

Special Report: Market Demand Forecast In Face Of Worldwide Single Hull Tanker Ban

November 2000

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\$ World Crisis \$ Politics \$ Big Oil Consolidation \$ Deepwater Technology \$

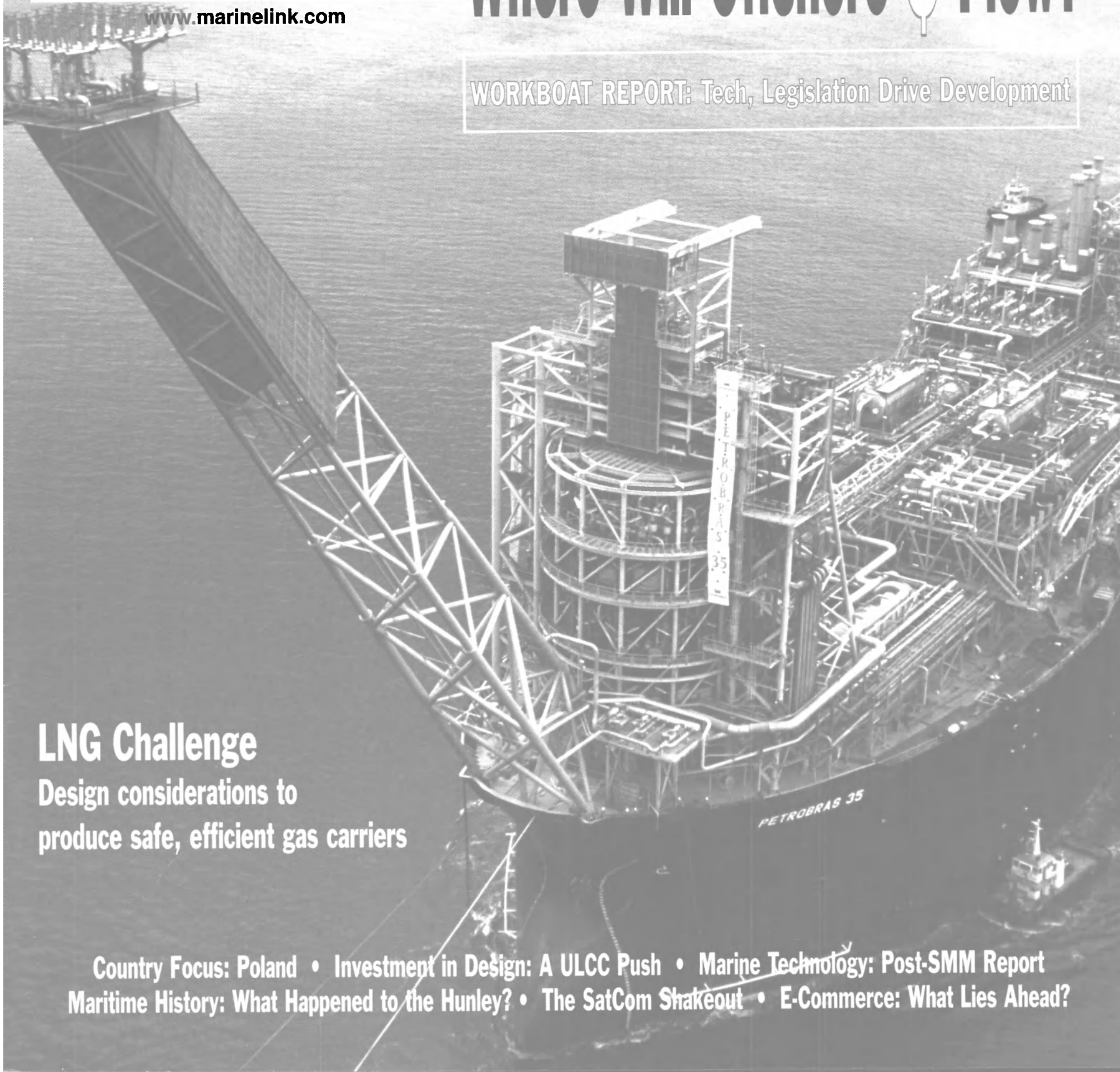
Where Will Offshore \$ Flow?

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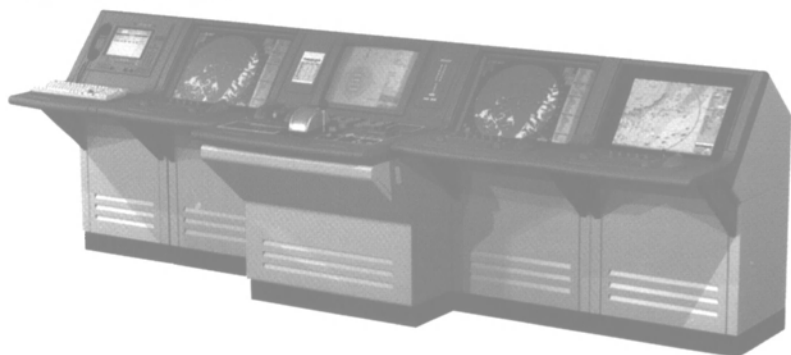
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On the Cover: The 100,000-bpd Petrobras P-35 floating production/offloading and storage facility, which is located in the Campos Basin off Brazil's Marlin Field. The vessel is being used by ABS Group for its new program, which aims to significantly reduce lifecycle maintenance and potential safety hazards by focusing on areas of higher concern, and therefore placing additional maintenance efforts on those areas.

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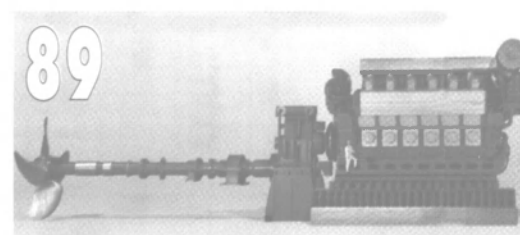
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118 E. 25th St., New York, NY 10010
Tel: (212) 477-6700; Fax: (212) 254-6271
e-mail: mren@marinelink.com
Internet: www.marinelink.com

PUBLISHERS

Charles P. O'Malley
John E. O'Malley
John C. O'Malley
jomalley@marinelink.com

Vice President/Editorial Director

Gregory R. Trauthwein
trauthwein@marinelink.com

EDITORIAL

Associate Editor
Regina P. Ciardiello
ciardiello@marinelink.com

Technical Editor

David Tinsley

Editorial Consultant

James R. McCaul, president, International Maritime Associates

Manager of Information Systems

Susan Cosme
cosme@marinelink.com

MARKETING

Marketing Assistant
Angelica Rivera
arivera@marinelink.com

PRODUCTION

Production Manager
Sharon Griffin
griffin@marinelink.com

Asst. Production Manager

Oksana Martemy
martemy@marinelink.com

CIRCULATION

Circulation Manager
Dale L. Barnett
barnett@marinelink.com

ADVERTISING SALES

Vice President of Sales
Lucia M. Annunziata
annunziata@marinelink.com

National Sales Manager

Robert C. Howard
Tel: (561) 732-3001
howard@marinelink.com

Regional Sales Manager

Jennifer Truman
truman@marinelink.com

Regional Sales Manager

Brett W. Keil
Tel: (561) 732-1185
bkeil@marinelink.com

Regional Sales Manager/Electronic Product Sales

Joe Trubinsky
Tel: (561) 732-4368
trubinsky@marinelink.com

Assistant to the Vice President of Sales

Tina Angelino
angelino@marinelink.com

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PUBLISHERS

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jomalley@marinelink.com

Vice President/Editorial Director

Gregory R. Truthwein
truthwein@marinelink.com

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cosme@marinelink.com

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Marketing Assistant
Angelica Rivera
arivera@marinelink.com

PRODUCTION

Production Manager
Sharon Griffin
griffin@marinelink.com

Asst. Production Manager

Oksana Martemy
martemy@marinelink.com

CIRCULATION

Circulation Manager
Dale L. Barnett
barnett@marinelink.com

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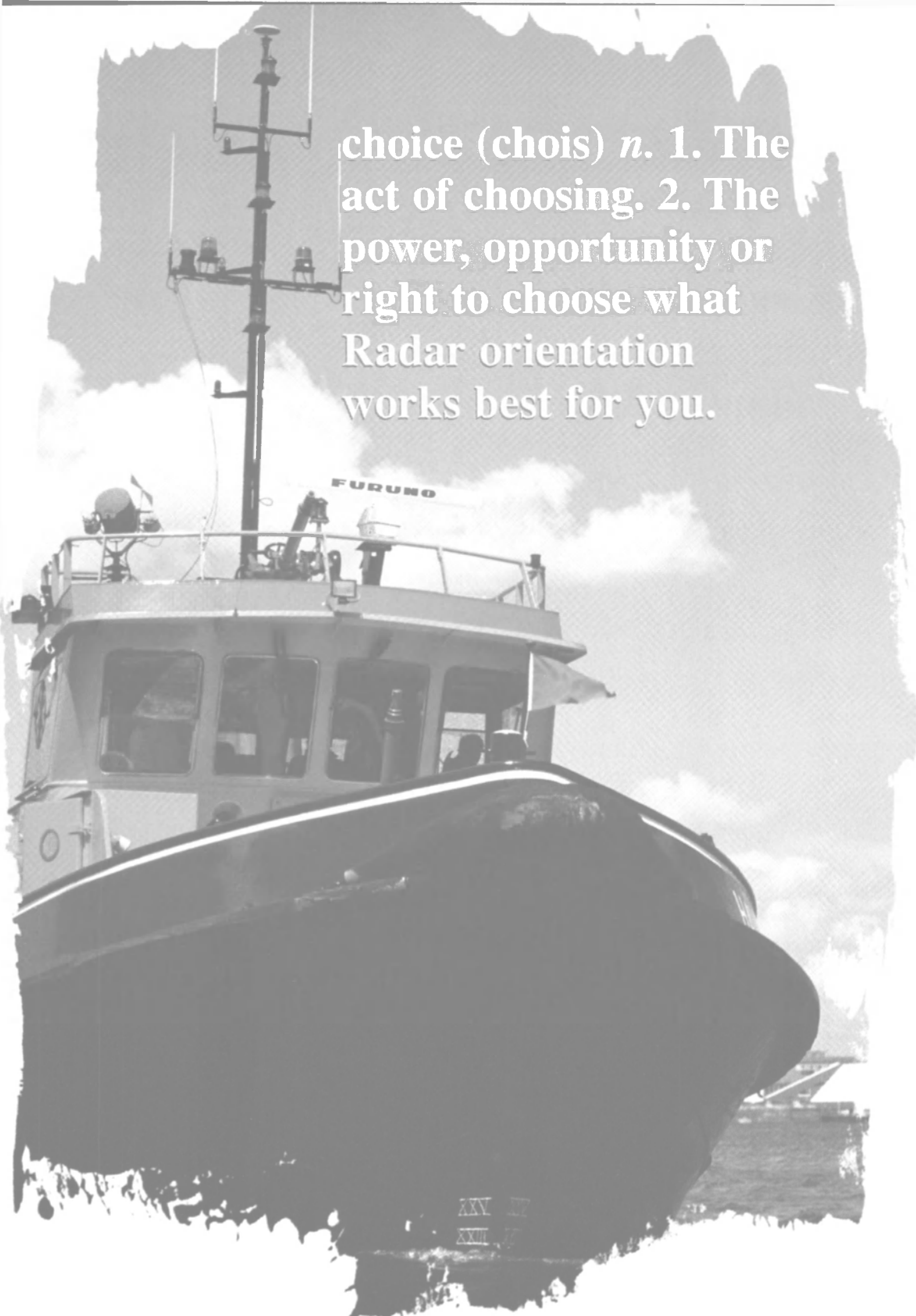
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Editor's Note

Uncontrollable external forces driving commercial development is the hallmark of any industry. However, the last three years serve as a prime example of how such forces can significantly affect the maritime realm. When the reality of an Asian financial collapse hit in late 1997 and the price per barrel of oil eventually dove to \$10, the thought of a \$30+ barrel by 2000 seemed ludicrous. But, just as world political and market forces help to drag markets down, they inevitably turn and help to push them up again.

Today's reality is a low to mid-\$30 per barrel of oil, as tensions in the Middle East, OPEC and low product stocks continue to buoy the barrel. With concerns of an energy crisis in the U.S. Northeast this winter, Texas Republican lawmaker Joe Barton, chairman of the House Commerce Energy Subcommittee, called for a 90-day suspension of the Jones Act. His legislation — which according to official and unofficial reaction is not likely to pass — would let President Clinton choose two domestic ports in the United States for foreign-flagged tankers to transport crude oil and products.

In the offshore sector, the business of exploring for and producing oil — and all of the resultant marine business it supports — has been slower than anticipated, particularly with such elevated and sustained prices. But with E&P budgets widely expected to increase 20 to 25 percent in 2001, the wait could be over.

Big oil corporate consolidation and some good old "hindsight is 20/20" reasoning has helped to temper the usually zealous pace for new oil exploration and production inherently associated with such a price. In short, companies are more judiciously spending today's dollars and planning tomorrow's budgets in order to flatten the often violent market swings.

Several factors, however, make this particular oil "boom" perhaps more sustainable than those past. First, most offshore and related companies 2001 projections are based on a barrel pricing more in the range of \$22 to \$28, which is the preferred target of OPEC. While company's record third quarter results continue to roll in at press time, it is evident that the industry leaders are taking a more long-term, stable approach than years past.

More significantly, however, the looming and soon to be booming deepwater oil industry, which according to a recent report by Schroder Salomon Smith Barney will be facing a shortage of equipment in a few years. The report, in part, reads "Deepwater construction capacity will be insufficient to handle anticipated demand requirements in 2002 and particularly 2003-04 ... We believe a rush of field development plans will be sanctioned in 2001, followed by major contract awards to marine contractors."

Gregory R. Trauthwein

www.marinelink.com

trauthwein@marinelink.com



International Representatives

International Operations

CHARLES E. KEIL, Vice President
215 NW Third Street
Boynton Beach, FL 33435
Telephone: +561-732-0312; Fax: +561-732-8063
24-hr Tel/Fax: +561-998-0313; Mobile Tel: +561-716-0338

TONY STEIN, International Sales Manager
12, Braehead, Bo'ness, West Lothian EH51 0BZ, Scotland, U.K.
Telephone: +44 (0) 1506 822240; Fax: +44 (0) 1506 828085

AustralAsia

TONY STEIN
12, Braehead, Bo'ness, West Lothian EH51 0BZ, Scotland, U.K.
Tel: +44 (0) 1506 822240;
Fax: +44 (0) 1506 828085

Argentina

R. LESLIE RAMSAY
Calle Pellegrini 173
Primer Piso, Departamento C
1009 Buenos Aires, Argentina
Tel: +54 1 394 8821; Fax: +54 1 326 4377

Benelux

PAUL TACQ
Maritime Media ML
Otweg 18 2771 VX Boskoop, Netherlands
Tel: +31 172 230707;
Fax: +31 172 230708

Brazil

JOSE DUARTE DOS SANTOS
Multipla Agencial Maritima, Ltda.
Rua Carolino Rodrigues 28
Cuarto Andar, CEP-11055-070
Santos, Sao Paulo, Brazil
Tel/Fax: +55 1 32 32 74 74

Central America

EDUARDO F. LOPEZ/ISELA BAZAN
Transmarine Media Services, P.O. Box 8579,
Balboa Ave., Panama 5, Panama
Tel: +507 617 1469;
Fax: +507 251 4794

China

TED GREEN
Zhejiang International Advertising Corp.
596 Tiyuchang Road
Hangzhou, Zhejiang 31007
Tel: +86 571 5150937; Fax: +86 571 5150444

Egypt

CAPTAIN TARIQ M. OSMAN
Osman Marine Media Co.
Algamhoria Street, P.O. Box 1248, Alkeej Bldg.
Port Said, Egypt
Tel: +20 66 323858; Fax: +20 66 323858

Germany/Switzerland

HANSJORG BRANS
Maritime Media
Freiherr v. Stein Str. 24, D-63303
Dreieich, Germany
Tel: +49 6103 697745; Fax: +49 6103 697743

Italy

VITTORIO NEGRONE
Ediconsult Internazionale
Piazza Fontane Morose, 3-16123 Genoa, Italy
Tel: +390 10 583684;
Fax: +390 10 566578

Japan

AKIO ISHII
Ace Media Service Inc.
12-6, 4-chome, Nishiike
Adachi-ku, Tokyo 121, Japan
Tel: +81 3 5691 3335;
Fax: +81 3 5691 3336

Korea

JO, YOUNG SANG
Business Communications, Inc.
Kwangwhomun P.O. Box 1916, Seoul, Korea
Tel: +82 2 739 7840;
Fax: +82 2 732 3662

Portugal

PAULO BREHM
AZ Publicidade Ltda., Rua Almirante Borroso, 52
1 D, P-1000 Lisbon, Portugal
Tel: +351 21 3142256;
Fax: +351 21 3525157

Scandinavia

STEPHAN R.G. ORN/LEON SCHULZ
AB Stephan R.G. Orn, Box 184
S-271 24 Ystad, Sweden
Tel: +46 411-184 00;
Fax: +46 411 105 31

South Africa

FINN KVAMSDAHL
Finn's Enterprises, Medio Marketing Division
P.O. Box 99, 2250,
Blinkpan, Republic of South Africa
Tel/Fax: +27 13 2953 023

Spain

JOSE LUIS SEVA
Via Exclusivas S.L., C/ Viriato, 69 SC
28010, Madrid, Spain
Tel: +34 91 448 76 22;
Fax: +34 91 446 0214

Turkey

NIHAT BOYTÜZÜN
Kamera Corp., Cumhuriyet Cad. 257/3,
Harbiye 80230, Istanbul, Turkey
Tel: +90 212 248 48 64;
Fax: +90 212 230 36 97

United Kingdom

TONY STEIN
12, Braehead, Bo'ness, West Lothian EH51 0BZ, Scotland, U.K.
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Cornering the ULCC Niche



by David Tinsley,
technical editor

For an independent tanker owner to undertake a newbuild fleet development program amounting to 3-million tons of crude oil carrier capacity in itself demonstrates a high degree of business verve. But to emphatically put one's own stamp on the design, construction and equipping of such tonnage is an added expression of will, given the production-driven tendency in the industry towards shipyard-orientated and class-minimum specifications.

Piraeus-based Hellespont Shipping Corp.'s commitment to a new generation of ultra large crude carriers (ULCCs) is exceptional on its own account, given the paucity of new investment in the category over the past quarter-century. The company is already an active exponent of oil transportation on the ULCC scale, controlling six tankers in the 315,000-421,000-dwt range. The technical challenge presented by a return to new con-

struction in the ULCC segment is all the greater for the added structural complexity imposed by mandatory double hulling.

In addition to four 302,700-dwt VLCCs booked with Samsung Heavy Industries, Hellespont has three 442,470-dwt newbuilds contracted at Koje Island's other major shipbuilder, Daewoo Heavy Industries. Confirmation of a fourth ULCC from the Okpo yard is on the cards. It claims that both classes of vessel, due to be commissioned between September next year and December 2002, will set a new standard for large tankers.

Counter to the trend in the industry, where owners' actual preferences are often subjugated to shipyard production considerations, Hellespont's nascent VLCCs and ULCCs reflect a very high degree of tailoring to the contractual party's requirements founded on expect-

tations of long life and dependable, safe — as well as efficient — service.

The additional features and construction criteria stipulated by the shipowning group are understood to have carried a premium in excess of \$10 million relative to the going market rate for such tonnage. Judicious timing of the order, including the program's array of options, now largely exercised, presumably made the additional expenditure more palatable to the company, which is 51 percent owned by **Basil Papachristidis'** Hellespont Group and 49 percent by Loews Corp.

The extra capital outlay is indeed a measure of a long-term trading perspective, and will create a more effective platform for the sound operating and maintenance practices, which are also elemental to the Hellespont philosophy. The shipowning group is unequivocal in its belief in the inter-relationship

between investment in a higher standard of design, construction and equipment in factors of efficiency, market competitiveness, safety and environmental protection.

Moreover, the improved ship productivity arising from the adoption of a higher power concentration for a faster speed, coupled with the extra shipment capacity vested in the ULCCs, should place the company in a particularly advantageous earnings position at times of exceptional rates. All longstanding shipowners know from experience that even short-lived peaks can generate enormous revenue gains that more than offset long periods of trading at lackluster rates.

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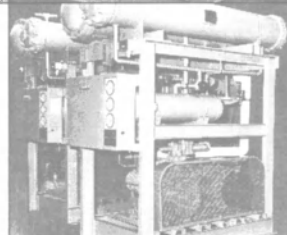
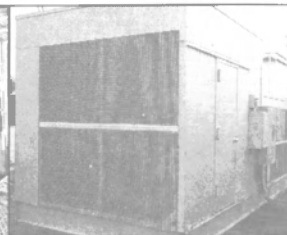
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Investment in Design

Main tenets of the design philosophy have been to build ships which reflect the construction standards applied by Japanese yards in the mid 1970s, manifested in a robust generation of vessels still trading with many owners, and which should be able to last 40 years or longer without steel replacement or

costly repairs. Hellespont's up-to-the minute experience with ULCCs has provided a solid basis for the design and equipment input to the new breed, while the Bureau Green Award Certificates conferred in recent years on its existing, 1970s-built vessels is an endorsement of the operating practices which it espous-

es. As a prime example of its circum-spect approach to the build program on the Korean peninsula, each of the VLCCs will have a substantially greater steel content than the norm, for a projected lightship weight of 48,150-tons. This may be compared with a yard minimum of some 40,000-tons, and up to

43,000-44,000 tons specified by many owners.

In addition, the VLCCs will offer a remarkably fast, laden service speed of 17.1 knots, by virtue of the adoption of far more powerful propulsive power installations than is the norm for such vessels. While current newbuilding VLCCs generally have power concentrations of no more than 35,000-bhp, the new breed from Samsung will be fitted with a 44,640-bhp two-stroke plant. The ton-mile capacity of the newbuilds is accordingly around 10-percent greater than that of similar-size tankers.

The selected design, the Sulzer RTA84T-D, was favored in its eight-cylinder configuration not only to achieve the power rating and margin sought, but also because the cylinder number was considered to offer a better shipboard environment relative to seven-cylinder plant typically used for VLCC propulsion. For the ULCCs, a step-up in power to 50,220-bhp has been achieved through the selection of the same class of engine from the Wartsila stable, but in nine-cylinder format. Each colossus, with main dimensions of 1,246 ft. (380 m) length overall and a 223 ft. (68-m) beam, is accordingly expected to be able to reach 16.5 knots with a full load.

