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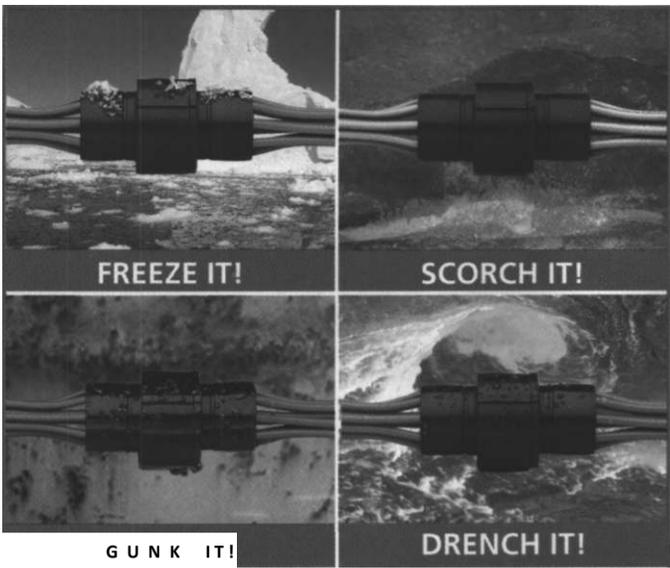
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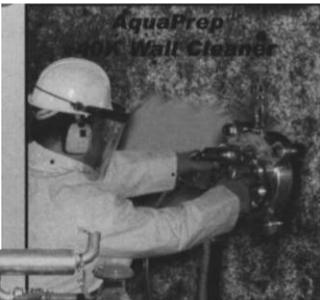
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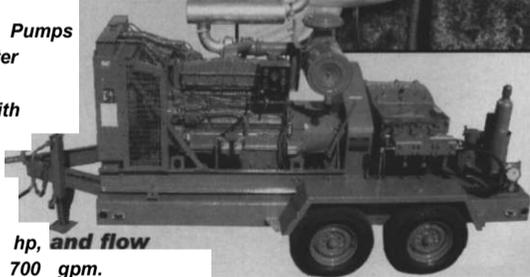
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MARITIME REPORTER

AND
ENGINEERING NEWS

ISSN-0025-3448
USPS-016-750

No. 3

Vol. 63

118 East 25th Street
New York, NY 10010
(212) 477-6700

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Founder: John J. O'Malley 1905 - 1980
Charles P. O'Malley 1928 - 2000

Maritime Reporter/Engineering News is published monthly by Maritime Activity Reports, Inc. Mailed at Periodicals Postage Rates at Waterbury, CT 06701 and additional mailing offices.

Postmaster send notification (Form 3579) regarding undeliverable magazines to Maritime Reporter/Engineering News, 118 East 25th Street, New York, NY 10010.

Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 0970700. Printed in U.S.A.

Publishers are not responsible for the safekeeping or return of editorial material.

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8 The Italian Renaissance

The Trieste plant of Wartsila Italia alone has reported letters of intent for 25 Sulzer low-speed engines. — by David Tinsley

16 E-Commerce: B2B Sites Still on Course

Despite a dot com crash, the prospects of business saving money and increasing efficiencies on the Web is bright. — by George F. Chandler III, Hill Rivkins & Hayden

20 New Company, Old Friend

The combined resources of the former Astilleros Espanoles and Bazan is IZAR, the world's ninth largest shipbuilder, which is intent on recapturing lost market share. — by Greg Trauthwein

Ship Repair & Conversion

26 **The Saga Continues:** The nearly 40-day Castor saga has sent a wake-up call to the world regarding ships in distress and ports of safe haven.

28 **Craft Bearing on Solid Ground:** Craft Bearing used its Split Roller Bearing to turn an ordinary pipe into a precision drive shaft.

29 **UMC Goes Underwater:** Specializing in underwater maintenance, UMC International has established a new ship repair facility in Portland, U.K.

43 Double Trouble?

Double-hull carriers, regarded for their positive impact on the safe carriage of petroleum products, are having unique internal corrosion problems.

11 Legal Beat:

Maritime Transportation is on Senate Subcommittee Agenda

18 **News: Jumbo Orders Super Heavylift Ships...McAllister To Get New Tug Pair...Seven Seas Will Boast Dolphin Poded Propellers.**

55 **Ship's Store: Coatings & Corrosion Control Products**

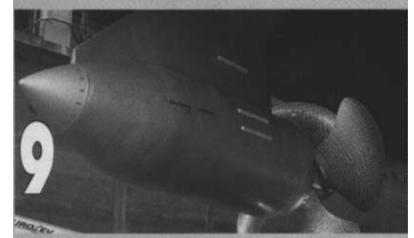
58 **Great Ships: Samsung Delivers Excellence in 2001**

62 **Buyer's Directory**

64 **Advertising Index**

65 **Classifieds**

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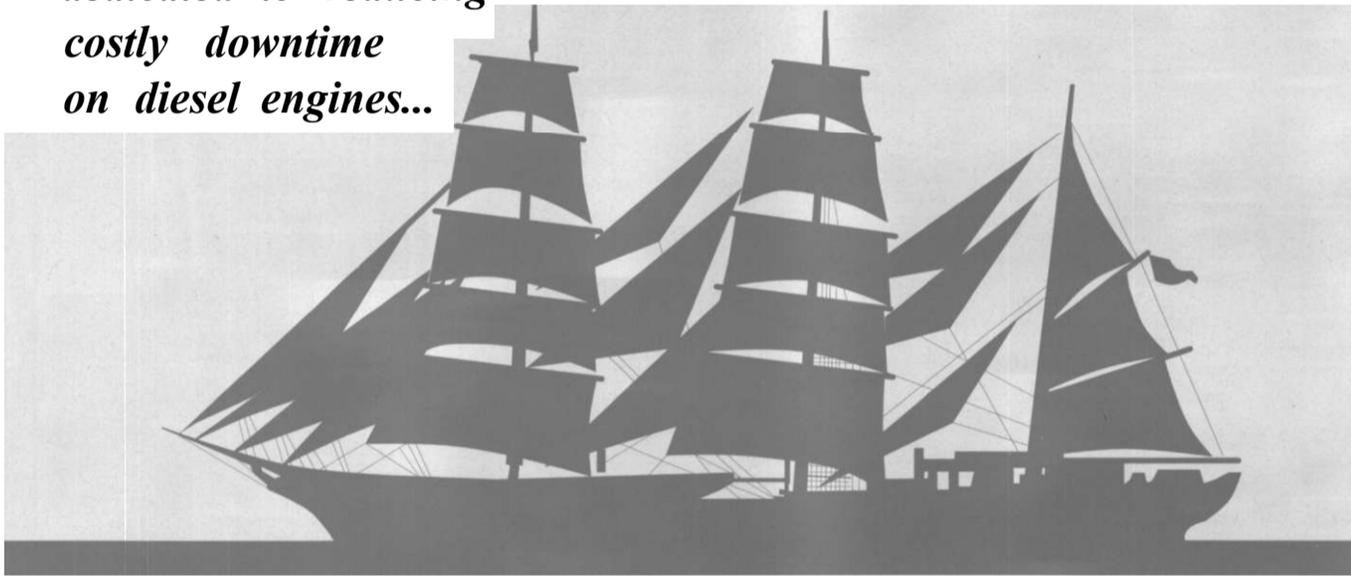
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International Operations

CHARLES E. KEIL, Vice President

215 NW Third Street
Boynton Beach, FL 33435

Tel: +561-732-0312; Fax: +561-732-8063
24-hr Tel/Fax: +561-998-0313;
Mobile Tel: +561-716-0338
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AustralAsia, United Kingdom

TONY STEIN, International Sales Manager

12, Braehead, Bo'ness,

West Lothian EH51 0BZ, Scotland, U.K.

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Fax: +44 (0) 1506 828085

Benelux

PAULA TACQ

Maritime Media ML, Otweg 18 2771 VX Boskoop,
Netherlands

Te: +31 172 230707; Fax: +31 172 230708

China

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Japan

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Ace Media Service Inc., 12-6,4-chome, Nishiike

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Korea

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Scandinavia

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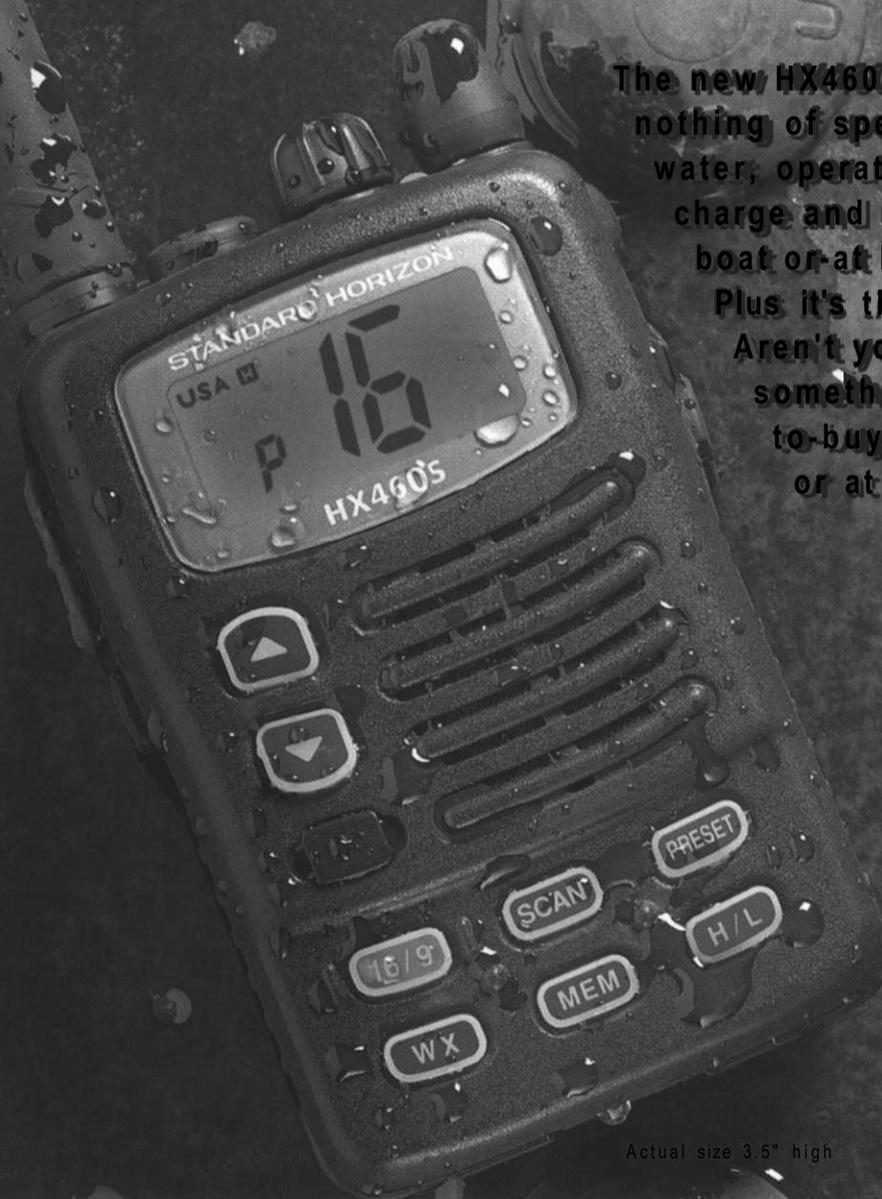
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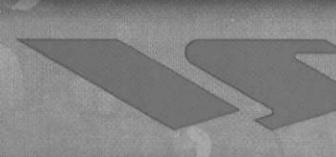
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Editor's Note

Word from Washington, D.C. is not good for the U.S. maritime industry, though far from definitive at the time of this printing. Those in the industry who watched the November 2000 U.S. presidential election with amusement, amazement and much concern have now redirected their lobbying efforts to the first budget proposal from President George W. Bush that, among other things, *eliminates* the Title XI financing program, a program which has helped to deliver billions of dollars in business to both large and small U.S. shipyards at a critical period of marine infrastructure consolidation and redevelopment.



Naturally, special interest groups are particularly vocal following an initial budget proposal, particularly when it is from a first-time president who has yet to establish his national track record on such matters. The standard rhetoric from all groups usually centers on the need to increase funding which is viewed as inadequate. However this year, the tone is a bit more desperate.

The American Association of Port Authorities (AAPA) notes that the Civil Works budget represents a 14 percent decrease, a total that AAPA claims falls far short of meeting the nation's water resources infrastructure needs. The budget outline, released February 28, would decrease the U.S. Army Corps of Engineers Civil Works budget to \$3.9 billion from \$4.5 billion, a sum which was then seen as too little given the enormity of updating projects needed.

More dire, however, is the state of the Maritime Administration and the Title XI Ship Loan Guarantee program. Cynthia Brown, president of the American Shipbuilding Association (ASA), simply states that "America will not be a maritime nation if it does not have a maritime industry." The proposal calls for the dismantling of MarAd, and the elimination of Title XI. While the budget is far from complete, interested parties (i.e. everyone reading this page!) should ensure that their voices are heard. To that end, Representatives Duncan Hunter (R-CA), Randy Cunningham (R-CA), Gene Taylor (D-MS), James Maloney (D-CT), Ronnie Shows (D-MS), Jo Ann Davis (R-VA), Ed Schrock (R-VA), Tom Allen (D-ME), Walter Jones (R-NC) and Charles Pickering (R-MS) have jointly sent a letter to President Bush urging him to include \$100 million in the FY '02 budget for Title XI.

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MARITIME REPORTER AND ENGINEERING NEWS

NEW YORK
118 E. 25th St., New York, NY 10010
Tel: (212) 477-6700; Fax: (212) 254-6271
e-mail: mren@marinelink.com
Internet: www.marinelink.com

FLORIDA
215 NW 3rd St., Boynton Beach, FL 33435

ASSOCIATE PUBLISHER

Gregory R. Truthwein • lruthwein@marinelink.com

EDITORIAL

Associate Editor

Regino P. Ciardiello • dariello@marinelink.com

Technical Editor

David Tinsley

Editorial Consultant

James R. McCoul, president, International Maritime Associates

MARKETING

Vice President of Marketing

Susan Cosme • cosme@marinelink.com

PRODUCTION

Production Manager

Sharon Griffin • griffin@marinelink.com

Asst. Production Manager

Oksana Martemy • mar1emy@marinelink.com

CIRCULATION

Circulation Manager

Dale L. Barnett • barnet1@marinelink.com

ADVERTISING SALES

Vice President of Sales

Lucia M. Annunziato • annunziata@marinelink.com

National Sales Manager

Robert C. Howard • howard@marinelink.com

Tel: (561) 732-3001; Fax: (561) 732-6984

Regional Sales Manager

Jennifer Truman • lruman@marinelink.com

Regional Sales Manager

Brett W. Keil • bkeil@marinelink.com

Tel: (561) 732-1185; Fax: (561) 732-6984

Regional Sales Manager/Electronic Product Sales

Joe Trubinsky • lrubinsky@marinelink.com

Tel: (561) 732-4368; Fax: (208) 575-3217

Accounting Manager

Angelica Rivera • arviera@marinelink.com

Assistant to the Vice President of Sales

Tina Angelino • angeino@marinelink.com

Classified Sales

Tel: (212) 477-6700

PUBLISHER

John E. O'Malley

John C. O'Malley • jomalley@marinelink.com

Chief Financial Officer

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Diesel renaissance in Italy

by David Tinsley,
technical editor

At a time when the South Korean heavyweights have signaled their determination to capture more than 50 percent of the global market for low-speed diesel engines, an Italian renaissance in two-stroke production testifies to a determination in one of the European camps not to bow to oriental industrial ascendancy.

As part of a broad-based manufacturing program encompassing two-stroke and four-stroke designs, the streamlined Trieste plant of Wartsila Italia reported firm contracts, letters of intent and options for 25 Sulzer low-speed engines

when your correspondent visited the works during February.

Since the former Grandi Motori Trieste (GMT) plant came under Wartsila management in 1997, followed by Finnish group's 100 percent takeover at the outset of January 1999, major efforts have been put into making the factory competitive on a worldwide basis.

That this has been achieved with a diversified production portfolio, in an era when large-scale manufacturing at any one location is trending towards optimized output of as few products as possible, is a measure of Wartsila's cir-

cumspect organizational planning and investment in production technology.

While in-house manufacturing capability is elemental to competitiveness in the four-stroke sector, the Finnish group's recourse to two-stroke building capacity at Trieste provides it with first-hand experience in a field of production otherwise dominated by licensees in the Far East. This type of involvement can only benefit its activities as a driver of two-stroke technology and design development.

Success in building the two-stroke business at Trieste, while reflecting the

increased efficiency of the plant and the group's European manufacturing network as a whole, has also been assisted by the recent rise in Far East engine prices, attributable perhaps to huge orderbook commitments

The Sulzer low-speed engine orderbook in Trieste includes a high concentration of RTA72U-B units for container ship newbuild projects at German yards. It also features the RTA84C design, underscoring the Italian plant's scope for wide-bore machinery, and has recently been boosted with RT-flex common-rail engines booked for a reefer

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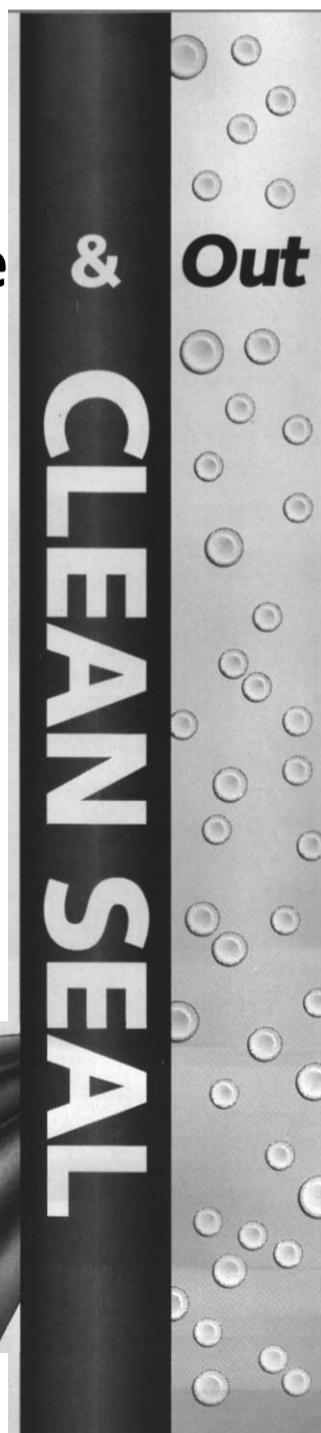
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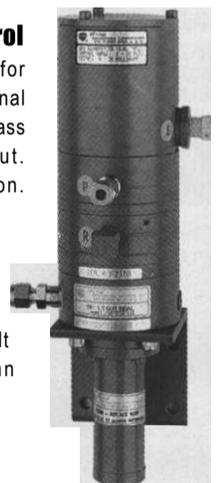
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Maritime Reporter/Engineering News

Investment in Design

vessel series entrusted to a Portuguese shipbuilder.

Trieste is currently operating at an output level in the region of 500-750 MW per annum, and is a showcase for the Wartsila Flexible Manufacturing System, the production model which has evolved out of the company's 'focused factory' concept. The Italian plant created something of the template for the new system, whereby nominated back-up factories support each product-specific factory for engine assembly and component manufacture. Its role in meeting the surging demand for Wartsila 46 medium-speed engines, for which the Turku plant in Finland is the lead producer, is illustrative of the arrangements.

The enduring popularity of the Sulzer ZA40S four-stroke series is clearly in evidence at Trieste, where it contributes substantially to the delivery program through to 2004. The Italian works is also the nominated factory for the Wartsila 26X, aimed at high-speed transportation and naval applications, and for the mighty 64-type four-stroke, the world's most powerful medium-speed diesel, delivering a staggering 2 MW per cylinder. Commencing with the 13,645-dwt German vessel Container-ships VI, commissioned in 1999, a total 11 engines of the Wartsila 64 type have now been supplied for marine propulsion. At press time, the Finnish engine group was hoping that the design would be nominated for an Italian tanker new-build project, to set a major new phase of diesel production in train at Trieste.

While the largest modern-day diesel, which the plant is currently geared up to produce is the RTA84C in its eight-cylinder configuration, the Italian factory has the distinction of having produced the world's biggest diesel engine as measured by bore size. The record was set in 1972 with the delivery of a Fiat two-stroke unit with a bore of 1,060-mm. By comparison, the largest, albeit considerably more powerful, engines now available are of 960 mm and 980 mm-bore, turned out in the Far East under license from Wartsila and MAN B&W, respectively.

Dolphin Finds A Home

A growing appreciation of the benefits of podded electric propulsion is widening the concept's market reach, although business for such systems has remained concentrated among just a handful of suppliers. The recent deal for the Dolphin system, while denoting the commercial breakthrough for the alliance between STN Atlas Marine Electronics

of Germany and John Crane-Lips of the UK, also expresses the market's receptivity to a further option and additional player.

Two Dolphin propulsors have been ordered for Radisson Seven Seas' 48,000-gt diesel-electric cruise liner

under construction at Mariotti's premises in Genoa harbor.

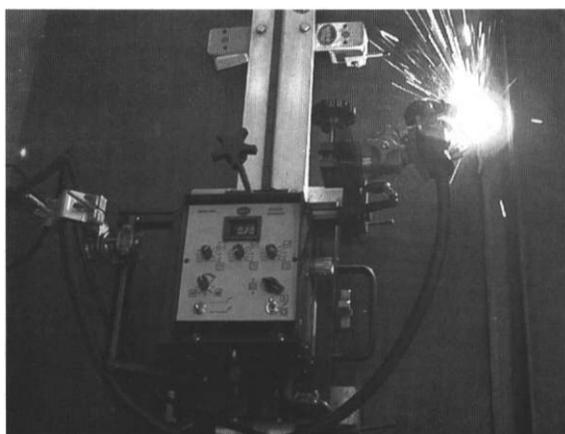
STN Atlas Marine's prowess in electrical engineering melded with John Crane-Lips' Dutch-honed skills in propellers, thrusters and hydrodynamics has resulted in a pod line covering units

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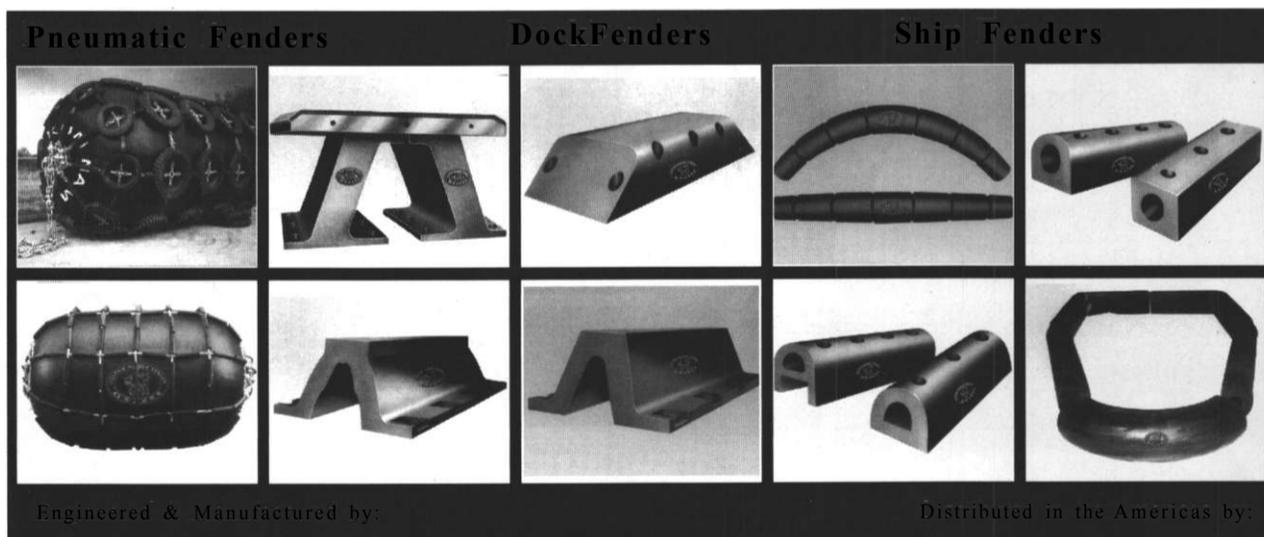
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March, 2001 www.maritimetoday.com 11

Investment in Design

ating merits of podded propulsors through its selection of two 8.5-MW Mermaid units for its similar-capacity newbuild Seven Seas Mariner, now approaching completion at Chantiers de l'Atlantique.

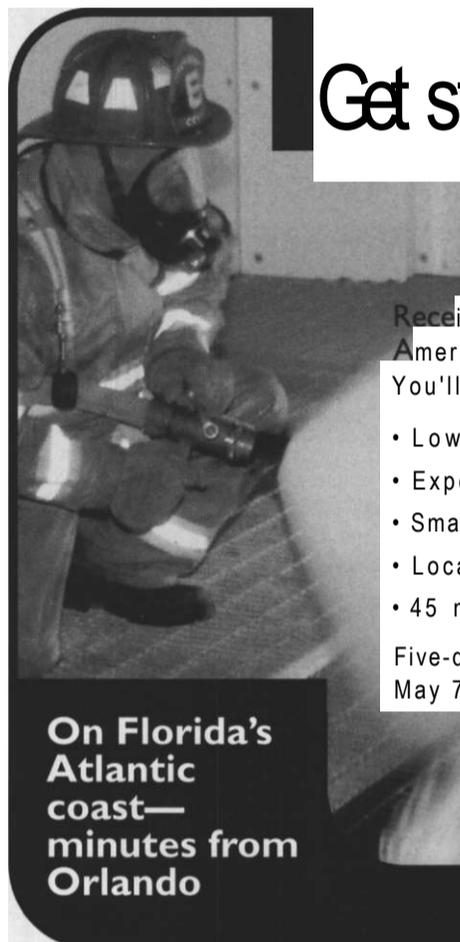
(Fuel) Cells of Endeavor

German high-speed diesel maker and power systems supplier MTU-Friedrichshafen showed its willingness

to push back the technological bounds when it announced at last year's SMM Exhibition in Hamburg that it had started development work on fuel cell marine propulsion. German propensity for front-line advance in engineering is also implicit in the nomination of

Siemens PEM (proton exchange membrane) fuel cells as part of the integrated propulsion arrangements for the navy's new 212-class submarines.

Now, classification society Germanischer Lloyd has taken a lead by establishing guidelines for fuel cell propulsion and power systems. Drawing on 13 years' experience with projects relating to submarine fuel cell installations and hydrogen-handling equipment for gas tankers, GL is offering services in fuel cell system and ship plan approval and classification, safety assessment, component certification, project definition, ship design and expert evaluation. In 2000, the society certified a German inland water excursion boat incorporating fuel cell propulsion, the first non-military craft to be so equipped. The concept has appeal for marine applications since it raises the prospect of power generation with improved efficiency and, above all, considerably reduced environmental pollutant release compared to conventional arrangements. Fuel cells generate electrical power by combining hydrogen with oxygen, without open flame combustion. The hydrogen can be obtained from methanol, natural gas, petroleum or renewable resources.



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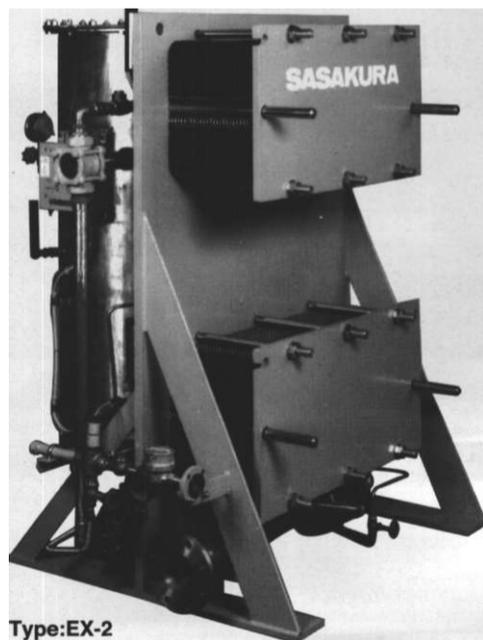
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Pimentel Steps Down From

Top Post At Cunard Line

Carnival Corp. announced the resignation of **Larry Pimentel**, president and CEO of its Cunard Line Limited unit. **Pamela Conover**, COO of Cunard, has been given the additional title of president and will replace Pimentel as head of the luxury cruise operator. Both management changes are effective immediately. Pimentel has served at the helm of Cunard Line, which is comprised of both the Cunard and Seabourn cruise brands, since 1998, when the Miami-based combined entity was formed, following Carnival Corp.'s acquisition of Cunard. Prior to that he spent six years as president and COO of Seabourn Cruise Line, formerly based in San Francisco. Pimentel resigned for personal reasons, citing a desire to spend more time with his family. "It is with great difficulty that I have made the decision to step down from my current post. My years at Seabourn and Cunard have been extremely rewarding. However, from a personal perspective, this is the right decision for me and my family," said Pimentel. He is reportedly in discussions with Carnival Corp. regarding a consultative role in connection with certain corporate-wide business initiatives.

Maritime Transportation Is On Senate Subcommittee Agenda

Rep. **Don Young** (R-Ark.) has taken over the helm of the House Transportation & Infrastructure Committee, after chairing the Resources Committee for the past six years. In one of his first acts as Chairman, on January 31, 2001, Chairman Young announced the new subcommittee Chairmen for the Transportation & Infrastructure (T&I) Committee for the 107th Congress. Chairman Young also set an ambitious agenda for the T&I Committee.

The following were named as new subcommittee Chairmen: Rep. **Tom Petri** (R-Wisc.) - Highways and Transit Subcommittee; Rep. **John Duncan** (R-Tenn.) - Water Resources and Environment Subcommittee; Rep. **John Mica** - Aviation Subcommittee; Rep. **Jack Quinn** (R-N.Y.) - Railroads Subcommittee; Rep. **Steven LaTourette** (R-Ohio)-Economic Development, Public Buildings and Emergency Management Subcommittee; and Rep. **Frank LoBiondo** (R-N.J.) - Coast Guard and Maritime Transportation Subcommittee. Ranking Members of the Subcommittees are, respectively, Reps. **Robert Borski** (D-Penn.) for Highways; **Peter A. DeFazio** (D-Ore.) for Water Resources; **William O. Lipinski** (D-Ill.) for Aviation; **Bob Clement** (D-Tenn.) for Railroads; **Jerry Costello** (D-Ill.) for Economic Development; and **Corrine Brown** (D-Fla.) for Coast Guard and Maritime Transportation.

