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1995 WORLD YEARBOOK



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IN THIS ISSUE

Always a global industry, the shipbuilding market has perhaps become even more international in recent years with the advent of strategic alliances among shipyards, equipment suppliers and shipping companies. A number of key issues — economic, technical and social — combine to create a dynamic and ever-evolving industry. Terms such as “aging fleet” and “fleet replenishment”, which some may pass off as industry jargon, are in fact the cornerstones to an approaching business boom in the commercial shipbuilding sector which will result in a newer, safer and more cost-effective world fleet. This issue of *Maritime Reporter & Engineering News* is filled with data, statistics and projections to help industry executives partake in this bright future. — ed.

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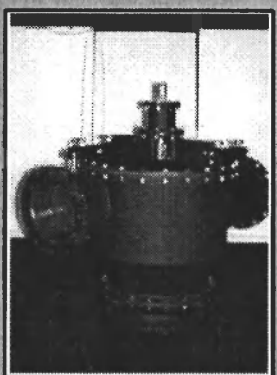
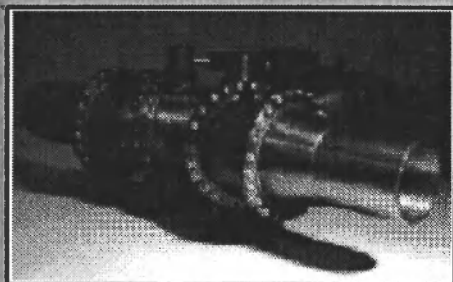
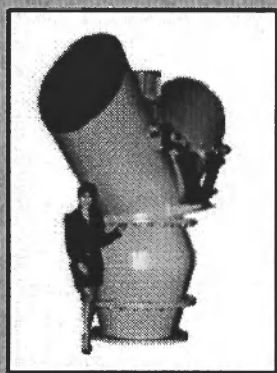
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GE Marine Systems, Sperry To Cooperate On Systems Marketing

Bruce Matthias, manager of GE Marine Systems & Services, and **J. Nolasco DaCunha**, Sperry Marine vice president for Sales and Service, have jointly announced that GE Marine Systems in New Orleans, La., and Sperry Marine of Charlottesville, Va. have entered into a non-exclusive cooperative agreement to market and sell GE's Machinery

Centralized Control System (MCCS) in conjunction with Sperry Marine's Vision 2100 Integrated Bridge System. These systems will provide substantial benefits to both shipyard and owner by providing a compatible link between bridge and engine room.

The two companies plan to take advantage of Sperry Marine's ad-

vanced ISO 9001 registered manufacturing and test capabilities in its Charlottesville headquartered factory, as well as the companies' respective service networks.

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For more information on Sperry
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MarAd News

TITLE XI

Van Ommeren Seeks Guarantees For \$203 M:

MarAd has received an application from Van Ommeren Tankers, (USA) L.L.C., Stamford, Conn., for

a Title XI guarantee to aid in financing the construction of five Double Eagle product tankers. The proposed builder of the vessels is Newport News Shipbuilding, Newport News, Va. Delivery dates have not yet been determined. The estimated guarantee amount is for \$203,875,000 of the

total estimated actual cost of \$233,725,000. Construction period financing would be covered between June 1995 and December 1998, and mortgage period financing would be covered from December 1997 through December 2023 (see related story on page 59 of this issue).

proposed builder of the tankers is Alabama Shipyard, Inc., Mobile, Ala. The total estimated guarantee amount is \$70,448,400 of the estimated actual cost of \$80,512,400, with a loan term of 25 years from delivery of each vessel plus construction period. The delivery dates of the vessels have not yet been determined.

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American Tankships Asks For Title XI Guarantees On Product Tankers:

MarAd has received an application from American Marine Tankships, Inc., Bethesda, Md., for a Title XI guarantee to aid in financing up to six product tankers and conversion of the tanker *M/V Marine Princess*. All would operate in the U.S. domestic trade. The proposed builder of the product tankers is Newport News Shipbuilding, Newport News, Va. The shipyard for the tanker conversion has not yet been named. The total estimated guarantee amount is \$274,864,000 of the estimated actual cost of \$314,130,000. For the newbuildings, the loan term would be 25 years from delivery of each vessel plus the construction period. For the conversion, the term would be 20 years plus the construction period. The delivery dates of the vessels have not yet been determined.

Financing In Place For Conversions At Avondale:

Financing is now in place for the construction of the first U.S.-flag tankers to be built to standards set by the Oil Pollution Act of 1990, MarAd announced. With the assistance of MarAd's Title XI federal ship financing program, four tankers will be constructed for American Heavy Lift Shipping Company, New Orleans, by Avondale Industries, Inc.

The vessels will be the first U.S.-flag tankers constructed for the domestic trades in more than 10 years. They will be the first in domestic service and will comply fully with all domestic and international environmental requirements.

"This project represents a tremendous vote of confidence by American Heavy Lift and Avondale in the domestic U.S.-flag fleet," Maritime Administrator **Albert J. Herberger** said. "It is made possible by the Administration's continued support of the Jones Act."

Mr. Herberger said the deal also demonstrates that the American oil transportation industry can and will act to comply with OPA 90 requirements. The total value of the project is about \$160 million. Of that, \$139 million is guaranteed under the Title XI program.

Dannebrog Rederi Seeks Guarantees For \$70.4 M:

MarAd has received an application from Dannebrog Rederi AS, Denmark, for a Title XI guarantee to aid in financing three double-hulled, 16,000-dwt tankers. All would operate in the international trade. The

Permission Sought

Sanco Asks To Sell Oil Platform:

MarAd has received a request filed by Sanco International, Inc., Brownsville, Texas, to sell the 10,046-gt oil platform Ocean Traveler. The proposed purchaser is Sociedad Industrial de Productos Siderurgicos S.A. of Colombia. The platform was built in 1966 in New Orleans. If approved, the platform would be scrapped in Cartagena, Colombia. MarAd's permission is required under section 9 of the Shipping Act, 1916, as amended.

Seadrill 88 Asks To Sell Mobile Drilling Unit:

MarAd has received an application from Seadrill 88, Inc., Houston, Texas, for permission to sell the mobile drilling unit *Glomar Main Pass III* and transfer it to Liberian registry. The proposed purchaser is Dual Holding Inc., Wilmington, Del. The 1982-built unit would be used for oil and gas exploration and extraction. MarAd's permission is required under section 9 of the Shipping Act, 1916, as amended.

Western Overseas Wants To Sell Two Vessels For Scrap:

Western Overseas, Inc., Sylvania, Ohio, has requested permission to sell the 14,260-dwt *John Lykes* and the 14,286-dwt *Ashley Lykes* for scrapping in India. The proposed purchasers of the vessels are Sanjay Steel Corp., and Gupta Steel, both of India. The vessels were built in 1960 in Pascagoula, Miss., and in 1963 in Sparrows Point, Md.

Neptune Wants To Sell Cargo Vessel For Scrap:

Neptune International, Inc., Elk Grove Village, Ill., has asked permission to sell the 10,723-gt cargo vessel *Genevieve Lykes* to Neter Navigation, S.A., of Singapore. The vessel was built in 1968 in Avondale, La. If approved, the vessel would be scrapped in Alang, India.

Shano Intl. Asks To Sell Fred G For Scrap:

Shano International Inc., Great Falls, Va., has asked permission to

sell the 14,530-dwt cargo vessel *Fred G* for scrapping in Alang, India. The proposed purchaser is Nicksons Exports Pvt. Ltd., of India. The vessel was built in 1960 in Pascagoula, Miss.

Permission Granted

Navieras Given MarAd OK On Carolina Request:

MarAd has granted a request filed by Navieras NPR, Inc. for temporary written consent under section 506 of the Merchant Marine Act, 1936, as amended, to operate the Lancer-class vessel *Carolina* temporarily in the domestic trade for one voyage. The vessel was built with the aid of construction-differential subsidy. In approving the request, the agency noted that NPR's competitors — Sea-Land Service, Inc.; Marine Transportation Services Sea Barge Group, Inc.; Allen Freight Trailer Barge, Inc.; and Trailer Marine Transport Corp. — did not object to the application.

Reciprocal Slot Exchange OK'd:

MarAd has approved a request filed by American President Lines (APL) to participate in a reciprocal slot exchange and coordinated sailing agreement between APL, Orient Overseas Container Lines Inc. (OOCL), and Mitsui O.S.K. Lines, Ltd. (MOL). APL is currently a party to a reciprocal slot exchange and coordinated sailing agreement, as well as a master slot charter agreement, both between APL and OOCL.

APL has been operating under those agreements in the trans-Pacific trade since 1991. The new agreements replace similar agreements between APL and OOCL, adding one new partner — MOL — and increasing the number of line haul strings from five to six. The geographic scope of the requested waiver includes all U.S. Pacific coast ports and Asia, from Japan as far east as Singapore and Malaysia.

Notice of the application, assigned docket S-918, was published in the Federal Register on February 23, 1995. Comments were filed by the seafarers' International Union of North America, Pacific District, on behalf of the memberships of the Marine Firemen's Union, Sailors' Union of the Pacific, and Seafarers International Union AGLIWD (SIU-). No comments were received on any U.S.-flag ship operating company.

MarAd OKs Lykes' Space Charter Request:

MarAd has approved a request by Lykes Bros. Steamship Lines (LBSL) to participate under section 506 of the Merchant Marine Act, 1936, as amended, in a reciprocal slot charter, sailing, and cooperating agreement with Evergreen Marine Corp., in the U.S. commerce. Section 804 prohibits subsidized U.S.-flag operators from operating foreign-flag vessels which com-

pete with essential U.S.-flag shipping services unless the Secretary of Transportation waives the provision of this section for a specific period of time. According to Lykes, the agreement covers the trade between the U.S. Gulf, East and West coasts and North Europe. Lykes also noted that the agreement is intended to permit Lykes to achieve better utilization of the vessels committed to North Atlantic services by estab-

lishing a course of slot chartering business with Evergreen. Through the use of slots on Evergreen's vessels, Lykes will be able to offer shippers broader, more responsive service without any additional capital outlay. Notice of the application, assigned docket S-919, was published in the *Federal Register* on March 27, 1995, with a closing date for comments of April 10. No comments were received.

Marmac Receives Approval To Sell Barge:

Marmac Corp., New Orleans, has received approval to sell the 1,920-gt barge *Marmac 2* to Strait Cross Joint Venture, a venture composed of Strait Crossing Inc.; GTMI (Canada) Inc.; Northern Construction Company Limited; and Ballast Nedam Canada Limited. The barge was built in 1977 and will be transferred to Canadian registry. MarAd's

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approval is required under section 9 of the Shipping Act, 1916, as amended.

Lykes Given OK To Use Foreign-Flag Ships For Time-Sensitive Cargo:

MarAd has given Lykes Bros. Steamship Co., Inc., permission to load a maximum of 45 commuter railcar shells on foreign-flag ships in Lisbon, Portugal, for transport

to Baltimore, Md., when Lykes' U.S.-flag vessels are not in position. Farrell Lines Inc. and Sea-Land Service, Inc., the U.S.-flag lines which provide direct service to the Mediterranean, advised MarAd that they do not object to Lykes' use of foreign-flag ships for such movements of this time-sensitive cargo. Farrell, however, wishes to be advised each time such a movement is anticipated. MarAd's approval is in the form of a

continuing-as-needed waiver of section 804(a) of the Merchant Marine Act of 1936, as amended. Section 804 precludes subsidized U.S.-flag operators or their affiliates from operating foreign-flag vessels which compete with essential U.S.-flag shipping services unless the Secretary of Transportation waives the provision of this section for a specific period. The approved waiver is effective through June 30, 1996.

Arctic King Fisheries To Sell Fishing Vessel:

Arctic King Fisheries, Inc., Seattle, Wash., has received approval to sell the fishing vessel *Arctic Trawler* to Kamchtrybprom, a Russian corporation. The vessel will be transferred to Belize registry.

Diamond Offshore OK'd To Transfer Registries

Diamond Offshore General Co., Houston, Texas, has received approval to transfer the 5,829-gt mobile offshore drilling unit *Ocean Epoch* and the 5,875-gt unit *Ocean General* to Panamanian registry, without change in ownership. The *Ocean Epoch* was built in 1977, and the *Ocean General* in 1976, both in Mobile, Ala.

Nabors OK'd To Transfer Jack-Up Drilling Platform:

MarAd has given approval Nabors International, Inc., Houston, Texas, to transfer the 2,826-gt jack-up drilling platform *Ocean Master VIII*, to Liberian registry, without change in ownership. MarAd's approval is required under section 9 of the Shipping Act, 1916, as amended.

Other MarAd News

Final Rule Amends Cargo Preference Regs:

MarAd has issued a final rule which amends its cargo preference regulations, and provides Great Lakes ports an opportunity to compete for government-generated agricultural commodity cargoes during an entire season trial period. The trial period coincides with the current Great Lakes shipping season, while the St. Lawrence Seaway system is in use. (On August 8, 1994, MarAd published a final rule in the *Federal Register* which provided for a trial period for the remainder of the 1994 shipping season, but no such shipments occurred.) During the current shipping season, MarAd will allow agricultural commodity preference cargoes to be loaded initially on foreign-flag vessels at U.S. Great Lakes ports for the trip along the St. Lawrence Seaway. The cargoes will then be transferred to U.S.-flag ships for the ocean portion of the trip to foreign destinations. A final rule designated docket R-153, has been published in the *Federal Register*. The contact for additional information about the rule is **John Graykowski**, Deputy Maritime Administrator for Inland Waterways and Great Lakes, Room 7206, 7th St. SW, Washington, D.C. 20541; tel: (202) 366-1718.

MarAd Releases 1995 Merchant Marine Employment Guides:

MarAd has released the 1995 editions of *Maritime Labor-Management Affiliations Guide*, and *Information Concerning Employment and Training in the U.S. Merchant Marine*. The *Guide* furnishes information


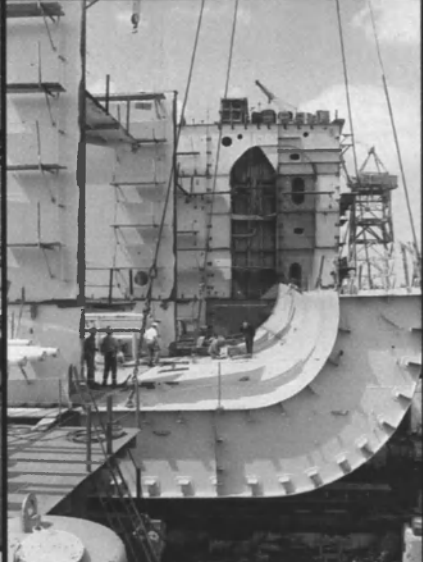

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ABS To Hold Free Type Approval Seminar

The American Bureau of Shipping (ABS) will host a free one-day seminar on the ABS Type Approval program in Houston, Texas, on July 18, 1995. This seminar will discuss the roles and advantages of third party product approvals, specifically the ABS Type Approval Program.

Speakers at the seminar will include representatives of ABS, NAVSEA, the USCG, shipyards, vessel owner/operators and current type-approved manufacturers. With a target audience of both the manufacturers and purchasers of marine equipment, this seminar will provide the opportunity to learn about the roles and advantages of product approvals in the marine industry.

For more information on this seminar, or to RSVP, please contact **Gerry Nielsen** of ABS America at tel: (713) 874-6483; fax: (713) 874-6398.

SEACOR Acquires Graham & Sons For \$74 M

SEACOR Holdings has signed a letter of intent to acquire substantially all the assets of John E. Graham & Sons and affiliated companies for \$74.3 million in cash, subject to adjustment. The transaction is conditional upon, among many other things, satisfactory completion of due diligence, execution of definitive documentation and receipt of all necessary governmental approvals. It is anticipated that the transaction will be consummated in the third quarter of 1995. SEACOR currently intends to finance the acquisition through a combination of borrowings and existing cash balances.

John E. Graham & Sons, Inc., based in Bayou La Batre, Ala., owns a fleet of 128 offshore vessels dedicated to serving the oil and gas industries in the U.S. Gulf of Mexico. The fleet includes 80 utility boats,

36 crewboats, seven supply vessels, and five mini-supply vessels. In addition to purchasing the marine equipment, SEACOR will also acquire industrial real estate, a shipyard, and nine vessel support bases located in Alabama, Louisiana and Texas. John E. Graham & Sons employs approximately 675 people. The selling partners, **Edgar, Glenn** and **Clark Graham**, will continue as advisors to the Graham operations.

Charles Fabrikant, chairman of SEACOR, said: "We look forward to carrying on the Graham family's tradition for excellent service. We intend to run this as a separate division and continue to operate the fleet using the Graham name and personnel. This acquisition consolidates SEACOR's position as a full-service provider of marine transportation to the offshore energy sector." He continued, "An additional benefit to this transac-

tion is the ability of our environmental oil spill response subsidiary, National Response Corporation (NRC), to use the Graham bases and to access a larger, more diversified pool of marine equipment and personnel on a priority basis. The acquisition will double NRC's response capabilities in the U.S. Gulf, which has the highest concentration of shipping and refining activity in the U.S."

For more information on SEACOR
Circle 141 on Reader Service Card



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AESA Yard Delivers Ferry *Volcan De Tauce*



The 393.7-ft. (120-m) ferry *Volcan de Tauce* was recently delivered to its owner, Naviera Armas, by the Barreras yard of Astilleros Espanoles SA (AESAs) in Vigo, Spain.

The vessel, which will carry a crew of 29 and a maximum of 250 passengers, achieved a trial speed of 18 knots. The ship's two main diesels drive a variable pitch propeller through two separate shaft lines.

Volcan de Tauce is classed by Bureau Veritas. Safety equipment includes fire detection and suppression systems, including sprinkler systems in the garage decks. The vessel is also equipped with a variety of deck and cargo-handling equipment.

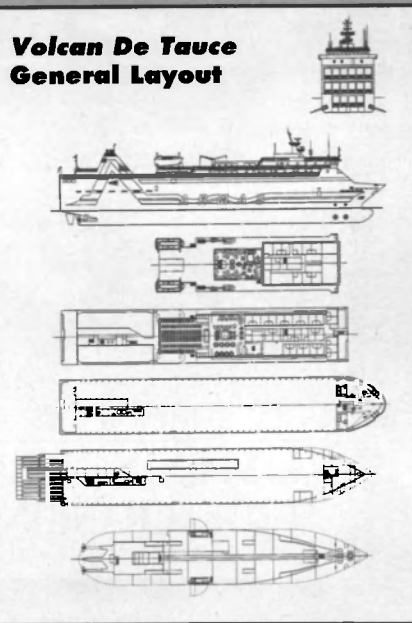
Significant automation and remote control is built into the vessel's systems, including control panels in the wheelhouse for fire detection, accommodation firescreen doors, hydraulically-driven watertight doors in the engine room, a sprinkler firefighting system in the accommodation sections, navigation signals and ventilation controls.

The vessel's suite of bridge elec-

tronics includes depth sounder, autopilot, ARPA radars, GMDSS system and two GPS satellite positioning receivers.

For more information on AESA
Circle 71 on Reader Service Card

**Volcan De Tauce
General Layout**



USA Catamarans Breaks Into RIB Market



USA Catamarans of Ft. Lauderdale, Fla., has broken into the RIB market with 33-ft. (10-m) and 41-ft. (12.5-m) versions of its Avenger class. The first USA Avenger 32.8-ft. (10-m) RIB is powered by a pair of Volvo diesels maintaining a speed of 50 mph in Sea State 3, while carrying a payload of 6,000 lbs. — all of this, reportedly, in dry comfort. Two 41-ft. (12.5-m) Avengers are due for delivery by this month. Powered by twin Caterpillar 3100 series and Avenger waterjets, the vessels are predicted to operate at 60-plus mph in Sea State 3 with a payload of 7,000 lbs.

For more information on USA Catamarans
Circle 78 on Reader Service Card

Fincantieri To Build Two Disney Cruise Ships



IT'S A DEAL! Disney Cruise Lines has signed a deal with Fincantieri to build its two new mega cruise ships.

Disney Cruise Lines has named Fincantieri of Trieste, Italy, as the shipyard that will build its two new mega cruise ships. The announcement was made by Disney Cruise Lines President **Art Rodney**.

The two ships, at 85,000 tons each, will reportedly each be larger than any cruise ship currently in operation. Each ship will accommodate 2,400 passengers.

Aside from the usual cruise ship amenities, these ships will be given children's areas that reflect popular Disney themes as an integral part of the decor, and will incorporate programming tailored by ages.

"Fincantieri is the premier shipbuilder in the world and I am delighted that we have reached an agreement with them to build our new ships," said Mr. **Rodney**. "Innovation will be the hallmark of our state-of-the-art ships. We will apply all the Disney excellence, originality, and magic to every aspect of the cruise experience just as we do our theme parks and resorts. The caliber of our Disney entertainment, shipboard programming activities, and levels of service will serve as a powerful attraction to both first-time and experienced cruise passengers."

Disney Cruise Lines will offer a one-week cruise vacation that will include a three- or four-day cruise and three or four days at the Walt Disney World Resort. Ports of call will include a stop at Disney's own private island where a full range of beach and aquatic programs will be featured.

The first ship is scheduled to sail in January of 1998, with a second vessel to start operations in November of 1998.

For more information on Fincantieri
Circle 76 on Reader Service Card

Alabama Shipyard Wins Triple-Vessel Danish Chemical Carrier Contract

Alabama Shipyard, Inc. announced that, subject to Title XI financing, they have reached an agreement with Dannebrog Rederi AS to build three 16,000-dwt IMO II chemical carriers.

Designed by Shipkonsulent AS of Norway, the vessels will be built as double-hulled tankers in compliance with OPA 90 requirements, and will measure 472 ft. (144 m) by 75 ft. (23 m).

This will be the first export order for vessels by Alabama Shipyard utilizing Title XI financing. The order is expected to create 200 jobs

in the yard and 500 jobs in the industry and surrounding areas.

Alabama Shipyard, Inc. is a subsidiary of Atlantic Marine Holding Company.

Dannebrog Rederi AS is a Danish business whose operations include Nordana Line, a liner service from the Mediterranean to the U.S., and from the U.S. to Central and South America.

For more information on
Alabama Shipyard
Circle 18 on Reader Service Card

Port Canaveral Will Be Home For Disney Cruise Ship

Disney Cruise Lines and the Canaveral Port Authority announced a joint agreement making Port Canaveral the home base for Disney Cruise Lines' first ship.

The agreement, which received full approval from the Port Commissioners, provides for a new terminal to be built for the exclusive use of Disney Cruise Lines, with construction beginning as early as April 1996.

"Our decision to sail from Port Canaveral demonstrates our confidence in its continued growth and development as a major cruise port,"

Italian Interests Contract For Tanker Construction

Nuovi Cantieri Apunania S.p.A. and Finaval S.p.A. have signed a contract for the construction of a 40,000-dwt product and chemical (IMO II) tanker, to be delivered in early 1997. The ship will be 688 ft. (187 m) long, 106.7 ft. (29 m) wide, with a cargo capacity of 44,000 cu. m. and a service speed of 14.5 knots. The agreement between the parties also considers the construction of a sistership.

Hong Kong Distributor For Vest Firefighting System

Garsley Sales & Marketing Ltd. (GSML) has been appointed exclusive distributor of the Maverick Foam Vest System (MFVS) for the Hong Kong and Macau region by International Marine Supply and Service Co. (IMSSCO) of San Diego, Calif. Despite the fact that in 1997 Hong Kong is slated to become part of China, **Garry W. Stiven**, managing director of GSML, stated, "Hong Kong is unique in the maritime community. Our future here is as promising as it was for other companies many years ago when Hong Kong was established."

The MFVS, which is ABS type-approved to comply with SOLAS, as well as UL-listed, allows the user to switch from foam to water and back at will.

Aker Omega Awarded Jacket Design Project

Aker Omega, Inc., was awarded the design of Meridian Oil Offshore, Inc.'s High Island Block A-371 jacket. The jacket will be designed to a water depth of 395 ft. (107.3 m) and will have four legs and skirt piles. In the preliminary design phase, the jacket will be designed for both a lifted and a launched installation scenario, and a design will be chosen after fabrication and installation bids are evaluated. Aker Omega, Inc., a subsidiary of Aker Oil & Gas Technology, Inc., provides project management, engineering, and construction management services for the offshore oil, gas, and marine industries.

said **Art Rodney**, president of Disney Cruise Lines. "We look forward to working with the Port Authority, and to the day our first ships departs on its maiden voyage from Port Canaveral."

Malcolm McLouth, chairman of the Canaveral Port Authority, said, "We are delighted that Disney Cruise

Lines has selected us. Disney's commitment to our port adds tremendous prestige to our continuing efforts to increase the importance and desirability of Port Canaveral."

Disney Cruise Lines plans to begin sailing in January 1998, offering a one-week vacation which includes a three- or four-day cruise

with the balance of the week at the Walt Disney World Resort. Ports of call will include a Disney private island, where guests can enjoy a day-long excursion.

Disney Cruise Lines has named Fincantieri of Trieste, Italy, to build its two new mega cruise ships. At 85,000 tons each, the ships will be larger than any cruise ship currently in operation and will accommodate 2,400 passengers.

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*partial list of 300 commercial vessels

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Circle 370 on Reader Service Card

Cincinnati Gears On New Austal Ferry

Cincinnati Gear Co. (CGCo) was awarded its second order from Austal Ships of Australia for two MA-107 marine reduction gearboxes. Austal Ships' latest catamaran ferry, hull No. 116, will feature two Cincinnati Gear MA-107 units, each powered by an AlliedSignal TF-40 gas turbine. The 131-ft. (40-m) fast ferry,

to be delivered to Yuet Hing Marine Supplies of Hong Kong, will be capable of full load cruising speeds of 43 knots.

The propulsion systems on this Austal application will feature CGCo's CIN-TEC control system, which monitors and controls operation of the MA-107 gearbox, and its relationship with other propulsion system components.

For more information on Cincinnati Gear Circle 47 on Reader Service Card

Keith Marine To Build Tender For Royal Caribbean

Keith Marine, Inc. (KMI) of Green Cove Springs, Fla., has been awarded a contract to construct an 85-ft. (25.9-m), 300-passenger steel passenger tender for Royal Caribbean Cruise Lines (RCCL).

The vessel will be constructed in KMI's Palatka, Fla., yard to ABS and DNV requirements. This is the

sixth vessel KMI has built for RCCL.

KMI, involved in shipbuilding, conversion and repair of private yachts and commercial vessels since 1978, will open a new 22-acre facility at the St. John's River Barge Port. The yard layout will more than double capacity.

For more information on Keith Marine Circle 48 on Reader Service Card

Ritchie sets a new standard in Electronic Compass Technology...



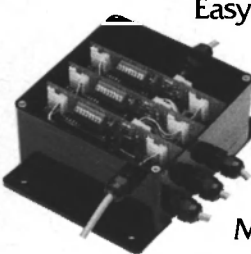
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Circle 32 on Reader Service Card

AMC, Weeks Jamestown Sign Cooperation Pact

American Marine Corporation (AMC) of Ossining, N.Y., and Weeks Jamestown, Inc. (WJI) of Cranford, N.J., announced the formal signing of an agreement that solidifies the working relationship between the two major marine response organizations. Together the two companies bring to the oil and transportation industry the first network of marine response capability that fully meets OPA 90 requirements for oil spill cleanup, salvage, firefighting, emergency lightering and towing.

Weeks Jamestown is a wholly-owned subsidiary of Weeks Marine, a marine company with extensive background in salvage, heavy lift, and emergency lightering operations. The company's range extends throughout the East, West and Gulf coasts, as well as Hawaii and the Caribbean Basin. The Weeks tug fleet consists of more than 30 vessels including oceangoing salvage tugs with 68 tons of bollard pull. More than 40 floating cranes and derrick rigs provide both lightering and heavy lift capability up to 700 tons. More than 120 barges and an extensive array of specialized equipment form the company's salvage capability.

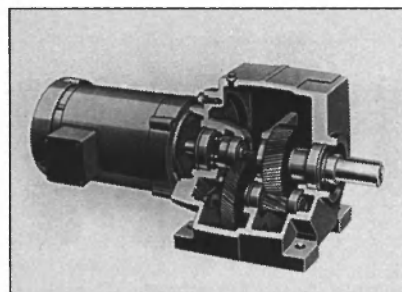
American Marine Corporation was organized in 1994 to provide a cost-effective alternative to existing OPA coverage options for companies that transport, store and handle oil. AMC has mitigated the heavy financial burden of this coverage through the creation of a response organization that emphasizes maximum utilization of existing commercial resources, supplemented as required to provide full OPA 90 coverage at substantially lower client costs. Through a cost-effective approach, AMC has been awarded Final Level E Classification by the U.S. Coast Guard (USCG) in Rivers/Canals and Inshore/Nearshore environments and Interim Level E Classification in Offshore/Open Ocean. The USCG inspection for AMC Final Level E Classification is scheduled for early December.

Together, the AMC-WJI team provides full-range OSRO, salvage, emergency towing, firefighting and emergency lightering services that fully meet the compliance requirements of OPA 90.

For more information on AMC Circle 49 on Reader Service Card

For more information on Weeks Jamestown Circle 50 on Reader Service Card

Falk Introduces New High-Efficiency Gearmotor



A new gearmotor, named the Ultramite™ for its high efficiency and compact size, has been introduced by the Falk Corporation. The Ultramite gearmotor is ideal for a wide range of general purpose, factory and plant low hp/kW power transmission applications.

Substitutions, drop-in replacement and retrofits are reportedly made easier due to the Ultramite gearmotor's base-mounted design that has a footprint that matches those of other major manufacturers. A simple, plug-in and bolt-on design makes this new drive compatible with standard, off-the-shelf NEMA and IEC-C face motors permitting the use of customer-preferred motor brands.

The Ultramite gearmotor is available in several sizes in the .25 kW (.25 hp) to 15 kW (20 hp) power range and features hardened, helical gearing for energy efficiency over worm gear drives.

Falk's new gearmotor is also available in flange-mounted housings for additional flexibility. The Ultramite gearmotor is available locally virtually anywhere in the world via Falk's global distribution network.

For more information on Falk
Circle 53 on Reader Service Card

Volvo Penta To Supply 36 Engines To Chinese Yard

Volvo Penta Marine Commercial has, via its Hong Kong importer Jehsen & Co. Ltd., secured a major order from China, a contract to supply 36 engines to a local shipyard. The order is worth about \$2.1 million.

The German shipping company, Fisser & v. Doornum recently placed an order for a dozen 4,600-dwt container vessels with Chinese shipbuilder Xingang Shipyard. Each vessel will be equipped with two complete genset units and an emergency generator supplied by Volvo Penta.

The vessels will each be supplied with electrical power by two Volvo Penta TAMD 162C six-cylinder, turbocharged diesels, each rated at 375 kW, while the emergency generator will be powered by a Volvo Penta TAMD 71 developing 110 kW.

Located immediately south of Beijing and employing 6,300 people, the Xingang yard is part of the China State Shipbuilding Corporation. The engines are scheduled for delivery in 1995 and 1996.

Volvo Penta opened up a sales office in Hong Kong following recent successes in Far East markets, especially China. The company has also decided to open an office in Singapore for its Asian operations. The new office will be headed by **Anders Bevreus**, currently vice president of Volvo Penta Industry.

For more information on Volvo Penta
Circle 54 on Reader Service Card

Cooling Systems Offer Lower Costs

Lytron Inc., a manufacturer of compact tube-fin and plate-fin heat exchangers, has released its Modular Cooling System (MCS)—a new product line of integrated cooling systems suitable for use with metric and English interface requirements—that the company says is

available at an initial purchase price of approximately half that of a refrigeration system, with lower operating costs.

The MCS product is a self-contained, closed-loop, liquid-to-air cooling system packaged in a lightweight, compact chassis (33 cm in height).

The MCS product line utilizes a modular design concept which maximizes customization for a variety of

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Located in the Port of Brownsville, the facility has a total land area of more than 150 acres, and is equipped with modern fabrication and deep water

facilities, as well as two 150-ton floating cranes and several units of heavy lift equipment of up to 300 tons capacity.

AMFELS operates an ASME and API certified facility for building process packages for onshore and offshore applications.

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5177 Richmond Avenue, Suite 1065
Houston, Texas 77056, USA
Phone: 713/840-8811
Fax: 713/840-1198

AMFELS
U.S. Representative
Keppel Marine Agencies Inc.

Head Office:
Port of Brownsville
Highway 48
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international and domestic applications.

MCS coolers reportedly provide a cost-effective cooling of process fluids in laser, hydraulic, medical, scientific and industrial applications.

The MCS10 and MCS20 models are available in 16 different configurations. Options include a choice of heat exchanger material and capacity, pump construction, electrical system interface, and rack-mount-

able or stand-alone chassis. In addition, each MCS provides an easy-to-read front panel fluid level indicator, an accessible top mounted reservoir port, a rugged all-welded steel frame, convenient built-in handles for easy transportation, and heavy duty vibration isolation mounting feet.

For more information on Lytron
Circle 52 on Reader Service Card

Firm Offers Refrigerant Management Assistance

Peregrine Technologies of Brunswick, Maine, offers confidential in-house refrigeration compliance audits for marine-related businesses and facilities that handle refrigerants. Although CFC record keeping is mandated by federal law, many marine-related businesses are

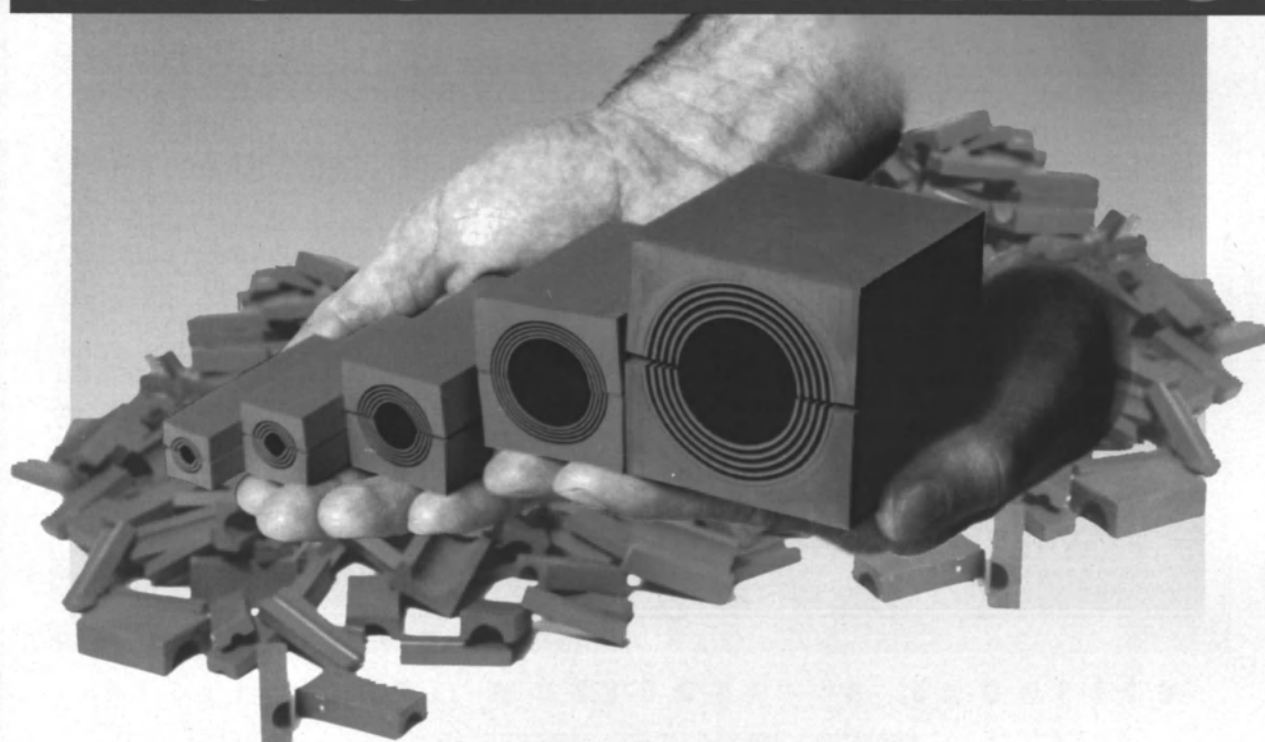
in need of assistance for establishing a formal refrigerant management program to avoid serious fines and future equipment downtime.

According to Peregrine, failure to comply with federal CFC edicts could result in fines of \$25,000 per day and even criminal prosecution. CFCs are scheduled to be phased out of production by the end of the year.

Peregrine will review existing refrigerant management plans as well as specific in-house procedures to assure the readiness of passing an EPA/CFC inspection. CFC awareness training for both technical and non-technical employees for the handling of refrigerants can be conducted, and refrigerant management software is available.

For more information on
Peregrine Technologies
Circle 56 on Reader Service Card

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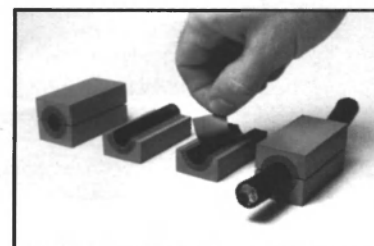
It has also been tested and approved as intermixable with MCT and can be installed successfully within the same frame penetration. Because the modules, stayplates and compression systems are compatible, you can begin using the ROX SYSTEM immediately.

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Allied Systems To Supply Cranes On Avondale/USCG Project

Allied Systems Company of Sherwood, Ore., recently announced that it has received an order from Avondale Industries to supply five deck cranes for the U.S. Coast Guard (USCG) Polar Icebreaker *Healy*, to be built in Avondale, La.

The order is for two 50-ton and one 30-ton rated hydraulic telescopic boom cranes for various cargo operations, and two knuckleboom cranes — one 20-ton and one 7.5-ton — to support science operations. The cranes are specially designed for use in Arctic/Antarctic environments. Deliveries of the equipment are scheduled for late 1996 and early 1997.

Allied has also recently supplied specialized cranes for Swire Pacific Offshore (Dubai) and Woods Hole Oceanographic Institution, and is currently under contract to supply boat handling davits with constant tension winches to Ingalls Shipbuilding, Pascagoula, Miss., for the U.S. Navy *Inchon* (LPH 12) conversion. Allied is also currently under contract to supply cranes, hydraulic power units and boat davits to Marinette Marine for the USCG WLM and WLB buoy tender projects.

For more information on Allied Systems
Circle 57 on Reader Service Card

Finland Awards Trimble Radiobeacon Contract

Trimble Navigation Ltd. announced it has been awarded a contract from the Finnish Board of Navigation (FBoN) to provide reference station and integrity monitors for the radiobeacon-based differential GPS (DGPS) marine navigation systems of Finland and Estonia. The FBoN will install Trimble's 4000MSK DGPS Reference Station and 4000IM MSK integrity monitors along the coasts of Finland and Estonia.

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Since Furuno has the largest product line in the marine electronics industry, we have just the right size product for you. Furuno is best known for our highly visible, leading edge radar, but — as you can see — we also offer the largest selection of chart plotters, fishfinders, sonar, GPS, satcom and a host of other units to meet every application.

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grammable NMEA data output. In fact, we guarantee it!

The Furuno product line exceeds 100 models, each one designed, manufactured and backed by the people at Furuno. Furuno products are so rugged, dependable and innovative they've won the National Marine Electronics Association Awards of Excellence more than 90 times since 1971. That's more than any two

manufacturers combined. It's also why marine electronic engineers and technicians believe Furuno's the best design over any other brand.

The extensive Furuno world-wide sales and service network has the most highly trained personnel in the industry, ready to assist you with your selection and installation of our products.

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Circle 26 on Reader Service Card



This brings to 14 the number of countries worldwide that have chosen Trimble's DGPS reference stations and integrity monitors for positioning and coastal navigation. Countries such as Germany, Sweden, Brazil, Venezuela, Bermuda and Korea have made Trimble technology a country-wide standard for marine navigation and positioning. Trimble says the award of the contract came after exhaustive trials

by the FBoN of many other DGPS systems. Trimble's radiobeacons broadcast DGPS data in the RIMC SC-104 standard format, in full compliance with the specifications of the International Association of Light-house Authorities.

Trimble's DGPS reference stations and integrity monitors provide fully integrated systems for offshore differential GPS navigation and precise positioning. Each system in-

cludes a DGPS reference station.

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For more information on Trimble
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Historical Society Presents Tribute To Maritime History

The Stamford Historical Society, in Conn., is presenting a tribute to U.S. maritime history called "The Works, The Wars, The Waters," until September 17.

The tribute will feature the construction of Luder Marine Construction Company, including an exhibition of models and architectural drawings of Luder-built yachts, boats and military vessels. On loan from the U.S. Navy are scale models of a WWI Patrol Craft and a WWII minesweeper. For more information, contact Ruth Mushkin at (203) 329-1183.

Offshore Systems Introduces ECDIS Product

Offshore Systems Ltd. (OSL) has released ECPINS M21, its latest Electronic Chart Display and Information System (ECDIS) product, offering the features of the company's Electronic Chart Precise Integrated Navigation System (ECPINS), but repackaged in modular design for new and retrofit installations.

ECPINS M21 options include a 17-in. monitor, an ARPA radar interface, and an SIU which provides digital input from gyrocompass, speed log and wind speed and direction. To complement this product release, the company offers compatible software, ECPINS Version 4.1, which includes manual and semi-automatic chart updating, ship's maneuvering and critical navigation enhancements, an enhanced radar image overlay, and an electronic bearing line/variable range marker.


For more information on
Offshore Systems Ltd.
Circle 125 on Reader Service Card

Nautronix Wins Contracts For DSV, ROV Vessels

Nautronix, Inc. of San Diego, Calif., has won a number of recent orders, three of them to supply various systems to a Small Waterplane-Area Twin Hull (Swath) dive support vessel being built for Global Industries, Ltd. Nautronix will supply a dual Automatic Station Keeping system (ASK4002), a dual Data Collection and Control System (DCCS), and a Thruster Control System (TCS4000) for the vessel.

The newbuild Swath — in addition to supplying support for Global's dynamically-positioned (DP) dedicated reel pipelay barge, the *Chickasaw* — will have saturation diving capabilities, will be able to install, maintain and service subsea completions, conduct abandonment operations, pipeline installation, and perform a host of other services. The ASK4002 dual DP system will enable the vessel to maintain a position on a fixed-point or pre-determined course. Nautronix says it received this follow-on order as a


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result of the performance of the DP system on the *Chickasaw*, which Nautronix also supplied.

The DCCS system is an automatic instrumentation monitoring system that keeps track of all instrumentation points of the vessel and allows remote control of ballast and safety features. Crewing requirements are decreased, as the system automates many vessel stations that previously required crewmembers.

The thruster control system will enhance the ASK4000 position keeping system, providing transit capabilities with autopilot features, offering the user worldwide navigational capabilities.

In addition to the Swath contracts, the company was awarded a contract for an Automatic Station Keeping ASK4000JS DP and joystick backup system for the Ocean Engineering International Remotely Operated Vehicle/Atmospheric Diving System (ROV/ADS) vessel *Ocean Service*. Featured in this system is a dual redundant computer configured for immediate activation in case of main computer failure, retaining joystick control. The system was specially designed to ensure the safety of WASP divers working below. A portable joystick and remote CRT display offer added flexibility in vessel control and ROV monitoring.

For more information on Nautronix
Circle 58 on Reader Service Card

New Acting Seaway Head After Parris Resigns

Stanford E. Parris, the sixth administrator of the St. Lawrence Seaway Development Corporation, has announced his resignation as head of the agency to pursue other interests. In his place now is Seaway Corporation Acting Administrator David G. Sanders.

Mr. Parris, a former U.S. Congressman from Virginia, took the position at the Corporation in 1991, and has been commended by Transportation Secretary Federico Peña for his leadership and dedication in keeping commercial trade through the Great Lakes Seaway System safe, competitive and reliable.

"Under his direction, the Seaway has re-emerged as a leading international trade route for North America. Stan was successful in negotiating the first Seaway toll freeze on the binational waterway in nearly a decade, and international tonnage has been on the rise for three years," said Secretary Peña.

The Saint Lawrence Seaway Development Corporation recently released 1994 results for the "New Business" portion of the Seaway Incentive Tolls Program, showing increases in tonnage shipped and toll amounted discounted to carriers.

During the 1994 navigation season, more than 1.7 million metric tons of cargoes qualified for toll discounts under "New Business," amounting to \$1.1 million. In 1993, toll incentives were \$535,000 on 1.6 million metric tons.

Corporation Acting Administrator Sanders noted that the incentive program clearly demonstrates what effect a reduction in tolls has on Seaway trade.

"The Incentive Tolls program, especially the New Business portion, has been extremely successful in generating new trade on the Great Lakes St. Lawrence Seaway system," Mr. Sanders said. "It proves that when Seaway tolls are reduced in

any form, including through discounts, that tonnage will rise."

Prior to the 1994 navigation season, the "New Business" portion was expanded to offer toll discounts instead of a rebate to entice traffic with immediate cost savings. To qualify under the "New Business" category in the program, carriers must ship commodities which have not moved between one of five geographical regions within the Sea-

way System and a particular country in quantities totaling five percent or more of the total traffic between the two locations for the prior three seasons. Qualifying cargoes receive an immediate cargo discount of 50 percent.

Since the program began in 1991, more than 6.9 million metric tons of cargoes have qualified, with toll rebates/discounts of more than \$2.7 million under "New Business."



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EUROPEAN UPDATE

European industry — still a force

by Carol Fulford & Andy Smith, contributing editors

With the domination of the shipbuilding market by Japan and South Korea, European builders have been forced to adjust to maintain its prominence on the international market. Individually, there is no question that things are no longer as they once were. In a situation where Japan accounts for 46 percent and South Korea 22 percent of the new orders for merchant vessels over 100 gt, no other single country reaches double figures. Collectively, however, the 12 European Union (EU) countries alone claim 11.5 percent, and with prospects for 1995 looking good for "greater Europe" constituents such as Poland, Romania and Croatia — there is no doubt that Europe as a whole is still a major force in shipbuilding.

Indeed, according to the merchant shipbuilding returns for the last quarter of 1994 published by Lloyd's Register, of the top 14 shipbuilding countries in the league table behind the big two, all but China and Brazil were European. Denmark, although a small country with high wage rates, is a remarkably significant player in the market with 1.2 million gt either on order or under construction.

Finland boasts only a slightly lower figure, which includes four 135,000-cu.-m. LNG ships at Kvaerner Masa, the first of which has just been launched, destined for Abu Dhabi, and the cruise vessels *Imagination* and *Inspiration* being built at Kvaerner's Helsinki yard. Carnival Cruise Lines has ordered an additional two sisterships for delivery in 1998.

Germany maintained its number one European status at the beginning of the year with 1.9 million tons either in build or on order. The completion by Meyer Werft of P&O's much heralded *Oriana* leaves the yard with three 70,000-gt sister liners to build for Celebrity Cruises. The first, *Century*, is due to be delivered in November and will operate out of Port Everglades, Fla.

However, all European yards have prepared for stiffening competition from new competitors, as the orderbooks at the Polish yards of Gdansk, Szczecin and Gdynia look exceedingly healthy. The latter celebrated its 500th newbuilding with a 96,000-dwt double-hulled tanker (the second of two), but Szczecin has 10 containerships, three product tankers and four bulk carriers to build with options for more in each series. The Romanian yard of Constantza has a series of bulk carriers to build, guaranteeing work until 1997, and a recent delivery included a 170,000-dwt vessel to Safmarine with four similar ships to follow for Exmar of Belgium.

Against the general trend, Spanish and French yards have registered significant improvements in their orderbook situations (41.2 percent and 22.1 percent, respectively), in both cases approaching the levels of activity achieved five years ago. The SNACH concern at Le Havre, France, has recently improved these figures even further by securing a contract to build three 17,000-dwt, diesel-electric chemical tankers for Holt Parcel Tankers. Chantiers de l'Atlantique will deliver the 862-ft. (262.7-m) *Legend of the*

Seas to Royal Caribbean Cruise Line (RCCL), and concentrate building efforts on sistership *Splendour of the Seas*. *Legend* will not only be one of the most innovative liners afloat in terms of comfort and sophistication for its 2,000 passengers, but at 24 knots, will be one of the fastest. Astilleros Espanoles has improved the Spanish outlook by beating South Korean yards to the order for an 80,000-dwt shuttle tanker for Texaco,

Finnish company ABB Marine, and the RCCL ships incorporating systems by Cegelec, an Anglo-French concern. *Oriana* and *Century* from Meyer Werft have retained more conventional diesel mechanical arrangements, with each vessel having two father and son pairs of nine- and six-cylinder MAN B&W medium-speed diesels to provide flexible operation.

Unfortunately, not all the news is good.



and the company also hopes to benefit from a co-operation agreement with Japanese giant Ishikawajima-Harima Heavy Industries (IHI).

The luxury cruise sector has kept the various Italian Fincantieri yards busy. *Ryndam*, the third of four sisters for Holland America, was delivered at the end of '94, and *Veendam* should shortly follow. Carnival, which will take delivery of *Sun Princess* at the end of the year, has now placed orders with Fincantieri for a second 100,000-gt vessel, sister to the liner already under construction there. Delivery of these 2,600-passenger ships is scheduled for the end of 1996 and 1998. A third vessel, to carry 1,300 passengers and recently ordered by Holland America, should dovetail nicely with the other deliveries, with a 1997 completion date.

The diesel-electric propulsion concept is becoming increasingly well established in the thriving cruise ship sector, with the Kvaerner-built ships for Carnival opting for systems by the

Sweden's once substantial shipbuilding industry is now virtually nonexistent, and with the closure of Swan Hunter, just Harland & Wolff is left to fly the British flag in the large vessel sector. The answer for many European countries has been specialization in smaller hi-tech vessels, as seen in The Netherlands. This country's overall total tonnage on order or in build is just 0.6 percent of the world total — below the U.K. (1.04 percent) and Turkey (0.83 percent). However, this represents a high number of vessels, at 128. This compares with just 34 in the U.K. and 41 in Turkey.

Dutch trade has improved recently with the delivery of *Pearl River*, reportedly the world's largest trailing suction hopper dredger. Built by IHC Holland, the vessel is reported to be 40 percent larger than any predecessor at 472 ft. (144 m) and 16,072 gt. The same yard has received an order to build a similar but larger vessel measuring 499 ft. (152 m) and the Merwede

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EUROPEAN UPDATE

yard has just been awarded a contract for a 512-ft. (156-m) version.

Norway is another country which has founded a significant export industry in a niche market. In the past five years, Norwegian yards

have been responsible for 53 percent of the fast ferries built in Europe. Names like Kvaerner Fjellstrand, Westamarin and Ulstein have long been at the forefront of fast ferry technology—aided

and abetted by the strength of Scandinavian engineers in waterjet technology. The prime market area is, however, the Far East—a factor which has helped the Australian fast ferry industry to develop so

quickly. The rise of Australia has brought a decline in the European share of vessels built since it peaked in 1990. However, this decline appears to have slowed and is being countered by European builders establishing yards and license agreements in the Far East.

New to the Norwegian scene is Rosendal Verft, with two 95-ft. (29-m) catamarans delivered and two 118-ft. (36-m) vessels to build before the end of the year for Chinese interests. The 95-ft. craft had unusual propulsion configurations featuring Servogear controllable pitch propellers to give a service speed of 32 knots. The first vessel built had a pair of 1,040-kW Mitsubishi diesels while the second used two pairs of 550-kW MTU engines.

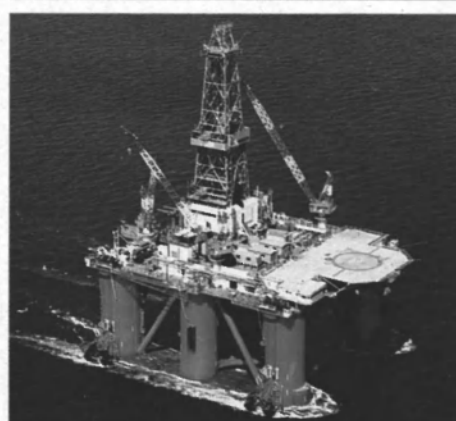
The statistics for 1995-96 will certainly be affected by the impressive progress made by a number of relative newcomers to this particular field. Dutch company Royal Schelde, with a number of smaller catamarans to its credit and a sizable portfolio of larger designs, recently received an order from a Greek operator for a 250-ft. x 72-ft. (76-m x 22.15-m) passenger/vehicle ferry with a speed of 36 knots. Greece is also the destination for two unusual 577-ft. x 79-ft. (173.7-m x 24-m) recently delivered by German yard Schichau Seebeckwerft. These otherwise conventional RoRo vessels have a capacity of 1,400 passengers and 100 cars, and operate at 27 knots.

The Spanish Bazan concern has used its frigate experience to make a success of its Mestral monohull fast ferry (see *MR/EN* February 1995). Patrol boat builder Leroux et Lotz in France is continuing with the Corsaire 8000 and 11000 monohull projects, and the company has issued details of a stretched Corsaire 6000 called the 7000. Mjellem & Karlsen has entered the field with a 312-ft. (95-m) monohull built for a Danish customer.

For both performance and style, the 320-passenger, 148-ft. (45-m) TriCats by the U.K.'s FBM Group have created much interest. One has recently entered service in Hong Kong, another is on its way and a third is virtually ready for shipment. Trials at over 50 knots confirmed that the Caterpillar Solar gas turbine/waterjet propulsion system was as smooth, quiet and efficient as predicted, and the keels have been laid on the first of the two further vessels required to complete the initial order of five. Discussions are taking place regarding the options for a further two. Meanwhile, progress has been made on two of four 148-ft. catamaran commuter ferries for Portugal with the marrying of superstructure to hulls. Diesel-driven, these craft retain much of the advanced styling of the TriCat class but are designed to carry 500 persons at 25 knots.

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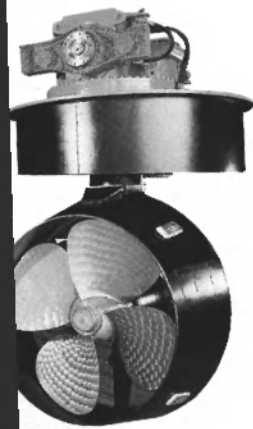
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EUROPEAN UPDATE

dominate throughout the fast ferry scene, but Kvaerner Energy packages with GM gas turbines will be used on the two 42-knot passenger/vehicle Seajet 250 Swath ferries under construction at Danyard for

Mols-Linien. The same Kvaerner/GE combination is to provide the larger turbine propulsion systems for three giant Stena HSS catamaran ferries being built by Finnyards. The first will eventually enter ser-

vice on one of the Irish Sea routes. With a capacity of 1,500 passengers and 375 cars, these vessels will operate at 40 knots.

The breakdown of the type of fast ferry built over the period 1989 to

1994 highlights interesting trends. Although catamarans have always dominated, the proportion of monohulls is increasing, while Surface Effect Ship (SES) and Swath types seem to have virtually disappeared. Fast ferries seem to be getting larger, faster and more sophisticated. During 1994, only six fast combined passenger/vehicle ferries were built worldwide, but the number of outstanding orders had risen to 18. As the move increases towards larger vessels at greater unit cost, order numbers may be down, but shipyard revenue is only marginally affected.

It is worth noting that the Channel Tunnel began operating at the beginning of the year and claimed 18 percent of the cross-Channel traffic. Interestingly, the market grew by 18 percent over the same period last year, leaving the ferry business unaffected.

The tug market

Recent orders placed, deliveries made and contracts mooted in the tug sector have also brought fresh hope to Europe's builders. Dutch yard Damen continues to supply its basic Stan Tug designs and, in keeping with current trends for high-power, multipurpose application and precision maneuverability, is offering more sophisticated packages. *Portgarth*, recently delivered to U.K. operator Cory Towage, is a good example. The vessel, which has just entered service, benefits from an Aquamaster thruster and a Twin Disc Marine Control Drive modulating clutch system.

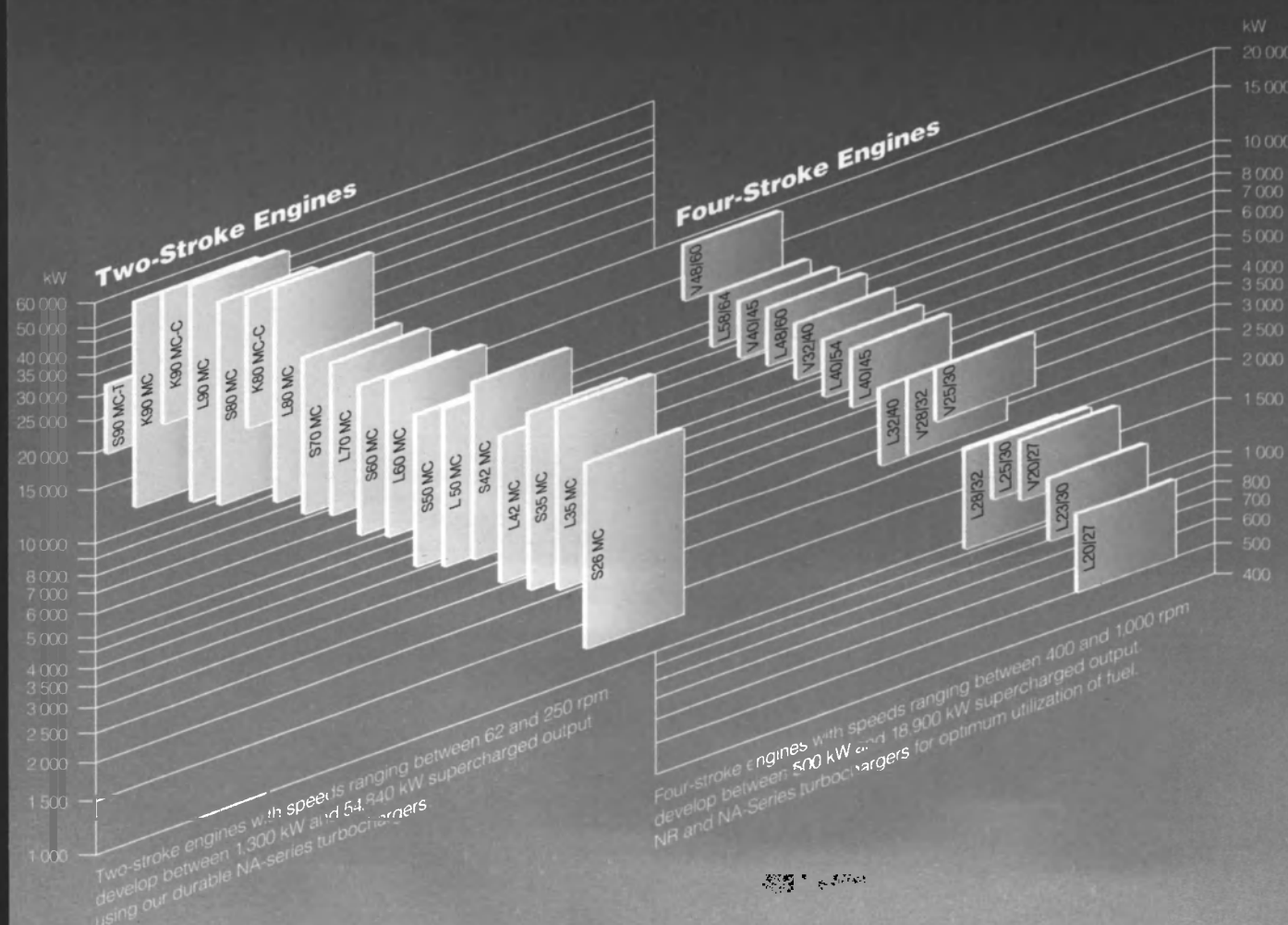
Damen is also likely to benefit from news just released by leading U.K. tug operator Howard Smith Towage & Salvage — that it intends to spend more than \$24 million on a program to improve its towage service. Six new tugs are to be introduced by mid-1996 and, although no official confirmation has been made, Damen and U.K. yard McTay Marine are considered prime candidates. The vessels will be powerful, highly maneuverable and equipped for firefighting and anti-pollution activities.

Should U.K. yard McTay receive the orders, it will without doubt boost confidence in the new management team, which bought the yard from the large, industrial Mowlem Group some months back. Recent deliveries from McTay include a powerful Voith Schneider tractor tug for the Forth Ports Authority and a berthing/firefighting vessel late last year to the Abu Dhabi Petroleum Ports Operating Company. Elsewhere in the U.K., Hull-based Yorkshire Dry Dock is building its first tug to date — a 108-ft. (33-m) vessel for Southampton's Red Funnel Group — with an option on a second vessel.

Tug contracts are among the hottest news at the Spanish Construnaves group yards of Armon,

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Maritime Reporter/Engineering News

EUROPEAN UPDATE

Gondan and Zamacona, the former having won an important contract for three 2 x 2,000-bhp vessels for Belgian operator Union de Remorquage et Sauvetage — with an option to extend the units ordered to six. All three yards also share a seven-vessel order for the Boluda Group, one of the most active tug and salvage companies in Spain.

Zamacona, in addition, is now ready to deliver a hi-tech tug to Yemen and has four 57-ft. (17.5-m) salvage boats to build for the Ministry of Maritime Fishing & Merchant Marine of Morocco.

The military market

Middle East operators continue to prove highly lucrative customers in the military sector helping to boost the healthy workload at Vosper Thornycroft in the U.K., CMN and DCN in France. Other international orders are in hand. The Brazilian Navy has ordered four coastal patrol boats from Peene Werft in Germany (one delivered to date), Leroux et Lotz is building two offshore patrol vessels for Morocco and Gondan in Spain has delivered two 208-ft. (63.5-m) landing craft to Kenya.

Scandinavians have led the way in the pilot vessel sector with significant deliveries made by Dockstavvarvet (Sweden) and Linstol (Norway). Finnish yard Marine Alutech has also had success with its Watercat range, which is primarily aimed at pilot duties but very adaptable for rescue, patrol and fast transport roles. The second delivery in a possible six-vessel order has recently been made to the Finnish Board of Navigation.

Further developments with the Nelson marque enabled U.K. yard Souter to secure a Crown Agent order on behalf of the Papua New Guinea Harbours Board for two pilot boats to be delivered next spring. The order is significant in that it is based on yet another Nelson hull type — the 38. Designer **Arthur Mursell** has explained that, although naturally shorter than the 40, its displacement is about 10 percent higher due to its wider waterline beam and fuller aft sections.

Challenges have also been met by German yard Fassmer which has delivered a total of five pilot boats to North Sea operator Mecklenburg-Vorpommern over the past 12 months. Of deep-V, semi-displacement type, they are based on a successful 65-ft. (19.8-m) police vessel design and feature anti-spray strips, a narrow waterline at full speed and sufficient stability to transfer pilots in Beaufort 10 conditions.

The fishing market

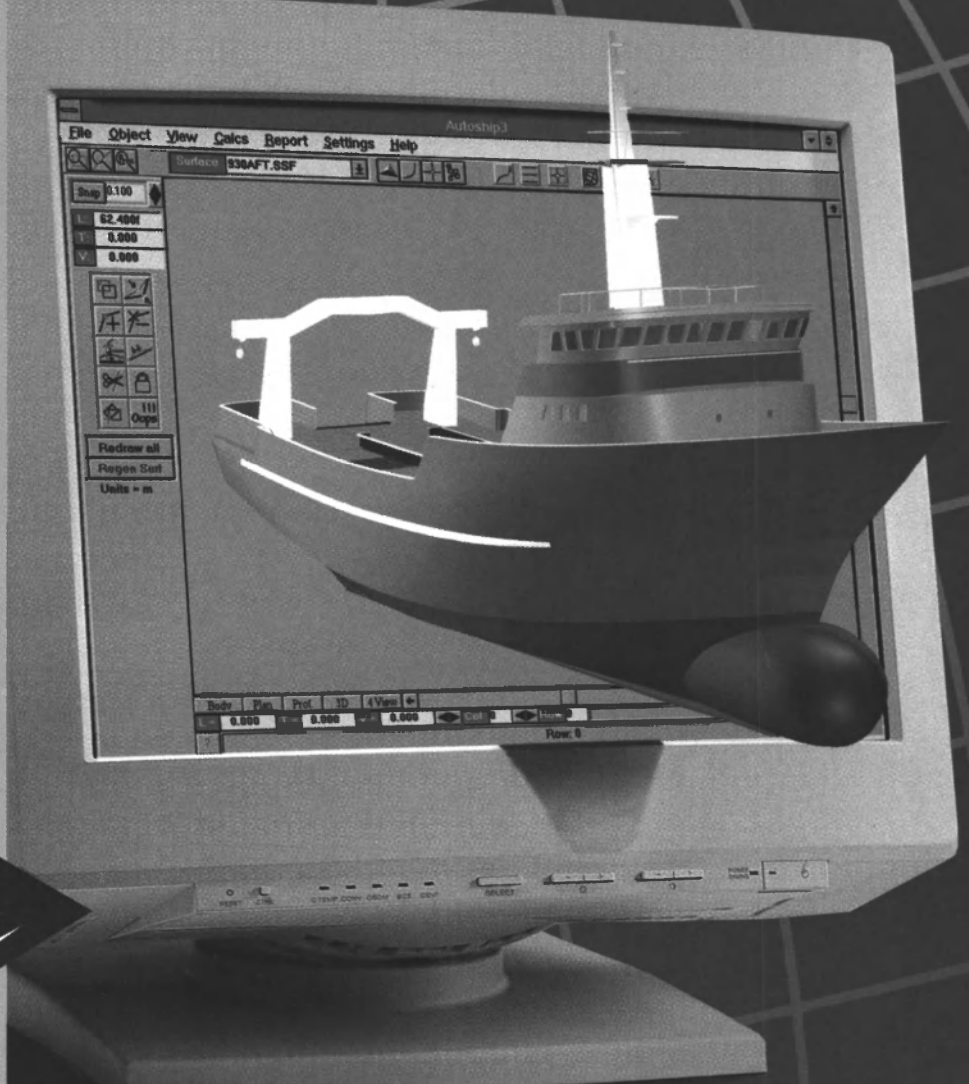
Yards which have traditionally specialized in building fishing vessels are becoming more export-minded as their own home industry faces difficulties. Although these

companies too often turn their export attentions to countries which are similarly affected by an excess of boats chasing too few fish, the year has seen some significant deliveries.

The renewal of the Irish fleet has attracted much attention from the Norwegian yards with by far the most prestigious recent order being placed with Thos. Hellesoy for *Veronica*, a 390-ft. (106.3-m) factory

trawler which has cost \$40 million. Now in operation from the Irish port of Killybegs, she is reportedly the largest and most modern vessel in the Irish fleet, and is equipped for fishing in both EU and international

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EUROPEAN UPDATE

waters. Flekkefjord is building a pair of identical 144-ft. x 36-ft. (44-m x 11-m) trawlers, again for Killybegs, to be named *Father McKee* and *Brendelen* when the owners' existing vessels of these names are

sold. Simek, also based in Flekkefjord has aimed its efforts at Scotland with the very recent delivery of *Vigilant*, a 166-ft. (50.45-m) purse seiner, and is currently working on a 188-ft. (57.5-m) pelagic

trawler for the Shetland Isles.

Armon in Spain has also concentrated heavily on attacking the Scottish market with the delivery of *Crusader*, an 85-ft. (26-m) steel vessel. This is due to be followed shortly

by *Vela*, an 80-ft. (24.2-m) trawler. The company has also recently delivered a 143-ft. (43.5-m) freezer longliner to a Spanish operator.

The Dutch yard of Visser den Helder is in the middle of a three-beamer order of its Mark III Multi-Purpose Trawler design for Germany. The first, *Stella Polaris*, has been delivered and the second is in the latter stages of completion. Further afield, the company is working on a series of 70-ft. (21.3-m) fish collection vessels for the Maldives Islands in the Indian Ocean.

Having a tough time fighting the attentions of overseas yards, Scottish yards have been concentrating on doing what they do best — building traditional fishing vessels tailor-made to local needs. Two in particular are faring reasonably well as a result. Incredibly, Macduff has three orders for 68-ft. (20.7-m) wooden vessels, despite having announced that it had built the last in this material several years ago. The yard has also recently completed a 90-ft. (24.4-m) steel trawler and has another to build. The Jones Buckie Shipyard is renowned for the quality of its vessels which maintain a high resale value. It has just delivered two stern trawlers and there are two more in build — all for local skippers.

Shipbuilding Marine and Offshore Equipment.

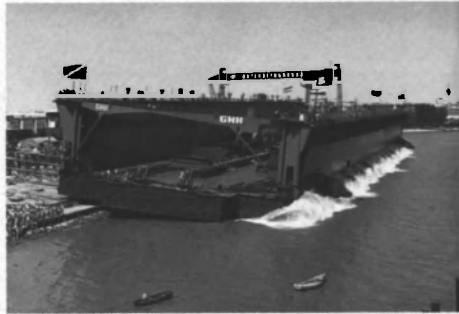


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Los Angeles Harbor Commission Awards \$95.5 Million In Contracts

The Los Angeles Board of Harbor Commissioners expanded its vision for Worldport L.A., awarding four major contracts totaling \$95.5 million.

The contracts are as follows: \$54.4 million for an on-dock intermodal railyard; \$34.7 million for a new lift bridge; \$3.5 million for steel pipe piles to support the new bridge and improve Port traffic; and \$2.9 million for maintenance dredging. The \$54.5 million contract was awarded to Shawnan Corp. in Downey, Calif., for backland improvements on Terminal Island, a major component of the new 230-acre container facility being constructed for American President Lines, Ltd.

The Commission awarded the \$34.7 million contract to Kajima Engineering and Construction in Pasadena, Calif., to remove an existing bridge and replace it with a state-of-the-art lift bridge.

D.P. Nicoli Inc. of Tualatin, Ore., won the \$3.5 million contract for the manufacture and delivery of steel pipe piles.

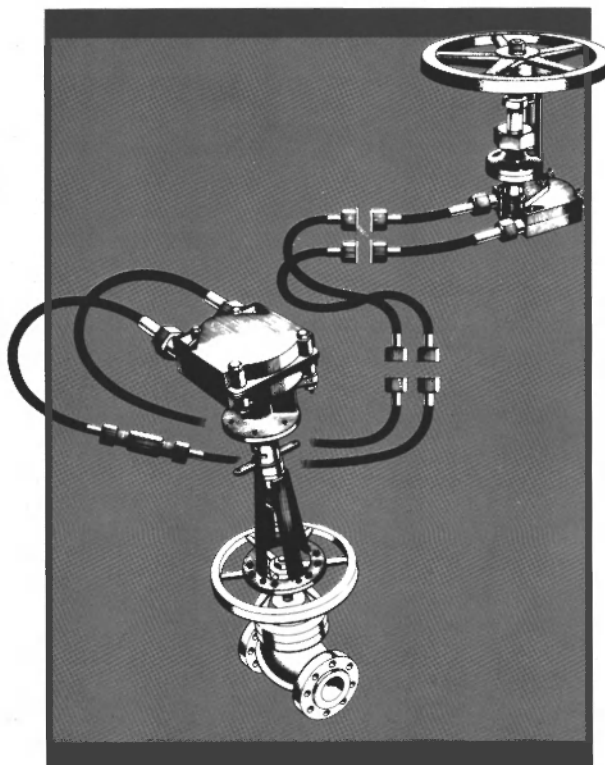
Finally, Manson Construction and Engineering Co., of Long Beach, Calif., was awarded \$2.9 million for maintenance dredging at the Port, in order to maintain adequate water depth for vessels berthing at cargo terminals.

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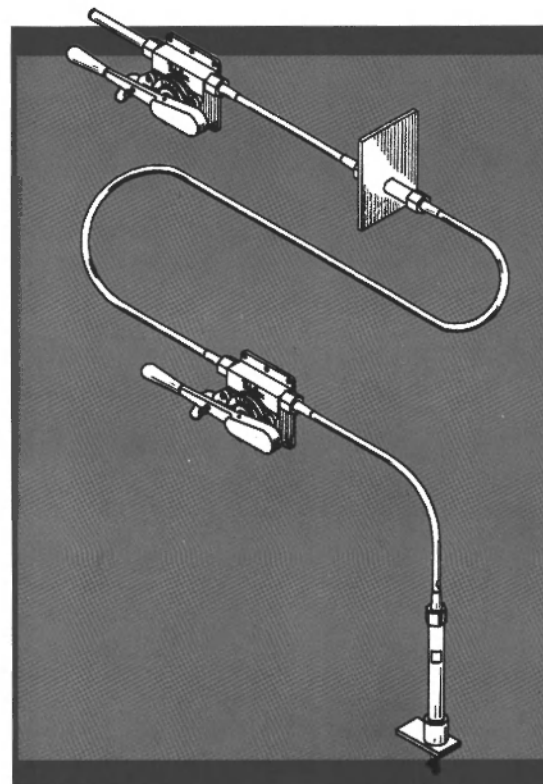
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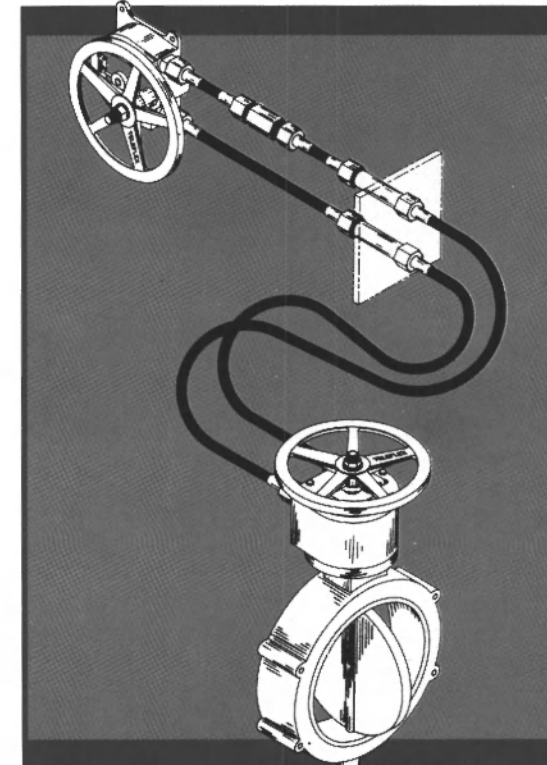
RMVA: Remote Mechanical Valve Actuator Systems for applications requiring delivery of multiple-turn rotary motion from remote locations.

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- Meets U.S. Navy MIL-A-24780 and Tech. Manual S6438-AA-DDT-010/ODME5



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Stage Set For Newbuilding Activity

Fleet replenishment, increasing demand to drive new ship orders

by Greg Trauthwein, Editor

Fleet replenishment and increasing shipping demands will drive the ship newbuilding market, with production levels possibly doubling on an annual basis over the next five years, said **James R. McCaul**, president, IMA Associates (Washington, D.C.). This infusion of shipbuilding business should lead to higher ship prices and slower turnaround, while serving as the final spark to fully ignite commercial business in, among other areas, the U.S. and China.

Mr. McCaul — a respected and oft-cited industry analyst — recently completed a five-year outlook study entitled *Shipbuilding Industry Outlook For The Next Five Years*. He spent time with *Maritime Reporter & Engineering News* to discuss his findings and their ramifications to the shipowner, shipbuilder and equipment supplier.

The Realities Of An Aging Fleet

Mr. McCaul reasons that replenishment rates over the past two decades have left the current large ship fleet old and in need of replacement.

"In general, there are 20,000 large ships over 1,750 gt and/or 100 m in length," said Mr. McCaul. "On average, these ships last 20 to 25 years," and by the fourth or fifth inspection, it becomes increasingly difficult — and costly — to keep them up to specification.

In order to maintain the world fleet inventory, he said that annual worldwide newbuilding output should be between 800 to 1,000 ships per year. In analyzing ship production over the last 20 years, Mr. McCaul found this demand has not been met. For example:

- from 1975 to 1979, there were 965 new ships built annually;

- from 1980 to 1984, 817 ships annually;
- from 1985 to 1989, 561 ships annually;
- and from 1990 to 1994, 497 ships annually.

Consequently, the average age of tankers has doubled, from eight years in 1975 to 16 years in 1994; and the average age of bulk carriers has increased from eight years in 1975 to 14 years in 1994.

"The average age cannot continue to increase," Mr. McCaul said. "The stage is set for a big rebound in ship construction." He estimates the ordering pace will have to reach levels between 1,000 and 1,500 ships per annum to keep pace.

While these numbers depict a bright outlook for builders and suppliers, it should be noted that only fleet replenishment projections are taken under consideration. When projections regarding demand are factored in, the market looks even more promising.

But make no mistakes, "the big driver, the big gorilla, is the replacement requirement," said Mr. McCaul.

Higher Prices, Slower Deliveries

"A sudden increase in orders will be difficult to accommodate. This increase will likely strain available shipbuilding resources. The result will be a spike in price levels," Mr. McCaul said.

He also projects that once the demand starts to rise rapidly, the market will overheat and draw many speculators into the market, speculators who

(Continued on page 33)

"The stage is set for a big rebound in ship construction."

— James R. McCaul, President, IMA Associates

COMPUTER TECHNOLOGY UPDATE

Sea-Land Streamlines Data Routing For Major Savings

When Sea-Land Service decided to upgrade the way it managed the traffic and cargo of its global fleet, WilTel, a wholly-owned subsidiary of LDDS Communications, steered the shipping giant toward a computer frame relay solution smart enough to transmit data without routers — its WilPak frame relay.

"We're saving more than 20 percent per month on our data transmission costs with WilPak," said **John West**, director of technology services at Sea-Land.

Sea-Land had been using private lines and multi-drop remote nodes connected to its IBM host mainframe through an IBM Front-End Processor (FEP). The dedicated circuits not only needed extra equipment, but they also consumed most of the FEP's ports. The result was high-cost, low-speed data transmission.

While frame relay seemed like an obvious answer to Sea-Land's data communications needs, there was one problem: Sea-Land wanted to maintain the simplicity of its IBM native environment for data transmission, particularly on the remote side.

WilTel Senior Systems Engineer **Bobbie Smith** designed a solution for Sea-Land's data communications needs with the help of Netlink, a Raleigh, N.C., firm that specializes in solving data communications problems.

Netlink builds the OmniLinx 4000, a Frame Relay Access Node (FRAN) that can interface with IBM equipment but which costs less than conventional routers. Since WilTel had not used the OmniLinx previously, four nodes were immediately installed for testing at WilTel's LAN lab in Tulsa. The results were impressive. For example, the turnaround time on one set of documents went from 45 minutes over private lines to just five minutes with a WilPak frame relay. The OmniLinx 4000 also simplifies network management, since it enables monitoring via industry-standard SNMP management platforms.

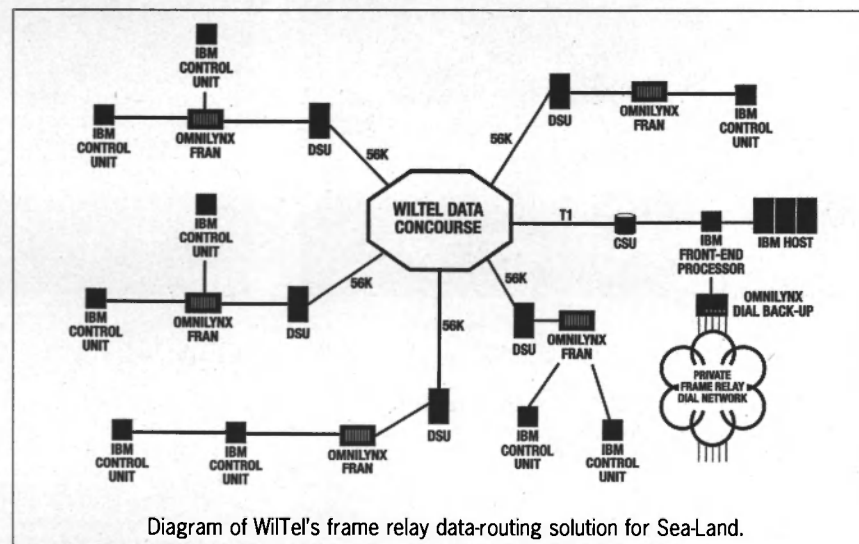


Diagram of WilTel's frame relay data-routing solution for Sea-Land.

"Data goes directly out of the Front-End Processor into the WilPak cloud, and then straight into our IBM control units," explained **John Arnett**, Sea-Land's manager of tactical planning. Sea-Land's IBM FEP can now easily transmit data to and from 120 controllers through a single port. Single controllers (less than 32 users) communicate with the FEP using frame relay. Multiple controllers plugged into OmniLinx 4000 FRANs have access to the WilPak cloud through just one physical connection. In some cases, there are up to six IBM controllers communicating with each OmniLinx 4000 FRAN.

