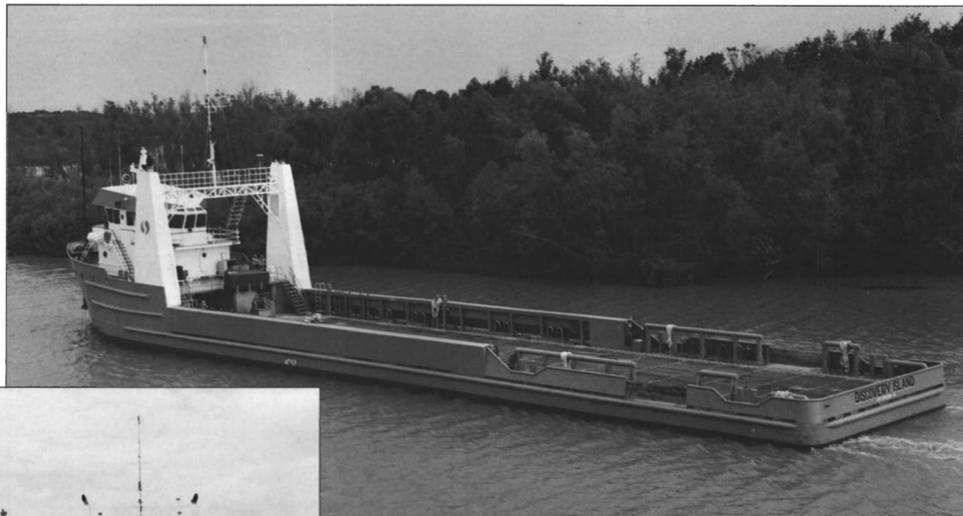


**MARITIME
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NAVAL TECHNOLOGY & SHIPBUILDING
MAY 1991 ISSUE



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ON THE COVER

At one time, part of Royal Viking Sea's route took her through one of the many fjords of Norway. Royal Viking Line, part of Kloster Cruise Limited, now plans to use the Royal Viking Sun on a three-week U.S.-Scandinavian route beginning this month. Royal Viking Line.

In conjunction with the 1,000th anniversary of Leif Ericsson's expedition to 'Vinland' and the popular international shipping conference and exhibition Nor-Shipping '91, this month MARITIME REPORTER & ENGINEERING NEWS will focus on Norway's substantial influence on future marine technology and pivotal shipping issues.

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Advanced Marine Wins \$8.5 Million Navy Contract

Advanced Marine Enterprises, Inc., a leading naval architecture and marine engineering firm headquartered in Arlington, Va., has been awarded an \$8.5 million contract to provide engineering technical services to Research & Development Programs at the David Taylor Research Center (DTRC) in Carderock, Md.

Principal support will be provided to the Ship Systems Integration Department (Code 12) in analyses of new and advanced ship systems technologies and concepts as well as analyses of logistics factors unique to these ships and craft.

For additional information on the services provided by Advanced Marine Enterprises, Circle 1 on Reader Service Card

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Bender Acquires Large Dry Dock Formerly Operated At Todd Ship

Bender Shipbuilding & Repair Co., Inc., Mobile, Ala., recently purchased a 545-foot-long steel floating drydock formerly operated at Todd Shipyards Corporation's Galveston, Texas, facility. The drydock, which

recently arrived in Mobile, has been named the Pete B in memory of a Bender superintendent, the late Pete Borgueta.

The drydock, called Lone Star by Todd, was built by Bender at its Mobile shipyard and delivered in January 1983.

The Pete B has a lifting capacity of 17,500 long tons and has an overall length of 545 feet. The distance between the inside of its wingwalls

is 122 feet.

The drydock's lifting capacity and wider working area between its wingwalls will allow Bender to service larger vessels including cruise ships and vessels designated Panamax, the largest vessels capable of navigating the Panama Canal.

For free literature on the facilities and capabilities of Bender Shipbuilding & Repair Co., Circle 35 on Reader Service Card

Tidewater Negotiating Acquisition Of Zapata In \$500 Million Deal

In a deal worth up to \$500 million and which would create the world's largest support vessel fleet, Tidewater is negotiating the acquisition of Zapata Gulf Marine. An agreement between the two U.S. groups would combine the 304 vessels of Zapata with the 303-vessel fleet of Tidewater.

Tidewater's worldwide market share would more than double, analysts say, with a fleet of more than 600 vessels.

Currently, Tidewater has between 10 percent and 11 percent of the world's offshore boat market, while Zapata's market share is put at nearly 12 percent. Combined, an expanded Tidewater could control 23 percent of the world's workboat market, and within U.S. waters, Tidewater, which has about 25 percent of the market in the U.S. Gulf, would have even more strength.

With Zapata's share of the Gulf, where 3,400 platforms and 132 drilling rigs are currently working, analysts say Tidewater's market share would soar to perhaps 40 percent.

On the supply and towing-and-supply business end, Zapata is very active, with boats currently commanding \$3,000 per day or more. Zapata has about 200 such vessels in its 304-vessel fleet.

Officials say a merger of the two firms would create tremendous economies-of-scale, by combining management and administration. In a merger, Tidewater revenues would soar.

Tidewater, in its latest figures for the nine months ending December 31, 1990, had revenue of \$180.4 million and net earnings of \$24.7 million, up from \$150.8 million and a loss of \$6.7 million, respectively, in the previous year.

Privately owned Zapata reported revenue for the 1990 calendar year of \$241 million and operating income of \$22 million. Net income was not made public by the company.

Kuwait Oil Production Could Reach Pre-Invasion Levels By End Of '93

U.S. oil experts expect oil production in Kuwait to reach pre-invasion levels by the end of 1993.

Daniel Yergin, president of the Cambridge Energy Research Institute private think tank, said Kuwait will produce 50,000 barrels a day as a symbolic gesture within the next several weeks. He expects exports of 350,000 barrels a day (b/d) by the end of 1991.

Although scientists, inventors and entrepreneurs are seeking innovative ways to extinguish the Kuwaiti oil fires, putting them all out is expected to take at least one year. Mr. Yergin said by the end of 1993, output should be back to 1.5 million b/d, the level before last August's invasion by Iraq.



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Chantiers To Construct Remaining 2 Of 6 Frigates In \$95.5 Million Order

The Floreal patrol frigate constructed by Chantiers de l'Atlantique, Saint-Nazaire, France, recently completed its sea trials and was delivered to the French Navy. Accordingly, the French Ministry

of Defence confirmed the expected order for two more frigates—No. 5 and No. 6—which makes a total of six such vessels ordered from Chantiers de l'Atlantique.

The order, which amounts to about \$95.5 million, provides the Saint-Nazaire shipyard with a workload of one million hours.

The Floreal-type patrol frigates, which have a displacement of 2,900 metric tons, will be assigned to over-

seas service. Their weaponry will be fitted out by the Lorient naval dockyard.

Deliveries of the six frigates will take place every six months till mid-1993.

For free literature on the facilities and capabilities of Chantiers de l'Atlantique,

Circle 22 on Reader Service Card

Sanwa Shosen Buys Six Ships From Navix For \$127.2 Million

Sanwa Shosen has bought six vessels for \$127.2 million from leading Japanese shipowner Navix Line.

Since a group of Tokyo banks ended its financial assistance to the company, Navix Line is launching a major financial reconstruction, in addition to the sale of Nippon Liner System (NLS), its liner division, to Nippon Yusen Kaisha (NYK Line) and the transfer of the ships to Sanwa Shosen.

The five-point rationalization plan includes expansion of a mixed crew manning system and reviewing of the present crew system; restructuring of marketing strategy; review of the personnel and corporate organization chart on the occasion of the absorption of NLS by NYK line; reduction of operating costs; and restructuring its affiliated companies in connection with the merger between NLS and NYK Line.

European E-3 Tanker Project Progressing

Five European shipyards—Astilleros Espanoles of Spain, Bremer Vulkan of Germany, Chantiers de l'Atlantique of France, Fincantieri of Italy, and Howaldtswerke Deutsche Werft of Germany—have signed a Memorandum of Understanding to confirm the decision to join efforts to develop a common design for a new generation of Very Large Crude Carriers (VLCCs).

This cooperation is progressing on schedule, according to Astilleros Espanoles. Everything indicates that the design envisaged will comply with and surpass actual and foreseen regulations to protect coasts and general environment.

According to Astilleros Espanoles, the E-3 (European, Ecological and Economical) Tanker will be designed with a capacity of 2 million barrels, special collision-avoidance systems, limiting of eventual outflows and pollution fighting, and highest performance and economical operation.

Ocean Express Signs Charter Agreement With Sea-Land Services

Ocean Express Lines, Inc., a Miami-based steamship cargo liner, recently entered into a space charter agreement with Sea-Land Services' Americas' Division. The new agreement allowed Ocean Express to expand its Caribbean services.

As a result, Ocean Express recently initiated weekly service to Grand Cayman, Belize, Guatemala, and Honduras. The company is utilizing two of the company's modern vessels, the M/V Kristine and M/V Ariane, for the new operation.

Ocean Express also offers service to San Andres Isla, Colombia and Mexico from Miami and Houston.



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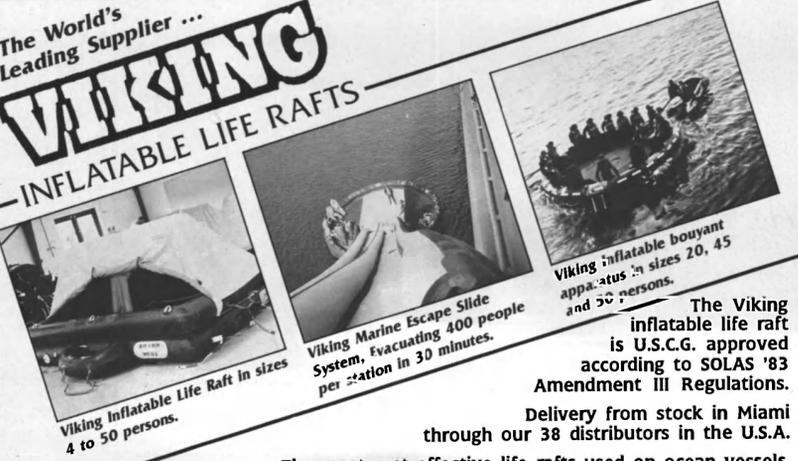
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**Avondale Awarded
\$135 Million Pact
To Build LSD-CV**

Avondale Industries, Inc., Avondale, La., was recently awarded a \$135 million contract to build an additional Landing Ship Dock, Cargo Variant (LSD-CV) vessel for the U.S. Navy.

Avondale has already built four LSD-CVs under a five ship contract awarded in 1988. The 609-foot vessels are designed to carry Landing Craft, Air Cushion (LCAC) vehicles and cargo. The latest LSD-CV will be delivered in 1995.

**Coastal Corporation
Names Knutsen President,
Coscol Marine**



Edward W. Knutsen

The Coastal Corporation has announced the election of **Edward W. Knutsen** as president of Coscol Marine Corporation, a subsidiary of the company.

Prior to joining Coastal in 1989 as vice president and general manager of the company's marine subsidiaries, Mr. **Knutsen** served as an officer of three ship operating companies in New York and Houston, including executive vice president and chief operating officer of a company operating tankers, bulk carriers and naval ships. He is a captain in the U.S. Naval Reserve and served as a captain in the merchant marine.

**OBO Quartet From B&W
Will Feature Innovative
Kvaerner Hatch Covers**

Kvaerner's ability to react quickly and innovatively to the fast changing requirements of the marine industry have been highlighted once again by a contract to design the side-rolling weatherdeck hatch covers for a total of four 70,000-dwt OBO carriers building for Norwegian and Dutch owners at Denmark's Burmeister & Wain Shipyard in Copenhagen.

This is the first time that Kvaerner Ships Equipment AB in Gothenburg, Sweden, has won a contract for the design of cargo access equipment for vessels building at Burmeister & Wain.

The four double-skinned OBOs, two for Naess Shipping of Holland and two for Norway's Tschudi &

Eitzen, are of a new design developed by the Danish shipyard.

Both the shipyard and the shipowner's requirements for a flexible hatch cover system that is easy to clean have been met by Kvaerner's solution. Hatch covers that are easy to clean are extremely important in the efficient operation of OBOs.

The design of the Burmeister & Wain 70,000-dwt OBO is such that the vessel does not have hatch coam-

ings—the covers rest directly on the deck.

The Danish Shipyard required a hatch cover system that, while being flexible, also provided cleating forces as close to the transverse bulkheads as possible.

Kvaerner's solution was to use a corrugated hatch cover design, whereby the corrugation is directed in the transverse direction. By utilizing such a system, the problem of

accumulation of seawater and cargo residue in the spaces between the hatches was alleviated.

Delivery of this quartet of 70,000-dwt OBOs, each with nine cargo holds, is set for 1992.

For more information on Kvaerner,

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For more information on Burmeister & Wain Shipyard,
Circle 6 on Reader Service Card

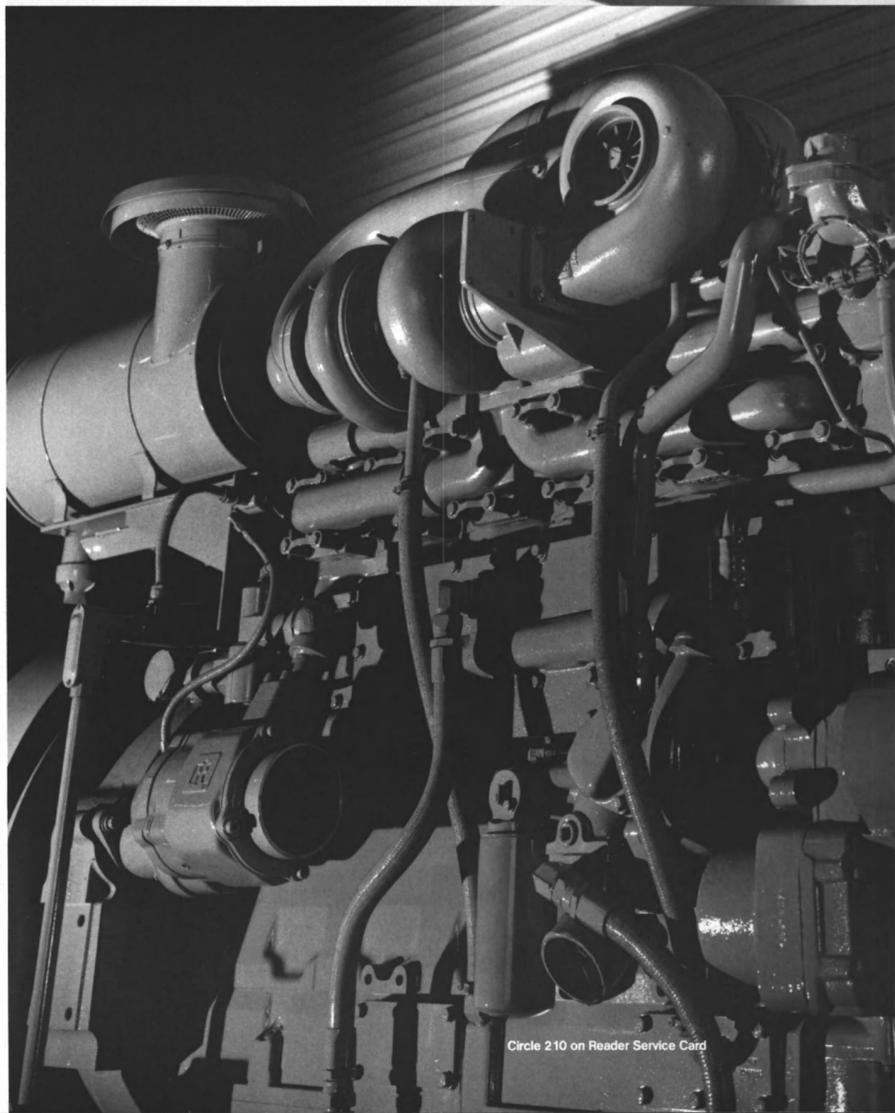
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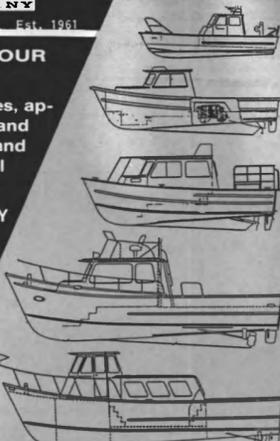
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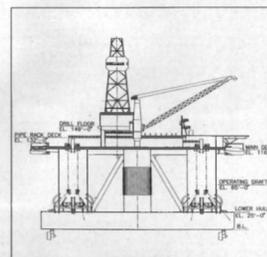
Wartsila-Powered Semisubmersible 'Drillmar I' Completed By 'ASTANO

Astilleros Y Talleres del Noroeste (ASTANO) of Ferrol (La Coruna), Spain, recently completed the semisubmersible drilling vessel Drillmar I for Drillmar, S.A.

The design, by Friede & Goldman, Ltd., is the latest version of their Pacesetter Class. Over 60 vessels have been built to this family of designs which, though similar in general appearance, vary considerably in size. The Drillmar I is one of the larger Pacesetters, with the capability of working in harsh environments and deep waters.

The Drillmar I has an overall length of 270 feet and overall beam of 203 feet. It has twin lower hulls, six stability columns, and the main deck is 116 feet above the base line. The vessel is equipped with an all-chain mooring system for 1,500-foot water depth consisting of eight Vicinay high holding Norshore-type anchors each weighing 30,000 pounds, and eight chains each 5,500 feet long of 3-inch-diameter K-4 type. Two thrusters of 3,750 bhp are currently installed for propulsion and mooring assist. Four Pusnes Double Wildcat electrically driven windlasses are fitted with an emergency release system which permits movement away from blowouts even in the event of a total blackout.

Power for the semisubmersible is provided by four Wartsila diesels each delivering 2,865 kw at 6,000 V. Propulsion and mooring assistance are provided by two AC motor-driven



Profile drawing of the Drillmar I.

The vessel is equipped to drill to depths of 25,000 feet in water depths up to 1,500 feet. Well control is through an 18-3/4-inch, 15,000-psi BOP and 21-inch-OD riser. The BOP is moved from its storage position to well center by means of a Maritime Hydraulics fork lift type carrier. Tension for the riser joints is provided by four dual 100 kip tensioners.

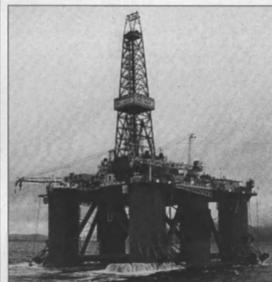
**DRILLMAR I
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Thrusters.....	Schottel
Mud pumps.....	National
Derrick.....	Branham
Drawworks.....	National
Tensioner.....	Shaffer
Pipe handling.....	Maritime Hydraulics
Cranes.....	Hagglunds
Rig management and position mooring systems.....	Simrad

The two-level quarters house provides housing accommodations for 96 people in two-man staterooms. The fully air-conditioned house also contains a six-bed hospital, two recreation rooms, two change rooms, galley, mess room, stores and bridge. A helideck sized for a Sikorsky S61N extends forward from the roof of the accommodations.

For free literature on the facilities and capabilities of ASTANO, Circle 50 on Reader Service Card

For more information on Wartsila Diesel engines, Circle 51 on Reader Service Card



Foundations for two additional dual 100-hp tensioners are provided on the Drillmar I, along with space for additional tensioner air bottles, control panels, and riser joints should the owner desire to upgrade the unit for 2,000-foot water depth.

Schottel controllable-pitch thrusters. Control of the thruster in the mooring assist mode is through a Simrad APM 3000 position mooring system. Two diesel hydraulic cranes with 140-foot booms satisfy the cargo handling needs of the vessel.

Control of the ballast system as well as the other fluid transfer system is provided by a Simrad AIM Rig Management System (RMS), which also monitors all fire, gas and ventilation alarms as well as the power generation and thruster system.

Mitsui Places \$181 Million Order For Four Product Carriers

An order for the construction of four double-hulled 40,000-dwt product carrier has been placed by Mitsui OSK Lines with Minami Nippon Shipbuilding, a medium-sized shipbuilder affiliated with Mitsui Engineering & Shipbuilding (Zosen) group.

The first vessel is scheduled to be completed in September 1992, and the last in the spring of 1993.

Maritime Reporter/Engineering News

**Aalborg Ciserv's Repair Area
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Aalborg Ciserv, which has facilities in San Francisco, Seattle and Los Angeles, now has a ship repair, service and maintenance coverage area that extends from Alaska to Hawaii, and includes all ports of call on the West Coast of the United States.

In addition to excellent machine shop services and worldwide spare parts organization, the company is very experienced in at-sea repairs and maintenance with a traveling crew of experienced engineers and service technicians ready at a moment's notice to attend to every need.

Because Aalborg Ciserv is a part of an international network of service and manufacturing companies, it has the resources and the technical expertise at hand to undertake almost any job. A solid work force of people is maintained, skilled in the repair and maintenance of marine diesel engines, boilers, control systems, steam turbines, pumps, valves and other types of machinery as well as the dynamic balancing of rotating equipment.

As an authorized service station for many of the most popular engine and turbocharger manufacturers, Aalborg Ciserv is qualified to handle all servicing and overhaul work.

For free literature giving more information on Aalborg Ciserv,
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**Latest Inmarsat-2 Satellite
Launch Provides More Capacity
For COMSAT Customers**

The second in a series of four Inmarsat-2 satellites was successfully launched recently by a McDonnell Douglas Delta rocket from Cape Canaveral, Fla. The Inmarsat-2 (F2) will occupy a permanent orbital slot at 15.5 degrees west longitude over the Atlantic Ocean Region-East (AOR-E), replacing the current satellite for that region, the MCS-B, which is leased from INTELSAT.

"The importance of this launch for COMSAT and its customers," said **Ron Mario**, vice president and general manager for COMSAT Mobile Communications, "is that it adds significant capacity to the Atlantic Ocean region, which is the most heavily used region in the Inmarsat system. Customers should not experience any congestion problems in the future," Mr. Mario said. "This satellite also provides for system efficiencies by using digital technology, which should help reduce costs and improve the range of services available for aeronautical, maritime and land mobile applications."

Each satellite in the Inmarsat-2 series can carry the equivalent of 250 voice circuits, making them about four times more powerful than the INTELSAT-V Maritime Communications Subsystems (MCS) and the MARECS satellites they replace. A special feature of the Inmarsat-2 satellites is specifically assigned "L-band" bandwidth of aeronautical services.

The third Inmarsat-2 (F3) is scheduled for launch on an Ariane rocket in the fourth quarter of 1991, from Kourou in French Guiana and will be placed over the Pacific Ocean region. The final satellite in the Inmarsat-2 series will be launched subsequently, also from Kourou. A contract was approved for the next generation of satellites, the Inmarsat-3s, which will be built by General Electric Astro-Space Division and launched in the 1994-95 timeframe.

COMSAT Mobile Communications provides a variety of satellite communications services to maritime, aeronautical and international land mobile industries throughout the world.

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Twin Disc Adds New Marine Transmission To MGN Series

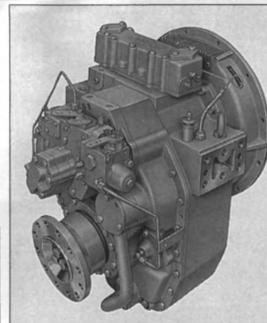
The MGNV-232E is the latest addition to Twin Disc's highly competitive, MGN Series of marine transmissions for use in high performance applications.

This transmission is well suited for large pleasure craft, crewboats and patrol boats requiring compact propulsion systems with low weight-to-horsepower capacity ratios to meet desired performance objectives.

The MGNV-232E marine transmission featuring a 10-degree down-angle is available in a power range of 511 to 895 (685 to 1,200 hp) with

identical forward and reverse capacities and ratios of 1.54:1, 1.73:1, 1.96L1 and 2.43:1. An SAE No. 1-14-inch rubber block drive input is standard as well as raw water heat exchanger and companion flange assembly.

Optional equipment available includes the popular "X" control which permits control of propeller speed independent of the engine in



Twin Disc MGNV-232E marine transmission.

either directional mode. A trailing pump and 14-inch torsional input coupling are also available as options.

As with most other Twin Disc marine transmissions, the MGNV-232E has helical gears for quieter operation, responsive oil-controlled and cooled clutches and virtually no external plumbing.

This transmission is covered by the Standard Twin Disc comprehensive warranty and backed by an extensive network of authorized Twin Disc distributors.

For additional information on the MGNV-232E marine transmission from Twin Disc,

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Litton's Category I EPIRB Fulfills GMDSS EPIRB Requirements

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as a homing beacon for pinpointing your vessel. Add to this a high-intensity xenon strobe for visual detection, and you and your craft will no longer be a needle in the haystack.

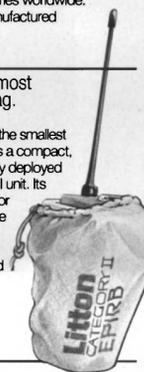
It's common sense. And it's fast becoming a law.

The Category I EPIRB is designed to release automatically, or manually when the situation permits. It can even be activated while wearing survival gloves. The hydrostatically released mechanism activates the EPIRB automatically when submerged in water 3-12 feet deep. This gives you more time to gather survival gear and prepare yourself and everyone on board for rescue. In a situation where lives are at stake, the hands free operation of the Litton Cat I EPIRB gives you one less thing to think about and more reason to feel confident.

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To find out about your particular EPIRB requirements, call Litton at 1-800-328-0948 or Fax 1-215-328-4016 Mon.-Fri. 8:30 to 5:00 pm EST. This product also distributed by KODEN International under their own name.

Circle 221 on Reader Service Card

PDVSA Plans To Double Fleet By 1996

As part of a strategy to take responsibility for shipping half the crude and product exports from Venezuela, the shipping arm of Venezuelan oil company Petroleos de Venezuela (PDVSA) is planning to build up to 22 new vessels spanning diverse ship types over the next five years.

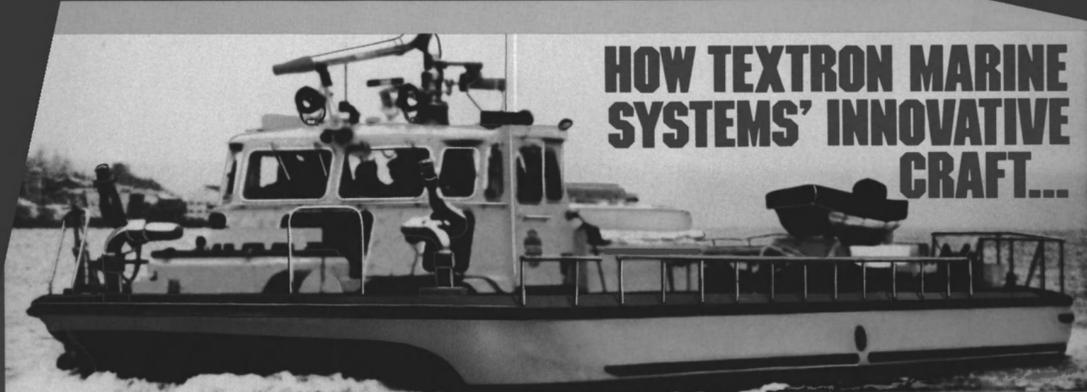
According to industry sources, PDVSA has drawn up a detailed plan which would more than double the size of its existing fleet by 1996 through the addition of crude tankers, product carriers, liquefied petroleum gas (LPG) carriers, dedicated Orimulsion carriers and a single lube carrier.

PDVSA is looking for eight tankers plus 14 ships of various types. In addition, the Venezuelans are planning to build four specialized ships of 60,000 tons each to carry Orimulsion, a bitumen-based liquid becoming increasingly popular for use in power stations as an alternative to oil.

The size of the present fleet would be increased under the plan from 19 ships of 768,000 dwt to 39 ships of 1,884,000 tons.

Recently, PDVSA opened financial negotiations with shipbuilders for the crude tankers it is planning. Orders for four ships worth about \$220 million will be placed initially, with options taken out for a further four.

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For example, the SES Fireboat will add a new dimension to fire suppression, search and rescue operations, security and pollution monitoring in New York City's harbor. Designed to conquer gridlock in cities like Washington, the air cushion water taxi will decrease travel time between airport and central city without making any environmental waves. And when Textron Marine Systems' UACV inadvertently crosses over bird nests during oil exploration in Gulf Coast areas, it does not destroy the eggs.

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New Forward Scatter Turbidimeter Announced By McNab, Inc.

A new forward scatter turbidimeter has been announced by McNab, Inc., Mount Vernon, N.Y. The Model "S", manufactured by McNab, measures clarity in food and

beverage processes and other sterile applications. These include centrifuge brewery and distillery products. Materials of construction are stainless steel and high-performance tempered glass. Parts are suitable for in-place cleaning. The Model "S" is a full flow process pressure turbidimeter that avoids the false low readings that can occur with restricted bypass lines, by measur-

ing in the center-of-the-pipe. Features designed for the OEM include NEMA 6 rated electronics, and the lowest on-pipe weight rating. A 4-20 ma DC output is standard.

For additional information and free literature on the new forward scatter turbidimeter from McNab,

Circle 39 on Reader Service Card

David H. Klinges Retires From Beth Steel



David H. Klinges

The retirement of David H. Klinges, vice president, maritime affairs, Bethlehem Steel Corporation, was recently announced by Walter F. Williams, chairman and chief executive officer.

In making the announcement, Mr. Williams said, "Dave Klinges has rendered dedicated and effective service to Bethlehem for 30 years. We are deeply grateful for his work, and he leaves with our sincere appreciation and very best wishes."

Mr. Klinges became associated with Bethlehem Steel as a maritime attorney in 1956 and took on the additional responsibilities of assistant secretary in 1970. He was named general manager of sales of shipbuilding in 1972, and was elected assistant vice president of shipbuilding in 1975.

In 1977, Mr. Klinges attended Harvard's advanced management program. He was elected vice president, shipbuilding, in 1978 and named president, marine construction in 1986. He was appointed to his present position in 1989.

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Circle 346 on Reader Service Card

Boycott Of Companies That Break Iraqi Embargo Ordered By U.S. Treasury

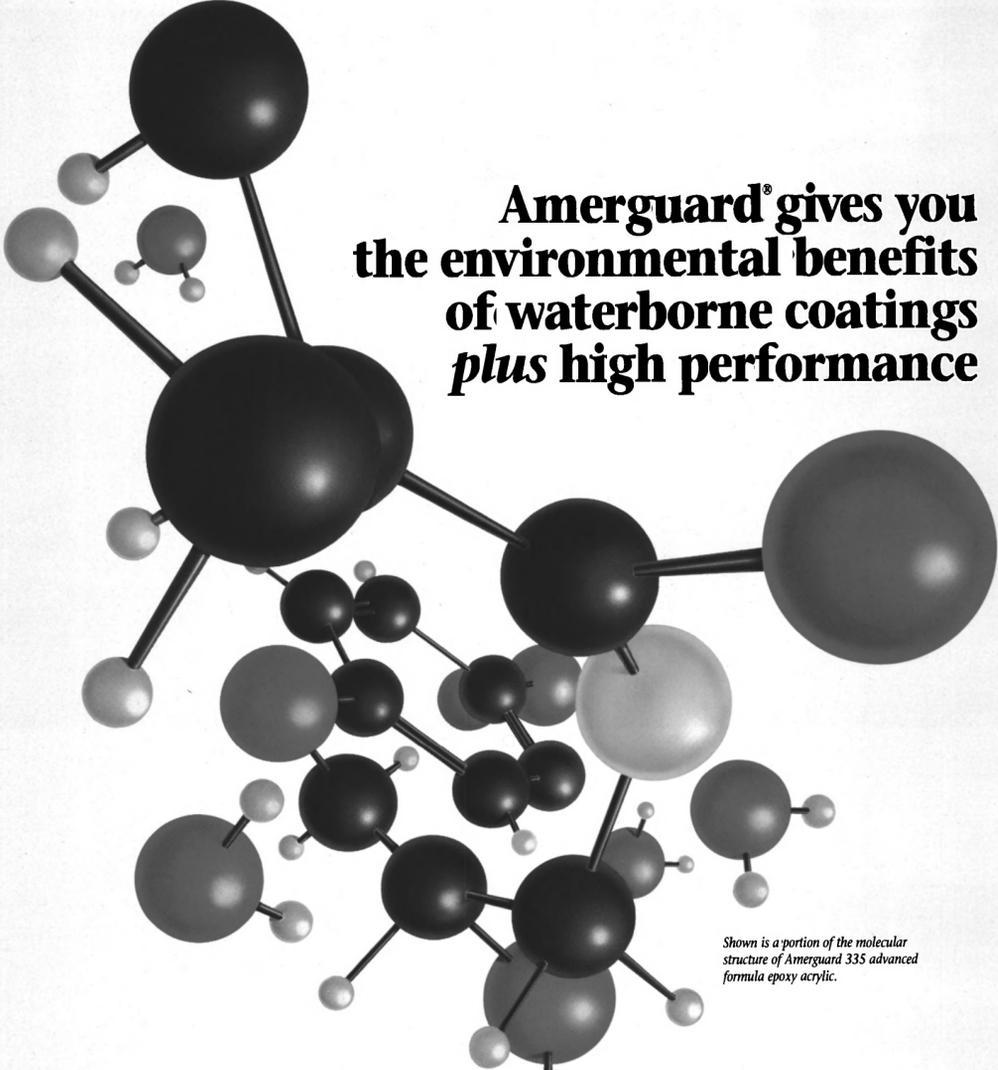
U.S. firms have been ordered to boycott seven shipping companies and 160 ships which the U.S. Treasury Department says have broken the UN embargo against Iraq.

Up to 12 years' imprisonment and fines of up to \$1 million for each violation can be imposed as penalties for doing business with the organizations and individuals, which will continue to be blacklisted by Washington.

Fifty-two businesses and 37 individuals that investigators believe acted as front companies and agents for the Saddam Hussein regime have been identified by the Treasury Department.

The Iraqi Government and quasi-governmental organizations own the majority of the 160 ships listed by the U.S.—mainly service craft, barges, tugs and patrol boats whose activities are confined close to Iraqi waters.

Maritime Reporter/Engineering News



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Circle 282 on Reader Service Card

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BAYOU LA' BATRE A Shipyard Success Story

Broadened Boatbuilding Capability Spurs New Growth

By Vincent Bosarge and Harold R. Larimer

Special to Maritime Reporter

One of Bayou La Batre, Alabama's very old timers years ago said, "You can hear anything in Bayou La Batre except money rattling and meat frying." Fish was the staple and the area generated little outside commerce, a situation not at all true today. In fact, the history of this relatively small fishing village (more people work here than live here) has always been one of rolling with the punches, adaptability and vision. Seafood production traditionally has so much flavored the local life-style that natives were referred to as being mullet chasers and its four seasons

The 143-foot luxury yacht Sea Falcon, built by Angus Yachts, Inc.

known as shrimp, crab, oyster and fish. As for rolling with the punches, local industries have proved resilient and pragmatic. Fierce storms and extremes in market changes have been faced as challenges and regardless of the output of its industries, their products have gained worldwide recognition.

The seafood industry of this 205-year-old town has mushroomed from a fresh local catch sold within limited surrounding areas, next moving to major exporter of canned product and today to that of being the source of vast shipments of frozen seafoods flown to Tokyo and other world markets. Additionally, present day processing of seafood here far exceeds the local catch.

Because of fishing, the towns-

people have always been boatbuilders with the type boats built paralleling fishing needs and innovations. When wooden boats began giving way to steel hulls in the late 40s, Bayou La Batre began what has destined to be its most dramatic change. Fishing, particularly shrimping, was entering a period of production in amounts previously unheard of. This ultimately opened a flood gate of demand for steel shrimp trawlers. A point was reached wherein a person holding a firm contract for construction of a trawler could sell the contract at a profit of several thousand dollars. Builders were booking as much as three years ahead.

The American fishing industry eventually became saturated with

boats and this, along with various other factors, caused domestic trawler demand to cease. Not sitting still, Bayou La Batre boatbuilders next directed their attention to the overseas fish boat market. Considering the complexities of foreign sales, it can probably be said that it is in this endeavor that these builders have been most successful. At this time, Bayou La Batre became known as the "Detroit" of trawlers and fishermen worldwide came to recognize the superiority of its trawlers.

Local builders have, however, kept their hands on the pulse of market potential and taken advantage of changing market demands. Today, the Bayou building pattern is literally a panorama of many dif-

ferent boat types . . . tugs, oil supply vessels, cruise boats, yachts, crew boats, ferries, and at the same time, trawlers.

It took Bayou La Batre until 1977 to gain recognition as the "Detroit" of the shrimp trawler industry. In 1978, however, a still ongoing change took place when Steiner Shipyard was awarded a contract for self-elevating work platforms (jack-up boats) for the oil industry. Until then, the only shipyard engaged in building anything in quantity other than shrimp boats was Off Shore Trawlers, Inc., owned and operated by **John E. Graham** and sons, who were building oil supply boats.

The launch by Steiner of the first jack-up boat in 1979 heralded the diversification of the Bayou's shipyard industry. Since that time Bayou yards have turned out a wide variety of different type and purpose marine vessels and floating equipment. Among them, aluminum tour boats and oyster boats, special purpose fire control vessels, tug and workboats, to name just a few.

Until 1979, the average shipyard worker in the Bayou had worked almost exclusively on shrimp boats. With diversification and the subsequent upgrading of shipyard equipment, he was suddenly faced with the challenge of learning new skills in order to remain competitive in the job market. Evidence that he was able to manage this transition can be seen in a \$7.9 million, 143-foot luxury yacht, the Sea Falcon, built by Angus Yachts, Inc. She was the center of attention at the 1990 Miami Boat Show. Nothing quite like her had ever been attempted by a Bayou shipyard, yet the workers responsible for its construction were all shrimp boat builders, most of whom had never worked on anything else. The shipyard is now engaged in completely restoring the 110-foot steel yacht Fead built in Holland in 1963.