Whether the reauthorization of TEA-21 — not scheduled until 2003 — will include further funds for maritime programs such as former Secretary of Transportation **Rodney Slater's** ambitious Marine Transportation System of the Americas remains to be seen.

The responsibilities of the Subcommittee on Aviation, the Subcommittee on Coast Guard and Maritime Transportation, and the Subcommittee on Water Resources and Environment will not be changed.

The leadership of the Senate Commerce Committee remains more constant, with Sen. **John McCain** (R-Ariz.) continuing as Chairman this Congress and Sen. **Ernest (Fritz) Hollings** (D-S.C.) as the Ranking Member.

Maritime jurisdiction in Commerce is divided between Senator **Olympia Snowe's** (R-Maine) Subcommittee on Oceans and Fisheries, (which includes Coast Guard jurisdiction), and Sen. **Gordon Smith's** (R-Ore.) Surface Transportation and Merchant Marine Subcommittee.

USCG To Explore Deeper Waters

The Coast Guard is urging Congress to find an estimated \$9 billion for its

new Deepwater Capability Replacement Project. According to the Coast Guard's 21st Century Preview (January 2001),

the Coast Guard plans to award a contract to one of three competing teams in January 2002 to begin "cutting steel" for



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the delivery of the new deepwater assets to replace its aging cutters, aircraft, and communications systems. For FY 2002, the Coast Guard is looking for \$350-\$500 million to initiate the Deepwater Project. The T&I Committee has jurisdiction to authorize such a Project, but only the Appropriations Committees can provide actual dollars. Where to find

this money at a time of tight budgets remains an open question.

Also facing the Coast Guard Subcommittee will be what to do with ballast water exchange programs. A few years ago, Congress passed federal legislation requiring all ships entering the Great Lakes to exchange ballast water and then amended the legislation to establish

a nation-wide program modeled after the Great Lakes region. States have also adopted legislation setting their own ballast water standards. This issue has become very controversial and Congress may decide to take further action.

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Aluminum Crewboat Built by Dubai Drydocks

On January 20, 2001, Dubai Drydocks delivered the new aluminum crewboat Khulood to Mutawa Marine of Abu Dhabi, for service in the offshore oil industry in the Arabian Gulf. Designed by Robert Allan Ltd., Naval Architects of Vancouver, the new vessel is the first newbuilding in welded aluminium built by Dubai Drydocks, and represents the first in a proposed new line of offshore crewboats to be offered by the shipyard to clients worldwide.

In collaboration with Robert Allan Ltd., Dubai Drydocks will offer a range of high-performance aluminium crewboats from 82 to 164 ft. (25 to 50

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m) in length, with service speeds up to 30 knots. Robert Allan Ltd. provided Dubai Drydocks with a complete contract design package for the boat, based on the end-user's specific operating requirements. In addition, Robert Allan Ltd. provided with a complete set of production working drawings, including all parts and plate developments for NC cutting of all aluminium. Khulood was built to the approval of Lloyd's Register of Shipping.

The crewboat was designed to offer a good combination of speed, cargo capacity manoeuvrability, and sea-keeping in a boat of modest size. The design features a spacious forward wheelhouse with excellent all-round and overhead visibility, with a large passenger area with comfortable seating for 31 behind. Below decks are

Main Particulars	
Length, (o.a.)	90 ft. (27.4 m)
Beam, (molded)	22 ft. (6.7 m)
Depth, (molded)	10 ft. (3.2 m)
Maximum draft	7 ft. (2 m)
Total deadweight	35.8 tons
Passenger capacity	31
Fuel capacity	11,400 liters
Fresh water capacity ...	2,000 liters
Main engines	... Cummins KTA38-M2
Gearboxes	Reintjes WVS 430
Propellers	Teignbridge
Generators	Perkins, 60 kW

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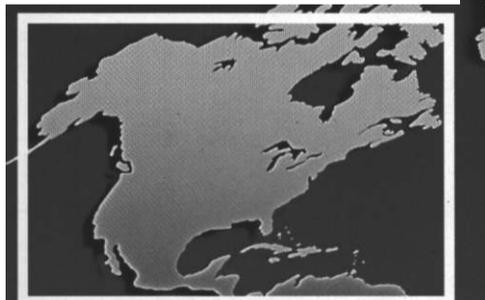
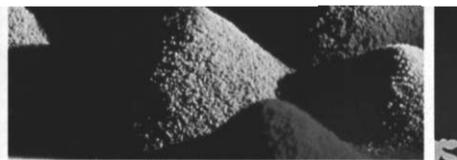
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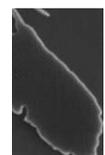
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News

crew quarters for six, a galley, and lavatory facilities. The engine compartment is accessible by large watertight hatches in the aft deck, permitting ready access to the machinery for servicing, or for removal of engines, or any large components should that be

necessary in the life of the boat. The aft deck is strengthened for carrying deck cargo, with a design capacity of 20 tons. Khulood is propelled by twin high-speed diesels, each driving a five-bladed propeller through a reverse-reduction gearbox. On trials conduct-

ed in January, 2001 Khulood demonstrated excellent performance in every category, with a top speed of 22.8 knots, excellent high-speed and low-speed manoeuvrability, and a very stable and comfortable ride.

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Horizon Delivers Z-Drive Tug



Horizon Shipbuilding, Inc. recently delivered Belle Watling, a 72-ft. (21.9 m) Z-drive tug to Dixie Towing of Jacksonville, Fla. The first azimuthing tug to be built at the Bayou La Batre shipyard, Belle Watling was delivered 30 days ahead of its contractual delivery date. Glowacki Engineering of Jacksonville provided the contract design for Dixie Towing; Horizon's design staff completed detail design.

The boat features a separate engine control room forward of the engine room. The Glowacki design provides for good deck stowage space and stowage below deck. The pilothouse is designed for 360-degree visibility and for working under a bow overhang when engaged in docking operations. The narrow pilothouse width is designed to enhance alongside and docking operations. Glowacki Engineering has prepared an 85-ft. (25.9 m) Z-drive design exclusively for Horizon, which is similar in concept to Belle Watling. Horizon hopes to market its new 85-ft. (25.9 m) 1,800-2,000 hp design at a very competitive price.

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Main Particulars - Belle Watling

Length, (o.a.)	72 ft. (21.9 m)
Beam	26 ft. (7.9 m)
Depth	12 ft. (3.6 m)
Horsepower	1,200 bhp
Main Engines	Cummins KTA-19M
Azimuthing Drives	Ulstein 370H
Generators (2)	Cummins 4B3.9635 (kw)
Towing Winch	Pullmaster 50,000 lb.
Crew Quarters	6 persons, 2 staterooms

Maritime Reporter staffer Rob Howard recently took to the seas aboard Carnival's Imagination, and although on vacation, he was kindly hosted by the crew to some behind-the-scenes activities. Here, Rob is pictured with Staff Chief Engineer Polisi Vincenzo in the engine control room.

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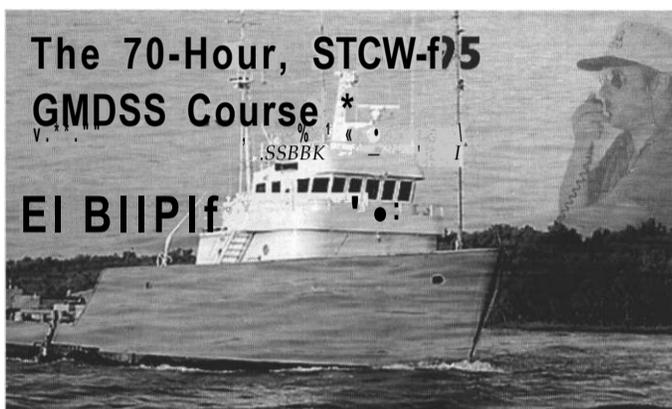
Abu Dhabi Granted \$50M Naval Contract

Abu Dhabi Ship Building (ADSB) has signed a contract with the UAE Armed Forces to complete major combat system upgrades for a series of six missile patrol boats in the UAE Navy's existing fleet. Valued at more than \$50 million, the contract will significantly improve the capabilities of these vessels by integrating and installing new, state-of-the-art combat equipment

as well as substantially upgrading the existing ship-board systems. The UAE Navy chose ADSB as the prime contractor for this project, which is known as Tarif-45. ADSB will have full responsibility for the complex upgrades that will be performed at the company's Abu Dhabi facilities. The company expects to join forces with several other international firms who will serve as subcontractors - including Combat System Integration company SaabTech Systems.

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powered by twin Caterpillar 3412E, 1,100-bhp diesel engines driving Hamilton HM521 water jets through ZF 1950 reduction gears. The vessel boasts Incat's single chine Z-bow shape. The resulting longer waterline improves the vessel's high speed performance and sea-keeping ability. Also featured onboard is a Vosper/MDI trim tab motion control system, which is expected to reduce the vessel's motion from wave action by as much as 60 percent.



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VISA Extended To 2003

The Maritime Administration (MarAd) published a notice in the Federal Register announcing the extension of the Voluntary Intermodal Sealift Agreement (VISA) for an additional two-year period, until February 13, 2001, pursuant to the provision of the Defense Production Act of 1950, as amended. The VISA program is the principal commercial sealift readiness program of the Department of Defense, and is sponsored by the Maritime Administration. The purpose of VISA is to make intermodal shipping services, intermodal equipment and related management services available to the DoD as required for emergency deployment and sustainment of U.S. military forces.

KMY Piikkid Works Agrees With Flender Werft

Kvaerner Masa-Yards Piikkio Works and German shipyard Flender Werft have signed a contract on the delivery of approximately 550 prefabricated modular cabins for two fast passenger/car ferries Superfast XI and Superfast XII, which are owned by Attica Enterprises.

The cabins, which will be supplied during the years 2001 and 2002, will be manufactured at Piikkio Works' new assembly factory in Paimio. The order comprises 211 high class passenger cabins and 62 well equipped crew cabins per ship.

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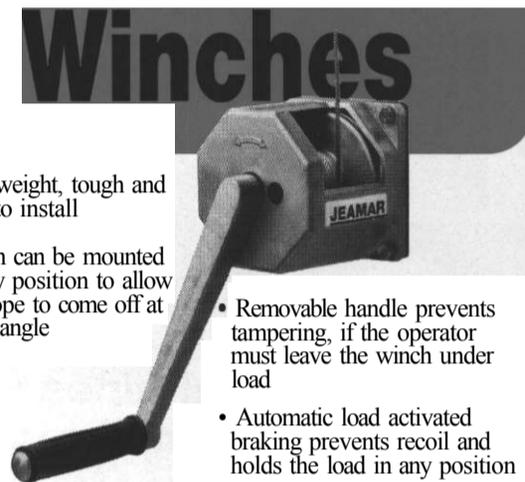
High Speed Ferry Set For Block Island

Beginning this summer, passengers traveling from Point Judith to Block Island, R.I. will be able to complete their travel in about half the time it normally takes to perform this voyage - thanks to a 99 ft. (30.1 m), 250-passenger high speed catamaran under construction at Gladding-Hearn.

The vessel, which will have a top speed of 33 knots when loaded at a dwt of 18.6 tons, will complete the 12-mile ocean crossing in approximately 22 minutes - according to shipyard officials.

Designed by Incat Designs, Sydney, Australia for commuter and tourist service, the all-aluminum vessel will be

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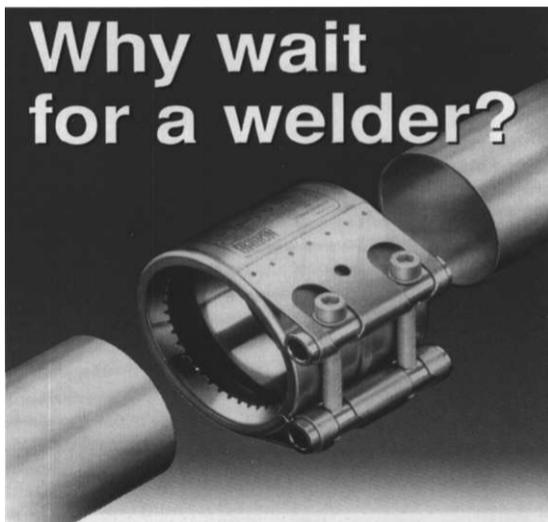
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by **George F. Chandler III,**
Hill Rivkins & Hayden LLP

Notwithstanding the hysteria surrounding it, Y2K turned out to be a non-event, but it did produce an unintended consequence. Business-to-Business (B2B) ventures that would have been introduced in the second-half of 1999 were postponed until the effects of Y2K could be determined. Thus, there was a flood of introductions of B2B's in the first quarter of 2000 that created a stampede of announcements by companies that were reluctant to be left behind. Many announcements were mere hype with empty websites or no website at all. However, there are enough operable websites to give sustenance to the expectation that the long-awaited electronic commerce revolution in international trade and transport may be at hand.

Throughout the 1990's Electronic Data Interchange (EDI) promised to capture the business world and lend it to the promise-land of paper-free transactions. While EDI was the solution for large

enterprises, particularly in the automotive, chemical and retail industries, small and medium sized enterprises did not take to EDI due to the high entry cost for software, training, and steep learning curves. B2B sidesteps these hurdles and permits access with relatively inexpensive desktop computers and an Internet connection. A typical B2B website is user friendly, and requires no additional software for training. Colorful graphics and well mapped out pages, lead the user to cheap and easy transactions.

As the Internet is currently used, a website is accessed, a transaction made and a printout is obtained. This is fine for one-time or occasional transactions, but the multiple transaction of business requires integration between the systems of the parties making the transactions to retrieve and send data between them, then record it or reuse it. The advantage of EDI was, and is, that a data field, such the description of goods being purchased, could be captured and re-used over and over again in bills of lading, insurance certificates, customs documents,

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etc. Unless the parties are both using EDI, or happen to have the same computer business systems, a B2B website is a one-way street for the flow of information, leaving the user unable to capture any data. However, XML (Extensible Markup Language), a variation of HTML (Hypertext Markup Language) — without which websites would not have been so easy to put together, provides the ability to integrate systems, thus allowing a user to capture data. Already in use, XML is providing such integration to many systems, and as XML standards are created, data can be downloaded and exchanged between any systems. The beauty of this solution is that companies would not have to discard their EDI systems to participate in B2B as long as they add XML to it, and users of such a Web site would not have to have EDI in order to capture data to record and reuse in their own systems. Many B2B websites for international trade and transport are online in one stage of development or another as has been reported in this magazine. The advantages of B2B to such a fragmented sector as international trade and transport are many: access to a more diverse customer base, fewer barriers to trade, faster and cheaper transactions, avoiding expensive private networks, the ability to partner with complementary services, and a "no-tech" business solution that is affordable.

While there are far too many websites for some areas such as trading chemicals or freight auctions, natural selection has begun to whittle them down to a select few. The successful B2B websites will be those that can provide the means to obtain all needed services through links or other means to complete a transaction. Transportation websites, which are numerous, have been slow to partner with trading websites. One of the largest chemical trading Web sites, ChemMatch (which has financing and other links), has linked with the chemical shipping website, ChemLink (affiliated with Stolt Tankers), in the first of such linkages. The natural advantages of such linkages will, no doubt, lead to other arrangements.

Unlike the other computing hypes of the past, the revolution in electronic commerce through B2B's will take place, and, in fact, is taking place. However, computing rarely delivers on time, so it is going to take a while to sort out all the websites, get all the ancillary services up and linked, and have all the bugs worked out of XML, before electronic commerce for international trade and transport can be said to be an established business

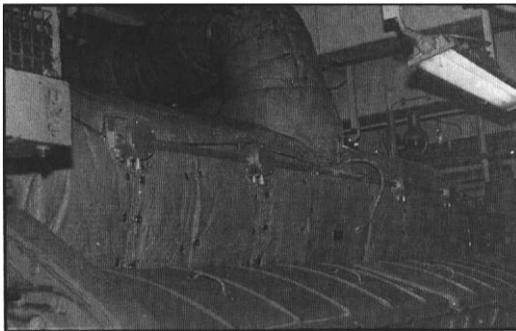
practice. But, at least, it has found a direction. Recently, the U.S. and the U.K. took important steps to recognize digital signatures by enacting laws permitting their use, and putting electronic commerce on the same footing as other methods of doing business. These laws are neutral as to the technology and techniques to be used, even though many sought to lock in the technology and have firm rules for techniques. At least electronic commerce and digital signatures have a legal basis in the U.S. and the U.K., and most developed countries will soon follow, such that the main uncertainty in using electronic commerce, in general, and digital signatures, specifically, has been removed.

The dawning of B2B has removed the excuses for resisting the extension of computer systems into all aspects of trade and transport. Cost and training are no longer an impediment to participating in B2B. Legal impediments are being removed as well. Those involved in trade and transport that fail to include this new business technique into their business procedures, run the risk of losing out to competition that will become more effective and efficient through the use of B2B.

George Chandler is a partner in Hill Rivkins & Hayden LLP in Houston, Texas. A more detailed paper on this subject is available upon request at HR_TEX_GFC@compuserve.com.

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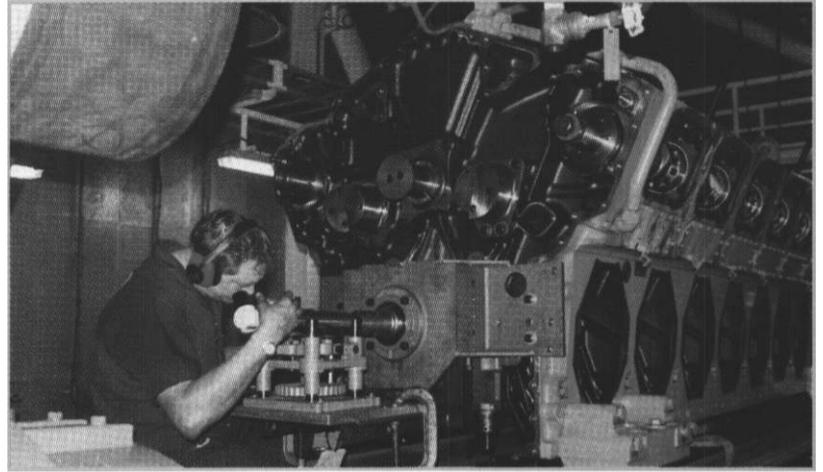
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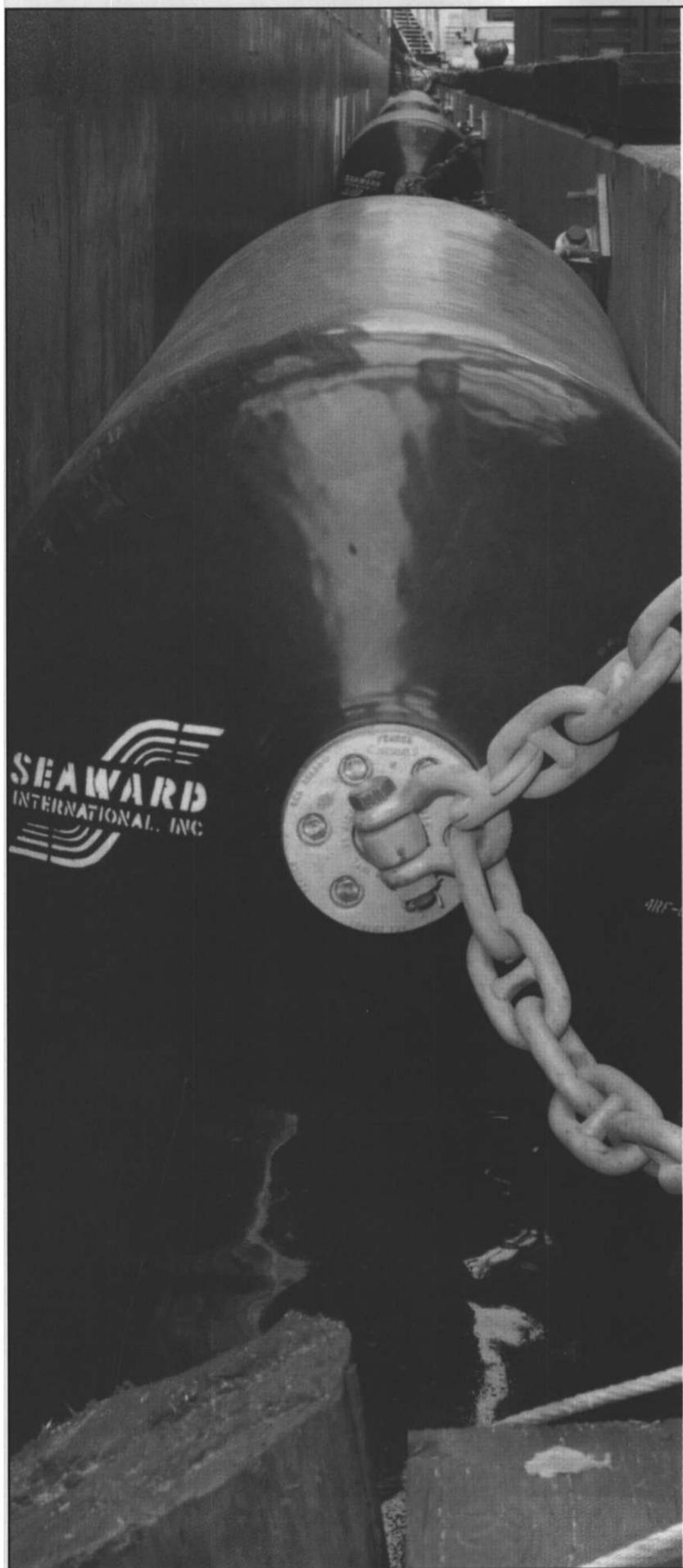


Jumbo Orders Super Heavylift Ships from Damen

Dutch heavylift shipping specialist Jumbo ordered two Super Heavylift vessels from Damen Shipyards Group of the Netherlands. Scheduled for delivery in 2003, the new 11,000 dwt J-1600 class vessels will reportedly be the heaviest heavylift vessels in the world.

The design reflects demand for greater lift and outreach capabilities. The vessel's equipment outfit takes account of market needs. The ships will have a pair of state-of-the-art rotating mast cranes, with a combined lift capacity of 1,600 tons at 16 m outreach and a maximum outreach of 35 m. The vessel's shallow draft of 6.5 m maintains the small port operational capability that is the basis of the Jumbo fleet.

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McAllister Towing Orders New Tug Pair



McAllister Towing and Transportation Co. has ordered two new 5,000 hp tugs scheduled for delivery this year. The first vessel, which will be named Janet M. McAllister, is scheduled for a spring delivery; the second vessel, Vicki M. McAllister, will be delivered this summer.

Designed by Jensen Maritime Consultants of Seattle, Wash., the tugs are being built to ABS classification standards by Eastern Shipbuilding Group, Panama City, Fla. Measuring 98 ft. (29.8 m), each will be equipped with two EMD engines and two Schottel drives - designed to produce a bollard pull up to 60 tons. Fire pump equipment will include Detroit Diesel PTO at 1,800 rpm to Goulds 3410 eight by 10 in. pumps, producing 3,000 gpm delivered to two fire monitors, each with 1,500 gallons AAF Foam Capacity. Each tug will also be equipped with two NETEC winches holding 475 in. of 10 in. circumference line.

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Seven Seas Voyager Will Boast Dolphin Podded Propellers

Seven Seas Voyager, the new 50,000-gt cruise ship under construction at T. Mariotti Shipyard in Genoa, Italy for Radisson Seven Seas, will be among the first ships to house the new Dolphin podded propulsion system jointly developed by STN Atlas Marine Electronics and John Crane-Lips. The vessel, which is scheduled for a 2003 delivery, will boast podded propellers delivering 2 x 7,000 kW at 170 rpm. Main features include integration of a powerful electric drive into a hydrodynamically optimized pod below ship, resulting in a directly-driven propeller. Extensive CFD analyses and model tank tests have led to the development of a pod shape with enhanced efficiency and maneuvering characteristics.

20 Maritime Reporter & Engineering News

News

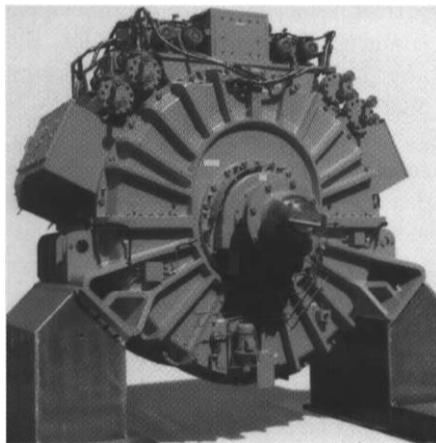
The Dolphin system has been developed for power ranges extending from 3 MW to more than 19 MW, and is suitable for a variety of vessels designed for high speed and good maneuverability operation. The standard drive of the fixed-pitch propeller includes air-cooled six-phase synchronous motor.

In addition to Dolphin, the focus of the delivery by STN Atlas and John Crane-Lips for Seven Seas Voyager also includes a complete propulsion system with synchro-converters, control and joystick system, diesel alternators and a high-voltage distribution assembly with propulsion and main transformers as well as bowthrusters.

Circle 10 on Reader Service Card

Siemens To Supply Fuel Cell Technology

The Siemens Industrial Solutions and Services Group (I&S) has been contracted to supply the most updated



Siemens Permasyn electric motor.

propulsion and automation systems (Nautos) for a trio of new submarines to be built for the Greek Navy for delivery between 2005 and 2008. The \$35.5 million contract features propulsion systems that will include Permasyn permanent-field electric motors and PEM Fuel cells (polymer electrolyte membrane) as power sources. Howaldtswerke-Deutsche Werft (HDW) has been granted a contract to supply the Greek Navy with three type U 214 submarines. The first will be constructed at HDW; the remainder will be built at the Greek and Hellenic Shipyards Co. The submarines will be powered by Siemens Permasyn electric motors - permanently synchronous machines suitable for a DC power supply that are very low signatures, compact and easy to operate. PEM fuel cells as AIP systems (air independent propulsion), will power the submarines when submerged. The AIP system is produced by HDW with Siemens providing the fuel cell modules and the supervisory systems.

Circle 12 on Reader Service Card

March, 2001

Image Marine Wins Dinner Cruise Contract

Image Marine signed a contract to build a 112 ft. (34 m) dinner cruise catamaran for Blue Line Cruises of Sydney, Australia for operation in Sydney Harbor.

Blue Line, which is part of the Accor

Group, currently operates the vessels Sydney Showboats and Majestic along the Harbor. The new vessel will be ready to join the fleet in August 2001.

Touring the Harbor by day and night, the aluminum catamaran will boast an approximate cruising speed of five knots. Passengers will have the benefits of a climate control air conditioning sys-

tem for all weather conditions, entertainment facilities and a large fully equipped galley.

Main Particulars

Length, (o.a.)	112 ft. (34 m)
Length, (waterline)	102 ft. (31 m)
Beam	44 ft. (13.5 m)
Propulsion	2x Cummins 6CTA @ 2,500 rpm
Service speed	5 knots

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IZAR: Hoisting More Than a New Image

By Greg Trauthwein

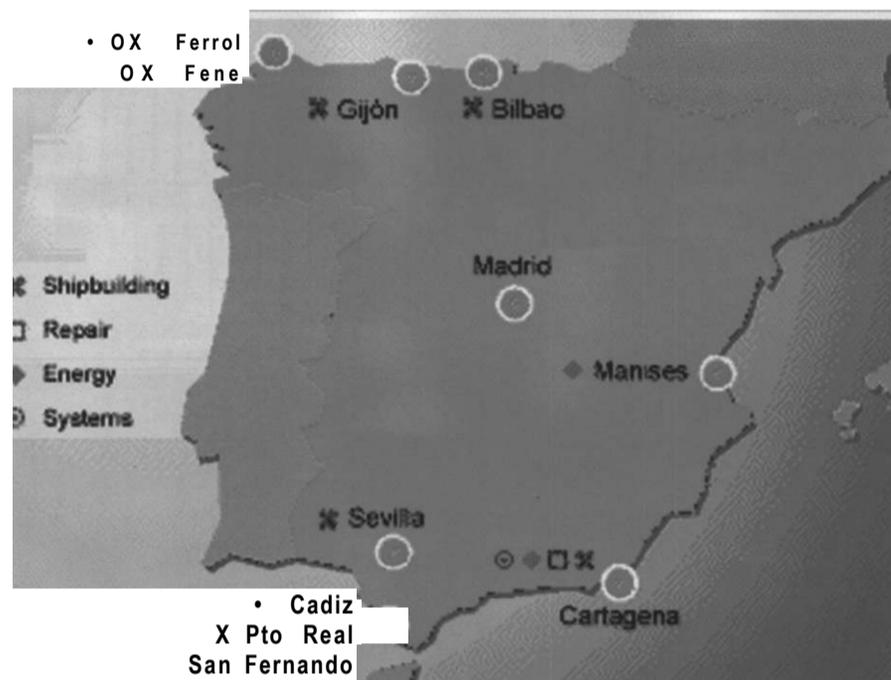
With a combined sum of two and half centuries of shipbuilding experience, the new Spanish shipbuilding conglomerate, IZAR — billed as shipbuilding's new one-stop shop — is hardly a neophyte entering the highly competitive world of international shipbuilding. Comprised of the assets of the former Bazan and Astilleros Espanoles, IZAR (which, in Spanish, means "to hoist") immediately becomes the world's ninth largest shipbuilding group, with a cumulative orderbook approaching four billion Euros. A toned behemoth intent on recapturing market share across a broad spectrum and led by **Jose A. Casanova**, chairman & CEO, the company is embarked on a plan of prudent investment in technology; technology aimed at enabling its facilities to competitively compete in the building of high-value ships with any yard of its stature, located anywhere in the world.

A History with a Future

The Spanish shipbuilding presence began more than 250 years ago, with the construction of shipyards in Ferrol and Cadiz, among other locales, in support of its burgeoning naval operations. In the early 1900s the company expanded its repertoire with an entrance in the commercial business, with new yards built and re-built around Spain. Eventually, the military business was spun off into Bazan, and the recent move — the culmination of a plan by SEPI — is simply putting the company back together. While there ultimately is a plan to take the company private — the Spanish government and SEPI having published this intention — Casanova admits "we are on the list, but we are far down on the list."