Less than nine months after WilTel Senior Major Account Manager

(Continued on page 34)

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Joint MarAd/LR Conference On Cruise Ship Building In The U.S.

In just one of several recent instances of cooperation with elements of the U.S. market, Lloyd's Register (LR), in conjunction with the Maritime Administration (MarAd), has released technical papers which were presented at a conference exploring the feasibility of cruise ship construction in the U.S.

The conference, held in Washington, D.C., was jointly sponsored by MarAd and LR. MarAd's participation supports the Clinton Administration's efforts to revitalize the American commercial shipbuilding industry.

The conference was attended by representatives of American shipyards, maritime industry organizations, cruise lines, naval architects and several government agencies.

Also in recent news has been LR's selection as the society to class the new Disney mega ships to be built by Fincantieri of Italy, and LR's selection to class a new series of chemical carriers to be built by Alabama Shipyard for Dannebrog Rederi AS of Denmark (for more information on these developments, turn to page 12).

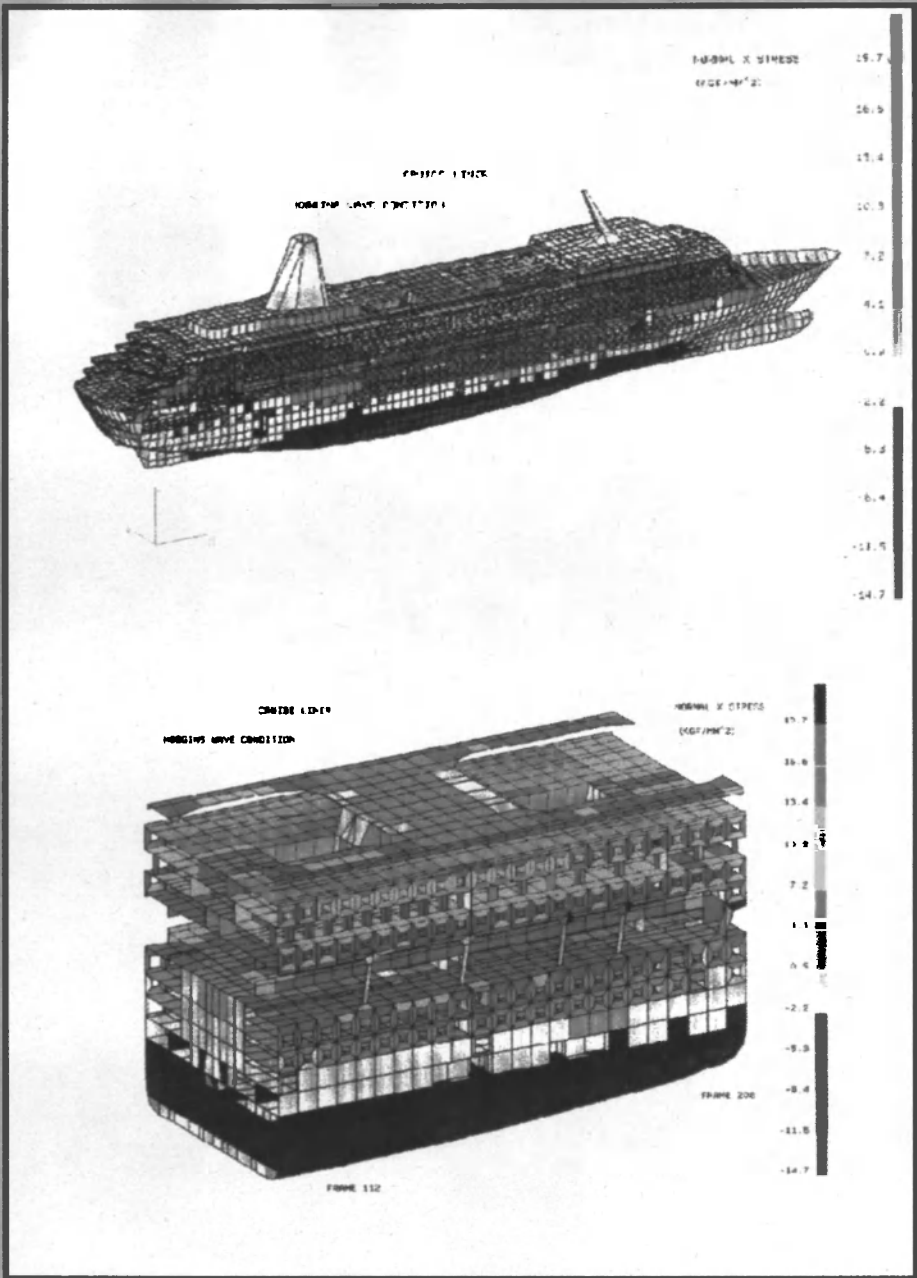
John Rugg, LR country manager for the U.S., said, "We are delighted to collaborate with MarAd on this important feasibility study and to lend our expertise to the effort to benefit the shipbuilding industry here in the United States."

Four technical papers were presented by LR personnel:

- **Mike Magill**, from LR's Statutory Services Department, presented a paper on passenger ship safety. He reviewed the development of relevant international requirements and their effect on design. He also discussed matters requiring special consideration for efficient construction of passenger ships.
- In a paper on modern cruise ship design, **Mike Gudmunsen**, from LR's Class Computational Services Group, gave an introduction to concepts such as size parameters, design and global loading and hull girder response.
- **Brian Shorman**, from LR's Engineering Services Group, presented a paper on electrical power systems. He briefly traced the history of electrical power systems on board passenger ships. He then described the modern centralized electrical power station with its load management systems and high voltage distribution, as well as electrical propulsion systems and standby power supplies.
- **John Carlton**, from LR's Technical Investigation, Propulsion and Environmental Engineering Department, discussed methods of achieving the delicate balance between the necessary performance and environmental requirements in marine propulsion and auxiliary systems design. Included were recent exhaust emissions studies and equipment monitoring methods.

Lloyd's Register currently classes 43 percent of the world's total cruise ship tonnage; that figure increases to 63 percent of the total cruise ship tonnage on order or under construction.

For more information on Lloyd's Register
Circle 82 on Reader Service Card



TOP: Normal stress plot for a cruise vessel. BOTTOM: Stress plot for midships region. Both are taken from M.J. Gudmunsen's report, *Some Aspects of Modern Cruise Ship Structural Design*, published by Lloyd's Register (LR) and presented at the recent MarAd/LR conference.

Kvaerner Masa Delivers 50,000-GT Cruise Liner *Crystal Symphony*

Crystal Symphony, the 50,000-gt luxury liner ordered by Japanese shipowner Nippon Yusen Kaisha (NYK) in 1993, was delivered in late April at Kvaerner Masa's Turku New Shipyard. The vessel will be operated by NYK-owned, Los Angeles-based Crystal Cruises, Inc. The



cruise liner is reportedly the first vessel ordered from Europe for a Japanese owner in 70 years.

Crystal Symphony is 780 ft. (238 m) long, and can accommodate 960 guests and a crew of 50. The total output of the diesel-electric machinery is 38,880 kW, and each of the two AC propulsion motors has an hp of 15,960. The vessel has a speed of 22 knots.

Kvaerner Masa's Helsinki New Shipyard also recently delivered a river icebreaker for Austrian Österreichische Donaukraftwerke AG. The vessel, *IB Rothelstein*, will assist river traffic and break ice formations at a new power station on the Danube river. This icebreaker is equipped with azimuthing electric propulsion drives, a new system jointly developed with ABB Industry in Finland, which reportedly gives the 138.7-ft. (42.3-m) vessel the capability of a large icebreaker, breaking up to 2.29 ft. (.7 m) of ice.

Crystal Symphony Particulars

Length	780 ft. (238 m)
Width	107 ft. (32.8 m)
GT	50,200
Classification society	Lloyd's Register
Speed	22 knots

Crystal Symphony Machinery

Machinery	Diesel-electric power station
Main engines	(6) Wärtsilä-Sulzer 9ZA40S
Total output	38,880 kW (52,860 hp)
Propulsion motors	(2) 11,500 kW
Propellers	(2) controllable pitch propellers
Rudders	(2) flap rudders
Thrusters	(2) 1,000-kW bowthrusters
.....	(2) 1,000-kW sternthrusters

LEFT: Kvaerner Masa-built *Crystal Symphony* leaving for sea trials.

STAGE SET FOR NEWBUILDING ACTIVITY

(Continued from page 28)

will acquire and resell shipyard space. The result: upwardly spiraling ship prices.

The upturn in new order activity should serve to draw in even more owners, owners ordering ships in order to avoid the higher prices. This action will serve to drive the prices even higher. In turn, delivery times should increase dramatically, as the available shipbuilding capacity will have initial problems being mobilized to accommodate a jump in demand. In particular, slowdowns will affect the very large ships — VLCCs and large containerhips — as space available to build these vessels would be especially tight.

U.S. Yards: Picking Up The Slack

As shipbuilding demand rises dramatically, owners can increasingly turn to shipyards in the U.S. to build a variety of vessels. The evolution of the shipbuilding industry in the U.S. over the past few years — from primarily navy to a commercial mix — has been dramatic for certain, yet still incomplete. The resources and support are in place to ensure the long-term success of U.S. yards in the commercial market.

Well-recorded in these pages has been the progress — and the steady stream of interest and orders — fueled by the revamped Title XI financing program. Although political changes and worldwide agreements seemingly pose a challenge to maintaining this momentum, it appears that nothing can stop U.S. yards from increasing their share of the commercial pie. Simply put, "The Department of Defense feels that it needs shipyards in this country, and whatever it takes to do that, it will happen. How do you keep the capacity to build military ships in the future? You have to have the assets available, and that means commercial business," said Mr. McCaul.

The sudden de-emphasis on U.S. Navy building took many in the industry by surprise, as production went from 20 ships per year in the 1980s (equaling \$4 billion annually in new orders) to just 10 ships per year in the first half of the 1990s. The result: an immediate need for U.S. yards to "think commercial."

The U.S. government was quick to help out, with money for facility conversion and upgrade projects. More important, the revamped Title XI program helped to generate serious owner interest in building ships in U.S. yards. The results to date have been impressive.

Counting contracts signed, options and letters of intent for product tankers at Newport News and on the east coast (reconstructions), the U.S. is first in the world in this product segment. "There are 14 product tankers on order or under letter of intent, and that would place the

U.S. at the top of the list worldwide," Mr. McCaul said. "I'd say that's a pretty decent penetration."

Product tankers have proven to be a natural segment for the U.S. yards to quickly find business from, as there is a strong history of prod-

uct tanker production in the U.S. Mr. McCaul points out that in the 1960s, Bethlehem Steel was a world leading builder of product tankers. Also contributing is the strong market demand in the U.S. for this type of ships, considering this country's

consumption of petroleum products. U.S. Department of Energy projections indicate a one to two percent increase in consumption, annually, in the U.S., while refinery capacity is virtually topped out. That means more product will have to be imported.

What To Build

In analyzing the world fleet, Mr. McCaul formulated a comprehensive

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Anthony Del Gavio
President

sive list of ships — by type — which will most likely prove to be the harbingers of increased business for yards and suppliers for many years to come. The following is a partial listing of those ships, with thoughts on why business prospects look so good.

Crude Carriers: market driven by sheer replacement requirements; a sudden concurrence of ships reaching the ends of their operational lives.

Chemical Tankers: continued replacement requirement will drive market; attractive price for ships, from \$60 to \$70 million, for a relatively small ship; ships include a lot of stainless steel, a lot of submerged hydraulic or deepwell pumps.

LPG Ships: not a gigantic market, but a niche business with very expensive, relatively small ships; a lot of specialty steel and lots of deepwell pumps.

LNG Ships: interesting market, but probably over-rated; these vessels are as expensive as a combatant ship, but there are some very well established players; the demand for new ships per year should be four or five, but it is a very volatile business.

Large Containerships: container trade has been booming, and there has been an increase in the trade of things that move in containers; also containerships are taking traffic away from other ships; ships are getting bigger.

Cruise Ships: always an interesting market, with six to eight new ships a year; ships are very expensive; problem (for new players) is the four well-established companies building the ships ... someone trying to get into the cruise ship business has a hard sell to make; cruise ship market will continue at a strong clip if there is not a major recession in the U.S.

IMA Associates' 220-page report, *Shipbuilding Industry Outlook For The Next Five Years*, is now available for \$875. The report analyzes 15 specific market niches, and includes more than 200 statistical tables and graphs to enable accurate business planning. For details on obtaining the report, contact *Maritime Reporter* at 118 East 25th Street, New York, NY 10010. tel: (212) 477-6700; fax: (212) 254-6271.

Sea-Land Reaps Savings In Data Solution

(Continued from page 28)

Ernie Ottinger recommended WilPak to Sea-Land, the international freight company had more than 50 nodes connected to the WilPak cloud.

With routerless frame relay, Sea-Land has been able to bypass costly dedicated circuits, as well as the extensive support equipment needed to keep them working.

WilTel is a full-service telecommunication company that offers domestic and international data, voice and video products and services to carriers and large business customers. WilTel operates a nationwide digital fiber optic network for its parent company LDDS, which is one of the four largest U.S.-based long distance carriers.

Netlink, Inc., based in Raleigh, N.C., delivers performance-assured solutions for transporting SNA plus LAN traffic over frame relay and other intelligent networks. These solutions reportedly sustain the highest quality of service for mission-critical data, assuring customers a painless transition to faster, more cost-effective communications technologies.

For more information on WilTel
Circle 51 on Reader Service Card

Maritime Reporter/Engineering N

Westinghouse Receives \$98 M Order For Ship's Service Turbine Generators

Westinghouse Electric Corp. has received a \$98 million order from Newport News Shipbuilding to provide eight ship's service turbine generator (SSTG) sets for CVN-76, the U.S. Navy's most recently authorized Nimitz class aircraft carrier.

Westinghouse's Marine Division, in Sunnyvale, Calif., will manufacture the turbines, condensers, and bedplates for the SSTGs. The generators will be provided by the company's electro-mechanical division in Cheswick, Pa. The SSTGs will be delivered in mid-1998.

Ship's service generators provide electricity for ship electronics and general service load. Westinghouse has provided eight SSTGs for each of the eight Nimitz class carriers built to date, reportedly the largest marine generators ever constructed.

For more information on Westinghouse
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Harvey Gulf International Repowers Offshore Rig-Moving Tug

Harvey Gulf International Marine, Inc., in Harvey, La., has repowered its offshore rig-moving tug *M/V Joseph Guidry*. This 6,000-hp classed tug has been retrofitted with new turbocharged EMD main engines, Lufkin reduction gears, new propellers and Kort nozzles. The rebuild project was completed by Bollinger Shipyard in Larose, La.

Harvey Gulf International specializes in offshore rig moving and ocean towing, and owns a fleet of 18 tugs ranging in size up to 7,000-hp classification.

For more information on
Harvey Gulf International
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U.S., U.K. Ship Management Businesses Form Merger

Two ship management businesses, Intercocean Management Corp. (IOM), based in N.J., and Ugland Brothers Limited (UBL), a British firm, have formed a merger. The strategic alliance was announced by the companies that will be managed by the new merger: Totem Resources Corporation (TRC), the Seattle-based Alaska cargo ship operator; and London-based Ugland International plc, a shipowner, manager, and drydock operator.

According to Robert B. McMillen, co-chairman and CEO of TRC, this is the first time two established marine management businesses have combined forces on an international scale. The new company is qualified for the management of U.S. and foreign flag vessels.

The agreement for the merger was reached with both TRC and Ugland acquiring a 25 percent ownership in the other's subsidiary. The organization, which will be called Intercocean Ugland Management Corporation in the U.S., will have 11 offices. There are presently 27 vessels under its management.

For more information on
Intercocean Ugland Management Corp.
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Bender Shipbuilding Proposal Selected For Maritech Funding

Bender Shipbuilding & Repair Co., Inc.'s proposal "Reefer 21, a Small Reefer Ship for Worldwide Training" has been selected for funding under the Maritech program. As part of the initiative for revitalizing the U.S. commercial shipbuild-

ing industry, the Advanced Research Projects Agency solicited proposals for cost-shared projects under the Maritech Program, in collaboration with the Maritime Administration.

"Reefer 21" is a design for a self-sustaining reefer ship with a 200,000-cu.-ft. capacity, capable of accommodating several different kinds of temperature-sensitive cargoes, providing more flexibility than conventionally-designed reefer ships. Bender's proposal was sub-

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Circle 343 on Reader Service Card

mitted in response to Broad Agency Announcement 95-02 which invited proposals from U.S. shipyards. Among the factors weighed in the competition was the potential significance of the proposal to enhance U.S. commercial shipbuilding competitiveness by developing a ship design for international markets, and reducing ship design and construction time and cost.

Bender Shipbuilding & Repair Co., Inc. operates a full-service fa-

cility in Mobile, Ala., with extensive drydock and fabrication capabilities.

For more information on
Bender Shipbuilding
Circle 133 on Reader Service Card

Singmarine Delivers LPG Carrier Ahead Of Schedule

Singmarine Industries Ltd. recently delivered a liquefied petro-

leum gas (LPG) carrier to its owner, Thai Oil Company Ltd., two and a half months ahead of schedule. This is the fifth vessel that Singmarine's subsidiary, Singmarine Dockyard & Engineering Pte. Ltd., has built for the same owner.

The vessel, named *Thaioil 5*, is propelled by two 600-bhp non-reversible four-stroke diesel engines, rotating at 900 rpm each, for a service speed of 10 knots. The vessel is 226.3 ft. (69 m) long, and has two

cargo tanks, each capable of carrying up to 650 cu. m. of liquefied gas. It will operate mainly in the Thai coastal waters between Bangkok and the Thai oil refinery in Choburi Province.

Singmarine is presently busy with the construction of a 6,500-dwt product tanker for Petroships, a containership for Steamer Containerships Holdings Pte. Ltd., and two harbor tugs for Keppel Smit Towage Pte. Ltd.

For more information on Singmarine
Circle 11 on Reader Service Card

Seattle Port Commission Authorizes \$109 M For Southwest Harbor Project

In late April, the Port of Seattle Commission voted to fully fund its Southwest Harbor Project by authorizing expenditures up to \$109.5 million for construction and related activities. The primary purpose of the project is to clean up and redevelop industrial property in order to enlarge and modernize Terminal 5 to meet the long-term needs of the tenant, American President Lines (APL), and other users of the facility.

The construction activities are scheduled to begin in July, pending the issuance of all permits. Environmental cleanup work is currently underway, and the improved facility is expected to be operational by 1997. To date, \$158 million has been authorized towards property consolidation, environmental cleanup, and construction. The completed terminal will be APL's Pacific Northwest load center.

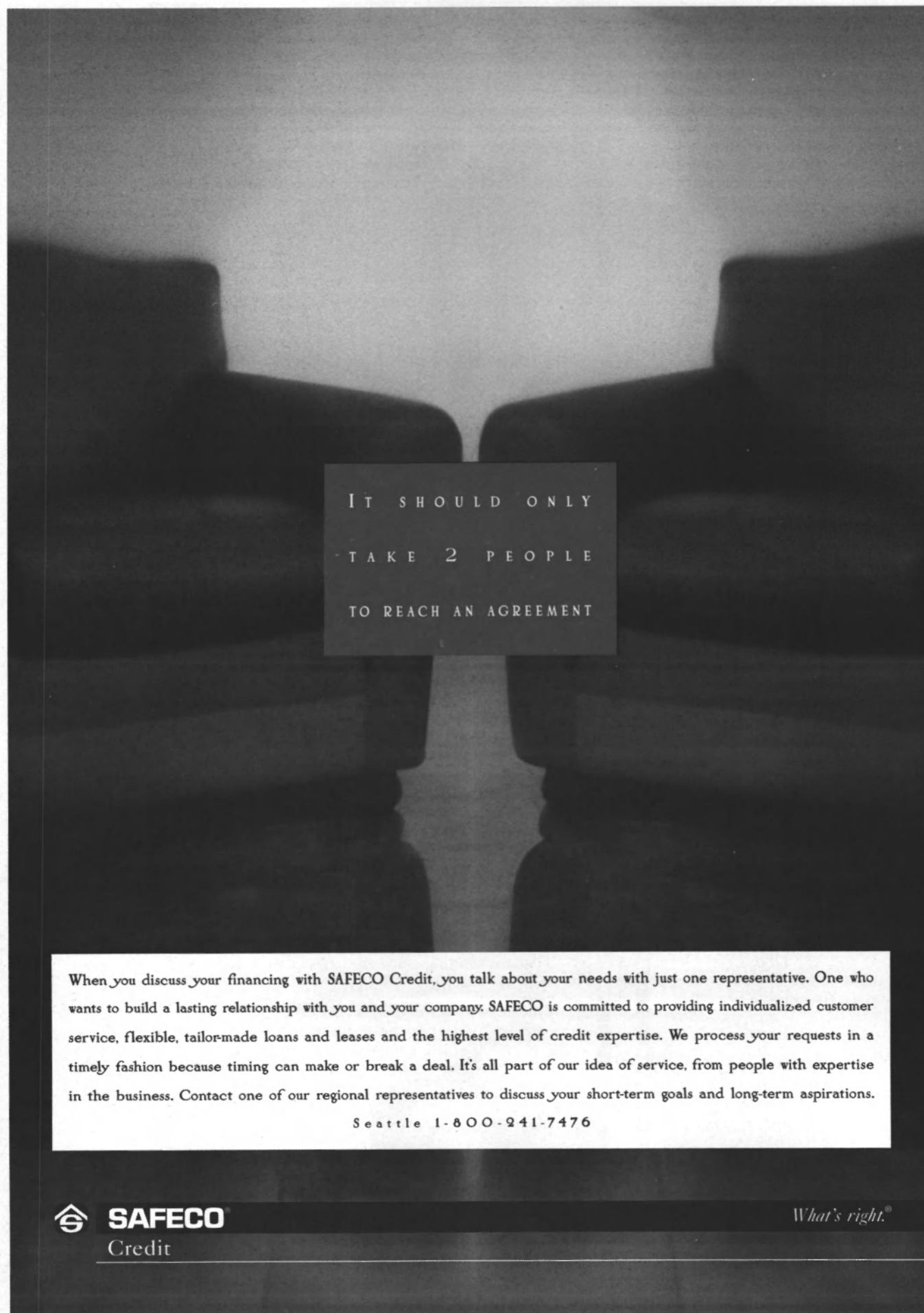
The Port of Seattle is an economic catalyst to the Puget Sound region and is a gateway to the Pacific Rim, handling \$35 billion in sea/air trade annually.

Southwest Marine Awarded \$80 M U.S. Navy Contract

Southwest Marine Inc. (SWM), in San Diego, Calif., was awarded a U.S. Navy contract for repairs, alterations and maintenance for six LPD-4 class vessels homeported in San Diego. The sixteen Phased Maintenance Availabilities, including drydocking and non-drydocking work, are scheduled to begin in July and to be completed in December 1999. The package includes any necessary emergency repairs.

The ships involved in this contract are: USS *Coronado* (AGF-11); USS *Oden* (LPD-5); USS *Juneau* (LPD-10); USS *Denver* (LPD-9); USS *Duluth* (LPD-6); and USS *Cleveland* (LPD-7). According to Herb Engel, president and COO of SWM, "The award of this contract will enable us to provide employment stability in this uncertain marketplace. We will be able to maintain our current workforce over the life of the contract."


For more information on
Southwest Marine Inc.
Circle 13 on Reader Service Card



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TECHNOLOGY

MIT: Putting FastShip To The Test

Hydrodynamic tests come up positive for revolutionary ship design

The proceeding article was excerpted from a paper created from test results of the FastShip design. The tests were conducted by the Massachusetts Institute of Technology's Department of Ocean Engineering, and the paper authored by Paul D. Sclavounos.

The Massachusetts Institute of Technology's (MIT) Department of Ocean Engineering recently put the TG 770 FastShip through tests to verify its hydrodynamic performance, and in the words of MIT, "the vessel ... is outstanding in all aspects of its hydrodynamic performance." Test results also appeared to point to a promise that the vessel may be able to maintain a speed nearing 40 knots in extreme North Atlantic sea states.

The Test

Over the past 10 years — under funding by the U.S. Navy and DNV — a three-dimensional panel method has been developed at MIT for the simulation of the free surface flow past realistic ship forms. A code has been written known as SWAN (ShipWaveANalysis) which is capable of predicting the Kelvin wave pattern and residuary resistance of ships in calm water and the motions and wave-induced loads in a sea state.

SWAN was first used to evaluate the calm water performance of the TG 770 FastShip (F/S). Computations were carried out of the residuary resistance of the vessel over the speed range of 30 to 50 knots. The different components of the ship resistance were identified including the frictional resistance which is proportional to the ship wetted surface, and the residuary resistance which was found to consist of a wave, hydrostatic and vortex or induced components. The sensitivity of each resistance component upon the hull shape was identified in a way not possible to discern from a traditional tank test.

Comparisons of the residuary resistance computed by SWAN with experiments carried out at SSPA was found to be very encouraging over a broad speed range. Moreover, a qualitative comparison was carried out with the residuary resistance of the well-established and popular semi-displacement British National Physical Laboratory (NPL) hull forms which resemble the F/S. For comparable length-displacement, beam/draft and transom area ratios, the residuary resistance of the F/S design was found to be 15 percent less than any comparable semi-displacement hull form.

The hull form was then put to the test in a typical North Atlantic sea state, including the heave-pitch motions, wave-induced vertical bending moment and shear force distributions, relative motion and added-wave resistance in head waves.

The added-wave resistance is perhaps the

(Continued on page 49)

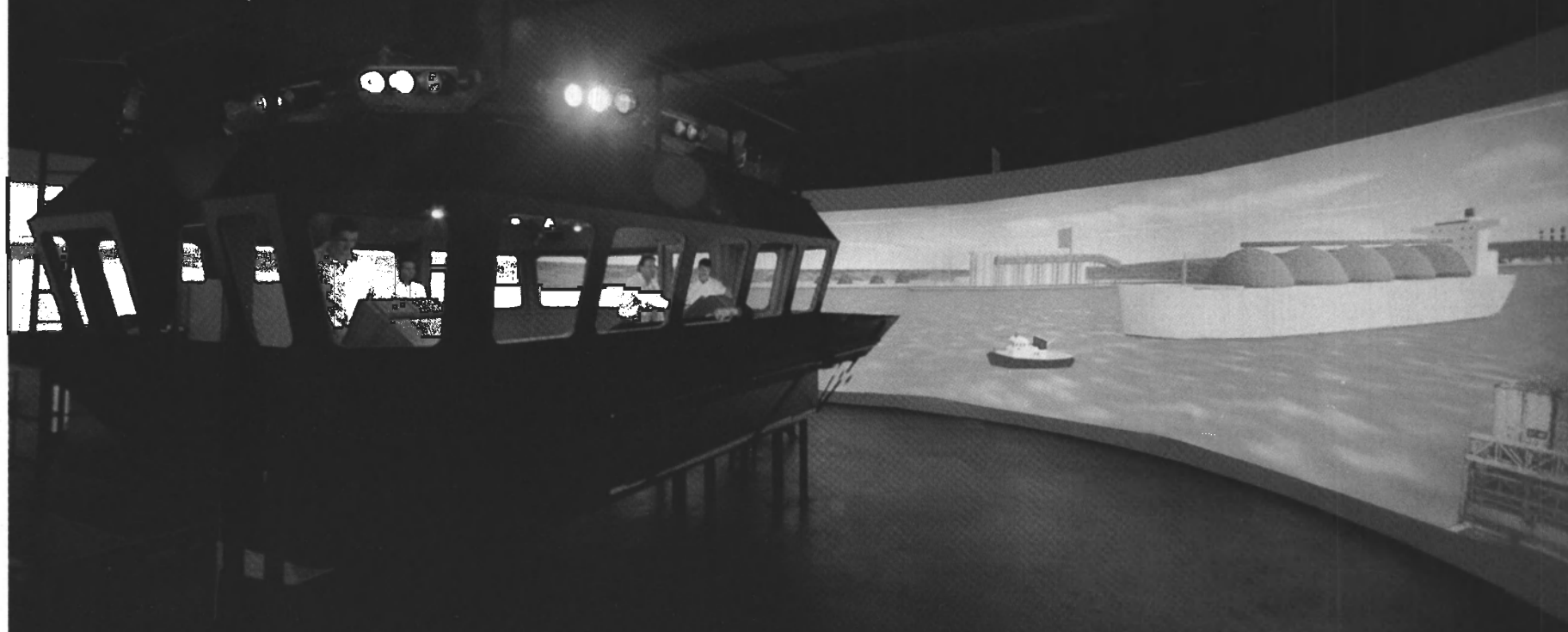
Technological advances play a critical role in all facets of the maritime industry in terms of making vessels — as well as building and repair procedures — more efficient, cost effective, safe and environmentally sound. Maritime Reporter & Engineering News is dedicated to discussing these technologies, and their ramifications to the shipowner, builder, repairer and supplier. The ensuing pages highlight just a few ongoing projects which promise to accomplish those goals in the coming years.



TAKING TECHNOLOGY TO NEW DEPTHS: This pressure hull research model, configured to a Trafalgar Class nuclear submarine and programmed to perform emergency recovery maneuvers, is a symbol of the sophisticated world of marine development at the Haslar Hydrodynamic Test Center at Gosport. The submarine model's glass reinforced plastic skin can be changed to simulate any new hull shape for testing purposes, and is designed to be adapted for non-military submersible applications. "We sell confidence and understanding to naval architects, shipbuilders, designers and engineers," said David Rainford, general manager of the Haslar test center. "We do this by physical testing and modeling to prove their designs. We sell the know-how to do this accurately."

For more information on technologies from Haslar
Circle 117 on Reader Service Card

U.S. Coast Guard 'Approves Simulator Testing By RTM STAR Center



A significant step has been taken to improve maritime safety and the protection of the environment by the U.S. Coast Guard. RTM STAR Center has been granted approval by the Coast Guard to provide simulator-based testing. Qualified mariners may now use simulator testing to demonstrate on-the-job skills required for an Unlimited Master's License. Many feel this is the first step toward simulator-based testing at various levels.

Those who have experienced simulator training know it is an economical, safe way to gain years of sea time skills in one to two weeks of classroom training. RTM STAR Center, the largest commercial simulator trainer in the U.S., offers over 30 courses utilizing bridge, engineroom, cargo handling and radar/ARPA simulators. There are specialized courses for mariners on tankers, tug-barges, workboats, and cruise ships.

You can reduce human errors and prevent the loss of property and life by enrolling crews in simulator-based training courses. Follow the Coast Guard's lead by calling Harry J. Crooks, Director of STAR Programs, for a complete listing of classes.

★ Training exercises on the bridge of this 360-degree field-of-view simulator can be customized to meet specific user needs. Simulator training sharpens a mariner's professional knowledge and operating skills.



★ The liquid cargo handling simulator can function independently, or in an integrated mode for full mission exercises.



★ Engineroom simulator training can help prevent equipment damage, reduce vessel downtime and increase operating efficiency.

RTM STAR Center

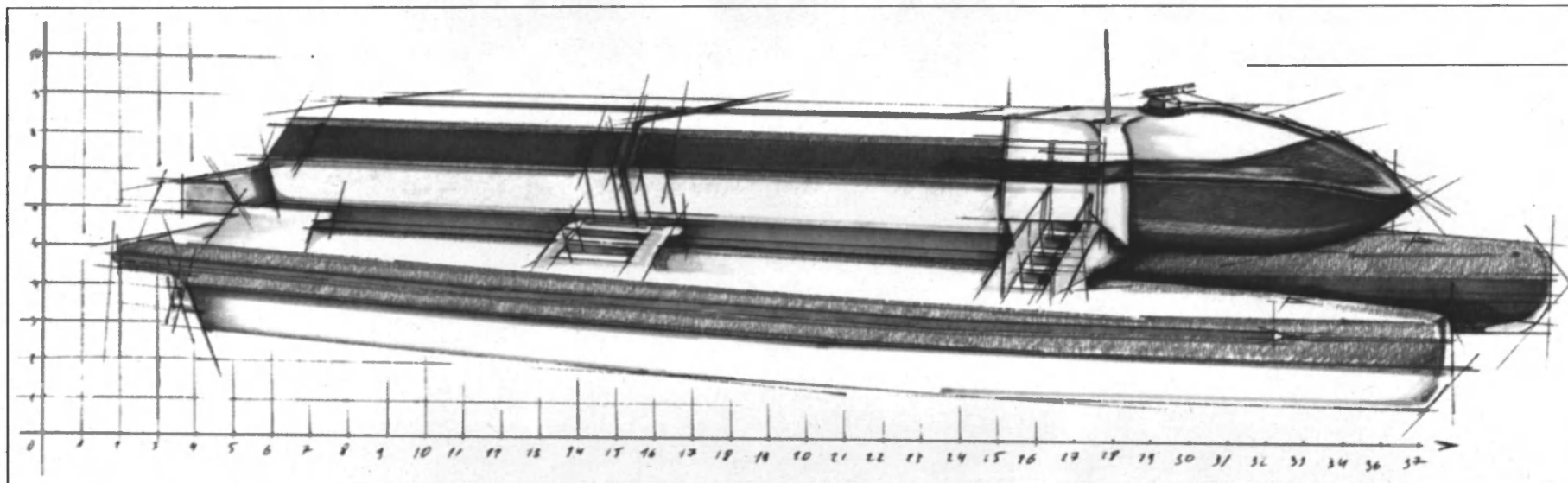
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Circle 33 on Reader Service Card

TECHNOLOGY

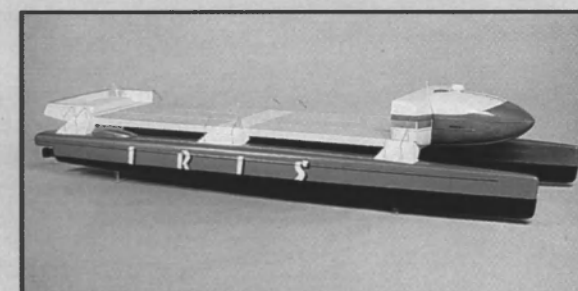


IRIS: New Concept For Multipurpose Catamaran

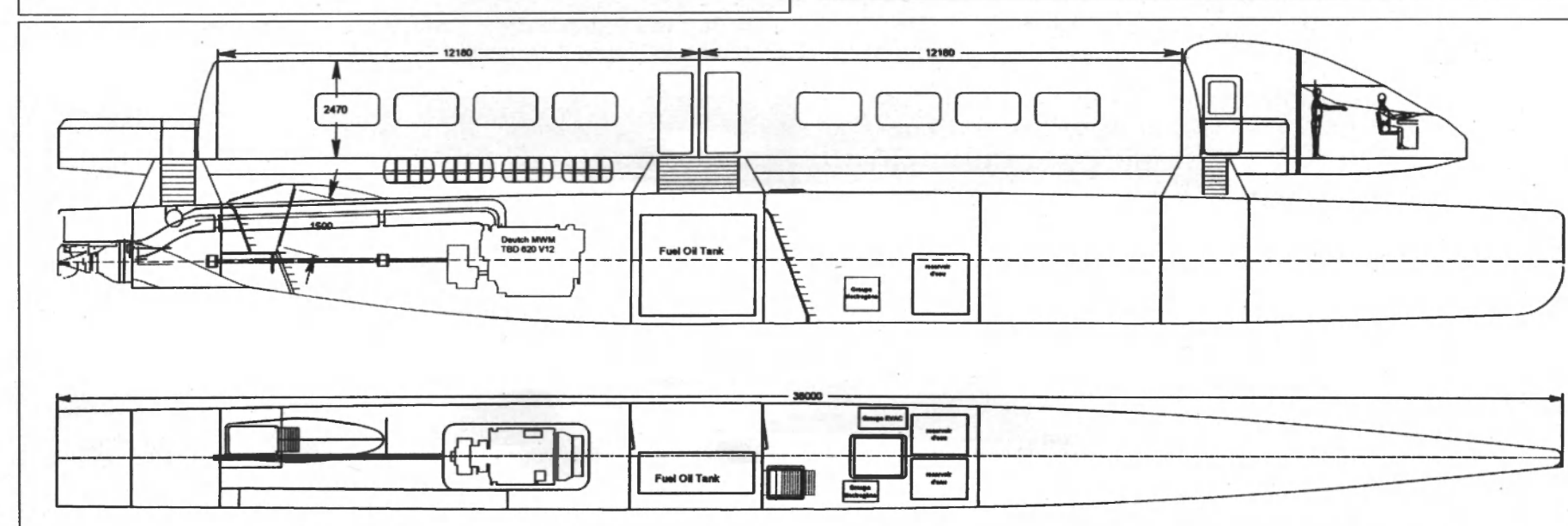
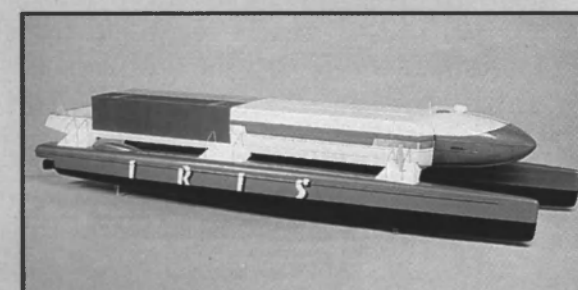
The InteR Island Shuttle (IRIS) project is a new multipurpose catamaran concept — meant for relatively short distances (maximum four hours sailing) for the transportation at sea of passengers, containers or eventually, special cargo. Developers laud the vessel's high speed and flexibility, which allow it to fit the needs of most any operator. Following are some specifications for the next-generation vessel.

For more information on IRIS
Circle 120 on Reader Service Card

IRIS CONFIGURATIONS			
Dimensions	Iris 4	Iris 6	Iris 8
Length o.a.	125 ft. (38 m)	125 ft. (38 m)	125 ft. (38 m)
Beam	36 ft. (11 m)	40 ft. (12.16 m)	48 ft. (14.71 m)
Draft	3.8 ft. (1.15 m)	4 ft. (1.27 m)	4.5 ft. (1.37 m)
DWT	38	55	70
Passengers	160	240	320
Speed (fully loaded at 90% MCR)	25 kn	26 kn	31 kn
Max. speed	31 kn	34 kn	36 kn
Propulsion	2 Deutz MWM 616-V12 2 Deutz MWM 620-V12 2 Lips LJ56DL	2 Lips LJ64DL	2 Deutz MWM 616 V16 2 Lips LJ70DL
Classification:	DNV		



The InteR Island Shuttle concept from IRIS Catamarans was designed with flexibility in mind. The vessel can be built as a multipurpose platform (top) or as a mixed passenger and cargo ferry (bottom).



TECHNOLOGY

Ingalls Wins \$21.7 Million Aegis Support Contract

The U.S. Navy has awarded Litton's Ingalls Shipbuilding division, Pascagoula, Miss., \$21.7 million to continue engineering and planning services on the Arleigh Burke (DDG-51) class Aegis guided missile destroyer program.

This award extends Litton's engineering, design and technical planning services work on the destroyer program for the second year of a five-year contract with a total potential value of about \$177 million.

Last June, Litton was awarded \$30.5 million for the first year of the current contract. Litton has been involved in technical services and planning work for the destroyers since December 1988.

Ingalls has built and delivered four Aegis destroyers, and is currently under contract for 10 additional ships of the class. The fifth vessel, *Russell* (DDG-59), was commissioned into active service on May 20, at Naval Station Pascagoula.

Litton is a leader in worldwide technology markets for advanced electronic and defense systems, and a major designer and builder of surface combatant ships for the U.S. Navy and allied nations.

For more information on Ingalls, Circle 162 on Reader Service Card.

Refrasil: High-Temperature Stability Welding Cloth

A new product line of Refrasil Welding Grade Cloth (WGC) has been introduced by BP Chemicals (Hitco), Inc. The products, in nominal widths of 36 in. and varying in thickness from .032 in. to .056 in., are designed to resist continuous temperatures to 1,800 degrees F (982 degrees C). Thermal protection continues during intermittent exposure to temperatures over 2,000 degrees F (1,093 degrees C), although some embrittlement and shrinkage does occur.

When used as welding blankets, screens and shielding, Refrasil cloth reportedly protects personnel, equipment and finishes from radiant heat, molten metal splash and sparks. The cloth also finds wide usage for stress-relieving pads, furnace curtains, casting mold protection blankets, heat treating, separator cloth, and general weld protection in shipbuilding and repair, and many other industries.

Standard weights of the fabric are 18 and 30 oz./sq. yd. An abrasion-resistant (AR) version (19 and 34 oz./sq. yd. weight) utilizes a urethane finish to enhance surface toughness and provide durability

against dragging, scraping, tearing and snagging that may occur in a rugged industrial environment.

WGC cloth products are made up of continuous filament amorphous silica fibers. The high silica content of 96 percent, according to Hitco, offers reliable thermal protection and

resistance to most chemicals, corrosive compounds and other elements within the cloth's temperature range. Low chlorine content reportedly enhances suitability for welding stainless steels as well as ensuring against weld contamination.

The WGC products augment the

existing line of industrial grade Refrasil cloth products which include Standard (UC 100), Abrasion Resistant (AR 100), Pre-Shrunk (C 100), higher-temperature Irish (C 1554) and Coated Irish (2221).

For more information on BP Chemicals, Circle 69 on Reader Service Card.

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The HX340 is available in both UHF or VHF at five watts. With eight channel capability, channels 6 and 16 are included on the VHF. The UHF provides four of the most commonly used UHF frequencies in the 450 MHz range. For that extra measure of security, the HX340 features a low battery warning light.

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TECHNOLOGY

Five-Year R&D Results In Advanced Drilling System

The Integrated Drilling System (IDS), the result of a comprehensive five-year research and development program, was the focus of a two-day seminar at RF-Rogaland Research in Stavanger, Norway. As part of the program, RF's *Ulrigg* was developed into an IDS prototype—a fully automated drilling rig which uses advanced computer technologies.

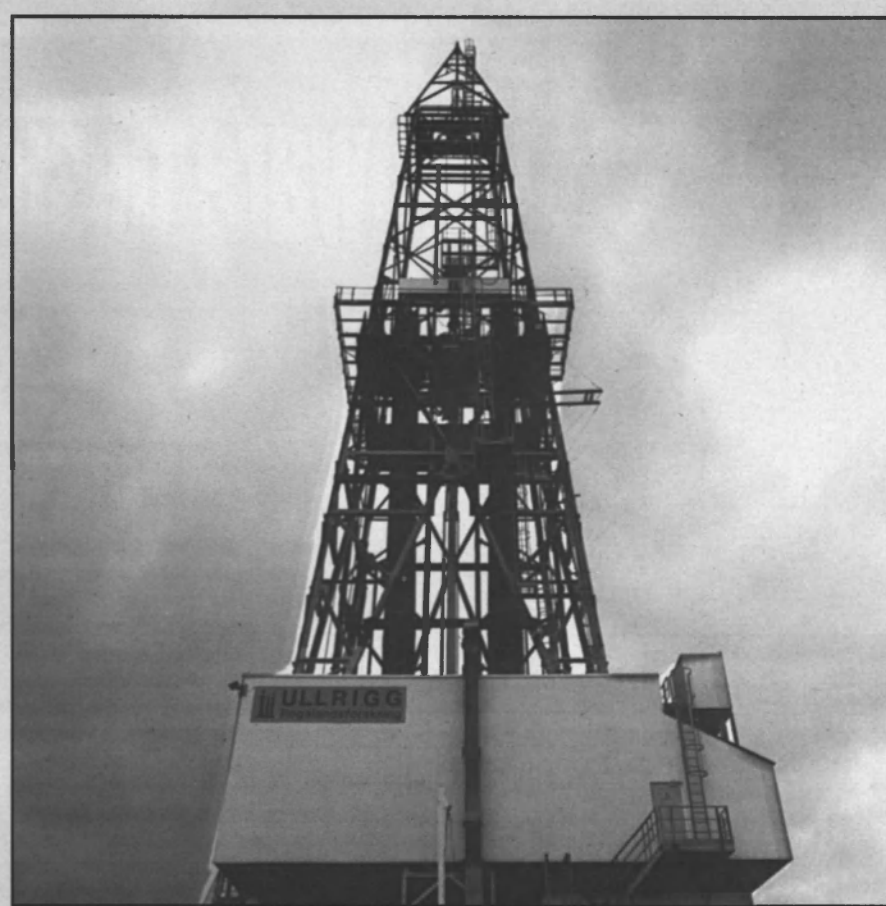
The IDS is capable of remotely controlled drilling without drilling crews on the drill floor and automatic tripping. The designers of the system emphasize its safety, speed, quality and cost reduction benefits.

The Technology

The IDS is viewed as a technical breakthrough with regard to remote control and automation of drilling operations. The IDS represents three levels of integration: integration and control of the different drill floor machinery into one advanced control room operation station; integration of computer technology and machinery including algorithms for cost-optimized drilling; and integration of the drilling-related services in the same control room (mud-logging, wire-line, cementing, etc.). Additionally, the fully automated drilling process has safety ramifications, as it removes personnel from the potentially dangerous drill floor environment.

Esso initiated the IDS program in 1990, and has provided the bulk of the investment in the project. RF-Rogaland Research, with its unique drilling facility *Ulrigg*, has been the main contractor. But creating the technical solutions is only one part of the project.

Transferring the results from the lab to commercial use is of equal importance. Hitec AS, a system supplier, and rig operator Smedvig Drilling have been heavily involved in the development of the IDS, and both have played a big role in developing the system into a commercial product. The entire system is compatible, and can be delivered to existing rig designs. Expectation of its commercial success is high, as parts of IDS have been delivered by Hitec to the Troll Platform and to the Hibernia Development Project in Canada. It was also ordered by Phillips Petroleum Co. of Norway, where the IDS concept has been taken into the fabrication plans for the 2-4X wellhead platform.



The Integrated Drilling System (IDS) is the result of a five-year R&D program, and is capable of remotely-controlled drilling without drilling crew on the drill floor, and automatic tripping.



Cyberbase, the man-machine computer, is now installed at Ulrigg.

TECHNOLOGY

Scot Forge Produces Record Size Rolled Ring For New Subs

The U.S. Navy, through subcontractor Martin Marietta, had been trying to procure a ring destined to be part of the new, advanced-design stealth propulsion system for the Seawolf class submarine. The propulsion system is super silent and reportedly undetectable by current sonar systems. The ring needed — known as a propulsor cone — was to have both inner and outer diameter profiles, and would finish at just under 200-in. O.D. and 42-in. face.

In mid-1994, Scot Forge installed a new fully automatic Wagner Ring Mill, reportedly one of the largest and most advanced in the world.

With 450 tons of radial force (400 metric tons) and 280 tons of axial force (250 metric tons), the new ring mill, in conjunction with an in-house, 3,000-ton hydraulic open die press, had the ability to do exactly what the Navy needed. Scot Forge won the order.

The company worked closely with the material supplier, Electralloy, a G.O. Carlson Co., which poured a 67-in. (170-cm) Nickel Aluminum Bronze (UNS C63200) ingot weighing 50,000 lbs. (23,000 kg). The alloy — while rarely used in forgings of this size — was chosen for its strength, resistance to corrosion and damping capacity (ability to absorb sound).

Rolling sequences were initially simulated using Rolltech, a software created specifically for the Scot Forge ring mill. After the ring mill was modified for the task, production took place and the result is the largest known defect-free profiled Nickel Aluminum Bronze ring in the world. Scot Forge, which received ISO 9002 certification in 1992, has been a leading manufacturer of open die forgings for more than 100 years.

For more information from Scot Forge
Circle 151 on Reader Service Card

Peterson Builders Heads Development Of New Urban Commuter Ferry

Peterson Builders, Inc. of Wisconsin was chosen to receive funding under the Advanced Research Projects Agency (ARPA)-sponsored program of research and development in the Maritech Near-Term Technology Applications program to develop the City Slicker high-speed urban ferry. The new ferry design will be developed in conjunction with PBI's consortium partners Spirit Cruises of Norfolk, Va., and FBM Holdings of Cowes, Isle of Wight, U.K.

PBI, Spirit and FBM will develop a new technology high-speed

ferry for urban commuter application in protected and semi-protected waters. The new ferry design will have low wake wash characteristics, which will reduce wake-induced shoreline erosion on its route.

PBI is licensed by FBM to market and construct its complete line of

high-speed ferries in the U.S. The new urban ferry design, City Slicker, will not only include performance improvements to support environmentally friendly introduction into its service routes, but will also allow PBI to employ series production manufacturing. The series produc-

tion technology and resulting process improvements will significantly improve PBI's ability to compete in both the international and domestic markets.

For more information from
Peterson Builders
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Circle 331 on Reader Service Card

TECHNOLOGY



Model tests of the SeaCoaster indicate the vessel is capable of high speeds and high efficiency.

First Full-Size SeaCoaster Built

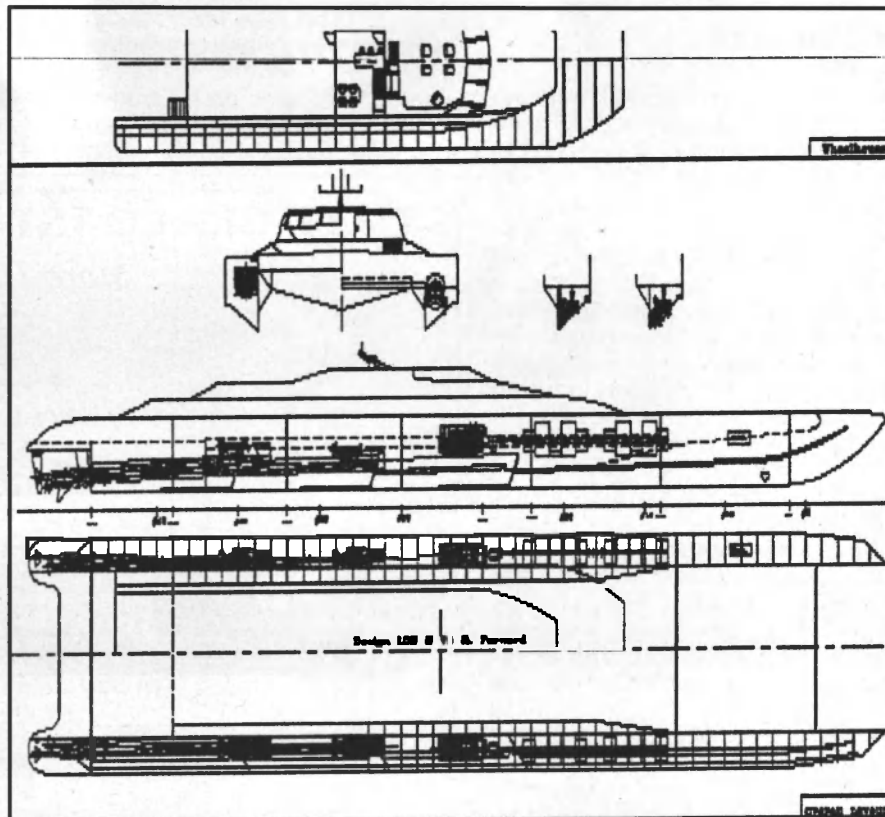
Air Ride Craft and Able Boat Inc. announced the construction of the first full-size commercial SeaCoaster. The new vessel is a catamaran-hulled Surface Effect Ship (SES), but reportedly differs extensively from the generic flexible seal SES.

The SeaCoaster has a high length to beam blower pressurized air cushion under each sidehull. The two widely separated air cushions, thus formed, support 85 to 90 percent of displacement. The sidehulls have very fine entry wave slicing bows, designed to provide outstanding seakeeping. Seakeeping ability can reportedly be enhanced by a hydrofoil between the sidehulls forward. The SeaCoaster has flexible seals and no air cushion between its sidehulls.

The SeaCoaster being built by Able is 45 x 18 ft. (13.7 x 5.5 m). The vessel is being built with advanced composites to provide high strength and low weight. The boat is being configured to be a 48-passenger, 45-knot ferry.

The SeaCoaster hull shape is what reportedly makes for an inherently strong structure longitudinally, as there are four full-length keels, two on each sidehull. Transverse strength is ensured by four robust watertight bulkheads positioned fore and aft of the blower compartment, and of the engine compartment. The composite construction hull incorporates E-glass skins and specialized cores, and the specific mechanical properties of two uniquely different state-of-the-art cores are being integrated to provide an optimum design to meet ABS and U.S. Coast Guard certification. One is Core-Cell, a new generation of closed cell linear polymer foam core, by ATC Chemical Corp. of Buffalo, N.Y. The other is a high-strength, lightweight honeycomb structural core supplied by Nida-Core Corp. of

Hoboken, N.J. The two aluminum and stainless steel blowers are driven by a single Caterpillar 3054 diesel at 67 kW (90 hp) through a right angle T-gear. The two main propulsion engines are Caterpillar 3126 diesels at 260 kW (350 hp). The Caterpillar diesels were supplied and engineered for the application by Pantropic Power Products of Miami, and model tests show speeds with this power of more than 50 knots at moderate loads, and approximately 40 knots at full loads.



General arrangement of the Gentry Transatlantic vessel. See full story next page. (Note: Because of the confidential nature of these drawings, it was necessary to reproduce them at a much smaller scale.)

To find out more about John Deere diesel engines for marine applications, contact one of our authorized distributors listed below:

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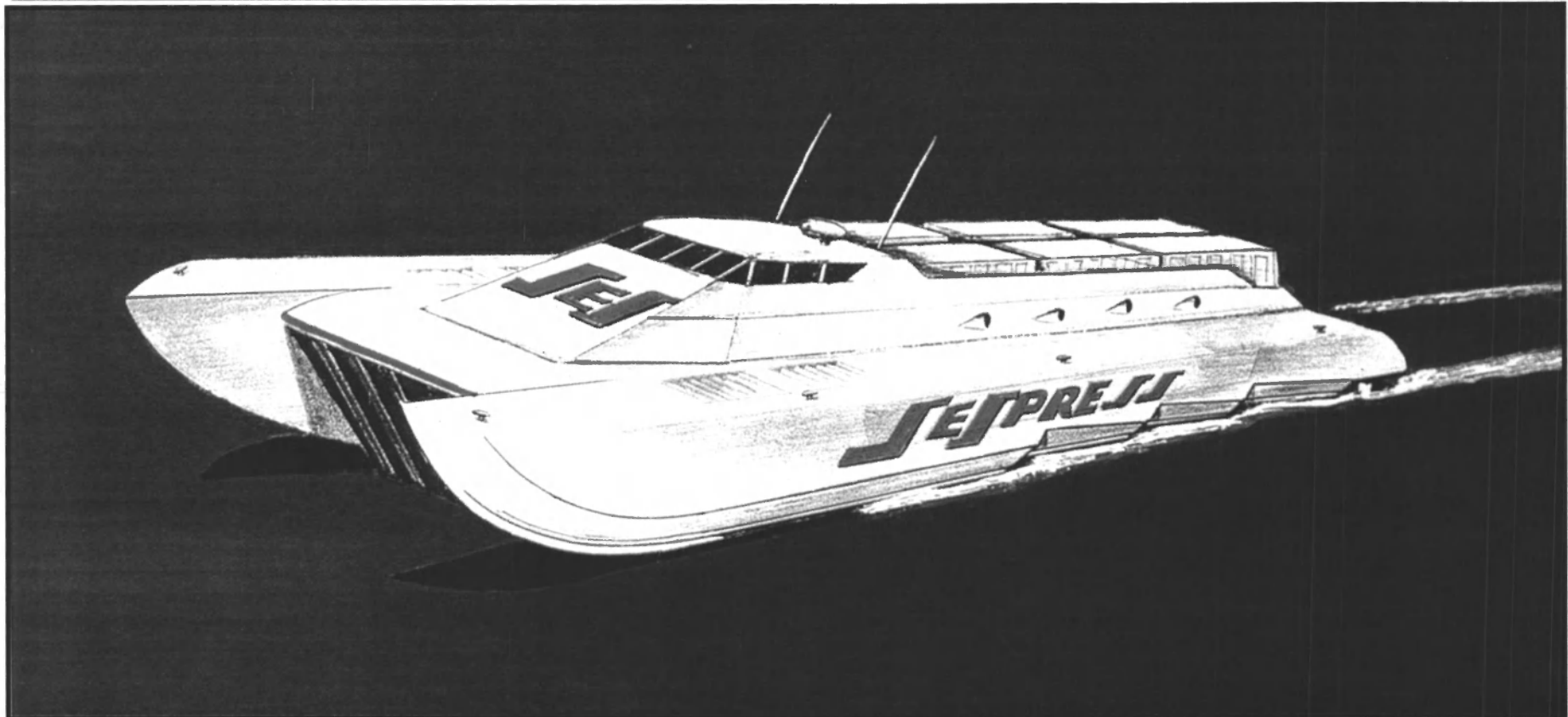
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 Fax: (912) 435-2946
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 Fax: (501) 684-7338
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 Fax: (515) 964-6119
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 Fax: (517) 278-8272
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 Fax: (33) 38 82 60 00
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JOHN DEERE
INTERCONTINENTAL GmbH
 400 19th Street
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TECHNOLOGY



Art Anderson Associates' rendition of the Gentry fast craft, which will also be designed for commercial shipping purposes.

Gentry Effort: Fast Design With Commercial Potential

Based on research by the Gentry Transatlantic team, a new very high-speed Surface Effect Ship (SES) is showing great promise for the commercial market. The team, whose aim focuses on building a vessel to set a new Atlantic crossing

record, said the SES could provide the basis of the next generation of high speed passenger ferries, but the main market for the concept would be for the rapid transport of perishable or high value cargoes.

The size of the prototype design

has been set at 147 ft. (45 m), the optimum size to carry adequate fuel for the 3,000-mile Atlantic crossing.

The design team projects the market for high-performance marine cargo carriers is likely to expand with the advent of high-speed craft

such as this. The Gentry Transatlantic team is headed by project manager **John Connor** and includes **Chris McKesson** of Art Anderson Associates. The team is currently seeking a major shipyard to complete development of the design.

For more information on the project
Circle 121 on Reader Service Card

JOHN DEERE ENGINES
ARE COMIN' ON STRONG



IN CRANE BARGES.

"Very little maintenance."

Joel Smith, of R&D Maintenance Service operates a new 54' x 160' crane barge with two Deere gen-set engines. He also uses two Deere powered compressors elsewhere in the project. "To my knowledge we haven't had to do anything but routine service on any of them."

"Seven years old and the engines run with no problems."

Smith likes the way even older Deere engines keep delivering the performance he needs. "The compressor engines have been in service for 7 years now, and they still work like the new ones. They just keep running. They give us the dependability we need on projects like ours."



John Deere engines from 70-300 hp (52-224 kW) are being used on more workboats of all kinds every day. Talk to the people who use them and find out why.

Circle 244 on Reader Service Card

Gentry Transatlantic
Vessel Specification

Hull	Aluminum
Wheelhouse	Aluminum
Length o.a.	185 ft. (56.3 m)
Beam	50 ft. (15.2 m)
Weight:	
Full load	826,682
Half load	581,682
Main Propulsion ..	(4) Allison turbines
Drives	(4) Arneson ASD-18
Gears	(4) Maag
Drivelines	Addax

TECHNOLOGY

Ultrasonic Bubble Test Used For Leak Detection

UE Systems, Inc.'s patented Liquid Leak Amplifier (LLA), used in conjunction with the Ultraprobe 2000 Ultrasonic Inspection System, is used for detecting extremely low-

level gas leaks which produce minimal turbulence. A liquid solution with low surface tension, LLA reportedly has two major advantages: bubbles do not have to be visible to detect leaks; and bubbles form and collapse almost instantly.

For more information from UE Systems
Circle 149 on Reader Service Card

Bergan Introduces New Monitoring Technology

Using patented technology created for the U.S. Navy, Ian-Conrad Bergan Inc. has developed a state-of-the-art modular sensing and evaluation system that can be used in marine or offshore vessels, as

well as other industrial applications.

Dubbed Guard Wire, the system is designed to perform automatic remote sensing and signal evaluation functions, including alarms and trending. The core of the technology is a patented two-wire system which incorporates both the means to communicate with remote sensors and the means to power them. Guard Wire sensors can be customized to monitor and detect a range of substances, environmental conditions and equipment conditions.

For more information on the system
Circle 150 on Reader Service Card

How To Make 1000 Tons Of Steel Handle Like A European Sports Car.



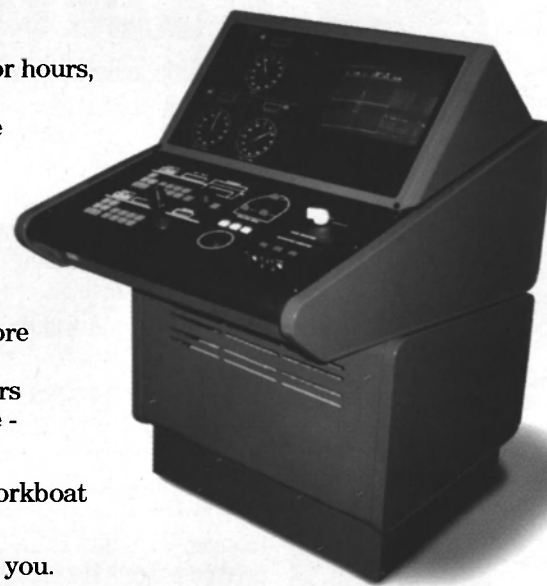
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Ulstein Wins Order For Seismic Research Vessel

A contract worth approximately \$34 million was won by Ulstein Verft to build a seismic research ship for the South Korean government.

The order is the first for the yard from an Asian customer, and calls for the delivery in the second half of 1996. The vessel is a new Ulstein design dubbed UT 723.

For more information from Ulstein Verft
Circle 148 on Reader Service Card

Art Anderson Develops Fast Ferry For Sensitive Waters

Washington-based naval architects at Art Anderson Assoc. have developed a new high-speed passenger-only ferry designed specifically for fragile waterways. Building on the company's research in low-wash hull forms, the firm has developed a 35-knot catamaran ferry intended to carry 330 passengers. The firm believes this vessel is suitable for routes in archipelagoes, such as those in Puget Sound, Alaska and Patagonia. The passenger space is designed to be built as a module and fixed on resilient mounts to minimize vibrations and noise. The 137.8-ft. (42-m) passenger ferry is only one example of the firm's low-wash catamaran concepts.

For more information on the design
Circle 153 on Reader Service Card

Furuno Debuts New Video Sounder

Furuno has added a new member to its family of professional grade fishfinders, the FCV-292. The new 10-in., dual frequency sounder is a reportedly rugged, cost-effective solution for commercial fishermen and larger sportfishing yachts.

The FCV-292's 1,000-watt RMS output and dual frequency operation — from 28, 50, 88 and 200 kHz — make it a versatile unit. Echoes are displayed on the high-resolution CRT in up to 16 colors or multi-level monochrome amber, for optimum evaluation of fish schools and seabed conditions.

For more information from Furuno
Circle 154 on Reader Service Card

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Circle 363 on Reader Service Card

TECHNOLOGY

MIT: Putting FastShip To The Test

(Continued from page 38)

most important seakeeping property from the point of view of speed performance in a high sea state. Computations of the added-resistance were carried out in a North Atlantic irregular sea state with upcrossing period of 10.4 seconds and significant wave height of 20 ft. (6 m) with the F/S advancing at 40 knots. It is worth noting that a significant wave height of 20 ft. does not preclude the occurrence of wave heights several times higher. The resulting increase in resistance was equivalent to 23,000 EHP, or just 5.5 percent of the installed power. The corresponding added-resistance index was found to be 0.15, which is lower than the corresponding index of naval or commercial ship forms, which typically have rough water resistance several times higher the F/S. The only hull form for which a smaller index was found is an America's Cup yacht advancing at a comparable Froude number.¹

The low added resistance of the F/S is perhaps its most remarkable

feature, and it is attributed to two aspects of its design. First, its hull form is characterized by a fine bow and a wide shallow transom stern, which are responsible for the low heave and pitch motion amplitudes relative to a conventional cruiser stern ship. The second is the length of the F/S, which on the waterline is about 755 ft. (230 m) and quite larger than the typical wavelength encountered in typical ocean wave spectra. It is known from oceanography that the typical period of the steepest wave encountered in ocean storms is very unlikely to exceed 10 to 12 seconds. The corresponding wavelength is less than 492 ft. (150 m), which is quite smaller than the F/S waterline length.

Wave-Induced Structural Loads & Relative Motion

Computations were carried out of the vertical shear force and bending moment RAO distributions along the F/S length in a head-wave Pierson Moskowitz spectrum at wave

upcrossing periods of 0 to 25 seconds. At the critical spectrum of 10.4 seconds period and 20 ft. significant wave height at 40 knots, two nearly equal maxima for the shear force were found to occur, one 10 percent of the F/S length upstream of the stern and the second 65 percent of the length from the transom. In the same spectrum, the vertical bending moment maximum was found to occur 45 percent of the F/S length from the transom.


The relative wave motion and velocity and the ship acceleration were also computed along the length of the F/S at 40 knots in the critical Pierson-Moskowitz spectrum. These quantities are needed in order to access the occurrence and severity of slamming and to evaluate the inertia loads on the cargo caused by the ship acceleration. Relative motion and velocity plots showed modest values near the bow and significant reduction of their magnitude near the F/S stern, indicating that slamming and white water are un-

likely to occur near the aft end of the ship where the waterjet inlets are placed. Near the fore perpendicular, some slamming may occur, but the severity of the resulting loads is alleviated by the V-shaped bow sections.


Comparison of seakeeping quantities were also conducted with independent computations of the same extremes carried out by Professor **Tendrup Pedersen** of the Technical University of Denmark (DTU) using more conventional strip theory. With exception of the relative velocity, which was traced to a difference in the MIT and DTU definitions, all seakeeping quantities were found to be in good agreement despite the disparity of the methods used.

¹ The Froude number is a measure of residuary resistance. Froude's Law of Comparison establishes that the residuary resistances of similar ships at corresponding speeds vary directly with the ships' respective displacements.

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WORLD YARDS — SHIPS ON ORDER

The following is a list of ships on order in yards around the world, a result of a limited survey by the editors of *Maritime Reporter & Engineering News*. (NOTE: all dimension are in meters). Publisher is not responsible for omissions or errors. (Source: *Maritime Reporter & Engineering News*, June 1995.)

YARD Name/No.	Type	Dimensions/ Capacity	Engine	Owner	Delivery	Yard Name/No.	Type	Dimensions/ Capacity	Engine	Owner	Delivery
Aarhus Flydedok A/S, Aarhus, Denmark						Legend of the Seas	Cruise ship	263 x 32 x 7.5	—	RCCL	4/95
Arktis Faith	Containership	6,800-dwt	Krupp MaK	Elite Shipping A/S	6/94	Splendour of the Seas	Cruise ship	263 x 32 x 7.5	—	RCCL	4/96
Arktis Fantasy	Containership	6,800-dwt	Krupp MaK	Elite Shipping A/S	10/94	—	Ferry	172 x 30 x 6.6	—	SNCM	4/96
Malbridge Flash	Containership	6,800-dwt	Krupp MaK	Elite Shipping A/S	12/94	Rhapsody of the Seas	Cruise ship	279 x 32 x 7.6	—	RCCL	4/97
Malbridge Force	Containership	6,800-dwt	Krupp MaK	Elite Shipping A/S	3/95						
214	Cargo	8,500-dwt	Krupp MaK	Elite Shipping A/S	6/95	CONSTRUNAVES					
215	Cargo	8,500-dwt	Krupp MaK	Elite Shipping A/S	10/95	Astilleros Huelva					
216	Cargo	8,500-dwt	Krupp MaK	Elite Shipping A/S	1/96	—	Multipurpose	5,600-dwt	—	Lithuan Multipurpose Shipping	96
217	Cargo	8,500-dwt	Krupp MaK	Elite Shipping A/S	4/96	—	Multipurpose	5,600-dwt	—	Lithuan Multipurpose Shipping	96
218	Cargo	8,500-dwt	Krupp MaK	Elite Shipping A/S	8/96	—	Multipurpose	5,600-dwt	—	Lithuan Multipurpose Shipping	97
						—	Multipurpose	5,600-dwt	—	Lithuan Multipurpose Shipping	97
Astilleros Espanoles, S.A., Madrid, Spain						—	RoRo	—	—	Eston RoRo Shipping, Estonia	—
Yucatan	Containership	202 x 32 x 19	MAN B&W 7S70MC	Transportaciones Maritimas Mexicanas	—	—	RoRo	—	—	Eston RoRo Shipping, Estonia	—
Sonora	Containership	202 x 32 x 19	MAN B&W 7S70MC	Transportaciones Maritimas Mexicanas	—	Astilleros Arman					
Mexico	Containership	202 x 32 x 19	MAN B&W 7S70MC	Transportaciones Maritimas Mexicanas	—	—	Tug	28.5	—	Union de Remorquage, Belgium	95
Hanne Knutsen	Shuttle tanker	265 x 43 x 22	ABB	Knutsen	—	—	Tug	28.5	—	Union de Remorquage, Belgium	96
Mowinckels	Product tanker	170 x 24 x 16	MAN B&W L35MC	Mowinckels Rederi	—	—	Tug	28.5	—	Union de Remorquage, Belgium	96
Volcan de Taute	Ferry	120 x 20 x 12	Deutz MWM	Naviera Armas	—	—	(7) Tugs	—	—	Grupo Baluda, Spain	—
BAS272	Barge	—	—	Saipem UK	—	Astilleros Zamacona					
Uisge Gorm	FPSO	—	—	Bluewater Terminal Systems	—	—	Salvage boat	17.5	—	Minist. Peches, Marit. et marine Marchande, Morocco	—
BS284	RoRo	156 x 24 x 13	MaK	Gorham Lines	—	—	Salvage boat	17.5	—	Minist. Peches, Marit. et marine Marchande, Morocco	—
BS285	RoRo	156 x 24 x 13	MaK	Gorham Lines	—	—	Salvage boat	17.5	—	Minist. Peches, Marit. et marine Marchande, Morocco	—
BS286	RoRo	156 x 24 x 13	MaK	Gorham Lines	—	—	Salvage boat	17.5	—	Minist. Peches, Marit. et marine Marchande, Morocco	—
B8299	Product tanker	46,500-dwt	—	Tomasos (Greece)	—	—	Salvage boat	17.5	—	Minist. Peches, Marit. et marine Marchande, Morocco	—
B8301	Product tanker	46,100-dwt	—	Admanthos Shipping Agency	—	C.N.P. Freire					
B8302	Product tanker	47,000-dwt	—	Petroleos de Venezuela (PDVSA)	—	—	Refrigerated cargo	5,500-dwt	—	Maritima del Norte, Spain	4/96
B8303	Product tanker	47,000-dwt	—	Petroleos de Venezuela (PDVSA)	—	—	Refrigerated cargo	5,500-dwt	—	Maritima del Norte, Spain	10/96
B8304	Product tanker	47,000-dwt	—	Petroleos de Venezuela (PDVSA)	—						
B8305	Product tanker	47,000-dwt	—	Petroleos de Venezuela (PDVSA)	—	Danyard, Frederikshavn, Denmark					
BJU349	Containership	134 x 21 x 11	Sulzer 6RTA 52	Malaysian Intl. Shipping	—	Nordgal	Bulk carrier	180 x 32 x 17.7	—	Norden	9/94
BJU350	Containership	134 x 21 x 11	Sulzer 6RTA 52	Malaysian Intl. Shipping	—	Nordkap	Bulk carrier	180 x 32 x 17.7	—	Norden	11/94
BJU351	Containership	134 x 21 x 11	Sulzer 6RTA 52	Malaysian Intl. Shipping	—	Maersk Pomor	Bulk carrier	180 x 32 x 17.7	—	Murmansk	2/95
BJU352	Containership	134 x 21 x 11	Sulzer 6RTA 52	Malaysian Intl. Shipping	—	Maersk Polar	Bulk carrier	180 x 32 x 17.7	—	Murmansk	12/95
BH1545	Ferry	120 x 20 x 12	Deutz MWM	Naviera Armas	—	Naja Arctic	General dry cargo	119 x 24 x 15	—	Royal Arctic Line	12/94
BPR67	Shuttle tanker	265 x 43 x 22	ABB	Knutsen	—	Nuka Arctic	General dry cargo	119 x 24 x 15	—	Royal Arctic Line	1/95
BPR75	Bulk carrier	289 x 43 x 24	—	Supreme Pearls (Hong Kong)	—						
BPR76	Bulk carrier	289 x 43 x 24	—	Supreme Pearls (Hong Kong)	—	Flender Werft Aktiengesellschaft, Lubeck, Germany					
BPR72	ESVLCC	—	—	Tajomar Shipping (Tapias)	—	Chesapeake Bay	—	247 x 32 x 19	MAN B&W	Claus Peter Offen	6/95
BAS273	FPSO	300,000 barrels	—	Galar Mar	—	Santa Elena	—	247 x 32 x 19	MAN B&W	Claus Peter Offen	12/95
BAS274	FPSO	550,000 barrels	—	Texaco U.K.	—						
B8306	Shuttle tanker	221 x 37 x 21	MAN B&W	Texaco U.K.	—	Gdynia Shipyard, Gdynia, Poland					
						B562/4	Bulk carrier	283 x 45 x 25	6RTA76	France	—
Austal Ships Pty. Ltd., Henderson, Western Australia											
Ono-Ono	Ferry (mono)	48 x 9 x 1.2	MTU	SPI Maritime (Tahiti)	6/94						
Xin He Shan	Ferry (cat)	40 x 10 x 1.4	MTU	He Gang Passenger	8/94						
Eriugrul Gazi	Ferry (mono)	30 x 7 x 1.2	MTU	Istanbul Deniz Otobustieri	12/94						
Aksemaddin	Ferry (mono)	30 x 7 x 1.2	MTU	Istanbul Deniz Otobustieri	12/94						
Zhang Shan	Ferry (cat)	40 x 11.5 x 1.4	Textron Lycoming	Zhang Shan Hong Kong Passenger Shipping	12/94						
Speeder	Ferry (cat)	43 x 11.2 x 1.3	MTU	Diamond Ferry (Japan)	5/95						
Super SeaCat	Ferry (cat)	79 x 23 x 2.4	Ruston	Sea Containers	5/95						
TBA	Ferry (cat)	40 x 12 x 1.4	Textron Lycoming	Shun Gang Passenger Trans.	9/95						
Blohm + Voss, Hamburg, Germany											
—	Containership	166 x 27 x 10	Mitsubishi	German KG	5/96						
Bremer Vulkan Werft, Bremen, Germany											
32	Containership	23,465-dwt	—	GEBA8 Gruppe, Germany	3/95						
98	Self unloading bulk carrier	32,000-dwt	—	Cosco, China	5/95						
99	Self unloading bulk carrier	32,000-dwt	—	Cosco, China	8/95						
107	Cruise ship	7,100-dwt	—	Costa Crociere S.p.A.	6/96						
108	Cruise ship	7,100-dwt	—	Costa Crociere S.p.A.	6/96						
109	Containership	34,800-dwt	—	NSB/Conship	8/96						
110	Containership	34,800-dwt	—	NSB/Conship	10/96						
111	Containership	34,800-dwt	—	NSB/Conship	12/96						
Chantiers De L'Atlantique, St. Nazaire, France											
Sapphire Princess	LNG	274 x 43 x 11	—	Patronas	9/95						
Emerald Princess	LNG	274 x 43 x 11	—	Patronas	mid96						
Turquoise Princess	LNG	274 x 43 x 11	—	Patronas	mid97						

FOR MORE INFORMATION...

on the shipyards included in this review, please circle the corresponding number on the Reader Service Card in this issue.