Hellespont's selection of Sulzer RTA84T-D machinery comes amid widely-publicized problems experienced by other VLCC owners with a number of RTA84T and RTA84T-B engines, which sustained bearing girder cracks. The company is confident of avoiding any shortcomings by insisting on having the improved design of bearing girders cast in Japan for delivery to the licensee engine manufacturer in South Korea. Moreover, the machinery will be fitted with the original, more robust girder form employed for the wide-bore engine class.

Considerable attention has also been paid to ballast tank protection, given the complexity of such huge double-shell structures and the implications for maintenance, safety and long-term integrity. All ballast spaces bar the aft peak will be inerted with double-scrubbed gas, adopting a system developed and tested on existing ULCCs over the past six years and shown to be highly effective in enhancing safety and corrosion control.

The inerting medium is reportedly so 'clean' that it has 25 times less sulfur than normal. As a key element in its tank purging and inerting initiative, Hellespont has developed the Vent 2D system to model air/gas flows in the double-hull spaces. It is now making the computer program freely available to the industry on request.



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The Future Of E-Commerce: Will The Maritime Industry Be Left Behind?

By Natalia W. Geren,
Dyer Ellis & Joseph

Maritime business commerce has changed rapidly over the last decade. In order to stay competitive, companies are increasingly inventing more efficient ways to conduct business. The advent of the Internet has created new tools to negotiate and complete business transactions for all major industries. Electronic commerce ("e-commerce") in particular, is revolutionizing the way industries transact all business. The buzzwords of today's marketplace are speed, accuracy and efficiency. Businesses are turning to the Internet as an outlet to increase sales and market share. A successful transition from paper to electronic business, however, requires a well-established electronic and legal infrastructure in order to succeed.

The information technology industry is now challenged with the task of creating compatible electronic systems through which multinational parties may transact business more efficiently. The expansion of business-to-business e-commerce has also challenged the legal

industry to create new legal assurances for parties involved in electronic transactions. The transactions previously negotiated on paper and culminating in a signature and a handshake now require the guarantee of document authentication and party-identity validation. These challenges are being met with the creation of electronic security measures designed to protect the transaction.

So where does the maritime industry fit into this technological and legal transition? Given the complexity of maritime transactions, the industry must establish its role during this transition and determine how best to proceed in today's electronic marketplace.

Technological Issues Related to Business-to-Business E-Commerce

In order for business to be able to communicate electronically through an exchange of documentation, a need developed for an electronic system capable of paperless commerce. This need led to the creation of Electronic Data Interchange ("EDI"). EDI is the computer-to-computer exchange of specifically formatted messages creating com-

mercial documentation. EDI converts information that would traditionally be transmitted in paper form to electronic messages. In order to benefit fully from the use of EDI, the contracting parties' electronic systems must be compatible and capable of directly communicating with all parties involved. Currently, most systems capable of running EDI are mainframe computers and not desktops. Therefore, the two businesses involved in a transaction must have highly compatible mainframe systems capable of running EDI to ensure the required level of standardization. This required standardization naturally excludes smaller businesses with incompatible systems from the exchange of electronic documentation.

The maritime industry has not been a principle leader in EDI, however efforts have consistently been made over the years to transfer key documents electronically, such as the bills of lading. SEADOCs was the first effort launched to create an electronic bill of lading system. The venture eventually failed due to high-added transaction costs and confidentiality concerns from the maritime

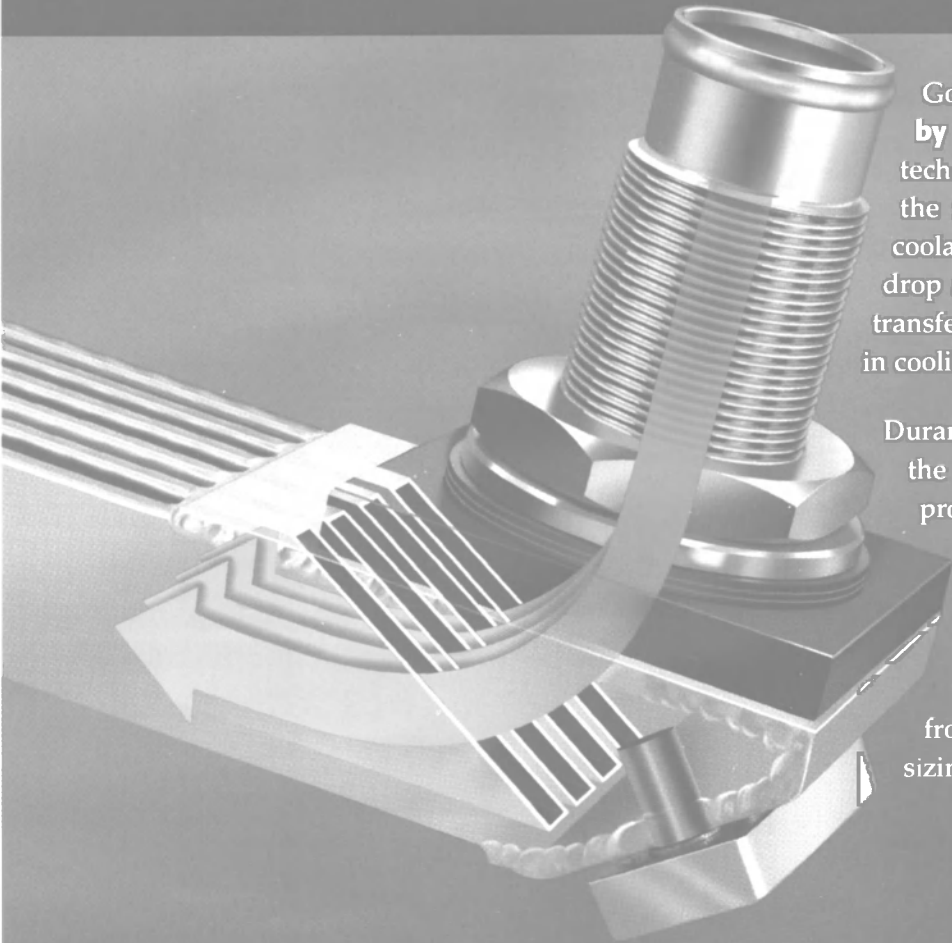
industry, since all trading information would be recorded and kept in a central location.

There currently exists no standard data form other than EDI in which the documents may be exchanged. The Comité Maritime International (CMI) has, however, created model rules for transmission of electronic bills of lading under EDI, which the parties to a transaction can adopt by agreement. Other industries have created standardized data exchange systems, which have been very successful. The SWIFT system (Society for Worldwide Interbank Financial Telecommunications), for example, established a standardized exchange for letters of credit communications between banks and beneficiaries. The efficiency of document exchange via e-commerce for the maritime industry can only be increased if a better mode of online information exchange is created. Currently, standardization outside of the EDI realm is left to the individual parties.

Not only must the industry itself develop a standard data format, but also EDI in general will need to be modified

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in order to survive. Large multinational corporations have their own data systems in place through Internet websites and are dictating individual data exchange mechanisms with their customers and suppliers. This type of competition with EDI should foster the proper environment necessary to create new and uniform data exchange systems capable of use and acceptance by companies at all levels of capitalization.

Legal Issues Related to Business-to-Business E-Commerce

As with paper documentation, electronic contracting gives rise to legal rights and duties. Transitioning business-to-business commerce to e-commerce requires applying traditional procedures for creating binding agreements, establishing assured payment mechanisms and settling disputes to Internet transactions. Evidence of electronic transactions must be made sufficiently reliable to prove the making of and the contents of the contracts. The goal today is to put electronic transactions on the same legal level of acceptability and uniformity as paper transactions. In order to achieve this goal, three critical issues must be evaluated before transacting maritime business via e-commerce: security of the transaction, negotiability of the terms, and choice of governing law.

Business-to-business e-commerce raises multiple security issues for the maritime industry. For example, how will parties ensure that the bill of lading or purchase order has not been tampered with during transmission from the buyer to the seller? Authentication and validation of electronic documentation is a major concern for any industry conducting business over the Internet. With EDI, the parties only have the transmitted document from the transferor without any assurance as to authenticity or lack of alteration. The advent of digital signatures, with the use of public and private keys, to pass secure messages through a trusted third party, or certification authority, will soon become the norm to ensure security and promote confidence in electronic transactions. The CMI already incorporated the use of digital signatures into its model electronic bill of lading rules.

In addition to security issues arising in e-commerce transactions, there is the concern of negotiability. E-commerce transactions have rendered purchases and sales more automated and there are concerns that purchasers are losing negotiating power. With electronic contracts exchanged between the parties, the methods of acceptance and rejection have changed. Today sellers are providing contracts to buyers with non-negotiable terms, and there is no longer a battle of the forms issue. Acceptance may be construed from the moment the buyer places the order and the legal recourse available to the buyer is in many cases already dictated in the pur-



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chase order. Before accepting the agreement, it is critical that the parties understand the terms as stated. With these new developments across the maritime industry, it is clear that e-commerce is changing the nature of business transactions in general.

The parties must also consider what

legal framework will control the transactions. Ordinarily the terms of the agreement control what law will govern the transaction, however, in the absence of such terms there are agreements providing guidance. For example, the U.S. Uniform Computer Information Transaction Act (UCITA) provides guidelines

to determine the law governing a transaction in the absence of an agreement between the parties. When drafting transaction documentation with choice of law provisions, parties should consider the location of their customers and their assets. Given the international nature of the maritime industry, great

consideration must also be given to the local laws of host countries that might govern industry sales through company Internet web pages.

Electronic technology is a vital means of development for the maritime industry. To promote increased speed, accuracy and efficiency in transactions, the industry must eliminate the need for processing necessary transactional documentation in paper forms and instead create ways to complete transactions electronically directly between the parties. Creation of a standardized system of data exchange, incorporating the necessary legal terms to provide for secure transactions, will properly launch the maritime industry into the realm of e-commerce where it belongs.

Natalia W. Geren is an associate with Dyer Ellis & Joseph, P.C., a Washington, D.C.-based law firm with a domestic and international practice involving transportation, shipping, finance, corporate, securities, legislative, environmental, and trade matters.

Mespas.com Seeks To Revolutionize Spares Buying

The Swiss company B2B Netservice Ltd. is now offering a business-to-business Internet platform using reverse auction techniques. Scheduled for operation on November 1, 2000, mespas.com will enable buyers and suppliers of maritime engine spare parts to meet on the Internet. The goal of the new platform is to simplify the procurement of bids by buyers of maritime engine spare parts, and, at the same time, to provide suppliers a new sales venue for their products. Ship operators will be able to post requests for bid with mespas.com, and suitable suppliers will summarily be informed by e-mail.

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Boat-Park.com Establishes Presence In Florida

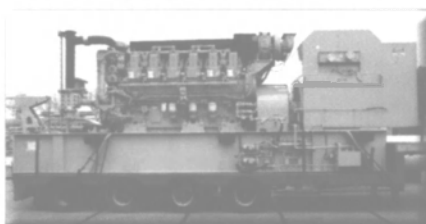
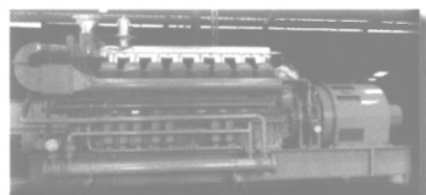
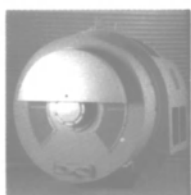
Boat-Park.com has expanded its offerings to the Southeastern U.S. with a new office in Fort Lauderdale, Fla. The company's main sales and engineering facilities are headquartered in Boston, Mass., while its marketing offices are housed in Newport, R.I.

Cannon Eley was selected to manage the new Florida office - he has an extensive background within the marine industry. In addition, Eley boasts vast knowledge of online ordering (e-commerce) capabilities in the boating community.

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Shipowners, Charterers Launch New Internet-Based Shipping Exchange

An international group of major energy, shipping and IT companies have joined forces to set up an independent shipping exchange: Worldfixture.com with operations based in Oslo and offices in Stockholm and Amsterdam.

The group consists of U.S.-based energy group Enron (www.enron.com); Norwegian tanker owner Frontline (www.frontmgt.no); Swedish tanker owner Stena Bulk (www.stena.com); Brussels-based TransPetrol; and Stockholm based Colony 101 (www.colony101.com).

Worldfixture.com is establishing an independent online exchange for the shipping market where owners of vessels or cargoes and their brokers can trade vessels and cargoes in real-time. The exchange will be made available as

an application service provider (ASP) and the portal www.worldfixture.com will offer a total shipping information system available to all members of the international shipping community. The intention is for the company to eventually be publicly listed.

Worldfixture.com will be designed to offer a total information system, providing maritime news and statistics, background information on maritime companies including main business activities, financial statements, fleet structure, vessel description and safety records, port

information and disbursements.

The Board of Directors consists of a group of shipping and IT professionals: **G. Stoutland**, (Chairman); **Finn Engelsen Jr.**, **Steinar Sønsteby**, **Scott Moncrieff**, **Hakan Swedin** and **Erik Augustsson**.

FreightDesk.com Releases Latest Version Of FreightDeskPro

FreightDesk.com released the most updated version of its flagship Internet-based shipment management system — FreightDeskPro release 3.0. Benefiting both importers and exporters, some of the program's new features include improved export functionality to handle export shipments with the same ease that the previous 2.0 version managed import shipments. FreightDeskPro also provides instant accessibility to import shipping data online - the new release offers this option to exporters as well.

The new application also supports multiple transportation modes, accommodating air, ground and ocean transport. Users will also have reusable profiles providing access to detailed individual or organizational data, reducing data entry and setup time.

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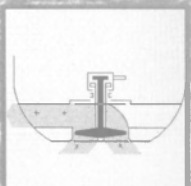

Wartsila Expands Into E-Commerce Arena

Wartsila Corp. is moving into the arena of e-commerce beginning this December with tailored services to dedicated users and customers in pilot testing. Subsequent to this, customers and suppliers will be added as the e-business channel expands and the scope of products, services and information are increased. The first release will be available the end of February 2001.

Access will be provided via three levels of entry and guaranteed security. Through this channel, Wartsila will serve shipowners, shipbuilders, utility companies and power plant operators, giving them direct connections to a vast amount of information and services specifically concerning their engines and installations.

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Costa Crociere Unit Orders Two New 105,000-Ton Vessels

Costa Crociere S.p.A., a unit of Carnival Corp., has signed a letter of intent with Italian shipyard Fincantieri Cantieri Navali S.p.A. for the construction of two 105,000-ton vessels for delivery in late 2003 and late 2004.

The 2,720-passenger ships, which will be built at Fincantieri's Sestri shipyard in Genoa, will cost approximately \$400 million for each vessel.

This latest agreement renews the association between Costa and Fincantieri, which began with the construction of the Costa Classica and Costa Romantica in 1992 and 1993, respectively.

Irving Shipbuilding To Construct Stern Drive Tugs

Irving Shipbuilding has secured an order for two azimuthing stern drive Tugs for the Panama Canal Authority. These 101 ft. (30.8 m) reverse tractor tugs are driven by two Z-drive azimuthing thrusters — which are dri-

ven by twin Deutz engines, each producing 2,200 bhp, giving the vessels a 50-ton bollard pull rating. Ship handling operations are performed over the bow, utilizing a powered line handling winch, and a resilient fendering system. Able to accommodate four, the tugs will be classed by Lloyds. Similar to line of tugs that East Isle has been building over the last four years, the vessels are scheduled for completion by the fall of 2001.

Circle 16 on Reader Service Card

Shipbuilders Complain To EU About S. Korean Subsidies

European shipbuilders last month complained to the European Union about alleged South Korean state aid to its shipbuilders, an action which could conceivably open the door for the EU to bring a case against South Korea at the World Trade Organization (WTO). The Committee of EU Shipbuilders' Associations (CESA) reported that it had filed a complaint with the European Commission under the EU's Trade Barriers Regulation over alleged trade distortions in global shipbuilding caused by South Korean aid to its industry. Specifically, the shipbuilders contend that bankrupt shipyards are offering prices which do not even cover their costs, an action which significantly harms the European shipbuilding community.


The EU has repeatedly accused South Korea of setting unfairly low prices for shipbuilding. Earlier this year, in fact, the EU and South Korea hammered out an agreement with the intention of stabilizing the world shipbuilding market. When talks on the matter broke down in early autumn, the EU warned it could launch a WTO dispute against South Korean shipbuilding practices. The EC — after examining the complaint — could launch its own investigation.

Robert Allan Lands Fireboat Design Contract

The consulting naval architectural firm Robert Allan Ltd. of Vancouver, B.C. has been chosen by the City of Los Angeles, Calif. to design a replacement for the City's major fireboat the 75-year-old Ralph J. Scott. Currently celebrating their 70th consecutive year of operations, Robert Allan Ltd. was chosen as the designers for this new vessel because of its recent experience in fireboat design and fire-fighting tug design, which includes major fireboats for Vancouver, B.C. as well as for Hong Kong and the Ports of Tuen Mun and Shenzhen in China. The new VSP-propelled fireboat will measure approximately 105 ft. (32 m) with a total pumping capacity approaching 30,000-gpm — reportedly designating it the most capa-

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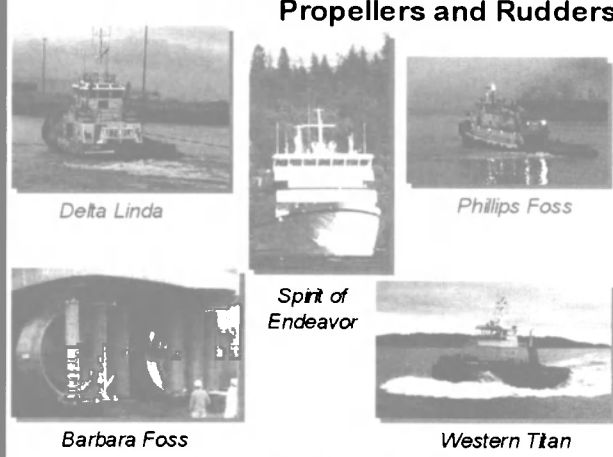
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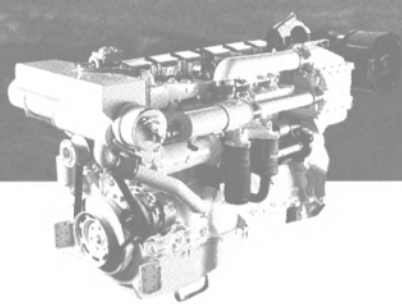
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Circle 29 on Reader Service Card

News

ble fireboat in the Americas. The vessel will be a high-performance fire-fighting vessel; versatile, stable and highly maneuverable in all operations. Support operations of the vessel will include rescue, de-watering (salvage-pumping) and diving support in and around the Los Angeles harbor. The fire-fighting system will comprise a foam/water system sup-

plied by main engine driven pumps plus a water fog/jet system supplied by four independent engine driven pumps.

It is anticipated that the contract design package for the Los Angeles Replacement Fireboat will be put out to tender and a construction contract award announced in 2001.

Circle 10 on Reader Service Card

FirstWave/Newpark Gets Rhodia Contract

FirstWave/Newpark was awarded a contract by Rhodia of Houston, Texas for the construction of a trio of inland service double-hulled tank barges - each of which measures 250 x 42 x 12 ft. (76.2 x 12.8 x 3.6 m) With a cargo

capacity of 2,200 short tons, the barges were designed by the naval architecture firm of Shearer & Assoc.

Blount Signs Ferry Contract

Fire Island Ferries, Bay Shore, L.I., has come to an agreement with Blount Industries of Warren, R.I. to construct an 85-ft. (25.9 m) all welded aluminum, 30-mph passenger commuter vessel for operation on the Great South Bay. With completion set for May 2001, the ferry will be based on the original design of Firebird, which was built for West Ferry in 1984 - it will be the seventh Blount vessel to operate at its Bay Shore, L.I. terminal. The 395-passenger, triple screw vessel will be certified under U.S. Coast Guard subchapter K Rules and Regulations. Its power will be provided by three GM 8V2000 engines.

Circle 18 on Reader Service Card

Tribon Solutions Signs Contract With DHI

Tribon Solutions has signed a \$ 4.5 million, 3-year contract with Daewoo Heavy Industries to supply and implement the Next Generation of the current Tribon M1 product on Windows NT. This Tribon Mx Series development will lead to Tribon M2 and Tribon M3 systems.



From left, **Young-Kyun Shin**, president of Daewoo Heavy Industries; **Lennart Olson**, president of Tribon Solutions AB, and **Moon-Kyu Lim**, senior vice president of Daewoo Heavy Industries, sealed the contract.

Tribon Mx Series development will be focused to greatly extend the Outfitting and Data Management functions in the current Tribon M1. Daewoo will contribute both requirements and partial financing for the Tribon Mx Series development. This contract is based on the already successful implementation of Tribon at Daewoo for commercial hull design and the complete use of both hull and outfitting functions in Daewoo Special Ships Division for in particular the Korean KDX1 Frigate and some recent orders for Passenger RoRo vessels.

The results from this contract will allow Daewoo to carry out their CAD Unification Project, which has the goal of using one system for their complete design work. Daewoo will step by step over the contract period implement the Tribon system for the complete commercial ship design process and replace their older systems.

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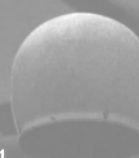
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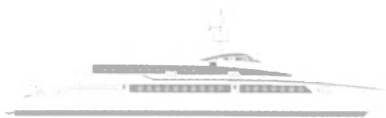
Circle 306 on Reader Service Card

Maritime Applied Physics Awarded Concept Design

Maritime Applied Physics Corporation has been awarded a U.S. Navy contract for a concept design study of a 2,200-ton prototype minesweeper. The contract is under sponsorship of Naval Sea Systems Command's Small Business Innovation Research Program. The vessel will house the company's proprietary Hydrofoil Small Waterplane Area Ship (HYSWAS) technology that has been developed jointly with the NSWC. It is designed to be capable of sustained high-speed, trans-oceanic self deployment. Payloads will include a wide array of newly emerging autonomous and semi-autonomous mission systems that can be rapidly deployed from the vessel while on station.

Circle 15 on Reader Service Card

FBMA Babcock Secures TriCat Order



FBMA Babcock Marine has agreed with ferry operator Dae A Express Shipping Co. of Pohang, South Korea, for the construction of a 171 ft. (52 m) TriCat fast passenger ferry. The award is subsequent to the successful acquisition by Babcock Engineering, demonstrating further the group's presence in both the commercial and military markets.