In a time when gargantuan corporate consolidations are the norm rather than the exception, the reformation of Spanish shipbuilding prowess under one flag should hardly come as a shock. But the new entity — well-endowed with a highly-skilled and flexible worker base, a proven performance in building high-value, quality ships, and a diversity of facilities to handle any marine need — will be challenged tomorrow as yesterday, by an oversupply of shipbuilding capacity and the political whims which lead to subsidized shipbuilding in many countries.

izar [l-sar] v. to hoist; to heave.



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A cornerstone of IZAR's plan to make the organization efficient, competitive and profitable is investment in technological upgrades throughout its 12 facilities, upgrades that will foster creativity and new marine solutions, helping it to not only fulfill but to keep a step ahead of customer needs and market trends. In total, there is currently in excess of 700 million Euros earmarked for investment in "Process and Innovation" projects, including development of new fast transport ship types, cruise vessels and naval ships.

The philosophy come from the new management's intent to prioritize innovation, specifically by developing and perfecting a portfolio of innovative products, increasing productivity, and offering added-value products with high-tech content.

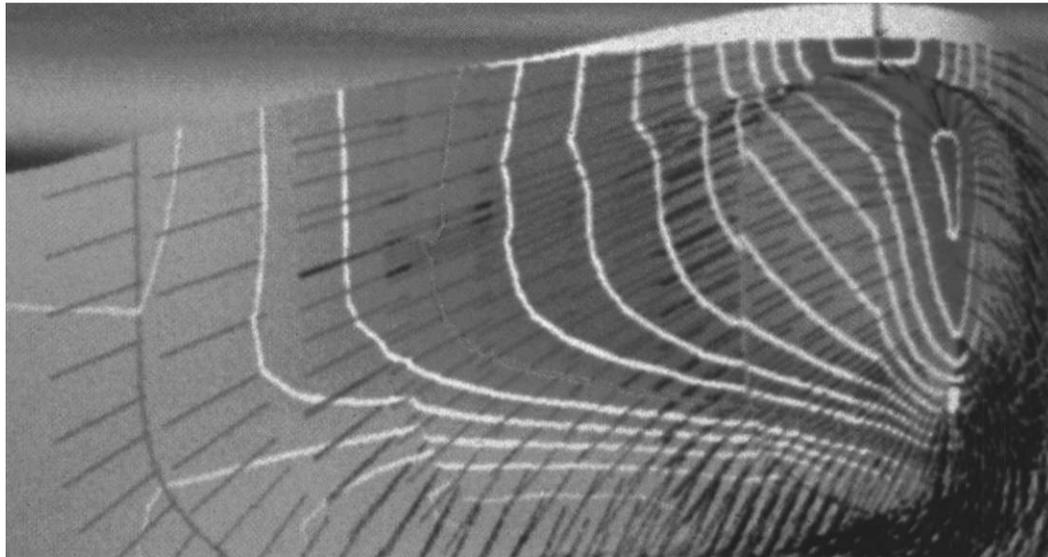
Providing the glue for this plan, according to Casanova, is the synergy that is inherent in the coupling of a commercial and naval shipyard, and he classifies this synergy as the primary strength of the new organization. For example, the naval side of the business will lend an invaluable access to a level of high technology uncommon in most commercial marine sectors. As shipowners — driven by international, national and regional regulations, as well as the constant push for increased lifecycle performance and increased cost efficiency — are demanding and receiving unprecedented levels of technological product and system development.

Similarly, the military side of the business can benefit from streamlining of process and materials procurement inherent on the commercial side.

While today's orderbook is more heavily skewed toward naval business, the new company optimally will enjoy a 40 percent military, 40 to 50 percent commercial and 10 percent "other" split of business.

More than a Manufacturer

While the synergy of the naval and commercial businesses is a key to IZAR's long-term success, another cornerstone of the new operation is embodied in the one-stop-shop philosophy. More than a simple slogan, Casanova notes that prior to the merger, the main product offering was the manufacture of ships. Now, the combined organization employs 10 times more naval architects



IZAR, the new shipbuilding leader, is the result of the merger of BAZAN and ASTILLEROS ESPANOLES, and it becomes the ninth largest shipbuilder in the world.

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and marine engineers — 600 v. 60 — and offer owners full service from design through manufacture, as well as a larger engineering capacity and valuable services for large fleets. The combined company today employs 11,000, and while the trend in big business inside and out of the marine industry has

been to slim forces in the face of economic slowdown, Casanova is adamant to retain a highly trained workforce.

Market Opportunities

IZAR is truly looking to leverage its combined engineering and financial base to help not only fulfill market

needs, but define them. While the company lost an estimated 100 million Euros in 2000, it is anticipated that the company will break even by 2003. This prospect may seem unlikely to some outsiders, given the tight margin nature of the shipbuilding business and the precarious nature of subsidy reduction pro-

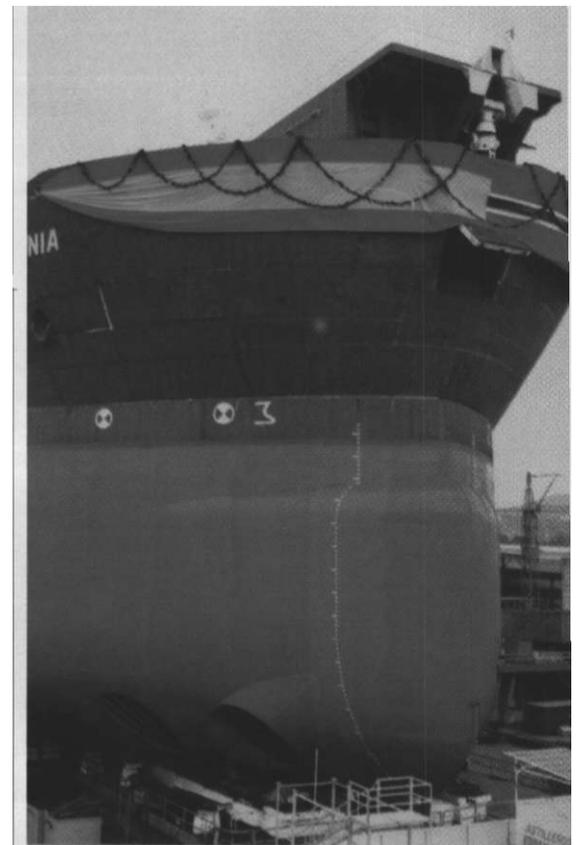


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grams, but Casanova and his executive team feel confident that this renewed focus on providing technologically superior, diverse products will make the difference.

In particular, the company sees vast opportunities in the business of transporting oil and gas products, given the current level of sustained high freight rates, the pressure from international and national authorities to provide transportation of such products in a manner that maximizes environmental protection, which of course include a strong demand for double hull units. Several recent cases, from the Erika to the Castor, lend credence to this assertion.

Much of the investment of the next four years will be spent on producing the capability to design and build vessels that are more automated and fuel efficient, which is where the company's Systems Division will play a key role.

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Sener Ingenieria y Sistemas' FORAN System is a suite of software modules specific for the design and production of all types of ships and floating structures. It is currently being used worldwide in a large number of shipyards and marine design offices. Its presence in the market dates from the late 60s, when the first license was granted to a shipyard, namely to E.N. BAZAN (now part of IZAR).

To ensure the program stays relevant, Sener has optimized the program by incorporating the latest technologies in information systems and in 3-D graphics hardware, and at the same time satisfied the ever increasing demands from very discerning customers for new and improved features.

Sener recently announced version 50, the next FORAN release, which it will launch during this year. This article highlights some of the main features of this new FORAN.

During the 80s, SENER developed its own software for the management of the FORAN proprietary database. However with the passing of the years and the appearance of new technologies, which at the same time is related to the ever increasing use of concurrent engineering technology, the decision to change this proprietary database and its associated management software has proved to be necessary. Thus in version 50 of FORAN the proprietary database has been substituted by a standard commercial relational database.

This solution has three fundamental advantages: the System becomes more open to users; the connection with other programs, in particular shipyard management systems, is facilitated; and the establishment of a distributed design office becomes more feasible. SENER has re-programmed all those areas of the System to do with the input/output of information, and has adapted the data structure to be in accordance with the requirements of the latest technology for database management.

New representation of ship surfaces

Another feature of the new version refers to the representation of the ship forms and main surfaces (i.e. decks and bulkheads). The current tendency is to represent the main surfaces of the ship by means of NURBS (non-uniform rational B-spline) patches. These are mathematical surfaces of general application which include as a particular case those surfaces most used in shipbuilding such as cones and Bezier.

Version 50 of FORAN includes a new module for the definition of ship forms using NURBS and the rest of the System has been adapted to be able to treat the resulting surfaces. With this improvement the traditional method of representing surfaces by a mesh of three-dimensional lines has been superseded. Thus the possible inaccuracies of this method that may be introduced when carrying out geometrical interpolations to calculate points and lines that are not contained within the main grid have also been eliminated.

The most important advantages of this change, according to Sener, are: possibility to define very complex ship forms to meet the current market requirements;



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	24" Radome/48" Open	48"/72" Open	48"/72"/108" Open
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more exact and reliable information for construction; and ease of use.

New System kernel

Perhaps the most significant innovation in FORAN version 50 is the introduction of a new kernel for 3-D modeling and visualization. Completely developed using the latest object oriented technology; this new kernel is made up of a series of libraries of C++ classes, which cover all the principal basic functions of the System. By extension this technology provides the System with a greater robustness and stability. The new kernel integrates solid and surface modeling, and at the same time incorporates specific primitives for modeling of the structure (e.g. curved profiles with holes and end cuts) and parametric primitives for the definition of equipment, pipes, ducts and trays.

High efficiency visualization is based on the OpenGL standard and high performance 3-D graphics cards. The new visualization possibilities greatly facilitate the comprehension of the model in 3-D space and include: direct working

with the solid model in shaded view, dynamic movement of the model to be able to analyze it from any view point and a complete control of light focus. There are also interesting options for navigation through the model in real time.

The new kernel also includes a new graphic user interface (GUI) that is native to Microsoft Windows; that is to say that it is based on the intrinsic resources of the operating system and needs no emulation.

The rapid evolution of personal computers and the consolidation of Windows technology have given rise to the desirability of their use for sophisticated CAD/CAM systems. Many applications, which until recently could only be processed on cumbersome and expensive work stations using the UNIX operating System, can now be executed very advantageously on personal computers running under Windows (NT or 2000). The new version 50 of FORAN has been designed specifically with this operating system in mind.

FORAN version 50 not only provides

a very much improved user interface, but also at the same time enhances this facility with a very powerful command system. This system includes advanced macro programming, undo/redo facilities, command chaining, short cut keys, configurable menus and icons, contextual menus and new dialogue windows.

New functions for basic design

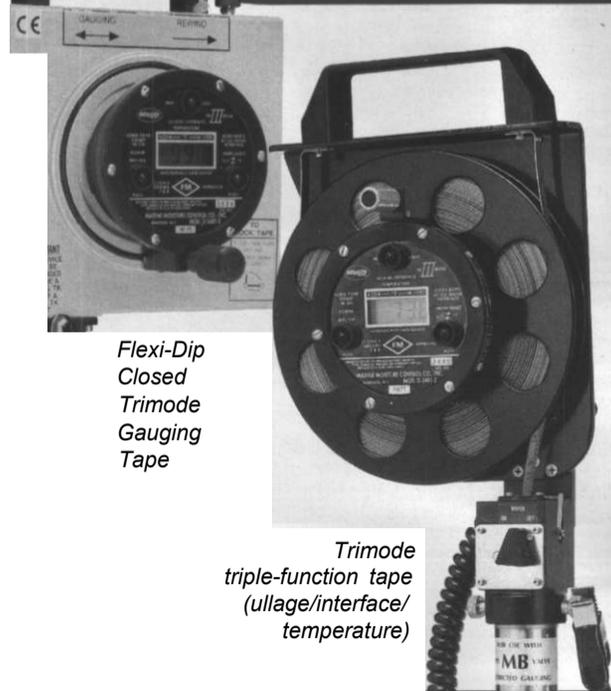
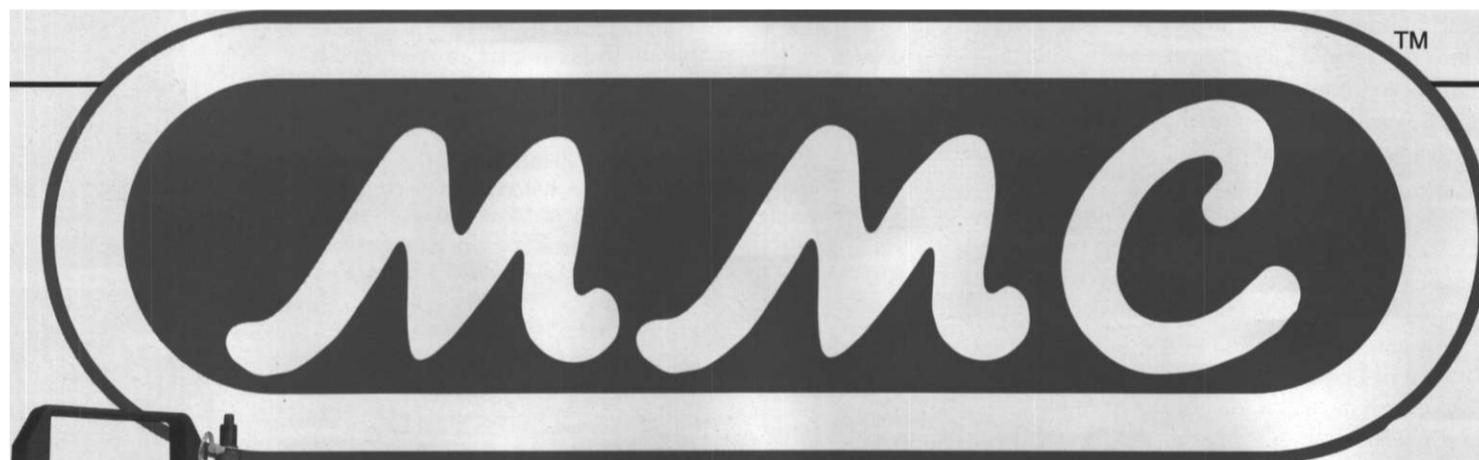
To reduce the design and production cycles, it is critical from the very beginning of a project to generate reliable information, information which can be reused when the detail engineering is carried out.

FORAN version 50 incorporates a series of functions for the preliminary 3-D definition of the ship model so that from the earliest stages of the project certain budgetary estimates can be carried out. Thus for example calculation of work content, weights, areas and other variables can be made, and this helps in the earliest possible definition of the product both from the technical and commercial viewpoint.

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Success For Transas In Spain

Transas Spain has completed the domestic delivery and installation of three PC-based GMDSS simulators. The new facilities will be used to train radio personnel at three Galician Nautical Fishery Schools comprising Instituto Politecnico Maritimo-Pesqueiro do Atlantico in Vigo, Escola Oficial Nautico-Pesqueira in Ribeira, and Escola Oficial Nautico-Pesqueira in Ferrol. Transas has supplied its latest generation TGS 4000 ver.2.0, which permits switching between simulated Sailor Compact 2000 and Sailor Program 4000 equipment. Each of the three systems is capable of providing interactive training for up to 10 Trainees simultaneously under the supervision of an Instructor. These units are the largest GMDSS simulators ever installed by Transas in Spain. Other types of simulators installed by Transas in the three Galician schools are the shiphandling Navi-Trainer Professional simulator and Engine Room Simulator, ERS 2000.



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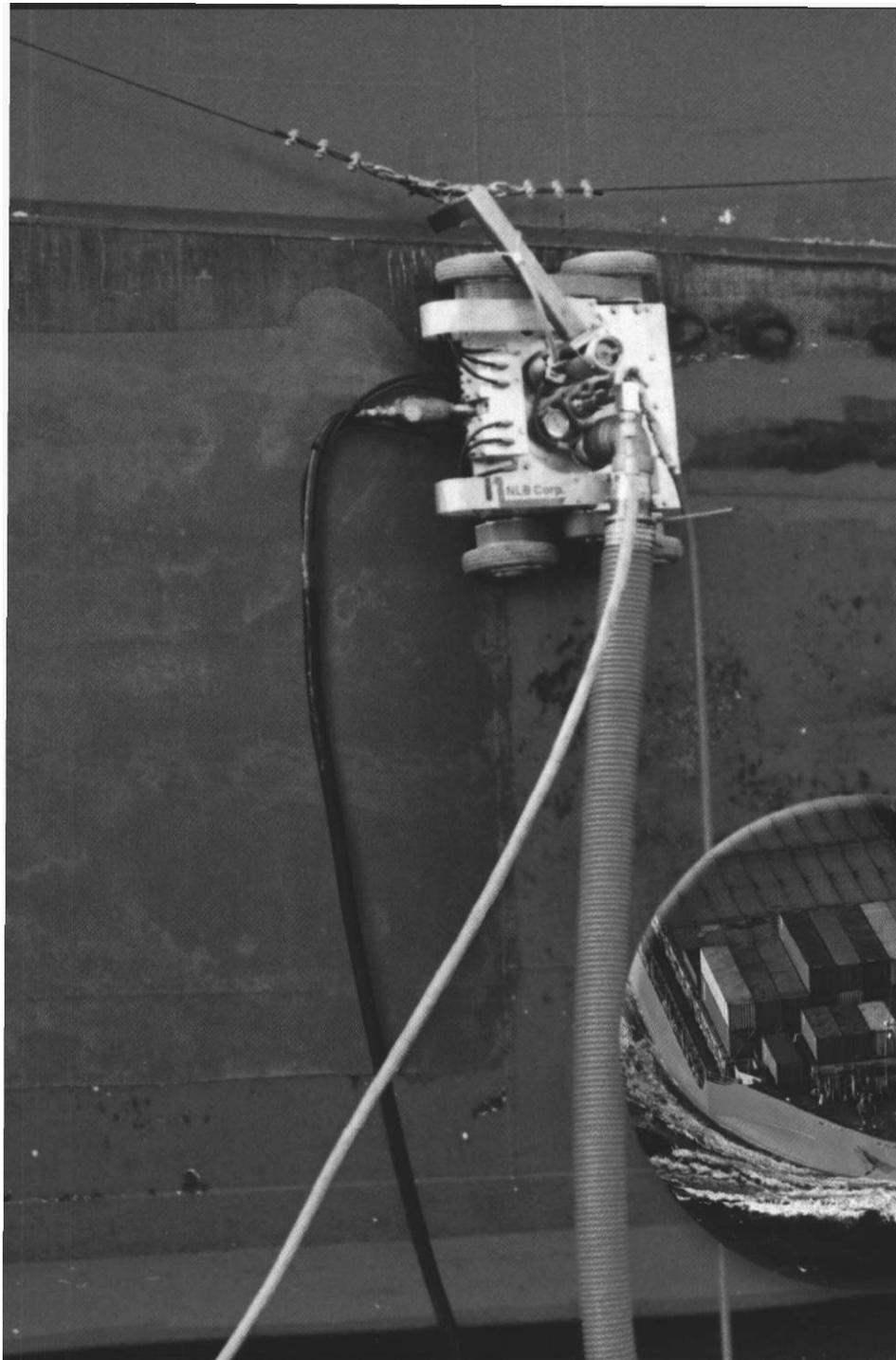
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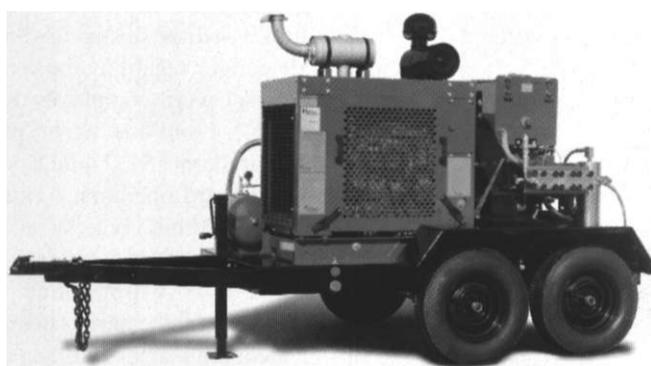
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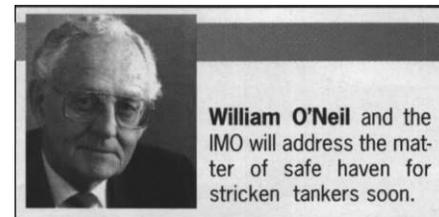
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Saving the Castor: Critical Issues Must Be Addressed

While this edition of *Maritime Reporter* focuses on the quick and successful repair of vessels, an issue which is sure to spur changes in the marine repair market occurred earlier this year when

the stricken tanker *Castor* was unable to find a safe harbor. The ship, which received a 60-ft. crack on its deck plate from a severe storm, was left in limbo for nearly 40 days as Morocco, Spain,

Algeria, Gibraltar, Greece, Tunisia and Malta all refused the ship entry into its waters, fearing a potentially catastrophic explosion of its nearly 30,000 tons of gasoline cargo. With the final discharge



of all cargo from the damaged tanker *Castor*, and its pending redelivery by the salvors to its owners for repair, a 39-day saga that has involved eight nations and raised serious concerns within the maritime industry has been successfully concluded.

"It is unfortunate that political intervention into what should have been a purely technical challenge, put so many elements at risk," said **Nicolas Hondos**, chief executive of Athenian Sea Carriers, owners of the *Castor*.

While the states refusing admission claimed an imminent hazard, independent scientific analysis of both scenarios clearly showed that the risk of an explosion was minimal and that the potential pollution threat was far worse if the vessel was to sink in deep water.

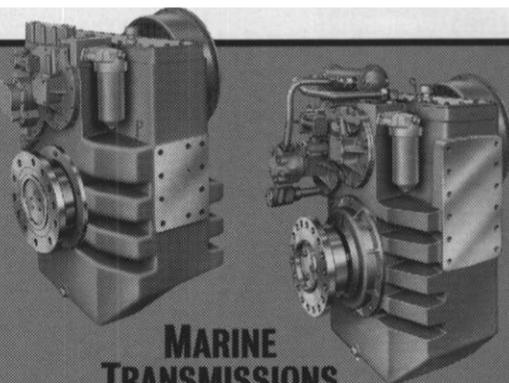
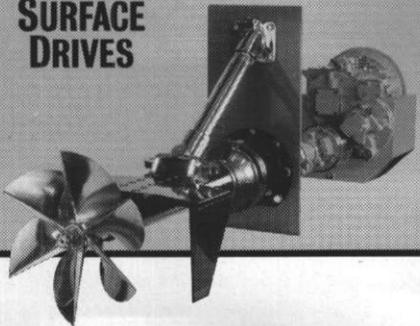
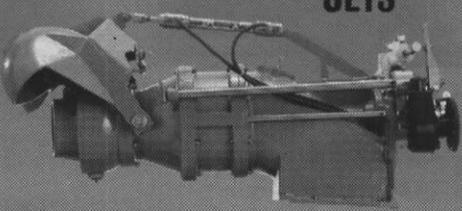
Throughout the salvage operation ABS, the classification society of record for the *Castor* stressed the difference between a damaged vessel and one that is substandard. "Since suffering the initial heavy weather damage this vessel has been subjected to an extreme Force 12 gale with wave heights in excess of 8 meters without any further deterioration in its structural condition," **Robert D. Somerville**, President of ABS, emphasized. "Over the last 39 days it has been towed 1,000 miles across the Mediterranean, remaining intact without losing any cargo or causing any pollution. Only a remarkably robust, well maintained vessel in stout structural condition could withstand such a beating and still deliver its cargo safely," he insisted.

"The facts speak for themselves," said **George Tsavlis**, a principal in the salvage firm Tsavlis Towage & Salvage. "The allegations regarding the condition of the vessel were completely without foundation." From a technical point of view the cargo transfer should have been a straightforward operation. "Given the traditional maritime courtesy of access to a sheltered area, this incident would have been over within three days," Tsavlis said. All the parties involved in this incident are fearful that the political treatment of the *Castor* may become a precedent for future casualties and believe it is imperative that sensible, risk based guidelines on sheltered areas be developed at an intergovernmental level within IMO. These must respect the rights of coastal nations but also provide adequate protection for damaged vessels, their cargoes and their crews. "IMO Secretary general **William O'Neil** is to be applauded for his swift response in placing this issue on the organization's future agenda," said Somerville.

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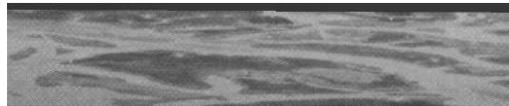
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Craft Bearing: On Solid Ground With Split Bearing Solution

Craft used its standard split roller bearing (the same bearing that is popular for use on marine drive shafts, rudder shafts and lifting equipment) to transform a couple of standard 2.5-in. schedule 80 pipes into precision drive shafts for critical positioning equipment in the United States Navy Research Laboratory's new Spacecraft Rendezvous and Docking Simulator. Craft's engineers designed this large, state-of-the-art equipment to maneuver full-sized spacecraft to simulate the terminal docking phase during rendezvous in space. They needed a long, rigid, lightweight drive shaft for the precision control of the docking spacecraft. Craft's engineers developed an effective and inexpensive solution that could be applicable to almost any situation where line shafts are needed.

Craft's engineers simply made the drive shaft from standard pipe rather than solid machined steel. This was possible because the use of a Craft Split Bearing required machining only the area where the bearing was to be installed. The rough 2.8 in. outside diameter of the pipe was easily turned to 2.7 for about six-in. near the center of the 20-ft. pipe sections. Each end was bored to 2.3 inside diameter to accept Trantorque keyless bushings.



Craft Bearing used its Split Roller Bearing to turn an ordinary pipe into a precision drive shaft.

The pipe sections were installed on either side of the girder mounted, low-backlash, parallel shaft gear reducer. Short stub shafts at each end were fitted with drive sprockets. The standard Craft SI-212 BCH Split Roller Bearing was then installed around the shaft.

Due to the high lateral stiffness and lightweight of the pipe sections, only one Craft Bearing was required at the mid-span of each pipe drive shaft. When engineers compared the pipe drive shaft

with a conventional 2-in. solid drive shaft, they found that the pipe shaft was: 28 percent lighter; 70 percent stronger; and 140 percent more rigid.

The ability of the Craft Split Roller Bearing to be assembled around the shaft saved hours of machining, reduced installation time, and made the concept feasible. This innovative approach should be considered by anyone using line shafts that need intermediate support. This is particularly true in the

marine industry where strength and weight are such important considerations.

Craft split bearings are designed to be easy to install because they eliminate the need to remove shafts and drive components. In addition, to increased reliability and longevity, the Craft bearing has a host of other innovative features.

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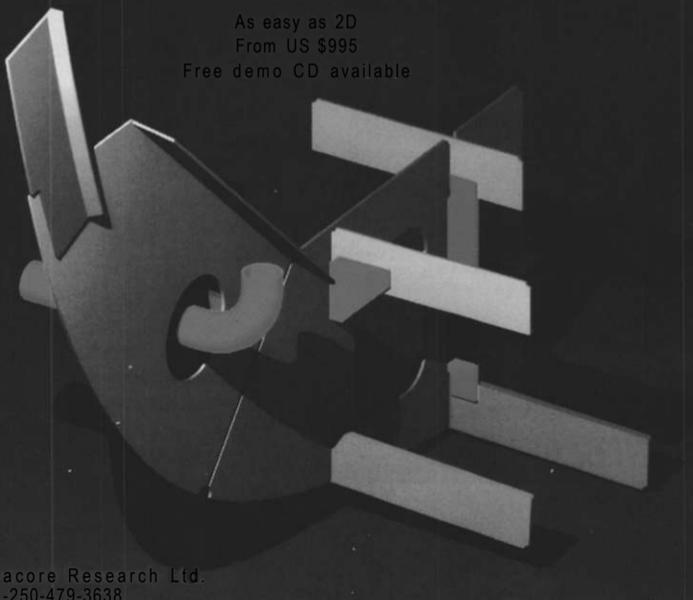
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Maritime Week

UMC Opens New Underwater Repair Facility in Portland, U.K.

Underwater maintenance specialists UMC International have established a new ship repair location in the Dorset port of Portland capable of offering ship owners a full range of survey and repair services.

UMC has already completed approxi-

owners and classification societies and this has led to us establishing a dedicated underwater maintenance and repair center within the port."

UMC has already carried out myriad number of tasks including a propeller

polish on the 90,607 dwt tanker Lochness before it went to dry dock in Poland, and fitting a new rudder to a general cargo vessel.

Other jobs have included underwater hull cleaning, surveys and replacing

defective hull plating.

Part of the investment being made by UMC at Portland will include two mini-Pamper underwater hull cleaning machines and Jones expects the port to become increasingly attractive for owners wanting a rapid solution to maintenance and repair requirements.

Circle 33 on Reader Service Card



A UMC worker prepares the shell plating

mately 50 jobs at Portland and the success of the operation has led to the Southampton-based company setting up a new office at the port with a permanent team of divers and equipment.

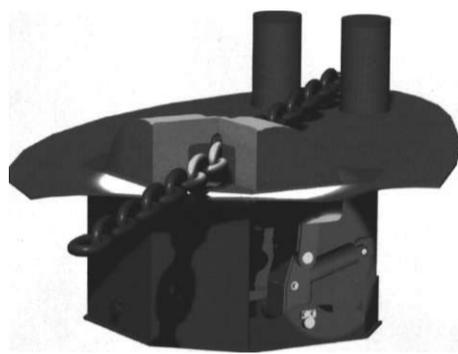
Ships can be accommodated either alongside or at anchor within the port breakwater. With about 39 ft. (12 m) of water available, ships up to VLCC size can be anchored within the harbor, while vessels up to 820 ft. (250 m) can be berthed alongside.

UMC chairman David Jones explained: "Portland has a strategic location on the U.K. South Coast and has excellent facilities including good shelter, deep waters, low currents and very clear underwater visibility. It has already proved popular with both ship



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Circle 318 on Reader Service Card

Bollinger Offers New Pitch To Ship Repair

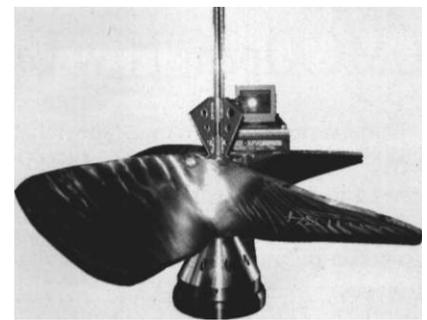
Bollinger Quick Repair (BQR), the ship repair and conversion facilities of Bollinger Shipyard has gone online with its new service, which aims to save vessel owners and operators money, as well as helping vessels to run more efficiently. The service is available via any of Bollinger's 14 shipyard in Louisiana and Texas.