Construction of the Sea Falcon was quite a feat as this, Angus Yachts' first boat, is one designed to compete with all other world-class yachts and is a dramatic demonstration of all local boatbuilding

skills: carpentry, design, metal work, interior finish and the myriad other abilities needed for the construction of such a vessel.

With diversification, the reputation of Bayou boatbuilders is penetrating every type of vessel construction, and proof that it is moving along smoothly can be found at Steiner Shipyard, where there is under construction a custom deluxe

flagship, Chicago's First Lady. She is being built for Mercury Yacht Charters, Inc., who were pioneers of Chicago's sightseeing boat industry. The vessel will operate from a dock located in the downtown area of Chicago.

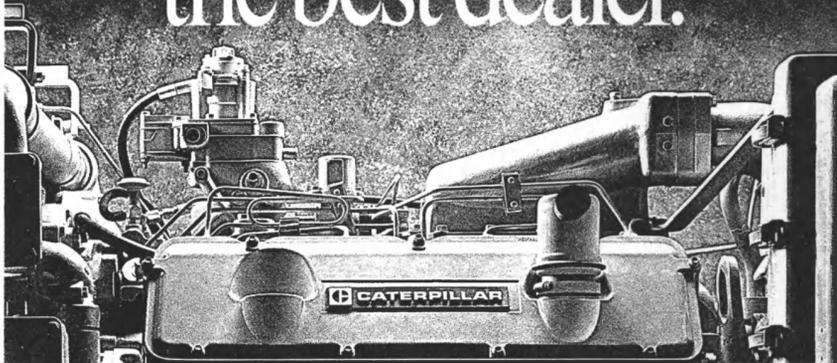
She is a 96-foot, 150-ton vessel designed by Florida marine architect **William Preston** and styled after the 1920s cruising yachts such

as the Presidential yacht Sequoia. She will be able to accommodate groups ranging from 50 to 250 passengers.

Bob Agra, executive vice president of Mercury Yacht Charters, when asked what factors influenced his decision to have the vessel built in Bayou La Batre, said, "My deci-

(continued)

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About the Authors: A sixth generation descendant of a founder of Bayou La Batre, **Vincent Bosarge** worked for Steiner Shipyard, Inc., as vice president for more than 12 years. Prior to his work at Steiner, Mr. **Bosarge** served as the assistant vice president with the First National Bank of Mobile, where he worked for 21 years. He received a Bachelor of Science degree in Business Education from Troy University, Troy, Ala., and studied Mandarin Chinese at Army Language School, Monterey, Calif., and Army Forces Far Eastern School of Languages in Osaka, Japan. He served with Military Intelligence at the Eighth U.S. Army Headquarters and I Corps Headquarters in Korea.
Employed at Steiner Shipyard from 1976 to 1988, **Harold R. Larimer** is a freelance writer who spent most of his adult life in the military. He served two years with the U.S. Navy and 25 years in the U.S. Army, where he saw action in World War II and the Korean and Vietnam Wars. While attending Lake Sumter Community College, Mr. **Larimer** received awards for his poetry and fiction.

Circle 21 on Reader Service Card

Bayou La Batre

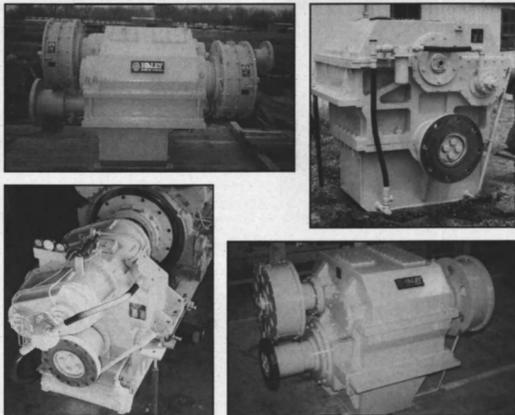
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sion to choose Steiner Shipyard was greatly influenced by observing first hand the quality of workmanship given to the work vessels currently under construction there. I figured that if a yard paid that much atten-

tion to quality and detail on a commercial workboat, it was the builder we were looking for."

Mr. **Agra's** wife, **Holly**, who has been of inestimable value to the business began her career in the tourism industry working for Marriott, at their northern Illinois amusement park, Great America. She began working in the boat busi-

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The Discovery Island, one of three offshore supply boats built by Steiner Shipyard for Seacor.

ness in 1978 and was soon director of sales and marketing, where through her many innovative concepts she was able to increase sales significantly. She became an active member of the National Association of Passenger Vessel Owners in 1983 and served as president for the year of 1990.

Proof positive of the determination and abilities of the Bayou La Batre shipbuilding industry is that 16 shipyards exist there today . . . quite a feat considering the devastating downturn in the industry in the 80s, and a gigantic feat considering the national average of survivorship.

Among these is Johnson Shipbuilding & Repair, Inc., which recently relocated to a larger facility in order to compete for construction of the larger type vessels that today's market demands. Since 1986 when their operation began, they have delivered a total of 20 fishing trawlers to buyers throughout the U.S. and Canada. Today there are ready to enter the workboat, pleasure boat, and custom-designed vessel markets of the world. With the dock space available at their new facility, they have the capability of performing dockside repairs to vessels in the 200-foot length category. **Frank Johnson**, owner and operator of the yard says he feels the future for the Bayou's shipbuilding industry lies in the larger, deeper draft vessels and workboats.

Another yard adding newbuilding dimensions to its fish trawler image is Rodriguez Boats, Inc., which was founded in 1976 by **Joseph Rodriguez Sr.** In 1977, operation was taken over by his son, **Joseph Jr.**, and to date they have delivered 75 vessels, of which 63 were for the shrimp and fishing industry. In 1990, with diversification in full swing, Rodriguez Boats built workboats and aluminum fishing vessels. Currently their workforce consists of 60 employees. In recent years, their specialties have included aluminum vessels and tug boats of all types. As of this writing, all the construction platforms at their yard are full.

LaForce Shipyard, Inc., owned and operated by **Frankie LaForce**, is located near the mouth of the big bayou and is presently converting a 65-foot steel oil supply boat to a 95-foot fish tender. The project re-

quires the addition of a 30-foot mid-section. At completion, the tender will serve Alaskan fish processing plants. This will be the yard's second such conversion and extension job to have been completed within 90 days. The first was delivered to its homeport in early February.

Of the 52 fishing vessels built by LaForce, 35 were delivered to East Coast buyers in New Jersey, New York and Rhode Island.

One shipyard specializing in vessel repairs and renovations is Gazzier Shipyard, Inc., owned and operated by **Richard (Pud)** and **Donna Jean Gazzier**. Among the most successful, not to mention challenging jobs undertaken by Mr. **Gazzier** was the complete renovation of eighteen 86-foot steel fishing vessels sold to Mexico. What made the feat so remarkable was the time it took to accomplish the job . . . just 18 days. At the request of Geophysical Services, Inc., a subsidiary of Texas Instruments, Gazzier built two 80-foot steel seismographic vessels for use in shallow water. One is being readied for seismographic soundings in Lake Maracaibo, Venezuela. These vessels are owned by Gazzier and both were utilized in recent years in plotting and charting the extensive gas findings in and around the Mobile Bay area. The yard also reclassified and placed back into service a 180-foot oil supply vessel.

Not all yards have found it necessary to diversify, yet certainly having this capacity is Ocean Marine, Inc., owned and operated by **J.L. Howard**. This yard has delivered 261 fishing vessels to customers in the U.S. and abroad since starting operations in 1972. One hundred and thirty of those vessels went to Nigeria, six to Honduras and one to India. Last year the yard delivered nine vessels.

Although Bayou La Batre is gradually moving away from wooden and small steel shrimp trawler construction, the needs of small boat owners are not being ignored. Yards like Randall's Boat Repair established within recent years specializes in small boat haul-out, painting and repair.

Multi-repair, conversion and restoration are the specialty of Bayou Marine Products & Services, Inc.,

(continued)



DUBUQUE CASINO BELLE

Designed for owners Robert and Ruth Kehl of Roberts River Rides by Patti Shipyard to be reminiscent of the elegant sidewheelers of yesterday, the Dubuque Casino Belle is the largest riverboat casino on the Mississippi and was the first American-flagged vessel to receive a gambling license.

The Dubuque Casino Belle joins three other Patti-built vessels in the Roberts River Rides fleet and, like her sisters, is another example of boatbuilding excellence by which other vessels are judged.

Patti is proud of the satisfaction and confidence shown by owners Robert and Ruth Kehl in again choosing Patti as the builder of this award-winning fourth vessel in their fleet.

Longer than a football field at 387 feet, the Dubuque

Casino Belle offers her 2,000 passengers the spaciousness of four decks, with three large casinos featuring 700 gaming devices, a theater lounge with headline entertainment, a children's activities center and a souvenir gift shop. Additionally, her two elegantly appointed 650-person dining rooms are served by full galley facilities, where sumptuous meals made famous by Roberts River Rides are prepared.

The centerpiece of the Dubuque Casino Belle is a 30-foot-high grand lobby outfitted with faux marble columns, rich-textured carpeting and charming lampposts nostalgic of a bygone era.

The Dubuque Casino Belle marks a milestone in construction excellence and design elegance that sets a new industry standard.



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One of two 80-foot seismicographic vessels built by Gazzier Shipyard for Geophysical Services, a Texas Instruments subsidiary.

managed by **James E. Simmons Jr.** Vessels from Peru, Chile, Mexico, Scotland and El Salvador have been converted and reconditioned since the yard opened in 1989. The yard also builds small wooden, steel and fiberglass boats to owners' specifications.

In addition to the repair and construction functions of the company, it also operates a labor pool where workers with various skills are made readily available to other yards in the area.

Master Marine, Inc. and Master Marine Repair, Inc., also engage in new construction, repair and conversions. Master Marine Repair has two floating drydock facilities for vessels up to 350 and 600 tons.

Ocean Marine Group, Inc., even though comparatively new to the area, has a varied background in new construction. Boats built by Ocean Marine have been outside the area of fish boats, with an emphasis on vessels such as ferries, cruise boats and tugs. This company has both aluminum and steel capabilities, with in-house design abilities. At the time of this writing, a major oceangoing tug and barge project is being negotiated.

Say, "It's a Landry Boat" anywhere and Bayou La Batre comes to mind. This yard first brought Bayou La Batre into the forefront of trawler builders long before steel hulls came into use in the U.S. fishing industry.

In 1944, **Roy Landry** took over one of the oldest shipyards in the area. Joined by his two brothers upon their return from service dur-

ing World War II, the three **Landrys, Roy, Joe and "Shine,"** carried on wooden vessel repair and new construction. These wooden-hulled vessels rapidly created such a demand that a point was reached wherein a waiting list of three years existed.

With over 200 vessels to its credit, new construction still continues at the yard, though at much reduced levels. **Roy Landry** passed away within the last few months and two surviving brothers are continuing this traditional form of vessel repair and construction. Two haul-out rails are maintained.

Reminiscing about yard history, **Joe Landry** recounted, "I remember the early days when we used an old gas truck engine to haul out boats." The history of Landry Boats has been long and varied with most boats built in the 75- to 85-foot category. The yards standard hull design was once modified and adapted to motor-powered sailing yacht, the Wanderlure, used in an around-the-world cruise.

Owner and operator of Horton Boats, Inc., **Elmo Horton** has been on the Bayou scene for many years. His yard has produced over 300 vessels since it began operation. Like others, he has seen the need for diversification and is now building work and oil industry-related vessels.

Interesting things are going on at Master Boat Builders, Inc., where president **Michael Rice** now has under construction a 92-foot fisheries development vessel (scallop-



The Silver Spray, a 116-foot Alaskan crabber built by Master Boat Builders.

dragger), which will be homeported in Peru. A 110-foot Alaskan crabber is well along in construction and a 150-foot long-line factory processor also will be joining the Alaskan fleet when completed. This company, founded in 1978, has within the past year delivered a 105-foot Alaskan dragger, a 116-foot Alaskan crabber and a 90-foot longliner to Hawaii. One of Master Boats most interesting past projects has been the construction of diving support vessels for the oil industry.

John E. Graham and Sons, Inc., is a multifaceted company involved in building, leasing, and repair of oil-related vessels and equipment. After a slowdown resulting from the early 1980s economic downturn in the oil industry, Graham has gone into the production of oil supply vessels once again. This company, with over 150 major oil boats to its credit, appears once again to be heading toward the building heights previously achieved.

Their capabilities include building vessels of 230 feet, a marine haul-out way of 200 ton capacity, facilities for 30 boat simultaneous construction and repair along with related marine services.

This giant among local boatbuilders has far-flung facilities along the entire Gulf Coast.

Steiner Shipyard, Inc., is one of the oldest and most diversified shipyards in Bayou La Batre. Started as a family operation in 1954 and under the guiding hand of **Russell R. Steiner**, it has become one of the major shipyards in the Gulf Coast region.

Among the 306 vessels delivered to buyers in the U.S. and other countries, 256 were shrimp trawlers, of which 137 were built exclusively for one company, Sahlman Seafoods, Inc. of Tampa, Fla. Twenty-nine, including 16 self-elevating work platforms, were built and delivered to oil industry facilities in the 70s and 80s, while more recently, three aluminum tour boats were built for **Frederick L. Nolan III**, president of Boston Harbor Cruises, Inc., in Boston, Mass. A research vessel was constructed for the State of California's Department of Fish and Game. Now under construction are two additional aluminum tour boats, two dredges and a 500-passenger, 190-foot steel pleasure boat.

When the oil crunch in the early 80s began taking its toll on the shipbuilding industry, Steiner Shipyard undertook a repair and renovation program for inactive used oil boats. A total of 10, ranging from 180 to 200 feet in length, were either completely repaired or rebuilt before being placed back in service.

Giving Steiner its outstanding rank among shipyards of the Gulf Coast region is the highly sophisticated technological capability it possesses. Headed by **Andrew Overstreet**, who supervises the overall operation for design and fabrication, these capabilities add a dimension not usually found in shipyards.

Its auto/CAD program is a general purpose, computer-aided design/drafting system used for vessel

drawings and interior design planning.

Auto/SHIP, another state-of-the-art concept, assists naval architects in developing architectural drawings of all types. The features available with this system are too numerous to mention here, but basically their purpose is to eliminate error probability in design planning and to accommodate whatever changes

may occur at any stage of construction.

Replacing an old plasma shape cutter is a new ESAB GXB 1200 CNC oxyfuel machine, which is used in conjunction with the Auto/CAD system for precision cutting steel plates into the shapes and forms needed to construct a vessel. It ensures complete uniformity of components and results in stan-

dardization of production procedures which, in turn, generate appreciable cost savings for buyer and builder. **Richard Lowery** oversees all functions involving the shape cutting machine.

A wheelbrator (blasting machine) provides protection from corrosion for all steel used in vessel construction.

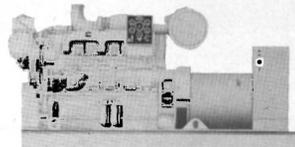
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Bayou La Batre

(continued)

tion. Each plate, after being blasted to a clean, smooth surface condition is immediately coated with a zinc-rich primer and paint mixture. The completed process provides maximum protection against corrosion not only from outside, but inside the vessel as well. Corrosion from within has always been a major problem for the shipbuilding industry, so the wheelbrator procedure greatly enhances the quality of the shipyard's finished product. **Sergian Truxillo** brings 22 years of experience to Steiner's wheelbrator capability.

The spin-off effect resulting from the bayou shipbuilding industry is extensive, reaching all points of the globe. In the U.S., there are countless suppliers who benefit from the building program.

Marine Gears, Inc., with headquarters in Greenville, Miss., furnishes gears and related components for the Bayou shipyards, while Houser Marine of Foley, Ala., has long been supplying Lario water pressure systems to all Bayou builders.

Cummins Alabama, Inc. and **Larry Neff**, its Mobile representative are no strangers to the Bayou shipbuilding industry. A recent and very significant first for them was the placement of all NT855 power



The 105-foot Alaskan dragger Majesty, built by Mast Boat Builders.

for generator sets, liquid mud pumps and bowthrusters aboard three oil supply vessels delivered to Seacor, Inc., Morgan City, La. These vessels were built at Steiner Shipyard, Inc. Operators reported that the first of these vessels, the Sun Island, has been in operation for almost a year without a single hour of downtime charged to the Cummins' power package.

McElroy Machine & Manufacturing Company, Inc., in Biloxi, Miss., has been furnishing winches for Bayou built vessels for over 24 years. Also they have provided a large share of the precision machine work required for certain vessel components. Recently they were called

upon by **Ljusbisa Nalovic**, president and owner of Compagnie Francaise De Peche, a seafood processing plant in French Guyana, to develop a winch capable of retrieving nets from deep waters (800 fathoms). Fishing deeper waters is a pioneer project embarked on by Mr. Nalovic and his company, and so far the results are gratifying. Previously, lack of a winch strong enough to pull and reel in the nets from such depths prevented exploration of these waters. However, McElroy engineers designed a winch specifically for that purpose. It has a drum capacity of 9,400 feet of 9/16-inch diameter wire rope, a line pull of 37,000 pounds and a maximum line speed of 330

fathoms per minute. The winch is installed on a Steiner vessel built exactly to the specifications required for Mr. Nalovic's project. Mr. Nalovic is very optimistic about the possibilities of deep water shrimping, feeling that it could produce a mother-love for the industry.

Few vessels have ever left Bayou shipyards with anything other than Furuno electronics equipment furnished and installed by **Buddy Johnson**, president and owner of Southeastern Electronics, Inc., located in Bayou La Batre. Southeastern has been outfitting vessels from the Bayou, as well as all parts of the world, since 1969.

Carolyn Overstreet of American International Marine, Inc., also located in the Bayou, has been distributing Fundiciones Rice propellers and kort nozzles, which are fabricated in Mazatlan, Sinaloa, Mexico, for over 14 years. The fuel saving features of the nozzles is known worldwide, and today almost all fishing vessels departing from the Bayou are equipped with them. Rice is currently promoting a new propeller design, the Nova Free Style open wheel, designed to eliminate vibration when moving in reverse. Rice wheels are available in 25- to 136-inch sizes.

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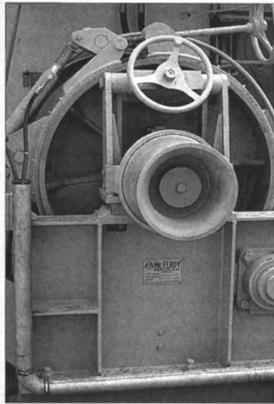
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McElroy Machine & Manufacturing specially developed this winch for retrieving nets from waters as deep as 800 fathoms for Compagnie Francaise De Peche, a seafood processing plant in French Guyana.

1754, it is also the sixth oldest United States corporation. The Devoe paint system has been used extensively by Bayou shipyards, and there is hardly a port anywhere in the world where you will not find vessels protected by the Devoe coating system.

A limiting factor in achieving full potential for the ongoing diversification program is the relatively shallow (12-foot) access channel. Some local shipyards have been able to overcome this adversity by making use of a "split operation" concept, where larger vessels are con-

structed, repaired and outfitted to the fullest extent possible, then, due to the depth limitations, moved to facilities that can accommodate the deeper draft vessels.

The good news is that a U.S. Army Corps of Engineers' feasibility analysis for channel improvements, recommending an 18-foot depth was completed in September 1988 and has now been approved by Congress.

It is possible that the first construction contracts will be in place by April 1992.

With the channel deepening, Bayou shipyards, with their favorable labor supply, skilled craftsmen and reasonable wage scale, will provide a highly beneficial alternative for fleet and vessel owners looking for reasonable repair and construction costs.

A trip down the bayou today is a lesson in geography. Hailing ports on boats being constructed reflect all sea bordering countries. Gumbo, a traditional dish relished locally, is a mixture of many things and this is true of vessels being built in Bayou La Batre . . . you name the type and Bayou shipyards have built it, are building it, or you can bet your deck boots, will build it for you.

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FOR MORE INFORMATION, Reader Service Numbers For Shipyards/Suppliers Of Bayou La Batre

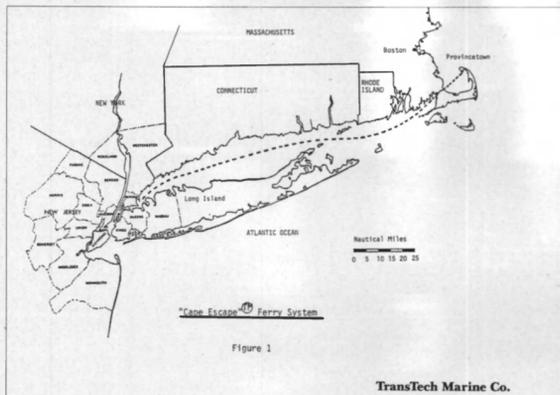
If you are interested in receiving detailed literature from all the Bayou La Batre shipbuilders, repairers and equipment suppliers mentioned in this article, circle Reader Service number **100** on the post-paid Reader Service Card bound into the back of this issue. If you are interested in a particular supplier or yard, see the alphabetical listing below for the appropriate Reader Service number.

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Report Predicts Growth In U.S. Coastal Ferry Market

Rapid technological advancement of large, fast, coastal and short-sea ferry designs is coinciding with favorable population and economic trends to create an important emerging new commercial market for U.S. shipyards and suppliers, according to TransTech Marine's report, "Analysis of Coastal Ferry Markets and Technologies in the U.S."

Present express ferry designs or those being developed will transport passengers in cabins and, in some cases, will also accommodate

their vehicles over longer distance trips. Although these vessels will be large, they will travel at speeds formerly associated with smaller craft such as commuter ferries. In spite of their large size, these vessels will be unlike traditional cruise ships. And in addition to their high speeds, they also will be more glamorous and luxurious than conventional passenger/vehicle displacement ferries. This new market is best described as coastal and short-sea ferry cruising, similar in overall concept to

Litton Demonstrates First Fiberoptic Towed Array Sonar System

An industrial team lead by Litton has successfully demonstrated to the U.S. Navy for the first time the application of advanced fiberoptic technology to an all-optical shipboard sonar system. The development was accomplished under the sponsorship of the Naval Research Laboratory and the Naval Underwater Systems Center.

A. David Klein, vice president for advanced programs at Litton's Guidance & Control Systems Division, Woodland Hills, Calif., said: "We expect that this technology will provide expanded data handling capacity and more capable sensors in a less complex, lighter weight and less costly system than currently operational sonar arrays towed behind ships. Additionally, this fiberoptic system would not require any electrical power in the sonar cable and would not be affected by electromagnetic interference from outside sources."

The demonstration at sea, completing a two-year, \$4 million development program, was conducted in a U.S. Navy research vessel utilizing Litton fiberoptic acoustic sen-

sors and an all-optical telemetry system linking the sensors in the cable with shipboard instrumentation. Litton's team member Bendix Oceanics, Sylmar, Calif., designed and fabricated the array structure and worked with Litton to integrate the system and conduct system testing.

Mr. Klein said that Litton and Bendix are currently working with the Navy to develop plans to introduce lower cost systems with these advances into future operational ships and submarines.

For further information and free literature on Litton,

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Towboat Association Elects Officers

The Northwest Towboat Association, at its 24th Annual Meeting, elected **Warner Nelson** president. Mr. Nelson is vice president of human resources and industrial relations, Foss Maritime Company. **Patrick McGarry**, equipment manager, Manson Construction & Engineering Company, will serve as vice president.

Directors elected to serve are **Alex Sweeney**, Crowley Maritime Corp.; **Norman Davis**, Brix Maritime Co.; **Hugh Marsh**, Puget Sound Freight

some services in Europe, such as the Baltic ferries, but utilizing higher speed technology for the U.S. market.

Technologies now in the lead to develop the U.S. ferry cruise markets are SWATH (Small Waterplane Area Twin Hull) and SSC (Semisubmerged Catamaran). However, rapid advancements have been made recently in larger size ACV (Air Cushion Vehicle) and SES (Surface Effect Ship) designs, and important new technologies are coming into play, such as the Quadrimaran hull form that has recently been licensed for U.S. construction and the Techno-Superliner, now under development in Japan. All available or anticipated design technologies are profiled along with a U.S. builder in the report.

Markets identified for these fast ships in domestic trades could require between 30 to 50 vessels with an overall value to shipyards and suppliers exceeding \$1 billion over the decade. Such a base would form an important component of commercial series production that would position U.S. builders to compete in world markets for this business, as they do now in some other types of high technology, high value ships, according to the report.

A ferry cruise route representative of what TransTech forecasts for the future and dubbed the "Short Escape to the Cape" (as in Cape Cod) is illustrated in Figure 1. The new vessel technologies will enable bringing back modern versions of such as Fall River and Eastern Steamship lines, as well as opening up entirely new destinations. The report's vessel forecast is broken down by proposed route. Recognizing that seasonality impacts many routes in North America, the report contains

complete financial analysis of one proposed service based on five months' operation. The analysis reveals that ferry cruise services can be profitable even without off-season vessel employment.

Geoffrey Uttmark, the report's author, recently said, "After you have technology that can economically live up to these demanding schedules and produce a satisfactory ROI, which is now emerging so that these services can be developed or re-developed, next you need a broad and deep marketing organization and superb operators." Mr. Uttmark continued, "That kind of infrastructure does exist in the U.S. now largely in modified form, such as airlines, foreign-flag cruise ship operators and international hotel chains. The best way it could be adapted to the ferry cruise business is through a parent organization responsible for marketing and finance with separate operating franchises."

"Analysis of Coastal Ferry Markets and Technologies in the U.S." contains over fifty pages of information and figures describing all aspects of this emerging business. The report is a useful market development resource for U.S. ship designers, builders and equipment vendors seeking greater participation in new commercial markets, overseas licensors of advanced cruise ferry technology, vessel operators and managers, transportation planners and economists, and industry lenders and investment groups.

The report may be ordered by remitting \$295 to TransTech Marine Co., 771 Carroll St., Brooklyn, N.Y. 11215. There is an additional \$10 charge for airmail postage for orders outside North America.

Lines, and **James Dunlap**, Dunlap Towing Co.

The Association, with offices in Seattle, Wash., represents the major marine towing and construction companies which operate from the Puget Sound area.

Sewage Treatment Plant From Omnipure Available Now In Take-Apart Unit

The Omnipure marine sewage treatment plant now comes in a take-apart version that can be fitted into spaces previously inaccessible to any marine sewage treatment plant. Maximum space required is 1.5 meters by 0.6 meters by 1.8 meters, with access suitable for personnel to pass through. EES Corporation's popular Omnipure 4MS and 6MS units are now easily disassembled into three pieces for transporting into place, then quickly and easily reassembled for operation.

The Omnipure Model 4MS will treat black wastewater for up to 12 people or black and gray water for up to 6 people. The Omnipure Model 6MS will treat black wastewater for up to 25 people and black and gray water for up to 12 people.

The Omnipure marine sewage treatment plant oxidizes and disin-

fects the organic matter in the sewage stream through the use of electrochemical process.

For further information and free literature on the Omnipure sewage treatment plant,

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Parker Hannifin Introduces New Hydraulic And Lube Duplex Filter

Parker Hannifin's Hydraulic Filter Division has introduced the DIL8 model high-flow, high-capacity duplex filter. This 500-psi, 400-gpm filter is engineered for critical hydraulic and lube systems where continuous flow is required and no servicing downtime is permitted.

The carbon steel and ductile iron construction is designed to operate in the most demanding maritime industry applications. The filter includes a patented flow diverter valve which provides virtually zero leakage and an extremely low-pressure drop. This valve was originally designed for demanding military applications.

For more information and a product brochure detailing the DIL8 filter from Parker Hannifin,

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Maritime Reporter/Engineering News



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NOR-SHIPPING '91

Oslo-Based Shipping Conference & Exhibition
Expected To Be Largest In Years

June 11-14

With the settling of hostilities in the Persian Gulf, the shipping community is once again able to turn its attention to such critical marine industry issues as ship finance, environmental and safety considerations, global tonnage demand, ship management and double-hull tanker pros and cons. And it appears that Nor-Shipping '91, a biennial international shipping and maritime offshore exhibition and conference held in Oslo, will provide a major forum for the shipping community to not only air its views, but also to examine the latest marine technology, products and services.

"Nor-Shipping is a melting pot and a meeting point—not only at the exhibition, but at private meetings in Oslo as well," said **Jon W. Thomas**, project manager for the Norwegian Trade Fair Foundation, organizers for the conference and exhibition. "We are confident that this year's Nor-Shipping will be much larger than in 1989," added

Aerial view showing the outskirts of Oslo, with the Sjølyst Exhibition Center, site of Nor-Shipping '91, in the foreground.

Mr. Thomas.

Nor-Shipping, which has been scheduled for June 11-14, 1991, in Oslo, Norway, at the Sjølyst Exhibition Center, is being held for the 13th time.

Oslo and Norway in general provide an excellent backdrop for the event because of the resurgence of the country's position in the world shipping community. According to the latest figures released by the Norwegian Shipowners Association, Norwegian shipowners now own or operate one of the world's largest merchant fleets. The fleet under Norwegian ownership stands at about 1,550 vessels totaling 55 million deadweight tons. An additional 300 or so vessels on time charter or under management contracts increases the total number of vessels to 1,870 or about 68 million deadweight tons under Norwegian control.

"The establishment of the Norwegian International Ship register, the NIS, in July 1987, coupled with freedom to use foreign flags, has given our shipping companies latitude in choice and action—both essential to profitability," said **Hanne**

K. Aaberg, information officer for the Norwegian Shipowners' Association. "The results have astonished even the optimists," continued **Ms. Aaberg**, "because the NIS has been an unqualified success."

The strong resurgence of Norwegian shipping is reflected in the fact that, for the first time, a separate national pavilion for Norway's maritime industry is being organized at the exhibition. Arranged by the Norwegian Trade Council under the slogan "Norway Your Maritime Partner," this pavilion will house about 150 exhibiting companies covering a broad array of shipping related products and services. The pavilion, the largest at Nor-Shipping, will cover over 3,500 square meters or 25 percent of the total exhibition area.

Participants range from manufacturers of ship equipment to shipbrokers and the Norwegian maritime authorities, successfully illustrating the breadth of the country's shipping environment.

"Our function has been to act as a catalyst," said **Jan Spilleth**, the Norwegian Trade Council's coordinator for the joint Nor-Shipping pa-

vilion.

"This display brings together the key players and shows the striking power deployed by the Norwegian maritime environment in the international market."

According to **Mr. Thomas** and **Mari Astrup Glittenberg**, information manager for the Norwegian Trade Fair Foundation, in a recent interview, this year's event is expected to employ five display halls—about 15,000 square meters—as compared with three halls at Nor-Shipping '89. **Mr. Thomas** was also quick to point out that the number of national pavilions for Nor-Shipping '91 has almost doubled from the 1989 exhibition—this year's event has 17 national pavilions, up from 9 pavilions two years ago. In all, more than 600 companies from 30 to 35 countries are expected to be exhibiting. The expanded exhibition is expected to draw more visitors than the 8,000 that attended in 1989.

Mr. Thomas said the success of the show is a direct reflection of the upturn in the marine market. He said that one would have to go back

(continued)

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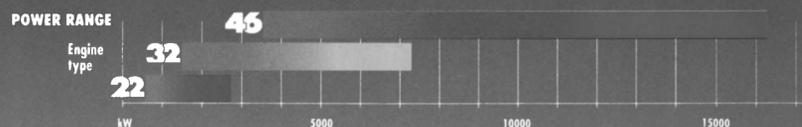
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Nor-Shipping '91

(continued)

several years to find a response as positive as this one.

Furthermore, Mr. Thomas also indicated that, although some companies had hesitated confirming their Nor-Shipping exhibits because of the Persian Gulf War, many are now committed. "It appears that international shipping feels able to plan for the future with greater confidence," said Mr. Thomas.

Another first at the exhibition is the joint U.S. display under the aegis of the Shipbuilders Council of America. According to Richard Thorp, SCA vice president of export activities and research, five U.S. marine equipment suppliers, members of the association's allied industries group, will exhibit at Nor-Shipping. The group will include Lake Shore, Inc. (deck machinery), Hopeman Brothers, Jamestown Metal (both accommodation and joiner work suppliers), Bird-Johnson (propellers) and General Electric (marine gas turbine engines).

"The Shipbuilders Council has become more proactive than it was 10 years ago," said Mr. Thorp. "It is more likely that our allied industry group members will make the first in-roads into the international market. Its our goal for our shipyards to follow." Mr. Thorp believes that Nor-Shipping is the most suitable forum for exposing this type of equipment. "Nor-Shipping has been for years the show for commercial shipping and shipbuilding. It's where the clients are," he added.

Mr. Thorp was also quick to point out that Sperry Marine, one of the most successful U.S. marine equipment suppliers, will also have its own exhibit at Nor-Shipping. Sperry Marine was recently one of 20 U.S. companies selected by the Commerce Department for special Federal trade assistance to develop the Japanese market. The companies were selected based on their ability to make long-term commitments to stay in the Japanese market.

As for the Nor-Shipping Conference, its central themes will be environmental concerns affecting the shipping industry, associated pressures for improvements in management quality and ship finance.

At the first session, "Finance—Where Now for Oslo," on Wednesday morning, June 12, one of the topics under discussion will be the lessons learned from Norway's limited partnership (K/S) market. Arguments for and against the Oslo international stock exchange will also be the subject of debate.

Topics in the afternoon session, "Markets: Is the Pessimism Justified?" include global tonnage demand after the Persian Gulf War and the commercial argument for and against double-hull tankers.

Trading opportunities for the dry bulk fleet, the outlook for second-hand tonnage, and an assessment of ship repair capacity for an aging fleet will also be discussed.

The second day will be dominated by environmental and safety considerations, starting with a morning session entitled "Shipping and

Nor-Shipping Conference Program (As of press time)

Wednesday, June 12, Morning Session

"Finance: Where Now for Oslo?"

Chairman: **Jens Ullveit-Moe**, chairman, Ullveit Gruppen

"K/S: The Lessons Learned," speaker to be announced.

"The Oslo Stock Exchange: For and Against."

(A) "Why International Shipping Needs the Exchange," by **Bjorn Ronneberg**, managing director, Eikland A/S.

(B) "The Oslo Shipping Bors—The Jury is Out," by **Charles Drury**, director, County NatWest Ltd.

The Debate—Panel Discussion. Panelists will include: **Geir Jansen**, managing director, Danish Investment Foundation; **Mr. Ronneberg**, **Mr. Drury**, and representatives from Finanshuset.

Afternoon Session

Chairman: **Paul Vogt**, chairman, Baltic Exchange

"A Global Supply/Demand Overview in the Light of the Gulf Situation," by **Dan Jessel**, managing director, Maritime Strategies.

"Double Hull Tankers: Will Freight Rates Justify the Investment?" speaker to be announced.

"Trading: Opportunities for the Dry Bulk Fleet," speaker to be announced.

"The S&P Market: What (is the) Price (for) Old Ships Now?" by **Christen Wikborg**, director, corporate finance, Fearnley Group (UK) Ltd.

"The Aging Fleet and Ship Repair Capacity," by **M.S. Tan**, managing director, Sembawang Shipyard Ltd.

Thursday, June 13, Morning Session

"Shipping and the Environment; Is a New Attitude Needed?"

Chairman: Representative from IMO to be announced.

"IMO: New and Pending Legislation," representa-

tive from IMO to be announced.

"Over Regulation is Counter Productive," by **Bob Bush**, manager fleet operations, Universe Tank Ships USA.

"Meeting the Shoreside Challenge," speaker to be announced.

"The Costs for Greener Shipping," by **Chris Horrocks**, International Chamber of Shipping.

Thursday, June 13, Afternoon Session

"Quality Management: Who Sets the Standards?" Chairman: **John Spruyt**, consultant, Spruyt & Co.

"Safety and Quality Management in Shipping. The Role of a Classification Society," by **Sten Bengtson**, vice president, and head of department for quality and safety management, Det norske Veritas.

"The Charterers?" representative from Shell International Marine to be announced.

"The Owners?" by **Bjorn Wihelmsen**, I.M. Skaugen and council member, Intertanko.

"The Managers?" by Captain **Joachim Meyer**, managing director, Hanseatic Shipping Company Limited.

"The Schools?" by Professor **Moreby**, Institute of Marine Studies Polytechnic South West.

Friday, June 14, Morning Session

"Technical"

Chairman: **Stein Thor Verle**, president, Det norske Veritas Classification A/S.

"Technical Solutions to Environmental Problems," by **Mr. Goodrich**, managing director, British Maritime Technology.

"When is Life Extension Practical," speaker to be announced.

"Shipbuilding Production: Are there Limits on Automation? Ship Operation and Marine Information Technology," by **Cato Sverdup**, Burmeister & Wain Shipyards.

"Ship Designs: The New Thinking for a New Decade," by **Per Lindemalm**, Saltech Consultants.

Flexibility

the Environment: Is a New Attitude Needed?"

IMO legislation, the possible counter-productive effects of over-regulation, meeting the shoreside challenge and the cost of "greener"

shipping will be debated.

On Thursday afternoon, June 13, under the session "Quality Management—Who Sets the Standards?" speakers will examine the issues of prime class tonnage, as well as the

roles of the charterers, owners, manager and schools.

"Green" issues will also be raised in the final technical session on Friday morning, June 14, which starts with a look at technological

solutions to environmental problems.

Other timely topics under consideration include vessel life extension, shipbuilding automation, and future ship design.