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WORLD YARDS — SHIPS ON ORDER

Yard Name	Type	Dimensions/ Capacity	Engine	Owner	Delivery	Yard Name	Type	Dimensions/ Capacity	Engine	Owner	Delivery
B562/5	Bulk carrier	283 x 45 x 25	6RTA76	France	—	1465	RoRo	9,500-ton	—	Oceanarrow Ltd.	9/96
8109/1	Containership	240 x 32 x 19	7RTA84C	Germany	—	1466	RoRo	9,500-ton	—	Oceanarrow Ltd.	1/97
8111/2	Containership	188 x 30 x 17	6RTA72U	Cyprus	—	Kvaerner Masa-Yards Inc. — Helsinki New Shipyard, Helsinki, Finland					
8113/2	Containership	188 x 30 x 17	6RTA72U	Germany	—	Imagination	Cruise ship	260 x 36 x 8	42,240kW	CCL	6/95
8113/3	Containership	188 x 30 x 17	6RTA72U	Germany	—	Inspiration	Cruise ship	260 x 36 x 8	42,240kW	CCL	3/96
8113/4	Containership	188 x 30 x 17	6RTA72U	Germany	—	491	Cruise ship	260 x 36 x 8	42,240kW	CCL	1998
8125/1	Containership	158 x 24 x 14	7550MC	Germany	—	494	Cruise ship	260 x 36 x 8	42,240kW	CCL	3/96
8125/2	Containership	158 x 24 x 14	7550MC	Germany	—	492	Cruise ship	279 x 32 x 8	50,400kW	RCCL	11/96
8125/3	Containership	158 x 24 x 14	7550MC	Germany	—	493	Cruise ship	279 x 32 x 8	50,400kW	RCCL	9/97
8125/4	Containership	158 x 24 x 14	7550MC	Germany	—	Kvaerner Masa-Yards — Turku New Shipyard, Turku, Finland					
8125/5	Containership	158 x 24 x 14	7550MC	Germany	—	1322	Cable ship	127 x 22	—	Intl. Cablesip	1997
8125/6	Containership	158 x 24 x 14	7550MC	Germany	—	1330	LNG	289 x 48 x 11	—	Abu Dhabi Natl. Oil	1/96
8130/1	Containership	159 x 24 x 14	7550MC	Germany	—	1331	LNG	289 x 48 x 11	—	Abu Dhabi Natl. Oil	6/96
8130/2	Containership	159 x 24 x 14	7550MC	Germany	—	1332	LNG	289 x 48 x 11	—	Abu Dhabi Natl. Oil	1/97
*8138/1	Containership	183 x 28 x 17	7570	Germany	—	1333	LNG	289 x 48 x 11	—	Abu Dhabi Natl. Oil	5/97
*8138/2	Containership	183 x 28 x 17	7570	Germany	—	1336	Cablesip	9,400-dwt	—	Cable & Wireless	9/95
*8138/3	Containership	183 x 28 x 17	7570	Germany	—	1337	Cruisesip	193 x 28 x 6	—	Deutsche Seereederei	6/96
*8138/4	Containership	183 x 28 x 17	7570	Germany	—	Leroux Et Lotz Naval					
8139/1	Containership	188 x 30 x 17	6RTA72U	Germany	—	—	Fast ferry	103 x 15 x 8	MTU	SNCM	1995
8139/2	Containership	188 x 30 x 17	6RTA72U	Germany	—	—	Offshore patrol	54 x 10 x 3	Deutz	French Navy	1995
* Not in force						—	Offshore patrol	61 x 11 x 3	Deutz	Morocco Fishery Ministry	10/95
Hitachi Zosen						—	Research vessel	95 x 67	Deutz	IFREMER	11/95
H5688	Tanker	315 x 57 x 29	Hitachi Zosen B&W	Golden Stream Corp.	3/95	—	Tug	—	Deutz	—	12/95
H4890	Tanker	322 x 58 x 30	Hitachi Zosen B&W	Wight Navigation S.A.	7/95	Lindeno GmbH Schiffswerft und Maschinen Fabrik, Kiel, Germany					
H4880	Tanker	315 x 58 x 32	Hitachi Zosen B&W	Exceed Shipping S.A.	10/95	Jiau She 51	Oil tanker	143 x 20 x 11	MaK 6MS52C	Shanghai Hai Xing Shipping	5/95
H4881	Tanker	315 x 58 x 32	Hitachi Zosen B&W	Exul Shipping S.A.	1/96	Jiau She 52	Oil tanker	143 x 20 x 11	MaK 6MS52C	Shanghai Hai Xing Shipping	9/95
H4861	Tanker	315 x 57 x 31	Hitachi Zosen B&W	Tomen Corp.	3/96	—	Tank motorship	177 x 28 x 17	MAN 6LS8/64	Carl Buttuor Tankreederei	9/96
H4887	Tanker	315 x 58 x 32	Hitachi Zosen B&W	Magestic Tankers Corp.	10/96	Meyer Werft, Papenburg, Germany					
H4888	Tanker	315 x 58 x 32	Hitachi Zosen B&W	Regency Tankers Corp.	1/97	Oriana	Cruise ship	260 x 32 x 8	—	P&O	4/95
H4877	Bulk carrier	215 x 32 x 19	Hitachi Zosen B&W	Sumitomo	4/95	—	Passenger ship	100 x 18 x 4	—	—	6/95
H4878	Bulk carrier	215 x 32 x 19	Hitachi Zosen B&W	Sumitomo	7/95	Century	Cruise ship	246 x 32 x 8	—	Celebrity	1995
H4879	Bulk carrier	215 x 32 x 19	Hitachi Zosen B&W	Dane Star S.A. & Palece Maritime Corp.	11/95	Galaxy	Cruise ship	260 x 32 x 8	—	Celebrity	1996
H4882	Bulk carrier	215 x 32 x 19	Hitachi Zosen B&W	Far Easter Silo Corp.	3/96	—	Cruise ship	260 x 32 x 8	—	Celebrity	1997
H4883	Bulk carrier	215 x 32 x 19	Hitachi Zosen B&W	Far Easter Silo Corp.	6/96	—	Cruise ship	147 x 23 x 6	—	—	1996
H4891	Bulk carrier	215 x 32 x 19	Hitachi Zosen B&W	Moebius Shipping	10/96	—	Cruise ship	147 x 23 x 6	—	—	1997
H4894	Bulk carrier	215 x 32 x 19	Hitachi Zosen B&W	Nissho Iwai Corp.	3/97	Mitsubishi Heavy Industries, Ltd., Tokyo, Japan					
H4895	Bulk carrier	215 x 32 x 19	Hitachi Zosen B&W	Nissho Iwai Corp.	6/97	Nagasaki Shipyard & Machinery Works					
H4896	Bulk carrier	215 x 32 x 19	Hitachi Zosen B&W	Nissho Iwai Corp.	9/97	2067	LNGC	280 x 46 x 11	KHI UA-400	ADGAS	10/95
H4889	LPG carrier	189 x 29 x 17	Hitachi Zosen B&W	—	10/96	2079 - NYK Vega	Containership	283 x 37 x 22	Mitsubishi Sulzer	Silvanus Shipholding	2/95
Industrias Verolme-Ishibras S.A. - IVI, Rio de Janeiro, Brazil						2080 - Diamond Hope	Tanker	310 x 58 x 30	Mitsubishi UE	Primo Shipping S.A.	2/95
Brazilian Venture	Bulk carrier	215 x 32 x 9	Sulzer 8RTA62	Wah-Kwong	4/95	2084 - Hokuriku Maru	Bulk carrier	223 x 43 x 21	Mitsubishi UE	Nippon Yusen Kabushiki	3/95
Royal Ocean	Bulk carrier	215 x 32 x 9	DU-Sulzer 8RTA62	Marubeni	9/95	2086	Tanker	310 x 58 x 30	Mitsubishi UE	Salvia Shipholding Nov.	9/95
172	Oil barge	207 x 45 x 24	—	BHP Hamilton Oil	9/95	2087 - Shincii Maru	Bulk carrier	223 x 43 x 21	Mitsubishi UE	Nippon Yusen Kabushiki	5/95
Frota Santos	Multipurpose	158 x 28 x 14	B&W 5560MC	Frota Oceanica	10/95	2088 - Fujiki	PCC	156 x 26 x 25	B&W 9550MC	Fujiki Kaun Kaisha, Ltd.	2/95
Frota Rio	Multipurpose	158 x 28 x 14	B&W 5560MC	Frota Oceanica	10/95	—	LNGC	298 x 46 x 26	Steam Turbine	MOL/NYK/Others	11/96
Marcos Dias	Bulk carrier	190 x 30 x 16	Sulzer 5RLB76	Cheval Navegacao	4/95	2090	LNGC	298 x 46 x 26	Steam Turbine	MOL/NYK/Others	4/97
Poti	Product tanker	208 x 32 x 18	Ishibras-Sulzer	Petrobras	7/95	2091	LNGC	298 x 46 x 26	Steam Turbine	MOL/NYK/Others	5/00
Itamonte	Product tanker	170 x 31 16	B&W 5550MC	Petrobras	6/95	2092	LPGC	219 x 37 x 20	Mitsubishi UE	Gas Diana Transport	1/96
Itafuba	Product tanker	176 x 31 16	B&W 5550MC	Petrobras	10/95	2093	Tanker	340 x 56 x 32	Mitsubishi UE	Natl. Shipping Co. of Saudi Arabia	1996
Lindolo	Product tanker	169 x 31 16	Ishibras-Sulzer	Petrobras	9/95	2094	Tanker	340 x 56 x 32	Mitsubishi UE	Natl. Shipping Co. of Saudi Arabia	1996
Livramento	Product tanker	169 x 30 x 18	Sulzer 6RTA62U	Petrobras	9/95	2095	Tanker	340 x 56 x 32	Mitsubishi UE	Natl. Shipping Co. of Saudi Arabia	1996
115	Bulk carrier	215 x 32 x 18	Sulzer 6RTA62U	Hamburg Sud	11/95	2096	Tanker	340 x 56 x 32	Mitsubishi UE	Natl. Shipping Co. of Saudi Arabia	1996
116	Bulk carrier	215 x 32 x 18	Sulzer 6RTA62U	Hamburg Sud	2/96	2097	Tanker	340 x 56 x 32	Mitsubishi UE	Natl. Shipping Co. of Saudi Arabia	1996
117	Bulk carrier	215 x 32 x 18	Sulzer 6RTA62U	Hamburg Sud	6/96	2098	Container Ship	262 x 40 x 24	Mitsubishi Sulzer	OOCL	8/95
Kawasaki Heavy Industries, Ltd., Tokyo, Japan						2099	Container Ship	262 x 40 x 24	Mitsubishi Sulzer	OOCL	11/95
1448	LPG carrier	38,000 m3	—	Jarrow Shipping Ltd.	6/95	2102 - Shin-Ei	Bulk carrier	278 x 45 x 24	Mitsubishi UE	New Harvest S.A.	3/95
1449	LPG carrier	38,000 m3	—	Kandas Shipping Ltd.	9/95	2103	LPGC	219 x 37 x 20	Mitsubishi UE	Tokyo Specialized Tankers	11/95
1456	LPG carrier	84,000 m3	—	United Power Shipping	3/96	2104	LPGC	219 x 37 x 20	Mitsubishi UE	Turtle Shipping Inc.	1/96
1440	LNG carrier	19,100 m3	—	MCCG Intl. Ltd.	2/96	2105	Tanker	328 x 56 x 32	Mitsubishi UE	Irving Oil Affiliate Co.	1997
1445	LNG carrier	135,000 m3	—	MOL/NYK/KL/SWL/IKK	4/97	Kobe Shipyard & Machinery Works					
1446	LNG carrier	135,000 m3	—	MOL/NYK/KL/SWL/IKK	4/97	1204 - Ever Result	Container ship	281 x 32 x 21	Mitsubishi Sulzer	Evergreen Intl. S.A.	1/95
1444	Tanker	258,000-ton	—	Polaris Tanker Corp.	4/95	1205	Container ship	281 x 32 x 21	Mitsubishi Sulzer	Evergreen Intl. S.A.	6/95
1489	Bulk carrier	150,000-ton	—	Marubeni Corp.	4/95	1206	Container ship	281 x 32 x 21	Mitsubishi Sulzer	Evergreen Intl. S.A.	11/95
1447	Bulk carrier	183,600-ton	—	H. Corp.	6/95	1209	Container ship	262 x 40 x 24	Mitsubishi Sulzer	OOCL	3/96
1452	Bulk carrier	86,000-ton	—	K-Line	5/96	1211	Container ship	285 x 40 x 24	Mitsubishi Sulzer	Evergreen Intl. S.A.	5/96
1453	Bulk carrier	150,000-ton	—	Hamilton Shipping	8/95	1212	Container ship	285 x 40 x 24	Mitsubishi Sulzer	Evergreen Intl. S.A.	8/96
1454	Bulk carrier	150,000-ton	—	Kamat Shipping	10/95	1213	Container ship	285 x 40 x 24	Mitsubishi Sulzer	Evergreen Intl. S.A.	11/96
1457	Bulk carrier	171,000-ton	—	Helios Shipping	3/96	1214	Container ship	285 x 40 x 24	Mitsubishi Sulzer	Evergreen Intl. S.A.	1/97
1458	Bulk carrier	150,000-ton	—	El Dorado Shipping	3/96	1215	Container ship	285 x 40 x 24	Mitsubishi Sulzer	Evergreen Intl. S.A.	4/97
1459	Containership	5,250 teu	—	Lube Shipping	12/96						
1460	Containership	5,250 teu	—	Yuehe Shipping	12/96						
1461	Containership	5,250 teu	—	Yuehe Shipping	12/96						
1462	Containership	5,250 teu	—	Wanhe Shipping	12/96						
1463	Containership	5,250 teu	—	Ninghe Shipping	12/96						
1464	Containership	5,250 teu	—	Chuanhe Shipping	12/96						



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In preparation for the America's Cup, the world's best sailors, engineers and designers are joining forces, or *partnering* - in pursuit of vital technological advantages.

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fibers into a premium rope that's easy to handle, with

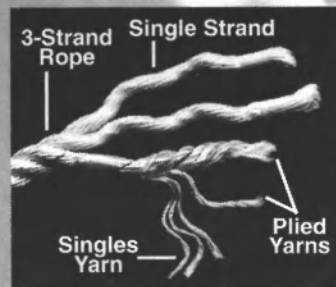
enhanced strength as well as minimal rope shrinkage and hardening. The result - significant performance advantages over ordinary twisted nylon ropes including:

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- **Superior wet abrasion resistance - up to 20X greater**
- **Improved resistance to harmful UV rays**
- **Outstanding durability for long-lasting performance**

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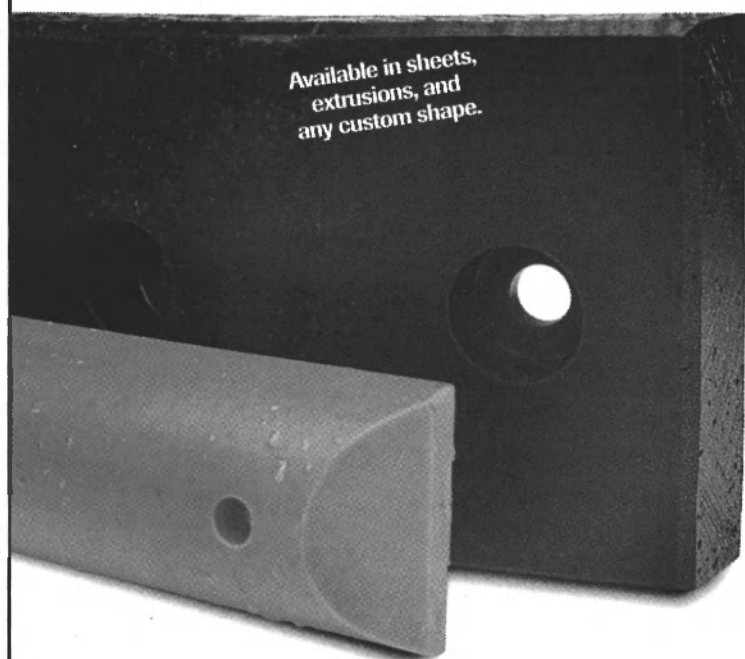


Circle 10 on Reader Service Card

WORLD YARDS — SHIPS ON ORDER

Yard Name	Type	Dimensions/ Capacity	Engine	Owner	Delivery	Yard Name	Type	Dimensions/ Capacity	Engine	Owner	Delivery
Kobe Shipyard & Machinery Works						Schichau Seebeckwerft AG, Bremerhaven, Germany					
996	Bulk carrier	165 x 24 x 13	Mitsubishi UE	Tokai Shipping Co.	3/95	SuperFast I	Fast ferry	173 x 24 x 6	—	Altica Enterprises (Greece)	3/95
1000	CF	125 x 21 x 7	NKK	Higashi-Hihon Ferry	3/95	SuperFast II	Fast ferry	173 x 24 x 6	—	Altica Enterprises (Greece)	5/95
1001	Ferry	90 x 16 x 6	Daihatsu	Oki Kisen Kabushiki Kaisha	2/95						
1004	Bulk carrier	158 x 27 x 13	Mitsui B&W	Chi Ling Panama S.A.	5/95	Stocznia Gdanska, Gdansk, Poland					
1005	Bulk carrier	158 x 27 x 13	Mitsui B&W	Chi Ling Panama S.A.	1995	Fingerhörn	Combi RoRo	10,700-dwt	NSD	Finnlines Group Oy AB	2/95
1007	Ferry	156 x 22 x 17	NKK SEMT	Arimura Sangyo Co.	6/95	TransEuropa	Combi RoRo	10,700-dwt	NSD	Posidon Schiff. Ohg.	5/95
1008	Bulk carrier	158 x 27 x 13	Mitsui B&W	Chi Ling Panama S.A.	1995	Finntrader	Combi RoRo	10,700-dwt	NSD	Finnlines Group Oy AB	9/95
1010	Container ship	151 x 25 x 14	MAN B&W	RCL	1995	8191/1	Containership	1,500-teu	MAN B&W	Scholler Holdings Ltd.	7/95
1011	Container ship	151 x 25 x 14	MAN B&W	RCL	1995	8191/2	Containership	1,500-teu	MAN B&W	Scholler Holdings Ltd.	10/95
1012	Bulk carrier	156 x 27 x 14	MAN B&W	Chi Ling Panama S.A.	1996	8191/3	Containership	1,500-teu	MAN B&W	Scholler Holdings Ltd.	6/96
1014	Container ship	151 x 25 x 14	MAN B&W	RCL	1996	8191/4	Containership	1,500-teu	MAN B&W	Scholler Holdings Ltd.	9/96
1015	Container ship	151 x 25 x 14	MAN B&W	RCL	1996	8191/5	Containership	1,500-teu	MAN B&W	Scholler Holdings Ltd.	2/97
						8191/6	Containership	1,500-teu	MAN B&W	Scholler Holdings Ltd.	6/97
Odense Steel Shipyard, Odense, Denmark						8684/1	Bulk carrier	190 x 31 x 19	MAN B&W	Gearbulk	11/95
L145	VLCC	299,900-dwt	—	A.P. Moller	1995	8684/2	Bulk carrier	190 x 31 x 19	MAN B&W	Gearbulk	4/96
L146	VLCC	299,900-dwt	—	A.P. Moller	1995	8684/3	Bulk carrier	190 x 31 x 19	MAN B&W	Gearbulk	9/96
Alphard Star	VLCC	300,000-dwt	—	Velo	1995	8684/4	Bulk carrier	190 x 31 x 19	MAN B&W	Gearbulk	1/97
L154	Containership	C4,800-teu	—	A.P. Moller	1996	8683/1	Bulk carrier	199 x 31 x 17	NSD	East Asiatic Co. Ltd.	9/95
L155	Containership	C4,800-teu	—	A.P. Moller	1996	8683/2	Bulk carrier	199 x 31 x 17	NSD	East Asiatic Co. Ltd.	12/95
L156	Containership	C4,800-teu	—	A.P. Moller	1996	8683/3	Bulk carrier	199 x 31 x 17	NSD	East Asiatic Co. Ltd.	5/96
L157	Containership	C4,800-teu	—	A.P. Moller	1996	8683/4	Bulk carrier	199 x 31 x 17	NSD	East Asiatic Co. Ltd.	9/96
L158	Containership	C4,800-teu	—	A.P. Moller	1996	8508/31	Reefer	138 x 22 x 13	MAN B&W	Lorient Maritime S.A.	2/96
L159	Containership	C4,800-teu	—	A.P. Moller	1997	8508/32	Reefer	138 x 22 x 13	MAN B&W	Quimper Maritime S.A.	5/96
L160	Containership	C4,800-teu	—	A.P. Moller	1997	8173/1	Containership	242 x 32 x 19	MAN B&W	Sapfro Navigation Inc.	6/97
L161	Containership	C4,800-teu	—	A.P. Moller	1997	8173/2	Containership	242 x 32 x 19	MAN B&W	Sapfro Navigation Inc.	1/98
L162	Containership	C4,800-teu	—	A.P. Moller	1997						
Samsung Heavy Industries, Seoul, Korea						Union Naval De Levante, Valencia, Spain					
1114	ST	254 x 46 x 23	Electric propulsion	Conoco Norway Inc.	4/95	Mar Almadena	Asphalt tanker	113 x 19 x 9	Wartsila	WW Marpetrol (Spain)	12/94
1117	Bulk carrier	216 x 32 x 19	B&W 6560MC	Alasia Steamship Co.	1/95	Tariq IBN ZIYD	Ferry	138 x 25 x 9	Wartsila	E.N.T.M.V. (Algeria)	12/95
1118	Bulk carrier	216 x 32 x 19	B&W 6560MC	Alasia Steamship Co.	4/95	—	Chemical tanker	113 x 19 x 10	Wartsila	WW Marpetrol (Spain)	6/96
1124	Bulk carrier	216 x 32 x 19	B&W 6560MC	KOMA Ltd.	2/95	—	Chemical tanker	93 x 16 x 9	MAN B&W	United Tankers (Sweden)	8/96
1131	COT	233 x 42 x 20	B&W 6160MC	Eastern Mediterranean Maritime	3/95	—	Tanker for bunkering	52 x 17	—	Cresa (Spain)	8/95
						—	Tanker for bunkering	52 x 17	—	Cresa (Spain)	11/95

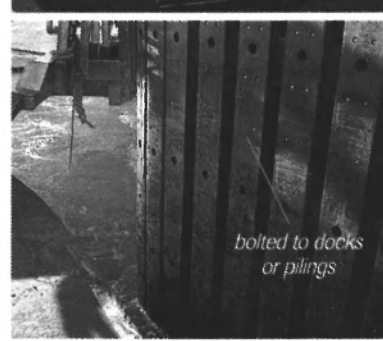
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A MESSAGE FOR THOSE WHO MAY NOT UNDERSTAND RADAR LEVEL GAUGING TECHNOLOGY

TRUE OR FALSE?

Radar-based level gauging in tanks is a relatively new technology. Just 20 years ago we launched Saab TankRadar, the very first system of this type. Since then, ongoing development has resulted in system enhancements, with the third generation introduced to the market just last year.

Today there are several suppliers in the market-place—each one claiming that their system is the best. We are not ashamed to admit that we are worried about this. In fact, we are really upset. And this has nothing to do with the competition, which just makes us try even harder. Our concern is that some manufacturers simply don't understand the principles of radar level gauging. And this lack of basic knowledge costs both shipyards and shipowners a lot of money. Not to mention how all of this affects the reputation of our business. Radar-based level gauging is a very advanced technology that requires considerable knowledge. So let's be straightforward and discuss what is true and what is false on this subject.

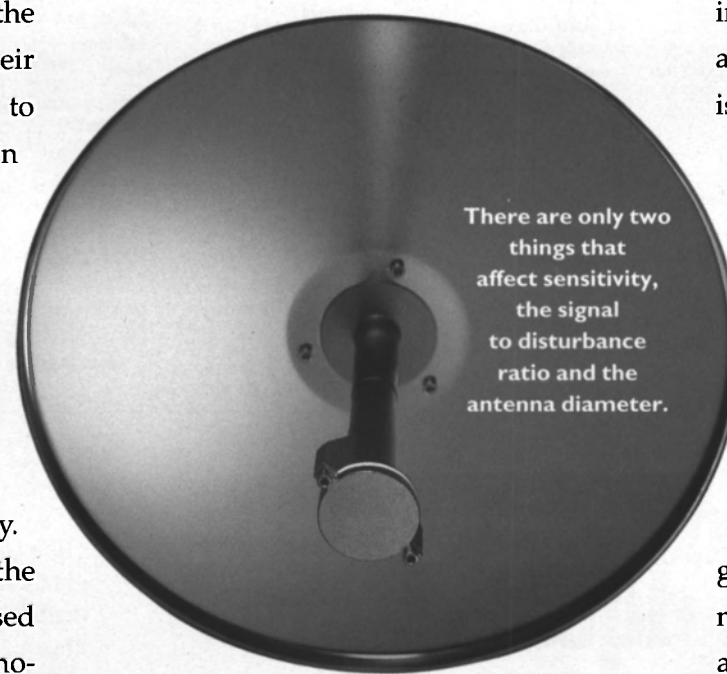
INTRINSICALLY SAFE OR FLAMEPROOF.

It is true that an intrinsically safe instrument is the best way to improve safety on board. There is not enough electrical energy in an intrinsically safe instrument to cause a spark that could ignite the explosive gas. Furthermore, an intrinsically safe instrument is resistant to human error, and can be safely opened and serviced while it is powered.

On the other hand, **it is false** to claim that a flameproof instrument is equally safe. A flameproof instrument allows an explosion to take place inside the enclosure. Therefore the enclosure must be able to

withstand the pressure, and must have well-defined, clean gaps that release the flames to the outside in a controlled way, so as not to ignite the explosive gas. Before servicing a flame-proof instrument, the deck must be gas-free, or the instrument must have been switched off for about one hour.

When it comes to safety on board, ship



owners, crew and the environment all benefit if you choose an intrinsically safe instrument.

SENSITIVITY OR MORE POWER.

It is false to say that there are any advantages in increasing the power when using radar to measure the distance to the liquid surface in tanks. **The truth is** that sensitivity is the single most important factor in the performance of a radar level gauge. And sensitivity is unaffected when the transmitted power is increased. In fact, there are only two things that affect sensitivity; the signal to disturbance ratio and the diameter of the antenna. The signal to disturbance ratio is also totally unaffected by the amount of transmitted power. The more power, the

more noise. It's comparable to listening to a radio that is not correctly tuned into a station. If you increase the volume, you increase the noise as well. But if you carefully tune into the correct frequency, you hear sweet, static-free music.

And, one more fact about sensitivity. **It is true** that a large diameter not only improves the sensitivity of an antenna. It also produces a narrow radar beam, which is an advantage when you're measuring in difficult conditions such as deep tanks, when there are waves on the surface or in tanks with a lot of internal structures. The most practical way of having a large antenna diameter is to use a parabolic antenna.

CAN YOU BELIEVE US?

You can easily see that radar-based level gauging is a very complex technology. It's not one where you can take short cuts and still have reliability. We invented it and we've worked hard over the years to ensure that Saab TankRadar is the safest and most reliable level gauging system available today.



The New Generation
Saab TankRadar™

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Tel +46-31-3700 00. Fax +46-31-25 30 22.
Telex (54)21652 saabra s.

Circle 322 on Reader Service Card

Cedervall Venture Opens New Office In China

Cedervall Zhangjiagang Marine Products Co. Ltd., a joint venture with Cedervall & Soner AB, Sweden, has manufactured shaft seals in China for three years. Recently, the company moved into new premises located in Zhangjiagang, outside Shanghai. The operation has supplied a large number of stern tube seals for the retrofitting of older vessels as well as for newbuildings in China and neighboring countries. The recent expansion will enable the company to increase its shaft seal production, and add more marine equipment such as bearings and shaftlines to its production lines.

For more information on
Cedervall Zhangjiagang
Circle 156 on Reader Service Card

Machine Works At Essex Delivers Shafts To Israel

The Machine Works At Essex, Inc., of Conn., has completed delivery of 22 propeller shafts to the Israeli Ministry of Defense, for use by the Israeli Navy in two different classes of fast patrol boats. The shafts are up to 21 ft. (5.7 m) long and 3 to 4 in. wide, and will be used in retrofits of existing patrol craft and new construction. The shaft contract coincided with the company's acquisition of a computer-controlled lathe devoted to propeller shaft production.

For more information on the company
Circle 157 on Reader Service Card

TMA Awarded Aegis Production Contract

Technology, Management and Analysis Corporation (TMA) has been awarded a five-year, \$30 million contract to provide engineering and production management support to the Naval Sea Systems Command (NAVSEA). The contract will be performed in support of the Aegis Shipbuilding Program at TMA facilities in Mississippi, Maine, and Virginia. Work efforts include quality assurance monitoring and the preparation of industrial work packages for the Arleigh Burke class destroyer post-shakedown availabilities. TMA provides engineering, project management, and computer services to government and commercial clients.

For more information on TMA
Circle 158 on Reader Service Card

Ashland Chemical Acquires Business From Vecom

Ashland Chemical Company has acquired the worldwide marine chemicals and shipboard supply business of Vecom Holding BV of The Netherlands. The business will become part of Ashland Chemical's

Drew Marine Division, a supplier of chemicals, refrigerants, and welding gases to the marine industry. Ashland has acquired the five subsidiaries comprising Vecom BV's marine business, including divisions in Japan, the U.S., The Netherlands, and Belgium. The Vecom subsidiaries offer a diverse mix of products and services including specialty chemicals, automated dosing systems, tank cleaning materials, welding and cutting gases, and

firefighting and safety equipment and services.

Ashland Chemical Co. is a worldwide distributor and producer of chemicals and plastics, and is headquartered in Ohio.

UNL Barcelona Introduces Express Docking Service

Union Naval de Levante of Barcelona (UNL), a specialist ship

repair yard, has launched an express docking service, offering immediate docking at short notice 24 hours a day. This means that, depending on the complexity of the work required, a vessel can be back at sea in as little as four days. This service is a result of improvements in work procedures due in part to the yard's new labor agreement. UNL's Barcelona yard was recently awarded a quality certificate from Lloyd's Register.

THE PERFORMANCE EDGE

Switchboard Systems from Metric Systems Corporation

With facilities in Fort Walton Beach, Florida, and Sumter, South Carolina, Metric Systems Corporation's Naval Systems Division specializes in the design and manufacture of shipboard switching systems, motor controllers, and equipment for power distribution, monitoring, and conversion.

Based on proven designs and tested extensively for guaranteed reliability, our products are built to allow flexibility and inter-operability with other shipboard systems. Modular construction insures that our systems, subsystems, and equipment are easy to install; easy to use; easy to maintain.

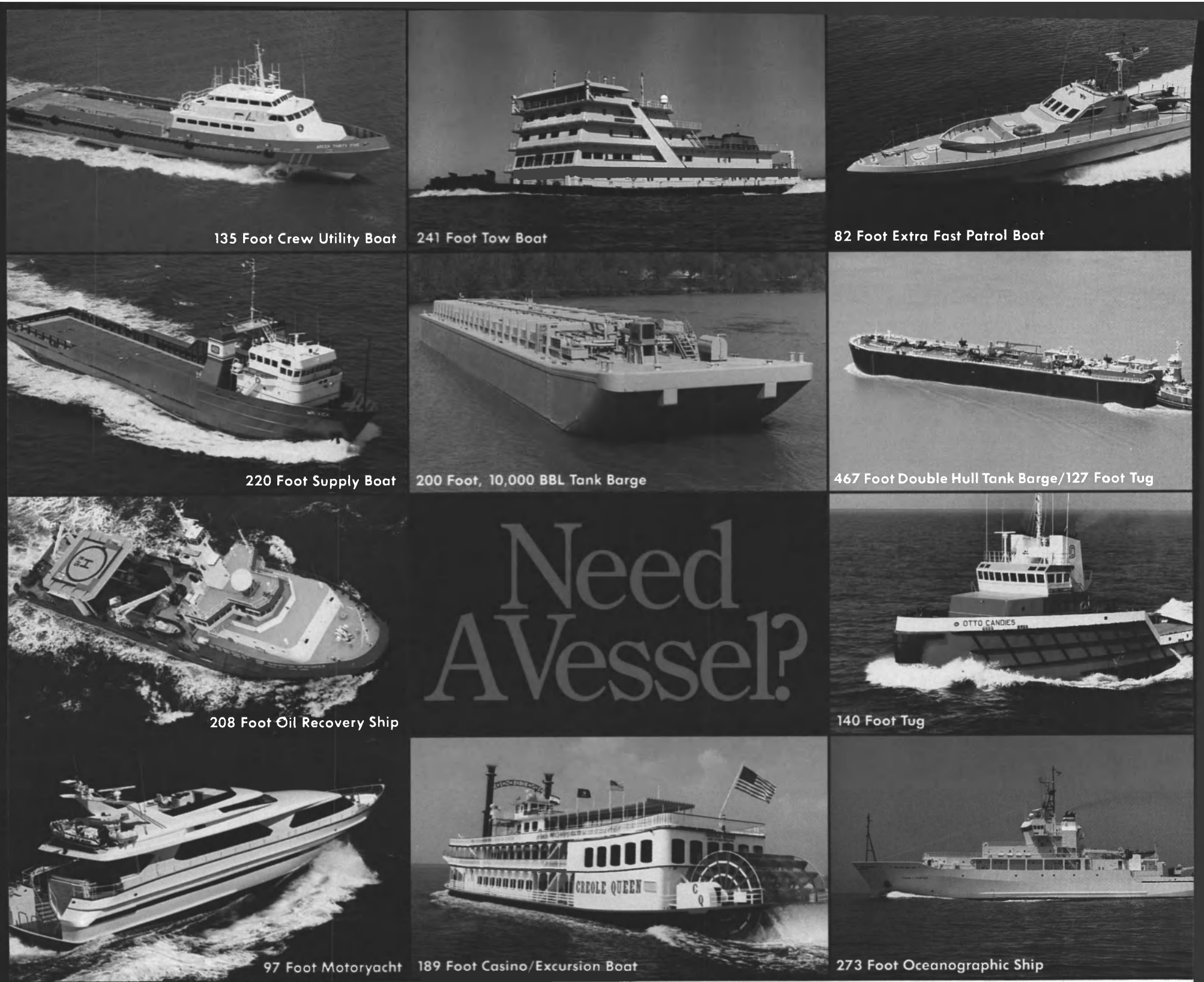
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Circle 346 on Reader Service Card

U.S. YARDS — VESSELS ON ORDER

The following is a list of ships on order in U.S. yards, a result of a limited survey by the editors of *Maritime Reporter & Engineering News*. (NOTE: all dimensions are in feet). Publisher is not responsible for omissions or errors. (Source: *Maritime Reporter & Engineering News*, June 1995.)

YARD Name/No.	Type	Dimensions/ Capacity	Engine	Owner	Delivery	Yard Name/No.	Type	Dimensions/ Capacity	Engine	Owner	Delivery
Alabama Shipyard, Mobile, Ala.											
—	Chemical carrier	472 x 75 x 40	—	Dannebrog Rederi AS	9/96	—	Deck barge	250 x 54 x 11	—	McDonough Marine	9/95
—	Chemical carrier	472 x 75 x 40	—	Dannebrog Rederi AS	1/97	Marmac 16	Deck barge	250 x 72 x 16	—	McDonough Marine	9/95
—	Chemical carrier	472 x 75 x 40	—	Dannebrog Rederi AS	5/97	Marmac 15	Deck barge	250 x 72 x 16	—	McDonough Marine	7/95
—	Oil tank barge	460 x 72 x 36	—	Penn Maritime	1995	Columbia Charleston	Deck barge	260 x 80 x 16	—	Turecamo Maritime	2/95
—	Oil tank barge	460 x 72 x 36	—	Penn Maritime	1995	Toku Provider	Deck barge	322 x 90 x 18	—	Western Towboat	1/95
—	Crane barge	200 x 54 x 12	—	Cooper T. Smith	1995	—	Riverboat casino	275 x 108 x 14	—	American Entertainment Corp.	4/95
—	Crane barge	200 x 54 x 12	—	Cooper T. Smith	1995						
Atlantic Marine, Inc., Jacksonville, Fla.						Intermarine USA, Savannah, Ga.					
Broward	Tractor tug	100 x 40	EMD	Hvida Marine	6/95	USS Oriole	Minehunter	188 x 35 x 9	—	U.S. Navy	4/95
Harveys Kanesville Casino	Casino vessel	272 x 78	Caterpillar	Harvey Iowa	10/95	USS Blackhawk	Minehunter	188 x 35 x 9	—	U.S. Navy	4/95
—	Ferry boat	168 x 64	EMD	State of Florida	10/95	USS Falcon	Minehunter	188 x 35 x 9	—	U.S. Navy	10/96
						USS Cardinal	Minehunter	188 x 35 x 9	—	U.S. Navy	7/97
						MHC-61	Minehunter	188 x 35 x 9	—	U.S. Navy	4/98
						MHC-62	Minehunter	188 x 35 x 9	—	U.S. Navy	12/98
Bath Iron Works, Bath, Maine											
Laboon	DDG-51	505 x 67 x 21	gas turbine	U.S. Navy	12/94	Kvichak Marine Industries, Seattle, Wash.					
Paul Hamilton	DDG-51	505 x 67 x 21	gas turbine	U.S. Navy	12/94	—	Seine skiff	20 x 10 x 4	Cummins	H&S Fish Co.	3/95
(13) DDG-51 class destroyers (deliveries from 1995 to 2000)						—	Fishing vessel	42 x 15 x 10	Caterpillar	Intersea Managment	4/95
						—	Seine skiff	16 x 7 x 3	Yamaha	Intersea Managment	4/95
						(29)	Oil skimmer	28 x 8 x 3	—	U.S. Navy Facilities Svc. Ctr.	3/95-7/96 4/95
Bender Shipbuilding & Repair Co., Inc.						(2)	Bristol Bay gillnetter	32 x 14 x3	Lugger	—	4/95
Lucky 7	Riverboat casino	232 x 78 x 14	Caterpillar	Randolph Riverboat	6/94	Ingalls Shipbuilding, Pascagoula, Miss.					
Grand Palais	Riverboat casino	360 x 99 x 14	Caterpillar	2/95	—	—	—	—	—	—	—
Cresent City Queen	Riverboat casino	360 x 99 x 14	Caterpillar	3/95	USS Russell	DDG 59	505 x 59 x 21	GE gas turbines	U.S. Navy	1995	
Casino Rouge	Riverboat casino	260 x 78 x 14	—	Louisiana Casino Cruises	12/94	USS Ramage	DDG 61	505 x 59 x 21	GE gas turbines	U.S. Navy	1995
—	Ferry boat	146 x 36	Detroit Diesel	NAVSEA	1/95	USS Stehlem	DDG 63	505 x 59 x 21	GE gas turbines	U.S. Navy	1995
Treasure Chest	Riverboat casino	260 x 78	Caterpillar	Treasure Chest	10/94	USS Benfold	DDG 65	505 x 59 x 21	GE gas turbines	U.S. Navy	1995
Grand Victoria	Riverboat casino	400 x 114	Caterpillar	Elgin Riverboat Resort	10/94	USS Cole	DDG 67	505 x 59 x 21	GE gas turbines	U.S. Navy	1996
						USS Milius	DDG 69	505 x 59 x 21	GE gas turbines	U.S. Navy	1996
Bentz Boats, Lewiston, Idaho						USS Ross	DDG 71	505 x 59 x 21	GE gas turbines	U.S. Navy	1997
—	River jet	32 x 10 x 4	Ford	U.S. Forest Service	8/94	USS McFaul	DDG 74	505 x 59 x 21	GE gas turbines	U.S. Navy	1998
—	River jet	32 x 10 x 4	Ford	South American	5/95						
—	River jet	32 x 10 x 4	Ford	Oregon State Police	6/95						
—	River jet	32 x 10 x 4	Ford	NEZ Pierce Fisheries	7/95						
Blount Industries, Warren, R.I.											
—	Passenger/cargo ferry	155 x 41 x 8	Detroit Diesels	Puerto Rico Port Authority	8/95						
Bollinger Machine Ship & Shipyard, Lockport, La.											
USS Firebolt	Cyclone class	170 x 25 x 13	Paxman	U.S. Navy	1/95						
USS Whirlwind	Cyclone class	170 x 25 x 13	Paxman	U.S. Navy	4/95						
USS Thunderbolt	Cyclone class	170 x 25 x 13	Paxman	U.S. Navy	6/95						
USS Shamal	Cyclone class	170 x 25 x 13	Paxman	U.S. Navy	9/95						
—	Utility/supply	145 x 36 x 12	Detroit Diesel	Gilbert Cheremie Boats	12/94						
—	Offshore support	181 x 92 x 16	Caterpillar	Halliburton Energy Services	11/95						
—	Riverboat casino	284 x 97 x 14	Caterpillar	Lady Luck	1/95						
—	Self elevating boat	91 x 65 x 8	Detroit Diesel	Danos Marine	5/95						
—	Dipper dredger	—	—	Dutra	10/95						
—	Offshore tug	124 x 37 x 18	EMD	Otto Candies	1/96						
—	Offshore tug	124 x 37 x 18	EMD	Otto Candies	5/96						
Campbell Industries, San Diego, Calif.											
Golden Shadow	Yacht support ship	219 x 38 x 20	Deutz	Actaeon Shipping	1/95						
Freeport Shipbuilding & Marine Repair, Freeport, Fla.											
—	Casino vessel	238 x 72 x 13	Cummins	American Marine Int'l	5/95						
Gladding-Hearn Shipbuilding, Somerset, Mass.											
Vizzaya	Pilot boat	52 x 16 x 6	Detroit Diesel	Ken Biscayne Pilots	11/94						
—	Police boat	36 x 13 x 5	Caterpillar	N.Y. City Police	12/94						
Winston Parris	—	45 x 14 x 6	Detroit Diesel	Virgin Island Port Authority	12/94						
Gulf Coast Fabrication, Lakeshore, Miss.											
—	Deck barge	250 x 54 x 11	—	McDonough Marine	1/96						

FOR MORE INFORMATION...

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U.S. YARDS — VESSELS ON ORDER

YARD						Yard					
Name/No.	Type	Dimensions	Engine	Owner	Delivery	Name	Type	Dimensions	Engine	Owner	Delivery
—	DDG 78	505 x 59 x 21	GE gas turbines	U.S. Navy	1999	Cheyenne	Submarine	360	nuclear	U.S. Navy	1996
—	DDG 80	510 x 59 x 22	GE gas turbines	U.S. Navy	2000	John C. Stennis	Aircraft carrier	1,073	nuclear	U.S. Navy	1995
—	DDG 80	510 x 59 x 22	GE gas turbines	U.S. Navy	2000	Harry S. Truman	Aircraft carrier	1,073	nuclear	U.S. Navy	1998
Bataan	Amphibious Assault Ship	844 x 106 x 24	Westinghouse	U.S. Navy	1997	—	Product tanker	600 x 106	—	Elseton	1996
Bon Homme Richard	Amphibious Assault Ship	844 x 106 x 24	Westinghouse	U.S. Navy	1998	—	Product tanker	600 x 106	—	Elseton	1997
Harit	Corvette	281 x 39 x 10	—	Israeli Navy	1995	Nichols Brothers Boat Builders, Freeland, Wash.					
Marinett Marine Corp., Marinette, Wis.						Cloud Ten	SWATH	122 x 60 x 12	AlliedSignal gas turbines	Marin Automatic	4/95
Juniper	Seagoing buoy tender	225 x 46 x 13	Caterpillar	USCG	11/95	Captain Cook	Dinner boat	112 x 29 x 8	MTU	—	5/95
Ida Lewis	Coastal buoy tender	175 x 36 x 8	Caterpillar	USCG	12/95	Escort Eagle	Tug	117 x 36 x 15	Caterpillar	D&V Boat Co.	8/95
Willow	Seagoing buoy tender	225 x 46 x 13	Caterpillar	USCG	1/97	Queen of the West	Sternwheeler	230 x 60 x 7	MTU	Sternwheeler Boat Co.	7/95
Kikui	Seagoing buoy tender	225 x 46 x 13	Caterpillar	USCG	8/97	Orange Shipbuilding Co., Inc., Orange, Texas					
Marcus Hanna	Coastal buoy tender	175 x 36 x 8	Caterpillar	USCG	2/97	Moline	Towboat	59 x 22 x 9	Caterpillar	U.S. Army	5/95
Frank Schubert	Coastal buoy tender	175 x 36 x 8	Caterpillar	USCG	6/97	Lasalle	Towboat	59 x 22 x 9	Caterpillar	U.S. Army	5/95
Anthony Pettit	Coastal buoy tender	175 x 36 x 8	Caterpillar	USCG	10/97	(22) YC's	Barges	110 x 32 x 9	—	U.S. Navy	12/96
Marine Builders Inc.						Pathfinder	Towboat	75 x 30 x 9	Caterpillar	U.S. Army	1/96
Paradise II	—	100 x 30 x 9	Cummins	Holiday Cruises	1995	(2) YON's	Barges	230 x 45 x 17	GM	U.S. Navy	3/96
—	—	90 x 30 x 9	Cummins	—	10/95	(6) LSO/C's	—	150 x 32 x 19	—	—	—
—	Reef explorer	65 x 14 x 6	Honda	—	6/95	Mr. Pat	Towboat	83 x 34 x 10	Caterpillar	U.S. Army	6/96
—	Towboat	65 x 26 x 8	—	—	1995	—	Fuel barge	195 x 35 x 12	—	U.S. Army	7/96
Marine Inland Fabricators, Panama City, Fla.						Patti Shipyard, Inc., Pensacola, Fla.					
Mustang	Workboat	25 x 10 x 4	Detroit Diesel	IMP&A	11/94	—	Office barge	266 x 40 x 11	—	USACE	6/95
—	Deck barge	24 x 10 x 3	—	Hugenberg Const.	1/95	Vessel of Honor	Shrimp trawler	99 x 26 x 15	Cummins	Frank Patti	12/95
—	Crane barge	40 x 10 x 4	—	Marco Marine	3/95	Quality Shipyard, Houma, La.					
—	Hopper barge	40 x 11 x 4	—	Aquatic Solutions	4/95	Hull 1210	Gaming	292 x 74 x 13	Cummins	Kehl Riverboats	4/95
Master Boat Builders, Bayou LaBatre, Ala.						Hull 1211	Gaming	292 x 74 x 13	Cummins	Kehl Riverboats	6/95
Master Anthony	Fishing	90 x 24 x 13	Caterpillar	—	1/95	SeaArk Marine, Inc., Monticello, Ark.					
Master Josh II	Fishing	95 x 24 x 13	Caterpillar	—	1/95	A0535	Passenger	54 x 15	—	—	2/95
Master Budwei	Fishing	84 x 22 x 12	Caterpillar	—	2/95	A0536	Utility	19 x 9	—	—	3/95
Pacific Dream	Fishing	85 x 24 x 13	Caterpillar	—	3/95	A0548	Y-hull	21 x 9	—	—	3/95
Queen Mary	Fishing	95 x 24 x 13	Caterpillar	—	3/95	A0549	—	30 x 10	—	—	5/95
Lac Phu	Fishing	97 x 25 x 13	Caterpillar	—	3/95	A0550	Skiff	22 x 7	—	—	3/95
Capt Scott II	Fishing	95 x 24 x 13	Caterpillar	—	4/95	A0559	Transporter	35 x 12	—	—	6/95
Mr. Ricky I	Fishing	85 x 24 x 13	Caterpillar	—	4/95	A0561	Utility	22 x 9	—	—	4/95
Mr. Ricky II	Fishing	85 x 24 x 13	Caterpillar	—	4/95	A0562	Passenger	40 x 13	—	—	5/95
Ruby 5	Fishing	85 x 24 x 13	Caterpillar	—	4/95	A0569	Passenger	54 x 14	—	—	5/95
Captain Juan	Fishing	85 x 22 x 13	Caterpillar	—	4/95	A0573	Passenger	28 x 10	—	—	5/95
Hull 192	Fishing	95 x 24 x 13	Caterpillar	—	5/95	A0569	Passenger	54 x 14	—	—	5/95
Hull 193	Fishing	95 x 24 x 13	Caterpillar	—	5/95	A0578	Utility	17 x 7	—	—	7/95
Hull 194	Fishing	95 x 24 x 13	Caterpillar	—	5/95	SkipperLiner, LaCrosse, Wis.					
Hull 200	Fishing	95 x 24 x 13	Caterpillar	—	5/95	M/V Island Girl VIII	Yacht	80 x 20 x 6	Caterpillar	Island Girl River Cruises	5/95
Hull 210	Fishing	95 x 24 x 13	Caterpillar	—	5/95	M/V Island Princess	Yacht	80 x 20 x 6	Caterpillar	Yachstasy	5/95
Hull 212	Fishing	95 x 24 x 13	Caterpillar	—	6/95	M/V Genesee Belle	Sternwheeler	64 x 20 x 4	Cummins	Genesee County Parks	4/95
Hull 202	Fishing	95 x 24 x 13	Caterpillar	—	6/95	M/V Windstar	Yacht	80 x 20 x 6	Caterpillar	Waterways Cruises	3/95
McDermott Inc., Amelia, La.						M/V Happy as a Clam	Water taxi	—	Cummins	Windward Sea Yacht Charters	4/95
Sulphur Enterprise	—	524 x 90 x 47	Wartsila	Sulphur Carriers	10/94	Washburn & Doughty, East Boothbay, Me.					
Siku	Tug	86 x 29 x 10	Caterpillar	Crowley Towing	3/95	Sunbeam V	—	65 x 21	Detroit Diesel	Maine Seacoast	2/95
Sinuk	Tug	86 x 29 x 10	Caterpillar	Crowley Towing	3/95	Carol Coles	—	82 x 22 x 4	Caterpillar	Missionary Society	3/95
American Queen	Cruise vessel	420 x 95	—	Delta Steamship	5/95	TDB 1	—	32 x 8 x 4	—	Clean Casco Bay	11/94
National Steel & Shipbuilding Co. (NASSCO), San Diego, Calif.						Nautilus	—	100 x 40 x 10	Caterpillar	Tall Ships, Barbados	10/95
AOE 8	Fast combatant support	754 x 108 x 38	GE gas turbines	U.S. Navy	5/95	Elijah McGrath	—	82 x 22 x 9	Caterpillar	Shafmaster Fishery	7/95
AOE 10	Fast combatant support	754 x 108 x 38	GE gas turbines	U.S. Navy	10/97	Westport Shipyard, Inc., Westport, Wash.					
T-AKR 295	Sealift (conversion)	885 x 106 x 35	B&W	U.S. Navy	1995	Alaskan Explorer	—	95 x 22 x 5	Caterpillar	Kenai Fjords Tours	5/95
T-AKR 297	Sealift (conversion)	885 x 106 x 35	B&W	U.S. Navy	1996	Zidell Marine Corp., Portland, Ore.					
T-AKR 299	Sealift (conversion)	885 x 106 x 35	B&W	U.S. Navy	1996	ZB335	Ocean deck barge	335 x 76 x 22	—	Zidell	10/94
T-AKR 310	Sealift	950 x 106 x 34	GE gas turbines	U.S. Navy	1998	ZB286	Ocean deck barge	285 x 78 x 18	—	Zidell	3/95
T-AKR 311	Sealift	950 x 106 x 34	GE gas turbines	U.S. Navy	1998	Hull652	Inland tank barge	272 x 84 x 18	—	Zidell	8/95
T-AKR 312	Sealift	950 x 106 x 34	GE gas turbines	U.S. Navy	1999	Hull653	Inland tank barge	272 x 84 x 18	—	Zidell	1/96
Newpark Shipbuilding & Repair, Houston, Texas						Newport News Shipbuilding, Newport News, Va.					
CBC 1265	Deck barge	260 x 72 x 16	—	Canal Barge Co.	2/95	Tucson	Submarine	360	nuclear	U.S. Navy	1995
CBC 1266	Deck barge	260 x 72 x 16	—	Canal Barge Co.	6/95	Greenville	Submarine	360	nuclear	U.S. Navy	1996
—	Tank barge	177 x 54 x 12	—	Dixie Carriers Inc.	10/95						
—	Tank barge	177 x 54 x 12	—	Dixie Carriers Inc.	1/96						

Newport News Signs Letter Of Intent For Five Double Eagle Tankers

Subject to MarAd Title XI approval, deal with Van Ommereen Shipping includes options for five tankers also

Newport News Shipbuilding, a unit of Tenneco, announced that it has signed a letter of intent with Van Ommereen Shipping (USA) Inc., to build five 46,000 ton Double Eagle product tankers, with options for up to five more. This marks the company's third sale of the Double Eagle since the design was introduced a year ago. The sale is pending approval of Van Ommereen's application for U.S. government

Title XI loan guarantees, administered by the U.S. Maritime Administration (MarAd). Double Eagle tankers are approximately 600 ft. (183 m) and 105 ft. (32.2 m) wide, with a dwt of 46,500 tons.

Van Ommereen provides shipping, transportation and tank storage service on a global basis, and owns 26 ships, including eight U.S. flag vessels. "Our company's main strategic objective is to be at the forefront in

tanker storage and shipping. These new ships will be a part of the systematic modernization of our fleet and help us maintain our strict quality and safety standards," said Nick van Reeseema, president of Van Ommereen Shipping.

According to Ed Waryas, director of commercial marketing at Newport News, "This new order for the Double Eagles' design meets the needs of a wide range of commercial

customers and will be a recognized class of vessels. . . Building this ship in a series will allow us to hold our costs down and increase our chances for winning new customers for this and other commercial ships." Newport News Shipbuilding, located in Virginia, has built more than 750 ships, including a wide range of commercial and military vessels.

For more information on NNS
Circle 30 on Reader Service Card

Maritime Info. Service Appoints VP of Sales

John F. Liss has been named vice president of sales at Rijnhaave Information Services, Inc. (RIS), a systems integration consultation organization. He will be responsible for the continued growth of the company's Data Warehousing Decision Support, Information Technologies and Professional Services Divisions. RIS is the U.S. arm of the Rijnhaave Group, a Dutch multi-national company, providing data processing, systems design and integration and network management for clients in the maritime and other transportation industries.

Maritrans Announces Management Changes

Francis D. Bailey, Jr. and Richard T. McCreary will join Maritrans Inc. as division presidents. Robert J. Lichtenstein, Esq., was elected to membership on the board of directors. Mr. Bailey will serve as head of the company's Eastern Division in Philadelphia, Pa., and will lead the overall coordination of Maritrans' marketing programs. Mr. McCreary will serve as president of the Gulf Division in Tampa, Fla., and will also coordinate the company's overall operations policies. Mr. Lichtenstein, a partner in the tax department of a Philadelphia

law firm, will continue to serve as outside counsel to Maritrans.

Maritrans owns and operates a fleet of tugboats and oceangoing petroleum tank barges along the Gulf and Atlantic coasts, and oil storage terminals on the Atlantic coast.

Change Of Command At USCG Marine Safety Office

On May 26, Captain Gordon D. Marsh, U.S. Coast Guard (USCG), relieved Captain Thomas E. Thompson as commanding officer of the Coast Guard Marine Safety Office in New Orleans, La. The Marine Safety Office in Louisiana is the largest of 44 such commands in the USCG, and is responsible for

two-thirds of Louisiana and Mississippi, and for commercial vessel inspections in South and Central North America. Commercial activity includes deep sea, river, intracoastal waterway traffic, along with numerous shipyards and 600 artificial island and mobile offshore drilling units on the Outer Continental Shelf. Capt. Thompson served in the Coast Guard for 27 years, and has been awarded several honors over the years. Among other positions, he was head of U.S. delegations to the former Soviet Union and the International Maritime Organization (IMO), where he was responsible for developing and negotiating the U.S.'s position for incorporation into international treaties.

FOR SALE TUGS AND RAILCAR BARGES



BARGES

372 Feet 287 Feet

TUGS

1700 HP 2550 HP

Inspections:

20 June 1995 6 July 1995



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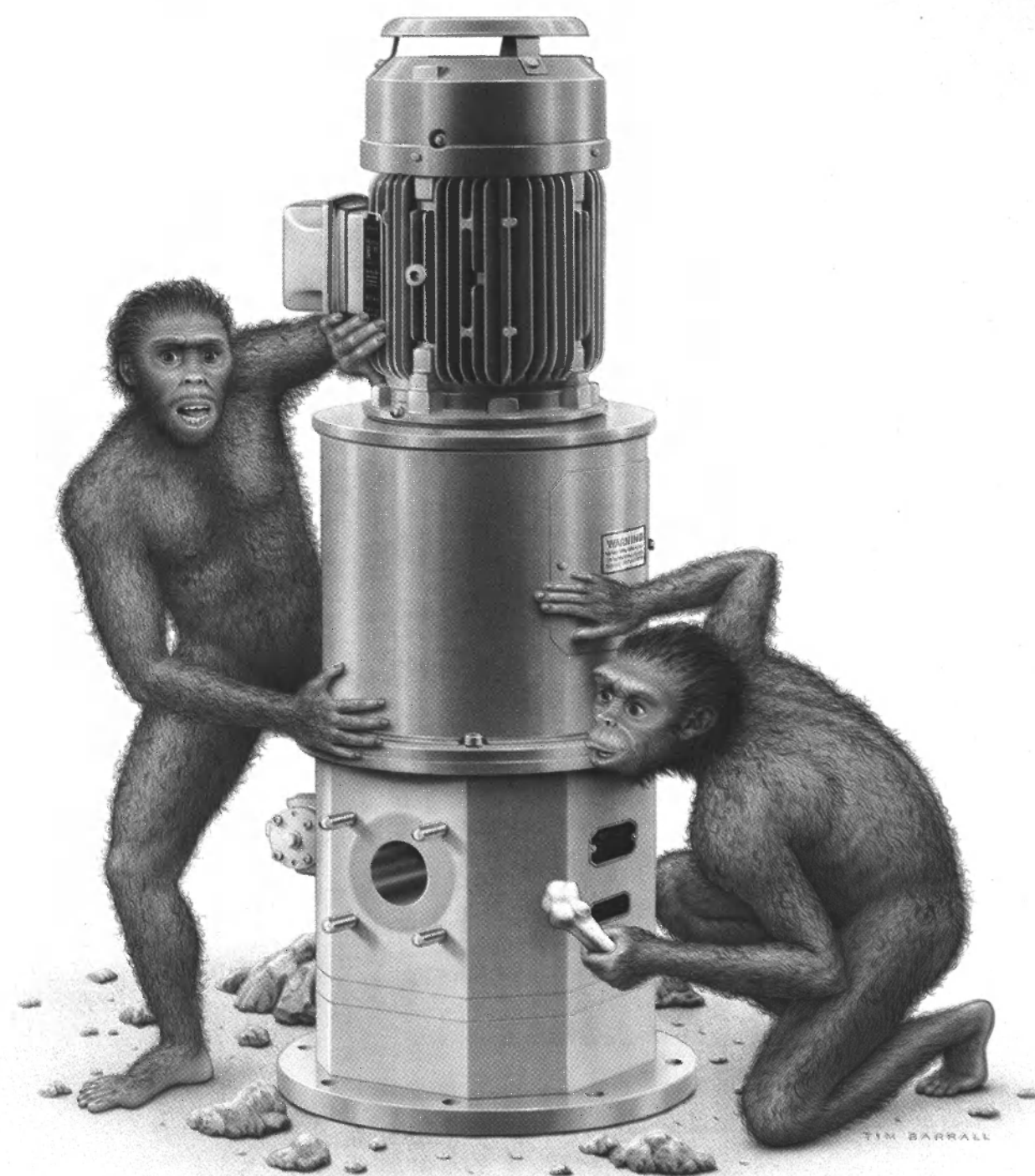
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PRINCIPAL WORLD SHIPBUILDING CONTRACTS RECORDED — APRIL 1995

For more information, contact: Ferlship, San Francisco de Sales No. 8, 28003, Madrid, Spain; tel: +341 441 41 38/40 96; fax: +341 441 41 38.

OWNER/OPERATOR	COUNTRY	SHIPYARD	COUNTRY	TYPE	SUBTYPE	No.	TEU	TPM	GT	CAR/TRAILER/PAX	M. CU.	DELIV.	PRICE M \$
ISLAND NAVIGATION	—	CHINA SB CORP.	TAIWAN	BULK CARRIER	—	2	—	165,000	—	—	—	1996	42.75
FAIRSKY	GREECE	DAEWOO	KOREA	BULK CARRIER	—	1	—	44,000	—	—	—	12/96	24
SHOUGANG HOLDING	HONG KONG	DAEWOO	KOREA	BULK CARRIER	—	1	—	210,000	—	—	—	12/96	48
SHOUGANG CONCORD	HONG KONG	DAEWOO HEAVY INDUSTRIES	KOREA	BULK CARRIER	—	1	—	200,000	—	—	—	—	48
PACIFIC BASIN	—	GUANGZHOU	CHINA	BULK CARRIER	—	2	—	26,000	—	—	—	1997	—
CZECH OCEAN SHIPPING	—	GUANGZHOU	CHINA	BULK CARRIER	—	2	—	25,700	—	—	—	7/97	38
CARRAS	GREECE	HALLA	KOREA	BULK CARRIER	—	4	—	165,000	—	—	—	1996	42
GRAND SATRADE	HONG KONG	HALLA	KOREA	BULK CARRIER	—	1+1	—	165,000	—	—	—	1996	42
SAN MARTIN	—	HALLA	KOREA	BULK CARRIER	—	1+1	—	45,000	—	—	—	12/96	25
TAI CHONG CHEANG	HONG KONG	HALLA SAMHO	KOREA	BULK CARRIER	—	1	—	168,000	—	—	—	1997	42
COSCO	CHINA	HUDONG	CHINA	BULK CARRIER	—	3	—	27,000	—	—	—	1997	58.5
SHOUGANG HOLDING	HONG KONG	HYUNDAI	KOREA	BULK CARRIER	—	1	—	186,000	—	—	—	11/96	—
PRECIOUS SHIPPING	THAILAND	HYUNDAI H.I.	KOREA	BULK CARRIER	—	6	—	18,000	—	—	—	19/97	90
DAICHI CHUO KISEN	JAPAN	IHI	JAPAN	BULK CARRIER	—	1	—	170,000	—	—	—	1/96	—
JAPANESE	JAPAN	IHI	JAPAN	BULK CARRIER	—	1	—	170,000	—	—	—	6/96	—
NAVIX LINE	JAPAN	NAMURA	JAPAN	BULK CARRIER	—	1	—	150,000	—	—	—	3/97	40
PAPADAKIS GROUP	GREECE	NAMURA	JAPAN	BULK CARRIER	—	1	—	71,200	—	—	—	6/96	—
CHINA FOOD CORP.	CHINA	OSHIMA	JAPAN	BULK CARRIER	—	2	—	47,500	—	—	—	1996	25
SUISSE ATLANTIQUE	SWITZERLAND	SEMBAWANG	SINGAPORE	BULK CARRIER	—	3	—	28,500	—	—	—	12/96	71.5
DAICHI CHUO KISEN	JAPAN	SHIN KURUSHIMA	JAPAN	BULK CARRIER	—	2	—	24,000	—	—	—	1996	24.12
SINOTRANS	—	TSUNEISHI	JAPAN	BULK CARRIER	—	2	—	45,000	—	—	—	4/96	25
WALLERUS	SWEDEN	DAEWOO	KOREA	CAR CARRIER	—	1	—	—	—	6000 car	—	1997	60
GRIMALDI	ITALY	FINCANTIERI	ITALY	CAR CARRIER	—	3	—	26,000	—	4700 car	—	97/98	180
GRIMALDI	ITALY	FINCANTIERI	ITALY	CAR CARRIER	—	2	—	18,500	—	4000 car	—	1997	110
HYUNDAI MAM	KOREA	HYUNDAI H.I.	KOREA	CAR CARRIER	—	4	—	20,600	55,864	6000 car	—	1996	—
KAWASAKI KISEN KAISA	JAPAN	IMABARI SHIPBUILDING	JAPAN	CARRIER	FORESTRY PRODUCTS	1	—	—	—	—	3,600	9/96	—
BERGSEEN	NORWAY	HYUNDAI H.I.	KOREA	CARRIER	ORE	1	—	220,000	—	—	—	12/96	50
SHOUGANG CONCORD INTL	CHINA	HYUNDAI H.I.	KOREA	CARRIER	ORE	1	—	185,800	—	—	—	1996	48
ASS. TRANSPORT	TAIWAN	CHINA SB CORP.	—	CONTAINER	—	3	—	—	—	—	—	—	—
S SIBUM	—	ELBEWERT BOIZEMBURG	GERMANY	CONTAINER	—	1	—	7,000	—	—	—	12/96	—
REEDEREI OFFEN	GERMANY	FLENDER	GERMANY	CONTAINER	—	1	3,500	—	—	—	—	12/95	65
CLAUS-PETER OFFEN	GERMANY	FLENDER	GERMANY	CONTAINER	—	4	2,000	—	—	—	—	12/97	55
DALLAN VIVID DRAGON	CHINA	ROSEN MEK VERKSTEDER	NORWAY	CONTAINER	—	4	602	—	—	—	—	—	—
GERMAN	GERMANY	GOYNIA	POLAND	CONTAINER	—	6+2	1,600	—	—	—	—	1996	32
GERMAN	GERMANY	GOYNIA	POLAND	CONTAINER	—	2	1,100	—	—	—	—	1996	23
DETJEN	GERMANY	HALLA INCHON	KOREA	CONTAINER	—	2	2,800	38,000	—	—	—	8/96	39
HYUNDAI M. MARINE	KOREA	HYUNDAI	KOREA	CONTAINER	—	2	5,000	—	—	—	—	4/96	—
COSCO	CHINA	KAWASAKI	JAPAN	CONTAINER	—	6	5,250	—	—	—	—	96/97	83
INTERORIENT NAV.	CYPRUS	KVAERNER WARK.	GERMANY	CONTAINER	—	2	2,600	—	—	—	—	1/97	49
REEDEREI LAESSEZ	GERMANY	KVAERNER WARK.	GERMANY	CONTAINER	—	2	2,600	—	—	—	—	4/96	49
WES	GERMANY	SAMSUNG	KOREA	CONTAINER	—	3	2,700	45,500	—	—	—	1996	50
HAL	MALAYSIA	SUMITOMO	JAPAN	CONTAINER	—	1	5,800	17,600	—	—	—	2/97	55
UNILINE	PERU	SZCZECIN	POLAND	CONTAINER	—	2	1,012	—	—	—	—	1997	21
CNI Y CSAY	CHILE	SZCZECIN SHIPYARD	POLAND	CONTAINER	—	3	1,700	22,900	—	—	—	6/97	—
COSTA CROCIERE	ITALY	BREMER VULKAN	GERMANY	CRUISE	—	1	—	74,000	—	—	—	6/97	420
CAR NIVAL CL	US	FINCANTIERI	ITALY	CRUISE	—	1	—	100,000	—	—	—	1998	—
HOLLAND AM. LINE	US	FINCANTIERI	ITALY	CRUISE	—	1	—	62,000	—	—	—	4/97	—
CARNIVAL CL	US	KVAERNER MASA	FINLAND	CRUISE	—	1	—	70,000	—	—	—	1998	—
D.S. TOURISTIK	—	KVAERNER MASA	FINLAND	CRUISE	—	1	—	38,000	—	—	—	1998	180
STOLT NIELSEN	NORWAY	SNACH	FRANCE	CHEMICAL	—	3	—	37,000	—	—	—	97/98	—
OCEAN BRIDGE INVESTMENT	ITALY	FINCANTIERI	ITALY	FERRY	—	3	—	—	—	600 pax.	—	—	—
SHIN NIKON-KAI FERRY	JAPAN	IHI	JAPAN	FERRY	—	2	—	17,300	—	515 pax, 81 car, 122 truck	—	—	—
WASHINGTON STATE FERRIES	US	TODD PACIFIC SHIPYARD	US	FERRY	—	3	—	—	—	2500 pax.	—	—	181.5
STENA LINE	SWEDEN	VAN DER GIESSEN DE NOORD	NETHERLANDS	FERRY	—	1	—	—	—	1500 pax.	—	—	94
UNKNOWN	GREECE	WAYMASTER INTERNATIONAL	AUSTRALIA	FERRY CATAMARAN	—	2	—	—	—	—	—	6/96	60
NUCLEAR FUEL TRANS.	JAPAN	MITSUBISHI	JAPAN	FUEL CARRIER	NUCLEAR	1	—	3,000	—	—	—	—	—
FREDRIKSEN	CYPRUS	BENETTI	ITALY	GAS TANKER	—	2	—	—	—	—	10,000	95/96	60
NYK	JAPAN	MITSUBISHI H.I.	JAPAN	LPG	—	1	—	—	—	—	78,000	8/96	70
JERSEN	—	HYUNDAI	KOREA	OBO	—	1	—	110,000	—	—	—	1996	49
KRISTIAN GERHARD JERSEN	NORWAY	HYUNDAI H.I.	KOREA	OBO	—	1	—	110,000	—	—	—	2/97	59
WOLFGANG HAMMANN	GERMANY	NORDSOVAERFTET	DENMARK	PAPER CARRIER	—	1	—	4,500	—	—	—	5/96	0
OJI PAPER	—	SANOYAS CORP.	JAPAN	PAPER CARRIER	—	3	—	49,000	—	—	—	1996	31.36
UNKNOWN	CHINA	AUSTAL SHIPS	AUSTRALIA	PASSENGER	CATAMARAN	1	—	—	—	—	—	9/95	10
A.T. CRUISES	AUSTRALIA	WAYMASTER	AUSTRALIA	PASSENGER	CATAMARAN	2	—	—	—	50 car, 400 pax.	—	6/95	458
COSTA	ITALY	BREMER VULKAN	GERMANY	PASSENGER	—	1	—	78,000	—	2350 pax.	—	6/97	350
DISNEY	US	FINCANTIERI	ITALY	PASSENGER	—	2	—	80,000	—	2,400 pax.	—	11/98	760
INDON. MIN. OF COMERCE	INDONESIA	MEYER WERT	GERMANY	PASSENGER	—	2	—	14,000	—	2000 pax.	—	1997	—
STENA LINE	SWEDEN	VAN DER GIESSEN DE NOORD	NETHERLANDS	PASSENGER	—	1	—	—	1500 pax, 680 car/truck	—	—	5/96	95
STENA LINE	SWEDEN	WESTAMARIN	NORWAY	PASSENGER	—	2	—	—	900 pax.	—	—	12/96	109.4
WESER-SCHIFFRTS-AGNTK	GERMANY	—	—	RoRo	—	1	—	25,600	—	—	—	96/97	—
ESTON RO-RO SHIPPING	ESTONIA	ASTILLEROS DE HUVELVA	SPAIN	RoRo	—	2	266	5,700	—	1140 l.m.	—	97/98	350
GRIMALDI	ITALY	FINCANTIERI	ITALY	RoRo	—	3	—	26,000	—	—	—	97/98	120.6
GRIMALDI	ITALY	FINCANTIERI	ITALY	RoRo	—	2	—	18,000	—	5000 car	—	97/98	160
COBELFRET	—	KAWASAKI	JAPAN	RoRo	—	2	—	100,000	—	—	—	1/97	80
OCEAN ARROW	—	KAWASAKI	JAPAN	RoRo	—	2	—	9,500	—	635 car, 160 trailer	—	1/97	80
NORFOLK LINE	NETHERLANDS	MITSUBISHI	JAPAN	RoRo	—	2	—	5,000	—	—	—	6/96	—
WILHELMSEN LINES	NORWAY	MITSUBISHI H.I.	JAPAN	RoRo	—	1	2,800	45,000	—	—	—	12/96	80
UNKNOWN	FINLAND	STERKORDER	NORWAY	RoRo	—	1	—	7,500	—	—	—	1997	—
AMERICA LINE (ITALY)	NORWAY	SUMIMOTO	JAPAN	RoRo	—	1	—	—	—	6,000 car.	—	—	—
SHELL EXPLORATION	—	FERGUSON	UK	SUPPLY	—	1	—	—	—	69612.5 M. L.	—	—	—
CLYDE HARRISON LTD.	NORWAY	KVAERNER GOVAN	U.K.	SUPPLY	—	1	—	—	—	—	—	6/96	19.4
GLOBAL MARITIME VENTURES	MALAYSIA	DALLAN SHIPYARD	CHINA	TANKER	PRODUCT	2	—	46,000	—	—	—	9/98	69.4
VROON/BUGGE	NETHERLANDS	HALLA INCHON	KOREA	TANKER	PRODUCT	2	—	46,300	—	—	—	9/96	33.5
MISC	MALAYSIA	HYUNDAI H.I.	KOREA	TANKER	PRODUCT	2	—	30,000	—	—	—	3/97	—
AMERICAN MARINE TANKSHIP	US	NEWPORT NEWS SHIPBLOC	US	TANKER	PRODUCT	1	—	46,000	—	—	—	—	—
IMC	SINGAPORE	DALLEN	CHINA	TANKER	PRODUCTS	2	—	45,000	—	—	—	1997	30.5
VROON/VERSHP	NETHERLANDS	KVESON	UKRAINE	TANKER	PRODUCTS	2	—	28,500	—	—	—	95/96	23.5
TARTANK	SWEDEN	KVAERNER KLEVEN	NORWAY	TANKER	PRODUCTS	1	—	10,900	—	—	—	7/96	—
SUMIMOTO	—	ONOMICHI DOCKYARD	JAPAN	TANKER	PRODUCTS	1	—	45,000	—	—	—	9/96	33
F.T. EVERAD	UK	TURKISH SHIPBUILDING	TURKEY	TANKER	PRODUCTS	2	—	4,500	—	—	—	6/96	—
AMPTC	EGYPT	HYUNDAI	KOREA	TANKER	SUEZMAX	2	—	153,000	—	—	—	6/97	104
KRISTEN NAV.	GREECE	DAEWOO	KOREA	TANKER	—	2	—	98,000	—	—	—	6/96	—
TRANSPETROL	BELGIUM	FINCANTIERI	ITALY	TANKER	—	1	—	150,000	—	—	—	12/96	52
YUKONG LINE	—	HYUNDAI	KOREA	TANKER	—	1	—	20,000	—	—	—	8/96	—
HYUNDAI OIL	KOREA	HYUNDAI	KOREA	TANKER	—	2	—	280,000	—	—	—	12/95	—
NOI	TAIWAN	SAMSUNG	KOREA	TANKER	—	1	—	100,000	—	—	—	2/97	43
NYK	JAPAN	IHI	JAPAN	TANKER (DH)	—	1	—	258,000	—	—	—	10/96	—



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retrobras on the Brazilian coast. an impact on the local market. One of an American shipowner. American
A ide from the possible threat ket, although price levels in Poland into the commercial market. One of an American shipowner. American

SHIPREPAIR

Ship Repair Industry Outlook

Tanker and ferry markets offer near-term promise

by Alan Thorpe, international editor

Despite not yet reaching its anticipated peak, there has been a great deal of ship repair and conversion activity worldwide, as yards gear themselves up for a market which many still believe will improve.

The large tanker segment is a good indicator of the repair market overall. Last year saw 40 such vessels go to the scrap yard — not enough to have any significant effect upon freight rates. This year has had a better start, and it is hoped that reducing the number of ships available will cause freight rates to rise, with the ship repair industry benefiting as a result.

The other area of interest is the ferry industry, especially following

the *Estonia* disaster, which will inevitably lead to refit work being carried out in repair yards. Yards in Northern Europe have already seen a trend toward larger refit contracts from the ferry industry, a trend which is likely to continue.

Singapore: Expanding In The Face Of Competition

The Singapore area, a worldwide leader in ship repair, has moved significantly into domestic and overseas expansion. Singapore-based repair yards have recently invested \$394 million in new docks, additional berths, equipment and machinery, anticipating a long-overdue shipping upturn in 1995-96. Keppel Shipyard is in the process of



constructing a \$107.9 million graving dock, capable of handling vessels up to 350,000 dwt, at its Tuas facility — which includes two graving docks of 330,000 and 155,000 dwt, and the 400,000-dwt graving dock at nearby Pioneer Shipyard.

The largest expansion program currently underway is the 400,000-dwt capacity graving dock being built at the existing Tanjong Kling shipyard of Jurong Shipyard Ltd. (JSL). Singapore Shipbuilding & Engineering (SSE) has completed work on a new shipyard in Tuas, which will comprise two Panamax floating docks; Singmarine has replaced a previously damaged floating dock; and Pan United, following the introduction of a new self-built floating dock in 1993, is planning another, similar expansion. Sembawang Shipyard and Malaysia Shipbuilding & Engineering (MSE) are also expanding facilities, involving additional alongside repair berths and cranes.

While expansion is continuing within Singapore, various overseas projects are well underway, especially involving Keppel and Sembawang. The largest overseas expansion program by Keppel involved the takeover of Philseco Shipyard in Subic Bay, renamed Subic Bay Shipyard, a yard which is capable of drydocking ships up to VLCC size. Keppel has also been active expanding facilities and ser-

vice in the Middle East, Australia, expansion programs, is still involved in building a new yard in Indonesia.

The Specter Of China

One of the greatest threats to the current repair situation in the Far East may be mainland China, which has tried over recent years to build up both its ship repairing and shipbuilding industries to attract the international market. Shipowners are tempted by China's lower repair prices, specifically in steel renewals, which can be as much as 40 percent cheaper than the already competitive prices in the Singapore area.

The main repair areas are Dalian, Tianjin, Shanghai, Gwangzhou, Nantong and Shanghai. Many Chinese owned and operated ships use the vast repair facilities in Hong Kong, especially the two main yards, Hongkong United Dockyard (HUD) and Tiu Lian Dockyard (the latter owned by the mainland Chinese). Following the takeover of the colony in 1997, both yards will become part of the country's repair industry.

A recently completed expansion plan at South Korea's Hyundai Mipo Dockyard (HMD) included the widening of the No. 4 graving dock by 36 ft. (11 m), to its present dimensions of 984 ft. x 246 ft. (300 m x 75 m). This is to allow more simultaneous dockings in the yard's four graving docks, all capable of taking ships up to VLCC size. One of the world's largest conversion contracts also took place in HMD, involving the 8,675-

U.S. Army Corps of Engineers
Dredging Contracts Awarded

Comex. She was converted at HMD to a specialized offshore pipelay vessel for use under a charter to Petrobras off the Brazilian coast.

Aside from the possible threat from China, competition has emerged from the Middle East, where two large yards at Dubai and Bahrain have undertaken expansion plans to increase capacity. Price differentials regarding scheduled repair contracts between the two areas are becoming narrower, although conversion work still favors the Singapore area. The main advantage the Middle East appears to have is that there are no limitations on the influx of foreign labor, as is the case in Singapore.

Dubai Drydocks inaugurated a new 40,000-dwt-capacity floating drydock, and Bahrain's Arab Ship Repair Yard (ASRY) over a year ago purchased two floating docks from the U.S. Success for the two Arabian Gulf yards has come in two areas — the westbound independents and the Arab-owned vessels.

The majority of the yards operating in the Mediterranean area have suffered over recent years, following the development and expansion in the Middle East. This has led to closures, privatizations and reorga-

nizations. The majority of the yards still operating have now found a fairly good chance of survival; but added competition, especially for the more fundamental repair operations such as steelwork, is increasing coming from the former Soviet states such as Ukraine, Georgia and former Eastern Bloc countries such as Bulgaria and Romania.

The main story concerning the southern European area over recent months has been the progress made by Portugal's Lisnave to reorganize its existing three yards — Margueira, Mitrena and Setubal— while the Rocha yard in Lisbon will remain active for smaller ships.

Meanwhile, Spain's Astilleros Espanoles SA (AESA) has been busy recently in the conversion market, especially the completion of the \$30 million contract for Bluewater Terminal Systems regarding the conversion of the 99,800-dwt conventional tanker *Dirch Maersk* to a specialized offshore floating production and storage offloading unit (FPSO), for use in Amerada Hess's Fife Field in the U.K. sector of the North Sea. Northern Europe's on-going battle with lower-priced competitors has led to several closures and reorganizations; however, the conversion industry has made something of a rebound. The main competition has come recently from

yards in former Eastern Bloc countries such as the Baltic States, Poland and Russia, all trying to make an impact on the international market, although price levels in Poland have risen slightly over recent months.

One area of optimism is the U.K., where ship repair yards have become very competitive on the international market. A&P Appledore has been active, with the reorgani-

zation of its three yards and the purchase of the Neptune yard from Swan Hunter.

The U.S. is making a comeback into the commercial market. One of the world's most significant conversion contracts has been placed with Avondale Industries, a U.S. yard. When the OPA 90 regulations governing double-hulled tankers came into force this year, many believed that it would result in a number of

conversion projects involving existing tankers. Avondale Industries is the first to be awarded such a contract involving Jones Act tankers by an American shipowner, American Heavy Lift Shipping (AHL). The \$160 million contract involves the forebody conversions, stern modifications and some house arrangements to the 34,723-dwt *King* and *Knight* and the 30,806-dwt *Solar* and *Spray*.

