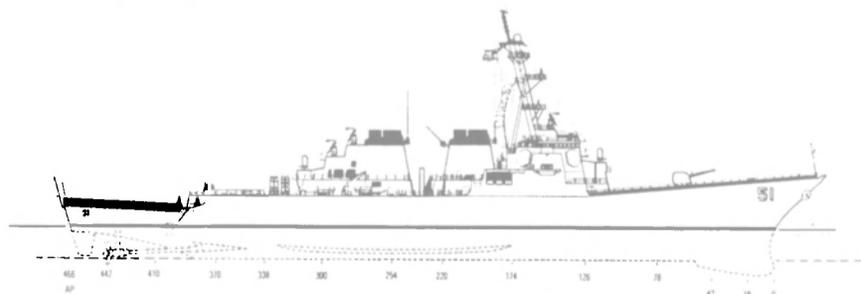
In addition, a 78-foot aluminum fast patrol boat under construction at Halter Marine for the Philippine Navy will be powered by two Detroit Diesel 16V92TAB engines driving through ZF BW255 reverse/reduction gears.

Serving the single engine 50-10,000 horsepower range, **MTU of North America** has supplied propulsion equipment for both Navy and Coast Guard patrol boats. In the U.S., MTU has its 16V396TB94 diesel engines, rated at 3,433 bhp at 2,100 rpm, for the repowering of the
(continued)

ARLEIGH BURKE (DDG 51)



TOPSIDE VIEW



OUTBOARD PROFILE

USNS Victorious (T-AGOS-19), the first of four advanced twin-hull Navy ocean surveillance vessels, is powered by a diesel-electric propulsion system. The system consists of four Caterpillar 3512 diesels with **Kato** generators driving two General Electric propulsion motors rated at 1,600 shp. The vessel's speed is estimated to be 10 knots.

ABB Marine, a leader in diesel-electric AC propulsion, is developing these type of propulsion systems for a wide range of vessels, including naval ships. ABB Marine began to develop its cycloconverter technology for marine propulsion in the early 1980s and successfully applied it on two Wartsila Marine-built icebreakers.

Since then, ABB Marine has delivered diesel-electric AC propulsion systems for the cruise ships *Fantasy*, *Ecstasy* and *Crystal Harmony* and has just received an order for three additional liners, which will be built by Fincantieri in Italy.

Since the completion of its first prototype submarine diesel engine more than 25 years ago, **Hedemora Diesel AB** of Sweden has made impressive progress not only in engine design, but also in the specialized field of exhaust turbocharging. The company's latest design is the twin-turbocharged VB 210 series 18-cylinder engine.

Hedemora Diesel was selected to be the supplier of the main engines for the new Type 471 submarine for the Royal Australian Navy. The new

submarines will each be equipped with three Hedemora VB 210 18-cylinder diesel generator sets with a combined output of more than 4 mw electrical power. Hedemora will supply a total of 19 engines under the contract.

Type 471 submarines, which will replace the older Oberon Class, will be harder to detect, have greater range and speed and more endurance than their predecessors.

For over two decades, the Hedemora VA 185 mm range of engines has provided the power for generator sets on Swedish coastal submarines. At present, 12-cylinder VA 185 engines are providing propulsion for the Swedish Navy's Vastergotland Class of submarines.

GAS TURBINES

Last year saw the launching of the U.S. Navy's newest and most advanced Aegis guided missile destroyer, the USS Arleigh Burke (DDG-51), at Bath Iron Works, Bath, Maine. Powered by four GE LM2500 gas turbines, the Burke is scheduled to be delivered in the first quarter of 1991. The DDG-51 Class is expected to grow to more than 80 ships in the 21st century.

Work on the proposal for development of the GE LM3000 Intercooled-Recuperative Marine Gas Turbine has slowed while the Navy reevaluates some of its requirements and reissues the RFP with a

new due date. This propulsion technology coupled with an integrated electric drive is currently planned for later ships in the DDG-51 Class and others. The LM3000ICR will reportedly be 30 percent more fuel efficient.

GE's Marine & Industrial Division also reported on the delivery of eleven LM2500 gas turbines for Ticonderoga Class cruisers CG-69 to CG-72. In addition, four LM2500s were delivered to the National Steel & Shipbuilding Co. (NASSCO), San Diego, Calif., for the powering of the fast combat supply ship USS Paul Hamilton (AOE-7), under construction at the yard.

GE's LM2500 gas turbine has found a wide variety of applications in the U.S. Navy. At present, 131 Navy ships in seven vessel classes utilize this type of gas turbine. Over 400 model LM2500 gas turbines have been delivered to the Navy since 1974.

GE has also had great success abroad. Six LM2500s, for instance, will be used on six new corvettes being built by Korean yards for the Korean Navy. Korea has an option for five additional engines. Japan has selected GE's 6,000-shp LM500 gas turbine for use on its new PPG hydrofoils. This is the first naval application for the LM500 since the Danish Navy chose it to propel the Stanflex 300 multimission ships.

Also recent selections of the GE LM2500 marine gas turbine by Taiwan, Greece and the Royal Thai

Navy brings the number of navies using LM2500s to 22.

The gas turbine generator set aboard the Arleigh Burke destroyer uses the Allison 501-K34 engine from **Allison Gas Turbine, Military Industrial Engines**, Indianapolis, Ind., to produce 2500 kilowatts of shipboard electrical power.

Significant AG9130 design features include: low noise signature (airborne and hull-radiated), fully integrated speed governing controls, voltage regulation, sequencing and signal conditioning.

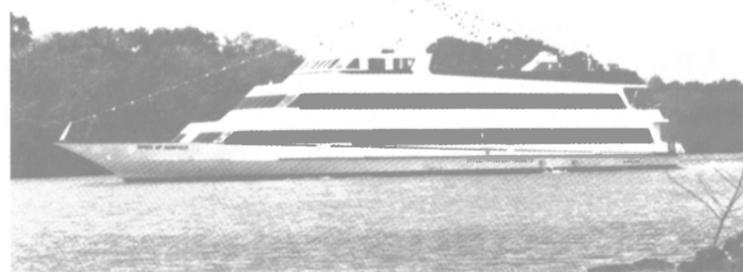
The 501-K34 is a single-shaft engine using a 14-stage axial flow compressor coupled to a four-stage turbine with air-cooled first and second stages. Six flow-through combustion liners are within a single annular chamber. The five main antifriction bearings are pressure lubricated. An accessory drive housing is mounted under the compressor for gear-driven fuel and lubrication system accessories. The engine has improved turbine efficiency and increased corrosion resistant materials. It has passed the military qualification MIL-E-173431C for a 3,000 kw continuous duty rating on a 100 degree F day.

The 501K-34, the prime mover for the AG9130, is being purchased by Japanese customers for their latest destroyer, the 63 DDG. That country's generator set will incorporate Allison design features.

(continued)

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Propulsion Systems

(continued)

STEAM TURBINES

Steam turbines, widely used in nuclear propulsion applications, such as in the case of the Nimitz Class aircraft carriers, can be found

in use aboard the U.S. Navy's 58,000-ton Iowa Class battleships. Both the battleships Iowa and Missouri are powered by a propulsion plant consisting of eight boilers and four GE geared steam turbines. **GE Naval & Drive Turbine Systems** supplies advanced steam propulsion and ships service turbine generator systems to U.S. Navy vessels ranging in size from the largest

aircraft carriers to the smallest auxiliary ships.

The USS Wasp (LHD-1), the lead ship of the Navy's newest amphibious assault ship, has a power plant which uses two **Westinghouse** steam turbines, developing a combined 70,000 shp, with two **Combustion Engineering** boilers, to drive the ship at speeds of more than 20 knots.

GEARS

The twelve 110-foot Island Class patrol boats under construction at Bollinger Machine Shop & Shipyard, Inc., Bayou Lafourche, La., will be outfitted with **ZF's** BW-755 transmissions. ZF has received orders for 26 of the transmissions from Caterpillar, manufacturer of the engines for the boats.

The twelve 141-ton-displacement WPBs will each be powered by two Caterpillar 3516-DITA engines, capable of providing 2,740 bhp at 1,910 rpm. The BW-755 transmissions will provide a 2.33:1 reduction ratio. The Island Class patrol boats will attain an estimated speed of 26 knots.

The first of the new patrol boats is scheduled for launch in December 1990. ZF marine transmissions were also specified for the 37 Island Class patrol boats previously built for the Coast Guard.

Founded on an over 100-year-old tradition of supplying the Navy with propulsion and auxiliary equipment, **GE**, through its **Naval & Drive Turbine Systems Department**, is currently involved in providing geared steam turbines or advanced hardened and ground gears or turbine generator sets for such U.S. Navy combatant programs as: the SSN-688 Los Angeles and SSBN-726 Ohio submarine classes; the CVN-68 Nimitz aircraft carrier; DDG-51 Arleigh Burke destroyer; and LHD-1 Wasp amphibious assault ship.

At present, GE is involved in the development of a highly advanced propulsion system for the Navy's next generation nuclear attack submarine, the SSN-21 Seawolf Class.

The Cincinnati Gear Company, which supplies gearing rated 2,500 hp and up, has gearing systems fitted aboard LCAC, TAO-187 Henry J. Kaiser Class fleet oilers, and AOE-6 Class Fast Combat Support Ships.

The company's most recent technological advancement is in the incorporation of **SSS/TOSI** reversing unit on a 50,000-hp gearbox in the AOE-6 program. The Fast Combat Support Ships will be powered by four GE LM2500 gas turbines with four SSS clutches transmitting a total of almost 80,000 kw.

SSS clutches have been supplied to about 400 naval vessels worldwide. The clutches have been used in such vessels as carriers, cruisers, destroyers, frigates, corvettes, gunboats, minehunters and patrol boats, ranging in size from 100 to 19,000 tons.

PROPELLERS

The **Bird-Johnson Company**, Walpole, Mass., was recently awarded a contract to supply Peterson Builders of Sturgeon Bay, Wis., with three shipsets of controllable pitch (CP) propeller systems for three Avenger Class Mine Countermeasure Ships. Bird-Johnson also supplied the propellers for the previous 11 MCM-1 Class ships.

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The new propeller systems are destined for MCMs 12, 13 and 14.

The propeller blades will be cast at Bird-Johnson's Pascagoula, Miss., foundry.

Last year, Bird-Johnson Company was awarded contracts to supply the twin-screw controllable-pitch propeller systems for the T-AOs 198, 200, 202, and 204.

In service off the Florida coast, the U.S. Coast Guard's 44-foot fast coastal interceptors feature Record propellers from **Rolla Propellers**. The Record propellers are used in the patrol boats' T-Torque drive systems, which provide surface-piercing drive. The boats can reach speeds in excess of 43 knots.

Last year, the U.S. Navy awarded contracts worth over \$28 million to the **Materials and Components Group of National Forge Co.**, Irvine, Pa., to supply military marine propulsion system components.

Components specified by the contracts include propeller shafts for new Aegis cruisers and spares for additional cruisers. Customers are Bath Iron Works, Litton Industries, and the Navy for its Spruance Class (DD-963) destroyers.

Under the contracts, National Forge will also build line shafts for two Nimitz Class aircraft carriers from Newport News, and one LHD-1 Wasp Class amphibious assault ship from Ingalls Shipbuilding, Inc.

National Forge will construct propulsion shaft systems for Trident and SSN-688 Class nuclear-powered submarines from Electric Boat Division-General Dynamics and Newport News Shipbuilding.

Netherlands-based **Lips BV** entered the large controllable-pitch propeller market in 1966, when it was awarded the contract to supply the 25,000-hp CP propeller for the Canadian Navy's new DDH-280 Class destroyers.

Since then, many other naval contracts have been obtained and finalized, but at present, the DDH-280 has once again become the focus of Lips' attention. The ships are undergoing a mid-service life conversion under TRUMP (Tribal Class Update and Modernization Program), and it includes a general overhaul and modernization of the propeller systems. After their conversion, these ships will remain operational well beyond the year 2000.

Besides the Canadian Navy, Lips controllable-pitch and fixed-pitch propellers have been fitted aboard naval combatant and auxiliary vessels from such countries as: Australia, Belgium, France, Greece, Italy, the Netherlands, Peru, Spain, Sweden, the United States, Venezuela. Lips fixed-propeller systems have been used aboard Nimitz Class aircraft carriers, and its CP propeller systems are being fitted aboard four twin-screw frigates for the Royal Thai Navy presently under construction at the Hudong Shipyard, PRC.

Sulzer-Escher Wyss five-bladed CP and reverse pitch propellers are featured on the FRG's Bremen Class frigates, as well as on a number of Canadian, Indonesian,

Saudi Arabian and South Korean naval ships.

Three new U.S. Navy Torpedo Test Craft being built by McDermott Shipyard, Amelia, La., will be equipped with **Omnithruster** hydrojet maneuvering and propulsion systems. The YTTs, -9, -10 and -11, will be fitted with 350-hp Omnithruster Mark II hydrojet Model JT

700TDs. The hydrojet units will offer the craft precise handling, position keeping and automatic heading.

One of the largest RIBs (Rigid-Hull Inflatable Boat) deployed by the U.S. Coast Guard in search and rescue operations uses a **Hamilton** model 291 waterjet for propulsion. The 32-knot, 4-ton boat, the Avon

27-foot Searider RIB, is fitted with a waterjet coupled to a Caterpillar 3208 TA turbocharged, aftercooled diesel engine. The waterjet provides high speed, exceptional maneuverability and shallow water operating capability, all of which ensure the craft is suited for its role of close in-shore rescue and vessel grounding operations. ■

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SSN 688 Submarines, A Technical Standard

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GE demonstrated construction efficiency, too, by delivering these 688 propulsion and SSTG systems to shipyards ahead of schedule. After installation, GE provides life cycle support through service facilities in every major Navy port in the U.S., and in major ports worldwide. Of course, factory experts are on-call 24 hours a day, too. Through this service team, continued evolutionary advances are made available to upgrade the existing fleet. Such upgrades aboard 688's permit them to remain at sea years longer between overhauls.

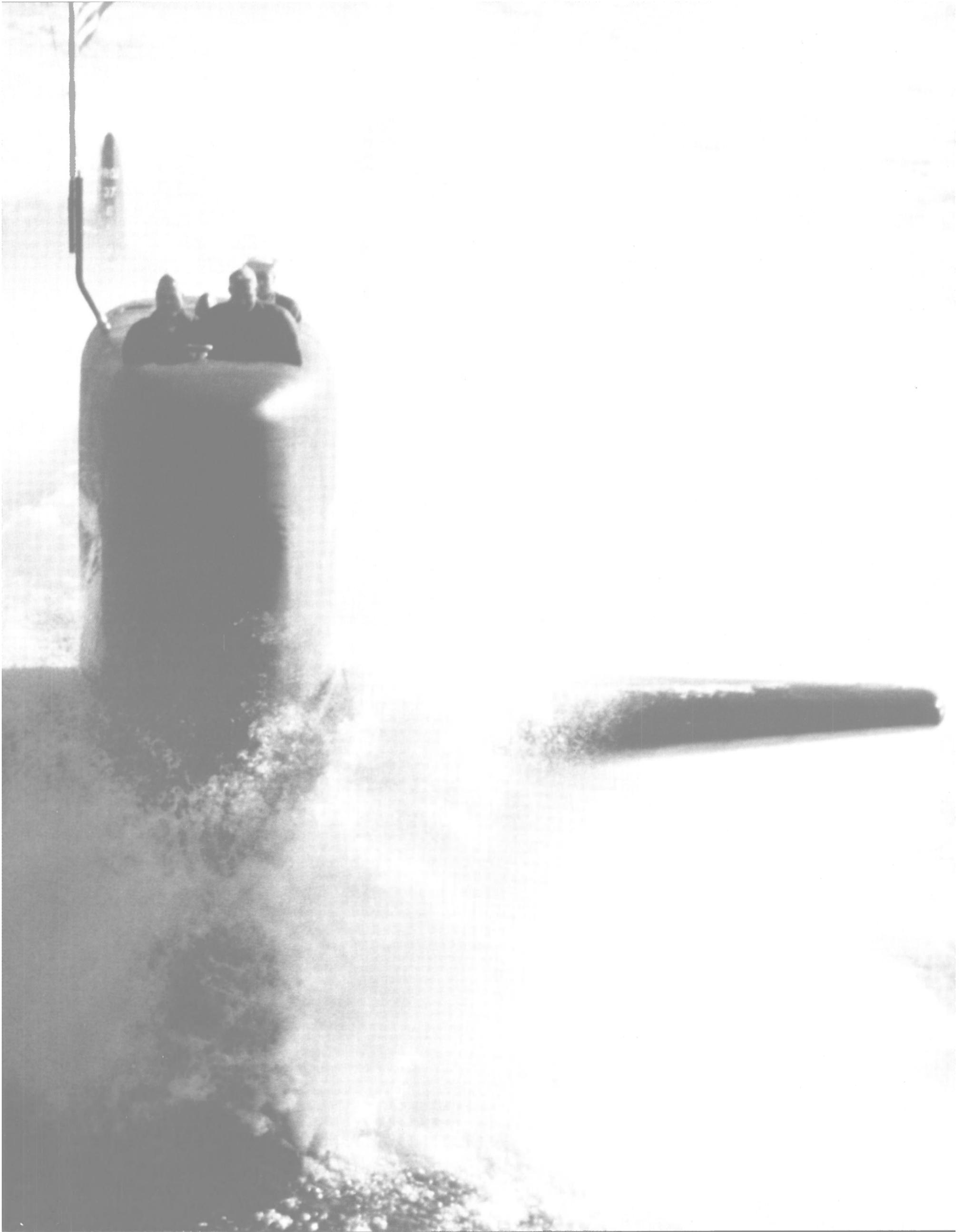
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The heritage Edison began with the first shipboard power generation system continues at GE Naval & Drive Turbine Systems. Today, we apply the resources of our \$50 billion dollar Company to develop advanced propulsion and ships service systems. It's the critical difference GE engineers will rely on to advance the Navy mission aboard the next generation of *Seawolf*.

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GE Naval & Drive Turbine Systems



Major Navy Contacts

Norfolk Shipbuilding & Drydock Corporation, Norfolk, Va., was awarded a **\$205,026** cost-plus-award-fee contract for advance planning work for the FY-91 Drydocking Phased Maintenance Availability of USS Saginaw (LST-1188) and to exercise the FY-90 option for the advance planning work for the FY-91 Drydocking Phased Maintenance Availability of USS La Moure County (LST-1194). Work is expected to be completed September 30, 1990. This contract includes options for an additional 12

availabilities over the next five years. These options, if exercised, could amount to **\$47,909,430**. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-90-C-8501).

Metal Trades, Hollywood, S.C. was awarded a **\$6,738,450** firm-fixed-price contract for the Selected Restricted Availability of USS Simon Lake (AS-33). Work will be performed in Holy Loch, Scotland, and is expected to be completed in December 1990. The Supervisor of Shipbuilding, Conversion and Repair, Charleston, S.C., is the

contracting activity (N00024-85-H-8686).

Bethlehem Steel Corporation, Baltimore Marine Division, Sparrows Point Md., was awarded an **\$8,653,127** firm-fixed-price contract for the Regular Overhaul of USS Waterford (ARD-5). Work is expected to be completed in December 1990. The Supervisor of Shipbuilding, Conversion and Repair, Groton, Conn., is the contracting activity (N00024-85-H-8120).

Ingalls Shipbuilding, Inc., Pascagoula, Miss., was awarded a **\$26,417,519** cost-

plus-fixed-fee option for lead yard services for CG-47 Class Aegis cruisers. Work is expected to be completed June 30, 1991. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-2111).

General Ship Corporation, Boston, Mass., was awarded a **\$5,483,370** firm-fixed-price contract for Drydocking Selected Restricted Availability (DSRA) for USS Valdez (FF-1096). Work is expected to be completed November 16, 1990. The Supervisor of Shipbuilding, Conversion and Repair, Boston, Mass., is the contracting activity (N00024-85-H-8157).

Litton Systems, Amecom Div., College Park, Md., was awarded a **\$418-million** firm-fixed-price contract for seven AN/BLD-1 direction finders for SSN-688 class submarines. Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-90-C-3303).

Tampa Shipyards Inc., Tampa, Fla., was awarded a **\$37-million** modification to a fixed-price-incentive contract to complete the construction of T-AO-191 and T-AO-192. Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-90-C-2300).

General Electric Co., Navy and Drive Turbine Systems, Fitchburg, Mass., was awarded a **\$21.5-million** modification to a firm-fixed-price contract for four shipsets of main reduction gears for DDG-51 class ships. Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-90-C-4016).

OTO Melara, S.p.A., La Spezia, Italy, was awarded a **\$12-million** modification to a firm-fixed-price contract for four Mk-75, 76mm gun mounts, along with barrel liners, shipping fixtures, spare parts and tools, for FFG-7 class ships. Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-85-7038).

U.S. Marine Management Inc., Norfolk, Va., was awarded a **\$161.5-million** firm-fixed-price contract to operate and maintain 18 military Sealift Command ocean surveillance ships (T-AGOS). The Military Sealift Command, Washington, D.C., awarded the contract (N00033-90-C-4006).

Metro Machine Corp., Norfolk, Va., was awarded a **\$53.9-million** cost-plus-award-fee contract for phased maintenance of LSD-41 class ships homeported in Norfolk. Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-90-C-8530).

Martin Marietta Aero & Naval Systems, Baltimore, Md., was awarded a **\$60,400,167** firm-fixed-price contract modification to procure MK-41 Mod 1 and MK-41 Mod 2 vertical launch system launchers for DD-982, DD-985, DD-986 and DDG-63 with an option for DDG-62. Work is expected to be completed July 1, 1993. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-5929).

FMC Corporation, Naval Systems Division, Minneapolis, Minn., was awarded a **\$6,993,054** firm-fixed-price with incentive fee contract for 64 MK-13 Mod 0 and 54 MK-14 Mod 1 canisters for the MK-41 vertical launching systems of DDG 51 and DD 963 class ships. Work is expected to be completed in June 1992. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-90-C-3217).

Bath Iron Works Corporation, Bath, Maine, was awarded a **\$23,426,764** modification to a previously awarded cost-plus-award-fee contract for lead yard and class services for the DDG-51 program. Work is expected to be completed November 9, 1990. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-87-C-2077).



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Maritime Reporter/Engineering News

House Committee Releases FY 91 Defense Bill Markup

The House Armed Services Committee recently completed its markup of the Fiscal Year 1991 (FY 91) Defense Authorization Bill, recommending most of the administration's requests for Navy shipbuilding and conversion intact.

The committee recommended authorization of \$1.45 billion for one SSN-21 Seawolf Class attack submarine in FY 91 and provided \$649 million in long lead procurement for two subs per year after FY 91. The Administration had requested \$2.34 billion for two Seawolfs in FY 91 and \$1.13 billion for advance procurement for six in FY 93.

The committee approved the amended defense budget request of \$1.24 billion for one Trident SSBN ballistic missile submarine, 18th in the class, but deleted the Administration's request for \$143 million for advanced procurement for the 19th and 20th Trident. The committee instead proposed the termination of

the program with the 18th sub.

The committee approved the procurement of five DDG-51 Arleigh Burke Class Aegis destroyers in FY 91 at a cost of \$3.56 billion.

Although the committee's report recommended the delay of the Administration's request of \$268.1 million for three coastal minehunters (MHC), indications are that Congress will fund the three vessels in its FY 91 authorization.

Good news for U.S. private shipyards is that the committee established a sealift program to build commercially viable cargo vessels which could be used for military purposes during national emergencies. The committee directed the Secretary of Defense **Richard Cheney** to establish the military features required and MarAd to specify the overall design of the ship to ensure its commercial viability.

At present, there is \$375 million available in FY 90 appropriated

funds for fast sealift construction. The recommended design for the ships is a diesel-electric-powered, hatchless convertible containership.

When the ships are completed, they will be chartered by the Navy to U.S. ship operators under competitive bidding.

The House Armed Services Committee recommended the authorization of \$9.36 billion for research, development, testing and evaluation in FY 91, an increase of \$342.9 million over the administration's request of \$9.02 billion.

However, after the House Armed Services Committee's markup, Secretary **Cheney** announced his recommendations to the Navy to scale down the purchase of Seawolf attack submarines and Arleigh Burke Class destroyers.

The Secretary based his decision on a four-month major warship review. Secretary **Cheney** recommended the purchase rate of three Seawolf attack submarines every two years beginning FY 91. Pentagon officials said that the slower purchase rate would result in only

two fewer subs by 1994 than originally planned.

Furthermore, he recommended purchasing four Aegis destroyers per fiscal year instead of current plans for 5 to 6.

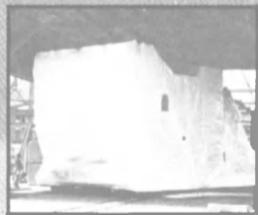
Drydock Technology Training Program Set For San Diego In 1991

The "Drydock Technology and Operation" training program will be offered once again by Marine Design Services Inc., March 4-8, 1991 at the Radisson Hotel, Mission Valley, San Diego, Calif.

The course will cover technical aspects of drydocking (commercial and U.S. Navy ships) in certified drydock facilities.

For details contact: **John W. McGruer**, Marine Design Services, Inc., P.O. Box 928, Bonita, Calif. 92002-0830, phone: (619) 427-4219.

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NAVY MARKETING MEETING

NavSea/MMA-Sponsored HM&E Conference Set For Arlington, November 27-28

Vice Adm. **Peter Hekman**, Commander of the Naval Sea Systems Command (NavSea), and **James P. Fromfield**, president of the Marine Machinery Association (MMA), recently announced their joint sponsorship of the first conference between the Navy and the manufacturers of its hull, mechanical and electrical equipment (HM&E).

The NavSea/MMA HM&E Conference will take place at the Hyatt Regency in Arlington, Va., on November 27 and 28, 1990. Topics to be covered include: U.S. Navy Marketing Outlook; Foreign Navy Mar-

keting Outlook; HM&E Technical Developments; Quality Assurance Initiatives; HM&E Research And Development; Mil-Spec And Navy Standard Drawing Updates; Rights In Data; Navy Acquisition Strategy; and Congressional Developments.

This HM&E Conference will build on last year's successful DAR-PA/MMA R&D Conference. It will be two days of intensive presentations and discussions to aid HM&E manufacturers to find the right path in today's changing market, and to ensure the continued health of the Navy's industrial base.

For further information, contact: Marine Machinery Association, 2021 L Street, N.W., Suite 250, Washington, D.C. 20036, phone (202) 785-8731.

TANO Awarded Contract For USCG's Prototype Heritage Class Patrol Boat

TANO Marine Systems, Inc. has been awarded a contract to provide the propulsion control system and central alarm and monitoring system for the U.S. Coast Guard's prototype Heritage Class Patrol Boat (WPB).

TANO was awarded the contract by MTU North America, which is providing the engines for the Coast Guard vessel.

The 120-foot patrol boat is designed to replace the Coast Guard's existing fleet of 82-foot and 95-foot patrol boats.

Under the contract, the TANO alarm and monitoring system will include two operator stations, each

with a color video monitor, keypad, printer and alarm horn or bell. The vessel's propulsion system will utilize a TANOnet data acquisition system.

TANO will also design and manufacture the engine room control stand, as well as drop-in panels for the pilothouse console and bridge wings. The equipment is scheduled to be delivered early next year.