The TriCat will operate on two major routes — Mokho to Ulleng Island — and North Korea. The latter is in support of the construction of a Power Station facility being built under the watch of the Korea Energy Power Corp. (KEPCO).

Measuring 171 ft. (52 m), the vessel will transport 447 passengers at up to 43 knots, powered by four MTU 16V4000 M70 engines driving through Kamewa 63 waterjets.

The vessel's hull has been lengthened and freeboard marginally increased to accommodate the four engines, which will ensure first-rate seakeeping.

Known as the fourth TriCat the yard has constructed in three years, FBMA will deliver the vessel in July 2001.

Circle 66 on Reader Service Card

Main Particulars

Length, (o.a.)	171 ft. (52 m)
Length, (waterline)	154 ft. (47 m)
Beam	39 ft. (11.8 m)
Draft	5 ft. (1.6 m)
Speed	Up to 43 knots
Passengers	up to 450

Keppel Shipyard Is Awarded Jumboization Contract

Keppel Shipyard, a member of the Keppel Hitachi Zosen Group, has secured a \$3.9 million jumboization contract from Baggermaatschappij Boskalis bv (Boskalis), an operating arm of the Royal Boskalis Westminster

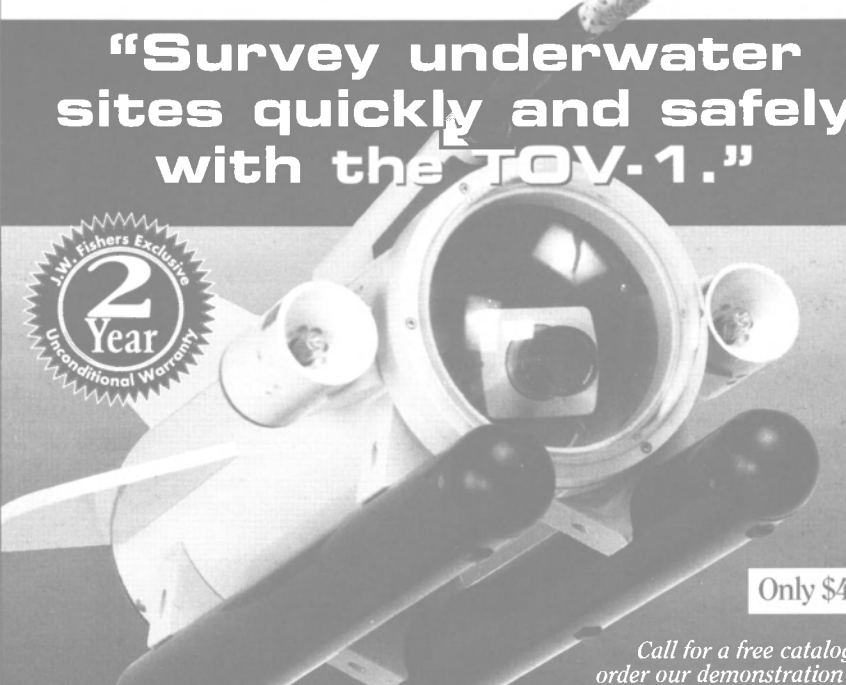
Group in the Netherlands, to upgrade its Trailing Suction Hopper Dredger, Seaway for enhanced dredging capabilities. Upon completion, the Seaway will work on several reclamation projects in Singapore and the region.

Keppel Shipyard's scope of work on the Seaway includes the fabrication and installation of a new 105 ft. (32 m),

1,100-ton mid-body section in the ship. In addition, the dredging and power management systems will undergo extensive modifications to cater to the increase in dredging depth from 115 x 190 ft. (35 to 58 m).

The vessel currently has a length overall of 433 ft. (132 m), a breadth of 72 ft. (22 m), a depth of 41 ft. (12.5 m) and a


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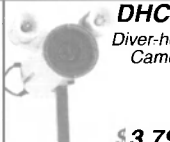
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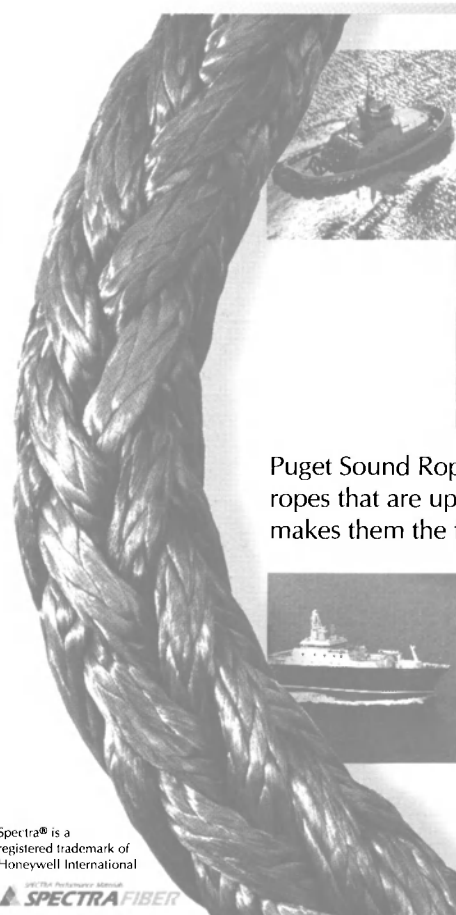
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Circle 228 on Reader Service Card

News

hopper capacity of 8,000 cu. m. Following the lengthening, the vessel will measure 164 ft. (58 m) with a hopper capacity of 13,000 cu. m. Seaway was expected to arrive in Keppel Shipyard in late October 2000 for a first quarter 2001 completion. The workscope will be carried out in compliance with the rules and regulations of Classification

Society Bureau Veritas and the Netherlands Shipping Inspectorate.

Teekay Wins FSO Job

Teekay Shipping's Australian subsidiary, Karratha Spirit, has been granted a contract by Woodside Energy to supply a floating storage and offtake

(FSO) tanker to the Legendre project on the northwest shelf of Australia.

The contract, which was signed for an initial three-year period, with options for a 10-year extension, calls for Teekay to convert the 1998-built 106,7000-dwt Aframax tanker Pioneer Spirit to an FSO tanker ready for first oil from the Legendre fields in second quarter 2001.

Ensolve Biosystems Wins Additional Orders

EnSolve Biosystems has won orders from Interlake Steamship Company to supply two PetroLinator 630 biomechanical bilge water treatment systems.

The PetroLinator 630 systems will replace the existing conventional oily water separator systems on the 1,000-ft. (304.8 m) cargo vessels MV Mesabi Miner and MV Paul R. Tregurtha. The installations will be completed during the winter layup period. The new order from Interlake follows on the successful sea trials of the PetroLinator system on another Interlake ship, MV James R. Barker, earlier this year.

The PetroLinator 630 is a new, patented maritime oily water separator that uses bioremediation to treat bilge water so that it meets international clean-water standards for discharge into environmentally sensitive waterways. It contains safe, non-pathogenic, hydrocarbon-ingesting bacteria that converts oils, grease, detergents and other hydrocarbons into harmless end products.

Circle 14 on Reader Service Card

Wartsila Powers Revolutionary Tankers

Wartsila Corp. has been granted an order to supply diesel engines to power a pair of 106,000-dwt Aframax ice-breaking tankers of the new double-acting concept. The tanker pair, which was contracted by the Finnish energy group Fortum Oil & Gas, will be built by Sumitomo Heavy Industries in Japan for a mid-2002 delivery.

Each vessel will be powered by a 22.9 MW diesel-electric plant supplying all propulsion and ancillary power requirements. Each plant boasts two Wartsila 9L38B diesel engines each of 6,320 kW output at 600 rpm; two Wartsila 6L38B diesel engines generating 4,220 kW each; and one Wartsila 6L26 diesel engine providing 1,860 kW at 900 rpm. Electric propulsion is provided by a single 16 MW podded drive.

The icebreakers will operate between the North Sea and refineries in the northern Baltic ports of Porvoo and Naantali, and are being built to Ice Super Class - following a Double Acting Tanker (DAT) concept — developed by the Arctic Technology Center of Kvaerner Masa-Yards in Helsinki.

Transas China Wins Two Major Simulator Projects

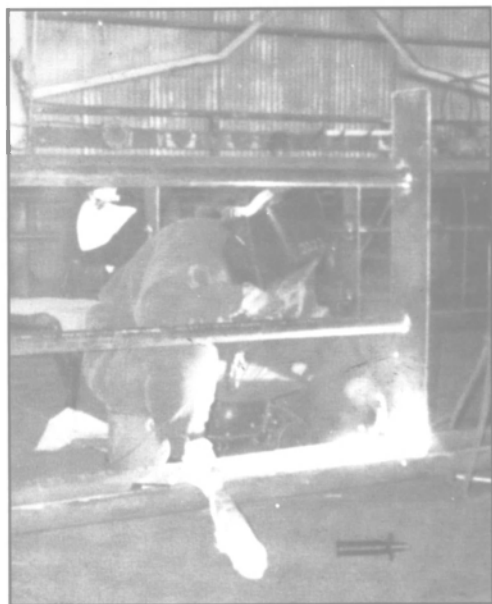
Transas China has secured two more orders for full mission bridge simulators. Contracts were signed successively with Shanghai ScienceLand and the Dalian Maritime University.

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Shanghai ScienceLand (SSL), with a total investment exceeding \$180 million, is scheduled to open in June 2001.

The other NT Pro order was received from the Dalian Maritime University in North China. This projected simulator facility will include an Instructor Station with selective ARPA module and two own-ship bridges. Each trainee bridge will consist of Conning, Radar/ARPA, ECDIS and NavAids simulators. Installation of the system is scheduled for December 2000.

Circle 17 on Reader Service Card

MacGregor To Supply RoRo Package For Brittany Ferries

MacGregor has won a contract worth approximately \$5 million from van der Giessen-de Noord to supply and install RoRo equipment on a 36,000-gt car/passenger ferry ordered by Brittany Ferries. The new 574 x 92 ft. (175 x 28 m), 21-knot ferry, will hold an equipment package comprised of bow and stern ramps and doors; hoistable car decks and ramps; ramp covers; engine room workshop and container covers; and hydraulic power packs.

Circle 20 on Reader Service Card

Transocean Receives Drilling Contract From Statoil

Transocean Sedco Forex has signed a contract for the semisubmersible Sovereign Explorer to drill two wells for Statoil (U.K.) Limited. The contract, which is valued at approximately \$16.8 million, is expected to begin in April 2001, spanning about 105 days.

A high-specification semisubmersible, capable of drilling in water depths of up to 4,500 ft. (1,371 m), Explorer is currently engaged in drilling operations for Ranger Oil in the U.K. North Sea.

Circle 19 on Reader Service Card

Litton Granted Engineering Support Contract

The U.S. Navy has awarded Litton Industries a five-year contract, valued at as much as \$311 million, to its Ingalls Shipbuilding unit to provide engineering and technical services support.

The contract, valued at about \$57.6 million in fiscal year 2001, will benefit the Navy's fleet of Ticonderoga Class Aegis guided missile cruisers and Spruance Class multimission destroyers.

ADSB Grants \$8.7M Contract

Abu Dhabi Ship Building (ADSB), has awarded a significant construction contract to a local contractor, Al Hamed Development and Construction, LLC. The contract, which is valued at approximately \$8.7 million, is the second of

two major contracts of its kind planned in ADSB's ongoing facility expansion, which will be completed by the end of this year.

The latest in this group of contracts includes the construction of a steel fabrication shop, outfit workshop, repair shop and warehouse complex.

Circle 69 on Reader Service Card

Steel Partnership Results In Contract Award

The joining of Fundia Profiler and Rautaruukki Steel has led to a contract worth more than \$5 million from Aker Finnyards. The partnership between the two companies — Fundia's profilers and Rautaruukki plates — provides Aker

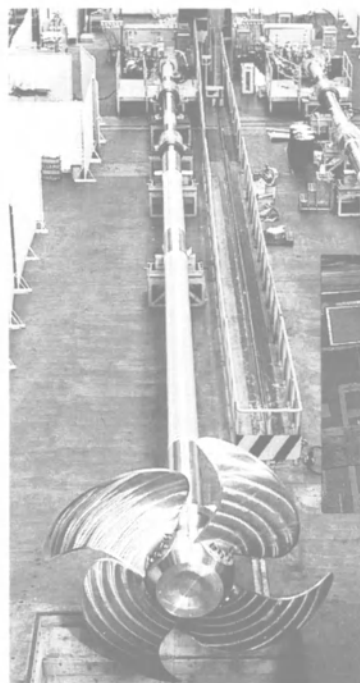
with added expertise on its new 32,000-grt car-passenger ferry for SeaFrance. The RoPax vessel will operate between Dover and Calais, and at a service speed of 25 knots, transporting 1,900 passengers and 700 cars across the channel in one hour. In addition, the company has an option for a sister vessel.

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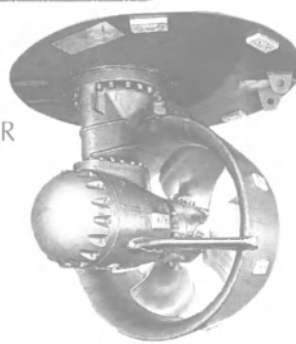


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World Single Hull Tanker Phase-Out Is Coming

More than a decade after the U.S. enacted OPA '90, much to the consternation of the vessel design and owning community, the International Maritime Organization (IMO) has taken the first formal step towards a global phase-out of single hull tankers.

The similarities between the action taken by the U.S. — action that was roundly panned outside of the States due to the fact that it was not undertaken under the auspices of the international community — and the recent action at IMO are uncannily familiar; both actions coming in the wake of a high-profile oil spill disaster. The action at IMO was pushed forward vigorously by the European Union in a determined effort to ensure that accidents such as the Erika, which broke in two and sullied the south of France last December, is unlikely to happen again.

While market factors such as increased ship sales is obviously not the primary concern in matters of protecting the environment, ships and crews, it is impossible to escape the fact that a phase out of single hull tankers, combined with the current overall poor sentiment towards fixing older tankers, will have a tremendous effect on the demand for vessels employed to move oil products. A recent Japan Ministry of Transport report showed that the current proposals for phasing out single hull tankers may induce additional tanker newbuilding demand of 30 million-dwt in 2003, and 80 million-dwt in 2008 (or 2010) for replacements of phased out tankers. In the interim, there would be a tightened shipping market and resultant higher freight rates.

The IMO Rules

The formal approval of the first phase of a single hull tanker phase out came with the approval by the 45th session of its Marine Environment Protection Committee (MEPC 45) of a working group report on proposed amendments to MARPOL 73/78. The approval thus

paves the way for the adoption of a revised regulation 13G of MARPOL at MEPC 46, the timing of which has already been brought forward to April 2001 to expedite the process. For purposes of classification, single hull tankers are separated into three categories:

Category 1 Oil Tanker Oil tankers of 20,000-dwt and above carrying crude oil, fuel oil, heavy diesel oil or lubricating oil as cargo, and of 30,000-dwt and above carrying other oils, which do not comply with the requirements for protectively located segregated ballast tanks.

Category 2 Oil Tanker Oil tankers of 20,000-dwt and above carrying crude oil, fuel oil, heavy diesel oil or lubricating oil as cargo, and of 30,000-dwt and above carrying other oils, which do comply with the protectively located segregated ballast tank requirement.

Category 3 Oil Tanker Oil tankers of 5,000-dwt and above but less than the tonnage specified for Category 1 and 2 tankers.

A Japan Ministry of Transport report shows that the current proposals for phasing out single hull tankers may induce additional tanker newbuilding demand of 30 million-dwt in 2003, and 80 million-dwt in 2008 (or 2010)

According to the Japanese Ministry of Transport report, the major part of Category 1 tankers' age is around 23 to 24 years old (distributed in 1975 or 1976) as in the year 1999, and most will be over 30 by 2005. Hence, a good deal of these category tankers will be scrapped under current requirements, without the acceleration scheme. However, the age limit of 23 years old to Category 1 tankers by the acceleration scheme will cause, according to the report, an impact to demand and supply of the tankers when it takes effect on January 1, 2003.

The draft revision envisions two alternative plans — A and B — for phasing out single hull tankers. Both plans call for Category 1 ships to be phased out between January 1, 2003

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Once again a maritime disaster, rare as it may be, is leading to rules and regulations that will shape the maritime industry for a generation. The break-up and sinking of Erika is part of the impetus for the push to eliminate single hull tankers from the world fleet.

and January 1, 2007. Category 2 tanker built in 1986 or earlier would be phased out after their 25th year of operation under both A & B, but this category of vessel built after 1986 would be phased out between 2012 and 2015 under Alternative A and between 2012 and 2017

under B. For Category 3 tankers, both plans entail phasing out tanker built on or before 1987 phased out between 2003 and 2013, but ships built after 1987 would be phased out between 2013 and 2015 for ships under plan A, and between 2013 and 2017 under plan B.

In addition, the working group concluded that Category 2 ships could be operated after 2010 only if they are high quality units, which have been subjected to a Condition Assessment Scheme (CAS), encompassing elements categorized in three sections: physical checks; documentation recording; and possible improvements in survey and inspection practice. It was stressed that CAS should not undermine the Enhanced Survey Program (ESP), and it was decided — following some delegations serious concerns about implementing such a scheme — that the matter needed to be settled before MEPC 46, and it was agreed to set up an Intersessional Working Group in late January 2001.

According to the Japanese report, the biggest impact will be felt in the Category 2 tanker class, as by the year 2010 the majority of this class will become only 17 to 18 years old. The youngest one will only become 14 to 15 years old at this time, furthermore, VLCCs are sharing a large portion of the younger generation.

INTERTANKO Calls For "Reasoned Solution" In Wake Of Single Hull Phase Out

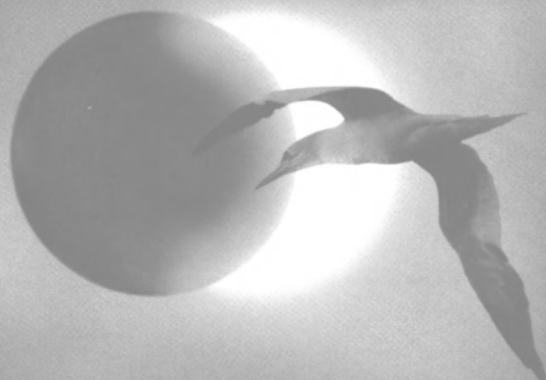
Prior to its meeting in London, the Council of the International Association of Independent Tankers Owners (INTERTANKO) called on IMO delegates to agree a single hull tanker phase out schedule which is reasoned and practical. The INTERTANKO position was endorsed by the Council at its Autumn 2000 meeting in Oslo on September 27-28, 2000.

The subject of single hull tanker phase-outs was discussed at the 45th Session of IMO's Marine Environment Protection Committee (MEPC 45) in London on October 2-6, 2000. The European Commission's proposals on the accelerated phase out of single hull tankers was the most controversial of a series of three initiatives it launched in the immediate aftermath of the sinking of the tanker Erika last December.

As a result of lobbying by a number of governments and industry bodies, including INTERTANKO, the EC agreed to pursue its proposals through IMO rather than introduce its measures solely as a regulation for EU member states. However, the danger of regional action being taken in Europe remains, should IMO fail to agree a solution deemed to be acceptable.

The initial EC proposal has reached

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Safety At Sea

IMO, slightly modified, in the form of a joint submission from France, Belgium and Germany. This and several other initial proposals call for the accelerated phase out of single hull tankers according to a schedule the world shipbuilding and scrapping industries could face problems in meeting if oil deliveries to global markets are to continue at current

levels. The INTERTANKO submission to MEPC 45 is in the nature of an information paper, with comments to the various proposals for single hull phase out. INTERTANKO supports an open discussion of the various proposals at IMO, leading to a reasonable and practical solution, and the Association has contributed extensive data to ensure that a

final decision is based on comprehensive and accurate information. The INTERTANKO proposal calls for entire phase-out to be gradually achieved, in a controlled manner, over the period 2010-2015, in a timetable which aligns, generally, with that specified in OPA 90 requirements for the phase-in of double hull tankers.

Exxon Mobil Appeal Rejected

The U.S. Supreme Court recently rejected an appeal by Exxon Mobil Corp. over the \$5 billion punitive damages verdict against it for the 1989 Valdez accident. The justices let stand a U.S. appeals court ruling that the award against the oil giant in a civil lawsuit brought by Alaskan fishermen and other plaintiffs should not be set aside because of irregularities during jury deliberations. The appeal centered on the misconduct of a court bailiff who escorted the jury during the 1994 trial and the deliberations. A dissenting juror had reportedly become emotionally distraught on the 32nd day of deliberations. When the jurors returned from the holiday weekend, the bailiff approached another juror and said the jurors were having problems with the distraught juror, the juror later testified at a hearing before the judge.

The bailiff then reportedly pulled out his gun and took out one of its bullets and said something about putting the juror out of her misery, the juror said. He said he took it as a tasteless joke rather than as a threat or serious suggestion. The judge and then the appeals court ruled that Exxon Mobil had failed to prove that the jury had been prejudiced by the bailiff's misconduct. In its Supreme Court appeal, Exxon Mobil said, "This case involves the fundamental right to a fair and impartial jury." The Supreme Court denied the company's appeal without any comment or dissent. The company still has other appeals pending before the California-based appeals court, and that the high court's action was not the final word on whether the damages would have to be paid.

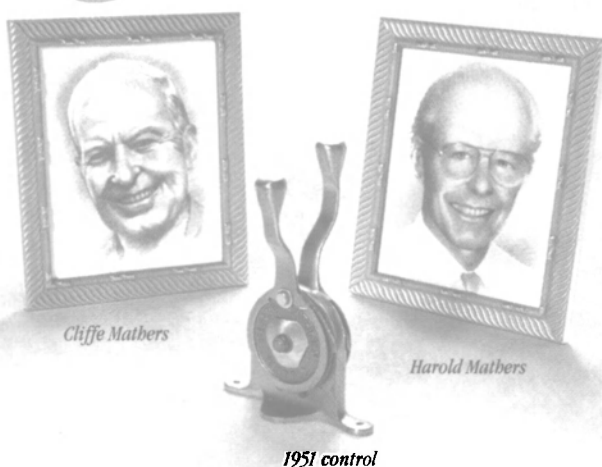
IMO Forum To Address High-Density Oil Spills

During the recent IMO 45th session of its Marine Environment Protection Committee (MEPC 45), it was agreed to hold a Research and Development Forum in March 2002, which will focus primarily on response to spills of high-density oil. France will host the forum, which will be the third R&D Forum sponsored by IMO. High-density fuel oils such as that carried by Erika are among the most difficult and most costly to deal with when spilled.