"Experience in our quick repair shipyard has shown that many new vessels are outfitted with under performing propellers for the type and work of the boat," said Jim Smith, BQR's engineering and technical manager. "Our new system, for propellers of at least 36 in., can help prevent that while speeding up the production of new propellers and the repair or modification of others."

Smith added that a problem is obviously visible when propellers are dam-

aged. However, he cited that when a vessel is not performing as expected, the propellers are often the wrong size, pitch diameter, style, or material. Bollinger offers a solution to this by recommending and providing the proper propeller for new boats, and suggesting and performing remedies for repair or modifications.

Bollinger encourages direct customer input when dealing with propeller repair, therefore the company invites



Customers can log onto BQR's Web site at: www.bollingershipyards.com for personalized propeller repair.

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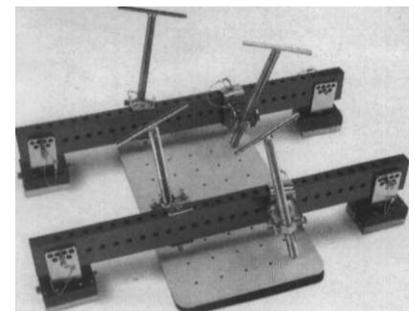
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customers to either visit its Harvey, La. site on long onto its Web site at: www.bollingershipyards.com, where they will find a propeller request form. By completing this, customers can provide Bollinger with useful information about their vessel's engines, gears, shaft size, diameter and pitch. This direct customer input allows Bollinger's propeller engineers to analyze the data efficiently, and evaluate the proposed propellers for new boats and those already outfitted. In most cases, according to Smith, "Bollinger can respond in 24 hours. For those clients with existing wheels, we can analyze the wheel at our Harvey facility on our computerized pitchometer, and then perform the needed correction on site."

Trident Technologies' SeaPatch Protects Against Spills



Trident Technologies, Baton Rouge, La., has been recognized in the emergency response sector of the maritime industry for its Sea-Patch Magnetic adhesion device. Available in three different sizes, the product, which protects against hazmat spills, offers versatility and leak stopping power, which is a necessity in spill containment devices.

Specifically designed for the maritime industry by its developer, former Navy Seal **Buren Palmer**, Sea-Patch is engineered to stop leaks in the shortest amount of time possible.

It can be secured to any hull either above or below the water level. Its modular, locking pin design provides the flexibility to make the product fit most any need.

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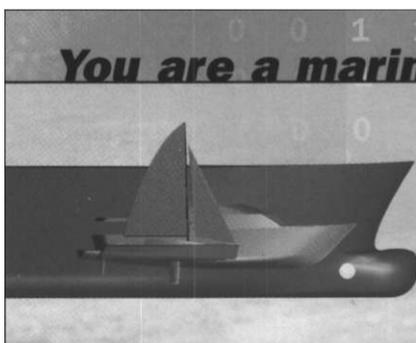
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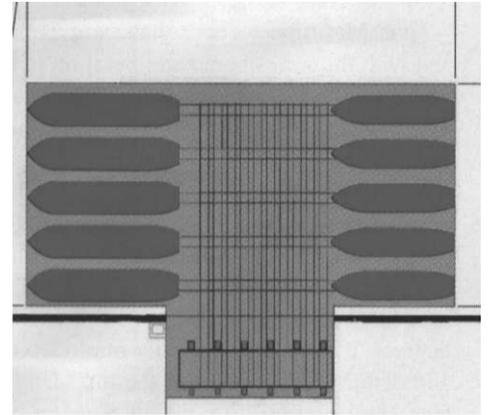
Syncrolift, a Rolls-Royce company, has been chosen by the Suez Canal Authority to supply a shiplift and transfer system valued at more than \$7 mil-

lion for the dry docking of Nile River cruise ferries.

Delivery of the 3,420 ton-lift-capacity Syncrolift is scheduled for the Armant Shipyard on the Upper Nile near Luxor City in March 2002. The shipyard will use the installation specifically for the

dry docking of ferries to improve efficiency in overall shipyard repair and maintenance, as well as minimizing the loss of revenue while cruise ferries are out of service for repair. This is especially conducive for the cruise industry, which relies heavily on an itinerary

Syncrolift's new shiplift and transfer system



basis. The Syncrolift system provides the benefit of less time out of the water, which leads to cancelled cruises and loss of revenue.

The order is the sixth Syncrolift installation in Egypt — the other two are with the Egyptian Navy — bringing Syncrolift's total worldwide installation to 221.

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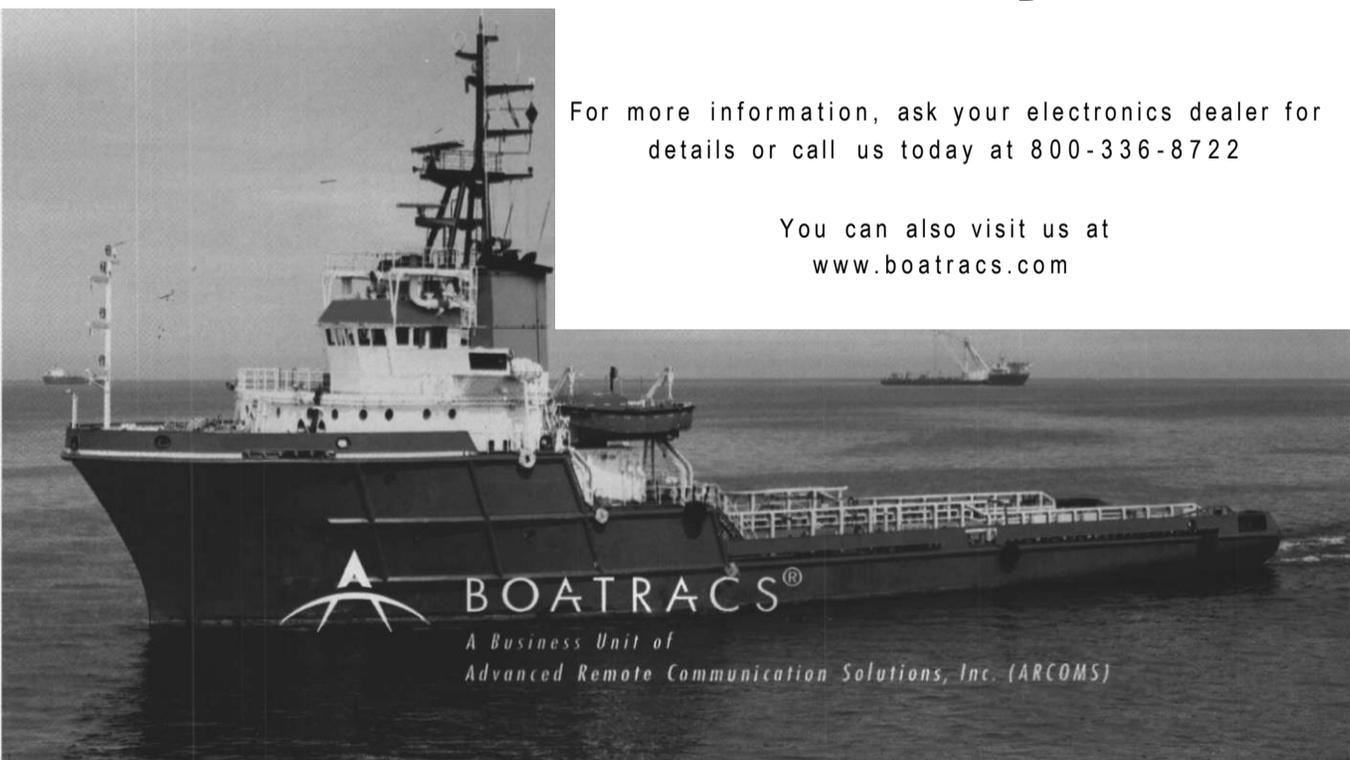
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Maritime Reporter/Engineering News

MSC Ships Call Upon NNS



The Military Sealift Command (MSC) ships M/V PFC. Dewayne T. Williams and M/V SGT. William R. Button are scheduled for repair work at Newport News Shipbuilding. The third and fourth installment of a four ship contract, Williams will be at the Shipyard from February 12 - March 7, 2001 and Button is scheduled to be at NNS April 16 - May 8, 2001. The vessels, which measure 673 x 105 ft. (205.1 x 32 m) each will undergo hull blasting and painting, tank blasting, resurfacing of the helo deck, disassembling and overhauling both main engine exhaust systems and performing all of the normal regulatory body inspections.

Circle 40 on Reader Service Card

Class Is In' On Cape Bon

A MarAd general agent, Interocean Uglund Management Corp., Voorhees, N.J., awarded a \$24.4 million contract to Bender Shipbuilding and Repair this past December. The contract specifies Bender to convert the National Defense Reserve Fleet (NDRF) vessel Cape Bon into a schoolship for the Massachusetts Maritime Academy (MMA). Under the contract, Bender will implement living quarters and lifesaving equipment for 600 cadets, officers, faculty and crew; expand galley and stores arrangements; and provide extra electric generating requirements in an auxiliary machinery room uniquely designed for diesel training. The vessel, which will be renamed Enterprise in honor of the MMA's first training ship, departed the Academy campus on December 29. Conversion began in January and is expected to last approximately one year. Cape Bon is a general cargo ship, which was originally constructed for the Lykes Bros. Steamship Company by Avondale Ship-

Flender Werft Launches

Floating Drydock

Flender Werft christened its new floating drydock with a nominal lifting capacity for ships up to 20,000 tons dwt (max. 23,000 dwt). The company said that the unit will replace the shipyard's largest dock (16,000 tons), which is reportedly being sought by a buyer in Dunkerque, France. This expansion of the yard's drydocking facilities allows it to partake in the new trend in Baltic shipping, which is leaning toward larger ships.

yards in 1967. The conversion will transform it from a conventional general cargo ship into a fully-equipped training ship for 600 passengers.

The cargo ship is currently configured with six holds to carry various breakbulk and cargoes. Hold number four will be converted into quarters and auxiliary machinery for services such as potable

water and air conditioning. Hold number five will have new refrigerated and dry storage storerooms and workshops installed, and two cargo oil deep tanks will be converted for potable water storage.

Hold number six will be changed into a laboratory and classroom area. Although the ship's existing steam

propulsion plant will remain, an auxiliary machinery space will be created in the number four cargo hold, centered around a new Wartsila 8L20 medium speed, heavy fuel diesel generator. This space will be equipped and arranged to simulate a modern diesel propulsion plant.

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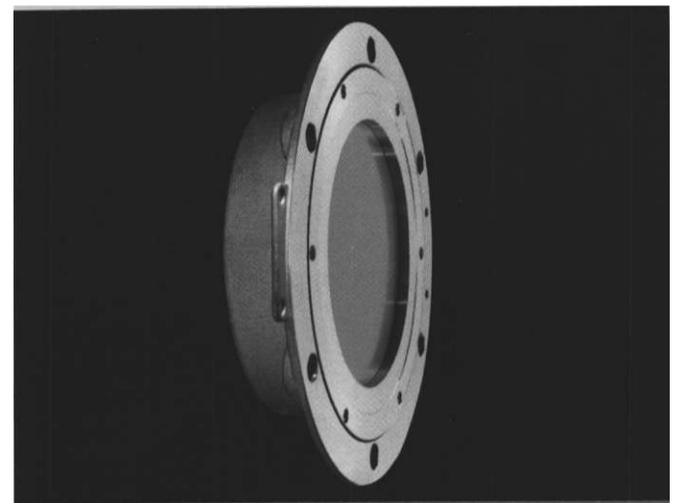
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Ship Repair & Conversion

Norshipco, MSC And Maersk Celebrate Renaming Of MV

Lt. Col John U.D. Page

Newark Bay, owned and operated by Maersk Line Ltd, for Military Sealift Command (MSC), was renamed MV Lt. Col. John U.D. Page during a ceremony

at NORSHIPCO on February 21, 2001.

Brad Sauer, president of Maersk Line, Ltd., served as the master of ceremonies for the event. **John F. Reinhart**, CEO Maersk Line; and **Alexander J. Krekich**, president of NORSHIPCO and COO of USMR, will make welcoming remarks.

The 950-ft. (289.5 m), civilian-crewed ship has been at NORSHIPCO since October undergoing a conversion from a commercial containership to a self-sustaining ammunition containership, capable of carrying 2,500 20-ft. containers. The main work package includes the installation of four new MacGregor



cranes, designed to ease loading and off-loading pier side and in-stream; the modification of container cell guides from 40 ft. to 20 ft., stacked from the tank top to the deck head; installation of a cargo hold cooling water spray system and cargo hold environmental control system; modifications to hatch covers, including the fitting of sockets and installation of hatch skirt landing pads; wheel shafting; and rudder and sea valve repairs. Old paint is being removed and the ship will be painted while in dry-dock.

The ship is named in honor of Army war hero, Lt. Col. John U.D. Page, who was awarded the Medal of Honor for heroic actions from November 29 to December 10, 1950 near Chosin Reservoir, Korea. Page's mission was to establish traffic control on the main supply route to the Chosin Reservoir Plateau. Rather than leaving after completing the mission, he voluntarily stayed to help an isolated signal station cut off from the Marine division.

Upon its delivery, Page will join a fleet of more than 35 Afloat Prepositioning ships under MSC's operational control - operating from the Diego Garcia area in the Indian Ocean.

NORSHIPCO is also scheduled to convert the Page's sister ship, M/V Sgt. Edward A. Carter, Jr., and is planning to deliver the vessel to MSC in June 2001.

Circle 41 on Reader Service Card

Celebrity Cruises To Dry Dock

Millennium For Two Weeks

Celebrity Cruises will place its ship Millennium in dry dock for two weeks to repair an electric motor that operates one of the ship's two propulsion units.

The dry dock will necessitate the cancellation of two one-week Caribbean cruises, scheduled to depart Fort Lauderdale on April 1 and 8.

"Although the under-performing motor has no impact on our guests' safety or comfort, it has reduced Millennium's maximum cruising speed of 24 knots, to 20.5 knots, and has the potential to affect arrival times in certain ports of call. We want to regain that power as soon as possible and the only way to accomplish this is to undertake this repair," said Rick Sasso, president of Celebrity Cruises. The electric motor in question is housed within one of the ship's two propulsion pods.

Maritime Reporter/Engineering News

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Ship Repair & Conversion

ASRY Grabs Hold Of UL/VLCC Market

The last quarter of 2000 proved to be an exceptionally active one for ASRY — the yard was filled to capacity during the last year.



Odfjell's Bow Lady was at ASRY in November 2000.



The 46,570 dwt bulk carrier Antillanca



Bahrain Mineral Co.'s Alyia arrived was at ASRY from November - December 2000.

This upswing, which had been projected prior to the fourth quarter, has proved to be true with the company's 300 percent increase in the ULCC and VLCC market during that period. The level of repair activity has been high on vessels in the 40,000 dwt to 100,000 dwt class with more than 12 being dry-docked for repairs.

A total of 29 vessels visited ASRY during this period, the largest being Bergesen's 360,700 dwt Berge Enterprise. Approximately nine bulk carriers were docked, and there was also a demand for steel renewals during the period with 766 tons being replaced — a total of 4,362 tons of steel work during the year. Blasting and painting contin-

ued to be a steady with 830,000 sq. m being applied to various vessels.

Noteworthy contracts won during the year included the six-vessel block booking with Iran Shipping Lines, illustrating ASRY's positive relationship with established customers.

In addition to the contract that ASRY

signed with Bergesen, the yard agreed with Iran Offshore Engineers for the complete conversion of derrick barge Abouzar 1200 into a pipelay barge.

The contract, which will be completed this year, sets the standard for ASRY to enter into the major conversion market for offshore oil and gas field contracts.

The yard is working continually to diversify its activities and has done so with major contracts for myriad of conversion and upgrade work on a variety of jobs, such as offshore drill rigs, diving support vessels and dredgers.

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UPC Foam Filled Fenders: The Ultimate Protector

Celebrating 25 Years of Service — Continuing its Commitment to Excellence

Just as today's maritime industry is currently experiencing technological advances, the equipment that will be used to produce and adhere to these changes must follow the same beat — specifically in the arena of fendering systems. Bellflower, Calif.-based Urethane Products Corp. (UPC) has developed a proven system for today's stringent and demanding marine environments.

The company has been demonstrating its expertise to a tee with its own foam-filled Marine Guard™ fenders, which offer the utmost protection for ships, harbor craft, docks and piers. Designed to safely absorb the large amount of energy generated by a ship's weight and relative velocity as it approaches a dock, pier or another ship, the fenders comply with all U.S. Navy and Coast Guard requirements.

The fenders are constructed to perform even under the most trying of conditions; Urethane tailors each fender to the customer's individual needs. Able to absorb up to 40 percent more energy than equal sized pneumatic fenders, Marine Guard's higher energy absorption is experienced even when subjected to uneven loads or when slightly damaged.

Perhaps one of Marine Guard's more significant features is its internal foam core, which is comprised of 100 percent closed-cell, cross linked resilient energy absorbing foam. This non water absorbing foam core, is designed, laminated and constructed to yield maximum strength and consistent performance and dependability levels.

On the outside of the fenders lies (the company's own) thick tough protective polyurethane elastomeric skin material, which encapsulates the fenders' foam core. The polyurethane elastomer skin's unique, seamless construction promises to leave vessel hulls free of marks and/or scratches. This specific skin is also reinforced with a woven nylon tire cord, which increases tensile strength and distributes energy and stresses.

Customers can choose to have their fenders made with integral swivel end fittings, which are constructed of high quality stainless steel — or hot

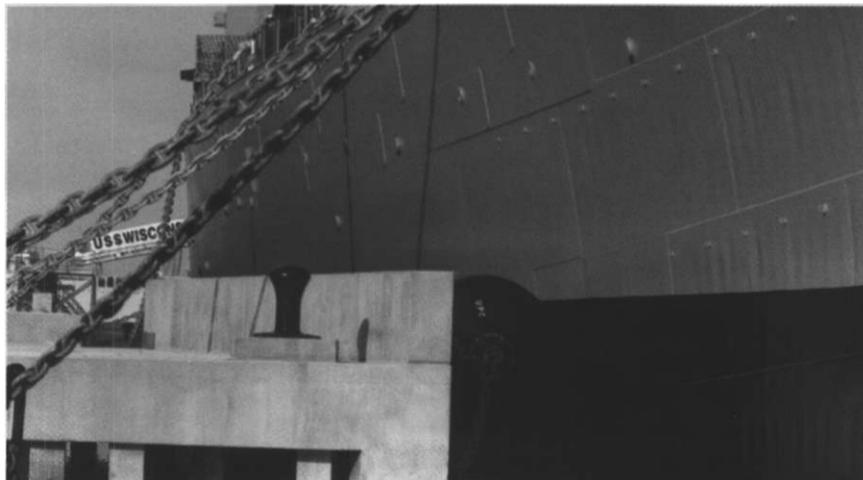


In December 2000, Urethane installed its innovative foam filled fenders at Nauticus Pier, Norfolk, Va., where the USS Wisconsin was docked.



Marine Guard Fenders are designed and constructed as the ultimate protector for use on ships, docks and piers. Shown here are the fenders that were used at Nauticus Pier.

(Photos: Gene Woolridge, Advertising Visuals, Virginia Beach, Va.)



dipped galvanized steel. The purpose of these fittings is to provide a safe and permanent end fitting for the fender and a fixed mounting point for the attachment of optional chain and

tire net. This specific design, which is designed not to impede angular and longitudinal compression, eliminates the possibility of fender damage due to end fitting failure.

The fenders' end fitting is connected internally with a heavy duty chain, which provides superior pull through strength, increased tensile strength and a distribution of energy and stresses.

Whether stainless steel or hot dip galvanized swivel end fitting are installed, both come equipped with a Bolt Type Safety Anchor Shackle (with bolt, nut and cotter pin), which complies with the requirements of Federal Specification RR-C271D Type IV A, Grade A, Class 3.

An Historic Selection

Last year, UPC was selected to supply its fenders for WWII battleship USS Wisconsin's arrival at Norfolk, Va.-based Nauticus Pier. Known as the last of the great battleships, the 887 ft. (270.3 m) historic ship was welcomed to its new home with a ceremony at the Pier on December 8, 2000. Attended by dignitaries such as Gov. **Jim Gilmore** and Gov. **Tommy Thompson**, the ceremony prompted visits by various war veterans — some of whom had served on Wisconsin. Recommissioned in 1988, the vessel is scheduled to begin tours (upper deck only) at its new berth this April. The lower decks are expected to be open to the public sometime within the next couple of years.

UPC incorporated three 8 by 18 ft. (2.4 x 5.4 m) high capacity fenders and one 11 by 18 ft. (3.3 x 5.4 m) standard capacity fender on USS Wisconsin. All were constructed with a heat laminated internal foam core encased by tough, heavy duty skins with a thick continuously wound nylon tire cord reinforced urethane.

The fenders were mounted in a hanging position by Tidewater Construction Corp. of Norfolk, Va., at a cost of approximately \$4 million. Maritime Intl. of Lafayette, La., supplied the Antifriction UHMW (ultra high molecular weight) polyethylene backing, which was affixed to the concrete to reduce wear on the fender skin.

For more information contact UPC at: 9076 Rosecrans Ave., Bellflower, Calif. 90706, tel: (562) 630-4982; fax: (562) 630-6974

Ship Repair & Conversion

USS Cole Returns Home To Litton Ingalls

Following the attack of USS Cole this past fall, the vessel returned to dry land to commence repair and restoration damage at Litton Ingalls Shipbuilding in Pascagoula, Miss.

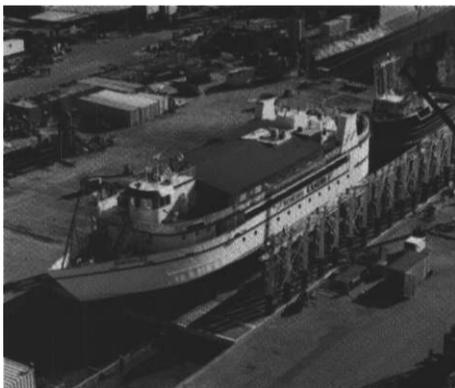


USS Cole was moved January 14 on land from Litton Ingalls Shipbuilding's floating drydock into a construction area of the shipyard's west bank.

Litton workers first picked up the 8,600-ton destroyer on the company's floating drydock, and then moved the ship over land, into a construction bay near where the ship was originally constructed five years ago.

The process of moving the ship over land was accomplished by a system of electrically-powered translation cars that travel over rails - similar to the way a train moves over land. Able to process as much as 200 tons of weight each, the cars relocated Cole 100 yards into the shipyard in approximately three hours time. The destroyer will remain at Ingalls until its restoration is complete.

Atlantic Dry Dock Takes On Tug And Gaming Market



Gaming vessel La Cruise will undergo routine maintenance at Atlantic Dry Dock.

With its 14,600 LT drydock completely booked until the end of April, which has been utilized to the fullest since it was put into operation last summer, Atlantic Dry Dock has myriad of projects scheduled at its yard.

The company's 4,000 LT Marine Railway is back in operation after an exten-

sive overhaul. Upcoming projects include routine maintenance on the dump scow, BTS 401; mega-yacht, Cakewalk; general cargo ship, Argosy; gaming vessel, La Cruise, and ferry Jean Ribault.

Regarding Atlantic's 1,300 LT Marine

Railway, the drydock has been busy over the past several months with vessels from both the Tug and Gaming market segments. Upcoming projects include the tug, Chub Key; and gaming vessel, Stardancer.

In addition, to its newly-renovated

drydocks, the company now houses a fully modernized Inside Machine Shop operation equipped with a 65 ft. (19.8 m) lathe capsule, which can accommodate a 6 ft. (1.8 m) turn.

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Ship Repair & Conversion

Hydrex Team Performs

Underwater Work On Saipem

This past summer marked the entrance of large crane vessel Saipem 7000 into Botlek Harbor of Rotterdam. Within

hours of its arrival, Hydrex's diving and repair crew boarded the vessel to carry out underwater servicing work, which required extensive dismantling of the vessel's thrusters.

The Hydrex team, which did research

prior to the Saipem job, removed some of the vessel's large thrusters. Since the available water depth was not sufficient to allow for the lowering and safe passage of them, dredging work was the first underwater task to be completed.



Hydrex's underwater ship repairers dug a trench using a six in. salvage pump. Five days after intense dredging and removal of debris and rocks — a crater of 5 m deep was created under one of the four main propulsion thrusters.

Concurrently, Saipem's engineers had disconnected the 70 ton thruster onboard, which was then lowered underwater, and with the help of Hydrex divers, hoisted to the surface so that maintenance work could be performed.

The vessel was then transported to a different location beneath the crane mammoth to commence dredging under one of the six DP retractable thrusters. Access space had to be created for the installation of a large cofferdam over the thruster-garage.

Exact positioning and installation is required to install these cofferdams. The team also removed the vessel's heavy lower gearbox of thruster number five. The removal was carried out by the smallest crane vessel in the port of Rotterdam due to the difficulty in having to pass under Saipem's bracings.

Circle 42 on Reader Service Card

Abu Dhabi Inaugurates New Shiplift And Transfer System

Abu Dhabi Ship Building (ADSB) commissioned its new Syncrolift Shiplift and Transfer System at a ribbon cutting ceremony on February 17.

The ceremony, which was presided over by **Lawrence Holiday**, ADSB's managing director, marked a major addition to the company's drydocking facilities.

The system allows for the lifting, building and repairing of vessels measuring 85 m and weighting up to 2,000 tons.

Regarding its ship repair activities, ADSB will now be able to work on much larger vessels in three 85 m dry berths that were commissioned along with the shiplift system.

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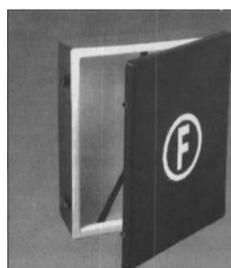
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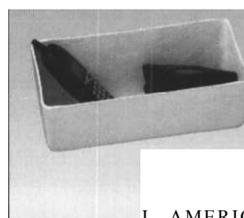
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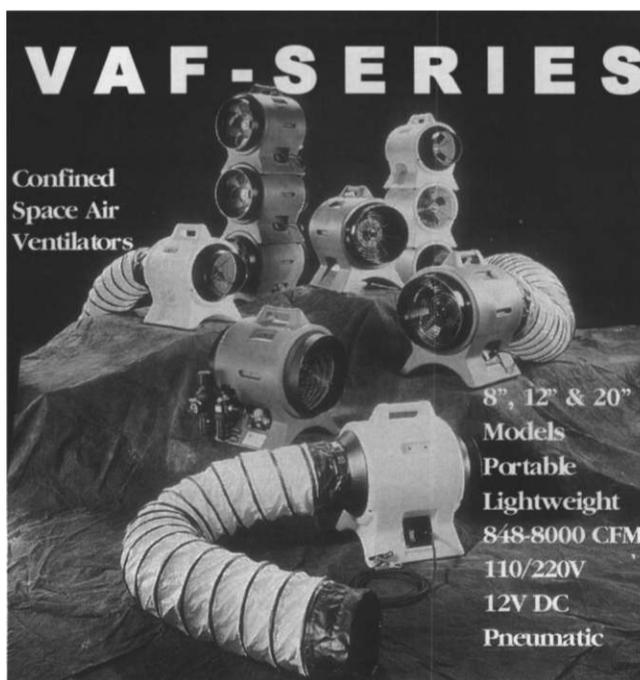
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Circle 204 on Reader Service Card

News

Raytheon Marine Purchased By Management Buyout Group

The management of Raytheon Marine Company (RMC) has successfully purchased the recreational marine products division for \$108 million. The management buyout team was backed by the European venture capital firm Mercury Private Equity. Led by CEO **Rick Kane**, former managing director of RMC, the management buyout group is comprised of five additional managers from the leadership team with extensive experience in product development, logistics, manufacturing and finance. The new company will operate as Raymarine Company.

The Company is firmly established as a technological leader in marine navigation equipment with award winning products such as the Pathfinder radar; Autohelm Series of autopilots and instruments; and Raychart navigation systems.

The sale includes Recreational Marine's headquarters and manufacturing operations in Portsmouth, U.K. and its sales and engineering operations in Nashua, N.H. and Fort Lauderdale, Fla. There are approximately 575 employees at these sites.

The management buyout group stated that there are no plans of downsizing the workforce.

Kobelt Establishes Presence In Houston, Texas

Kobelt Manufacturing has opened an office in Houston, Texas in order to expand upon its presence in the Latin America and Gulf of Mexico marketplace.

The Houston office will be located at: Kobelt Americas, 11600 Jones Rd., Ste. 108-10, Houston, TX 77070, tel: (281) 517-5126; fax: (281) 517-5127.

GE Marine Starts Engineering For Eighth LHD

GE Marine Engines has received partial funding from Ingalls Shipbuilding to begin the engineering work on equipment to be used on the U.S. Navy's eighth LHD Wasp-class large-deck, multipurpose amphibious assault ship. Measuring 844 ft. (257.2 m), the vessels displace 40,500 tons.

This LHD project represents several milestones. The ship will be powered by two GE LM2500+ aeroderivative gas turbines, with GE main reduction gearing (two gearboxes). This marks the first military application of GE's LM2500+ gas turbine.

Currently there are 20 LM2500+ in or slated for operation worldwide on vari-

ous commercial fast ferries and cruise ships, with an additional 74 units in diverse power generation applications.

The LM2500+S each will have the U.S. Navy rating of 35,000 shp for the LHD application. GE expects to finalize the U.S. Navy certification for this rating by the end of 2001.

The ship will also feature a unique hybrid electric drive system, with electric motors providing propulsion power at low loitering speeds. The previous seven LHD ships, also designed and built by Ingalls, were powered by steam propulsion systems.

Six of the large ships, designed to

carry some 2,000 Marines, have already been delivered to the U.S. Navy by Ingalls, and are active in the Fleet.

LHD 7, recently christened Iwo Jima, is currently under construction and is scheduled for delivery in mid-2001.