The Coast Guard plans to build a prototype Heritage Class vessel in Curtis Bay, Md. Plans call for the prototype to undergo an extended evaluation of about two years before full production begins.

TANO Marine Systems, Inc. is a subsidiary of TANO Corporation.

For further information and free literature,

Circle 47 on Reader Service Card

14th Aegis Guided Missile Cruiser Built At Ingalls Christened 'Hue City'

CG-66, the 14th Aegis guided missile cruiser to be built by Ingalls Shipbuilding division of Litton in Pascagoula, Miss., was recently christened Hue City. The vessel became the first U.S. Navy warship named in commemoration of the efforts of U.S. Marines, soldiers and sailors involved in the battle to retake the old imperial capital of Hue from invading North Vietnamese in 1968.

Principal speaker for the event was Congressman **John P. Murtha** of Pennsylvania's 12th Congressional District, a member of the House Appropriations Committee and chairman of the House Appropriations Defense Subcommittee. Congressman **Murtha** was introduced by Mississippi's Fifth District Congressman, **Gene Taylor** of Bay St. Louis.

Mrs. **Jo Ann Cheatham**, wife of retired Marine Corps Lt. Gen. **Ernest C. Cheatham Jr.**, served as the Hue City's sponsor.

Other participants in the christening ceremony included General **Cheatham**; Rear Adm. **Raynor A.K. Taylor**, USN Deputy Assistant Chief of Naval Operations for Surface Warfare; Rear Adm. **Walter H. Cantrell**, USN, Vice Commander, Naval Sea Systems Command; Capt. **R. Bruce Woodruff**, USN, Supervisor of Shipbuilding, Pascagoula; and **Jerry St. Pe**, senior vice president of Litton and president of Ingalls Shipbuilding.

The U.S. Navy's Aegis program, of which Hue City is the newest ship, is among the most important shipbuilding programs in America today. Aegis ships are designed and built to provide primary protection for the Navy's battle forces. Aegis cruisers are 567 feet long, with a beam of 55 feet. Four GE LM2500 gas turbine engines power the 9,500-ton ships to speeds in excess of 30 knots.

The CG-66's Aegis Combat System, heart of the ship's capability, is a significant advance in fleet air defense. Four fixed array radar antennae, mounted on the four sides of the ship's superstructure, replace conventional rotating radars, enabling the ship and her crew to scan in all directions simultaneously.

The Hue City is equipped with the MK 41 Vertical Launching System (VLS), a multiwarfare missile launching system capable of firing missiles against air, surface and underwater threats. VLS is composed of modules symmetrically grouped to form launcher magazines, located both forward and aft on the ship's deck.

Ingalls Shipbuilding, lead shipbuilder for five of the latest classes of Navy surface combatants, has delivered 53 major warships into the Navy's fleets since 1975, a major portion of the surface combatants delivered during the period.

As lead shipbuilder for the Aegis cruiser program, Ingalls has been contracted to build 19 of the 27



The GE-powered Hue City, 14th Aegis guided missile cruiser to be built by Ingalls Shipbuilding division of Litton in Pascagoula, Miss., is shown berthed adjacent to the company's 13th cruiser, Chosin (CG 65), which is being prepared for pre-delivery sea trials.

Aegis cruisers authorized for construction since 1978. Twelve Ingalls-built Aegis cruisers are now in the fleet, with a 13th to be delivered this fall. Ingalls is also building DDG 51 Class Aegis guided missile destroyers, with six ships under contract.

In addition to its Aegis programs, Ingalls is producing the Navy's Wasp Class of multipurpose amphibious assault ships and overhauling the multimission destroyer USS John Hancock (DD 981).

For free literature on the facilities and capabilities of Ingalls Shipyard,

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| 400 Hz Power Supply | MagneTek |
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| Air compressors | Worthington Compressors |
| Fan coil assemblies | Mario Coil, Nuclear Cooling, Inc. |
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| Oil Pumps | Warren Pumps |
| Duplex strainers | Chas. M. Bailey |
| Control valves | Cla Val Company |
| SilBrazed union end valves, Bushings | Bushings |
| bronze valves | Milwaukee Valve |
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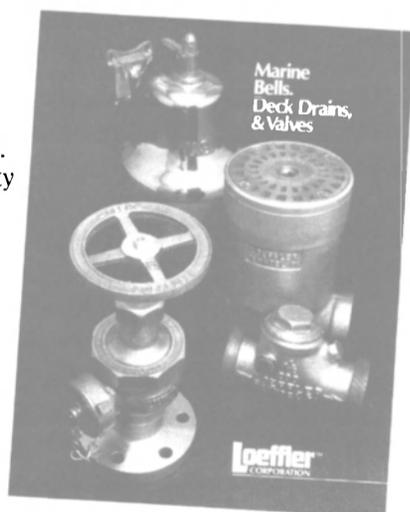
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Circle 23E on Reader Service Card

SPD Looks To Expand Product Lines To Adapt To Changing Defense Market

Reductions in military spending are having adverse effects on defense contractors, particularly smaller companies which are totally dedicated to the military market.

Such is the case with SPD Technologies, a large producer of military circuit breakers and switchgear, and its subsidiaries, Henschel, which designs and manufactures ship control and interior communications systems, and PacOrd, which specializes in ship repair and overhaul services.

"Even though we have leadership positions in our respective product categories, the shrinkage in the market puts us in a life-threatening situation," commented **George M. Gordon**, the company's chief executive officer.

"We're not about to abandon the military market," said **George M. Gordon**, chief executive officer of SPD Technologies. "First of all, our products are critically important to

the nation's defense, and we have been faithfully serving this market for more than 75 years—MIL-SPEC engineering and manufacturing is what we know best and do best," said Mr. **Gordon**.

According to Mr. **Gordon**, SPD has instituted several major initiatives to diversify and expand its products and services to the marine market.

First, SPD is seeking to acquire new lines of military hardware that fit with its totally integrated manufacturing framework.

"We're talking to companies with relatively significant product lines, up to \$30 million or so, which simply don't fit strategically in current long-range plans," said Mr. **Gordon**.

He indicated that SPD is interested in the fabrication or assembly of virtually any type of mechanical or electromechanical systems or components. Included among the

types of lines being considered are motor controllers and motor control centers, power conversion and regulating equipment, transformers, rectifiers and power switching equipment.

SPD's fully integrated manufacturing plants in Philadelphia and Newburyport, Mass., and a highly experienced team of engineers and technicians, lend particularly well to bringing in contract fabrication and assembly.

The facilities include virtually all types of machining equipment, welding, compression molding, heat treating, plating, painting, assembly and testing.

Second, SPD has intensified its internal product development efforts. For example, the company has developed an advanced new computerized all-cell battery monitoring system which has now been successfully applied by the Canadian Navy.

In addition, SPD has accelerated the expansion of its technology in the development of the first electronically controlled 100-ampere military circuit breaker to other types of small molded case breakers.



Actron 102, SPD Technologies' new 100-amp circuit breaker.

SPD also expects more growth from its role in the U.S. Navy's integrated electric drive program. The company is working under a \$6.7-million contract to produce a 5,000-volt switchgear as a subcontractor to GE for use on the first IED vessel.

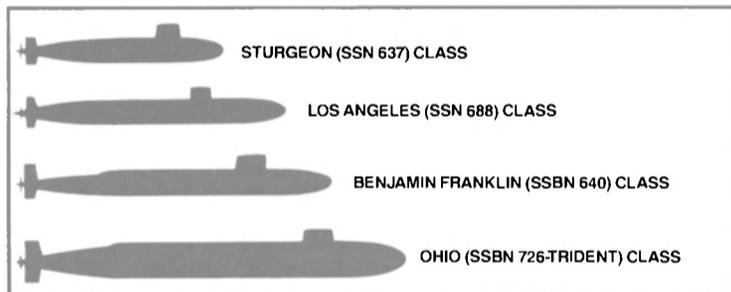
At the same time, SPD is looking at expanding into commercial applications with its products. SPD and Henschel engineers are evaluating

(continued)

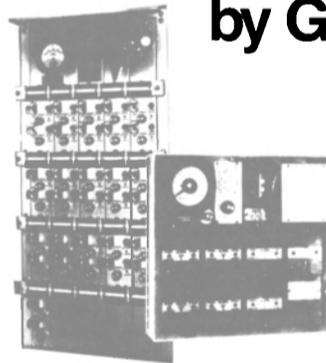
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SPD

(continued)

several areas in which high reliability systems are required in an effort to expand production selectively beyond the military sector.

Henschel, for example, is planning to expand its presence in the bridge control market. Also, applications for new battery monitoring systems in the utilities sector are being explored.

Furthermore, the company is seeking to apply its extensive engineering expertise on a broader horizon of developmental projects.

Henschel in particular has extensive project and engineering research experience across a wide range of monitoring and controls systems applications. For example, the company is currently taking an active role in the development of new highly distributed parallel network communications systems.

The company is working with several government and commercial research units in various areas of advanced technology, including digital systems, microprocessors, sensors, computer software, LED, A/D and D/A conversions and systems integrations.

For free literature detailing SPD Technologies' military circuit breakers and switchgear,

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\$9.4-Million Contract Received By Tracor For Navy Sub Program

Tracor Applied Sciences, Inc., a subsidiary of Tracor, has received a contract from the Naval Underwater Systems Center (NUSC) to provide engineering and technical services supporting towed arrays and interfacing systems, sound source program support, and transducer repair facility support of NUSC's Towed Array Test and Evaluation Facility. The contract is for three years with a total value of approximately \$9.4 million.

K. Bruce Hamilton, group vice president for Tracor Applied Sciences, said Tracor will provide engineering and technical support services involving streaming and recovery evolutions, in-service engineering, preparation and revision of documentation, maintenance, test, calibration, logistic support including operation and maintenance of leased facilities, and at-sea evolutions.

Marine Electric RPD Wins Navy Contract To Supply Conductivity Systems

Marine Electric RPD, Inc., Clifton, N.J., has received a contract to provide the Navy with specialized Galbraith-Pilot Marine EDTA conductivity monitoring consoles and sensors for boiler feedwater treatment.

Marine Electric RPD, Inc., is a leading designer and manufacturer of military and commercial shipboard salinity and temperature monitoring, public address and intercom systems, engine room and wheelhouse alarm panels and power support equipment.

The company's equipment has been installed on most U.S. Navy ship classes.

For free literature detailing the products offered by Marine Electric RPD,

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Bender Awarded Contract For Overhaul/Drydocking Of USNS Range Sentinel

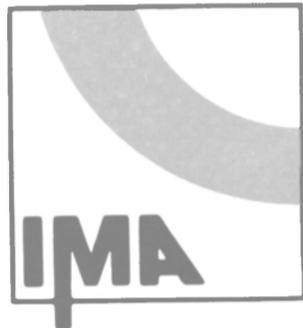
Bender Shipbuilding & Repair Co., Mobile, Ala., was recently awarded a contract for the regular overhaul and drydocking of the USNS Range Sentinel (T-AGM22), a missile tracking vessel based at Port Canaveral, Fla.

The Range Sentinel is scheduled to arrive at Bender's facility in Mobile this month where the work will be performed in 90 days, employing approximately 175 workers. The base contract amount is \$3.2 million with growth potential to \$4.5 million.

Bender is a full-service shipyard that has built, converted and repaired vessels for commercial and governmental owners and operators for over 70 years.

For full information on the services available from Bender,

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IMA has prepared a comprehensive, in-depth assessment of the future U.S. marine market. In a 200+ page report IMA analyzes trends and direction in each of 38 specific market segments—and forecasts construction requirements in each segment over the next five years.

* * * * *

38 MARKET SEGMENTS ARE ASSESSED

Large Commercial Ships

- cruise ships
- coastal container and ro/ro ships
- coastal crude carriers
- coastal product tankers
- chemical and specialty tankers
- Great Lakes self-unloaders
- bulk carriers and seagoing barges

Major Government Ships

- combatants
- support ships
- sealift ships
- research ships
- icebreakers
- foreign ship sales

Small Ships and Boats

- ferries
- dinner and excursion boats
- coastal and river cruise vessels
- municipal craft
- harbor and coastal tugboats
- small naval craft
- Coast Guard cutters and tenders
- Army watercraft
- FMS patrol boats

Offshore Equipment

- offshore rigs and drill ships
- production platforms
- support vessels

Fishing Boats

- processing ships
- catcher/processors
- catcher boats

Recreational Boats

- megayachts

Inland Waterway Equipment

- pushboats
- river barges

Dredges

- hopper dredges
- dustpan dredges
- bucket wheel and clamshell dredges

Other Fabrications

- prison barges
- floating production platforms
- dam caissons
- sunken tube tunnel sections

EACH SEGMENT IS ANALYZED IN DETAIL

Size and Shape of Current Business Base

- current operating inventory and orderbook
- age and condition of current fleet

Assessment of Underlying Market Drivers

- trends and direction of underlying industry demand
- regulatory and policy developments impacting future building requirements

Forecast of Construction Requirements

- five year forecast of orders
- projected value of orders
- sensitivity of forecast to changes in underlying demand

Assessment of Key Players

- likely future customers
- likely bidders for future work

* * * * *

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U.S. Marine Management Awarded \$161.5-Million Contract By MSC

U.S. Marine Management, Inc. of Norfolk, Va., has been awarded a \$161.5 million contract for the operation and maintenance of 18 ocean surveillance ships (T-AGOS). The contract is for three years with two one-year options, with the first ship being turned over early in October 1990.

SPD Technologies Receives Award For Use Of Advanced Materials

An advanced electronic component designed by SPD Technologies has won the 1990 Powder Metallurgy Part-of-the-Year award in international competition, sponsored by the Metal Powder Industries Federation.

The award was presented for the application of advanced metal injection molding (MIM) technology in the development of a unique solenoid housing assembly used in a new electronic circuit breaker introduced earlier this year.

SPD's new Actron 102, which utilizes the award-winning component, is the first electronically controlled 100-ampere military circuit breaker, and is being hailed as a breakthrough in electrical protection systems technology.

SPD Technologies, Philadelphia, Pa., is one of the largest producers of military circuit breakers and a world leader in advanced electrical protection equipment, ship control and interior communication systems designed for U.S. Navy ships. The company has service, repair, and overhaul facilities across the U.S. and serves military markets throughout the world.

For more information and free literature on SPD Technologies,

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Art Anderson Associates Awarded Keyport Contract

The Department of the Navy has awarded Art Anderson Associates, Bremerton, Wash., an indefinite quantity contract for various mechanical and electrical projects at the Naval Undersea Warfare Engineering Station, Keyport, Wash. The term of the contract is one year or \$200,000, whichever occurs first, with an option for an additional year.

Willard Marine Anticipates Quick SOLAS Approval For 18- And 22-Foot RIBs

Willard Marine Inc., a leading manufacturer of rigid inflatable boats based in Anaheim, Calif., recently announced that testing for SOLAS approval of its new 18-foot RIB will start at the beginning of next year.

The 18-foot RIB will have the capacity to carry 10 people and is the newest in Willard Marine's line of rigid inflatable boats which include 22- and 24-foot RIBs. The 22-foot RIB is currently being tested for SOLAS approval, and is expected to be SOLAS approved in October.

Designed for quick response and rescue applications of the U.S. Coast Guard, U.S. Navy, Oil and Fishing Industries, the 18-foot RIB

is constructed like all Willard Marine RIBs. It utilizes high quality fiberglass and an inflatable collar that is mechanically fastened to the hull. The collar is constructed of heavy polyester weave fabric and has a neoprene-hypalon coating for extra durability.

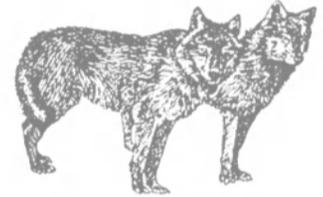
With SOLAS approval expected in October for its 22-foot RIB, Willard Marine will be the only U.S. manufacturer of SOLAS-approved RIBs. "We're very proud of that

fact," remarked Bob Pearcy, president of Willard Marine. "It reflects very positively on the quality of our construction and design, and with the eventual SOLAS approval of the 18-foot RIB, I really feel that Willard Marine's leadership in the manufacturing of RIBs will be secured."

For more information and free literature from Willard Marine,

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The Seawolf Team...



GD/Electric Boat Division and Newport News Shipbuilding are using the latest technology to build a new class of submarine (SSN 21, Seawolf) based on enhanced performance, maintainability and cost effectiveness.

Marotta is proud to have been selected as a team member with the opportunity to help advance submarine science into the next century.

Marotta's alliance with these two companies dates back to the late 1950's with the Skipjack class - 585 and 591 - right on through to today's Trident missile carrying Ohio class of submarines.

So, when you need a reliable team member to supply hydraulic or pneumatic valves and control systems with proven performance... call upon Marotta!

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Woodward Governor Relocates East Coast Regional Office

Woodward Governor Company recently announced the establishment of a Northeast regional office in Norristown, Pa. The former East Coast regional office in Rocky Hill, Conn., is now closed.

The Office will handle sales to

turbomachinery end users and eventually will perform some service functions. This move was made to more satisfactorily and efficiently serve Woodward's growing clientele along the Eastern seaboard.

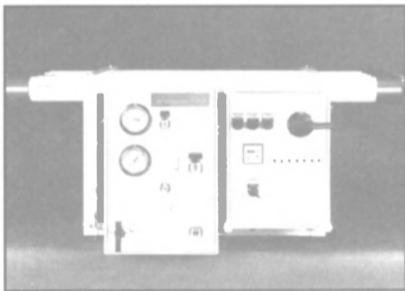
The address of the Northeast office is: Woodward Governor Company, Plymouth Greene Campus, 810 E. Germantown Pike #E4, Norristown, Pa. 19401; phone (215) 278-1900.

WATER



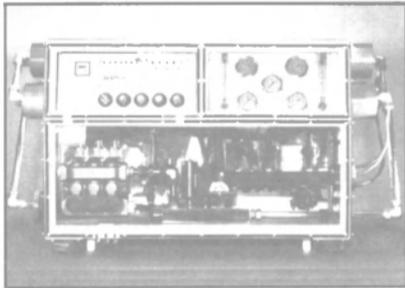
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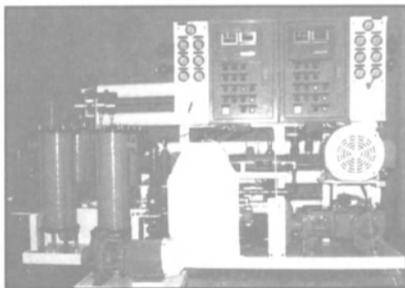
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STILL ROOM FOR ONE MORE AT BETH-BALTIMORE—

Although Bethlehem Steel's Baltimore Marine Division's piers and docks appear fully utilized, the yard will make room for a floating drydock, the USS Waterford, which will arrive shortly for major repairs. The Waterford will be accommodated in the yard's flexible building basin (upper left) which currently has the ITB New York barge in the outboard position. The 200-foot-wide by 1,200-foot-long basin is equipped with an intermediate gate that, when installed in one of two fixed locations, divides the basin into two sections. The Waterford, which is used by the U.S. Navy for servicing submarines in its homeport of Groton, Conn., will be docked in the inboard position of the basin. Work on the Navy's drydock will take about six months and require approximately 300 workers during this period. Other ships shown (from bottom) are the S/S Flickertail State, the USNS Regulus, the ITB New York tug (in the inboard section of the floating drydock) and the SS Gopher State (in the outboard section). The other two ships are the USNS Tanner, inboard, and the USNS Grumman, outboard.

For free literature on the facilities and capabilities of Bethlehem Steel's Baltimore Marine Division,

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Litton Awarded \$18-Million Navy Pact For SSN-688 Equipment

Litton's Amecom division, College Park, Md., has been awarded an \$18-million Navy contract for continued production of AN/BLD-1 direction-finding systems for SSN-688 Class submarines. The new contract provides for seven systems, spares, support equipment, data and engineering services. Contracts now total \$129 million with 31 systems already delivered.

SEACO/Elliot Introduces New Line Of Reversible Life Rafts/Platforms

SEACO/Elliot manufactures and sells a full product line of inflatable life rafts and personnel rescue platforms and related products for oceangoing vessels, offshore platforms, commercial fishing vessels, corporate and commercial aircraft and various military applications.

In its 30 years, Elliot inflatable life rafts have been instrumental worldwide, in saving hundreds of lives at sea. Originally manufactured in Wales, the Elliot life raft was brought to the U.S. in 1958, where it underwent extensive design changes for U.S. Coast Guard and SOLAS testing and approvals. El-

liot was awarded USCG and SOLAS approval in 1960.

Elliot has passed the latest USCG and SOLAS 1983 amendments as one of the first U.S. inflatable life raft manufacturers to have approval for its full line of inflatable life rafts, including its 25-person davit-launched life raft. Also, in 1988 and 1989, the company became the only U.S. manufacturer to obtain multinational SOLAS 1983 Amendment approvals, including the Canadian Coast Guard, U.K. Department of Transport, USSR Register of Shipping, Portugal IGN, and Government of Argentina.

SEACO/Elliot recently introduced its line of new reversible life rafts or platforms and it is the only U.S. manufactured platform with USCG and Canadian Coast Guard approval.

SEACO/Elliot offers sales and servicing facilities worldwide through its extensive network of factory authorized distributors. All Elliot-approved servicing facilities are USCG approved with servicing technicians trained at the factory to insure all Elliot life rafts are serviced properly.

World headquarters—executive offices, manufacturing and servicing facility—are located at Riviera Beach, Fla. The area is serviced by ocean, air, rail and truck transportation within a five-mile radius.

For further information and free literature on SEACO/Elliot,

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Perhaps more important than the dramatic time and cost savings offered with Pyplok® is its proven* superior performance compared with MIL-F-1183 fittings. In side-by-side comparative tests, Pyplok® endured more punishment, more vigorous testing than its labor-intensive counterpart, including an unprecedented, scorching 2000 degree fire test conducted at a major independent research facility. Pyplok® fittings

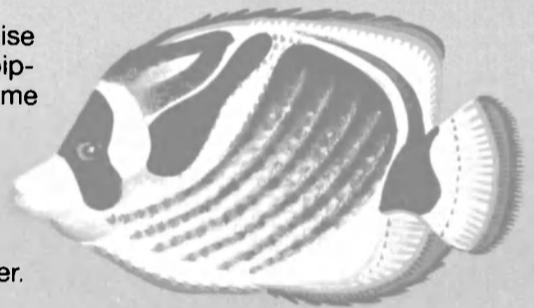
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Available in 600 to 6000 psi pressure classes, sizes to 2" NPS and in a variety of configurations including sweep tees, elbows, couplings and reducers, and in a variety of materials.

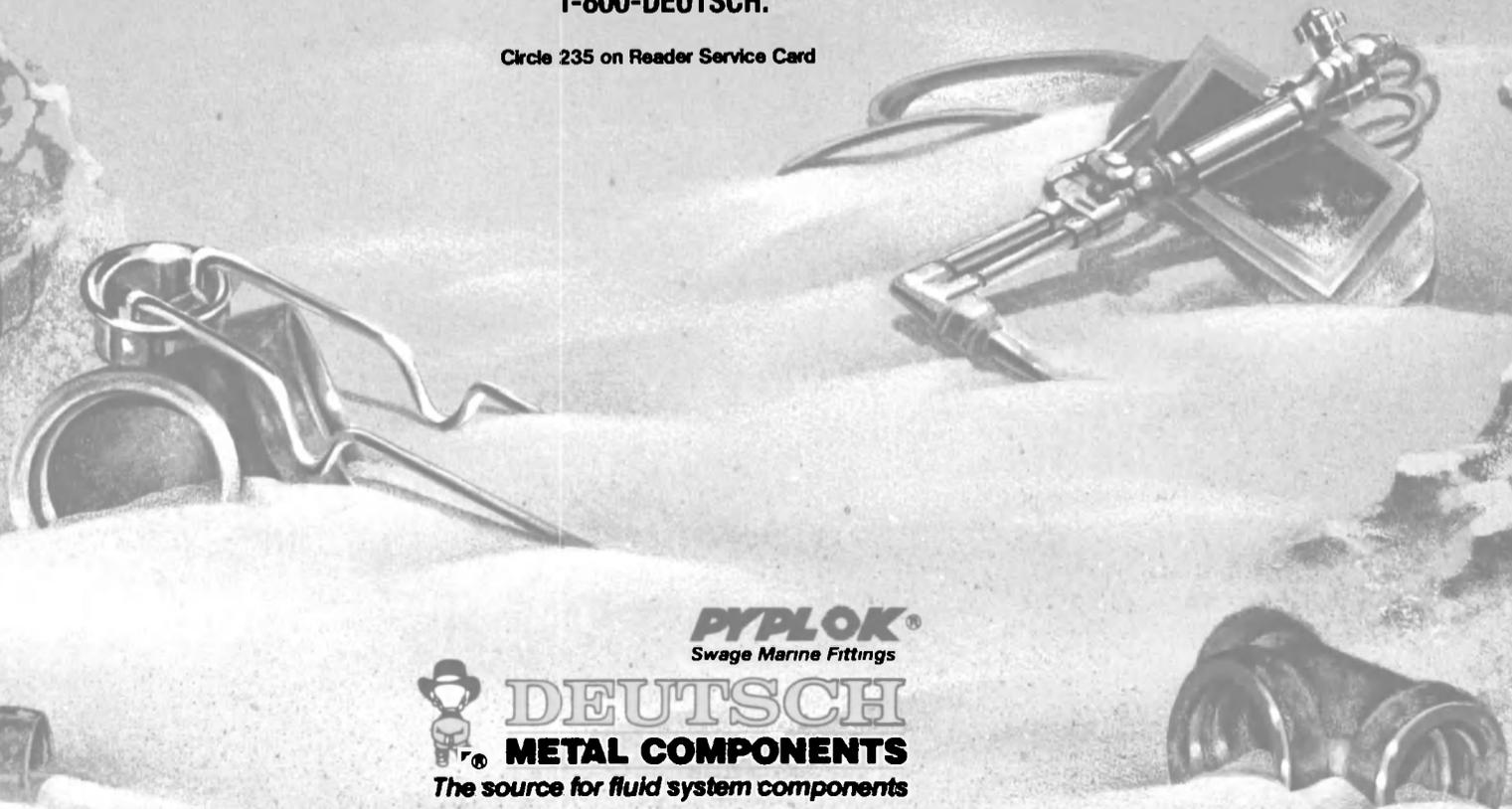
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**MAN B&W Appoints
Carl-Erik Egeberg VP,
Director-Engineering**



Carl-Erik Egeberg

Carl-Erik Egeberg has been appointed vice president, director-engineering of MAN B&W Diesel A/S, and member of the management group responsible for the research, development and design activities within the company's two-stroke engine sector.

After graduating as a mechanical engineer in 1967, Mr. Egeberg was employed in the company's design departments and, over the years, has been assigned extended areas of responsibility. He is also involved in international, technical cooperation within the company's line of business.

**Marine Transport Lines
Announces Promotions**

Marine Transport Lines, a major owner and operator of oceangoing vessels, recently announced the promotion of Eugene F. Whitehorne, director of chartering, to vice president, marketing. He will report directly to chairman/president Richard T. du Moulin. In addition, Mr. Whitehorne will continue as the general manager of the joint venture with Union Carbide.

Other promotions within the marketing group are: Tom Lowndes, assistant chartering manager to manager, chartering; Mark van Stolk, project manager-new business development to manager, project planning; and Jeff Miller, port captain to manager, chartering operations.