One of the world's most significant conversion contracts has been placed with Avondale Industries

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Quantity Job Name	Cubic Yds.	Winning Bid	Winning Bidder	Quantity Job Name	Cubic Yds.	Winning Bid	Winning Bidder
LMK District VICKSBURG				NED District NEW ENGLAND			
WEST PEARL RIVER	2,000,000	\$2,584,500	MID-SOUTH DREDGING CO.	Wellfleet Harbor, MA	135,000	\$1,043,500	GREAT LAKES DREDGE & DOC
RED RIVER AND LOWER BLACK	3,000,000	\$4,373,000	T.L. JAMES & CO., INC.	Block Island Harbor, RI.	19,000	\$192,050	GULF COAST TRAILING CO.
				Stony Creek, CT	60,000	\$498,000	THAMES DREDGE & DOCK CO.
LMN District NEW ORLEANS				NPA District ALASKA			
MISS RIV NEW ORL HARBOR 1-95	717,762	\$717,965	T.L. JAMES & CO., INC.	DILINGHAM/HOMER/NIINLCHK 95&96	98,000	\$1,031,000	TANGO
BERWICK BAY LSD CUTTER 1-95	300,000	\$673,200	T.L. JAMES & CO., INC.				
PASS MANCHAC - NORTH PASS	90,000	\$338,200	RIVER ROAD CONSTRUCTION				
ATCH RIV GRAND/SIXMILE LAKE	1,400,000	\$1,921,100	MIKE HOOKS INC.				
HOUMA NAV CANAL MI 0-3.0	900,000	\$1,568,000	GREAT LAKES DREDGE & DOC	NPP District PORTLAND			
ATCH RIV HORSESHOE LSD CUT-1	750,000	\$1,875,025	T.L. JAMES & CO., INC.	PORT ORFORD BOAT HOIST	6,000	\$222,000	NEHALEM RIVER DREDGING
MISS RIV SWP LSD HOPPER 1-95	4,080,000	\$5,333,295	GREAT LAKES/GULF COAST J	CHINOOK CHANNEL	145,000	\$592,675	M. CUTTER
MROGO MI 18.0 TO 13.9	3,500,000	\$1,568,000	GREAT LAKES DREDGE & DOC	GOV.SOUTH CHANNEL 205 SHOAL	15,500	\$24,895	PORTABLE HYDRAULIC DREDG
				OREGON SOUTH COAST HOPPER	250,000	\$1,340,300	NATCO LIMITED PARTNERSH
				GOLD BEACH BOAT BASIN CH.	50,000	\$210,000	PORTABLE HYDRAULIC DREDG
NAB District BALTIMORE				NPS District SEATTLE			
POCOMOKE RIV, SOMERSET CO, MD	139,500	\$607,500	MARYLAND ENGINEERING & D	SWINOMISH CHANNEL, WA	100,000	\$735,500	AMERICAN CONSTRUCTION CO
RHODES PT. TO TYLERTON, MD	42,000	\$822,000	COTTRELL ENGINEERING COR				
BALT. HARB. CAPE HENRY, VA	500,000	\$1,575,000	NO. AMERICAN TRAILING CO				
OCEAN CITY, WORCESTER CO, MD	78,409	\$474,272	COTTRELL ENGINEERING COR				
ISLAND CK, ST. GEORGE IS, MD.	11,430	\$104,707	COTTRELL ENGINEERING COR				
NAN District NEW YORK				ORP District PITTSBURGH			
ContinueLake Montauk Harbor, NY	50,000	\$560,400	GIBSON & CUSHMAN DREDG	EMRG DRDG POOL3 MI40.8 MON R	13,150	\$0	RIVER SALVAGE CO., INC.
BROWS CREEK	14,013	\$136,288	GIBSON & CUSHMAN DREDG				
NAO District NORFOLK				SAC District CHARLESTON			
AIW - LOWER NORTHLANDING RIV	150,000	\$524,000	COTTRELL ENGINEERING COR	CHARLESTON ENTRANCE	1,300,000	\$1,660,000	NATCO LIMITED PARTNERSH
JAMES RIVER - TURKEY ISLAND	33,000	\$331,650	COTTRELL ENGINEERING COR	AIWW JEREMY AND VICINITY	310,000	\$602,000	WRIGHT DREDGING CO.
JAMES RIVER - DANCING/SWAN	306,500	\$572,460	NORFOLK DREDGING COMPANY	PORT ROYAL INSIDE DREDGING	160,000	\$459,790	WEEKS MARINE, INC.
BALTIMORE HBR CAPE HENRY	300,000	\$1,575,000	NATCO LIMITED PARTNERSH				
GREENVALE CREEK	11,000	\$95,663	M.C.M. MARINE INC.	SAJ District JACKSONVILLE			
QUINBY CREEK	57,000	\$221,480	COTTRELL ENGINEERING COR	DUVAL CO BE, CONT 1&2 *	1,250,000	\$7,377,795	GULF COAST TRAILING CO.
WCY - ACCOMACK COUNTY	185,000	\$500,000	WOODINGTON CORP	ST. LUCIE INLET EMERGENCY	156,000	\$1,721,904	GREAT LAKES DREDGE & DOC
RUDEE INLET	110,000	\$638,000	COTTRELL ENGINEERING COR	SAND BYPASS SYSTEM CANAVERAL	705,000	\$4,050,200	WEEKS MARINE, INC.
CHINCOTEAGUE IN. OCEAN BAR	110,000	\$716,400	GULF COAST TRAILING CO.	PALM BEACH HARBOR	146,000	\$1,450,000	GREAT LAKES DREDGE & DOC
				FERNANDINA/KINGS BAY EC & TAC	368,000	\$3,250,200	BEAN DREDGING CORP.
NAP District PHILADELPHIA				SAM District MOBILE			
OCEAN CITY/PECK BEACH	400,000	\$2,425,000	GREAT LAKES DREDGE & DOC	Pascagula Harbor, MS.	1,500,000	\$3,913,000	MIKE HOOKS INC.
CAPE MAY BEACHFILL	300,000	\$2,438,995	GREAT LAKES DREDGE & DOC	Perdido Pass, AL	300,000	\$1,029,300	RIVER ROAD CONSTRUCTION
NJINW/CAPE MAY HBR	350,000	\$1,478,600	BARNEGAT BAY DREDGING CO	BW&T Rivers, Upper	2,200,000	\$3,684,280	T.L. JAMES & CO., INC.
NCB District BUFFALO				SAS District SAVANNAH			
CLEVELAND	275,000	\$1,467,500	GREAT LAKES DOCK AND DRE	KINGS BAY FY95 MAINTENANCE	500,000	\$1,715,455	WRIGHT DREDGING CO.
TOLEDO OPEN	200,000	\$520,000	B&B DREDGING CORPORATION				
NCE District DETROIT				SAW District WILMINGTON			
GRAND HAVEN HBR, MI (OUTER)	11,500	\$78,494	M.C.M. MARINE INC.	MOREHEAD CITY OCEAN BAR	1,425,000	\$2,158,000	BEAN DREDGING CORP.
ONTONAGON HARBOR, MI	50,000	\$258,000	KING COMPANY, INC.	CAROLINA BEACH RENOURISHMENT	1,066,000	\$2,580,020	GREAT LAKES DREDGE & DOC
HOLLAND HARBOR, MI (OUTER)	10,000	\$62,256	M.C.M. MARINE INC.	MANTED OLD HOUSE CHANNEL	439,300	\$1,486,962	SOUTHERN DREDGING CO., I
ST. JOSEPH HARBOR, MI(OUTER)	36,000	\$197,000	KING COMPANY, INC.				
LUDINGTON HARBOR, MI	60,000	\$267,000	M.C.M. MARINE INC.	SPL District LOS ANGELES			
BIG BAY HARBOR, MI	11,000	\$49,700	TWT DREDGING	MARINA DEL REY	132,000	\$4,909,678	DUTRA DREDGING CO.
ROUGE RIVER, MI	44,000	\$302,090	GREAT LAKES DREDGE & DOC	Venlura Harbor Emergency	0	\$1,154,679	MANSON CONSTR. & ENGRNG
DETROIT RIVER, MI (PTE M.)	23,000	\$161,910	GREAT LAKES DREDGE & DOC	Los Angeles River Emergency	250,000	\$953,000	MANSON CONSTR. & ENGRNG
LITTLE LAKE HARBOR, MI	25,000	\$92,500	MICHIGAN HYDRAULIC DREDG				
ARCADIA HARBOR, MI	4,000	\$26,924	KING COMPANY, INC.	SPN District SAN FRANCISCO			
PENTWATER HARBOR, MI	11,000	\$57,538	KING COMPANY, INC.	OAKLAND HBR (42' DEEPENING)	5,510,000	\$42,454,755	DUTRA DREDGING CO.
NCS District ST. PAUL				SWL District LITTLE ROCK			
MISSISSIPPI RIVER CONTINUED	505,000	\$2,917,000	L&S INDUSTRIAL MARINE	MCCLELLAN-KERR MI 0-444.8	1,300,000	\$1,198,650	PENTZIEH, INC.
READS LANDING EXCAVATION CONT	1,495,000	\$2,036,770	L.W. MATTESON, INC.				
				REPORT TOTAL	75 Contracts	42,555,064 CYS	\$138,943,970
				Source: U.S. Army Corps of Engineers			

Law UN Conference Addresses Law Of The Sea

six-week conflict between Canada and Spain set off a debate where the responsibility lies for enforcing conservational measures fishing rights in international waters, and prompted the United Nations (UN) to establish mandates for intervention in international sea routes. On March 9, officers of the Canadian Department of Fisheries and Oceans (DOF) fired upon, boarded and seized a Spanish fishing vessel in international waters alleged violation of the total allowable catch (TAC) of Greenland halibut (turbot) fish directly outside Canadian waters in the North Atlantic. Spanish authorities denied claims of misconduct or overfishing. Our ships are fishing completely legally and are answerable only to the Spanish fisheries secretariat and the European Union authorities nobody else." Spain demanded the release of the vessel, *Estai*, and its crew — and in retaliation for Canada's action, halted all official visits to Canada, and reinstated visa requirements for Canadian tourists.

The UN responded by establishing a new conference, The Conference On Straddling Fish Stocks And Highly Migratory Fish Stocks, to follow up the 1982 mandates set down in the Law of the Sea Convention. The goal of the UN's 1995 conference is to establish binding regulations on specific conservational measures, and to establish a medium of enforcement, which was where the Law of the Sea Convention fell short. According to **Moripaka Hayashi**, Secretary of the Conference, "This is an ongoing conference in which we are trying to set regulations on how to better manage straddling fish stocks. Hopefully, by the end of the two sessions this year, we will have adopted a binding convention or other type of recommendation."

"The Law of the Sea sets down regulations which are regarded as customary international regulations. However, it is not clear in defining responsibilities of states — it only provides general provisions. There has to be something more concrete."

For the provisions of the conference to be binding, individual nations must agree to be bound by the new agreements. According to Mr. Hayashi, "All states involved have to become party to the new agreement, so it can be enforced by binding arbitration or judicial procedure such as tribunals." He added that Canada has been one of the promoters of the recent UN conference.

Canada and Spain were not parties to the 1982 UN Law of the Sea Convention; therefore, even if there was an agency of enforcement, they could not be penalized for actions contrary to its guidelines. If individual world nations each decide to ratify the agreement drafted by the UN Conference On Straddling Fish Stocks And Highly Migratory Fish Stocks, action could be taken to resolve international conflicts, and at last, there would be a Law of the Sea packing an official punch.

The most recent meeting of the contemporary UN conference was held on April 12, and more than 100

countries were represented, including the European Union (EU), which represents Spanish fishing rights. Mr. Hayashi said the meeting produced a primary draft of the final agreement. "There are a lot of areas agreed upon already. We are very close to coming to an agreement. The only areas left to decide on are the most controversial areas."

He said the conference's last meeting is scheduled to take place from

July 24-August 4. The 1995 conference has decided to adopt many of the regulations set down in the Law of the Sea convention, and each dispute can be resolved in any of four ways; the method will be chosen by the parties involved. The arbitration methods include putting the decision to a newly established International Tribunal in Hamburg.

The conflict ended in compromise in mid-April, with the nations striking

an agreement on turbot fishing quotas. The conflict suggested the need for an international regulatory agency for enforcing conservational standards in international waters, and prompted the formation of a 1995 UN conference. The UN is actively working to preserve the world's fishing stocks by creating an agency with the legislative power to enforce conservational regulations.

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The Marine Parts Information Network

Shipbuilding Demand:

Fleet Obsolescence, Safety Concerns To Drive Newbuild Activity Through 2010

Despite the fact that the volume of international trade by sea quadrupled between 1960 and 1990, and continues to grow in overall terms, freight rates have remained at a low level, and in 1994 had declined in real terms taken over the previous 12 years. The situation has been brought about by the indiscriminate entry of

new tonnage into the markets and failure to scrap less economical ships (between 1950 and 1980 the global merchant fleet grew by more than 400 percent in deadweight terms). Nevertheless, the advancing age of ships, with accompanying growing maintenance expenses, higher running costs, increased safety concern and impending obsolescence, must

inevitably lead to fleet replacements. On top of this, future needs must be catered to in changing markets — in addition to changes in established trades, new markets are emerging. These issues have important implications for shipowners, shipbuilders and others involved in newbuilding projects.

With the forecast of global cost of newbuildings amounting to \$28 billion in 1995, rising to \$38 billion by the turn of the century, both shipowners and shipbuilders are faced with daunting problems. The shipowner must make critical investment decisions in risky circumstances, while the shipbuilder, despite the prospects of a growing demand for ships, is faced with fierce competition due to global overcapacity and uncertainty as to the future role of government subsidies. Drewry's new report, *The Shipbuilding Market: Analysis and Forecast of World Shipbuilding Demand, 1995-2010*, addresses the underlying factors influencing newbuilding orders and explains the most likely projected effects on the shipping and shipbuilding industries.

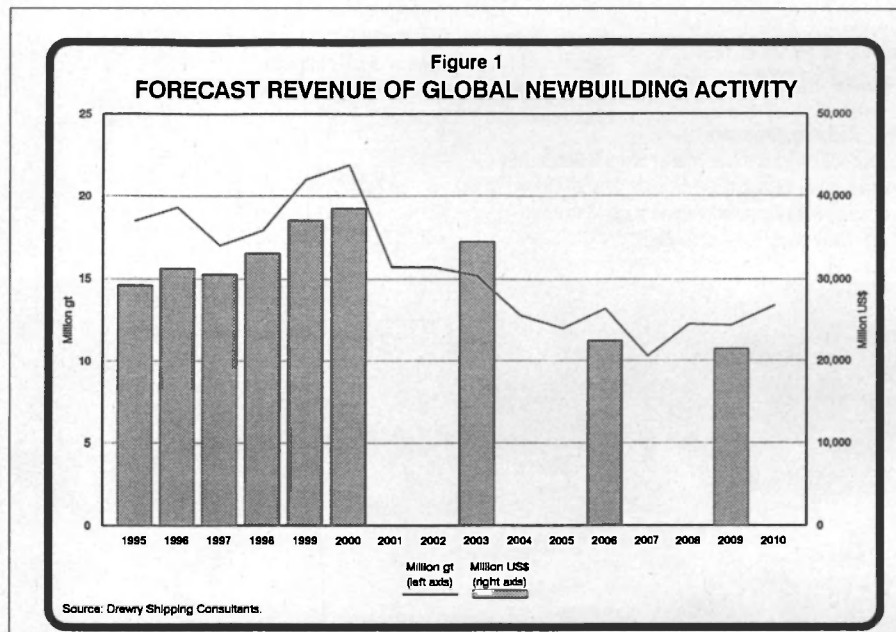
For the shipowner trading a new ship on inadequate returns, high capital recovery costs must often be


covered in competition with old ships having smaller capital overheads. On the other hand, marginal improvements in market conditions may lead to a new ship suitable design outperforming old ships and proving itself a valuable asset.

Decisions as to the timing of order for a new ship, or whether there is an acceptable alternative which may be resorted to, are, therefore, of critical importance and can only be judged by an analysis of the particular market in which the ship is employed.

A forecast of how a shipping market will perform within the global economic cycle must be taken into account structural changes which are at work in the composition of the world economy as a whole and which arise from new manufacturing and commercial practices. Examples of such changes are to be found in the trading patterns in the Pacific Rim countries, in the continuing development of container trades and in the supply of basic commodities to changing steel and power generating industries.

Prospects for shipbuilding in overall volume terms are seen as good, with shipping acquiring a slice of a growing world trade likely to be a





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Maritime Reporter/Engineering News

ture of the next five years. The shipbuilding lustry, is, however, dogged by the overcapacity d a seeming inability of governments to accept the omomic realities of the marketplace; instead, sub- zation is still rife.

The most recent OECD accord on the removal of vernment subsidies requires an end to direct assis- nce by 1996, but it remains to be seen how effective is will prove. Competition for most yards in the ture will be fierce, with newbuilding revenue tend- g to be thinly spread.

Most shipbuilders unable to rely any longer upon ptive markets, as previously existed at corpora- on, national or regional levels, must compete in the obal marketplace. The shipbuilder who is alert to re state of the world economy and the shipping arkets, and able to offer a better deal to prospective ustomers will fare best.

Over the next few years there will be important hanges in the product mix of shipyards and in arket share. Newbuilding prices will be affected by emand and supply side factors, subsidization, legis- ation, inflation and exchange rates, with improve- ments in technological, managerial and marketing rices playing an important part at the design stage is well as during building.

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Table 1

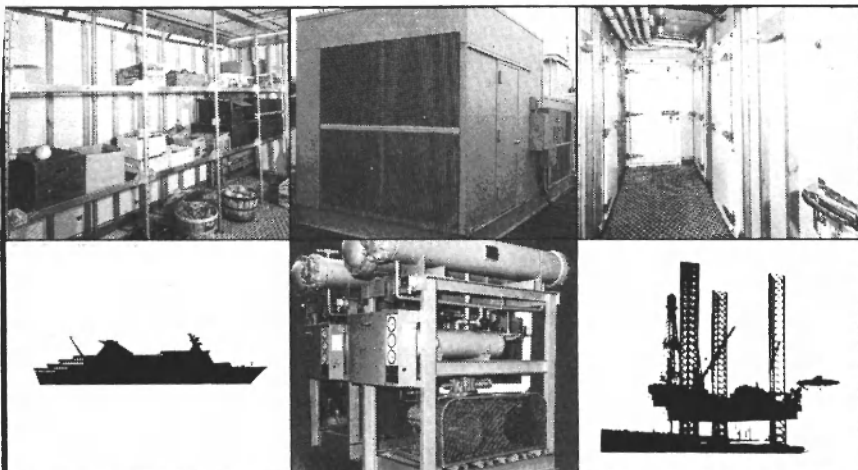
Global Cargo Carrying Fleet in 1989 and 1993 with Reported Newbuilding Completions and Disposals/Losses by Shiptype																	
	Mid 1989 Ships	1989 Totals M gt	M dwt	'89		'90		'91		'92		'93		Ships	End 1993 Totals M dwt	Av age	
				+	-	+	-	+	-	+	-						
Oil Tankers	6,383	129.6	246.2	172	67	145	55	171	50	221	85	273	96	6,550	143.1	270.2	16
Chemical Carriers	942	3.4	6.2	75	15	97	22	105	18	128	21	92	11	1,958	11.1	18.8	11
Liq Gas Tanker	789	10.1	10.5	33	6	47	4	55	4	43	7	33	7	946	13.1	13.4	13
Bulk Carriers	4,708	109.5	187.4	176	33	176	27	126	22	106	22	113	23	5,689	124.8	208.7	14
Oba Carriers	363	20.0	37.7	6	3	3	8	5	14	11	5	14	263	16.1	30.0	14	
Container Ships	1,122	22.7	24.1	44	9	68	2	78	2	82	7	94	8	1,461	31.7	35.3	11
General Cargo	16,444	61.7	75.4	319	318	351	248	381	271	349	259	231	151	17,239	55.5	81.4	20
Refrig Ships	1,402	6.6	7.4	50	13	58	12	49	10	43	12	45	27	1,553	7.8	8.5	15
Ro-Ro Cargo Ship	971	7.1	8.0	35	10	22	7	30	4	33	2	23	7	1,494	14.4	8.2	16
Ro-Ro/Pass Ship	1,902	6.5	1.9	75	8	71	7	42	4	57	2	49	7	2,125	8.4	3.4	16
Passenger Ships	2,713	6.2	0.6	107	10	118	14	96	13	89	8	81	5	2,384	5.3	1.2	18
Other Cargo	2,309	15.1	13.0	3	4	1	5	2	5	0	2	0	0	490	2.0	14.6	20
Totals	40,138	388.5	618.4	1,095	496	1,154	406	1,143	408	1,165	438	1,039	356	42,152	433.3	693.7	17

Note: Reported completed in first two quarters of 1994:
Ships '000 dwt
Oil Tankers 93 6,137
Oil/Ore Carriers 1 83
Dry Bulk Carriers 73 5,230
General Cargo 156 661
Containerships & Others 79 2,294

+/- signifies reported additions and disposals/losses in current year.
Totals are affected by changes in ship categorization and other factors.
1993 passenger ship numbers include 1,780 vessels under 500gt.
1993 Ro-Ro Cargo and Ro-Ro Passenger/Cargo Totals include 2,862 ships under 5,000 dwt.

Sources: Lloyd's Register of Shipping, ISL

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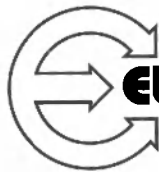
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CFCs And Modern Refrigeration Technology

Is the marine industry prepared to enter a new age of ozone-friendly refrigerants? Deadlines mandated by the United Nations-sponsored Montreal Protocol are in effect, and on December 31, 1995, the production of chlorofluorocarbons (CFCs)

will end worldwide. Prudent shipowners should plan now to retrofit their shipboard refrigeration and air conditioning systems to accommodate ozone-friendly refrigerants, since it is widely reported that the hydrochlorofluorocarbon (HCFC)-R-

22 will follow R-12 (also referred to as CFC-12) and other CFCs into the same regulatory oblivion.

Shipowners who continue to rely on R-12 beyond the December 31 deadline could expect to face an immediate future filled with uncertain refrigerant supplies and escalating costs. The impact has already been felt in the European Union (EU) countries where CFC production ended last December. Shortages of R-12 reportedly now

exist in many ports and by early 1996, remaining supplies are expected to essentially disappear worldwide. It's a safe hypothesis that none of the marine industry traditional refrigerants will be in existence during the remaining useful lifetimes of most deep-sea vessels now in service. Consequently, if a vessel is not sold, or sent to the breakers, its shipboard refrigeration and air conditioning systems will have to be retrofitted to accommodate refrigerants that present less risk to the environment. Fortunately, if shipowners work with reliable global refrigerant suppliers and service providers, the process can be accomplished efficiently and with minimal disruption to ship operations.

The transition away from CFCs

CFCs are very stable compounds, a virtue which made them attractive as refrigerants since their introduction 50 years ago. While other chlorine bearing molecules break down under normal sunlight at low altitudes, CFC does not. When the compound is released into the atmosphere, it eventually rises to ozone level altitudes where it is broken down by sunlight. Over time, the resulting free chlorine particles reduce ozone to oxygen. The chlorine molecule is then released and again available to reduce additional ozone for many years, gradually depleting the ozone layer. The ozone layer protects the Earth from excessive amounts of hazardous Ultraviolet B radiation. Loss of the ozone layer, it is predicted, will ultimately result in a major increase in the incidence of skin cancer, as well as damage to food crops and destruction of plankton, which would negatively impact the marine food chain.

The generally accepted conclusion in the scientific community is that ozone depletion is caused by the presence of chlorine-containing compounds in the upper atmosphere. Scientists of many countries continue to debate this conclusion, and the debate is likely to continue.

For most national and international regulatory authorities, however, the debate over the hole in the ozone ended nearly a decade ago. In 1987, over 125 signatory countries voted to support the Montreal Protocol's original timetable, which called for the gradual elimination of CFC production and restrictions on imports/exports. In 1992, with increased evidence of the global impact of ozone depletion available, the Copenhagen UN Accord accelerated the phaseout of CFCs, capped hydrochlorofluorocarbon (HCFC) production, and provided for their eventual elimination. Many countries have further accelerated the phaseout schedule.

Recent meetings of the UN in Nairobi, as well as the EU Parliament, and the governments of individual UN member countries, have tolled an early death for both R-12 and R-22 marine refrigerants. Many believe the R-22 phaseout schedule will be further accelerated.



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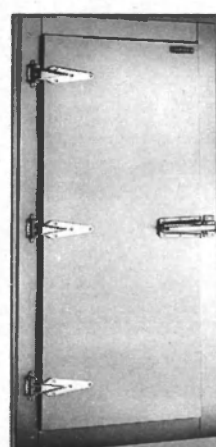
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Shoring in ozone-friendly refrigerants, R-134a

Today most reefer containers and at least 20 percent of stationary shipboard systems currently use R-12 as a refrigerant. Shipowners planning to retrofit these systems must first decide on an alternative refrigerant, because this choice dictates the CFC conversion decision and process.

A professional shipboard survey of the existing system and a thorough engineering evaluation should be done by a reliable marine retrofit service contractor before a shipowner makes his or her decision needs. Shipowners should make certain the contractor they choose also provides efficient follow-up service and worldwide warranty protection. While no single solution is ideal for all applications, most anticipated marine retrofits will likely involve the conversion of R-12 systems to R-134a (also referred to as HFC-134a). With its zero ozone depletion potential and low global warming potential, R-134a is considered by many to be the long term marine refrigerant of choice. The ozone-friendly R-134a refrigerant is produced by many global manufacturers and is already commonly used in commercial, industrial and marine applications, ensuring worldwide availability. Global prices of the refrigerant have also been trending lower this year.

The most time-consuming step in the process of converting a R-12 system to R-134a involves a series of oil changes. A retrofit service contractor will repeatedly drain and flush the mineral oil in the R-12 system with a POE lubricant until residual material concentrations are reduced to five percent, the generally accepted maximum level for optimum system efficiency. It has been reported that as many as four oil changes and flushes are required to reach the five percent limit. Service engineers on board the vessel check the levels of residual mineral oil by conducting a simple refractometer test.

Polyolester lubricants are compatible with all refrigerants

Chlorine-free refrigerants like R-134a are compatible with the environment, but are not compatible with mineral oil or the alkyl benzene synthetic oils traditionally used to lubricate R-12 systems. A compatible lubricant is critical to the system's optimum performance. It takes a polyolester (POE) lubricant, such as Mobil EAL Arctic Series, to lubricate compressors and system components effectively using HFC-134a. Available worldwide through Drew Ameroid Marine's global network, EAL Arctic Series oils are part of Mobil's family of Environmental Awareness Lubricants (EAL). Mobil manufactures its own refrigeration oil basestock. The company also uses a proprietary manufacturing process to produce an ester with virtually none of the metallic residuals that can cause oxidation and ad-

versely affect the thermal stability of a lubricant.

The POE lubricant is made to provide properly controlled miscibility with all refrigerants, and lubricity superior to those of mineral oils used with CFCs and HCFCs. Because POEs are hygroscopic (absorb moisture), the company packages the refrigeration oils in steel containers capped with nitrogen to guarantee low moisture content.

At the end of 1995, CFC produc-

tion will end around the world. Before long, shipowners using R-12 will find their supplies disappearing in early 1996. Some shipowners may also be exposed to unscrupulous elements marketing so-called "recycled" R-12, refrigerants containing very high moisture levels, destructive noncondensables, metal fines and contaminated mineral oil lubricants. There have been cases reported of recycled R-12 adulterated with quantities of propane.

Shipowners can avoid the prospect of uncertain refrigerant supplies and escalating prices by working with trustworthy suppliers and retrofitting experts.

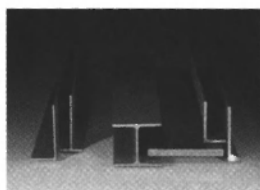
The preceding commentary was submitted by Marketing Communications, Inc., on behalf of Mobil Marine and Drew Ameroid Marine.

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This century has been demanding. The shipbuilding industry and the designs of the ships being constructed, have changed and changed again. It's taken a lot to keep up with it, and even more to keep ahead of it.

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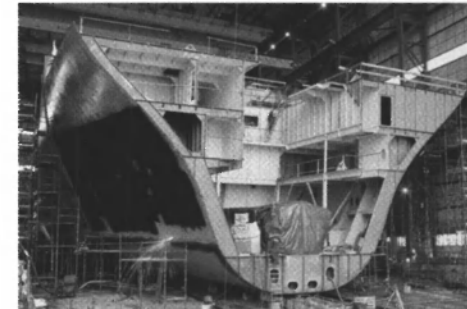
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Tapping An Expanding Market

Norwegian maritime exporters — bullish on newbuilding prospects in U.S. yards — offer technical solutions to build ships more efficiently

By Greg Trauthwein, Editor

The re-emergence of U.S. yards as builders of commercial ships is a reality, and the momentum to "Buy American" gained speed in significant measure due to the interest and support of ship's equipment suppliers from Norway. Norwegian maritime companies are respected around the world as suppliers of innovative and technologically advanced equipment. A group of companies — with the assistance and support of the Norwegian Export Council — visited six U.S. yards for two weeks in mid-March to assess the business potential in the States. In short, the future looks good.

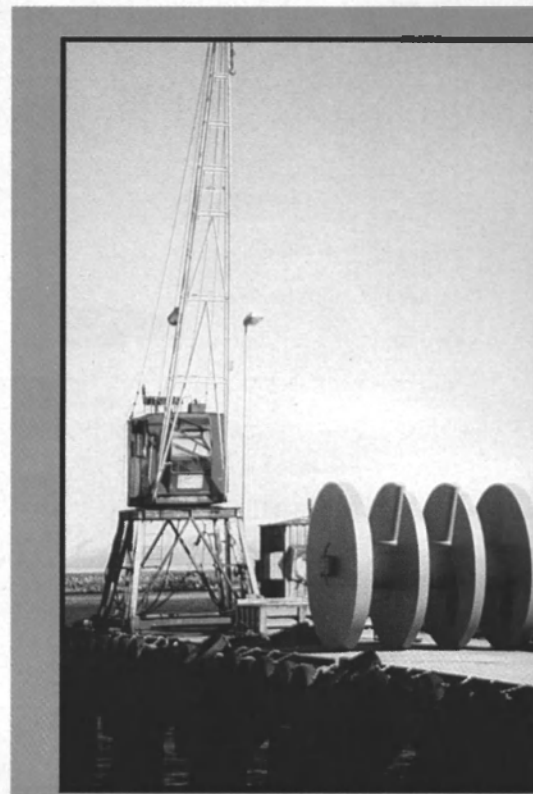
The Visit: Groundwork For Success

"We try to be the catalyst in the process ... we try to arrange the marketing platforms," said **Jan Spilleth**, manager, ship's gear and fishing equipment, Norwegian Trade Council. The tour of U.S. yards was a big piece of that marketing platform in promoting Norwegian companies to the states.

Following Cruise Shipping, the group of Norwegian ship's equipment suppliers visited McDermott, Avondale, Trinity, Ingalls, Alabama Shipyard and Newport News (see map on page 72). The visits were designed to allow each supplier to present its company's products and services to the yards' decision makers. The common thread among the companies was their ability to offer technically advanced and cost-effective equipment solutions — solutions which are currently used by many of the world's commercial construction yards. Each member of the Norwegian entourage was pleased with the overall reception, saying U.S. shipbuilders were eager to discuss time and cost-saving measures. In fact, the consensus is that the near and long-term business prospects in the U.S. are good. Several of the companies reported receiving inquiries from select yards less than a month after their trip. One yard requested a bid from one manufacturer for a series of 10 vessels. Other manufacturers reported that one of the yards on the list was likely to receive orders for up to 16 vessels in the near future. Such numbers are sure to draw intense interest from manufacturers around the globe, and the Norwegian companies believe their "pre-emptive strike" was well-timed.

Addressing The Changing Marketplace

Increased competition, a focus on turnkey solutions and a "new attitude" among shipowners in regard to ship repair have substantially changed the way internationally competitive suppliers — and shipyards — do business.



I.P. Huse designed and built these specialized iceberg towing winches.

The company, which markets itself as a specialist in large units, is a designer and manufacturer of products for unique applications.

"We are engineers who happen to run a workshop ... that is our role, problem solver," said **Inge Huse**, managing director.

Mr. **Huse** and his crew relish unique tasks, but admit that the toughest job sometimes is finding out what the customer wants a piece of equipment to do.

A trend to watch: technology which will allow for oil production in deeper water.

The company is developing a winch for Petrobras for producing oil in 3,116 ft. (950 m) of water.

The Norwegian Export Council invited Maritime Reporter & Engineering News to Norway, for an exclusive visit with a group of companies which view U.S. shipyards as ripe for business in the commercial shipbuilding sector. This report is the result of that visit.

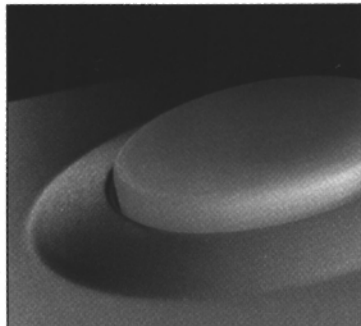
"The price for a ship, relatively, has never been as low as it is today," said **Terje Dyrseth**, marketing director, Brunvoll AS. "This translates to tough times for ship machinery suppliers."

To compete in this cost-crazed environment, companies such as Brunvoll have had to optimize efficiency while maintaining quality. Like many other Norwegian maritime companies, Brunvoll's roots are as a supplier to the Norwegian fishing industry. As Mr. **Dyrseth** and many of his colleagues will claim, it is hard to find a customer who places more demands on equipment than the professional fisherman. Today, Brunvoll is a specialist in thruster technology, a leading manufacturer of controllable and fixed pitch bow, stern and azimuthing thrusters. From the delivery of its first thruster for a purse seiner more than 30 years ago, there have been numerous milestones and innovations, including the company's first thruster with a controllable pitch propeller (1972); the company's first resiliently mounted thruster (1977); and its breakthrough for low-noise thrusters in the form of its patented Super Silent bowthruster, developed for a diving support vessel in 1984. Product innovation combined with ever-improving automated manufacturing processes have positioned the company well for present and future market fluctuations.

Ulstein Deck Machinery, comprised of Ulstein Norwinch AS and Ulstein Brattvaag AS, is another company with roots in the local fishing market. The low-pressure hydraulic system employed by Ulstein deck machinery is a proven entity; proven by deliveries to more than 25,000 ships. The company offers a comprehensive range of high-torque, low-pressure deck machinery with control systems suitable for nearly all applications within the shipping, fishing and offshore industries. And as **Magnus Bernson**, sales and marketing director, points out, "Our products are designed with ships in mind only ... the drive system is designed for marine use on an open ship deck."

The Ulstein philosophy for deck machinery is relatively simple: few parts, low pressure and high torque. This philosophy, coupled with Ulstein's international reach, makes for a fierce competitor. The company has more than 130 years in the shipbuilding industry, and features subsidiaries in 14 countries with representatives worldwide. While the deck machinery companies have been built up on the low-pressure systems, it has more than 100 successful installations of high-pressure deck machinery as well; and its product range includes high-pressure-driven anchor and mooring winches for merchant vessels.

Changing attitudes regarding repair and maintenance could also prove a boon for suppliers in the near and long term. According to **Robert Roander**, director, corporate development and communications, Unitor AS, many factors have created a favorable market for maritime repair and maintenance, including: a lack of long-term preventative maintenance during the 1980s; ever increasing international safety standards; and the need to keep a vessel up to specification to maintain its value and control insurance costs. To address this changing market, Unitor is focusing on "Project Sales," an effort targeting the shipyards, naval architects and shipowner, an approach which Unitor has positioned as "a lifetime solution for the owner," said Mr. **Roander**. Unitor to date receives 80 percent of its marine business from the repair and maintenance side. The Project Sales effort is designed not only to get involved in a newbuilding project, but to ensure service of the equipment in the future, and "getting a foot in the door for the next newbuilding."



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INTERNATIONAL UPDATE: Norwegian Suppliers Court U.S. Shipbuilders

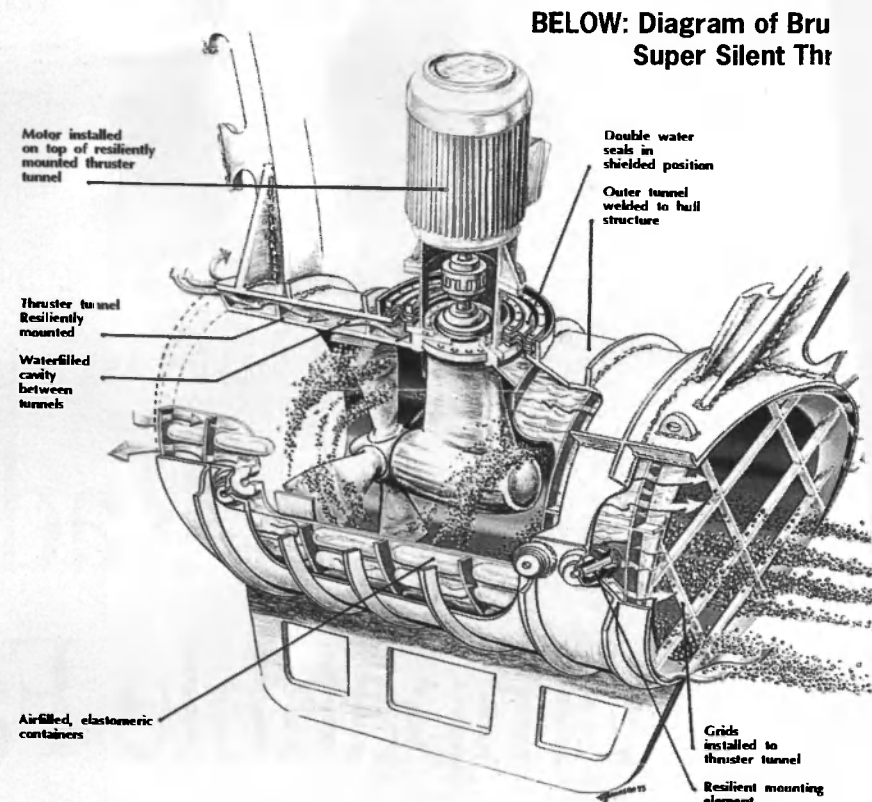
Strength In Numbers

Although it may be deemed cliché, there is a fair amount of teamwork to be found in the Norwegian ship's equipment sector. Companies both large and small, although frequently competing against one another, have realized the benefits of a certain amount of group marketing. This fact is immediately evident in the group effort in the U.S. It is further shown with alliances such as Norwegian Team Quality, which includes GF Marine AS, Jensen & Rhoden, Jets, Moland and Teknotherm. (Recently the four other members combined to purchase Jensen & Rhoden.) "Norwegian Team Quality provides strong benefits in terms of marketing support, particularly at exhibitions," said **Otto Knudsen**, managing director, Moland Automation. Moland is a small company (20 employees) which embodies the general spirit and attitude of many of the small to medium-sized Norwegian suppliers: a strong niche manufacturer which depends on next-generation technology to meet market demands.

Moland manufactures, among other products, the Macon 100, which is a ship's alarm, monitoring and control system. A top feature of the system — particularly for the refit market — is the Macon 100's installation flexibility. Installation can reportedly be achieved using existing sensors.

The low-weight, space-conscious system is also engineered with ease of operation in mind, and a menu-based concept with a simple keyboard is designed to present information quickly and efficiently as informative operating pictures on a visual display unit. Among Moland's customers are Bergessen and Petrobras, and Mr. **Knudsen** believes the refit business looks strong for the coming years.

Teknotherm, another Team Quality group member, is a full service supplier of refrigeration systems, providing design, production, installation and service. Since WWII the company has completed more than 3,000 installations. Divided into merchant marine and fishing/industrial systems divisions, the



BELOW: Diagram of Bru Super Silent Thr

Points Along The Itinerary



Avondale Industries, Inc.



McDermott Morgan City Yard



Ingalls Shipbuilding



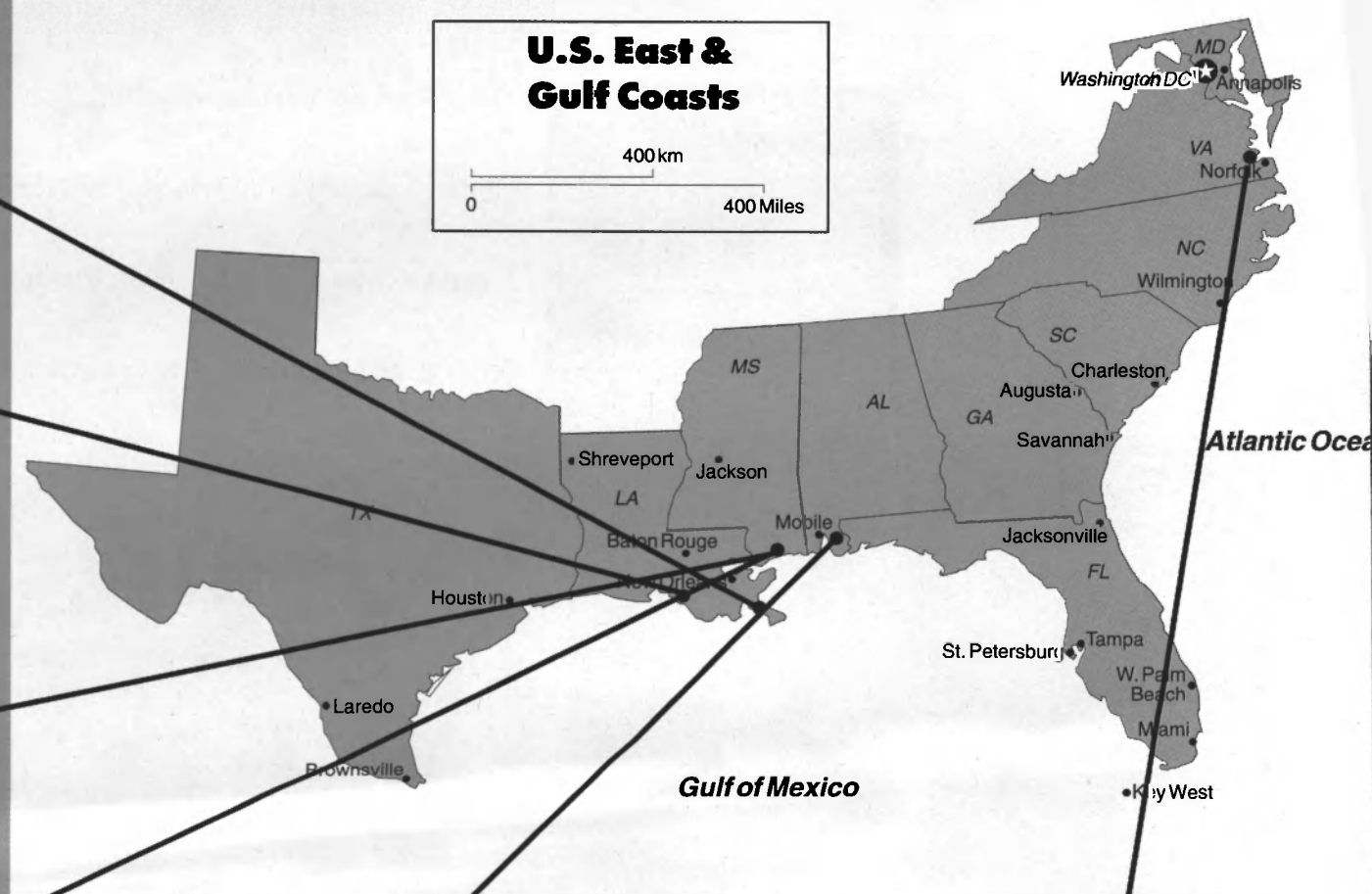
Trinity's Halter Marine



Alabama Shipyard



Newport News Shipbuilding



INTERNATIONAL UPDATE: Norwegian Suppliers Court U.S. Shipbuilders

Hot product today is its size, and it has already acquired a reputation for its quality, said **Magne Flanagan**, a merchant marine product manager. While the company is not yet a major player in the big cruise ship market, it offers significant advantages to owners and yards alike. Mr. Flanagan describes the company's small size as a flexibility advantage, allowing it to be more willing to respond to customer demands for unique products and applications. Westad, a unit of Crane, is a smaller company which has a lucrative niche. Westad is a manufacturer of butterfly and ball valves for marine, offshore and petrochemical applications. The company — which is celebrating its centennial — started as a supplier to the paper and pulp industry. It moved into the maritime industry following World War II, when Norwegian owners were building up their fleets. It is these early partnerships with Norwegian owners and shipbuilders which has helped Westad become one of the most respected suppliers for high-value vessels. As **Harry Bjorn Bystrom**, Westad's

senior manager, marine sales department, explains, the Norwegian industry was willing to try out new products and concepts in the name of advancing marine technology in general, and fellow Norwegian companies specifically. This has helped the company become a lead supplier on today's most technically advanced ships, despite not flaunting the lowest prices on the market.

The group of Norwegian manufacturers which visited the U.S. offer experience in supplying quality and cost-effective products and services to the international shipbuilding market.

"If the shipyard makes the decision, they only look at price," said Mr. Bystrom. "But on an LNG, performance matters and the company size makes no difference." The company will manufacture between 4,000 and 5,000 valves per year. Perhaps the most interesting company statistic is the one which shows that Westad's market share grows with the complexity of the vessel. For instance, company statistics show that for 2,800 oil tanker newbuilds between 1970 and 1994, 170 ships feature Westad products, or a six percent market share. However, in the product carrier segment, Westad's market share is 18 percent, followed by: chemical carriers (20 percent); LPG & LEG carriers

(20 percent); and LNG carriers (25 percent). While the company has enjoyed great success in the high-end market, it recognizes the need to diversify and is currently exploring areas such as seawater ballast systems, introducing its composite-constructed valve in 1991. The new composite material is resistant to

seawater and corrosion, as well as most chemicals, and features 75 percent lower weight than comparable steel or iron equivalents, the company said.

While many of the Norwegian suppliers which participated in the U.S. yard visits are justifiably classified as small to medium-sized niche companies, all are not. The two companies which comprise the Ulstein deck machinery makers are backed by the Ulstein reputation and international reach. Another participant, Unitor, has 74 offices in 32 countries, 180 authorized agents in a further 67 countries, and serves 950 of the world's ports. The com-

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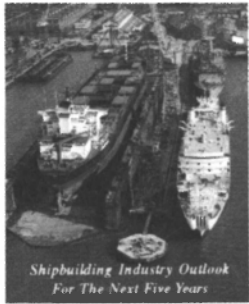
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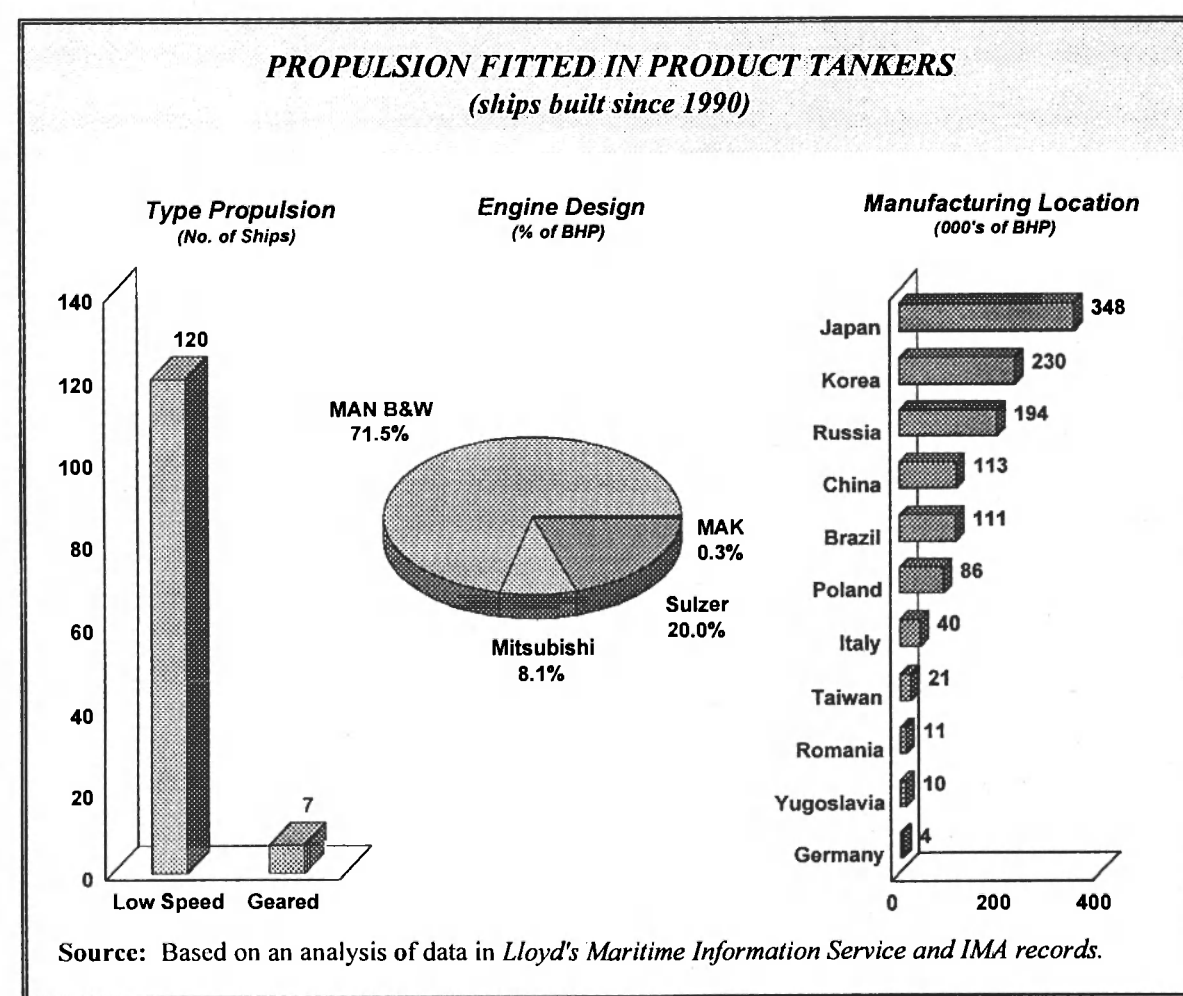
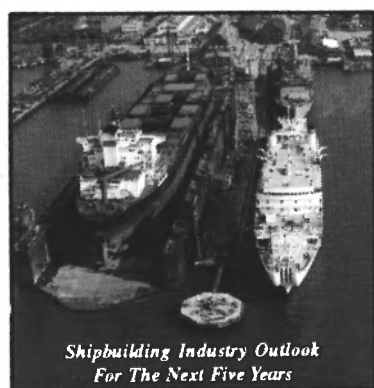
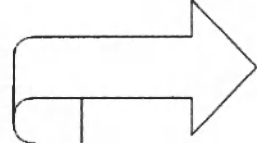
Future Role of Major Players
Emerging Competition From China
Potential Role of U.S. Yards
Major Vessel Operators & Builders
Vessel Inventories
Vessel Retirement Over The Next Five Years

Strategic Positioning Options for Maximizing Market Penetration

- Niches With Highest Value Added
- Where Competition is Vulnerable
- Financial Engineering Possibilities
- Emerging Market Players
- Future Construction Requirements
- Who Controls What
- Vessels on order or under construction

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INLAND WATERWAYS



The Showboat Branson Belle cruises the waters of Table Rock Lake, Mo., in the early evening.

Showboat Branson Belle Sets Sail In Missouri

On April 14, the *Showboat Branson Belle* set sail on Table Rock Lake in Branson, Mo. The riverboat, constructed by On-Site Marine and co-owned by Silver Dollar City Inc. and entertainer **Kenny Rogers**, offers entertainment and food, without gaming. On-Site Marine constructed two of the vessel's decks on the shores of Table Rock because the man-made waterway did not offer large vessel access. The vessel's unusual launch — using bananas as rail lubrication for environmental reasons — took place eight months ago, after which construction of the vessel was completed.

Showboat Branson Belle is 278 ft. by 78 ft. (84.7 m by 23.7 m), and is one of the largest excursion vessels operating in a landlocked waterway. The vessel is equipped with twin paddlewheels, each 24 ft. (6.5 m) in diameter and 16 ft. (4.87 m) wide, and is a replica of a turn-of-the-century paddlewheel riverboat. Detroit Diesel engines power the vessel. The *Branson Belle* cost \$8 million to build, with total investment equaling \$13 million. It will cruise Table Rock Lake three times daily during the summer months, offering a theatre production and a sit-down meal during each run.

Pictured is the insertion of bananas into the slide rails of the *Branson Belle* by Minnesota-based company Power Team. Ten cases of the lubricant were used per slide rail during the launch.



Riverboat Count Swells With New Gaming And Passenger Vessels

As more passengers hop a ride on the "banana" boat, trace Lewis and Clark's journey through the Columbia Snake region, or step up to the roulette wheel, the future of the inland cruising vessel market gains strength as investors recognize the diverse appeal of water-bound entertainment centers. This proves good news for the builders of these vessels, as the yards have seen gaming vessel orders slow due largely to

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K FOR THE NEXT FIVE YEARS" ITION

Competition for Future Orders

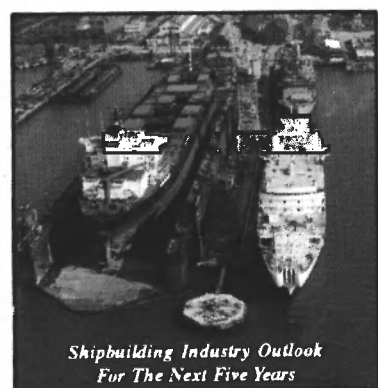
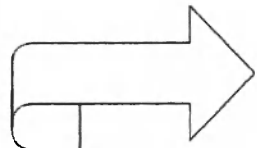
- Future Role of Major Players
- Emerging Competition From China
- Potential Role of U.S. Yards
- Major Vessel Operators & Builders
- Vessel Inventories
- Vessel Retirement Over The Next Five Years

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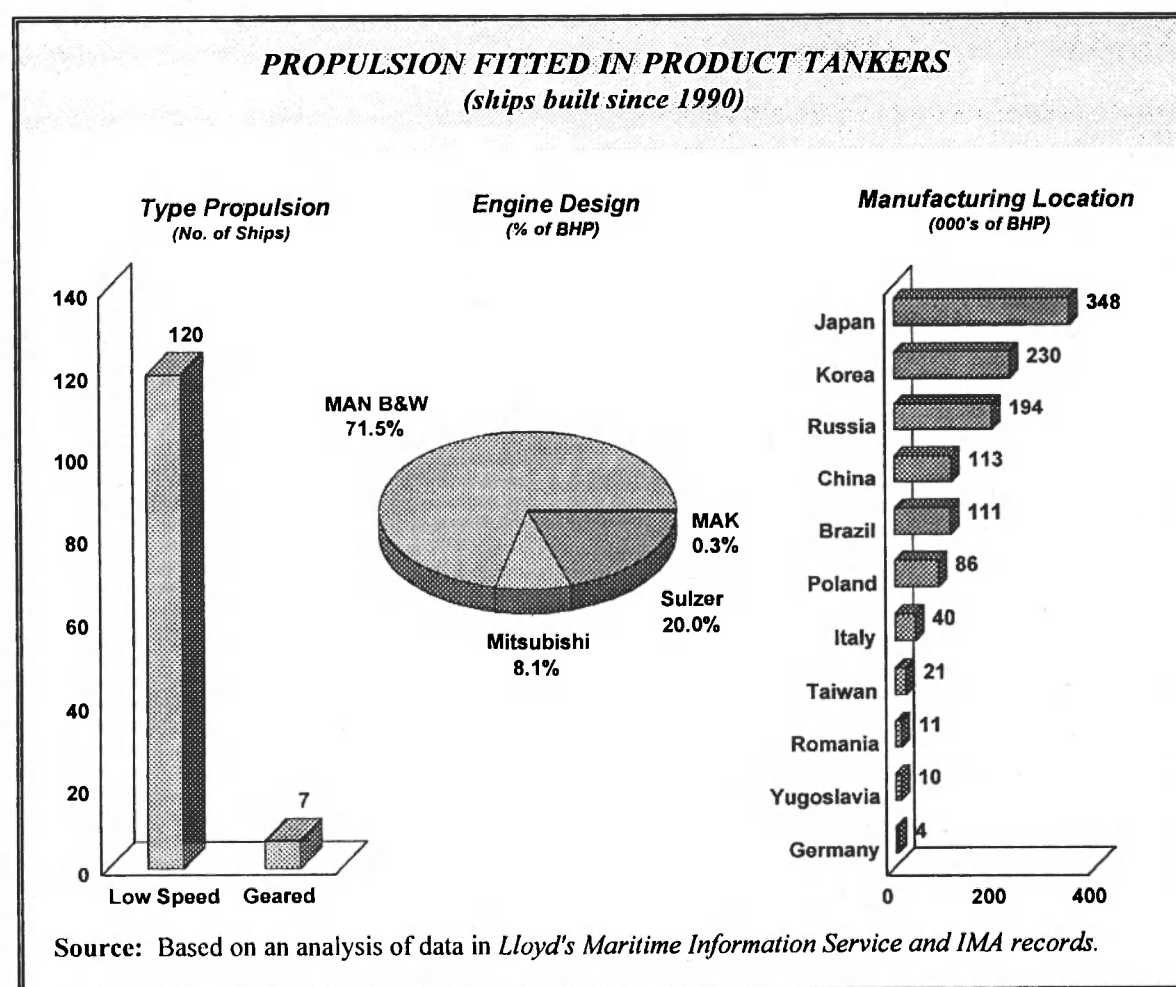
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Shipbuilding Industry Outlook
For The Next Five Years



INTERNATIONAL UPDATE: Norwegian Suppliers Court U.S. Shipbuilders

pany offers a wide variety of product and services, from fire and safety equipment to refrigeration equipment to surface preparation, cleaning and application equipment. Seventy-three percent of all Unitor sales are marine-related. In total, 36 percent of its sales are in the insulation and refrigeration category,

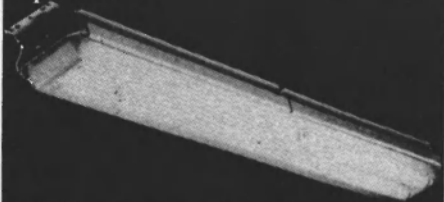
followed by fire and safety (22 percent), maintenance (19 percent), and chemicals (16 percent). Unitor's efforts to increase its presence in the newbuilding market via its Project Sales effort (described above) reflects the company's determination to increase its international profile further.

The group of Norwegian manufacturers featured in this story are steadfast in the belief that there are considerable business prospects in U.S. yards, and equally steadfast in the belief that they, as suppliers, can provide proven technologies and systems which will help shipyards produce ships more efficiently.

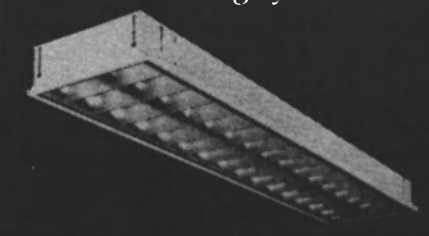
For more information on the companies in this story, circle the corresponding number on the Reader Service Card bound in this issue.

Brunvoll	83
I.P. Huse	84
Moland	85
Teknotherm	86
Ulstein Bratvaag & Norwinch	87
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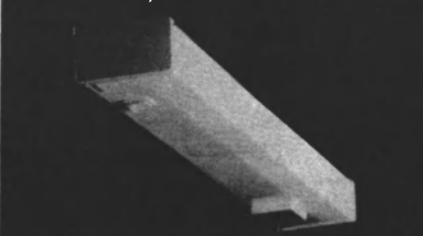
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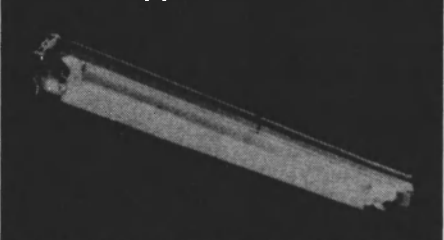
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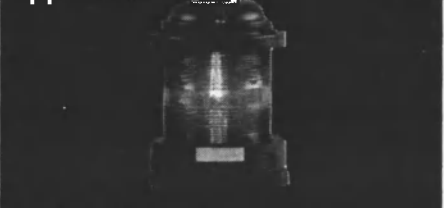


GLAMOX - one of the worlds largest manufactures of marine and offshore light fixtures-establishes presence in North America with manufacturing, sales and distribution.

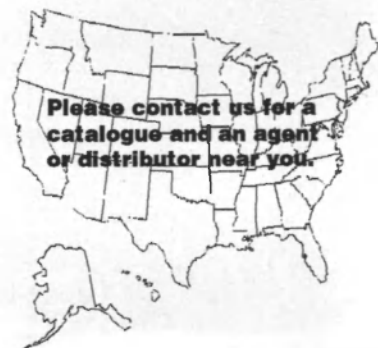
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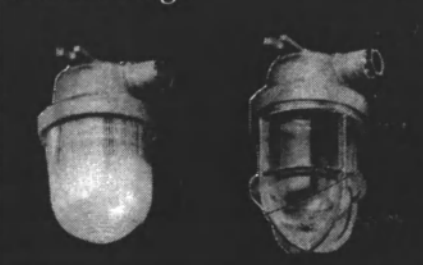
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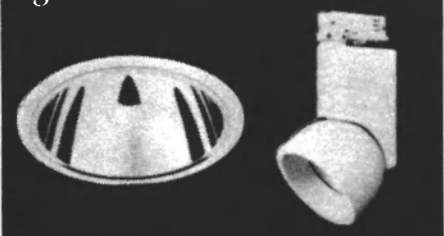
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Rapp Hydema Products Made For Tough Situations

Rapp Hydema AS is part of the Rapp Marine Group, and the company designs and manufactures advanced hydraulic deck machinery for the worldwide fishing fleet. Its most important product areas include: trawl and purse seine winches with automatic control and monitoring systems; research winches; anchor mooring and towing winches; and fish pumps.

Rapp Hydema is developing a new generation, medium-pressure hydraulic winch system, which includes in-house produced drive units. The winch motors are designed to operate with 20 to 30 percent lower pressure than previously produced units, which helps extend the lifetime of the motor and the entire hydraulic system.

While the company strives for a 50/50 mix between general maritime and fishing business, said **Tor S. Andersen**, executive vice president, Rapp Marine A/S, currently about 70 percent of the business comes from the fishery side. Part of its plan to accomplish this balanced marketing mix includes expanding its presence in the U.S. market, and in particular, targeting the product tanker market with its anchor and mooring winches. Last year the company invested more than \$1 million into research and development, and new developments to look for include a new constant tension winch.

For more information from Rapp Marine Circle 90 on Reader Service Card

Technology Focus Lends Freedom To Seatex

Seatex incorporates available and next-generation technology into products designed to improve quality and safety. Founded in 1984, Seatex already has a strong presence with clients such as the U.S. Navy, Shell International, Woods Hole Oceanographic Institution, Statoil, Amerada Hess, Amoco, etc.

The company specializes in designing and manufacturing advanced products for: differential GPS; underwater high-resolution laser-based systems; and monitoring and logging oceanographic, me-

INTERNATIONAL UPDATE: Norwegian Suppliers Court U.S. Shipbuilders

teorological and pollution data.

Products include the Wavescan system, an advanced oceanographic data-buoy system; and motion reference units (MRUs), used for a number of applications including directional control for shipborne sonar arrays, and heave stabilization of cranes on floating drilling rigs or ships. Last year the company introduced SeaPilot, which integrates electronic maps with DGPS. Installed on four high-speed ferries to date, the system has reportedly resulted in significant fuel savings for the owner, helping to keep the vessel on course and on time.

For more information from Seatex
Circle 91 on Reader Service Card

Vingtor Launches AlphaCom Marine At Nor-Shipping

Vingtor Marine AS, the maritime subsidiary of Stentofon Norway, has launched AlphaCom Marine, a system based on digital technology, offered as a future solution for integrated onboard communications.

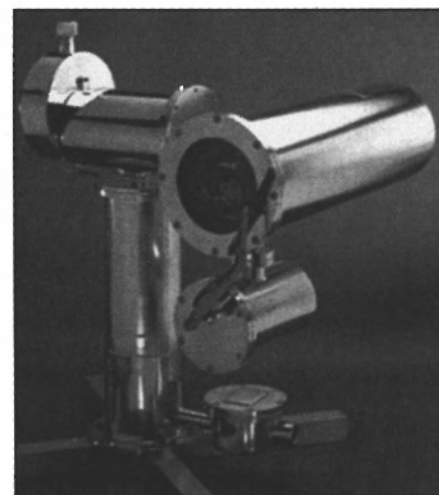
Priority was given to making the system user-friendly by providing new stations, several new or improved functions, and superior sound. The system is designed for easy connection to other systems, such as wireless paging, alarm, CCTV, data net, fax, Satcom, etc. The 15-kHz bandwidth helps en-

sure no misunderstandings in voice messages. The system features easy PC programming; line surveillance and fault logging; remote service via modem; and compliance with EC, UL, EMC and DNV regulations.

For more information on Vingtor
Circle 93 on Reader Service Card

Hernis Carves Market Niche With CCTV

Hernis developed its Closed Circuit Television (CCTV) system to withstand the rigors of the offshore



Hernis CCTV system.

market, built it to resist the most corrosive environment, and engineered it for quick replacement of modules. Business mushroomed, and Hernis systems are found on many types of vessels, including passenger ships, special-purpose ships and naval vessels.

Marketed for its many uses, the CCTV systems from Hernis are praised as useful tools to increase efficiency and safety. The company reasons that it is a time and effort-saving measure to have strategic cameras on board, for example, a tanker, where the distance from the bridge to the forecabin is considerable. Strategically-placed cameras can also provide instant visual information when alarms sound, so appropriate and immediate actions can be taken.

The Hernis 300 CCTV system is featured on the RCCL cruise ships *Sovereign of the Seas*, *Monarch of the Seas* and *Regent of the Seas*. The fact that the company was founded by engineers is evident in developments such as the Hernis Multicable, a system designed to reduce the costs of installation. One cable is used for each camera's transmission, reception and power, thus reducing the overall number of cables for installation.

For more information on Hernis
Circle 92 on Reader Service Card

CargoMaster Provides All-in-One Monitoring

The CargoMaster from Scana Skarpenord is marketed as an all-in-one solution to cargo monitoring. The system offers fingertip control of many operating parameters, including level, temperature, pressure, cargo density, draft, trim, list, loading rates, discharge rates, calculation of volume and weight and hull stress and stability.

The Scana Skarpenord solid-state sensors can function with all kinds of cargo, and are engineered to withstand vigorous tank washing.

For more information from
Scana Skarpenord
Circle 94 on Reader Service Card

NEXT ISSUE:

MR/EN's CRUISE INDUSTRY ANNUAL in July will feature exclusive looks at cruise ship propulsion, electronics, and more.

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INLAND WATERWAYS



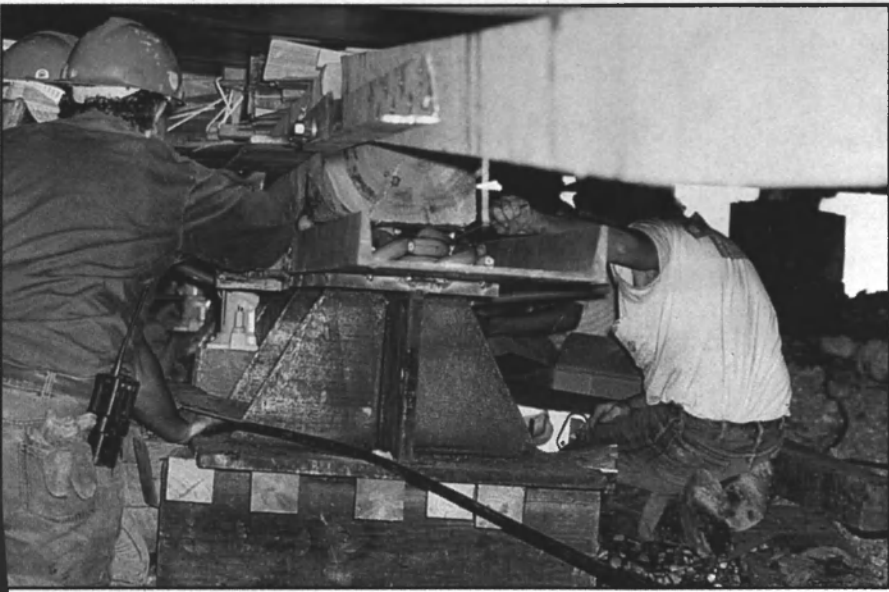
The Showboat Branson Belle cruises the waters of Table Rock Lake, Mo., in the early evening.

Showboat Branson Belle Sets Sail In Missouri

On April 14, the *Showboat Branson Belle* set sail on Table Rock Lake in Branson, Mo. The riverboat, constructed by On-Site Marine and co-owned by Silver Dollar City Inc. and entertainer **Kenny Rogers**, offers entertainment and food, without gaming. On-Site Marine constructed two of the vessel's decks on the shores of Table Rock because the man-made waterway did not offer large vessel access. The vessel's unusual launch — using bananas as rail lubrication for environmental reasons — took place eight months ago, after which construction of the vessel was completed.

Showboat Branson Belle is 278 ft. by 78 ft. (84.7 m by 23.7 m), and is one of the largest excursion vessels operating in a landlocked waterway. The vessel is equipped with twin paddlewheels, each 24 ft. (6.5 m) in diameter and 16 ft. (4.87 m) wide, and is a replica of a turn-of-the-century paddlewheel riverboat. Detroit Diesel engines power the vessel. The *Branson Belle* cost \$8 million to build, with total investment equaling \$13 million. It will cruise Table Rock Lake three times daily during the summer months, offering a theatre production and a sit-down meal during each run.

Pictured is the insertion of bananas into the slide rails of the *Branson Belle* by Minnesota-based company Power Team. Ten cases of the lubricant were used per slide rail during the launch.



Riverboat Count Swells With New Gaming And Passenger Vessels

As more passengers hop a ride on the "banana" boat, trace Lewis and Clark's journey through the Columbia Snake region, or step up to the roulette wheel; the future of the inland cruising vessel market gains strength as investors recognize the diverse appeal of water-bound entertainment centers. This proves good news for the builders of these vessels, as the yards have seen gaming vessel orders slow due largely to legislative bottlenecks.



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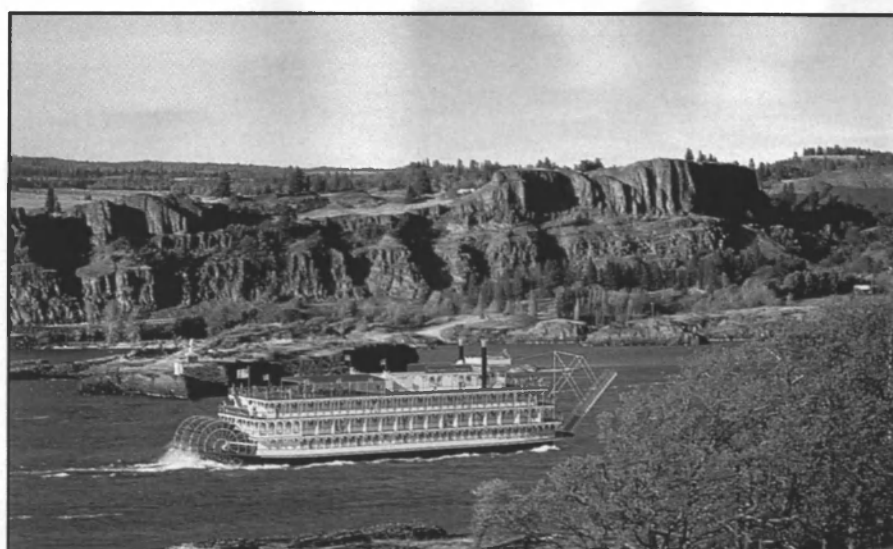


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Circle 35E on Reader Service Card

INLAND WATERWAYS



Artist's rendering of Queen of the West cruising the Columbia River region.

Newly-Flagged U.S. Cruise Ship Features Historic Tours Through Pacific Northwest

A newly formed U.S.-flagged cruise line, American West Steamboat Company, of Seattle, Wash., recently announced the birth of its authentic sternwheel-driven cruise ship, *Queen of the West*. Standing more than four decks high, the 230-ft. (70 m), 163-passenger vessel, is reportedly the largest of all U.S.-flag ships in the small ship category, and is the first overnight passenger sternwheeler to be built and operated in the West in almost 80 years. *Queen of the West*, with interiors by Interior Design International, will cruise the Columbia, Snake and Willamette Rivers, from Portland, Ore., offering two through seven night itineraries.

Currently under final construction at Nichols Bros. Shipyard in Freeland, Wash., the cruise liner is scheduled to begin its inaugural season on July 13. The *Queen of the West's* 26-ft. (7.9 m) paddlewheel is the sole propulsion for the vessel, and the ship's direction is controlled by

six custom-designed rudders. The Pitman Arms connected to the wheel are powered by twin MTU diesel engines, providing a maximum speed of 14 knots. A forward located bowthruster will provide mobility for maneuvering in and out of navigational locks in the Columbia and Snake Rivers. **Michael Lomax**, vice president of marketing and sales for American West Steamboat Co., has reported that the cruise themes will be exploration of the nature and history of the Pacific Northwest region, and that passengers will "view miracles of man and nature while exploring the history of the Real West, The Oregon Trail, Lewis and Clark's epic journey, the era of steamboats and cowboy and Native American cultures."

American West Steamboat Company has published a 36-page brochure featuring *Queen of the West* and its ports of call.

Bally Launches Customer Service Line, Appoints New Executives

Bally Gaming's newly appointed Director of Customer Service, **Glen Thompson**, recently announced the launch of a new 24-hour "fax-back" information line for customers. The automated program will provide up-to-the-minute information on technical bulletins and product enhancements. Information is accessed through a touch-tone phone, and requested data is faxed to the caller's fax machine.

Bally has also named a new field service manager. **John Archuleta** will coordinate installations and customer service for all Bally Gaming products in the U.S., overseeing a staff of 16 technical experts.

Bally Gaming, based in Las Vegas, is a manufacturer and designer of reel spinning



Glen Thompson

slot machines, video gaming equipment and video lottery terminals.

Lake Charles Riverboat Commences Operations

On April 28, the *Lake Charles Star Riverboat* casino, owned by Players International, Inc., commenced operations at the company's Lake Charles riverboat site.

This is the second riverboat owned by Players to occupy the site, and according to the corporation, the two vessels will operate on staggered schedules in order to meet increased customer demand.

Players reports that it anticipates investing approximately \$58 million over the next year to enhance its Lake Charles facility, including the development of new docking and parking facilities, a 50,000 sq. ft. entertainment center, and the purchase and expansion of the existing hotel.



IDI-designed interior of the Spirit of '98.

IDI Provides Design For Queen Of The West And Spirit of '98

Interior Design International, Inc., (IDI) located in Seattle, Wash., created the interior design of American West Steamboat Co. *Queen of the West* and West Travel's *Spirit of '98* to represent the character of the frontier reflected by each vessel. IDI provided all of the interior space planning and material specifications for both turn-of-the-century-themed passenger vessels.

"Because the *Queen of the West* is a paddlewheeler, we decided on deeper colors for maintenance reasons," said IDI President **Shirley LaFollette**, in a recent interview. Various interior design schemes were used throughout the *Queen* because of the number of stateroom classifications. The company updated its work on the *Spirit of '98*, a passenger vessel originally completed in the 1980s, and named for the 1898 Gold Rush in the Klondike. In the refurbishment, new custom-designed headboards and stateroom cabinetry were crafted from aluminum in order to conform to fire codes.

IDI designs its vessels to meet U.S. Coast Guard (USCG) standards, and has experience incorporating structural product requirements into interiors for different class vessels, such as different ceiling, joiner systems and deck coverings depending on vessel type.

For more information on IDI
Circle 123 on Reader Service Card



There Are More Than A Few Good Reasons Why Experience Counts...



Circle 33 on Reader Service Card

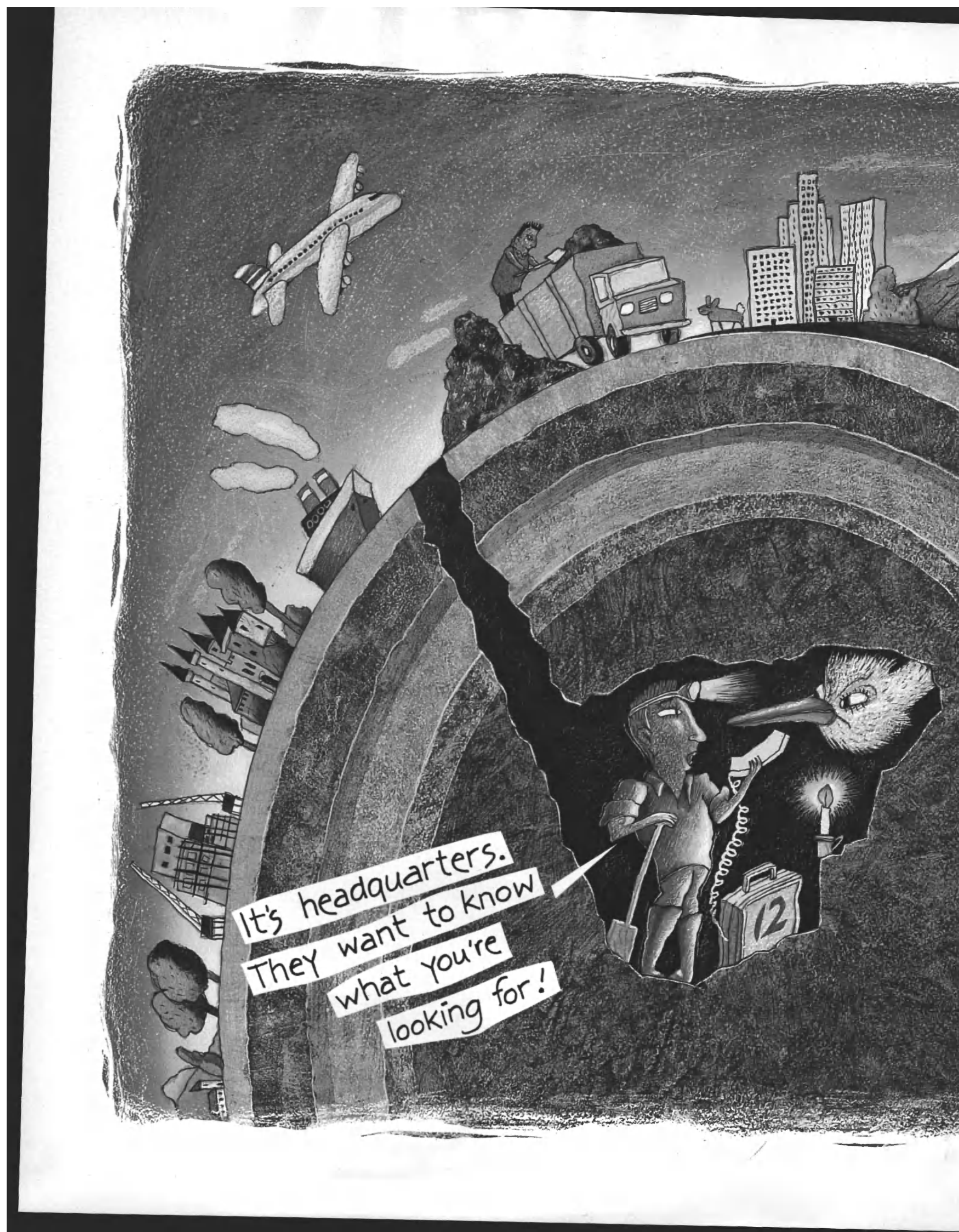
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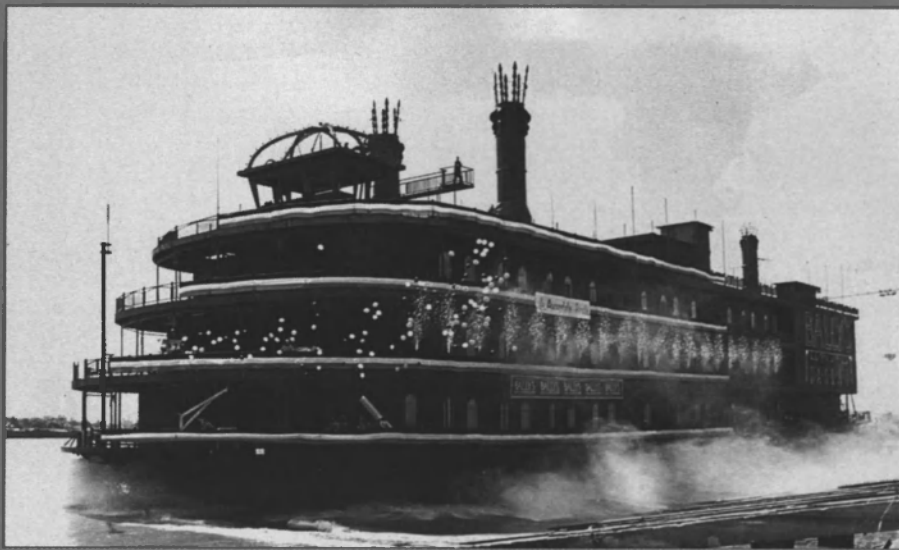
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Circle 315 on Reader Service Card

INLAND WATERWAYS

Avondale Launches Belle of New Orleans



Avondale launches the Belle of New Orleans.

Avondale Industries, Inc. held christening and launching ceremonies recently for Bally's *Belle of New Orleans* casino riverboat, which will be homeported at Southshore Harbor of Lake Pontchartrain in New Orleans.

The sponsors were **Ora Brooks** and **Lucy Marsch**; also present at the ceremony were **Norbert Simmons**, president of Bally's Lakeshore Casino Resort; **Marc H. Morial**, Mayor of New Orleans; and **Barry Heaps**, vice president and general manager of Avondale's boat division, who also acted as Master of Ceremonies.

The *Belle* is 350 ft. long (106.6 m), accommodating 2,450 passengers and 300 crew, with 30,000 sq. ft. of gaming space.

The interior design was furnished by Yates and Silverman, who fa-

vored a 1890s theme. Propulsion is provided by a combination of paddlewheels and propellers. Two 96-in. propellers will turn inside two 97-in. nozzles. The propeller drive engines are two Caterpillar 3508 DITA rates at 960 hp turning through Reintjes 7.47:1 reverse reduction gears. The paddlewheel is powered by two 425 hp EPD DC electric drive systems. Three Caterpillar 3516 DITA 1,500-kW generator sets will supply the main power.

The *Belle* features two bowthrusters and one sternthruster. All units are Schottel model STT-170, each driven by a 300 hp DC electric motor.