Ballast Water Exchange

An MEPC Working Group furthered the efforts to enact new regulations for ballast water management to prevent the transfer of harmful aquatic organisms in ballast water. It is planned to hold a diplomatic conference during 2002 or 2003 to adopt the new measures. The proposed new measures take a two-tier approach. Tier one includes require-

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ments that would apply to all ships, including mandatory requirements for a Ballast Water and Sediments Management Plan, a Ballast Water Record Book and a requirement that new ships shall carry out ballast water and sediment management procedures to a given standard or range of standards.

Existing ships would be required to carry out ballast water management pro-

cedures after a phase-in period, but these may differ from those applied to new ships. Tier two includes special requirements which may apply in certain areas and would include procedures and criteria for the designation of such areas in which additional controls may be applied to the discharge and/or uptake of ballast water. The text for Tier two is still to be developed.

Greek Ferry Disaster Will Result In Safety Enhancements

Debate surrounding one of the worst Greek sea tragedies in decades will continue for years, likely resulting in changes to ferry design, outfitting and/or crew training.

In the wake of the sinking of the Express Samina, which resulted in the

death of 80 of its 525 passengers, the Greek cabinet devised a plan to withdraw some 105 aging vessels from the island ferry business by 2006.

While commercial opportunity is obviously not the first thought in the wake of such tragedy, the prospects of replacing more than 100 passenger vessels will be of interest to the international shipbuilding community. The cabinet also agreed to open up the market to foreign operators in 2002, two years earlier than planned.

The Express Samina ferry sank when it hit a well-charted islet just before reaching the Aegean island of Paros. Shipping officials have partly blamed the disaster on the near-monopolies that have developed in the Aegean, saying competition would improve the quality of ships and services. In the weeks following the accident, more than 60 vessels were restricted to port pending safety system upgrades.

While the action initially resulted in the protest of the Greek ferry owning community — as it felt it was being vilified for a one-off incident — most of the vessels are sailing once again and calm seems to have returned.

A bill is expected as early as this month which would liberalize sea transport in Greece, a liberalization which could begin as early as 2002. Measures regarding ship age, seaman training and education, and safety equipment onboard are likely to follow.

New Safety Technology Unveiled


D&B Technologies Group, Inc. has entered into an exclusive distributorship agreement with EMX, Inc. makers of commercial grade thermal imaging cameras. D&B Technologies Group, Inc. is now the worldwide-authorized dealer for all non-military applications of EMX, Inc.'s products. D&B Technologies will release the thermal imagers under the HOTEYE brand name. The HOTEYE 3x and PT8 cameras are the newest in marine electronics and the company believes they will revolutionize safety of private and commercial boats and ships traveling in waters around the world. Thermal Imaging Cameras — also known as Forward Looking InfraRed (FLIR) — utilize infrared camera technology that was proved so effective in the Gulf War. "This is cutting edge technology for the professional mariner who has safety of his crew, passengers and boat as his first and foremost concern," said **Duke Comfort**, executive vice president of D&B Technologies. The HOTEYE Thermal Imaging Camera is available in two models. The 3x is a handheld, portable unit, while the PT8 is a fixed pan and tilt mount unit.

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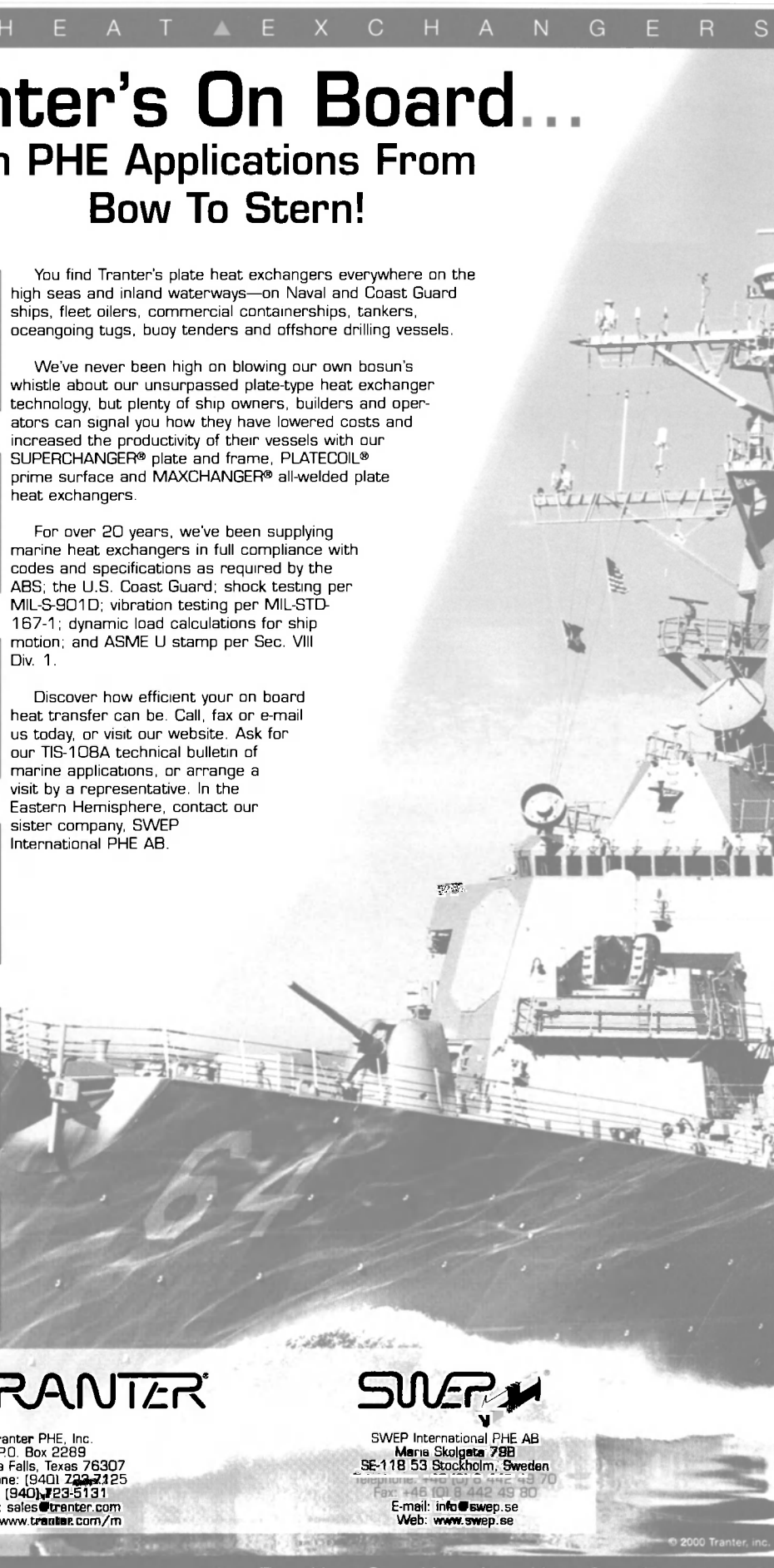



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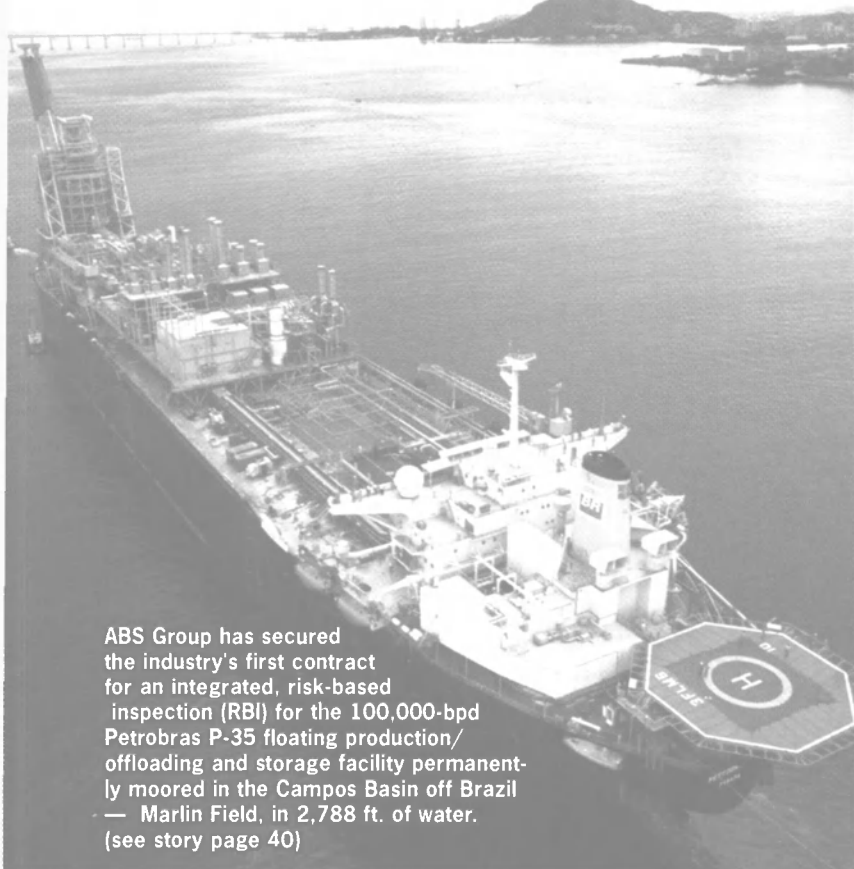
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Workboat Report

Oil Instability, Consolidation Muddy Offshore E&P Picture



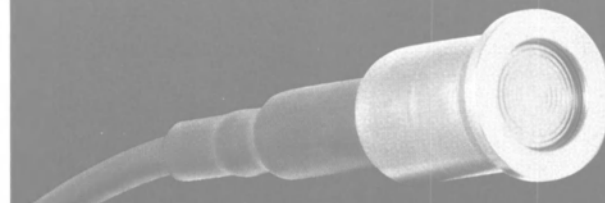
ABS Group has secured the industry's first contract for an integrated, risk-based inspection (RBI) for the 100,000-bpd Petrobras P-35 floating production/offloading and storage facility permanently moored in the Campos Basin off Brazil — Marlin Field, in 2,788 ft. of water. (see story page 40)

The cyclical nature of the oil business has blossomed into full bloom during the latter part of 2000, as a host of political power plays have sent oil prices on a virtual rollercoaster, albeit mostly up, helping to send it soaring as high as \$37/barrel at the time of this writing.

The business of accurately predicting the direction in which oil pricing will go has seemingly become less of a science and more of a speculative game. While it was the Asian financial crisis which led prices to the cellar in 1997, it is another crisis — the potential advancement of hostilities in the Middle East — which have helped to send the price back up to near decade (read: Gulf War) heights. Combined with uncertainties regarding the severity of the upcoming winter, quickly rising marine freight rates, extremely low oil stocks and concerns about quickly escalating natural gas prices, the market is considered tight and rather fragile.

Throw in the old standbys of OPEC power playing and election-year politics, and the result is a bevy of market forces pulling oil

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Workboat Report

pricing seemingly in infinite directions.

In comments at a recent industry briefing, Royal Dutch/Shell Group chairman **Mark Moody-Stuart** said that he expects oil prices to remain strong for the next year, but sees them falling after that as technology jump-starts development of new fields. "The price, we suspect, will be up for a year or so,

although it will be coming under downward pressure," Moody-Stuart said in a wide-ranging briefing for investors sponsored by Lehman Brothers. "But in the longer-term, we do feel that technology will tend to drive price down" to \$20 a barrel or less, he added.

Crude oil prices presently stand above \$30 a barrel, having recovered from \$10

a barrel in 1998, and companies including Shell are now looking to funnel some of their newfound cash flow back into capital projects. Shell, for instance, recently said it planned to six new North Sea oil projects that will raise its spending in the area by 20 percent to \$1.2 billion. Beyond the North Sea, Shell is also pressing ahead with exploration and

production projects in the U.S. Gulf of Mexico, where technology has allowed companies to tap deep into the waters for oil and natural gas. Shell Oil Co., a subsidiary of the group, recently said it made a major find in the U.S. Gulf of Mexico and decided to proceed with the development of another. Together, they are expected to have oil and gas reserves that equal more than 500 million barrels of oil equivalent.



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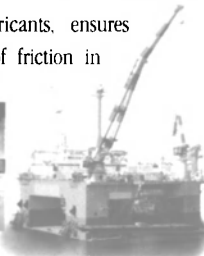
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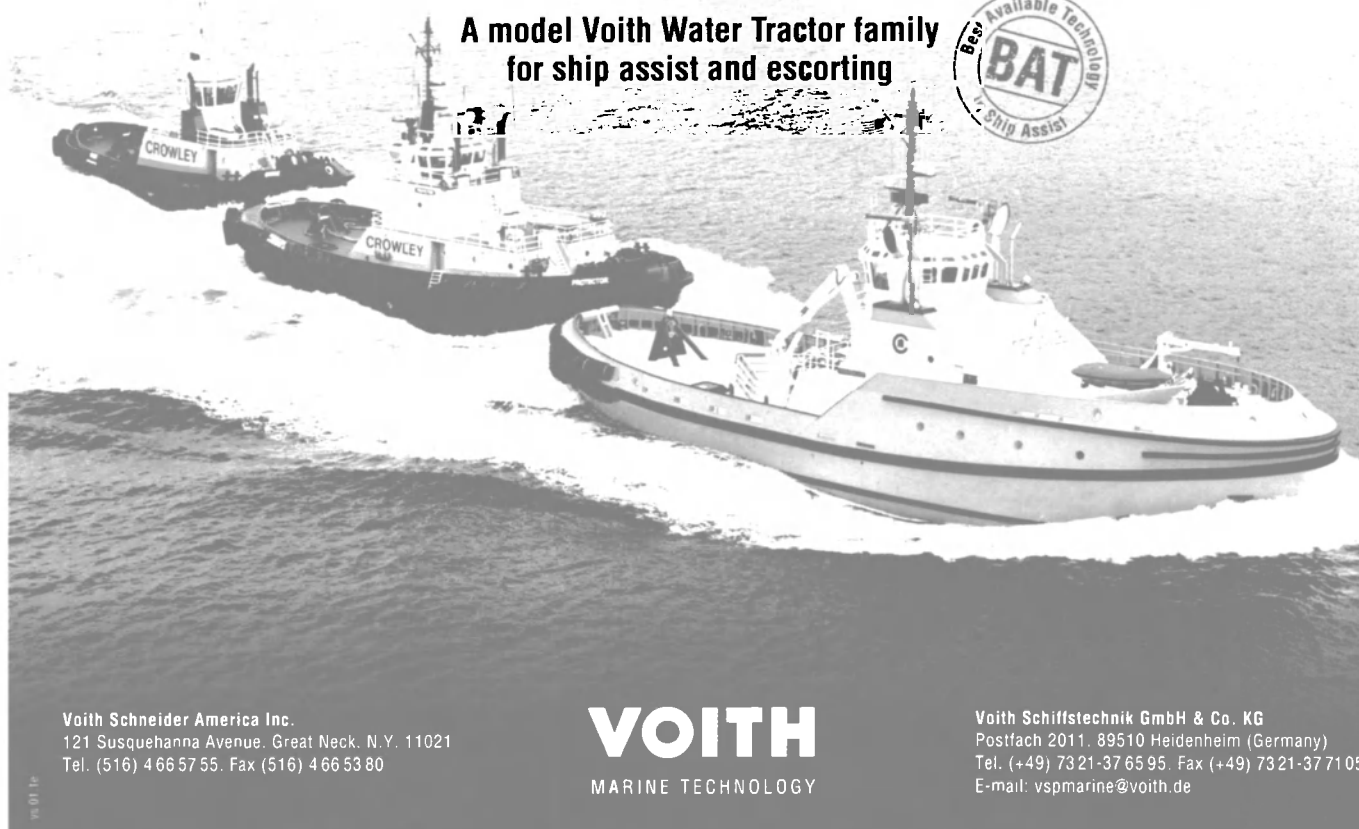
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Energy Consolidation Continues

Many who depend on a rebound in "Big Oil" E&P spending to revitalize marine operations could be waiting longer than anticipated due to continued consolidation within the energy industries. Speaking to companies more than a year ago, many predicted a significant business boom by mid this year based on sustained oil pricing. Back then, the thought of a \$30 plus per barrel price would have undoubtedly made these projections even brighter. And even though the business of exploring for and recovering oil has strengthened considerably, there remains and underlying reserve on behalf of the oil companies to unleash E&P budgets to former scale.

Mid last month Chevron, the second-largest U.S. oil company, agreed to buy third-ranked Texaco Inc. in a \$35 billion stock deal that will form an energy powerhouse. The deal will face close scrutiny both in the U.S. and EU, as a wave of blockbuster transactions — led by ExxonMobil and BP Amoco — have effectively helped to redefine the world energy markets. The new company, to be called Chevron Texaco Corp., will also go head-to-head against other industry leaders like Royal Dutch/Shell and TotalFina Elf.

But a deal need not be a mega merger to have significant ramifications. Early in October, for example, Chevron, Shell and Schlumberger announced plans to form a separate corporation dubbed OpenSpirit Corp., designed to develop and market the next-generation of middleware for E&P applications and data integration. Chosen to lead the new company is **Neil Buckley**, who will serve as the Houston-based company's CEO. Buckley has more than 12 years of software commercialization experience in the energy business. He is a former president of U.S. operations for Merak, a division of GeoQuest. Of the new organization he said: "OpenSpirit represents a significant advancement in our industry's ability to share information and develop innovative collaborative solutions in a distributed environment. Until now, there has not been a comparable framework capable of integrating data and applications from multiple sources in the E&P industry."

Workboat Report

World Floater Market Is Stable

The floating rig market was showing signs of stability in many of the world's major drilling basins. However, reports **Offshore Data Services**, demand for older, second-generation units continues to lag. Worldwide, 149 of the existing 179 floating drilling rigs are under contract and fleet utilization for these rigs is 83.2 percent. In its previous *Offshore International Newsletter Market Outlook* on floaters, which was published in July, utilization was 82.1 percent with 147 of the existing 179 floating rigs under contract. Activity may slack off in the closing months of the year as oil companies formulate their drilling plans for next year. With this in mind, closing out 2000 with utilization still in the low- to mid-80 percent range will place floating rig contractors in prime position to capitalize on expected E&P budget increases.

Second-Generation Semis

Demand for second-generation semis has changed little since July, and utilization remained around 70 percent. In the U.S. Gulf this segment was signing contracts to work for \$30,000 to \$35,000 per day. In July, these rigs were making anywhere from \$27,500 to \$46,500 per day. Day rates are similarly mixed in the North Sea, where second-generation semis are signing new deals for \$39,500 to \$44,500 per day, compared to about \$41,000 per day in July.

Third-Generation Semis

Third-generation semis have fared pretty much the same as second-generation units over the last three months. Utilization stands at 85.1 percent with 40 of the world's 47 third-generation semis under contract. However, with utilization holding steady in the 85 percent range, day rates have been under pressure to move up. In the North Sea, third-generation semis are landing new contracts with rates in the \$42,000 to \$67,500 range, a solid improvement from the \$35,000 to \$45,000 these rigs were making just three months previous. In the Norway/West of Shetlands region, day rates jumped from \$57,000 to \$130,000 per day in July to \$90,000 to \$160,000 today.

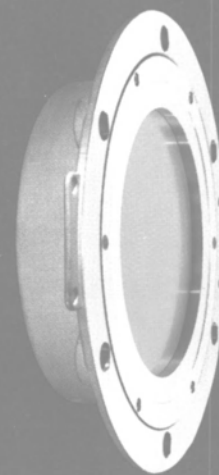
Fourth-Generation Semis

Utilization is 100 percent with all of the world's 34 fourth-generation semis under contract. However, day rates have moved very little due to the long-term nature of the contracts for these high-specification rigs. In the Gulf of Mexico, day rates increased slightly. Fourth-generation semis in the region are signing contracts specifying day rates between \$50,000 and \$125,000. In July, the day rate range was from \$49,000 to \$139,700.

DP Drillships

The DP drillship market has changed little, as with no rigs available for immediate work, utilization effectively is 100 percent. A couple of contract rollovers have taken place, leading to day rate increases. In the U.S. Gulf, DP drillships are signing contracts for about \$130,000 per day, compared to about \$118,100 per day in July. — (Source: Offshore Data Services)

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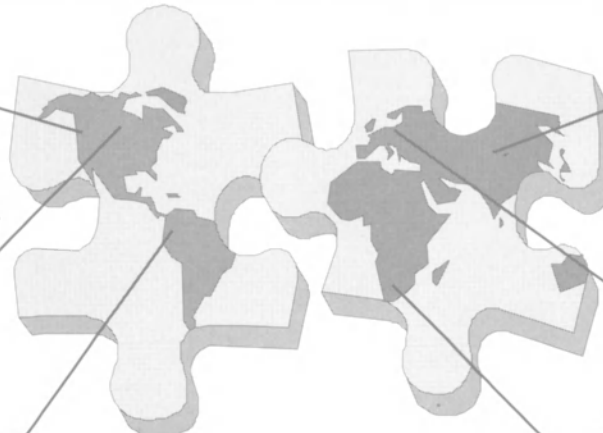
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Workboat Report • Marine Propulsion

Olympic Engine Selection Evokes Thoughts Of "Green"

When Olympic Tug & Barge was founded in 1987, owner **Harley Franco** had environmental responsibility on his mind. Early major oil tanker disasters south-east of Nantucket, Mass., near Galveston, Texas, and off the coasts of England and Mexico were influencing the future of the oil transportation industry. So Franco committed himself to growing his business by assembling a "fleet of the future" built around the most environmentally friendly technology he could afford. Today, parent company Harley Marine Services oversees a combined fleet of more than 40 vessels.

Olympic Tug & Barge began as a vessel bunkering operation, leasing a tugboat and barge to transport the

bunker barges from ship to ship. "It was difficult for a start-up company in such a capital-intensive business to afford the best technology. There was a lot of World War II tonnage out there," says Franco. "But one of the things we did was get a full-time safety and compliance officer to continually inspect, audit and enforce. For a small business, that was a big commitment." Then, in 1989, the single-hull supertanker Exxon Valdez struck a reef in Alaska's Prince William Sound, spilling 11 million gallons of oil. The huge slick eventually spread over 10,000 square miles of Alaska's coastal seas and as far as 600 miles from the reef.