Nor-Shipping '91 Exhibitors

Alcatel Kabel Norge
Alfa Laval Industri
Allweiler
Andersen & Odegaard
Aqua-Teknikk
Arctic Light
Armaturjonsson
Assuranceforeningen Skuld
Astilleros Espanoles
Autronca Marine
Beha-Hedo
Bertel O. Steen
Bridon Svenska
Brunvoll
Brausgaard & Blindheim
Bugge & Gertsen
Camex Coatings
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Centa Transmisioner
Centimor
Chris-Marine
Clausen, Kaldager & Co.
Comrod
Comsat Maritime Services
Consilium Marine
Contrade
CSD Sealing & Protecting Systems
CTI Industries
Cummins Diesel Salg & Service
Det norske Veritas
DHL International
Diesel Power
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EB Distribusjon
EB Industri & Offshore-Marine Div.
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Glamox
Gouldens
Granges Metalock
Gulf Agency Co.
Halvorsen, Anders
Hamworthy Engineering
Harding Verft
Heien-Larssen
Hydraulik Brattvaag
Hovik Lys
Imarsat
Institute of Marine Engineers
IMO
ITS Norway
Japan Ship Exporters Assoc.
Jelin Norge
Jets Vacuum
Jotron Electronics
Joban Cathodic Protection
Jotun Protective Coatings
KaMeWa
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Lloyd's Register of Shipping
MacGregor-Navire Group
Mar-EI
Marinco
Maritek
Maritex-Swedish Telecom Radio
Maritime Software
Maritime Forum
Marin Scandinavia
Merlin Gerin Norge
Miba Gleitlager
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NORWEGIAN MARINE EQUIPMENT & SHIPPING

Developing New Technology For Tomorrow's Ships

Maritime Reporter Staff

For more than ten centuries, since the Norsemen first cast off from her misty shores in their dragon-shaped long ships, Norway's prosperity has been intertwined with the sea. An integral part of this deep-rooted maritime tradition is a spirit of innovation which has enabled this rugged, mountainous country to remain in the forefront of economic, political, and technical developments in the marine field.

As if emerging from the mists of the past, three replica Viking ships will set sail this month on a trans-Atlantic voyage to commemorate the 1,000th anniversary of Leif Ericsson's expedition to North America.

Although only one of the vessels will make the entire "Vinland Revisited" trek, all three ships will rendezvous in Washington, D.C., on October 9th for Leif Ericsson Day festivities.

The voyage, however, will not only celebrate Norway's millennium-old heritage, but also mark its passage

The Royal Viking Sea at the Seven Sisters Waterfall in Norway.

into a new era of maritime development.

One of the World's Largest Fleets

A nation with a population of slightly more than 4 million, Norway exerts a great deal of influence on the global maritime market through its large number of ship owners, operators, and brokers, marine-based technology companies and highly developed offshore industry.

Figures supplied by the Norwegian Shipowners' Association (NSA) show that about 72,000 Norwegians are employed in shipping-related activities, a majority of which can be accounted for by shipping companies, shipyards and ships' equipment manufacturers.

As of the first of this year, the Norwegians controlled one of the largest merchant fleets in the world, totaling an astounding 1,867 vessels and aggregating an estimated 68 million deadweight tons. This total encompasses 1,162 ships totaling 42 million dwt. under the Norwegian flag, 380 ships totaling 12.9 million dwt. under foreign flag and

another 325 ships on a time charter or management basis. A full one-quarter of the world's gas carriers and one of the world's largest cruise fleets with more than 30,000 berths lie under Norwegian control. The Norwegian fleet, in fact, is an important player on the world market, with about 90 percent of it engaged in cross-trading—trading outside of Norway.

Shortage of Officers

However, Norway's thriving maritime sector faces some major challenges. One, according to a recently released report by a Norwegian marine industry group, is a serious shortage of officers in the near future. The study, conducted by Maritime Forum, which focuses on issues facing domestic shipowners, yards and marine equipment suppliers, estimates that Norwegian shipping will need about 1,000 officers per year, whereas the supply now runs at about 450.

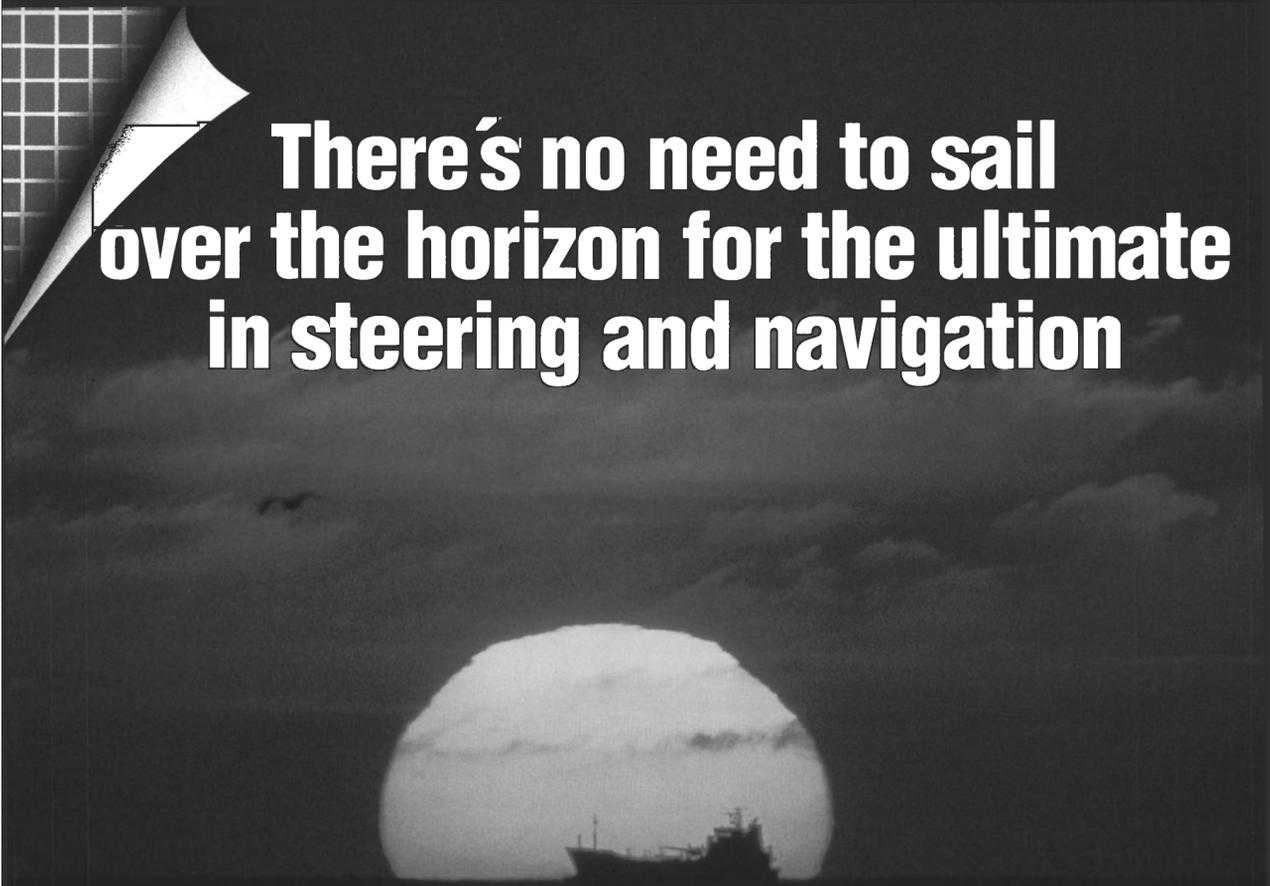
The NSA has been actively seeking solutions. The association, for example, tried to launch a maritime training plan by offering \$16 million to its members in a five-year pro-

gram, with a goal of turning out 500 officers. The program, thus far, has met with very limited success. A government white paper on shipping is due out this month which is expected to address the officer shortage.

Fleet Renewal

Fleet renewal is a second critical issue facing Norwegian owners. The tremendous success of the Norwegian International Ship Register (NIS), established in 1987, which breathed new life into a dwindling national register, brought with it an influx of secondhand tonnage, pushing up the average age of the country's combined fleet to almost 12 years old—slightly below the world average.

Hanne K. Aaberg, NSA information officer, said, "Obviously, you cannot extend the lifetime of a vessel indefinitely, and our biggest challenge in the 90s is the renewal of the Norwegian fleet. We have made some calculations and estimated that approximately NOK 150 billion (\$23 billion) will have to be invested over the next five years." (continued)



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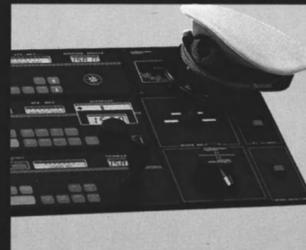
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Norwegian Marine Technology

(continued)

According to Ms. Aaberg, Norway has 160 vessels aggregating 9 million dwt. on order. This amounts to around 15 percent of the world's newbuilding orders. A large percentage of these orders, valued \$6.2 billion, are for tankers and bulk carriers.

Foreign Investment Needed

Ms. Aaberg also stressed the need for foreign investment to meet the demands of financing the fleet. "Our future financial requirements," said Ms. Aaberg, "cannot be met exclusively at a national level." Pending tax reform is expected to have a great deal of influence on foreigners investing in Norwegian shipping partnerships.

One such investment partnership, the K/S system, has come under fire by many critics for containing aging, substandard vessels. However, according to a recent report by London-based Clarkson Research Studies Ltd., the K/S fleet is well-balanced, with 55 percent of the asset value invested in tankers and 45 percent in other type vessels. "The average age is 13 years,

which makes it representative of the world fleet as a whole," states the report.

For the most part, the K/S system is based on investments in single vessels, underwritten by a call capital system.

New Ship Management Class

One of the three major ship classification societies, Det norske Veritas (DnV), headquartered in Hovik, a suburb of Oslo, has classed about 4,500 ships or 14 percent of the world's tonnage that is now in service.

According to Tore Hoifodt, DnV vice president, corporate communications, 23.7 percent of all newbuildings in 1990 were built to DnV class, which compares favorably with ABS and Lloyd's Register, which posted figures of 15.4 and 15 percent, respectively, according to DnV. DnV's growth coincides with the start of the Norwegian International Ship Register.

DnV is banking on its new Safety Management Class (SMC). To date 15 contracts have been signed with shipping companies that collectively control 300 vessels, and discussions are underway with another 20 companies controlling 600 vessels, according to Sten Bengtsson, vice president, head of department for quality & safety management class.

In a meeting at DnV's Hovik headquarters, Mr. Bengtsson claimed that human error and substandard actions caused about 74 percent of all marine losses—a figure which seems quite startling.

"Investigations show that most accidents are caused by unsafe acts," asserted Mr. Bengtsson, "but experience shows that most of the mistakes that people make are caused by factors which only management can control. Thus, the DnV classification of management focuses on management control, onboard and ashore."

The DnV Tentative Rules for Management of Safe Ship Operation and Pollution Prevention were introduced to cover independent verification of management quality. The rules cover the IMO Resolution A647 (16) Guidelines for the Safe Operation of Ships and for Pollution Prevention.

P&I Clubs

Norway's marine underwriters have extended their activities around the world. On the P&I side, the two Norwegian mutual clubs, Gard and Skuld, cover about 90 million gross tons, or about 20 percent of the world merchant fleet between them.

An international Protection and Indemnity (P&I) Club founded in Oslo in 1897, Skuld is owned entirely by its members—the owners, charterers or operators of ships and vessels who have joined together to insure against liabilities and losses they may incur in the operation of their ships.

Although an international P&I association, about 60 percent of the club's vessels are under Nordic control.

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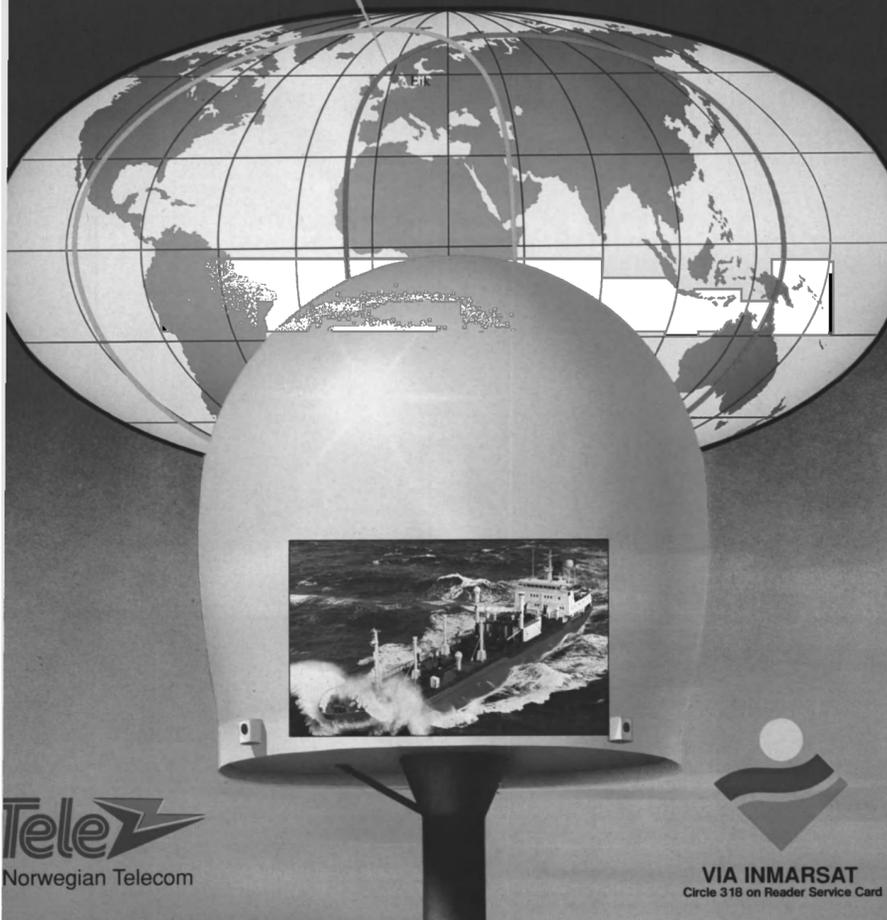
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The OPA 'Monster'

One of the future challenges facing Skuld is the U.S. Oil Pollution Act of 1990. "The OPA (Oil Pollution Act of 1990) has created a monster to keep inside its cage," said **Michael Thorp**, Skuld deputy director recently at the company's Oslo headquarters. "It's well to create an act with unlimited liability . . . but you have to keep in mind what is practically possible. We are all

deadly interested in protecting our environment, but if the insurance is not there, what can you do?"

"We are going to behave no differently from other P&I clubs," continued **Mr. Thorp**, "we cannot provide certificates under the present Oil Pollution Act (OPA) conditions."

The top level of liability provided by P&I clubs is \$500 million, with a facility to provide an additional \$200 million in liability from reinsurance brokers.

The OPA non-certification clause in the coverage states that it is not evidence of financial responsibility under the Oil Pollution Act of 1990 or any similar federal or state laws and may not be shown or tendered to the U.S. Coast Guard or any federal or state agency as evidence of financial responsibility or evidence of insurance. The insurers do not consent to be guarantors.

"The reinsurance market won't be able to take it," **Mr. Thorp** asserted. "The shipowner is going to be reluctant to commit his assets for fear of losing not just one vessel, but to be forced to lose his others." **Mr. Thorp** believes that this will lead to operators with older, poorly maintained vessels entering the market.

Threatens Structure Of Insurance

"Another problem with OPA," **Mr. Thorp** continued, "is that the U.S. government will have direct access to the insurance underwriters. This threatens the whole structure of insurance, because among other factors the P&I clubs require shipowners to fulfill certain obligations for the insurance to remain in effect. What if a ship does not maintain class for example?—it takes time for us to get that information and pass it on. But with a certificate on board, the ship U.S. authorities would still be able to sue the club for unlimited amounts of clean up costs, even though the insurance was void."

Concerning the new Ship Management Class, **Mr. Thorp** said that if loss ratios were good over a four-year period, then Skuld could cut its rates.

On double-bottoms and double-hulls, **Mr. Thorp** said that Skuld would not induce owners to buy these types of vessels by automatically lowering premiums. "But," he added, "if after a time we see there are a lower number of claims, then we may reduce premiums."

Significant Oil Producer

With the start-up of production from major offshore fields in recent years, Norway's significance as an oil-producing nation has risen. According to figures provided by the Export Council of Norway, the coun-

try produced 82 million tons of oil equivalents in 1988, with proven offshore reserves of 4.2 billion tons of oil equivalents.

Once several fields which are currently under development come on-line, domestic production is expected to increase by 1.6 million barrels a day, or 90 million tons of oil per year, enhancing Norway's status as the world's third largest oil ex-

porter outside of OPEC.

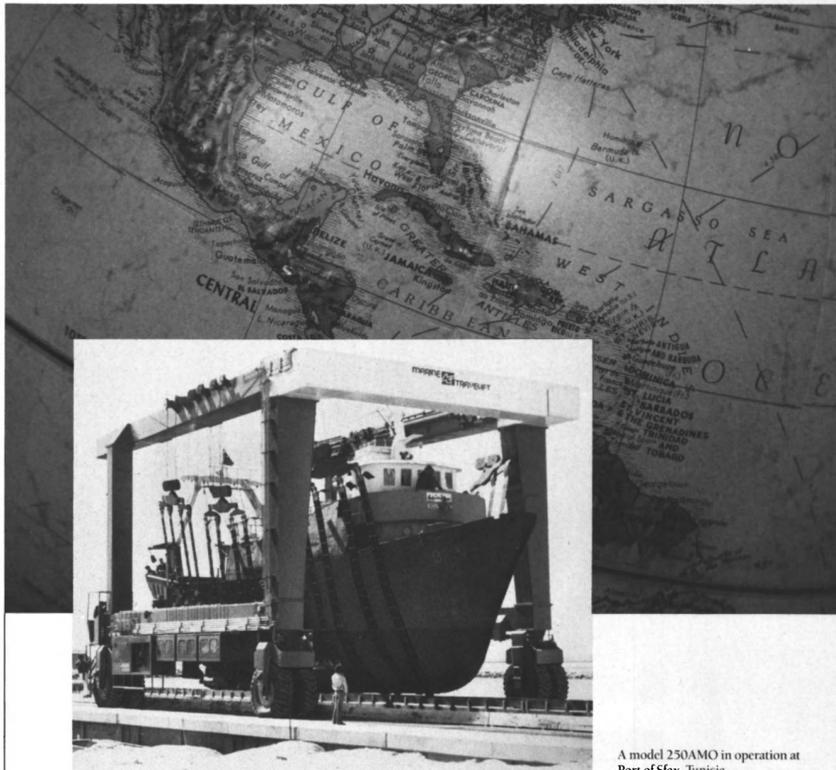
Total investments on the Norwegian shelf for oil and gas exploration are expected to climb from \$5.2 billion last year to \$5.7 billion by the end of this year.

Offshore Technology Development

Platforms for offshore oil production are some of the most notable—

and certainly noticeable—examples of Norwegian engineering skills. Some of these giant monoliths represent the largest structures ever moved by man. Norwegian specialists like Aker—whose subsidiary, Norwegian Contractors, developed the Condeep concrete platform concept—and Kvaerner have built up

(continued)



A model 250AMO in operation at Port of Sfax, Tunisia.

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Norwegian Marine Technology
(continued)

expertise recognized around the world.

In recent years, the principal activities of Kvaerner Engineering, which marked its 25th anniversary last month, have centered around the design and modification of topside structures on offshore plat-

forms. However, KE has been awarded several preliminary design contracts by Conoco Norway in connection with the Heidrun development off central Norway. This work will end up as tenders for the detail design, and is due to be completed during the fall. Parallel assignments have been awarded to Aker. In an effort to boost its expertise,

Kvaerner is collaborating with Doris Engineering of France and Skanska of Sweden on the project. The KSD (Kvaerner-Svenska-Doris) collaboration will carry out preliminary designs of the concrete hull for the tension leg platform on Heidrun.

Small Companies, Big Results

An examination of the member

roster of the Oslo-based Federation of Norwegian Engineering Industries (Teknologibedriftenes Landsforening) provides a great deal of insight into the make-up of Norwegian companies. The bulk of its 530 members are small- and medium-sized companies—at least by Norwegian standards—averaging 100 employees or less. These companies are typical of Norway, with efficient, streamlined production and management.

In all, 70 TBL companies either manufacture ships' equipment or build the ships or offshore structures themselves. According to the partial statistics furnished by the TBL, Norwegian companies exported about \$827 million worth of marine equipment out of a total of \$1.42 billion produced in 1988.

Norwegian Shipbuilding

To a large extent, the Norwegian shipbuilding industry specializes in producing vessels under 30,000 dwt. for the offshore support, commercial fishing, research and passenger sectors.

According to data provided by the Export Council of Norway, as of 1990 52 ships of 100 gross tons and over were under construction in Norwegian yards, 30 of which were for export.

Kvaerner Acquires Masa-Yards

As a result of a recently completed \$106 million deal, Kvaerner acquired 100 percent of the shares of Finnish builder Masa-Yards. Renamed Kvaerner-Masa, it incorporates the New Helsinki yard and the larger Turku yard. The yards employ a combined workforce of 4,000 and add large cruise vessel and icebreaker technology to the Kvaerner portfolio. And, due to the yard's close ties with the U.S.S.R., the acquisition will provide Kvaerner with access to the Soviet shipping market.

Fast Ferry Market

The company's Fjellstrand shipyard recently delivered the first high technology catamaran officially to start operations in Greek waters. The 134-foot catamaran Flyingcat I entered service with the Ceres Flying Dolphins fleet. The 352-passenger has a service speed of 38 knots. The Kvaerner Fjellstrand yard has sold 53 high-speed catamarans to 19 countries.



Artist conception of Kvaerner's 40M Foilcat.

Kvaerner is developing a new generation of Foilcat, a 41-meter, 50-knot prototype under construction at its Omastrand yard. The 449-passenger fast ferry will be foil assisted, with two fully submerged foils, 100 percent dynamically sup-

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ported, and powered by a propulsion package in each hull.

According to **Nic. Nilsen**, vice president of business development for Kvaerner Fjellstrand, the Foilcat will have several advantages over the Boeing/Kawasaki jetfoil, including being less costly, about \$15 million to \$18 million, producing less of a wake and able to carry more passengers and a larger payload. Designed with triple redundancy systems, GE LM500 gas turbines and KaMeWa waterjets, the Foilcat also has potential as a cargo forwarder as part of a total transport system.

MCMVs Being Built By Mandal Yard

The new purpose-built Mandal yard of Kvaerner Batservice is constructing nine SES mine countermeasure/catamaran vessels for the Norwegian Navy under a \$333 million contract. The 23-knot, 164-foot MCMVs are an entirely new combination of catamaran and hovercraft constructed of composite materials. The first vessel is expected to be delivered in 1992.

The project will have a major impact on Norwegian manufacturers, who will supply 65 percent of its equipment content. Simrad has joined forces with Thomson of France to supply \$63.7 million in tactical equipment, while Horten-based Norcontrol Automation will supply \$7 million worth of technical control systems. About \$4.8 million worth of waterjet equipment will be supplied by Kvaerner Eureka.

Four Survey Ships For U.S. Owner

The Ulstein Group, consisting of 30 international companies, offers a comprehensive range of products and services in shipbuilding and equipment, including diesel engines, control and propulsion systems, and hydraulic deck machinery.

A number of different vessel types have been designed over the past 30 years by Ulstein companies Ulstein Trading and Skipskonsulent A.S., including fishing, coastal passenger, cargo, ferry, well-simulation, tug, factory, multipurpose, and one of the firm's newest, surface effect. More than 230 vessels have been built in the UT 700 series of offshore vessels alone.

The Ulstein Hatloe yard recently received a \$40 million order from Western Atlas International of Houston to construct a fourth seismic survey ship for the company. The U.S. owner contracted three survey ships last year with Hatloe at a cost of \$90 million. The addition of the fourth ship will boost Western Atlas's survey fleet to 34 ships.

Unique Antarctic Research-Passenger Vessel

Also constructed by the Hatloe yard was a unique 5,129-gross-ton antarctic research/passenger vessel, the Polar Circle. Delivered to Rieber Shipping Company, the 300-foot Polar Circle can accommodate 120 passengers and a crew of 65. She is fitted with a 96-seat restaurant, three lounges, library and bar.

For research work, the vessel, which is capable of breaking 3-foot

ice at three knots, has wet and dry laboratories, a helideck and hangar aft.

Future Concept Craft

The UT 904 Surface Effect Ship represents Ulstein's latest area of involvement. A purpose-built yard in western Norway, owned jointly with fast ferry specialist Brodene Aa was established to construct

these high-speed vessels in fiberglass reinforced plastic hulls with sandwich construction.

"We believe this (SES) is the future concept craft," said **Bjarne Waerdahl**, information manager for Ulstein. Ulstein has aggressively pursued the development of turbines, waterjets, thrusters, electronics and design for the SES.

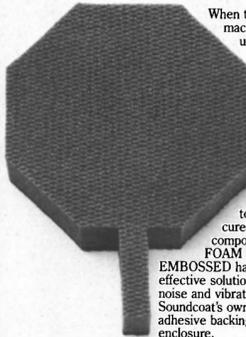
"These vital components should

be in our hands soon," said Mr. **Waerdahl**, "and we are not going to fail."

Ulstein Turbine is developing a powerful, efficient, compact gas turbine, which is expected to weigh one tenth of a lightweight diesel for installation in the SES. Four prototypes are scheduled for completion

(continued)

NOISE PROBLEMS? FOAM DAMPING SHEET-EMBOSSSED IS A NOISE-VIBRATION "STOPPER"



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Norwegian Marine Technology
(continued)

by 1993 in power range of 2,200-2,900 kw, with full production to start in 1995.

According to Mr. Waerdahl, this turbine engine will also comply with the strictest exhaust regulations, even running on liquid fuel. Consumption of fuel will be 30-40 percent lower than any known turbine, and oil will be used only for lubrication.

Propulsion Solutions

Part of the Ulstein Group, Bergen Diesel has more than 40 years' experience constructing marine generating sets, propulsion plants and stationary power generators. Generator sets are produced in the range from 460 kva to 4,010 kva, and single or multi-engine propulsion plants from 1,500 to 20,000 bhp.

According to Jan A. Kristiansen, general manager of sales and marketing for Bergen Diesel, Bergen currently has 3 percent of the world diesel market and expects a turn-

over of about \$90 million in 1991, a substantial increase over 1990 figures.

A major supplier of medium-speed diesels to the cruise industry, Bergen's most recent deliveries were to the Crown Monarch and the three Kloster cruise ships under construction in France and Germany.

In the U.S., Bergen has supplied 50 engines to the U.S. Navy, as well as medium-speed diesels for the newly constructed Edison Chouet research/icebreaking vessel.

Engine Spares For Major Diesel Makes

Located in Arendal, a small town located at the edge of the sea and built on small islands and skerries, Nyland Marine Service has been a supplier and manufacturer of engine spares for diesels for 70 years.

Taken over by the Maritime Group A.S. in 1989, Nyland Marine offers cylinder liners, cylinder covers, piston crowns, piston skirts and exhaust valve spindles and skirts for MAN B&W, Sulzer and Gotaverken diesel engines. As a specialist manufacturer of diesel spares,



Bergen Diesel in production at Bergen's diesel engine plant in Bergen, Norway. The engine is destined for a Kloster Cruise ship.

Nyland Marine products carry the same 12-month guarantee as the original manufacturer's. Nyland Marine spares conform to the OEM's technical and material specification criteria and are tested and accepted by all major classification societies.

Concentrating on the refit market, Nyland Marine has shown a steady increase in turnover over the last three years, rising from \$8.1 million in 1988 to \$18.9 million in 1990. And, although Norway accounts for its largest market at about 41 percent, Tom Erik Johnsen, the company's managing director, believes that the U.S. is an impor-

tant market. Mr. Johnsen believes that the company's turnover will jump 400 percent in 1991 over last year.

In 1985, the company expanded its product line with the addition of DnV type-approved Splitex and Monex propeller shaft seals.

Last year, the firm added the portable Fuel Ignition Analyzer (FIA) to its product line. The FIA, developed and manufactured in cooperation with Autronica A/S, Marintek A/S and Fueltech A/S, monitors ignition and combustion properties, which, left unattended, might result in serious and costly engine problems.

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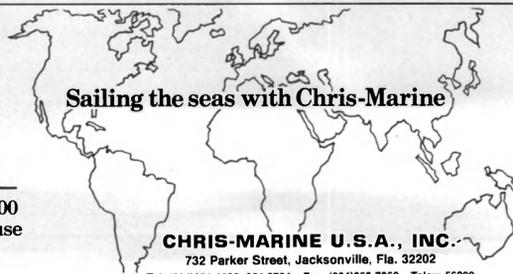
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Extensive Supply, Distribution Network

An extensive worldwide distribution and supply network is one of the key's to Unitor's market position as an important service organization for the international shipping community.

"We are the only people able to carry out service in one port and complete it in another port," said Christopher V. Horn, corporate marketing manager, at a recent meeting in the company's Kolbotn headquarters. "This company's strength lies in the fact that 120 people are based at the company's head office in Norway, whilst 1,000 people are stationed around the world," he stated.

Unitor's service and distribution network comprises 58 wholly owned branch offices plus an additional 202 agents. In all, Unitor covers 837 ports and serves in excess of 15,000 vessels from over 70 countries annually.

Unitor's diverse product and service range extends from industrial gases in standardized and exchangeable cylinders to refrigerants to marine chemicals to firefighting and rescue equipment.

Breakthrough Product For Spill Response

A breakthrough product for the company's newly formed Enviro division is the Unitor oil bag concept, a spare collapsible container used in the event of oil spillage from a damaged cargo tank. "Its most outstanding feature," said Mr. Horn, "is its simplicity."

Usable in all types of spills, not just groundings, and made from Protex, a seawater- and oil-resistant polymer-coated fabric, the Unitor oil bag features flexibility coupled with light weight and compact size for ease of handling, operation and storage. Three versions of the bag are available—a portable

model which can be flown by helicopter to the site of a tanker accident; an onboard deck-mounted version; and oil skimming version.

According to Mr. Horn, one 100-cubic-meter oil bag has already been sold to Esso Norway and Unitor has received several inquiries from U.S. owners. Unitor recently signed a contract with Washington, D.C.-based Marine Spill Response Corporation for a tentative order for testing with the U.S. Coast Guard.

"We believe that the oil bag is the most practical solution for dealing with the containment of oil spills and will satisfy forthcoming regulations," said Mr. Horn.

Inert Gas Systems Reduce Risk Of Explosions On Tankers

A subsidiary of the \$7 billion Monsanto Company, Permea A.S. Maritime Protection specializes in the design and manufacture of gas processing equipment based on three technologies—membrane gas separation, pressure swing absorption and combustion—for ships, offshore platforms and land-based industries. Permea A.S. Maritime Protection has sold over 400 inert gas systems for marine use worldwide.

The Kristiansand-based firm's Prism Alpha nitrogen systems generate nitrogen from the air by means of hollow-fiber membranes, and have proved to be a low-cost alternative to shore-supplied nitrogen bottles on chemical, LNG and LPG carriers.

Nitrogen, an inert gas, is used mainly for purging and blanketing of tanks and pipelines. The inert gas not only minimizes the risk of explosion but also prevents degradation of cargoes sensitive to oxygen and moisture. It is also useful for drying void spaces like cofferdams.

In the offshore market, Permea A.S. Maritime Protection has supplied over two dozen nitrogen systems for installation on North Sea platforms and has even supplied a Prism Alpha unit to Conoco for a platform operating in the Green Canyon in the Gulf of Mexico.

According to Mark E. Modjeska, managing director of the company, all the LNG carriers and 80 chemical carriers constructed over the last four years—over 100 newbuildings—have been outfitted with Prism membrane systems.

No More Bad Apples

Prism Alpha systems have also been found to be useful for creating controlled atmospheres on reefers carrying fruits and other vessels involved in long-distance transport of perishables. The storage life of apples, for example, has been significantly prolonged in this way, thus increasing their salability.

Keep Your Cargo Under Control

With about 170 installations worldwide, the Cargomaster system, which controls and monitors cargo, slop, ballast and fuel tanks, is one of the leading products from Skarpenord International A.S. All functions can be integrated into a single system to provide the operator with

a unified presentation and overall monitoring.

Level, temperature, inert gas pressure and cargo density measurement functions can be integrated into the system. Optional equipment includes loading computer, draft measurement, pump and valve control and cargo line pressure.

An average cargo tank installation consists of one sensor at the top

of the tank for inert gas pressure monitoring, one mid-sensor and one bottom sensor for closed remote level gauging and temperature monitoring.

By using two sensors submerged in the cargo, the system measures the density in each tank.

One important feature is the system's ability to gauge level accurately during stripping and tank

washing.

Cargomaster pressure sensors are specially developed to withstand the extremely severe environment inside a tank.

According to Knut Knutsen, product coordinator for Skarpenord International, negotiations are underway for eight to 10 retrofit

(continued)

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Norwegian Marine Technology
(continued)

projects for U.S. owners for installation of inert gas measurement systems.

Besides Cargomaster, the Langsund-based company offers Valve Remote Control Systems and hydraulic actuators for all types of valves. The company is focusing on

the American refit market for older tankers for new opportunities.

Waste Not

The IMO Marpol 1973/78 Regulations for the Prevention of Pollution from Ships are well known to the shipping industry. These regulations prohibit dumping of plastics and synthetic materials, as well as any waste that contains the small-

est amount of these materials in the ocean. Marpol regulations also prohibit the overboard discharge of oil, sludge oil and chemicals—and in restricted areas such as the North Sea or the Mediterranean, there is a total ban on all dumping of any type of waste except food waste.

Waste disposal is becoming an increasingly difficult problem for fishing and merchant fleets around

the world. Shore facilities for waste handling are not available in many parts of the world and onboard storage is often expensive and impractical.

According to figures provided by **Jorgen Kyed**, marketing manager for TeamTec, a manufacturer of incinerators for shipboard, offshore and land-based use, heavy fuel-operated diesel ships produce about 1 million tons of sludge oil per year.

TeamTec's solution is onboard incineration, which is approved by IMO for end destruction of garbage, waste and sludge oil. TeamTec Golar marine incinerators meet IMO's requirements for complete and smoke-free incineration.

TeamTec Golar incinerators come in five basic models with optional variations, and are approved by the major classification societies and other maritime authorities.

Offering compact modular construction, high temperature, clean and thorough high temperature (as much as 1,200 degrees C) combustion, efficient burning of both solid and liquid waste, simple operation, low maintenance and capacities ranging from 150,000 to 650,000 kcal/h, TeamTec Golar Marine incinerators have been installed on all types of vessels, from coasters to cruise ships, with more than 1,400 units sold worldwide. TeamTec has supplied the U.S. Navy with 60 to 70 units and, in fact, the entire FFG-7 Oliver Hazard Perry Class is fitted with a specially designed model SK 25 incinerator.

Another company product, TeamTec Golar stripping ejectors have capacities from 2-1/2 to 2,000 tons per hour and can be used on tankers, bulk carriers, dredgers and as bilge and ballast ejectors on all types of vessels. About 27,000 units have been sold worldwide.

Info Displays For Cruise Ships

The two main marine products offered by Scandinavian Micro Systems are the ScanRepeater, a digital heading repeater, and ScanDisplay, a large electronic LED information display.

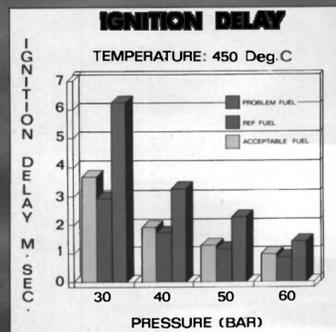
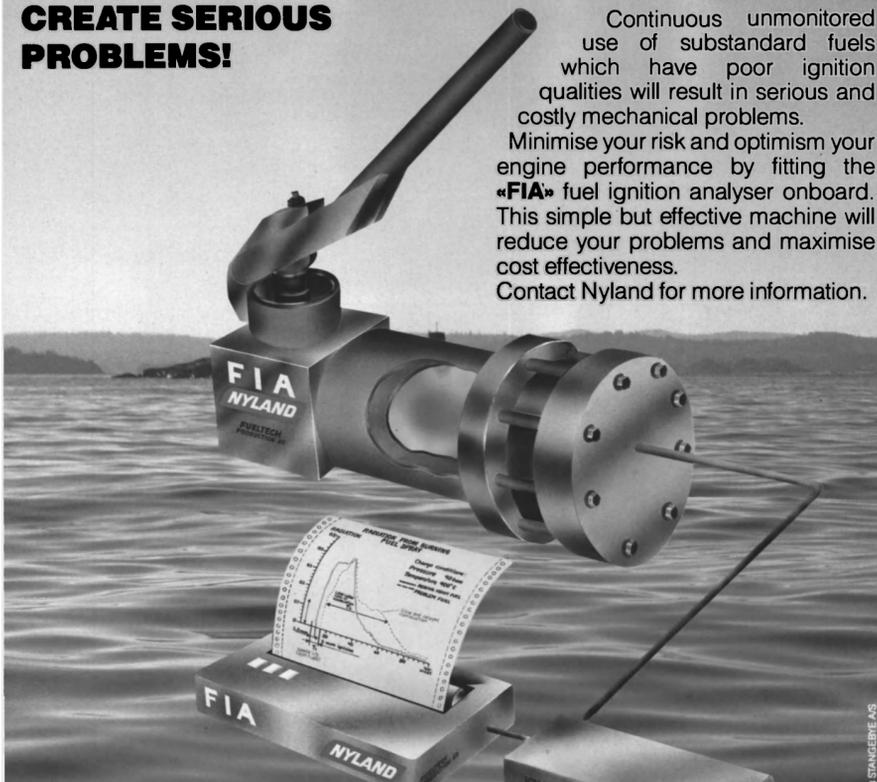
Headquartered in Kolbotn, just outside Oslo, Scandinavian Micro Systems' ScanDisplay has met with great success in the cruise and ferry market. The ScanDisplay cruise information system consists of a Bridge Control Terminal—an IBM PC—and a large "electronic map" where the vessel's present and future itineraries, as well as other passenger information, can be shown in a moving display. The bridge control unit determines the ship's current itinerary and the ports of call as well as the text in the moving text display. ScanDisplays have been installed on one dozen of the world's largest and most luxurious cruise ships.