Marine Transport Lines is a leading owner, manager and operator of oceangoing vessels engaged in the transportation of bulk commodities.

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Twin-Path® slings from Slingmax® Rigging Products, Aston, Pa., were utilized to raise a 240-ton tug after it sank in the Port of Green Bay, Wis.

The marine construction and salvage company that was called to raise the tug consulted with Wisconsin Lifting Specialists Inc., a Slingmax dealer in Milwaukee, Wis., who

recommended using Kevlar® Twin-Path slings over traditional wire rope slings.

Twin-Path slings are essentially two complete slings in one, each making a separate connection between hook and load. They are lightweight, easy for divers to use and constructed of 100 percent polyester, ensuring a strong and secure lift.

Wisconsin Lifting supplied nine

Twin-Path slings. Each sling was used in a basket hitch and has a working load capacity of 120,000 pounds.

"It took three full days to complete the entire job and we were all very satisfied with the performance of the Twin-Path slings," reported Ted Proite, sales manager at Wisconsin Lifting.

Slingmax dealers offer a complete line of innovative rigging products,

in addition to Twin-Path products, for use in rigging, construction, millwrighting, overhead lifting and crane applications. Slingmax has over 30 locations in North America, with representation in Europe and the Middle East.

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Fincantieri Delivers 135,000-DWT Bulker To Italian Owner



The 135,000-dwt bulk carrier Ignazio, built by Fincantieri-CNI, during recent sea trials.

The Marghera yard of Fincantieri-Cantieri Navali Italiani recently delivered the 135,000-dwt bulk carrier Ignazio to shipowner Feromar Company, Ferruzzi Group.

The ship will be utilized to transport coal for the Italian thermoelectric power plants of state-owned ENEL Company under a 10-year contract.

The Ignazio is 853 feet long, 141 feet wide, with a 75-1/2-foot depth. A fully automated propulsion plant can be directly controlled from the bridge. The main engine is a two-stroke GMT-Sulzer diesel with a maximum rating of 17,800 hp. She has a service speed of 15 knots.

The Ignazio is also fitted with a Selesmar Vector Integrated Navigation System which provides navigation planning, position fixing, route steering and data monitoring, and with satellite navigation and satellite communications systems.

Feromar's fleet comprises four bulk carriers, four LPG carriers, three tankers and two concrete carriers.

At present, Fincantieri has another bulk carrier of 145,000 dwt, that will be delivered next year, and a 90,000-dwt tanker under construction at its shipyards.

For free literature detailing the shipbuilding facilities of Fincantieri,

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Dreyfus Announces New Sales Representatives —Literature Available



Mark A. Ippolito

George A. Brewer Jr.

Dreyfus Supply and Machinery Corporation of New Orleans, La., a major supplier of off-shore, marine and contractor's equipment for the Southeastern U.S., recently announced the additions of **Mark A. Ippolito** and **George A. Brewer Jr.** as sales representatives.

Mr. Ippolito will be servicing customers throughout the state of Louisiana, while **George Brewer** will be providing customers in Mississippi and Alabama with the benefit of his 30-plus years of experience in the industry.

Both men will be backed, around the clock, with Dreyfus's experienced inside sales staff and huge inventories of anchors, anchor chains, connections, wire rope and associated fittings.

For free literature giving full information on Dreyfus Supply and Machinery Corporation,

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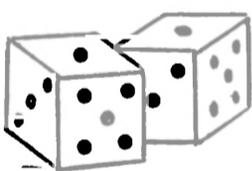
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Circle 204 on Reader Service Card

**Robertson-Shipmate Names
Perlowski Commercial
Sales Manager**



Walter Perlowski

Robertson-Shipmate recently announced the appointment of **Walter Perlowski** to the position of commercial sales manager. Mr. **Perlowski** has 27 years' experience in a wide variety of sales, marketing, and general management positions in the marine electronics industry. He will be responsible for product sales support to Robertson-Shipmate's dealer network in the large ship autopilot, gyrocompass and Commander product groups.

Mr. **Perlowski** recently completed 10 years' service as program manager with the Navcom subsidiary of Magnavox, where he was responsible for major shipboard navigation and communications systems, particularly in the area of computer control, satellite communications and systems integration.

Prior to this, he gained broad experience in navigation, echosounding and communications with Simrad and Communication Associates, Inc.

For more information and free literature on Robertson-Shipmate,

Circle 28 on Reader Service Card

**EG&G Merges Marine,
Ocean Products Divisions**

EG&G has combined its Ocean Products and Marine Products divisions into one operating company EG&G Marine Instruments. **Richard A. Jablonski** is president and **Harold E. Maxfield** is vice president. The company is headquartered on Cape Cod in Cataumet, Mass.

EG&G Marine Instruments produces a wide variety of products, including sector and side-scan sonars, sub-bottom profilers, acoustic releases, CTDs, current meters and other marine instrumentation technology. Through previous acquisitions, the company's product line also includes Neil Brown Instruments and Sea-Link Systems.

For more information and free literature on EG&G Marine Instruments,

Circle 43 on Reader Service Card

**BoatLIFE To Supply
Deck Compounds For
Cruise Ship Project**

BoatLIFE of New York and Southampton, England, recently re-

ceived a major contract from MASA-Yards OY of Helsinki, Finland, to supply deck compounds. Under the contract, BoatLIFE will supply its non-curing bedding compound and two-part polysulfide seaming compound to bed teak onto the metal decks of the Ecstasy, Carnival Cruise Lines' latest cruise ship under construction at MASA Yards.

BoatLIFE has sent master mechanics to Helsinki to instruct the deck personnel on the operation of its newly developed mix, meter and dispensing unit to apply the deck compounds.

Edwin Kehrt, chairman of the board of BoatLIFE said: "This new contract reflects the company's technical abilities, its reliable products and willingness to assist and

develop new methods of installing teak decks. We have a proven track record of reliable products used on Carnival's newest ship, the Fantasy, put into service early this year, which was a major factor in securing this new contract."

For free literature detailing BoatLIFE deck compounds,

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ASNE SYMPOSIUM 1990

DESTROYER, CRUISER & FRIGATE TECHNOLOGY
September 27-29, Biloxi, Mississippi

The American Society of Naval Engineering (ASNE) in cooperation with the Surface Navy Association (SNA) and the Supervisor of Shipbuilding, Pascagoula, Miss., will sponsor a symposium entitled "Destroyer, Cruiser & Frigate Technology" on September 27-29, 1990, at the Mississippi Gulf Coast Coliseum in Biloxi, Miss.

The symposium is planned to bring the Navy and industry together for an interchange of technical ideas for future ship designs. The 18 invited papers will emphasize subsystem technology in the area of weapons, command and control, aircraft installation, machinery, hydrodynamics, structures, survivability and detectability. Additional papers are planned on foreign technology, technology needs and technology assessment. Moderators for the session have been selected from distinguished leaders in the topics being presented. Over 40 companies will have exhibits at the coliseum and additional exhibit space is still available.

Luncheon speakers will feature **Ron Kiss**, Director of Shipbuilding, Office of the Assistant Secretary of the Navy (RD&A), and Rear Adm. **William J. Flanagan Jr.**, Chief of Legislative Affairs. The Thursday evening banquet speaker will be Vice Adm. **John W. Nyquist**, Assistant Chief of Naval Operations (Surface Warfare). On Saturday morning, September 29, there

will be a tour of Ingalls Shipbuilding to include a visit aboard a Ticonderoga Class cruiser.

Registration fee for the technical conference is \$75 for ASNE and SNA members, \$125 for nonmembers, and \$20 for students. For more information, write or call **Mrs. Sally Skolnick** at ASNE Headquarters at 1452 Duke Street, Alexandria, Va. 22314; telephone: (703) 836-6727; or call **Kim Shanahan**, symposium chairman, at Ingalls Shipbuilding, Inc. (601) 935-1420.

TECHNICAL PROGRAM

Thursday, September 27
SESSION I—MACHINERY

Jan Hope, Asst. Sec. Navy Office
8:30-9:15 a.m.—"The MEKO Design of Surface Ships," by **Karl Otto Sadler**, Blohm + Voss.

9:15-10 a.m.—"Waterjet Propulsion of Large Marine Craft," by **Rolf Stovsson**, Ka-MeWa.

10-10:15 a.m.—Break.

10:15-11 a.m.—"Advanced Epicyclic and Parallel Offset Propulsion Gearing for Surface Ships," by **Alan R. Marquis** and **Terence J. Dansdill**, General Electric.

11-11:45 a.m.—"Future Trends in Auxiliary Machinery," by **John R. Ward**, DTRC-Annapolis.

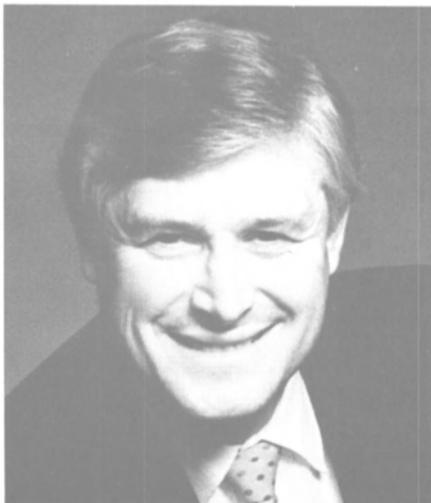
Luncheon.

SESSION II—HULL & SUPPORT SYSTEMS

George Kerr, DTRC-Carderock

1:30-2:15 p.m.—"Advanced Surface Ship Hull Technology," by **Jeffrey E. Beach**, DTRC-Carderock.

(continued)



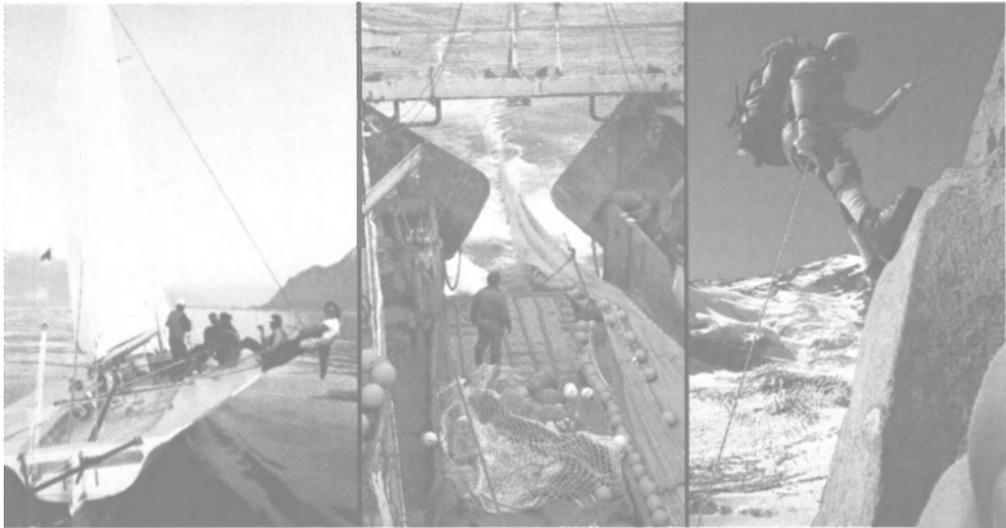
Ron Kiss

Photo: Aircraft carrier Forrestal with battle group during Fleet Week in N.Y. Harbor.



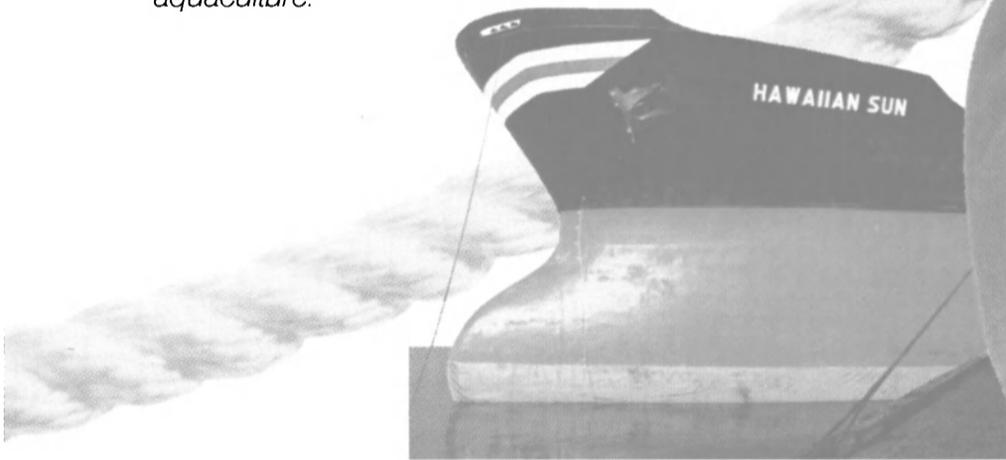
Rear Adm. William J. Flanagan

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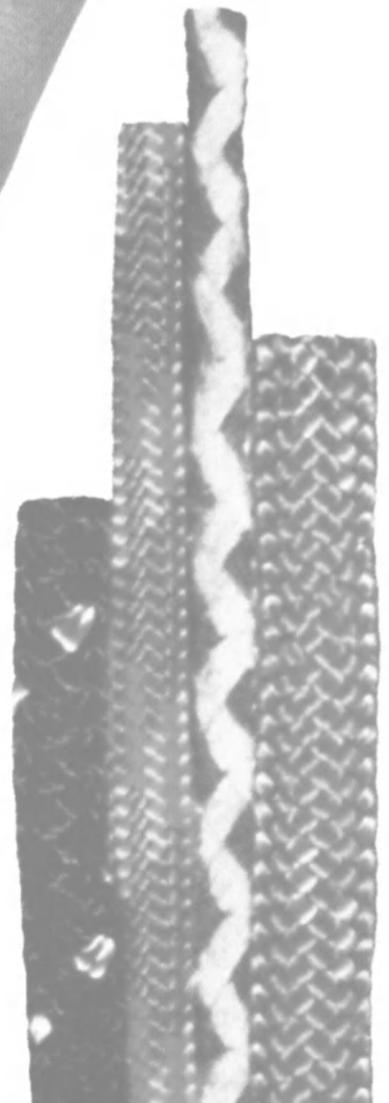
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A.S.N.E. Symposium

(continued)

2:15-3 p.m.—"Hull Form Design Studies for Monohull Combatants," by **W. Brett Wilson**, Naval Oceanographic Center.

3:3-45 p.m.—"Double Hull Producibility," by **Jeffrey E. Beach**, **Marty R. Fitzgerald** and **Arun Mehta**, DTRC-Carderock and Ingalls Shipbuilding.

3:45-4 p.m.—Break.

SESSION III—AFFORDABILITY

Capt. **Jim Baskerville**, DTRC-Carderock

4-4:45 p.m.—"Affordability, the Watchword of the Nineties," by Capt. **Clark Graham**, Commander, David Taylor Research Center.

4:45-5:30 p.m.—"Cruiser, Destroyer, Frigate Technology Assessments," by Dr. **Dean A. Rains** and **John A. Johnson**, Decision Engineering.

Friday, September 28

SESSION IV—ELECTRICAL SYSTEM

Timothy Doyle, DTRC-Annapolis

8:30-9:15 a.m.—"Applications of Fuel

Cells to Naval Power/Propulsion," by **David F. Bloomfield**, Analytic Power Corp.

9:15-10 a.m.—"AC Electric Drive Machinery Design," by **John P. Casey**, General Electric Co.

10-10:15 a.m.—Break.

10:15-11 a.m.—"VSCF Cyclo-Converter Power Equipment (A Versatile Technology for Full Range PDSS)," by **Kenneth J. Hultgren**, General Electric Co.

11-11:45 a.m.—"Navy Electrothermal Gun Applications," by Dr. **George Chryso-mallis** and **Michael Guill**, FMC.



Vice Adm. John W. Nyquist

Luncheon.

SESSION V—CURRENT SHIP DESIGNS SURVIVABILITY

Capt. **Charles Calvano**, NAVSEA

1:30-2:15 p.m.—"The DDG-51 Flight III," by **R.H. Fortune** and **Don L. Ewing**, NAVSEA.

2:15-3 p.m.—"The SA'AR-5 Corvette," by **Charles J. Gallagher Jr.**, Ingalls Shipbuilding.

3-3:15 p.m.—Break.

3:15-4 p.m.—"NATO Frigate Replacement for the Nineties," by **Harvey G. Kloehn** and **Roger Schaffer**, Westinghouse and Advanced Marine Enterprise.

4-4:45 p.m.—"Enhancing Ship Survivability," by Dr. **L. Dean Simmons**, Institute for Defense Analyses.

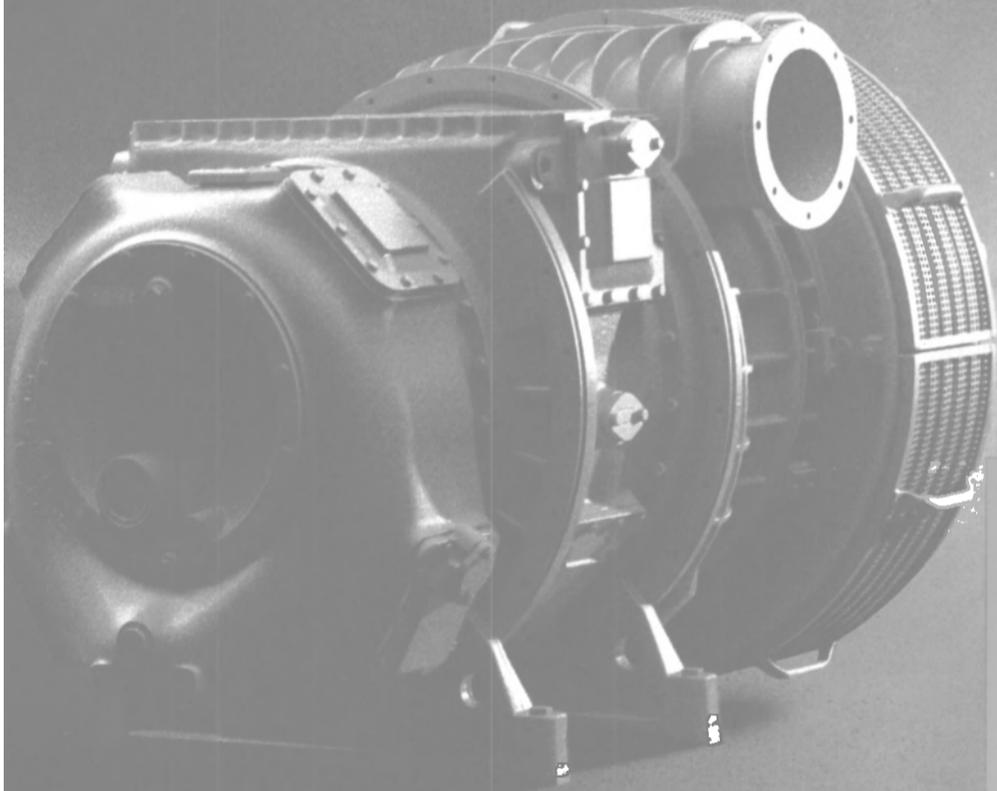
4:45-5:30 p.m.—"Maritime Tactical Defeat—Why? How? What? The Future for Surface Warships," by **G.H. Fuller** and **Carlos A. Tomassoni**, BMT, Designers and Planners.

ASNE SYMPOSIUM 1990 Exhibitor List

| Company | Booth |
|-------------------------------|--------|
| ABS | — |
| ASNE | 85 |
| Automated Terminal Info. Sys. | 4 |
| Bath Iron Works | 28 |
| CDI Marine | 70 |
| David Taylor Research Center | 3 |
| Decision Engineering | — |
| Designers & Planners | 13 |
| Deutsch Metal Components | 7-9 |
| Dresser-Rand | 21 |
| Engineering Visions | 75 |
| Envirovac | 77, 78 |
| FMC Corp. | 29, 30 |
| Force | 46 |
| General Electric | A-D |
| Hiller Systems | 82 |
| Ingalls Shipbuilding | 36-38 |
| Intermarine USA | 35 |
| Jered Brown Bros. | 27 |
| J.J. McMullen Assoc. | 1 |
| Joy Technologies | — |
| Kamatics | 2 |
| Keystone Valve USA | 51 |
| Lapeyre Stair | 69 |
| Litton Data Systems | 10, 11 |
| Marlo Coil | 16, 17 |
| Marotta Scientific Controls | 32, 33 |
| Martin Marietta Aero & Naval | 73, 74 |
| Mississippi State Univ. | 52 |
| MTU North Amer. | 34 |
| Naval Surface Warfare Center | 5, 6 |
| Nelson Electric | 26 |
| NMP Corp. | 63 |
| Olympus Corp. | 31 |
| Pall Land & Marine | 45 |
| Rockwell Int'l | 58, 59 |
| Seacor Engineering | 76 |
| Solar Turbines | 14 |
| SPD Technologies | 24 |
| Stanley G. Flaggs | 57 |
| V.L. Logistics | 25 |
| Waukesha Bearings | 15 |

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Midland LMR Announces New Line Of Advanced Portable Radios

Midland LMR has introduced a new line of two-way FM portable radios said to be not only smaller but also more rugged and reliable than was economically practical with previous technology. The advanced new portables make extensive use of surface-mount technology, use the small new high-energy batteries and even the lowest-cost models meet MIL SPEC 810C/D, shock and vibration.

Designed for a broad spectrum of users whose needs vary from basic to highly sophisticated, the new Midland line includes over 30 models, with numerous options, in a wide range of cost/capability levels. At one end of the scale, for example, are simple, sturdy, economical little 2-watt units with one or two channels and auto-squelch. At the other end of the scale are compact, high-capability Syn-Tech XTR® models with 5 watts, up to 99 channels programmable in groups, both tone and digital squelch, DTFM signaling, priority scan, and optional weather-proof remote speaker/microphone. All models are available in VHF or UHF bands.

For more information and free literature,

Circle 41 on Reader Service Card

Saab Marine To Equip Environmental Tankers —Literature Available

"Environmental tankers," as classified by DNV, are now under production. The first two ships, of Suezmax size, were recently ordered from Daewoo by Nynas Petroleum of Sweden, and Neste of Finland.

Apart from double bottoms and double skins, reliable cargo handling and level gaging are vital to an environmental tanker, and the equipment for these functions is to be supplied by Saab Marine Electronics.

The level gaging system for the nine cargo and two slop tanks on each of the vessels is the proven Saab TankRadar. Level is detected by means of microwave technology, without contact with the product surface, and with sensors for temperature and inert gas pressure connected to the TankRadar deck transmitter. The information from the different sensors in multiplexed and transmitted by a single cable to the processor unit, together with information from other transmitters. The processor unit also receives input from the electropneumatic level gaging systems for draft, ballast and fuel, supplied by an outside contractor. The processing unit is connected online to the load calculator.

In itself, this would already be a highly advanced system, but in this case, it has been integrated with the Saab MaC/501 cargo control system. Here, the TankRadar processing unit acts as a substation. Another substation controls the 11

cargo pumps, two ballast pumps, 44 valves and pump discharge pressure, and both are connected to a control room station.

At the top of the hierarchy sits the operator. There are two operating sites. All operations can take place at either of them, and they have been designed according to the latest advances in man/machine

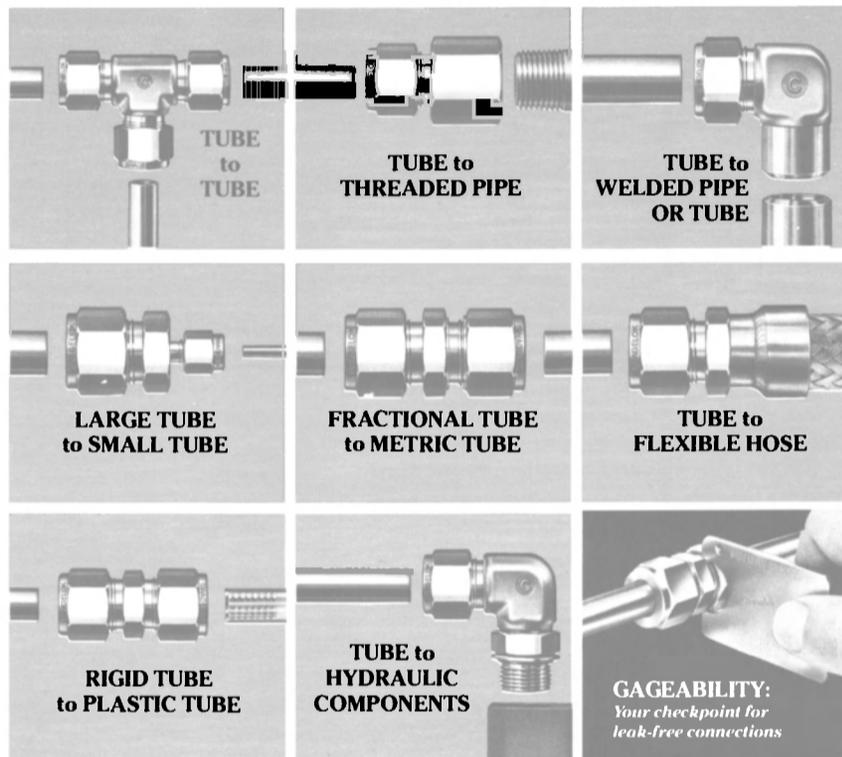
communication. All cargo control is undertaken by touching a light pen to a 20-inch color screen. The valves and meters of yesterday's consoles have been replaced by symbols in mimic diagrams on the screen. A touch to any one of the symbols activates it. When a function, e.g., a pump, is active, different parameters can easily be set. Built-in safety

functions prevent the operator from performing invalid functions and operators are also alerted in the event of a malfunction, e.g., a stuck valve.

For free literature giving full information on equipment from Saab Marine Electronics,

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Only SWAGELOK Tube Fittings make all these connections with *Gageable* Reliability



Circle 295 on Reader Service Card

All these types of SWAGELOK Tube Fitting connections contain fluids safely. They maintain a leak-tight seal under vibration, shock, pressure surges and temperature variations.

They are the *only* tube fittings that are gageable to confirm proper pull-up... a major factor in reducing hazardous risk.

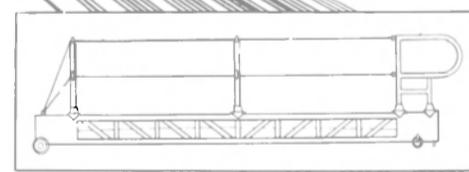
And they are stocked locally for immediate delivery by Authorized Sales and Service Representatives.