"Exxon Valdez was a shocker and eye-opener, particularly being so close to our base in Seattle," Franco recalls. "It made everybody in our industry jump on the bandwagon to prevent spills resulting from groundings or collisions. But back then, a double-hull ship was a concept that most everyone thought was too expensive and not practical."

By 1992, Olympic Tug & Barge expanded its fleet to three barges and four tugs operating in the Puget Sound. In 1994, further growth came with new oil operations on the Colum-

bia and Willamette Rivers in Oregon, and dry bulk transportation and deck barge services a year later.

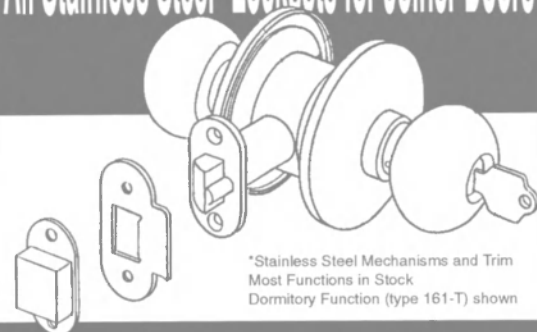
In the aftermath of the major oil disasters, the emerging use of tanker escort services in restricted waters sparked the development of agile, maneuverable tractor tugs that offer greater bollard pull than traditional pusher tugs. Franco saw this opportunity and moved into the ship assist business in 1998 by purchasing



Millennium Star, the 105-ft. (32 m) tractor tug built by MARCO Shipyard for Olympic Tug & Barge.

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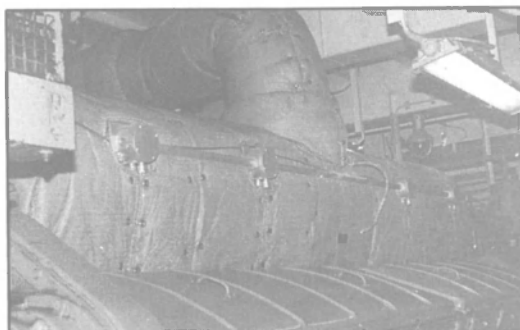
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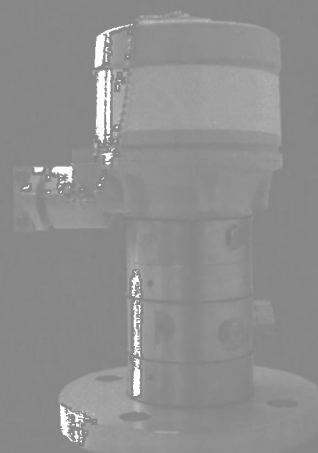
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Workboat Report • Marine Propulsion

Pacific Coast Maritime. As a result, Olympic Tug & Barge acquired its first tractor tug, the Gyr Falcon. It also attained its first double-hull barge. In April of this year, the company took delivery of the new 105-ft. (32 m) tractor tug Millennium Falcon, and in September launched the Millennium Star. The tugs were built by MARCO Ship-

yard in Seattle. Each tug is powered by twin, electronically-controlled Caterpillar 3516B diesels delivering 4,400 bhp @ 1,600 rpm, supplied by N C Power Systems Co. in Seattle and financed by Caterpillar Financial Services Corporation through their marine division. The engines turn Ulstein stern Z-drives with 94.5-in. propellers inside Ulstein high-

performance nozzles. Franco says he selected electronically controlled engines because they produce more power compared to mechanically controlled engines of the same number of cylinders, size and weight. An electronic control module (ECM) replaces the traditional mechanical governor with precise, infinitely variable electronic

control of injection timing. Fuel consumption and exhaust emissions are reduced at all levels of loading.

Emissions management was a key factor when parent company Harley Marine Services moved forward with its ship assist program — particularly because it would be operating in California waters.

"That's why we selected Caterpillar engines," says **Rod Gullickson**, Olympic Tug & Barge vice president and general manager. "The 3516B engine met and exceeded California Air Resources Board regulations better than any of the competitors. It seemed to be the proven product in that horsepower class."

"Another reason was that we're trying to standardize," adds **Gregg Nelsen**, Harley Marine Services' director of maintenance and engineering. "With a uniform fleet, there's economy of scale in parts, service and training. Safety improves, too, because crews know that all the equipment works or can be maintained in a certain way. We see a lot of value in that."

After completing sea trials this fall, the Millennium Star will join its sister-ship Millennium Falcon at the Port of Los Angeles — the busiest port in the U.S. and third largest in the world. Also on duty is the Escort Eagle, a leased 115-ft.(35 m) tractor tug powered by Cat 3512 engines and Aquamaster 1350 drives. Harley Marine Services entered this competitive market two years ago by purchasing the assets of established Links Marine, launching Westoil Marine Services, a Long Beach bunker and petroleum transportation company with three barges. Millennium Marine was formed earlier this year to manage tug operations.

"Entering the L.A. market was a natural," Franco says. "For us, bunker and ship assist go hand-in-hand. Based on volume, we now have 70 percent of the bunkering business there, so it makes sense to push our oil barges around with what we think are the best multipurpose tractor tugs."

Although Harley Marine Services continues to expand into new markets, the original Olympic Tug & Barge business plan — to be a service-oriented company sensitive to environmental needs — continues as a key corporate mission. "We have been dedicated to investing in reliable, high-technology that helps protect the environment," Franco says. "Buying a tractor tug marked our 'arrival' in the industry, and now we're the only group on the West Coast building double-hull bunker barges. Our selection of low emission engines is another example — we'll be relying on them for the next 20 years."

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Maritime Reporter/Engineering

Workboat Report • Marine Propulsion

Volvo Penta Offers Larger Engine Range

Sweden's Volvo Penta has introduced a new engine range that significantly expands its power output up to 1,380 kW (1,850 hp) and opens vast new markets for the company's products.

The new range will include in-line six cylinder units, and, for the first time for the company, V12 and V16 configuration engines.

The new range comprises five basic engine sizes,

from 24.5 - 65.4 liter displacement. The new engines are designed to be reliable, fuel efficient with low emissions, a suitable power choice for a wide range of vessels from coastal freighters and fishing vessels to harbor tugs operating on inland waters. In addition, the engines are reportedly suitable for auxiliary duties.

On the table below are the power specifica-

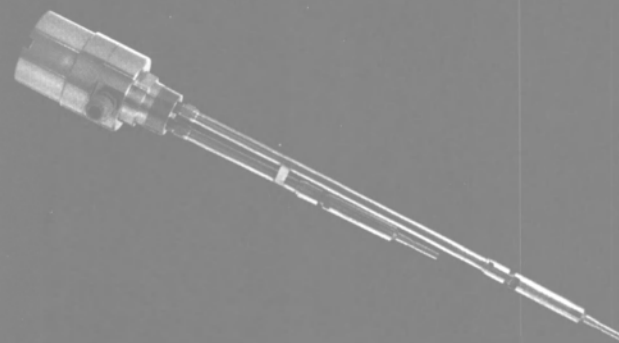
tions for the new line.

Each engine is available in either single or twin circuit cooling systems, the latter resulting in a small but significant increase in engine output. Except for the D34 diesels, which have a bore of 150 mm and a stroke of 160 mm, all units in the range feature a 170 mm bore with a stroke of 180 or 220 mm.

The D25 and D30 are in-line six cylinder engines,

Engine	Power R1 kW(hp)/rpm	Power R2 kW(hp)/rpm	Cyl	Displ.	Bore mm	Stroke mm
D25A-MS	440 (590)/1,600	485 (650)/1,650	L6	24.5	170	180
D25A-MT	470 (630)/1,600	520 (697)/1,650	L6	24.5	170	180
D30A-MS	445 (596)/1,350	490 (657)/1,400	L6	29.96	170	220
D30A-MT	480 (643)/1,351	530 (710)/1,400	L6	29.96	170	220
D34A-MS	634 (850)/1,940	701 (940)/2,000	V12	33.9	150	160
D34A-MT	701 (940)/1,940	776 (1,040)/2,000	V12	33.9	150	160
D49A-MS	880 (1,180)/1,600	970 (1,300)/1,650	V12	49	170	180
D49A-MT	940 (1,260)/1,600	1040 (1,394)/1,650	V12	49	170	180
D65A-MS	1170 (1,568)/1,600	1290 (1,730)/1,650	V16	65.4	170	180
D65A-MT	1250 (1,676)/1,600	1380 (1,850)/1,650	V16	65.4	170	180

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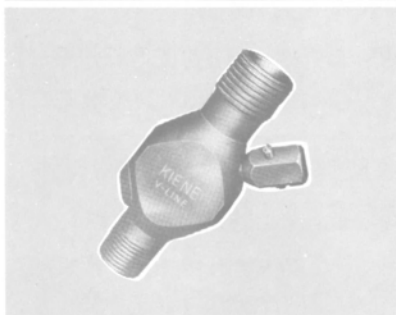
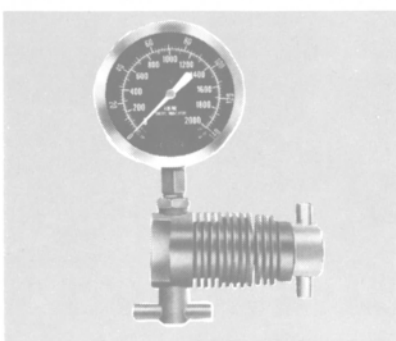
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Workboat Report

the D34 and D49 are V12s, while the D65 is a V16. Output ranges from 440 kW (590 hp) up to 1,380 kW (1,850 hp) at speeds between 1,350 and 2,000 rpm. All engines have been optimized for efficient fuel consumption and gentle emissions through optimum design of the combustion chamber combined with the fuel injection system. To help ensure

long life, the engine block is rigid and features main bearings with four bolts. The crankshaft is single piece, internally forged with balance weights. Another interesting feature is that the valves are rotating to extend lifetime and the seats are made of special alloy steel for greater wear resistance.

Circle 90 on Reader Service Card

MTU Presents New 8000 Series

Seeking to vastly expand its propulsion range and the types of vessels, which it serves, MTU has introduced a new group of engines dubbed the 8000 series.

The first engine of the Series 8000

with a cylinder output of 410 kW and a nominal speed of 1,150 rpm will be available as of April 2001.

Presented in Hamburg in conjunction with SMM 2000, the new engine is considered an essential part of a product offensive, which was launched in 1996 with the introduction of the Series 2000 and 4000 engines.

Initially, the engines are being touted as appropriate for high-speed ferries, yachts and naval vessels, all current strongholds for the current MTU stable. However, the 8000 concept goes far beyond a 20 cylinder version of these applications. Accordingly, MTU is planning to make available to the market 16V and 12V versions and, due to the flexible engine concept of the 8000 series, in-line engines and heavy-fuel engines, allowing the company the capability to provide a range of products for the large segment of commercial ships.

The 8000 features common-rail injection, a technology that was originally

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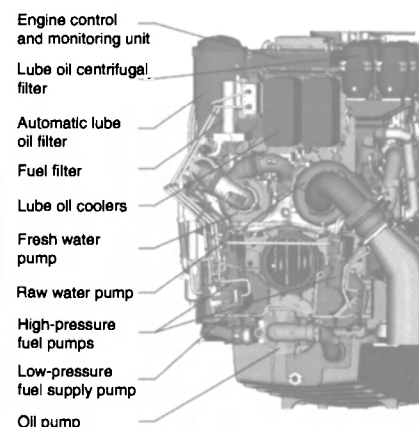
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Workboat Report

MTU 20V 8000 Technical Details

Power output	8,200 kW
Output per cylinder	410 kW
Cylinder displacement	17.37 dm ³
Bore	265 mm
Stroke	315 mm
Rated speed	1,150 rpm
Dimensions	7,400 x 1,900 x 3,300 mm (LxWxH)
Weight	43t
Weight-to-Power	5.3 kg/kW
Specific fuel consumption	195 g/kWh
Mean effective pressure	24.6 bar
Mean piston speed	12.1 m/s
Fuel injection	Common Rail
Vee angle	48 degrees
TBO	24,000 hours

deployed in the MTU 4000 series and allows the independent determination of all injection parameters, resulting in reduced fuel consumption and emissions.

Another characteristic of the 8000 series is the sequential turbo charging, which is an optional feature. The technology is designed to considerably help supercharged engines to achieve a wide performance map, thus good acceleration while keeping fuel consumption and smoke levels low. With sequential turbo charging, individual exhaust turbochargers can be switched on and off during operation, depending on the engine's power demand.

All engines of the Series 8000 are controlled and monitored by the electronic engine management system MDEC. The system is designed to optimize all engine functions, and the engine can be included in an overall controlling and monitoring concept of the entire propulsion system and other areas of the ship.

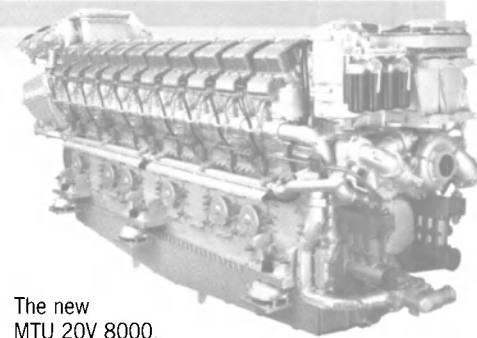
The reported drive in developing the 8000 was an overall reduction of life cycle costs through the reduction of fuel consumption and maintenance costs. For example, when deployed in a fast com-

mercial ship application, the fuel consumed by the 20V 8000 lies, over a wide operating range, below 195 g/kWh. At its best performance, it remains below 190 g/kWh, while always keeping within IMO limits for NOx.

On the maintenance side, intervals between the engine main overhauls are

set at 24,000 hours for fast commercial vessels. When maintenance is needed, time spent working on the powerplant is minimized by the fact that all components subject to maintenance routines have been placed into a so-called service block at the free end of the engine.

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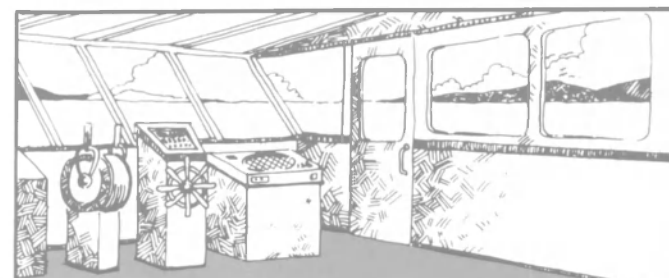


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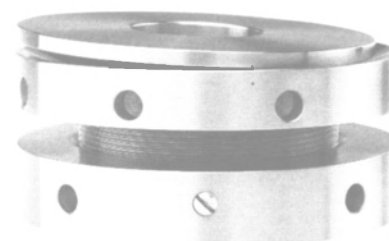
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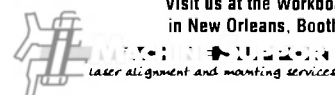
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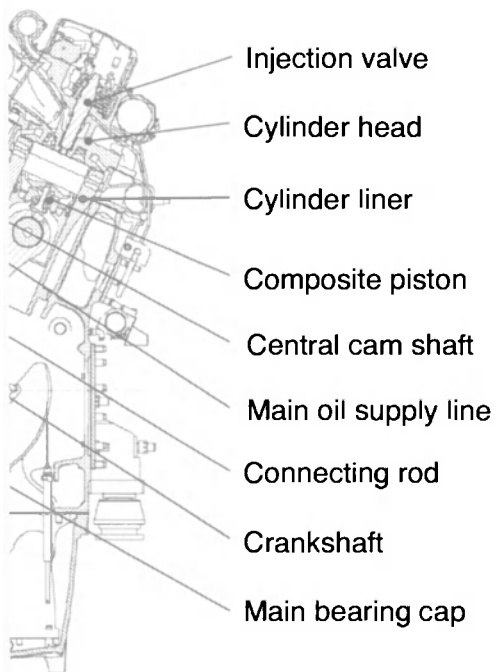


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Workboat Report • Marine Propulsion

ZF Fortifies Product Line, Business Plan

Consolidation of manufacturing and service entities is perhaps the world's worst kept secret. Marine propulsion manufacturers, in particular, have been rapidly consolidating companies, lines and capabilities in order to broaden their organizations to be truly global, while filling any holes in the power range along the way. ZF, a renowned maker of marine transmissions, has done this and more in becoming a single source propulsion supplier.

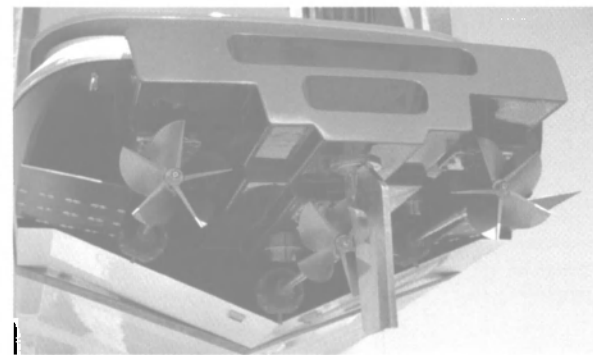
The expansion of the product line includes a complete propulsion systems

was part of ZF Marine's strategic plan established in January 1999. It has now become a reality, with the founding of the Propulsion Systems division, based at ZF Padova.

Stephane Jacquemond was appointed manager of this new department, and brought with him a wide range of marine propulsion experience, having worked for the French subsidiary of RENK, S.E.E. (now ZF Masson), as well as the French supplier of propellers and propulsion systems, France Helices. ZF Marine has now finalized major

agreements with several companies, which will increase the Group's technical expertise, enlarge the product portfolio and enable ZF Marine to enter new markets.

The Joint Venture with FB Design and foundation of ZF-Trimax to market surface-drive systems was the first step. These drives are well suited to the ZF Marine range of 2-Speed transmissions, and this combination, with the advanced hull design of Fabio Buzzi's company, FB Design, lead to the series production of the 38 ft. (11.5 m) Sunseeker XS 2000. ZF Marine's program of surface-drives has also been supplemented by a licensing and marketing agreement with France



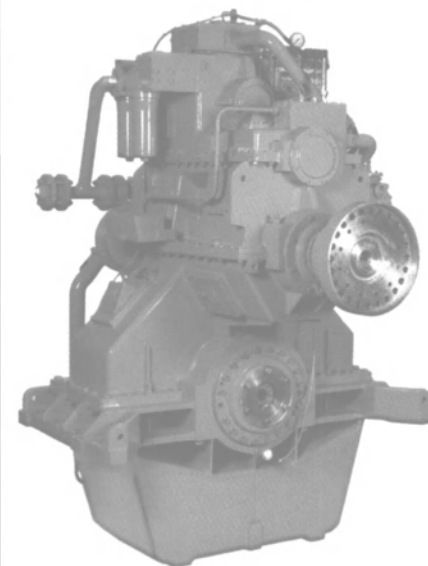
Helices for their SDS range of trimmable surface-drives.

Controllable pitch propellers have now been added to ZF Marine's product line by the founding of ZF Marine Technic S.L., and negotiations are taking place for the addition of a full range of high technology, fixed pitch propellers.

The latest addition to the ZF Marine Group was the acquisition of Mathers Controls Inc. to provide a comprehensive range of state-of-the-art propulsion controls systems for all applications.

ZF Marine Buys Mathers Controls

Harold Mathers, President of Mathers Controls, Inc., signed papers on September 18 transferring ownership of the company to the ZF Marine Group. Mathers Controls, a privately held company with corporate offices in Burlington, Wash., was founded 50 years ago by father and son partners **Cliffe** and **Harold Mathers**. The company pioneered the development of single-lever throttle and gear controls in 1953 and later pioneered the development of multi-station electronic controls with the introduction of MicroCommander in 1987. In the early years, Mathers Controls focused on commercial vessels. Later, with the introduction of MicroCommander and innovations, which included a hand-held control and the company's MC 2000 series, Mathers took the lead in the pleasure craft market. "When we looked at what compa-



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Workboat Report • Marine Propulsion

nies are doing in electronic controls, we recognized that Mathers Controls was our ideal choice," said **Roland Heil**, ZF Marine general manager and CEO. "Of course, we also recognized that the people at the company, and the people connected to the company, were responsible for its success."

ZF Expands Line

ZF Marine is expanding its range of heavy duty commercial transmissions with a complete series using modular designed components, which will eventually extend to torque capacities of around 100,000 Nm. This confirms ZF Marine's intention to become a major supplier in the workboat market, as already achieved in the pleasure and fast-craft markets.

The first of this range, the ZF W23100 NR, was displayed at SMM in Hamburg, and three of these transmissions have already been sold for installation in tankers being built in Istanbul, Turkey.

The ZF W23100 series has a maximum torque capacity of approx. 26,000 Nm at ratios up to 3:1 and the ratio range covers 2.5 - 5.85. It is available for non-reversing applications with disengaging clutch (NR) or without clutch (NC). Provision is also made for the attachment of an O/D box for controllable pitch propeller actuation. The robust, cast iron casing is split transversely at the axis of both the input and output shafts to allow easy on-board maintenance. Various PTO options are also available, both live and clutchable and clutch actuation is either electrical or pneumatic.

This gear series was designed at the ZF Marine Group's German plant, ZF Marine GmbH in Friedrichshafen, in conjunction with ZF Masson in France, and is manufactured at the ZF Padova plant in Italy, who this year received QS 9000 certification by Det Norske Veri-

tas. ZF Marine's highest capacity transmission, built primarily for the fast ferry market, has now been up-rated to accommodate new engine developments with ratings up to 8,200 kW / 1,150 rpm.


The ZF 53000 NR series (formerly BU 5300) is non-reversing for use with water-jet systems and is available with

port or starboard horizontal offset, or vertical offset. The horizontal version includes a patented "ZF Antiflex" mounting system to prevent stresses caused by hull flexing from being transmitted to the gear housing.

The first application of the ZF 53000 NR was in the 449 ft. (137 m) Corsaire

13000 built by Chantiers de l'Atlantique, powered by MTU 20V 1163 Diesels and LM 2500 gas turbines. They have also been installed in two 197 ft. (60 m) "Jumbo Cats" with Caterpillar 3618 engines built in Norway by Fjellstrand, and further orders are pending.