About 6,000 of the company's ScanRepeaters are installed on commercial, fishing, Navy and larger pleasure vessels around the world. Developed by **Oddbjorn Steinsland**, the managing director of Scandinavian Micro Systems, the ScanRepeater is distributed and sold

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by major gyrocompass manufacturers from around the world. The ScanRepeater LR40/LR60 models have a large bright digital display with an analog indicator which allows instant estimation of the vessel's heading and turning rate. A universal interface is compatible with virtually all types of gyrocompasses.

Safer Navigation

A three-month trial of Robertson Tritech's Disc Navigation Systems was recently completed in the "Seatrans Project" aboard the 4,500-ton paper carrier Nornews Express which could have an impact on navigation safety. Results from these trials are being used to define final IMO and IHO standards for ECDIS.

Conducted in collaboration with Det norske Veritas, the Norwegian Hydrographic Service and the Norwegian Maritime Directorate, the trials were performed on the paper carrier's normal trading route from Trondheim to Amsterdam via Oslo and Hamburg. The Robertson Disc Navigation System stores digitized electronic charts on laser discs (CD-ROM) automatically updated by satellite. Norwegian Telecom, which cooperated in the project, provided satellite services utilizing the EIK Coast Earth Station via Inmarsat A. Sensors for Disc Navigation System are standard electronic instruments which also operate as stand-alone units.

The "official" chart of the area is displayed on a large color screen, while a Navstar GPS accurately and automatically fixes the vessel's position and the radar inputs details of the other vessels in the area. The Electronic Chart Display and Information System (ECDIS) is able to show the ship's position continuously in relation to planned track, navigational hazards and other vessels on a single screen.

The Robertson Tritech system uses official digitized charts, the legal equivalent to paper charts prepared by the Norwegian Hydrographic Office. Robertson is adding data from other hydrographic agencies is being incorporated in order to quickly form a database equivalent to the 2,000 paper charts needed for worldwide coverage. Each vessel can input information from its own sensors onto the chart and updates can be made automatically using the Inmarsat A or C satellite communication system but all of these details will be stored on separate discs to avoid contamination of the official chart.

Last Element In One-Man Bridge

Interfaced with a variety of sensors including GPS, ARPA, log, autopilot, gyrocompass and sounder, the ECDIS is intended to form the main bridge workstation. Additional product development might allow the system to satisfy the requirements for fully integrated bridge systems, the so-called "one-man bridge."

According to DnV's principal

nautical surveyor, **Capt. Per Larsen**, it also represented the last element necessary for a true one-man bridge in all types of water.

The sensitive issue of one-man navigational watches will be discussed at a meeting this month of IMO's Maritime Safety Committee. The issues of fatigue, as well as training will be examined.

Referring to OPA and its double-

hull requirement, **Hilton Cowie**, marketing manager for systems, Robertson Tritech, single-hull tankers might be granted a special dispensation if they were fitted with an ECDIS system. This would be good news to tanker owners, but, unfortunately, this is only speculation.

Large U.S. Market

Besides its ECDIS, Robertson, a

Bird Group company, has had marked success with its autopilot, gyrocompass, joystick, and dynamic positioning systems. The U.S. is the largest single market for the company, with 50 percent of its export sales.

Besides its dominant position in the U.S. pleasure boat market for

(continued)

You Could Lose Up To 94,000 Passengers This Year To Weight Problems.



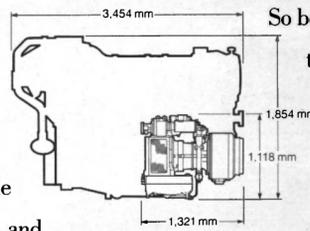
A twin-diesel power plant can weigh over 40,000 pounds, and puts out 6,000 tons of passengers.

But substitute two TF40 turbines and the scales shift dramatically.

TF40's are just 1/10th the weight of comparable diesels, and they still give you over 8,000 shp. So you get more speed—potentially enough to add an extra round trip a day.

And since TF40's use far less space,

you have lots more room for passengers. That can mean as many as 94,000 more fares every year.*



A diesel exhaust system alone weighs more than an entire TF40. That's a lot of fares gone up in smoke.

So before you go diesel, weigh the alternative.

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Norwegian Marine Technology
(continued)

autopilots, Robertson has sold a number of joystick and dynamic positioning systems in the American offshore market. Systems have been sold to Seacor Marine, Tidewater, Nicor, Oil & Gas Marine, Edison

Chouest Offshore and Freeport Sulphur Tankers and for the U.S. Navy's A-GOR-23.

According to Mr. Cowie, a large percentage of the company's installations are refurbishments.

Future Bridge Concept
Located on the "Electronics Coast" in southeastern Norway, Horten-

based Norcontrol Automation has developed an ARPA and navigation system which it believes will not only comply with the proposed future requirements for IMO/IHO, but also be an integral part of the bridge of the future.

"We are looking at new concepts for bridges," said Tom Leegaard, managing director of Norcontrol

Automation. "We look upon designing bridges as one of our future product lines. This is an area we feel we can expand into," continued Mr. Leegaard. "We are working with Det norske Veritas in this area and we are prepared to follow the rules set down by the classification societies."

Norcontrol Automation-developed DataBridge 2000 is a complete navigation system—ARPA, simulator training, route planning, sailing and voyage plotting information system.

Norcontrol's modular concept ensures flexibility and adaptability to customer specified navigation equipment and functions.

Norcontrol envisions the DataBridge as part of an Integrated Ship Control System (ISC), which would also incorporate the company's AutoChief (propulsion system automation), DataChief (alarm, monitoring and control systems for machinery), DataMaster (cargo and ballast systems automation) and administrative systems.

According to Johnny Christiansen, marketing manager, Norcontrol Automation, an ISC would reduce the cost of a ship life-cycle by reducing manning levels, optimizing fuel savings, reducing human error, reducing service and increase the ship's competitiveness.

Shipbuilding costs would also be reduced, according to Mr. Christiansen, by reducing installation, testing, commissioning and purchasing times.

Springboard To U.S. Navy

DataBridge 2000 Systems have already been earmarked for the nine MCMVs under construction at Kvaerner Batservice for the Royal Norwegian Navy. The \$7 million order could prove an important springboard for Norcontrol to the huge U.S. Navy market, since Norway is part of NATO.

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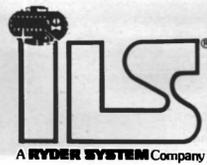
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REPORT ON FUTURE NAVY SHIP MAINTENANCE & REPAIR

Navy Budgets \$25.7 Billion For Ship Maintenance, Modernization Over Next Three Fiscal Years

By James R. McCaul, President
IMA Associates, Inc.

The Navy has budgeted \$25.7 billion over the next three fiscal years for ship maintenance and modernization and for the purchase of mechanical systems, electronics and communications components and other equipment needed for replacement and modernization. Another \$1.5 billion has been budgeted over the same period by the

Cover: Silhouetted bow view of the patrol combatant missile ship USS Gemini (PHM-6) at the San Diego Naval Base.

Above: Starboard bow view of the aircraft carrier USS Dwight D. Eisenhower (CWN-69), ammunition ship USS Butte (AE-27), guided missile cruiser USS Virginia (CGN-38) and other ships underway during NATO exercise.

Military Sealift Command and the Maritime Administration for the maintenance of their ships.

IMA has just completed an in-depth assessment of future U.S. Navy ship repair. The 150-page report published in April documents future work activity and analyzes issues impacting ship repair industry prospects. It includes details for specific job starts planned in FY 1991, 1992 and 1993—showing the type of availability planned and work start date. Market share is estimated for each of the shipyards performing Navy ship repair over the past six years. This article highlights some of the findings in the report.

Status of Current Industry Base

U.S. shipyards building and repairing Navy ships as of the beginning of this fiscal year are shown in Exhibit 1. There were 50 yards involved in Navy work. Five were strictly involved in construction, 38 in repair and conversion and the remaining seven performed both repair and construction.

The trend in the number of Navy vessel construction capable yards has fallen from 37 to 20 over the past nine years—a decrease of 46 percent. In contrast, the number of yards with full repair capability has dropped from 49 to 44—a decrease of only 10 percent. There has been

almost no decrease in the number of yards capable of performing limited repairs.

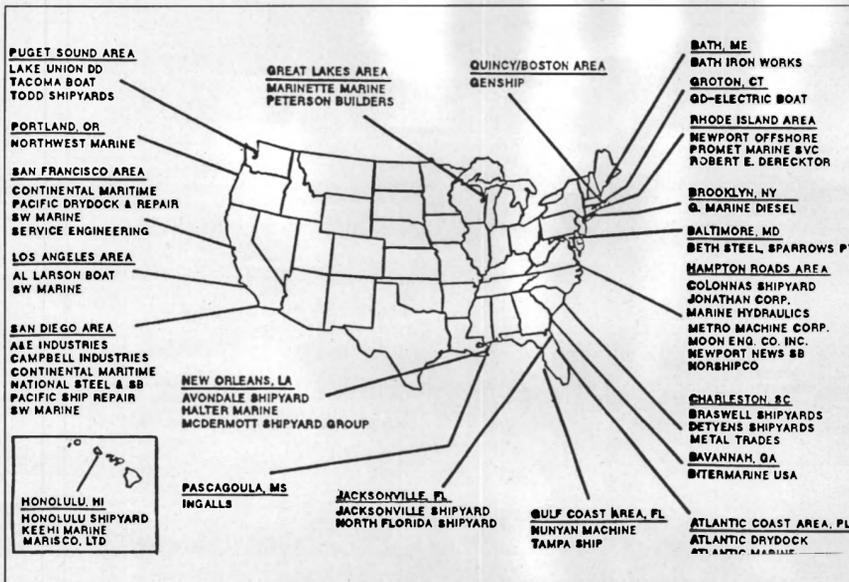
Exhibit 2 shows the major suppliers of hull machinery & electrical (HM&E) components. These manufacturers supply components for new construction, as well as repair and modernization of the current fleet.

Current Navy Maintenance Practices

Four basic ship maintenance patterns are employed by the Navy for active and reserve fleet ships: regular overhaul cycle, engineered/

(continued)

U.S. NAVY



extended operating cycle, phased maintenance and progressive maintenance.

Regular Overhaul Cycle—Traditional Navy maintenance practice had been to schedule periodic, lengthy ship overhauls during which repairs and planned alterations would be performed. A typical cycle was approximately 36 months between major overhauls. The overhaul took eight to 12 months.

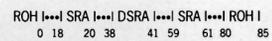
The Navy has largely discontinued this maintenance practice. Currently only floating drydocks and a few unique ships are maintained according to a regular overhaul cycle.

Engineered Operating Cycle—This strategy was introduced in 1974 for maintaining ballistic missile submarines. The objective was to match submarine overhaul intervals to a length compatible with new long-life reactor cores. The EOC concept was extended to surface ships in the late 1970s.

Under EOC maintenance, overhauls (ROHs) are scheduled at intervals as great as 15 years. Intermittent depot level availabilities (SRAs and DSRA) are scheduled between overhauls, lasting two to four months duration.

Fourteen ship classes are now in an EOC maintenance plan. The maintenance cycle shown for a DD-963 Class destroyer illustrates the EOC concept.

DD 963 Engineering Operating Cycle

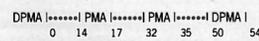


Phased Maintenance—This maintenance strategy was first employed in the late 1970s. Initially it was used for the Atlantic Fleet combat stores ships and has subsequently been extended to additional classes.

The general idea of phased maintenance is to perform short, frequent phased maintenance availabilities (PMAs and DPMA) in place of regular lengthy overhauls. Ships are generally scheduled for PMAs/DPMA of two to four months duration at 15 to 18-month intervals. The work is generally accomplished under multi-ship, multiyear contracts where one contractor is responsible for a particular group of ships.

Twenty-one ship classes are now in a phased maintenance plan. The schedule shown for the LSD-41 Class landing ship dock amphibious assault ships illustrates the phased maintenance concept.

LSD 41 Phased Maintenance Cycle



Progressive maintenance—In the

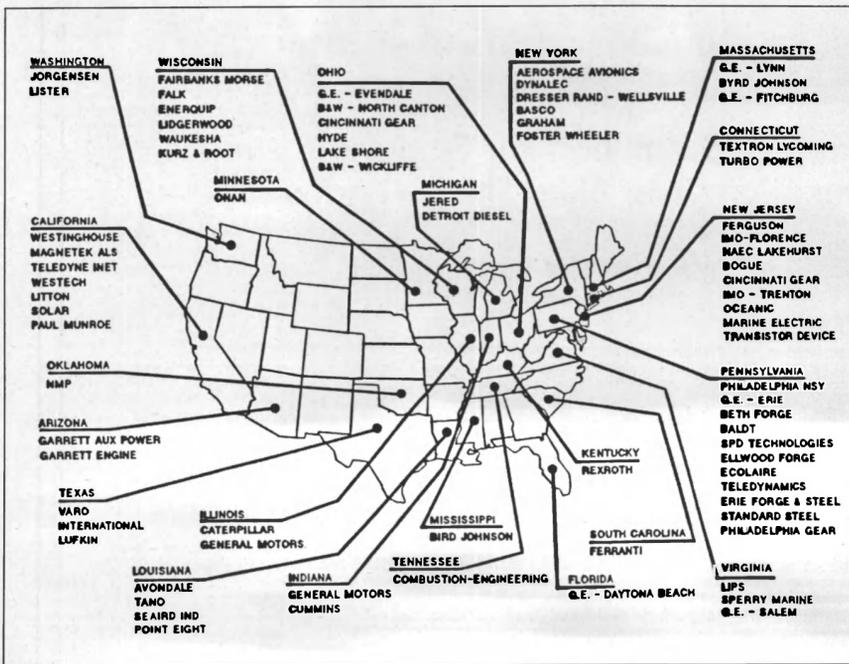


Exhibit 3
Six Year Maintenance Market Share:
Submarine Tenders and Tank Landing Ships
(FY 1985-1990)

Ship Class/Contractor	Short Term Availabilities		Overhauls	
	No. of Jobs	% Market Share	No. of Jobs	%Market Share
Submarine Tenders (AS)				
Charleston NSY	4	27	1	17
Guam SRF	1	7	2	33
Norfolk NSY	9	0	1	17
Norshipco	4	27	1	17
Metal Trades	2	13	0	0
Ingalls	1	0	1	17
Bethlehem-Sp. Pt.	1	7	0	0
Cont. Maritime	2	13	0	0
Southwest	1	7	0	0
Total	15	100	6	100
Tank Landing Ships (LST)				
Yokosuka SRF	4	7	0	0
Jonathan	13	23	0	0
Metro Machine	9	16	1	33
Southwest	9	16	0	0
NASSCO	18	32	1	33
Marine Hydraulics	2	4	0	0
Hoboken	1	2	0	0
Arcwel	0	0	1	33
Total	56	100	3	100

Source: MA report No. 7117

1970s the Navy initiated a ship logistics concept designed for specific classes which had reduced manning. The FFG-7 Perry Class frigates and PHM hydrofoil patrol boats were designed with progressive maintenance as an objective. Frequent maintenance and repair of these ship classes is scheduled at both intermediate and depot level activities. Depot level maintenance actions are to be performed during selected restricted availabilities which may involve drydocking (DSRAs) or not involve drydocking (SRAs).

About 10 ship classes are now in a progressive maintenance program. The maintenance cycle shown for the MHC Class minehunters illustrates this concept.

MHC Progressive Maintenance Cycle

DSRA |-----| SRA |-----| DSRA |
0 18 20 38 41

MSC and RRF Maintenance Practices—The Military Sealift Command (MSC) basically follows commercial procedures in maintaining

ships. Drydocking and overhauls are scheduled at two-year intervals and last 30 to 45 days. Intermediate servicing (midterm availabilities) lasting 15 to 20 days is scheduled between overhauls. Repairs, sponsor modifications, upgrades, etc. are performed during the overhauls and midterm availabilities.

The Maritime Administration (MarAd), which manages the Ready Reserve Force (RRF) fleet, schedules drydockings for RRF ships at two-year intervals to satisfy Coast Guard and ABS certification requirements. At six-month intervals, minor preventive maintenance is performed aboard each ship by MarAd personnel.

Project Funding & Number of Availabilities

The Navy has budgeted \$13.5 billion over the next three years for ship maintenance and modernization: \$4.1 billion in FY 1991, \$4.7 billion in both FY 1992 and 1993. Another \$12.2 billion is budgeted over the next three years for pur-

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PKS-9

December 1995. The Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-88-C-6150).

Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind., was awarded a **\$12,423,004** firm-fixed-price contract to furnish 30,000 AN/SSQ-53D sonobuoys. The work is expected to be completed in February 1993. The Naval Avionics Center, Indianapolis, Ind., awarded the contract (N00163-91-C-0081).

Halter Marine, Inc., Gulfport, Miss., was awarded a **\$91,849,470** fixed-price-incentive contract for the detail design and construction of T-AGS 60 and 61 oceanographic survey ships, with an option of one additional ship in fiscal year 1991. The work is expected to be completed in July 1994. The Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-91-C-2316).

Westinghouse Electric Company, Marine Division, Sunnyvale, Calif., was awarded a **\$90,759,000** firm-fixed-price contract option for materials and production of two main propulsion units and related equipment for the SSN-21-class submarine. The work is expected to be completed in September 1993. The Naval Sea Systems

Command, Washington, D.C. awarded the contract (N00024-90-C-4228).

Halter Marine, Inc., Gulfport, Miss., was awarded a **\$38,000,000** modification to a previously awarded firm-fixed-price contract to build 17 patrol craft. The work is expected to be completed in November 1993. The Naval Sea Systems Command, Washington, D.C. awarded the contract (N00024-89-C-2020).

Raytheon Company, Equipment Division, Wayland, Mass. was awarded a **\$7,264,203** firm-fixed-price-option to refurbish and upgrade MK 74, Mod 14 missile fire control systems for two ships. The work is expected to be completed in October 1993. The Naval Sea Systems Command, Washington, D.C. awarded the contract (N00024-89-C-5607).

General Electric Company, GE Government Services, Cherry Hill N.J. was awarded an **\$8,564,083** cost-plus-fixed-fee contract for the services of 10 Surveillance Towed-Array Sonar Systems (SURTASS) operation and maintenance technician crews and field support team members. The work is expected to be completed in September 1991. The Space and Naval Warfare Systems Command, Washington,

D.C., awarded the contract (N00039-91-C-0097).

Hughes Aircraft Company, Ground Systems Group, Cherry Hill, N.J., was awarded an **\$8,564,083** cost-plus-award-fee contract for the services of nine Surveillance Towed-Array Sonar Systems (SURTASS) operation and maintenance technician crews and field support team members. Work is expected to be completed in September 1991. The Space and Naval Warfare Systems Command, Washington, D.C., awarded the contract (N00039-91-C-0015).

Textron Marine Systems, New Orleans, La., was awarded a **\$69,086,849** firm-fixed-price contract option for craft construction equipment for the Landing Craft Air Cushion (LCAC) Program. The work is expected to be completed in September 1993. The Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-89-C-2028).

Southwest Marine, Incorporated, San Diego, Calif., was awarded a **\$31,050,340** firm-fixed-price-with-performance-fee contract for the regular overhaul of USS STERETT (CG-31). The work is expected to be completed by August 1992. Naval Sea Systems Command, Washington, D.C.,

awarded the contract (N00024-85-H-8221).

Raytheon Company, Submarine Signal Division, Portsmouth, R.I., was awarded a **\$80,899,896** fixed-price incentive contract to design and develop a team trainer for the AN/BSY-2 Submarine Combat System. The work is expected to be completed in June 1998. The Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-91-C-6505).

IBM Corporation, Federal Sector Division, Manassas, Va., was awarded a **\$77,412,440** cost-plus-fixed fee contract for repairs and systems support aboard SSN 594/637/688 class attack submarines and SSBN 726 class Trident ballistic missile submarines. The work is expected to be completed in January 1996. The Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-91-C-6001).

TRW, Inc., Systems Integration Group, Fairfax, Va., was awarded a **\$6,000,000** cost-plus-award-fee contract modification to provide engineering services for the Amphibious Warfare Ships Program. The work is expected to be completed in June 1991. The Naval Sea Systems Command, Washington D.C., awarded the contract (N00024-85-C-2099).



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*A Detailed Assessment of Future Business Opportunities
and Review of Key Competitors' Market Position*

Report No. 7117 -- \$575.00 per copy
April 1991

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Despite planned reductions in fleet size, the U.S. Navy will continue to provide major business opportunities for shipyards, equipment manufacturers and other marine suppliers. However, the timing and composition of the market is changing -- placing even greater importance on the need for timely, accurate market information.

A new report by IMA assesses policies and issues impacting Navy ship M & R, forecasts work available to the industry and documents the competitive performance of each of the major players. The 150+ page report contains detailed schedule information on maintenance availabilities and type of work to be performed over the next 2 1/2 years. Information in the report reflects the new budget request and return of ships from the Persian Gulf.

Nothing like this report is available anywhere. It contains data and analysis virtually impossible to duplicate -- building on the extensive Navy ship repair database developed by IMA over the past ten years.

OUTLINE OF REPORT

1. Overview of Navy Ship Maintenance

- status of current industry base
- trend in funding for ship and equipment repair
- description of current Navy and MSC maintenance practices
- current guidelines for maintenance intervals and notional mandays

2. Policies and Issues Shaping Navy Ship Maintenance and Repair

- lessons learned from Persian Gulf ship activations
- impact of cumulative deferred ship maintenance
- impact of budget constraints
- force structure changes and ship retirements
- changing ship technology
- increasing emphasis on short term availabilities

3. Anticipated Impact on Industry

- homeport policy to have distortionary effect on business prospects
- closure of naval shipyards will force work into the commercial sector
- ship inactivations will provide near term business prospects
- return of ships to RRF status will generate opportunities

4. Detailed Schedule for FY 1991, 1992 and 1993 Active Fleet Ship Maintenance

- lists scheduled availabilities planned for each ship
- data show SupShip or naval shipyard assignment
- planned start and completion dates given
- sorted by fleet and ship class

Note: Information current as of 2 April 1991 -- and includes all ship maintenance scheduled to be performed in commercial and naval shipyards during FY 1991-93

5. Detailed Schedule for MSC Ship Maintenance Over the Next 12 Months

- shows type work planned for each MSC ship and scheduled start date
- method of procurement shown
- sorted by ship class

Note: Data current as of 1 April 1991 -- and reflect Persian Gulf deployments

6. Detailed Listing of Major Equipment Purchases Budgeted in FY 1992 and 1993

- list includes equipment for replacement and ship modernization
- shows quantity and dollars for planned Navy purchases

7. Eight Year Record of Scheduled Ship Maintenance in U.S. Commercial Shipyards

- lists Navy contracts to each shipyard over the past eight years
- database includes over 1,000 repair contracts between 1983 and 1990

8. Five Year Record of MSC Ship Maintenance and Repair

- lists MSC work performed by each shipyard over the past five years
- database includes more than 400 MSC repair contracts

9. Two Year Record of Work Assigned to Navy-owned Ship Repair Facilities

- lists work performed in each of the government-owned naval shipyards and ship repair facilities
- database covers the past two years

10. Market Share Analysis

- summarizes number of jobs and percentage share of each contractor
- segmented by ship class and type maintenance

The report is available for \$575.00. To order, please contact IMA Associates, Inc. - 2600 Virginia Ave., NW - Suite 901 - Washington, DC 20037 - Telephone 202-333-8501 - Fax 202-333-8504. Telephone or fax orders will be accepted.

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MSRC Places Tender For \$400 Million Of Oil Spill Equipment

The Washington, D.C.-based Marine Spill Response Corporation (MSRC) recently placed a tender for \$400 million worth of oil spill cleanup equipment. About 30 U.S. shipping and shipbuilding companies are expected to compete for the contracts to supply 16 vessels and oil pollution control equipment.

The announced guidelines for the new or modified pollution control vessels include U.S.-built, 200 to 220 feet long, capable of towing at six knots and crew quarters for 38.

Crowley Maritime Corporation, OMI, and several Gulf Coast shipyards are expected to bid for the work. Successful bids will be announced in July.

Corps Of Engineers Recommends Go-Ahead On \$12 Million Projects

Two harbor dredging and maintenance projects costing about \$12 million proposed for Port Canaveral and Port Everglades in Florida are under review by the Chief of Engineers and the Secretary of the Army.

The two projects were recommended by the Board of Engineers for Rivers and Harbors of the U.S. Army Corps of Engineers.

The most sizable of the two projects is the Port Canaveral one, with an estimated price tag of \$11.89 million for navigational and recreational facilities work. Part of the project will include deepening the channel entrance to 41 feet.

The much smaller scale Port Everglades work will provide federal dredging maintenance of the Southport Container Complex Channel and Turning Notch, assuring a depth of 42 feet at the facility.

A.P. Moller Negotiates For More LPG Ships With Hyundai

Following its recent contract with Hyundai Heavy Industries for four LPG carriers, A.P. Moller is reportedly negotiating with the Korean shipbuilder for an additional four ships.

In the original contract, Moller ordered four 35,000-cubic-meter-capacity LPG carriers, last of which will be delivered in 1992. Moller is reportedly seeking four options for 18,000-cubic-meter-capacity vessels.

Robertson-Shipmate Introduces GPS Navigation System

Robertson-Shipmate, Happaage, N.Y., has introduced a computerized GPS marine navigation system

which it believes offers superior accuracy and dependability at an affordable price.

Called the RS5500, the system, which operates on signals received from navigation satellites, will allow all boats, from small pleasure boats to larger commercial boats to take advantage of a constellation of 24 orbiting satellites providing precise data on a 24-hour basis, regard-

less of weather conditions.

Containing the same core receiver as Robertson-Shipmate's commercial grade RS5300 unit, the RS5500 consists of three parts—the RS5500 Control unit, the RS5500 Receiver or "black box," and the RS5342 antenna. The control unit's size, 3 inches high by 7-1/2 inches wide and 1-1/4 inches deep, as well as the compact nature of the two other

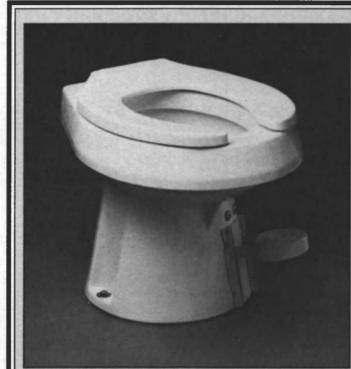
components is something every boat operator will appreciate.

According to a Robertson-Shipmate spokesman, two complete systems are already being installed on a 123-foot megayacht for a U.S. owner.

For free literature fully detailing Robertson-Shipmate's new RS5500 GPS navigation system,

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Unique U.S. Navy Minehunter, First Of New MHC Class, Launched At Intermarine USA

Reportedly World's Largest GRP Ship

Intermarine USA recently launched the USS Osprey (MHC-51) at its Savannah, Ga., shipyard. She is the first of a new class of GRP ships solely designed for minehunting.

The Osprey, which features advanced technology to locate mines with sonar and then neutralize them via a remotely controlled underwater robot, is the first U.S. Navy ship designed solely for minehunting and the reportedly the world's largest glass reinforced plastic (GRP) ship.

This technology was first developed for the Italian Lerici Class minehunters and was built for the U.S. Navy under a technology transfer arrangement between Italian and U.S. authorities.

Among the dignitaries in attendance were Senator **Sam Nunn**, Chairman of the Senate Armed Services Committee; Senator **Wyche Fowler**, Member of the Senate Appropriations Committee; U.S Representative **Lindsay Thomas**; Secretary of the Navy **H. Lawrence Garrett III**; His Excellency **Rinaldo Pettrignani**, the Italian Ambassador to the U.S.; and sev-

eral other senior ranking U.S. Navy personnel, and Ferruzzi Group officials.

Colleen Nunn, wife of Senator **Nunn**, broke the traditional bottle of champagne across the Osprey's bow.

At 188 feet long and 880 metric tons, the U.S. Navy's MHC Class is a larger version of the successful Lerici Class Italian minehunters which were in the Persian Gulf to assist in mine clearance as part of Operation Desert Storm. The vessel is built entirely of flexible and resilient fiberglass to ensure her survival in the event of a close mine explosion. Her crew of 51 will search for mines with a high definition, variable depth sonar and neutralize them with a remotely controlled robot submarine.

The MHC-51 Class design integrates modern mine countermeasures technology into a uniquely designed platform with exceptionally low magnetic and acoustic signatures to protect against mine detonations during minehunting operations.

According to **Len Thorell**, presi-



The USS Osprey, the first of the coastal minehunter (MHC) class, was recently launched at Intermarine USA, Savannah, Ga. She is reportedly the largest GRP ship in the world.

dent of Intermarine USA, and **Tom Wright**, company marketing manager, the vessel's major reciprocating machinery is not mounted on its hull, but rather, the equipment is hung from "cradles" attached to the main deck. This allows the hull to flex during explosive shock and also provides an excellent sound isolation method.

The Osprey will be commissioned by the Navy and join the fleet following an extensive test and trials program in 1992. The second ship of the class, the *Heron*, is also under construction at Intermarine.

The program to transfer Italian design and construction technology to U.S. Navy Mine Warfare shipbuilding programs began in 1986 with the award of a design contract to Intermarine SpA, a Montedison company. Montedison and its parent, Ferruzzi, established Intermarine USA as a wholly owned subsidiary of Intermarine SpA in 1987 to build these ships for the U.S. Navy.

For free literature detailing the construction and engineering capabilities of Intermarine USA,

Circle 2 on Reader Service Card

Fincantieri Wins \$36.6 Million P&O Ferry Contract

Fincantieri of Italy has won a contract in excess of \$36.6 million from P&O European Ferries for the lengthening and modernization of the 7,951-gt passenger/car ferry *Pride of Kent*.

The vessel will arrive at the Palermo Shipyard during the latter part of 1991 and remain for approximately five months for the refit operation.

The ship, which is used on the Dover/Calais service is expected to be redelivered prior to the start of next year's summer season.

B&W Combination Carrier Design Complies With New US Tanker Legislation

With an eye to changed legislative requirements governing ships trading to the United States, shipbuilder **Burmeister & Wain Skibsvaerft** of Copenhagen has developed a new design of combination carrier, the BCT85, that complies with the new American standards relating to oil-carrying vessels entering U.S. waters.

The 80,500-dwt BCT85 type is based on the yard's experience in the production of double-skinned, Panamax-breadth vessels in the

shape of the successful CPT54 product carrier class and the more recently formulated BCT70 design, which is available in bulk, OBO or product tanker versions.

The nine-hold BCT85, with its two-meter spacing between inner and outer shells, has been conceived for liquid cargoes such as crude oil, clean and dirty petroleum products and lube oils, and dry bulks such as coal, grain and ore.

The BCT85-type Panamax OBO has a length overall of about 807 feet, molded breadth of 106 feet, and molded depth of 62 feet. Service speed is 14 knots.

The design has been approved by Det norske Veritas for its HC/EA class notation.

For more information on **Burmeister & Wain**,

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New Viking Videos Teach Lifesaving Techniques To Vessel Crews

In an emergency at sea, familiarity with the lifesaving equipment aboard could mean the difference between disaster and a successful rescue. Several new videotapes to train crews in the proper use of marine lifesaving equipment are now available to operators of commercial vessels. The films have been produced by **Viking**, an international manufacturer of life rafts and other

marine lifesaving products.

Three instructional videos, which detail throw-overboard life rafts and davit-launchable rafts use highly effective, step-by-step teaching techniques.

In addition to a thorough description of the operation of the raft, equipment contents and parts of the raft are also described. The detailed instructions also cover the raft's emergency packs and critical equipment such as flares, paddles and sea anchors.

Other key sequences show how to facilitate loading the rafts under emergency conditions, and how to maintain discipline among passengers. Procedures for rescuing raft passengers by helicopter are also covered.

The use of a Marine Escape Slide (MES) system in an emergency evacuation is also discussed.

For information on how to obtain these instructional videos,

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Cruise Lines Report Increased Bookings

The cruise industry, slowed at the end of 1990 and the beginning of this year by the Persian Gulf War combined with a national recession, is showing signs of recovery.

Some of the biggest operators out of Florida, **Royal Caribbean**, **Carnival Cruise** and **Norwegian Cruise**, report a surge in bookings.

According to a spokesman for **Royal Caribbean**, for example, the cruise line recently finished a five-week period of record bookings, averaging between 15,000 to 16,000 calls per day.

Carnival reported revenues of over \$328 million for the first quarter of 1991, up about 27 percent from the same quarter in 1990. **Carnival** reported the revenue increases were due for the most part to added capacity.

In reporting the results, **Micky Arison**, **Carnival's** chairman and CEO, said, "When you consider everything we had working against us—increased capacity in the industry, the recession and the outbreak of the war—our results for the first quarter are remarkable."

Besides the settlement of the war, other factors such as price reductions and the introduction of new ships into the market. Cruise line executives also point to the cruise's all-inclusive quality, which makes it an attractive vacation to consumers facing a recession and the fact that Americans seem to be reluctant to travel abroad this year.

Carnival will add the 2,600-passenger *Ecstasy*, sister ship to the *Fantasy*, in June. **Royal Caribbean** will take delivery of two new superliners, the *Monarch of the Seas*, in November and the *Majesty of the Seas* in May 1992. **Kloster** plans to add a liner in November 1992 and early 1993.

Cruise line executives voiced their optimism that the upward swing would continue.

North American Marine Jet Names Paul Brunette VP, Sales & Marketing



Paul Brunette

The board of directors of North American Marine Jet, Inc. (NAMJ) recently announced the election of **Paul Brunette** as vice president of sales and marketing.

Mr. **Brunette** most recently served as director of marketing and has been with the corporation since 1987. He previously held the position of sales manager.

His areas of responsibility include the development and implementation of all marketing and sales strategies; designing and managing sales discount and dealer structures; development and implementation of all international marketing areas and sales strategies; planning the annual marketing/advertising budgets; organization and technical management of all sales trips and trade shows; and development and management of company advertising, national sales promotions, ad placement and documentary video films.

NAMJ, located in Benton, Ark., manufactures a complete line of marine jet propulsion units in the 150 to 750-hp range.

CAORF Selected For Rotterdam Study

The Port of Rotterdam has selected MarineSafety-CAORF, located at the U.S. Merchant Marine Academy, Kings Point, N.Y., to conduct full mission simulator studies which will help determine entry and shiphandling policies for the Port's new Maasvlakte Harbor basin during two stages of its development. The real-time, man-in-the-loop simulator tests will cover the maneuvering of various sizes and types of vessels and the degree of tug assistance required.

MarineSafety will develop visual, bank, current, wind and plotting data bases covering two stages of construction. Vessel response models will be prepared and validated for 180,000, 267,000 and 350,000-dwt bulk carriers and for a large, loaded containership. Computer models will also be prepared for moored ships, a crane barge and inland barges.

Simulator tests will include the use of four Voith-Schneider type tugs working on towlines. Three of these tugs will be modeled as independent ownships---this is, each will react to the tow line and other hydrodynamic forces as in real life. During tests,

three interactive tugs will provide the required assistance.

A precision wind simulation will be prepared. The wind velocity will be specified by a fine grid of points over the geographic area. This will allow a wind velocity distribution to permit simulation of the effects of varying wind shear along the ship's hull and superstructure. Following

validation testing, carefully controlled experiments will be conducted using four interactive simulators at MarineSafety's Newport, R.I., Simulator Center. This is the only visual shiphandling facility in the world that can simulate four manned interactive ownships simultaneously. During the validation and experimental phases, the four

ownships will be operated by masters, pilots and tug captains from the Port of Rotterdam. A final report documenting test methodology, analyses, results and conclusions will be provided to the Port of Rotterdam early in 1991.

For free literature on MarineSafety-CAORF,

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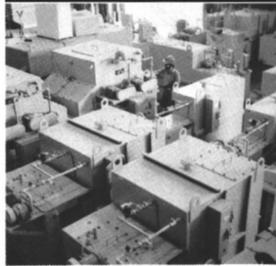
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A PREVIEW OF

CRUISE



FERRY



1991 CONFERENCE & EXHIBITION

London, May 29-31

Regarded as one of the world's largest passenger ship shows, Cruise + Ferry has been scheduled for May 29 to 31, 1991 in London's Olympia 2 Conference and Exhibition Center. The biennial event, with its large international exhibition, is a premier meeting place for all those engaged in passenger shipping, its fleets and their ports, and most importantly, its future. According to the event's organizers, this year's show is expected to be double the size of the 1989 event, a reflection of the growth in the passenger vessel market.

At the 1989 show, more than 150 companies participated, representing one of the largest displays ever of specialist know-how in designing, building, outfitting and providing increasingly sophisticated on-board services for the cruise ships and ferries of the future.

With a huge cruise and ferry market still largely untapped in the U.S., a resurgence of cruising interest in Europe and the dawn of a new cruise era in Japan and the Pacific, there still are a number of prospects for growth.