For more information on Avondale Industries Inc. Circle 31 on Reader Service Card

INTERNAL U.S. WATERWAYS
TONNAGE COMPARISONS: 1993 vs 1994*

(Millions of Tons)

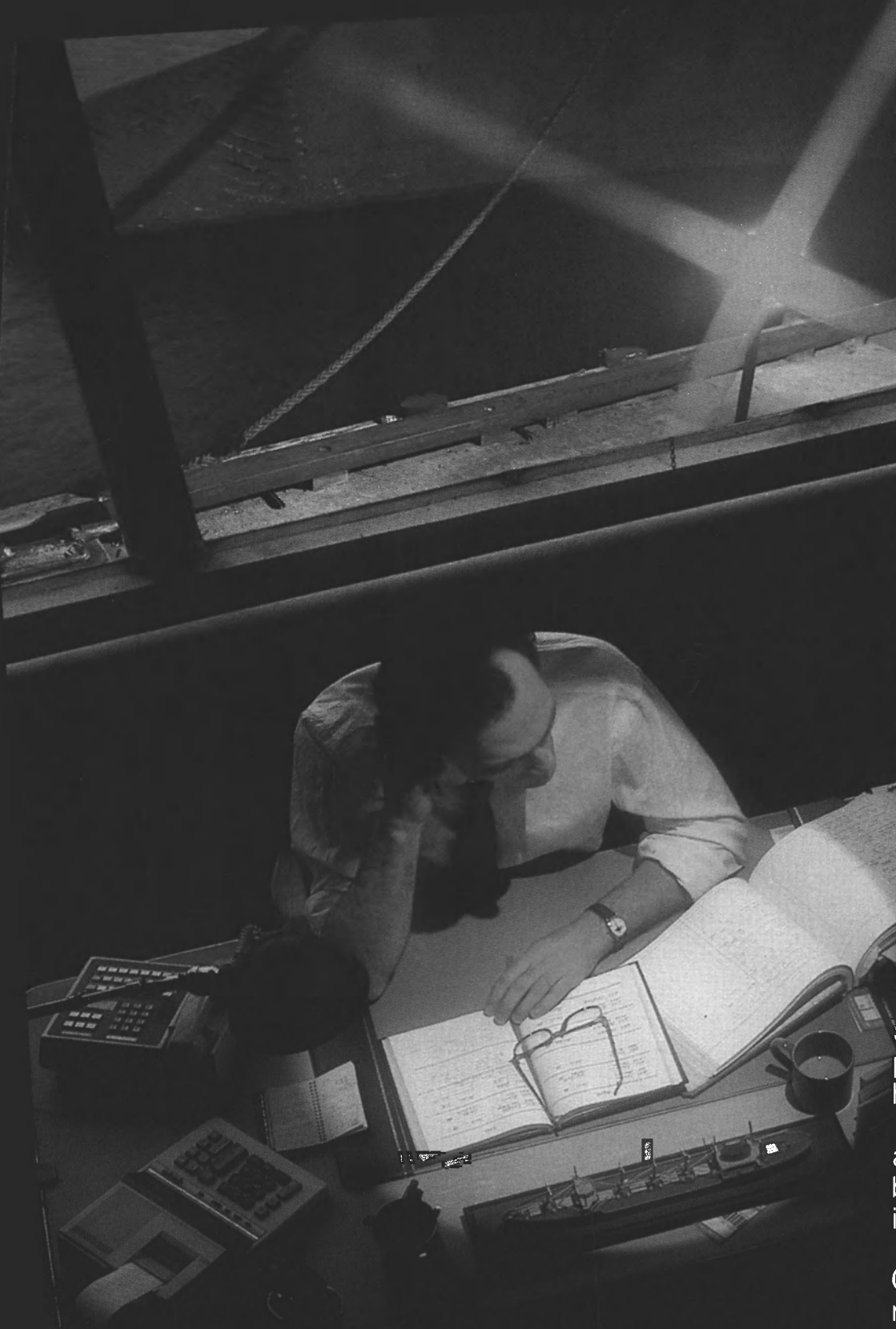
	1993	1994	Percent Change
National Internal Totals			
All Commodities	607.3	637.7	5.0
Food and Farm	88.7	90.5	2.0
Coal	178.0	192.2	8.0
Waterways			
Alabama-Coosa River	1.2	1.0	-16.0
Allegheny River	3.1	3.4	10.0
Atlantic Intracoastal	3.8	3.8	-0.3
Black Warrior River	23.7	23.2	-2.0
Columbia River	18.0	19.9	10.0
Cumberland River	14.3	13.6	-4.5
Gulf Intracoastal	114.9	113.2	-1.5
Illinois Waterway	42.6	46.4	9.0
Kanawha River	22.3	22.4	0.5
McClellan-Kerr Hwy	9.4	10.7	13.8
Mississippi River	298.3	322.1	8.0
Monongahela River	33.1	36.0	9.0
Ohio River	227.2	238.6	5.0
Snake River	6.2	6.9	12.0
Tennessee River	48.2	49.7	3.2
Tennessee Tombigbee	7.1	7.4	4.0

*1994 Estimated March 95
Internal: Moved solely within the boundaries of the U. S.
Rounding may cause slight discrepancies among the data.
Source: Army Corps of Engineers

INTERNAL U. S. WATERWAY TONNAGE INDICATOR*
MONTHLY TONNAGES 1992-1995
(MILLIONS OF TONS)

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
1992	44.1	45.5	51.8	52.2	52.8	51.0	51.3	54.5	51.5	54.9	52.8	46.9
1993	46.0	43.4	47.5	48.0	50.9	50.6	36.1	44.8	51.5	54.5	51.9	48.7
1994	39.9	41.0	49.7	51.1	52.4	50.0	50.1	53.0	51.9	55.6	54.0	51.4
1995	49.5	44.7	52.6									

*Internal: Moved solely within the boundaries of the U. S.
Source: Army Corps of Engineers



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Circle 392 on Reader Service Card

INLAND WATERWAYS

Freeport Shipbuilding Launches Gaming Vessel

Freeport Shipbuilding and Marine Repair has launched its first-ever gaming vessel. The 238-ft. (72.5-m) by 72-ft. (21.9-m) sidewheeler slid into the waters of Four Mile Creek in Freeport, Fla., in mid-March. Delivery of the casino boat will take place as soon as the interior and exterior finishing work is complete. Homeport for the four-deck gaming vessel has yet to be determined. Several parties have expressed an interest in purchasing the boat. The vessel will feature 25,000 sq. ft. of gaming space, with a passenger capacity of 1,500. Freeport Shipbuilding designs and builds passenger vessels up to 300 ft. (91.4 m) in length.

For more information on Freeport
Circle 19 on Reader Service Card

Hornblower Marine And Aztar Finalize Contract

Hornblower Marine Services, a maritime consulting firm, has recently contracted with Aztar Corp. to provide marine management ser-

vices for the operation and maintenance of its riverboat casinos, the M/V *City of Evansville*, and the M/V *City of Caruthersville*. The *Evansville* is expected to be operational by late August, and the *Caruthersville* began operation in late April.

Aztar operates the TropWorld Casino and Entertainment Resort in Atlantic City, N.J., Tropicana Resort and Casino in Las Vegas, Nev., and Ramada Express Hotel and Casino in Laughlin, Nev. In addition to its management services, Hornblower Marine offers assistance in business plan development, financing, marine design and construction, casino vessel construction, and marine safety and loss prevention.

For more information on Hornblower
Circle 67 on Reader Service Card

Bender Delivers Riverboats For New Orleans

Bender Shipyard, Inc. of Braithwaite, La., delivered the *Grand Palais* in February, and the *Crescent City Queen* in March. These 360-ft. (109.7-m) sister casino gaming vessels were built for Grand Palais Riverboat, Inc. and Crescent City Capital Development Corporation, members of River City Joint

Venture, New Orleans, La. Both vessels are located at the Orange Street Wharf in New Orleans.

Built in the style of a 19th Century sternwheeler, the *Grand Palais* and *Crescent City Queen* each have 30,000 sq. ft. of gaming space, accommodating 2,000 passengers and 500 crew. The vessels will cruise the Mississippi River powered by six Caterpillar engines with two 920-kW Schottel Z-drives and two 900-hp DC motor driven paddlewheels.

For more information on Bender
Circle 137 on Reader Service Card

Gaming Legislation Update

Federal legislation is currently pending on a measure intended to permit gaming vessels to operate on Lake Michigan from northern Indiana port cities. The measure, introduced in the House of Representatives in April, would amend the federal Gambling Devices Transportation Act (Johnson Act).

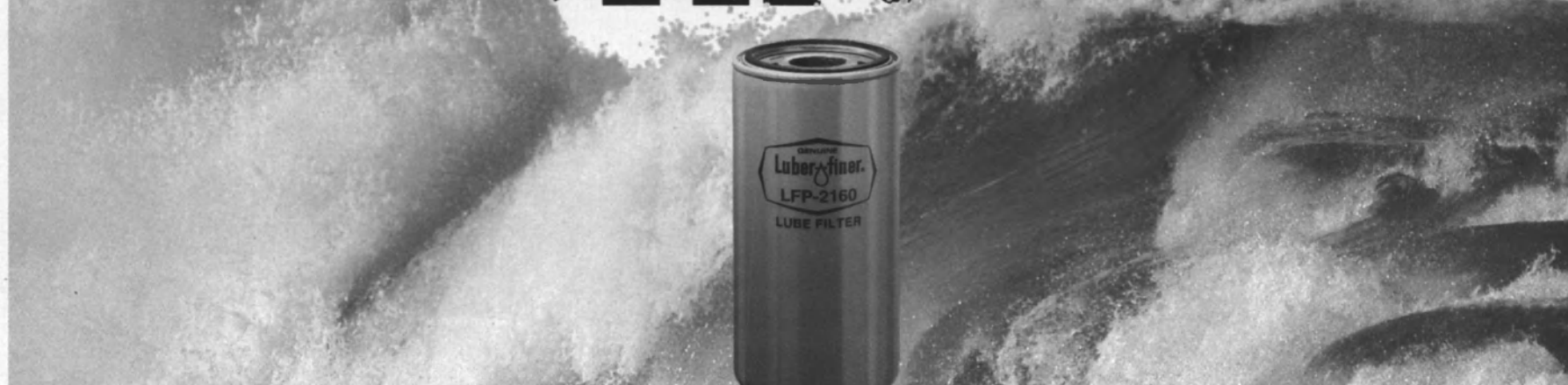
The Hawaiian House of Representatives recently rejected the Hawaiian Senate Bill (S.B.) 1904 which would have permitted gaming on licensed vessels in the state's territorial waters. The measure died without a hearing in the House Finance Committee.

In Illinois, a Senate bill that would

permit dockside gaming under certain conditions has been referred to a Senate subcommittee for review.

The Louisiana legislature has introduced four new bills regarding gaming; one allowing riverboat owners to operate the vessels as dockside casinos; one prohibiting dockside gaming in inclement weather; one absolving the vessel operators from criminal penalties for failing to conduct an excursion in poor weather; and a bill allowing for the assessment of an annual civil penalty against any riverboat judged by a court or competent jurisdiction to have conducted dockside operations. In Maryland, a bill to establish a task force to study commercial gaming activities was passed by the state legislature in April. The Maryland Chamber of Commerce will study the issue of expanding gaming in the state, concentrating on how gaming would affect the business climate and quality of life in the state. In South Carolina, a House bill has been introduced providing for the authorization of riverboat gaming on waters within the state, without offering further details. Another bill calls for the establishment of a South Carolina Gaming Commission to regulate gaming activities. Both measures are pending in the House Judiciary Committee.

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Circle 294 on Reader Service Card

Maritime Reporter/Engineering

Canal Boats Delivers Water Taxis In Miami

Canal Boats has delivered four 32-ft. (9.8 m), 42-passenger boats to Water Taxi for a new service in Miami Beach, Fla.

The U.S. Coast Guard-certified vessels are powered by Honda four-cycle outboards. The vessels sport fiberglass construction and have a shallow-draft design to facilitate operation in less than two feet of water.

Canal Boats offers vessels with a variety of applications including utility, commercial fishing, patrol, and tour boats, in lengths of up to 38 ft. (11.6 m) with maximum capacities of 49 passengers.

Texas Drydock Acquisitions

Don Covington, president and CEO of Texas Drydock, Inc. (TDI), announced the recent purchase of two new shipyard and fabrication properties located on the Sabine Neches Waterway. The purchase of a Sabine Pass, Texas-based facility from Sabine Offshore Services will provide 980 ft. (298.7 m) of water frontage on a 21-acre site.

TDI also completed the purchase of an 18-acre site from the Gulf Copper Group, encompassing 2,100 ft. (640 m) of water frontage south of Port Arthur, adjacent to the Chevron turnaround basin.

TDI operates five domestic facilities, and the company reports that their latest acquisitions are part of an overall marketing strategy aimed at placing TDI in a strong position to aggressively pursue semi-submersible modifications, repairs and conversions, as well as fabrication of offshore production structures and components.

Hatteras' Presence In Megayacht Market Strong

With the introduction of its largest custom yacht built to date, the 130-ft. (39.6-m) *Bellini*, Hatteras Yachts continues its growth as an industry force in the megayacht segment of the marine market.

According to Irwin Jacobs, chairman of Genmar Holdings, which owns Hatteras, "Currently we have 16 custom yachts in construction with orders through spring of 1997." The company attributes the expansion of its Custom Yacht Series to key factors, including the repeal of the luxury tax in the U.S., good financing rates, and an overall positive economic outlook in countries around the world in which it conducts business. Hatteras Yachts is a division of Genmar Industries, Inc., and is headquartered in High Point, N.C. The company builds sportfishing vessels from 30 to 90 ft. (9.1 to 27.4 m), motor vessels from 40 to 77 ft. (12.1 to 23.5 m), and custom megayachts from 82 to 130 ft. (24.9 to 39.6 m).

Renovation Of Inland Service Tug Completed

Shearer & Associates, Inc. announced the completion of the repowering and renovation of the inland service tugboat *Mark K*. The conversion was performed by Master Marine, Inc., of Bayou La Batre, Ala., for McDonough Marine Service of New Orleans. Shearer developed contract specifications for

McDonough and provided on-site representation during the conversion.

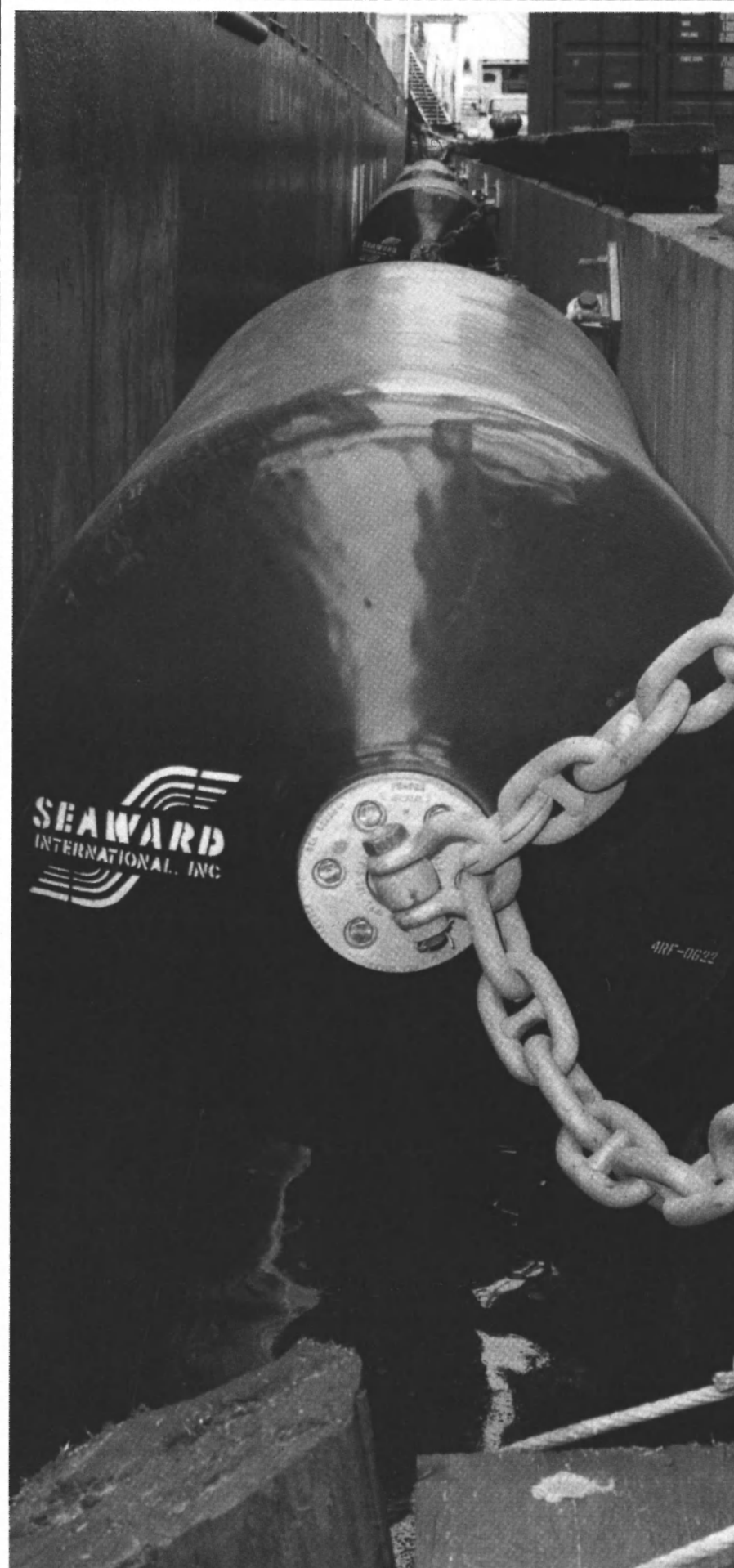
The tugboat, originally the *Sand Storm*, caught fire and burned in 1989, and was located in Houston until the rebuild.

A new deck house was constructed, all new machinery and equipment were installed, and repairs were made to the hull, propellers, shafting and rudders.

Two Detroit Diesel model 4-71

generator sets were rebuilt by Stewart & Stevenson in Houston, who also supplied new Detroit Diesel model 8V149 DDEC engines rated at 800 hp each at 1,800 rpm.

The two Twin Disc model MG540 reverse/reduction gears were rebuilt by Power Systems, Inc. of Houston. A fixed carbon dioxide system and an alarm panel were also installed. The vessel reportedly performed well on dock and sea trials with minimal vibration, even at bollard condition.



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Circle 325 on Reader Service Card

Bulk Carrier Safety

The International Association of Dry Cargo Shipowners (Intercargo) gathered recently in New York City to discuss bulk carrier safety. Prominent in discussion were the results of the analysis of bulk carrier and OBO losses for the period

of 1990-94. According to **Bruce Farthing**, consultant director of Intercargo, "Ninety-nine point eight percent of bulk carrier cargoes were delivered safely and without incidence — this is a reliable, environmentally-friendly and cost-efficient

service." The purpose of the seminar was to address the real issues affecting safety, including structural failure as well as navigational or human failure. As stated by **Spyros Polemis**, Intercargo chairman, "We are interested in improving safety in a realistic and practical manner. Real results will come

not from naming names, but by realistically attacking problems."

Published results presented at the seminar indicate that over the five-year period, 33 percent of losses were navigation-related, including collisions and strandings. Plate failure and "taking water" accounted for 28.6 percent of losses. Other reasons contributing to losses were engine room fire and explosions (10.7 percent), disappearances (9.8 percent), other fires and explosions (9.8 percent), engine room flooding (4.5 percent), and engine failure (3.6 percent). In 1994, one ship belonging solely to an Intercargo member was lost, and according to Mr. Farthing, "This is roughly four to five times better than the average and gives credence to our claim that membership of the Association is increasingly synonymous with quality."

Speakers at the seminar included **Cliff Abraham**, president, Upper Lakes Shipping; **Frank Iarossi**, chairman of the American Bureau of Shipping (ABS); Commander **J.M. Holmes**, chief of the Compliance and Enforcement Branch of the Office of Marine Safety, U.S. Coast Guard (USCG); and Captain **B.F. McKay**, Canadian Coast Guard.

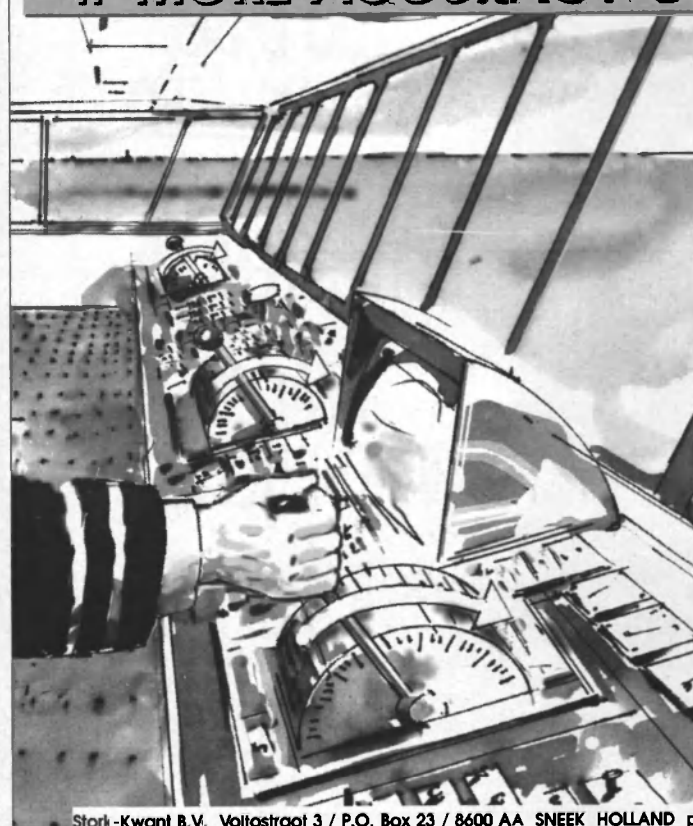
Mr. Abraham, of Upper Lakes Shipping, presented a view of safety

"Ninety-nine point eight percent of bulk carrier cargoes were delivered safely and without incidence — this is a reliable, environmentally-friendly and cost-efficient service." — **Bruce Farthing**

and the market from the outlook of the shipowner. Mr. Abraham viewed increasing safety regulations as a mixed blessing. "Regulation is not necessarily a bad thing. It presents an opportunity to drive out substandard owners and prevent disasters." He contrasted the public's view of safety with the shipowner's approach to safety, explaining that while shipowners tend to regard new safety standards as an overreaction, "The public regards every ship (tankers, bulkers, etc.) as a potential environmental disaster." He emphasized the extended party chain involved in the safety of every ship, and pointed out that, "The customer's needs involve more than fast, cheap transport from A to B." Mr. Abraham encouraged shipowners to emphasize safety and quality, stating "ultimately, you get what you pay for."

Mr. Iarossi, of ABS, offered a class society view on the current standards of safety. He focused on SafeHull technology, and addressed

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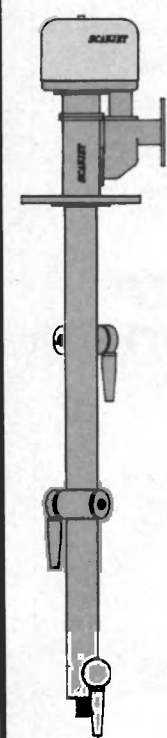


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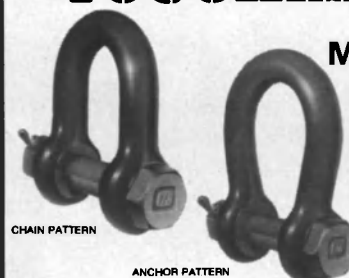


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four major areas: the importance of fatigue and corrosion; the complexity of bulk carrier structures; the lagging of technology; and the significance of cargo loading. He stressed that the standards and levels of safety need to be improved, and stated that classification societies, ship designers and shipbuilders must resist the temptation to compete on the basis of lowest steel weight, noting in his report, "Light scantling vessels are not a positive reflection on our industry. They certainly do not represent a step towards improved bulk carrier safety." Mr. Iarossi said that the industry must improve its ability to determine and control the actual weight of cargo in each hold, and that the structural design of all new bulk carriers should be analyzed using finite element methods, similar to those employed in the verification of tanker structures.

Cdr. Holmes addressed bulk carrier safety from a regulator's viewpoint, and explained the new mandates to the USCG Port State Control Program that are now in effect. The goal of the new mandates is to ensure "fair and simple national consistency and to take a hard line versus substandard ships," stated Cdr. Holmes. He explained the USCG's method of boarding priorities, and the corresponding point system assigned to vessels. The two determining factors in detaining vessels will be: one, if the vessel is determined unsafe for intended voyage; and two, if the vessel poses a threat to the environment. Cdr. Holmes stressed that the system is one of "intervention leading to detention," and added, "We don't have a check-list mentality."

Cdr. Holmes noted that 73 percent of boarded vessels had no deficiencies, and that lifesaving and firefighting equipment violations were the most popular offenses in the remaining 27 percent. Addressing the seminar audience, he emphatically concluded, "Port state control is no substitute for other long-term solutions. No initiatives will be successful unless full cooperation is garnered by government, class societies, and all other aspects of the industry."

Capt. McKay, of the Canadian Coast Guard, further discussed safety, port state control, and the related work of the International Maritime Organization (IMO). Capt. McKay spoke about cost-cutting strategies such as "flagging out," and obstacles such practices can present to safety standards.

The Intercargo seminar was a valuable forum on maritime industry safety, with an important message underlying each presentation: As recently attributed to Mr. Farthing in an Intercargo release, "One (vessel) loss . . . and particularly one involving fatalities, is one too many and Intercargo continues to work closely with its members as well as the international shipping community in efforts to further enhance the standards of quality and safety in the industry."

Great Lakes Towing Co. Kicks Off Navigational Season

The Great Lakes Towing Company has successfully completed its first project cargo shipment of the 1995 Great Lakes navigating season. The cargo, an air distillation column measuring 170 ft. (51.8 m) long and weighing 60 metric tons, was manufactured in Canada for Praxair, Inc., an industrial gas pro-

ducer. The column was rolled onto the 180-ft. (54.8-m) barge, *Mobro 2001*, at Port Robinson, Ontario, and towed by the tug *Ohio* to Ecorse, Mich. The column, unloaded by a Demag 4800 crane, is part of a \$30 million air separation plant being constructed by Praxair in the Detroit area. The plant is expected to

be on-line by August, producing 1,500 tons of oxygen daily. The Great Lakes Towing Company operates 40 tugboats on the Great Lakes, serving 35 ports. The company specializes in project cargo transportation, interport barge towing, harbor towing, icebreaking, rescue for grounded or damaged vessels and icebreaking.



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Study: U.S. Yards Must Focus On Technological, Logistical Improvements To Be Competitive Internationally

Over the past decade, large U.S. shipyards involved in new construction have concentrated on the building of vessels for the U.S. government, primarily combatants and auxiliaries for the U.S. Navy. The

merchant ships that have been built were for the Jones Act trade, in which foreign shipbuilders were precluded from competing. This workload was sufficient to maintain the industry during the buildup to

the 600-ship Navy in the 1980s. Events after that have led to a dramatic downturn in shipbuilding for the U.S. Navy. As a result, U.S. shipyards must seek other customers in order to remain in business.

Since the U.S. merchant fleet is relatively small, U.S. shipbuilders will be forced to compete for shipbuilding contracts for foreign ship operators.

This puts the U.S. shipyards in direct competition with shipbuilders throughout the world. As U.S. shipyards prepare to compete for merchant shipbuilding for export, it will be important for them to understand their worldwide competitive position.

Methodology

A technological survey performed in 10 yards—five U.S., five foreign—examined how up-to-date each shipyard's hardware and facilities were, the procedures used to operate them, and the methods used to plan and control the work and the production of engineering information.

To start, each yard was assigned a level of technology, from Level 1 to Level 5. Level 1 is reflective of the shipyard technology level of the 1960s, with little mechanization, with outfitting characteristically carried out on board after launching. On the opposite end of the spectrum, Level 5 represents 1990s state-of-the-art shipbuilding technology, indicative of a yard that combines automation, integrated operating systems, the use of CAD, and effective quality assurance. Levels 2-4 fall in between respectively. By assigning each shipyard with a level, consistent assessments of the yards could be made by the three surveyors responsible for making yard visits and gathering relevant information.

Details on ship production, shipyard personnel, work patterns, man-hours used in production, and financial information were collected. The unit for measuring the relative output of merchant shipbuilding activity in this case was Compensated Gross Tonnage (CGT). The competitiveness of the U.S. shipbuilding industry was assessed in terms of the cost of producing a CGT compared with the same measure for its competitors. The five foreign shipyards visited were: AESA Sestao Yard, Spain; Harland and Wolff, U.K.; IHI Kure Yard, Japan; Kvaerner Govan, U.K.; and Odense, Denmark.

Survey Results

It was determined that there are a number of areas of improvement that should be targeted by the U.S. shipbuilding industry. Critical areas in need of improvement are: business plans, shipbuilding policies, marketing tactics, design and engineering, quality management, material management, purchasing, outfitting, painting, and mixing naval and merchant ship construction. Additionally, among the other areas in need of development are: build strategy use, reduction in stock levels, treatment line, plate burn-

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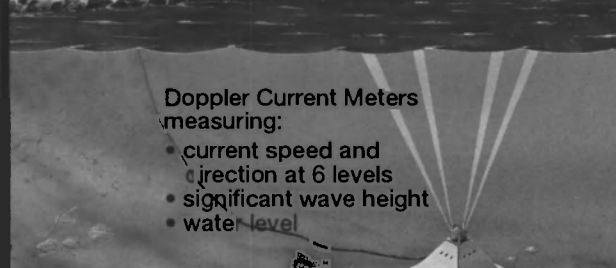
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ing and marking, block assembly, and production control.

Despite the need for significant improvements, there are some reasons for optimism contained in the results. Labor costs and average hours worked for U.S. yards are world competitive. Technology improvements needed are generally of the soft or management technology type, rather than facility or hardware type. Thus, major capital improvements are not required to produce major productivity improvements.

Shipbuilding Policy Improvements

Organization is key to improving several aspects of the yards. The shipyards must focus on the product range which they intend to build and determine their capacity, targeted output and build cycles. They also need to develop targets for costs and a pricing policy, as well as a well-organized marketing plan. Total quality management (TQM) principles should be put into place, and accuracy control procedures should be adopted. U.S. yards should also learn to employ JIT (just-in-time) logistics in order to avoid rework. The yards need to build up a database of suppliers of equipment of merchant ships, together with the means of recording their perfor-

mance for future use. Continuing efforts to improve supplier relationships are critical for achieving worldwide competitiveness. Purchasing should aim for JIT delivery of materials and equipment to the shipyard in order to reduce capital tied up in stored goods and the storage area necessary.

Only one of the U.S. yards visited had collected data on an outfit manufacturing or installation procedure in order to have them analyzed as part of a self-checking statistical process control system. Outfit workshops should be organized on a group technology basis with groups of similar work being produced in dedicated workstations using standard procedures and tools. When a ship is in the water the required services should be led in planned routes, kept clear of the deck, and arranged in modular form to allow for removal or expansion without interruption to the remainder of services. Painting should also be similarly organized so that finished painted blocks go to the ship assembly berth. Japanese yards are currently making large investments in painting techniques in order to improve productivity and quality.

In terms of yards mixing naval and merchant ship construction, strategic approaches must be adopted to ensure a yard's ability to compete effectively with yards that

concentrate solely on specific markets for merchant ships.

It is hoped that these recommendations will provide a framework for U.S. shipyards to conduct internal evaluations to set a course for international competitiveness. These plans must be prepared and implemented in order to enable the industry to survive in the coming decade.

The preceding was excerpted from a paper that was presented at the Society of Naval Architects and Marine Engineers' (SNAME) 1995 Ship Production Symposium in Seattle, Wash. The paper, titled 'Technological Survey of U.S. Shipyards - 1994, was researched and written by Richard Lee Storch from the University of Washington Department of Industrial Engineering, John Clark of A&P Appledore International, Ltd., and Thomas Lamb of Textron Marine & Land Systems. The paper reports the results of a study on the international competitiveness of the U.S. shipbuilding industry, based on a technological survey of five U.S. and five foreign yards.

New Prop Remanufacturing Shop Opened

Shepherd's Yacht Yard, in Md., has opened Black Dog Props, a new division which will use a new technology, called Prop Scan, to remanufacture propellers.

Using optical technology developed in Australia, Black Dog Props will reportedly be able to measure and pattern a propeller, and then remanufacture it by equalizing the pitch of each blade, balancing the propeller.

According to the company, reconditioning propellers with this technology will decrease fuel consumption, eliminate vibration, and increase the life of the machinery. Black Dog Props will serve vessels with props up to seven blades, at 40 in. in diameter.

Marine Multimedia Merges With Aviations Software

Criteria Instruments, Inc., of Portland, Ore., developer of multimedia boating products, has merged with MentorPlus Software, Inc., developer of aviation software, located in Aurora, Ore. **John Laurin**, former CEO of Criteria Instruments, will head the new marine division for MentorPlus Software.

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ABB Turbocharger Opens Tacoma Service Center

ABB Turbocharger Company has announced the opening of a new service center in the Seattle/Tacoma, Wash., area. The new center will offer complete shop repairs and 24-hour field service for ships calling in the Pacific Northwest. Services include computerized rotor balancing, blast clean-

ing, and machining and shaft repairs. Original and reconditioned ABB spare parts are available, many on an exchange basis.

For more information on ABB Turbocharger Co.
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Simrad Wins Surveying, Positioning Systems Orders

Simrad, the Norwegian marine

electronics group, has been awarded contracts totaling \$2 million for the delivery of positioning systems for five offshore vessels, for customers in The Netherlands, the U.K., the U.S., and Norway. Equipment to be supplied in these contracts includes: APA 701 and 702 redundant dynamic positioning systems, HPR 410 underwater positioning systems, electronic chart systems, and an AP autopilot system. The company has also secured orders amounting to

\$1.2 million from customers in the U.S., Canada, and the U.K. for multibeam echosounders.

Double-Ended Ferry Delivered To Dutch Owner

Conoship International BV announced that Bijlsma, one of its associated shipyards, delivered a double ended ferry, named *Sier*, to Dutch owner Wagenborg Passagiersdiensten B.V. The 1,440-passenger ferry will operate between Ameland and Holwerd. The vessel's propulsion plant consists of four non-reversible 675-kW diesel engines, driving Schottel jet propulsion units, for added maneuverability in shallow water. *Sier* was constructed to exceed safety standards, and has permanent buoyancy in the wing tanks due to the presence of blocks of polystyrene hardfoam.

American Commercial Barge Announces Appointments

American Commercial Barge Line Co., Jefferson, Ind., has made several executive appointments. **Edward Donaldson** was named vice president of purchasing. He was formerly director of purchasing and terminals for the Hanlin Group, Inc., a plastics manufacturer. **Brooke Bickerton** was appointed environmental projects manager. She is experienced in environmental and energy audits, underground storage tank removal, and remediation. **Michael C. Edwards** will serve as manager of bulk and steel sales. He was formerly manager of a large scrap brokerage company.



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Harland And Wolff Christen Bulk Carrier

Harland and Wolff Shipbuilding and Heavy Industries Ltd., of Belfast, recently christened its latest newbuild, a bulk carrier named *Lowlands Trassey*. The vessel is a 162,000-dwt cape-size bulk carrier of the Harland and Wolff S162 "safety through strength" design, and is the first vessel to be constructed for Trassey Shipping Ltd., the ship-owning subsidiary of Harland and Wolff Holdings plc. **Bep Pellemans** christened *Lowlands Trassey*. She is the wife of **Jan Pellemans**, managing director of the Belgian cape-size bulk carrier operator, Combam NV for whom the vessel will operate on a seven-year charter.

For more information on Harland and Wolff
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Lowland Trassey Particulars

Length	1,044-ft. (283.7-m)
Width	163.4-ft. (44.4-m)
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Speed	15.5 knot
Classification	Lloyds +100A1

Nedlloyd Lines Introduces U.S. East Coast/Asia Route

Nedlloyd Lines has introduced a route providing fixed-schedule service between the eastern seaboard and Asia. The route, dubbed the Pacena route, is the final link in the company's global shipping network for companies exporting from and importing to the U.S. East Coast. The route serves three East Coast ports — in New York, Virginia, and South Carolina, and five Asian destinations — Tokyo, Kobe, Hong Kong, Kaohsiung, and Nagoya. The Pacena route also serves Colon, Panama's Port of Manzanillo.

Nedlloyd's nine vessels assigned to the route have an average capacity of 2,800 TEUs to accommodate FCL/FCL, reefer and other cargoes. Nedlloyd Lines is a subsidiary of the Royal Nedlloyd Group NV, an international shipping and logistics management company based in The Netherlands.

Newpark Signs Contract To Build Two Barges

Newpark Shipbuilding and Repair, Inc., of Houston, Texas, has signed a contract with Dixie Carriers, Inc., also of Houston, to build two double skin box unit tank barges with dimensions of 177 ft. x 54 ft. x 12 ft. (53.9 m x 16.4 m x 3.6 m). Delivery of the first barge is scheduled for mid-October, followed by delivery of the second barge at the end of January, 1996.

For more information on Newpark Shipbuilding and Repair, Inc. Circle 132 on Reader Service Card

Schuyler Acquires Baier Hatch

Schuyler Rubber Co., of Woodinville, Wash., recently purchased L.S. Baier and Associates of Portland, Ore. The new entity will operate as Baier Hatch Company, Inc., and will continue to manufacture a complete line of patented flush hatches in aluminum, bronze, and galvanized steel.

For more information on Baier Hatch Company, Inc. Circle 25 on Reader Service Card

Reed's Nautical Almanac Is Accepted By USCG

Thomas Reed Publications, Inc., announced that the U.S. Coast Guard (USCG) has accepted *Reed's Nautical Almanac* and *Reed's Nautical Companion* as legitimate records of the navigational information required on board commercial fishing vessels. The *Nautical Almanac* has been accepted as an extract of the U.S. Coast Pilot, Coast Guard List, Tide Tables, and Current Tables. The *Nautical Companion* contains the required Inland and International Rules of the Road, as well as a first aid manual. For more information, call 800-995-4995.

June, 1995

SBF Shipbuilders Sells Fifth Fast Ferry To Singapore

Australian company SBF Shipbuilders has sold its fifth fast ferry to Auto Batam Ferry Services of Singapore. The vessel is a 101.7-ft. (31-m) triple-screw monohull that was building on spec. The ferry is powered by three MTU 12V18, 3TE72 series engines, and will travel at 32 knots. Delivery is scheduled to

occur in the last week of June. SBF Shipbuilders delivered its first fast ferry to the Singapore interest in July 1990.

Lloyd's Register Publishes World Fleet Figures

Lloyd's Register statistics show the world fleet grew by 18 million gt in 1994 to a new record of 475.9 million gt. The average age of the

tanker fleet increased from 16 years to 17 years; the average age of bulk carriers remained unchanged at 14 years. Last year, 1,437 ships totaling 19 million gt were completed. A total of 1,057 cargo carrying ships were completed in the world. Japanese yards delivered 510 vessels amounting to 13.3 million dwt, and South Korean yards completed 115 vessels totaling 6.7 million dwt. Germany completed 67 cargo ships, totaling 1.2 million dwt.

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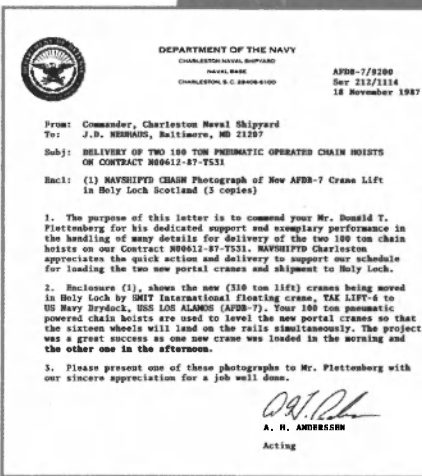
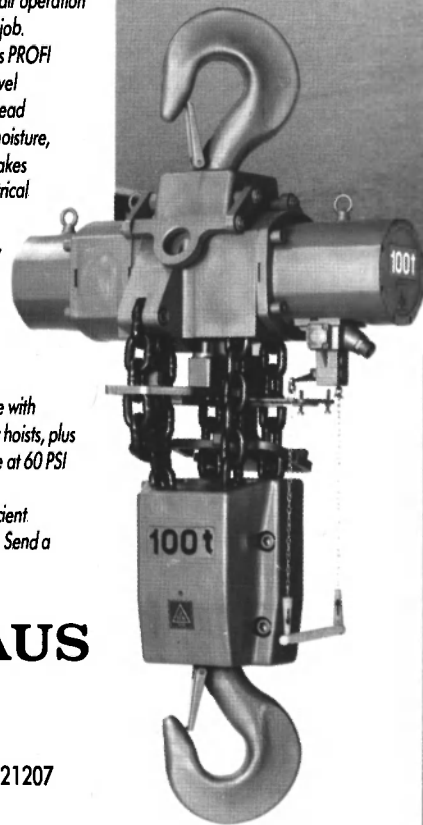
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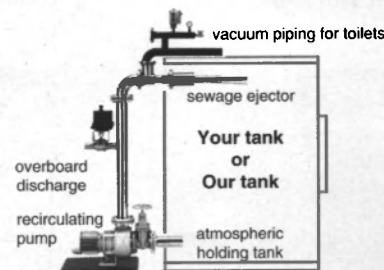


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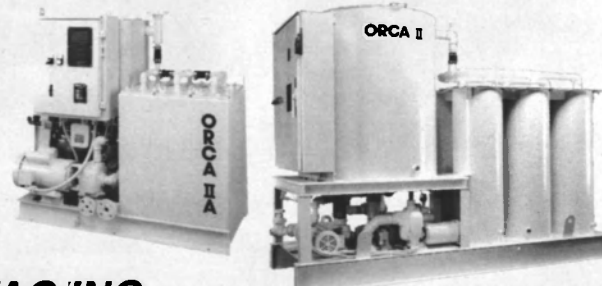
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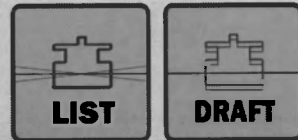
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Intermarine Launches Fifth Osprey Class Minehunter For U.S. Navy

In early June, Intermarine USA launched the U.S. Navy Coastal Minehunter *Falcon* (MHC 59) into Georgia's Savannah River. **Lillian Budd Darden**, wife of The Honorable **George Darden**, who previously represented Georgia's 7th Congressional district, sponsored the vessel in its christening ceremony. *Falcon* is the fifth Navy ship of the Osprey class to be launched by Intermarine. The vessel is 188 ft. (51.1 m) long, displaces 890 metric tons, and is one of the world's largest ships to be constructed of glass-reinforced plastic (GRP). Minehunters are designed to clear littoral, harbor, coastal and ocean waters of acoustic, magnetic, pressure and contact type mines. Intermarine also delivered the USS *Oriole*, the third of the eight contracted Osprey class ships, in mid-May.

Intermarine USA is a U.S. shipyard registered as a partnership in N.Y. with Intermarine SpA of Sarzana, Italy. The Savannah yard offers shipowners and operators a complete range of ship repair services.

For more information on Intermarine
Circle 160 on Reader Service Card

National Maritime Hall Of Fame Announces 1995 Selections

Elmer A. Sperry, credited for the development of the modern gyrocompass and holder of several patents for navigation and safety devices, and the vessel *Pennsylvania*, the first important deep sea iron vessel built in the U.S., have been voted into the National Maritime Hall of Fame for 1995. The Hall of Fame was established in 1982 by **Frank O. Braynard** to honor the memory of extraordinary people and vessels in American maritime history. Its roster includes 52 seafarers and 51 vessels.

Stolt Comex Seaway Appoints New Chief Executive

Stolt Comex Seaway S.A.'s board of directors recently announced that CEO **Gilles de Naurois** has resigned. **Bernard Vossier**, the present COO of the company and long-time associate of Mr. de Naurois, has been named to replace him. Stolt Comex Seaway is a diversified contractor to the offshore oil and gas industry, specializing in technologically sophisticated subsea engineering, survey

CALENDAR OF EVENTS

JUNE

Marine Refrigeration: June 1, London, U.K.
Contact: **Kathleen Ford**, conference organizer, The Institute of Marine Engineers, 76 Mark Lane, London EC3R 7JN, tel: +44 171 481 8493; fax: +44 171 481 8493.

ASME Turbo Expo '95 — Land, Sea & Air: June 5-8, Houston, Texas.
Contact: The American Society of Mechanical Engineers, 5801 Peachtree Dunwoody Rd., Suite 100, Atlanta, Ga. 30342-1503, tel: (404) 847-0072, fax: (404) 847-1503.

MARICHEM Asia '95: June 7-9, Raffles City Convention Centre, Singapore.
Contact: RAI Exhibitions Singapore Pte. Ltd., 1 Maritime Square, #09-49 World Trade Centre, Singapore 0409, tel: 65-272 2250, fax: 65-272 6744.

World Fishing Exhibition '95: June 7-10, Copenhagen, Denmark.
Contact: **Patricia Foster**, Exhibition Director, Nexus Media Ltd., 84 Kew Rd., Richmond, Surrey, TW9 2PQ, England, tel: +44 (0) 181 332 9273; fax: +44 (0) 181 332 9335.

19th World Ports Conference of the International Association of Ports and Harbors: June 10-16, Westin Hotel, Seattle, Wash.
Contact: Port of Seattle, Port Communications, Attn: IAPH 19th World Conference, P.O. Box 1209, Seattle, Wash. 98111.

1995 International Offshore and Polar Engineering Conference: June 11-16, The Hague, The Netherlands.
Contact: The International Society of Offshore and Polar Engineers (ISOPE) 95, The Hague TPC, P.O. Box 1107, Golden, Colo. 80402-1107, fax: (303) 420-3760.

SPE Petroleum Computer Conference: June 11-14, Houston, Texas.
Contact: SPE, Office, 4 Mandeville Pl., WIM 5LA, London, England, tel: +44 71 487 4250; fax: +44 71 487 4229.

SNAME Fourth National Workshop: June 13-15, Maritime Institute of Technology and Graduate Studies, Linthicum Heights, Md.
Contact: **Frank Long**, Workshop project manager, Win/Win Strategies, 1160 Blossom Circle, Bethlehem, Pa. 18017-1008, tel: (610) 865-1588; fax: (610) 868-5886.

Nor-Shipping '95: June 13-16, Sjolyst Exhibition Center, Oslo, Norway.
Contact: Norwegian Trade Fair Foundation, P.O. Box 130 Skoyen, N-0212 Oslo, Norway, tel: +47 22 43 91 00;

fax: +47 22 43 19 14.

XIV Copinaval, Marine Expo '95, Pan-American Congress of Naval Engineering, Maritime Transportation and Port Engineering: June 13-16, Lima, Peru.
Contact: XIV Copinaval, Organizing Committee, Av. Contralmirante Mora

1102, Base Naval del Callao, P.O. Box 112, Callao, Peru, tel: +51 14 652171; fax: +51 14 657966.

Warship '95: Offshore Protection Vessels: June 14-15, London, U.K.
Contact: **Amanda Wilkes-Brough**, Royal Institution of Naval Architects, 10

Upper Belgrave St., London, U.K. SW1X 8BQ, tel: +44 171 235 4622; fax: +44 171 245 6959.

International Hydrofoil Society 25th Anniversary Celebration and Conference: June 14-16, Army-Navy Country Club, Arlington, Va.

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CALENDAR OF EVENTS

Contact: IHS, P.O. Box 51, Cabin John, Md. 20818

3rd Annual NAVSEA/NAVSUP International Logistics Symposium: June 19-22, Hyatt Regency Hotel, Crystal City, Va.

Contact: Sandra Kramer, NAVSEA, tel: (703) 602-9000; fax: (703) 602-7951.

Offshore Noise and Vibration: June 20, Aberdeen, U.K.
Contact: The IMarE Conferences Dept.,

The Institute of Marine Engineers, 76 Mark Lane, London EC3R 7JN, tel: +44 171 481 8493; fax: +44 171 488 1854.

International Heavy Oil Symposium: June 25-27, Calgary, Canada. Con-

tact: SPE, Office, 4 Mandeville Pl., W1M 5LA, London, England, tel: +44 71 487 4250; fax: +44 71 487 4229.

International Rope Technology Workshop (IRTW): June 25-28, Cornell University, Ithaca, N.Y.
Contact: IRTW c/o Pigeon Mountain Industries, P.O. Box 803, Lafayette, Ga. 30728, tel: (706) 764-1437; fax: (706) 764-1531.

American Petroleum Institute (API) Production Annual Standardization Conference: June 26-29, Palliser Hotel & Skyline Plaza, Calgary, Canada.
Contact: API, 1220 L Street, N.W., Washington, D.C. 20005, tel: (202) 662-8000; fax: (202) 682-8223.

International Fisheries Conference: June 28-30, Cape Town, South Africa.
Contact: MGH Bremen GmbH, tel: +49 421 3630521; fax: +49 421 321485.

JULY

SPE Forum Series in North America: July 16-August 11, Snowmass Village, Colo.
Contact: SPE, Office, 4 Mandeville Pl., W1M 5LA, London, England, tel: +44 71 487 4250; fax: +44 71 487 4229.

AUGUST

Dam Engineering '95: August 1-2, Kuala Lumpur, Malaysia.
Contact: John S. Y. Tan, Dam Engineering '95, conference secretariat, 150 Orchard Road, #07-14, Orchard Plaza, Singapore 0923, tel: +65 7332922; fax: +65 2353530.

8th American Water Jet Conference: August 26-30, J.W. Marriott Hotel, Houston, Texas.
Contact: WJTA, 818 Olive St., Suite 918, St. Louis, Mo. 63101-1598, tel: (314) 241-1445, fax: (314) 241-1449.

MARTRANS '95 - First International Conference on Marine Transport in the 21st Century: August 30-September 1, Plymouth, U.K.
Contact: Paula Doughty-Young, MARTRANS 95 conference secretariat, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA, U.K., tel: +44 703 293223; fax: +44 703 292853.

SEPTEMBER

Offshore Europe: September 5-8, Aberdeen.
Contact: SPE, Office, 4 Mandeville Pl., W1M 5LA, London, England, tel: +44 71 487 4250; fax: +44 71 487 4229.

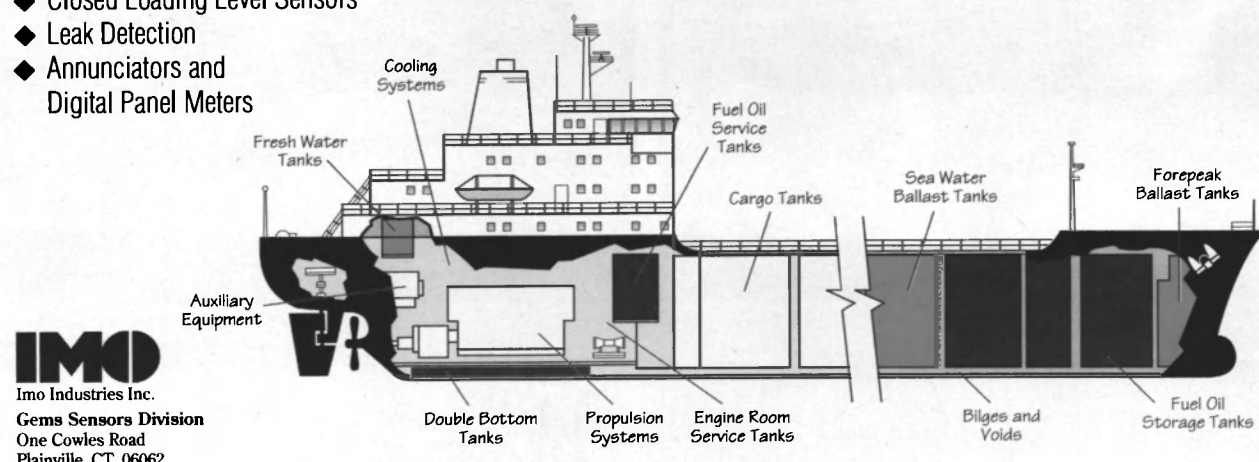
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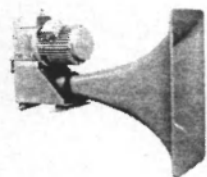
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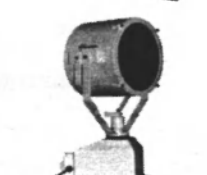
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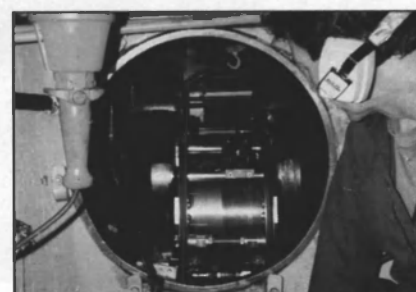
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CALENDAR OF EVENTS

Directors Meeting: September 7-8, Seattle, Wash.
Contact: AWO, fax: (703) 841-0389.

SPE Forum Series in Europe: September 10-29, Seefeld, Austria.
Contact: SPE, Office, 4 Mandeville Pl., WIM SLA, London, England, tel: +44 171 487 4250; fax: +44 71 487 4229.

Morintex 95 - International Conference and Exhibition on Marine Intellectual Technologies: September 12-16, St. Petersburg, Russia.
Contact: Morintex 95 Organizing Committee, Lotzanskaya str. 3, St. Petersburg, Russia, 198008, tel: 812-113-71-36, fax: 812-113-81-09.

NEVA 95 - The International Shipping Exhibition with Russia and the Republics: September 12-16, St. Petersburg, Russia.

Contact: **Roderick Keay**, Dolphin Exhibitions Ltd., 112 High Street, Bileston, Suffolk IP7 7EB, England, tel: +44 449 741801; fax: +44 449 741628.

Riverboat Gaming Congress & Expo: September 13-15, St. Louis, Mo.
Contact: World Gaming Congress & Expo, Seven Penn Plaza, N.Y., N.Y. 10001-3900, tel: (212) 594-4120; fax: (212) 714-0514.

Third Thematic Conference on Remote Sensing for Marine and Coastal Environments: September 18-20, Westin Hotel, Seattle, Wash.
Contact: ERIM/Marine Environmental Conference, P.O. Box 134001, Ann Arbor, Mich. 48113-4001, tel: (313) 994-1200, ext. 3234, fax: (313) 994-5123.

American Petroleum Institute (API) Elec-

tronic Data Interchange Conference & User Group Meeting: September 25-27, New Orleans Hilton, New Orleans, La.
Contact: API, 1220 L. Street, N.W., Washington, D.C. 20005, tel: (202) 662-8000; fax: (202) 682-8223.

National Waterway's Conference (NWC) Annual Meeting: September 27-29, Adam's Mark Hotel, Tulsa, Okla.
Contact: NWC, 1130 17th St., Wash., D.C. 20003-4676, tel: (202) 296-4415; fax: (202) 835-3861.

OCTOBER

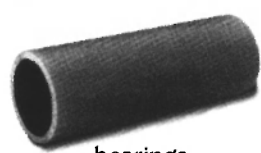
NASPL: October 1-3, Minneapolis Convention Center, Minneapolis, Minn.
Contact: World Gaming Congress & Expo, Seven Penn Plaza, N.Y., N.Y. 10001-3900, tel: (212) 594-4120; fax: (212) 714-0514.

SNAME Annual Meeting and International Maritime Exposition: October 4-7, Washington Hilton, Washington, D.C.
Contact: Society of Naval Architects and Marine Engineers (SNAME), 601 Pavonia Ave., Jersey City, N.J. 07306, fax: (201) 798-4975.

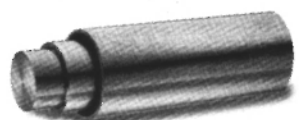
Oceans '95 MTS/IEEE Conference and Exhibition: October 9-12, San Diego, Calif.
Contact: **Deam Given** or **Bill Hulburd**, 9825 Bonnie Vista Dr., La Mesa, Calif. 91941-6828, tel: (619) 695-1197; or contact the MTS at tel: (202) 775-5966; or the IEEE at tel: (206) 525-2578.

World Gaming Congress & Expo: October 17-19, Las Vegas Convention Center, Las Vegas, Nev.
Contact: World Gaming Congress & Expo, Seven Penn Plaza, N.Y., N.Y. 10001-3900, tel: (212) 594-4120; fax: (212) 714-0514.

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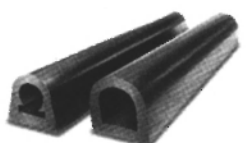
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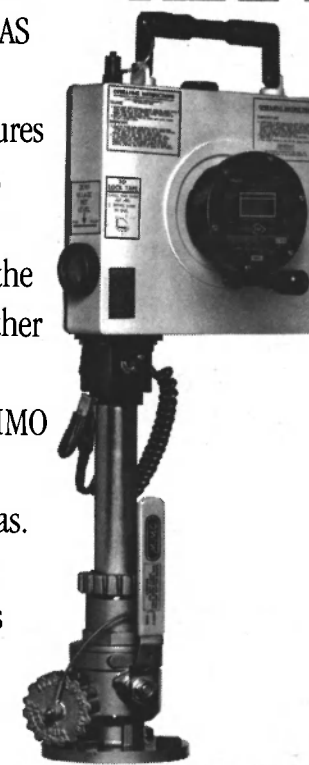
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97

CALENDAR OF EVENTS

(212) 714-0514.

SPE Annual Technical Conference and Exhibition: October 22-25, Dallas, Texas.
Contact: SPE, Office, 4 Mandeville Pl.,


W1M 5LA, London, England, tel: +44 71 487 4250; fax: +44 71 487 4229.

Fleet Maintenance Symposium 95 - Fleet Maintenance in the Joint Environment: October 23-25, Virginia Beach,


Va.
Contact: **Bill Conley**, American Society of Naval Engineers, 1452 Duke St., Alexandria, Va. 22314-3458, tel: (804) 857-4922; fax: (804) 857-4934.

American Petroleum Institute (API) Refining Autumn Meeting: October 23-25, Walt Disney World Dolphin Hotel, Orlando, Fla.
Contact: API, 1220 L. Street, N.W., Washington, D.C. 20005, tel: (202) 662-8000; fax: (202) 682-8223.


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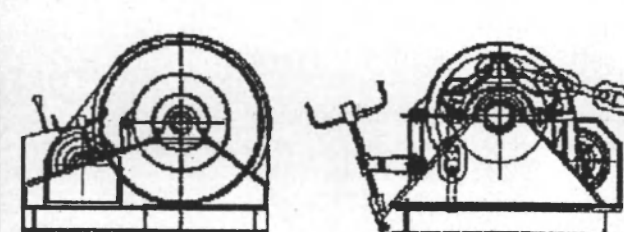
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Newbuild 2000 And The Role Of The Naval Architect: October 24-25, London, U.K.
Contact: **Amanda Wilkes-Brough**, Royal Institution of Naval Architects, 10 Upper Belgrave St., London, U.K. SW1X 8BQ, tel: +44 171 235 4622, fax: +44 171 245 6959.

Expoship Riomar '95: October 24-27, Rio de Janeiro, Brazil.
Contact: **Paulo Correa**, FCI, Av. das Americas, 1.155—Sala 1.507 22631-000, Rio de Janeiro, Brazil, tel: 55 21 439 9097; fax: 55 21 493 8203, or in the U.K., contact **Bob Hill**, Seatrade House, 42-48 N. Station Rd., Colchester CO1 1RB, tel: +44 206 45121; fax: +44 206 45190.

Pacific Structural Steel Conference (PSSC) 1995: October 25-27, The Mandarin Hotel, Singapore.
Contact: **John S.Y. Tan**, PSSC 1995, Fourth Pacific Structural Steel Conference, 150 Orchard Road, #07-14, Orchard Plaza, Singapore 0923, tel: +65 7332922; fax: +65 2353530.

Clean Gulf '95: The Fifth Annual Conference and Exhibition on Oil Spill Prevention, Response, and Technology in the Gulf Coast Region: October 1-November 1.
Contact: **Sean Guerre**, sales manager, Penn Well Conferences & Exhibitions, 3050 Post Oak Blvd., Suite 205, Houston, Texas 77056-6524, tel: (713) 963-6218; fax: (713) 963-6284.

NOVEMBER

Small Craft Symposium: November 9-10, Great Lakes/Great Rivers Section, Ann Arbor, Mich.
Contact: SNAME, 601 Pavonia Ave. Jersey City, N.J. 07306, tel: (201) 798 4800, fax: (201) 798-4975.

American Petroleum Institute (API) Annual Meeting: November 12-13, Hyatt Regency, Houston, Texas.
Contact: API, 1220 L. Street, N.W. Washington, D.C. 20005, tel: (202) 662-8000; fax: (202) 682-8223.

International Oil and Gas Exhibition: November 13-16, Beijing, People's Republic of China.

CALENDAR OF EVENTS

Contact: SPE, Office, 4 Mandeville Pl., W1M 5LA, London, England, tel: +44 71 487 4250; fax: +44 71 487 4229.

International Meeting on Petroleum Engineering: November 14-17, Beijing, P.R. of China.

Contact: SPE, Office, 4 Mandeville Pl., W1M 5LA, London, England, tel: +44 71 487 4250; fax: +44 71 487 4229.

Euro Port 95: November 14-18, Amsterdam RAI Congress Center, Amsterdam, The Netherlands.
Contact: Euro Port 95, Amsterdam RAI, P.O. Box 77777, 1070 MS Amsterdam, The Netherlands, tel: +31 20 5491212; fax: +31 20 6464469.

Pacific Fishing 95: November 16-18, Seattle, Wash., Pier 48
Contact: **Bruce Buls**, tel: (206) 789-5333; fax: (206) 784-5545.

Viet Portex 95: November 21-24, Ho Chi Minh City, Vietnam.
Contact: Viet Portex 95 Project Management, Hamburg Messe und Congress GmbH, JungiusstraBe 13 D-20355, Hamburg, Germany. tel: +49 40/3569-21 90/92; fax: +49 40/35 69-21 87.

Maritime Technology Exhibition Conference 1995: November 22-24, Royal Exhibition Building, Melbourne, Australia.
Contact: **Bill Hare**, Australian Exhibition Services Pty Ltd., Illoura Plaza, St. Kilda Rd., Melbourne, VIC 3004 Australia, tel: (03) 867-4500.

High Speed Vessels For Transport and Defense: November 23-24, London, U.K.
Contact: **Amanda Wilkes-Brough**, Royal Institution of Naval Architects, 10 Upper Belgrave St., London, U.K. SW1X 8BQ, tel: +44 171 235 4622; fax: +44 171 245 6959.

Marichem '95: The Industry Meeting For Bulk Chemicals: November 28-30, Cologne, Germany.
Contact: Marichem Secretariat, Glen House, 200/208 Tottenham, London W1P 9LA, U.K., tel: +44 171 436 9774; fax: +44 171 436 5694.

DECEMBER

American Waterways Operators (AWO) Winter Convention & Board of Directors Meeting: December 7-8, Washington, D.C.
Contact: AWO, fax: (703) 841-0389.

MARCH 1996

ea Japan '96: March 5-9, 1996, Tokyo, Japan
Contact: **Lyndsay Job**, tel: (703) 841-0389.

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Contact: **Anthony Nash**, Seatrade House, 42 North Station Rd., Colchester CO1 1RB, U.K., tel: +44 1206 45121, fax: +44 1206 45190, or contact: **Christopher Eve**, Shuwa Kioicho TVR Bldg.,

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Singapore '96 International Maritime Exhibition & Conference: March 26-29, 1996, World Trade Center, Singapore.

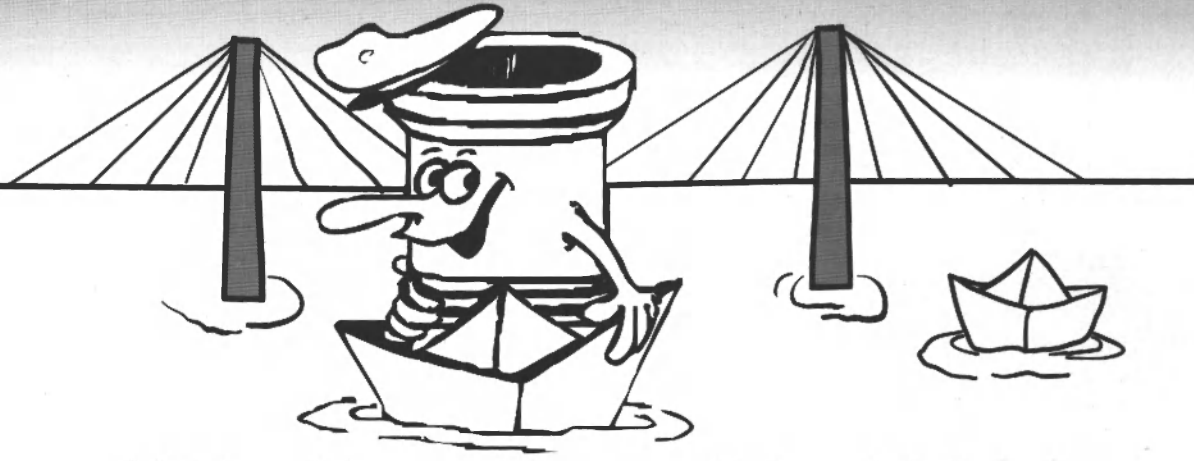
gapore.

Contact: SingaPort '96, Times Conferences & Exhibitions Pte. Ltd., Times Center, One New Industrial Road, Singapore 1953, tel: +65 284 8844; fax: +65 286 5754.

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CALENDAR OF EVENTS

MAY 1996

Offshore Technology Conference and Exhibition: May 6-9, 1996, Astrodome, Houston, Texas.
Contact: Society of Naval Architects and Marine Engineers (SNAME), 601 Pavonia Ave., Jersey City, N.J. 07306, fax: (201) 798-4975.

JUNE 1996

ASME Turbo Expo '96: June 10-13, Birmingham, U.K.
Contact: Marina Stenos, Public Information, The American Society of Mechanical Engineers, 345 East 47th St., New York, NY 10017, tel: 212-705-7738.

Seventh International Conference on Marine Engineering Systems: June 13-14, Trondheim, Norway.
Contact: Kathleen Ford, conference organizer, The Institute of Marine Engineers, 76 Mark Lane, London EC3R 7JN, tel: +44 171 481 8493; fax: +44 171 488 1854.

SEPTEMBER 1996

Mediterranean Cruise and Ferry Convention: September 17-20, Port of Genoa.
Contact: Michael Kazakoff, Princeton Forrestal Village, 125 Village Boulevard, Suite 220, Princeton, N.J. 08540-5703, USA, tel: (609) 452-9414; fax: (609) 452-9374, or contact Tony Nash, 42 North Station Rd, Colchester,

CO1 1RB, U.K., tel: +44 1206 45121; fax: +44 1206 45190.

ITS '96 (The International Towage and Salvage Convention and Exhibition): September/October, Seattle, Wash.
Contact: Thomas Reed Publications, 19 Bridge Rd., Hampton Court, East Molesey, Surrey DT8 9EU, U.K., tel: +44 0181 941 7878; fax: +44 0181 941 8787.

OCTOBER 1996

Ship Machinery & Marine Technology Exposition (SMM) '96: October 1-5, 1996, Hamburg, Germany; fax: +49 40 35 69 2149.

Expo Shipping '96 Incorporating Air Transportation: October 16-19, Putra World Trade Center, Kuala Lumpur.
Contact: Richard Lim, managing director, Global Expositions, Rm. 57138, Xi Yuan Hotel, Beijing 100046, People's Republic of China, tel: 01-8334723; fax: 01-8342310.

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send all details, including event name, date, and location, as well as contact information and latest exhibitor list to:

Maritime Reporter & Engineering News, Attn: EDITOR, 118 E. 25th St., New York, N.Y., 10010; fax: (212) 254-6271.

Troy Corp. Offers Anti-Icing Coating Solution

TroyGuard™ 527, an icephobic/water-shedding additive developed by Troy Corporation of East Hanover, N.J., is touted by the manufacturer as the answer to a decade-long search for a coating that helps ships shed water and ice, keeping them at peak readiness in all weather conditions.

The Navy recently concluded a one-year sea test of a coating containing the additive. The coating, a silicon alkyd enamel called MIL-E-24635 Type 1, was applied to the superstructure of the USS *Peterson* at the Norfolk Naval Station. More than 640 sq. ft. of surface area were covered. The ship was then put through its routine paces over the year, exposing the coating to a range of high-stress operating conditions.

"The Navy had been looking for something as effective as TroyGuard 527 for some time," said Don Williams, product manager, Performance Additives, for Troy. "Until they tested the reformulated MIL-E-24635, nothing had really come close to meeting their expectations. The new coating passed all their lab and at-sea tests and now has been accepted for use by the Navy."

When NAVSEA tested a stand-alone coating which appeared to have remarkable resistance to ice adhesion, personnel were reluctant to accept a coating that needed to be applied over the basic paint. They issued an open solicitation to develop an environmentally compliant topcoat paint to ease removal of ice buildup on the superstructure of ships. At this point, Troy joined forces with Nile's Chemical Paint Company, the only paint vendor at the time which met the EPA's stringent Volatile Organic Compound (VOC) specification.



The result was Navy MIL-E-24635 containing TroyGuard 527, a coating that exceeded even the military's expectations for ice-shedding. According to Mr. Williams, the Navy was looking for a material that would shed twice as much as a normal coating. The TroyGuard-enhanced coating reportedly shed 15 times more ice.

Other reported benefits of TroyGuard include its ability to be easily stirred into solvent-borne systems; it is easily post-added; it is fully recoatable; and it can be used with primers or topcoats. Its weather-resistant ability has sparked interest in non-military markets. Maritime shippers are reportedly intrigued by the potential of TroyGuard-enhanced coatings to shed ice from oceangoing merchant vessels, reducing weight and fuel consumption and cutting operating costs.

For more information on Troy Corp.
Circle 79 on Reader Service Card

Maritime Reporter/Engineering News

Halter Marine Launches R/V Roger Revelle

In late April, Halter Marine, Inc. christened and launched the R/V *Roger Revelle*, the U.S. Navy's newest oceanographic ship, from its Moss Point, Miss. yard. Scheduled to be completed this month, *Roger Revelle* will be operated by the Scripps Institute of Oceanography of the University of California, San Diego, as an all-season, general purpose, oceanographic ship in coastal and deep waters.

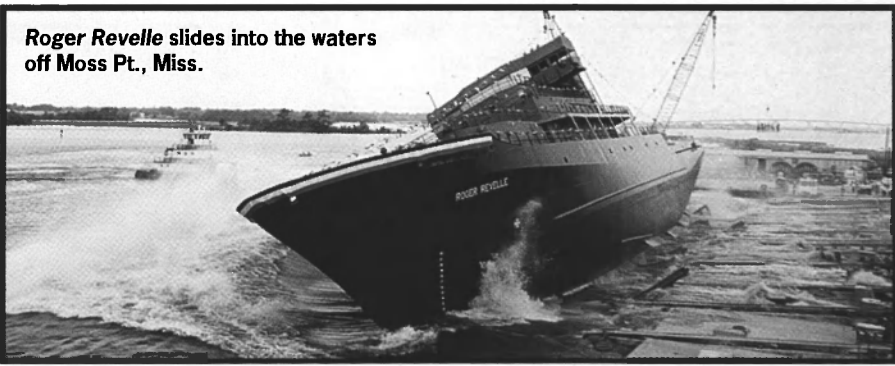
The vessel is 274 ft. (83.5 m) long and has a diesel-electric propulsion system with three 715 kW and three 1500 kW diesel generators integrated to provide power for propulsion and ship service electrical systems. The ship is equipped with a dynamic positioning system which provides automated precision track-line and stationkeeping capability. *Roger Revelle* has the capacity to tow large scientific packages and vehicles (10,000 lbs. tension at five knots), and has more than 4,000 sq. ft. of space for various scientific labs. Typical scientific missions will include physical, chemical and biological oceanography, multi-discipline environmental investigations, ocean engineering, marine acoustics, marine geology and geophysics, and survey tasks.

This vessel is the second oceanographic ship built by Halter Marine for the Scripps Institute. The namesake of the vessel, **Roger Revelle**, was a distinguished scientist, scholar, wartime naval officer, a creator of the Office of Naval Research, the officer in charge of what is currently Naval Sea Systems Command, director of the Scripps Institute, and founder of the University of California at San Diego. His widow, **Ellen Revelle Eckis**, christened the ship in his

honor.

Halter Marine is part of The Trinity Marine Group, a group which includes 19 U.S. shipyards.

For more information on Halter Marine
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Roger Revelle slides into the waters off Moss Pt., Miss.

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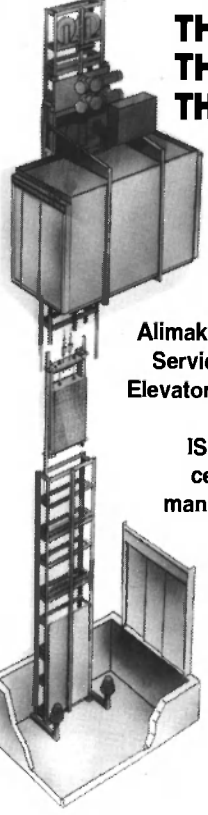
Roger Revelle Principal Characteristics

Length 274 ft. (83.5 m)
Width 52.5 ft. (16 m)
Draft 17 ft. (5.2 m)
Displacement 3,250 t
Speed 15 knots
Certifications ABS Ice Class C,
..... USCG Oceanographic Research Vessel

Propulsion System

Diesel Generators
..... (3) Caterpillar 3516TA, 1500 kW
..... (3) Caterpillar 3508TA, 1500 kW
..... (1) Caterpillar 3406TA, 250 kW
Motors (2) 3,000-hp
..... General Electric CD6999
..... (1) 1,117-hp G.E. bowthruster CD 6887
Propulsors (2) 3,000-hp Z-drives
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June, 1995



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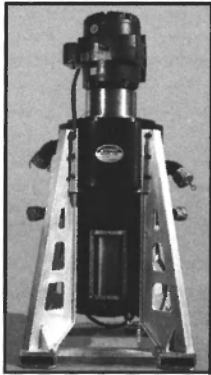
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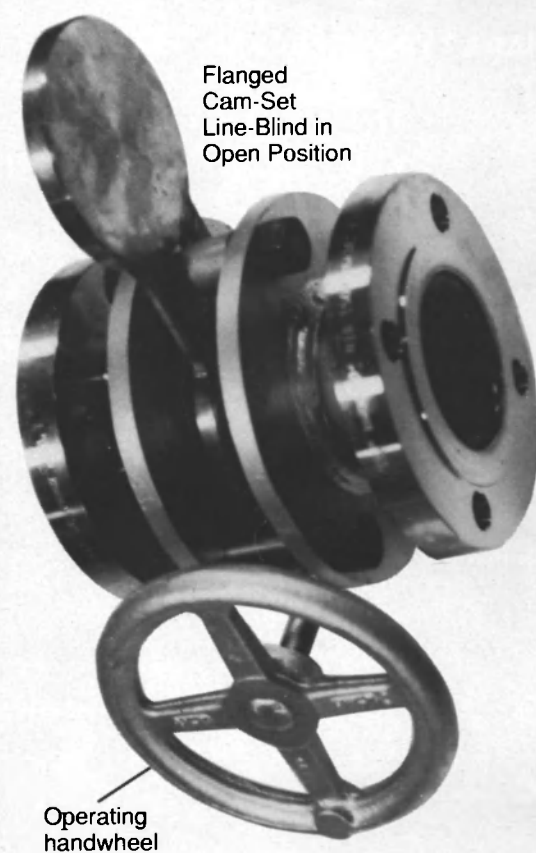
Royal Schelde twin-screw RoRo vessel.

Keel-Laying For Second Schelde RoRo For Commodore Ferries

In March, the keel was laid at Schelde Shipbuilding yard for a second RoRo freight vessel for Commodore Ferries. The first vessel was scheduled to be delivered in May. The vessels are identical in size, at a length of 414.7 ft. (126.4 m), and will be the largest vessels to operate

a freight service on the Channel Island routes. The vessels have a service speed of more than 18 knots.

For more information on
Royal Schelde Shipbuilding
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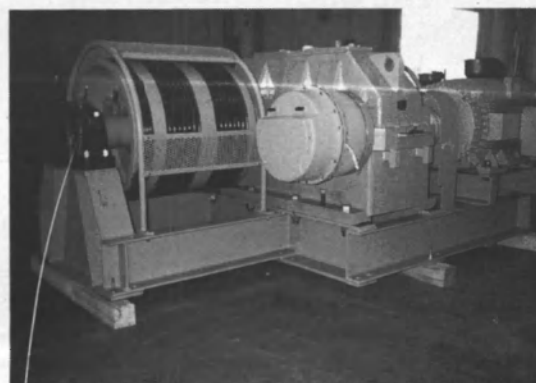
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Vessel Particulars

Type	RoRo
Builders	Royal Schelde, The Netherlands
Flag	Nassau, Bahamas
Length	414.7 ft. (126.4 m)
Width	70.2 ft. (21.4 m)
DWT	5,215

Main Equipment

Engines	(2) Krupp MAK 8M552C diesel engines 4,500 kW each
Gears	Schelde
Thrusters ...	(2) electric bowthrusters 590 kW each
Propellers ...	(2) controllable pitch propellers

Appleton Fluorescent For Marine Applications



Appleton's compact fluorescent provides lighting for technician.

Appleton's new low profile compact fluorescent combines a high output, high efficiency amalgam lamp with an electronic, high-power factor ballast. The result is a small, lightweight fixture that provides the efficiency and long lamp life of an instant-on, white light fluorescent with the high-lumen output of an HID.

In addition to long lamp life and high efficiency, the new Mercmaster III Low Profile also provides high lumen over an extremely wide temperature range. This translates into lower operating costs, superior photometrics and fewer fixtures per job.

The Compact Fluorescent is UL listed for Marine and NEMA 4x applications.

For more information on Appleton
Circle 6 on Reader Service Card

Maritime Reporter/Engineering News

Dockstavarvet Delivers Merkur, Second Of Three Pilot Boats

Dockstavarvet AB recently delivered a 46-ft. (14-m) pilot vessel to Lodsreguleringsfonden (The Pilot Vessel Foundation) in Denmark to be stationed in Dragør, south of Copenhagen. The vessel, dubbed *Merkur*, is the second in a series of three units ordered in June 1994. It will be followed by a sister vessel for Grenaa, to be delivered this month. The first vessel in the series, *Sirius*, has been stationed in Kalundborg since December 1994. The yard previously delivered two 49-ft. (15-m) and two 43-ft. (13-m) boats to Lodsreguleringsfonden in 1992 - 1994.

In connection with the delivery of *Merkur*, a new order from the same client was signed for an additional six vessels.

The first boat will be a prototype for a new waterjet-driven design which has been developed by the project dept. of the yard. Maximum speed will be about 30 knots with two 530-hp engines. Delivery will be in December 1995 and a six-month test period will follow before more are produced for other clients.

The following five units will be boats of 46 ft. in length of standard type, i.e., sister vessels to *Sirius* and *Merkur*. The last delivery in the series will be in November 1997.

Apart from the present series manufacture of Combat Boat 90, Dockstavarvet has also received an order from Forsvarets Materialverk (The Swedish Defense Administra-

tion) for the conversion of four Command Vessel units. Two prototype conversions were performed in 1993 and have been systematically tested with good results. The result of the conversion will be that the boats are furnished and equipped as centers of command for the Amphibious Battalion and contain a substantial amount of electrical and electronic installations.

For more information on Dockstavarvet Circle 80 on Reader Service Card

Dockstavarvet AB recently delivered a 46-ft. (14-m) pilot vessel to Lodsreguleringsfonden (The Pilot Vessel Foundation) in Denmark. The vessel, dubbed *Merkur*, is the second in a series of three units ordered in June 1994.



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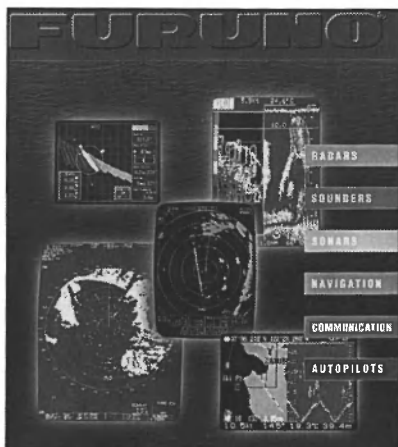
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Furuno Marine Electronics Catalog Offered



Furuno has published its 1995 product catalog, featuring a full listing of products for the professional and recreational mariner. It includes more than 80 models of sonar, radar, fishfinders, GPS, communications equipment, navtex, weatherfax, ADFs, loran, and chart plotters. New products for '95 include: Felcom 80 Inmarsat-B designed for private and military vessels; 12-in. X-band radars with advanced video processing techniques, FR-7041 and FR-111; and the 1621 LCD micro-radar, with a newly-expanded range scale of up to 16 nm.

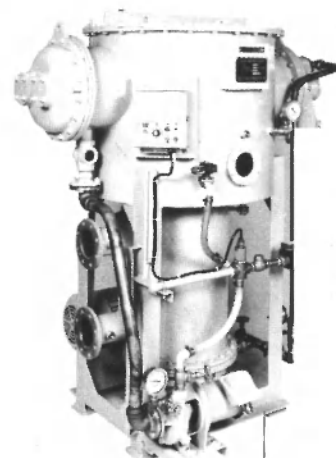
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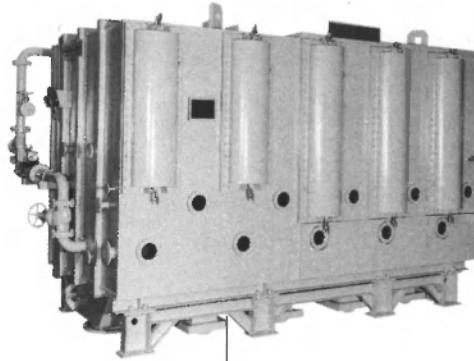
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Circle 125 on Reader Service Card

Marine Travelift Mobile Boat Hoist Operational In Singapore

Marine Travelift, Inc., of Sturgeon Bay, Wis., has announced that the latest 500-ton capacity, model 500 BFM mobile boat hoist built and erected by the firm is now in operation at the new Siong Huat Shipyard Pty., Ltd., in Singapore. The new shipyard was constructed to build and service com-

mercial vessels including tugboats, offshore supply boats, work barges and large pleasure craft. The model 500 BFM hoist is designed to lift and transport the full complement of vessels within the yard five to 10 times faster than other ship lifting systems. A 300-hp diesel engine drives eight hydraulic pumps to

power the hoisting, driving, and steering systems of the machine.