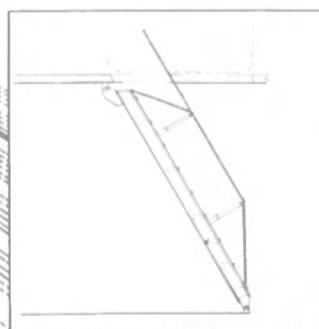
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SWAGELOK Canada Ltd., Ontario

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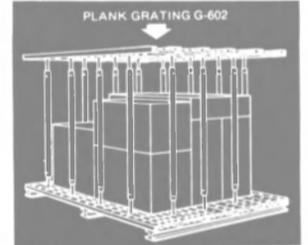


GANGWAYS

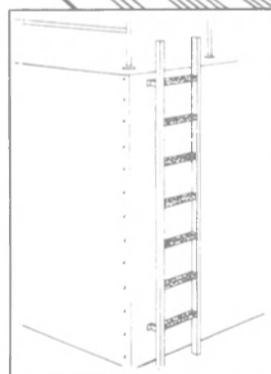


INCLINED LADDERS

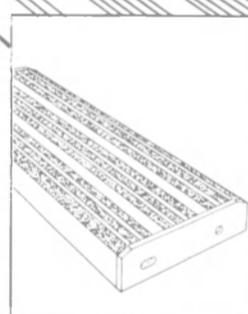
BATTEN SYSTEMS



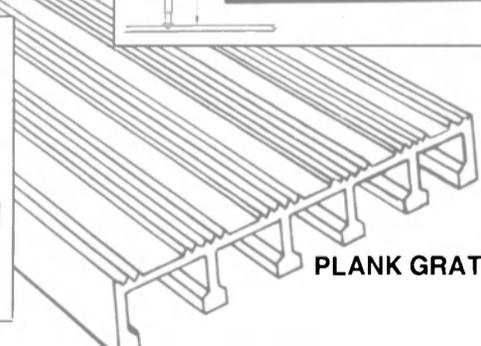
PLANK GRATING G-602



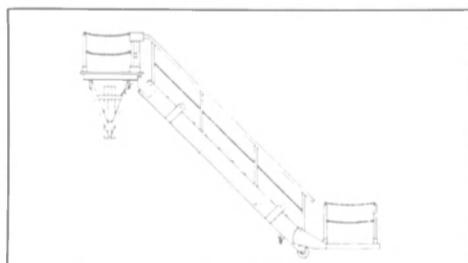
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Anschutz 'Nauto Control' Product Line Fulfills Navigator Demands

The central navigation work station has become more and more the focus of modern bridge design in seagoing ships and, in accordance with this, Anschutz & Co. GmbH of Kiel, West Germany, offers its

"Nauto Control" line of products to fulfill the demand of navigators for fast, comprehensive information, safe operation and reliable systems. The Nauto Control line, which is continuously being extended, has taken over a central function in the modern bridge.

The components involved in the central functions of the Anschutz Nauto Control system are; gyrocompass—Standard 14, Gyrostar; head-

ing reference and managing system—Nautocourse; digital and adaptive autopilot—Nautopilot D/A; track controller—Nautotrack N/A; automatic chart table—Nautoplot; manual steering control system—Nautosteer; nautical information display—Nautocommand; and global positioning system—Nautostar GPS.

With Nautostar GPS, Anschutz offers a high-tech GPS receiver



Anschutz Global Positioning System Nautostar GPS.

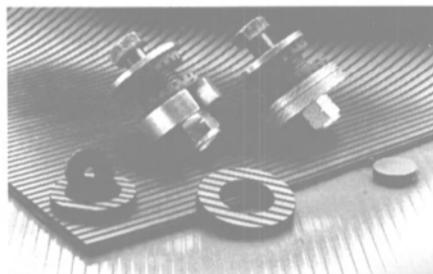
which is optimal both for marine applications and for inclusion in the integrated navigation and steering control system, Nauto Control.

The receiver computes all navigation data relevant for command of the ship. Operator and display components have been tailored to the requirements of commercial shipping. The large illuminated LCD-display is easy to interpret. The six-channel receiver was conceived as an easy-to-install unit for installation in desk or bulkhead.

For free literature giving full information on the Nauto Control line of products from Anschutz,

Circle 32 on Reader Service Card

Literature On Shock And Vibration Isolation Products Offered By Alert Mfg.



Alert's innovative design concepts in vibration isolation and shock pad materials are used for new and refurbished shipbuilding needs, including the Navy's latest nuclear submarine designs.

Alert Manufacturing Co. of Norridge, Ill., is offering free literature on its complete line of vibration isolation and shock pad materials and products for the marine industry.

The company's central Midwest location in Norridge, a suburb of Chicago, has proven ideal for fast, efficient shipment and service to shipbuilders on all three coasts.

Alert's vibration isolation material designs for shipbuilders are utilized best for mounting of electronic wall components, delicate weapons consoles, compressors, piping throughout the ship, mess food processor, lathes, valves and torpedo room equipment. Shock pad materials are used primarily for larger items and is available as wrapped bushings, sheet, and molded items.

Alert is certified under MIL SPEC 145208 and Q9858 with D.I.S.C. and major shipyards all over the country.

For more information and free literature on Alert's capabilities,

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Our propeller shaft seals **SPLITEX** and **MONEX**, for shaft diameter 100 mm to 1200 mm, were introduced in 1985. Within the first years of manufacture they have exceeded all expectations with regard to the number of installations carried out. Extensive monitoring and tests have shown insignificant wear, minimal consumption of lubricants — in most cases not even measurable — and a high degree of reliability which minimises stoppages caused by seal failure, also due to minimal loss of lubricants the seal is ecologically safer for marine life. All this gives the customer fewer problems and better returns.

By using the split shaft seal **SPLITEX** removal and assembly can be carried out with the shaft in place thus increasing efficiency, safety and cost effectiveness.

Classification

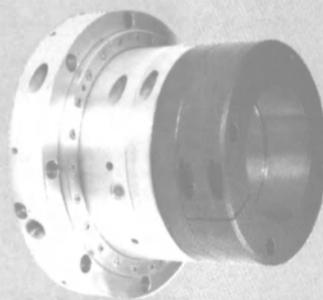
Type approval certificate from Det norske Veritas.

NYLAND

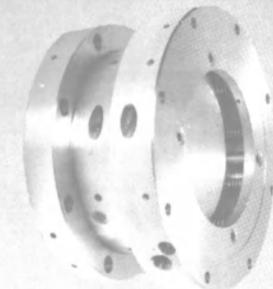
NYLANDS MARINE SERVICE AS

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Circle 277 on Reader Service Card



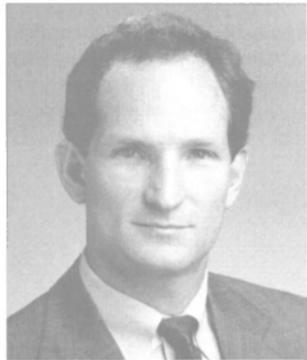
Inboard
SPLITEX — MONEX



Outboard
SPLITEX — MONEX

STANGEBYE AS

Crowley Maritime Names Rockwell Smith Manager, Oil Transportation



Rockwell Smith

Rockwell (Rocky) Smith has joined Crowley Maritime Corporation's Pacific Division in the newly created position of manager of oil transportation, according to a recent announcement by **Vincent Godfrey**, Crowley director of oil industry services, Seattle, Wash.

Mr. **Smith** is responsible for marketing offshore oil transportation and for contract administration in the oil industry and contract services department.

The company performs oil barging on the U.S. West Coast as well as to Alaska and Hawaii, utilizing a fleet of oil barges ranging up to 400 by 100 feet in dimensions and 16,000 long tons in capacity. Products carried include gasolines, diesel, jet fuel, chemicals, fuel oil, and crude oil. In addition to oil barging, Crowley's contract services include ocean and coastwise towing, offshore support operations, heavy-lift and heavy-haul, and marine salvage.

Mr. **Smith** is based at division headquarters in Seattle.

Johnson Pumps Acquires Mayfair Marine

Johnson Pumps of America, Schiller Park, Ill., a wholly owned subsidiary of Johnson Pump AB, Orebro, Sweden, recently acquired the Mayfair Marine Division of Mayfair Molded Products, producer of submersible bilge pumps, automatic switches, bilge blowers, and live well aerating devices.

Mayfair Marine will operate as an independent division of Johnson Pumps of America. A smooth and stable transition has been ensured, according to Johnson Pumps, through a long term lease and supply agreement, which will enable Mayfair Marine to continue manufacturing at its Schiller Park facility, and retain virtually all of its current employees.

For more information on Mayfair Marine and Johnson Pumps of America,

Circle 97 on Reader Service Card

Load-Dispersing System From Uni-Mat Used In Transport Operation

Davenport/Mammoet, Rosharon, Texas, recently utilized an interlocking, load-dispersing mat system from Uni-Mat International, Inc.,

Houston, Texas, for transport of a heavy pressure vessel.

For the transport operation, a section of the deck of a 182- by 54-foot barge was decked using Uni-Mats. The primary purpose of the decking of the barge was to prevent high point loads from damaging the metal deck.

The layout pattern for the ninety 8- by 14-foot Uni-Mats used was such that each Uni-Mat was inter-

locked into and on top of four bottom Uni-Mats, thereby reportedly decreasing the loads on the deck section by 75 percent when compared to conventional mats. The total load on the barge was 830 tons—the 630-ton pressure vessel and 200-ton self-propeller hydraulic trailer assembly.

After the four-hour installation of the Uni-Mats, Davenport/Mammoet installed conventional timber

mats for cradle sections for the splitter tower to rest on. The pressure vessel unit was loaded on the barge at Lake Charles, La., and transported to Sulphur, La., for installation as part of a major ethylene plant under construction.

Uni-Mat International is offering a free brochure detailing its load dispersing system. For a free copy,

Circle 5 on Reader Service Card

Dependable Power

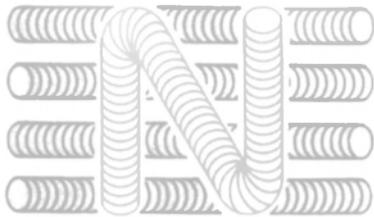


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Nuflex, Inc.

America's Composite Hose Company

An Open Letter From The President:

The composite hose manufactured at Nuflex is superior in every facet to those manufactured by any of our competition.

One reason for this is the materials that go into our hose are the finest - (all made in America). We buy our materials from companies such as Exxon Corp., Johnson & Johnson, I.C.I. Americas. All proven companies with a proven record of excellence.

By manufacturing the product in the USA we are able to service our customers not only much easier and faster but at a more competitive price as well. Special services such as color coding—customer labeling—different wire or other compound combinations can be manufactured and shipped usually within a seven day period. (This lead time is unthinkable when dealing with our European competitors.)

Because of all the problems America has encountered through the years, everyone is conscious of the strong message being sent out to "Buy American" we believe that this gives our distributors a decided edge over their competition when competing in today's marketplace.

While examining our catalog you will become aware of the wide variety of hoses that Nuflex offers, we feel this also gives our distributors a decided edge.

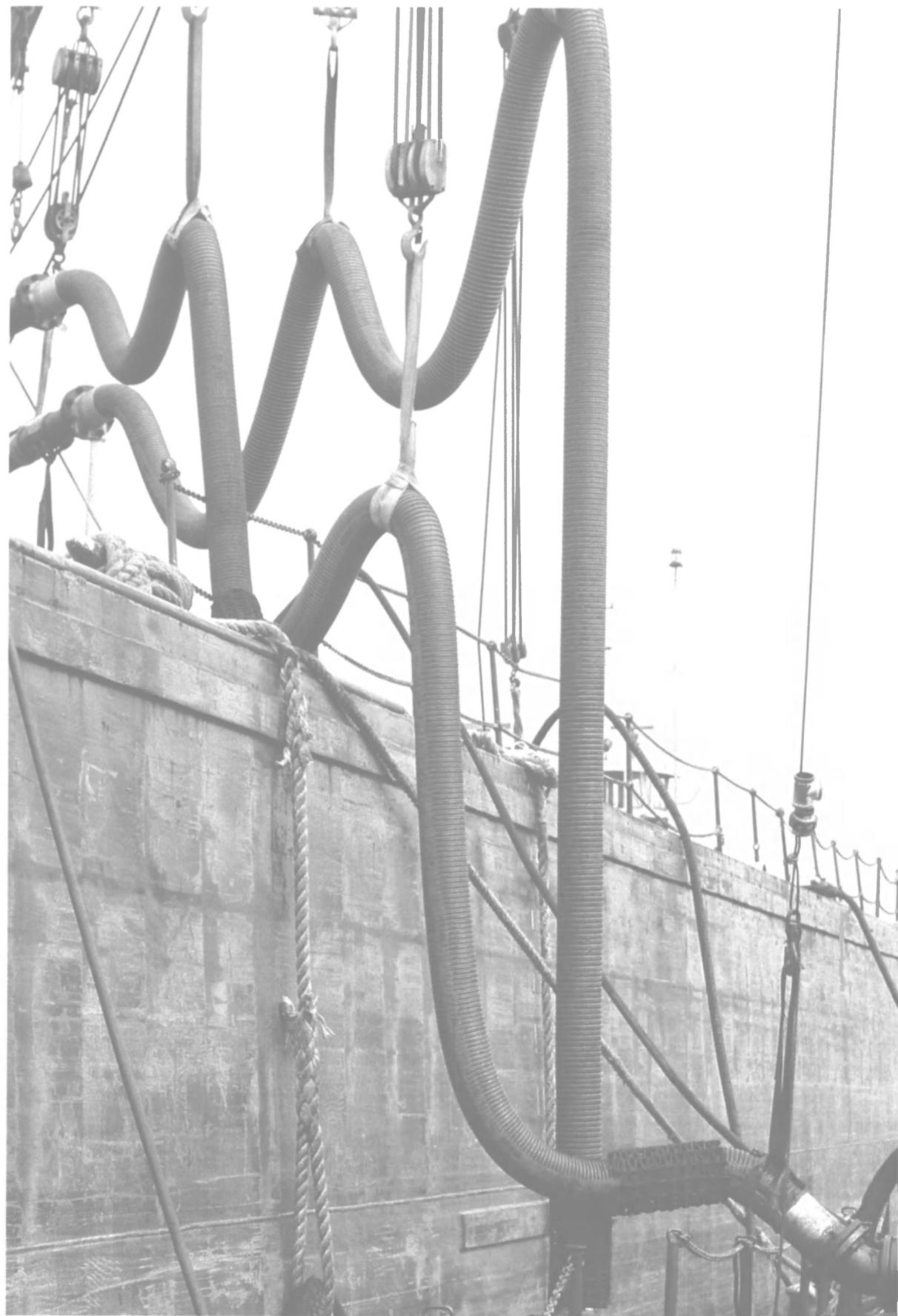
In The Final Analysis We Offer:

- 1. Finest quality (American made materials)
- 2. Superior Service
- 3. Proven Saleability
- 4. Wider Range of Products

There is one point that we haven't covered here and that is DEDICATION. Everyone at Nuflex is totally dedicated to supplying our customers with a product that is suited to their needs at a price that they "can live with". When talking with our inside people, sales engineers or technical people this dedication will become very apparent. All we ask in return is the opportunity to serve you.

Very truly yours,

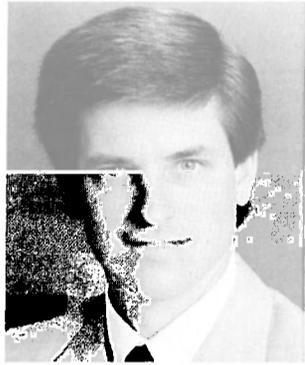
Harry Combe
President



800-242-2533

Circle 307 on Reader Service Card

**Schubert Joins Imo's
Delaval Turbine Division
As Marketing Specialist**



Joel P. Schubert

Joel P. Schubert recently joined the Delaval Turbine Division of Imo Industries Inc. as a marketing specialist, according to Richard L. Neff, division marketing manager.

In his new capacity, Mr. Schubert will be responsible for the sale of centrifugal compressors and steam turbines to the process, oil and gas markets.

Mr. Schubert, who was previously employed by the Delaval Turbine Division as an application engineer from 1982 to 1989, rejoins the company after serving for the past year as a senior mechanical equipment engineer at Foster Wheeler USA in Clinton, N.J.

Delaval Turbine supplies engineered rotating machinery products and services to the utility, process, oil and gas, municipal and pulp and paper industries.

**Wireless Data Appoints
New General Manager**

Wireless Data Corporation, a leading manufacturer of telemetry devices that transmit and receive temperature and stress data from extreme rotary environments, recently announced the appointment of Harlan Dybdahl as its new general manager. Much of Mr. Dybdahl's career experience has been in marketing and general management for computer system manufacturers specializing in industrial measurement and control.

Microdyne Inc., a well-known telemetry equipment manufacturer of Ocala, Fla., acquired the wireless data coupler product line from Acurex Corporation of Mountain View, Calif., in April 1990. Wireless Data Corporation, now a subsidiary of Microdyne, Inc., will continue manufacturing and marketing the products formerly supplied by Acurex.

**Aeroquip Introduces
Stainless Steel
Marine Fittings**

Maintaining flexible hose assembly integrity in a corrosive marine environment has been a challenge facing shipbuilders. Working with naval designers, Aeroquip is helping solve this problem with a new line of stainless steel fittings. Created specifically for use with flexible hose lines installed on shipboard fuel,

lubrication and hydraulic systems, these new fittings have been approved for use on all U.S. Navy Arleigh Burke Class DDG-51 destroyers.

Aeroquip's stainless steel fittings provide extended service life for each hose assembly. Regular maintenance of the hose lines during overhaul or repair (when multiple assembly/disassembly of hose lines occurs) does not result in a need for

fitting replacement parts.

A complete range of reusable fittings are available in sizes from 3/8 inches to 10 inches. Exact specifications and dimensions for these Aeroquip stainless steel fittings can be found in new Aeroquip Bulletin 2286.

Aeroquip Corporation, Maumee, Ohio, is a Trinova company. Aeroquip produces flexible hose, fittings and assemblies; custom engineered

molded and extruded plastic products; molded rubber products; quick disconnect and V-Band couplings; swivel joints; refrigeration/air conditioning components; and various aerospace, automotive and railroad products.

For further information and a free copy of Aeroquip Bulletin 2286,

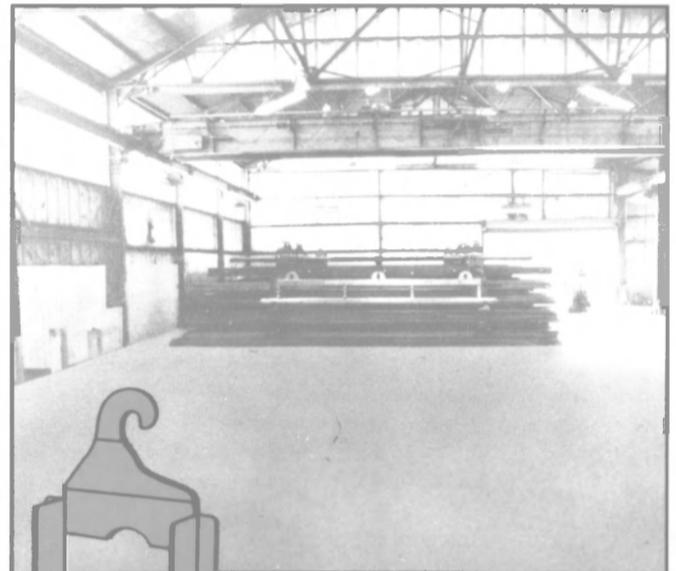
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After



Before



After



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**Mid-Coast Marine
Delivers Combination
Crabber, Packer**

Mid-Coast Marine, Coos Bay, Ore., recently delivered a 72-foot combination crabber, called Northern Mariner, built for Tom and Denise Branshaw of Cordova, Alaska.

The coastal crabber is 72-feet 6-six inches long with a 23-foot 3-inch beam and a 11-foot molded depth. Capacities include 10,000 gallons of fuel oil in port and starboard wing tanks, 2,300 gallons of fresh water, two fish holds in RSW or crab circulation with the forward hold at 2,300 cubic feet, and the aft hold at 650 cubic feet.

A 500-hp Caterpillar 3412 DIT

diesel with a Twin Disc 518 marine gear at 5.07:1 powers the vessel. Auxiliary equipment includes two main auxiliary gensets which are Isuzu model 6 SAIT with 75-kw Lima SER generators on the back end and a Denison T6 CC double hydraulic pump on the front end, driven through Pitts electric clutches.

The vessel accommodates five

**NORTHERN MARINER
Equipment List**

| | |
|-------------------|-----------------------|
| Engine | Caterpillar |
| Tail shaft | Aquamet |
| Propellor | Independent Propellor |
| Reduction gear | Twin Disc |
| Bearing | Cooper |
| Mufflers | Harco |
| Grid coolers | Fernstrum |
| Generator engines | Isuzu |
| Generators | Lima |
| Hydraulic pumps | Denison |
| Electric clutches | Pitts |
| Fire suppression | Kidde |
| Refrigeration | Carrier |
| Deck crane | Alaska Marine |
| Anchor winch | Thompson |
| Anchor | Danforth |

crew members in three staterooms. For more information on Mid-Coast Marine,

Circle 159 on Reader Service Card

**MAN GHH Launches
Floating Dock
For Algeria**

At its West German yard in Nordenham, MAN Gutehoffnungshutte GHH AG recently launched a floating dock with a lifting capacity of 15,000 tons that will operate on the Mediterranean coast about 124 miles east of Algiers. MAN GHH built the 623-foot long, 131-foot wide dock for Entreprise National de Reparation Navale, the Algiers repair yard. The Algerian company named the unit "Dock Flottant Haute Occasionelle."

For more information on MAN GHH,

Circle 153 on Reader Service Card

John E. Flannigan



John E. Flannigan

The Marine Machinery Association announced the death of John E. Flannigan, the chairman of its board of directors.

Mr. Flannigan began his career as an engineer at Gibbs & Cox in 1940, and with time out for army service in World War II, he stayed with that firm until 1954, when he took a position with the Whiton Machine Co. He remained with that organization as it became part of Terry Turbine Co., Ingersoll-Rand Co., and then Dresser-Rand, until his death in June of 1990 at the age of 68.

He was a founder of the Marine Machinery Association and brought to it his devotion to quality and ethics. In 1989, the Association created the "Jack Flannigan Award," presented annually to honor contributions to the quality of machinery for Navy ships.

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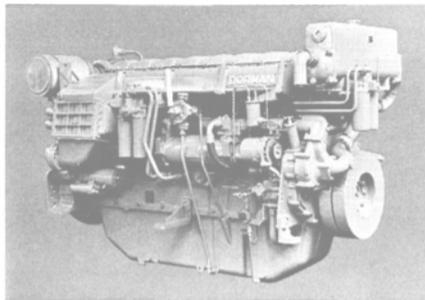
Dorman Diesels' 'Sea King' Engine Range In Demand For Fishing Propulsion Market

The Dorman "Sea King" marine diesel range from Dorman Diesels, Ltd., Stafford, England, is enjoying continued success in the fishing propulsion market, with numerous installations for arduous fishing duties throughout Europe and the U.K.

One of the most recent Dorman U.K. installations is the re-engining of the trawler Sara Maria for T.R.B. Fisheries. A Dorman Sea King 6TA/2 marine diesel developing 284 hp at 1,350 rpm for main propulsion was installed in the vessel. The Sara Maria has a Twin Disc gearbox which was also supplied by Dorman.

Dorman recently made its first Sea King 8 installation in the Greek fishing propulsion market. The vessel, a purse seiner of steel construction, was supplied with a propulsion package consisting of the Sea King 8 engine, Reintjes gearbox and engine controls.

According to Dorman, the Sea King range combines advanced diesel technology with excellent fuel efficiency and highly reliable propulsion power, making the engines ideal for the most arduous fishing



Dorman Sea King 8 marine diesel engine, part of the propulsion package recently installed in a Greek purse seiner.

duties. The range offers a continuous output band up to 670 kWb at speeds between 1,200 and 1,800 rpm for both propulsion and auxiliary applications. The engines are premium specification, direct injection, turbocharged, water-cooled marine diesels of in-line configuration which are available with cooling systems to suit the application and installation considerations.

The Sea King series offers one of the lowest fuel consumptions in its class, typically a 5 percent saving over other engines. This highly com-

petitive fuel consumption is available over a wide operating speed range.

The Sea King 6 and 8 offer the considerable servicing advantages associated with an in-line configuration and have been designed for ease of service access and maintenance.

The compact nature of the engines makes installation considerably easier in many situations and these engines benefit from high levels of engine protection to ensure a long and trouble-free life.

Dorman has an extensive international distributor network covering over 120 countries worldwide which has recently been further enhanced by the continued development of marine service care from specialized marine diesel distributors in France, Holland, Spain, Germany, Italy, Norway, Iceland and Greece.

For free literature giving further information on the Dorman Sea King range of marine diesel engines,

Circle 18 on Reader Service Card

Inorganic Coatings Offers Brochure On IC 531, Zinc Silicate Technology

Inorganic Coatings, Inc., Malvern, Pa., has published a 20-page, full-color brochure that focuses on IC 531, water-based high-ratio zinc silicate technology that was developed by NASA.

The brochure first traces the history and performance of water-based zinc silicates from the 1940s to their culmination in NASA's breakthrough high-ratio technology. Benefits and innovations in coating made possible with the high-ratio technology are then pointed out throughout the publication.

In addition to offering virtually

permanent protection from corrosion, high-ratio IC 531 eliminates the cure process and offers numerous other benefits, including: zero VOCs, clean-up with water, and no toxic chemical waste; ready for top-coating or service in two hours or less; a hard adhesive finish which means less touch-up and a better overall job; mudcrack and overspray resistance; easy mixing and application properties; and infinite maintainability by repairing or recoating with itself.

Bulletins from a series of case studies on IC 531 are also available from Inorganic Coatings.

For further information and a free copy of the Inorganic Coatings brochure,

Circle 59 on Reader Service Card

INTRODUCING THE EPOCH MARK II SERIES.

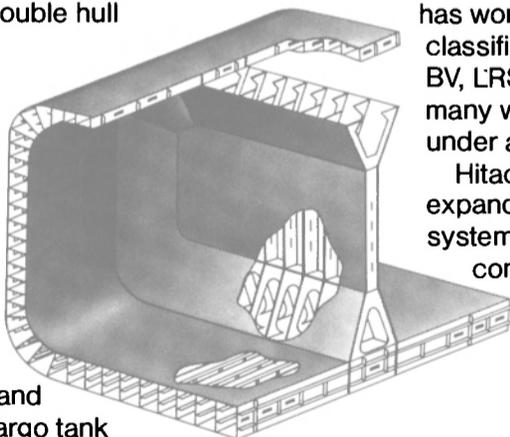
A new era in product oil carrier design.

Hitachi Zosen has developed the EPOCH MARK II series which has a unique structure not found on conventional ship designs.

Revolutionary in concept, the MARK II incorporates a unidirectional girder system combined with a complete double hull structure.

While a ship's hull is customarily designed with a grillage of longitudinal and transverse members for strength, this system uses only longitudinal members in a double hull to provide sufficient strength.

This unidirectional girder system results in unprecedented structural simplicity and completely flush surfaced cargo tank



interior. MARK II product oil carriers provide unrivaled advantages in performances over more conventional designs.

The EPOCH MARK II series is available in 40, 60 and 80 thousands dwt designs. And has won the approval of leading classification societies (ABS, BV, LRS, NK, DNV). At present many worldwide patents are under application.

Hitachi Zosen is also expanding this new structural system for the development of combination cargo carriers such as PROBO or OBO carriers other than oil tankers.

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| Cargo tank cleaning | cleaning time | * | *** |
| | completeness | * | *** |
| Gas free | cargo tank | * | *** |
| | ballast tank | ** | ** |
| Cargo tank heating | | * | *** |
| Cargo purity | | * | *** |
| Maintenance | cargo tank coating | * | *** |
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Circle 279 on Reader Service Card

Du Pont 'Kevlar' Mooring Ropes Perform Like Steel, Handle Better Than Nylon

Cables and ropes of Du Pont's high-strength "Kevlar" aramid fiber are replacing steel wire for some of the world's toughest mooring jobs.