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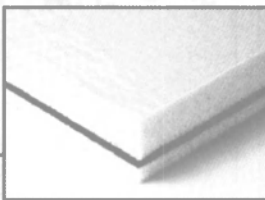
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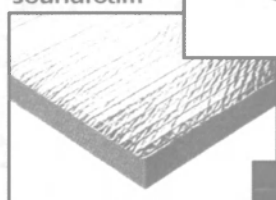
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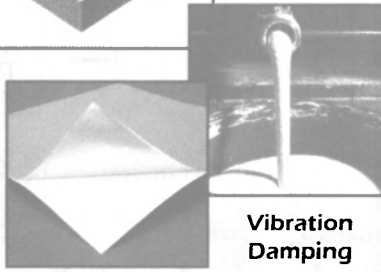
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JC-L to Showcase Tug Thruster and Fully Split Stern Shaft

John Crane-Lips - exhibiting at booth 2038 at the New Orleans Workboat Show - will feature the Lips Tug Thruster, which has recently been selected for several workboat newbuilding programs. JC-L will also feature the Fully Split Stern Tube Seal, which eliminates the need for workboat drydocking for installation or seal maintenance.

John Crane-Lips is a leader in marine propulsion systems, providing complete onboard propulsion and sealing service for the commercial and naval fleets of the world. Products include hull, propeller shaft and onboard sealing systems, together with Lips propellers, shafts, waterjets, thrusters, and control systems. John Crane-Lips also has niche leadership in precision cable handling systems.

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The USMMA Global Maritime and Transportation School

Through its Global Maritime and Transportation School (GMATS), the United States Merchant Marine Academy now offers the most extensive maritime and transportation professional education program in the country. In 2000, USMMA GMATS will begin offering joint master's degree programs with other schools.

During the fall of 1999, the Vice President's National Performance Review (NPR) awarded the USMMA Global Maritime and Transportation School the prized "Hammer Award" for reinventing government. (This is a bittersweet victory for USMMA as it was the NPR that considered closing Kings Point or charging tuition in the early 90's)

MISSION

To offer leading-edge education and training programs that will benefit professionals from the maritime and transportation industry (private-sector, military, and government). Through its education and training initiatives, the USMMA GMATS is dedicated to optimizing America's economic and strategic intermodal transportation system and its global transportation interests.

USMMA GMATS Today

The USMMA Global Maritime and Transportation School is currently divided into three divisions: Nautical Science and Military Affairs, Marine Engineering, and Transportation Logistics and Management. Together these divisions offer more than 140 professional education and training programs. In addition, GMATS specializes in developing customized education and training programs that meet the specific needs of any transportation organization. GMATS is a major supplier of training for personnel from numerous government, military, and commercial entities.

Nautical Science and Military Affairs

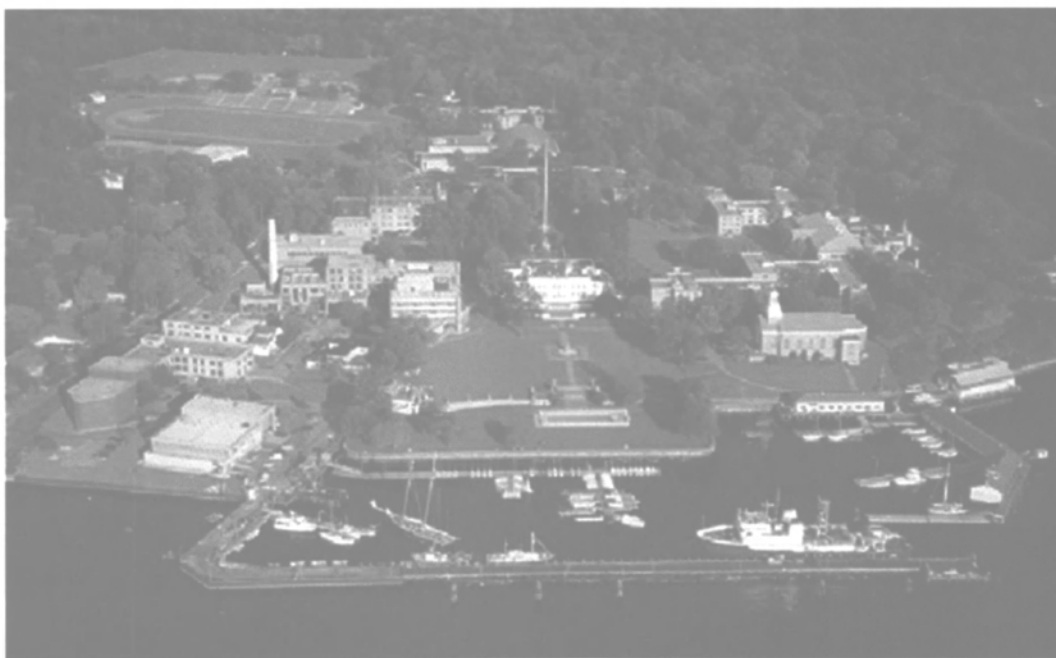
- Over 25 courses offered (many U.S. Coast Guard approved programs) which are designed to keep shipboard merchant marine personnel and military reservists current on technology innovations, industry practices, safety, and regulations which affect mariners. These programs include the comprehensive training required by the International Maritime Organization's (IMO) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995 (STCW 95).

Engineering

- Courses offered for seagoing engineers, port engineers, and professionals from the shipbuilding, design, and repair industry. Courses range from steam and diesel engine operations/preventive maintenance/repair to shipboard electronic systems, pump maintenance, engineering management, and practical economics for port engineers.

Transportation Logistics and Management

- These programs meet the transportation training needs of corporate America as well as those of government and military organizations. Courses include topics designed for management trainees, other persons new to the industry, and seasoned professionals who wish to understand complex maritime/intermodal transportation and logistics systems in order to most efficiently manage or expand the transportation activities of their organization.



Faculty

The GMATS faculty brings a wealth of diversity and talent to the classroom. Instructors include USMMA faculty, academia from other colleges and universities, and guest lecturers from private-sector, military, and government organizations who are subject matter experts in their field. In keeping with the Kings Point tradition, where appropriate, classroom presentation is augmented by extensive use of the Academy's laboratories, simulators, and waterfront vessels. Transportation related courses generally include field visits to intermodal facilities in the Port of New York/New Jersey.

The Challenge and Vision For Tomorrow

As the next century dawns, the human factor in developing and operating America's maritime and intermodal transportation system becomes ever more crucial. The Secretary of Transportation recently noted that our nation's marine transportation system (and related intermodal systems) can expect a doubling of volume within twenty years. In the words of Secretary Slater, "We are at a crossroads in the transportation field. Much the nation's seasoned workforce is retiring. Meanwhile the demand for both traditional and new skills is expanding. America must develop the human resources needed to design, deploy, operate, and maintain an integrated and seamless national transportation system."

It is clear that the role of the U.S. Merchant Marine Academy,

both within the undergraduate program and within GMATS will become increasingly vital to America's strategic and economic transportation interests. To help meet the challenge of training America's transportation professionals, the USMMA Global Maritime and Transportation School has developed partnership arrangements with nearly twenty prominent transportation associations and organizations, including, the Intermodal Association of North America (IANA), the National Cargo Security Council (NCSC), and the National Industrial Transportation League (NITL). GMATS has also formed a Board of Advisors that includes nearly thirty of America's top leaders in the intermodal transportation industry.

Critical to the success of evolving transportation systems are well-trained and well-motivated employees.

Accordingly, the need for retraining and continuing education for transportation professionals has never been greater. To stay competitive in the new century and to provide our nation with a vibrant economic and strategic transportation system, our nation's transportation companies must embrace the importance of on going employee professional education.

In the new century, America's worldwide interests depend upon an efficient intermodal transportation system. The USMMA Global Maritime and Transportation School stands ready to help ensure that America's transportation companies are provided with the best possible training in the world.

Strengths

- The United States Merchant Marine Academy is America's "Transportation Academy" and recognized worldwide as a leader in providing education and training to the transportation industry.
- With over 140 courses, USMMA offers the most extensive maritime and intermodal transportation professional education program in the United States.
- USMMA is an entity of the U.S. Department of Transportation (DOT) and has the potential to access enormous training resources available throughout all DOT organizations.
- GMATS utilizes outstanding professors from USMMA and other fine colleges and universities as well as guest lecturers who are subject matter experts from the transportation industry.
- When appropriate, transportation courses include practical field visits to the extensive intermodal terminals and transportation facilities in the Port of New York/New Jersey area. Combined with classroom lecture, this provides the best possible training available.
- GMATS has the ability to develop and offer a customized training program in short order and to ensure that a program meets the specific needs of a company or organization.

Vision

"To be a world leader in providing professional education in maritime activities, intermodal transportation, and logistics"

For further information please call USMMA GMATS at (516) 773-5120, refer to our web site: www.usmma.edu/gmats or email us at frangoss@usmma.edu or



Circle 195 on Reader Service Card

MARINE ENGINEERING TRAINING

The United States Merchant Marine Academy (USMMA) at Kings Point, New York is one of the five federal service academies and the America's premier maritime institution. Along with the undergraduate program, USMMA offers the most extensive maritime and transportation continuing education program in the United States. Most courses are one to two-weeks in duration.

We teach over 35 Marine Engineering courses and over 100 other courses in Nautical Science, Maritime Business, and Intermodal Transportation. Our instructor staff includes outstanding USMMA faculty, guest lecturers, and industrial experts. "Hands-on" lab exercises complement classroom lecture where we use the Academy's 22 magnificent engineering laboratories and waterfront vessels. In addition to regularly scheduled courses, we can also tailor programs to meet specific company or organization needs.



**FOR MORE INFORMATION, PLEASE
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ABS Innovates For Petrobras Project

Risk-based inspection (RBI), long a source of theoretical interest to the offshore industry, is the key element of a new first-of-its-kind program being developed by ABS Group Inc., for the Petrobras 100,000-bpd 35 FPSO (pictured on page 27), operating in the Campos Basin offshore Brazil - Marlin Field, in 2,788 ft. of water. The program, when developed and implemented, is designed to significantly reduce lifecycle maintenance and the potential for accidents by pinpointing areas of higher concern and focusing additional inspection and maintenance efforts on them.

Previously, risk-based inspections typically have been focused on individual components of an offshore structure. This project will provide the entire offshore structure with a single comprehensive RBI program.

In one very critical study, the U.S. Minerals Management Services (MMS) engaged the Offshore Technology Research Center and EQE International to conduct a risk analysis to compare the risks of FPSOs with existing deepwater production systems currently operating in the GOM.

The existing deepwater production systems considered in the study were TLPs, Spars, and fixed jacket platforms serving as both production facilities and

transportation hubs for deepwater production. Risks were evaluated for each system over a 20-year operational life, beginning at first oil and ending with production shut-in. The risk analysis addressed personnel safety and environmental pollution.

In order to incorporate this information into the risk analysis, teams of technical experts were assembled for each study production system. Input from the technical experts was obtained through a series of workshops facilitated by EQE. "The study approach relied extensively upon industry expertise provided by Deepstar participants," said Dr. **Andrew J. Wolford**, EQE Offshore Risk Manager.

"This process may well establish a precedent for cooperative risk assessment addressing fundamental regulatory issues pertaining to the U.S. outer continental shelf.

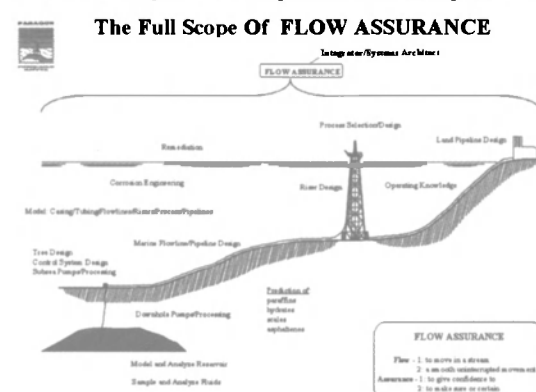
The results from this study will be used by the U.S. government to develop a policy concerning the use of FPSOs in the GOM. "This study represented a rare opportunity for engineers to provide meaningful and objective information to policy makers before a major policy is developed," according to Wolford.

Circle 60 on Reader Service Card

Deepwater Studies Seek To Ease Field Development

DeepStar Contractor Paragon Engineering Services is currently conducting two deepwater studies — entitled "Flow Assurance Practices/Methods for Deepwater Facilities" and "Pipeline Blockage Remediation Strategies for Long Offset Subsea Flowlines and Pipelines" — that are designed to facilitate an industry information exchange while creating avenues for safe, reliable production in water depths exceeding 5,000 ft (1,524 m).

The studies, undertaken on behalf of DeepStar and in conjunction with the U.S. MMS, seek to build on lessons learned to avoid repeated flow assurance problems in ultra-deep waters. "At present, both major oil companies and independents



"We're No.1. The Best."

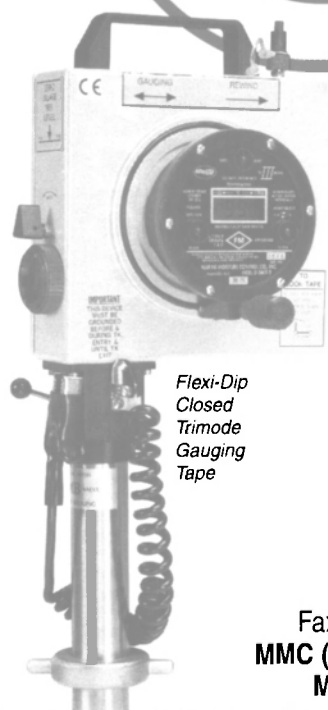
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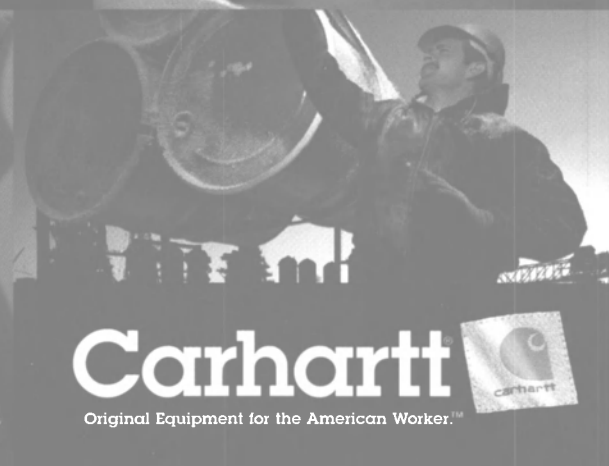
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HOPEMAN™

Over a century ago, A.W. Hopeman founded a small woodworking and cabinetry shop with a single business philosophy based on the following principles: Integrity, Quality, and Value. His sons entered into the design, manufacture and installation of marine accommodations in 1916. Never losing sight of that original vision has proven itself beneficial to both Hopeman and its customers. Hopeman Brothers Marine Interiors LLC has long since become the United States' major turnkey supplier of maritime accommodations.

Headquartered in Waynesboro, VA, Hopeman also has offices and warehouses in Jacksonville, FL, Moss Point, MS, Pascagoula, MS, Vicksburg, MS, New Orleans, LA, Coral Springs, FL and San Diego, CA.

Technical teams located in the Virginia office support the installation and material functions. The engineering staff is equipped with the latest in computerized drafting equipment including 3-D modeling. The staff also has a thorough knowledge of the requirements of SOLAS, U.S.C.G., Lloyd's, UK Marine Safety Agency and other Flag Administration Regulations as they apply to the public spaces and accommodation areas of passenger carrying vessels. One of the major benefits customers experience when working with Hopeman is the professionalism and experience of the onsite superintendent and the core supervision. Hopeman has very experienced managers in the field to support the customer, providing solutions to the most challenging task.

Hopeman's reputation for quality and performance resulted in the contract to outfit the highest visibility rooms for two cruise ships constructed in the late 90's at Fincantieri Shipyard in Marghera, Italy. In an effort to effectively serve the European market, Hopeman established a new company; Hopeman Brothers Marine Interiors S.r.l. located in Venezia-Mestre, Italy.

Accomplished in all areas of marine accommodations, Hopeman can provide Program Management, Engineering, Installation, Procurement, Service after Sale, and the Financial Stability to Ensure Performance.

The Hopeman customer knows that the job will be done well, within budget, and on time.

Cruise Ships:

Hopeman's involvement with cruise ships has been as small as replacing bulkhead and ceiling panels to as large as the refurbishment of many of the public spaces on the *Viking Serenade*.

"...Workmanship of the highest quality, coupled with a technical understanding for finesse and subtlety of detail essential to the articulation of good design—resulted in a quality and excellence in execution, surpassed only by the care, creativity and cooperation they brought in achieving it."

Njal R. Eide - Viking Serenade

New Cruise Ship

Two 1,900 passenger cruise ships are being constructed for American Classic Voyages Co.'s United States Lines® subsidiary and are the first major ocean-going passenger ships to be built in the United States in more than 40 years.

Litton Ingalls Shipbuilding, in Pascagoula, MS has selected Hopeman as a major turnkey contractor for this

prestigious project. Hopeman has the complete responsibility for the construction of the 7-deck high atrium, 900-seat show lounge, 590 seat cabaret lounge, conference center and high energy lounge with adjacent lanai. The United States Lines ships will enter service in Hawaii in 2003 and 2004.

(Drawing courtesy of American Classic Voyages Co.)



Commercial Vessels:

Space-saving designs, quality materials and workmanship plus a reputation for on time deliveries has resulted in the award of joiner packages and management services for most of the major marine programs in the United States. Programs include: Cargo ships, Containers Ships, Drill Rigs, Ferries, LSV's, Oceanographic Survey Ships, Oil Spill Response Vessels, OSV's, Patrol Boats, Sealift Ships, Tankers, and T-AO Oilers.



(Caesars Casino)

Casinos:

Providing unmatched quality of management, materials and installation for riverboat casino interiors has given Hopeman a solid foundation in this market niche. Engineering expertise combined with installation experience allow products such as gingerbread and decorative applique, joiner bulkheads, ceilings, doors, insulation, railing and deck covering to meet the customers needs from design to delivery. Recently completed projects include: *Diamond Joe, Elgin Casino, Bally's Casino, Hollywood Casino, Showboat, Blue Chip, Caesars, and Hollywood Park.*



(A.Q. Photo courtesy of The Delta Queen Steamboat Co.)

Riverboats:

Six decks high, 418 feet long and accommodating 436 passengers, the grand *American Queen* is the world's largest steamboat.

"Working closely with The Delta Queen Steamboat Co., the designer and the shipyard, Hopeman Brothers brought life to our concept. Hopeman provided the extra level of detail and craftsmanship, a skill that is very unique in the cruise ship industry, to create the 'Steamboat Victorian' decor throughout the vessel." Linda Landesberg, Director of Development / Special Projects - American Queen

Design support, procurement of materials, project management and installation of the public spaces, 81 staterooms and many specialty features related to the Pacific Northwest decor were provided by Hopeman for the *Columbia Queen*.

Coastal Vessels

The *cv Cape May Light* and *cv Cape Cod Light* under construction in Jacksonville, FL for Delta Queen Coastal Voyages are scheduled to enter service in spring and summer 2001. The passenger cabins and suites, public rooms, food services spaces and crew spaces for the two new, classically designed, 226-passenger coastal ships will be provided by Hopeman.

Navy Ships:

Meeting the habitability goals for naval vessels takes practice and experience. Hopeman has been working with the Navy since the thirties. Naval architects and designers often consult Hopeman about problems affecting shipboard habitability.

San Antonio LPD 17 is the Navy's newest class of ships. The 12 ships of the class integrate the latest in shipbuilding and war fighting technologies. Hopeman is providing the accommodations' outfitting, including the medical spaces and a state of the art galley.

Reduced operational costs and an improved capability to incorporate technological advances are essential design objectives. Hopeman is actively participating in the IPT (Integrated Product Team) environment together with the Navy and Litton Avondale Industries to develop and incorporate changes to decrease the TOC (Total Ownership Cost) of the LPD 17 Program.