Because of the introduction of increasingly sophisticated cruise ships, passenger expectations are rising rapidly and, to stay ahead,

At top right, the luxury cruise ship Crystal Harmony, built by MHI, and at top left, the Baltic cruise ferry Silja Serenade, built by Masa-Yards (now Kvaerner-Masa).

owners are looking for new and innovative ideas in design, construction and materials and in providing an ever widening range of passenger services.

The Cruise + Ferry 91 Exhibition will be a unique showcase for these new developments and will provide effective support for companies already active in the industry and for those seeking new market opportunities. Shipbuilders, designers, hull machinery and equipment suppliers, port authorities, outfitters, and service suppliers will all be on hand to display their various goods and services.

The Olympia, located in the heart of London, was selected to accommodate exhibitors' display requirements and the spacious display halls will feature one of the world's largest international exhibitions serving cruise and ferry operations.

The market for fast ferries has also experienced rapid growth during the last 20 years. There has been a constant increase in demand from operators worldwide and advanced design and technological developments have opened up many more routes for high-speed ferries. Fast ferry designs from the leaders in this field will be on exhibit.

At the Cruise + Ferry 89 Exhibition, international builders of these ever increasingly sophisticated ships were present from Australia, the U.K., Scandinavia and the U.S., and

coverage of this large market will once again be highlighted and increased at Cruise + Ferry 91.

Shipbuilders and specialist suppliers will be able to effectively demonstrate developments in design, equipment, and the increasingly comprehensive on-board services now offered to maximize passenger comfort.

The expanded size of Cruise + Ferry's exhibition will be paralleled with a major enlargement of the scope of the conference, which now will feature nine main sessions, including one of 14 presentations on the very active fast ferry sector of the market. The conference will have a greater focus on efficient management and operation. The design sessions will focus on the glamorous exterior/interior designs of new and future cruise ships, with presentations on the use and design of deck spaces, as well as an examination of accommodation construction materials in the wake of the Scandinavian Star and other fire disasters.

Among the papers at the conference's Ship Design Session, which is divided into two parts on Thursday, May 30, and Friday, May 31, will be a report of passenger ship recommendations of the IMO Safety Committee, which convenes some days before the Cruise + Ferry Conference. The same session will include several presentations on new

radical concepts, including an evaluation of the 2,614-passenger cruise ferry Silja Serenade which has already dramatically increased passenger occupancy by 1,000 passengers per day on the operator's Stockholm-Helsinki services. Delegates will be able to inspect the ship firsthand on a special post-conference tour, June 1-2.

The Silja Serenade, a Maritime Reporter "Outstanding Passenger Ship of 1990," features a spectacular promenade mall, 26 feet wide, 460 feet long and five decks high. The promenade forms a natural social center where passengers can meet.

Partly sponsored by the builder Masa Yards (now part of Kvaerner) and the owner Silja Line, the event will offer an operational and technical presentation and a comprehensive tour of the entire ship. Delegates will be charged a fee of 72 British pounds for a single cabin, dinner and breakfast, cocktails and the presentations for an overnight cruise from Stockholm to Helsinki. Delegates must arrange their own air travel to Stockholm and return trip from Helsinki.

For further information on registration and exhibiting at Cruise + Ferry 91, contact: Cruise + Ferry Secretariat, 2 Station Road, Rickmansworth, Herts WD3 1QP England; telephone: 44 (923) 776363; and fax: 44 (923) 777206.

Cruise & Ferry Conference Program

Wednesday, May 29

9 a.m.—Registration desk and exhibition opens.
2 p.m.—Conference opens.

SESSION 1: Markets & Marketing

"Prospects and Implications for the European and North American Cruise Markets," by **Stanley I. Buchin**, senior consultant, **Arthur D. Little**.

"Car Ferries—Looking to the Future," by **B. Langford**, passenger marketing and sales director, P&O European Ferries Ltd. Papers to be discussed by ship operators panel consisting of:

G. Hughes, managing director, Canberra Cruises/Princess Cruises and chairman, Passenger Shipping Association;

R. Sandstrom, vice president, Edfjoh International;

J.R. Sullivan, senior vice president, Cunard Europe; and

B. Langford, see above.

"Corporate Identity in the Cruise Business—Is Redirection Needed?" by **J.J. Lewis**, president, Market Scope, Inc.

"Solving a Ferry/Cruise Contradiction—Combining Low Volume Essential Freight with Seasonal Passenger Traffic," by **J.E.C. Cartwright**, managing director, Isles of Scilly Steamship Co. Ltd. and **H.P. Simmons**, director, TecEcon.

"Recent and Future Developments in Baltic Ferry Shipping with a Changing Political Background," by **A. Hader**, senior researcher, Institute of Shipping Economics and Logistics.

SESSION 2: Fast Ferries Part 1

(This session runs parallel to Session 1)

"Ferry Routes, Ship Motions and Passenger Comfort—Analyzing the Relationship," by **J.R. MacGregor**, principal SWATH naval architect, **G.R. Lamb**, chief of technology, and **T.D. Kelley**, chairman, SWATH Ocean International.

"Human Comfort Onboard Fast Passenger Ferries," by **E. Brubakk**, noise and vibrations section, and **F. Tøllsgaard**, environmental loads section, Det norske Veritas Classification.

Paper title to be announced. Will be presented by **P.C. Hercus**, executive chairman, International Catamaran Designs.

To be followed by official welcome reception.

Thursday, May 30

SESSION 3: Interior/Exterior Design

(including Fire Safety)

"New Interpretations of the Interior to Exterior Relationship—The Importance of the 24-Hour Deck Environment," by **B. Sonneveld**, interior designer of cruise ships, ferries and megayachts, Studio Acht.

"Designing for Profit—Innovations to Improve Revenue on Ferries. New Club Class and Retail Facilities on P&O Vessels," by **B. Finnegan**, managing director, Portland Design Associates.

"Interior and Exterior Design Features of Luxury Cruise Ships—Sea Goddess—Seabourn Pride—Renaissance etc.," by **P. Yran**, Petter Yran and Bjorn Storbraaten Architects.

"Construction and Materials for Improved Fire Safety in Accommodations. Research in Surface Materials and Ceilings since the Scandinavian Star Disaster," by **G. Jacobsen** and **B. Molgaard**, Rockment A/S.

"The Application of Fire Retardant Glass in Passenger Vessels," by **S. Howe**, technical sales manager, Solaglas Firescreens.

SESSION 2: Fast Ferries Part 2

(Parallel to Sessions 3, 4 & 5)

"Fast Craft and the Competition on the London-Paris and London-Brussels Routes. Time and Cost Comparisons City-to-City," by **J. Charlier**, research associate NFSR, Institute of Geography UCL, Belgium.

"A 50-Knot Gas Turbine-Powered Foilcat for 300-400 Passengers," by **E. Instanes** manager, product development, Kvaerner Fjellstrand.

"The DB Catafoil—a New Foil-Assisted Catamaran

Passenger Ferry. Breaking the 40-Knot Barrier at Minimum Cost," by **N. Gee**, senior partner, Nigel Gee & Associates.

"SES Developments in the Fast Commuter Range," speaker to be announced.

SESSION 4: Shipboard Management and Control

(Parallel to Session 2 & 3)

Integrated Shipboard EDP for Hotel Management/Automatic (Dis)embarking/Telecommunication/Shore Excursions/Goods Administration. Cash-

less Systems Prevent Money Leakage on Passenger Ships," by **J.-M. Becker**, ships, hotels & resorts department, Siemens Nixdorf.

"PC-Based On-Board Computer Management Systems with Security Options. Case Studies include 20-Station Installation on the Maxim Gorky," by **P. Hovland**, managing director, Pabulum Consultants.

SESSION 5: Operational Efficiency Part 1

(Catering/Waste and their Regulations)

(Parallel to Session 2 & 3)

"Meeting the U.S. Public Health Service Requirements with Minimum Investment for Existing and New Tonnage," by **E.L. Soloman**, National Sanitation Inspection Service.

"Galley Design on Passenger Ships—Hygiene—Safety—Functionality—Results," by **P.G. Pas-salacqua**, marketing director, Precetti SpA.

"Passenger Satisfaction from Five-Star Restaurant Service Requires New Thoughts on Catering and Waste Handling. And the USPH, USCG and

(continued)

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Cruise & Ferry

(continued)

Marpol must also be Satisfied," by **G.J. Deenberg**, managing director, Deerberg Systems, and **R. Ghiselli**, president, Seaking.

Lunch for registered delegates.

SESSION 5: Operational Efficiency Part 2 (Parallel to Sessions 2 & 6)

"Simulator Training for New Crews, New Ships and New Dimensions," by **O. Tersloev**, Danish Mari-

time Institute, and **I. Engan**, senior vice president, Crystal Cruises.

"Fuel Economy Optimization in Ferry Voyage Management. New Propulsion Autocontrol Systems Demonstrates Significant Savings," by **R.G. Ceen**, technical director, and **J.R. Nichols**, software engineering manager, C-Tech Systems, and **J. Aisen**, consultant, Hydrodynamik.

SESSION 6: Ship Design & Regulations Part 1 (Parallel to Sessions 2, 5 & 7)

"The Fourth Generation Cruise Ferry Silja Sere-

nade. The Realization of Its Unique Concept, with Problems, Solutions and Service Experience," by **H. Kulovaara**, Effjohn International and **M. Niini**, Masa Yards.

"Crystal Harmony—the First Major Japanese Cruise Ship Designed to Compete in International Markets," by **T. Suzuki**, deputy general manager, and **T. Fukushima**, manager, ship design department, Mitsubishi Heavy Industries.

"New Design of Cruise Ferry with Emphasis on Capital Costs—Damaged Stability—Fire Safety—

Environmental Aspects," by **M. Kanevra**, director, business development, Elomarine.

"Passenger Ship Regulations—Outcome of the 59th Session of the Maritime Safety Committee (13-24 May 1991)," by **F. Plaza**, senior deputy director, Maritime Safety Division, IMO.

"Passenger Ship Funnel Design Improvements from Wind Tunnel Investigations—Comparisons and Criteria," by **P. Broas** and **L. Helle**, technical research center of Finland, Ship Laboratory.

"Application of Light Alloy on Passenger Vessels," by **G. Bacicchi**, design department, and **A. Macari**, Fincantieri.

SESSION 2: Fast Ferries Part 3 (Parallel to Sessions 5, 6 & 8)

"Regulatory Considerations for SWATH Ships," by **A.P. Ritola**, assistant vice president, regulatory affairs, ABS.

"Service Experience of the Seamaster Fast Displacement Catamaran (SWATH) Ferry," by **R. Milner**, FBM Marine.

"Compact Diesel Engines for Fast Ferries," by **G. Haussmann**, head of ship applications, MTU.

SESSION 7: Passenger Ship Management (Parallel to Sessions 2 & 6)

"Managing the Increasing Burden of Safety Regulations & Legislation," by **Capt. P.A. Heathcote**, formerly, Marine Atlantic.

"Management of Revenue vs. Management Costs. A Fresh Perspective on their Relative Effect on the Bottom Line," by **M.E. Steller**, vice president, Temple, Barker & Sloane.

"Developing and Applying a Service Rating System for Ferry Management—Passenger Volumes—Delays—Vehicle Traffic, etc.," by **D. Robinson**, division of highways, Department of Transportation, North Carolina.

"Maximizing Revenue from a Mixed Passenger/Cargo Ferry Operation," by **S.D. Smith**, managing director, Third Wave Consulting.

Official evening cocktail reception for all delegates and spouses.

Friday, May 31

SESSION 6: Ship Design & Regulations Part 2 (Parallel to Sessions 2 & 8)

"Ferry to Cruise Vessel Conversion—the Corsica Regina," by **F. Aagaard Petersen**, managing director, Knud E. Hansen.

"New Large Capacity Diesel-Electric Rail/Car/Passenger Shuttle Ferries with a Small Crew and Maximum Safety," by **A.M. Friis**, managing director, Dwingel Marineconsult.

"Propulsion Considerations and Results for an Eight-Ship Series of Mini-Cruisers," by **L.R. Hansen**, senior technical manager, MAN B&W Diesel.

SESSION 2: Fast Ferries Part 4 (Parallel to Sessions 6 & 8)

"The Impact of New High Performance Fast Ferries on Port Facilities—the Design Process," by **D. Byrne**, managing director, Transmarine.

"Port Opportunities for Maximizing the Use of High-Speed Catamaran Ferries," by **J. Rose**, managing director, Marine Development.

SESSION 8: Destination Development (Parallel to Sessions 2 & 6)

"Developing Out-Island/Special Destinations for Enhancing Market Position and Additional Revenue," by **Ricardo J. Fernandez**, president, Indigo Service Corporation.

"Floating Concept Provides Destination Infrastructure for Cruise-and-Stay Eco-Tourism," by **Gerhard Heid**, consultant, Maritel.

SESSION 9: Passenger Terminals & Handling

"Taking the Ship Style Onshore into the Design of Passenger Terminals," by **Niels Kryger**, architect.

"Cost Effective Solutions for Passenger and Baggage Handling through Prefabricated Modular Design," by **Jes Boldsen**, managing director, MacGregor-Navire, Marine Cranes/Elevators Division.

Close of conference.
Lunch for registered delegates.
Exhibition closes at 5 p.m.



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In September, 1986 at the Clinton Terminal, a vessel rammed the wingwall, snapping the 12" X 12" timbers. The Ultra Fend faces attached to the timbers remained intact. All but two pads were reapplied to the new timbers. The two that were not reapplied had not cut nor broken on impact, but only stretched as the ferry pressed through the broken wingwall. Terminal engineers are planning to extend Ultra Fend use to the dolphins as well.



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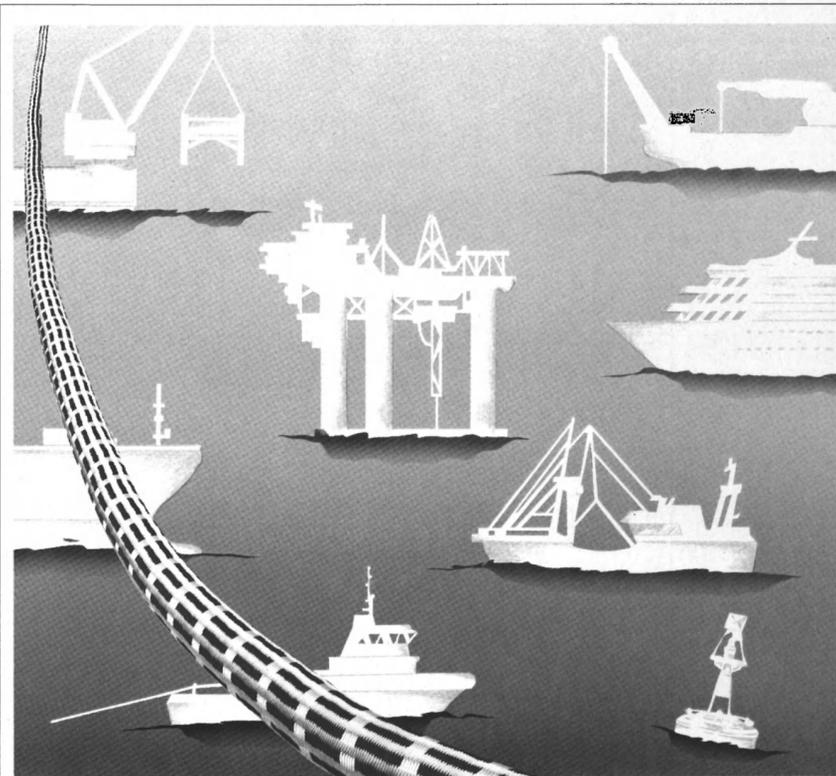
**Cruise & Ferry
Exhibitor List**
(As of press time)

A/S Edco
ABB Stromberg Drives
Advanced Multi-Hull Designs
AGP Marine
Alpha-Laval Desalt
Aqua Signal
Aquamaster Rauma
Aquasonic International
Araflex BV
Austal Ships
Batservice Industrier
Blohm + Voss
Bremer Vulkan
Brissonneau et Lotz
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C-Tech Systems
Carlton Cess Marine
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Caterpillar Overseas
Chantier de l'Atlantique
Cirrus
Comfort Mate
Comsat
Dampa
Danish National Group
Dansk Wilton
Davidson SpA
Deep Sea Seals
Deerberg Systems
Delegation au Developpement (France)
DMT Marinetechnik
DuraStic
Electrolux
Electrosonic
Elomarine
FBM
Finnish National Group
Flakt Marine
Flender Werft
Frydenbo-Mjolner
Gaylord Industries
Heien-Larsen
Hernis Electronics
Hugh Mackay
Hydro Aluminum
Hypnos
IES Cruise Management
Inmarsat
International Hi-Prez
Jamestown Metal Marine
KaMeWa
Kelvin Ross
KMM-Westamarin
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Lips
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Ruston Diesels
Sabroe

SACM Diesel
Scanrope
Schat-Davit
Schichau Seebeckwerft
Sea Service International
Seaking
Shoreside Consultants/Tiber
Siemens-Nixdorf
Simonship
Societa Escercizio Cantieri
Solaglass

Stal Refrigeration
STE Brissonneau et Lotz Marin
Ste d'Azur
Stirling Design
Studio Acht
Swath Ocean
Teleste Marine Communication
Teniford
Time Work
TNT Shipping & Development
Trimline

TrioVing
Ulstein
Ultra Poly
Unit Marine
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Wyn
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(Abbreviated list due to space limitations.)



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Kvaerner To Help HHI Construct LNG Carriers

Norwegian industrial group Kvaerner's subsidiary Kvaerner Eureka recently signed contracts with shipbuilder Hyundai Heavy Industries worth about \$6.6 million for help in construction of LNG carriers.

Kvaerner Eureka will assist Hyundai in the fabrication of aluminum cargo tanks for South Korea's first LNG carrier.

On-site training at Hyundai's Busan yard while the tanks are being built and installed is also included in the contracts, which it is believed could take two years to complete and involve at least 10 people from Kvaerner being transferred to the

yard.

Although only one large LNG carrier is now on order from Hyundai, as many as eight more could be ordered to help meet South Korea's growing demand for imported gas.

The first LNG carrier, which will be owned by a consortium of shipping companies, is also the first of these specialized ships to be built in South Korea, though Korea's yards

have been anxious for a number of years to start building these vessels.

For free literature on the facilities and capabilities of Kvaerner, Circle 12 on Reader Service Card

Japanese Owners Order Single-Hull Tankers

Shipowners NYK and Idemitsu Tanker recently ordered single-hull tankers from two Japanese shipyards. Both new ships are intended for use in service between Japan and the Middle East, thus avoiding the tough U.S. double-hull legislation.

NYK placed an order for a 238,000-dwt. Very Large Crude Carrier (VLCC) with Ishikawajima-Harima Heavy Industries for delivery in March 1993.

Kawasaki Heavy Industries received an order from Idemitsu for the construction of a 258,000-dwt. VLCC for delivery in late 1993.

\$11.3 Million Navy Contract To Tracor

Tracor Applied Sciences, Inc., a subsidiary of Tracor, has been awarded a contract from the David Taylor Research Center of Bethesda, Md., to provide engineering and technical services in the area of structural acoustics. The five-year contract has a total potential value of approximately \$11.3 million.

K. Bruce Hamilton, president of Tracor Applied Sciences, said: "Tracor will provide engineering services in the areas of noise and vibration, shock, modeling, testing and measurement, structural analysis and development of computer software."

Diversified Technologies Delivers Liquid Cargo Transfer Equipment

Diversified technologies (Dt) recently shipped three sets of towing equipment, lay barges equipment and a POL receiving unit to Manuli Rubber Industries (s.r.l.).

The Dt equipment is used with Manuli's long-length flexible conduit for handling of water and refined petroleum products to and from tankers offshore. This is the fifth in a series of such deliveries.

Diversified technologies is a naval architecture and marine engineering firm providing support to a wide range of commercial and government clients, primarily in the areas of tugs, tankships, and unique vessels. Dt is probably best known for its salvage engineering, specialty equipment design, rigging/cargo handling analyses and environmental systems.

For free literature giving more information on Diversified Technologies, Circle 18 on Reader Service Card

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Contracts Worth Over \$6 Million Secured By Lyngso-Valmet

Lyngso-Valmet Marine has secured several contracts worth over \$6 million for advanced ship automation systems and communication equipment worldwide.

The contracts are for both Damatic and Stella ship automation systems and Amplidan communication equipment to be delivered to Masa Yard, Finland; 3.MAJ, Rijeka, Yugoslavia; Fincantieri of Italy, ASEA of Spain; and Hyundai of Korea.

Lyngso-Valmet Marine has operative bases in Norway, Denmark and Korea, with a worldwide sales and service agency network.

For free literature on Lyngso-Valmet Marine,

Circle 16 on Reader Service Card

Gulf Lease Sale Draws Foreign Bidders

The U.S. Department of Interior's latest offshore oil and gas lease sale for the Gulf Of Mexico drew a great deal of attention from foreign oil companies.

The Minerals Management Service, the leasing unit of the Interior Department, offered 5,420 blocks drawing a total of \$320.5 million in bids. Prime blocks off the coasts of Alabama, Louisiana and Mississippi, a total of 464 in all, drew bids of about \$260 million.

Elf Aquitaine Operating Inc. was one of the most active foreign oil companies, with several bids. The firm came in with the top bids for Viosca Knoll block 694 (\$6.3 million), block 695 (\$657,187) in a 50/50 joint venture with Shell Offshore Inc., Main Pass Area South and East Addition block 248 (\$453,546), and block 249 (\$303,696).

Other foreign bidders included Agip Petroleum, BP Exploration, BHP Petroleum (Americas), British-Borneo Exploration, British-Borneo Petroleum, Japex (U.S.), Nippon Oil Exploration, and Pan-Canadian Petroleum.

U.S. bidders were led by Exxon, which was the top bidder on 63 blocks. Chevron USA was top bidder on 38 blocks, Shell Offshore, 29, Odeco Oil & Gas, 12, and Louisiana Land & Exploration on nine.

Ferry Simulation Offered For Training By CAORF At USMMA In Kings Point

Two classes of ferry boats and two fully equipped terminals have been simulated by the Computer Aided

Operations Research Facility (CAORF) 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 ferry boat 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 screws and has twin rudders and bow thrusters. It is approximately 130 meters in length and has a loaded displacement of 5,800 tons.

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.

For literature giving complete information on training offered by MSI/CAORF,

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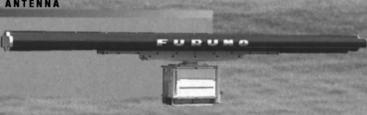
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series auto tracking adapters both put all the nav info right on the radar CRT and employ convenient RAM cards to store user data or ROM cards with factory digitized NOAA electronic charts.

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The 2,000-passenger Dubuque Casino Belle, recently delivered by Patti Shipyards, is reportedly the largest passenger/gambling boat on the Mississippi. She has a length overall of 387 feet.

Largest Casino/Passenger Boat Delivered By Patti Shipyards To Roberts River Rides

Patti Shipyards, Pensacola, Fla., recently delivered the largest passenger vessel and gambling boat on the Mississippi River to Roberts River Rides of Dubuque, Iowa.

Built at a total cost of \$12 million (including gaming equipment) and larger than a football field, the 387-foot riverboat has four passenger decks and is finished in a Victorian era motif. U.S. Coast Guard-certified to carry 2,000 passengers, the

Dubuque Casino Belle was reportedly the first American-flagged vessel to receive a license for casino gambling.

"The entire vessel is geared towards the enjoyment of the passenger," said Patti chief engineer **Ron Frye**. "Our intent was to design something truly special, truly unique. In the Dubuque Casino Belle, I think we have."

Although designed to resemble a

19th century sidewheeler, the Dubuque Casino Belle is fitted with a modern screw propulsion. Three Cummins model KTA38-M diesel engines, supplied by Northern Iowa Diesel of Dubuque, produce a total horsepower of 2,400 hp at 1,800 rpm. Power is transmitted to her three Michigan Work Horse 64-inch-diameter propellers via Aquamet shafting and three ZF BW-251 transmissions. Made of cast iron construction, the ZF transmissions have engine-matched torsional input couplings to reduce vibration and enhance gear life.

The Dubuque Casino Belle, with a beam of 58 feet, draft of 5 feet, is actually an integrated combination vessel, consisting of a 100-foot power module and 250-foot passenger barge connected by a winch cable system.

She has three casinos, two on her main deck and one on her Hurricane Deck. Her Hurricane Deck also includes a 272-seat theater lounge and bar, as well as the children's play area, and souvenir gift shop. Management offices are also located on this deck.

One deck below on the Boiler Deck, passengers have a choice of two dining rooms—the forward dining salon with 292-seat capacity and the larger aft dining salon with 352-seat capacity. Both are served by a full galley and scullery located aft. Crew quarters and lounge are also located aft.

DUBUQUE CASINO BELLE Equipment List

Main engines (3).....	Cummins
Propellers.....	Michigan
Thrusters (2).....	Thrustmaster
Generator engine.....	Cummins
Reduction gears.....	ZF
Engine controls.....	Schrader-Bellows
Steering controls.....	Custom Hydraulics
Shafting.....	Aquamet
Coatings.....	Seaguard
VHF radio.....	Kenwood
Radar.....	Furuno
Fire pump.....	MCM
Bilge pumps.....	M.P. Pump

With the addition of the Dubuque Casino Belle April 1 and the advent of year-round gambling on the Mississippi Belle II, Roberts River Rides employment jumped from 150 in 1990 to 525 in 1991.

During 1990 season, more than 250,000 people cruised with Roberts River Rides, and this number is expected to double this year.

The Dubuque port facility for the Spirit of Dubuque, another Roberts vessel, and the Dubuque Casino Belle adjoins the new Iowa Welcome Center. The \$3.5 million building houses ticket offices, eight shops, a lounge and an observation deck.

For free literature detailing the boatbuilding facilities and capabilities of Patti Shipyards, Circle 90 on Reader Service Card

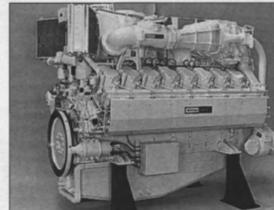
Propulsion Update

Paxman Secures U.S. Navy Contract To Supply 32 Diesel Engines For New Patrol Boat Program

Paxman Diesels of Colchester in Essex, U.K., has won a multimillion dollar contract to supply 32 propulsion engines to the U.S. Navy for its new Coastal Patrol Boat (PBC) program. Under the contract, Paxman will supply Valenta model 16 RP200-1-CM engines.

The PBC vessels, based on a Vosper Thornycroft hull design, will each be powered by four 16-cylinder Valenta engines and will be capable of speeds in excess of 30 knots. The eight 171-foot craft, designed as ocean capable vessels, will be used for essential patrol and surveillance operations, as well as to support various naval missions. For this duty, each of the four engines aboard the PBC will be continuously rated at 3,350 bhp at 1,500 rpm and drive a fixed pitch propeller through a Reintjes reverse reduction gear box fitted with a trolling valve slow-speed drive and loiter facility.

Paxman's success in winning this new contract follows the application of the Paxman 16-cylinder Valenta engine in the patrol craft for the U.S. Coast Guard Island Class program. The Island Class vessels have now been operating for over five



Paxman Diesels will supply 32 Valenta 16-cylinder marine propulsion engines, rated at 3,350 bhp at 1,500 rpm, under a multimillion dollar contract to the U.S. Navy for installation in its new Coastal Patrol Boat class.

years around the coast of the U.S., from Alaska to Hawaii to Puerto Rico. The engines in some of the first vessels commissioned have now been in operation for nearly 9,000 hours without a major overhaul, with total aggregated hours now exceeding 300,000. The excellent service and condition at inspection of the Valenta engines, according to Paxman, has enabled the Coast Guard to increase top overhaul periods from 6,000 to 8,000 hours and

major overhauls from 12,000 to 16,000 hours, further underlining the cost-effectiveness of the Paxman diesels.

The Valenta engines for the PBC program will be delivered this year and next to Bollinger Machine Shop & Shipyard, Inc., Lockport, La., which is constructing the craft—thus continuing the relationship formed between the two companies established during the Island Class program.

IFC To Build Stern Section Of Superferry After Leasing VPSI Facilities

Integrated Ferry Constructors Ltd. (IFC) of North Vancouver, the company managing construction of British Columbia's first superferry for the B.C. Ferry Corporation, will build the stern section (Block A) of the ship's hull in Victoria using the workforce and leased facilities of Versatile Pacific Shipyards Inc. (VPSI), project executive **David Longdale** recently announced.

"The contract for the important Block A main hull was previously intended for VPSI, but that company's prolonged financial problems made it necessary for us to take other action," Mr. Longdale said. "We have leased the Esquimalt shipyard from VPSI and put our own management in place to get on with the construction job by employing VPSI's skilled employees. We are preparing the leased space for the start of construction."

The 470-car superferry is being

built in sections or blocks and is scheduled for delivery to B.C. Ferries in early 1993. IFC earlier awarded a contract to Allied Shipbuilders Ltd. of North Vancouver to build the forward end of the hull—Block B.

After launch, the stern section will be joined to be bow section in the Esquimalt graving dock.

Mr. Longdale said negotiations are continuing for the construction of five other blocks that will form the vessel's superstructure. IFC expects to be supervising the construction of all of the various component parts of the first superferry at a number of different B.C. shipyard locations within the next several months.

B.C. Ferry Corporation awarded a \$120 million contract to IFC in October 1990 (See MARITIME REPORTER/Engineering News, March 1991, page 74). The 2,000-passenger superferry will be the largest ever built on Canada's west coast.

For more information on IFC,

Circle 3 on Reader Service Card

Aker Wins \$59 Million Contract For Platform In British North Sea

A major new contract in the British sector of the North Sea has been won by Norwegian industrial group Aker.

Aker Stord, Aker subsidiary, was awarded a \$59 million contract by Shell UK for the construction of the drilling module, derrick and its substructure and skid base for the Nelson platform.

A spokesman for Aker said the platform contract was confirmation Norwegian industry was now competitive in that it was the first time in more than 10 years Norwegian industry had won an export contract of this size in the British sector.

The platform contract is in addition to several recent contracts allotted to Aker.

For free literature detailing the facilities and capabilities of Aker,

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PBM Offers Actuated Multi-Port Ball Valves

PBM's line of 3- 4- and 5-way multi-port ball valves incorporate streamlined investment cast components that increase the pressure and temperature range of the valve. Pressures to 400 psi and temperatures to 550 degrees F are possible.

Mated to an electric actuator, these valves tie directly into micro-processor-controlled systems through the use of an encoder or resolver. One valve/actuator takes the place of two to four two-way valves and simplifies the piping system and computer programming.

Seventy-three flow patterns are available in valve sizes 1/2-inch to 4 inches. Choose from eight different end fittings. Materials of construction include 316 s/s, carbon steel, iron, bronze, and other exotic alloys.

The multi-port valve catalog, Section IV, has a wealth of engineering data, including C, charts, pressure/temperature curves and dimensional data. For a free copy,

Circle 95 on Reader Service Card

Pentagon Seeks To Expand, Modernize Sealift Fleet

Defense Department officials, in the first major policy shift reflecting lessons learned from the war against Iraq, have drafted a multibillion-dollar plan to expand and modernize the military's fleet of cargo ships.

Under the plan, as many as 25 large, speedy cargo vessels are proposed to be built or purchased over the next decade at a cost of \$7.3 billion. Billions of dollars could be added to those costs because of long-term maintenance and operating

costs, but the Bush Administration is expected to ask Congress to authorize only a small portion of the total this year.

In a recent memo to Navy officials, Navy Secretary **Lawrence Garrett** said that the acquisition of additional ships is a top sealift priority, and the start of detailed planning aimed at construction or purchase of commercially available

ships was ordered right away, even before the complete plan is completed. Final approval of the plan must be given by Defense Secretary **Dick Cheney**.

According to officials, the draft version of the plan circulating at the Pentagon and on Capitol Hill suggests doubling the current fleet of eight fast cargo vessels available to the military. The acquiring of 15 or

more slower ships that can be loaded and unloaded quickly (RO/ROs) is also envisioned by the Pentagon.

John Stocker, president of the Shipbuilders Council of America, said the experience in the Gulf proved that these assets are badly needed.

At last, he said, the issue is being discussed and decisions are being made at the highest levels.



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Circle 300 on Reader Service Card

FOCUS ON PORTS

The Effect Of Ship Design On Ports

By James H. McJunkin, President
International Association of Ports & Harbors



James H. McJunkin

There is an old adage about one party sneezing and the other catching pneumonia as a result. This is the routine reaction of ports to new ship designs. A recent example was the introduction of "beyond Panamax container ships" in the Pacific trade by American President Lines. Suddenly, practically every container crane in the world was obsolete or feared to be obsolete by the port authorities. The new APL ships require a crane boom reach of approximately 140 feet to reach the 16th or outboard rows of containers. The prior standard was 115 feet to reach over 13 rows of 8-foot-wide containers which is as many rows that can be accommodated in a Panamax vessel with a beam limitation of 106 feet. Although other shipowners have not as yet followed APL, port authorities know they must be prepared for new ship designs, particularly if the change involves larger ships. Therefore, the market for new container cranes has become almost exclusively for the larger, 140- to 150-foot boom length cranes. These cranes are approximately \$2 million higher in cost than the older smaller models. Therefore, the ports of the world will spend a quarter of a billion dollars per year for the next several years because of this one change in ship design.

The explosion of the international trade during the past 30 years has created a global economy, led by very large multinational companies, who collectively ship the majority of all international shipments and who, to compete in our harshly competitive economy, demand a global transportation system designed to meet their logistic plans. The shipowner has had little choice but to meet these demands.

Fortunately the consignee-consignee demands have followed a pattern which has enabled the ship designer to have basic goals in designing ships. These basic requirements are:

- (1) Transportation must be cheap;
- (2) Transportation must be fast;
- (3) Transportation must be damage-free; and
- (4) Transportation must be very punctual.

For dry cargo, the ship designer has responded by replacing the general purpose tweendecker breakbulk vessel with self-contained cargo-handling gear for dry cargo. For liquid, he has made the tanker larger and longer. In fact, both bulk carrier and container vessels also continue to grow. The result is that

the ports of the world have had to be completely rebuilt, often in different locations.

For example, the finger piers and transit sheds on the Manhattan waterfront are falling into the Hudson and East Rivers. New York's cargo-handling facilities are now container terminals in neighboring New Jersey. The great Port of London is now an office building and apartment complex. Cargo is handled at Felixstowe, 60 miles from London. Rotterdam routinely handles 300,000-ton tankers and 200,000-ton bulk carriers with drafts exceeding 70 feet. Singapore has become the world's largest container port and expects to handle 6,000,000 twenty-foot-equivalent units (TEUs) this year. We could continue this list of port changes ad infinitum.

Amazingly, this complete revolution of shipping and ports has been carried out with no standardization and no contact between ship designer and port. Ten identical vessels are rare. Generally, two or three identical vessels are the norm. I have been in the port business for 33 years, 11 of those as executive director of a major U.S. port; I have, as yet, never had a conversation with a ship designer about forthcoming vessels. As president of the International Association of Ports and Harbors (IAPH), I know most of the world's port directors. To the best of my knowledge, none of these ladies and gentlemen have had such a conversation. In fact, secrecy is common among shipowners so that a port doesn't know what the problems are until the ship arrives. Many a tense moment has occurred wondering if a new vessel is going to have sufficient water under its keel or whether or not a container crane boom is going to clear the top layer of containers. Somehow, however, the system has worked and shipping transformed itself.

Today, the ports face a greater challenge than ever before in meeting the desires of the merchant

marine. For the first time in living memory, some of these port problems may be thrown back to the ship designer to help solve. Most of these problems are environmental in nature and constitute the greatest concern for port management. In fact, when the ports of the world gather this month in Spain for the 17th IAPH Conference, the greatest amount of time will be spent on environmental problems. In other words, knowledge on how and what to build is common knowledge in both undeveloped and developed nations. How to get the permits to build is now the problem.

As background, in addition to the general concern of the human race for a cleaner world, shipping and ports have lost their protective coating. In our all-out drive for efficiency, we have de-glamorized, de-humanized and de-populated our ports and shipping. In the pre-container age, the ports were generally, immediately, adjacent to the downtown area and the piers were readily accessible to the general population, a person could gaze out his window or stroll through the colorful waterfront and dream of sailing away to far Bombay. Now, the piers are located in more remote areas and surrounded by acres of parking lots and chain-link fences. The glamour is gone. Ships now remain only hours, rather than days, and as a result, there is little or no association between ships' crews and the local population. Ships have become inanimate objects rather than a source of cultural interchange. Lastly, there are fewer people on the waterfront. Despite the immense growth in trade, the number of ships has not grown. The ships have grown larger and the crew size has been dramatically reduced. The waterfront employs far fewer people at waterfront locations. For example, in New York the number has been reduced from 40,000 to 4,000 jobs. The number needed is probably 2,000. Employment has not actually been so dramatically reduced; it has been scattered throughout the community. The direct employment in the port of Rotterdam, still considered the world's largest port, is nearly 69,000. Only 15 percent, or 10,000, are engaged in loading or unloading ships. Therefore, the political base of waterfront workers has disappeared.

No one is suggesting a return to a labor intensive industry, but it does make it harder for port authorities, which are by and large an area unit of government, to gain

support and money for port projects. The local populace is now indifferent and, in some instances, hostile to the port. This comes at a time when ports, as never before, need political support for the necessary permits and funding to carry out port projects. These conditions effect the ship designer in several important ways. The most important are:

(1) Ship size—Larger ships require deeper channels, and at most ports, deeper channels require dredging of polluted channel bottoms which, in turn, require permits and disposal areas. Currently, the Cape-size vessel of 100,000 to 125,000 tons is becoming a very popular workhorse in both the dry and liquid bulk trades. Cape-size tankers and bulk carriers require channel depths in excess of 50 feet. The larger container vessels now require in excess of 40 feet of water. Most of the world's ports do not have channels this deep, and many will find it impossible or very difficult to gain permits to dredge. The ports, therefore, are finding it impossible to react to the needs of the larger ships. The ship designer may have to settle for smaller ships which extract an economic penalty.