For more information on Marine Travelift, Inc. Circle 63 on Reader Service Card



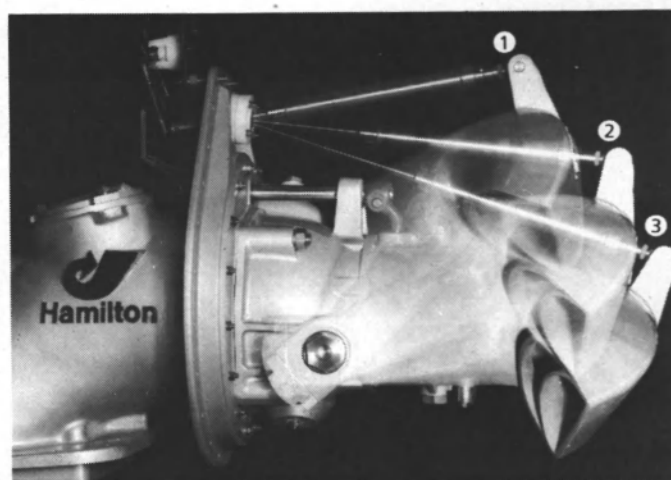
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Circle 269 on Reader Service Card

Permalight On Ship Walls Highlights Escape Routes



Permalight highlights emergency escape routes.

Permalight Aktiengesellschaft (AG) exhibited its line of photoluminescent products at the Cruise + Ferry 95 show.

The company's most popular product for line markings, especially in the passenger and crew areas, is reportedly the Permalight photoluminescent rigid plate material inserted into the aluminum profile. This combination offers the high luminance of the rigid plate material and, at the same time, blends into the interior design of the ship.

Permalight offers assistance for the planning and installation of the escape route markings according to the plans of each vessel. Permalight has been recognized by Lloyd's Register, and Bureau Veritas.

For more information on Permalight Circle 7 on Reader Service Card

Abanaki Offers Pollution, Contamination Solutions

The Abanaki Corporation, Oil Skimmer Division, has recently published a new bulletin that provides technical and installation data for its Tote-It portable oil skimmer. The literature describes the unit's diverse applications; such as in wastewater sumps, coolant systems, parts washers, and heat treating fluids. Reportedly removing up to 12 gallons of oil per hour, Tote-It provides a cost-effective solution to industrial oil contamination problems.

Abanaki also designs custom, turnkey pollution control systems for a variety of applications.

For more information on Abanaki Circle 8 on Reader Service Card

Maritime Reporter/Engineering News

Waller Marine Completes Offshore Power Plant, Receives ABS Certification

Waller Marine, Inc. of Houston, Texas, has recently completed the design for an innovative self-elevating platform power plant. The design utilizes two existing jackup offshore drilling rigs, after having removed the drilling equipment, with each unit supporting the separate components of a 150 MW combined cycle generating facility.

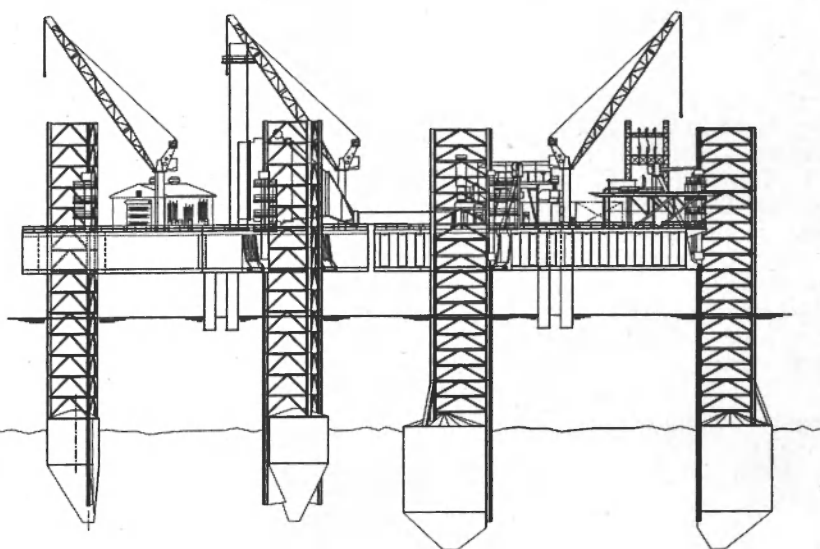
The first platform will be fitted with three GE LM6000 gas turbine packaged generating sets, with a combined simple cycle output of 120 MW. This self-contained unit will provide power to a West African community. It will be joined by the second platform outfitted with exhaust heat recovery boilers, and a 40-MW steam turbine generation plant, for connection to the gas turbines permitting a gross facility output of 160 MW. The platforms should both be completed in mid-1996.

Waller Marine has also received certification from the American Bureau of Shipping (ABS) to conduct thickness measurement surveys on all ABS-classed vessels, including gauging of tankship and bulk carrier structures subject to an enhanced survey. The company can also perform thickness surveys on tank barges subject to structural evaluation after 30 years of service.

Waller Marine, Inc. is a naval architecture and marine consulting firm that serves the domestic and international marine industry with design, project management, surveys and owner representation.

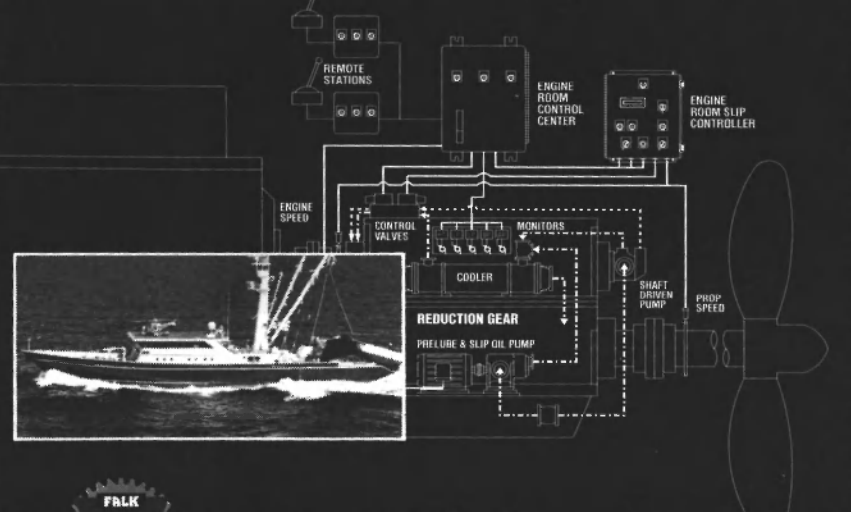
For more information on Waller Marine Inc.
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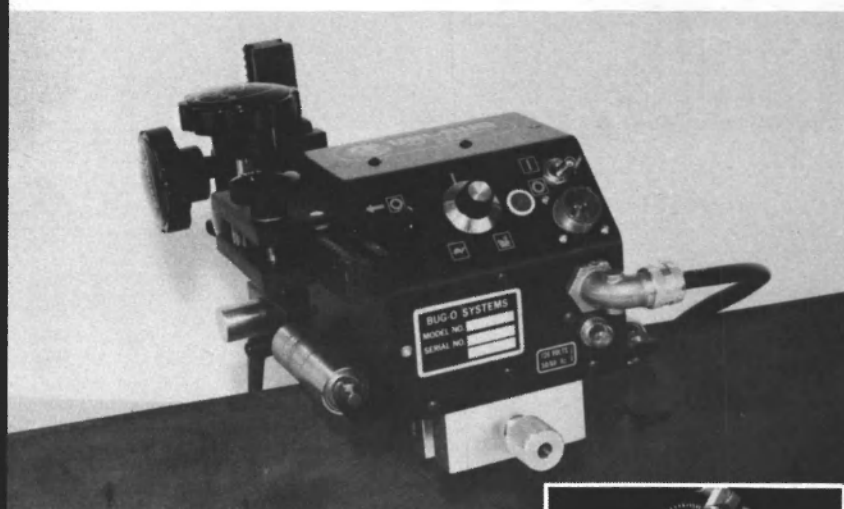
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Meyer Werft Delivers Cruise Vessel Oriana

On April 2, the 69,153 gt cruise liner *Oriana* was delivered by Meyer Werft shipyard of Papenburg, Germany, to P&O Cruises, London. The vessel was scheduled to be christened by **Queen Elizabeth II** in Southampton on April 6th. *Oriana* is the fastest cruise liner built for a quarter of a century, capable of speeds up to 25 knots. Her high

speed and technically advanced hull design will enable her to operate a far-reaching itinerary.

The cruise liner's maiden cruise was scheduled for April 9, where she was to sail from homeport Southampton to the Canary Islands, Morocco, Gibraltar and Portugal. She will carry out 16 European and Caribbean cruises during the remainder of 1995 before sailing an around the world voyage in January 1996.

Oriana was built under the survey of Lloyd's Register of Shipping, and has the class notation: 100 A 1 "Passenger Ship," LMC, CCS. The vessel complies with SOLAS requirements for number of lifeboats and fire protection standards. All areas of the ship are monitored, with 3,700 fire detectors in all. By means of the addressable detectors it is possible to exactly locate



Meyer Werft's *Oriana* on sea trial.



Oriana's engine room.

any fire alarm from the bridge, the engine control room and the fire control room. The public address system and the alarm plant of the vessel comply with the regulations of the U.K. Marine Safety Agency. A total amplifier output of 20,000 watts is available for announcements and alarms.

Oriana's integrated bridge system, NACOS 45-2 by STN Atlas Elektronik, was selected to cope with difficult navigational conditions and to meet with the highest safety standards, since the vessel will be sail-

ing worldwide. The integrated bridge system includes STN Atlas Multipilot, capable of displaying the radar images, electronic sea chart and actual course of the vessel on a single display unit. The radar mast is equipped with three STN Atlas radar antennae. The cruise liner has two controllable pitch propellers, three bowthrusters, one stern-thruster and two rudders, all operated by a joystick. The installed stabilizers are capable of reducing the rolling motion by 90 percent at a speed of 19 knots.

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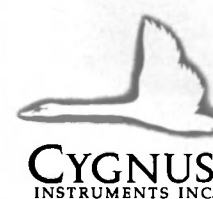


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Maritime Reporter/Engineering News

The ship is propelled by four non-reversible, four-stroke MAN B&W L58/64 engines, each with an output of 2 x 11,925 kW and 2 x 7,950 kW at 428 rpm. Each pair of engines transmits its power via a gearbox to a propeller shaft.

The heavy fuel oil operated diesel engines are resiliently mounted and arranged according to the "father and son" principle, whereby one big and one small engine each work via a double reduction gear on a propeller shaft. Each gearbox is additionally provided with a power take-off for a 4,200 kW shaft generator for electric power supply during the voyage.

The engines are connected to the gearbox via flexible Vulkan-Rato couplings. The two Renk-Tacke gearboxes reduce the engine speed from 428 rpm to 127.6 rpm. The output is transmitted to the four-bladed Lips variable pitch propeller plants via a hollow shaft. For electric power supply, four auxiliary diesel generator sets of MAN B&W type 6L40/54 were installed. Each main engine has two integrated lubricating oil pumps, Boll + Kirch automatic filters, and Westfalia separators. The propulsion plant of the *Oriana* is referred to by experts as a "hybrid system."

The vessel's waste handling system takes environmental regulations into account; for



The bridge of the cruise vessel *Oriana*.

example, the galleys and pantries have integrated food waste pulpers connected to a discharge tank via a piping system, which brings food waste automatically to the incinerator, consistent with the standards of the U.S. Department of Public Health. Dry waste is centrally located, reduced in hydraulically operated shredders, bunkered in silos and injected into incinerators.

Alternatively, glass and tins can be sorted, shredded, compressed and led to a recycling process ashore. According to MARPOL V standards, residues from the incinerators can be discharged overboard or disposed of ashore.

Oriana combines advanced technology with the comfort and style of traditional ocean liners.

Oriana Particulars

Length	853 ft. (260 m)
Width	105.6 ft. (32.2 m)
Draft	26.9 ft. (8.2 m)
DWT	7,270 t
Tonnage	69,153 gt
Propulsive power	2 x 11,925 kW = 2 x 16,200 HP
.....	2 x 7,950 kW = 2 x 10,800 HP
.....	2 x 4,000 kW (PTI) = 2 x 5,434 HP
Auxiliary diesel engines	4 x 4,420 kW = 4 x 6,005 HP
Speed at 90% MCR	24 knots
Passenger capacity	1,975
Flag	British

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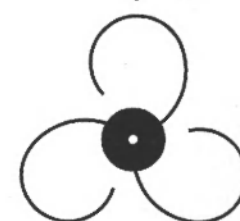
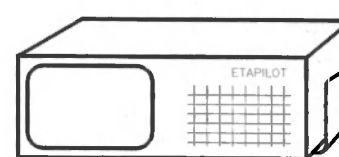
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107



Last In Series Of Christenings At Bollinger

The last two ships of a 13-ship contract with the U.S. Navy, *Thunderbolt* (PC 12) and *Shamal* (PC 13), were christened at the Lockport facilities of Bollinger Machine Shop and Shipyard, Inc. on March 11, 1995. Keynote speaker at the ceremony was Con-

gressman **John M. Spratt, Jr.**, Fifth Congressional District, State of South Carolina. The sponsor for PC 12 was **Jane Stacy Spratt**. **Nora Slatkin**, assistant secretary of the Navy for Research, Development and Acquisition, served as sponsor for PC 13.

Thunderbolt and *Shamal* will join 11 sisterships stationed in San Diego, Calif., or Little Creek, Va. According to Rear Admiral **Raymond C. Smith, Jr.**, Commander of the Naval Sea Systems Command, eight of the fleet of 13 ships will be actively deployed by the end of the year.

For more information on Bollinger
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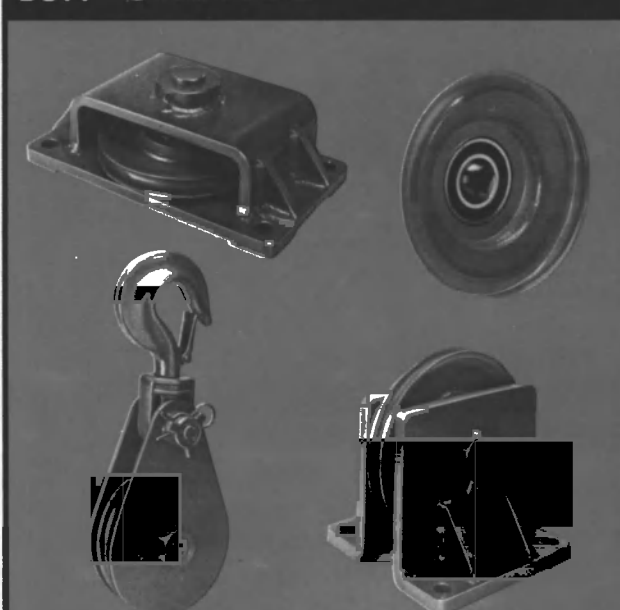


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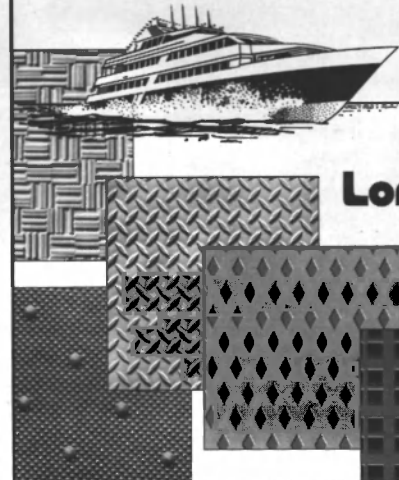
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Circle 263 on Reader Service Card

Gladding-Hearn Delivers Pilot Boat To Virgin Islands

Almost 25 years after buying its first pilot boat from Gladding-Hearn Shipbuilding, the Virgin Island Port Authority has taken delivery of another pilot boat built by the Somerset, Mass., shipyard.

The new vessel, which is replacing a smaller launch, is identical to its 45-ft. (13.7-m), steel-built sister, except for its all-aluminum construction and removal of the bunks in a shorter, forward cabin.

The Port Authority specified that the new boat weigh as much as its older sister. "The pilots wanted a medium-speed, aluminum boat that's as comfortable as their older one, but without the high maintenance of a steel boat," **Peter Duclos**, Gladding-Hearn's vice president of engineering, explained. "The new boat was heavily built to displace 38,000 lbs. without internal ballast."

Designed by Gladding-Hearn, the vessel features a modified V-hull, powered by twin Detroit Diesel 6-71Ns, each rated for 230 bhp at 2,100 rpm, reaching speeds of 16 knots.

Noise levels are under 80 decibels in the pilothouse, said shipyard officials. Metal sheathed, acoustical insulation was placed under the deck and against the engine room bulkheads. Also, a sound-reducing air-intake system, heavy-duty sound-absorbing engine mounts and a hospital-grade muffler further dampen sound on the boat.

For more information on Gladding-Hearn
Circle 81 on Reader Service Card



Maritime Reporter/Engineering News

Mobil Calls Attention To Greener Issues

By Bridget A. Murphy, assistant editor

Mobil Marine Division held a private symposium for shipowners and customers focusing on the company's efforts to create "environmentally acceptable" products, particularly marine lubricants, in an effort to manufacture products that add years onto an engine's lifecycle. In order to bypass terms such as "environmentally friendly," and "green," which, according to Mobil's **Sandy Macfarlane**, offer no standard of measurement, the company has begun labeling selected products "Environmental Awareness Lubricants" (EAL), and has established guidelines to express the connotations of this phraseology. By assembling data based on Mobil's Explorer test engine, the company also looked at the future of emissions regulation and their impact on shipping.

Mobil Marine has defined EAL lubricants as products that will "have a reduced general impact on the ecosystem when used correctly," and possess one or more of the following characteristics: are readily biodegradable; are virtually non-toxic; are compatible with other environmental awareness products; and produce less waste, extending engine drain intervals.

Biodegradability standards are formulated by adding bacteria from a sewage treatment process to a lubricant product, and observing the level of aerobic degradation after a period of 28 days. The product is then classed by Mobil as "inherently biodegradable," or "readily biodegradable." The company reported that this process is based on tests established by the U.S. Environmental Protection Agency (EPA) and the Organization for Economic Cooperation and Development (OECD). The toxicity standards are pronounced based on a case study that Mobil performs using rainbow trout fish, measuring their lifespan and toxicity levels after being isolated in a tank and being consistently exposed to marine lubricants for a period of 96 hours. This procedure is reportedly an adaptation of a similar test developed by the British Ministry of Agriculture, Fisheries and Food (MAFF). If 50 percent of the trout are alive after 96 hours of swimming in a tank of water with mechanically-circulated marine lubricant, then the product is declared "virtually non-toxic," and labeled as such by Mobil. After a video demonstration of the Mobil trout test, Mr. **Macfarlane** reminded those present, "Using these lubricants does not absolve you for any accidents you might have."

Mobil's presentations concentrated on the company's role in combining technology with the need to preserve a balance between the delicate ecosystem and commercial productivity. This was most clearly illustrated by the explanation of the Mobil Explorer — a full-size engine installed in a laboratory setting, facilitating the study of gas emissions levels and characteristics in conjunction with cylinder oil

development, prior to actual sea trials. As explained by **Alban Eyres**, worldwide technical manager, the Explorer, a 4 MW Sulzer 6RTA38, is installed at a facility in Gravenchon, France, and test research programs are performed according to the developing needs of the shipping industry. Currently, New Sulzer Diesel and Lloyd's Register are using the Explorer in a study of selective catalytic reduction (SCR) to large, slow-speed diesels. Mobil's objective

is to create a cylinder oil that will outperform competitive oils by extending piston overhaul to four years, and conform to the IMO's proposed lower sulfur fuel content regulations, as explained in a presentation by Mobil's **Fred Hills**. The company uses Explorer to determine if new cylinder oil technology adversely impacts exhaust system durability. Tests encompass 6,000 hours a year, in three phases. Mobil seems to be doing its part to

participate in the general sweep of environmentalism that is penetrating the shipping industry. In her opening remarks to the conference participants, **Ellen McCoy** said, "We are not the least expensive company, but we cost the less." Measures to protect the marine ecosystem can be compatible with technological advancements; especially if one considers the cost of a massive cleanup operation compared to cost of preventative maintenance.

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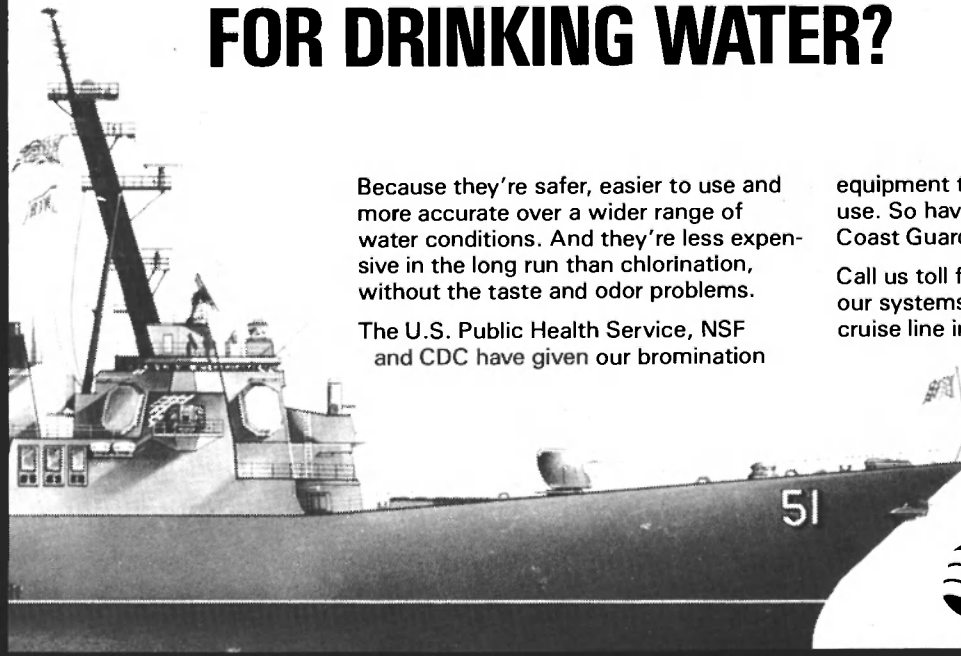
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Stolt Comex Appoints CFO

Stolt Comex Seaway S.A. has appointed **Paul A. Frikstad** chief financial officer (CFO). Mr. Frikstad replaced **Jan Chr. Engelhardt** as CFO early this month. He was formerly general manager of Dual Offshore Ltd. in Bombay, India, with responsibility for all of Dual's Indian operation.

Stolt Comex Seaway is a contractor to the offshore oil and gas indus-

try, specializing in subsea engineering, survey and construction.

Hastings Instruments Names New Representation

Teledyne Brown Engineering, Hastings Instruments, manufacturers of quality vacuum gauges and flow meters, announced that new representation has been appointed in Texas and Canada.

In Texas, the company is represented by Butler & Land, P.O. Box 550339, Dallas, Texas, 75355. In Canada, the company is represented by Finnan Engineered Products Ltd., 1149 Bellamy Rd., North, Unit 22, Scarborough, ON M1H 1C4 Canada.

Hastings Instruments manufactures a complete line of instruments for precise measurements and control of vacuum and gas flows.

For more information
Circle 12 on Reader Service Card

AMS Honors Marine Industry Executives

American Maritime Safety, Inc.'s (AMS) annual membership meeting and award ceremony will be held in New York City at the Intercontinental Hotel, on July 27. The award ceremony is open to all industry executives. The following persons will receive awards: **Anne Kane**, Ocean Shipholdings, Inc.; **Fred Rosser**, Kirby Tankships, Inc.; **Dennis Kelly**, Sun Transport, Inc.; **Patrick Branagan**, American Overseas Marine Corporation; and **Kevin Monagle**, Maersk Line, Ltd.

Industry safety citations will be given to: **David W. Martowski**, U.K. P&I Club; **Peter Wiswell**, Turnabout Services, Ltd.; **George Cavoors**, Seagroup/Ceres Hellenic Shipping Enterprises, Ltd.; and **Margaret Killip**, Scandinavian Marine Claims Office.

Crowley Appoints Oster CFO



Richard Oster

Richard Oster has been appointed senior vice president and chief financial officer of Crowley Maritime Corporation. After serving Inchcape Shipping Services as senior vice president for the past 18 months, Mr. Oster re-

turns to Crowley Maritime, where he has served in numerous capacities since 1981, including as controller of the international division.

Crowley Maritime Corporation is the parent company of Crowley American Transport and Crowley Marine Services, and provides worldwide contract and specialized marine transportation services.

Kurz Elected To ABS Board Of Directors

Gerhard Kurz, president of Mobil Shipping and Transportation Company, has been elected to the American Bureau of Shipping (ABS) board of directors. Mr. Kurz is a recognized safety advocate, and holds an honorary doctorate in public administration from the Massachusetts Maritime Academy. He is also chairman of the Oil Companies International Marine Forum and a member of several other marine associations.

At the ABS annual meeting in April, **Frank Iarossi**, chairman of ABS, paid tribute to **Gerhard Kurz's** predecessor, former ABS board member **A.B. Kurz**, president of Keystone Shipping Company, in recognition of his 23 years of leadership.

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New Passenger Vessel Brokerage Formed



Robert E. McMahon, Jr.

A new corporation, Pinnacle Marine Corporation, will provide a full range of services to buyers and sellers of passenger vessels. Services include brokerage of pre-owned passenger vessels, assistance in attaining a financing package and competitive insurance program, marketing and business consulting, aid with regulatory agencies, and provision of transportation for vessels.

Robert E. McMahon, Jr., founder of the corporation, was previously senior vice president of marketing and sales of Skipperliner Industries, Inc. His 10 years of experience will be used to benefit Pinnacle and its clients, buyers and sellers of pre-owned passenger vessels.

For more information on Pinnacle Marine Corporation
Circle 14 on Reader Service Card

Zodiac Reorganizes Professional Division

Zodiac of North America has announced organizational changes within its Professional Division. **Bill Mow** has been promoted to vice president of sales and marketing for Amfuel, a recent acquisition of the Zodiac Group. **William F. Clark**, formerly of Boston Whaler, will manage professional RIB sales, with responsibility for government and commercial sales. **Alan Brocius** will serve as manager of professional liferafts and commercial military inflatables. **Jackie Taylor** will continue as sales coordinator with responsibility for military inflatables and professional liferafts. **Diane Suite** will join Zodiac as a sales coordinator responsible for professional RIBs.

For more information on Zodiac of North America
Circle 136 on Reader Service Card

Keith Marine Appoints Development Director

Nicholas J. Florentine has joined Keith Marine, Inc. (KMI) as director of development. He serves on the ISO Technical Committee for small craft, and has worked with Newport News, Sun Ship, MonArk Workboats, Chris Craft and Atlantic Yacht Corporation in the past.

Keith Marine, Inc. is involved in

newbuilding, alteration and repair of commercial and private vessels. "We are going after new contracts very aggressively. We have developed new sales tools and we are getting them out to our targeted market. We will be far more visible from now on," stated Mr. Florentine.

For more information
Circle 22 on Reader Service Card

StenTex Appoints Executives

StenTex, a joint venture between Stena Bulk AB and Texaco, has announced the appointment of **Charles W. Park** as president, and **Mats Berglund** as vice president and treasurer of the company.

Mr. Park formerly acted as vice president of commercial operations for Texaco Marine Services Inc. Mr.

Berglund served as CFO of Stena Bulk, a tanker company within the Stena companies.

StenTex, which has established main offices in London and White Plains, N.Y., will oversee Texaco's marine transportation requirements.

For more information on StenTex
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Circle 390 on Reader Service Card

Matson Leasing To Be Acquired By Xtra Corp. For \$350 M

Alexander & Baldwin, Inc. (A&B) have announced the signing of a letter of intent with Xtra Corporation, by which the latter will acquire the containers and other assets of A&B's subsidiary, Matson Leasing Company, Inc., for a sum of

\$350 million. The proposed transaction, expected to be completed in late June, requires the completion of satisfactory due diligence, preparation of a definitive purchase agreement, and regulatory approvals.

Matson Leasing commenced operation in 1989 and has grown to be one of the largest international marine container leasing companies, owning about 165,000 TEUs as of March. **John C. Couch**, A&B's

chairman, remarked, "We have concluded that the sale of Matson Leasing to Xtra would improve the container leasing business' opportunities to grow in response to customers' needs. Xtra's attractive offer, their complementary strategic objectives, as well as their high regard for the existing Matson Leasing management team all were factors we considered in reaching that conclusion."

Royal Chemical Gets DNV Approval On Ballast Tank Coatings

Royal Chemical Corporation of Belle Chasse, La., recently received approval from Det Norske Veritas on its two ballast tank coating systems, Royal Rust Kote and Easy Kote. They are water-based coatings that consist of asphalt, polymers, and other enhancing chemicals. Both have also been approved by ABS and BV. Easy Kote has been additionally classified by Underwriters Laboratories as a potable water coating under the U.S. health authority standard for drinking water.

For more information on Royal Chemical Corp. Circle 138 on Reader Service Card

Trimble Awarded USCG GPS Contract

Trimble Navigation Limited announced that it has signed a \$1.3 million contract with the U.S. Coast Guard (USCG) to provide GPS Integrity Monitoring Stations for use in the USCG's Differential Global Positioning System (DGPS). The DGPS system will provide navigation information for coastal areas, harbors, and waterways of the U.S., Puerto Rico, and most of Alaska and Hawaii, free of charge. Trimble's 4000IM MSK Integrity Monitors will verify that the system is broadcasting accurate navigation messages to recreational boaters, commercial shipping and fishing fleets, workboats and cruise ships.

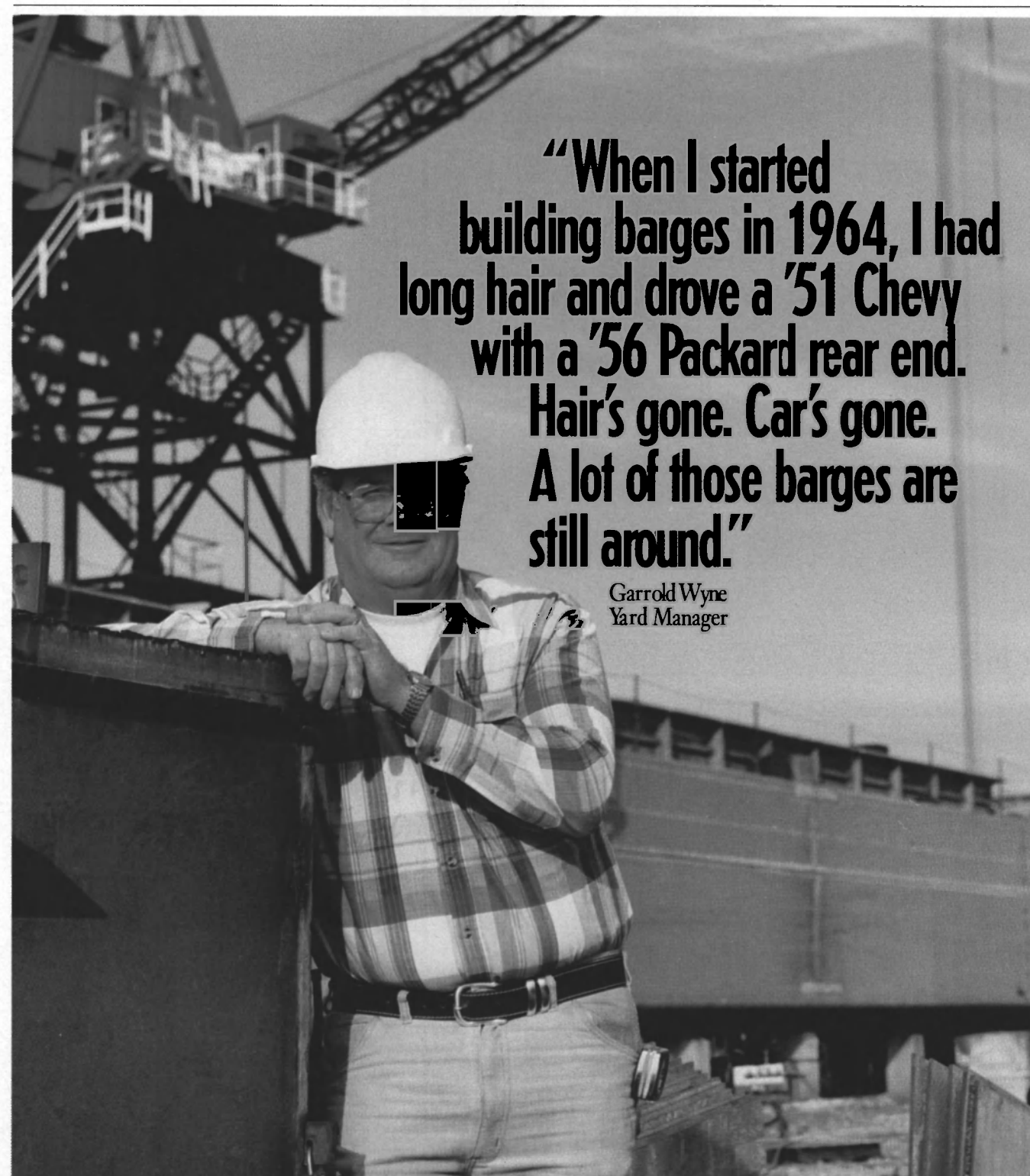
Trimble is involved in the emerging commercial markets for GPS satellite-based navigation, positioning and data communications products.

For more information on Trimble Navigation Circle 142 on Reader Service Card

Welding, Cutting Machine Consultancy Relocates

D-Tech, a sales, service and consulting company in the automated welding and cutting machine industry, recently relocated its facilities to Boulder Creek, Calif., in order to better serve its expanding marine industry customer base in the western U.S. **James Sottolano**, D-Tech's president, indicated that existing corporations can no longer depend solely on factory technicians who have exclusive training on limited lines. Cutting systems can consist of three different brands of optical readers, five styles of oxy-fuel cutting torches, four types of plasma cutting systems, five brands of computer controls and new CAD-CAM software.

D-Tech has begun marketing used cutting machines to the marine industry, such as a small router gantry for aluminum boat building.



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Yard Manager

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Circle 279 on Reader Service Card

Siemens Corporate Manager Receives CTL Certification



Mike Brewer

Siemens Energy & Automation, Inc.'s (SE&A) manager of Corporate Logistics, **Mike Brewer**, has received Certification in Transportation and Logistics (CTL) from the American Society of Transportation and Logistics. As manager of corporate logistics, Mr. Brewer's responsibilities include the coordination of SE&A Traffic Council activities including contracting for motor freight and other transport modes used by Siemens companies.

SE&A manufactures electrical and electronic equipment. Its products include high-power substations, motors from 1 to 10,000 hp, and complete industrial control and automation systems. For more information on Siemens Energy & Automation

Circle 24 on Reader Service Card

ITW Adhesives Receives Quality Award

ITW Adhesives has been recognized by Ford Motor Company as a supplier of quality prod-

ucts, and has issued the company its Q1 Preferred Quality Award.

The company manufactures Plexus Adhesives — a line of methacrylate structural adhesives for bonding engineered plastics as well as composites, alloys, steel, aluminum and wood. The adhesives can be used in boat manufacture due to their reported flexibility and resistance to impact, fuels, chemicals and water.

For more information on ITW Adhesives

Circle 23 on Reader Service Card

Keiger Named Project Engineer At Aquamaster-Rauma



Karl H. Keiger

Propulsion and deck equipment supplier Aquamaster-Rauma, Inc. recently named **Karl H. Keiger** its new project engineer and after-sales manager. His responsibilities will include expanding Aquamaster's service network, as well as maintaining a spare parts inventory for all Aquamaster-Rauma propulsion systems in the U.S. Prior to joining Aquamaster-Rauma, Inc., Mr. Keiger was employed by the Trinity Marine Group and

naval architecture firm Guarino & Cox, Inc.

Aquamaster-Rauma designs and manufactures steerable propulsion systems, including contra-rotating propeller Z-drives, as well as a line of gear and deck machinery.

For more information on Aquamaster-Rauma

Circle 33 on Reader Service Card

Port Authority Of N.Y. And N.J. Elects Board Members

In April, the Commissioners of The Port Authority of N.Y. and N.J. re-elected **Kathleen A. Donovan** as chairwoman of the bi-state agency's 12-member board. She will serve as CEO and principal policy spokesperson.

Other incumbents were **George J. Marlin**, executive director; **Jeffrey S. Green**, general counsel; **Cruz C. Russell**, secretary; **Richard R. Kelly**, vice president and general manager of PATH; and **A. Paul Blanco**, vice president and secretary of the Legal Center Corporation. **Charles A. Gargano** was elected vice chairman, after being appointed to a six-year term by N.Y. State Governor **George Pataki**.

The Port Authority of N.Y. and N.J. is a self-supporting agency functioning without tax revenues, and operating terminal, transportation and other facilities of commerce to promote commerce for the port.

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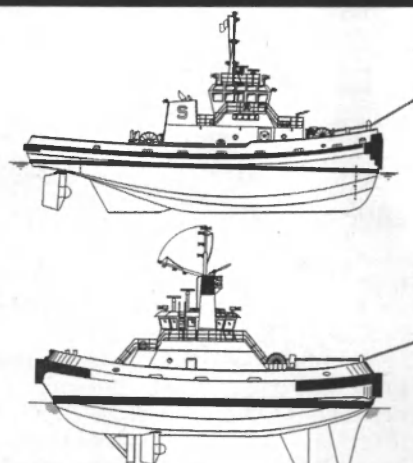
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OR-26

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Circle 212 on Reader Service Card

Novoship Appoints Mgr. Of Chartering Dept.

Novoship (USA) Inc. has appointed **Anatoli N. Nelipovitch** as manager of chartering, according to Novoship President **Vladislav Chmatenko**. Mr. Nelipovitch has been employed with Novoship since 1991, serving as the fleet operator for tankers carrying crude oil products from parent company offices in Russia.

Novoship (USA) is a branch of Novoship Novorossiysk whose fleet of 96 comprises specialized tankers and OBOs of approximately 4.4 million dwt.



Anatoli N. Nelipovitch

Marketing Communications Staff Changes At Raytheon

Raytheon Marine Company has announced that **Mary Lou Adamowski** has rejoined the company as assistant manager, marketing communications.

Ms. Adamowski will focus on directing the company's marketing and advertising programs for the Raytheon, Autohelm and Apeldo brands.

Carolyn Olson, Raytheon's advertising coordinator, will concentrate on providing media insertions, public relations material and products for testing on all three brands. **Kim Weeks**, the department manager, is currently on maternity leave and will return in September.

For more information on Raytheon Marine Company
Circle 26 on Reader Service Card

Inmarsat Appoints Interim Director

The Inmarsat Council, which recently met in London, appointed **Noel Isotta** as interim director general of the 77-member country organization.

Mr. Isotta, who recently retired as the organization's deputy general director, assumed his new position April 1. At the meeting of Inmarsat's major shareholders, a process was also initiated to solicit nominations for the appointment of a permanent director general.

Mr. Isotta joined Inmarsat in 1980 as director of Administration and Finance. He has also worked for the European Space Agency, British Broadcasting Corporation and the U.K. Ministry of Defence.

For more information on Inmarsat
Circle 27 on Reader Service Card

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Circle 255 on Reader Service Card

Names Crabtree Recipient Marine Safety Award



Cozette McGuire, with Chairman Archibald N. Stewart (center) and William J. Crabtree.

At a company event marking the opening of its Virginia headquarters, International Registries Inc. (IRI) presented an award to **William J. Crabtree**, chairman of Universe Tankships Inc., in recognition of his contribution to the improvement of marine safety for ships, crews and the marine environment.

Mr. Crabtree was presented with a crystal

seahorse, symbolic of the beauty and purity of the marine environment. The award was presented by **Cozette McGuire**, widow of **James E. McGuire**, former chief of the Marine Safety Department of IRI. This award marks the beginning of the annual safety award program, which will promote safety at sea among maritime leaders in open registries.

International Registries Inc. administers the Liberian and Marshall Islands maritime and corporate registries.

For more information on International Registries Inc. Circle 29 on Reader Service Card

Elliott Appointed Sonsub Manager

Peter Elliott has been appointed area manager for Sonsub International Management, Inc. He will head up the company's office in the People's Republic of China, where he will be responsible for a growing number of clients, including the Chinese Offshore Oil Nahai East Corporation and Amoco Orient Petroleum Company. Sonsub develops solutions for subsea and hazardous environments throughout the world.

For more information on Sonsub International Management Inc. Circle 64 on Reader Service Card

Exec Appointments At M. Rosenblatt



Bruce S. Rosenblatt



Capt. Perry W. Nelson

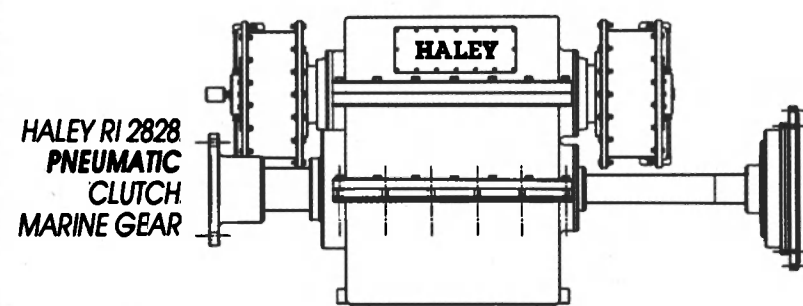
Loester Rosenblatt, chairman and CEO of M. Rosenblatt & Son, Inc., recently announced appointments in the firm management. **Bruce S. Rosenblatt** has been appointed president and COO, and **Capt. Perry W. Nelson, USN (Ret.)** has been appointed vice chairman. **Bruce S. Rosenblatt** has held the positions of executive vice president, vice president, and manager of the Newport News branch. **Capt. Nelson** held the positions of executive vice president and vice president of operations within the company.

M. Rosenblatt & Son Inc. is a naval architecture and marine engineering firm, specializing in commercial and naval ship design.

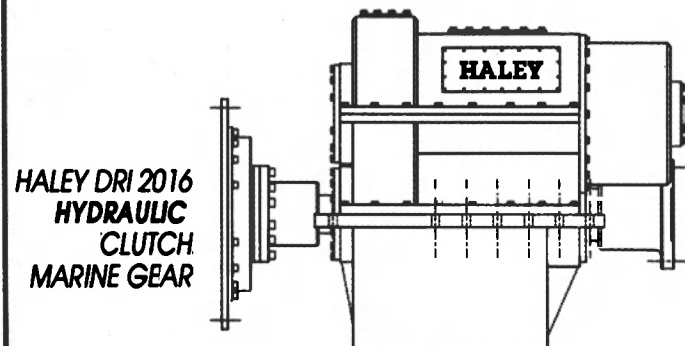
For more information on M. Rosenblatt & Son Inc. Circle 65 on Reader Service Card

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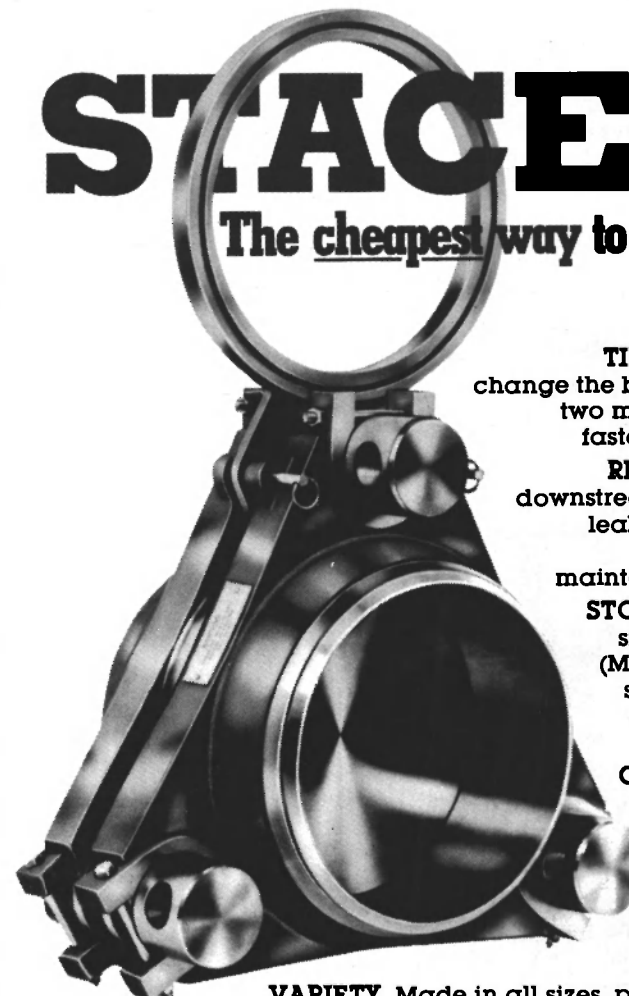
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MMS Names Business Development Managers

Marine Management Systems (MMS), Inc., in Stamford, Conn., announced that **Joseph E. Bonner** and **Robert C. Hubbard** have been appointed business development managers for the company. Mr. **Bonner's** background includes worldwide sales and marketing experience at Drew Chemical Corp. and M&T Chemical Corp., and ownership of a private marketing consultation firm. In the past, Mr. **Hubbard** was employed as senior marketing manager at Dixilyn-Field Drilling Co.

Both Mr. **Bonner** and Mr. **Hubbard** will be responsible for selling MMS's Fleet Manager Series to worldwide shipowners and operators, and for developing new agent distribution channels for the company's products.

Elliott Bay Names Cassidy Senior Electrical Engineer



Michael J. Cassidy

Elliott Bay Design Group (EBDG), a naval architecture and marine engineering firm in Seattle, has named **Michael J. Cassidy** senior electrical engineer. Mr. **Cassidy** was most recently electrical project engineer on a Coast Guard ice-breaker project at Avondale Shipyard in New Orleans. His 25 years in the marine industry include working with Lockheed Shipbuilding, Peterson Builders, and Tacoma Boat, as well as three design/consulting firms.

Robas To Manage Talleyrand Terminal At Jacksonville Port Authority

Victoria B. Robas has joined the Jackson-

ville Port Authority (Jaxport) as manager of its Talleyrand Docks & Terminal facility.

Ms. **Robas** formerly served nine years as Director of Port Administration at the Port of Fernandina, Fla., where she managed daily port functions including construction, permitting, port marketing and community relations. At Jaxport, she will manage all TD&T terminal operations, including budget, equipment control, maintenance and tenant relations.



David Stewart

Avon Marine Announces Promotions

Avon Marine, national distributor of Avon Inflatables, located in Irvine, Calif., has announced three promotions.

David E. Stewart has been named East Coast sales manager, **Russel Copley** will become the national riverboat sales manager, and **Marsha Reynolds** has been appointed operations manager of the company's East Coast facility in Florida.

Avon Marine distributes a line of inflatables including dingies, rovers, roll aways, sportboats, RIBs, liferafts, riverboats and workboats.

For more information on Avon Marine
Circle 122 on Reader Service Card

Sperry Marine Appoints Rubin Marine Australian Sales And Service Rep.

Sperry Marine has appointed Rubin Marine, a division of E.S. Rubin Group Pty. Ltd., located in Artarmon, New South Wales, its sales and service representative for Australia.

The company has sales and service centers in Sydney, Melbourne, Brisbane and Fremantle, well-situated to serve Australia's major ports, including Sydney, Melbourne, Brisbane, Fremantle, Port Kembla, Newcastle, and

Geelong.

Sperry Marine, headquartered Charlottesville, Va., is a developer and manufacturer of advanced navigation systems.

For more information on Sperry Marine
Circle 131 on Reader Service Card

Sabre Acquires Assets, Forms Subsidiary

Sabre Corporation has purchased the assets North End Marine & Fiberglass Engineering, and has formed a new subsidiary, North End Composites Inc.

North End Marine does composite work, including fabrication of fiberglass parts and the designing and manufacturing of molds, for boat builders such as Boston Whaler, Hinckley, Lyman Morse, Grady White, and Sabre. The Sabre Corporation manufactures luxury sail and power yachts. The subsidiary will service the marine industry by introducing updated procedures and equipment to mold making, plug making, and laminating.

For more information on North End Composites Inc.
Circle 1 on Reader Service Card

SPAR Awarded \$18.4 M Contract

Spar Aerospace Limited announced that it has been awarded an \$18.4 million follow-on contract to provide critical components for the Canadian federal government's international satellite-based search and rescue system.

The SARSAT system to be supplied enables satellites equipped with SARSAT transponders to receive distress signals from beacons carried by ships and aircraft. The signals are processed and transmitted from the satellites to ground terminals, thereby enabling rescue personnel to quickly determine the location of incidents and to launch rescue operations.

For more information on Spar Aerospace Limited
Circle 20 on Reader Service Card

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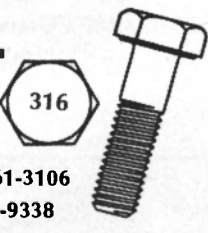
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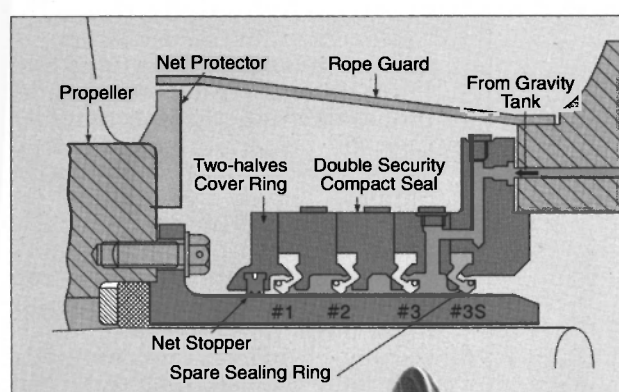
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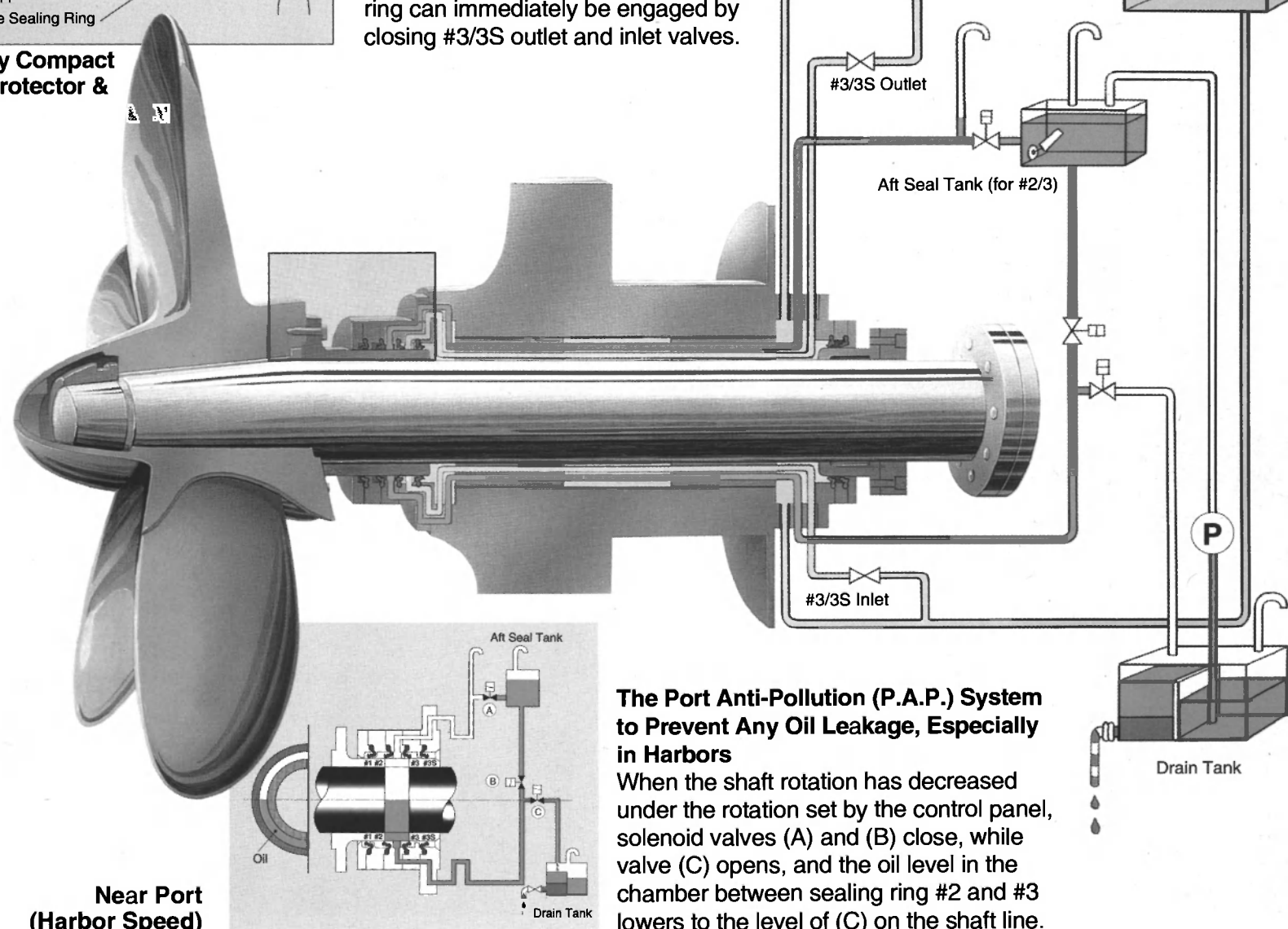
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KOBELCO's Net Protector and Net Stopper

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Circle 285 on Reader Service Card

Ship Simulator Opens At CMA

In mid-April, a ceremony held at California Maritime Academy (CMA) in Vallejo, Calif., marked the opening of the Academy's Full Mission Bridge simulator. The ceremony was dedicated to honoring Captain **Jerry Aspland**, Academy graduate and recently retired presi-

dent of ARCO Marine, as an advocate for the training of mariners.

The new training device, designed and installed by MarineSafety International in conjunction with Buffalo Computer Graphics, was made possible by the U.S. Maritime Administration (MarAd), which funded the project with assets acquired from the scrapping of vintage ships. The simulator is equipped with the latest ONYX virtual reality image genera-

tors system and is capable of simulating more than 30 types of commercial and naval vessels in dozens of actual harbors. It will be used to provide individual cadets with watchstanding experience, allowing them to gain seetime equivalency toward their licenses; and will also provide refresher training to shipping companies and harbor pilots.

As stated by **Charlie Bonham**, director of the CMA Continuing

Maritime Education Department: "The Academy will share in commercial revenues and will also benefit from continuous upgrades." The first commercial shiphandling course was conducted for ARCO Marine during the week prior to the opening.

For more information on MarineSafety International Circle 16 on Reader Service Card

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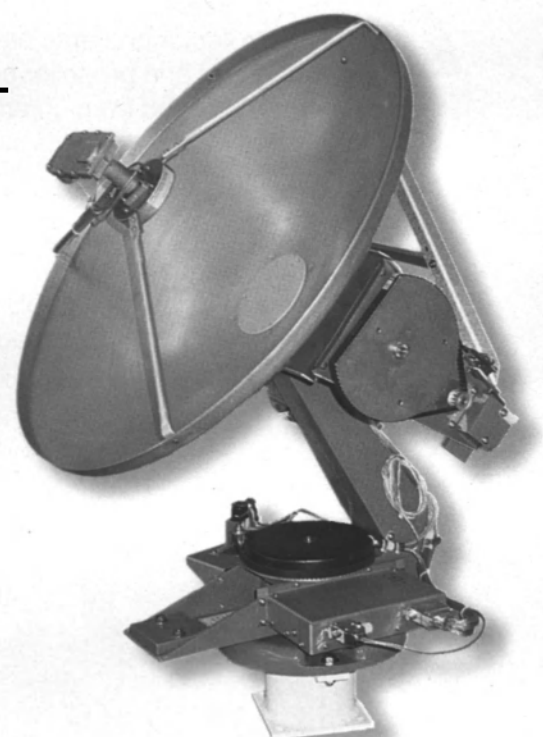
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Pictured above, the Center's computer generated bridge simulator navigating New York Harbor.

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Circle 387 on Reader Service Card

Port Of Portland Narrows Search For Sole Contractor

The Port of Portland's search for a sole contractor to operate, or operate and manage, the Portland Shipyard (PSY) has resulted in detailed proposals from three companies: Cascade General, Inc., Portland, Ore.; NASSCO (National Steel & Shipbuilding Co.), San Diego, Calif.; and Todd Pacific Shipyards Corporation, Seattle, Wash.

The Port's search for a sole contractor is an effort to protect public investment in PSY, maintain the economic benefit to the community, and make the yard financially self-sufficient.

The final three proposals were selected from the nine responses that were returned from companies the U.S., U.K., Japan and Korea, after initial contact was made by the Port of Portland with 250 companies worldwide.

Containership Company, Railroad Forge Partnership

Hanjin Shipping Company, Ltd. and Norfolk-Southern Corporation have forged a partnership to facilitate the handling of Hanjin's international container business in Norfolk-Southern's rail territory east of the Mississippi River. Hanjin is South Korea's leading containership company, and Norfolk-Southern is the fourth largest railroad in the U.S.

In the agreement, Norfolk-Southern will provide and operate a container-handling terminal in Chicago, Ill., and in return, Hanjin will provide Norfolk-Southern the opportunity to service its intermodal line-haul and terminal services east of the Mississippi for a period of seven years.

According to **H.T. Hwang**, executive vice president of Hanjin, "This new agreement assures Hanjin of growth capacity, a heightened profile, and greater ability to provide quality intermodal transportation services strategically located in North America's most populated areas."

In March, Hanjin announced expansion plans for its Long Beach, Calif. facility, and the company also plans to acquire six 5,000-TEU container vessels to further augment its growth. Hanjin offers containerized and bulk services linking Asia, North, Central and South America, Europe, and Australia.

Maritime Reporter/Engineering News

Awarded Naval Sea Systems Command Contract

Technology, Management and Analysis Corporation (TMA) was awarded a 187,000-hour contract to provide engineering and material management services to the Naval Systems Command (NAVSEA) Warfare Ship Program Management Office. Work efforts will include ship trials support and life cycle management for the Navy's MCM and MHC class ships. The services will be performed at JMA's Crystal City facilities. TMA is headquartered in Arlington, Va., and provides engineering, project management and computer services to government and commercial clients.

For more information on TMA
Circle 34 on Reader Service Card

Electrochlorination System Supplied To Vietnamese Offshore Oil Platforms

Electrocatalytic, Inc. (ELCAT) has designed and manufactured what is reportedly the first-ever electrochlorination system supplied to Vietnam for use on an offshore oil platform. The Chloropac electrochlorination system has been selected to treat process cooling water, injection water, and to protect firefighting units on two oil platforms off the country's shoreline.

Chloropac systems safely prevent the fouling of process and cooling water in land-based applications, onboard ships, on offshore drilling operations, and in other applications utilizing seawater. ELCAT is a worldwide manufacturer of water treatment systems and corrosion control equipment.

For more information on
Electrocatalytic, Inc.
Circle 35 on Reader Service Card

AMSC Launches Satellite

American Mobile Satellite Corporation's (AMSC) MSAT satellite was successfully launched from Cape Canaveral Air Force Station on April 7. The satellite will facilitate continent-wide mobile communications service, on land, in the air, and in the maritime sector. In 1995, the company will introduce four product groups to the market: the Skycell Satellite Roaming Service, Skycell Satellite Telephone Service, AMSC Fleet Communications Products and AMSC Private Network Capacity.

For more information on
American Mobile Satellite Corporation
Circle 36 on Reader Service Card

Launch Of Last Los Angeles Class Submarine

On April 2, the launch of the last Los Angeles class submarine took

place at Newport News Shipbuilding in Virginia. Congressman James B. Longley, Jr. of Maine, a member of the National Security Committee of the U.S. House of Representatives, initiated the mechanical transfer system that transported the ship from its land-level construction site to the nearby James River. The USS *Cheyenne* (SSN-773) will float in drydock for a year of final outfitting before it is delivered to the Navy. *Cheyenne* is the last of 29 Los Angeles class submarines that Newport News has built, and one of the 53 nuclear-powered submarines to come from the Virginia yard.

Newport News Shipbuilding has built more than 700 ships, from tugboats and luxury yachts to aircraft carriers and submarines.

For more information on
Newport News Shipbuilding
Circle 37 on Reader Service Card

MAN B&W, Coltec To Produce Dual-Fuel Engines

MAN B&W Aktiengesellschaft GmbH and Fairbanks Morse Engine, a division of Coltec Industries Inc., have agreed to jointly develop low-emission, dual-fuel engines, to be derived from MAN B&W's family of diesels. Dual-fuel engines, which are powered by a combination of natural gas and a small amount of diesel fuel, reportedly provide cleaner exhaust emissions than conventional diesel engines.

Fairbanks Morse will also license MAN B&W's diesel engine technology. The licensing and joint-development agreements will enable Fairbanks Morse to manufacture and market a new series of engines,

ranging from 3,000 hp to 26,000 hp, to specific U.S. government and stationary markets in North America.

MAN B&W is a designer of low and medium speed diesel engines. Coltec Industries is a manufacturing company serving industrial markets.

For more information on MAN B&W
Circle 38 on Reader Service Card

For more information on Coltec
Circle 39 on Reader Service Card

SafOre Takes Delivery Of Bulk Carrier

SafOre, a joint venture between Safmarine, a South African shipping company, and Iscor, a South African steel producer, has recently taken delivery of the bulk carrier *Saldanha*. The vessel is second of two 170,000-dwt bulk carrier newbuildings ordered from the Constantza Shipyard in Romania. *Saldanha* will sail her maiden voyage from Romania to Piraeus to bunker, and then to Richards Bay to load fuel cargo destined for Europe. The vessel will join *Ferosa*, *Sishen*, and the other charter vessels in the SafOre fleet in international iron ore and coal trade, generating foreign exchange for South Africa.

For more information on SafOre
Circle 40 on Reader Service Card

Bremerhaven River Quay Extended

To meet the growing container traffic in Bremerhaven, Germany, which set a new monthly record in

March with 135,000 standard containers handled by the facilities of B.L.G. Bremer Lagerhaus-Gesellschaft, the river quay is being extended to the north.

Up until now, 1,148 ft. (350 m) have been completed and the driving work on the sheet pile walls, measuring a total of 2,300 ft. (701 m) in length, will be completed in August. The overall quay length at the completion of the extension is projected at three kilometers.

Globe Wireless Introduces GlobeEmail

Globe Wireless, Half Moon Bay, Calif., has introduced a new GlobeEmail service that uses modern digital technology to deliver telex and text messages, as well as computer data files, using HF radio. Its worldwide network of coastal radio stations covers the world's oceans.

A feature of the new service is a rate structure based upon the amount of data transferred without regard to the circuit time used. Ship-to-shore messages can be filed through network access nodes, worldwide, without regard to ship position, and any member of a ship's crew can send and receive messages using an e-mail-like interface.

For more information on Globe Wireless
Circle 41 on Reader Service Card

Lifestream Supplies Oceanographic Ship

Lifestream Watersystems Inc. will supply T-AGS 63, an oceanographic research ship, with twin 4,000-gallon/day reverse osmosis watermakers. The vessel, a 329-ft. (100-



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m) design, is being constructed at Trinity Marine Group's Halter Marine yard, to be operated by civilian crews for the Military Sealift Command. The watermaker systems are skid mounted with seawater preheaters, media filters, chemical injection systems, and a reverse osmosis system with a custom control system.

Lifestream supplies desalination systems and custom water purification systems up to 100,000 gpd for military, commercial marine, and industrial applications.

For more information
Circle 44 on Reader Service Card

Lykes Bros. Steamship Centralizes, Consolidates

Lykes Bros. Steamship Co., Inc. announced that it will centralize and consolidate operations in order to increase the effort to position itself as an international force in containerized cargo transportation. According to CEO **Tom Rankin**, "Our objective has been to focus the company on commercial shipping services free of government subsidies. The latest changes are significant mileposts on the road to Lykes' goal of achieving

industry-leading customer service."

The addition of customer service jobs, consolidation of its U.S. office network, and key management appointments were measures highlighting the company's latest efforts. Lykes operates a fleet of modern container ships providing service between the U.S., Europe, the Mediterranean and Africa.

Houston Marine Offers Simulation Training

Houston Marine has installed a Poseidon Simulation Systems network at its International Training Center, in response to recently adopted U.S. Coast Guard (USCG) rules requiring tow vessel operators to complete specialized training in inland radar operations. "Proposed changes in the Standards of Training and Watchkeeping Convention, coupled with the U.S. Coast Guard's intention to move away from written exams, will require innovative solutions to the logistical and economic problems of 'hands-on' training," said **Greg Szczurek**, Houston Marine's chief development officer.

The new simulators operate from desktop personal computers; therefore, no technicians or programmers are needed to run the programs. The latest addition to Houston Marine's lineup of part-task simulators is Turbo Diesel, a new PC-based simulator which makes the user responsible for the operation and maintenance of a marine diesel engine.

Unitor Launches New Shipboard Welding Machine

Unitor AS of Norway has launched its latest shipboard welding machine, UWI-134DP, dubbed "The Mighty Midget." According to the manufacturer, the unit weighs 4 kg, and has a high duty cycle to ensure that welding at maximum current can be done almost continuously. The UWI-134DP has continuous current control from 5A to 130A and automatic thermostat overload protection. It plugs into a standard one-phase 16A, 220V socket onboard, saving the time needed for stretching cables from the main welding power source. Built on the inverter principle, the unit offers portability, a smooth and stable arc, and small outer dimensions.

For more information on Unitor AS
Circle 60 on Reader Service Card

Wesmar Introduces Roll Fin Stabilizer System

Wesmar (Western Marine Electronics), manufacturer of bowthrusters, has introduced an electronic gyro roll fin stabilizer system that the company says is more efficient than conventional gyrocompass designs. The system continually adjusts to sea conditions, anticipating the size and strength of incoming waves and counteracting their force by adjusting stabilizing fins on the boat to make precise decisions. The stabilizers are designed for vessels from 30 ft. to 120 ft. (9.1 m. to 36.5 m), and three fin sizes are offered to match the specifications of any vessel.

For more information on
Western Marine Electronics
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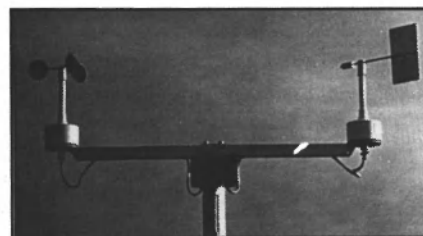
Circle 34 on Reader Service Card

can predict how a damaged vessel will respond in an emergency to proposed remedial options, by using Ship Emergency Response Service (SERS) from Lloyd's Register (LR). Shell International Trading and Shipping will use the SERS to provide technical support to the Shell casualty response team in a casualty situation or emergency exercise. Twenty-two crude oil and product tankers, LNG and LPG carriers, will subscribe to this service.

SERS will aid Shell in fulfilling international requirements such as MARPOL 73/78 and the International Safety Management (ISM) Code.

For more information on SERS
Circle 45 on Reader Service Card

Vaisala Introduces Wind Transmitter



Vaisala WAT 12 wind transmitter.

Vaisala's new WAT wind transmitter provides digital wind sensors with current loop signal output for wind speed and direction. The WAT 12 incorporates a small PC board, mounted in the standard junction box of cross arm assembly. It converts the wind speed and direction data measured by the digital WAA 15A anemometer and digital WAV 15A wind vane into two analog current loop signals. Output signals can be interfaced to: analog panel meters, chart recorders, digital LCD or LED displays, data loggers, and computers with analog inputs.

Due to low consumption, it is possible to supply power to the unit remotely through a standard phone line cable from distances greater than two miles, provided that 5 mA signal current loops and 28 VDC remote power supply are used.

For more information on Vaisala
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Refrigeration System Retrofits: Alternatives To CFCs



Drew Ameroid's brochure featuring CFC alternatives.

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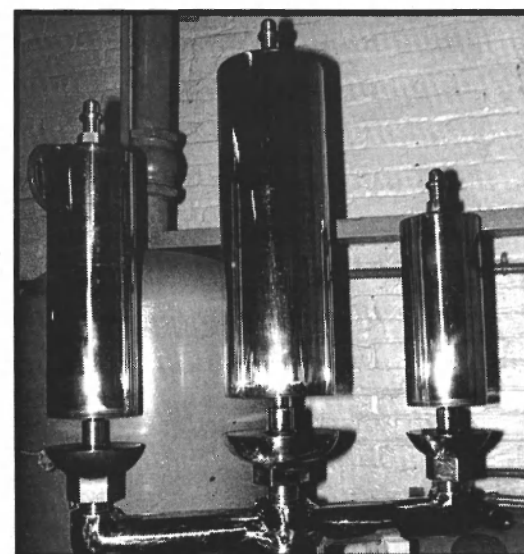
June, 1995

the subject of a brochure now available from Ashland Chemical's Drew Ameroid Marine Division. Recently implemented to assist the marine transition to non-CFC refrigerants, the brochure highlights the expertise and technical resources available to owners responsible for making new decisions about shipboard refrigeration and air conditioning systems.

For more information on Drew Ameroid
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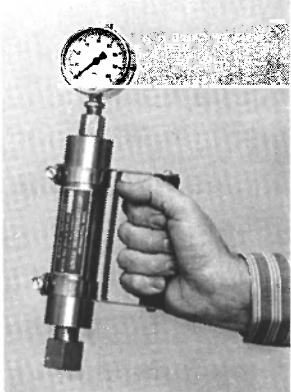
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USCG Changes To Intl. Boundary Range A

The U.S. Coast Guard (USCG) announced a change in the configuration of the International Boundary Range Light A, which will significantly enhance the mariner's ability to identify the location of the international boundary. This range consists of two navigation lights near Pt. Roberts, Wash., north of

the San Juan Islands. The front and rear range lights have been changed from green to white lights. In addition, the front range light will oscillate at intervals as vessels approach the actual boundary line. Sector lights of this type are used in Franklin Sound, Australia, and Auckland, New Zealand, for navigation in areas of low visibility.

For more information: Lt. **Corey Runnels**, USCG Aids to Navigation Office, Seattle, tel. (206) 220-7277.

Oil Prevention Program In Former Soviet Bloc

The U.K.'s Overseas Development Agency (ODA) has embarked upon an Environmental Review program to assist Azerbaijan, a major oil-producing former USSR republic. ODA contracted AURIS, the commercial arm of Scotland's Aberdeen University, to provide the review. AURIS recruited Vector Re-

sponse Corporation (VRC) to lead a four-day oil pollution prevention course, including an equipment demonstration at the Harbor of Montrose, VRC's headquarters.

The review reflects the concern in the former Soviet republic for environmental preparedness, and involves field and classroom participation, and equipment mobilization. The Azerbaijan group includes ecologists from the State Committee of Ecology, the head of Ecological Physiology at the Academy of Sciences, and members of state oil companies Socar and Hazar.

VRC, a subsidiary of Seacor Holdings, Inc., and a sister company of U.S.-based NRC, is a public company with interests in a diversified fleet of vessels dedicated to supporting offshore oil and gas exploration and environmental services on a global basis.

Sonsub Mobilizes ROVs To Assist With Platform Installations

Sonsub Inc. was recently awarded a contract with J. Ray McDermott S.A. to assist with the installation of two platforms in the Gulf of Mexico. For the first four-pile installation for Marathon Oil, Sonsub mobilized a 75-hp Discovery Advanced Remotely Operated Work System (ARROWS) and a 20-hp Viper Remotely Operated Vehicle (ROV) onboard the *Derrick Barge 50*. Working in 360 ft. (110 m) of water, the vehicles performed a two-well stab over an existing eight-slot template and drove four external skirt piles. During the ROV-assisted grouting operations, the Discovery was also used to plug leaks in two of the grout lines. The ROV systems concurrently installed a jacket for the Louisiana Land & Exploration Co.

Sonsub develops solutions for sub-sea and hazardous environments, and maintains offices worldwide.

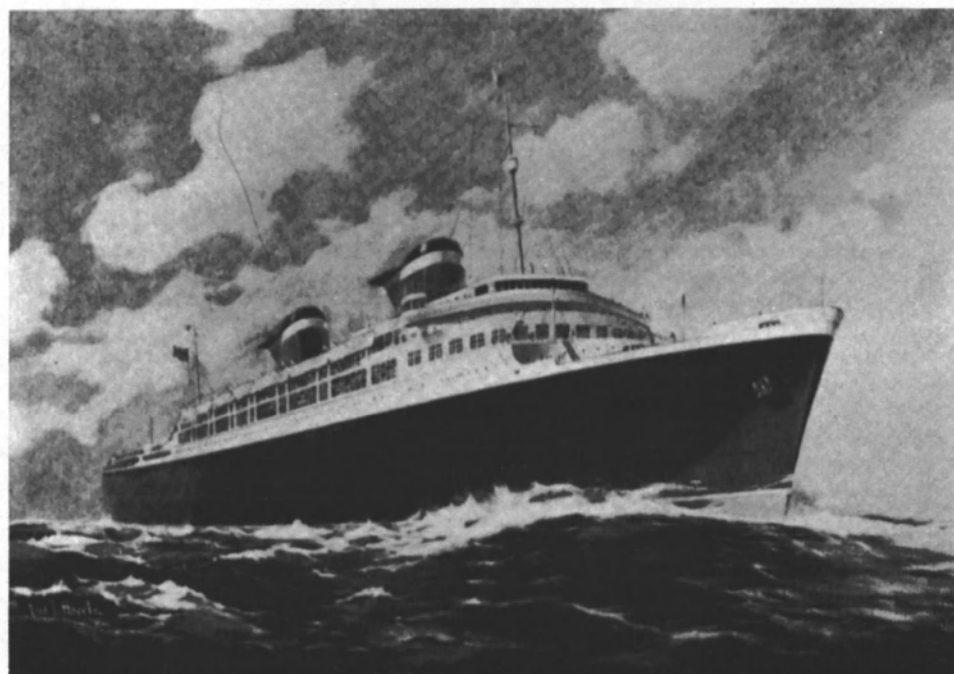
Hollywood Casinos To File For Missouri Gaming License

Hollywood Casino Corporation announced that it has acquired an option on 50 acres of land adjacent to the I-255 and the Jefferson Barracks Bridge in South St. Louis County. The company has plans to file for a gaming license with the Missouri Gaming Commission. Hollywood Casinos has created an investment plan totaling \$120 million for the development of a waterfront entertainment facility and a 50,000-sq.-ft. gaming vessel. **Jack E. Pratt**, chairman and CEO of the company, said, "Obtaining a license in St. Louis underscores the company's strategic objective of expanding into existing jurisdictions where a gaming facility would attract local and regional visitors and complement tourist attractions."

Hollywood Casino Corp. owns and operates casino entertainment facilities in Aurora, Ill., Tunica, Miss., and Atlantic City, N.J.

Maritime Reporter/Engineering News

50 YEARS AGO IT WAS A BIG DEAL IT STILL IS !



The new United States Liner *America* which will make her maiden voyage on August 10 to begin a series of twelve-day cruises.

AMERICA ENTERS CRUISE SERVICE AUGUST 10

That the new steamship *America*, largest and costliest commercial vessel built in this country, would be employed in the West Indies cruise trade instead of being tied up until the end of the war, was confirmed by **John M. Franklin**, president of the United States Lines. He said the company's 27,000-gross-ton, \$17,500,000 flagship would leave here at noon on Aug. 10 on her maiden voyage to begin a series of twelve-day cruises to the neutral ports of St. Thomas, Virgin Islands; San Juan, Puerto Rico; Port au Prince, Haiti, and Havana, Cuba.

The luxury liner was built to run with the *Manhattan* and the *Washington* to England, Ireland, France and Germany, but not

long before she was completed by the Newport News Shipbuilding and Dry Dock Company the war had broken out and American shipping was barred from the trade by the neutrality act.

Up until a few weeks ago it was expected that the United States Lines would be forced to tie up the *America*, the *Manhattan* and the *Washington*, but a way was found to keep them running under the provisions of the Bailey-Bland bill, which provides financial assistance to all American companies whose vessels have been forced out of their regular services by the neutrality act.

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EDITORIAL

Organization Touts Ferry Construction As Way Of Bolstering U.S. Yards

by James M. Acuña, president, A³mF

In January of 1995, The American Association for the Advancement of Marine Ferries (A³mF) formed to dedicate itself to the promotion of slow to high speed ferries in American waters. The ultimate goal of the association is to have ferries constructed in the U.S., in order that A³mF's members, who depend on shipbuilding, can benefit from their construction. The association members include shipyards, manufacturers, suppliers, ferry owners and operators, designers, engineers, architects, marine financing companies and insurance agents, civil construction contractors, and environmental corporations.

A³mF has members as large as Intermarine Shipyard of Savannah, Ga., and AlliedSignal Inc., to small ferry operators such as Sayville Ferry Services of Sayville, N.Y.

The goals of A³mF are:

- To promote both high- and low-speed ferry use and ferry construction to local, state, and federal officials who determine the path for communities in the U.S.
- To promote the advantages of modern ferry use and ferry construction to the public in locations where A³mF sees a need.
- To provide a newsletter which helps in educating communities on the advantages of ferries, and acts as forum in which association members can address concerns.
- To educate water privileged cities on the advantages of ferries by promoting the "ferry alternative," using marketing tools such as placing advertisements in large metropolitan newspapers promoting the idea, "what if there were ferries in your community?"
- To provide an outlet for companies to introduce new products associated with ferries.
- To provide statistics on different aspects of ferries and ferry operation.

Marine ferries have had limited success in the U.S. over the last 30 years. Currently, there are only 26 publicly-owned ferry systems operating in the U.S. This includes approximately 98 vessels. Privately the number is far fewer with only a handful of ferry operators. The large metropolitan areas that have seen the success of ferry routes include Puget Sound, San Francisco, New York, and Boston. These cities represent only a minute fraction of the total possible ferry routes in the U.S. New ferry routes could be established in a multitude of loca-



James Acuña

tions such as Bath, Maine; Washington, D.C.; Savannah, Ga.; San Diego, Calif.; and the Hawaiian Islands, to name a few.

Ferries serve an invaluable service to many communities. They provide the needed link between the mainland and remote islands for full- and part-time inhabitants, business commuters, and tourists. Ferry transport is sometimes the only viable means of moving people, freight and automobiles. For example, the *Swan Quarter Ferry* on Ocracoke Island, N.C., connects this tiny island located on the southern end of the outer banks to the mainland in a trip of two and a half hours, in an otherwise five hour auto trip. This trip could be even faster with the implement of high speed ferries as used in the Pacific Rim and Europe.

Ferries provide commuters with an alternative to overcrowded highway, rail, and subway systems. Fast ferries could potentially cut most car commutes more than in half. This would enable a businessperson who worked in Washington, D.C., for example, to live in one of the southern counties of Maryland or Virginia up to two or three hours from D.C., and still have a feasible commute.

In addition, ferries have also been developed to serve as a means of transporting high value time-sensitive (HVTS) cargo. FastShip Atlantic Inc. has plans to construct a 863-ft. (263 m) 1360-TEU HVTS-carrying fast ferry in January 1996.