For additional information, please contact:

Hopeman Brothers Marine Interiors LLC

435 Essex Avenue Waynesboro, VA 22980 USA

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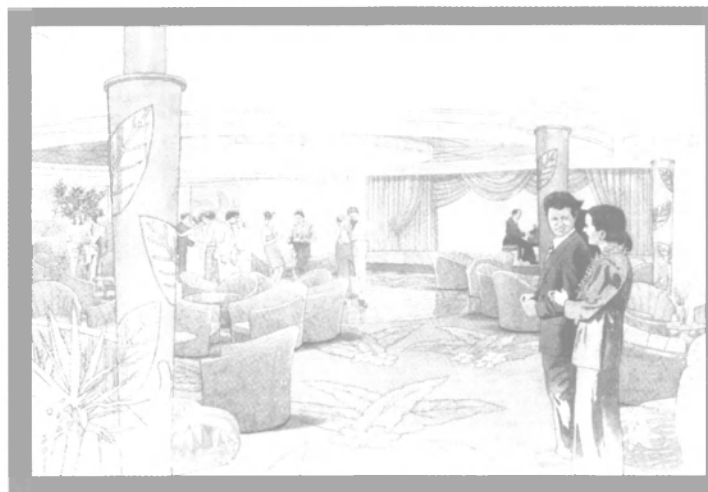
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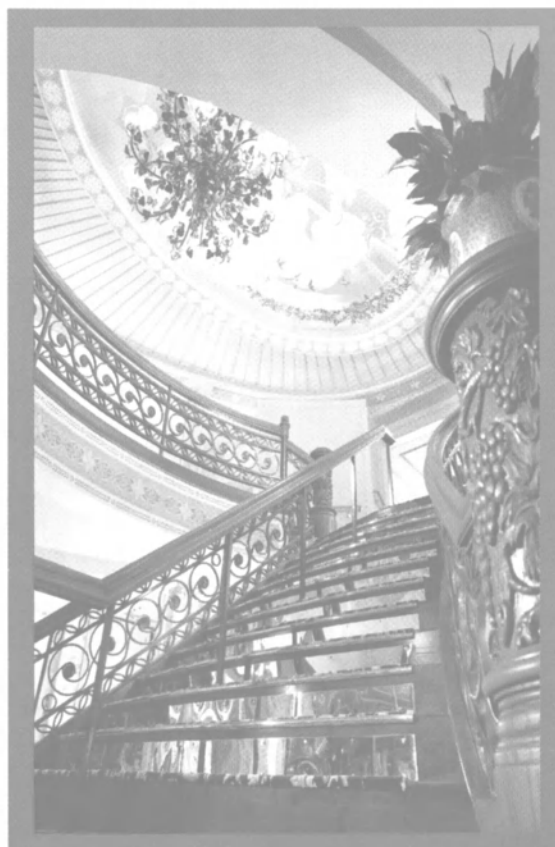
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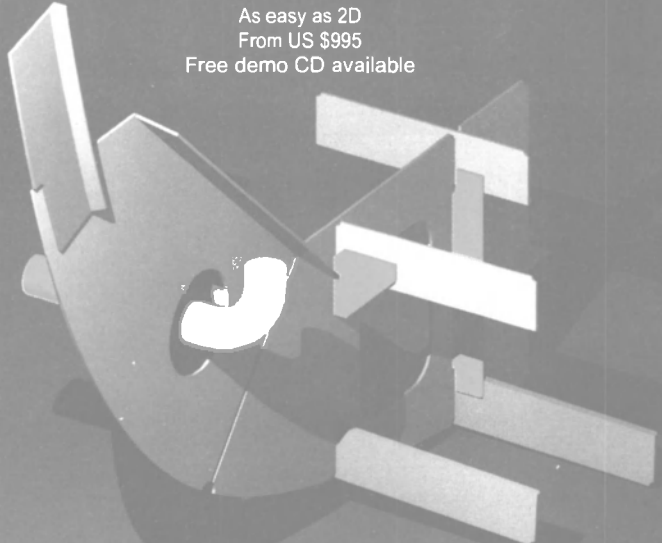
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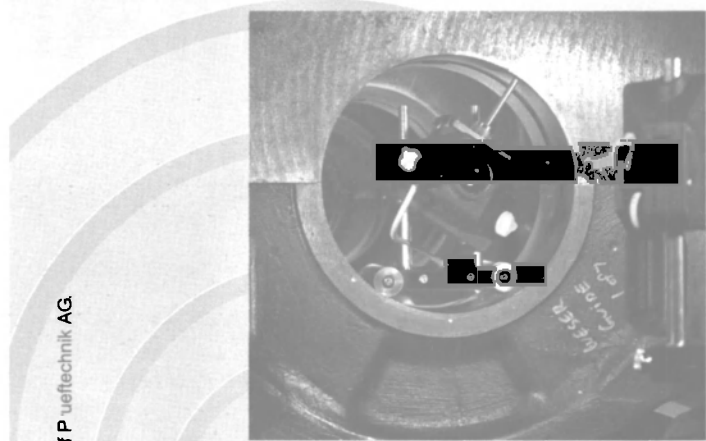
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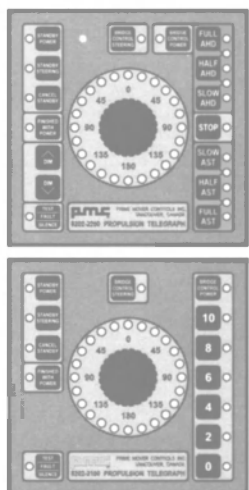
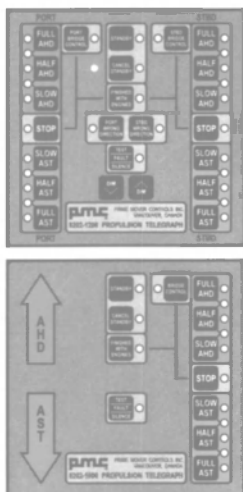
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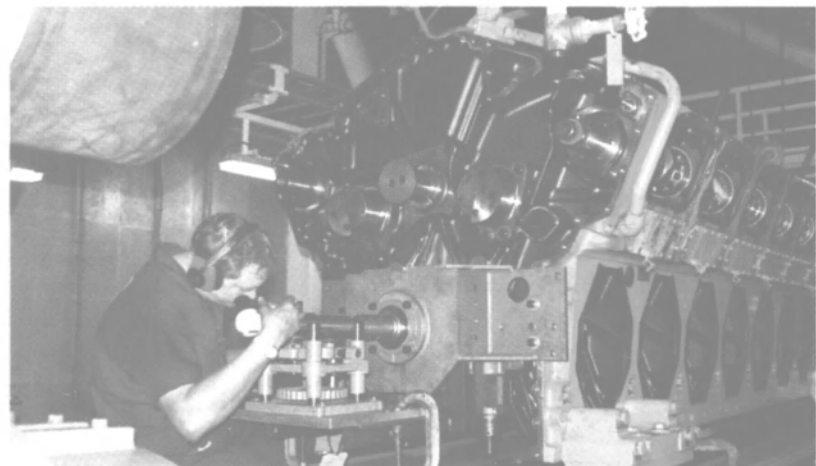
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Circle 271 on Reader Service Card

Workboat Report • Offshore

Environmentally Sound, Commercial Efficient Wastewater Treatment

Quality wastewater treatment is the driving force behind the daily operation of Owens Manufacturing & Specialty Co. For more than 20 years, its Kleen Tank product has worked in the marine and offshore markets to ensure that clean water is the rule, not the exception.

Owens, unlike many other marine manufacturers, was founded to provide marine industry solutions, not vice versa, and its product line has since expanded to additional land-based applications. Owens originally designed Marine Sanitation Devices and systems for small boats, ships and offshore platforms. The need for an environmentally sound and operationally successful packaged sanitation device for

commercial business, subdivisions, and single homes prompted the development of our additional plants.

Owens Kleen Tank units are versatile in that they can be engineered to fit most small, hard-to-fit areas while handling a wide range of capacities, a diversity that is not lost on the marine industry, notorious for demanding big production from small spaces.

All models of the Kleen Tank are patented and USCG Certified for Marine and Offshore use.

In early 2000, Owens unveiled its latest technological advancement in the wastewater treatment field in Canada, a country well known for its stringent environmental quality standards.

As the Canadian government works toward the

goals of eliminating chlorine as a disinfecting solution, Owens president, **John L. Kroesser, III**, introduced the Ozone System, which was eventually chosen.

A custom-designed Owens Kleen Tank sanitation system which uses an ozonation system was installed on the motor vessel, Osprey 2000, a ferry boat on the Kootenay Lake in Canada. Specifically, the ozonation system uses high-energy ultra-violet light.

The chemical reaction produced generates an extremely effective disinfecting process. The end result is a non-chlorine effluent discharge, rich in oxygen, thus proving beneficial to aquatic life forms.

Circle 192 on Reader Service Card

Beier Radio Gets OSV Job

Beier Radio has successfully installed its IVCS2000 Vessel Control System on the Offshore Supply Utility Vessel M/V Ryan T, for Atlas Boats. The system provides manual joystick and automatic position hold (DP) control of the vessel by integrating all of the vessel's engine, thruster and steering controls with the vessel's navigation systems. The system utilizes a Heavy Duty industrial grade PC: Windows NT based software and a sunlight viewable flat touch LCD display. This was the first installation of a DP system on a 150-ft. (45.7 m) supply utility vessel in the Gulf of Mexico. MV Ryan T has the capability of handling 1,600 barrels of liquid mud, and finds the DP system beneficial for off loading in seas, wind and current without the use of tie-up tackle.

Circle 68 on Reader Service Card

(Continued from page 40)

are experiencing flow assurance problems for which there are technical resolutions," said **Chuck Horn**, Paragon's subsea/deepwater business manager. "Our goal is to get this technical information to all parties in the deepwater market."

Over the next year, the Paragon team will interview both Gulf of Mexico and U.K. North Sea operators to develop case studies of 20 or more projects to uncover data, which will translate into more successful deepwater pursuits. "The team also seeks to include trends for each case study and to identify potential risk factors associated with increased water depth," said Horn. "Of course, each company's proprietary engineering data will be protected."

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TLG 2000
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LoadRite®
 - cargo planning systems
INSONEX®
 - sonic cleaning equipment
USONEX
 - ultrasonic cleaning equipment





Kockum Sonics AB, whose product TYFON® is the most well known of all marine whistles, proudly introduce the new TLG 2000 with several unique features. The log facility stores the 80 last activities for printing out or for down load to PC.

TLG 2000 features:

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Circle 285 on Reader Service Card

Trailblazing Transas leads the way with Technology

In existence little more than a decade, Transas Group's Marine Navigation and Simulation Technology is second to None.

From humble beginnings in the late 1980s, Transas Marine has risen to become a leader in the field of Marine Navigation and Simulation Technology.

The Transas Group, lead by Transas Marine Limited at its headquarters in Portsmouth England, comprises several associated international companies, and a worldwide network of distributors managed from seven global 'hub' offices. Transas Marine has committed itself to the design, development and distribution of innovative, highly reliable, and unique software products and turnkey solutions for the marine industry.

The range of high-tech Transas products includes integrated marine navigation, vessel traffic management information, and oil spill response management systems, as well as a comprehensive array of marine simulation solutions. Transas Marine also has strong OEM relations and strategic alliances with market-leading companies for almost all of its products. The majority of Transas' close-knit, highly experienced team have nautical certification or extensive qualifications in marine education or software development, and who have been involved in the Marine Industry throughout their careers. The structure of worldwide representatives allows Transas to combine global technology with personal support and service.

Transas Simulator Products

Recent years will be remembered as a boom period within the computer industry, which has, as a result, dramatically influenced the development of marine simulation products. Almost all marine simulator manufacturers are following Transas' lead by making use of the latest PC technology. Transas recognized some years ago that the use of this PC technology would, without sacrifice to simulation performance or its quality, result in huge price reductions for simulators, making them well within reach of all training establishments. Another advantage has proved to be that the most basic of simulators provide a platform upon which much more complex systems can be built. Within a few years of implementing this unique approach, Transas has become recognized as a leading supplier of a whole range of marine simulators for an industry that is now statutorily required to engage in simulator training to enhance safety and efficiency.

International Certification and Approvals

The Transas Navigational Simulator, NT-PRO, was the first to be approved by the UK's Marine Safety Agency (MSA) as fully compliant with the latest STCW'95 Code.

Transas' GMDSS simulators have been approved by many of the major national authorities and Transas oil spill management software (PISCES project developed in co-operation with Dynalantic Corp.) was selected by the US Coast Guard to be used on coastal stations as a core of their National Oil Spill response program. In 1998 Transas was awarded the inaugural Lloyds List Award for "outstanding and consistent contribution to training within the maritime industry." Transas Software House and Transas Marine Ltd. maintain quality in all respects — development, production, installations, service and customer support — and are internationally certified to ISO 9001 and 9002 standards.



Commercial Off-The-Shelf Products

Several years of extensive development and polishing of simulator technology has resulted in the creation of the widest range of highly efficient 'off-the-shelf' simulator products. Influenced by market requirements, and strictly following IMO requirements, Transas has developed a variety of suitable 'off-the-shelf' solutions. This has, in turn, enabled these versatile systems to be competitively and cost effectively priced. Transas provides its customers with comprehensive information about its simulators, including detailed descriptions, demonstrations, specifications and pricing in order to allow them to decide on the optimum simulator system to meet their needs within their available budget. Additional features or customizations requiring development can equally be discussed and negotiated. When such customer requirements for new features fall in line with Transas' own development plans, the customer receives them as they are introduced either free of charge or for a minimal upgrade price.

Transas has access to arguably the world's largest team of highly experienced engineers dedicated to maritime simulation. Several Research & Development departments are involved in simulation development and production and comprise more than 85 software and hardware engineers, specialists in 3D computer graphics, ship-modeling, installation and service. Transas makes full advantage of being one of the major ECDIS and Electronic Chart manufacturers in the world. The company also integrates engine room, VTMS, radar processors, and environment protection modules into their simulators to ensure all customer applications are facilitated.

A Complete Range of Simulators

Transas is in a position to supply a complete set of simulators to cover most areas of maritime training: Navigation, Communication, Propulsion Plant, Electric Plant, Cargo Handling, Vessel Traffic Management and Oil Spill Response.

For each area Transas offer the full range of

simulators to meet the needs of the industry:

- Single computer based training for individual in-house or distance training, equipment familiarization, refresher programs, self-tests/examination programs and knowledge assessment.
- Multi-Purpose training classes for group interactive exercises under instructor supervision, dedicated to specific areas of training and certification.
- Assessment of theoretical knowledge of full mission simulators for final training and certification where all elements of simulated equipment, modules and participants are brought together forming a complete interactive simulation environment. Use of such a complete range of simulators enables training centers to maximize their through-put by breaking training process into several stages and also to use appropriate types of simulator that are the most suitable for a particular training objective, from the basic to the most complex.

Assessment of theoretical knowledge and professional skills enables instructors to work out the most suitable course/simulator for each individual trainee and to bring him/her to a higher level of competence, and ultimately successful certification with minimal investment.

Achieving Reality in Simulation

Transas Marine produces the most accurate and detailed Marine visual scenes at extremely low cost, and in the shortest possible time scale. Innovative use of the latest open GL graphics techniques, coupled with integration of real ship controls, provides for a truly realistic training environment. Transas provides generic vessel controls to meet 'general' training needs, and if required by the customer, can provide customized integration with a variety of ship control units, ranging from modern "Z-drive" tugs all the way up through the latest Integrated Bridge Systems found on modern ocean going vessels. The quality of mathematical ship models and their associated processes and phenomena, is one of the essential criteria used for the assessment of

the simulator's suitability for training purposes. All the simulators of the Navi-Trainer family use mathematical models with 6 degrees of freedom (motion in the horizontal field view, rolling, pitching, and heaving). All the most important physical effects connected with the ship's interaction with other objects are simulated and, most certainly, operation of the ship machinery.

Flexibility and Expandability

All Transas simulators are extremely flexible. Using the same core software, Transas simulators enable the Instructor to select the type or model of simulated equipment and simply by acquiring more licenses the system may be expanded to form a number of simulated modules, bridges/training stations, etc. This flexibility of multi-purpose training classes is an ideal example of an effective use of training facilities to respond to customer requirements whilst maximizing the time that the simulator is in use.

Courseware and Instructor Training

Working in close co-operation with some of the world's best known Maritime Training Institutions, Transas has designed a number of different training methods, courseware documentation, and large libraries of ready-made scenarios, exercises, test and examination programs. All such materials, some accumulated from the experience of Transas' customers, are supplied as standard with simulators, allowing the system to generate results and revenue with the minimum of delay.

- Transas provides special training courses for:
- simulator operational training (basic and advanced);
 - technical/ maintenance/ trouble-shooting;
 - customized training programs (e.g. for database modeling station)

Transas offers instructor courses with flexible duration from a few days to several weeks, which can be carried out either at a customer's premises or at one of Transas' network of worldwide offices.

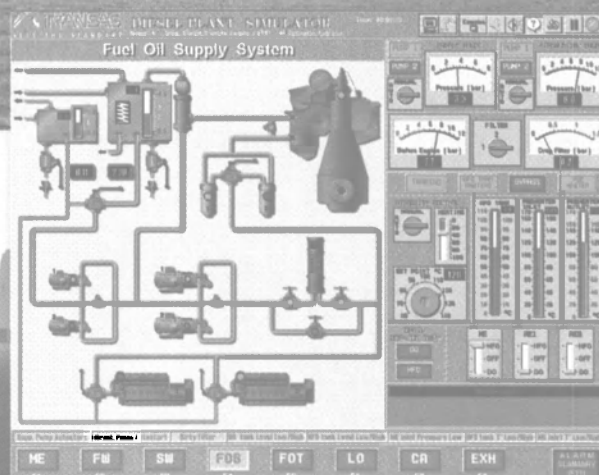
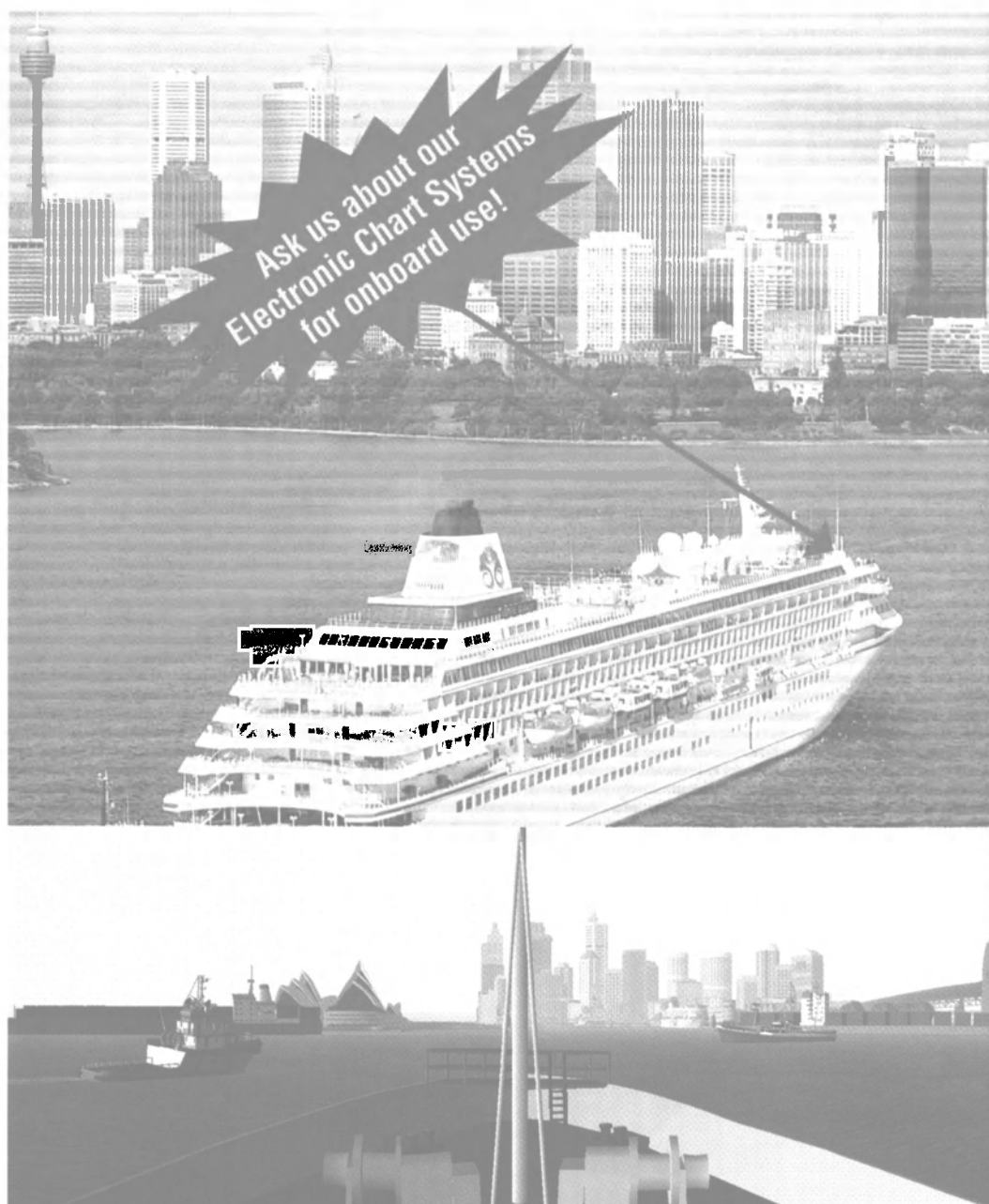
Management, Installation, Training

Transas project managers are readily available to provide individual companies alike with complete solutions via the support of a network of worldwide representatives. From simulator design and planning, Transas service teams can ensure cost optimization and the effectiveness of any facilities as well as advice on a clear path for future upgrades. During installation our engineers provide extensive training to the simulator technician who will become responsible for technical aspects of the system (computer and network adjustments, trouble shooting). By linking of the simulator to the Transas network — via the Internet or manually — the customer can receive the latest simulator software information, hardware updates, and availability of newly developed area/ship models libraries.

Each Transas customer you are eligible to take advantage of the company's upgrade scheme, this takes the form of regular information about new products, software versions, hardware options and new database libraries. Transas aggressive pricing of upgrade packages allows the customer to keep their facility at the leading edge of simulation training long beyond initial installation.

Circle 198 on Reader Service Card

TRANSAS, SAFETY THROUGH SIMULATION



- **Navigational/Fishing simulators**
- **GMDSS simulators**
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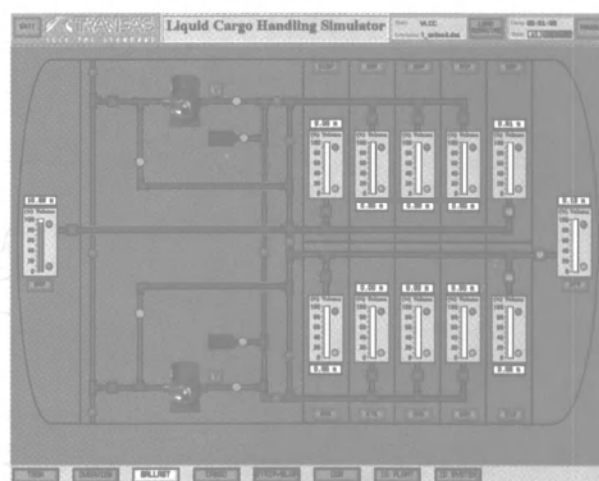
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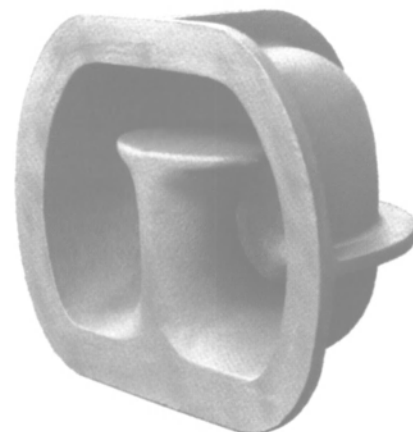
Workboat Report • Offshore

Ansell Jones Uniquely Serves Offshore Market

Ansell Jones, a leader in the manufacture of lifting, mooring and access equipment for use in the offshore and marine markets, has a vast product range and a history spanning more than 150 years. In all, the ISO-9001-certified

company's range includes: spark proof cranes and hoists; blocks, sheaves and swivels; shackles, hooks and forgings; deck fittings and hardware; watertight doors, hatches and scuttles; steadfast anchors; and chasers and grapnels.

A factor that sets the manufacturer apart from other product makers, according to **Steve Williams**, sales and marketing manager, is the fact that the company is a specialized manufacturing and engineering company, meaning that



custom orders and truly unique engineered solutions are the norm rather than the exception.

With three factories in the U.K. — each certified to ISO standards — the company can forge pieces up to four tons. The company, at the time of SMM in Hamburg, Germany in early October, was very close to finalize the opening of its U.S. office in Houston.

"Everywhere we go, we try to sell all products into all markets," said Williams. "But we don't seek only distributors, we seek and find technically competent people."