(2) Pollution from ships—The various Marpol regulations are but indicators of things to come. The recent U.S. legislation requiring double-hulled tankers is one such indicator. Another is the very serious drive by the Los Angeles Air Quality Management District to require ships to turn off their engines and use shoe power when alongside a dock. It is estimated that this would reduce air contaminants in the Los Angeles area by nearly 5 tons per year. Many ships' engine designers have never been active in emission reduction efforts. They had better become active or lose access to many ports.

The days when ship designers could treat the ports with the benign confidence that they would be able to accommodate any new ship design are probably over.

About the Author: Current president of the International Association of Ports and Harbors, James H. McJunkin is also a consultant with the Kingsley Group, Inc., Berkeley, Calif. From 1977 to 1988, Mr. McJunkin served as the executive director of the Port of Long Beach, Calif. Other experience includes active duty in the U.S. Navy during the Korean War. He received a Bachelor of Science degree in Business Administration from the University of Arizona and performed graduate work at Golden Gate University, San Francisco, Calif.

Port Briefs

Maritime Reporter Staff

NATIONAL SCENE

Who's on first?

Which U.S. port handled the most tonnage in 1990? Well, if you said New Orleans, Los Angeles, or New York/New Jersey, you're wrong. According to preliminary data recently released by the **Port of South Louisiana**, the port handled 189.1 million tons in 1990, tops in the country. The 1990 total port-wide cargo rose a healthy 7.7 percent over 1989 tonnage.

In fact, the Port of South Louisiana is part of Louisiana's vast Mississippi River Port Complex, which accounted for a total tonnage of 366.9 million tons in 1988, far outstripping the Port of Rotterdam, generally considered the world's largest port, which handled 255 million tons in 1988. (See exhibit, "Top 25 Of World's Leading Ports," for details.)

The Mississippi River Complex is composed of five individual port authorities with jurisdiction over specific sections of the river, from the mouth of the Mississippi to 253 miles inland. The complex consists of the Port of Greater Baton Rouge, Port of South Louisiana, Port of New Orleans, the St. Bernard Port, Harbor and Terminal District and the Plaquemines Port, Harbor and Terminal District.

TOP 25 OF WORLD'S LEADING PORTS (As of January 1, 1989)		Million S/Tons
Louisiana's Mississippi River Port Complex		366.9
1. Rotterdam		255.0
2. Port of South Louisiana (La.)		172.2
3. Kobe		159.4
4. New York/New Jersey		155.1
5. Singapore		129.5
6. Houston		124.9
7. Nagoya		109.6
8. Yokohama		108.6
9. Valdez		107.1
10. Antwerp		96.9
11. Sydney		96.7
12. Marseille		95.7
13. Osaka		83.5
14. Baton Rouge (La.)		76.4
15. Hong Kong		70.5
16. Vancouver		70.5
17. Hampton Roads		68.3
18. Kaohsiung		68.0
19. Tokyo		66.4
20. New Orleans (La.)		64.1
21. Pusan		59.6
22. Corpus Christi		57.9
23. Hamburg		56.7
24. Plaquemines (La.)		54.2
25. Le Havre		51.1

* Revised 2/28/91, U.S. Army Corps of Engineers
Source: U.S. Army Corps of Engineers
Lloyd's List

Port Improvements

The **Port of Savannah (Georgia)**, the 12th largest container port in the U.S., recently completed a new bridge spanning the Savannah River at the entrance to the harbor.

The 185 feet of vertical clearance afforded by the new bridge ensures that new generation container ships,

as well as other vessels will be able to call at the port.

Another improvement underway at the port is the widening of the harbor by 400 to 500 feet to allow for more navigation area of vessels.

A major topic on the port's agenda is channel deepening. Channel deepening is particularly important in light of projections which indicate that 30 percent of the world's con-

tainer fleet will be unable to navigate channels shallower than 40 feet by the year 2000. Present channel depth at the port is 38 feet.

Container Volume Up

At the **Port of Oakland**, 1990 brought a jump in container volume, driven by strong U.S. exports, new stacktrain routings and the return to service of terminals

knocked out by the Loma Prieta earthquake.

The port handled an equivalent of 817,480 loaded TEUs for the year, representing a jump of 6.7 percent over 1989. Total container tonnage was 13,553,220 revenue tons.

The main exports moving through the port included fresh and pro-

(continued)

Nat of Droog? (Wet or Dry)



Designing A New Terminal

The available dry land is scarce and expensive - yet, the new harbor basin must be wide enough to accommodate large vessels in high winds. Man-in-the-loop simulation helped the Port of Rotterdam obtain the best wet to dry balance and achieve an optimum economic design.



Capt. van Maanen
Port of Rotterdam

"To other port authorities: If you have ships, tugs and humans involved in a complex system, you must view them in real-time simulation."

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Port Briefs

cessed produce, paper, cotton, resins, meats and metals. Imports were led by iron and steel, beverages, road vehicles and computer hardware.

A growing share of Oakland's international lifts moved on stack-trains to and from inland points via the three railroad lines serving the port—Santa Fe, Southern Pacific and Union Pacific.

Most Vessel Calls

At L.A./Long Beach

The Maritime Association of the Port of New York/New Jersey recently released statistics detailing the number of vessels calling at 11 major ports in the contiguous U.S. during 1990.

According to the data, the **Ports of Los Angeles and Long Beach** topped the list, as they did in 1989, with 6,934 vessel arrivals, representing 16.9 percent of the total of 41,022 calls for the 11 ports. New Orleans/Lower Mississippi River (between Baton Rouge and Pilot-town) was second with 6,150 vessel calls. New York/New Jersey and Connecticut was third with a total of 5,188 calls, which was a decrease of 180 vessels from 1989. Details on vessel calls for the period 1988-1990 are shown in the exhibit, "Vessel Calls At 10 Major Ports in Contiguous U.S."

The Maritime Association of the Port of N.Y./N.J. attributed a large percentage of this decrease to a drop

VESSEL CALLS AT 10 MAJOR PORTS IN CONTIGUOUS U.S.			
PORT	1990	1989	1988
Los Angeles/Long Beach	6,934	6,975	7,076
New Orleans/Miss.	6,150	6,239	3,661 ¹
N.Y./N.J./Conn.	5,188	5,368	5,310 ²
Houston	4,699	4,656	4,750
San Francisco	3,661	3,637	3,675
Seattle/Puget Sound	3,242	3,356	980 ³
Philadelphia	3,003	3,002	3,041
Hampton Roads	2,936	2,891	2,953
Baltimore	2,293	2,476	2,766
Columbia River	2,151	2,166	2,302

Source: Maritime Association/Port of N.Y./N.J. and Maritime Reporter/Engineering News

Footnotes: (1) New Orleans only (2) New York and New Jersey only (3) Seattle only

in tanker traffic to the area. According to the data released, 1,750 tankers called at the port area in 1990 as compared with 1,880. Major oil spills in the harbor and the closure of Exxon terminals for up to three months caused tanker traffic to be diverted to other ports.

Tacoma On Top

According to U.S. Commerce Department statistics covering up to the end of the third quarter of 1990, the **Port of Tacoma** has emerged as the leading domestic port for the shipment of wood products.

The 1990 figures show the port handled 3.6 million tons of wood products, including lumber, wood chips, pulp and paper.

The **Port of Beaumont** in Texas

handled a record amount of forest products in 1990, showing a tonnage increase of 50 percent over 1989 figures. In 1990, the port moved 328,568 tons of forest products, including plywood, logs, wood chips, lumber, linerboard and woodpulp.

In 1989, the port handled 218,499 tons of forest products.

Coffee, Anyone?

The **Port of San Francisco** was recently named an official coffee exchange port by the Coffee, Sugar & Cocoa Exchange, joining New York and New Orleans. San Francisco will be able to receive futures coffee and store it until a buyer is found. Futures market buyers will now have a West Coast alternative to New York and New Orleans in coffee purchases. Coffee, the second

largest commodity handled by the port, accounts for about \$170 million in port revenue. About 50 percent of the West Coast's coffee business is handled by the port.

New Executive Director At Pascagoula

The **Port of Pascagoula** recently announced the appointment of **Fred S. Sherman** as the executive director of the Jackson County Port Authority/Port of Pascagoula. Mr. **Sherman** succeeds Capt. **Paul Smith**, who left the position to become the executive director of the U.S. Merchant Marine Academy Alumni Association.

Mr. **Sherman** has over 35 years' professional experience in the management of marine transportation and terminal companies and has been active in the international, coastwise, inland, intracoastal, and Great Lakes vessel, barge and terminal businesses.

L.A. Leads Nation's Ports In Containers

The **Port of Los Angeles**, also referred to as Worldport LA, was the nation's leading container port last year, according to statistics released by the port. According to released data, the port handled 2,116,404 twenty-foot-equivalent units (TEUs) in 1990 for the calendar year, surpassing the two million TEU mark for the second consecutive year.

The port's director of marketing, **Albert Fierstine**, attributed Los



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Angeles's continued rise in containerized cargo traffic to an increase in the U.S. export market, additional vessel calls and major new accounts. The 1990 total surpassed the previous port record of 2,056,980 TEUs, set in 1989, by 2.9 percent.

Containers-On-Barge Service Proves Success On Columbia/Snake Rivers

Containers-on-barge, established some 17 years ago, has proved to be a great success, according to a Maritime Administration official.

According to remarks by **John M. Pisani**, Director of the Office of Port and Intermodal Development, Maritime Administration, at a recent seminar in Indiana, the success of the service can be attributed to the cooperation of various groups and their commitment to the intermodal service, an attractive commodity mix in the system, and favorable geography.

The system moved 36,000 TEUs during 1990. Scheduled service is provided to six inland river ports by two barge operators with the Port of Portland (Oregon) serving as the major steamship hub.

INTERNATIONAL SCENE

Hong Kong Relinquishes Top Box Port Title

Although apparently relinquishing its title as the world's leading container port to Singapore in 1990, **Port of Hong Kong** officials expressed satisfaction with the fact that the port showed an increase in box traffic of 14.3 percent over 1989 figures.

According to recently reported figures, Singapore handled 5.2 million TEUs in 1990, just beating Hong Kong's volume of 5.1 million TEUs. The two ports were the only ones in the world to handle more than 5 million TEUs.

Piraeus Plans VTS

The **Port of Piraeus** will get a Vessel Traffic Control System (VTS) if plans by the Greek Ministry of Merchant Marine are successful.

According to **Aristotle Pavlides**, merchant marine minister, the Ministry of Environment, Planning and Public Works, has been asked to cover the costs of buying and installing the VTS, which could amount to over \$800 million.

The ministry is conducting a study as to the system's specifications, but the project has not been tendered and there is as yet no operational date.

In The Wake Of War, Kuwait Faces \$1 Billion Repair Of Ports

Following the devastation of the Gulf War, Kuwait now faces an estimated \$1 billion pricetag to restore its two heavily damaged commercial ports, according to a Kuwaiti official.

The acting director-general of the Kuwait Ports Authority, **Capt. Abdul Rahman al-Naibari** said that the restoration of Shuwaikh and Shuaiba, the country's two com-

mercial ports, would cost an estimated \$500 million each. Besides the removal of port vessels and equipment, restoration crews face the task of hidden mines, boobytraps and sunken boats.

Access to Shuaiba, about 40 miles south of Kuwait City, has been limited to RO/RO vessels for about the last three weeks. Entry to the port is limited to a 3,000-foot-wide channel cleared of mines and restricted

to daylight hours under naval escort. Shuwaikh, on the other hand, remains closed and is expected to be out of service for several months.

Brazilian Bill Looks To Privatize Port Terminals

A new Brazilian bill with far-reaching implications would provide the private sector the opportunity to operate port terminals. The pro-

posed legislation would also end the monopoly stevedore unions have on employment on board ships.

At present, port authority-hired dock workers can only handle cargo dockside. Under no restraints from the government or commercial sectors, stevedore unions, on the other hand, can select self-employed workers to handle cargo on board ship.

The outcome of the legislation is still pending.

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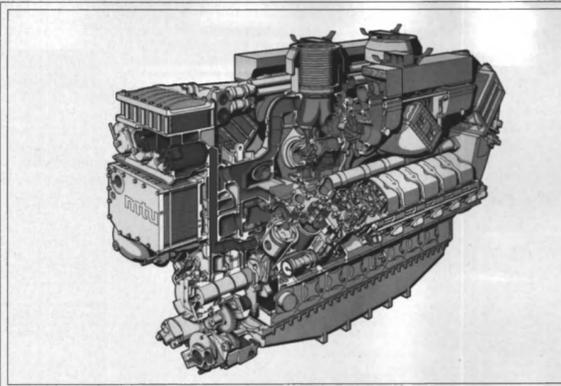
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Circle 222 on Reader Service Card

May, 1991



Cutaway drawing of the MTU 12-cylinder 595 TE50 engine.

New MTU Series 595 Engine, First Of Type To Enter Service, Installed On Ferry 'Deutschland'

The first MTU Series 595 engine has now entered actual service with installation of a 12-cylinder model on the ferry Deutschland.

The 476-foot-long oceangoing ferry Deutschland, powered by nine MTU 12-cylinder 956 engines rated at 1,840 kw at 2,500 hp each, has

been doing shuttle service on the "Vogelflug" route between Puttgarden and Rodby since 1972. One of the 956 models has now been replaced by a new 595 to obtain service data complementing exhaustive factory trials.

As a standard feature, the new engine (2,100 kw at 2,860 hp, 1,500 rpm) with its MTU designation 12V 595 TE50, has electronic engine management to control both two-stage sequential turbocharging and high-pressure injection (up to 1,500 bar) to achieve fuel economy and low exhaust emissions.

Engine installation, performed during normal ferry service, took less than an hour. After the initial start of engine operation, final approval by Germanischer Lloyd was granted a few weeks later.

The Deutschland uses diesel-electric propulsion, i.e., diesel power is converted into electric energy to supply two Siemens propulsion motors rigidly connected to the two propeller shafts. The propellers are designed for 7,000 kw each when both shafts are operated, and for 7,700 kw with single-shaft operation. Maximum ship speed of 20.2 knots (approximately 37 km/h) is achieved at 204 propeller rpm. Since the ship's commissioning in 1972, each of the nine MTU engines has logged more than 50,000 hours.

Generally, the use of several engines as compared to a one- or two-engine plant guarantees higher operational reliability and parameters which are particularly important for such a ship. If maintenance work is performed on one or several diesel engines, continuation of ship operation is possible without any restrictions. Moreover, a multiple-engine plant achieves operating economy by a more flexible response to varying wind, sea and loading conditions.

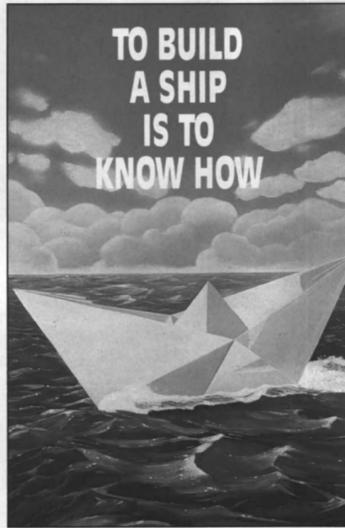
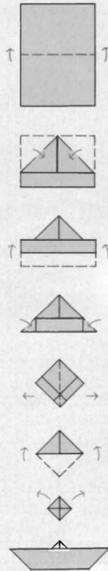
The Detuschland is one of three Federal German Railway ferries offering a daily shuttle service on the "Vogelflug" route between Puttgarden on the island of Fehmarn and the Danish port of Rodby, the shortest and fastest ferry connection for rail and road traffic between Central Europe and Scandinavia.

Three decks are available for railroad, cars and passengers. There is room for 12 rail coaches or 146 cars on the railroad deck and another 94 cars on the suspended deck. The car deck capacity is 118 vehicles, and the passenger deck with its restaurant, bank, cafeterias and shops can easily accommodate 1,500 people.

For free literature giving full information on the new MTU Series 595 engine,

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The police surveillance launch RP 9, built by Damen Shipyards, is capable of coming alongside ships with a dangerous cargo in accordance with ADNOR appendix B (requirements valid for tankers).

Damen Delivers New Type Police Surveillance Launch

A new police surveillance launch, RP 9, was recently delivered to the Dutch Marine Police Force by Damen Shipyards of Gorinchem, the Netherlands.

The first vessels of this type, built by Damen as pilotboats, are in service off the German coast. The shipyard has adapted the layout and the superstructure on the basis of the staff requirements formulated by the Dutch Marine Police. The propulsion installation has also been

adapted in accordance with the specific staff requirements, such as sailing in shallow and rough water and maintaining optimum maneuverability at all speeds.

As a result of quickly changing legal provisions, the shipyard and customer construction team worked, between contract date and the order, to come up with a modern vessel that satisfies all safety requirements, ergonomic perceptions and new shipbuilding developments.

The 71.3-foot-long by 18.3-foot-wide Damen Stan Patrol 2200, RP 9, is the first vessel to be painted in the new house-colors of the Dutch Marine Police Force.

The steel-hull, aluminum-superstructure vessel is propelled by two MTU type 12V 183TE61 main engines turning Lips propellers, with installed horsepower of 2 by 393 kw at 2,100 rpm. Hydraulic systems are by Sperry Marine.

Low noise levels were obtained by placing all spaces on suspended floors and by flexible mounting (cage in cage construction).

The RP 9 is the first National Marine Police Force vessel fitted with an automatic pilot.

For free literature on the facilities and capabilities of Damen Shipyards,

Circle 47 on Reader Service Card

Bird-Johnson Awarded ANAZC C-P Propeller, Shafting Supply Contract

Bird-Johnson Company, Walpole, Mass., has been awarded the contract to supply the twin-screw controllable-pitch (C-P) propeller systems and shafting to Australian Marine Engineering Consolidated Limited (AMECON), Williamstown, Australia, for the ANZAC Ship Project.

The project consists of 10 frigates with an option for two additional ships. Eight frigates are scheduled for delivery to the Royal Australian Navy and two for delivery to the Royal New Zealand Navy. The project is one of the decade's most important naval surface combatant shipbuilding programs.

Each C-P propeller system will be five-bladed in design with air emission silencing features, 13.78 feet in diameter, rated at 14,600 hp (10,890

kw) at 180 rpm at a ship speed of approximately 27 knots. In addition to the C-P propellers and the shafting, the scope of supply also includes bearings, seals and couplings for each shipset. Equipment for the first shipset is scheduled to begin delivery in 1992. Delivery for the 10th shipset will be completed in 2003.

The contract stipulates extensive direct involvement with Australian and New Zealand industries and Bird-Johnson will provide the associated technology transfers and training necessary to meet these in-country manufacturing requirements. Additionally, the contract includes a broad offset commitment for ANAZC Ship Project related and non-project related and non-project related offsets during the course of the contract.

For free literature giving full information on Bird-Johnson marine propeller systems,

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65

Full Line Of GMDSS Products From Raytheon Marine —Literature Available—

Raytheon Marine Company and JRC have worked closely with ship owners, operators and crew to develop functional, easy to use, reliable products for Global Maritime Distress and Safety System (GMDSS) carriage. Together these companies offer a single source for all GMDSS equipment to help ships meet GMDSS requirements.

These GMDSS products include MF/HF, and VHF radio, and Inmarsat equipment for voice and printed message communication, which can be operated by remote control from the ship's bridge. The key MF/HF radios from Raytheon are the JSS-710 and 720 which provide ship-to-shore communication by voice or telex using Digital Selective Calling

(DSC) and Narrow Band Direct Printing (NBDP). The system features automated Maritime Safety Information Alerts, message calls by DSC, and printed messages in ARQ mode. These features allow routine operation and message transmission without the need for special training and skills. On-scene, ship-to-ship and ship-to-shore communication are provided by VHF-FM radiotelephones, the JHS-31 with DSC, and the waterproof JHS-7 Portable VHF Radiotelephones.

The JRC Inmarsat Ship Earth Station (SES) satellite communication systems provide a high degree of reliability. The JUE series of SES

have been installed on over one-third of all shipboard systems worldwide.

Other products, such as Navtex (model NCR-300A) and ECG Receivers and Decoders, provide Enhanced Group Call Maritime Safety Information messages such as weather warnings, SAR alerts, and other communication.

Raytheon is the exclusive distributor of JRC GMDSS products in North, Central and South America and Europe.

For further information on the full line of GMDSS radio equipment from Raytheon,

Circle 52 on Reader Service Card

House Bill Strengthens Jones Act, Limits Foreign Shipyard Work

A recently introduced House of Representatives bill aimed at strengthening the Jones Act will limit the ability of U.S. vessel operators to repair or reconstruct their ships in foreign shipyards.

The bill, introduced by Virginia Democrat Rep. Owen B. Pickett, prohibits the foreign construction or repair of U.S. vessels operated in American coastal and inland waters. Only emergency repairs at foreign yards would be allowed under the bill.

Representative Pickett said, "Judicial and administrative interpretations have hollowed out (the Jones Act) to the point where there is virtually no limitation on the rebuilding and repair of Jones Act vessels abroad."

There are no hearings scheduled for the bill.

Lisnave Reports Record Repair Sales

Portuguese ship-repairer Lisnave recently reported a company record-breaking revenue of \$184 million in 1990, while also experiencing a significant increase in productivity.

A yard spokesman indicated that the number of man-hours at Lis-

nave's facilities near Lisbon decreased by 6.7 percent. The company repaired 312 ships during 1990, totaling 14.1 million dwt. The workforce stood at 3,712 for the year.

During 1989, Lisnave repaired 335 vessels, totaling 11.6 million dwt, while maintaining a workforce of 3,815.

The international marine market accounted for 80 percent of Lisnave's turnover in 1990.

Soviets Sell Tankers Worth \$300 Million To Scandinavian Owners

Danish and Norwegian shipowners have formed a partnership with

Soviet shipbuilders for the construction of 15 handy-size oil tankers which may be worth \$300 million.

According to reports, the Soviets have sold 15 double-hull tankers—five to Terkol of Aarhus, Denmark, and 10 to O.J. Libaek of Oslo, Norway. Terkol has taken delivery of four of the tankers, with the next one due in June. O.J. Libaek has received seven of the 10 tankers, with the remaining vessels due for delivery in 1991 and 1992.

According to a spokesman for Sudexport, the Soviet ship export trading company, the O.J. Libaek tankers were purchased on the behalf of Fram Shipping, which was involved in the 'Pepsi' deal. Fram has already sold the first two tankers in the series to Italian interest

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PROPULSION UPDATE

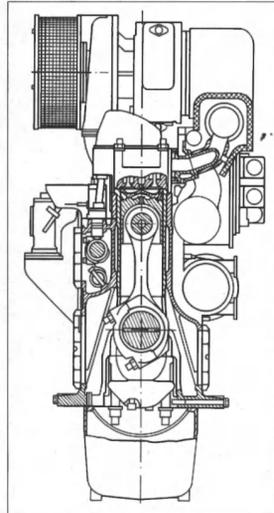
Deutz MWM Introduces New Big-Engine Series

With the development of a new diesel engine series, Motoren-Werke Mannheim AG will systematically follow up, as announced last year, the concept of economical high-performance engines.

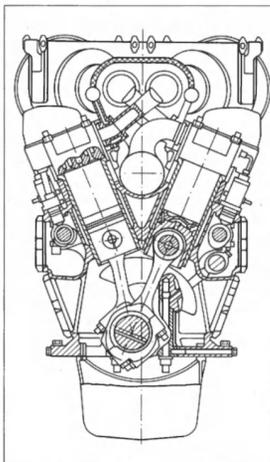
Based on the successful series 628, of which over 1,500 units have been sold since its market launch more than 10 years ago, the 632 series has been conceived with a cylinder output of 265 kw for continuous operation at a rated speed of 900 and 1,000 rpm and a maximum output of 350 kw at 1,200 rpm.

Trial runs of this new series have been started in Mannheim with an eight-cylinder in-line model. A pre-production series featuring in-line engines will be manufactured mid-1992. The V-models are likely to be launched on the market one year later. The engine series will cover in-line versions with six, eight and nine cylinders and V-versions with 12, 16 and 18 cylinders. Their power spectrum will thus range from 1,590 to 6,300 kw.

Dr. Hubert Hitziger, board member responsible for research and development, reported about the technical data of the new series: Similar to the 628 series, the new engines will have a bore of 240 mm, but their stroke of 320 mm will be considerably larger. The firing pressure will be 180 bar and the mean effective pressure 24 bar. For the



Schematic cross section of an in-line engine of the new Deutz MWM series 632 (bore 240 mm, stroke 320 mm, maximum height about 2,730 mm). Envisaged are in-line models with six, eight and nine cylinders.



Schematic cross section of a V-engine of the new Deutz MWM series 632 (bore 240 mm, stroke 320 mm, maximum height about 2,550 mm). Envisaged are V-engines with 12, 16 and 18 cylinders.

production model, the expected power-to-weight ratio will be 4.0 kg/kw with the in-line engines and 3.5 kg/kw with the V-engines. These are absolute top values for engines of this type and power class, which also underline the exemplary features of this new series.

Of course, it has also been the aim of the R&D activities to build more economical and environment-friendly engines. The distinctly higher working pressures as compared to current engine series are an important contribution toward this goal. On the other hand, the piston speed is as low as 12.8 m/s even at the maximum speed of 1,200 rpm.

In accordance with the Deutz MWM philosophy, the new engines feature a very compact configuration; this means that their specific installation space requirement is relatively low. Their low weight has been achieved with a high inherent stability instead of high tensile materials. The crankcase, which has been optimized by way of calculation and experiments, represents an important aspect of that stability. Its casting is simple and its torsional and bending stiffness is excellent. This was mainly realized by systematic provision of through-going cross sections, their arrangement relative to the crankshaft position as well as sturdy transverse fastening of the main bearing blocks.

The above specific data result in a low fuel consumption. Ease of main-

tenance is ensured for the new engines by the combination of parts in assembly groups and minimization of special tool requirement.

The new 632 series emphasizes an initial development impact after the medium- and big-engine activities of Deutz and MWM have been joined at Motoren-Werke Mannheim AG. The concentration of engineering and manufacturing of all water-

cooled engines in Mannheim and the resulting relocations from Munich, Cologne and Voerde to Mannheim, as well as the adaptation to market needs have brought about a company consolidation, the prerequisite for further developments of other engine series as well.

For free literature on the new big-engine series from Deutz MWM, Circle 43 on Reader Service Card

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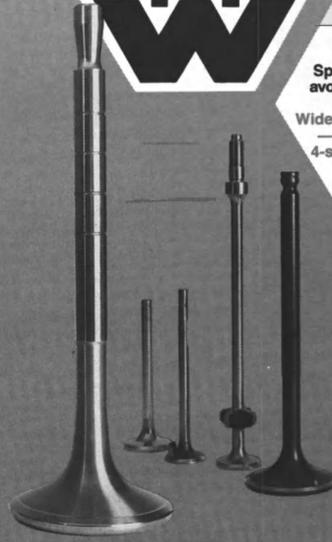
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The bulk carrier Solidarnosc, recently delivered by B&W, features a new bow form which offers larger cargo volume and easier access to Hold No. 1, while maintaining the same performance standard.

Burmeister & Wain Delivers First Vessel In Series Of Six To Polish Steamship Company

Burmeister & Wain Shipyard (B&W), Copenhagen, Denmark, recently delivered the Panamax bulk carrier Solidarnosc (BCT70), first vessel in a series of six vessels for the Polish Steamship Company. A second BCT70-type bulk carrier for the Polish Steamship Company, the

Armia Krajowa, will be delivered this month.

Four more of the BCT70 vessels are going to be built as OBO-carriers, the last one to be delivered at the end of 1992. Thereafter, B&W intends to replace it with a new design, the BCT85 which, with its

double hull and two meters between the inner and outer hull, meets the new American standards for oil carriers entering U.S. waters, as defined in Oil Pollution Act 90.

The Solidarnosc has a length of 750 feet, molded breadth of 106 feet, and design draft of 41 feet. Propulsion is provided by one MAN B&W crosshead diesel engine of the five-cylinder, direct-reversible, single-acting, two-stroke, constant-pressure turbocharged type 5S60MC or equivalent, achieving a speed of 15.2 knots when the main engine is developing 9,800 bhp. Auxiliary engines consist of three diesels, type MAN B&W 5L23/30 or equivalent, each directly coupled to an alternator, 550 kw, 720 rpm, 3 by 440 V, 60 Hz. There is also an emergency

diesel generator of approximately 100 kw.

The BCT70 is a flexible type and can be delivered either as bulk carrier, product carrier or OBO-carrier. The vessel's design is such that the owner can postpone the decision as to whether it should be bulk carrier or OBO-carrier until the construction stage is reached when specialized equipment—auxiliary engines, pumps, etc.—must be ordered. It is a double hull vessel with all structural reinforcement between the inner and outer hull. As a consequence, the holds are completely free of sharp edges and, therefore easy to clean and maintain.

For free literature on the facilities and capabilities of B&W, Circle 42 on Reader Service Card

Del Gavio Marine Announces Relocation—Literature Available

Anthony Del Gavio has announced the relocation of the corporate headquarters of Del Gavio Marine Hydraulics Inc. to 619 Industrial Road, Carlstadt, N.J.

The new 12,000-square-foot facility will house the corporate offices as well as a full-service hydraulic and pneumatic repair center, a complete machine shop and an electrical repair shop. The firm is capable of providing turnkey service on hydraulic or pneumatic

pumps, motors, valves, actuators, cylinders and accumulators including the capability to perform full load testing to ABS standards.

In addition, sales and complete repair service is offered for fuel oil and lube oil pumps for marine or industrial applications.

Hydraulic hoses and fittings of various sizes in both metric and American standard sizes are available in stock for immediate fabrication.

Field service engineers and technicians are available on a 24-hour basis for dispatch worldwide.

For free literature giving more information on Del Gavio Marine, Circle 75 on Reader Service Card

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Circle 213 on Reader Service Card

Maritime Reporter/Engineering News

DTRC Soliciting White Papers For Sealift Cargo Handling Systems

The David Taylor Research Center (DTRC) Mobile Support Systems Program Office is soliciting white papers for cargo handling systems and system components for a fast sealift ship that is both militarily useful and commercially viable. This announcement is timed to impact a draft mid-term options paper due in December 1991.

Potential vendors are encouraged to submit white papers outlining proposed research and development activities. If a white paper is favorably reviewed, the prospective vendor would be asked to submit a formal proposal for consideration of possible funding.

The cargo handling system is for a militarily useful, commercially viable ship, designed with the flexibility to handle RO/RO cargoes, LO/LO cargoes, or a combination of both. Self-offloading capability should be considered in the design.

White papers should be no longer than 15 double-spaced pages. Formal proposals of no longer than 30 double-spaced pages for concept development may also be submitted.

Responses to this broad agency announcement must be received by May 31, 1991 and should refer to the number N61533-BAA-91-01. An original and six copies should be submitted to the David Taylor Research Center, Annapolis Laboratory, Code 1235/Keith R. McAllister, Annapolis, MD 21402-5067.

For a full copy of the text of this broad agency announcement, refer to the Commerce Business Daily (on or about May 1) or contact the contracting officer Darrell Bachman at (301) 267-5273.

Vetco Gray Now Under Control Of ABB Asea

ABB Asea Brown Boveri, the Swedish power, engineering and shipping group, has taken control of U.S. offshore equipment company Vetco Gray through its Norwegian subsidiary EB Corporation.

Vetco Gray is one of the leading producers of equipment for underwater production systems and offshore platforms, with a turnover of \$511 million.

Vetco Gray, Houston, Texas, has production centers in the U.K. and Singapore and is represented in a number of countries.

Described as a strategic move in ABB's involvement in the international oil and gas market through its 63-percent-owned subsidiary Norwegian EB Corporation, the purchase will strengthen ABB's position as a supplier of services to the offshore industry.

For free literature detailing ABB products and services,

Circle 102 on Reader Service Card

High-Speed Catamaran Ferry Planned Between Vancouver And Victoria

A target startup date of June 1 has been announced along with plans for a high-speed passenger catamaran service between Vancouver and British Columbia's capital,

Victoria, on Vancouver Island.

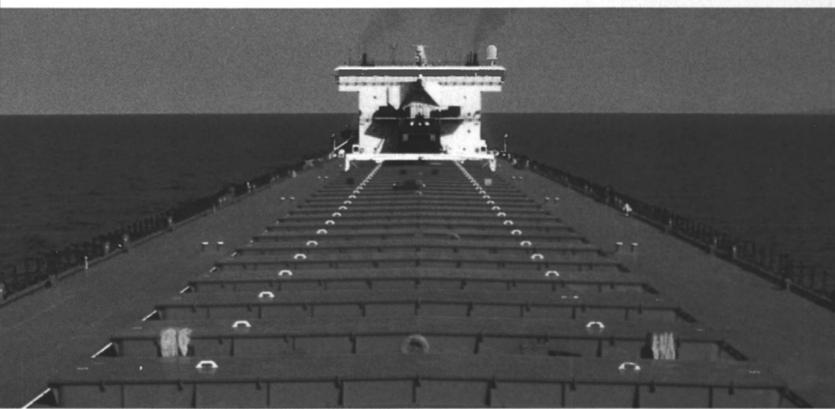
Vancouver Island Ferry Corporation (VIFC), a newly formed company, says it hopes to attract 10 percent of the 5.8 million passengers who use government-owned B.C. Ferry Corporation services between Vancouver and Victoria.

Four round-trips daily at twice the speed of B.C. Ferries would be offered by the proposed service.

Bob Ward, spokesman for VIFC, said he believed the time was right for a 300-capacity passenger-only ferry, and that VIFC was negotiating in Norway to buy two used catamarans which have been little used.

The startup cost was \$10.4 million, he said, and the company was backed by private individuals in the Victoria area and Eastern Canadian shipping companies.

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Circle 237 on Reader Service Card



Royal Schelde's Seaswift 23 during sea trials.

Royal Schelde Exhibits Versatility In Shipbuilding

Royal Schelde of Vissingen, the Netherlands, will be exhibiting their versatility in shipbuilding this year at the Cruise & Ferry '91 exhibition in London, England, May 29-31, as well as at Nor-Shipping '91 in Trondheim, Norway, June 11-14, by show-

ing models of two ships out of their Seaswift range of Surface Effect Ships, as well as a model of a sea/river cruise ship, and a model of a light corvette.

Royal Schelde's main areas of shipbuilding are high-speed Surface

Effect Ships, special design vessels such as the sea/river cruise ship, research vessels and rescue vessels, and a wide range of naval vessels.

At present, the range of Seaswift Surface Effect Ships consists of the Seaswift 23, Seaswift 34 and Seaswift 60.

Seaswift 23, the smallest vessel in the range of Royal Schelde Surface Effect Ships, is capable of carrying around 150 passengers in aircraft-type seats at a service speed of 30+ knots, it is the ideal vessel for commuter traffic in harbor areas of large coastal cities.

The intermediate size Seaswift 34 is capable of carrying around 350 passengers at a service speed of 40 knots. The flexibility in interior layout offers many possibilities for coastal transportation of passengers or cargo in sea conditions with up to 2-meter waves.

This vessel, as an alternative design, is also available as a Coast Guard vessel and in this configuration it can be applied for a variety of policing, patrol, and interception roles, thereby providing the speed,

maneuverability and endurance necessary to perform the task requirements.

At present, Seaswift 60 is the largest of the Royal Schelde Surface Effect Ship designs, offering the capability of transporting 434 passengers and 62 cars in its basic configuration. Capable of operating in sea conditions with up to 3-meter wave height, the Seaswift 60 is offered with either diesel or gas turbine propulsion and will travel at speeds of 40+ knots.

For the purpose of river and coastal cruising, Royal Schelde has designed a medium-sized intimate vessel, capable of carrying about 250 cruise-passengers, with spacious public rooms and decks.

Other activities of Royal Schelde will also be prominently displayed at the exhibitions in London and Oslo, as the company is active in a broad field with related products.

For free literature giving full details on the activities of Royal Schelde,

Circle 48 on Reader Service Card

2 'Pepsi' Tankers Sold On Secondhand Market

Two double-hull/double-bottom tankers built as part of the 'Pepsi' deal were recently sold on the secondhand market for about \$53 million. They are believed to be the first tankers sold under the deal.

The two 68,157-dwt tankers, Bregen and Hesnes, built in the U.S.S.R. in 1989 and 1990, were sold to undisclosed Italian interests.

The two vessels were the first of 11 contracted by Fram Shipping of Bermuda in conjunction with Pepsi Cola Co. in part payment for soft drink concentrates.

As many as 70 more ships may be built at Soviet yards between 1991-95.

The tankers, along with others in the series are believed to be on charter to the Finnish oil company Neste Oy.

NKK Executive Expects World Shipbuilding Boom

Based on rising construction prices and full order books for the next two to three years at major world yards, Heichiro Miyazaki, managing director of NKK Corp.'s shipbuilding and offshore structures division, recently called the shipbuilding industry's outlook "rosy" and suggested a "long period of growth" is possible.

Because of the aging of the world fleet and the growing demand for offshore oil drilling rigs, Mr. Miyazaki is convinced a "massive demand" is building for new vessels and rigs.

Present worldwide annual shipbuilding capacity stands at 16 million tons. Mr. Miyazaki anticipates that shipbuilding capacity will rise to 18 million tons per year, but will still be outstripped by demand, which may reach 20 million tons per annum later in this decade.