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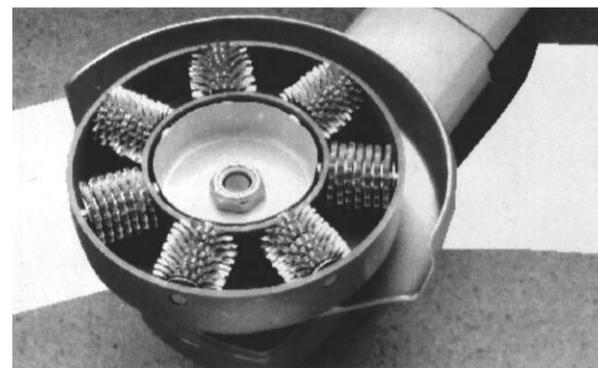


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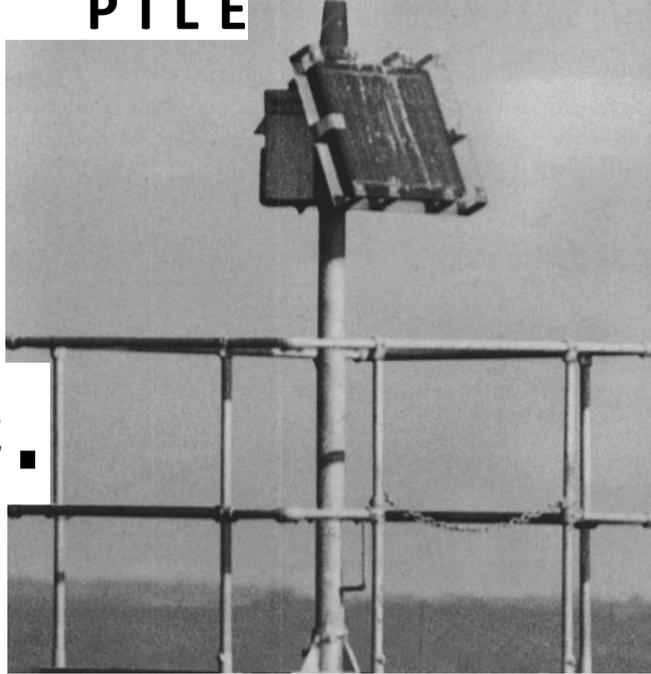
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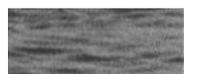
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Inland Report

U.S. Tank Barge Market Report

Since January 2000 there has been a decrease in the total number of inland tank barges listed for sale. Prices for inland tank barges have increased an average of 10 percent over last year for barges under 10,000 bbl capacity. Barges over 10,000 bbl have increased about 14 percent. Asking prices for inland barges in general are ranging around \$14-24 per barrels for working units with most sales ranging from \$10 - \$15/ bbl depending on condition and age. Most of the inland barges for sale are single skin units averaging about 37 years in age with the oldest being built in 1941.

Prices for ocean tank barges under 20,000 bbl have increased an average of 13.3 percent over the year 2000, while prices for larger size units have remained relatively stable. Most of these are single skin. Although there are few U.S. flag ocean tank barges currently listed, values seem to be ranging about \$30 - \$40/bbl for good tonnage with life remaining before their OPA 90 retirement dates. Most of the newer barges for sale, with one exception, are foreign-flagged, single skin and located in the Far East.

New Contracts

Halter Marine, Inc., has signed a contract with Vessel Management Services, Inc., of Seattle, Wash., for the construction of a 150,000-bbl, oceangoing, double-hulled articulated tug-barge (ATB), with options for up to five additional units. The barges will be built at Halter's Port Bienville shipyard in Pearlinton, Miss., and the tugs at its Moss Point Marine shipyard, in Escatawpa, Miss.

Maritrans Operating Partners has obtained a patent on its process for rebuilding single hull tank vessels with internal double hulls. Together with the Houston-based naval architecture firm Schuller & Allan, Maritrans developed a double-hull manufacturing process to rebuild single-hulled tank vessels with the double hulls required by OPA 90. The process uses computer-assisted design for fabricating modular internal hull sections. In 1998, Maritrans completed the rebuilding of the 10,549-gt tank barge Maritrans 192 (formerly Ocean 192), which was the first large single hull tank vessel rebuilt with a double hull to meet OPA's standards. In 2000, Maritrans completed rebuilding 16,021 GRT tank barge Maritrans 244 (formerly Ocean 244). Both vessels, now in compliance with OPA 90, are in service transporting petroleum products in the Gulf of Mexico. Maritrans' patent now grants Maritrans the right to exclude others from practicing its pro-

ected process. **Stephen A. Van Dyck**, chairman and CEO commented, "Mari-

trans' reputation as an industry leader is confirmed by our substantial financial investment into the initial rebuild process design and in the Maritrans 192 pilot project. By obtaining patent protection for our internal rebuilding process,



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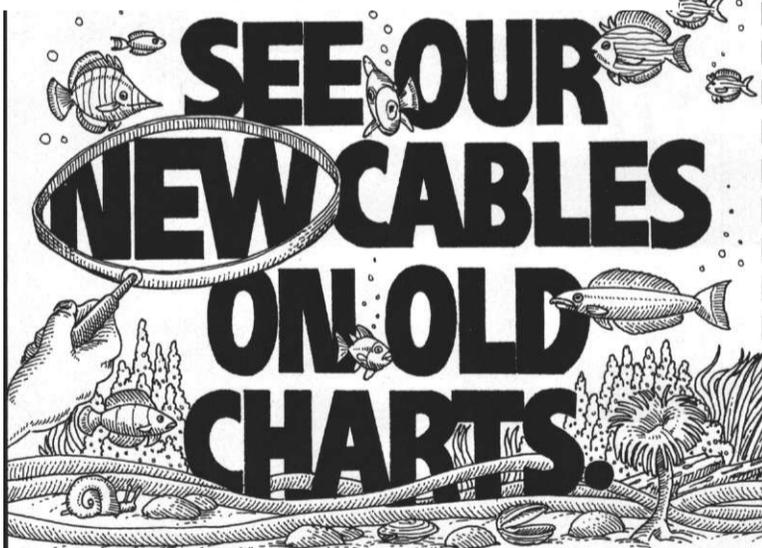
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Inland Report

we believe we will be able to protect the competitive advantage we have gained through our hard work and innovation. Our second vessel rebuild is now complete, and we will continue our efforts to rebuild our fleet to meet OPA's mandate. Module fabrication is already underway for the barge Ocean Cities, which is due

to enter the shipyard this spring."

Barges for Sale

Marcon International, Inc. has been appointed as exclusive brokers by Louisiana-Pacific Corporation, parent company of Ketchikan Pulp Company of Ketchikan, Alaska to sell the double

skin OPA 90 ocean tank/rail car barge Harry A. Merlo. The 9,000-dwt, ABS-classed barge was built in 1994 by Gulf Coast Fabricators at a cost of about \$8.4 million to supply fuel oil, chemicals and other materials for pulp processing and lumber mill operations in Southeastern Alaska. The barge was designed by

Elliott Bay Design Group of Seattle, Wash. Black oil, diesel and caustic soda was carried north in the integral cargo tanks plus smaller parcels of chemicals and stocks were hauled in tank and hopper cars loaded on deck. On the southbound run, boxcars were loaded with pulp. In 1997, the mill was closed because it needed about \$200 million in environmental upgrades and other improvements and the barge became surplus to Owner's requirements.

The 35,000-bbl ocean tank barge Caribbean Protector has been added to Crowley Marine's surplus list and Marcon has signed a new contract to act as their exclusive broker in handling sales of floating marine equipment. The 250 x 76 x 17-ft. (76.2 x 23.1 x 5.1 m) barge was originally built in 1969 by Todd Shipyard in Texas and was converted to dedicated oil spill response in 1993. Barge is now laid up in Mobile, Alabama. — (Source: Marcon)

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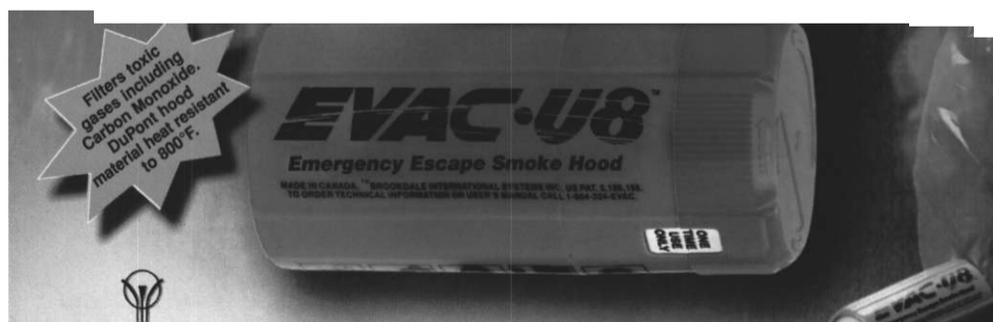
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	10,000	19,999	29,999	39,999	Plus	
January 1998						
January 1999						
January 2000	33					59
June 2000	22					52
September 2000						
February 2001						

Inland Tank Barges

Built	0-	10,000-	20,000-	Grand Total
	9999	19999	29999	
Unknown				
1941				
1943				
1947				
1949				
1952				
1955				
1956				
1957				
1958				
1959				
1960				
1961				
1963				
1966				
1969				
1974				
1975				
1977				
1980				
1984				
1989				
Grand Total				

OCEAN AND COASTWISE BARGES

	Under	10,000	20,000	30,000	40,000	50,000	Total
	10,000	19,999	29,999	39,999	49,999	Plus	
January 1998	12						
January 1999	12						
January 2000	15						
September 2000	16						
February 2001	12	5					
Average Age	1989	1976			1994	1964	

Double T r o [^] Trou We,

The U.S. was instrumental in the introduction on a large scale of double-hulled tankers. Born out of a desire to make tanker vessels safer by making them more resilient in the event of a grounding or collision, double-hull designs nonetheless have corrosion properties that legislators did not foresee. Double-hulled carriers quickly proved themselves far more susceptible to internal corrosion than their single-hulled predecessors. Coatings manufacturers are now working hard towards a solution, according to one leading coatings specialist.

"When the first generation of double-hulled tankers were taken into service, their owners were startled to find that their state-of-the-art ships were rotting away almost twice as quickly as single-hulled tankers. Pitting corrosion in the inner tank top plating was taking place at an annual rate of between 1 mm and 2 mm. In some instances, pits developed as deep as 7 mm to 9 mm within five years. That's 40 percent of the original plating thickness," says **Ed Jansen** of Antwerp-based Expertise- en Ingenieursbureau Touw-Jansen, a

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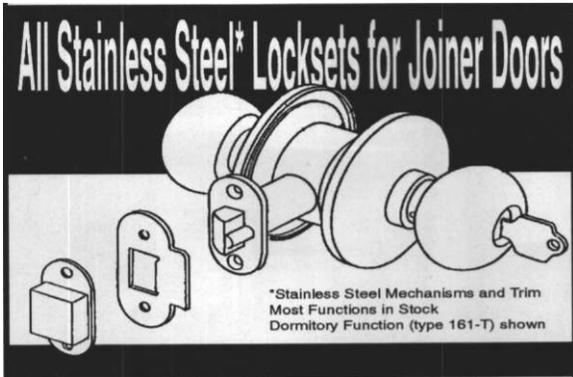
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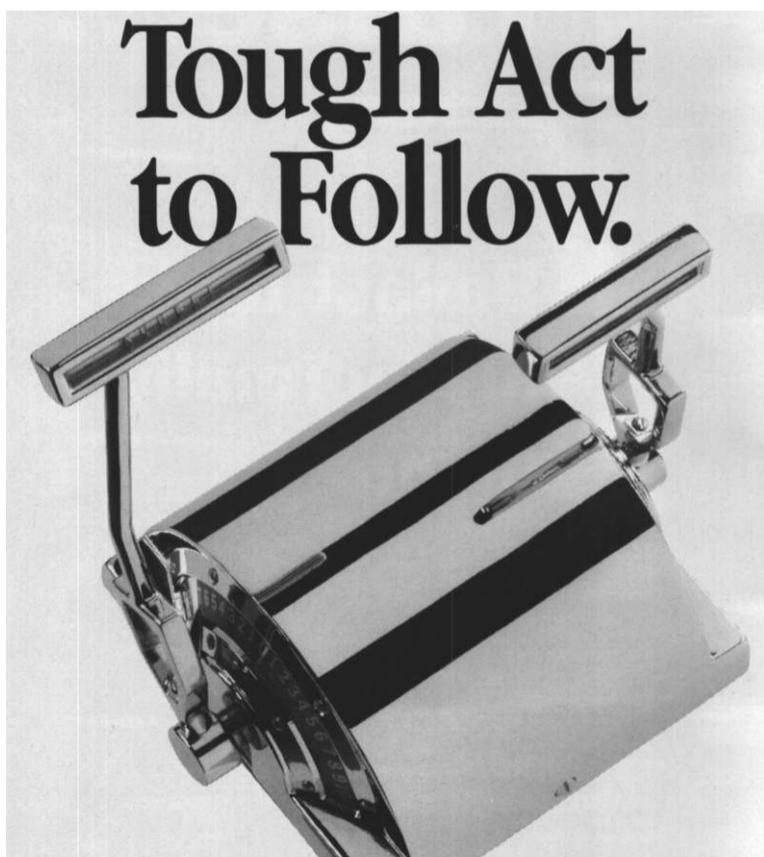
This came as a shock to the system to an industry that had been used to doing major corrosion repair work around the time of the second special survey. Suddenly, owners found that they were footing hefty repair bills on very young ships. But why were double-hulled tankers rusting away so quickly? The answer was provided only recently, thanks to work done by Sigma Coatings, for whom Jansen acts as a consultant.

"Research done by Rodney Towers at Sigma suggests that the corrosion problems caused on board double-hulled tankers can be attributed to the thermos-flask effect of the design. Crude oil is usually loaded in locations where temperatures can reach as high as 45 to 50 degrees Celsius. It is then shipped to locations that are much cooler. If it is carried on board single-hulled ships, the oil cools down comparatively quickly under the influence of the ambient sea temperature, reaching sea temperature between 36 and 48 hours after being loaded,

depending on the volume of oil and other factors. On board double-hulled vessels, cooling down times are much longer, taking days rather than hours," Jansen explains. Oil in double-hulled tanks takes an average of 20 days to reach sea temperature, he adds.

The significance of the longer cooling down period is found in the lifecycle of corrosion inducing bacteria. The bacteria survive longer in the warmer oil in double-hulled ships, lengthening the electrochemical corrosion process that naturally occurs at the bottom of cargo tanks on board oil carriers.

Not only do the bottom of tanks on board double-hulled vessels rust more rapidly, under-deck plating and ullage areas are more prone to corrosion as well. The reason for this is a different one, however. Here, it is the choice of construction material that is significant. To offset the increase in weight due to the extra steel required for double-hulled newbuilds, shipyards incorporated higher levels of high-tensile steel into their designs. "High-tensile



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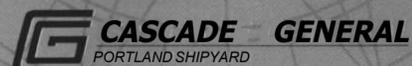
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Maritime Reporter/Engineering News

Coatings & Corrosion Control

steel ships are subject to greater degrees of hull flexing at sea. This is important when you consider the corrosive processes in under-deck and ullage spaces," Jansen says. During ballast voyages, inert gas is pumped into the cargo tanks of tankers to prevent the build up of flammable gases from cargo residues. Inert gas is also used to fill up the ullage space left after a cargo has been loaded. The gas used is generally pumped in at a temperature of roughly 45 degrees Celsius. At night, the natural drop in temperature will cause the gas to cool to around 20 degrees Celsius.

Even the thermos-flask characteristics of a double-hulled ship cannot prevent this. As a result, the walls lining the spaces filled with gas are covered in condensation. Rodney Towers' study suggests that in an inerted VLCC as much as 12 tons of condensation can be created each night. "The condensation dissolves solubles in the inert gas mixture that trigger the corrosion process," Jansen explains.

This is particularly damaging for ships with high levels of high-tensile steel. Their increased flexing during voyages leads to higher levels of flaking. Flaking exposes fresh areas of steel for the corrosive solubles to do their damage. According to Jansen, "By encouraging flaking, high-tensile steel is its own worst enemy."

The good news for owners is that coatings manufacturers have been hard at work to develop products that will help prevent excessive corrosion. Rodney Towers' work has been very significant and Sigma Coatings is addressing the issues raised by his research. Jansen will be helping the company better understand the requirements of modern tanker shipping. "Improved coatings, a clearer understanding of coatings on the part of crews, and investment in coatings by owners at the new-build stage will help prevent double-hulled tankers from causing more problems than they solve," he says.

See Ship's Store starting on page 55 for more Coatings and Corrosion Control products

Scottish Company To Revolutionize Coating Inspection

Luminous Technologies Ltd. has, after 12 years of research, developed an optically active additive (OAA) that when introduced into an existing coating formulation enables easier inspection during application and through life of the coating — without degrading the performance of the existing coating formulation.

The product, which is targeted for the marine market, concentrates on areas such as ballast tanks that are hard to inspect properly and adequately as the vessel is being built, as well as throughout its life.

The system can be used for the improvement of ballast tank coating, cargo tank coating, confirmation of removal of shop primer and any coating application quality.

Instrumental in providing a solution that currently plagues the shipping industry — the product ensures that vessels remain in good condition through life. The protection to the vessel afforded by the coating is increasingly critical and subjected to greater inspection by shipbuilders, paint companies, owners and classification societies. In addition, the ballast tank areas have greatly increased as a result of the OPA 90 requirements for double hull vessels

The OAA system, which works in ambient light conditions normally found in a ballast tank during

The two-coat scheme has a reactive first coat that clearly shows up abrasion damage.

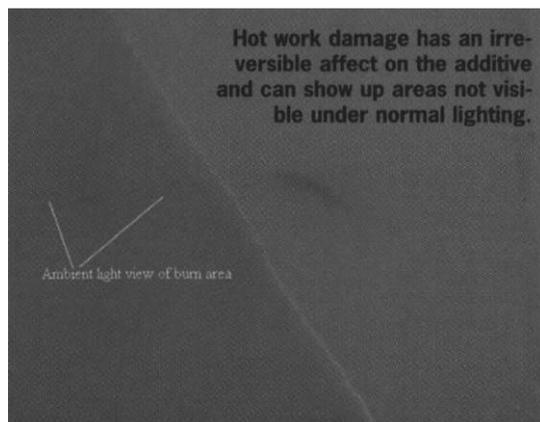
new construction, is added to an existing formulation in such small quantities (less than one percent) that the existing formulation performance is unlikely to be affected in any way. OAA causes the coating to become sensitive to certain wavelengths of light allowing for defects within the film such as pinholes and areas of under/over application that cannot be seen by the naked eye.

The system works by adding the first coat of the scheme and using the suitable hand held light so that the coating process can be examined during and after application. The applicator can use the system to ensure that first time application is providing the coverage and not leaving uncoated edges.

Once the coating is dry, the system is designed to enable an inspector to survey a tank using a suitable hand held torch. The system can enable one sq. m to be examined at a distance of three meters with pinholes easily visible at this distance.

The second passive coat (which doesn't have to be the same color as the first coat) of the scheme is then applied. This coat does not contain an optically active additive. In service, any damage to the topcoat will reveal the active undercoat and therefore provide a clear and unambiguous indication for maintenance.

Circle 56 on Reader Service Card



Wheelabrator Elects New Sales Manager

Wheelabrator Abrasives, Atlanta, Ga., has named **Christopher Pawlicki** as the regional sales manager for Ohio, the Northeastern U.S. and Ontario, Canada. Pawlicki, who has an extensive background in industrial sales, most recently served as a manufacturer's representative for various quality products.

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Training & Education

Leading a Sea of Change

The Marine industry, and especially the world shipping industry, has seen many changes in the past three decades. These changes have come about partly as a result of the economic crises in the world and partly because of the very rapid advancement of technological innovations.

The world recession forced many ports, shipyards, shipping companies and related industries to close down. This, together with increase in the oil prices, demanded a new generation of ships, which are cheaper to run, more efficient and carry more cargo but fewer personnel. The new era in computer and automation technology has helped the design of these ships in many respects. Using digital computers it has become possible to solve problems, which have been very difficult or impossible to solve until very recently. This has resulted in an improvement in the theoretical basis of ship design. Computer-aided design and optimization techniques are now part of the design task, which make the final design a more refined piece of work than what used to be the case. It is now possible to store large amounts of data from previous designs in data banks and refer to them when necessary.

All these, together with the advancement of science in other related fields, have resulted in ships being designed and built with revolutionary hull forms and machinery, which have totally different maneuvering characteristics when compared with more conventional ships. These new ships range from fast passenger and container ships, some of which have large areas exposed to the wind when loaded with deck cargo, to

ultra-large crude carriers with substantial physical dimensions requiring very deep water and large turning basins for their safe navigation. These ships have to go in and out of ports in almost all weather conditions in a matter of hours.

Port operators, in order to remain competitive and also to attract more customers, have to make certain that their ports are equipped with all the facilities required for handling these ships and also to ensure their safe passage within the port area. This latter problem is then referred to the port design consultants serving the port authorities to ensure that ships of different types and sizes can navigate safely within the harbor areas and suggest any maintenance program and/or modifications required to keep the port open, safe and competitive.

Simulator applications

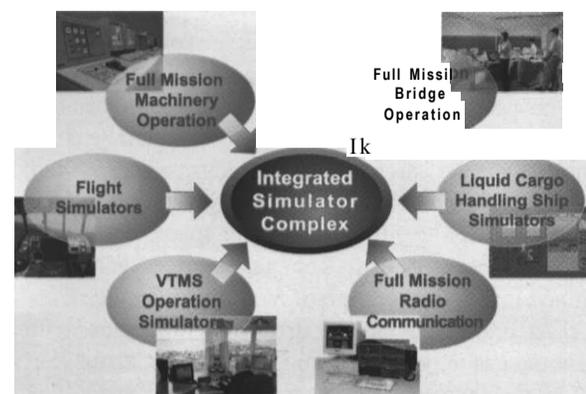
Applications of ship simulators can be identified by examining the potential end-users and their requirements. Simulation exercises are usually carried out in one of the following modes: single-module simulation, off-line simulation and real-time simulation.

Single-module simulation is used in order to improve or modify an existing module. Another reason for such simulation is an interest in the behavior or the output of just one part of the model under different operating conditions. Off-line simulation with the complete model is especially useful when the output results are independent of the human response. In this mode of simulation, time-sharing systems or batch processing procedures may be very conveniently used by pre-setting the iteration period. This method is also used in validating and fine-tuning of a special ship-type or in some port design studies.

Real-time simulation may be achieved in different ways: for example, the execution of each iteration may be timed, and the body-fixed coordinates, advanced by the same amount, or the process may be timed and ceased until a certain time interval has elapsed for the next iteration to begin. In this mode, the mathematical model usually forms an integral part of a ship-simulator and requires interaction with a mariner to control the ship. STCW 95 was perhaps the most effective catalyst in getting simulation more accepted as a training tool within the shipping industry. This has meant that simulators are not only used in nautical colleges as a training tool but also during the sea service.

Deck cadets and other crew members intended to steer the ship may practice steering different types of ships on a simulator to understand the very basic differences between steering a ship and other transport vehicles, and gain experience for use aboard a ship when required.

"Rules of the road" exercises can be practiced on a ship simulator by junior officers and deck cadets, by placing them in a situation where a decision should be made to avoid collisions or close-quarter situations. The instructor can then examine the efficiency of the action taken. The usefulness of this becomes apparent when we consider the possible consequences of taking a



wrong decision in a close-quarter situation. A simple mathematical model with no external effects would be sufficient for this purpose.

Bridge procedures, passage planning and group work can be practiced using a bridge simulator as well. For this simulation exercise a full complement of the relevant bridge personnel is required. It has long been a common practice in the Merchant Navy that mariners do not usually gain any Ship handling experience until they are actually put in command of a ship; a wrong state of affairs. This can now be improved by training the officers from very early stages of their service at sea. This method is also ideal when senior officers are joining a vessel where they have no experience of her maneuvering behavior. A high-fidelity mathematical model with all the external effects is required.

Port approaches can be extremely hazardous especially when the personnel on board have no previous experience of the local conditions. A desktop simulator on board a ship can increase the confidence by exercising the approach using the simulator. A high fidelity mathematical model of the ship together with database for the port area is required.

The way ahead

There are still improvements needed for the Maritime Simulation environment, and the first area that needs improvement is the so-called Integrated Simulator Complex. Very few simulator manufacturers actually do provide a complete integrated ship simulator, which seamlessly integrates (for example), bridge operations with engine room and communication operations.

Transas has implemented (as far as possible) the multi purpose High Level Architecture (HLA) interface that allows full integration between the various simulators providing the trainee with an Integrated Simulator Complex instead of the typical "stand-alone" simulator solutions available these days.

A logical continuation of this integration should eventually allow compatibility between simulators of different manufacturers. However this seems to be a long way off due to mainly commercial reasons.

The next step of improving the Maritime Training Solutions is the establishment of providing "On-Going" Education after they have completed a simulator course at one of the established training centers around the world. This type of training can be performed at home or on board (at sea or in port). Some technology is already available and improved communication technologies between ship and shore are just a matter of time. Once we have solved the ship to shore data transfer there will be no technological barriers to the implementation of the so-called Virtual Maritime Academy.

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The preceding was written by Peter Mantel, sales & marketing director, Transas Marine Ltd.

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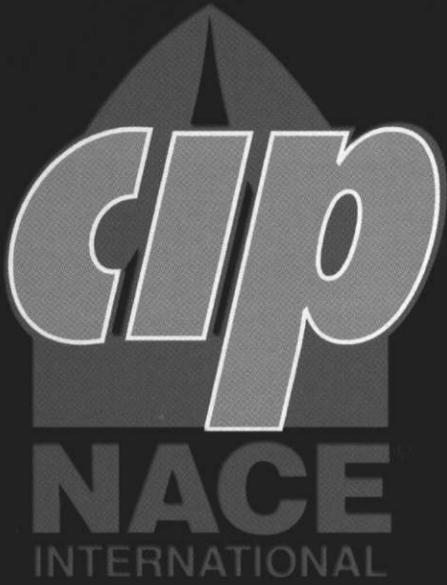
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A black and white photograph of a hand holding a paintbrush. The brush is in the process of painting a surface, with white paint being applied. The handle of the brush is covered in water droplets, suggesting it has been dipped in water. The background is dark and out of focus.

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Training & Education

The Practical Lifeboatman

The standing joke in the lifeboatman practical portion of the AB class is "...The good news is that you will only have to row and learn the oar commands ... The bad news is that the instructor

wants to water-ski."

Finding a ship with gravity davits, that will invite an outsider to participate in lowering drills, is no easy task. Schools that teach AB/lifeboatman courses often



do a disservice to the mariner by suggesting this method of obtaining the

required practical training, knowing full well that finding this arrangement is nearly impossible. Sea School, the College of Nautical Knowledge, admits to some guilt, in the past, in making this recommendation. However today it can announce that its two-day U.S. Coast Guard Approved Lifeboatman course includes hands-on practical lowering of a lifeboat with full size gravity davits and rowing a real lifeboat on Tampa Bay. A Z-card or merchant mariner document (MMD) is available with a few variations. For Able Seaman (AB) special, Limited or Unlimited the requirement is that the lifeboatman rating must be included. For a person assigned to lifeboat duty on a vessel where he may not be considered part of the crew, (a domestic gambling vessel where croupiers maybe required to assist in abandon ship) the Z-card may be issued as Lifeboatman without the AB rating.

In the past, the USCG used about 13, ,25-scale models at Regional Exam Centers (REC) to accomplish the practical requirements. Recently, the National Maritime Center (NMC) of the USCG announced that the ,25-scale models could not be used any longer for this purpose. This makes a real-life gravity davit/lifeboat a scarce but valuable tool for teaching a U.S. Coast Guard course.

SS American Victory, a vintage 1945 victory ship, was brought into Tampa Bay to be transformed into the American Victory Mariners Memorial & Museum Ship. This was done to provide a unique and realistic venue for meetings, reunions, receptions, seminars and other special events, and to present interactive maritime educational programs. Sea School has been invited to participate in fulfilling this goal by holding USCG-approved courses (including lifeboatman) aboard this superb teaching platform. The demand for this hands-on practical exercise has exceeded all expectations of the Sea School staff. "All the work that we put into rigging and repairing the davits was worth all the sweat equity," said Sea School Director **Ed Morris** (USCG ret.), Captain of the lifeboatman project for the school. For certain mariners, NMC has indicated that the lifeboatman portion will meet STCW 95 requirements for survival craft training. Morris comments, "if we can figure how to keep the callouses off these deck officers soft hands, we may be able to challenge other rowing groups to some hot races up and down the Tampa Ship Channel".

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The new millennium is an excellent time to be switching to modern advanced simulation technology. Today's simulation industry has advanced significantly compared with only a couple of years ago. Information technologies, High Level Architecture, modular design, precise mathematical modeling and the spectacular performance of modern PC's, all make the Implementation of the latest simulation solutions readily available at extremely attractive prices. In turn, they offer a progressive step forward towards safe seafaring in the new century.