Five times as strong as steel, pound for pound, rope of Kevlar is only one-sixth the weight of steel at equal diameter, with lower stretch than other synthetic fibers.

Groton Pacific, a firm that manages three large oil carriers, has for some time specified Kevlar as a synthetic replacement material in mooring tails and ropes on its vessels Hawaiian King, Hawaiian Sun and Hawaiian Monarch.

"These carriers require extraordinary performance and safety characteristics from a rope material," said **Demetrius Panagopoulos**, technical director for Groton Pacific.

"We specified mooring tails of Kevlar because, relative to polypropylene tails, Kevlar has low elonga-



A mooring line of Du Pont Kevlar is easily carried by a single crewman. At one-fifth the weight of steel on land, and one-fifteenth the weight in water, the ropes lessen the number of crew hands needed for docking.

tion, is stronger and lighter and is easier to handle," he added.

According to Du Pont, rope maintenance is another area where Kevlar outperforms steel. The cost savings is in the hours of maintenance on steel wire that are not necessary

with the Kevlar rope.

The designer and maker of the lines for Groton Pacific says that mooring lines and mooring tails for tankers and other ships are ideal uses for ropes made of Kevlar. Such uses take full advantage of the many principal characteristics of Kevlar: high strength, light weight, corrosion resistance, low stretch, long fatigue life, weather resistance, chemical resistance and flexibility.

For free literature giving full information on cables and ropes of Du Pont's high-strength Kevlar,

Circle 56 on Reader Service Card

New Literature Describes Broco Underwater Cutting And Welding Systems

Broco, Incorporated, Rialto, Calif., is offering a new four-page full-color brochure describing the "Broco Underwater" line of underwater cutting and welding equipment.

The new literature fully describes and illustrates the features and ben-

efits of the BR-22 Ultrathermic Cutting Torch and Broco Underwater Ultrathermic Cutting Rods.

Also described are SofTouch Wet Welding Electrodes and the BR-20 Welding Stinger.

SofTouch welds consistently meet AWS D3.6-83/89, the standard for certifying underwater welds.

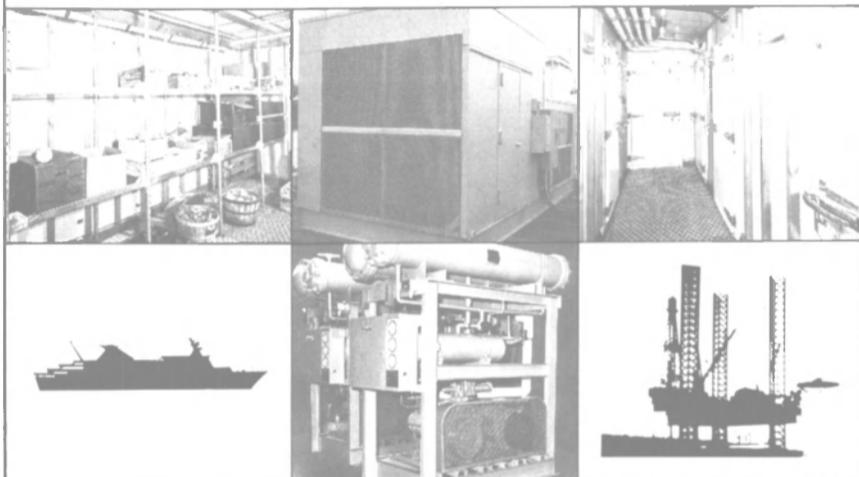
The Broco Underwater Ultrathermic Cutting System enables divers to quickly cut through almost anything including cast iron, brass, other ferrous and nonferrous metals and concrete. The Ultrathermic Cutting Rod will cut through marine growth, rust and mill scale eliminating the need for pre-cleaning.

According to the company, the unique characteristics of Broco Underwater Ultrathermic Cutting Systems and SofTouch Wet Welding Electrodes provide the fastest, most cost-effective means of completing underwater tasks involving cutting or welding.

For more information and free literature from Broco,

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Complete Marine Refrigeration Systems Air Conditioning Compressor and Chiller Units Reefer Cargo Box Installation/Repair



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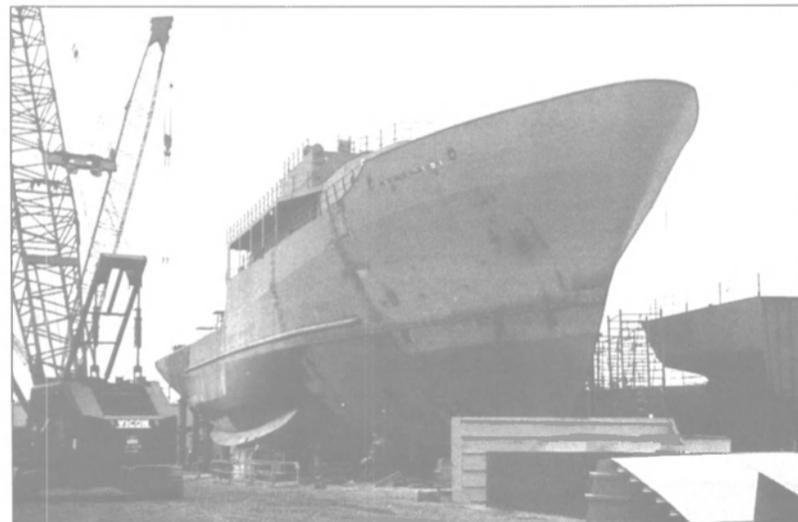
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Circle 224 on Reader Service Card

Steamboat Announces Corporate Staff Expansion

Douglas Kratz, president of Steamboat Development Corporation, has announced the addition of Christopher Gibase, Steven Roxberg, and James Rylander to the company's corporate staff.

Mr. Gibase has been appointed casino manager of the company. He will plan, develop and oversee gaming areas for all of Steamboat Development's casino cruise ships. Mr. Gibase was employed by Resorts International when the company pioneered casino gaming in New Jersey.

Mr. Rylander has joined Steamboat Development as project manager. He will be coordinating land-based construction and maintaining the completed facilities.

Mr. Roxberg has been named manager of information systems. He will be involved with projects including systems integration, programming, procurement, and project management.

J.R. Merritt Introduces Rugged Cast Design Single Axis Controllers

Type NSO-SF Single Axis Rugged Cast Design Controllers, recently introduced by J.R. Merritt of Stamford, Conn., are actively utilized in controlling equipment in military, industrial and marine applications. The devices are particularly suitable for hostile environments such as in shipboard and offshore applications as well as for controlling heavy mining and material handling equipment. These controllers provide the operator with a precise manually selectable directional or proportional variable speed control of equipment utilizing AC or DC drives and electrohydraulic valves, strokers and actuators.

For more information and free literature from J.R. Merritt,

Circle 113 on Reader Service Card

New Fairplay Book Details 1990 World Shipping Statistics

Shipping industry professionals interested in statistics will welcome a new publication just issued by Fairplay Information Systems (FISYS).

Drawn from the extensive FISYS database, "World Shipping Statistics 1990" presents a detailed statistical analysis of world shipping industry, in a concise graphical format. The 174-page volume contains more than 300 graphs, completely updated to reflect changes in the marine industry since 1989.

The volume is divided into five sections: World Merchant Fleet, Newbuildings, Market Prices, Freight Rates and Port Traffic. The first chapter provides extensive country-by-country cross-tabulation of the current world shipping fleets by flag, owner's country or

domicile, country of build and classification society. The Newbuildings section analyzes the current world shipping orderbook by vessel type, flag, owner's country of domicile and country of build. This section also provides graphs analyzing market shares for shipbuilding nations, yards and engine manufacturers.

In the Market Prices chapter, a

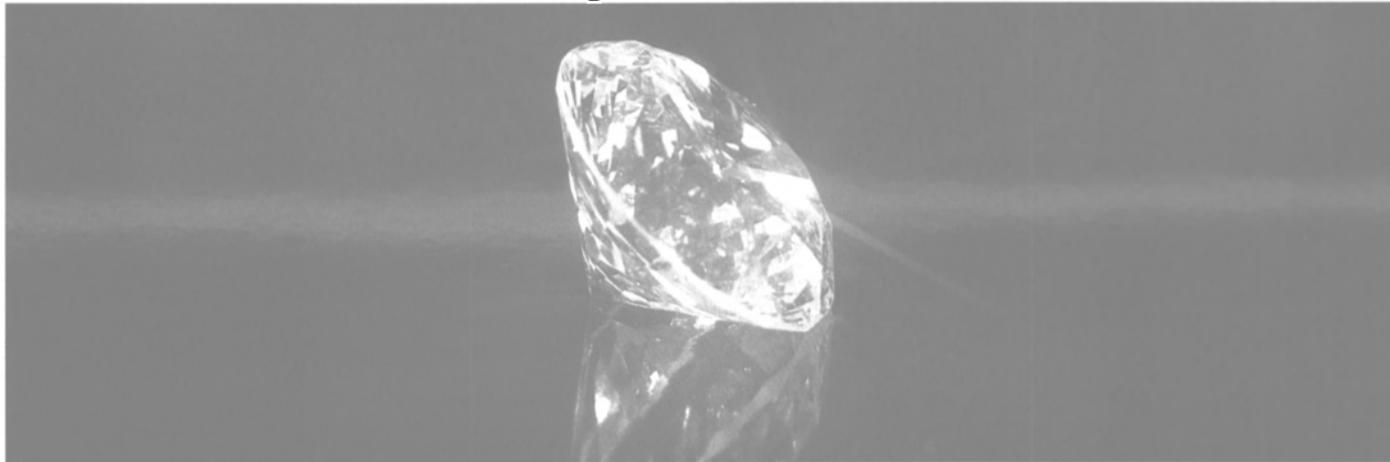
series of graphs illustrate trends in newbuilding prices, second-hand prices and demolition prices, as well as tonnage scrapped, tonnage laid-up and casualties. The Freight Rates section includes analysis of the Baltic Freight Index and GCBS Freight Rates, as well as bulk tanker and gas freight rates. The final chapter provides graphs showing port container and cargo through-

put by country and region.

The cover price in the U.S. for "World Shipping Statistics 1990" is \$78. Copies may be ordered from:

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Circle 206 on Reader Service Card

L&C Associates Installs Dehumidification System Aboard S.S. Beaver State

L&C Associates, North Hampton, N.H., recently announced the completion of a dehumidification, sealing and alarm system aboard the S.S. Beaver State. At the direction of MarAd, the T-ACS-10 vessel is being dehumidified to protect it

from moisture-induced corrosion.

Most notable to the installation is the use of Protective Sealing System, PSS to seal openings leading to the dehumidified spaces. Protective Sealing System, PSS is a spray-applied, semi-adhering, flexible, vinyl plastic which prevents moisture from migrating into dehumidified spaces. Since PSS is strippable, the vessel can be reactivated quickly, a key requirement of the lay-up specification.

L&C technicians designed and installed the desiccant dehumidification equipment, and the ducting system which distributes the dehumidified air. Other components of the L&C package included an alarm system and the testing of the d/h and sealing system.

For more information and free literature from L&C Associates,

Circle 111 on Reader Service Card

New Krupp MaK Engines For Two Trawlers

West German diesel engine manufacturer Krupp MaK recently secured an order for two six-cylinder M453C Series diesels to repower two South African fishing trawlers.

Capable of burning heavy fuel oil, the two four-stroke medium-speed engines will have a bore of 320 mm and be rated at 1,800 kw (2,414 hp) at 600 rpm. The first engine will be delivered in November, while the second propulsion unit will be turned over in April 1991.

For free literature detailing the full line of medium-speed engines offered by Krupp MaK,

Circle 129 on Reader Service Card

Tenjford Steering Installed In Army Tugs Being Built At Robert E. Derecktor

Tenjford hydraulic steering system featuring rotary piston rudder actuators have been installed in the new class of 130-foot Army tugs under construction in Robert E. Derecktor Shipyard, Middletown, R.I.

Tenjford Inc., located in Hoboken, N.J., handles steering gears for all sizes and types of vessels.

For more information and free literature from Tenjford,

Circle 103 on Reader Service Card

Mitsubishi Launches Daihatsu-Powered Expedition Cruise Ship

Mitsubishi Heavy Industries (MHI) recently held a ceremony at its Kobe Shipyard & Machinery Works to christen and launch the expedition cruise ship Frontier Spirit. The vessel is scheduled to be delivered to Frontier Cruises, Limited, in October of this year.

The 6,700-ton Frontier Spirit has an overall length of 365.8 feet, breadth of 55.7 feet, and capacity for 184 passengers. Propulsion is provided by two Daihatsu main diesel engines with a power output of 3,300 hp at 720 rpm, providing a maximum cruising speed of 16.6 knots.

Frontier Cruises was established last year as a joint venture company between MHI, Nippon Yusen Kaisha (NYK), Mitsubishi Corporation, Salen Lindblad Cruising in the U.S. and Hapag Lloyd in West Germany to offer expedition cruises to exotic destinations in the world such as the Arctic and Antarctic areas and Amazon River.

Unlike luxury cruise ships, the Frontier Spirit will have a capability to cruise frozen sea and be equipped with equipment and facilities necessary for expeditions, such as a heliport and landing boats. The ship has 82 large cabins with closets designed to hold clothes necessary for such special expeditions.

For free literature on the facilities and capabilities of MHI,

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Circle 202 on Reader Service Card



Waugh Company Delivers More Than 100 Modular Acrylic Bathroom Units

The Waugh Company, based in Jacksonville, Fla., has manufactured and delivered more than 100 modular (acrylic) bathroom units to North Florida Shipyard, Columbia University, Marco Shipyard, Versatile Pacific Shipyard (Canada), Ulstein Hatlo Shipyard (Norway) and to a USCG cadet vessel.

According to the company, shipyards are realizing the potential cost-savings and the advantage of not having to coordinate the multi-trades and materials necessary to complete bathrooms on board ships.

The Waugh Acra-Mold T/S Units are composed of a durable one-piece reinforced acrylic surface completely outfitted with tile, accessories, plumbing and electrical lines. The delivery time is approximately 4-6 weeks.

For more information and free literature from Waugh,

Circle 112 on Reader Service Card

Megasystems Introduces Diesel Engine Analyzer —Literature Available

Megasystems, Inc., Delray Beach, Fla., recently introduced a portable diesel engine analyzer (Portable DOT/PC) to provide fleet or multiple engine site users with a means of tuning diesel engines and maintaining engine status documentation to reduce fuel costs and detect operating problems.

The unit enables users to analyze and tune various diesel engines and to store data on diskettes for record keeping, analysis and comparison.

The system, weighing less than 50 pounds, comes with a laptop computer, and a SC-350A combustion pressure sensor. An IP-1000 injection pressure is available as an option. A user can obtain engine crank angle information with a magnetic-based mounting kit which is included.

For free literature on the new portable diesel engine analyzer from Megasystems,

Circle 96 on Reader Service Card

Unusual Voith-Schneider Propulsion System Adopted For New Dutch Ferry

The Voith-Schneider-propelled double-ended Dutch ferry Molengat has been operating successfully between Den Helder and the North Sea island of Texel, Holland, for about 10 years. Due to the increase in traffic on this route, the operator of the line has ordered a new ferry with approximately 30 percent more capacity, to be built at Verolme Scheepswerft, Heuseden B.V.

The new vessel, with an overall length of 362.5 feet, breadth of 59 feet and draft of 12.5 feet, is also to

be powered by Voith-Schneider propellers. It will be able to carry approximately 250 cars on two decks, and about 1,500 passengers.

Since larger propellers were not to be used because of the draft, an unusual type of propulsion system for VSP double-ended ferries, with four propellers, was adopted: two at either end of the vessel. The propellers are controlled from the bridge by means of the electronic control

system developed jointly by Voith and Siemens. To facilitate operation, two propellers are combined in one transmitter unit and controlled as one unit.

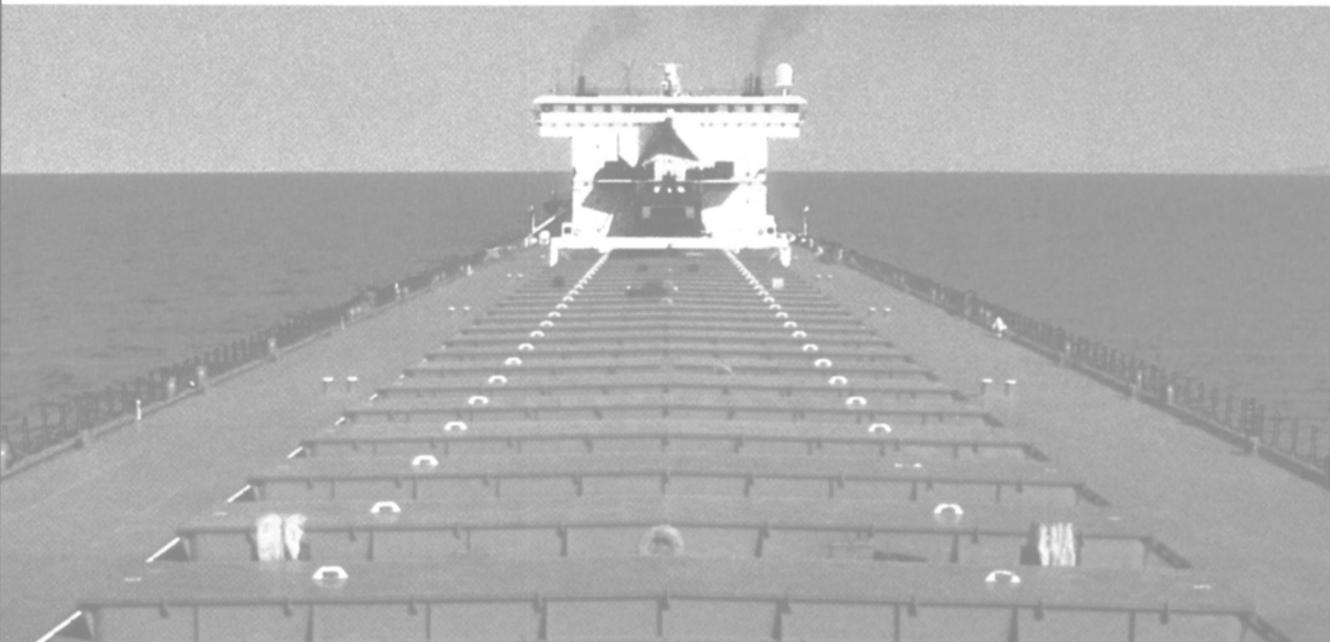
Each propeller is driven by two three-phase AC squirrel-cage motors, each developing 625 kw at 1,500 rpm synchronous rotational speed, arranged in tandem. The motor output shaft is connected to the input shaft of the reducing gear

unit, which is flange-mounted on the propellers, by means of hydraulic couplings with deceleration chambers. On reaching the operation speed, the coupling connects rigidly. The open water speed will be approximately 14 knots.

For free literature giving full information on Voith-Schneider propellers,

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Robertson Marine Named Agents For Jason Firefighting Equipment

Bennex A.S., Norway, has appointed Robertson Marine Systems, Inc. (RMS) U.S. and Canadian agents for Jason firefighting equipment and oil pollution control.

Jason brand of high quality firefighting equipment is applicable to

marine and industrial applications. All Jason hardware is designed for reliable operation under all conditions with a minimum of corrosion.

Unlike most firefighting equipment which requires frequent servicing, Jason equipment is manufactured of high quality materials, and features enclosed and sealed-for-life bearing arrangements. Jason's back-up control functions, through testing and advanced QA

program insures long and reliable service without maintenance.

Jason produces manual and remote control monitors, water only and water/foam monitors, monitor towers and oil dispersant spray booms.

For more information and free literature on Jason firefighting equipment,

Circle 115 on Reader Service Card

Rumsey Joins Pen Coal As VP Of Transportation



Peter E. Rumsey

Peter E. Rumsey, formerly vice president of sales for Ingram Barge Company in Nashville, Tenn., recently joined Nashville-based Pen Coal Corporation as vice president of Pen Transportation Company. Mr. Rumsey has 23 years' experience in the field of transportation, having been previously employed by Amoco Oil, Gulf & Western and as a management consultant.

Pen Coal Corporation, which changed its name from P&C "Bituminous Coal," Inc. earlier this year, is one of the largest U.S. steam coal exporters from the U.S. Pen Coal is a wholly owned subsidiary of Pen Holdings, Inc.

James Morris, executive vice president and chief operating officer of Pen Coal, said: "We are pleased to have Mr. Rumsey join our company. His knowledge of terminal operations and his extensive knowledge of rail, truck and barge transportation, especially within the coal market, will greatly contribute to our planned growth."

Biobor JF Helps Solve Microbial Fuel Problems —Literature Available

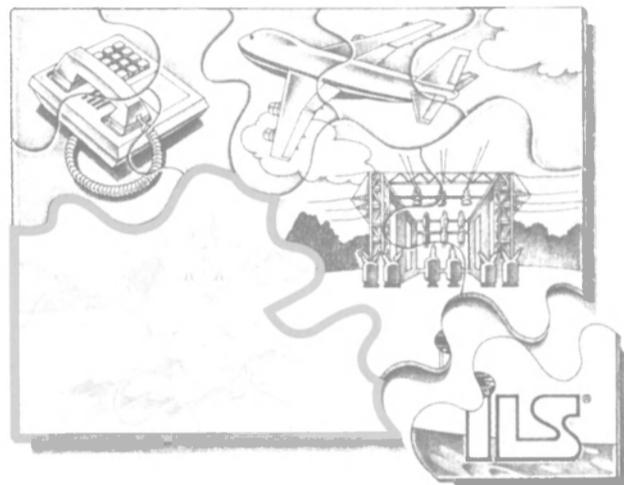
Microbial growth in fuel flourishes in the warmer months of the year, which can cause a variety of equipment problems, such as injector deposits; fuel filter plugging; ignition trouble; smoke; and leaking storage tanks due to microbial by-products causing rust and corrosion. It can be identified as slimy, unfilterable blobs (brown, black or greenish in color) which characteristically can emit a foul odor.

According to its manufacturer, U.S. Borax, Biobor JF™ is one of the safest and most effective solutions to microbial fuel problems and among the safest biocidal/fungicidal chemicals available. In use for over 20 years, Biobor JF is biodegradable and nonhazardous to waterways and the environment.

Registered by the EPA, approved by the FAA and commercially approved by many equipment and engine manufacturers, Biobor JF is distributed by Amalgamated Coal and Petroleum to major airlines, utilities, the U.S. military, the marine transportation sector, and many other industries.

For more information detailing Biobor JF,

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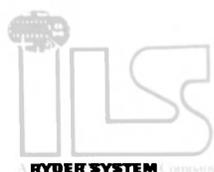
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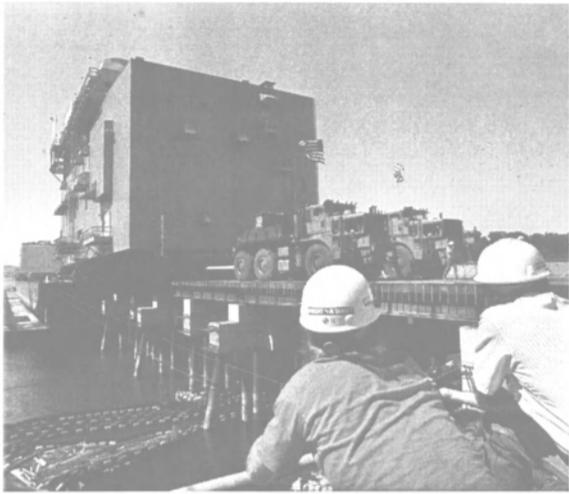
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LARGEST OIL MODULE EVER built for ARCO Alaska, Inc., is loaded onto a Crowley Navigation barge positioned on Drydock 4 at Portland Ship Repair Yard (PSRY) for shipment to Alaska's Prudhoe Bay. One of eight modules fabricated at PSRY for ARCO by Wright Schuchart Harbor Co., the two largest are 3,200-ton turbine compressor modules. The 11-month, \$40-million project generated peak employment for 1,600 workers.

For free literature on the facilities and capabilities of Portland Ship Repair Yard,

Circle 36 on Reader Service Card

Schottel Pump-Jet Displays Outstanding Maneuverability During Recent Demonstrations



Schottel M-Boat 3 during recent practical demonstration in France.

The West German firm of Schottel has held a number of presentations in Italy, France and England, at which the company demonstrated to numerous shipping experts the advantages offered by the Schottel Pump-Jet under practical conditions. The outstanding maneuverability and excellent performance in shallow waters were displayed with an M-Boat 3 developed and built by Schottel.

The company presently offers standard Pump-Jet units in the power range from 20 to 650 kw as propulsion systems and maneuvering aids.

The extensive experience of Schottel enables one of the world's leading manufacturers of 360-degree controllable propulsion units and maneuvering aids not only to offer technically perfected products, but also to develop complete system solutions. The presence of subsidiary companies and authorized representatives at all major shipping centers in the world ensures a close dialogue with the customer and prompt performance of service work.

For information on Schottel's entire range of products and services, for example on the possible applications of Schottel Rudderpropellers (power range 15-5,000 kw), transverse thrusters, and steering and control systems (Copilot 2000 and Schottel Masterpilot),

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Fincantieri Delivers 1,900-Passenger Superliner Crown Princess To P&O

P&O Plans To Build Second Sister Ship

The Monfalcone shipyard of Fincantieri-Cantieri Navali Italiani SpA recently delivered the 792-cabin luxury cruise ship Crown Princess to her owner, British P&O (Peninsular & Orient Steam Navigation Company).

The Crown Princess is the first cruise ship built by Fincantieri since 1964, when it delivered the 29,000-ton Eugenio C. to Costa Shipping company.

During the delivery ceremony, Sir Jeffrey Sterling, P&O president, announced his company's intention to order a second sister ship from Fincantieri.

The Crown Princess along with her sister Regal Princess were origi-

nally ordered by Sitmar Cruises through its Italian company Astramar. P&O acquired Sitmar along with Astramar in 1988 as part of a \$210-million deal.

With a gross tonnage of 70,000, the Crown Princess has an overall length of 803 feet, maximum molded breadth of about 106 feet, design draft of 25.7 feet and deadweight of 5,400 tons. She will have a service speed of 19.5 knots.

Fincantieri collaborated with Italian naval architect Renzo Piano of Studio Piano on the design of the vessel in order to provide the Crown Princess with a unique exterior design.

For the ship's silhouette, Studio



The Crown Princess is the first of three luxury liners to be built by Fincantieri for P&O/Princess Cruises.

Piano took inspiration from the dolphin, with particular emphasis on the profile of the "head," which constitutes a large front dome over the Belvedere Bar/Casino.

The transferring of such a design in a construction phase raised extreme difficulties. Because the dome

and the upper deck structure were manufactured entirely of light alloy, while the superstructure is made of steel, suitable protection and welding methods had to be developed in order to ensure a proper connection. The final positioning phase of the 250-ton-plus dome (60 meters long

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Circle 231 on Reader Service Card

Maritime Reporter/Engineering News

by 30 meters wide) was particularly delicate.