Crowley Maritime Reorganizes

Crowley Maritime Corporation, Oakland, Calif., is reorganizing its corporate structure in order to centralize its liner and marine contract activities.

Crowley's liner services to Hawaii and Alaska, the Caribbean and Central and South America will be headed up by James J. Carey II, group vice president of liner services.

The company's other services, ocean towing, petroleum transport and storage, environmental cleanup, tug and lightering, and salvage operations will be headed by Brent Stienecker, group vice president, contract transportation services.

Mr. Carey and Mr. Stienecker will both report to Leo L. Collar, Crowley's president and CEO.

A company spokesman indicated that the centralization of activities will also be important to coordinate Crowley's multimillion dollar contract for oil spill cleanup work in the Persian Gulf.

Offerors For Operation Of Deep-Ocean Research Ships Sought By Navy

The Navy will be constructing two general purpose ocean science research ships, the AGOR 24 and AGOR 25.

The eligible offeror must be a member of the University National Oceanographic Laboratory System (UNOLS) or meet the requirements and agree to apply for full membership if selected.

Offerors must be able to provide technical assistance during the period covering builder selection through delivery; enter into a renewable charter party agreement with the Navy; maintain and operate such ships under sound maritime practices; complete final fit-

ting of the vessels and be willing to undertake a cooperative role in scheduling and operating the ship in the support of the Navy research programs and the larger U.S. ocean science research community.

Offerors may propose to operate either ship or both ships. Written requests for an RFP should be sent to the Office of Naval Research, 800 North Quincy Street, Arlington, Va. 22217-5000.

For more information contact B. Hetfield at (703) 696-4513.

RGB Spectrum Introduces Versatile Scan Converter

The new RGB/Videolink® 1600U scan converter from RGB Spectrum, Berkeley, Calif., transforms high resolution computer graphics to television format in real time. This allows recording of computer graphics on any video tape recorder an connection to video projectors, teleconferencing systems and composite monitors. The new model automatically syncs to all computer RGB signals with a horizontal scan rate from 20.0-90.0 kHz, including PCs, Mac IIs and workstations from Sun, DEC, HP/Apollo, IBM, Silicon Graphics and others. Both interlaced and non-interlaced inputs are accepted.

Synchronization and setup are completely automatic. The 1600U measures the horizontal and vertical frequencies of the input signal and sets up the parameters for the sharpest picture, correct aspect ratio and size of the output image.

A unique feature of the 1600U is a direct interface to video projectors and other display equipment accepting signals up to 32 kHz. The 1600U offers a double rate 31.5 kHz output simultaneously with the broadcast video. According to the manufacturer, the 1600U is able to perform both high quality projection and videotaping.

The 1600U can map any number

of input lines to any number of output lines, allowing the ideal screen resolution of all images. For example, 350 line EGA displays can be converted to the full 486 visible lines for NTSC or 575 visible lines for PAL. High resolution 1,024 line displays can be mapped to NTSC or PAL screens without losing any part of the image.

The 1600U is controlled by a sophisticated front panel LCD display and a system of context sensitive "soft" keys. At the top menu level, the keys control basic functions such as fade, flicker filter, zoom and freeze frame. At lower level menus, the keys control custom setups, test pattern selection, zoom parameters, etc. This system allows full control with a simple uncluttered front panel.

For more information and free literature,

Circle 30 on Reader Service Card

Ritchie Announces New Three-Year Warranty On Magnetic Compasses

Starting with the 1991 season, all Ritchie magnetic compasses will now have a three-year extended warranty, according to Stephen Sprole, national sales manager.

Mr. Sprole said: "We are passing along the benefits of improvements in design and materials to our customers. This new warranty also supports the Ritchie commitment to quality and backs our position as one of the world's leading compass manufacturers."

The new warranty will apply to the complete line of Ritchie compasses, from the new RitchieSport X-10, 1-7/8-inch dial model, to the Globemaster 6-inch dial models for large yachts and commercial vessels.

For a free catalog and selection guide from Ritchie,

Circle 94 on Reader Service Card

Hoffer Offers Wide Selection Of Flowmetering Solutions To Meet User Requirements

Hoffer Flow Controls, Inc. of Elizabeth City, N.C., offers an exceptionally wide range of turbine flowmeter sizes and configurations to choose from. Their turbine flowmeters provide solutions in most clean liquid and gas flow applications.

Hoffer turbine flowmeters are available in three separate series. The mini-flowmeter series covers flow rates from .007 to 3.5 gpm for liquids and .005 to 1 ACFM for gases. The HO series of axial turbine flowmeters meets most user requirements and are available in sizes 1/4 through 12 inches. Finally, the HP series of insertion flowmeters provides flow measurement capability in pipe sizes from 3 inches through 48 inches and are usable in either liquids or gases.

Standard flowmeter linearity is +/- .5 percent with a repeatability of +/- .1 percent. Turndown ranges of 10:1 to 100:1 are available. In many cases the wide selection of flowmetering solutions available from Hoffer will help meet most user requirements.

For more information and free literature on Hoffer Flow Controls,

Circle 27 on Reader Service Card

GMG Provides Quick Response Persian Gulf Video Support For Navy, Army And MSC

In response to quick turnaround video training requirements for Operation Desert Storm, GMG International, Newington, Va., developed several specialized video training productions for the U.S. Navy, U.S. Army and Military Sealift Command.

These training and informational videos were produced in as little time as one or two weeks and shown in training classes to military personnel in various arms of the service.

Dave Gardy, president of GMG, noted, "Our production crews were just happy to be selected to help out in the effort. It was rewarding to see how quick-response video training could perform such an integral role."

Gardy McGrath (GMG) International, Inc. is a video studio and post-production facility specializing in marine and defense videos on technically related subjects. As a qualified video producer for the U.S. Government, GMG has produced over 300 broadcast quality videos on marine and military related subjects at various security levels.

For more information and free literature on GMG,

Circle 29 on Reader Service Card

Elliott Manufacturing Catalog Features Remote Valve Operators For Ships

Pursuant to Elliott Manufacturing Company's expansion in the remote valve operator business, the company is releasing its new "Remote Valve Operators" catalog for engineers, designers, and manufacturers involved in the design, specification and purchasing of ship parts and systems.

The catalog is presented in a durable three-

ring binder divided into headings such as Gear Boxes, U-Joints, and Miscellaneous Hardware. Each component is clearly drawn with the measurements distinctly labeled. Specification charts clearly show materials used, component size, and part number.

The Remote Valve Operators catalog features components designed for the maritime industry,

but many are flexible enough to be used in other industries.

Elliott Manufacturing is a world leader in the power transmission industry.

For a free copy of the "Remote Valve Operators" catalog from Elliott Manufacturing,

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Circle 296 on Reader Service Card

Electronics Update

Safer Navigation With Disc Navigation System From Robertson Trittech

Recently conducted trials of Robertson's Disc Navigation System, an Electronic Chart Display and Information System, aboard a Norwegian paper carrier may have a great deal of impact on the future of navigation safety.

Knut Magnus Skaar, director of Seatrans A/S, a Norwegian shipping company which operates the paper carrier *Nornews Express*, said, "We believe this system will have the same impact on safer navigation as radar had when it was introduced in the mid-1940s."

As a result, Seatrans has asked for the prototype system to be left on board pending delivery of a production Disc Navigation unit. Additionally, the company has placed orders to similarly equip two chemical tankers under construction in Germany.

Working in collaboration with Det norske Veritas, the Norwegian Hydrographic Service and the Norwegian Maritime Directorate, the Robertson Trittech A/S of Egersund, Norway, participated in the three-month-long "Seatrans Project" to test and evaluate its Disc Navigation System on the 4,568-dwt *Nornews Express* during normal commercial operations in the North Sea plying between Trondheim, Oslo, Hamburg and Amsterdam. Results from these trials are being used to

define final IMO and IHO standards for Electronic Chart Display and Information Systems (ECDIS).

Interfaced with a variety of sensors including GPS, ARPA radar, log, autopilot, gyrocompass and sounder, the Robertson Disc Navigation ECDIS system is intended to form the main bridge workstation. The information received is used to superimpose the vessel's position, and that of all other vessels in the area, onto a digitized chart appearing on a large format screen and held on disc within the system. However, it also compares the ship's position with preplanned track, navigational hazards and the course of other ships in the vicinity for any potentially dangerous situations.

Robertson Trittech's system uses official digitized charts—the legal equivalent to papers charts—prepared by the Norwegian Hydrographic Office. Some other electronic chart systems, however, may only be used as aids to navigation. Robertson is enlisting the services of other national hydrographic agencies, incorporating standardized digitizing procedures, in order to form a database equivalent to the 2,000 paper charts needed for worldwide coverage. Each vessel can input information from its own sensors onto the chart and updates can be made automatically using the In-



The Robertson Trittech Disc Navigation system recently underwent trials on board the paper carrier *Nornews Express*.

marsat C satellite communication system. These updated details are stored on separate discs to avoid contamination of the official chart.

At a recent conference held aboard *Nornews Express*, the vessel's master, Capt. **Atle Grindheim**, said that he believed one of the biggest advantages was the quality of advice the system provided. For example, his ship's draft plus a suitable safety margin had been programmed-in to produce an individual safety depth color. On the *Nornews Express* depths shallower than this selected contour are clearly shown on the chart screen as dark blue and an alarm sounds if the vessel is on course to cross areas so colored—a feature which might have prevented the Exxon Valdez accident.

It has been suggested by some that Robertson's Disc Navigation System may well represent an economic alternative to double hulling and Seatrans regards its anti-grounding features to be of pivotal

importance.

Johan Hvide, vice president of Seatrans said that he thought ECDIS would become mandatory in certain areas and expected that vessels equipped with the system would be preferred by charterers with hazardous cargoes to ship, anticipating reduced cargo and hull insurance premiums.

According to DnV's principal nautical surveyor Capt. **Per Larsen**, it also represented the last element necessary for a true one-man bridge in all types of water.

Even before completion of the Seatrans Project, another Norwegian owner, Riebbe Shipping A/S, had installed a Robertson ECDIS system on the icebreaking research/passenger vessel *Polar Circle*, the latest addition to its fleet, which operates in Antarctic waters.

For free literature detailing Robertson Trittech's Disc Navigation System,

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Circle 22 on Reader Service Card

Hellenic To Refit

Texaco Ships Under \$5 Million Pact

Greek shipbuilder Hellenic Shipyards of Skaramanga recently received a \$5 million refit on four Texaco ships. This contract comes on the heels of a \$6 million pact for steel replacement and repair of a Maritime Overseas vessel. In all, more than \$26 million of repair work has been booked at the yard this year.

Texas Passes New Oil Spill Law

The Governor of Texas, **Ann Richards**, recently signed a new oil spill bill into law. Some provisions of the law which would concern vessel operator liability include: Response costs of \$5 million for vessels under 8,000 gt; \$600 per gt or \$50 million, whichever is less, for vessels over 8,000 gt; or \$1 million for non-oil carrying vessels under 300 gt.

In addition, the same scale will be used for third party economic damages. The new law, however, does not limit liability for damage to natural resources.

Maritime Reporter/Engineering News

**\$823.4 Million Program
For East German Yards
Being Prepared By Bonn**

A subsidy program worth around \$823.4 million is being prepared by the Bonn government for the shipyards of eastern Germany.

Designed to cover existing orders, mainly from the Soviet Union, and fresh work, the program will extend over a period of up to four years. Existing orders from western owners, however, will not be subsidized.

Eastern German yards would be given help of around \$198,250,000 per year under the program, compared with similar programs for western German yards worth about \$279,080,000 annually.

Eastern German yards would be granted straight newbuilding subsidies of 14.9 percent of the newbuilding price, as well as interest rate help of up to 2 percent on Deutschmark financing and 4 percent on foreign currency financing. When ordering ships from eastern German yards, developing countries could get additional help under the program.

Newbuilding subsidies of at least 20 percent, however, are what the shipbuilding industry said it wants. A special exemption from the EC Commission, which is restricting shipyard help to 14.9 percent, would be required for this.

The Bonn parliament's budget committee is discussing the scheme, which has been introduced both as part of the budget and the additional special program "Upturn East," for a revival of the eastern German economy.

**MSE Secures
\$9.1 Million Order
For Cargo Vessel**

A \$9.1 million order to build a 3,000-dwt cargo vessel for Indonesian shipowner Damarsegara Agung Line has been secured by Malaysia Shipyard and Engineering Bhd (MSE) in the southern Malaysian state of Johor.

Scheduled for delivery next year, the ship is the first foreign vessel built by the yard.

MSE, which specializes in repairs, conversion and newbuilding, also recently secured orders for the construction of two container cranes.

For free literature on the facilities and capabilities of MSE, Circle 10 on Reader Service Card

**Two Louisiana Yards
Awarded Environmental
Vessel Contracts**

Ecomarine USA recently awarded two Louisiana shipyards contracts to build the first of two series of multimission environmental vessels, model ECO-800 and the model ECO-110. The vessels will monitor and control water pollution and clean up oil slicks and other chemi-

cal spills.

Ecomarine, formed in late 1990, provides advanced technology and services for oil-spill response, marine pollution control and marine monitoring and mapping.

Trinity Marine Group of New Orleans was awarded a contract to begin production of the ECO-800, a 65-foot vessel that will serve as the flagship of the Ecomarine fleet.

A contract to begin production of the ECO-110, a 38-foot vessel that will be the workhorse of the Ecomarine fleet, was awarded Bollinger Shipyards of Lockport, La.

Delivery of the first two vessels is due in June 1991.

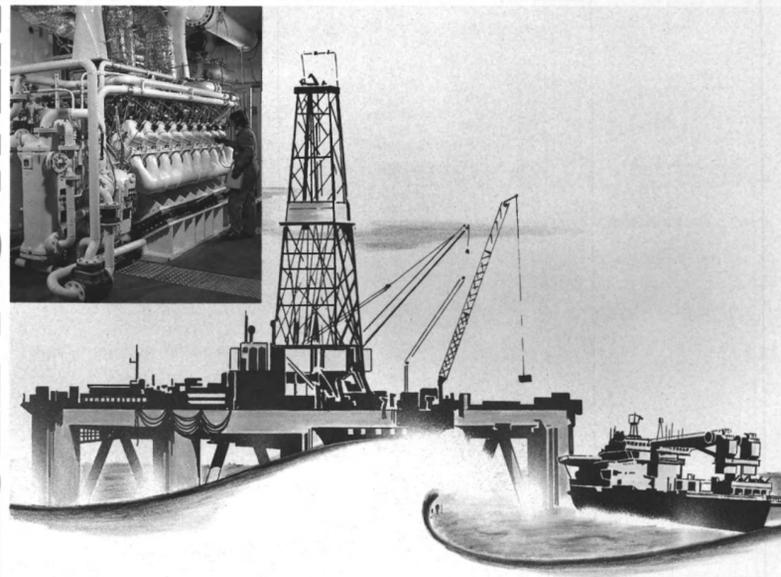
The ECO-800 and ECO-110 will be equipped with mechanical jaws designed to extract debris from the water with a powerful suction

mechanism capable of consuming large volumes of oil and debris. The boats can also be outfitted with a technologically advanced system for monitoring water quality.

William S. Doyle, president of Ecomarine USA, said the vessels will be leased to government agencies, businesses and other groups concerned with keeping the nation's waterways clean.

FOR OFFSHORE

DIESEL POWER



Hedemora Diesel has its origins in an engineering company established in the 19th century in Bergslagen, the traditional mining district in central Sweden. The production of engines started in 1946. The company has been part of the Nordstjernan Group since 1935.

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Centrico, Inc., Northvale, N.J., offers a Westfalia automatic self-cleaning oil purifier designed to remove impurities and water from heavy fuel oil, thus improving engine performance and preventing

engine breakdown.

Westfalia automatic oil purifiers, which are being increasingly specified for use on oceangoing and service vessels, incorporate self-cleaning disc-type bowls designed for optimum oil-water separation even when oil characteristics and feed rates change. Purifier models are available with rated capacities up to 26,000 liters/hour (115 gpm), but

actual throughput depends on viscosity, specific gravity and other properties of the oil.

Centrico has supplied Westfalia purifiers to the U.S. Navy, Military Sealift Command, U.S. Coast Guard, and the Canadian Coast Guard.

For further information and free literature on the Westfalia automatic self-cleaning oil purifier, Circle 37 on Reader Service Card

\$130 Million Loan Granted Ishibras To Build Two Ships

A \$130 million loan has been granted by Brazil's national development bank to Ishikawajima do Brasil (Ishibras) to build two ships for an American-Japanese consortium.

Financing was approved by the Banco Nacional de Desenvolvimento Economico e Social for Ishibras shipyards of Rio de Janeiro to build two tankers of 130,000 tons capacity each for a ship operating consortium composed of Japan's Mitsui trading company and Chevron oil company in the U.S.

For Ishibras, which is building three other tankers for Mitsui-Chevron, it was the second such export loan.

Ishibras, which is owned by Japan's Ishikawajima Heavy Industries, received \$105 million worth of financing to cover construction costs on the first three contracts.

Ishibras has applied for financing to build one more tanker for the same consortium.



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Kvaerner Eureka Offers 20-Page, Full-Color 'Marine Equipment Review'

Kvaerner Eureka of Seattle, Wash., Marine Equipment Division, is offering a 20-page, full-color brochure titled "Marine Equipment Review," featuring products marketed by the company.

The following chapter headings taken from the contents list give a quick account of what the brochure contains: the CK double suction cargo pump; MGFE—a major player in the Far East CAE market; Cargo Scooper self-discharging system; specialized applications for RO/RO operators; world leader in gas tanker technology; UK CAE company goes from strength to strength; Cool Carriers reefers at Boelwerf; breakthrough into the North American and Yugoslav markets; and Japanese cooperation partner Tsuji Heavy Industries.

Through the marine equipment division of Kvaerner Eureka, a systems approach is offered in the specialized areas of ships cargo access equipment, cargo pumps and control system, firefighting systems and engine-room pumps and specialized equipment for LNG/LPG tankers.

Kvaerner Eureka is well known for its innovative approach to designing and supplying ships equipment for handling both dry and liquid cargoes, and has attained an enviable position of being recognized as a supplier of cost-effective and reliable equipment.

For further information and a free copy of the Marine Equipment Review from Kvaerner Eureka,

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The Seatrade event at the Barbican Centre,
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**Homeport Marine
Completes Fish Tender
'Northern Wind'**

Homeport Marine Services, Inc. of Moss Point, Miss., has completed the 195-foot fish tender Northern Wind, owned by Arctic Alaska Fisheries, Inc. of Seattle, Wash. Upon

delivery, the vessel will travel to Seattle by way of the Panama Canal where Western Pioneer of Seattle has contracted to manage and operate it.

The Northern Wind, a sister ship to the Eastern Wind, also built by Homeport and delivered in June 1990, is 41.5 feet wide and 28 feet deep. It has a total of 78,000 cubic feet of cargo hold, which will allow it

to transport three million pounds of frozen fish at minus 24 degrees Fahrenheit. It is self-loading and unloading by way of four cargo booms rated at 10,000 pounds each.

Built to support a crew of 10, the tender is equipped with modern and comfortable quarters and with a walk-in freezer and cooler. She will carry 150,000 gallons of fuel and



The Northern Wind, built by Homeport Marine Services in Moss Point, Miss.

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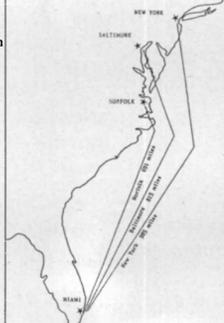
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8,000 gallons of water. The Northern Wind was built to ABS requirements and is certified by ABS as a loadline vessel.

Propulsion is provided by two General Motors Electro Motive Division 12-cylinder engines supplied by Defco, developing a total of 3,000 hp. It has reduction gears built by Haley Gear Co. of Greenville, Miss., with 3:1 ratio. Propellers are Bird-Johnson 86-inch by 68-inch, four-blade bronze. Electrical power totals 495 kw driven by three 3306 Caterpillar engines capable of full paralleling. The main electrical switchboard was built by Contec of Port Bienville, Miss., and is designed for parallel operation.

The vessel's engine control is Westinghouse Air Brake Co. with Logic Master panels. Steering is electrohydraulic manufactured by International Steering of Pearlinton, Miss. Electronics, furnished by Lunde of Seattle, feature gyro by Sperry, and all the standard radios and satellite communicating equipment including a fax machine.

The cargo freezing capacity of minus 24 degrees Fahrenheit is obtained with Freon and 35 thousand feet of 1-1/2-inch cooling coils.

The Northern Wind, a new class of cargo vessel, was designed by Homeport Marine, Design Associates of New Orleans, La., an Arctic Alaska's chairman Francis L. Miller with the special purpose of transporting frozen seafood products. Designed as a freighter for international trade, it will take product on the high seas, from catcher processors to domestic or international markets.

In addition to new construction, Homeport is currently overhauling two 200-foot supply boats for Seacor Marine, Inc. of Morgan City, La.

Two-year-old Homeport Marine, which has approximately 100 employees, is a local and privately owned company located on a 17-acre site next to the Escatawpa River in Moss Point.

For more information and free literature,

Circle 44 on Reader Service Card

**Gulf Offshore Buys
Supply Vessel
From Swedish Owners**

Gulf Offshore of the U.S. recently purchased the UT705 type platform supply vessel/pipe carrier Far Marlin from Swedish investors. The vessel will be renamed the Highland Star and has been chartered to Allseas for 120 days for use in pipelaying operations.

Koden's New Compact 7-Inch Radar Provides Full 3 KW Of Power

When radar is installed on smaller boats, the owner often has to decide on a compromise: put up with the poorer target definition of a 1.5-kw radar, or fill up the dash or overhead compartment with a large radar display. Koden's new MD-3401 radar eliminates the need for compromise, providing a full 3 kw of power in a compact, 7-inch radar.

In ideal conditions, 1.5 kw delivers enough power to show most targets. According to the manufacturer, even in bad weather or high seas, Koden's MD-3401 delivers superior radar performance.

The powerful MD-3401 is designed for yachts and fishing boats where space is at a premium. It is exceptionally easy to operate—all controls are in English instead of symbols.

Ten ranges are selectable, all the way down to an incredible 1/8 mile for maneuvering in tight quarters. The "power save mode lets you turn off the screen (saving power consumption), while your invisible guard zone keeps watch for intruding targets.

The MD-3401 is fully compatible with compass and nav systems providing NMEA-0183, allowing for North-up and Course-up as well as the standard Head-up presentation. It also provides navigational data, EBL, VRM, off-centering, target tracking and automatic tuning.

Users can choose a compact dome-type antenna or a 3-foot open scanner for improved target definition.

For free literature giving full information on the Koden MD-3401, Circle 21 on Reader Service Card

Wallenius Lines Buys 50 Percent Stake In Norway's UECC

One of the world's leading car carriers, Wallenius Lines of Sweden, has acquired a 50 percent stake in Norway's Uglund European Car Carriers (UECC), the company formed last year when NYK of Japan bought out the Uglund short-sea carrier fleet.

The biggest European and Japanese car carriers are brought together in the move in an attempt to capture a significant market share of rising intra-Europe car shipments after the single market in 1992.

To be renamed United European Car Carriers, the new joint venture company will continue to be operated by Uglund from Norway, as well as its U.K. office which manages the short-sea fleet.

Drewry Study Says Cheaper Oil Prices Will Boost Tanker Trade

According to a new study from Drewry Shipping Consultants,

May, 1991

cheaper international oil prices will prove a major boost to tanker trade levels.

Titled "The Outlook for Oil Trades to 1995," the Drewry report says if the spot crude price stabilized around \$20 a barrel before gradually rising to \$30 between 1990-95, the tanker trade would rise by only about 1 percent per annum to 1.725 billion tons.

However, if spot prices were forced down to \$15 by 1992, the oil trade would show a healthy growth of around 3 percent a year by 1995.

If oil prices are forced to much higher levels then, conversely, trade would decline much as it did after the price increases of 1979-80. The decline then in trade would be almost 2 percent a year to about 1,530 tons in 1995. **Andy Carpenter,**

Drewry managing director, said in all cases little growth was likely to occur in 1991-92, and most would take place from 1993 onward.

Trade in refined products will tend to show faster growth than crude oil, the study says. The main growth on products trade routes would be from the Persian Gulf/Red Sea to Japan, North America and Europe.

THE EUROPEAN TRADE EXHIBITION FOR SMALL COMMERCIAL CRAFT & EQUIPMENT



The European Workboat Show has firmly established itself as the European show for anyone involved with commercial craft and associated equipment or services.

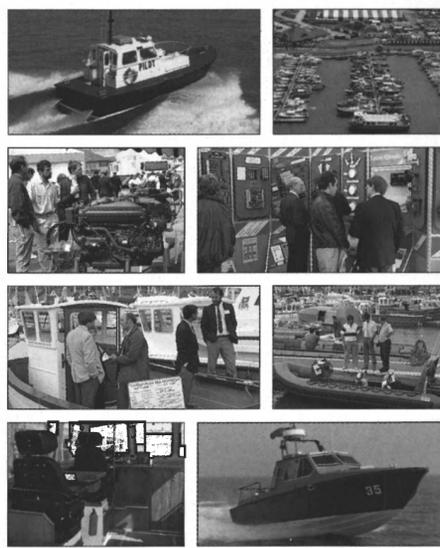
Last year's show - Workboat '90 - was a resounding success and this year's promises to be bigger and better. Take a glance at the list of products opposite and you can see how comprehensive the exhibition is.

The venue, Port Solent, is a superb marina complex with excellent visitor facilities, easy access and huge free parking - right by the show entrance.

Entry is free to trade visitors and a free coach shuttle service to and from Portsmouth Harbour Station operates throughout the show.

Workboat is organised by National Boat Shows Ltd., with many years of experience in presenting marine shows, including the London and Southampton Boat Shows.

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Liebherr-Werk Nenzing GES.mbh, P.O. Box 10, A-6710 Nenzing, AUSTRIA

Marine Travellit, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235

Morgan Crane Company, Inc., 1300 Normandy Place, Santa Ana, CA 92705

J.D. Neuhaus Hebezeugfabrik GmbH, D-5810 Witten, GERMANY

Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883

Reco Crane Co., 5734 Jefferson Highway, 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

Technigas, Division of Bouygues Offshore, 3 rue Stephenson, 78884 St. Quentin en Yvelines, FRANCE

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

Markey Machinery Co., Inc., P.O. Box 24788, Seattle, WA 98124-0788

Morgan Crane Company, Inc., 1300 Normandy Place, Santa Ana, CA 92705

McEroy Machine & Mfg. Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454

Seattle Pot & 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

Coltec Industries Fairbanks Morse Engine Div, 701 Lawton Ave., Beloit, WI 53511

Diesel America Inc., 5217 River Rd., New Orleans LA 70123

Gearhardt's Inc., P.O. Box 10161, Jefferson, LA 70181

General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360

Kiene Diesel Accessories, 325 S. Farbanks St., P.O. Box 386, Addison IL 60101

Pow'RQuik, 5518 Mitchelldale, Houston, TX 77092

DIESEL ENGINE—Spare Parts & Repair

Aalborg Ciser (Miami) Inc., 1539 SW 21st Avenue, Ft. Lauderdale, FL 33312

Coltec Industries, Parts & Service Div., 701 Lawton Ave., Beloit, WI 53511

Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005

Global Maritime Services, 247 SW 33 Court, Ft., Lauderdale, FL 33315

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

KHD Canada, Inc., 4420 Garand, Ville St-Laurent, Quebec, CANADA H4R 2A3

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, GERMANY

MAN B&W Diesel, 50 Broadway, 18th Fl., New York, NY 10004

MTU of North America, 10450 Corporate Drive, Houston, TX 77478

Markischesch Werk GmbH, P.O. Box 1442, D-5884 Halver 1, GERMANY

Pacific Rim Diesel, 3842 W. Marginal Way SW, Seattle, WA 98106

Paxman Diesels, P.O. Box 8, Paxman Works, Colchester, Essex, CO1 2HW, ENGLAND;

Paxman Diesels USA, (A Div. of Ruston Gas Turbines, Inc.), 15950

Park Row, Houston, TX 77084

S.E.M.T. Pielstick, 2 Quai de Seine, Saint Denis, Paris, FRANCE 93203

Sitzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166

DIVING & SALVAGE

H.J. Merrhuie, P.O. Box 23123, New Orleans LA 70183

Muldoon Marine Services, Inc., P.O. Box 3221, Terminal Island, CA 90731

Sea Side Diving, 28612 Harper Ave., St. Clair Shores, MI 48081

DRILLING DESIGN

Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381

Marine Design Services, P.O. Box 928, Bonita CA 92002

MAN GH1 Sterkrade, P.O. B. 110240, D-4200 Oberhausen 11, GERMANY

ELECTRICAL EQUIPMENT

L. F. Gaubert & Co., Inc., P.O. Box 50500, New Orleans LA 70150

M/MC International, 60 Ino Dr., Inwood NY 11696

P.J. Fishner Marine/Radio Research Instrument Co., 584 N. Main St., Waterbury, CT 06704-3506

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 Rd. 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

EPIRB'S

Alden Electronics, 40 Washington St., Westborough, MA 01581

Liton Special Devices, 750 W. Sprout Road, Springfield, PA 19064

EQUIPMENT/TOOLS

Byrne, Rice & Turner, Inc., 1172 Camp St., New Orleans, LA 70130

Gladsky Marine, Garves Point Rd., Gen Cove, NY 11542

Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302

Ovalok Steel Inc., P.O. Box 745, Avon, CT 06001

EVAPORATORS

AifaLaval, Desalt A/S, Stambolmen 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

FANS-VENTILATORS-BLOWERS

Carling Turbine Blower Co., 10 Nebraska St., P.O. Box 88, Worcester, MA 01613

Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA 94402

FASTENERS

Jameson Distributors, 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02635

Non-Ferrous Bolt & Mfg. Co., 4085 Nevos Dr., Suite C, Las Vegas, NV 98103

FENDERING SYSTEMS/BUOYS-Dock & Vessel

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

Morgan Marine Supply Inc., 5832 Harvey Wilson, Houston, TX 77020

Rowe Bumpers, Conveyors & Caster Corp., 3501 Detroit Ave., Cleveland, OH 44113

Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook, VA 22624

Solidur Plastics Co., 200 Industrial Dr., Delmont, PA 15626

Standard Refrigeration Co., 2050 N. Ruby, Melrose Park, IL 60160

Ultra Poly Inc., 2926 South Steele, Tacoma, WA 98409

Viking Feeder Co., 50 Church Street, Sea Bright, NJ 07760

FUEL ADDITIVES, CONDITIONING

U.S. Borax/Industrial Chemicals, 3075 Wilshire Boulevard, Los Angeles, CA 90010

GALLEY EQUIPMENT

Cospolch Refrigerator Co., 949 Industry Rd., Kenner LA 70062

Gayford Industries, 10900 S W Avery St., P.O. Box 1149, Tualatin, OR 97062

McEroy 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 32966

Sea Systems Inc., 65 Avco Road, Ward Hill, MA 01835

Westmont Industries, 10805 Painter Ave., Santa Fe Springs, CA 90670

Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

HEAT EXCHANGERS

AifaLaval, Desalt A/S, Stambolmen 93, DK-2650 Hvidovre, Copenhagen, DENMARK

AifaLaval Separation Inc., 2115 Linwood Avenue, Fort Lee, NJ 07024

Beard Industries Inc., P.O. Box 31115, Shreveport LA 71130

Thomas C. Wilson, Inc., 21-11 44th Avenue, Long Island City, NY 11101

HORNS/WHISTLES

Kahlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241

HOSE

HBD Industries, Inc., 1801 S. Railroad Street, Salisbury, NC 28145-0948

HYDRAULICS

Aeroquip Corporation, 3000 Strayer, P.O. Box 631, Maunee, OH 43537-0631

Cuningham Marine Hydraulics Co., 201 Harrison St., Hoboken NJ 07030

Del Gavio Marine Hydraulics Inc., 619 Industrial Rd., Carlstadt, NJ 07072

INCINERATORS

Teartec 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

JOINER—Watertight Door—Paneling—Ceiling System—Decking

Cupples Products, 2650 S. Hanley Rd., St. Louis, MO 63144

GEC-Marconi Electronic Systems Corp., 550 S. Fulton Avenue, Mount Vernon, NY 10550

IMAO AB, Berga Alle 1, S-252 55 Helsingborg, SWEDEN

U.S. Rep. Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980

Maritime Services Corp., 3457 Gugnard Drive, Hood River, OR 97031

Walz & Krenzer Inc., 1390 M. Read Blvd., Rochester NY 14606

KEEL COOLERS

R.W. Ferriham & 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., Ste 350, 2701 First Ave., Seattle, WA 98121

LIFEBOATS/RAFTS

Zodiac of North America, P.O. Box 400, Stevensville, MD 21666

Willard Marine Co., Inc., 1250 N. Grove St., Anaheim, CA 92806

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights

Archway Marine Lighting, 4501 Swan Ave., St. Louis, MO 63110

Carisak & Finch, 4562 W. Mitchell Ave., Cincinnati, OH 45232

The L.C. Doane Co., P.O. Box 975, Essex, CT 06426

Nautilus Equipment Ltd., P.O. Box 66, Station M, Halifax, Nova Scotia B3J 2L4, CANADA

Phoenia Products, 6161 N 64th St., Milwaukee WI 53218

LINE BLINDS

Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474

LOGISTICS

Maritech, Seaciff, Bay Road, Newmarket, NH 03857
Maritime Design, Inc., 3020 Hartley Rd., Jacksonville, FL 32257
R.J. Melius & 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
Olson Marine Surveyors Co., P.O. Box 283, Port Jefferson, NY 11777
Omega Marine Engineering Systems, Inc., 11757 Katy Freeway, Ste 1100, Houston, TX 77079
QED 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 965, Essex, CT 06426, 17 Battery Pl., New York, NY 10004; P.O. Box 205, Solomons MD 20688; 2 Skyline Pl., 5203 Leesburg Pike, Suite 700, Falls Church, VA 22041; 1305 Franklin St., Suite 210, Oakland, CA 94612
Seaworthy Electrical Systems, 17 Battery Pl., N.Y. N.Y. 10004
George E. 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
TMSCO, P.O. Box 91360, Mobile, AL 36691

NAVIGATION & COMMUNICATIONS EQUIPMENT

AT&T, High Seas Dept., 412 Kemble Ave., Room C380, Morristown, NJ 07960
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
Hose McCann, 9 Smith Street, Englewood, NJ 07631
IBB Aero-Nautical Communications, 15200 Omega Dr., Rockville, MD 20850-3240
Kelvin Hughes Ltd., New North Rd., Haverhill, Essex 106 2UR ENGLAND
Mackay Communications, 441 US Highway #1, P.O. Box 331, Elizabeth NJ 07207
Maxon, South Boundary St., P.O. Box 69, Tell City, IN 47586
Mobile Telesystems, Inc., 300 Professional Drive, Gaithersburg, MD 20879
Naval Electronics, 5417 Jetview Circle, Tampa FL 33634
Norwegian Telecom, P.O. Box 6701, Oslo 1, NORWAY
Robertson Marine Systems, 3000 Kingman Street, Suite 207, Metairie, LA 70006
SPD Technologies, 13500 Roosevelt Blvd., Philadelphia, PA 19116
S.P. Radio A/S, DK-9200, Aalborg SV, DENMARK
Simrad, 620 Northwest Bright Street, Seattle, WA 98107
Singapore Telecom, Orchard Point Post Office, P.O. Box 38, SINGAPORE 9123
Sperry Marine Inc., 1070 Semsole Trail, Charlottesville VA 22901
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Trimble Navigation, 585 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94086
Waterway Communications System, Inc. 453 E. Park Pl., Jeffersonville, IN 47130

NOZZLES

Nautican Enterprises Ltd., 407 Mountain Highway, North Vancouver, B.C. V7J 2L1
OL—Marine—Additives
Castrol, Inc., Raritan Plaza I, Raritan Center, Edison, NJ 08837
Chevron, USA, 575 Market Street, San Francisco, CA 94105
Exxon Company International, 200 Park Ave., Bldg 222, Room A279, Florham 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

OL/WATER SEPARATORS

AlfaLaval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974-0556
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale NJ 07647
FAST Systems, Inc., 3240 N. Broadway, St. Louis, MO 63147
MMC International, 60 Imp Dr., Inwood NY 11696
Shel Oil, P.O. Box 2453, Houston, TX 77252

PAINT—COATING—CORROSION CONTROL

Ameron, 201 N. Berry St., Brea, CA 92622
Enviro Coatings, Inc., 4560 Belt Line Rd., Suite 300, Dallas, TX 75244
Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
GlobalTech, 9801 Westheimer St., Ste. 202, Houston, TX 77042
Jamestown Distributors, 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02635
Microphor, Inc., Marine Division, 452 E. Hill Rd., P.O. Box 1460, Willets, CA 95490
PPG Industries, Inc., One PPG Place, 38th Floor, Pittsburgh, PA 15272
Sigma Coatings, 8979 Market St., Houston, TX 77029, 330 Rover Road, Harvey, LA 70059, 1100 Adams St., Hoboken, NJ 07030
Unitor Ships Service, Unitor Marine Chemicals Division, 3 High St., Rickmansworth, Herts, WD3 1SW UNITED KINGDOM

PIPE FITTINGS/CONNECTING SYSTEMS

Aerocorp Corporation, 3000 Strayer, P.O. Box 631, Maumee, OH 43537-0631
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
Stanley G. Flagg Co., 1020 W. High St., Stowe, PA 19464

PORT SERVICES

Port of Iberia, P.O. Box 897, New Iberia, LA 70561
Port of Orange Texas, P.O. Box 516, Orange, TX 77630
Port of Portland, 5555 N. Channel Ave., Portland, OR 97217