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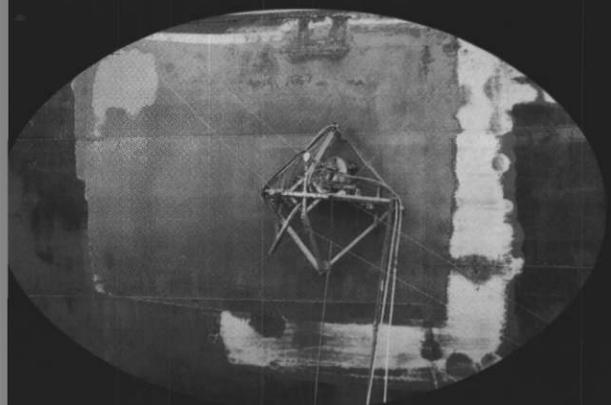
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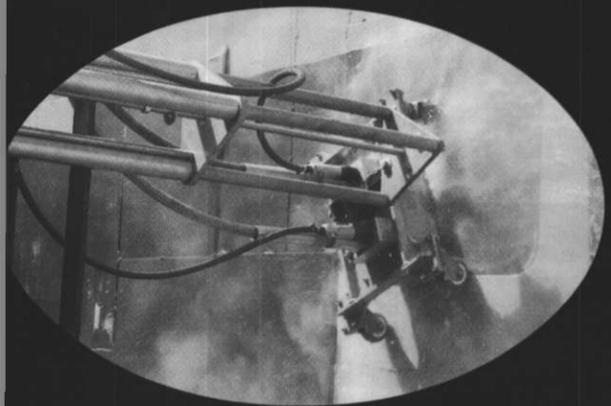
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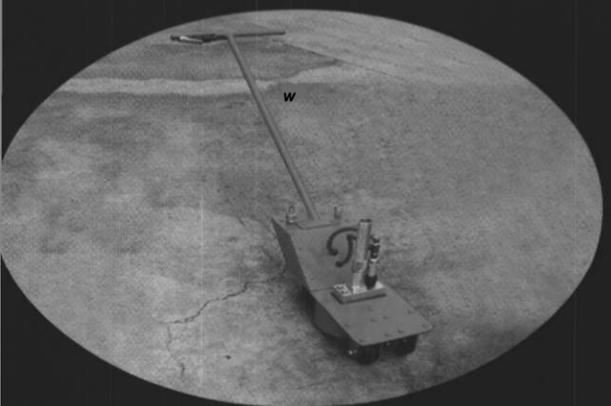
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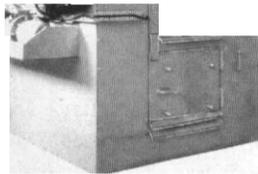
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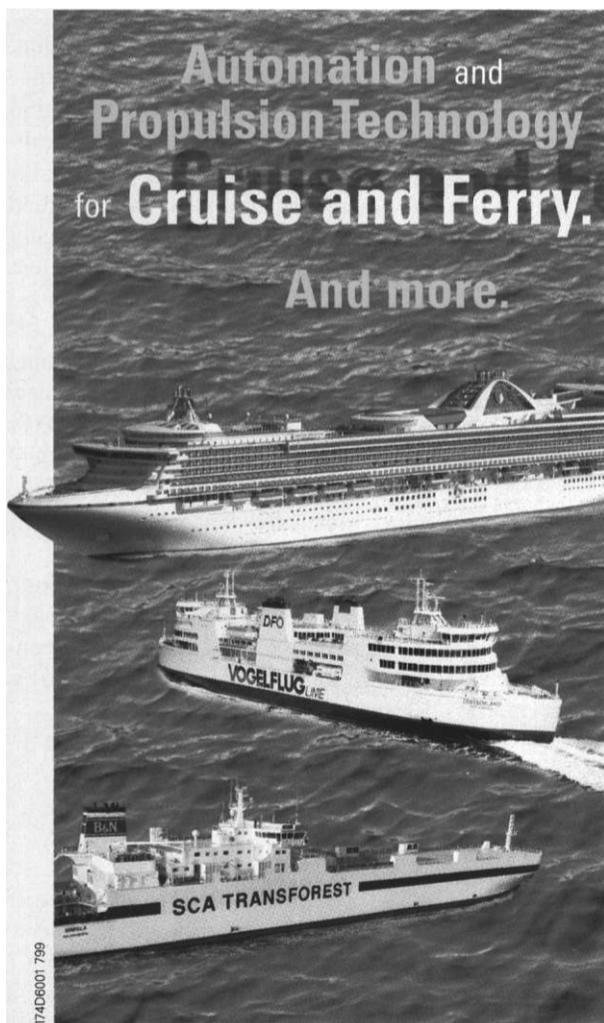
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Future oriented ideas also stand behind the Siemens diesel-electric propulsion systems. For example the economical operation through optimal utilization of fuel for diesel engines to generate electrical power, even in partial load ranges. Or the high availability through modular design with small probability of total loss of propulsion power.

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Circle 251 on Reader Service Card

Using Computer Based Training for STCW Basic Training

Houston Marine Training Services has partnered with MGI International Inc., of Vancouver, BC, Canada, to provide Computer Based Training (CBT) delivery of the classroom-theoretical portions of STCW-Basic Safety Training. An impetus for this deal is the urgency for mariners to comply with international regulations of the Standards for Training, Certification and Watchkeeping (STCW), as under current traditional training delivery parameters, it is expected that 60 - 80 percent of companies will be compliant with STCW by February 1, 2002. The availability of this training in a CBT format will increase the training capacity to meet the demands currently facing the maritime industry.



The CBT program is approved by the U.S. Coast Guard and fully meets the STCW requirements for the traditional classroom portion of Basic Safety Training. The courseware is delivered using interactive multimedia that combines CBT with practical training. The modular design allows ongoing student interaction in a proctored, self-paced learning environment. Each student must still be assessed for proficiency in fire fighting, water survival, and first aid. The benefits of this training method delivered in an electronic teaching format are crew flexibility, cost savings, and student data management.

Maintaining crew flexibility is vital to companies competing in a global economy. Training is available around the clock when delivered onboard the vessels. When the student has completed the CBT elements, the student can enroll in the instructor lead practical field/final assessment for fire fighting, water survival, and first aid. Both companies and employees are burdened with the cost of training related expenses. The reduction in training hours, travel costs, and the integration of the training with work schedules will result in substantial cost savings. Each student's progress is captured on a "Student Access Card." Instructor observation capabilities allow electronic monitoring of the student's course progression. The scores and progress sheets are available to the instructor or training coordinator by accessing the administration database.

Circle 30 on Reader Service Card

ICS Launches Video Conferencing Breakthrough

The Institute of Chartered Shipbrokers (ICS) has launched a ground-breaking initiative by using video conferencing to deliver education and training to Europe. Funded in part by the Suffolk Technical and Enterprise Council, the video conference link will enable students overseas to receive tutorials directly from a tutor based at the ICS in London. Using sophisticated software the tutor is not only visible on screen, he/she is also able to use the screen as an overhead projector and a blackboard. Initially launched in Italy, Spain and Portugal on November 30, 2000, the Institute's Understanding Shipping course will be the first course to be delivered in this way. "This is a very good way of investigating what will be a key method of delivery in the future," says **John Barclay**, education consultant to Tutorship, the correspondence college of the ICS. "Through the use of video conferencing, we are meeting demand for the delivery of shipping education overseas in a cost-effective way," he adds.

Understanding Shipping is one of the latest courses to be launched by the ICS aimed at new entrants to the shipping industry with little or no exposure to ships or shipping. Taking approximately six months to complete, the course has nine modules covering ships and trades, the business and the players, bills of lading, port agency, bulk carrier and tanker documents, liner agency documentation, chartering, ports and cargoes, ship management and operations. Each student receives course material by post, which is supported by a one-hour tutorial by video conference each week. At the end of each module is a multiple choice test and, prior to completion of the course, each student is interviewed on an individual basis.

Circle 26 on Reader Service Card

Marine Technology

Furuno Offers New GMDSS

Furuno's new A2 GMDSS radio station is a communications station that provides communication at any time, from any location within A1 and A2 sea areas. The A2 GMDSS Radio Station is designed to ensure maximum availability of safety communications and dis-

tress calls for all passenger vessels, and also on cargo vessels of 300 gt and up engaged in voyages 150 miles from coast stations. The A2 GMDSS Radio Station is made up of three main components — FM-8500 VHF DSC Radiotelephone, FS-1562 Single Sideband Radiotelephone and DSC-6A MF

DSC with watch-keeping receiver. The FM-8500 is an all-in-one marine VHF radio system consisting of a simplex/semi-duplex 25W VHF radiotelephone, a DSC modem and a CH70 Watch Receiver. The FS-1562 is a semi-duplex, SB radiotelephone, available in both 150 kW and 250 kW



configurations. It offers instant selection of 2,182 kHz, 2,187 kHz, IT channels and 400 programmed transmit and receive frequency pairs. It also features a large, back-lit LCD display. The DSC 6A is a DSC modem capable of composing DSC messages, verifying the prepared message before it is transmitted, controlling the radio transceivers, storing distress messages, performing routing testing without radiation of signals.

Circle 54 on Reader Service Card

ICOM Offers New VHF Marine Radio



ICOM America intends to offer its new IC-M402 marine VHF pending FCC approval. The new unit incorporates the latest in user-convenient digital technology, and is rated JIS-7 submersible. The IC-M402 includes a built-in, emergency response feature called DSC watch function, a feature usually found only on high-end radios. The feature allows the IC-M402 to continuously and automatically alternate monitoring between emergency DSC channel 70 and another tuned channel. The new radio can be integrated with ICOM's Commandmic (HM-127), effectively allowing for full, remote control of the radio. It can also connect with the GPS and act as a position repeater.

The IC-M402's large, new-design LCD and speaker are designed to make the radio easy to sea and hear in all conditions. List price for the radio is \$360.50.

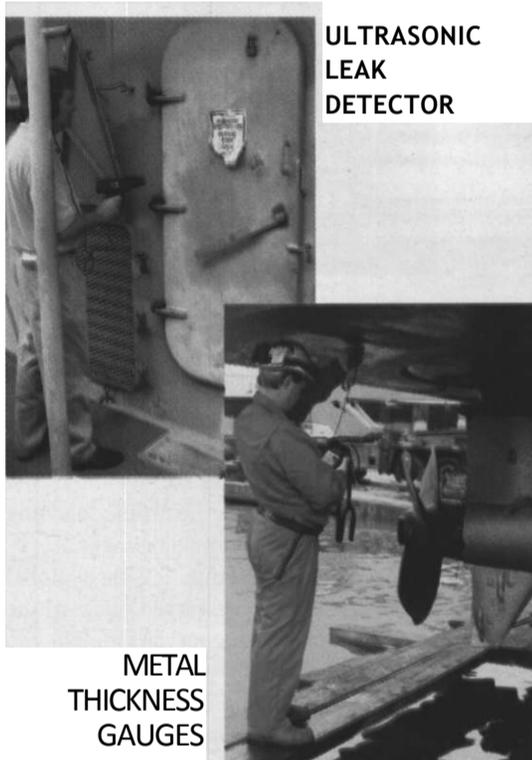
Circle 48 on Reader Service Card

Leica MK 40 Offers Cutting

Edge Technology

The Leica MK 40 GPS chart plotter provides a combination of advanced, high-accuracy GPS receiver, built-in C-MAP NT vector cartography, and a high-resolution direct sunlight readable screen. The MK 40 GPS chart plotter shows the vessel's constantly updated precise position and movement on a C-

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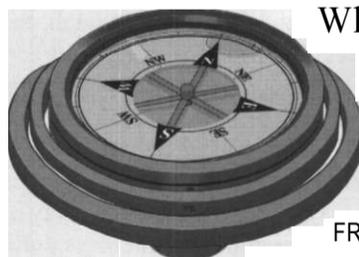


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MAP NT vector chart, and the chart plotter makes it easy to plot and change routes on screen with point-and-click functions.

"With the removal of Selective Availability, it is more important than ever to use a high performance GPS receiver capable of getting optimal accuracy from the GPS signals," said Gunnar Mangs, business director for marine GPS at Leica. The waterproof, ultra-thin MK 40 display and control unit can be mounted below decks or in an open cockpit. The MK 40 incorporates a high-resolution color flat-panel LCD screen with special anti-reflective coating. The MK 40 is based on IBM's leading-edge silicon germanium (SiGe) chip technology.

Circle 51 on Reader Service Card

JRC Combines Plotter, Sounder

JRC North America has introduced a combination color chart plotter and fish finder, the PLOT 500F. The unit features a 6.5-in. sunlight-viewing LCD (TFT) display, and supports C-Map NT Micro Charts and C-Map's Ports and Tides functions simultaneously. The plotter portion of the PLOT 500F receives position information from a



GPS or DGPS sensor, and supports 1,000 waypoints for navigation, 40 routes and 10,000 tracks or marks. For navigation, the plotter displays ship's position, chart scale, heading, the range, direction and ETA of a selected waypoint, cursor position and time of day. The PLOT 500F employs the same Mixed Image Technology as JRC's recently introduced FF50 Fish Finder.

Circle 49 on Reader Service Card

PosiTector 6000

The PosiTector 6000 Series hand-held coating thickness gages measure coatings on both ferrous and non-ferrous metals. Features include Instant Automatic Gage set-up, simple two-button control, Flip Display, and Reading Indicator Light. In addition, now the display of every PosiTector 6000 coating thickness gage is illuminated by a backglow. Available with Built-in Probe, Separate Probe, or with extended cable up to 250 feet. For more information: P.O. Box 676, 802 Proctor Ave., Ogdensburg,

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Mascoat Products

Delta T Marine Insulating Coating is designed to replace or enhance conven-

tional thermal insulating materials found in shipboard construction. A 20-60-mil layer achieves an equivalency insulation factor of R9-15. Used on approximately 150 vessels worldwide for thermal and condensation protection, Delta T is applied with conventional airless spray equipment reducing total application

costs significantly. The coating is one part, extremely lightweight, contains no harmful VOC's and is approved by the USCG, ABS, DNV and Lloyd's. Please contact Mascoat Products, 10890 Alcott Bldg 102, Houston, TX 77043, tel: (713) 465-0304; fax: (713) 465-0302.

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Austal USA Secures Candies Vessel Duo

Austal Ltd. has reported that its U.S. operation, Austal USA, has secured a two-vessel order for the construction of 150 ft. (45.7 m) aluminum crew supply vessels to operate in the Gulf of Mexico.

The vessel pair, which has been ordered by Otto Candies of Des Alle-

mands, La., is scheduled for delivery in early 2002. This new order adds on to the current 82 ft. (25 m) high speed passenger catamaran that Austal USA is constructing for an unnamed owner.

The monohull designed vessels will be used to service the offshore industry in the Gulf of Mexico. Operating at a speed of 26 knots, each will house two forward cabins on the main deck to provide seat-

ing for 80 passengers; the vessels' aft cargo deck has been designed to carry up to 150 long tons of cargo.

Both vessels will be powered by 4x Cummins KTA 38 M1 diesel engines (1,000 hp) driving Hamilton 571 waterjets through Reintjes WVS 430/1 reversing gearboxes.

Circle 45 on Reader Service Card

Aker Finnyards To Build \$1.5 Million Fast Surface Combatant

Aker Finnyards and the Finnish Navy have agreed on a \$1.5 million contract for the construction of another Hamina-Class Fast Surface Combatant.

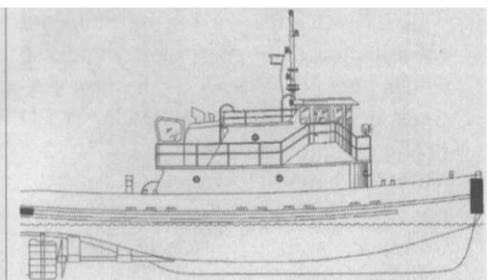
The vessel, which will be delivered in April 2003, will have a length of 28 ft. (8.5 m), draft of 5 ft. (1.5 m) and displacement of 200 tons. Comprised of aluminum and lightweight composite materials in the superstructure, the vessel's propulsion system will consist of two waterjets producing a speed of more than 30 knots.

Circle 46 on Reader Service Card

A&B Industries To Build

76 Ft. Tug

A&B Industries, Morgan City, La., has signed a contract with Luhr Bros., Columbia, Ill., for a 76 ft. (23.1 m) model bow tug for service in the Great Lakes as a switch tug and general operations vessel.



The tug will be powered by twin main engines producing 1,710 hp. Since the tug will be involved in operations in low bridge clearance areas, its superstructure and mast were modified to a low profile to meet a 19 ft. air gap clearance. Also onboard will be a hydraulically-operated stern towing winch to increase the vessel's capabilities and versatility.

The vessel is the third to house a hull design developed by A&B to meet inland and coastal operator requirements for 10 and 12 ft. hull depths. This specialized design can accommodate main engines with power ratings up to 3,000 bhp.

Circle 64 on Reader Service Card

MMC Gets Rep For Barge Industry

MMC International Corp., Inwood, L.I. will be represented by ERL Inc., New Albany, Ind. for the inland waterways barge industry.

ERL will be marketing MMC's full product line including the Flexi-Dip closed gas tight portable gauging and sampling systems and CL couplings for flange to flange connections.

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topside protection. **Circle 102**

Ameron

Ameron offers a full line of coating products for any ship, including antifouling, linings for ballast and water tanks, coatings for cargo holds, chemical tank linings and coatings for hull and

rosion control applications is designed to provide extra power for higher flow rates, longer lines and better atomization. Additionally, Graco's SuperCat, a high-pressure proportioner offers a pressure performance capacity of 5,000 psi, allowing atomization of viscous materials through long hose lengths.



Circle 110

Sattex Corp.

Sattex offers a super-smooth gelcoat finish from its Sattex Marine line of buffing compounds. These buffing



in brick shapes and stacks in six different

abrasive grades.

These buffing compound bricks and sticks vary in order to remove varying degrees of surface oxidation, minor scratches, orange peel and sanding marks while enhancing the luster of the hull's gelcoat.

Circle 103



energy into most inaccessible areas.

Circle 104

Gardner Denver

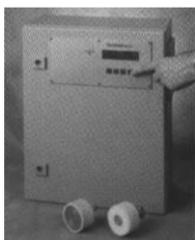
Gardner Denver high-pressure water jetting units are designed to provide a powerful, environmentally safe method of solving difficult cleaning and cutting challenges. At supersonic speeds, low-volume, high-pressure water delivers its cleaning

Neutra Rust

Neutra Rust offers a unique line of coatings that are designed to be effective in a variety of highly corrosive environments. All Neutra Rust products are non-toxic, non-hazardous, and non-flammable. In addition to the coatings, Neutra Rust has cleaners and solvent that can

be used for surface preparation prior to coating applications.

Circle 105



Corrintec

Corrintec's Minitek Impressed Current Cathodic Protection Systems (ICCP) have been ordered for two new passenger ferries, which will operate in Portsmouth Harbor. Minitek ICCP system has been specially developed to provide protection

against hull corrosion for smaller vessels. Easily installed and compact in design, it provides continuous and accurately controlled protection.

Circle 107



Aqua-Dyne

Aqua-Dyne has been manufacturing waterjetting equipment, systems and parts for more than 29 years. These units typically operate at 10,000 to 40,000 psi and are used in surface preparation, internal cleaning of pipes and heat exchangers, concrete removal (hydrodemolition),

and as cutting alternative to saw blades and laser cutting machines for parts fabrication.

Circle 109

Graco

Graco is a publicly held worldwide manufacturer of fluid handling systems and components. Graco's expanded line of high pressure airless sprayers for cor-

Circle 110

Por 15

Por 15 system is designed to permanently stop rust from returning to marine equipment. The system is designed to be applied directly to rusty surfaces, leaving a rock-hard finish that won't crack, chip or peel. It is created to coat a rusty keel, hull, bulkhead, anchor, prop, or bilge and stop rust in its tracks. Por 15 products are designed to work together to produce maximum results.

Circle 111

Chugoku Marine Paints (CMP)

CMP manufactures synthetic resin paints, specializing in paints for marine vessels. The new Nova 5000 Barrier is designed especially for ballast water tanks. The barrier is designed to be easily applied at a high film thickness and then prevents water penetration, and corrosion is halted. The new Umeguard Super-H, a highly abrasive cargo holding coating, is designed to extend the period between major grit blasting of cargo hold up to 50 percent.

Circle 112

Hoffer Flow Controls

Hoffer Flow Controls' new Positive Displacement Flowmeters are designed for industrial use and are constructed of 316 stainless steel with other materials of construction optional. Available with a variety of end connections including the standard NPT, this product has a high temperature range of up to 850 degrees F, is pressure rated up to 3,000 PSI standard, and has been independently tested at .25 percent better accuracy on viscous applications above 100 CSTKS.

Circle 113

USF Surface Prep

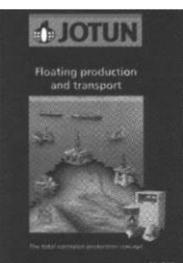
BCP, a division of USF Surface Preparation Group, has helped to pioneer the design and manufacture of advanced airblast systems for more than half a century. The company recently completed a 12-page product guide, which highlights a wide range of custom designed BCP airblast rooms and components including paints booths, recovery floor, room arrangements, and Schmidt™ abrasive control valves.

Circle 114

Jotun Paints

Jotun Paints offers products that boast advanced tin-free technology, high gloss finishes, products for ballast tank protection, newbuilding and maintenance coating systems, and cathodic protection.

Circle 115



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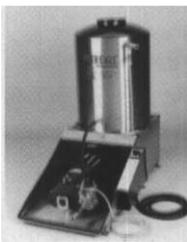
Desmond-Stephan

The amazing Swirl-Off Tool — The new Swirl off tool from Desmond Stephan Mfg., scours surfaces rapidly to remove paint, rust, barnacles, graffiti, and other hard coatings. The rotary tool attaches to portable grinders, sanders drills or polishers. Swirl Off reduces the time and effort needed to clean and refinish almost any floor, wall or other structure. **Circle 126**



Imtra Corp.

Imtra specializes in quality marine products for boats and yachts of all types — specifically Recaro Maritime Seats, which are now available to the marine industry through Imtra. Recaro has been setting the standard for ergonomically designed seats for many years. Imtra offers four models that come standard with black leather upholstery. **Circle 101**



Silver Eagle Pressure Systems

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It UMPS



Barnant Company

Barnant Company offers a new line of Pendorf peristaltic hose pumps in 24 dry-running and lubricated models with capacities up to 220-psig pressure and 176 GPM flow. The large-capacity pumps are in stock for immediate delivery to customers in a wide range of process and industrial fluid handling applications. **Circle 106**



Parametrics

Parametrics is one of the leading manufacturers of ultrasonic testing instruments that measure accurately the remaining wall thickness of internally corroded structures. The line of high quality instruments includes the advanced 36DL Plus with A-Scan and B-Scan, the 26-Series of hand-held basic thickness gauges and the EPOCH Series of digital ultrasonic flaw detectors. **Circle 119**



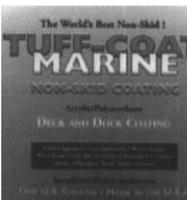
HoldProducts

HoldProducts has recently introduced new barrier and cleaning products to the shipping industry. HoldBlock-10 protects ship holds against corrosion from sulphur, salt, potash and other such cargoes. The biodegradable product is easy to use, and is safe in occupied areas. For more information log onto www.holdproducts.com. **Circle 128**



MacGregor

MacGregor's new Sherlog Ultrasonic Testing System is designed for checking the tightness of key cargo access equipment, such as hatch covers and shell doors. Operators can check cargo access sealing system condition at any time, with no water involved and no interference with other shipboard activities. Sherlog also features a data transfer capability to a PC or laptop, and can be used as a periodic survey information source. **Circle 108**



Tuff Coat Marine

Self-proclaimed as the marine industry's best non-skid protective coating, Tuff Coat Marine is a state-of-the-art, single pack, acrylic/urethane copolymer, with incredible adhesion, strength, elasticity and durability. It is water based, has no VOC's, is non-flammable, solvent free, chemical resistant and UV stable. The product can be applied to aluminum, fiberglass, steel, wood and concrete. **Circle 121**



Schmidt

Schmidt abrasive blasting equipment is designed to maximize productivity for bulk system applications such as those found in shipyards. All systems feature an efficient piping designed to minimize pressure drop, and Schmidt valves and controls that use significantly less abrasive. Save on abrasive costs, spend less time on cleanup and minimize disposal. Schmidt bulk systems are available in a range of standard and custom systems to meet specific applications. **Circle 129**



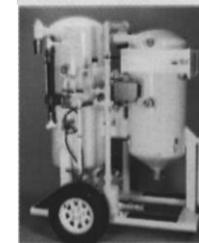
CPV Manufacturing

CPV Manufacturing's O-Seal System valves and fittings are rated for heavy-duty liquid or gas service and provide years of reliable, leak-proof operation. The O-Seal Valve's leakproof reliability is the result of two flat-faced fittings that are joined with a resilient O-ring incorporated into a close tolerance groove that uses line pressure — meaning the higher the pressure, the tighter the seal. O-Seal valves and fittings are rated for 6,000 psi, at temperatures from -20 to 225 degrees F. Tel: (888) 278-8339; internet: www.cpvvmfg.com **Circle 120**



Automation USA

The QuaNix Keyless Coating Thickness Gauge measures overall metals and is waterproof. It is a fully-automatic gauge with wireless probe. There are no keys, no buttons, no menus, no cables, and no connectors. The innovative QuaNix Keyless offers automatic zeroing, optimum handling and user-friendly operation. **Circle 122**



Vacu-Blast

The Vacu-Blast BRS systems use a wide range of abrasive media to remove coatings and other materials from steel surfaces. Applications include large jobs where productivity is paramount: weld-joints, barge and ship cleaning, bridge work, and more. BRS systems can perform blast and vacuum functions simultaneously, thereby virtually eliminating dust clouds, poor visibility and costly cleanup. The simultaneous blast/vacuum action makes the Vacu-Blast BRS ideal for situations when open air blasting is neither possible nor practical. The BRS systems can also perform each function independently, making them versatile and powerful tools for any blast cleaning application. **Circle 131**



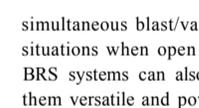
Wynn

The Type "C" is a heavy-duty internally mounted motor straight-line wiper from Wynn's Ocean Range. It offers an advanced design of linear action window wiping systems for marine and other specialist applications. Wynn wipers are designed to be durable, reliable and quiet. **Circle 123**



Aqua-Strip

Back To Nature Products Co. introduces Aqua-Strip Safer Marine Paint & Varnish Remover. It removes multiple layers of bottom and topside coatings in one application. Aqua-Strip is environmentally safe, biodegradable, non-flammable and contains no methylene chloride. It is safe for all surfaces including fiberglass and gel coat. The paste formula applies easily by brush, roll, or spray. It is odor free and is easily cleaned up with water. Back To Nature Products Co., 28 Harrison Ave., Ste. 238, Englishtown, N.J. 07726, tel: 800-423-7733 **Circle 124**



Dust Muzzle

Dust Muzzle is a polypropylene shroud for collecting dust made by angle sanders and die grinders. It is flexible, transparent and retrofits over 1,200 tools in minutes. No special paper is needed, it works with any vacuum and it is over 95 percent efficient. The company also offers its Chip Muzzle, which is a heavy duty PVC dust collector that retrofits all needle scalers into dustless tools in minutes. Easily adapted to corners or curves, it is more than 95 percent efficient. Shave Away, Europe, 837 Cornish Drive, San Diego, Calif. 92110, tel: (619) 223-2154; Fax: 619 223-9690, www.dustmuzzle.com, e-mail dustmuzz@dustmuzzle.com **Circle 132**



Smith ikruir Marine! Inc.

Smith Berger Marine

Using innovative designs, Seattle's Smith Berger manufactures ship equipment that is unique and sturdy. From Flag Blocks to Chain Stoppers, the company offers many different designs and can even custom manufacture most items. **Circle 130**



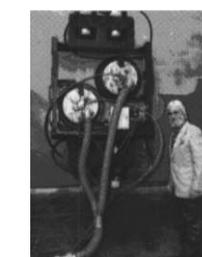
Blastrac

Blastrac EBE portable abrasive blast cleaning systems are an environmentally friendly way to prepare steel surfaces such as ship sides, decks and other marine surfaces. The systems use steel shot and grit, and operate dust-free to eliminate the need for containment and minimize exposure to the worker and the environment. Vertical systems use a rigging system to crawl around steel surfaces, working three to six times faster than conventional blasting. A range of models for either vertical or horizontal surfaces assures the right machine to reduce labor cost, exposure, disposal and production time on your job. Call 800-256-3440 or visit www.surfacepreparation.com. **Circle 125**



Syntho-Glass

Syntho-Glass is a water activated, fiberglass repair tape that is easy to apply. We offer six primary patch systems, in a variety of sizes to accommodate any repair. The only water activated repair system required on board U.S. Coast Guard and Navy vessels. **Circle 133**



UltraStrip Systems, Inc.

The unique, patented industrial grade UltraStrip Robotic Hydro blasting system is capable of removing coatings from the hulls of ships at the rate of 2,000 to 10,000 square feet per hour. Pictured with the system is Jean-Michel Cousteau, son of the late explorer and environmentalist, Jacques Cousteau. A noted environmentalist in his own right, Jean-Michel Cousteau believes the UltraStrip closed loop system will help save marine life from grit blasting, one of the largest streams of industrial waste facing the world today. **Circle 134**

Renaissance Cruise Uses ETC

This past year, Renaissance Cruise Lines added three new ships to its fleet, the R5, R6 and R7. The company is set to add the R8, which was scheduled to be named in a ceremony on February 18th. Built at Chantiers de l'Atlantique, Saint-Nazaire, France, the R-class ships are almost identical in design, and the Saint-Nazaire division of HMS France has supplied and installed the entertainment systems, TV distribution and the broadcast and editing systems on all of them. For the entertainment areas of the R5, R6, R7 and R8, HMS installed an ETC Sensor delta dimming system plus 48 Source Four PARs and 32 Source Four ellipsoidals at the specification of its Miami-based division Harbour Marine Systems. Aiming for standardization in terms of equipment, Harbour Marine Systems now specifies ETC equipment for all its cruise ship projects, including those installations carried out by parent company HMS France.

Circle 31 on Reader Service Card

NASSCO Receives ISO 14001 Certification

NASSCO has earned the designation as the first private shipyard in the U.S. to receive ISO 14001 certification for its comprehensive Environmental Management System and environmental protection policies. The certification process was conducted by ABS.

Stratos Announces Global Distribution Deal

Stratos Global Corp. has reached an agreement with Iridium Satellite to provide Iridium services globally. The new Iridium service will be the sole handheld communication service to offer complete global coverage. Compared to Iridium's initial plan, pricing has been reduced dramatically, in addition to improved functionality. The new service is comprised of voice and data functions accessed by a smaller, lighter and easier to use handset. Airtime charges are expected to be a fraction of the former Iridium charges, and handset charges will be significantly reduced as well.

Circle 61 on Reader Service Card

Offshore Inland Completes Many Projects

Offshore Inland Marine and Oilfield Services, Mobile, Ala., has finished a two-ship contract for the fabrication and installation of rail car and marine equipment for the LMS Shipmanagement Vessels, Banda Sea and Bali Sea. LMS Shipmanagement commenced the conversion process at a Singapore shipyard and concluded work in Mobile, where the new rail car

ANCHORS CHAINS

service to Mexico originates. Offshore was given the responsibility of fabricating and installing rail car bumper stops, roller chocks, track switching gear and side shell removals for access to the new mooring winches and handrails across the vessel's stern.