Although a scantily-recognized fact in the U.S., there are more ferries in use in south central Asia than in all 50 states. The Hong Kong & Yaumati Ferry Company operates more high-speed ferries than a combination of all private U.S. ferry operators. Hong Kong has 14 civil operators with more than 230 vessels. Japan operates 220 vessels with 68 operators. Coun-

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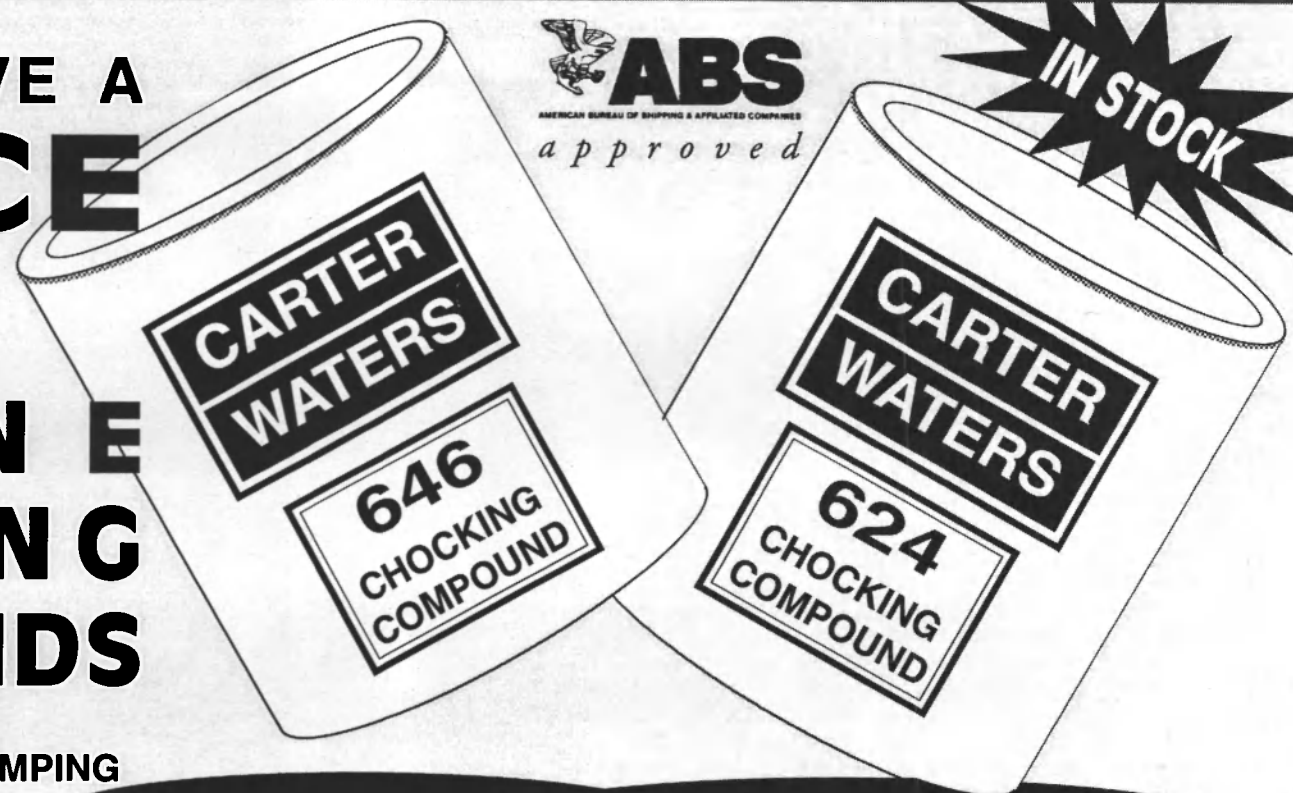
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ies in Europe highlight the gap further. Greece, Norway, and Italy have hundreds of fast ferries in operation. Ceres Hydrofoil Services of Greece operates 28 ferries. Norway operates more than 100 vessels with 3 operators. Italy has 150 vessels and 23 operators. Combined, the countries of Europe operate 1,500 vessels with 900 operators. Why is the U.S. lagging behind?

The answer is that public education regarding ferries, including the education of local, state, and federal officials, is non-existent. American people have grown to love their autos. They perceive ferries as small, 0-knot vessels that transport them to seaside vacation spots. The public does not realize that ferries in other countries are being built to accommodate large numbers of passengers and cars, such as the 234.6-t. (74-m) wave piercing catamaran built by Incat Australia for Buquebus, Argentina. This ferry is capable of transporting 383 passengers and 80 autos at speeds in excess of 35 knots. These types of ferries also offer passengers modern conveniences such as noise reduction control, climate control, fax machines, cellular phones, satellite television and gourmet dining. With little or no impression of modern ferries, elected bodies have almost altogether ignored ferry service in the U.S., and coincidentally, no substantial federal legislation subsidizing or promoting ferry routes has been presented.

Until the formation of A³mF, there was no existing organization, national or international, concerned solely with the construction and development of new ferries and ferry routes in the U.S. A³mF is concerned not only with technical and educational issues; it is a national business trade alliance dedicated to American interest in the promotion of ferries in the U.S.

Any ferries constructed in the U.S. will ultimately fall under the Jones Act, which is in effect for vessels traveling between two American ports. Although we do encourage the construction of Jones Act ferries in the U.S., our main purpose is to promote all types of ferry use and construction. Increasingly more U.S. shipbuilding companies are using "foreign bottom" hulls via foreign licenses built in the U.S. American manufacturers, shipyards, suppliers, and designers can benefit from foreign license agreements.

In 1992, Textron Marine Systems of New Orleans built two surface effect ships (SESs) for the New York City Fire Department. These were built under a license agreement with Hovermarine of Great Britain. These craft helped keep more than 1,000 U.S. workers employed in an otherwise depressed high-performance market. Both Westport Shipyard and Nichols Brothers of Washington have built foreign hulls for U.S. waters. Ferry service has been established via foreign hulls in N.J., with Hover Commuter Services. A³mF's bottom line is the establishment of ferry routes in the U.S. and the continuation of American shipbuilding in any way,

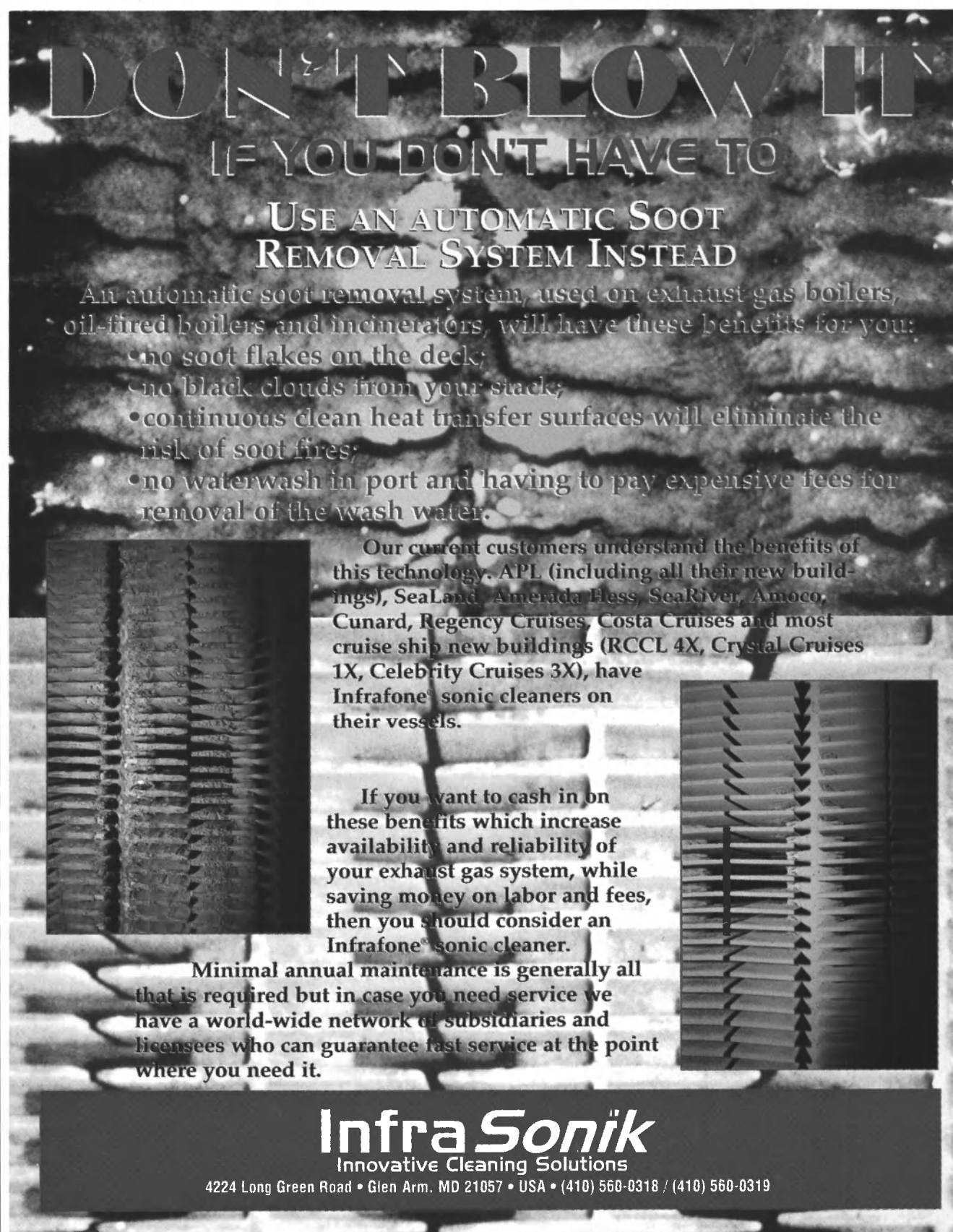
shape, or form.

With the advent of modern high-speed vessels, ferries can play an integral part in the intermodal means of transportation in the U.S. Today, ferries provide high-speed commuter service, an efficient means of water transportation for water communities, and a fast and reliable means of transporting HVTs cargo. A³mF recognizes the need for ferry service and the need for shipyards to continue to produce com-

mercial ships. Ferries represent the continuation of commercial shipbuilding in the U.S., and hopefully, the continuation of the existence of private U.S. shipyards and their sub-contractors.

For more information on the American Association for the Advancement of Marine Ferries, contact: A³mF, tel/fax (301) 249-5532, 15606 Powell Lane, Mitchellville, Md. 20716.

James Acuna, president of A³mF, has consulted for shipyards in Maryland, Louisiana and Alabama. He has been employed with design agents in Virginia and Argentina, and has worked with Naval Sea Systems Command and the University of Michigan in other marine fields. Mr. Acuna is a member of the Society of Naval Architects and Marine Engineers (SNAME) SD-5 panel on high-performance craft.



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Recent Ship Sales

This report, compiled by Shipping Intelligence, Inc., a New York maritime consulting firm, tracks sale prices of secondhand bulk carriers and tankers.

Date Reported	Vessel Name	Vessel Type	DWT	Year Built	Sale Price (Millions \$)
04/18/95	Junior	Bulker	13,264	82	4.6
04/24/95	Adamas Pride	Bulker	16,208	83	5.3
05/09/95	Cosel	Bulker	16,641	76	2.9
05/15/95	Trans Friendship	Bulker	17,607	80	5.1
05/15/95	Samsun Mariner	Bulker	19,395	79	4.4
05/01/95	Agate	Bulker	20,475	73	2.5
04/24/95	Zim Barcelona	Bulker	22,311	73	1.8
05/01/95	Silver Hawk III	Bulker	23,400	85	10.5
05/09/95	Janice Aung	Bulker	24,498	80	7.5
05/15/95	Santista	Bulker	24,858	73	2.4
05/09/95	Ontario	Bulker	26,119	75	2.8
05/01/95	Citrus Island	Bulker	26,587	85	12.5
05/01/95	Nomadic Lady	Bulker	27,923	75	4.45
04/26/95	La Boheme	Bulker	31,107	84	11.5
04/24/95	Consensus Progress	Bulker	31,432	83	12
05/15/95	Bergnes	Bulker	34,503	77	7.4
05/15/95	Livanita	Bulker	34,537	77	7.4
04/24/95	Nan Feng	Bulker	34,830	78	7.85
05/01/95	Nomadic Mermaid	Bulker	35,157	76	9.05
05/09/95	Alexander	Bulker	35,224	75	4.5
04/26/95	Global Fame	Bulker	35,485	85	14
05/09/95	Corcovado	Bulker	37,092	87	14
05/16/95	Eftychis M.	Bulker	37,950	76	6.85
04/24/95	Nikkei Challenge	Bulker	40,190	85	15.9
05/15/95	Lucky Union	Bulker	43,000	85	15.75
04/18/95	Seawish	Bulker	60,740	76	7.5
04/18/95	Panthea	Bulker	61,839	83	14.5
05/15/95	Iolcos Leader	Bulker	61,893	78	7.35
05/01/95	Rolan	Bulker	61,981	80	5.1
04/26/95	Papago	Bulker	64,730	82	14.5
05/01/95	Guinomar Trader	Bulker	64,976	82	13.8
04/18/95	Pegasus V	Bulker	66,713	83	14.8
05/01/95	General Guisan	Bulker	68,789	90	23
04/16/95	La Colina	Bulker	127,958	82	15.5
05/01/95	Singapore Ace	Bulker	133,082	82	16.75
05/09/95	Federal Skeena	Bulker	164,891	83	21
04/18/95	Federal Hunter	Bulker	164,891	84	20
05/01/95	Kiho	Bulker	169,621	76	5.8
05/15/95	Torm Venture	Tanker	29,999	82	9.8
05/01/95	Vsp 1	Tanker	32,234	75	4.5
04/24/95	Fai Xx	Tanker	36,150	67	2
05/15/95	Da Qing 66	Tanker	55,500	79	6.2
05/09/95	Sanita	Tanker	59,996	81	9.6
05/09/95	Vergina	Tanker	63,798	81	14
05/01/95	Ryvingen	Tanker	66,160	90	24.8
05/09/95	Yuhō Maru I	Tanker	81,278	80	13
05/01/95	Primo	Tanker	81,350	87	27.8
04/18/95	Altus	Tanker	82,000	80	14.2
04/18/95	Full Moon River	Tanker	86,400	87	26
04/24/95	Euro Pride	Tanker	67,050	75	4.2
05/01/95	Nikka Maru	Tanker	95,007	85	21
04/18/95	N Cedar	Tanker	106,677	80	11.85
05/15/95	Olympic Splendour	Tanker	112,744	76	6
04/18/95	Michael	Tanker	138,000	76	8.1

For further information, contact: Shipping Intelligence, Inc., 25 West 43rd Street, New York, NY 10036, tel: (212) 997-0966.

Increase In Repairs At ASRY



Front Rider, owned by Frontline AB of Stockholm, in ASRY's 500,000-dwt graving dock.

The Arab Ship Repair Yard (ASRY) repaired 34 vessels in the first quarter of this year, following an 18 percent increase in ship repair revenue to \$66.5 million in 1994. The company reported that steel renewals rose 50 percent, and the demand for internal tank coating remained strong. ASRY now has a two floating dock capacity, in addition to its graving dock. ASRY expects to benefit from increased repair work demand now that improved revenues are being received by bulk carrier owners because of higher freight rates.

Q-Sea Completes Ultrasonic Crawler Field Trials

Q-Sea Marine Inspection Services, a division of Ultrasonics & Magnetism Corp., has completed field testing of its portable, computer-based UTC-2250 ultrasonic crawler.

The testing was conducted under the supervision of Lloyd's Register of Shipping and the American Bureau of Shipping (ABS), New Orleans, La.

The UTC-2250 consists of a water coupled ultrasonic transducer mounted to a crawler. The crawler has magnetic wheels and is moved with a telescoping pole to allow access to previously difficult, or inaccessible upper areas of the vessel.

The system has been adapted for weld inspection, and includes a portable scanning crawler for new plates which meets all ASTM A-578 specifications for new plate inspections.

Ongoing developments to the system include a motorized version with a waterproof video camera allowing real-time visual inspection above or below the water line.

For more information on Q-Sea Circle 124 on Reader Service Card

C&M Technology Wins Corps Of Engineers Contract

C&M Technology Inc., of Old Saybrook, Conn., has won a U.S. Army Corps of Engineers contract

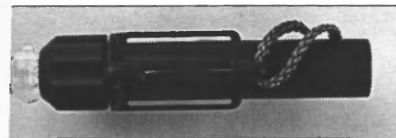
for the fabrication of dam gate remote control systems. The contract, valued at \$699,470, complements other on-going work at C&M Technology involving oceanographic, acoustic, and control systems.

Brown Awarded For Research On RoRo Survivability

The Henri Kummerman Foundation award for innovative research and development within the marine industry has been won by Scottish naval architect **Jack Brown** for his work on RoRo vessel survivability and his designs for inflatable hull blisters and 'intelligent' washports. Mr. **Brown** received \$25,000 to assist in the funding of future work on RoRo safety. "I believe upgrading the survivability of existing RoRo ferries can best be achieved by a combination of floodwaters dumping outside and by the provision of outboard buoyancy at the shipsides. 'Intelligent' washports sense any floodwaters on the vehicle deck and open automatically to dump the water outside; however, they close immediately if they become submerged," said Mr. **Brown**.

The late **Henri Kummerman** was founder and president of the International MacGregor Organisation, a cargo access designer and supplier, and established the foundation in 1978 to assist students in furthering maritime vocations.

CR C-Light For Signaling Emergency



R Electronics' C-Light for use with PFDs.

The new C-Light from ACR Electronics, Inc. is a new design in U.S. Coast Guard (USCG) approved floating units for use in conjunction with personal flotation devices (PFDs). Named the C-Light because the product is designed to meet the demands of the sea, ACR's newest addition to its family of lights reportedly being accepted by the most users who have used bulky, heavy PFD lights in the past.

The C-Light attaches to a life vest jacket with a self-contained stainless steel pin or integral lash loops and a Velcro strap, with a wrist trap for keeping the light secure. The unit weighs 1.3 oz., is visible for up to two miles, and has an operating life of eight hours in a minimum temperature of -20 degrees F.

ACR Electronics manufactures a complete line of safety and survival products.

For more information on ACR
Circle 4 on Reader Service Card

Walker Airsep Designed to Improve Engine Performance



Airsep breathing system.

Walker Engineering has introduced its Walker Airsep Breathing Systems for retrofitting on commercial diesel engines. Each Walker Airsep commercial kit is equipped with an industrial-grade Airsep unit, installation fittings, a heavy-duty air filter reinforced with wire mesh, and a filter cleaning kit to clean the air filtration elements.

The Airsep systems are reportedly standard equipment on major makes of marine diesels. The Airsep reduces oil consumption, reduces blow-by, improves engine performance, minimizes wear on air induction system and air filters, and helps stop oil leaks.

For more information on Walker
Circle 5 on Reader Service Card

Microfine Replacement Filter Cartridges

The Vokes Division of North American Filter Corporation is now

June, 1995

offering microfine replacement filter cartridges for use in Vokes and other similar filter units.

Microfine filter applications include hydraulic systems, compressors, transmissions, turbines and diesel engines.

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tion of hydraulic, lubricating and light fuel oils.

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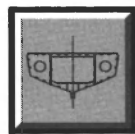
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from Albacore Research Ltd.

ShipCAM4: Fairing, lofting, surface/surface intersection, filleting between two surfaces and shell expansion for developable and compound curvature surfaces for ship construction and repair.

NC-Pyros is a NC-code generator for burning featuring automatic path connection, leads and interference check.



General HydroStatics (GHS)

from Creative Systems, Inc.

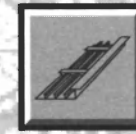
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from Proteus Engineering

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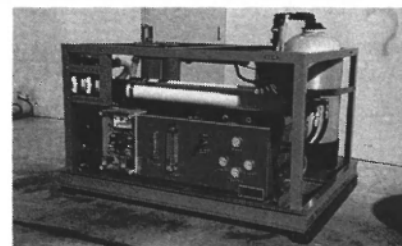
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FINANCIAL UPDATE

Ship Finance: A View From, And Of, The Ship Registry

By Guy E. C. Maitland

To an onlooker, the classic definition of vessel finance is: finding the money to pay for the ship. One shipowner, attending a conference on the subject "Money and Ships,"

declared the subject should have been "Money *or* Ships." Experienced shipping hands know how money can disappear more quickly than the ship can appear. Most executives, however, are at a loss as to why certain decisions are made, and how these decisions affect con-

struction, purchase, and operating costs. This article will describe the linkage between the ship's registry and the money that pays for the ship.

The structure of ship finance is built around the idea that the vessel itself is security for the money

that paid for it. The ship mortgage, the basic security agreement, is a vital contract from everyone's point of view. If the contract and the law upon which it is based does not meet banker standards, credit will not be forthcoming. The laws of the country in which a ship is registered vary a great deal. This is important to a lender who does not wish his or her money to disappear too rapidly.

The purpose of a ship mortgage is to give the lending institution, usually a bank or a syndicate of banks, a right to share in the sale proceeds of the ship if there is a foreclosure. Without the mortgage, the lender has no hen. The mortgage also gives the bank other rights, including (possibly) the right of interlocutory sale without the need for lengthy and expensive court proceedings.

It is at the mortgage-drafting stage that trouble can start for the banker and shipowner, partly because bankers to the shipping industry have been historically prone to flashes of excessive enthusiasm during the periodic upswings that characterize the trade. In the 1970s, banks throughout Europe and U.S. saw shipping as a low-risk growth area, and in some cases they lent to the wrong people, and the wrong ships, at the wrong time.

Stories have been told about ship mortgages being illegally recorded in several places in order to avoid bank liens. Some registries will accept a ship for registration without proper deletion from its previous registry. Banks tend to trust their lawyers, or someone else's, to make sure that the good ship in question has been duly stricken, and the mortgage(s) duly released or discharged, before the ship is registered someplace else.

What the bank doesn't know is that the ship, on which it has a mortgage, has been registered in more than one country. Lenders are often more afraid than the owner is of losing the ship; the ship being the only asset the lender may be able to get his or her hands on.

Shipping is largely asset-based in terms of its financing, and depending on the market, a tanker that is in good condition may be worth almost as much as one that has just been built. Banks therefore look for registries that will look after their ships. The smart lender looks for a registry that investigates the cause of each major casualty, including unexplained fires and explosions.

The flag state is responsible for



Guy E. C. Maitland

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(Continued on page 131)

Maritime Reporter/Engineering News

Structural Epoxy Anchors Sterntube Assemblies

For fast, convenient, cast-in-place installations of bearings and sterntube assemblies, many shipyards now rely on Chockfast Orange, a pourable structural epoxy system. The cast-in-place system maintains permanent alignment, ensures superior control of the bearing fit in each sterntube assembly, and extends the working life of oil and water-lubricated bearings.

The pourable structural epoxy also eliminates the need for boring of sternframes (usually done on building ways or in drydocks), criti-

cal machining of the outside diameters of sterntube bearings, and the potential dangers of forcing machined components into bored hulls with pressures up to 100 tons.

Other advantages include substantial reductions in machining and assembly time, error-proof interfacing of seals to bearings; and the elimination of hand scraping required to profile a sterntube bearing to the line of a tailshaft.

Hundreds of vessels with both oil and water-lubricated bearings are operating throughout the world with

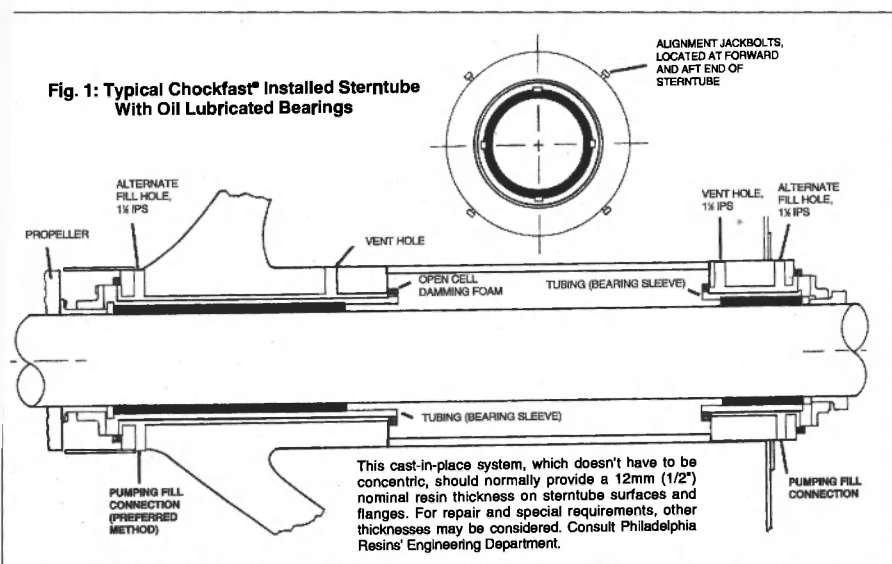


Fig. 1

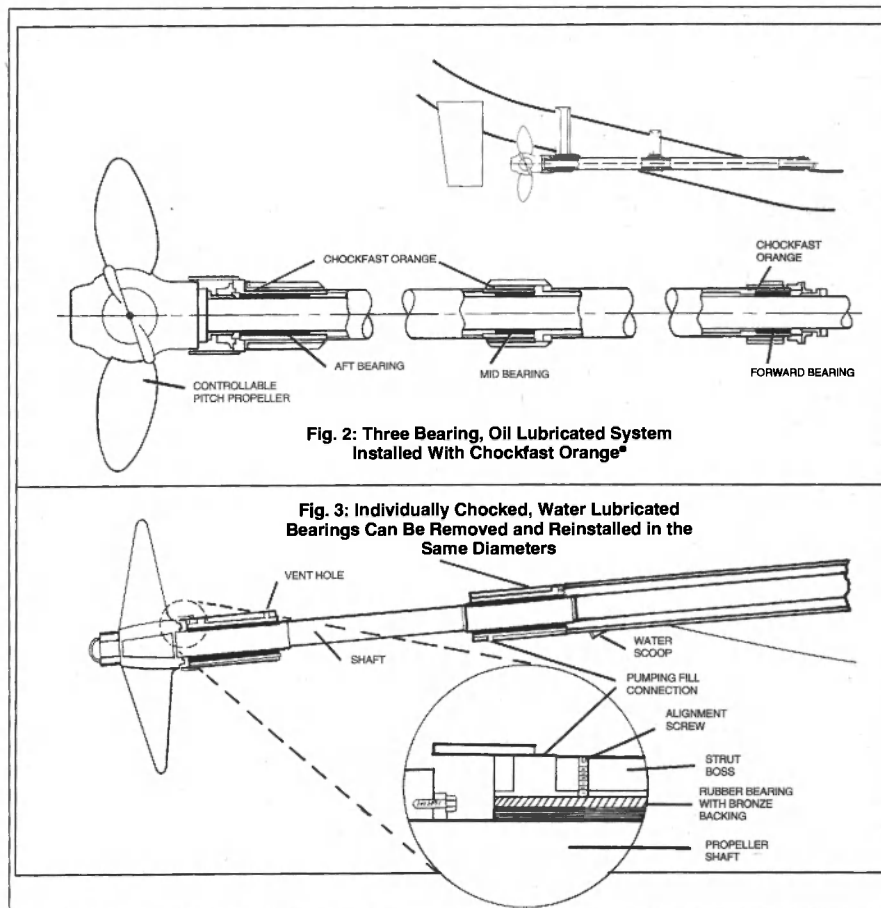


Fig. 2 & 3

sterntubes and strut bearings permanently aligned on high-strength structural epoxy.

The earliest vessels with these cast-in-place bearing/sterntube assemblies have been in service since 1969. Coincidentally, more than 30,000 main propulsion systems, with cumulative in-service hours exceeding 450 million, are also per-

manently aligned on Chockfast Orange.

With this structural epoxy system, complete sterntube assemblies can be aligned and installed in ship hulls quickly and conveniently. Instead of line boring the sternframe while a vessel is in drydock, all machining is transferred to a machine shop where greater accuracy is as-

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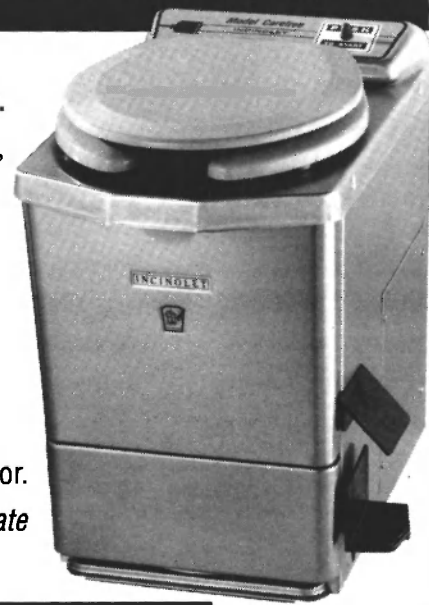
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sured. Variations in temperature and other ambient dockside conditions (i.e. rain, snow, or even heavy fog) can cause hull deflections that adversely affect dockside machining.

Stern-tube assemblies with shaft diameters up to 830 mm (33 in.) have been installed without any dockside machining, hand scraping or press fitting. Here's a quick summary of the make-ready and

cast-in-place procedures.

Oil-Lubricated Bearings

For stern-tubes with oil-lubricated bearings, both forward and aft bearings are fitted individually into flanged tubes ("bearing sleeves," fig. 1), which are approximately 25 mm (1 in.) smaller in diameter than the bore of the stern-tube. Each flanged tube is set up in a lathe and machined to accommodate either the

forward or aft bearing. The bearings are then assembled into the precisely machined sleeves. To assure a right-angle mounting face for forward and aft seals, the flanges at one end of each bearing sleeve assembly are faced off in the lathe.

Off-center machining in a controlled machine-shop environment helps to ensure superior alignment of the bearings to the shaft-line and to each other.

Machining accuracy is relative easy to maintain, compared to dockside machining where complex boring-bar setups are affected by temperature and other conditions that cannot be controlled.

Each bearing sleeve assembly is then placed in the vessel. By using adjusting screws or jackbolts, the bearing sleeve assembly is aligned to the shaft-line. A 12-mm (.5-in) radial clearance is normally sufficient to allow final positioning of both bearing sleeve assemblies within a stern-frame. The clearance need not be uniform because the pourable structural epoxy will fill all voids.

To complete the installation, the radial clearance and a nominal 12 mm (.5-in.) annular space between the welded-on flange and the aft face of each bearing sleeve assembly are filled completely with Chockfast Orange, as indicated by figure 1. After the structural epoxy cures within 18 hours at 22 degrees C (72 degrees F), both bearing sleeve assemblies will be permanently and precisely anchored in the stern-frame.

Three-bearing, oil-lubricated stern-tube and strut assemblies are installed by chocking in a similar manner. Convenient alignment of the individual bearings is accomplished as indicated by figure 2.

Water-Lubricated Bearings

In addition to ease of installation, a significant advantage of epoxy chocking for water-lubricated bearings is the fact that a bearing can be removed from the cured epoxy and readily reinserted into the same fixed-pocket diameter.

This is accomplished by applying the structural polymer directly to the OD of the bearing shell to individually chock each open-shaft water-lubricated bearing. This technique has been employed for both strut and stern-tube bearings, (figure 3).

Another advantage of the individually chocked water-lubricated bearings is a significant decrease in vibration and operating noise.

Other Applications


In addition to oil and water-lubricated bearings, the two-component structural epoxy (resin and hardener) is widely used to simplify the installation of rudder and pintle bearings, line-shaft bearings, and roller bearings in large diameter, fabricated assemblies for mooring buoys and seagoing cutter/dredgers.

Chockfast Orange is formulated to withstand the most severe marine, industrial and power-generation environments, to dampen vibrations and shock loads, and to maintain unsurpassed critical alignment.

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This article was submitted by Eric Dow, international marine marketing manager, and Bruce Shipley, P.E., chief engineer, ITW Philadelphia Resins.

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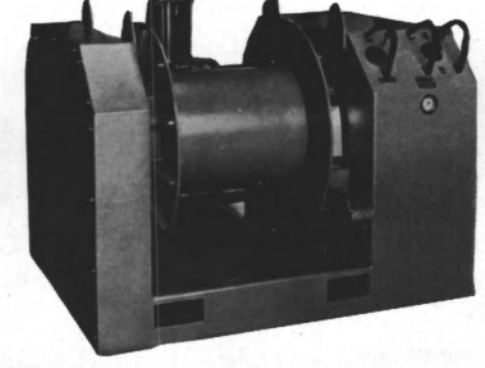
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Circle 386 on Reader Service Card

Ship Finance: A View From, And Of, The Ship Registry

(continued from page 128)

ducting formal inquiries, and whether or not the results of an investigation are published will influence the banker's choice of where to flag the ship. There is a definite quality factor in choosing a flag, and astute bankers are aware of certain flag states named suspect by port state control authorities. Most flag states do not fully implement Article 94 of the United Nations Law of the Sea Convention, which lists what a registry is supposed to be all about — ideally, part police officer, part jurisdiction, and part document office. A registry should offer a sound legal basis for mortgages, as well as make sure the ship stays out of trouble.

Vessel finance, whatever its form, cannot exist without international rules that regulate shipping, and are imposed on a national level. The application of adequate international standards, whether they deal with the safety of ships, the technical requirements for recordation of mortgages, working or living conditions aboard, or protection of marine and coastal environments, are all part of a system of control through national registration.

Without this system, the security available to a lending institution — that is, the legal system on which it depends — will collapse. The laws applicable to the country in which the owner registers its ship are essential to an orderly regime for financing the construction and purchase of merchant ships. As a part of this system, each ship registry must have in place a structure of corporate ownership laws that is recognized in the courts of major commercial and trading countries, as well as for the sale of securities and publicly-held shipping companies, or public offerings, that will be acceptable to the world's leading stock markets.

A second characteristic of the "registry of choice" is the ability to legislate changes in its operational framework to keep pace with new conditions in financial centers. For example, the recordation and registration process was admittedly simpler when shipping was financed, in earlier decades, almost exclusively on the London and New York markets. Today, the world of ship finance is scattered from Rotterdam to Seoul, and global communications have decentralized the process of registration, often called a "closing."

It is those flag states with the highest safety standards and trained personnel that will eliminate outmoded restrictions on debt and security. The progressive registries of today are notable for their ability to adapt to the type of procedures applicable to broader categories of property and equipment finance, whether they originate with European, Asian or U.S. banks. Restrictions on the type of non-maritime security that may be mortgaged along with a ship are being

eliminated from registration laws in order to satisfy the requirements of sophisticated corporate capital structures.

The Liberian and Marshall Islands registries, working with groups of lawyers and bankers in Europe, Asia and the U.S., have enacted a broad range of legal and technical changes in order to adjust their vessel ownership and mortgage laws to the needs of the modern world. As

lenders become more wary of being drawn into extended and expensive litigation involving pollution and environmental claims, or loss of life and personal injury, based on even the right of the lender to protect its security interest in the ship, the technical choice and evaluation of a registry becomes a matter of importance.

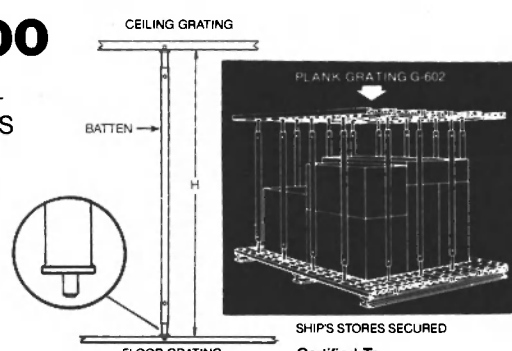
Guy E. C. Maitland is head of

the ship and mortgage registry departments of the Republics of Liberia and the Marshall Islands, both of which are administered by International Registries, Inc., of Reston, Va. and New York City.

He was a delegate to the United Nations Conference on Conditions for Registrations of Ships, and assisted in drafting the provisions of the 1992 Convention on Ship Mortgages and Maritime Liens.

B-600

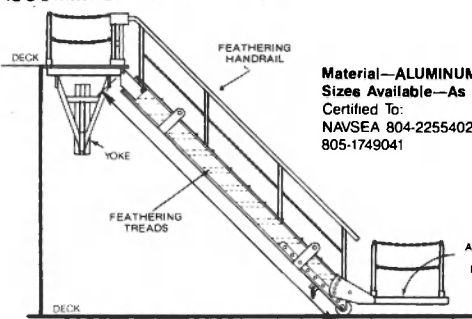
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Sizes Available—Length As Specified BUSHIPS 805-1749068 (Fixed) B-600F

AC-500F

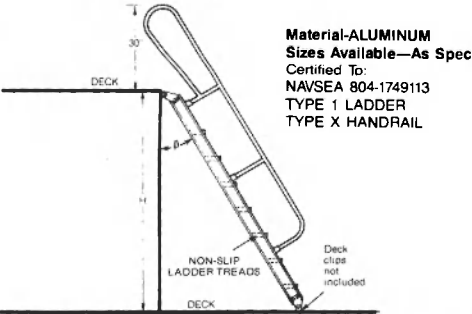
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Size Available—As Specified
Certified To: NAVSEA 804-2255402 or 805-1749041

IL-101

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Size Available—As Specified
Certified To: NAVSEA 804-1749113
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TYPE X HANDRAIL

209

Certified To: RR-T-650C Class C
Type 3

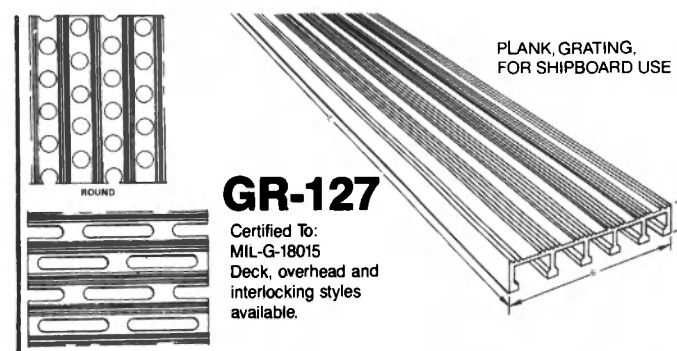


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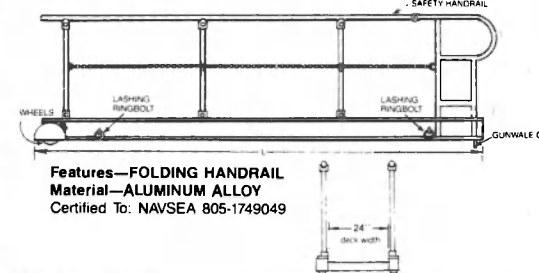
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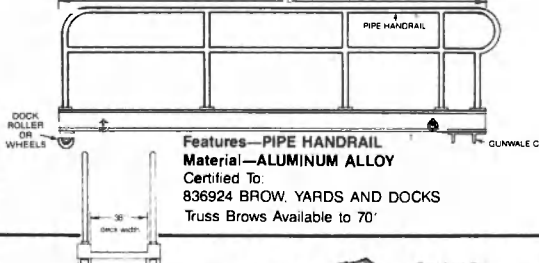
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Features—FOLDING HANDRAIL
Material—ALUMINUM ALLOY
Certified To: NAVSEA 805-1749049

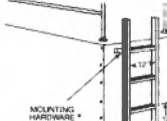
BB-300

BROW—FOR SHIP TO SHIP ACCESS

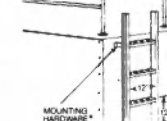


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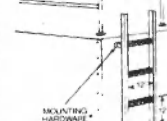
AL-100



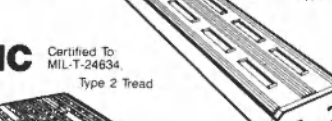
S-100



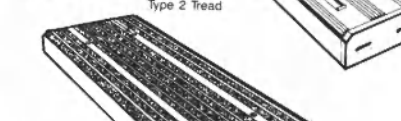
GRP-100



SNH



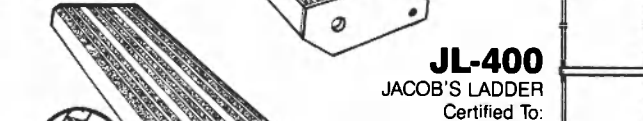
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Circle 327 on Reader Service Card

Four Major Shippers To Form Alliance

A new global cooperative alliance has been agreed to between P&O, Hapag Lloyd, NYK and Neptune Orient Line.

The intention of the new alliance is to establish comprehensive services in Europe/Asia, Asia/East Coast North America, and trans-Pacific trade lanes starting in spring 1996, and jointly employing more than 60 container vessels. The partners intend to explore how this can be extended to the Atlantic trades as soon as possible.

The new alliance will cover the exchange of vessel capacity and the provision of ships. It will also aim to extend to fully integrated landside services and inland capability.

Commenting on the announcement, P&O Containers Chairman **Tim Harris** said, "The new alliance will enable P&O to offer a comprehensive first-class service on all the major trades, including for the first time trans-Pacific, as well as allowing us to make further efficiency improvements." Presumably such advantages will be enjoyed by all four shippers.

It is intended that the new partnership will commence with a four-loop operation in Europe/Far East services, thus providing an outstanding product to all customers with a wide range of ports and high frequency.

The trans-Pacific trade lane is initially planned to operate four weekly services, adding a fifth service for mainland China as soon as is practical. A separate service be-

tween Asia and East Coast North America via the Suez Canal will complete this coverage.

Next to the benefits and improved service pattern for customers, it is felt that the new global alliance will largely contribute to trade stability and capacity alignment.

At press time, the new alliance was still subject to meeting all appropriate regulatory requirements. The companies announced that detailed service features would be announced in due course.

Anker Marine Paints Relocates

Leif Anker Ammentorp, president of Anker Marine Paints, announced that the company would be moving to Westport, Conn. The

move comes after the company has spent 33 years located in the borough of Manhattan in New York City. The company's new address will be: Anker Marine Paints, 1 Charles Street, Westport, CT, 06888.

Mathers MicroCommander Offers Smooth Operation

An electronic marine control developed, manufactured and popularized in the Pacific Northwest is reportedly becoming more popular with commercial and pleasure craft owners in over 20 countries.

The control, made in Burlington Wash., by Mathers Control Inc., is the MicroCommander. Some 14,000 units have been installed throughout the U.S. and overseas, and export trade now accounts for about 35 percent of annual production.

The development of MicroCommander was based on technology used in large commercial vessels and the finger-tip control. Its ease of operation during the trickier aspects of boating such as mooring, docking and anchoring is reportedly one of the keys to its increasing popularity among owners.

A special feature is the crash reversal time delay, designed to stop the boat smoothly and quickly without damaging the transmission if the operator has to suddenly slam the gears from forward to reverse at high speeds.

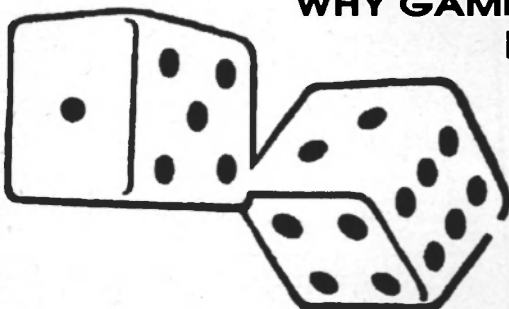
For more information on Mathers Circle 143 on Reader Service Card

MES Completes And Delivers Bulk Carrier

The 46,635-dwt bulk carrier *Padang Hawk* (Hull No. 1415), built at the Tamano Works of Mitsui Engineering & Shipbuilding Co., Ltd. (MES), was recently completed and delivered in late April to its owner, Singa Star Pte. Ltd. of Singapore.

The *Padang Hawk* is a medium-sized bulk carrier, of the type commonly known as handysize. The vessel has five cargo holds and four cranes. The 46,635-dwt (metric) vessel's Mitsui-MAN B&W 6S50MC diesel engine drives the vessel to a speed of 14.4 knots. The vessel is classed by Nippon Kaiji Kyokai (NKK) of Japan and will fly the flag of Singapore.

For more information on MES Circle 144 on Reader Service Card



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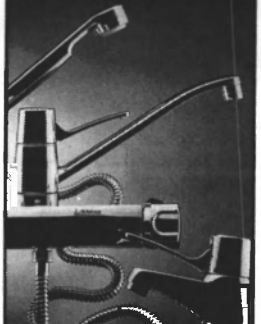
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Padang Hawk	
Principal Particulars	
Length o.a.	622.7 ft. (189.8 m)
Breadth (molded)	101.7 (31 m)
Depth (molded)	54.1 ft. (16.5 m)
Full-load draft (molded)	38.1 ft. (11.6 m)
GT	27,011
DWT	46,635 (metric)
Main engine	Mitsui MAN B&W
	6550MC diesel
MCR	11,100 PS at 122 RPM
Maximum complement	25
Speed	14.4 kn
Classification	NK
Builder	Mitsui Engineering & Shipbuilding Co., Ltd. Singapore



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Siemens, MaK Cooperate With CCG For Faster Icebreaker Response

The *Louis S. St-Laurent* is the Canadian Coast Guard's largest icebreaker. Commissioned in 1969, she has a displacement of 14,500 tons and is driven by three fixed-pitch propellers each with a power capacity of 7 MW.

The *Louis's* main function is to serve as an icebreaker and ship escort in both the Gulf of St. Lawrence and the Canadian Arctic. In this capacity, one of its most important operational features is propulsion system response time.

Response time is generally measured as the time for the propeller drive shafts to go from full ahead to full astern. This shaft reversal is often referred to as "crash reversal" for free running maneuvers and this time would be in the order of 40 - 80 seconds for most commercial vessels. The need to both operate at full power in close proximity to other vessels, and the accuracy needed for repetitive bow-ramming of ice

ridges, generally require a response time in the order of 10 - 20 seconds.

The original turbo/electric DC drives of the *Louis* were replaced by a five-engine diesel/AC-DC system — with MaK engines and Siemens Electric controls — during mid-life modernization in 1992. The new configuration allowed for dynamic braking and reversal of the motors by continuous field control.

Following this refit, the ship reportedly demonstrated a remarkable improvement in open water and icebreaking performance on the first Arctic mission. Analysis of ice trials data collected on this trip, however, revealed the propulsion system had untapped capability, as well as several interface problems between the new drives and the original telegraph consoles. The combined effect of these conditions resulted in shaft reversal times longer than the potential performance of the system.

The Cooperative Solution

The CCG turned to Siemens Electric Ltd. of Montreal to help develop an innovative and cost-effective solution to the problem. With this project, the CCG also put in place its new mandate of Downward Delegation by giving the vessel's management team the entire responsibility for the upgrade. Every aspect of the project including specification development, contractor liaison, materials procurement, systems training, onboard installation and commissioning, and financial management would be coordinated by the *Louis's* own engineering crew.

Initial discussions were held between the *Louis*, Siemens, and MaK

in May of 1994. A review of the propulsion response time curves showed that the existing control strategy did not initiate motor field reversal until the armature current had climbed to approximately 60 percent. This approach was originally adopted to improve fuel efficiency, but resulted in a nine-second lag from telegraph command until reverse power was exercised upon the propeller shafts. Other "delays" were identified in the time to unload the diesel engines and response time of the bridge telegraph consoles.

A plan was developed to make changes to three areas: telegraphs, engine control methodology, and motor control algorithms. The

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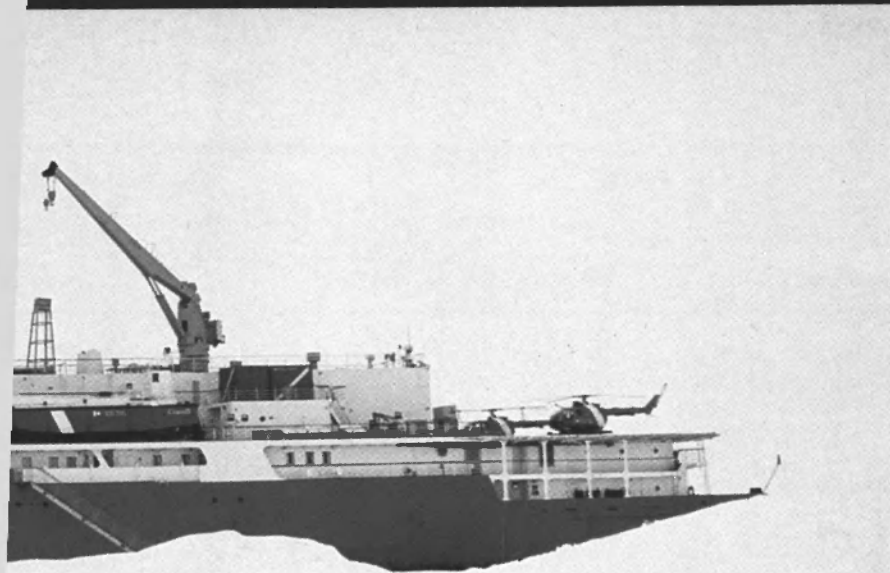
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Maritime Reporter/Engineering News



project was approved in November of 1994 and the *Louis* engineering crew immediately began work to minimize the downtime required to make the actual propulsion control change-over. This was considered a key element of the project, as the ship was about to enter its busiest operational season in the Gulf of St-Lawrence.

The Siemens work focused on changes to the electrical control software by which the armature current would be increased immediately following the telegraph command, and the motor field reversal would be achieved earlier. In this fashion, reverse power could be brought to bear on the propeller shafts much earlier while still re-

specting the engine unloading limits.

Through careful planning the bulk of the upgrade was able to be completed while the vessel remained in operational status. Approximately one week of downtime was required to install the new bridge telegraph consoles and "tune" the new control software. The resultant propulsion response time curve showed that shaft reversal time had been reduced to approximately 21 seconds, a reduction of close to 65 percent. Further improvements are anticipated by additional electrical control software changes which would sense the operating condition of the engines, and use the power absorbing capability of each engine and the

heat-dissipative tolerance of the motors to more quickly stop the propeller shafts. Response times of 10 seconds or less may be achievable using this approach.

Overall Project Benefits

The improvement in shaft reversal response time for icebreakers has other benefits in addition to the operational performance criteria listed earlier. Perhaps the most significant is the anticipated reduction in engine maintenance as a direct result of reduced engine cycling. Eliminating the need to have more engines running for maneuvering flexibility in ice conditions, and altering the engine unloading/loading strategy used to control motor amperage current, will positively affect engine maintenance.

The project was completed well within budget and in a four-month total time frame. By taking the vessel management team approach to this project, the CCG realized significant savings not only in external contractor costs but in the ship's operational availability — since downtime was limited to seven days, compared to an estimated three weeks for a typical shore-based managed project of this magnitude.

Further benefits will be derived, since the vessel now has an engineering crew an extensive under-

standing of the new system, and a stronger relationship has been developed with the external suppliers. It is expected that this will translate into reduced maintenance costs in the future.

Overall, the CCG was pleased with one of its first efforts to make its operation more cost-effective and commercially driven by delegating more "hands-on" responsibility to its front line vessels. The management and crew of the *Louis S. St-Laurent* have demonstrated that the benefits of vessel management and project ownership far exceed those derived from more traditional shore-based management projects.

The preceding was based on an article written by Mark Cusack, senior chief engineer aboard the CGCS Louis S. St-Laurent.

For more information on the companies participating in this project, circle the appropriate number on the Reader Service Card bound in this issue:

Mak 134
Siemens 135

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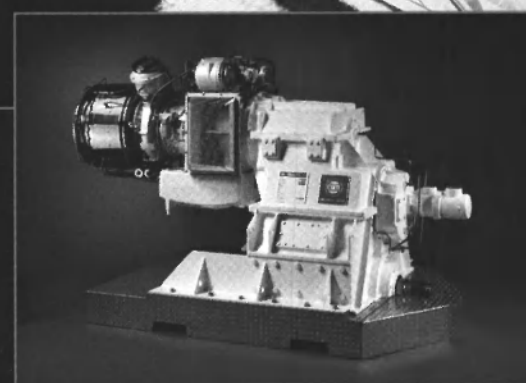
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Name	Year Built	Class Code	Class Desc	Dwt	Grt	Owner
1st Lt. Alex Bonnyman	1980	59	Ro/Ro	21050	36815	Wilmington Trust
1st Lt. Baldomero Lopez	1985	59	Ro/Ro	22454	44543	Wilmington Trust
1st Lt. Jack Lummus	1986	59	Ro/Ro	22454	44543	Wilmington Trust
2nd Lt. John P. Bobo	1985	59	Ro/Ro	22454	44543	Wilmington Trust
Adabelle Lykes	1969	09	Containership	15400	16757	Lykes Bros. Ss Co. Inc.
Advantage	1977	01	Freighter	22180	11523	Red River Carriers
Ambassador	1980	59	Ro/Ro	8995	13412	Crowley Caribbean Trans. Inc.
American Condor	1981	59	Ro/Ro	20786	15636	American Transport Line
American Cormorant	1975	01	Freighter	52092	10195	Automar Iii
American Falcon	1981	59	Ro/Ro	20786	15636	American Transport Line
American Heritage	1976	02	Tanker	93323	44864	Clc Of America Inc.
American Kestrel	1972	53	Container/Barge Carrier	30298	26406	American Kestrel Corp.
American Merlin	1978	59	Ro/Ro	19669	26409	American Automar
American Veteran	1973	53	Container/Barge Carrier	30298	26456	Coastal Barge Corp.
Arco Alaska	1979	02	Tanker	191459	83675	Arch Tankers Inc.
Arco Anchorage	1973	02	Tanker	122249	57691	1st National Bk. Of Chicago
Arco California	1980	02	Tanker	127003	83675	Arco Marine Inc.
Arco Fairbanks	1974	02	Tanker	122520	57691	Bank Of America
Arco Independence	1977	02	Tanker	266585	117515	Arco Marine Inc.
Arco Juneau	1974	02	Tanker	122249	57691	Bankers Trust Co.
Arco Prudhoe Bay	1971	02	Tanker	71873	31487	Tankers Leasing Corp.
Arco Sag River	1972	02	Tanker	71507	35646	Oil Tankers Leasing Corp.
Arco Spirit	1977	02	Tanker	266585	117515	Arco Marine Inc.
Arco Texas	1973	02	Tanker	91393	39665	Arco Marine Inc.
Argonaut	1979	09	Containership	16401	17902	Hartford Natl. Bank & Trust
Arzew	1978	34	L.N.G. Tanker	65674	69472	Arzew Tanker Corporation
Ashley Lykes	1963	01	Freighter	14515	11891	Lykes Bros. Ss Co. Inc.
Atigun Pass	1977	02	Tanker	152405	74250	New Conn. Nat. Bank
Austral Rainbow	1972	53	Container/Barge Carrier	30223	26456	Central Gulf Lines
B. T. Alaska	1978	02	Tanker	188099	83649	Bankers Trust Co.
Baltimore Trader	1955	02	Tanker	58813	27269	American Trading Trans. Co.
Baltimore/Baltimore	1983	26	Tug/Barge(Tanker)	48000	22331	Attransco, Inc.
Betty Wood/Throughbred Topper	1973	87	Tug/Barge(Bulk)	23751	15834	Gulf Coast Transit Co.
Beverly Anderson/Mary Turner	1982	87	Tug/Barge(Bulk)	21500	14337	Gulf Coast Transit Co.
Blue Ridge	1981	02	Tanker	42268	21359	Union Oil Co. Of California
Bonnie B	1956	02	Tanker	1986	1055	Poling Transportation Corp.
Bravado	1977	33	Chemical Tanker	4501	2110	Sealift Inc.
Bridgeton	1977	02	Tanker	413842	199430	Chesapeake Shipping, Inc.
Brooks Range	1978	02	Tanker	176404	74250	Interocean Manag. Corp.
Buffalo Soldier	1978	59	Ro/Ro	19669	26409	Rr & Vo Partnership
Carolina	1971	09	Containership	20428	19454	Puerto Rico Maritime Shpg Auth
Champion	1969	02	Tanker	38482	20858	Omi Champion Transport Inc.
Charleston	1956	02	Tanker	39366	21649	1st Penna. Bank
Charlotte Lykes	1968	09	Containership	19650	16757	Lykes Bros. Ss Co. Inc.
Chelsea	1975	33	Chemical Tanker	39971	22357	Keystone Shpg Co.
Chemical Pioneer	1974	02	Tanker	34930	19979	Bankers Trust Co.
Cherry Valley	1981	02	Tanker	39966	22357	Keystone Shpg Co.
Chesapeake City	1982	02	Tanker	89279	44313	Chesapeake Shipping, Inc.
Chesapeake Trader	1976	02	Tanker	50920	24668	First Atfranco Tanker Corp.
Chestnut Hill	1977	02	Tanker	92760	44875	Mellon Bank Natl. Assoc.
Chevron Arizona	1972	02	Tanker	39836	16941	New Conn. Nat. Bank
Chevron California	1976	02	Tanker	71339	35588	First Interstate Of Calif.
Chevron Colorado	1977	02	Tanker	39842	16941	First Interstate Of Calif.
Chevron Louisiana	1972	02	Tanker	39795	16941	New Conn. Nat. Bank
Chevron Mississippi	1975	02	Tanker	71336	35589	First Interstate Of Calif.
Chevron Oregon	1976	02	Tanker	39847	16941	First Interstate Of Calif.
Chevron Washington	1959	33	Chemical Tanker	39795	22761	First Interstate Bank Of Ca
Chilbar				39995	21937	Chilbar Shipping Co.

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Maritime Reporter/Engineering News

U.S. FLAG OCEANGOING MERCHANT FLEET

Ship Name	Year Built	Class Code	Class Desc	Dwt	Grt	Owner
veland	1969	01	Freighter	22536	15949	Victory Maritime Inc.
ast Range	1981	02	Tanker	40631	21356	Union Oil Co. Of California
astal Corpus Christi	1960	02	Tanker	52800	23299	Coastal Manatee Inc.
astal Eagle Point	1960	02	Tanker	52759	23299	Coastal Manatee Inc.
astal Manatee	1961	02	Tanker	31285	19030	Coastal Manatee Inc.
astal New York	1956	02	Tanker	38733	23459	Leasing Tankers, Inc.
lorado	1944	02	Tanker	31081	13919	Sabine Towing & Trans. Inc.
ncho	1945	02	Tanker	33266	18681	Sabine Towing & Trans. Inc.
nstitution	1951	05	Combo Pass & Cargo	7222	20199	American Global Line
rnucopia	1958	22	L.P.G. Tanker	23737	21668	Union Oil Co. Of California
ronado	1973	02	Tanker	39973	22357	Manufacturers Ntl. Bk Of Del.
rpus Christi	1964	01	Freighter	15244	14081	Afram Line (U.S.A.), Co. Ltd.
urrier	1977	02	Tanker	35663	21572	Omi Courier Transport, Inc.
ve Endeavor	1971	02	Tanker	71589	35633	Sea Road Inc.
ve Liberty	1954	02	Tanker	70417	33596	Cove Liberty Corp.
ve Trader	1959	02	Tanker	50130	28310	Cove Trading, Inc.
pl. Louis J. Hauge, Jr.	1979	59	Ro/Ro	21050	38411	Wilmington Trust
elaware Trader	1982	02	Tanker	50860	24668	Second Attransco Tanker, Corp.
enali	1978	02	Tanker	191117	83649	Bankers Trust Co.
uchess	1971	02	Tanker	37874	20751	The Falcon Shipping Group
astern Sun	1985	02	Tanker	3549	1576	Eastern Sun Barge Co.
lizabeth Lykes	1966	01	Freighter	14897	10954	Lykes Bros. Ss Co. Inc.
nergy Altair/Energy Ammonia	1982	26	Tug/Barge(Tanker)	16024	11438	Energy Ammonia Trans. Co.
nergy Independence	1983	24	Collier	33373	24900	New Eng. Call Co.
xport Freedom	1972	09	Containership	16605	17904	Farrell Lines Inc.
xport Patriot	1973	09	Containership	16605	17904	Farrell Lines Inc.
alcon Champion	1984	02	Tanker	33869	17735	The Falcon Shipping Group
alcon Leader	1983	02	Tanker	33869	17735	The Falcon Shipping Group
aust	1985	59	Ro/Ro	28050	51858	American Auto Carriers, Inc.
rances Hammer/Oxy 4103	1981	26	Tug/Barge(Tanker)	37300	17026	New Conn. Nat. Bank
red G	1960	01	Freighter	14530	11891	Pacific Gulf Marine Inc.
Fredericksburg	1958	02	Tanker	40006	21557	Fredericksburg Shipping Co.
Galveston Bay	1966	01	Freighter	14897	10718	Afram Line (U.S.A.), Co. Ltd.
Galveston Bay	1984	09	Containership	58943	57075	Sea-Land Service Inc.
Gamma	1979	34	L.N.G. Tanker	65674	69472	Cabot Lng Shipping
Genevieve Lykes	1968	01	Freighter	14897	10723	Lykes Bros. Ss Co. Inc.
Golden Endeavor	1974	02	Tanker	91844	44870	Irving Trust
Golden Gate	1970	02	Tanker	63141	27898	Keystone Tankship Company
Golden Monarch	1975	04	Bulk Carrier	92854	44881	Aquarius Marine Co.
Great Land	1975	59	Ro/Ro	16397	17527	Interocean Manag. Corp.
Green Bay	1987	59	Ro/Ro	13491	38659	Central Gulf Lines
Green Harbour	1974	53	Container/Barge Carrier	46892	28487	Central Gulf Lines
Green Island	1975	53	Container/Barge Carrier	46892	28487	Central Gulf Lines
Green Lake	1987	59	Ro/Ro	14104	46950	Central Gulf Lines
Green Ridge	1979	01	Freighter	12487	9514	Central Gulf Lines
Green Valley	1974	53	Container/Barge Carrier	46152	28487	Central Gulf Lines
Green Wave	1980	01	Freighter	13130	9521	Central Gulf Lines
Grotan/Grotan	1982	26	Tug/Barge(Tanker)	48000	22470	First Tug/Barge Corporation
Guadalupe	1945	02	Tanker	30369	17985	Sabine Towing & Trans. Inc.
Guayama	1969	09	Containership	20904	19283	Puerto Rico Maritime Shpg Auth
Gus W. Darnell	1985	02	Tanker	29500	21471	Wilmington Trust
Howell Lykes	1973	09	Containership	18832	21467	American President Lines Ltd.
Humacao	1968	09	Containership	22582	19046	Puerto Rico Maritime Shpg Auth
Independence	1950	05	Combo Pass & Cargo	7250	20221	American Global Line
Inger	1945	04	Bulk Carrier	23997	14192	Sealift Bulkers Inc.
Iowa Trader	1981	04	Bulk Carrier	37061	24384	Iowa Trader Partnership
Ita Jamie Baxter/CF-1	1977	87	Tug/Barge(Bulk)	24372	16248	Gulf Coast Transit Co.



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U.S. FLAG OCEANGOING MERCHANT FLEET

Name	Year Built	Class Code	Class Desc	Dwt	Grt	Owner
Jacksonville/Jacksonville	1982	26	Tug/Barge(Tanker)	48000	22470	1st Penna. Bank
James Lykes	1960	01	Freighter	14530	11891	Lykes Bros. Ss Co. Inc.
Jean Lykes	1973	09	Containership	18832	21475	American President Lines Ltd.
Jeb Stuart	1970	53	Container/Barge Carrier	49858	36021	Waterman Steamship Corp.
John Lykes	1960	01	Freighter	11684	8762	Lykes Bros. Ss Co. Inc.
Julius Hammer/Oxy 4101	1981	26	Tug/Barge(Tanker)	41000	17026	New Conn. Nat. Bank
Kaimoku	1976	56	Container/Ro/Ro	16373	17525	Matson Navigation Co.
Kainalu	1974	59	Ro/Ro	16337	17513	Matson Navigation Co.
Kansas Trader	1981	04	Bulk Carrier	36414	24384	Seahawk Management, Inc.
Kauai	1980	09	Containership	26350	24559	Matson Navigation Co.
Kenai	1979	02	Tanker	125089	60384	New Conn. Nat. Bank
Keystone Canyon	1978	02	Tanker	127005	81776	Keystone Shpg Co.
Keystone	1953	33	Chemical Tanker	18720	11368	Keystone Tankship Company
King	1957	02	Tanker	35280	20138	American Heavy Lift Shpg
Kittanning	1977	02	Tanker	92809	44875	Mellon Bank Natl. Assoc.
Knight	1958	02	Tanker	35280	20025	American Heavy Lift Shpg
Lake Charles	1980	34	L.N.G. Tanker	72600	93619	Lachmar Corp. Inc.
Lash Atlantico	1972	53	Container/Barge Carrier	30298	26406	Coastal Barge Corp.
Lawrence H. Gianella	1986	02	Tanker	32965	21471	Wilmington Trust
Leader	1969	02	Tanker	38414	17320	Omi Leader Transport Inc.
Leslie Lykes	1962	01	Freighter	14759	11891	Lykes Bros. Ss Co. Inc.
Liberty Belle	1976	02	Tanker	83657	44864	Liberty Shipping Group, Ltd.
Liberty Sea	1984	04	Bulk Carrier	63800	36254	Liberty Shipping Group, Ltd.
Liberty Spirit	1986	04	Bulk Carrier	64152	35944	Liberty Shipping Group, Ltd.
Liberty Star	1986	04	Bulk Carrier	63400	35944	Liberty Shipping Group, Ltd.
Liberty Sun	1986	04	Bulk Carrier	63400	35944	Liberty Shipping Group, Ltd.
Liberty Wave	1984	04	Bulk Carrier	63463	36254	Liberty Shipping Group, Ltd.
Lng Aquarius	1977	34	L.N.G. Tanker	72622	95084	Wilmington Trust
Lng Aries	1977	34	L.N.G. Tanker	64620	95084	Wilmington Trust
Lng Capricorn	1978	34	L.N.G. Tanker	64620	95084	Wilmington Trust
Lng Gemini	1978	34	L.N.G. Tanker	64620	95084	Patriot I Shipping
Lng Leo	1978	34	L.N.G. Tanker	64620	95084	Patriot II Shipping
Lng Libra	1979	34	L.N.G. Tanker	64620	95084	Hull Fifty Corp.
Lng Taurus	1979	34	L.N.G. Tanker	64620	95084	Hartford Natl. Bank & Trust
Lng Virgo	1979	34	L.N.G. Tanker	64620	95084	Patriot IV Shipping Corp.

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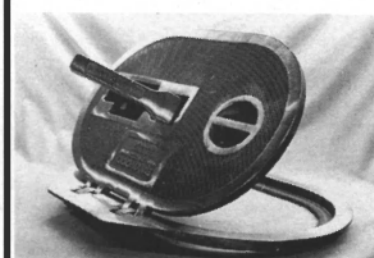
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Maritime Reporter/Engineering News

U.S. FLAG OCEANGOING MERCHANT FLEET

me	Year Built	Class Code	Class Desc	Dwt	Grt	Owner
ise Lykes	1965	01	Freighter	14897	10954	Lykes Bros. Ss Co. Inc.
isiana	1980	34	L.N.G. Tanker	72571	93619	Lachmar Corp. Inc.
ine	1973	59	Ro/Ro	22030	24901	Matson Navigation Co.
es Enterprise	1960	01	Freighter	14530	11891	American President Lines Ltd.
ersk Constellation	1980	59	Ro/Ro	21213	20529	Maersk Line
or Stephen W. Pless	1983	59	Ro/Ro	21529	45408	Wilmington Trust
nukai	1970	09	Containership	27107	23785	Matson Navigation Co.
nulani	1970	09	Containership	27107	23785	Matson Navigation Co.
rgaret Lykes	1968	09	Containership	15400	16225	Lykes Bros. Ss Co. Inc.
rine Chemist	1970	33	Chemical Tanker	36526	20239	Marine Chemical Navi. Corp.
rine Duval	1944	33	Chemical Tanker	25131	11080	Marine Sulphur Shipping Corp.
rine Floridian	1944	33	Chemical Tanker	25236	13400	Marine Transport Line
rine Princess	1967	04	Bulk Carrier	52565	26059	Marine Transport Line
rine Reliance	1987	11	Car Carrier	11676	35750	Fuji Marine Corp.
riorie Lykes	1962	01	Freighter	11684	8762	Lykes Bros. Ss Co. Inc.
antha R. Ingram/Ios 3301	1971	26	Tug/Barge(Tanker)	36581	15579	Maritrans Inc.
atsonia	1978	59	Ro/Ro	13860	19301	Matson Navigation Co.
ui	1978	09	Containership	26665	24544	Matson Navigation Co.
ayaguez	1968	09	Containership	20904	19203	Puerto Rico Maritime Shpg Auth
obile/Mobile	1983	26	Tug/Barge(Tanker)	47600	22331	Amerada Hess Shipping Corp.
oku Pahu/Hstc 1	1982	26	Tug/Barge(Tanker)	25931	17286	Hawaiian Sugar Trans. Co.
ormacsky	1977	02	Tanker	39861	22354	Moore-Mcormack Marine Trans.
ormacstar	1975	02	Tanker	39861	22354	Moore-Mcormack Marine Trans.
ormacsun	1976	02	Tanker	39861	22354	Moore-Mcormack Marine Trans.
eches	1958	02	Tanker	35490	20066	Sabine Towing & Trans. Inc.
edlloyd Holland	1984	09	Containership	58943	57075	Sea-Land Service Inc.
iew York Sun	1980	02	Tanker	31382	18503	New York Shipping Co.
iew York/New York	1983	26	Tug/Barge(Tanker)	48000	22331	Second Tug/Barge Corporation
iewark Bay	1985	09	Containership	58869	57075	Sea-Land Service Inc.
table Star	1977	01	Freighter	18230	16840	Sealift Tankships, Inc.
orthern Lights	1975	59	Ro/Ro	16011	31515	Totem Ocean Trail Express Inc.
orthern Sun	1981	02	Tanker	2295	1553	Florida Barge Co.
osac Ranger	1978	59	Ro/Ro	17406	16568	Ranger Shipholding Corp.
uevo San Juan	1970	09	Containership	20336	19444	Puerto Rico Maritime Shpg Auth
ocean City	1981	02	Tanker	89279	44313	Chesapeake Shipping, Inc.

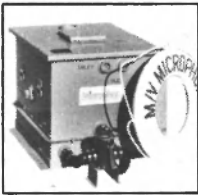
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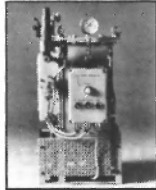
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U.S. FLAG OCEANGOING MERCHANT FLEET

Name	Year Built	Class Code	Class Desc	Dwt	Grt	Owner
Omi Columbia	1974	02	Tanker	124999	67856	Omi Challenger Transport Inc
Omi Dynachem	1981	33	Chemical Tanker	49530	32328	The Bank Of New York
Omi Hudson	1981	33	Chemical Tanker	41819	32328	The Bank Of New York
Omi Missouri	1983	04	Bulk Carrier	49675	30162	Omi Missouri Transport, Inc
Omi Sacramento	1983	04	Bulk Carrier	43155	30162	Omi Missouri Transport, Inc
Omi Star	1970	33	Chemical Tanker	37702	19046	Omicem Transport Inc.
Oocl Innovation	1985	09	Containership	58943	57075	Sea-Land Service Inc.
Oocl Inspiration	1985	09	Containership	58869	57075	Sea-Land Service Inc.
Overseas Alaska	1970	02	Tanker	63000	28250	Intercontinental Bltck. Corp.
Overseas Alice	1968	02	Tanker	38421	20879	Alice Tankships Corp.
Overseas Arctic	1971	02	Tanker	63000	28250	Overseas Bulk Tank Corp.
Overseas Boston	1974	02	Tanker	123692	61212	Cambridge Tankers, Inc.
Overseas Chicago	1977	02	Tanker	92091	44869	Maritime Overseas Corp.
Overseas Harriette	1977	04	Bulk Carrier	25515	14309	Maritime Overseas Corp.
Overseas Joyce	1987	59	Ro/Ro	16340	48017	Osg Car Carriers, Inc.
Overseas Juneau	1973	02	Tanker	122409	57701	Juneau Tanker Corp.
Overseas Marilyn	1977	04	Bulk Carrier	25515	14309	Maritime Overseas Corp.
Overseas New Orleans	1983	02	Tanker	43643	21446	New Conn. Nat. Bank
Overseas New York	1977	02	Tanker	91843	44906	Maritime Overseas Corp.
Overseas Ohio	1977	02	Tanker	92017	44869	Maritime Overseas Corp.
Overseas Philadelphia	1982	02	Tanker	43648	21446	Philadelphia Tanker Corp.
Overseas Valdez	1968	02	Tanker	38421	20879	Valdez Tankships Corp.
Overseas Vivian	1969	02	Tanker	38421	20879	Vivian Tankships Corp.
Overseas Washington	1978	02	Tanker	91967	44906	Maritime Overseas Corp.
Patriot	1976	02	Tanker	35663	21572	Omi Patriot Transport, Inc.
Paul Buck	1985	02	Tanker	29500	21471	Wilmington Trust
Pecos	1950	02	Tanker	28851	17291	Sabine Towing & Trans. Inc.
Pembina	1945	01	Freighter	6045	3813	Seaborne Line, Inc.
Pfc. Dwayne T. Williams	1985	59	Ro/Ro	22454	44543	Wilmington Trust
Pfc. Eugene A. Obregon	1982	59	Ro/Ro	25073	45408	Wilmington Trust
Pfc. James Anderson, Jr.	1979	59	Ro/Ro	21050	36815	Wilmington Trust
Pfc. William B. Bough	1979	59	Ro/Ro	21050	38412	Wilmington Trust
Philadelphia Sun	1981	02	Tanker	34000	17491	Philadelphia Sun Shpg. Co. Inc
Philadelphia/Philadelphia	1983	26	Tug/Barge(Tanker)	47600	22470	Fourth Tug/Barge Corporation
Platte	1982	04	Bulk Carrier	37061	24384	Omi Corporation
Ponce	1968	59	Ro/Ro	18725	17594	Sun Leasing Co.
Potomac Trader	1983	02	Tanker	50860	24668	Third Attranco Tanker Corp.
President Adams	1988	09	Containership	54655	61926	Meridian Trust Co.
President Arthur	1987	09	Containership	44966	39132	Meridian Trust Co.
President Buchanan	1987	09	Containership	44966	39132	Meridian Trust Co.
President Eisenhower	1980	09	Containership	47841	36859	American President Lines Ltd.
President F. D. Roosevelt	1980	09	Containership	47841	36195	American President Lines Ltd.
President Garfield	1987	09	Containership	44966	39132	Meridian Trust Co.



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ame	Year Built	Class Code	Class Desc	Dwt	Grt	Owner
resident Grant	1971	09	Containership	37346	26746	American President Lines Ltd.
resident Harding	1987	09	Containership	44966	39132	Meridian Trust Co.
resident Harrison	1971	09	Containership	30226	28162	American President Lines Ltd.
resident Hoover	1971	09	Containership	38656	26746	American President Lines Ltd.
resident Jackson	1988	09	Containership	54665	61926	American President Lines Ltd.
resident Jefferson	1973	09	Containership	20718	21467	American President Lines Ltd.
President Kennedy	1988	09	Containership	54665	61926	American President Lines Ltd.
President Lincoln	1982	09	Containership	30825	40627	American President Lines Ltd.
President Monroe	1983	09	Containership	30825	40627	American President Lines Ltd.
President Polk	1988	09	Containership	54700	61926	American President Lines Ltd.
President Truman	1988	09	Containership	54700	61926	American President Lines Ltd.
President Tyler	1972	09	Containership	38656	26746	American President Lines Ltd.
President Washington	1983	09	Containership	30825	40627	American President Lines Ltd.
Prince William Sound	1975	02	Tanker	122941	60084	Bank Of America
Pvt. Franklin J. Phillips	1980	59	Ro/Ro	22704	38411	667 Leasing Company
R. J. Pfeiffer	1992	09	Containership	28555	31573	Wilmington Trust
Rainbow Hope	1980	01	Freighter	2000	983	Matson Navigation Co.
Ranger	1976	02	Tanker	35663	21572	Rainbow Navigation, Inc.
Richard G. Matthiesen	1986	02	Tanker	29526	21471	Omi Rover Transport, Inc.
Robert E. Lee	1974	53	Container/Barge Carrier	41578	28580	Wilmington Trust
Rover	1977	02	Tanker	35663	21572	Amsouth Bank N.A.
S/R Baton Rouge	1970	02	Tanker	76813	34266	Omi Rover Transport, Inc.
S/R Baytown	1984	02	Tanker	58643	32204	Exxon Shipping Company
S/R Benicia	1979	02	Tanker	175547	75272	Exxon Shipping Company
S/R Charleston	1983	02	Tanker	48844	31452	Exxon Shipping Company
S/R Galveston	1970	02	Tanker	27726	12769	Exxon Shipping Company
S/R Jamestown	1957	02	Tanker	41528	19733	Exxon Shipping Company
S/R Long Beach	1987	02	Tanker	214862	110831	Exxon Shipping Company
S/R Mediterranean	1986	02	Tanker	214861	110831	Exxon Shipping Company
S/R New Orleans	1965	02	Tanker	72655	32035	Exxon Shipping Company
S/R North Slope	1979	02	Tanker	175305	75272	Exxon Corporation
S/R Philadelphia	1969	02	Tanker	77382	34266	Exxon Shipping Company
S/R San Francisco	1969	02	Tanker	76813	34266	Exxon Shipping Company
S/R Wilmington	1984	02	Tanker	48779	31452	Exxon Shipping Company
Sabine	1957	02	Tanker	33540	20020	Sabine Towing & Trans. Inc.
Sam Houston	1974	53	Container/Barge Carrier	41578	28580	Waterman Steamship Corp.
Samuel L. Cobb	1985	02	Tanker	32572	21471	Wilmington Trust
Sea Fox	1985	56	Container/Ro Ro	24500	34318	Wilmington Trust
Sea Isle City	1981	02	Tanker	96888	44542	Chesapeake Shipping, Inc.
Sea Lion	1985	56	Container/Ro Ro	24500	34318	Wilmington Trust
Sea Princess	1972	02	Tanker	37276	20751	Sea Princess Trading Inc.
Sea Venture	1972	33	Chemical Tanker	18924	9993	Atlantic Co., Ltd Partnership
Sea Wolf	1984	56	Container/Ro Ro	24500	34318	Wilmington Trust



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Name	Year Built	Class Code	Class Desc	Dwt	Grt	Owner
Sea-Land Anchorage	1987	09	Containership	20668	20965	Sea-Land Service Inc.
Sea-Land Atlantic	1985	09	Containership	58943	57075	Sea-Land Service Inc.
Sea-Land Challenger	1968	09	Containership	22493	19157	Sea-Land Service Inc.
Sea-Land Consumer	1973	09	Containership	25730	23763	Sea-Land Service Inc.
Sea-Land Crusader	1969	09	Containership	20904	19203	Sea-Land Service Inc.
Sea-Land Defender	1980	09	Containership	23749	32629	Sea-Land Service Inc.
Sea-Land Developer	1980	09	Containership	30296	32629	Sea-Land Service Inc.
Sea-Land Discovery	1968	09	Containership	22013	18894	Sea-Land Service Inc.
Sea-Land Endurance	1980	09	Containership	23250	32629	Sea-Land Service Inc.
Sea-Land Enterprise	1980	09	Containership	30976	28095	Sea-Land Service Inc.
Sea-Land Expedition	1973	58	Partial Container	19845	21687	Sea-Land Service Inc.
Sea-Land Explorer	1980	09	Containership	23676	32629	Sea-Land Service Inc.
Sea-Land Express	1980	09	Containership	23676	32629	Sea-Land Service Inc.
Sea-Land Freedom	1980	09	Containership	30240	32629	Sea-Land Service Inc.
Sea-Land Hawaii	1973	58	Partial Container	19842	21687	Sea-Land Service Inc.
Sea-Land Independence	1980	09	Containership	22957	32629	Sea-Land Service Inc.
Sea-Land Innovator	1980	09	Containership	30341	32629	Sea-Land Service Inc.
Sea-Land Integrity	1984	09	Containership	58943	57075	Sea-Land Service Inc.
Sea-Land Kodiak	1987	09	Containership	20668	20965	Sea-Land Service Inc.
Sea-Land Liberator	1980	09	Containership	30240	32629	Sea-Land Service Inc.
Sea-Land Mariner	1980	09	Containership	23782	32629	Sea-Land Service Inc.
Sea-Land Motivator	1984	09	Containership	58943	57075	Sea-Land Service Inc.
Sea-Land Navigator	1972	09	Containership	28200	28087	Sea-Land Service Inc.
Sea-Land Pacer	1978	09	Containership	15417	17376	Sea-Land Service Inc.
Sea-Land Pacific	1979	09	Containership	30903	28095	Sea-Land Service Inc.
Sea-Land Patriot	1980	09	Containership	30225	32629	Sea-Land Service Inc.
Sea-Land Performance	1985	09	Containership	58869	57075	Sea-Land Service Inc.
Sea-Land Pride	1985	09	Containership	58943	57075	Sea-Land Service Inc.
Sea-Land Producer	1974	09	Containership	25730	23763	Sea-Land Service Inc.
Sea-Land Quality	1980	09	Containership	58869	57075	Sea-Land Service Inc.
Sea-Land Reliance	1980	09	Containership	41165	29965	Sea-Land Service Inc.
Sea-Land Shining Star	1968	09	Containership	17672	17801	American President Lines Ltd.
Sea-Land Spirit	1980	09	Containership	21500	29965	Sea-Land Service Inc.
Sea-Land Tacoma	1987	09	Containership	20668	20965	Sea-Land Service Inc.
Sea-Land Trader	1973	09	Containership	31495	28087	Sea-Land Service Inc.
Sea-Land Value	1984	09	Containership	58943	57075	Sea-Land Service Inc.
Sea-Land Voyager	1980	09	Containership	22963	32629	Sea-Land Service Inc.
Seabulk America	1975	33	Chemical Tanker	46312	22138	Hvide Shipping Inc.
Seabulk Challenger/Stl-3901	1975	26	Tug/Barge(Tanker)	41800	20982	Hvide Shipping Inc.
Seabulk Magnachem/Scc 3902	1977	26	Tug/Barge(Tanker)	42000	18671	Hvide Shipping Inc.
Seadrift	1942	58	Partial Container	16576	8538	Allied Towing Corp.
Sealift Antarctic	1975	02	Tanker	27648	17157	Irving Trust
Sealift Arabian Sea	1975	02	Tanker	27648	17134	Irving Trust
Sealift Arctic	1975	02	Tanker	27648	17157	Irving Trust
Sealift Atlantic	1974	02	Tanker	27648	17157	Irving Trust
Sealift Caribbean	1975	02	Tanker	27648	17157	Irving Trust
Sealift China Sea	1975	02	Tanker	27648	17134	Irving Trust
Sealift Indian Ocean	1975	02	Tanker	27648	17134	Irving Trust
Sealift Mediterranean	1974	02	Tanker	27654	17157	Marine Ship Leasing Cor.
Sealift Pacific	1974	02	Tanker	27648	17134	Irving Trust
Seminole	1961	02	Tanker	49534	28218	Mobil Oil Corp.
Senator	1981	59	Ro/Ro	8995	13412	Crowley Caribbean Trans. Inc.
Sgt. Matej Kocak	1981	59	Ro/Ro	24032	45408	Wilmington Trust
Sgt. William R. Bulton	1986	59	Ro/Ro	26523	44543	Wilmington Trust
Sheldon Lykes	1969	09	Containership	15400	16375	Lykes Bros. Ss Co. Inc.
Sierra Madre	1981	02	Tanker	40631	21351	Union Oil Co. Of California
Solar	1959	02	Tanker	31300	18116	American Heavy Lift Shpng
Southern	1978	34	L.N.G. Tanker	75171	69472	Southern Tanker Corporation
Spray	1960	02	Tanker	31300	18150	American Heavy Lift Shpng
Star Georgia	1964	33	Chemical Tanker	26755	16514	Texaco Ref. And Market
Star Massachusetts	1963	33	Chemical Tanker	19683	16515	Texaco Ref. And Market
Star Rhode Island	1964	02	Tanker	19992	16584	Texaco Ref. And Market
Stella Lykes	1968	01	Freighter	22630	15949	Lykes Bros. Ss Co. Inc.
Stonevall Jackson	1974	53	Container/Barge Carrier	41578	28580	Amsouth Bank N.A.
Strong Texan	1976	59	Ro/Ro	2776	1382	New Conn. Nat. Bank
Strong Virginian	1984	59	Ro/Ro	21541	16169	Strong Virginia Nav. Co.
Strong/American	1985	17	Tug/Barge	20000	13374	Kadampanattu Corp.
Sue Lykes	1969	01	Freighter	22564	15949	American President Lines Ltd.
Sugar Islander	1973	04	Bulk Carrier	29984	15544	Bankers Trust Co.
Tampa Bay	1966	01	Freighter	14897	10723	Afram Line (U.S.A.), Co. Ltd.
Texas Sun	1960	02	Tanker	54311	26281	Texas Sun Shipping Co.
Thompson Lykes	1974	09	Containership	18832	21475	First Interstate Of Calif.
Thompson Pass	1978	02	Tanker	173619	74250	Interocean Manag. Corp.
Tillie Lykes	1985	09	Containership	36003	31920	Lykes Bros. Ss Co. Inc.
Tonsina	1978	02	Tanker	124751	60384	New Conn. Nat. Bank
Trinity	1966	33	Chemical Tanker	38359	20572	Keystone Tankship Company
Tropic Sun	1957	02	Tanker	35280	20177	Tropic Sun Shipping Co. Inc.
Tyson Lykes	1985	09	Containership	36003	31920	Lykes Bros. Ss Co. Inc.
Ultramax	1973	78	Ore/Bulk/Oil	83518	39827	Ultra Maritime Inc.
Ultrasea	1974	78	Ore/Bulk/Oil	83437	39827	Sealift Inc.
Valiant	1973	33	Chemical Tanker	7634	4415	Sealift Chemicals Inc.
Westward Venture	1977	59	Ro/Ro	18202	17527	Interocean Manag. Corp.
Willamette	1969	02	Tanker	38460	20884	Omi Willamette Transport, Inc

COMPANY PROFILE

AmClyde Proves An Ally In The Search For Offshore Oil

AmClyde Engineered Products Inc. is best known as the designer/builder of the world's largest offshore marine cranes. AmClyde also enjoys a strong and growing reputation for mooring systems designed for the offshore industry. The company's heritage combines American Hoist and Derrick Company and Clyde Iron, two century-old companies with traditions in the offshore heavy lifting and mooring/winch markets. AmClyde has delivered 34 of the 44 super marine cranes (more than 1,000-ton capacity) in existence, for a world market share of more than 75 percent.