Another innovative feature of the Crown Princess is her propulsion plant. Designed for worldwide cruising, the vessel will be powered by a highly advanced diesel-electric plant. There will be four 6.6KV, 60-Hz main alternators driven through flexible couplings by four MAN B&W eight-cylinder, in-line L58/64 four-stroke, medium-speed engines, with a maximum continuous rating of 9,720 kw at 400 rpm. These alternators will supply power through transformers to the two 12,000-kw, three-phase synchronous-type propulsion motors, each directly driving a fixed-pitch Lips propeller via shafting. In addition to supplying 6,600/450 volt, 60 Hz electrical power to the propulsion motors, this same power is fed to the motor-driven thrusters and air conditioning compressors, while other motors are generally powered by 440 volts, 60 HZ AC. Other electrical equipment is served by 440/220/115 and 24 volt DC circuits.

The construction of the 14-deck Crown Princess involved the formation of a new work organization inside Fincantieri in order to speed coordination and manage construction of the ship. The ship cost about \$275 million, 15 percent of which went to the actual construction of the vessel and the other 85 percent towards completing the machinery, furnishings, etc. The work involved over 150 companies and about 10,000 workers, constituting a wide range of suppliers.

According to company officials, Fincantieri plans to capture as much as 25 percent of the world cruise ship construction market. Fincantieri has concentrated its cruise ship construction at two yards—the Monfalcone yard and a shipyard located at Marghera.

The Regal Princess, sister of the Crown Princess, is expected to be delivered by the Monfalcone yard in April 1991. The yard is then expected to begin construction of the first of three cruise ships for Holland America Line.

The Marghera yard of Fincantieri, located near Venice, has two 55,000-ton cruise ships on order for Italian cruise line Costa Shipping.

For a free color brochure detailing the shipbuilding capabilities of Fincantieri,

Circle 93 on Reader Service Card

MARI-TECH 91, Scheduled For Ottawa, May 8-10, Issues Call For Papers

A "Request for Papers" has been issued for the Canadian Institute of Marine Engineering technical meeting and workshop to be hosted by the Ottawa Branch, May 8-10, 1991.

The theme of the three-day meeting is "Marine Engineering and the Environment." Abstracts of about 200 words should be forwarded by September 30, 1990, to **W. Bruce Wilson**, 816 Stanstead Road, Ottawa, Ontario, Canada, K1V 6Y7, telephone (613) 731-8490.

September, 1990

Standard Refrigeration Offers Rugged Marine Service Condensers

Designed for hostile marine environments, Standard Refrigeration of Melrose Park, Ill., is offering marine service condensers in shell and tube and compact tube-in-tube modular counterflow configurations. The shell and tube series is available in 1

to 125 hp models.

There are more than 35 cataloged models, plus WR modify condensers with additional valves, brackets, and accessories to meet specific marine applications. All feature cupro-nickel tubes, tubesheets, water plates, and monel fittings for resistance to sea water. Marine-duty epoxy coatings are included.

The company also incorporated sacrificial zinc anodes to provide

protection from stray currents, galvanic action, and electrolysis. The MS series also feature dual refrigerant outlets to maintain constant liquid feed, even in heavy seas, and removable water plates to make cleaning easier.

For free literature on Standard Refrigeration marine service condensers,

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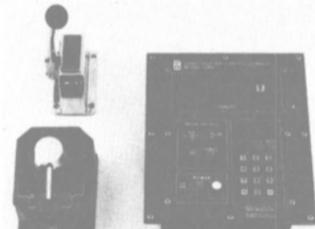


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75

Avondale Awards Washington Aluminum \$1.5 Million In Contracts

The Washington Aluminum Company, Inc. has been awarded over \$1.5 million in contracts by Avondale Industries, Inc. for aluminum fabrications on fleet oilers under construction by the Louisiana builder. The two separate contracts cover the fabrication of eight ship-

sets of portable stanchions and dunnage systems and seven shipsets of accommodation ladders.

"Washington Aluminum Company was involved in the original design of aluminum accommodation ladders for the Navy in the late 1940s," said **Robert Pickens**, president of Washington Aluminum. "We are truly pleased Avondale Industries has selected us for what we see as an important role in this TAO project."

The Washington Aluminum

Company has provided over 40 years of continuous service in the design and manufacture of products for the Navy.

The current project, according to marine customer service manager **Stephanie Koltko**, includes dunnage identified as "an overhead and deck track system with movable stanchions for munitions cargo containment. The accommodation ladders feature an electrically operated hoist system for this TAO project." Ms. Koltko commented further

that "our welders are qualified to MIL standard 248C and our QA/QC program is in accordance with MIL-I-45208. Our shop floor team takes tremendous pride in the work they do for the Navy."

For further information and free literature from Washington Aluminum Company,

Circle 109 on Reader Service Card

ARN Delivers First Of Eight Soviet Cargo Ships

The Bilbao shipyard of independent Spanish shipbuilder Astilleros Reunidos del Nervion (ARN) recently delivered the first of eight new generation Arctic class multi-purpose cargo ships for the Soviet Union.

Called the Igor Ilinskiy, the 7,365-ton vessel will be utilized for the transport of timber, containers, bulk commodities and a variety of dry cargoes in Arctic conditions.

Built to the class of the USSR Register of Shipping, the Igor Ilinskiy is powered by a Bryansk-MAN B&W six-cylinder L42MC low-speed diesel engine, rated at 6,960 bhp at 168 rpm. The two-stroke diesel is direct-coupled to a Liaaen CP propeller supplied by Navacel of Spain.

Auxiliary power is provided by a pair of Bazan-built MAN B&W diesel generator sets. Other equipment on board includes Norwinch type windlasses and constant-tension winches, MacGregor-Navire hydraulically operated hatch covers, Indar shaft alternator, San Carlos compound exhaust gas/burner boiler, Aalborg burner boiler, and Hagglunds pedestal cranes. Additionally, Valmet Automation supplied a Damatic system, a sophisticated automation and control system for monitoring ship equipment and functions.

The underwater areas of the Igor Ilinskiy's hull are protected by a single coat of International Paint's Intershield ER160, an anti-abrasion, solvent-free epoxy paint.

For further information on the shipbuilding services of ARN,

Circle 132 on Reader Service Card

NAPVO To Hold 1991 Annual Convention In Honolulu

The National Association of Passenger Vessel Owners (NAPVO) scheduled their annual convention for January 16-21, 1991, in Honolulu at the Sheraton Waikiki Hotel.

The trade association, which includes operators of dinner cruises, excursion boats, car and passenger ferries, windjammers, and whale-watching vessels, plans more than 15 small group workshops, three social functions, a trade show with more than 60 exhibitors, plus plenary sessions.

In addition to the Honolulu sessions, the association also scheduled activities on Maui from January 21-23 to give participants an opportunity to examine industry operations in Hawaii.

GASTECH 90

The 14th International LNG/LPG Conference & Exhibition
RAI Congress Centre, Amsterdam, December 4-7, 1990

CONFERENCE PROGRAMME

Gastech Official Reception.
Graciously hosted by Kvaerner, Norway

Session 4: TRANSPORTATION, TECHNOLOGY & OPERATIONS

Part 1: Liquefied gas technology at sea

Chairmen: R.C. Flooks, Consultant, UK and W. Brumshagen, Managing Director, LGA Gastechnik GmbH, Remagen-Rolandseck, Germany

Development and experience of a low boil-off panel insulation system for LNG carriers, H. Hashiguchi, N. Kamoi, A. Murakami & I. Kaku, Kawasaki H I Ltd, Kobe, Japan

Studies on the behaviour of a floating LPG plant in the open sea, Widodo Pangestu, New Shipbuilding Department, Pertamina, Jakarta, Indonesia

Super performance of future LFG/LPG carriers. A technical and economical analysis, H. Pakleppa, LGA Gastechnik GmbH, Remagen-Rolandseck, Germany

The IHI SPB LNG carrier, Dr T. Fujitani, Head, LNG Project, Y. Okumura and A. Ando, Ishikawajima-Harima Heavy Industries Co. Ltd, Tokyo

High flexibility and effective operating cost reduction for the LNG carrier "Ekaputra" due to low boil-off rate, Drs. R. Tanudjaja and B. Lanquetin, Pertamina, Jakarta, Indonesia

Part 2: Gas carrier longevity: Is age a criterion for replacement?

Chairmen: R.J. Lakey, President, Robert J. Lakey & Associates, Inc, Houston, Texas, USA and Captain Ghani Ishak, Director, LNG, Malaysian International Shipping Corporation Berhad, Kuala Lumpur

Gas carriers after 20 and more years' service: a classification society's experience, Speaker to be announced. Registro Italiano Navale, Genoa, Italy

Useful service life of LNG carriers - 20, 30, 40 years?, B. Thygesen, Vice President, Fleet Operations (LNG), Gotaas-Larsen Ltd, London

Service longevity of a spherical tank LNG vessel - a study based on the "LNG Aquarius" class design and experience, E.G. Tornay, Vice President Engineering and R.A. Gilmore, Marketing Director, Energy Transportation Corporation, New York

5 C3/C4 LPG tanks of 80 000 m³ completed after 8 years' standstill due to the Gulf War, K. Hahnel, LGA Gastechnik, Remagen-Rolandseck, Germany

Planning for longevity: a review of R&D design and construction of three series of large LNG carriers, N. Itoyama, Chief Naval Architect, Mitsubishi Heavy Industries Ltd., Tokyo

Session 5: A REVIEW OF EXISTING LNG PLANT, TERMINALS AND SHIPS: PROGNOSIS FOR THE FUTURE

Chairman: P. Anderson, Poten & Partners, Inc., New York, NY

This is to be a Commercial Workshop discussion session with no formal papers. The session panellists will be named in the next conference programme brochure.

Session 6: FUTURE GAS PROJECTS

Chairman: J. Ball, Director, Gas Matters, London

The Second Anzai Paper on Expanding the Commercial Frontiers of Natural Gas

Applying past lessons to financing future projects, A. Mashayekhi, Chief, Natural Gas Development, Industry & Energy Department, The World Bank, Washington DC and D. Amanda, Associate Consultant, EconoMatters, London

TAGS - LNG's largest export project, W.V. McHugh, President and Chief Executive Officer, Yukon Pacific Corporation, Anchorage, Alaska

Natural gas utilisation in India - opportunities and options, R.P. Sharma, Gas Authority of India, New Delhi

Plans for natural gas importation into Greece. The LNG terminal at Revythousa Island, L. Dragatakis, Project Manager, D.E.T.A., Athens

Current research directions into natural gas utilisation in Malaysia, Dr Ramlee Karim, Petronas, Petroleum Research Institute, Selangor, Malaysia

Power generation: a driving force behind natural gas demand growth, J.P. Jonchere, BEICIP, Rueil-Malmaison, France

Gas and the greening of Third World power generation - a development strategy, D. Spottiswoode, Partner, Alphanatia Group, London

Discussion on the foregoing papers

Note: The speakers listed in this session will be joined by the authors of the Anzai Paper and by other invited panellists

Session 7: LIQUEFIED GAS TERMINALS AND STORAGE

Chairman: C.A. Durr, Technology Manager, Gas Processing, M.W. Kellogg Company, Houston, Texas, USA

Distribution management for liquefied gas terminals, W. Riederer, LGA Gastechnik GmbH, Remagen-Rolandseck, Germany

Cryogenic technology for the recovery of liquid hydrocarbons from refinery fuel streams, T.R. Tomlinson, Costain Engineering Ltd, Manchester, England

Natural gas liquefaction in Northern Norway, H. Mork, Statoil, Stavanger, Norway and M.D. Webster, Bechtel Ltd, London

Membrane technology for purification and separation of hydrocarbon gases, Prof. A.I. Gritsenko, General Director & B.G. Bergo, VNPO Sojuzgazteknologiya, Moscow, USSR

Measurement of the velocity of natural convection movements in an LNG storage tank, O. Marcel and J.F. Aubron, Gaz de France, DETN, Saint-Denis, France

Debottlenecking a gas plant to enhance capacity from 450 MMSCFD to 540 MMSCFD, M. Salem Al-Dhaheri and M. Anani, Abu Dhabi National Oil Company, Abu Dhabi, United Arab Emirates

Experience with mounded LPG storage at Gaz de France, C. Carre and P. Bre, Gaz de France, Production and Transmission, Paris

REGISTRATION

We wish to make Conference Registration(s) for delegate(s) and enclose our cheque for made payable to Gastech Ltd. Conference fee of £480.00/Dfl.1600 (or equivalent in other currencies) includes Conference Papers, participants list, two buffet parties, 3 lunches and coffee breaks

Delegates who will attend (please print)

Name
Title
Name
Title
Company

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Great Lakes Dredge Offers Marine Yard Services From South Chicago Facility

Marine yard facilities including a 53-foot-wide by 120-foot-long, 1,500-ton drydock are being offered to the Great Lakes marine trade by Great Lakes Dredge & Dock Company, according to an announcement by **D.D. Barlow**, president of the 100-year-old marine contracting firm.

The yard, which is on the Calumet River at Turning Basin No. 1, is serviced by the Chicago Short Line Railroad, and is accessible from the Mississippi River via the Calumet River and the Chicago Sanitary and Ship Canal. The yard operates under the general supervision of **Robert Kilander**.

For further information,

Circle 35 on Reader Service Card

Brittany Orders Cross-Channel Ferries From Masa-Yards

Finnish shipbuilder Masa-Yards Inc. has received an order from Brittany Ferries to build a new car/passenger ferry for cross-Channel service.

The 27,000-gt ship, which has capacity for over 2,100 passengers, will be constructed at Masa's Turku facility. Design plans call for the ferry to have an overall length of 529 feet and a breadth of 85 feet. Masa has scheduled delivery of the vessel for the spring of 1992.

The ferry will be able to attain a service speed of 21 knots. The scheduled route for the vessel is between Portsmouth, England, and Caen, France.

Masa has also announced that they are on the verge of completing a second deal with Brittany Ferries for a new freight ferry, which will be operated between Poole, England, and Cher-



Artist's conception of Brittany's new cross-Channel ferry.

bourg, France. If this second contract is confirmed, the combined value of the two contracts is estimated to be about \$210 million.

For further information regarding facilities available from Masa-Yards Inc.,

Circle 102 on Reader Service Card

Hydro Brochure Highlights Latest Garbage Treatment Systems For Cruise Ships

International regulations for prevention of pollution by garbage from ships have become much more stringent in recent years, requiring the installation of an effective on-board garbage handling and incineration system.

Norsk Hydro Environmental and Energy Systems, which has many years of experience in engineering and manufacturing of waste-handling systems, has published a full-color brochure on cruise ship waste treatment plants tailor-made to achieve maximum effect and best economy.

State-of-the-art combustion technology as used in the Norsk Hydro multi-chamber partial pyrolytic ma-

rine incinerators precludes the emissions of black smoke, fly ash, malodors or toxic substances. The waste handling system has been developed into an automated process—garbage is fed into the system as close as possible to where it is generated and subsequently not seen again. The sterile ash is automatically and continuously removed from the incinerator and discharged to the sea.

A typical automated plant on board a modern cruise ship is diagrammed in the brochure, and equipment necessary for the plant is listed for dry burnable garbage, non-burnable garbage, and wet garbage. Each individual system can be fitted to existing vessels already in operation or vessels under construction.

Hydro also provides project organization, installation supervision, startup, training and after sales service.

For more information and a free copy of the brochure from Norsk Hydro Environmental and Energy Systems,

Circle 110 on Reader Service Card

Unitor Buys Singapore Marine Refrigeration Service Company

Unitor Ships Service AS, an international ship's supply company based in Kolbotn, Norway, recently acquired Leading Engineering & Refrigeration Pte. Ltd., one of Singapore's largest marine refrigeration companies.

Lee Fook Choy, owner and manager, will continue to manage Leading Engineering & Refrigeration, which has an annual turnover of more than \$2.5 million.

The purchase increases Unitor capacity to perform more conversions of shipboard reefer plants from systems using environmentally harmful refrigerants to more environmentally friendly systems, the company said. During the past year, Unitor has focused on this area, and is setting up special service stations to carry out conversions. By the end of 1990, the company said 16 conversion service stations would be in 16 ports worldwide.

For more information on Unitor,

Circle 142 on Reader Service Card

Bailey Controls Guide Details Steam Generator Emission Control Units

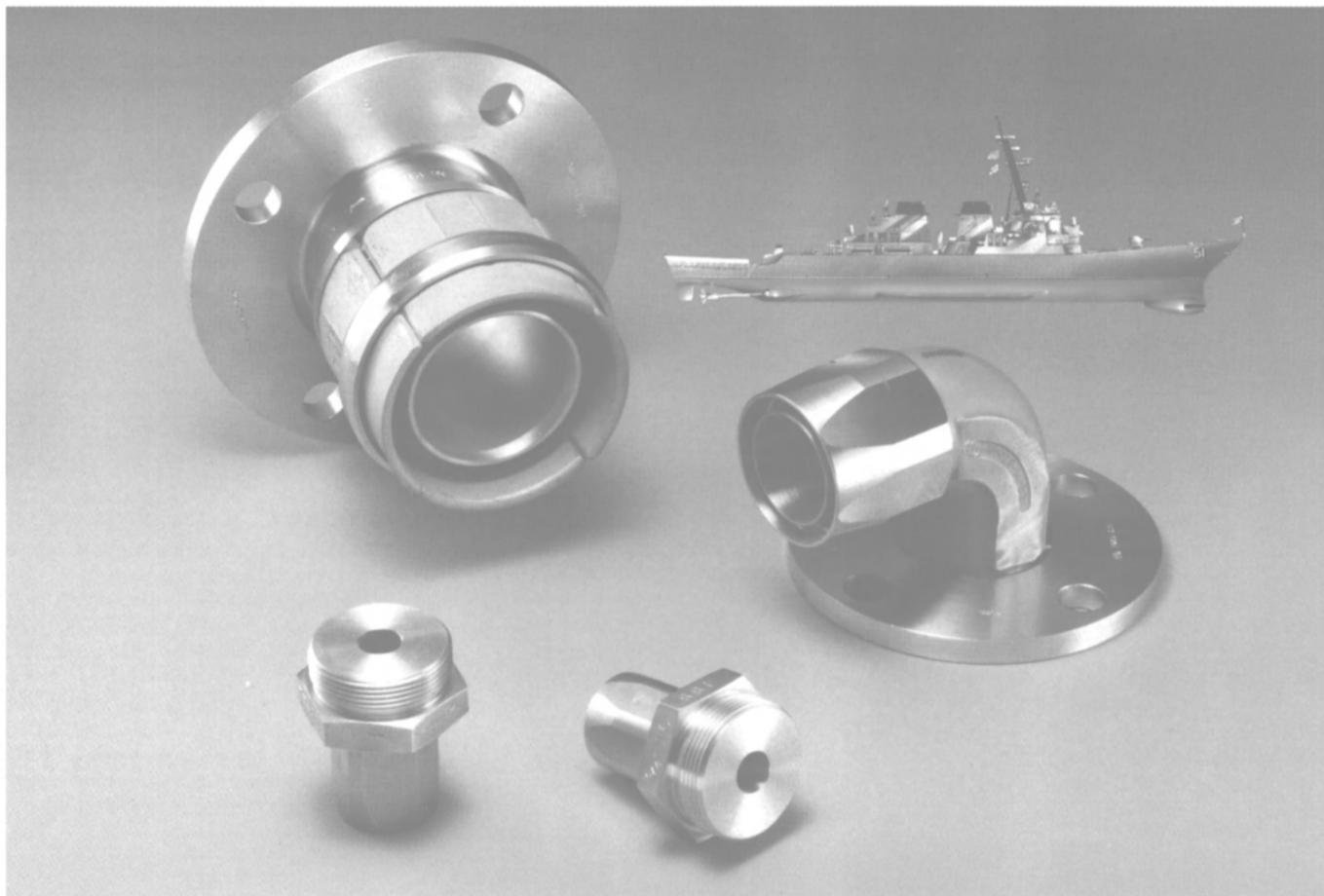
A new application guide, entitled "Combustion Zone NO_x Control Systems for Utility and Industrial Steam Generators", is now available from Bailey Controls. The publication discusses the benefits of applying state-of-the-art control system technology to NO_x formation, including potential fuel savings.

The guide outlines how advanced control strategies can enhance performance, and offers a section on conventional and advanced control strategies. There is also a detailed, yet concise explanation of the chemical processes involved in formation of oxides of nitrogen.

The publication outlines a variety of popular NO_x control approaches, including Burners-Out-Of-Service, Overfire Air, Water Injection, Flue Gas Recirculation and others, for the most commonly used fuels.

For a free copy of this publication,

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Shipboard corrosion problems solved.

Aeroquip engineers, working with the Navy on corrosion resistance technology for the DDG51 program, developed a line of noncorrosive Monel and stainless steel reusable fittings.

In addition to solving the corrosion problem, the Aeroquip designed hose fittings also extend service life and quickly refit at sea. Replacement fittings are not necessary. With Aeroquip reusable fittings, "inventory" is already in place on the old fluid line.

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3/8" to 10" are available. Configurations include 90° doglegs, male O-Ring seals, and 150 pound and 600 pound commercial flanges. If you have other requirements, call us and we'll team you with our engineers to solve your problem.

Send for FREE Bulletin 2286.

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NAVSEA approved... reusable fittings for rapid replacement of hose lines. Three piece, bolt-together fittings are easily assembled with hand tools.

*Teflon is a DuPont trademark

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Aeroquip RISIC 3 Couplings provide improved system flexibility for piping on ship water and oil service. RISIC 3 is approved for use on U.S. Navy surface and subsurface vessels.

Consult Aeroquip for your application.

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Marine Hose and Fittings

Aeroquip FC300 AQP® hose now has NAVSEA approval. FC300 hose has been engineered for demanding high temperature shipboard applications and is available with a complete selection of fittings. FC300 also exceeds SAE 100R5 specifications.

Request FREE Catalog 306A

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IM62

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

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AIRBORNE ULTRA-SOUND INSTRUMENTS

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AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION

Adrick Marine Corp., 320 Cantor Ave., Linden NJ 07036
Bailey Group, 2323 Randolph Ave., Avenel, NJ 07001
Stal Refrigeration AB, Butangsgatan 16, S-601 87 Norrköping, SWEDEN

BALLAST

Genstar Stone Products, Executive Plaza IV, Hunt Valley, MD 21031
Keel Co., 327 East B Street, Wilmington, CA 90744
Mineral Research & Recovery Inc., 4565 S. Palo Verde, Ste 203, Tucson AZ 85714

BARGE BUILDING

Conrad Industries, P.O. Box 790, Morgan City LA 70381

BARGES—Leasing

McDonough Marine Service, P.O. Box 1825, Parkersburg WV 26101
Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

BASKET STRAINERS

Beaird Industries, P.O. Box 31115, Shreveport, LA 71130
Cleveland Gear, 3249 E. 80 St., Cleveland OH 44104

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B.F. Goodrich (formerly L. Q. Moffitt, Inc.) P.O. Box 5550, Akron, OH 44313
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Thomson Gordon Ltd., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6
Waukesha Bearings, P.O. Box 798, Waukesha WI 53187

BOILER CLEANING

Asea Stal, 50 Chestnut Ridge Rd., Montvair NJ. 07645
Thomas C. Wilson, Inc., 21-11 44th Avenue, Long Island City, NY 11101

BOILERS—Manufacturers

Aalborg Ciser (Miami), Inc., 1539 SW 21st Avenue, Ft. Lauderdale, FL 33312

BROKERS

Captain Astad Company, Inc., P.O. Box 350486, Ft Lauderdale, FL 33335
2900 Energy Centre, 1100 Poydras Street, New Orleans, LA 70163-2900
Jack Faulkner, 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960

BUNKERING

Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

CARGO ACCESS EQUIPMENT

Morgan Crane Co. Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1300 Normandy Place, Santa Ana CA 92705

CHAIN

Baldt, Inc., 6 M. Butler St., Chester, PA 19013
Crandall Dry Dock Engineers Inc./Marit Chain, 21 Pottery Lane, Dedham MA 02026
Lister Chain & Forge, 3810 Loomis Trail Road, Blaine, WA 98230
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020
Washington Chain & Supply, 2901 Utah Ave South, Seattle WA 98124

CHEMICAL CLEANERS

Charlie Chemical & Supply, Inc., P.O. Box 4639, Greenville, MS 38704-4639

CHOCKING COMPOUNDS

ITW Philadelphia Resins, 130 Commerce Drive, Montgomeryville, PA 18936

CLAMPING—Pipe, Tubes, Hose

ZSI, 32497 Schoolcraft Road, Livonia, MI 48105

COMPACTORS

International Compactor, Inc., P.O. Box 5918, Hilton Head, SC 29938
Resource Technology Group, P.O. Box 159, 1015 Middletown Ave., Northford CT 06472
Thorne Compactors & Trash, Inc., 14055 Grand Avenue, Burnsville, MN 55337
A/S Vesta, Skudehavsvvej 27, DK-2100 Copenhagen, DENMARK. Sales Agents: American United Marine Corp., 5 Broadway, Rt 1, Saugus, MA 01906, USA

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TIMSCO, P. O. Box 91360, Mobile AL 36691

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Doucette Industries, Inc., 701 Grantley Road, P.O. Box 2337, York, PA 17405

IMO Delaval Inc., P.O. Box 6550, Lawrenceville, NJ 08648

Wright Austin Co., 3250 Franklin St., Detroit MI 48207

CONTROL SYSTEMS—Monitoring

ASEA, Inc., 4 New King St., White Plains, NY 10604
Autronica Marine USA, 234 Industrial Parkway, Northvale, NJ 07647
The Clark-Reliance Corporation, 16633 Foltz Industrial Parkway, Strongsville OH 44136
Eldec Corp., P.O. Box 100, Lynnwood, WA 98046-0100
Henschel, Inc., 9 Hoyt Drive, Newburyport MA 01950
IMO Industries, Gems Sensors Division, One Cowles Rd., Plainville CT 06062
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696

Marine Electric RPD, Inc., 50 Carol St., P.O. Box 1135, Clifton NJ 07014
NAMCO Controls, 7567 Tyler Blvd, Mentor OH 44060

Robertson Marine Systems, 3000 Kingman St., Suite 207, Metairie, LA 70006

TANO Marine Systems Inc., 4301 Poche Court West, New Orleans LA 70129

Teleflex Inc., 771 First Ave., King of Prussia, PA 19406

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 Gavo Marine Hydraulics Inc., 207 W. Central Ave., Maywood NJ 07607
telex: 132610 DELMARINE

Effer S.p.A., 40013 Castel Maggiore, Bo, ITALY

Liebherr-Werk Nenzing GES.mbh, P.O. Box 10, A-6710 Nenzing, AUSTRIA
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
Morgan Crane Co. Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1300 Normandy Place, Santa Ana CA 92705

Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883

Reco Crane Co., P.O. Box 10296, New Orleans LA 70181

Westmont Industries, 10805 Painter Ave., Santa Fe Springs, CA 90670

Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

CYROGENICS

Technigaz, Division of Bouygues Offshore, 3 rue Stephenson, 78884 St. Quentin en Yvelines

DECK MACHINERY—Cargo Handling Equipment

All Set Marine Lashing AB, P.O. Box 14112, S-161 14 Bromma, SWEDEN

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), 1300 Normandy Place, Santa Ana CA 92705