WORTELBOER

The company is currently performing a piping and tubing installation on six thrusters for Transocean Sedco Forex's drill ship Discoverer 534. Offshore Inland performed all tubing and piping installation, not to mention a hydraulic system flush and miscellaneous steel work.

Friede Goldman Halter awarded the company a contract to install piping and tubing for the choke and kill lines, high pressure wash down system, hatch covers, water tight doors and anchor winches. In addition, Ocean Rig called upon Offshore Inland to set up an onsite facility to remove, test and re-install all of the relief valves for the semis Bingo I and Bingo II.

Circle 57 on Reader Service Card

Lang Manufacturing Appoints New CEO

David W. Ek has been elected as president and CEO of Lang Manufacturing effective, February 12, 2001. Ek succeeds Jack Sparacio, who had held the position for the past seven years and will continue to sit on the board of directors. Ek joined Lang In October of 2000 as executive vice president. Prior to this, he was executive director of Business Development with FSbuy.com, an e-commerce business designed to serve the food service industry. He has a very successful track record in sales and marketing in the food service industry and has held management positions with Wells/Bloomfield Division of Specialty Equipment, and National Controls Corporation.

P And H, Modern Maritime Team Up

Modern Maritime (MMI), of Arlington, Va., and P and H Marine Associates, (P and H),

Portsmouth, N.H., suppliers of Marine Management System consulting services, have agreed to terms for a merger of the two companies, effective early March. The new company, which will be known as Modern Maritime, Inc., plans to offer the marine industry with cost-effective solutions to the management of problems encountered through increasing regulatory requirements and a more competitive marketplace.

Founded by Captain Jamie Clarkson, MMI is a newly developed Internet portal designed to provide the marine industry with professional services specializing in solutions for safety, quality, and environmental management, regulatory compliance, and Maritime Information Systems.

Circle 43 on Reader Service Card

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Circle 333 on Reader Service Card

Great Ships of 2000

Samsung Delivers Excellence

Due to a production glitch, the following vessels from Korea's Samsung Heavy Industries were erroneously omitted from the December 2000 edition. Following are details on OOCL Los Angeles, a 5,500-TEU containership; Vinland, a 126,000 shuttle tanker; and SaiBos FDS, a pipelay and crane vessel, all of which are honored as Maritime Reporter & Engineering News Great Ships of 2000.

Vessel's Name OOCL Los Angeles
Type 5,550 TEU Containership
Owner/Operator Nordcapital/OOCL
Shipbuilder Samsung Heavy Industries Co.

Designed by Samsung Heavy Industries Co., OOCL Los Angeles is the seventh in a series of 15 containerships ordered by Nordcapital OOCL. Floated out in February 2000 and delivered three months later, the ship is designed and constructed with eight container holds, and the German-flag ship is capable of carrying 5,550 TEU, stowed nine tiers by 14 rows in hold and six tiers by 16 rows on deck. There are three rows of pontoon type hatch cover on deck shall be arranged in way of hold compartments except No.7 F. Propulsion power for the containership is provided by a B&W12K90MC engine with MCR rating 74,640 bhp at 94 rpm, driving a fixed pitch propeller. To ensure exceptional maneuverability in port, one set of bowthruster has been fitted at forward to ensure the good maneuvering in port. Accommodation has been provided for 16 officers and 10 crewmembers, in single and six maintenance; crews in three double-berth cabins. One personnel lift has been arranged from navigation deck to third deck.

This vessel has a main engine exhaust gas pipe from the exhaust gas economizer to funnel top is to be carefully insulated and fabricated of stainless steel 5 mm inhibit corrosion. Electrical supply is derived from one main engine driven 2,100 kW shaft generator, three diesel-powered 1,300 kW main alternators and one 150 kW emergency generator. Fuel oil shall type coolers have been provided for the central cooling system. The navigation system has been prepared and equipped for one-man bridge operation of DNV W1 concept.

Vessel's Name Vinland
Type Shuttle Tanker
Owner/Operator Penny Uglund
Shipbuilder Samsung Heavy Industries Co.

Vinland, hull no. 1293, is a Canadian-flagged 126,000-dwt shuttle tanker measuring 892 x 151 ft. (272 x 46 m), with a tank capacity of about 141,000 cu. m. Delivered in August 2000, the ship is designed specially to cope with the harsh weather in the North Sea. For instance, the Dynamic Positioning System (DPS) that interfaces with twin CP propellers and four bow and stern thrusters, keeps the vessel's position automatically during bow loading, maximizing its safety and reliability when transferring oil between the oil platform and this ship. In addition, the ship is equipped with the special nav-

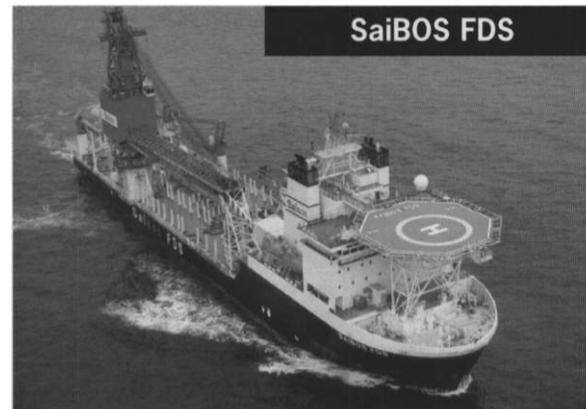
igation device, which boasts suitable anti-frozen facilities in order to operate in icy waters at outside temperatures averaging 17 degrees C below zero. Samsung Heavy utilized many of the skills needed to construct such an advanced vessel during the construction of a pair of shuttle tankers, Kometic and Mattea, which were delivered in 1997. The shipbuilder also credits The J.J. Uglund Companies for extending to it the confidence in the building of such technically demanding tonnage.

Vessel's Name SaiBOS FDS
Type Pipe Lay & Crane vessel
Owner/Operator SaiBOS CML
Shipbuilder Samsung Heavy Industries Co.

Samsung Heavy Industries Co. delivered the Bahamas-flagged, dynamic positioned pipe lay & Crane vessel pf SaiBOS in mid-December. The SaiBOS FDS, Pipelay & Crane Vessel has been designed and constructed with the regulation of DNV classification society. Tanks are contained within a complete double side/bottom/bulkhead structure with topside tanks, the inner line of which is extended to form the side of a full length upper deck trunk, also with double skin. In this way, not only is the threat of tank damage from outside reduced, but protection is provided against critical steelwork fractures in the outer hull, caused by extremely low cargo temperatures.

Able to carry a marine crew of 30 with a maximum 169 technicians, the technically advanced ship is outfitted with the latest array of marine equipment. SaiBOS FDS — which measures 536 x 98 (163.5 x 30 m) — is powered by four Wartsila 16V26 engines, and is able to achieve a service speed of 13 knots.

OOCL Los Angeles



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Circle 208 on Reader Service Card

Maritime Reporter & Engineering News

E-Commerce

Orders are transmitted using EDI protocols and after a short time, delivery confirmations are received. When the vessel arrives in port, the products are available at the quayside, ready for loading onboard. When orders are registered by Unitor, an invoice is automatically generated. In addition, the owner's land-based Purchasing Department can also

'track and trace' the progress of RFQ's and PO's via the system.

Boatrac

Boatrac Focusing primarily on workboats, riverboats, oil field supply boats and fishing boats, Boatrac is a leading



maritime workboat industry.

provider of satellite communications and integrated hardware and software information solutions for the

Wartsila

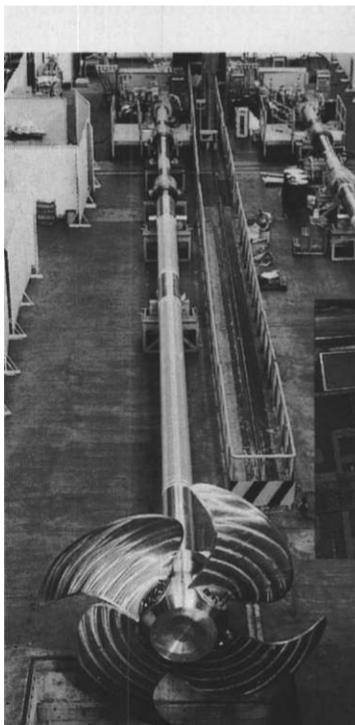
Last year Wartsila Corp. announced plans to develop a new channel for its products, services and information via the Internet. Through e-business, Wartsila's hopes to put its expertise and technical resources at its customers' fingertips. The e-business functions started with tailored services to dedicated users and customers in pilot testing from mid-December 2000. The first release was scheduled for availability at the end of February 2001. Access will be provided in three different levels of accessibility and guaranteed security:

- The Open Level providing access to publicly-available information, such as pre-engineering concepts and installation design information, etc.;
- Registered Level requiring the user to register for customized information;
- Agreement Level authorizing access to those users having an agreement with Wartsila on their individual scope of accessibility to information and services. Through this channel, Wartsila will serve shipowners, shipbuilders, utility companies, and power plant operators, etc., giving direct access to information and services specifically concerning their engines and installations.



IN PURSUIT OF MANOEUVRABILITY

Aspiring to provide excellent systems, Kawasaki, with a century-long experience, is continually researching and developing new propulsion systems.



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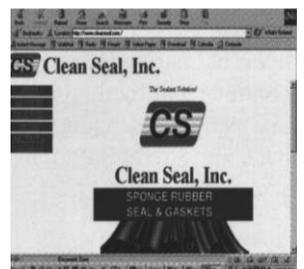
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Clean Seal

Clean Seal, Inc. of South Bend, Ind. offers extruded EPDM, Neoprene, Silicone and Nitrile



Seals to the marine industry. The company also offers vulcanizing services for endless seal applications. In the extruded rubber industry since 1978, the company warehouses over 6 million feet of product stocking more than 500 profiles for just-in-time delivery. Visit Clean Seal at: www.cleansal.com.

Crew Vision 2001

Network Pipeline has introduced Crew Vision 2001, an Internet-based personnel logistics database tool for use by fleet personnel departments in the marine industry. The new system can be used for commercial shipping lines and passenger cruise lines internationally. Based in Fort Lauderdale, Fla., Network Pipeline's Crew Vision system provides ocean carriers and passenger cruise lines with a paperless solution in regards to crew management.

Circle 231 on Reader Service Card

Ferlship's New Ship Contracts • December 2000/January 2001

Ferlship is a strategic consultancy highly specialized in market researches guided to the shipping industry. For additional information, please contact Ferlship @: Pza. Sta. M^a Soledad Torres Acosta, 2. 2° C, 28004 Madrid, Spain, Tel. : +34 91 531 01 78 , 689 01 45 66; Fax: +34 91 531 01 78' e-mail: ferlship@iies.es (Prices are in U.S. Dollars)

OWNER OPERATOR	COUNTRY SO	SHIPYARD	COUNTRY SB	TYPE	No	TEU	DWT	DELIV	PRICE M \$
NICO INTERN.	UAE	ADYAR ABU DHABI	UAE	AHT	1	0	0	2	0
TIDEWATER	US	YANTAI RAFFLES SHIPYARD	CHINA	AHTS	5	0	0	01/02	0
MAERSK SUPPLY SERVICE	DENMARK	LANGSTEN SLIP & BAABYGGERI AS	NORWAY	AHTS	2	0	0	02	0
SOLSTAD SHIPPING	NORWAY	ULSTEIN VERFT	NORWAY	AHTS	1	0	0	02	40
STIRUNG SHIPPING	UK	GOVAN BAE SYSTEM	UK	AHTS	1	0	2800	2	0
TIDEWATER	US	YANTAI RAFFLES SHIPYARD	CHINA	AHTS	5	0	0	2-Jan	0
MAERSK SUPPLY SERVICE	DENMARK	LANGSTEN SLIP & BAABYGGERI AS	NORWAY	AHTS	2	0	0	2	0
SOLSTAD SHIPPING	NORWAY	ULSTEIN VERFT	NORWAY	AHTS	1	0	0	2	40
VESSEL MANAGEMENT SERVICES	US	HALTER MARINE GULFPORT	US	BARGE	1	0	20000	02	0
ALUED TRANSPORTATION	US	ALABAMA SHIPYARD	US	BARGE	1	0	14000	02	0
BOUCHARD TRANSPORTATION	US	HALTER MARINE GULFPORT	US	BARGE	1	0	15000	02	0
VESSEL MANAGEMENT SERVICES	US	HALTER MARINE GULFPORT	US	BARGE	1	0	20000	2	0
ALUED TRANSPORTATION	US	ALABAMA SHIPYARD	US	BARGE	1	0	16000	2	0
BOUCHARD TRANSPORTATION	US	HALTER MARINE GULFPORT	US	BARGE	1	0	15000	2	0
JAPANESE INTERESTS	JAPAN	TSUNEISHI	JAPAN	BULK CARRIER	2	0	76000	02/03	0
UNKNOWN	JAPAN	TSUNEISHI	JAPAN	BULK CARRIER	4	0	63000	02/03	0
SETAF SAGET	FRANCE	NANTONG COSCO KHI	CHINA	BULK CARRIER	1	0	47100	02	20
CANADIAN FORREST NAVIGATION	CANADA	WUHU SHIPYARD	CHINA	BULK CARRIER	2	0	27800	02	29
MITSUI & CO.	JAPAN	KANASASHI CO.	JAPAN	BULK CARRIER	2	0	52200	3	0
ALLIED MARITIME	JAPAN	MITSUI	JAPAN	BULK CARRIER	1	0	43000	2	20.5
EGON OLDENDORFF	GERMANY	SAIKI	JAPAN	BULK CARRIER	1	0	32000	4/02	0
JAPANESE INTERESTS	JAPAN	SHIN KURUSHIMA	JAPAN	BULK CARRIER	3	0	49000	2-Jan	0
JAPANESE INTERESTS	JAPAN	TSUNEISHI	JAPAN	BULK CARRIER	2	0	76000	3-Feb	0
UNKNOWN	JAPAN	TSUNEISHI	JAPAN	BULK CARRIER	4	0	63000	3-Feb	0
SETAF SAGET	FRANCE	NANTONG COSCO KHI	CHINA	BULK CARRIER	1	0	47100	2	20
CANADIAN FORREST NAVIGATION	CANADA	WUHU SHIPYARD	CHINA	BULK CARRIER	2	0	27800	2	29
MITSUI O.S.K. UNES (MOL)	JAPAN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER ORE STRENGTHENED	2	0	88000	3	60
PASHA HAWAII TRANSP. UNES	US	HALTER MARINE INC.	US	CAR CARRIER	1	0	13000	2	69
CAUSA	ITALY	3 MAJ	CROATIA	CHEMICAL TANKER	1	0	35000	6/02	29

Mediterranean Shipping Takes Another Cruise Ship

Mediterranean Shipping Co had exercised an option with Alstom for a second 793-cabin cruise liner to be delivered in 2004.

Although Alstom declined to give the value of the contract, industry sources put the value of the liner in the region of 300 million euros (\$279.1 million).

The company's Alstom Marine unit now has 11 cruise ships in its order book.

NASSCO Delivers

USNS Watkins

National Steel and Shipbuilding Company (NASSCO) delivered USNS Watkins (T-AKR 315) to the U.S. Navy ahead of schedule, under target cost, and with zero discrepancies.

The Watkins is the sixth new construction ship completed by NASSCO under the U.S. Navy's Strategic Sealift Program. A total of eight new construction ships and three ship conversions have been awarded to NASSCO under the 20-ship Strategic Sealift Program. The sealift new construction ships are large, medium-speed, RoRo ships (LMSRs). The ships are assigned to the U.S. Navy's Military Sealift Command, and are repositioned to deliver U.S. Army tanks, armored personnel carriers, tractor-trailers, as well as other equipment and supplies.

The USNS Watkins is 950 ft. long, has a beam of 105 ft. and displaces approximately 62,000 long tons when fully loaded. The ship has over 390,000 sq. ft. of cargo carrying space. The gas turbine-powered ship will be able to sustain speeds up to 24 knots when fully loaded.



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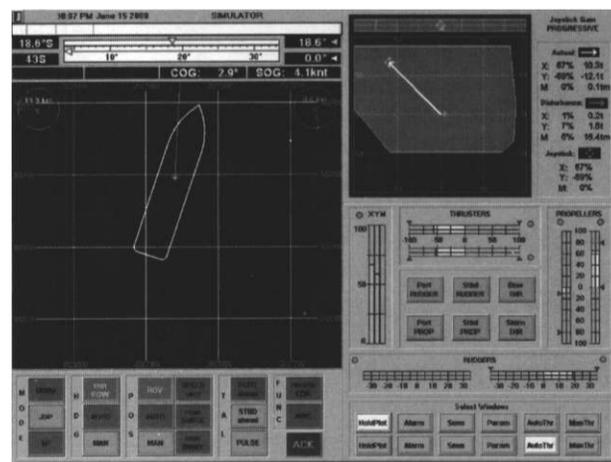
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Adrick Marine, 81 Mahan St., W. Babylon NY 11758

Repair & Installation, Equipment & Services

Carrier Transcold, P.O. B. 4805, Syracuse, NY 132211

Stork Canada, 47 bout. Mane Victorin, Candiac, Quebec, Canada. J5R 1B6

AIRHORNS/SIGNALING EQUIPMENT

Kahlenberg Marine, P.O. Box 358, Too Rivers, WI 54241

ALARMS, FACTORY MUTUAL-APPROVED

SEICO 353 A Asbury Commons Dr., Atlanta, GA 30338

Hermont Marine, 3528 Griffith StLaurent Quebec Canada H4T1A7

ALUMINUM BOATS

William E. Munson Co., 18130 Sunset Way, Edmonds WA 98026

ANCHORS AND CHAINS

**GJ Wortelboer Jr. B.V. PO Box 6003 3008 AA
Rotterdam, Netherlands**

Crandall Diy Dock Engineers Inc., P.O. B. 505804, MA 02150

Washington Chain Inc., Bo* 3645, Seattle, WA 98124

ASSOCIATION

Marine Machinery Assoc., 2300 Clarendon Blvd., Arlington, VA 2201

AUTOMATED SELF UNLOADING

Seabulk Systems Inc., Suite 100, 3751 Shell Road, Richmond, British Columbia, CANADA V6X2W2

AUTOPILOT SYSTEMS

Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851

ComNav Marine, 1915 Stainsburg Ave., Vancouver, B.C. CANADA

Raytheon Marine Co, 22 Cotton Rd, Nashua NH 03069

BAKING MACHINE

Erika Record lie, 20 Vandeelhof Ave. Suit 2, Rockaway, NJ 07866

BALLAST

Ballast Technologies ,4620 S. Coach Dr., 85714 , Tucson, AZ

Redland Genstar Inc., Executive Plaza IV, Hunt Valley, MD 10912-1031

BEARING—Rubber, Metallic, Non-Metallic

Kahlenberg Bros. Co., P.O. Box 358, Too Rivers, WI 54241

Craft Bearing 2506 58th St Hampton, VA 23661

Orkof Inc., 2535 Prairie Rd, Unit D, Eugene, OR 97402

Thordon Bearings inc., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6

Vesco Plastics, P.O. B. 40647, Cleveland 2022 SOUTH AFRICA

Sohre Turbomachinery 132 Gilbertville rd PO Box 889 Ware, Mass 01082

BLOCKS & RIGGING

Skookum, P.O. Box 280, Hubbard, OR 97032

BOATBUILDER

Kvaerner Masa Marine, 1525 W. 8th Ave, Vancouver B.C. Canada V6JH5

Kivach Marine, 469 NW Boodino Pl, Seattle, WA 96107

Washburn Doughty, P.O. Box 296, E.Boothbay ME 04544

BROKERS

Captain Astad Company, Inc., P.O. Box 350486, Ft Lauderdale, FL 33335

Marcon International, Inc., P.O. Box 1170, Coupeville, WA 8239-1170

Mowbray's Tug & Barge Sales Corp, 35 De Hart St, Morristown NJ 07960

BRUSHES

**Sohre Turbomachinery Inc 132 Gilbertville Rd PO Box
889 Ware, Mass. 01082-0889**

BULKHEAD SEALS/PANELS

CSD North America, 880 Candia rd, Unit 10, Manchester. NH 03109

Themax, 15006 Shaw Rd, Tampa, FL 33625-5500

Themax 3115 Range Rd Temple, TX 76501

BUOYS

Detrex, P.O. Box 1150, Kinder, LA 70648

CABLE TRANSIT SYSTEMS

CSD North America, 880 Candia rd, Unit 10, Manchester. NH 03109

CALIBRATIONS

Standard Calibrations Inc., 908 A Ventures Way, Chesapeake VA 23320

CAD/CAM SYSTEMS

Aleacore Research, 4196 Kashan Place, Victoria, B.C. Canada V8X4L7

Autoship Systems Corp, #403, 611 Alexander St, Vancouver, BC, Canada V6A1E

Creative Systems, Inc., P.O. B. 1910, Port Townsend.WA 98368

IMS, 13 Jenkins Court, Suite 200, Durham, NH 03824

Kockums Computer Systems AB, PO Box 50555, S-202 15 Malmo SWEDEN

P.T.C., 128 Tech Drive, Waltham MA 02543

Scientific Marine Servks, Inc, 101 State Pl, Suite F, Escondido, CA 92029

Ship Motion Associates, 10 Danforth St, Portland, ME 04101-4567

CAP TREADS

Washington Aluminum, 1330 Knecht Ave., Baltimore, MD 21229

CAPSTANS

G.J. Wortelboer Jr. Bv. P.O.B. 5003, 3008 AA Rotterdam. Netherlands

Superior Lidgerwood Mundy, 1101 John Ave, Superior, WI 54880

CARGO MONITORING & CONTROL SYSTEM

Radio-Holland USA, 8943 Gue Freeway, Houston, TX 77017

Hematic Inc, 4522 Center St, Deerpark, TX 77536

CAST IRON REPAIR

Metal Surgery, 2901 W Mill Road, Milwaukee, WI 53209

In-Place Machining 1929 N. Buftum St Milwaukee, WI 53212

CHAINS

New England Marine & Industrial, 200 Spaulding Tnpjpike, Portsmouth, NH 03801

Washington Chain, P.O. Box 3645, Seattle, WA 98124

CLUTCHES

Hayley Clutch and Coupling Corp., 1820 Hoy, 1 North, Greenville, MS 38702

CLASSIFICATION SOCIETY

Lloyds Register 71 Fenchurch St London EC3M 4B5

CNC PLATE CUTTING

Advanced Fabricating Inc PO Box 3721 Galveston, TX 77552

COATINGS / CORROSION CONTROL / PAINT

American Safety Technologies 565 Eagle Rock Ave Roland NJ 07068

Anker Marine Paints, 21 Charles Street, Westport, CT 06880

Aqua-Dyne, 3620 W. 11th St., Houston, TX 77008

21st Century Coatings Inc, 4701 Willard Ave.#109, Chevy Chase, MD 20815

Brile Products, 14650 Dequindre, Detroit, MI 46212

Chugoku Marine Paints PO Box 73 47932H Finaart The Netherlands

Junon Paints Inc, 1401 Severn St, Baltimore.MD 21230

Eureka Chemical Co., 234 Laurence Ave, South San Francisco. CA 94080

Corrosal Inc., 70 E. Sunset Way, 1251, Issaquah, WA 96027

Flow International Corp, 23500 64th Ave. South Kent, WA 98032

Mascoat Products, 3500 E. T.C. Jester, Suite N., Houston, TX 77018

Nace Intl, 1440 South Creek Dr., Houston, TX 77084

NoFire Technologies, 21 Industrial Ave, Upper Saddle River, NJ 07458

Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502

Ferro Corp, 1301 North Flora St, Plymouth, RI 04653

Jamestown Distrib, P.O. Box 348, Jamestown, RI 02835

Chesapeake Specialties Products, 5055 North Points Blvd, Baltimore Md 21219

Wesper High Tech Coatings, 8041 South 228th St, Kent, WA 98032

COMMUNICATIONS SERVICE

Boatrac, 10675 Sorrento Valley Road, Suite 200, San Diego, CA 92121

Maritime Telecommunications Networks, Inc, 8400 NW 52nd St, Suite 110, Miami, FL 33166

Mantel Marine Communications, 16 E. 41st St, NY, NY 10017

Comsat Maritime Services, 6560 Rock Spring Drive, Bethesda, MD 20817-1146

Radio Holland, 8943 Gulf Freeway, Houston, Texas 77017

COMPOSITE PROCESSING

Composite Technology Consultants, Inc.12310 Northwinder Roo, Bayonet Point, Fla. 34667

Mektech Composites Inc, 40 Strawberry Hill Rd, Hillside, NJ 07642

COMPOUNDS

ITW Philadelphia Resins, 130 Commerce Dr. Montgomeryville, PA 18936

COMPRESSOR PARTS

CMP Corporation, P.O. Box 15199, Oklahoma City, OK 73155

COMPUTER / COMPUTER SOFTWARE

Autoship Systems Corp, #403, 611 Alexander St, Vancouver, BC, CANADA V6A1E

Fleet Technology, 311 Legget Dr. Karata, Ontario, Canada K2K 1Z8

MIL Systems, 200-1150 Morrison Drive, Ottawa, Ontario K2H 6S9

Sener, C/Severo Ochoa, 4 Parque Tecnológico de Madrid, 28760 Tres Cantos - Madrid SPAIN

Lloyd's Register, 100 Leadenhall St., London, England EC3A 3BP

Ship Motion Associates, 10 Danforth St, Portland, ME 04101

Azonix Corp, 900 Middlesex Tpke, Billenca, MA 01821

Spar Associates, 927 West St, Annapolis, MD 21401

Creative Systems, Inc, P.O. B. 1910, Pott Toonwnd. WA 98368

COMMUNICATIONS

Hose McCann 1241 W. Newport Center Deerfield Beach, FLA 33442

Mackay Comm Inc 2721 Discovery Or Raleigh NC 27616-1851

COMPUTER SOFTWARE SYSTEMS

Autoship Systems Suite 312-611 Alexander St Vancouver BC V6A1E1

Spec Tec Professor Koth's Vey 1366 Lysaker Norway

Proteus Engineering 345 Pier One Rd Stevensville, MO 21666

CONSULTANTS

Homblower Marine, Pier 3 Ferryboat Santa Rosa San Francisco, CA 64111

CONSOLE - GMDSS

Furuno USA, Inc, 4400 NW Pacific Rim Blvd., Camas, WA 96607

Mackay Communicatms, 2721 Discovery Dr, Raleigh, N.C. 27616-1651

Raytheon Marine Co., 22 Cotton Rd, Nashua NH 03069

CONTROL SYSTEM - Monitoring/Steering

Governor Control Systems, 3190 S.W. 4th Ave, Ft. Lauderdale, FL 33315

Motor Services Hugo Stamp, 3190 S.W. Lauderdale, a 33315

MMC International, 60 Inip Dr. Inwood NY 11096

Raytheon Marine Co, 22 Cotton Rd, Nashua NH 03069

Scientific Marine Services, Inc, 101 State Pl, Suite N. Escondido, CA 90229

Stork Kwant, P.O. Box 23, 8600 AA Srmek, Netherlands

Kcbett Mfg Co, Ltd, 8238-129 St. Surrey, B.C. V3W0A6

Electronic Marine Systems, 800 Fendale Pl, Rahway, N.J. 07065

Kockum Sonics, Inc, 819 Veterans Blvd., Suite 201, Kenner, LA 70066

CORROSION CONTROL

Gardner Denver Water Jetting Systems 8807 Emmett Rd. Suite 100 Houston, TX 77040

COUPLINGS

GeisingerAligner Striebe 30 A-5026 Salzburg

American Vulkan, 2525 Dundee Rd., Winter Haven . a 33864

Mapeco Products, 91 Wilenbrock Rd, Unit B, Oxford, CT 06476

Centa Corp, 815 BlackHoak Dr., Westmont, IL 60559

Lo-Rez Vibration Control, Ltd, 186 West 8th Ave, Vancouver, B.C. V5Y 1N2

American Vulkan, P.O. Draoer 673, Winter Haven, a 33882

MMC Intl, 60 Inip Drive, Inood, NY 11096

CRANE-HOIST-DERRICK-WHIRLEYS

E. Crane 241 Executive Dr. <3 Marion OH 43302

Bisso Marine Co. P.O. Box 4113, New Orleans, LA 70178

Holy Hoist Corp, P.O. Box 86, SL Clair Shores, MI 480804086

Edgeoater Machine 1 Fabricators, P.O. Box 356, Edgeoater, FL 32132-0358

Westmont Industries, 10805 Painter Ave, Santa Fe Spngs, CA 90670

CRANKSHAFT DEFLECTION ANALYZER

FCS, Inc., 22 Main St, Centerbrook, CT 06409

Prisma Teknik AB Soeden, www.prismateknik.com

CRANKSHAFT GRINDING

Goltens . New York Corp, 160 Van Brunt St, Brooklyn, NY 11231

CRANKSHAFT REPAIR

In-Place Machining 1929 N. Buftum St Milwaukee, WI 53212

Goltens . New York Corp, 160 Van Brunt SL, Brooklyn, NY 11231

CREW MANAGEMENT & LOGISTICS

Brad J. Wilkum a Associates PO Box 101073 Ft Lauderdale, FL 33310

CUSTOM CLOSURES

Waltz S Krenzer, 91 Wilenbrock Rd, Oxford, CT 06478

CUTTING AND WELDING MACHINES

Bug-O-Systems, Inc, 3001 W. Carson St, Pittsburgh, PA 15204

CYLINDER LOAD ANALYZER

General Thermodynamics, 210 S. Meadow Rd, Plymouth, MA 02360

DECKING & FLOORING

E.H. O'Neill, 1405 Chpvendale Rd, Lutherville, MD 21093

DECK MACHINERY - Cargo Handling Equipment

Skookum, Inc., P.O. Box 280, Hutoard, OR 97032

Intercontinental Engineering, P.O. Box 9055, Kansas City, MO 64168

Edgeoater Machine S Fabricators, P.O. Box 358, Edgeoater, a 32132-0358

Neo England Traoler Equipment Co, 291 Eastern Avenue, Chelsea, MA 02150

Rapp Hydema, 4433 27th Avenue West, Seattle WA 96199

Smith Berger Marine Inc., 7915 10th Ave. S, Seattle, WA 98106

Superior Lidgerwood-Mundy, 1101 John Ave, Superior, WI 54660

DECK STRUCTURES

Carolina Cockpit, P.O. Box 83037, Portland, OR 97283

DESALINATION - REVERSE OSMOSIS

G.E.T., Inc, 3135 Golden Avenue, Long Beach, CA 90806

Pal Rodiem, 5775 Rio Vista Drive, Clearwater, FL33760-3114

Matrx Desalination, 3295 S.W. 11th Ave., Fort Lauderdale, a 33315

Reverse Osmosis of South Florida, 12301 SW. 133 Court, Miami, a 33186

DESIGN CONSULTING

Fleet Technologies, 311 Legget Dr, Kanata, Ont. K2K 128 Canada

DIESEL ENGINE ANALYZER

Kiene Diesel, 325 South Fairbanks, Addison IL 60101

FCS, Inc, 22 Main Street, Centerbrook, CT 06409

Hermont Manne Inc, 3528 Griffith, St. Laurent Quebec Canada

DIESEL ENGINE - Spare Parts a Repair

GE Marine Engines 1 Neuman Way Cincinnati,OH 45215

Baltic Spare Services Ltd 8 Astronomow St 80-299 Gdansk Poland

Scardania Americas Bkg, 502 Empire St, GreeflekJ Park, J4V1V7 Canada

Heimont Marine Inc, 3528 Griffith, St. Laurent, Quebec Canada

Industrial Estate, New Territories, HONG KONG

Caterpillar, Inc, Engine Div, P.O. Box 610, Mossville, IL 61552-0610

Deutz Canada Inc, 4420 Garand St, Montreal, Que. H4R 2A3

Goltens - New York Corp, 160 Van Brunt SL, Brooklyn, NY 11231

Governor Control Systems, 3190 S.W. 4th Ave, FL Lauderdale, a 33315

MAN B&W Diesel AG, Stadtbachstrasse 1, D46153 Augsburg 1, GERMANY

MAN B&W Diesel A/S, Tegtlilomsgade 41, DK-2450 Copenhagen SV, DENMARK

MAN BAW Diesel, 17 State St, New York, NY 10004

Mariso USA, Inc., 100 Davidson Ave, Sommers, NJ 08673

Motor-Service AB, Box 2115, S-144 04 Ronninge, SWEDEN

Motor Service-Hugo Stamp, 3190 S.W. 4th Ave, Ft. Lauderdale, FL 33315

Wartsila Diesel, 201 Defense Highway, Annapolis, MD

Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

MARINE EQUIPMENT

Baltic Spare Services Ltd 8 AstronomodomSt 80-299 Gdansk Poland

I-Com Industry Inc., 13873 Park Center Road, Suite 713, Hemdon, VA 20171

Plastic Pilings Inc., 1485 South Willow Ave., Rialto, CA 92376

Scardana Americas Bkg., 502 Empire St., Montreal, Greenfield Park, J4V1V7, Canada