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines

Avondale Industries, Harvey Quick Repair, P.O. Box 116, Harvey, LA 70058
American Air Filter, P.O. Box 35690, Louisville, KY 40432
ASEA Brown Boveri, 1460 Livingston Ave., North Brunswick NJ 08902
ASEA Brown Boveri (Stromberg), P.O. Box 185, 00381 Helsinki, FINLAND
Argo International, 140 Franklin Street, New York, NY 10013
Bergen Diesel A/S, P.O. Box 924, N-5002, Bergen, NORWAY
Bird Johnson Company, 110 Norfolk St., Walpole, MA 02081
CWF Hamilton & Co., Ltd., P.O. Box 709, Christchurch, NEW ZEALAND
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
Coltec Industries (Farbanks Morse Engine Div.), 701 Lawton Avenue, Bebit, WI 53511
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
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 N158, Cincinnati OH 45215
GE Naval & Drive Turbine Systems, 166 Boulder Dr., Fitchburg MA 01420
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Krupp MaK, 7555 Danbro Crescent, Mississauga, Ontario, CANADA L5N 6P9
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, P.O. Box 1442, D-5884 Halver GERMANY
MAN B&W Diesel, 50 Broadway, New York, NY 10004
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Høleby, 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
MTK Magnetek Inc., 11150 Santa Monica Blvd., Los Angeles CA 90025
New Suter Diesel, Ltd., CH-8401, Winterthur, SWITZERLAND
Northwest Marine Services Corp., 6452 So. 144th St., Tukwila WA 98168
Nylands Marine Service A/S, P.O. Box 130, N-4818 Faerw, NORWAY
Omnistruster Inc., 9515 Sorensen Ave., P.O. Box 2144, Santa Fe Springs, CA 90670
Ovako Steel Couplings AB Sweden, S-813 00 Hofors SWEDEN
Propulsion Systems, 1441 N Northlake Way, Seattle WA 98103
Roka SP Propellers SA, Via Silva 5, P.O. Box 251, 6828 Balerna SWITZERLAND
Roka SP Propellers USA, 4030 Mustang Road, Melbourne, FL 32934, USA
Karl Senner Inc., 25 W Third, Kenner LA 70062
Schottel-Werft, D-5401 Spay, GERMANY
Stewart & Stevenson, 1400 Destrhan, P.O. Box 8, Harvey LA 70059-0008
Sulzer/Escher Wyss, Ravensburg GERMANY
Ulsten International, A/S, N-6065 Ulsten, NORWAY
Ulsten International, 1011 Centre Road, Wilmington, DE 19805
GERMANY U.S. Rep. Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021
Oy Wartsila Ab, Vasa and Abo Divisions, P.O. Box 244, SF-65100 Vasa, FINLAND
Oy Wartsila, Stork Division, P.O. Box 244, SF-65100 Vasa, FINLAND
Westech Gear Corp., 2600 E. Imperial Highway, Lynwood, CA 90262
ZT of North America, Marine Sales, 500 Barclay Blvd., Lincolnshire IL 60069

PROTECTIVE WRAPS

FANA (Fim Applicators of North America), 1260 E Woodland Ave., Springfield PA 19064

PUMP—Repair—Drives

Coffin Turbo Pump, Inc., 326 S. Dean Street, Englewood, NJ 07631
Del Gave, 619 Industrial Rd., Carlstadt, NJ 07072
Goffen Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231
Houser Marine, Lario Division, 1713 S McKenzie St., Foley AL 36535
Jim's Pump Repair, 48-55 36th St., Long Island City NY 11101
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Via 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—Hawser—Fibers

Allied Signal Inc., Fibers Division, 1411 Broadway, New York, NY 10018
Columbian Rope Corp., P.O. Box 270, Gutwren, MS 38849
Dacant, Montgomery 403, 1011 Centre Road, Wilmington, DE 19805

SANITATION DEVICE—Pollution Control

Jered Brown Brothers, 56 South Surrell Dr., Auburn Hills, MI 48326
Byrne, Rice & Turner, Inc., 1172 Camp Street, New Orleans, LA 70130
Envrovac, Inc., 1260 Turret Dr., Rockford, IL 61111
FAST Systems, Inc., 3240 N. Broadway, St. Louis MO 63147
Microphor, Inc., 452 E. Hill Rd., P.O. Box 1460, Willets, CA 95490
Red Fox Environmental Services, Inc., P.O. Box 53809, Lafayette, LA 70505-3809
Research Products/Blankenship (Incinelt), 2639 Andon, Dallas, TX 75220

SCAFFOLDING

Spider Staging Corp., 12720 Gateway Dr., Seattle WA 98168

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

SHIPBUILDING EQUIPMENT

MAN—GHH, Sterkrade Werfstrabe 112 D-4100 Duisburg 18, GERMANY
MAN—GHH, P.O. Box 110240, D-4200 Oberhausen 11, GERMANY
NEI Syncoff, Inc., 9570 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
Atlantic Marine, Inc., 8500 Heckscher Dr., Jacksonville, FL 32226
Avondale Industries Inc., P.O. Box 50280, New Orleans LA 70150
Bechtel Shipbuilding & Repair, P.O. Box 42, Jacksonville 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
Bollinger Lockport & Larose, P.O. Box 250, Lockport, LA 70374-0250
Brodski Shipbuilding Industry, Put Udarnka 19, P.O. Box 17, 58000 Split YUGOSLAVIA
Chris-Marine AB, P.O. Box 9025, S-2000 39, Malmö, SWEDEN
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., P.O. Box 1171 Panama City, FL 32402
Equitable Shipyards Inc., Trinity Marine Group, Box 29266, New Orleans LA 70189
Fincantieri SpA Cantieri Navali Italiani, Via Copro 11, 16129 Genoa ITALY
Freeport Shipbuilding, P.O. Box 417, Freeport, FL 32439
Galveston Shipbuilding, 6800 Port Industrial Boulevard, P.O. Box 2660, Galveston, TX 77553
Gulf Craft, Inc., 3904 Highway 182, Patterson, LA 70392
Hitachi Zosen, Hitachi Shipbuilding & Engineering Co., 1-1-1 Hitotsubashi, Chiyodaku Tokyo 100, JAPAN
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530
InPlace Machining Co., 1929 N. Bufum Street, Milwaukee, WI 53212-3793
Jacksonville Shipyards, 750 E. Bay St., Jacksonville AL 32202
Jeffboat, Inc., P.O. Box 610, Jeffersonville IN 47130
Kvaerner Fjellstrand, N-5632 Omastrand, NORWAY
Lindenaue Werft, Postfach 9060, D-2300 Kiel-Friedrichsort, GERMANY
Lisnave, Apartado 2138, 1103 Lisbon, Codex PORTUGAL
MAN GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, GERMANY
ML Dave, 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
Norconsult Engineering Co., Inc., P.O. Box 529, 5785 Plantation Rd., Theodore, AL 36682
North Florida Shipyards, P.O. Box 3255, Jacksonville FL 32206
Proteco, Ltd., Rua Eugenio Castro, 13A/r/c, 2800 Almada, PORTUGAL, U.S. Rep. Walter Thorsen, Inc., 79 Oweno Rd., P.O. Box 755, Mahwah, NJ 07430-0755

Quality Shipyards, Inc. (Zapata), 3201 Earhart Dr., P.O. Box 1817, Houma, LA 70361
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 92011
3 Maj Associates Shipbuilding Industry, P.O. Box 117, 51001 Rijeka YUGOSLAVIA
Textron Marine Systems, 6600 Plaza Drive, New Orleans, LA 70127-2584
Trinity Marine Group, Box 3029, Gulfport, MS 39505-3029
Union Dry Dock & Repair, P.O. Box M1539, Hoboken, NJ 07030
Zidel 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

Beird Industries Inc., P.O. Box 31115, Shreveport LA 71130

SMOKE CURTAINS

HMS Marine Hardware, 333 W. Merrick Road, Valley Stream, NY 11580

STABILIZERS

Naal Stabilizers, Van Dusen & Meyer Inc., P.O. Box 558, Shelton, CT 06484
Seatrac Industrial Marine, 834 W. Production Pl., 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 Watercraft, P.O. Box 465, Ft 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
MMC International, 60 Imp Dr., Inwood NY 11696
Saab Marine Electronics AB, P.O. Box 13045, S-402 51 Goteborg SWEDEN

TESTING

Barbee Valves, 205 W. 35th St., Suite A, National City, CA 92050
Wyle Laboratories, 7800 Govern's Dr., SW, Huntsville, AL 35807

TOOLS

Derbyshire Machine & Tool, Belfield Ave. & Wister St., Philadelphia, PA 19144-1788
Dacant, Montgomery 403, 1011 Centre Road, Wilmington, DE 19805
LSP Industries, P.O. Box 5303, 2511-20th Street, Rockford, IL 61125
San Diego Marine Hardware, 1660 Logan Avenue, San Diego, CA 92113

TORSIONAL VIBRATION SPECIALISTS

T.W. Spaetgens, 156 W. 8th Ave., Vancouver, BC, CANADA, V5Y 1N2

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.

Jack Fastener, 2419 Caddy Lane, Flossmoor IL 60422

TURBOCHARGERS

Cooper Industries, Energy Services Group, North Sandusky St., Mt. Vernon, OH 43050

VALVES AND FITTINGS

Aerocorp Corporation, 3000 Strayer, P.O. Box 631, Maumee OH 43537-0631
American Vulkan Corporation, P.O. Drawer 673, 2525 Dundee Rd., Writter Haven, FL 33882-0673
Circle Seal Controls, Brunswick Corporation, P.O. Box 3666, 1111 N. Brookhurst St., Anaheim, CA 92803
Cla Val Co., P.O. Box 1325, Newport Beach, CA 92663
Conco Corp., 214 N Hawaiian Ave., P.O. Box 306, Wilmington CA 90748
Dobson Ltd., 863 West 44th Street, Norfolk, VA 23508
Loeffler Machine, US #1 & Robbins Ave., Penedel PA 19047
MMC International, 60 Imp Dr., Inwood NY 11696
Marotta Scientific Controls, Inc., 78 Boonton Ave., P.O. Box 427, Montville, NJ 07045

RESEARCH TOOL & Die Works, 17124 S Keegan Ave., Carson CA 90746

Slacks/Fetterville, P.O. Box 103, Skippack, PA 19474

Stanley G. Flagg Co., 1020 West High St., Stowe, PA 19464

Zidel Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

VIBRATION ANALYSIS

DJ Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110
T.W. Spaetgens, 156 W 8th Ave., Vancouver BC, CANADA V5Y 1N2
Vibanalysis Engineering Corp., 4380 S. Wayside, Suite 100, Houston TX 77087

VIDEO—Training

Walport Wusa, 840 Bond St., Elizabeth, NJ 07201

WASTEWATER TREATMENT

EES Corporation/Omipure, An Eltech Systems Company, 12850 Bournewood Dr., Sugarland TX 77478

WATER PURIFIERS

AlfaLaval, Desalt A/S, Stamholmen 93, DK-2650 Hvidovre, Copenhagen, DENMARK
AlfaLaval Separation Inc., 955 Mearns Rd., Warminster, PA 18974
Beird Industries Inc., P.O. Box 31115, Shreveport LA 71130
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Exstar International, 6502 Windmill Way, Wilmington, NC 28405
Matrix Desalination, Inc., 3295 SW 11th Avenue, Fort Lauderdale, FL 33315
Sea Recovery Corp., P.O. Box 2560, Gardena, CA 90247-0560

WEATHER CHART RECORDERS

Alden Electronics, 40 Washington St., Westborough, MA 01581

WELDING

American Danwell 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
Jeamar Winches Ltd., 53 Maple Ave., Richmond Hill, Ontario L4C 6P3, CANADA
MMC International, 60 Imp Dr., Inwood NY 11696
Markey Machinery Co., 79 South Horton St., Seattle, WA 98134
Nordic Machine Manufacturing, 4700 Ballard Ave., NW, Seattle, WA 98107
Smith Berger Marine Inc., 516 S. Chicago St., Seattle, WA 98108

WINDOWS—Windshield Wipers

GEC-Marcos Electronic Systems Corp., 550 S. Fulton Ave., Mt. Vernon, NY 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 **MARTIME 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 program in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and no assumes no responsibility for errors. If you are interest in having your company listed in this Buyers Directory Section, contact John C. O'Malley at (212) 477-6700.

ABRASIVES

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Stan-Blast Abrasives, P.O. Box 968, 3300 River Road, Hawley, LA 70059

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
York Int'l, P.O. Box 1592-0836, York, PA 17405

BALLAST

Chesapeake Specialty Products, 5055 Northport Blvd., Baltimore, MD 21219
Genstar Stone Products, Executive Plaza IV, Hunt Valley, MD 21031
Mineral Research & Recovery Inc., 4565 S. Palo Verde, Ste 203, Tucson AZ 85714
Queen City Iron & Steel, P.O. Box 7205, Charlotte, NC 28241-7205

BARGE BUILDING

Conrad Industries, P.O. Box 790, Morgan City LA 70381

BARGE—Leasing

McDonough Marine Service, 2300 Surekote Road, New Orleans, LA 70117
Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

BASKET STRAINERS

Beard Industries, P.O. Box 31115, Shreveport, LA 71130

BEARING—Rubber, Metallic, Non-Metallic

B.F. Goodrich, Engineered Polymer Products, 150 Division Dr., Wilmington, NC 28401
B.F. Goodrich, Marine Products Group, 6061 B.F. Goodrich Boulevard, Jacksonville, FL 32226
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 1616, Waukesha WI 53187

BOILER CLEANING

Thomas C. Wilson, 21-11 44th Ave., Ste. 1, Long Island City, NY 11101

BOILER—Manufacturers

Aalborg Ciseri (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
Diversified Marine Brokerage, 1201 Northern Blvd., Manhasset, NY 11030
Jack Faulstich, 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 ACCESSORIES

Morgan Crane Company, Inc., 1300 Normandy Place, Santa Ana, CA 92705

CHAIN

Baldt, Inc., 6 M. Butler St., Chester, PA 19013
Crandall Dry Dock Engineers Inc./Mart Chain, 21 Pottery Lane, Dedham MA 02026
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020
G.J. Wortelboer Jr. B.V., Postbus 5003, 3008 AA Rotterdam, NETHERLANDS

CHEMICAL CLEANERS

Chemical Cleaning & 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 48150

COMPACTORS

International Compactor, Inc., P.O. Box 5918, Hilton Head, SC 29938
A/S Vesta, Skudehavsvvej 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
Standard Refrigeration Co., 2050 N. Ruby, Melrose Park, IL 60160
Wright Austin Co., 3250 Franklin St., Detroit MI 48207

CONTROL SYSTEM—Monitoring

Astronica Marine USA, 234 Industrial Parkway, Northvale, NJ 07647
Henschel, Inc., 9 Hoyt Drive, Newburyport MA 01950
IMO Industries, Gems Sensors Division, One Cowles Rd., Plainville CT 06062
Lynso-Vaimet Marine A/S, P.O. Box 130, N-3430 Spikkestad, NORWAY
MMC International, 60 Insp Dr, Inwood NY 11696
NAMCO Controls, 7567 Tyler Blvd., Mentor OH 44060
Norcontrol A/S, P.O. Box 1024, N-3191 Horten, NORWAY
Robertson Marine Systems, 3000 Kingman St., Suite 207, Metairie, LA 70006
Robertson-Shipmate, 400 Oser Avenue, Hauppauge, NY 11788
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406

CRANE—HOIST—DERRICK—WHIRLEYS

The Crosby Group, Inc., P.O. Box 3128, Tulsa OK 74101
Del Gaudio Marine Hydraulics Inc., 619 Industrial Rd., Carlstadt, NJ 07072
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 Company, Inc., 1300 Normandy Place, Santa Ana, CA 92705
J.D. Neuhaus Hebezeug GmbH, D-5810 Witten, GERMANY
Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883
Reco Crane Co., 5734 Jefferson Highway, 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, FRANCE

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
Markey Machinery Co., Inc., P.O. Box 24788, Seattle, WA 98124-0788
Morgan Crane Company, Inc., 1300 Normandy Place, Santa Ana, CA 92705
McEroy Machine & Mfg. Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454
Seattle Crane & Equipment Co., Inc., 4403 20th Street East, Fife, WA 98424
Willem Pot b.v., P.O. Box 29102, 3001 GC Rotterdam, The Netherlands

DECKS

Boatfile, 205 Sweet Hollow Road, Old Bethpage, NY 11804

DEHUMIDIFIERS

L&C Associates, 216 Lafayette Rd., North Hampton NH 03862

DIESEL ACCESSORIES

Coltec Industries Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Diesel America Inc., 5217 River Rd., New Orleans LA 70123
Gearhardt's Inc., P.O. Box 10161, Jefferson, LA 70181
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
Pow-R-Quik, 5518 Mitchelldale, Houston, TX 77092

DIESEL ENGINE—Spare Parts & Repair

Aalborg Ciseri (Miami) Inc., 1539 SW 21st Avenue, Ft. Lauderdale, FL 33312
Coltec Industries, Parts & Service Div., 701 Lawton Ave., Beloit, WI 53511
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
Global Maritime Services, 247 SW 33 Court, Ft. Lauderdale, FL 33315
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
KHD Canada, Inc., 4420 Garand, Vile St. Laurent, Quebec, CANADA H4R 2A3
Kin Holstart Mig Co., E 5724 Broadway Ave, P.O. Box 42, Spokane WA 99210
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1, 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, GERMANY
Pacific Rim Diesel, 3842 W. Marginal Way SW, Seattle, WA 98106
Paxman Diesels, P.O. Box 8, Paxman Works, Colchester, Essex, CO1 2HW, ENGLAND
Paxman Diesels USA, (A Div. of Ruston Gas Turbines, Inc.), 15950 Park Row, Houston, TX 77084
S.E.M.T. Pielstick, 2 Quai de Seine, Saint Denis, Paris, FRANCE 93203
Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166

DIVING & SALVAGE

H.J. Merrhuie, P.O. Box 23123, New Orleans LA 70183
Muldoon Marine Services, Inc., P.O. Box 3221, Terminal Island, CA 90731
Sea Side Diving, 28612 Harper Ave., St. Clair Shores, MI 48081

DRY DOCKS—Design

Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381
Marine Design Services, P.O. Box 928, Brea CA 92602
MAN GHF Sterkrade, P.O. B. 110240, D-4200 Oberhausen 11, GERMANY

ELECTRICAL EQUIPMENT

L. F. Gaubert & Co., Inc., P.O. Box 50500, New Orleans LA 70150
MMC International, 60 Insp Dr, Inwood NY 11696
P.J. Pfeiffer Marine/Radio Research Instrument Co., 584 N. Main St., Waterbury, CT 06704-3506

ELECTRONIC DISPLAY

Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY

ELECTRONIC ENCLOSURES

ADI Manufacturing, 14131 Franklin Ave., Tustin CA 92680

ELECTRONIC INFORMATION SUPPORT

Inventory Locator Service, 3965 Mendenhall Rd. 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

EPIRBS

Alden Electronics, 40 Washington St., Westborough, MA 01581
Litton Special Devices, 750 W. Sprout Road, Springfield, PA 19064

EQUIPMENT—Marine

Tomer, Inc., 1172 Camp St., New Orleans, LA 70130
Gladsky Marine, Garves Point Rd., Glen Cove, NY 11542
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
Ovako Steel Inc., P.O. Box 745, Avon, CT 06001

EVAPORATORS

Alfa-Laval, Desalt A/S, Stannholmen 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

FANS-VENTILATORS-BLOWERS

Carling Turbine Blower Co., 10 Nebraska St., P.O. Box 88, Worcester, MA 01613
Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA 94402

FASTENERS

Jamestown Distributors, 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02635
Non-Ferrous Bolt & Mfg. Co., 4085 Nevus Dr., Suite C, Las Vegas, NV 89103

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, Conveyors & Caster Corp., 3501 Detroit Ave., Cleveland, OH 44113
Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook, VA 22624

Solidir Plastics Co., 200 Industrial Dr., Delmont, PA 15626

Standard Refrigeration Co., 2050 N. Ruby, Melrose Park, IL 60160

Ultra Poly Inc., 2926 South Steele, Tacoma, WA 98409

Viking Fender Co., 50 Church Street, Sea Cove, NJ 07760

FUEL ADDITIVES, CONDITIONING

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
McEroy 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 Oscola Blvd., Vero Beach, FL 32966
Sea Systems Inc., 65 Avco Road, Ward Hill, MA 01835
Westmont Industries, 10805 Painter Ave., Santa Fe Springs, CA 90670
Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

HEAT EXCHANGERS

Alfa-Laval, Desalt A/S, Stannholmen 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

Thomas C. Wilson, Inc., 21-11 44th Avenue, Long Island City, NY 11101

HORNS/WHISTLES

Kahlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241

HOSE

HBD Industries, Inc., 1801 S. Railroad Street, Salisbury, NC 28145-0948

HYDRAULICS

Aeroquip Corporation, 3000 Strayer, P.O. Box 631, Maumee, OH 43537-0631
Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken NJ 07030
Del Gaudio Marine Hydraulics Inc., 619 Industrial Rd., Carlstadt, NJ 07072

INCINERATORS

Teamtec A/S, P.O. Box 100, N-4912 Gjevning, 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
JOINER—Watertight Door—Paneling—Ceiling System—Decking
Cupples Products, 2650 S. Hanley Rd., St. Louis, MO 63144
GEO-Marconi Electronic Systems Corp., 550 S. Fulton Avenue, Mount Vernon, NY 10550

MAC AB, Bergs Alle 1, S-252 55 Helsingborg, SWEDEN

U.S. Rep: Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031
Walz & Krenzer Inc., 1390 M. Read Blvd., Rochester NY 14606

KEEL COOLERS

R.W. Fernstrom & 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., Ste 350, 2701 First Ave., Seattle, WA 98121

LIFEBOATS/RAFTS

Zodiac of North America, P.O. Box 400, Stevensville, MD 21666

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights

Archway Marine Lighting, 4501 Swan Ave., St. Louis, MO 63110
Carlisle & Finch, 4562 W. Mitchell Ave., Cincinnati OH 45232
The L.C. Doane Co., P.O. Box 975, Essex, CT 06425
Nautilus Equipment Ltd., P.O. Box 66, Station M, Halifax, Nova Scotia B3J 2L4, CANADA

Phoenix Products, 6161 N 64th St., Milwaukee WI 53218

LINE BLINDS

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 Gaudio, 619 Industrial Rd., Carlstadt, NJ 07072
Global Maritime Services, 247 SW 33 Court, Ft. Lauderdale, FL 33315
Golten Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231

MACHINING—On Site Repair

Global Maritime Services, 247 SW 33 Court, Ft. Lauderdale, FL 33315

MARINE ACCOMMODATIONS

Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980

MARINE FURNITURE

Wilson & Hayes, 1601 Eastlake Avenue, East, Seattle, WA 98102

METAL PRODUCTS

Williams & Co., Inc., 901 Pennsylvania Avenue, Pittsburgh, PA 15233-1495
Jamestown Metal Marine Sales, Inc., 4710 N.W. Second Ave., Boca Raton, FL 33431

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS

American Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
Aero Nav Laboratories, Inc., 1429 112 St., College Point, NY 11356
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

Chid's 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 Hwy, Ste. 3000, Arlington, VA 22202
Diversified Technologies, 812 Live Oak Dr., Chesapeake VA 23320
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706

Fisher Maritime Transportation Counselors, Inc., 71 Valley Street, South Orange, NJ 07079

GHM Inc. (Industrial Measurement Consultants), P.O. Box 1836, Newport News, VA 23601
Gibbs & Cox, Inc., 50 West 23rd Street, New York, NY 10010
The Glosten Associates Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104

Morris Guralnick Associates, Inc., 130 Sutter Street, Suite 400, San Francisco, CA 94104

C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110
Hydrocomp, Inc., 45 James Farm Lee, P.O. Box 865, Durham, NH 03824
JRH Inc., No. 4 Executive Campus, Culbert Blvd. & Route 70, P.O. Box 5031, Cherry Hill, NJ 08034

R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073

James S. Krogan, 1515 NW 7th St., Suite 124, Miami, FL 33125
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
McEroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
John J. McMullen Associates, Inc., 1 World Trade Center, Suite 3000, New York, NY 10048

MacPherson Maritime Services, 141 Jefferson Ave., Westfield NJ 07090

Fendall Marbury, 9 Neal Street, Annapolis MD 21401
Marine Design & Operations, Inc., 226 Chestnut St., Roselle Park, NJ 07204
Marine Management Systems Inc., 102 Hamilton Ave., Stamford CT 06902
Marine Power Associates, 1010 Turquois St., Ste 217, San Diego, CA 92109

Maritech, Sealcliff Bay Road, Newmarket, NH 03857
Maritime Design, Inc., 3020 Hartley Rd., Jacksonville, FL 32257
R.J. Melluso & 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
Olsen Marine Surveyors Co., P.O. Box 283, Port Jefferson, NY 11777
Omega Marine Engineering Systems, Inc., 11757 Katy Freeway, Ste 1100, Houston TX 77079
QED Systems Inc., 4646 Wiltchuck 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 965, Essex, CT 06426; 17 Battery Pl., New York, NY 10004; P.O. Box 205, Solomons MD 20688; 2 Skyline Pl., 5203 Leesburg Pike, Suite 700, Falls Church VA 22041; 1305 Franklin St., Suite 210, Oakland, CA 94612
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
AT&T, High Seas Dept., 412 Kemble Ave., Room C380, Morristown, NJ 07960
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
Hose McCain, 9 Smith Street, Englewood, NJ 07631
IBB Aero-Nautical Communications, 15200 Omega Dr., Rockville, MD 20850-3240
Kevin Hughes Ltd., New North Rd., Hamault, Bedford, Essex, 166 2UR ENGLAND
Mackay Communications, 441 US Highway #1, P.O. Box 331, Elizabeth NJ 07207
Maxon, South Boundary St., P.O. Box 69, Tell City, IN 47586
Mobile Telesystems, Inc., 300 Professional Drive, Gaithersburg, MD 20879
Naval Electronics, 5417 Jetview Circle, Tampa FL 33634
Norwegian Telecom, P.O. Box 6701, Oslo 1, NORWAY
Robertson Marine Systems, 3000 Kingman Street, Suite 207, Metairie, LA 70006
SPD Technologies, 13500 Roosevelt Blvd., Philadelphia, PA 19116
S.P. Radio A/S, DK-9200, Aalborg SV, DENMARK
Simrad, 620 Northwest Bright Street, Seattle, WA 98107
Singapore Telecom, Orchard Point Post Office, P.O. Box 38, SINGAPORE 9123
Sperry Marine Inc., 1070 Semcoe Trail, Charlottesville VA 22901
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Trimble Navigation, 585 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94086
Waterway Communications System, Inc., 453 E. Park Pl., Jeffersonville, IN 47130

NOZZLES
Nautican Enterprises Ltd., 407 Mountain Highway, North Vancouver, B.C. V7J 2L1

OL—Marine—Additives
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, Florham Park NJ 07932, P.O. Box 4706, Houston, TX 77210-4706
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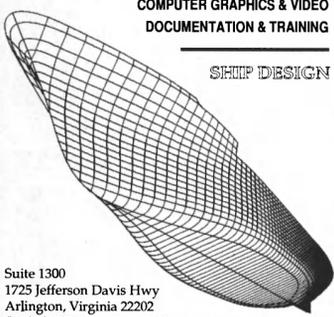
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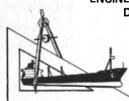
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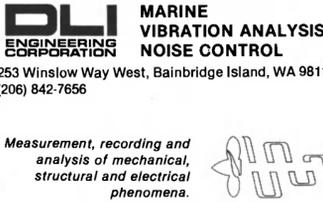
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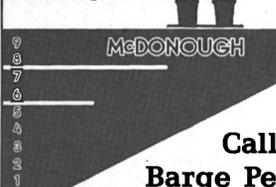
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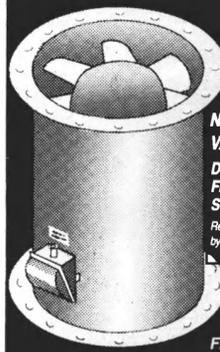
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Westmont Industries Delivers 1st Of 5 Barge Cranes To Mayport Naval Station



The 100-foot-long barge crane recently delivered to Mayport Naval Station by Westmont Industries.

Westmont Industries, San Fe Spring (Los Angeles), Calif., has delivered its first 100-long-ton barge crane YD-246 to Mayport Naval Station near Jacksonville, Fla., under contract N62472-87-C-1455 with the U.S. Navy to engineer, fabricate, assemble, test and deliver five 100-long-ton floating cranes. The cranes are to be used at various naval activities, with four cranes to be located on the East Coast and the other crane on the West Coast.

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

The crane is diesel-powered, fully revolving, with a luffing boom and three independent hook hoists. The main hoist has a rated main hoist capacity of 100 long tons at an 80-foot radius, an auxiliary hoist capacity of 38,000 pounds and a whip hoist capacity of 10,000 pounds.

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Intermarine USA To Build Third Fiberglass Minehunter For U.S. Navy

A third contract to build a reinforced fiberglass modified Lerici class minehunter has been awarded by the U.S. Navy to Intermarine USA of Savannah, Ga. Intermarine USA is a subsidiary of Montecatini, part of the Ferruzzi-Montedison Group. The new minehunter is expected to be completed in 1994.

The first minehunter built for the U.S. Navy at Intermarine's Savannah shipyard, the Osprey, was launched (for details, see page 50 of this issue).

The vessel, which is about 187 feet long and weighs 880 metric tons, has a single-piece flexible fiberglass keel capable of withstanding a close mine explosion. It is also equipped with sophisticated technology to locate mines with sonar and neutralize them via a remotely controlled underwater robot.

A second minehunter of the same class is currently under construc-

tion in Intermarine's Savannah shipyard. This second ship, to be named Heron, is scheduled to be launched in December.

Lerici class minehunters produced by Intermarine S.p.A. are used by the Italian navy as well as by the navies of three non-European countries.

Intermarine USA is wholly owned by Intermarine S.p.A., a subsidiary of Montecatini (Part of the Ferruzzi-Montedison Group).

Systems Engineering Announces Promotions

Systems Engineering Associates (SEA) Company recently announced the following employee promotions and transfers within the finance and accounting department.

Joseph W. Ritzel has been promoted to vice president, finance and accounting for Day & Zimmermann, Inc. (DZI), SEA's parent company, located in center-city Philadelphia. He will be responsible for Payroll, Accounts Receivable, Billing, and Government Reporting, among other areas, for the newly consolidated DZI finance and accounting organization.

Mr. Ritzel joined the DZI organization in 1983, and most recently served as senior vice president, finance for SEA.

Thomas O'Shea, currently controller for Seacor, a SEA company, will be promoted to vice president, finance for SEA, with overall financial planning responsibility for the three SEA companies in conjunction with the company presidents. He will be responsible for consolidation of financial statements, interface with DZI, and profitability analyses. In his new position he will report directly to **Jack Apperson**, chairman/CEO of SEA.

John Park, who most recently served as controller for Aquidneck Data Company (ADC), part of the SEA family of companies, has been promoted to Seacor controller, reporting to **Jon Groff**, Seacor president. He will assume responsibility for Seacor's accounting department. Before joining ADC in 1990, Mr. Park spent four years as tax manager with DZI.

Kvaerner Eureka Cargo Pumps Specified For Two North Sea Tankers

Kvaerner Eureka cargo pumps have been specified for two 91,000-dwt North Sea shuttle tankers recently contracted by Finland's state oil company Neste Oy, from domestic shipbuilder Masa Yards.

This contract is a significant one for Kvaerner Eureka as it breaks

new ground in the use of the company's cargo discharge systems, as well as continuing the boom in orders for its cargo pumping systems.

The cargo discharge solution for the Neste shuttle tankers is a departure from the norm for Kvaerner Eureka. After a great deal of technical discussion and development, Neste decided on a Kvaerner Eureka centrifugal, deep-well, cargo pump system.

Each vessel will be fitted with seven deep-well, submerged centrifugal cargo pumps, all driven by frequency-controlled electric motors.

Instrumental in Neste's decision in specifying the Kvaerner Eureka system was overall economics and environmental awareness.

The unloading system for both Neste North Sea shuttle tankers has been developed by Kvaerner in cooperation with EB Industry & Offshore. The two tankers will be delivered by Masa Yards in 1991/92.

Kvaerner Eureka scored a significant increase in pump orders for the 1990 year—45 percent up on 1989.

For more information and free literature on Kvaerner Eureka,

Circle 99 on Reader Service Card

C-MAP/USA Named National Distributor For SeaPlot Software

In a move to provide customers with a new medium for displaying its electronic charts, C-MAP/USA has announced that it has become a national distributor for SeaPlot software, an integrated navigation and charting software package that allows users to display C-MAP charts on their IBM-compatible computers, according to **Kenneth Cirillo**, operations manager of C-MAP/USA.

SeaPlot displays C-MAP charts in full color—the charts' depth contours can even be color-coded. As the user zooms in or out, or pans left or right, SeaPlot automatically displays the chart that features the best coverage of the area. SeaPlot also supports infinite levels of magnification; users are not restricted to four or five predefined levels. Chart information such as depth contours, restricted areas, and chart labels can be turned on or off depending on how much detail the user wants.

Other features of SeaPlot software include sophisticated route planning capabilities for setting and saving waypoints; a unique depth sounder interface for displaying and saving color-coded depth points; an Event Log that can be edited and printed; and an autopilot interface.

SeaPlot software is designed and manufactured by OceanTech, a division of Seattle-based BioSonics, Inc., that has been selling its computer-based SeaPlot integrated navigation and charting systems to the commercial fishing market for

five years.

For further information and free literature on SeaPlot software, Circle 38 on Reader Service Card

Aqua Signal Offers Free Literature On Electronic Ballasts

Aqua Signal, Batavia, Ill., manufacturer of marine lighting and electronics, is offering free literature on electronic ballasts which work in the high frequency range and, according to Aqua Signal, are the modern alternative to the conventional core ballasts for fluorescent lamps.

These systems are remarkable because of low energy consumption expense. The Aqua Signal systems reduce costs, increase lighting quality and improve comfort by light-controlling and automatic cut-out. Light efficiency can be increased with higher operating frequency and constant power by about 10 percent.

Aqua Signal also offers electronic ballasts for light controlling. Light control units can be dimmed down to 3 percent. Light controlling helps to save energy with the right illumination for any case or need. The Aqua Signal units are qualified for dimming of several or all lamps of an illumination system, even when there are light sources of different technics. Because of the different intensity of daylight and different demands of light, a saving potential of up to 60 percent is possible.

For further information and free literature from Aqua Signal,

Circle 7 on Reader Service Card

J F Instruments Offers Brochure On Calibrators And Engine Rooms

The demand for test and calibration of temperature and pressure sensors is increasing more and more due to requests for improved utility rate of marine engines in the commercial, naval and offshore areas.

J F Instruments, Denmark, has published a free brochure on the company's complete line of portable low-weight calibrators.

Included in the publication, with photographs and descriptive text, are one temperature calibrator, ranging from ambient to 600 degrees C/1,112 degrees F, and two pressure calibrators, ranging from vacuum to 135 bar/1,958 psi.

According to the company, the instruments are fast, easy and safe, approved by DnV and supplied with a test certificate. J F Instruments supplies and services the marine market in most major ports worldwide.

For more information and a free copy of the brochure from J F Instruments,

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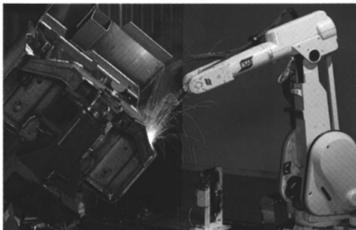
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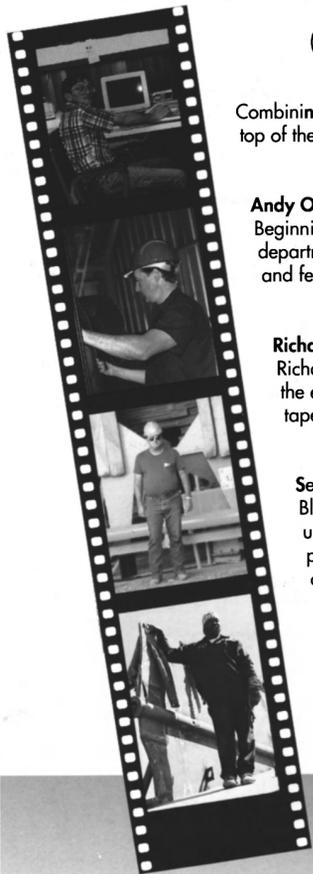
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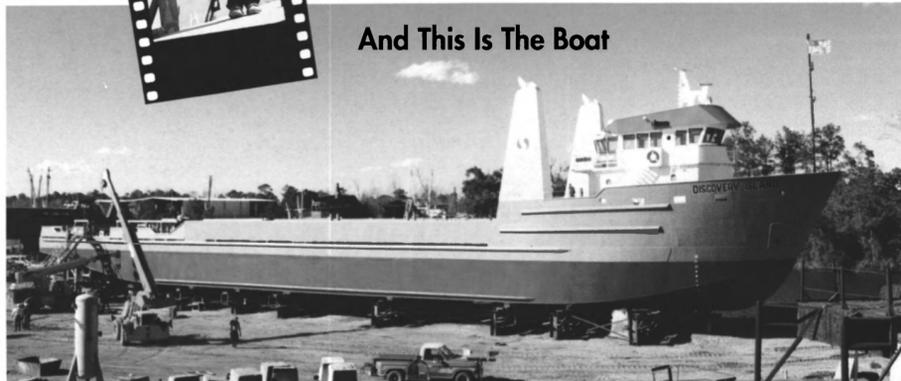
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