Slattery Equipment Co., Inc., 4403 20th Street East, Fife, WA 98424

Willem Pot b.v., P. O. Box 29102, 3001 GC Rotterdam, The Netherlands

DECKS

Boatlife, 205 Sweet Hollow Road, Old Bethpage, NY 11804

DEHUMIDIFIERS

L&C Associates, 216 Lafayette Rd., North Hampton NH 03862

DIESEL ACCESSORIES—CYLINDER LINERS

Acreux 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

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

Aalborg Ciser (Miami) Inc., 1539 SW 21st Avenue, Ft. Lauderdale, FL 33312

Alaska Diesel Electric, P.O. Box 70543, Seattle, WA 98107

Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511

Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005

Golden Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231

Grace Dearborn, W.R. Grace & Co., 300 Genesee Street, Lake Zurich, IL 60047

Hatch & Kirk, 5111 Leary Avenue NW, Seattle, WA 98107

Kim Hotstart Mfg Co., E 5724 Broadway Ave, P.O. Box 42, Spokane WA 99210

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

MTU of North America, 10450 Corporate Drive, Houston, TX 77478

Markisches Werk GmbH, P.O. Box 11442, 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

DRY DOCKS—Design

Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381

Marine Design Services, P.O. Box 928, Bonita CA 92002

M.A.N. GHM Sterkrade, P.O. B. 110240, D-4200 Oberhausen 11, West Germany

ELECTRICAL EQUIPMENT

Consolidated Switch Gear Inc. P.O. Box 8745, Mandeville, LA 70470-8745

Eldec Corp., P.O. Box 100, Lynnwood, WA 98046-0100

L. F. Gaubert & Co., Inc., P. O. Box 50500, New Orleans LA 70150

MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696

SPD Technologies, 13500 Roosevelt Blvd., Philadelphia PA 19116

ELECTRONIC DISPLAY

Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY

ELECTRONIC ENCLOSURES

A&J Manufacturing, 14131 Franklin Ave., Tustin CA 92680

ELECTRONIC INFORMATION SUPPORT

Inventory Locator Service, 3965 Mendenhall Road South, Suite 10, Memphis, TN 38115

ENGINE TEST EQUIPMENT

General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360

Instruments, Computers, & Controls, Inc., 6942 Haven Creek Dr., Katy TX 77449

EQUIPMENT—Marine

Byrne, Rice & Turner, Inc., 1172 Camp St., New Orleans LA 70130

Dynabrade, 72 E Niagara St., Tonawanda NY 14150

Gladsky Marine, Garvies Point Road, Glen Cove, NY 11542

Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302

EVAPORATORS

Alfa-Laval, Desalt A/S, Stamholmen 93, DK-2650 Hvidovre, Copenhagen, DENMARK

Aqua-Chem, Water Technologies Div., P.O. Box 421, Milwaukee WI 53201

Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130

Equipment Engineering, 666 Baker St., #265, Costa Mesa CA 92626

FANS—VENTILATORS—BLOWERS

Carling Turbine Blower Company, 10 Nebraska St., P.O. Box 88, Worcester MA 01613

Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA 94402

FASTENERS

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

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020

Rowe Bumpers, Conveyor & Caster Corporation, 3501 Detroit Avenue, Cleveland, OH 44113

Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook VA 22624

FUEL ADDITIVES, CONDITIONING

Fuel Conditioning, 2500 Hampton Blvd., Norfolk VA 23517

U.S. Borax/Industrial Chemicals, 3075 Wilshire Boulevard, Los Angeles, CA 90010

GALLEY EQUIPMENT

Cospolch Refrigerator Co., 949 Industry Rd., Kenner LA 70062

Gaylord Industries, 10900 S W Avery St, P.O. Box 1149, Tualatin, OR 97062

McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454

GANGWAYS, LADDERS

Coast Marine & Industrial Supply Inc., 398 Jefferson St., San Francisco, CA 94133

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

Sea Systems Inc., 65 Avco Road, Ward Hill, MA 01835

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

GEARS

IMO Delaval, Inc., P.O. Box 6550, Lawrenceville, NJ 08648

HEAT EXCHANGERS

Alfa-Laval, Desalt A/S, Stamholmen 93, DK-2650 Hvidovre, Copenhagen, DENMARK

Alfa-Laval Separation Inc., 2115 Linwood Avenue, Fort Lee, NJ 07024

Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130

Doucette Industries, Inc., 701 Grantley Road, P.O. Box 2337, York, PA 17405

Thomas C. Wilson, Inc., 21-11 44th Avenue, Long Island City, NY 11101

HORNS/WHISTLES

Kohlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241

HOSE

HBD Industries, Inc., 1801 S. Railroad Street, Salisbury, NC 28145-0948

Nufflex, Inc., 1826 E. Elizabeth Avenue, Linden, NJ 07063

HYDRAULICS

Aeroquip Corporation, 3000 Strayer, P.O. Box 631, Maumee, OH 43537-0631

Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken NJ 07030

Del Gavo Marine Hydraulics Inc., 207 W Central Ave., Maywood NJ 07607;

telex: 132610 DELMARINE

HYDROSTATIC REMANUFACTURING

Hydra Service, Inc., 12332 East First Street, Tulsa, OK 74128

INCINERATORS

Teamtec A/S, P.O. Box 100, N-4912 Gjeving, NORWAY

A/S Vesta, 27 Skudehavsvvej, DK-2100 Copenhagen DENMARK. US Agent:

American United Marine, 5 Broadway, Rte 1, Saugus, MA 01906

INSULATION

Soundcoat Company, 1 Burt Drive, Deer Park, NY 11729

INTERIOR DESIGN

Feathers Corp., P.O. Box 934, Langley WA 98260

JOINER—Watertight Doors—Paneling—Ceiling Systems—Decking

ES Marine Systems Corp., 550 S. Fulton Avenue, Mount Vernon, NJ 10550

IMAC AB, Berga Alle 1, S-252 55 Helsingborg, SWEDEN

U.S. Rep: Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980

E.H. O'Neill Company, 5515 Belair Rd., Baltimore MD 21206

Walz & Krenzer Inc., 1390 Mt. Read Blvd., Rochester NY 14606

KEEL COOLERS

R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

LEGAL SERVICES

American Maritime Correspondents, One Embarcadero Center, Suite 330, San Francisco, CA 94111

John Jozwick, c/o Bryan, Schiffrin & McMonagle, First & Cedar Bldg., Suite 350, 2701 First Ave., Seattle WA 98121

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights

Carlisle & Finch, 4562 W. Mitchell Ave., Cincinnati OH 45232

Phoenix Products, 6161 N 64th St., Milwaukee WI 53218

LINE BLINDS

American Piping Products Inc., Box 1056, New Hyde Park, NY 11040

Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474

LOGISTICS

VL Logistics Consultants, Inc., 3420 Bienville Blvd., Ocean Springs MS 39564

QED, 4646 N. Witchduck Road, Virginia Beach, VA 23455

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING

Del Gavo, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DELMARINE

Golden Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231

MACHINING—On Site Repair

Furmanite, 535 London Bridge Road, Virginia Beach, VA 23454

MARINE CHEMICALS

Nalfeet, Bull & Roberts, 155 Morris Ave., Springfield NJ 07081

MARINE CONSULTING

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 Turquoise 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
Nautical Designs, Inc., 2101 S Andrews Ave, Suite 202, Ft Lauderdale FL 33316

Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean Oil International Engineering Corp., 3019 Mercedes Blvd, New Orleans LA 70114

Omega Marine Engineering Systems, Inc., 11757 Katy Freeway, Ste 1200, Houston TX 77079

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
Sea School, 10812 Gandy Boulevard, St. Petersburg, FL 33702
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
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

NAVIGATION & COMMUNICATIONS EQUIPMENT

Comsat Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Henschel, Inc., 9 Hoyt Drive, Newburyport MA 01950
Kelvin Hughes Ltd., New North Rd., Hainault, Ilford, Essex IG6 2UR England

Hull Electronics, 7563 Conroy Court, San Diego, CA 92111
Mackay Communications, 441 US Highway #1, P.O. Box 331, Elizabeth NJ 07207

Magnavox MSS, 2895 Maricopa St., Torrance CA 90503
Marine Electric RPD Inc., 50 Carol St., P.O. Box 1135, Clifton NJ 07014-1135

Mobile Telesystems, Inc., 300 Professional Drive, Gaithersburg, MD 20879
Naval Electronics, 5417 Jetview Circle, Tampa FL 33634
Radio Holland USA B.V., 8943 Gulf Freeway, Houston, TX 77017
Robertson-Shipmate, Inc., 400 Oser Ave., Hauppauge NY 11788

S.P. Radio A/S, DK-9200, Aalborg SV, DENMARK
Singapore Telecom, Orchard Point Post Office, P.O. Box 38, Singapore 9123

Sperry Marine Inc., 1070 Seminole Trail, Charlottesville VA 22906
Trimble Navigation, 585 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94088

Watercom Communications Systems, 453 E. Park Place, Jefferson IN 47130

NOZZLES

Nautican Enterprises Ltd., 407 Mountain Highway, North Vancouver, B.C. V7J 2L1

OILS—Marine—Additives

Burmah-Castrol Inc., Raritan Plaza II, Raritan Center, Edison NJ 08837
Castrol, Inc., Raritan Plaza II, Raritan Center, Edison, NJ 08837
Chevron, USA, 575 Market Street, San Francisco, CA 94105
Exxon Company International, 200 Park Ave., Bldg 222, Room A279, Flaham Park NJ 07932, P.O. Box 4706, Houston, TX 77210-4706
Mobil Oil Corporation, 3225 Gallows Road, Fairfax, VA 22037-0001
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., 3240 N. Broadway, St. Louis, MO 63147
Jofra, 67-55 Woodhaven Boulevard, Rego Park, NY 11374
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696

PAINTS—COATINGS—CORROSION CONTROL

American Abrasive Metals Co., 460 Coit St, Irvington NJ 07111
Armcor Sales Inc., 2 Marineview Plaza, Hoboken NJ 07030
Chugoku Marine Paints (USA) Inc., 1610 Engineers Road, Belle Chasse, LA 70037
Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
International Paint (USA) Inc., 6001 Antoine Dr., P.O. Box 4806, Houston TX 77210-4806

LTC International, 101-G Executive Dr., Sterling VA 22170
Sigma Coatings, 8979 Market St., Houston, TX 77029, 330 Rover Road, Harvey, LA 70059, 1100 Adams St., Hoboken, NJ 07030

Walter Thorsen, Inc./PROTECNO, 79 Oweno Road, P.O. Box 755, Mahwah, NJ 07430-0755
Unitor Ships Service, Unitor Marine Chemicals Division, 3 High St., Rickmansworth, Herts, WD3 1SW UNITED KINGDOM

PIPE FITTINGS/CONNECTING SYSTEMS

Aeroquip Corporation, 3000 Strayer, P.O. Box 631, Maumee OH 43537-0631

Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
IMO Industries Inc., Wiggins Connectors Div., 5000 Triggs St., P.O. Box 22228, Los Angeles CA 90022

PORT SERVICES

Port of Iberia, P.O. Box 897, New Iberia LA 70561
Port of Orange Texas, P.O. Box 516, Orange, TX 77630

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines

ASEA Brown Boveri, 1460 Livingston Ave., North Brunswick NJ 08902
Bergen Diesel A/S, P.O. Box 924, N-5002, Bergen, NORWAY
Bird Johnson Company, 110 Norfolk St., Walpole, MA 02081
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
CWF Hamilton & Co., Ltd., P.O. Box 709, Christchurch, New Zealand
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005

Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Electro-Motive Division of GM, 9301 W 55th St., LaGrange, IL 60525
Fincantieri, Diesel Engines Division—GMT, Bagnoli della Rosandra 334, Trieste, ITALY
GE Marine & Industrial, 1 Neumann Way N-158, Cincinnati OH 45215

GE Naval & Drive Turbine Systems Department, 166 Boulder Dr., Fitchburg MA 01420
General Motors, Allison Gas Turbine, P. O. Box 420, U-6, Indianapolis IN 46206

KaMeWa, P.O. Box 1010, S-681 01 Kristinehamn, SWEDEN
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

Krupp MoK, 226 Britannia Road East, Mississauga, Ont., CANADA L47156
Mapeco Products Inc., P.O. Box 6, 725 Glen Cove Ave., Glen Head NY 11545

Marine Gears, Inc., P.O. Box 689, Greenville MS 38707
Marine Systems Inc., 2032 Atlantic Ave., Chesapeake VA 23324
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
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
Northwest Marine Services Corp., 6452 So. 144th St., Tukwila WA 98168
Omnithruster Inc., 9515 Sorensen Ave., P.O. Box 2144, Santa Fe Springs, CA 90670

Okavo Steel Couplings AB Sweden, S-813 00 Hofors SWEDEN
Propulsion Systems, 1441 N Northlake Way, Seattle WA 98103
Rolla SP Propellers SA, Via Silva 5, P.O. Box 251, 6828 Balerna SWITZERLAND

Rolla SP Propellers USA, 4030 Mustang Road, Melbourne, FL 32934, USA

Karl Senner Inc., 25 W Third, Kenner LA 70062
Schottel-Werft, D-5401 Spay, West Germany
Stewart & Stevenson, 1400 Destrehan, P.O. Box 8, Harvey LA 70059-0008
Sulzer Diesel Ltd., 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

Oy Wartsila Ab, Vasa and Abo Divisions, Vasa Factory, FINLAND
Westech Gear Corp., 2600 E. Imperial Highway, Lynwood, CA 90262
ZF of North America, Marine Sales, 500 Barclay Blvd, Lincolnshire IL 60069

PROTECTIVE WRAPS

FANA (Film Applicators of North America), 1260 E Woodland Ave., Springfield PA 19064

PUMPS—Repairs—Drives

Coffin Turbo Pump, Inc., 326 S. Dean Street, Englewood, NJ 07631
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DELMARINE

Golten Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231
Houser Marine, Lario Division, 1713 S McKenzie St., Foley AL 36535
Imo-Delaval, Inc., IMO Pump Division, Box 447, Monroe NC 28810
Jim's Pump Repair, 48-55 36th St., Long Island City NY 11101
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238

Vita Motivator, 99 W Hawthorne Ave., Suite 622, Valley Stream NY 11580

REMOTE VALVE OPERATORS

Teleflex, Inc., 771 First Ave., King of Prussia, PA 19406

ROPE—Manila—Nylon—Hawesers—Fibers

Allied Signal Inc., Fibers Division, 1411 Broadway, New York, NY 10018
Atlantic Cordage Corp., 60 Grant Ave., Carteret, NJ 07008
Columbian Rope Corp., P.O. Box 270, Guntown, MS 38849
Dupont Company, Montgomery 403, 1011 Centre Road, Wilmington, DE 19805

Samson Ocean Systems, 2090 Thornton St., Ferndale WA 98248

SANITATION DEVICES—Pollution Control

Byrne, Rice & Turner, Inc., 1172 Camp Street, New Orleans, LA 70130
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
FAST Systems, Inc., 3240 N. Broadway, St. Louis MO 63147
Precision Control Inc., 3154 Martin Rd., Walpole Lake MI 48088
Research Products/Blankenship (Incinole), 2639 Andjion, Dallas, TX 75220

SCAFFOLDING

Spider Staging Corp., 13536 Beacon Coal Mine Rd S., Seattle WA 98178

SCALE MODELS

Sturgeon Bay Model Shop, 187 N Ninth Ave., Sturgeon Bay WI 54235

SCUTTLES/MANHOLE

L.S. Baier & Assoc., 7527 NE 33rd Dr., Portland OR 97211
Walz & Krenzer, Inc., 725 Glen Cove Ave., P.O. Box 6, Glen Head NY 11545

SHIPBUILDING EQUIPMENT

M.A.N.—GHH, Sterkrade Werfrabe 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
Offshore Industries, Inc., 144 Railroad Ave., Suite 206, Edmonds WA 98020

SHIPBUILDING—Repairs, Maintenance, Drydocking
Astilleros Espanoles S.A., Padilla 17, 28006 Madrid, SPAIN
Avondale Industries Inc., P.O. Box 50280, New Orleans LA 70150

Bellinger Shipyard, Division of Jacksonville Shipyards, Inc., 13911 Atlantic Boulevard, Jacksonville, FL 32225
Bender Shipbuilding & Repair Company, Inc., P.O. Box 42, Mobile AL 36601

Bethlehem Steel, Martin Tower, Bethlehem PA 18106
Bethlehem Steel, Baltimore Marine Div., Sparrows Point Yard, Sparrows Point MD 21219
Blount Marine, Box 368, Warren RI 02885

Brodosplit Shipbuilding Industry, Put Udarnika 19, P.O. Box 17, 58000 Split YUGOSLAVIA
Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381

Curacao Drydock (USA), Inc., P.O. Box 3012, Curacao, Netherlands Antilles
Eastern Shipyards, Inc., Energy Centre, Suite 2900, 1100 Poydras Street, New Orleans, LA 70163
Equitable Shipyards Inc., Trinity Marine Group, Box 29266, New Orleans LA 70189

Fincantieri SpA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
Galveston Shipbuilding, 6800 Port Industrial Boulevard, P.O. Box 2660, Galveston, TX 77553

Gladding-Hearn Shipbuilding, The Duclos Company, One Riverside Avenue, Box 300, Somerset, MA 02726
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

In-Place Machining Co., 1929 N. Buffum Street, Milwaukee, WI 53212-3793
Jeffboat, Inc., P.O. Box 610, Jeffersonville IN 47130
Koch Ellis Barge & Ship Service, P.O. Box 9130, Westwego LA 70094

Lisnav, Apartado 2138, 1103 Lisbon, Codex PORTUGAL
M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany

MIL Davie, Inc., P.O. Box 130, Levis, Quebec, CANADA
Marco, Inc., 2300 W Commodore Way, Seattle, WA 98199
T. Mariotti, Calata Chiappella, 16126 Genoa (Port) ITALY

Master Marine, Inc., P.O. Box 665, Bayou La Batre, AL 36509
Munson Manufacturing, 150 Dayton, Edmonds WA 98020
Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607

New York Shipyard Corp., One Beard St., Brooklyn NY 11231
North Florida Shipyard, Commodore Point, P.O. Box 3255, Jacksonville FL 32206

SeaArk, P.O. Box 210, Monticello AR 71655
Service Marine Industries, P.O. Box 3606, Morgan City LA 70381
Skipperliner Shipyards, 621 Park Plaza Dr, Dept 21, LaCrosse WI 54601
Swath Ocean, 979 G Street, Chula Vista, CA 92001

3 Maj Associates Shipbuilding Industry, P. O. Box 117, 51001 Rijeka YUGO-SLAVIA

Textron Marine Systems, 6600 Plaza Drive, New Orleans, LA 70127-2584
Trinity Marine Group, Box 29266, New Orleans LA 70189
Wartsila Marine Industries AB, P.O. Box 1090, SF 00101 Helsinki, FINLAND

Willard Marine Co., Inc., 1250 N. Grove Street, Anaheim, CA 92806
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

SIMULATOR TRAINING

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

SILENCERS

Beard Industries Inc., P.O. Box 31115, Shreveport LA 71130

STABILIZERS

Seatrack Industrial Marine, 834 W. Production Place, Newport Beach, CA 92663

STAINLESS PLATE

Eastern Stainless Division, Cyclops Corporation, P.O. Box 1975, Baltimore MD 21203

STUFFING BOXES

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

SURVIVAL EQUIPMENT

Schat-Marine Safety Corp., P.O. Box 465, Foot of Industrial Rd., Farmingdale, NY 07727

Stearns Manufacturing, P.O. Box 1498, St. Cloud MN 56302
Viking Life Saving Equipment, 1625 N Miami Ave., Miami FL 33136

TANK CLEANING

Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530

TANK LEVELING INDICATORS

Autronica Marine USA, 234 Industrial Parkway, Northvale, NJ 07647
IMO Industries, 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 Marine Electronics AB, P.O. Box 13045, S-402 51 Goteborg SWEDEN

TESTING

Wyle Laboratories, 128 Maryland St., El Segundo CA 90245; P.O. Box 077777, Huntsville AL 35807-7777

TOOLS

LSP Industries, P.O. Box 5303, 2511-20th Street, Rockford, IL 61125

TORSIONAL VIBRATION SPECIALISTS

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

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.

Jack Faulkner, 2419 Caddy Lane, Flossmoor IL 60422

TURBINES

IMO Delaval Inc., P.O. Box 6550, Lawrenceville, NJ 08648

TURBOCHARGERS

Cooper Industries, Energy Services Group, North Sandusky St., Mt. Vernon, OH 43050
Aeroquip Corporation, 3000 Strayer, P.O. Box 631, Maumee OH 43537-0631

American Vulkan Corporation, P.O. Drawer 673, 2525 Dundee Rd., Winter Haven, FL 33882-0673

Cajon Co., 9760 Shepard Rd., Macedonia, OH 44056
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
Cunico Corporation, 214 N Hawaiian Ave., P.O. Box 306, Wilmington CA 90748

Elliott Manufacturing, P.O. Box 773, Binghamton, NY 13902
Stanley G. Flagg Company, 1020 W. High Street, Stowe, PA 19464
Loeffler Machine, US #1 & Robbins Ave., Pennel PA 19047
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696

Marotta Scientific Controls, Inc., 78 Boonton Avenue, P.O. Box 427, Montville, NJ 07045
Nupro Co., 4800 E. 345th St., Willoughby, OH 44094

Research Tool & Die Works, 17124 S Keegan Ave., Carson CA 90746
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474
Swagelok Company, 5171 Hudson Dr., Hudson, OH 44236
Whitey Co., 318 Bishop Road, Highland Heights, OH 44143

Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

VIBRATION ANALYSIS

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

T. W. Spaetgens, 156 W 8th Ave., Vancouver BC CANADA V5Y 1N2
Vibranalysis Engineering Corp., 4380 S. Wayside, Suite 100, Houston TX 77087

WASTEWATER TREATMENT

EES Corporation/Omnipure, An Eltech Systems Company, 12850 Bourne-wood Dr., Sugarland TX 77478

WATER PURIFIERS

Alfa-Laval, Desalt A/S, Stamholmen 93, DK-2650 Hvidovre, Copenhagen, DENMARK

Alfa-Laval Separation Inc., 2115 Linwood Avenue, Fort Lee, NJ 07024
Beard Industries Inc., P.O. Box 31115, Shreveport LA 71130
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Matrix Desalination, Inc., 3295 SW 11th Avenue, Fort Lauderdale, FL 33315

WEATHER CHART RECORDERS

Alden Electronics, 40 Washington St., Westborough, MA 01581

WELDING

American Durweld Sales, P.O. Box 850, Scituate MA 02066
Welding Consultants USA, 10399 Paradise Blvd. #101, St. Petersburg, FL 33706

WINCHES AND FAIRLEADS

Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013

Gearmatic—see 'Braden Carco Gearmatic' above.
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696

Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134

Smith Berger Marine Inc., 516 S. Chicago St., Seattle, WA 98108

WINDOWS

ES Marine Systems Corp., 550 S. Fulton Avenue, Mount Vernon, NJ 10550
Marketec, Inc., P.O. Box 999, Pisgah Forest NC 28768

WIRE AND CABLE

Seacoast Electric Company, Station Plaza, Rye NY 10580

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

ABRASIVES

Chesapeake Specialty Products, Inc., 5055 Northpoint Blvd., Baltimore, MD 21219

AIRBORNE ULTRA-SOUND INSTRUMENTS

UE Systems, Inc., 12 West Main Street, Elmsford, NY 10523

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION

Adrick Marine Corp., 320 Cantor Ave., Linden NJ 07036
Bailey Group, 2323 Randolph Ave., Avenel, NJ 07001
Stal Refrigeration AB, Butangsgatan 16, S-601 87 Norrköping, SWEDEN

BALLAST

Genstar Stone Products, Executive Plaza IV, Hunt Valley, MD 21031
Keel Co., 327 East B Street, Wilmington, CA 90744
Mineral Research & Recovery Inc., 4565 S. Palo Verde, Ste 203, Tucson AZ 85714

BARGE BUILDING

Conrad Industries, P.O. Box 790, Morgan City LA 70381

BARGES—Leasing

McDonough Marine Service, P.O. Box 1825, Parkersburg WV 26101
Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

BASKET STRAINERS

Beard Industries, P.O. Box 31115, Shreveport, LA 71130
Cleveland Gear, 3249 E. 80 St., Cleveland OH 44104

BEARINGS—Rubber, Metallic, Non-Metallic

B.F. Goodrich (formerly L. Q. Moffitt, Inc.), P.O. Box 5550, Akron, OH 44313

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Thomson Gordon Ltd., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6

Waukesha Bearings, P.O. Box 798, Waukesha WI 53187

BOILER CLEANING

Asea Stal, 50 Chestnut Ridge Rd., Montvail N.J. 07645
Thomas C. Wilson, Inc., 21-11 44th Avenue, Long Island City, NY 11101

BOILERS—Manufacturers

Aalborg Ciser (Miami), Inc., 1539 SW 21st Avenue, Ft. Lauderdale, FL 33312

BROKERS

Captain Astad Company, Inc., P.O. Box 350486, Ft. Lauderdale, FL 33335
2900 Energy Centre, 1100 Poydras Street, New Orleans, LA 70163-2900
Jack Faulkner, 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960

BUNKERING

Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

CARGO ACCESS EQUIPMENT

Morgan Crane Co. Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1300 Normandy Place, Santa Ana CA 92705

CHAIN

Baldt, Inc., 6 M. Butler St., Chester, PA 19013
Crandall Dry Dock Engineers Inc./Marit Chain, 21 Pottery Lane, Dedham MA 02026

Lister Chain & Forge, 3810 Loomis Trail Road, Blaine, WA 98230
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020
Washington Chain & Supply, 2901 Utah Ave South, Seattle WA 98124

CHEMICAL CLEANERS

Charlie Chemical & Supply, Inc., P.O. Box 4639, Greenville, MS 38704-4639

CHOCKING COMPOUNDS

ITW Philadelphia Resins, 130 Commerce Drive, Montgomeryville, PA 18936

CLAMPING—Pipe, Tubes, Hose

ZSI, 32497 Schoolcraft Road, Livonia, MI 48105

COMPACTORS

International Compactor, Inc., P.O. Box 5918, Hilton Head, SC 29938
Resource Technology Group, P.O. Box 159, 1015 Middletown Ave., Northford CT 06472

Thorne Compactors & Trash, Inc., 14055 Grand Avenue, Burnsville, MN 55337

A/S Vesta, Skudehavsvej 27, DK-2100 Copenhagen, DENMARK. Sales Agents: American United Marine Corp., 5 Broadway, Rt 1, Saugus, MA 01906, USA

COMPUTERIZED INFORMATION SYSTEMS

TIMSCO, P. O. Box 91360, Mobile AL 36691

CONDENSERS/SEPARATORS

Beard Industries Inc., P.O. Box 31115, Shreveport LA 71130
Doucette Industries, Inc., 701 Grantley Road, P.O. Box 2337, York, PA 17405

IMO Delaval Inc., P.O. Box 6550, Lawrenceville, NJ 08648
Wright Austin Co., 3250 Franklin St., Detroit MI 48207

CONTROL SYSTEMS—Monitoring

ASEA, Inc., 4 New King St., White Plains, NY 10604
Autronica Marine USA, 234 Industrial Parkway, Northvale, NJ 07647
The Clark-Reliance Corporation, 16633 Foltz Industrial Parkway, Strongsville OH 44136

Eldec Corp., P.O. Box 100, Lynnwood, WA 98046-0100
Henschel, Inc., 9 Hoyt Drive, Newburyport MA 01950
IMO Industries, Gems Sensors Division, One Cowles Rd., Plainville CT 06062
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696