Superior Lidgerwood-Mundy, 1101 John Ave., Superior, WI 54880

Commercial & Marine Products, 3924 Forest Dr., #11, Columbia, SC 29204

Waterman Supply, P.O.Box 596, Wilmington, CA 90748

MARINE INSURANCE

JBL Trinity Group, 17 State Street 16th Fl, New York, NY 10004

MARINE RADIOS

Standard Horizon, 17210 Edwards Rd., Cerritos, CA 90703

MARINE SHAFTING

Kahlenberg Bros., P.O. Box 358, Two Rivers, WI 54241

MARITIME TRAINING & SCHOOLS

Marine Safety Intl., Marine Terminal Laguardia Airport, NY 11371

MGI International Marine Safety Solutions, 115 Carrie Cates Cour, North Vancouver, BC V7M3J4

MEDICAL CASE MANAGEMENT

Van Hall Health Inc., 31692 Horse Shoe Dr., Evergreen, CO 80439

METERS

Selco USA, 2508 Lakebrook a, Atlanta, GA 30360

MOLDED FIBERGLASS PRODUCTS

American Custom Yachts, 6800 S.W. Jack James Dr., Stuart, FL 34997

MONITORING SYSTEMS

Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851

MOORING LINES

Bayer FAser Bvlding F18 DV Martrtg Monofil 41538 Dormagen Germany

MOORAGE FACILITY

Washington North Tongue Point 1300 Dexter Ave N, Ste 205 Seattle, WA 98109

MOTOR PROTECTION EQUIPMENT

Marine Safe Electronics, 261 Millway Ave, Unit 12 Concord ONTARIO L4K 4K9

MOUNTING SYSTEMS

Lo-Rez Vibration Control, Ltd., 186 w 8th Ave., Vancouver B.C. Canada V5Y 1N2

Machine Support 1932 Mill Pond Dr Chesapeake, VA 23320

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS

A.K. Suda , Inc., 3004 19th St., Metairie, LA 70002-4989

TIMSCO, P. O. Box 91360, Mobile AL 36691

Band, Lavis, & Associates, 900 Ritchie Hwy, Suite 203, Severna Park, MD 21146

Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202

Bay Engineering, 253 N. First Ave., Sturgeon Bay, WI 54235

C. Baxter & Associates, P.O. Box 9006, Mobile, AL 36609

CDI Marine Co., 9550 Regency Square Blvd. Ste. 400, J acksonville, FL 32222

C.R. Cushing, 18 Vasey St. New York, NY 10007

CT Marine, 56 Crooked Trail, Rowayton, CT 06853

Cunningham & Walker, 1762 Providence Hollow Lane, Jacksonville, FL 32223

DeJong & Lebet, Inc., 1734 Emerson Street, Jacksonville, FL 32207

Designers & Planners, 2120 Washington Blvd. Ste.200, Arlington, VA 22204

Fleet Technology, 311 Leggett Dr., Karata, Ontario, Canada K2K 1Z8

Gibbs & Cox, Inc., 50 West 23rd St., New York, NY 10010

John W. Gilbert & Assoc., Inc., 199 State St., Boston, MA 02109

The Glosten Assoc. Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104

Guido Perla & Assoc., 720 3rd Ave., Ste. 1200, Seattle, WA 98104

R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073

Kvaerner Masa Marine Inc., 201 Defense Highway, Suite 202, Annapolis, MD 21401

James S. Krogen, 739 Brickell Plaza Ste. 701, Miami, FL 33131

MCA Engineers, Inc., 2960 Airway Ave., #A-103, Costa Mesa, CA 92626

Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063

McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloixi, MS 39535-4454

MIL Systems, 200-1150 Morrison Drive, Ottawa, Ontario K2H 8S9

John J. McMullen Associates, Inc., 4300 King St., Suite 400, Alexander, VA 22302

Marine Design & Operations, Inc., 225 E. 1st Ave., Roselle, NJ 07203

Maritech, Seaciff, Bay Road, Newmarket, NH 03857

Maritime Design, 13000 Sawgrass Village Circle, Ponte Vedra Beach, FL 32082

R.J. Mellusi & Co., 71 Hudson St, New York, NY 10013

Nautical Designs, Inc. 2101 S. Andrews Ave.Suite 202, Ft Lauderdale FL 33316

M. Rosenblatt & Son, Inc., 2341 Jefferson Davis Hwy, Arlington, VA 22202

Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112

Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

Sea School, 10812 Gandy Blvd, St. Petersburg, FL 33702

Seaworthy Systems Inc., P.O. Box 965, Essex, CT 06426;

George G. Sharp, Inc., 100 Church St., New York, NY 10007

MSCL Inc., 1452 Duke Street, Alexandria, VA 22304

Vibtech, Inc., Box 435, N. Kingston, RI 02852

Washburn Doughy, P.O. Box 296, E. Boothbay, ME 04544

NAVICOM EQUIPMENT

C-Map/Commercial, 133 Fairmouth Rd., Mashpee, MA 02649

C-Map, P.O. Box 212 4371 Egersund Norway

St. Johns, Newfoundland, Canada A1A 2G8

Electronic Marine Systems, 800 Fendale Pl., Rahway, N.J. 07065

Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607

Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851

Transas Marine USA, 19105 36th Ave. W. St. 101, Linwood, WA8036

Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017

Raytheon Marine Co., 22 Cotton Rd., Nashua NH 03069

Scandinavian Micro Systems P.O. Box 155, N-1411, Kolbotn, NORWAY

Standard Communications, P.O. Box 92151, Los Angeles, CA 90009

Waterway Communications System, Inc. 453 E. Park Pl., Jeffersville, IN 47130

Offshore Systems International, 5013 Pacific Hwy East, Fife, WA 98424

Offshore Systems International, 107-930 W. 1st St., N.Vancouver,

BC Canada V7P3N4

Litton Marine Systems, 1070 Seminole Trail, Charlottesville, VA 22901-2591

Icom America, Inc., 2380 116th Ave. NE, Bellevue, WA 98004

KVH Industries, Inc., 110 Enterprise Center, Middleton, R.I. 02842-5268

NAVIGATION

Transas Marine USA 19105 36th Ave

West Ste 101 Lynwood, WA 98036

NOISE & VIBRATION
Soundcoat, 1 Burt Dr., Deer Park, NY 11729

NOZZLES/NOZZLE SYSTEMS

Harrington Metals, 6720 124th Ave., Fennville, MI 49408

OFFSHORE TOWING

Tidewater, 601 Poydras Street, New Orleans, Louisiana 70130

OIL—Marine—Additives—TESTING

Mobil Oil Corporation, 3225 Gallows Road, Fairfax, VA 22037-0001

OIL/WATER SEPARATORS

Sasakura Engineering, 7-32 Takeshima, 4-chome, Nishiyodogawa,

KY, Osaka555, Japan

Alla-Laval Separation, Inc., 955 Meams Rd., Warminster, PA 18974-0556

Alla-Tec, Inc., 4027 21st Ave. West, Seattle, WA 98199

MMC International, 60 Inip Dr., Inwood NY 11096

PAINTS/ANTI-FOULANTS

Jotun Paints Inc, 1401 Severn St., Baltimore,MD 21230

Wasser High Tech Coatings, 8041 South 228th St., Kent, WA 98032

PARTS LOCATOR SERVICE

Inventry Locator Service, 3965 Mendenhall Road.,Memphis, TN 38115

PIPE FITTINGS/CUTTINGS/CONNECTING/ SYSTEMS

Norma Products (U.S.) Inc. 31132 Century

Drive, Wixmon, MI 48393

Jesse Engineering, 5225 7th St. East., Tacoma, WA 8424

Neptune Research, 1685 Latham Rd., West Palm Beach, FL 33409

PHOTOLUMINESCENT PRODUCTS

Datrex, P.O. Box 1150, Kinder, LA 7064

POLLUTION CONTROL PRODUCTS

Ensocon Corporation, 125 Baylis Rd., Melville, NY 11747-3800

PORTABLE VENTILATORS

Americ Corp 1910 E. Devon Ave Elk Grove Village, IL 60007

PORT DEVELOPMENT

Sasakura Engineering, 7-32 Takeshima, 4-chome, Nishiyodogawa, KY, Osaka555, Japan

RTM Star Center, 2 W.Dixie Hwy., Dania, FL 33004

PRECISION FLAME CUTTING/SAWING

Radio Holland, 8943 Gulf Freeway, Houston, Texas 77017

Ronson Technical, 2146 B Flintstone Dr., Tucker, GA 30085

PROPELLERS-Repairs

Kahlenberg Bros., P.O. Box 358, Two Rivers, WI 54241

Rice Propeller, Av Rios Espinoza No. 88, Col. Benito Juarez, Mazatlan, Sin., Mexico 82180

PULPULSION EQUIPMENT

Alstom USA 2000 Dayhill Rd Windsor, CT 06095

Siemas Electric Ltd. 1180 Courtney Park Rd, Mississauga, Ontario Canada

Jan Verhaar Omega Thrusters 2340 AC Oegstgeest Holland

ABB Drives Inc., P.O. Box 372, Milwaukee, WI 53201-0372,

ABB Industry Oy, P.O. Box 185, 00381 Helsinki, FINLAND

ABB TURBOCHARGER, INC.,1460 Livingston Avenue, N. Brunswick, NJ 08902

Axtron Mfg. 7900 e. Pleasant valley Rd Independence OH 44131

Mathers Controls Inc., 675 Pease Rd., Burlington, WA 98232

Brunvoll A/S, P.O. Box 370, N-6401, Molde, Norway

ZF Marine 3131 SW 42nd St., Ft. Lauderdale, FL 33312

Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320

Centa Corp., 8185 Cass Ave., Darien, IL 60561

The Falk Corp., PO Box 492, Milwaukee, WI 53201-0492

Fincantieri, Diesel Engines Div—GMT, Bagnoli della Rosandra 3334, Trieste, ITALY

Jan Verhaar Omega Thrusters, P.O. Box 119, 2340 AC Oegstgeest,

NETHERLANDS

Gottens Worldwide, 160 Van Brunt St., Brooklyn, NY 11231

Harbormaster Marine Inc., 31777 Industrial Rd., Livonia, MI 48150

Harrington Metal, 6720 124th Ave., Lennville, MI 49408

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

Kaplan and Association, 30808 Crest Forest, Farmington MI 48331

Lo-Rez Vibration Control, 186 West 8th Ave., Vancouver, BC CANADA, V5Y 1N2

Mapeco , Inc., 91 Willenbrock Rd., Unit B4, Oxford CT 06478

Markisches Werk, P.O. Box 1442, D-5884 Halver GERMANY

MAN B&W Diesel, 17 State St., New York, NY 10004

MAN B&W Diesel A/S, Ostervej 2, DK-4960 Holeyb, DENMARK

MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15, DK-9900 Frederikshavn, DENMARK

MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-86153 Augsburg 1 GERMANY

Omnithruster Inc., 30555 Solon Ind. Pkwy., Cleveland, OH, 44139

Orion Corp., 1111 Cedar Creek Rd., Grafton, WI 53024

Karl Senner Inc., 25 W Third, Kenner LA 70062

Schottel-Werft, Manizer Strasse 99, D-56322 Spay/Rhein, GERMANY

Schottel Inc., 500 Industrial Blvd., Sugar Land, TX 77478

Siemens Electric Ltd., 1180 Courtney Park Rd., Mississauga, ONTARIO

The Cincinnati Gear Company, 5657 Wooster Pike, Cincinnati, OH 45227

Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021

Schottel-Werft, Josef Becker Gmb11 & Co. KG, HRP, 432 Really Dr., Dretna, LA 70056

PUMP—Repair—Drives

Scardana Americas Bkg., 502 Empire St., Greefield Park, J4V1V7, Canada

Advanced Environmental Systems, 2 Sutton Rd., Webster, MA 01570

Vita Motivator, 566 Parker St., Newark, NJ 07104

RADARS —ARPAS

Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607

Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017

CMF Corporation, P.O. Box 15199, Oklahoma City, OK 73155

REFRIGERATION COMPRESSOR

REPLACEMENT PARTS

CMF Corporation, P.O. Box 15199, Oklahoma City, OK 73155

REPLACEMENT TRENDS

Washington Aluminum, 1330 Knecht Ave., Baltimore, MD 21229

REVERSE OSMOSIS

GET Inc 3135 Golden Ave Long Beach, CA

RE RIGID INFLATABLE BOATS

Gollens, 16 0 Van Brunt St., Brooklyn, NY 11231

Willard Marine, Inc. 1250 N. Grove St., Anaheim, CA 92806

ROPE—Manila—Nylon—Hawsers—Fibers

Cortland Cable Co., 44 River St.(PSR), Cortland, NY 13045-0330

Puget Sound Rope, 1012 Second St., Anacortes, WA 98221

Pelican Rope Works, 4001 W.Cariage Way,Santa Ana,CA 92704

ROTATING EQUIPMENT

FCS, Inc., 22 Main Street, Centerbrook, CT 06409

RUDDER BEARINGS & BUSHES

Duramax Marine, 16025 Johnson St., P.O. Box 67, Middlefield, OH 44062-0067

Thorndon Bearings, Inc., 3225 Mainway, Burlington, Ontario Canada L7M 1A6

DBC Marine Safety 101 3760 Jacobs Rd Richmond BC V6V146

Walport "WUSA" 39-SA Dover Rd South Toms River, NJ 08757

Brookdale International, 1-8755 Ash St., Vancouver BC, V6P6T3

MGI International, Ste. 113-980 West 1st Street N.Vancouver, BC CANADA V2P 3n4

Viking Life Saving, 1825 N. Miami Ave., Miami, FL 33136

New England Marine & Industrial, 200 Spaulding Turnpike, Portsmouth, NH 03801

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Page	Advertiser	Product	R/S#	Page	Advertiser	Product	R/S#
6	ABB Turbo Systems AG	turbochargers	292	34	Jeffboat Incorporated	drydocking	228
39	ABS	classification society	201	57	Jesse	flanges	333
54	ABS	classification society	338	13	Jotun Paints	coatings	229
28	Albacore Research	CAD-CAM	200	C 4	Karl Senner	marine gears	230
39	Algae X International	fuel filtration	202	60	Kawasaki Heavy Industries	marine equip/supplies	231
38	Americ Corp	portable ventilators	204	8	King Engineering	tank leveling indicators	293
38	American Custom Yachts	fire hose boxes	310	44	Kobelt	propulsion	233
29	American Vulkan	couplings	203	3	Leica	marine navigation	234
16	Anchor Marine	marine equipment	315	61	Loadmaster International	software	235
50	Aqua-Dyne	coatings & corrosion	205	38	Marine Safety In'tl	simulation training	236
30	AR Larsen Co.	refrigeration	206	19	Maritel Marine	communications	237
53	Asia Pacific Maritime	exhibition	330	59	Mascoat Products	coatings-marine insulation	238
48	ASNE	exhibition	207	24	MMC International	tank gauging tapes	301
27	Atlantic Marine	shipyard	307	39	Motor Service AB	propulsion	239
35	Atlas Metals	shipbuilding material	350	47	NACE International	coatings & corrosion	240
30	Autoship	software systems	290	11	Newport News	shipbuilder	241
58	Barkemeyer -Schifftechnik	manouvering equipment	208	25	NLB Corp.	corrosion control	242
32	Boatracs/Arcoms	satellite communications	209	16	Norma Products	couplings	295
42	Brookdale International	survival equipment	210	43	Omnithruster	thrusters	243
9	Bug-O-Systems	cutting & welding	212	41	P&H Marine	safety, quality & environ.	360
44	Cascade General	ship repair/shipyards	294	40	Plastic Pilings	dock tendering systems	332
37	Chesapeake Specialty Prod.	deck coatings	213	10	Port Canaveral	marine firefighter academy	244
43	Chugoku Marine Paints	coatings	328	17	Research Prod. Blankenship	sanitation	313
45	Chugoku Marine Paints	coatings	214	58	Restomotive	coatings	246
8	Clean Seal	extruded rubber products	286	14	RTM Star Center	training	245
7	Comsat Mobile	communications	317	52	S.E. Connecticut Ent.	economic development	311
41	Concert Cable Protection	underwater cables	nrsn	10	Saskura	fresh water generator	247
1	Craft Bearing	bearings	309	55	Sasmex	event	289
52	Cygnus	gauges	215	30	Seaschool	maritime training	354
22	DC Maritime	electrical engineering	340	18	Seaward	fenders	248
39	Desmond Stephan	swirl off scarifier	216	59	Selco USA	generator controls & alarms	249
51	Detegasa	waste management	303	12	Sherwin Williams	coatings	250
C 3	Deutz	diesel engine manufact.	351	51	Siemens AG	electrical motor drives	251
9	Dolphin International	ship fenders	217	31	Skookum	deck machinery	252
46	Donjon Marine Co. Inc.	boatbuilder	352	29	Smith Berger	deck hardware	253
29	Electronic Marine Systems	sensors	318	5	Standard Horizon	marine electronics	254
31	Electronic Marine Systems	sensors	218	17	Superior Energies	insulation mfg & contractor	255
33	Electronic Marine Systems	sensors	219	2	Sure Seal Connectors	sealed electronic connect.	341
35	Electronic Marine Systems	sensors	306	42	Thermax	bulkhead panels	256
61	Frank L. Beier Radio	integrated vessel control	220	33	Tidewater	offshore operations	388
2	Gardner Denver Water Jet Syst	corrosion control	221	49	Transas Marine Overseas Ltd.	navigation	257
57	GJ Wortelboer Jr. B.V.	diesel eng spare parts	222	26	Twin Disc	propulsion	359
4	Goltens	diesel engine repairs	223	36	Urethane Products	foam filled fenders & buoys	399
14	Gov. Control Systems	diesel eng spare parts	224	C 2	USMMA	maritime & transp. Training	304
44	HMS Marine Hardware	locksets	320	16	Van Hall Health Inc	medical management	258
15	Houston Marine	marine training services	284	57	Volmar	ultrasonic homogonizers	259
22	In Cat	fast vessels	225	35	Walport	safety videos	329
17	In Place Machining	crankshaft repair	323	52	Waterman Supply	marine equipment	299
21	Ilzar	shipbuilder	226	59	Western Machine Works	tractor pins	260
23	Japan Radio Co., Ltd.	communications	297				
15	Jeamar Winches	winches & sheaves	298				
15	Jeamar Winches	winches & sheaves	227				

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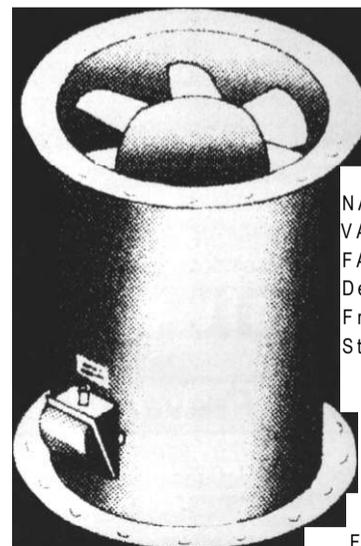
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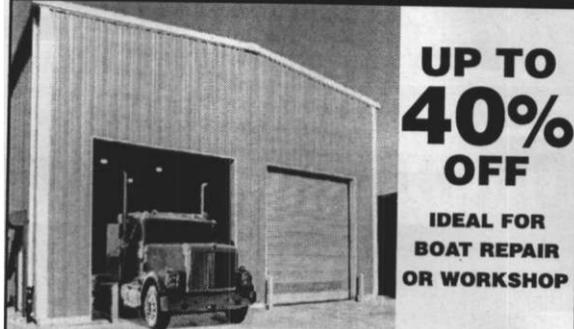
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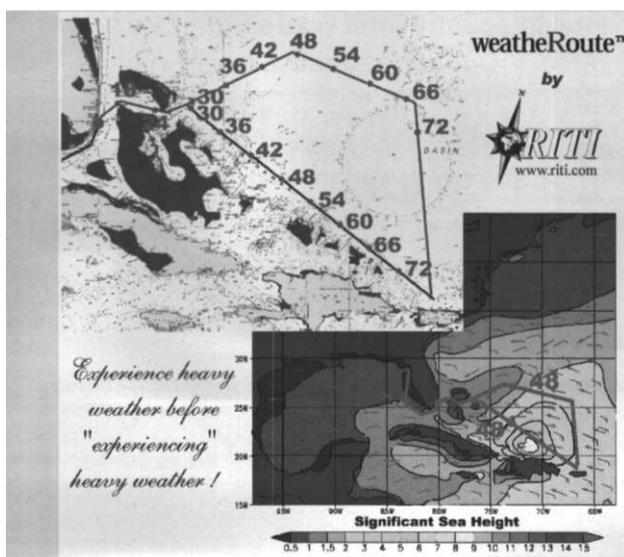
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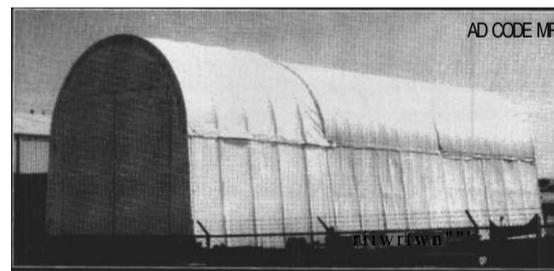
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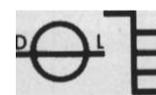
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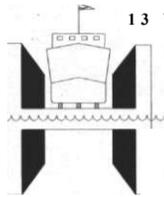
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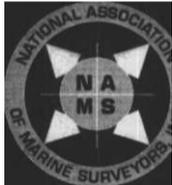
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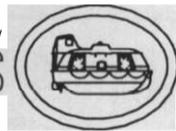
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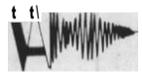
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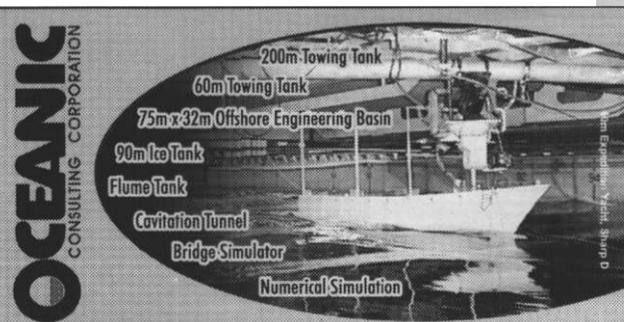
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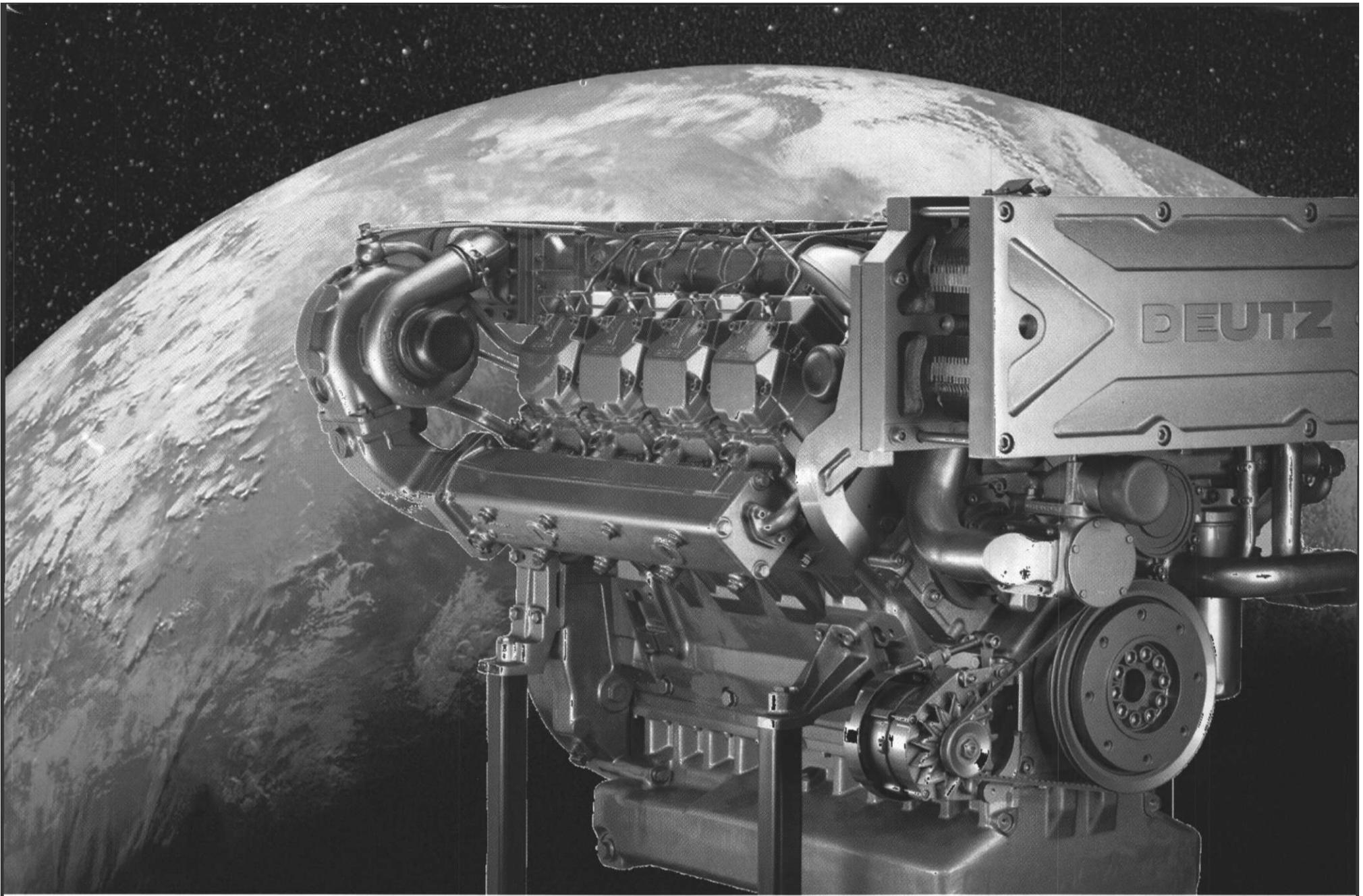
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Engine type		BF4M1013E/C	BF6M1013E	BF6M1013EC	BF6M1013ECP
Configuration		in-line	in-line	in-line	in-line
No. of cylinders		4	6	6	6
Bore/stroke	mm	108/130	108/130	108/130	108/130
Displacement	l	4.76	7.15	7.15	7.15
Power ratings 1)	kW	81-118*	123-145*	148-174*	166-195*
at speed	min-1	2300	2300	2300	2300
Continuous power 2)	kW	81-105	122-128	146-155	
at speed	min-1	1500/1800	1500/1800	1500/1800	
Weight 3)	kg	600/650	750	800	800
Weight 4)	kg	500/550	650	700	700
Dimensions	mm	1050x850x910	1420x850x910	1420x850x910	1420x850x910

1015 Series

Engine type		BF6M1015	BF6M1015C	BF8M1015C
Configuration		V-engine	V-engine	V-engine
No. of cylinders		6	6	8
Bore/stroke	mm	132/145	132/145	132/145
Displacement	l	11.91	11.91	15.87
Power ratings 1)	kW	214-240*	261-425*	348-560*
at speed	min-1	2100	2100-2300	2100-2300
Continuous power 2)	kW	210-228	285-310	380-413
at speed	min-1	1500/1800	1500/1800	1500/1800
Weight 3)	kg	1300	1400	1800
Weight 4)	kg	880	950	1250
Dimensions (L x W x H)	mm	1205x1305x1021	1480x1305x1021	1673x1305x1021

1) For marine propulsion engines.
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