AmClyde is unique in that it has concurrently developed both rotary winch and proprietary linear winch technology, plus a full range of ancillary support equipment. This includes chain stoppers, chain jacks, patented bending shoe fairleads for either chain or wire rope, rotary fairleads and capstans. The company recently acquired mooring windlass and traction winch technology as well as intellectual property from John T. Hepburn, Ltd., and now is able to fully service that line of equipment.

AmClyde is working together with MODEC and Sea Engineering in developing and marketing MOSES, a minimum surface equipment TLP (Tension Leg Platform) designed for 50 million barrel fields in deep water. In a related area, AmClyde has developed a proprietary Turret Bearing System for FPSOs (Floating Production Storage and Offload vessels) and is in the final phase of delivering a system to a customer in S.E. Asia.

AmClyde's OCECO of New Orleans is the manufacturer of the Unit Mariner line of platform pedestal cranes which are sold and serviced around the world. AmClyde employs a force of more than 220 professionals, reportedly including the largest group of crane and winch designers in this industry in the world. Engineering excellence is a constant goal of the company, and this has resulted in a total of seven Minnesota and National Societies of Professional Engineers Outstanding Achievement Awards over the past eight years.

For more information on AmClyde
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Semisubmersible crane vessel *Micoperi 7000* en route to a deep water job. The vessel features twin AmClyde 7,000-metric-ton cranes.



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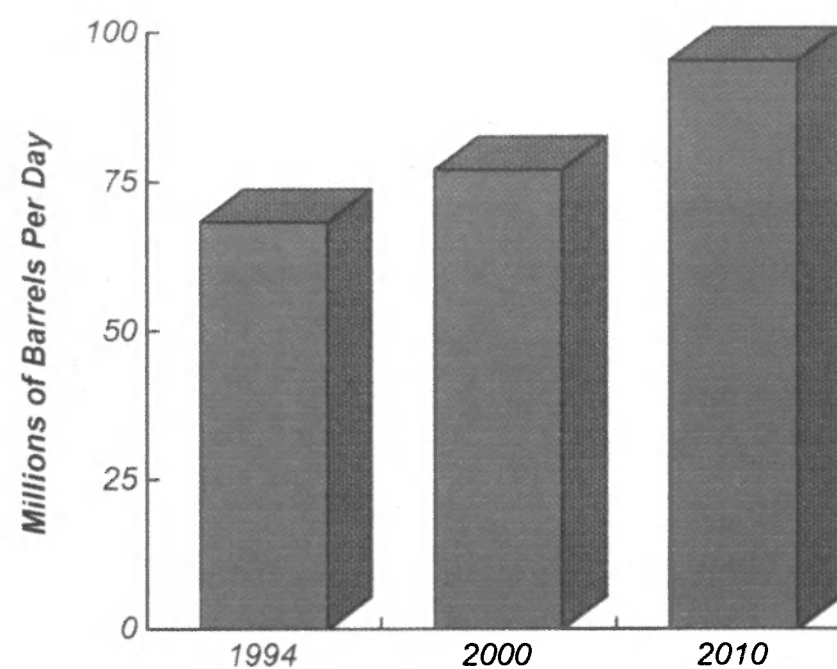
INDUSTRY TRENDS

by

James R. McCaul, President
IMA Associates, Inc.

WORLD OIL DEMAND

World oil demand is projected to increase almost 40 percent over the next 16 years — driving seaborne trade of crude oil and petroleum products to increasingly higher levels. Combined with a huge ship replacement requirement, the increase in demand for oil will create a booming construction market for crude carriers and product tankers during the second half of this decade.



Source: *Shipbuilding Industry Outlook*, IMA Associates, June 1995

U.S. PARENT COMPANY FOREIGN FLAG SHIPS

Source: U.S. Maritime Administration

Parent Co.	Direct Own	Name	Class	Where Built	Year Built	GRT	DWT	SPEED	FLAG	ON PARENT
Aluminum Co. of America	Lib-Ore Steamship Co. Inc.	TARPON	ORE/BULK/OIL	JPN	1977	9,794	15,000	0	LIBERIA	P
Aluminum Co. of America	Lib-Ore Steamship Co. Inc.	SENTINEL II	ORE CARRIER	JPN	1982	34,353	47,503	0	LIBERIA	P
Aluminum Co. of America	Lib-Ore Steamship Co. Inc.	PATHFINDER II	ORE CARRIER	JPN	1981	34,353	47,560	15	LIBERIA	P
Aluminum Co. of America	Lib-Ore Steamship Co. Inc.	PROSPECTOR II	ORE CARRIER	JPN	1982	34,353	47,535	15	LIBERIA	P
Aluminum Co. of America	Lib-Ore Steamship Co. Inc.	MARLIN	ORE/BULK/OIL	JPN	1977	9,792	15,000	13	LIBERIA	P
Amerada Hess Corp.	Seal Island Shipping Corp.	SEAL ISLAND	TANKER	SWD	1973	123,009	259,042	16	LIBERIA	P
Amerada Hess Corp.	Serpent Sea Corp.	MT. CABRITE	TANKER	SWD	1971	122,960	259,447	16	LIBERIA	P
Amerada Hess Corp.	Swansea Corp.	SAINT LUCIA	TANKER	SWD	1972	122,960	259,447	16	LIBERIA	P
Amerada Hess Corp.	Tropical United Shipping Corp.	TROPICAL LION	TANKER	GBI	1972	122,960	256,387	16	LIBERIA	P
Amoco Corporation	Amoco Ocean Tanker Co.	OCEAN VICTOR	TANKER	JPN	1981	50,169	81,283	15	LIBERIA	P
Amoco Corporation	Amoco Ocean Tanker Co.	OCEAN NAVIGATOR	TANKER	JPN	1988	49,279	81,274	15	LIBERIA	P
Amoco Corporation	Amoco Ocean Tanker Co.	OCEAN EXPLORER	TANKER	JPN	1988	49,279	81,274	15	LIBERIA	P
Amoco Corporation	Amoco Ocean Tanker Co.	OCEAN LEADER	TANKER	JPN	1989	49,279	84,841	15	LIBERIA	P
Bank of California National Association as Trustee	Amoco Ocean Tanker Co.	CHEVRON COPENHAGEN	TANKER	JPN	1974	118,178	268,226	15	LIBERIA	P
Bank of California National Association as Trustee	Amoco Ocean Tanker Co.	CHEVRON NAGASAKI	TANKER	JPN	1974	118,147	268,230	15	LIBERIA	P
Bank of California National Association as Trustee	Amoco Ocean Tanker Co.	CHARLES PIGOTT	TANKER	JPN	1973	118,220	268,373	15	LIBERIA	P
Bank of California National Association as Trustee	Amoco Ocean Tanker Co.	C. W. KITTO	TANKER	JPN	1974	118,218	268,334	15	LIBERIA	P
Bank of California National Association as Trustee	Amoco Ocean Tanker Co.	CHEVRON FELUY	TANKER	JPN	1973	118,197	268,418	15	LIBERIA	P
Brunswick Salt & Materials Transfer	Inagua Transports Inc.	CECILE ERICKSON	SALT CARRIER	JPN	1957	3,299	5,588	0	SAINT VINCENT	P
Caltex Petroleum Corp.	Caltex Tanker (Australia)	AUSTRALIA SKY	TANKER	KRS	1989	21,718	33,239	15	AUSTRALIA	P
Caltex Petroleum Corporation	Hal Investments (Singapore) Pte. Ltd.	AUSTRALIA STAR	TANKER	KRS	1986	54,656	94,783	0	AUSTRALIA	P
Central Gulf Lines Inc.	LCI Shipholdings Inc.	RHINE FOREST	CONTAINER/BARGE CARRIER	BLG	1972	31,386	44,799	18	LIBERIA	P
Central Gulf Lines Inc.	Swordfish Shipping Co. Ltd.	NORDIC LOUISIANA	CHEMICAL TANKER	GBI	1964	18,589	28,346	16	VANUATU	P
Central Gulf Lines Inc.	LCI Shipholdings Inc.	ACADIA FOREST	CONTAINER/BARGE CARRIER	JPN	1969	33,231	49,835	18	LIBERIA	P
Central Gulf Lines Inc.	Cypress Auto Carriers Inc.	CYPRESS TRAIL	CAR CARRIER	KRS	1988	42,447	12,763	19	LIBERIA	P
Central Gulf Lines Inc.	Lash Carriers Inc.	SPRUCE	CONTAINER/BARGE CARRIER	JPN	1975	1,380	8,172	0	LIBERIA	P
Central Gulf Lines Inc.	Cypress Auto Carriers Inc.	CYPRESS PASS	CAR CARRIER	KRS	1988	42,447	12,763	0	LIBERIA	P
Chemical Banking Corp.	Chemical Trust Co. of California	GEORGIA S	ORE CARRIER	JPN	1981	15,462	30,187	0	PANAMA	P
Chevron Corporation	Chevron Transport Corp.	SAMUEL H. ARMACOST	TANKER	JPN	1982	21,582	35,607	15	BAHAMAS	P
Chevron Corporation	Chevron Transport Corp.	JOHN YOUNG	TANKER	JPN	1990	88,946	155,547	15	LIBERIA	P

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Maritime Reporter/Engineering News

U.S. PARENT COMPANY FOREIGN FLAG SHIPS

Source: U.S. Maritime Administration

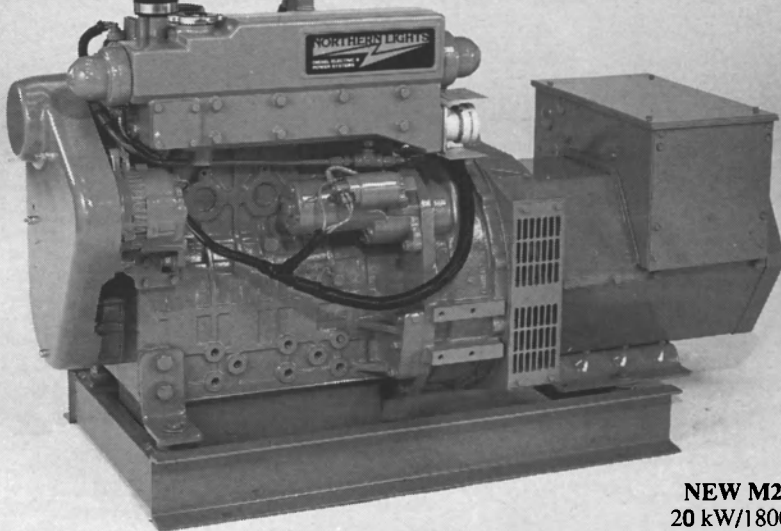
Parent Co.	Direct Owner	Name	Class	Where Built	Year Built	GRT	DWT	SPEED	FLAG	ON PARENT
Chevron Corporation	Chevron Transport Corp.	GEORGE SHULTZ	TANKER	BRZ	1993	80,914	136,055	15	LIBERIA	P
Chevron Corporation	Chevron Transport Corp.	CONDOLIEZZA RICE	TANKER	BRZ	1993	80,914	135,829	15	BAHAMAS	P
Chevron Corporation	Chevron Transport Corp.	J. DENNIS BONNEY	TANKER	BRZ	1991	88,946	155,103	15	LIBERIA	P
Chevron Corporation	Chevron Transport Corp.	WILLIAM E. CRAIN	TANKER	BRZ	1992	88,946	155,127	15	LIBERIA	P
Chevron Corporation	Chevron Transport Corp.	CHARLES E. RENFREW	TANKER	JPN	1988	44,840	78,656	14	BAHAMAS	P
Chevron Corporation	Chevron Transport Corp.	WILLIAM E. MUSSMAN	TANKER	JPN	1979	43,428	81,273	15	LIBERIA	P
Chevron Corporation	Chevron Transport Corp.	GEORGE H. WEYERHAEUSER	TANKER	JPN	1981	23,709	35,597	15	BAHAMAS	P
Chevron Corporation	Chevron Transport Corp.	KENNETH T. DERR	TANKER	JPN	1982	23,709	35,587	15	BAHAMAS	P
Chevron Corporation	Chevron Tankers (Bermuda) Ltd.	CHEVRON SOUTH AMERICA	TANKER	JPN	1976	207,987	413,158	15	BERMUDA	P
Chevron Corporation	Chevron Transport Corp.	BRUCE SMART	TANKER	BRZ	1991	88,946	155,150	15	LIBERIA	P
Chevron Corporation	Chevron Transport Corp.	JAMES M. SULLIVAN	TANKER	BRZ	1992	80,914	135,915	15	LIBERIA	P
Chevron Corporation	Chevron Tankers (Bermuda) Ltd.	CHEVRON EDINBURGH	TANKER	JPN	1974	118,178	268,333	15	BERMUDA	P
Chevron Corporation	Access Atlantic Inc.	CHEVRON ATLANTIC	TANKER	JPN	1992	80,130	149,748	15	BAHAMAS	P
Chevron Corporation	Chevron Transport Corp.	CHEVRON HORIZON	TANKER	JPN	1974	60,491	123,969	0	LIBERIA	P
Chevron Corporation	Chevron International Ltd.	CHEVRON ZENITH	TANKER	SPN	1972	48,645	96,716	16	LIBERIA	P
Chevron Corporation	Chevron Transport Corp.	R. HAL DEAN	TANKER	JPN	1988	44,840	78,656	15	BAHAMAS	P
Chevron Corporation	Chevron Transport Corp.	CHEVRON ANTWERP	TANKER	JPN	1975	122,626	276,783	15	BAHAMAS	P
Chevron Corporation	Chevron Transport Corp.	KENNETH E. HILL	TANKER	JPN	1979	43,428	81,273	15	BAHAMAS	P
Chevron Corporation	Chevron Transport Corp.	CHEVRON STAR	TANKER	JPN	1977	76,547	156,313	16	LIBERIA	P
Chevron Corporation	Chevron Transport Corp.	ALDEN W. CLAUSEN	TANKER	JPN	1981	23,709	35,588	15	LIBERIA	P
Chevron Corporation	Chevron Transport Corp.	CHEVRON PACIFIC	TANKER	JPN	1983	23,709	35,596	15	LIBERIA	P
Chevron Corporation	Chevron Transport Corp.	CARLA A. HILLS	TANKER	JPN	1981	23,709	35,597	15	LIBERIA	P
Chevron Corporation	Chevron Transport Corp.	CHEVRON PERTH	TANKER	JPN	1975	122,627	276,837	15	BAHAMAS	P
Chevron Corporation	Chevron Transport Corp.	SAMUEL GINN	TANKER	JPN	1993	88,919	156,835	15	BAHAMAS	P
Chiquita Brands Inc.	Narvel Ltd.	CHIQUITA JEAN	FREIGHTER/REEFER	NOR	1993	8,665	11,831	22	BAHAMAS	P
Telegraph Shipping Co. Ltd.	Telegraph Shipping Co. Ltd.	CHIQUITA CINCINNATIAN	FREIGHTER/REEFER	JPN	1984	6,117	6,413	17	BAHAMAS	P
Chiquita Brands Inc.	Telegraph Shipping Co. Ltd.	CARIBAN	FREIGHTER/REEFER	JPN	1983	5,321	6,371	17	BAHAMAS	P
Chiquita Brands Inc.	Scanreeler Navigation Co. Ltd.	ABAVA	FISH CARRIER	POL	1992	7,057	6,200	16	CYPRUS	P
Chiquita Brands Inc.	Scanreeler Marine Co. Ltd.	AMATA	FISH CARRIER	POL	1991	7,392	6,232	16	CYPRUS	P
Chiquita Brands Inc.	Narvel Ltd.	CHIQUITA FRANCES	FREIGHTER/REEFER	NOR	1992	7,944	10,963	20	BAHAMAS	P
Chiquita Brands Inc.	Narvel Ltd.	CHIQUITA BRENDA	FREIGHTER/REEFER	NOR	1993	8,665	11,793	22	BAHAMAS	P
CRH Shipping Ltd.	CRH Shipping Ltd.	FRANCES L	CONTAINERSHIP	JPN	1991	19,595	15,646	22	BAHAMAS	P
Chiquita Brands Inc.	Elke Shipping Ltd.	CHIQUITA BARACOA	FREIGHTER/REEFER	JPN	1985	12,660	13,613	24	BAHAMAS	P
Chiquita Brands Inc.	Kyoto Shipping Ltd.	CHIQUITA BARU	FREIGHTER/REEFER	JPN	1984	12,659	13,556	23	HONG KONG	P
Chiquita Brands Inc.	GPH Shipping Ltd.	COURTNEY L	CONTAINERSHIP	JPN	1992	19,595	15,593	22	BERMUDA	P
Chiquita Brands Inc.	Elke Shipping Ltd.	CHIQUITA BURICA	FREIGHTER/REEFER	JPN	1985	12,659	13,636	24	BAHAMAS	P
Chiquita Brands Inc.	BVS Ltd.	CHIQUITA ROSTOCK	FREIGHTER/REEFER	GEU	1993	10,842	12,850	22	BAHAMAS	P
Chiquita Brands Inc.	CRH Shipping Ltd.	EDYTH L	CONTAINERSHIP	JPN	1990	19,595	15,672	22	BAHAMAS	P
Chiquita Brands Inc.	Lake Biwa Shipping Ltd.	CHIQUITA BOCAS	FREIGHTER/REEFER	JPN	1985	12,659	13,584	20	HONG KONG	P
Chiquita Brands Inc.	BVS Ltd.	CHIQUITA BREMEN	FREIGHTER/REEFER	GEU	1992	10,842	12,890	21	BAHAMAS	P
Canoco Inc.	Canoco Shipping Co.	CONSTITUTION	TANKER	JPN	1978	43,850	81,131	16	LIBERIA	P
Canoco Inc.	A.T.-Sentinel Inc.	SENTINEL	TANKER	JPN	1986	60,339	106,650	14	LIBERIA	P
Exxon Corp.	Esso Sociedad Anonima Petrolera Argentina	ESSO RIO GRANDE	TANKER	ARG	1982	11,503	15,450	13	LIBERIA	P
Exxon Corp.	Esso Sengaku K.K.	ESSO YOSHINO MARU	TANKER	JPN	1984	1,360	2,962	13	JAPAN	P
Exxon Corp.	Esso Marine U.K. Ltd.	ESSO TENBY	TANKER	GBI	1970	2,144	3,429	0	UNITED KINGDOM	P
Exxon Corp.	Esso Marine U.K. Ltd.	ESSO INVERNESS	TANKER	GBI	1971	2,144	3,419	13	UNITED KINGDOM	P
Exxon Corp.	Esso Marine U.K. Ltd.	ESSO MILFORD HAVEN	TANKER	SWD	1968	10,631	18,377	17	UNITED KINGDOM	P
Exxon Corp.	Esso Marine U.K. Ltd.	ESSO FAWLEY	TANKER	SWD	1967	10,631	18,377	17	UNITED KINGDOM	P
Exxon Corp.	Esso Marine U.K. Ltd.	ESSO SEVERN	TANKER	GBI	1975	11,897	20,776	16	UNITED KINGDOM	P
Exxon Corp.	Esso Norge A.S.	ESSO SLAGEN	TANKER	SWD	1968	9,762	18,797	17	NORWAY	P
Exxon Corp.	Esso Marine U.K. Ltd.	ESSO MERSEY	TANKER	GBI	1972	11,898	20,510	16	UNITED KINGDOM	P
Exxon Corp.	Esso Sociedad Anonima Petrolera Argentina	ESSO BAHIA BLANCA	TANKER	JPN	1974	12,806	22,861	15	LIBERIA	P
Exxon Corp.	Esso Marine U.K. Ltd.	ESSO AVON	TANKER	NTH	1981	1,599	3,134	0	UNITED KINGDOM	P
Exxon Corp.	Esso Sociedad Anonima Petrolera Argentina	ESSO SANTA CRUZ	TANKER	CAN	1975	21,619	38,987	16	LIBERIA	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO AFRICA	TANKER	FRA	1975	133,969	274,467	16	BAHAMAS	P
Exxon Corp.	Esso Sociedad Anonima Petrolera Argentina	ESSO RIO NEGRO	TANKER	JPN	1975	19,568	38,711	16	LIBERIA	P
Exxon Corp.	Esso Societe Anonyme Francaise	ESSO PICARDIE	TANKER	FRA	1976	137,578	274,467	16	KERGUELEN	P
Exxon Corp.	Esso Societe Anonyme Francaise	ESSO PARENTIS	TANKER	JPN	1973	13,544	22,698	15	FRANCE	P
Exxon Corp.	Esso Societe Anonyme Francaise	ESSO LANGUEDOC	TANKER	GFR	1973	126,186	256,726	16	FRANCE	P
Exxon Corp.	Esso Societe Anonyme Francaise	ESSO NORMANDIE	TANKER	FRA	1974	137,578	274,333	16	FRANCE	P
Exxon Corp.	Esso Societe Anonyme Francaise	ESSO PORT JEROME	TANKER	JPN	1972	13,544	22,726	15	FRANCE	P
Exxon Corp.	Esso Sociedad Anonima Petrolera Argentina	ESSO SAN SEBASTIAN	TANKER	CAN	1976	21,619	38,987	15	LIBERIA	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO DEMETIA	TANKER	SWD	1973	123,375	258,979	16	BERMUDA	P
Exxon Corp.	Imperial Oil Ltd.	IMPERIAL BEDFORD	TANKER	CNL	1969	9,500	13,980	14	CANADA	P
Exxon Corp.	Imperial Oil Ltd.	IMPERIAL ST. CLAIR	CHEMICAL TANKER	CNL	1974	7,964	12,708	15	CANADA	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO GENEVA	TANKER	JPN	1975	149,608	307,235	16	BAHAMAS	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO WESTERNPORT	L.P.G. TANKER	FRA	1977	57,830	66,769	17	BAHAMAS	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO PALM BEACH	TANKER	JPN	1978	31,677	50,801	16	BAHAMAS	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO MELBOURNE	TANKER	JPN	1974	17,210	28,963	16	SINGAPORE	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO KADHSIUNG	TANKER	CHT	1983	54,537	91,821	15	BAHAMAS	P
Exxon Corp.	Esso Marine U.K. Ltd.	ESSO PENZANCE	TANKER	GBI	1971	2,144	3,402	14	UNITED KINGDOM	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO HONOLULU	TANKER	JPN	1974	139,150	283,399	16	BAHAMAS	P
Exxon Corp.	Esso Marine U.K. Ltd.	ESSO CLYDE	TANKER	GBI	1972	11,897	20,776	16	UNITED KINGDOM	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO ORIENT	TANKER	GFR	1974	50,235	99,980	16	SINGAPORE	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO NASSAU	TANKER	CHT	1982	54,537	91,601	15	BAHAMAS	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO MEXICO	TANKER	CHT	1982	54,563	91,741	15	BAHAMAS	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO CORAL GABLES	TANKER	JPN	1975	19,568	36,968	16	SINGAPORE	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO HAWAII	TANKER	JPN	1975	139,150	283,276	15	BAHAMAS	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO JURONG	TANKER	JPN	1981	3,265	5,200	12	SINGAPORE	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO BAYWAY	TANKER	JPN	1978	31,677	50,915	16	BAHAMAS	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO TEES	TANKER	JPN	1970	12,975	21,116	15	SINGAPORE	P

U.S. PARENT COMPANY FOREIGN FLAG SHIPS

Source: U.S. Maritime Administration

Parent Co.	Direct Owner	Name	Class	Where Built	Year Built	GRT	DWT	SPEED	FLAG	ON PARENT
Exxon Corp.	Esso Marine U.K. Ltd.	ESSO TYNE	TANKER	JPN	1974	13,340	22,333	14	UNITED KINGDOM	P
Exxon Corp.	Esso International Shipping (Bahamas) Co. Ltd.	ESSO KAWASAKI	TANKER	JPN	1974	149,608	307,431	16	BAHAMAS	P
Exxon Corp.	The Imperial Pipe Line Co. Ltd.	IMPERIAL ACADIA	TANKER	CNL	1966	7,068	10,475	14	CANADA	P
Exxon Corp.	Imperial Oil Ltd.	IMPERIAL SKEENA	TANKER	CAN	1970	3,047	4,856	13	CANADA	P
Fairfield-Maxwell Ltd.	Hitorio Shipping S.A.	CHOFU	BULK CARRIER	JPN	1987	14,499	23,319	14	PANAMA	P
Fairfield-Maxwell Ltd.	Sun River Investment S.A.	YOHFU	BULK CARRIER	JPN	1987	15,941	26,712	14	PANAMA	P
Fairfield-Maxwell Ltd.	Sun River Investment S.A.	KAIFU	FREIGHTER/REEFER	JPN	1988	4,939	6,536	17	PANAMA	P
Fairfield-Maxwell Ltd.	Purple Line Holding S.A.	HAKUFU	BULK CARRIER	JPN	1987	15,944	26,682	14	PANAMA	P
Fairfield-Maxwell Ltd.	Olympic International Ltd.	KEIYO MARU	FREIGHTER/REEFER	JPN	1983	6,684	7,079	18	JAPAN	P
Fairfield-Maxwell Ltd.	Hitorio Shipping S.A.	KOHFU	FREIGHTER/REEFER	JPN	1986	4,936	6,544	17	PANAMA	P
Fairfield-Maxwell Ltd.	Great American Lines Inc.	SUNBELT DIXIE	CAR CARRIER	JPN	1978	11,447	12,730	18	LIBERIA	P
Fairfield-Maxwell Ltd.	Eurus Maritime S.A.	SHOFU	FREIGHTER/REEFER	JPN	1986	4,936	6,532	17	PANAMA	P
Fairfield-Maxwell Ltd.	Eurus Maritime S.A.	OTARU REX	FREIGHTER/REEFER	JPN	1986	4,963	6,530	17	PANAMA	P
Fairfield-Maxwell Ltd.	Eurus Maritime S.A.	OAHU REX	FREIGHTER/REEFER	JPN	1986	4,963	6,553	17	PANAMA	P
Fairfield-Maxwell Ltd.	Eurus Maritime S.A.	KEIFU	CHEMICAL TANKER	JPN	1987	7,178	12,742	13	PANAMA	P
Fairfield-Maxwell Ltd.	Apollo Shipping Properties S.A.	TENFU	FREIGHTER/REEFER	JPN	1988	4,939	6,530	17	PANAMA	P
Fairfield-Maxwell Ltd.	Olympic International Ltd.	BIYO MARU	FREIGHTER/REEFER	JPN	1984	5,725	6,788	18	JAPAN	P
Gypsum Transportation Ltd.	Gypsum Transportation Ltd.	GYP SUM KING	BULK CARRIER	CNL	1975	12,839	18,314	15	BERMUDA	P
Gypsum Transportation Ltd.	Gypsum Transportation Ltd.	GYP SUM BARON	BULK CARRIER	CNL	1976	12,839	18,314	15	BERMUDA	P
Gypsum Transportation Ltd.	Gypsum Transportation Ltd.	A. V. KASTNER	BULK CARRIER	KRS	1987	12,702	19,075	15	BERMUDA	P
Kedma Ltd.	David Shipping Ltd.	DAVID I	BULK CARRIER	JPN	1973	16,008	26,976	14	LIBERIA	P
Kedma Ltd.	Joshua Shipping Ltd.	JOSHUA	BULK CARRIER	JPN	1976	19,663	34,410	15	LIBERIA	P
Kedma Ltd.	Loyla Shipping Ltd.	DEBORAH	ORE/BULK/OIL	JPN	1973	94,900	168,685	0	LIBERIA	P
Kedma Ltd.	Rafael Shipping Ltd.	RAFAEL	BULK CARRIER	JPN	1973	19,831	34,186	13	LIBERIA	P

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U.S. PARENT COMPANY FOREIGN FLAG SHIPS

Source: U.S. Maritime Administration

Parent Co.	Direct Owner	Name	Class	Where Built	Year Built	GRT	DWT	SPEED	FLAG	ON PARENT
Keystone Shipping Co.	Serena Navigation Ltd.	SERENA SKY	TANKER	JPN	1976	77,588	154,934	16	LIBERIA	P
Manufacturers Hanover Corporation	Manufacturers Hanover Trust Co., Trustee	STAR BALTIC	TANKER	NOR	1976	17,679	31,502	16	BAHAMAS	P
Manufacturers Hanover Corporation	Manufacturers Hanover Trust Co., Trustee	STAR BERGEN	TANKER	NOR	1977	17,679	31,502	16	BAHAMAS	P
Manufacturers Hanover Corporation	Manufacturers Hanover Trust Co., Trustee	STAR PEMBROKE	TANKER	NOR	1977	17,679	27,000	16	BAHAMAS	P
Marine Transport Lines Inc.	Oswego Chemical Carriers Corp.	CALINA	L.P.G. TANKER	JPN	1967	13,482	15,661	16	LIBERIA	P
Marine Transport Lines Inc.	Equili Co.	KENTUCKY	TANKER	JPN	1980	42,175	81,279	16	PANAMA	P
Marine Transport Lines Inc.	Oswego Chemical Carriers Corp.	SAVONETTA	L.P.G. TANKER	NTH	1964	9,942	10,947	16	LIBERIA	P
Marine Transport Lines Inc.	Oswego Chemical Carriers Corp.	AMELINA	L.P.G. TANKER	NTH	1964	9,954	10,922	17	LIBERIA	P
Marine Transport Lines Inc.	Equili Co. II	WEST VIRGINIA	TANKER	JPN	1981	42,175	81,279	16	PANAMA	P
Marine Transport Lines Inc.	L. & C. III Ltd.	HARBEL TAPPER	FREIGHTER	JPN	1981	8,148	11,683	17	LIBERIA	P
Marine Transport Lines Inc.	L. & C. II Ltd.	HARBEL CUTLASS	FREIGHTER	JPN	1980	8,752	11,733	15	LIBERIA	P
Maru Shipping Co. Inc.	Maru Shipping Co. Inc.	BILLIE FAY	BULK CARRIER	JPN	1977	17,959	30,853	16	LIBERIA	P
Maru Shipping Co. Inc.	Maru Shipping Inc. & General Ore Int'l	HELEN B.	BULK CARRIER	POL	1983	36,659	69,420	13	LIBERIA	P
Meridian Trust Co.	Meridian Trust Co.	PIONEER	TANKER	KRS	1993	53,858	96,724	15	LIBERIA	P
Meridian Trust Co.	Meridian Trust Co.	GUARDIAN	TANKER	KRS	1992	53,772	96,920	15	LIBERIA	P
Meridian Trust Co.	Meridian Trust Co.	PATRIOT	TANKER	KRS	1992	53,772	96,920	15	LIBERIA	P
Meridian Trust Co.	Meridian Trust Co.	CONTINENTAL	TANKER	KRS	1993	53,848	96,724	15	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping Co. Ltd.	LUBCHEM	CHEMICAL TANKER	SPN	1973	1,999	3,310	13	UNITED KINGDOM	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	ALCIDES	TANKER	JPN	1971	72,540	136,304	16	MARSHALL ISLANDS	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	WANETA	TANKER	JPN	1982	41,135	81,282	0	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	SAUCON	TANKER	JPN	1983	19,580	38,452	15	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	SACHEM	TANKER	FIN	1974	18,235	31,102	16	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	SACONA	TANKER	JPN	1982	19,580	33,187	0	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	ASTRAL	TANKER	JPN	1975	60,946	127,505	16	LIBERIA	P



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U.S. PARENT COMPANY FOREIGN FLAG SHIPS

Source: U.S. Maritime Administration

Parent Co.	Direct Owner	Name	Class	Where Built	Year Built	GRT	DWT	SPEED	FLAG	ON PARENT
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	SWIFT	TANKER	JPN	1973	119,969	272,494	15	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	SAMOSE	TANKER	JPN	1982	19,580	33,235	0	LIBERIA	P
Mobil Oil Corporation	Mobil Tankers Ltd.	FLINDERS	TANKER	JPN	1982	93,939	149,235	15	AUSTRALIA	P
Mobil Oil Corporation	Probo Pty. Ltd.	TASMAN	TANKER	YUG	1990	20,662	34,808	15	AUSTRALIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	HAWK	TANKER	JPN	1976	138,601	279,938	16	MARSHALL ISLANDS	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	EAGLE	TANKER	JPN	1993	160,347	284,493	16	MARSHALL ISLANDS	P
Mobil Oil Corporation	Mobil Oil Francaise (Dept. Transports Maritimes)	ATHOS	TANKER	JPN	1974	134,478	276,221	16	FRANCE	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	SYLVAN ARROW	CHEMICAL TANKER	YUG	1983	22,587	39,731	15	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	FALCON	TANKER	JPN	1976	138,601	284,089	15	MARSHALL ISLANDS	P
Mobil Oil Corporation	Mobil Oil Australia Ltd.	MAWSON	TANKER	AST	1972	15,579	24,489	15	AUSTRALIA	P
Mobil Oil Corporation	Mobil Oil Francaise (Dept. Transports Maritimes)	D'ARTAGNAN	TANKER	JPN	1974	134,478	275,225	17	FRANCE	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	WABASHA	TANKER	JPN	1975	50,222	81,278	16	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	WAPELLO	TANKER	JPN	1982	41,135	81,283	0	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	MAGNOLIA	TANKER	JPN	1973	139,092	280,428	16	MARSHALL ISLANDS	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	SHABONEE	TANKER	FIN	1974	18,235	31,102	16	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	ROYAL ARROW	CHEMICAL TANKER	YUG	1983	22,587	39,776	15	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	SAUDI GLORY	TANKER	JPN	1974	122,296	276,368	13	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	MOBIL ALADDIN	TANKER	SWD	1974	68,502	140,803	16	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	SATUCKET	TANKER	ITL	1971	16,861	30,397	16	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	SAUDI SPLENDOR	TANKER	JPN	1975	125,393	280,511	13	LIBERIA	P
Mobil Oil Corporation	Mobil Shipping & Transportation Co.	HARRIER	TANKER	JPN	1975	135,712	276,069	16	MARSHALL ISLANDS	P
Nicar Inc.	Deguano Trading Pte Ltd.	NP TATINA	TANKER	JPN	1976	46,620	96,550	16	SINGAPORE	P
Occidental Petroleum Corp.	Oxychem Shipping Ltd.	ARMAND HAMMER	CHEMICAL CARRIER	JPN	1967	32,194	59,806	16	MALTA	P
OMI Corp.	Volga Transport Inc.	VOLGA	TANKER	JPN	1981	33,932	59,998	15	LIBERIA	P
OMI Corp.	Rowayton Shipping Ltd.	OCEAN SPIRIT	TANKER	JPN	1982	31,821	54,130	15	LIBERIA	P
OMI Corp.	Rowayton Shipping Ltd.	EBRO	ORE/BULK/OIL	JPN	1978	43,444	71,882	16	LIBERIA	P
OMI Corp.	Rowayton Shipping Ltd.	GENERAL	L.P.G. TANKER	JPN	1975	42,461	49,882	17	LIBERIA	P
OMI Corp.	Rowayton Shipping Ltd.	ALMA	TANKER	JPN	1988	18,055	29,999	14	LIBERIA	P
OMI Corp.	Sokolica Transport Inc.	SOKOLICA	TANKER	JPN	1975	76,883	133,300	15	LIBERIA	P
OMI Corp.	Rowayton Shipping Ltd.	CZANTORIA	TANKER	JPN	1975	76,883	146,110	15	LIBERIA	P
OMI Corp.	Rowayton Shipping Ltd.	PANDA	CHEMICAL TANKER	YUG	1987	44,322	83,651	14	LIBERIA	P
OMI Corp.	White Sea Corp.	WHITE SEA	TANKER	JPN	1975	76,472	132,500	15	LIBERIA	P
OMI Corp.	Saybrook Shipping Ltd.	PAGODA	TANKER	JPN	1988	18,055	29,996	14	LIBERIA	P
OMI Corp.	Avac Ltd.	ELBE	TANKER	JPN	1984	38,529	66,800	15	LIBERIA	P
OMI Corp.	Omi Avon Transport Inc.	CAIRO SEA	TANKER	JPN	1975	76,472	134,999	15	LIBERIA	P
OMI Corp.	Saugatuck Shipping Ltd.	PAULINA	CHEMICAL TANKER	JPN	1984	16,820	29,992	15	LIBERIA	P
OMI Corp.	Amazon Transport Inc.	SETTEBELLO	TANKER	PTG	1983	160,415	322,446	15	LIBERIA	P
OMI Corp.	Colorado Shipping Ltd.	COLORADO	TANKER	JPN	1980	44,731	81,278	15	LIBERIA	P
OMI Corp.	Darien Shipping Ltd.	PATRICIA	CHEMICAL TANKER	JPN	1984	16,820	29,974	15	LIBERIA	P
OMI Corp.	Limar Shipping Ltd.	LIMAR	TANKER	JPN	1988	18,055	29,999	14	LIBERIA	P
OMI Corp.	Mackenzie Navigation Co. Pte. Ltd.	MARITIME MOSAIC	BULK CARRIER	JPN	1993	38,379	73,657	14	SINGAPORE	P
OMI Corp.	Mendola II Transport Inc.	WILLOMI ALTA	TANKER	JPN	1990	76,992	133,300	14	LIBERIA	P
OMI Corp.	Mendola III Transport Inc.	WILLOMI TANANA	TANKER	JPN	1992	76,965	134,003	14	LIBERIA	P
OMI Corp.	Nile Transport Inc.	NILE	TANKER	JPN	1981	33,932	64,716	15	LIBERIA	P
Overseas Shipholding Group Inc.	Island Tanker S.A.	SHIRLEY	TANKER	JPN	1975	60,814	130,286	15	PANAMA	P
Overseas Shipholding Group Inc.	First United Shipping Corp.	WESTERN LION	TANKER	JPN	1974	130,539	269,117	16	LIBERIA	P
Overseas Shipholding Group Inc.	First Pacific Corp. & Second Pacific Corp.	PACIFIC HUNTER	TANKER	JPN	1979	17,960	32,109	0	LIBERIA	P
Overseas Shipholding Group Inc.	First Products Tankers Inc.	LUCY	TANKER	KRS	1986	36,512	64,000	14	LIBERIA	P
Overseas Shipholding Group Inc.	Exemplar Bulk Carriers Ltd.	EXEMPLAR	BULK CARRIER	KRS	1990	64,141	122,760	14	HONG KONG	P
Overseas Shipholding Group Inc.	Fourth Products Tankers Inc.	NEPTUNE	TANKER	KRS	1989	22,946	40,085	14	LIBERIA	P
Overseas Shipholding Group Inc.	Glasgow Bulk Carriers Ltd.	TRUDY	BULK CARRIER	KRS	1985	17,228	29,432	16	HONG KONG	P
Overseas Shipholding Group Inc.	Excelsior Bulk Carriers Ltd.	EXCELSIOR	BULK CARRIER	KRS	1990	64,141	122,829	15	HONG KONG	P
Overseas Shipholding Group Inc.	Interocean Tanker Corp.	SOUTHERN LION	TANKER	JPN	1975	126,850	269,085	16	LIBERIA	P
Overseas Shipholding Group Inc.	Commonwealth Shipping Co. Ltd.	ULLA	BULK CARRIER	KRS	1985	17,228	29,399	16	HONG KONG	P
Overseas Shipholding Group Inc.	ITI Shipping S.A.	RUTH M	TANKER	JPN	1975	60,814	128,300	15	PANAMA	P
Overseas Shipholding Group Inc.	Intercontinental Coal Transport Ltd.	EQUINOX	BULK CARRIER	KRS	1982	76,449	138,500	14	HONG KONG	P



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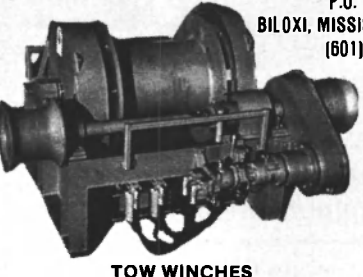

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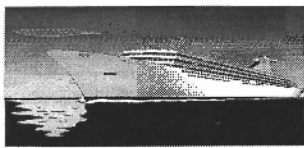
U.S. PARENT COMPANY FOREIGN FLAG SHIPS

Parent Co.	Direct Owner	Name	Class	Where Built	Year Built	GRT	DWT	SPEED	FLAG	ON PARENT
Overseas Shipholding Group Inc.	Enterprise Shipping Co. Ltd.	ENTERPRISE	BULK CARRIER	SWD	1973	64,741	117,955	15	HONG KONG	P
Overseas Shipholding Group Inc.	Edinburgh Bulk Carriers Ltd.	ENDEAVOR	BULK CARRIER	GFR	1975	64,552	122,933	16	HONG KONG	P
Overseas Shipholding Group Inc.	Diane Tanker Corp.	DIANE	TANKER	JPN	1987	38,241	64,140	0	LIBERIA	P
Overseas Shipholding Group Inc.	Concord Tanker S.A.	CONCORDIA C.	TANKER	JPN	1976	61,110	132,594	15	PANAMA	P
Overseas Shipholding Group Inc.	Columbia Tanker Corp.	COLUMBIA	TANKER	JPN	1989	144,139	258,076	14	LIBERIA	P
Overseas Shipholding Group Inc.	Chrismir Shipping Corp.	CHRISMIR	BULK CARRIER	KRS	1980	31,242	61,203	17	LIBERIA	P
Overseas Shipholding Group Inc.	Canopus Tankers Inc.	CANOPUS	TANKER	KRS	1981	18,402	31,000	15	LIBERIA	P
Overseas Shipholding Group Inc.	Atlantia Tanker Corp.	ATLANTIA	TANKER	JPN	1979	42,155	96,920	15	LIBERIA	P
Overseas Shipholding Group Inc.	Ania Tanker Corp.	ECLIPSE	TANKER	KRS	1989	78,244	135,134	0	LIBERIA	P
Overseas Shipholding Group Inc.	Amity Products Carriers Inc.	JULIE N	TANKER	JPN	1982	18,477	29,994	0	LIBERIA	P
Overseas Shipholding Group Inc.	Jostelle Shipping Co. Ltd.	JOSTELLE	BULK CARRIER	GFR	1975	63,863	122,970	16	HONG KONG	P
Overseas Shipholding Group Inc.	Delphina Tanker Corp.	DELPHINA	TANKER	KRS	1989	22,972	39,673	14	LIBERIA	P
Overseas Shipholding Group Inc.	Secand Products Tankers Inc.	SUZANNE	TANKER	KRS	1986	36,512	64,000	14	LIBERIA	P
Overseas Shipholding Group Inc.	Venus Tanker Corp.	VENUS V	TANKER	KRS	1981	42,047	79,999	15	LIBERIA	P
Overseas Shipholding Group Inc.	Vega Tanker Corp.	VEGA	TANKER	KRS	1989	22,972	39,710	14	LIBERIA	P
Overseas Shipholding Group Inc.	Timar Navigation Ltd.	NORTHERN LIGHT	BULK CARRIER	KRS	1981	31,006	65,592	13	LIBERIA	P
Overseas Shipholding Group Inc.	Third United Shipping Corp.	EASTERN LION	TANKER	JPN	1973	126,795	269,164	16	LIBERIA	P
Overseas Shipholding Group Inc.	Third Shipco Inc.	CONTINENTAL SPIRIT	BULK CARRIER	KRS	1983	35,603	65,224	17	LIBERIA	P
Overseas Shipholding Group Inc.	Mansfield Marine Corp.	MERIDIAN SKY	BULK CARRIER	KRS	1989	36,042	64,282	15	LIBERIA	P
Overseas Shipholding Group Inc.	Secand United Shipping Corp.	NORTHERN LION	TANKER	JPN	1974	126,850	269,117	16	LIBERIA	P
Overseas Shipholding Group Inc.	Saturn Bulk Carriers Inc.	SATURN	BULK CARRIER	KRS	1980	31,242	62,212	17	LIBERIA	P
Overseas Shipholding Group Inc.	Pluto Tankers Inc.	PLUTO	TANKER	KRS	1981	18,402	31,302	15	LIBERIA	P
Overseas Shipholding Group Inc.	Overseas Coal Transport Ltd.	ESPLANADE	BULK CARRIER	KRS	1982	76,449	138,500	14	HONG KONG	P
Overseas Shipholding Group Inc.	Olympia Tanker Corp.	OLYMPIA	TANKER	JPN	1990	144,139	258,076	14	LIBERIA	P
Overseas Shipholding Group Inc.	Oleron Tanker S.A.	VESTA	TANKER	KRS	1980	42,047	81,278	15	PANAMA	P
Overseas Shipholding Group Inc.	Northanger Shipping Corp.	CARIBBEAN SKY	BULK CARRIER	KRS	1989	36,042	64,282	15	LIBERIA	P
Overseas Shipholding Group Inc.	Matilde Tanker Corp.	MATILDE	TANKER	KRS	1989	78,244	135,134	0	LIBERIA	P
Overseas Shipholding Group Inc.	Marina Tanker Corp.	MARY ANN	TANKER	JPN	1986	38,241	64,239	14	LIBERIA	P
Overseas Shipholding Group Inc.	Third Products Tankers Inc.	URANUS	TANKER	KRS	1988	22,946	39,451	15	LIBERIA	P
Premier Cruise Lines Ltd.	Merchant Ships Trustees Ltd. as Trustees	STARSHIP ATLANTIC	COMBO PASS & CARGO	FRA	1982	19,337	7,000	24	LIBERIA	P
Premier Cruise Lines Ltd.	Premier Cruise Lines Ltd.	STARSHIP OCEANIC	COMBO PASS & CARGO	ITL	1965	19,500	8,738	20	BAHAMAS	P
Premier Cruise Lines Ltd.	Noel Shipping Ltd.	STARSHIP MAJESTIC	COMBO PASS & CARGO	ITL	1972	17,042	2,352	26	BAHAMAS	P
Sea-Land Service Inc.	Murcia Del Mar S.A.	LA TRINITY	CONTAINERSHIP	JPN	1980	6,764	9,809	15	PANAMA	P
Sea-Land Service Inc.	Troy Compania Naviera S.A.	PANAREA I	CONTAINERSHIP	JPN	1980	6,807	9,663	16	PANAMA	P
Sea-Land Service Inc.	Sandy Steamship Co. S.A.	SANTA PAULA	CONTAINERSHIP	JPN	1983	8,428	12,066	16	PANAMA	P
Sea-Land Service Inc.	Marine Ro-Ro Feedships Corp.	SEA LINK	CONTAINERSHIP	JPN	1983	8,654	12,083	16	LIBERIA	P
Sea-Land Service Inc.	Marine Ro-Ro Feedships Corp.	SEA LARK	CONTAINERSHIP	JPN	1984	8,654	12,085	16	LIBERIA	P
Sea-Land Service Inc.	Mar del Plata Armadora S.A.	OAHU	CONTAINERSHIP	JPN	1980	6,807	9,809	16	PANAMA	P
Sea-Land Service Inc.	InterSea Operations Ltd.	SEA PIONEER	CONTAINERSHIP	JPN	1978	17,618	15,417	16	BAHAMAS	P
Sea-Land Service Inc.	InterSea Operations Ltd.	SEA ADVENTURE	CONTAINERSHIP	JPN	1978	17,618	15,417	16	BAHAMAS	P
Sea-Land Service Inc.	InterSea Operations Ltd.	SEA LEADER	CONTAINERSHIP	JPN	1978	17,618	15,417	16	BAHAMAS	P
Sea-Land Service Inc.	Shelly Bay Ltd.	SHELLY BAY	CONTAINERSHIP	JPN	1983	8,635	12,067	16	PANAMA	P
Seaboard Trading & Shipping	African Fern Shipping Ltd.	AFRICAN FERN	BULK CARRIER	JPN	1981	5,222	9,124	15	LIBERIA	P
Seaboard Trading & Shipping	African Camellia Shipping Ltd.	AFRICAN CAMELLIA	BULK CARRIER	JPN	1980	5,085	8,991	15	LIBERIA	P
Seaboard Trading & Shipping	African Dahlia Shipping Ltd.	AFRICAN DAHLIA	BULK CARRIER	JPN	1980	5,085	8,991	15	LIBERIA	P
Seaboard Trading & Shipping	African Gardenia Shipping Ltd.	AFRICAN GARDENIA	BULK CARRIER	JPN	1981	5,220	9,101	15	LIBERIA	P
Seaboard Trading & Shipping	African Evergreen Shipping Ltd.	AFRICAN EVERGREEN	BULK CARRIER	JPN	1981	5,222	9,122	15	LIBERIA	P
Seaboard Trading & Shipping	Carlos Shipping Ltd.	AFRICAN AZALEA	BULK CARRIER	JPN	1978	5,360	8,986	15	LIBERIA	P
Seaboard Trading & Shipping	Seaboard Express Ltd.	SEABOARD EXPRESS	RO/RO	FRA	1980	7,878	10,208	0	PANAMA	P
Seaboard Trading & Shipping	Buttercup Shipping Ltd.	AFRICAN BEGONIA	BULK CARRIER	JPN	1979	5,377	8,944	15	LIBERIA	P
Tankship Transport Ltd.	Empress Partners L.P.	SEA EMPRESS	TANKER	JPN	1976	211,359	423,677	16	BAHAMAS	P
Texaco Inc.	Texaco Panama Inc.	STAR JAPAN	TANKER	JPN	1975	129,973	267,732	16	LIBERIA	P
Texaco Inc.	Texaco Panama Inc.	STAR WESTCHESTER	TANKER	BRZ	1981	49,754	88,389	15	BAHAMAS	P
Texaco Inc.	Texaco Panama Inc.	STAR AFRICA	TANKER	JPN	1974	126,974	274,597	0	BAHAMAS	P
Texaco Inc.	Texaco Panama Inc.	STAR ITALIA	TANKER	JPN	1974	129,973	263,620	15	BAHAMAS	P
Texaco Inc.	Texaco Panama Inc.	STAR LONDON	TANKER	SPN	1976	131,850	272,739	16	BAHAMAS	P
Texaco Inc.	Texaco Panama Inc.	STAR LOUISIANA	TANKER	PTG	1975	65,407	115,829	16	BAHAMAS	P
Texaco Inc.	Texaco Panama Inc.	STAR WILMINGTON	TANKER	BRZ	1983	49,754	96,296	15	BAHAMAS	P
Texaco Inc.	Texaco Overseas Tankship Ltd.	STAR WINDSOR	TANKER	JPN	1980	49,809	79,997	15	UNITED KINGDOM	P
Texaco Inc.	Texaco Overseas Tankship Ltd.	STAR WESTMINSTER	TANKER	JPN	1981	49,809	79,999	15	UNITED KINGDOM	P

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U.S. PARENT COMPANY FOREIGN FLAG SHIPS

Parent Co.	Direct Owner	Name	Class	Where Built	Year Built	GRT	DWT	SPEED	FLAG ON PARENT
Texaco Inc.	Texaco Canada Inc.	A. G. FARQUHARSON	TANKER	CNL	1969	5,038	6,538	13	CANADA P
Texaco Inc.	Texaco Canada Inc.	LE BRAVE	TANKER	JPN	1977	8,545	9,657	14	CANADA P
Texaco Inc.	Refineria Panama S.A.	CHILBRE	TANKER	USA	1970	2,105	3,678	0	PANAMA P
Texaco Inc.	Refineria Panama S.A.	TABOGA	TANKER	JPN	1971	2,978	5,723	0	PANAMA P
Texaco Inc.	Getty Marine Corp.	STAR KANSAS	TANKER	SWD	1976	65,407	112,999	17	BAHAMAS P
Texaco Inc.	Texaco Panama Inc.	STAR SOUTH AMERICA	TANKER	SPN	1976	130,958	268,522	16	LIBERIA P
The Coastal Corporation	Jada Carriers Corp.	BAY RIDGE	TANKER	USA	1979	103,812	224,428	16	LIBERIA P
The Coastal Corporation	Golden Carriers Corp.	COASTAL GOLDEN	ORE/BULK/OIL	KRS	1983	78,164	129,017	13	LIBERIA P
The Connecticut Bank & Trust Co., as Trustee	The Connecticut Bank & Trust Co., as Trustee	INDEPENDENCE	TANKER	JPN	1976	117,646	274,774	16	LIBERIA P
The Connecticut Bank & Trust Co., as Trustee	The Connecticut Bank & Trust Co., as Trustee	EUROPE	TANKER	JPN	1975	122,394	276,050	17	LIBERIA P
Tropical Shipping Co. Ltd.	Birdsall Shipping S.A.	TROPIC JADE	RORO	JPN	1978	1,813	2,536	15	SAINT VINCENT P
Tropical Shipping Co. Ltd.	Tropical Shipping & Construction Co. Ltd.	TROPIC QUEST	RORO	GFR	1983	7,947	9,989	15	SAINT VINCENT P
Tropical Shipping Co. Ltd.	Birdsall Shipping S.A.	TROPIC SUN	RORO	SGN	1992	6,536	7,450	15	PANAMA P
Tropical Shipping Co. Ltd.	Tropical Shipping & Construction Co. Ltd.	TROPIC PALM	RORO	USA	1978	2,944	4,810	13	SAINT VINCENT P
Tropical Shipping Co. Ltd.	Tropical Shipping & Construction Co. Ltd.	TROPIC REIGN	RORO	GFR	1984	7,947	9,793	15	SAINT VINCENT P
Tropical Shipping Co. Ltd.	Birdsall Shipping S.A.	TROPIC LURE	RORO	JPN	1983	1,795	2,563	0	SAINT VINCENT P
Tropical Shipping Co. Ltd.	Birdsall Shipping S.A.	TROPIC KEY	RORO	JPN	1980	1,786	2,530	15	SAINT VINCENT P
Tropical Shipping Co. Ltd.	Birdsall Shipping S.A.	TROPIC MIST	RORO	JPN	1983	1,795	2,563	0	SAINT VINCENT P
Tropical Shipping Co. Ltd.	Birdsall Shipping S.A.	TROPIC TIDE	RORO	SGN	1993	6,536	7,430	15	PANAMA P
Valica Shipping Co. Ltd.	Valica Shipping Co. Ltd.	W. H. BLOUNT	BULK CARRIER	KRS	1984	35,904	65,402	15	BAHAMAS P
Valica Shipping Co. Ltd.	Valica Shipping Co. Ltd.	BERNARDO QUINTANA A.	BULK CARRIER	JPN	1984	37,168	67,044	14	BAHAMAS P
Wilmington Trust Co., as Trustee	Wilmington Trust Co., as Trustee	BROOKLYN	TANKER	USA	1973	103,813	229,727	18	MARSHALL ISLANDS P

Smit-Lloyd PSVs Placed Under Charter



Smit-Lloyd's two new platform supply vessels (PSVs) have secured charters from Aberdeen Service Company (North Sea) Ltd. (ASCo). The two 5,440-bhp PSVs will form the core of medium class vessels of this type within the ASCo pool. The vessels were acquired as hulls at ItalThai Marine's Bangkok yard, following cancellation of an order placed by Norwegian interests. Smit-Lloyd modified the original "TRIM S-166" design to account for North Sea operational requirements.

The main task of the two PSVs will be to service ASCo's pool of North Sea clients — BP, Conoco, Amoco and Kerr-McGee — in the central and northern North Sea. Their activities will include support for BP's drilling operations west of Shetland.

The 2,580-dwt PSVs have 600 sq. m. of free deck area, length overall of 234.6 ft. (71.5 m), beam of 53.1 ft. (16.2 m) and maximum draft of 17 ft. (5.2 m). They are equipped with two bowthrusters and a sternthruster.

Smit-Lloyd Manager Aart Broek said, "We believe that our enhancements to the original design ... represent an ideal specification for P-2-type vessels for North Sea operation. The substantial multipurpose underdeck capacities, coupled with an enclosed deck area providing for safe operation when working west of Shetland, make these vessels attractive new entrants into the market."

In addition, Smit-Lloyd has won a contract extension from Hamilton (U.K.) for the *Smit-Lloyd 91*, currently supporting the company's operations in the Liverpool Bay area. The 9,000-bhp *Smit-Lloyd 91* has spent the last 18 months supporting the jackup rig *Trident 14*, which is engaged in the drilling the development wells for Hamilton's Liverpool Bay project. The AHTSV will continue in this role until the program is completed, toward the end of 1996.

Rockwell Developments Focus On Needs Of Next Century

Rockwell's Dolphin semisubmersible is an unmanned vehicle of use for remote minehunting, and for hydrographic research in the oceanographic community. The Dolphin is self-contained and uses Global Positioning System (GPS) technology for autonomous navigation.

Rockwell announced that successful demonstrations by the U.S. Navy of the Remote Minehunting Operation Prototype (RMOP) have proven its Dolphin semisubmersible vehicle (pictured) offers a cost-effective, quick-reaction robotic capability to conduct exploratory mine reconnaissance for both open and littoral environments.

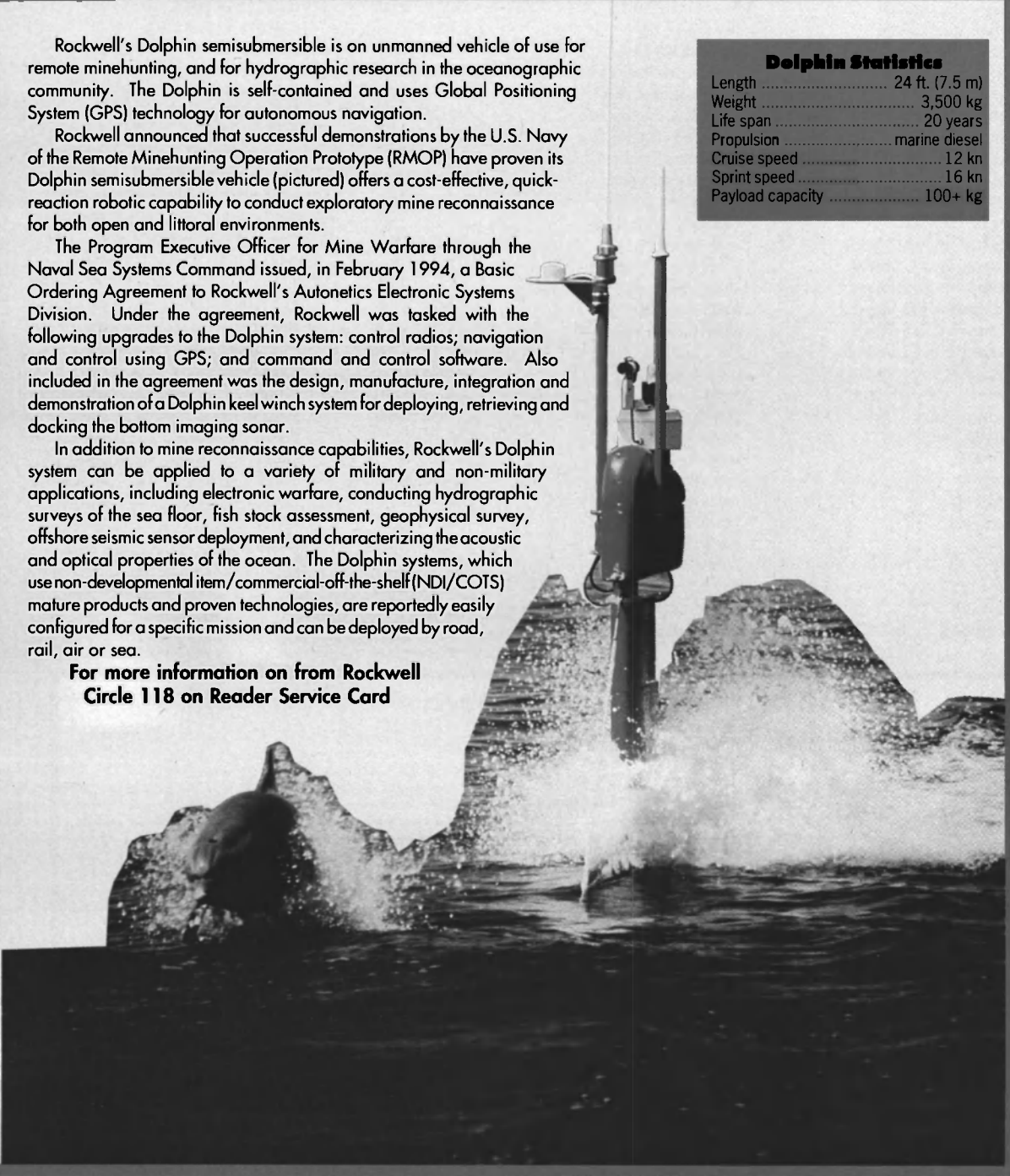
The Program Executive Officer for Mine Warfare through the Naval Sea Systems Command issued, in February 1994, a Basic Ordering Agreement to Rockwell's Autonetics Electronic Systems Division. Under the agreement, Rockwell was tasked with the following upgrades to the Dolphin system: control radios; navigation and control using GPS; and command and control software. Also included in the agreement was the design, manufacture, integration and demonstration of a Dolphin keel winch system for deploying, retrieving and docking the bottom imaging sonar.

In addition to mine reconnaissance capabilities, Rockwell's Dolphin system can be applied to a variety of military and non-military applications, including electronic warfare, conducting hydrographic surveys of the sea floor, fish stock assessment, geophysical survey, offshore seismic sensor deployment, and characterizing the acoustic and optical properties of the ocean. The Dolphin systems, which use non-developmental item/commercial-off-the-shelf (NDI/COTS) mature products and proven technologies, are reportedly easily configured for a specific mission and can be deployed by road, rail, air or sea.

For more information on from Rockwell
Circle 118 on Reader Service Card

Dolphin Statistics

Length	24 ft. (7.5 m)
Weight	3,500 kg
Life span	20 years
Propulsion	marine diesel
Cruise speed	12 kn
Sprint speed	16 kn
Payload capacity	100+ kg



High-Speed Vessel Building Proposals For City Of Vallejo

Six proposals have been received by the City of Vallejo to build the city's two high-speed ferry boats. The deadline for submitting proposals was May 15.

Those who submitted proposals were Halter Marine, Inc. (of Trinity Marine Group), Gulfport, Miss.; Peterson Builders, Inc., Sturgeon Bay, Wis.; Dakota Creek Industries, Inc., Anacortes, Wash.; Nichols Brothers Boat Builders, Freeland, Wash.; Bay Ship and Yacht and Wavemaster USA, both of Alameda, Calif.; and Martinac Shipbuilding of Tacoma, Wash.

"Proposals will be screened to determine compliance with basic legal and regulatory requirements. Following the initial screening, all proposals will be evaluated to determine the competitive range, at which time negotiations will begin with selected builders," said **Pamela Belchamber**, transportation manager.

"Due to the nature of negotiated procurement," and related federal procedures, this process is expected to take several weeks, and during this time price information is kept confidential," she said.

In mid-May, the Vallejo City Council also approved appointment of naval architects Art Anderson Associates, Seattle, Wash., to assist the Vallejo Public Works Department in evaluating the proposals, a process in which the prospective ferry operator, Blue & Gold Fleet, will also participate.

SGC Transceiver Control Head Offers Clear Signal Quality

PowerTalk™ is a full-featured ADSP/SNS control head for SGC's Model SG-2000 or SG-2000SP transceiver. PowerTalk incorporates adaptive digital signal processing and spectral noise subtraction to provide unsurpassed signal quality on the HF bands, with user-friendly operation via LED indicators.

The PowerTalk ADSP reduces unwanted noise. In addition, the operator can adjust the frequency range, and then the center frequency up or down. The SNS feature subtracts noise in the spectrum where voice modulation is not present, further enhancing the signal. The result, according to SGC, is clear signal quality.

A notch filter feature allows up to five tones to be suppressed simultaneously, and user memory (eight pre-set and seven user-programmable) allows the operator to configure the frequency and mode desired for ease of operation. Surface mount technology ensures reliability in any environment.

The PowerTalk control head is designed to operate with the SG-2000 or SG-2000SP transceiver. The SG-2000 series of SSB radiotele-

phones are 150 watts and 644 channels, and operate in the 1.6 to 30 MHz range.

For more information on SGC
Circle 146 on Reader Service Card

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Navtech-USSA announced an insurance program available to work-

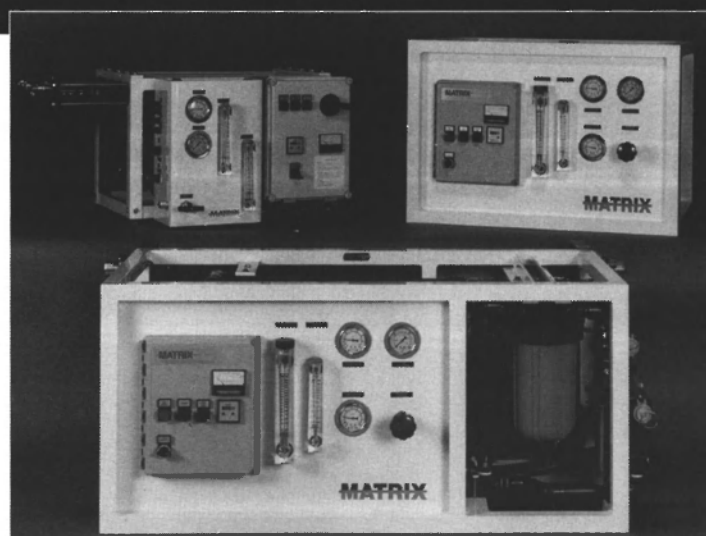
ing marine surveyors. (A policy for Omissions and Errors including liability with various limits, underwritten by American Fire and Marine Insurance Co. of Marine Managers of London Ltd.)

The policy is a joint effort by **Terri Healey** of Healey Insurance Agency, Reading, Mass.; the board of Navtech US Surveyors; and board member **Rob Scanlan**. This policy is available exclusively to active members of Navtech US Surveyors.

Each member's credentials will be reviewed by the board and by the underwriter upon application. Members of other organizations including SAMS and NAMS are invited to explore this opportunity by contacting Navtech-USSA. Navtech-USSA trains potential marine surveyors via its Navtech Marine Surveyors Course. USSA is a private organization for working marine surveyors who wish to stay current on USCG and ABYC inspection information.

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Orkot Engineered Prods., 2535 Prairie Rd., Unit D, Eugene, OR 97402

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CONTROL SYSTEM - Monitoring

Engine Monitor, Inc., 179 Hickory Ave., Harahan, LA 70123

CONTROL SYSTEM - Monitoring

Kobelt Mfg. Co., 11720 Horseshoe Way, Richmond, BC, CANADA V7A 4V5

CONTROL SYSTEM - Monitoring

IMO Industries, Gems Sensors Division, One Cowles Rd., Plainville CT 06062

CONTROL SYSTEM - Monitoring

MMC International, 60 Inp Dr., Inwood NY 11696

CONTROL SYSTEM - Monitoring

Marine Electric RPD, Inc., 50 Carol St., P.O. Box 1135, Clifton, NJ 07014-1135

CONTROL SYSTEM - Monitoring

Robertson Marine Systems, 3000 Kingman St., Suite 207, Metairie, LA 70006

CONTROL SYSTEM - Monitoring

Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

CONTROL SYSTEM - Monitoring

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CONTROL SYSTEM - Monitoring

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50 Vashell Way, Orinda, CA 94563

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Cornell Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024

Cresphone, 2100 Park Central N., Pompano Beach, FL 33064

Electronic Marine Systems, 800 Fernside Pl., Mahwah, NJ 07065

Funaro U.S.A., 271 Harbor Way, S. San Francisco, CA 94080

Hose-McCann, 1241 W. Newport Center Dr., Deerfield Beach, FL 33442

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Maday Communications, 300 Columbus Circle, Edison, NJ 08837

Megapulse, Inc., 8 Preston Court, Bedford MA 01730-2380

Mobile Telesystems, Inc., 300 Professional Dr., Gaithersburg, MD 20879

Negron Marine Consultants, 640 Bond Street, Elizabeth, NJ 07201

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Raytheon Marine Co., 676 Island Pond Rd., Manchester, NH 03109-5420

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San Diego Firm To Develop Oregon Site For Shipbuilding

Pacific Marine and Steel, Inc. (PMSI) will establish the firm's Marine and Construction divisions at North Tongue Point, Ore., the San Diego company has announced. **Bill Kelley**, operating manager of Seattle-based Cresmont, Inc., said that this was a significant step in his company's program to develop the former Navy base on the Columbia River near Astoria into a thriving marine-related industrial park.

"With PMSI employment expected to grow to 150 people by year's end, this represents a welcome addition to an area seeking to supplant lost lumbering jobs," he said.

"Signing up for this kind of company also firmly establishes a base for seeking further companies in the marine, environmental, and metal fabrication fields that can make use of the impressive docks and facilities at the site."

"Since this was a cooperative effort between Cresmont, PMSI, and state and county economic development agencies to bring the company to North Tongue Point," Mr. **Kelley** went on, "it was a successful forerunner of how we hope to develop additional enterprises at the facility."

The firm is seeking business such as homeporting for fishing vessels, other types of marine construction and repair, and vessel berthing and storage, among other activities," he said.

A PMSI spokesman, **David Webb**, said that the company has in excess of \$100 million in backlog to build fishing vessels, jackup offshore vessels, and prefabricated houses for international markets.

PMSI will immediately begin to prepare the North Tongue Point facilities for production and expects to begin fabrication operations within 60 days, he said.

PMSI has leased approximately 100,000 sq. ft. of office and manufacturing space, and 4.5 acres of outdoor space that includes the option for use of Tongue Point's piers and launching ramps.

Current contracts for the PMSI Marine division include 20 long-line fishing vessels for a company in Tahiti and five jackup vessels for a Panamanian company. Jackup vessels feature supports that can be lowered to seabeds to stabilize vessels used for certain kinds of exploration and site development.

North Tongue Point, located about five miles from Astoria, Ore., is a former U.S. Navy seaplane base. The State of Oregon acquired the land in 1980. It is managed by the Oregon Division of State Lands. However, Cresmont, Inc., won a 30-year lease for the 140-acre industrial site in 1994 when the state sought a partner to develop industry there.

Mr. **Webb** said that PMSI decided to establish its fabrication

divisions at North Tongue Point because of the piers which give access to deep water and economic incentives offered by Oregon, a state trying to increase the economic base in areas hard hit by cutbacks in logging.

North Tongue Point offers access to the Columbia River channel, and

direct highway and rail access to Portland and beyond. Five 30-ft. (9.1-m) wide concrete and steel piers, 1,000 to 1,550 ft. (304.8 to 472.5-m) in length extend into a 43-ft. (31.-m) deep channel.

Mr. **Webb** explained that PMSI's \$18 million contract to build 20 long-liners for Tahitian interests includes

options for 180 additional vessels at the rate of 20 vessels a year. The five jackup vessels for Panamanian interests involve a \$75 million contract for 154-ft. (46.9 m) vessels that incorporate 250-ft. (76.2-m) jacking pinions for work at underwater sites.

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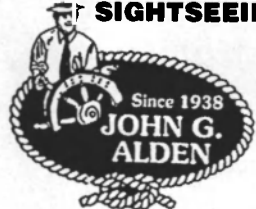
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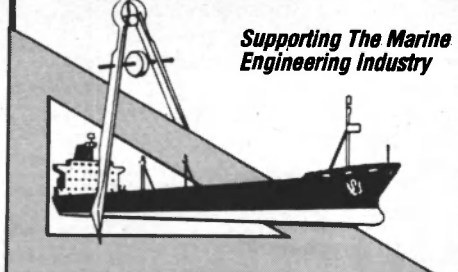
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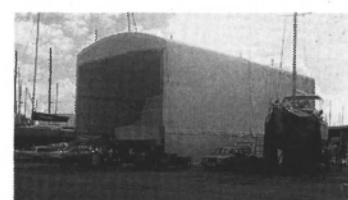
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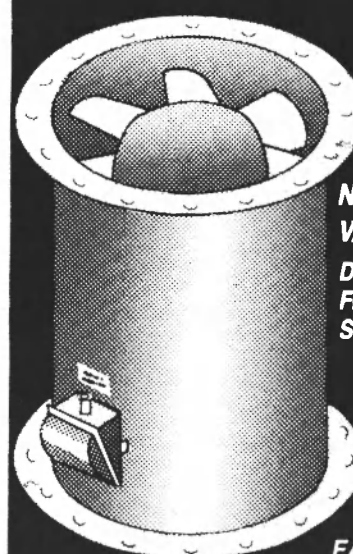
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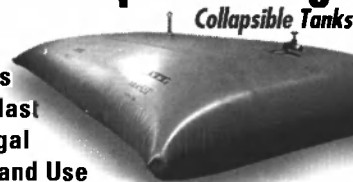
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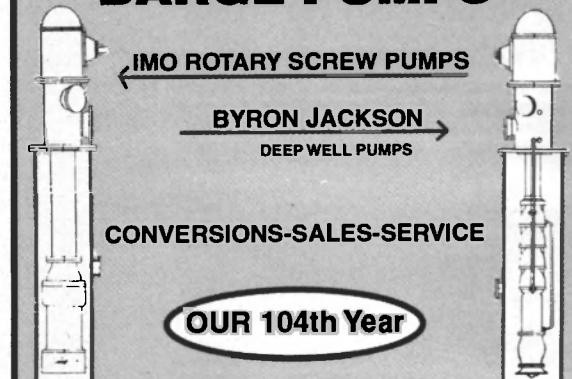
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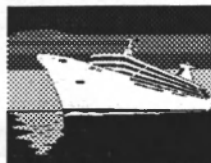
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The preferred candidate will possess a BS degree in Marine Engineering Technology or a related field, a Marine Engineer's license, sailing experience on motor vessels (over 4,000 HP) and a minimum of two years shore-side supervisory experience.

For consideration, send resume to:

Human Resources Department
Attn: Recruiter
TROPICAL SHIPPING
821 Avenue E
Riviera Beach, FL 33404
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For further details, please contact:

John Williford
Aeromarine International
P.O. Box 1088, Whistler,
B.C., VON 1B0, Canada
Fax: (604) 938-9660.

PORT ENGINEERS - American Systems Engineering Corp. (AMSEC) has provided Port Engineers and related marine services to the U.S. Navy, other government vessel operators and major ship operating companies for many years. As we expand our Marine Services Operations, we seek USCG licensed engineers with at least a BS in engineering, at least six years prior merchant vessel operational experience and significant depot/shipyard experience. NOAA, MARAD, MSC or commercial senior engineering management experience desirable. U.S. citizenship required. EOE. For further information, contact Andy Ott at (804)463-6666. Send resumes to:



Director of Human Resources
AMSEC, Dept. HR 94-137
2829 Guardian Lane
Virginia Beach, VA 23452



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PORT ENGINEER

Seattle

Royal Seafoods, the seafoods industry leader in the Pacific Northwest is seeking a Port Engineer to direct our fleet engineering management and services.

We offer competitive compensation and benefits.

To apply, you should send a resume with recent salary history to: Royal Seafoods, Inc., Dept. PE, P.O. Box 19032, Seattle, WA 98109. Equal Opportunity Employer.

ROYAL SEAFOODS

Leica Navigators Support Type 9

All Leica DGPS navigation products already support USCG and IALA Type 1 and Type 9 RTCM DGPS beacon broadcast.

The U.S. Coast Guard has decided to utilize the RTCM SC104 Type 9 message format for its beacon broadcasts instead of Type 1 and Type 2 messages, to provide a faster update rate and better accuracy. Some GPS manufacturers indicate that their GPS receivers will require modifications in order to work with this format. Leica's navigation products already work with Type 9 just fine!



MX 200 Navigator, six-channel system with superior software for the professional navigator.



MX 300 Navigator, a high resolution DGPS system designed for offshore survey and land-positioning.



MX 100 Navigator, six-channel continuous tracking for yacht skippers and blue water sailors.



MX 51R Beacon Receiver and MX 200 DGPS Navigator, with combined GPS and H-field beacon antenna.



MX 41R, affordable differential GPS Beacon Receiver that improves precision up to 10 times.



MX 9212 12-channel DGPS Navigator, gives submeter DGPS accuracy for real-time applications.



The MX 100 GPS Navigator combined with the MX 41R Beacon Receiver provides accuracy to under 5m.

In February 1994 Leica purchased the Magnavox GPS Division, and its Navigator product line.

Leica
Navigation and Positioning Division
23868 Hawthorne Boulevard
Torrance, CA 90505, USA
(310) 791-5300, Fax (310) 791-6108

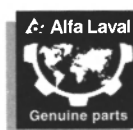
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