Marine Electric RPD, Inc., 50 Carol St., P.O. Box 1135, Clifton NJ 07014
NAMCO Controls, 7567 Tyler Blvd, Mentor OH 44060
Robertson Marine Systems, 3000 Kingman St., Suite 207, Metairie, LA 70006

TANO Marine Systems Inc., 4301 Poche Court West, New Orleans LA 70129

Teleflex Inc., 771 First Ave., King of Prussia, PA 19406

CRANES—HOISTS—DERRICKS—WHIRLIES

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

Effer S.p.A., 40013 Castel Maggiore, Bo, ITALY
Liebherr-Werk Nenzing GES.mbh, P.O. Box 10, A-6710 Nenzing, AUSTRIA
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235

Morgan Crane Co. Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1300 Normandy Place, Santa Ana CA 92705
Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883
Reco Crane Co., P.O. Box 10296, New Orleans LA 70181
Westmont Industries, 10805 Painter Ave., Santa Fe Springs, CA 90670
Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

CYROGENICS

Technigaz, Division of Bouygues Offshore, 3 rue Stephenson, 78884 St. Quentin en Yvelines

DECK MACHINERY—Cargo Handling Equipment

All Set Marine Lashing AB, P.O. Box 14112, S-161 14 Bromma, SWEDEN

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), 1300 Normandy Place, Santa Ana CA 92705

Slattery Equipment Co., Inc., 4403 20th Street East, Fife, WA 98424
Willem Pot b.v., P. O. Box 29102, 3001 GC Rotterdam, The Netherlands

DECKS

Boatlife, 205 Sweet Hollow Road, Old Bethpage, NY 11804

DEHUMIDIFIERS

L&C Associates, 216 Lafayette Rd., North Hampton NH 03862

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
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

Aalborg Ciser (Miami) Inc., 1539 SW 21st Avenue, Ft. Lauderdale, FL 33312

Alaska Diesel Electric, P.O. Box 70543, Seattle, WA 98107
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511

Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005

Golten Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231
Grace Dearborn, W.R. Grace & Co., 300 Genesee Street, Lake Zurich, IL 60047

Hatch & Kirk, 5111 Leary Avenue NW, Seattle, WA 98107
Kim Hotstart Mfg Co., E 5724 Broadway Ave, P.O. Box 42, Spokane WA 99210

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

MTU of North America, 10450 Corporate Drive, Houston, TX 77478
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

DRY DOCKS—Design

Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381
Marine Design Services, P.O. Box 928, Bonita CA 92002

M.A.N. GHH Sterkrade, P.O. B. 110240, D-4200 Oberhausen 11, West Germany

ELECTRICAL EQUIPMENT

Consolidated Switch Gear Inc. P.O. Box 8745, Mandeville, LA 70470-8745
Eldec Corp., P.O. Box 100, Lynnwood, WA 98046-0100

L. F. Gaubert & Co., Inc., P. O. Box 50500, New Orleans LA 70150
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696

SPD Technologies, 13500 Roosevelt Blvd., Philadelphia PA 19116

ELECTRONIC DISPLAY

Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY

ELECTRONIC ENCLOSURES

A&J Manufacturing, 14131 Franklin Ave., Tustin CA 92680

ELECTRONIC INFORMATION SUPPORT

Inventory Locator Service, 3965 Mendenhall Road South, Suite 10, Memphis, TN 38115

ENGINE TEST EQUIPMENT

General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360

Instruments, Computers, & Controls, Inc., 6942 Haven Creek Dr., Katy TX 77449

EQUIPMENT—Marine

Byrne, Rice & Turner, Inc., 1172 Camp St., New Orleans LA 70130
Dynabrade, 72 E Niagara St., Tonawanda NY 14150

Gladsky Marine, Garvies Point Road, Glen Cove, NY 11542
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302

EVAPORATORS

Alfa-Laval, Desalt A/S, Stamholmen 93, DK-2650 Hvidovre, Copenhagen, DENMARK
Aqua-Chem, Water Technologies Div., P.O. Box 421, Milwaukee WI 53201

Beard Industries Inc., P.O. Box 31115, Shreveport LA 71130
Equipment Engineering, 666 Baker St., #265, Costa Mesa CA 92626

FANS—VENTILATORS—BLOWERS

Carling Turbine Blower Company, 10 Nebraska St., P.O. Box 88, Worcester MA 01613

Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA 94402

FASTENERS

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

Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020

Rowe Bumpers, Conveyor & Caster Corporation, 3501 Detroit Avenue, Cleveland, OH 44113

Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook VA 22624

FUEL ADDITIVES, CONDITIONING

Fuel Conditioning, 2500 Hampton Blvd., Norfolk VA 23517
U.S. Borax/Industrial Chemicals, 3075 Wilshire Boulevard, Los Angeles, CA 90010

GALLEY EQUIPMENT

Cospolich Refrigerator Co., 949 Industry Rd., Kenner LA 70062
Gaylord Industries, 10900 S W Avery St, P.O. Box 1149, Tualatin, OR 97062

McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454

GANGWAYS, LADDERS

Coast Marine & Industrial Supply Inc., 398 Jefferson St., San Francisco, CA 94133

Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960
Sea Systems Inc., 65 Avco Road, Ward Hill, MA 01835

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

GEARS

IMO Delaval, Inc., P.O. Box 6550, Lawrenceville, NJ 08648

HEAT EXCHANGERS

Alfa-Laval, Desalt A/S, Stamholmen 93, DK-2650 Hvidovre, Copenhagen, DENMARK

Alfa-Laval Separation Inc., 2115 Linwood Avenue, Fort Lee, NJ 07024
Beard Industries Inc., P.O. Box 31115, Shreveport LA 71130

Doucette Industries, Inc., 701 Grantley Road, P.O. Box 2337, York, PA 17405

Thomas C. Wilson, Inc., 21-11 44th Avenue, Long Island City, NY 11101

HORNS/WHISTLES

Kohlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241

HOSE

HBD Industries, Inc., 1801 S. Railroad Street, Salisbury, NC 28145-0948
Nufflex, Inc., 1826 E. Elizabeth Avenue, Linden, NJ 07063

HYDRAULICS

Aeroquip Corporation, 3000 Strayer, P.O. Box 631, Maumee, OH 43537-0631

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

HYDROSTATIC REMANUFACTURING

Hydra Service, Inc., 12332 East First Street, Tulsa, OK 74128

INCINERATORS

Teamtec A/S, P.O. Box 100, N-4912 Gjeving, NORWAY
A/S Vesta, 27 Skudehavsvej, DK-2100 Copenhagen DENMARK. US Agent: American United Marine, 5 Broadway, Rte 1, Saugus, MA 01906

INSULATION

Soundcoat Company, 1 Burt Drive, Deer Park, NY 11729

INTERIOR DESIGN

Feathers Corp., P.O. Box 934, Langley WA 98260

JOINER—Watertight Doors—Paneling—Ceiling Systems—Decking
ES Marine Systems Corp., 550 S. Fulton Avenue, Mount Vernon, NJ 10550

IMAC AB, Berga Alle 1, S-252 55 Helsingborg, SWEDEN
U.S. Rep: Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980

E.H. O'Neill Company, 5515 Belair Rd., Baltimore MD 21206
Walz & Krenzer Inc., 1390 Mt. Read Blvd., Rochester NY 14606

KEEL COOLERS

R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

LEGAL SERVICES

American Maritime Correspondents, One Embarcadero Center, Suite 330, San Francisco, CA 94111

John Jozwick, c/o Bryan, Schiffrin & McMonagle, First & Cedar Bldg., Suite 350, 2701 First Ave., Seattle WA 98121

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights

Carlisle & Finch, 4562 W. Mitchell Ave., Cincinnati OH 45232
Phoenix Products, 6161 N 64th St., Milwaukee WI 53218

LINE BUNDS

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

LOGISTICS

VL Logistics Consultants, Inc., 3420 Bienville Blvd., Ocean Springs MS 39564
QED, 4646 N. Witchduck Road, Virginia Beach, VA 23455

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DEL-MARINE

Golten Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231

MACHINING—On Site Repair

Furmanite, 535 London Bridge Road, Virginia Beach, VA 23454

MARINE CHEMICALS

Nalfleet, Bull & Roberts, 155 Morris Ave., Springfield NJ 07081

MARINE CONSULTING

Maritech, Seacliff, Bay Road, Newmarket, NH 03857

MARINE FURNITURE

Alum: ~ Feathers Corp. (Marine Interior Design Div.), P.O. Box 728, Langley WA 98260

Wilson & Hayes, 1601 Eastlake Avenue, East, Seattle, WA 98102

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
Amirikian Engineering Co., P.O. Box 15210, Chevy Chase MD 20815

B.C. Research, 3650 Westbrook Mall, Vancouver, B.C. Canada V6S 2L2
CDI Marine Co., 9487 Regency Square Blvd., Suite 500, Jacksonville, FL 32225

CT 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, 3200 Ridgelande Dr., Suite 403, Metairie LA 70002

Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129

Designers & Planners, 2611 Jefferson-Davis Highway, Suite 3000, Arlington, VA 22202

Diversified Technologies, 812 Live Oak Dr., Chesapeake VA 23320
E.Y.E. Marine Consultants, Suite 7, 327 Prince Albert Road, Dartmouth, NS B2Y 1N7, CANADA

Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706

Fisher Maritime Transportation Counselors, Inc., 71 Valley Street, South Orange, NJ

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 Turquoise 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
 Nautical Designs, Inc., 2101 S Andrews Ave., Suite 202, Ft Lauderdale FL 33316
 Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
 Northern Marine, P.O. Box 1169, Traverse City, MI 49685
 Ocean Oil International Engineering Corp., 3019 Mercedes Blvd, New Orleans LA 70114
 Omega Marine Engineering Systems, Inc., 11757 Katy Freeway, Ste 1200, Houston TX 77079
 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
 Sea School, 10812 Gandy Boulevard, St. Petersburg, FL 33702
 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
 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

NAVIGATION & COMMUNICATIONS EQUIPMENT
 Comsat Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024
 Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
 Henschel, Inc., 9 Hoyt Drive, Newburyport MA 01950
 Kelvin Hughes Ltd., New North Rd., Hainault, Ilford, Essex IG6 2UR England
 Hull Electronics, 7563 Convoy Court, San Diego, CA 92111
 Mackay Communications, 441 US Highway #1, P.O. Box 331, Elizabeth NJ 07207
 Magnavox MSS, 2895 Maricopa St., Torrance CA 90503
 Marine Electric RPD Inc., 50 Carol St., P.O. Box 1135, Clifton NJ 07014-1135
 Mobile Telesystems, Inc., 300 Professional Drive, Gaithersburg, MD 20879
 Naval Electronics, 5417 Jetview Circle, Tampa FL 33634
 Radio Holland USA B.V., 8943 Gulf Freeway, Houston, TX 77017
 Robertson-Shipmate, Inc., 400 Oser Ave., Hauppauge NY 11788
 S.P. Radio A/S, DK-9200, Aalborg SV, DENMARK
 Singapore Telecom, Orchard Point Post Office, P.O. Box 38, Singapore 9123
 Sperry Marine Inc., 1070 Seminole Trail, Charlottesville VA 22906
 Trimble Navigation, 585 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94088
 Watercom Communications Systems, 453 E. Park Place, Jefferson IN 47130

NOZZLES
 Nautican Enterprises Ltd., 407 Mountain Highway, North Vancouver, B.C. V7J 2L1

OILS—Marine—Additives
 Burmah-Castrol Inc., Raritan Plaza II, Raritan Center, Edison NJ 08837
 Castrol, Inc., Raritan Plaza II, Raritan Center, Edison, NJ 08837
 Chevron, USA, 575 Market Street, San Francisco, CA 94105
 Exxon Company International, 200 Park Ave., Bldg 222, Room A279, Floram Park NJ 07932, P.O. Box 4706, Houston, TX 77210-4706
 Mobil Oil Corporation, 3225 Gallows Road, Fairfax, VA 22037-0001
 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., 3240 N. Broadway, St. Louis, MO 63147
 Jofra, 67-55 Woodhaven Boulevard, Rego Park, NY 11374
 MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696

PAINTS—COATINGS—CORROSION CONTROL
 American Abrasive Metals Co., 460 Coit St, Irvington NJ 07111
 Armcor Sales Inc., 2 Marineview Plaza, Hoboken NJ 07030
 Chugoku Marine Paints (USA) Inc., 1610 Engineers Road, Belle Chasse, LA 70037
 Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
 International Paint (USA) Inc., 6001 Antoine Dr., P.O. Box 4806, Houston TX 77210-4806
 LTC International, 101-G Executive Dr., Sterling VA 22170
 Sigma Coatings, 8979 Market St., Houston, TX 77029, 330 Rover Road, Harvey, LA 70059, 1100 Adams St., Hoboken, NJ 07030
 Walter Thorsen, Inc./PROTECNO, 79 Owens Road, P.O. Box 755, Mahwah, NJ 07430-0755
 Unitor Ships Service, Unitor Marine Chemicals Division, 3 High St., Rickmansworth, Herts, WD3 1SW UNITED KINGDOM

PIPE FITTINGS/CONNECTING SYSTEMS
 Aeroquip Corporation, 3000 Strayer, P.O. Box 631, Maumee OH 43537-0631
 Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
 IMO Industries Inc., Wiggins Connectors Div., 5000 Triggs St., P.O. Box 22228, Los Angeles CA 90022

PORT SERVICES
 Port of Iberia, P.O. Box 897, New Iberia LA 70561
 Port of Orange Texas, P.O. Box 516, Orange, TX 77630

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
 ASEA Brown Boveri, 1460 Livingston Ave., North Brunswick NJ 08902
 Bergen Diesel A/S, P.O. Box 924, N-5002, Bergen, NORWAY
 Bird Johnson Company, 110 Norfolk St., Walpole, MA 02081
 Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
 CWF Hamilton & Co., Ltd., P.O. Box 709, Christchurch, New Zealand
 Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
 Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
 Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
 Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
 Electro-Motive Division of GM, 9301 W 55th St., LaGrange, IL 60525
 Fincantieri, Diesel Engines Division—GMT, Bagnoli della Rosandra 334, Trieste, ITALY
 GE Marine & Industrial, 1 Neumann Way N-158, Cincinnati OH 45215
 GE Naval & Drive Turbine Systems Department, 166 Boulder Dr., Fitchburg MA 01420
 General Motors, Allison Gas Turbine, P. O. Box 420, U-6, Indianapolis IN 46206
 KaMeWa, P.O. Box 1010, S-681 01 Kristinehamn, SWEDEN
 Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

Krupp MaK, 226 Britannia Road East, Mississauga, Ont., CANADA L47156
 Mapeco Products Inc., P.O. Box 6, 725 Glen Cove Ave., Glen Head NY 11545
 Marine Gears, Inc., P.O. Box 689, Greenville MS 38707
 Marine Systems Inc., 2032 Atlantic Ave., Chesapeake VA 23324
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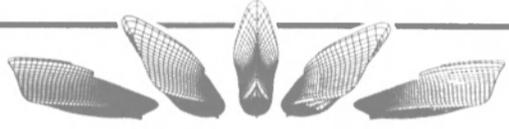
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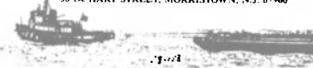
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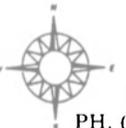
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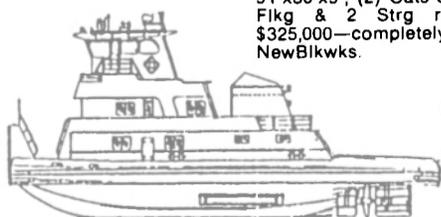
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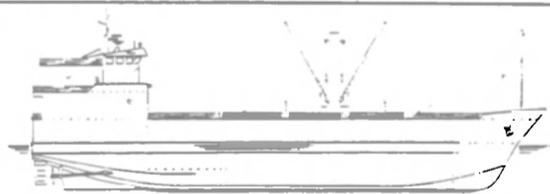
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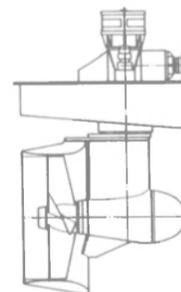
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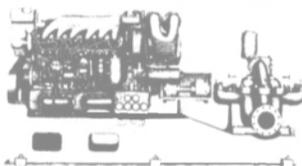
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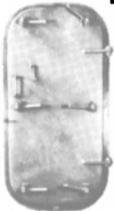
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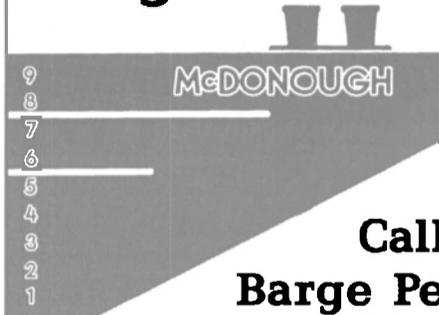


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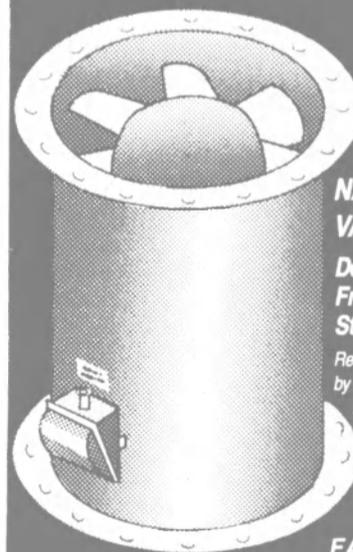
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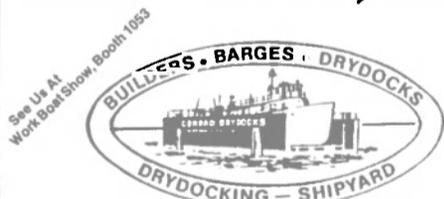
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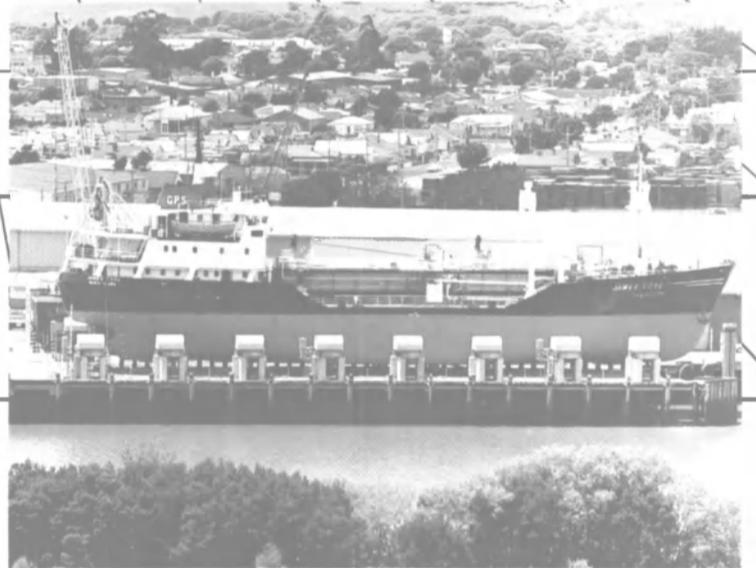
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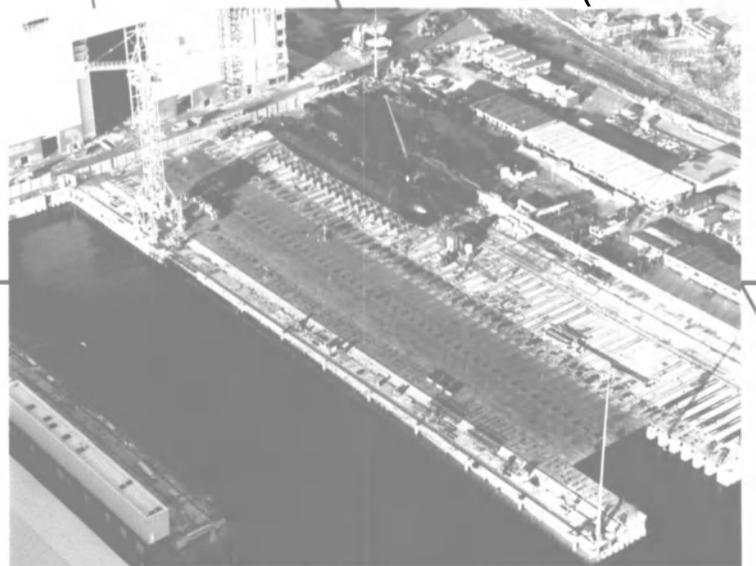
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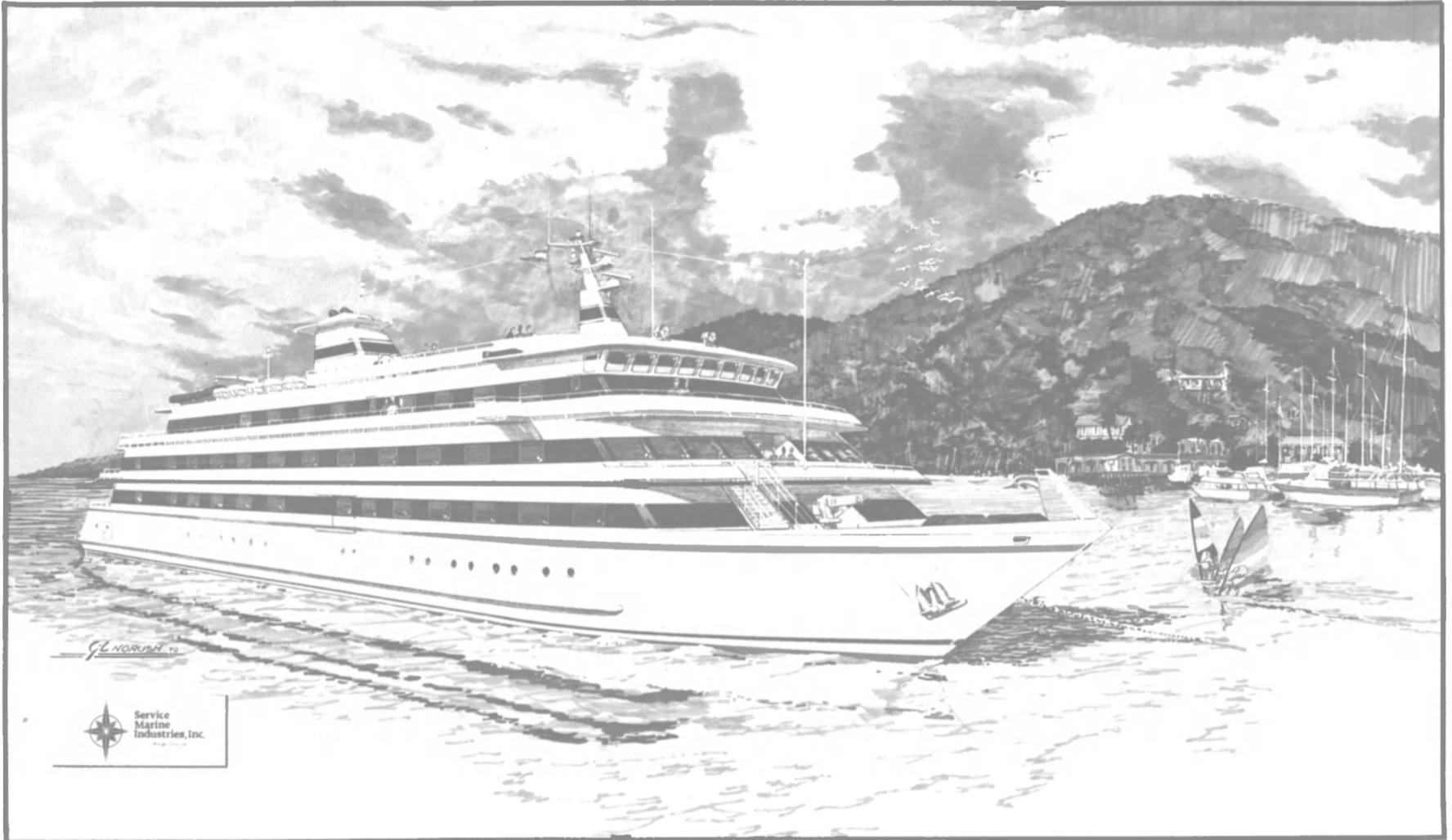
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IDYLIC ISLAND — THAT'S THE NEW ONE HUNDRED PASSENGER CRUISING YACHT FROM SERVICE MARINE INDUSTRIES, INC.



Take your customers aboard a yacht that offers quiet elegance, uncompromising quality, space for individuality, and fabulous meals — give them their own secluded island. This is the 261 foot long yacht that Service Marine Industries, Inc. has created for one hundred pampered guests.

Fifty spacious deluxe cabins all have lower beds, large vista windows, private shower and facilities. Each room has individual temperature controls, dressing table, full length mirror, wardrobe, reading lamps, 110 volt appliance outlets, telephone, stereo radio, and wall-to-wall carpet.

The first deck is devoted to pleasures of the senses, starting with a lavishly decorated dining room,

large enough to accommodate your guests in one seating. Adjacent to the dining room is a galley suitable to the culinary artistry of the most demanding "Escoffier" chef.

Forward of the dining room, the scintillating cabaret is ready for an evening of entertainment. Here, your guests can dance the night away, view your outstanding dance review, see the latest movie, or other entertainment which is on your schedule for the cruise. By day, the cabaret transforms into a 100 seat lecture room for seminars.

On the third deck, a spacious lounge offers a glorious view of the ocean gently rolling by or the bright white moon-lit strip of palm-lined

beach of your secluded anchorage. Where better for your guests to unwind after an action-packed day?

Adjacent to the lounge, your guests can take their chances one evening in the casino. There, one game of blackjack could make their evening, or one more pull at the slots could ring the jackpot.

In the hold, beside the engines and machinery room, are located crew quarters, laundry, baggage storage, sewage treatment, and water-making equipment. The ship is roll dampened by a Vosper 4-fin non-retractable stabilizer system. She is powered by three Cummins KTA50-M diesels, rated at 1240 hp at 1800 rpm. Gears are Twin Disc MG540, with a reduction of

4.60 to 1. The vessel will achieve a speed of 15 knots and will have a cruising range of approximately 5000 nautical miles.

The ship, 261' LOA x 44' x 21'-6", has a design draft of 16'. She has three Cummins KTA-19 G02M gensets generating 360 kw each, with full parallel automatic switching. Emergency power comes from a self-starting Cummins 6BT 5.9 genset rated at 90 kw. The vessel is assisted in maneuvering by a Schottel bow thruster Model S-226-L rated at 450 hp, driven by a Cummins NTA-855M diesel.

Give your guests an odyssey of sensual pleasures that vanquishes all urgency. Make your next ship an Idyllic Island Yacht from SERVICE MARINE INDUSTRIES, INC.

SERVICE MARINE INDUSTRIES, INC. IS A FULL SERVICE SHIPYARD — DESIGN, ENGINEERING, CONSTRUCTION, INTERIOR DECORATING — MODULAR DESIGN OR CUSTOM BUILDING TO YOUR SPECIFICATIONS.



Service Marine Industries, Inc.

Trust • Quality • Economy • Service

P.O. Box 3606 • Morgan City, LA 70381 • (504) 631-0511 or (504) 764-1817

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