Proof that the company, which employs approximately 120 worldwide, extends far beyond simple component manufacturer is the fact that entire project management, from initial concept through manufacture and final commissioning, is an increasingly important part of its business.

Proof of the company's prowess in providing sound solutions to marine's inherent challenges is seen in the products it has produced. For instance, to overcome the problem of corrosion, Ansell Jones produced the first set of stainless steel hoists. In another case, an innovative product, the Supasheave, employs the principle of cold metal flow and deformation to produce a sheave which is designed to be exceptionally strong, light and long-lasting, as well as cost-competitive.

Specialist Steel Forgings

Ansell Jones is one of the world's leading forgers in the areas of lifting equipment and mooring applications, and renowned for its range of hooks and shackles up to one thousand tons SWL, which are manufactured to the various international standards requested by its customers. The mooring range of products includes a complete range of forged anchor chasing equipment, with either open or closed facility. The range of forgings can be supplied with fully traceable material certificates, and witness of test is carried out by the customer's classification society of choice.

Circle 92 on Reader Service Card

E-CRANE™

E-Crane International

Designed to move material faster, farther, for less money

Visit our booth #1767, at the International Workboat Show in New Orleans, December 6-8.



In keeping with the philosophy of doing things better, Wayne B. Smith, Inc. was looking for ways to provide better service to their customers and gain an advantage over their competitors. Mr. Pat Short, Project Manager for W.B.S. explained "The addition of the E-Crane to our off-loading facility has greatly improved our versatility. Not only are we more productive and efficient in completing jobs we have done for years, we have started to find new applications that allow us to offer more material handling services to our customers."

With the pinpoint accuracy of the E-Crane, we have decreased the possibility of fugitive emissions while at the same time increasing worker safety." Mr. Jerry Smith, General Manager for W.B.S. said the new E-Crane would be used dockside to unload bulk commodities. "It has the potential to increase capacity, but the main reason we went with the E-Crane was the ease of operation, efficiency and operator friendliness."

PRODUCTIVITY:
EXCEEDING 1000 TONS/HR.

LIFTING CAPACITY: 16.5 TONS
REACH: 86.6 FT



The Cargill Fertilizer facility in Savage Minnesota needed to reduce operating costs and increase the volume produced by their barge offloading operation. A conventional cable crane and rope at "Port Cargill" facility for years but - increasing safety concerns, repair costs and poor reliability made it clear that a change was needed. Ricky Carlson, North American Operations and Engineering Manager for Cargill, explained, "the E-Crane™ is a key piece of equipment in the improvement of our Port Cargill facility. This crane will substantially improve the productivity of Port Cargill."

LIFTING CAPACITY: 10 TONS
PRODUCTIVITY: EXCEEDING 500 TONS/HR
REACH: 81 FT

The Equilibrium Crane: Proven in Bulk Handling Applications Time and Again

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- near perfect balance
- clean electric power
- easy operation
- choice of undercarriage

And when it comes to product support, the E-Crane servicing dealers are ready to provide the industry with experienced help on specifications, installation by factory-trained technicians, and support in the field.



This E-Crane, installed in September of 1999, is situated on 4 fixed cells at a Power Plant on the bank of the Ohio River in Marietta, OH. It has met or exceeded productivity expectations, effortlessly handling all water fluctuations with its parallelogram designed boom. Carl Baker, President of B&N Coal explained, "Initially we researched upgrading older cable cranes that we own. Then we looked at new cable cranes. But, once we priced out the E-Crane, there wasn't any choice - this just made the most sense." Of all the benefits the E-Crane offers, Carl was most impressed with its ease of operation... It's doing a super job."

LIFTING CAPACITY: 16.5 TONS
REACH: 86.6 FT
PRODUCTIVITY: EXCEEDING 500 TONS/HR.

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Circle 37 on Reader Service Card

Deepwater Business Prospects Ripe

It appears that the long-held promise of deepwater offshore discovery and recovery is well-positioned to pay off, particularly in the face of \$30+ barrels of oil.

As technology has increasingly allowed oil companies and offshore drilling firms to more accurately find and evaluate potential drilling hot spots, there has been a fervor for the development of deepwater drilling equipment and design of offshore supply vessels to support the operation.

The booming global deepwater oil industry is on course to outpace supply of offshore development hardware in the next two years, according to an analysts' report, as reported in the October 30 edition of *Maritime Week*, sister-publication to *Maritime Reporter & Engineering News*.

"Deepwater construction capacity will be insufficient to handle anticipated demand requirements in 2002 and particularly 2003-04," said an oilfield and equipment services report by Schroder Salomon Smith Barney. "We believe a rush of field development plans will be sanctioned in 2001, followed by major contract awards to marine contractors," it added.

While oil prices have shot up from about \$10 per barrel to just over \$30 per barrel today, big oil consolidation and a reluctance to quickly increase exploration and production budgets due to the slump in 1998-99 has led to a backlog of potential developments could grow as limits emerge to equipment supply.

"Rapidly accelerating demand and limited new capacity set the stage for robust earnings growth for deepwater-focused construction contractors," the report said.

After a five to 10 percent decrease in 2000, spending by major companies on deepwater development is set to rise 20 to 25 percent per annum over the next three to five years, the report said.

The predicted increase in development spending would benefit firms such as marine construction experts Saipem, Global Industries and Coflexip Stena Offshore.

"Major deepwater development projects have been frustratingly slow to commence, yet the amount of new discoveries continues to increase," the report said.

Since 1995, more than 180 fields had been found and another 158 sites were forecast to be discovered in the next two years.

"By 2005, we expect a doubling of production from reservoirs in greater than 600 ft. of water and a quadrupling

in more than 2,500 ft.," the report added.

As part of this growth, the firm believes several large contracts to devel-

op sites offshore Brazil, Mexico and West Africa will be awarded in the next 12-18 months.



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*The Nicole Leigh Reinauer was
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This begins a new era.



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Workboat Report • New Vessels

W&D Completes Moran Series

Washburn & Doughty Assoc. recently delivered Surrie Moran, the last vessel in a six-boat contract, to Moran Services Corp. in Greenwich, Conn.. The Surrie Moran is a 92 x 32 x 14 ft. (28 x 9.7 x 4.2 m), 4,000 hp Z-Drive that will join the other members of the Marci Moran

Class in Norfolk, Va., where it will be used to fulfill Moran's contract with the Military Sealift Command.

The Washburn & Doughty contract with Moran was originally signed on November 11, 1998. Moran took delivery of the first tug, Marci Moran, on September 26, 1999. Since that time Washburn & Doughty has averaged a

vessel delivery every two months.

Moran vice president, **Jim Coyne** (whose wife **Surrie Coyne** christened the tug) said: "I want everyone to know that Moran is very happy with the six boats that were built here. The Navy has put them in all types of different positions and made sure they're versatile...The boats have worked great-the



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crews love them; we love them; and the Navy loves them. We're very pleased and that's why we're going to build another one here." The contract for the next Z-Drive tug Coyne referred to was signed on July 17, 2000. Like the Marci Moran Class tugs, this vessel will measure 92 x 32 x 14 ft., and be powered with two EMD engines. Construction has begun and a delivery is scheduled for the second quarter of 2001.

Washburn & Doughty is also building a 91 ft. (27.7 m) Oceanographic Research vessel for the Skidaway Institute of Oceanography in Savannah, Georgia. Rodney E. Lay & Associates designed the vessel.

Circle 51 on Reader Service Card

Atlantic Marine Awarded Additional ATB Contract

Atlantic Marine won a contract for a second state-of-the-art articulated tug and barge (ATB) vessel to be built at its Alabama Shipyard facility in Mobile, according to **Dick Wells**, President. This will be the second ATB to be supplied to the Staten Island, NY-based Reinauer Transportation Companies. "The first ATB, with its speed and loading capabilities, enabled us to provide our customers with superior, more timely service," said **Craig Reinauer**, CEO of Reinauer Transportation. The first ATB, the Nicole Leigh Reinauer, was delivered by Alabama Shipyard on December 11, 1999. The 7,200 hp twin-screw ocean-going tug will have a length of 124 ft. (37.7 m) and will feature the patented Intercon tug/barge coupler system designed and built by Intercontinental Engineering and Manufacturing Corporation of Kansas City, Mo. The system consists of two independently mounted gear drive ram assemblies that connect the tug and barge. The connection is transversely rigid and mechanically locked, resulting in a vessel that handles like a conventional ship. The tug is able to push a loaded barge at approximately 11 knots, up to 35 percent faster than traditionally towed barges. Alabama Shipyard designed the 143,000-barrel, 487-ft. (148 m) barge in compliance with OPA 90. "This additional ATB will put us ahead of the curve in providing superior service to our customers in an environmentally safe manner," Reinauer said. The ATB

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Workboat Report

is designed to operate in the widest range of sea states; offer the complete elimination of tug/barge hull contact; and eliminate the need for towing lines and related gear. The tug/barge — designed and built to ABS classification standards — can be engaged and disengaged without crew on deck.

Circle 52 on Reader Service Card

Crewboats Inc. Expands Fleet

In a sure sign that an offshore rebound is close at hand, Crewboats Inc. is increasing its fleet of fast aluminum offshore crew/supply vessels with four new boats capable of 28 knot speed carrying up to 72 passengers and 235 long tons of supplies. All four 152 ft. (46 m) vessels

— two of which are already in service — will be plying the waters of the Gulf by May 2001.

Designed and built by Breau's Bay Craft, each vessel is powered by four Caterpillar 3512 marine engines, each rated 1,400 bhp at 1,800 rpm and supplying a cumulative power of 5,600 bhp (4,176 bkW). The 3512s drive Hy Torq



48 in. x 53 in. (1.22 x 1.35 m) propellers through Twin Disc 2.5:1 gears.

"These are some of the fastest vessels in the Gulf," said **Shane Pescay**, Crewboats' vice-president. "More power allows us to carry these heavier loads with good speed, but for us, the main issues are longevity and reliability of the engine packages."

Louisiana Power Systems of Belle Chase, La., provided all engines for the vessels, which also include three Cat 3306B engines per vessel, one to power a Thrustmaster bowthruster.

Circle 59 on Reader Service Card

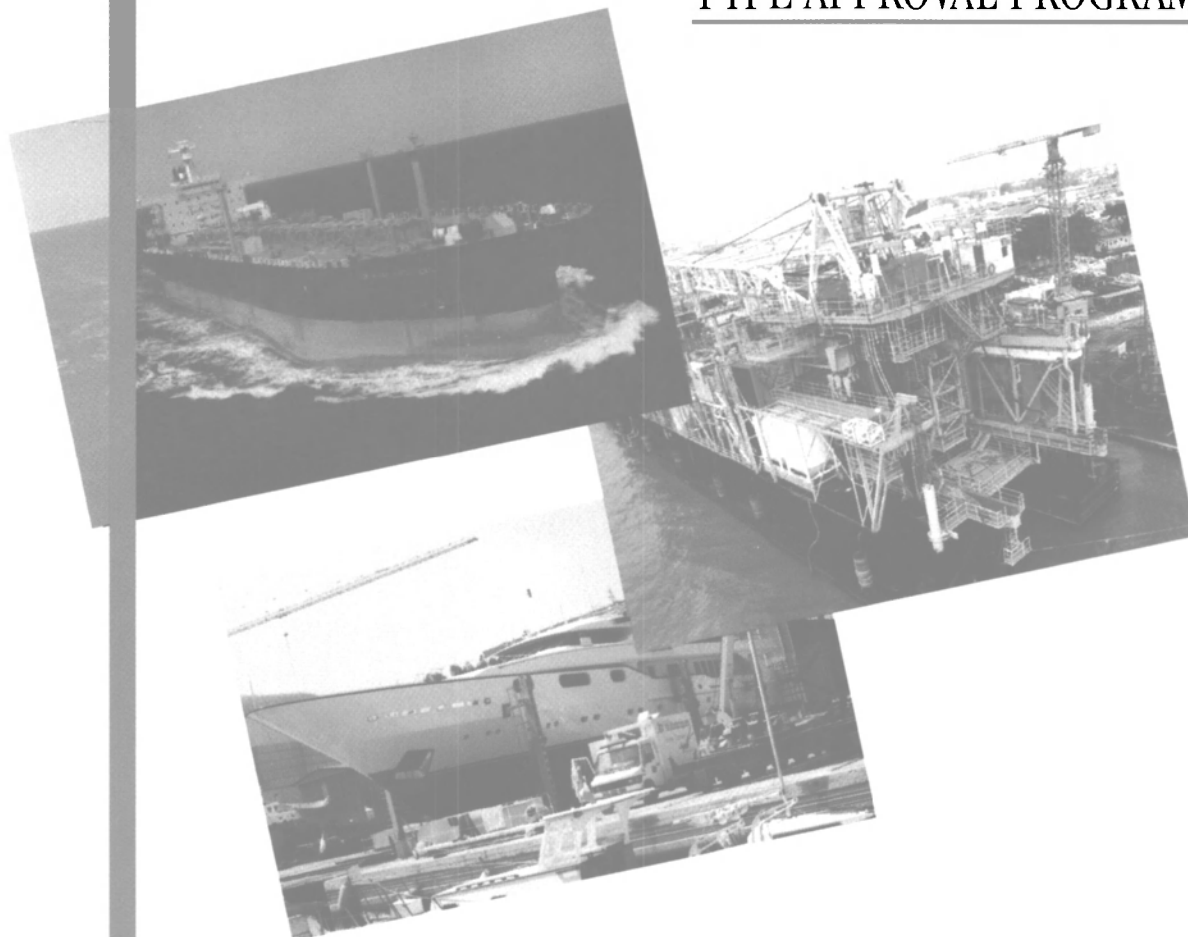
Klyne Tugs Orders AHTS From China

Klyne Tugs (Lowestoft) Ltd. signed a contract with Yantai Raffles Shipyard in China to build a powerful anchor handling tug/supply vessel (AHTS). The 221 x 51 x 20.3 ft. (67.4 x 15.5 x 6.2 m) vessel will be built to a Rolls Royce Ulstein UT 719-2 design, Lloyds Class +100+LMC, UMS, FiFi 1, and is expected to achieve a bollard pull of 180 tons and a free running speed of 17 knots.

The ship will incorporate features and equipment identified from many years of operational experience in offshore work, salvage and environmental protection. On confirming the order Chairman of the Klyne Group, **Roger Klyne**, said: "We are delighted to move forward with this new construction. We have learned a great deal from our experience with Anglian Monarch, which entered service in early 1999, and we remained convinced that new tugs are necessary to enable the company to move forward. By doing so we can improve the service to our clients and maintain the level of versatility and reliability the salvage and offshore industries have come to expect."

Managing Director **Carl Beare** added "We owe our thanks to **Peter Worden** of Offshore Shipbrokers Limited from whom we have received considerable support and advice during the protracted discussions leading up to the signing of this contract."

The Yantai Raffles Shipyard is located on Zhifu Island, Yantai, in the Shandong Province of China. Yantai Raffles is part of the Brian Chang Group of Companies, and within the space of one year



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Workboat Report

has received orders for a number of vessels in the offshore market, including anchor handlers, supply vessels, tugs, production systems, a 3,800 ton heavy derrick pipelay barge.

Brian Chang, Chairman of Yantai Shipyard, said "We are extremely pleased that Klyne Tugs has entrusted us with this very prestigious project. Our

modern shipyard is fully committed in the industry and staffed with 250 engineers, 45 naval architects and 1,000 skilled workers and look forward to a long relationship with Klyne Tugs."

Rolls Royce Ulstein will produce the design package, much of the equipment to be installed in the new ship and oversee construction. Two main engines will

each produce 6,000 kW to drive a pair of Ulstein CP propellers, rotating within fixed nozzles. High lift flap rudders will be capable of independent operation and full integration with two 800-hp bow thrusters and one 900-hp stern thruster. Deck machinery will include an Ulstein triple drum towing/anchor handling winch, with one towing drum and two

anchor handling drums, with a maximum pull of 300 tons and brake holding power of 450 tons.

Circle 55 on Reader Service Card

AMFELS Wins \$76M Chiles Contract

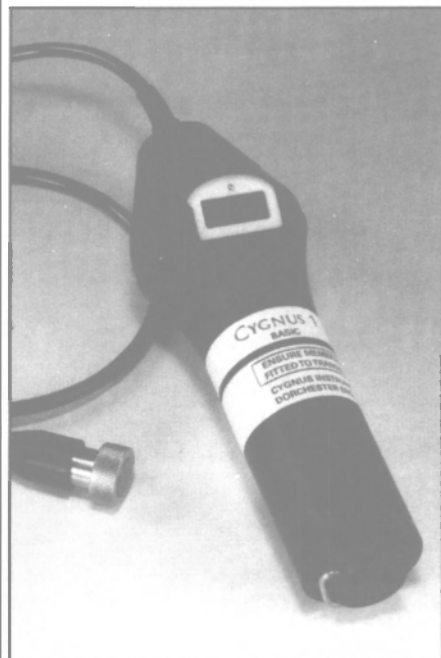
AMFELS Inc, of Brownsville, Texas, has signed a contract with Chiles Offshore Inc (Chiles) of Houston, Texas to build a \$76 million ultra-premium jack-up rig of the KFELS MOD V 'B' design. The total project value is estimated to be \$110 million, with AMFELS' share of the contract valued at around \$76 million. Work on the rig is expected to start soon, with delivery scheduled for the third quarter of 2002.

Currently, another KFELS MOD V 'B'-class jack-up rig ordered in April this year is being built for Chiles at Keppel FELS' Pioneer Yard facility in Singapore. This rig is scheduled for delivery in the second quarter of 2002. The KFELS MOD V 'B' design is one of KFELS' ultra-premium proprietary jack-up designs modified for non-harsh environment usage. It is designed to exceed the operating capabilities of conventional non-harsh environment jack-up rigs and will be built to a leg length of 517 ft. (157 m), with an option to extend this to 545 ft. (166 m). The design also incorporates modern engineering concepts that are designed to improve productivity, enhance safety and provide added independence from supply lines and environmental conditions.

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Circle 248 on Reader Service Card

Lash Barges Certified By DNV

Det Norske Veritas (DNV) has formed an agreement with LMS Shipmanagement of New Orleans to certify 1,800 of its lash barges. The agreement, which went into effect this August, calls for certification based upon type approval and certification scheme.

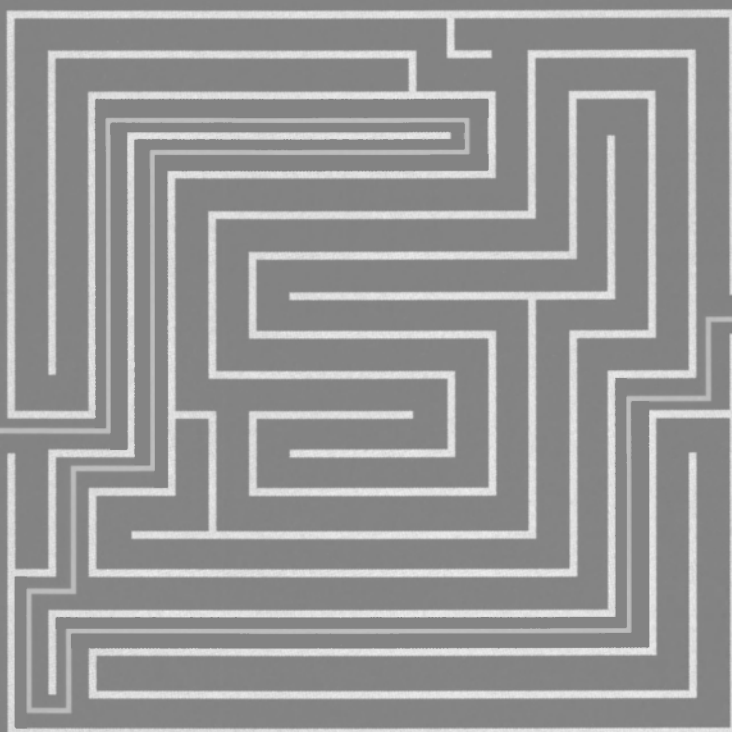
While there is no international requirement for lash barges to be classified, the industry requires third-party documentation from an internationally-known organization, such as DNV, to confirm the barges' maintenance and quality. DNV will certify the barges to ISO 9002, type approval and approval of their planned maintenance system, in addition to periodical audits and inspections. Certificates for the first 1,500 barges were delivered to LMS in August — the remainder will be approved as they are brought back into operation.

Alliance Continues

The Drew Marine Division of Ashland Specialty Chemical Co. and Norwegian company Odfjell Seachem have

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Workboat Report

renewed a business agreement for supply of Drew Marine's tank-cleaning chemicals and worldwide technical support to Odfjell's 70-vessel fleet.

The agreement covers the supply of both commodity chemicals and 12-special-purpose cleaners formulated to Odfjell's specifications.

Circle 94 on Reader Service Card

ICOM's Commandmic Offers Remote Control

ICOM, manufacturer of communications and navigation equipment, has launched its submersible Commandmic, a handheld mic offering full remote control (except DSC) of the new IC-M502 marine VHF radio.



ICOM's IC-M502 VHF radio.

Users can install the Commandmic into a port on the backside of the IC-M502. For long connections, a 20-ft. (6 m) go-between connection cable and a non-invasive con-

nection plug that flush mounts onto the fly bridge comes with the mic. The Commandmic, which is rated JIS-7 submersible, it can be exposed to rain or water spray without harm. The product also doubles as an intercom, which is especially helpful on larger yachts and commercial vessels. The company's conventional version of the IC-M502 houses

a large-sized front panel with large buttons and dials that are big enough for fast and easy operation, even in rugged conditions — yet the back of the radio is shallow enough to fit into small areas.

Circle 95

Applegate Launches Water Dam Mufflers

Applegate Industrial Materials, Baton Rouge, La., has released for production its new line of water dam mufflers. Following extensive research for this type of muffler, Applegate was able to lower noise levels in passenger areas of the client's crewboats from 105-dbs. To 70-dbs. — with little or no back pressure. The design of the all stainless steel mufflers can be utilized in most fresh water applications in engine sizes from 300-hp to 800-hp — where noise levels are of specific consideration.

Circle 98

Load Calculator For Bulk Carriers

Sweden-based Kockum Sonics has developed LoadRite, which is specifically geared toward Bulk Carriers, while fulfilling new safety requirements. The load calculator has been developed jointly by Kockum Sonics' headquarters in Malmo, Sweden and its software house in St. Petersburg.

The new program includes an extensive planning tool for safe loading/unloading.

Circle 97

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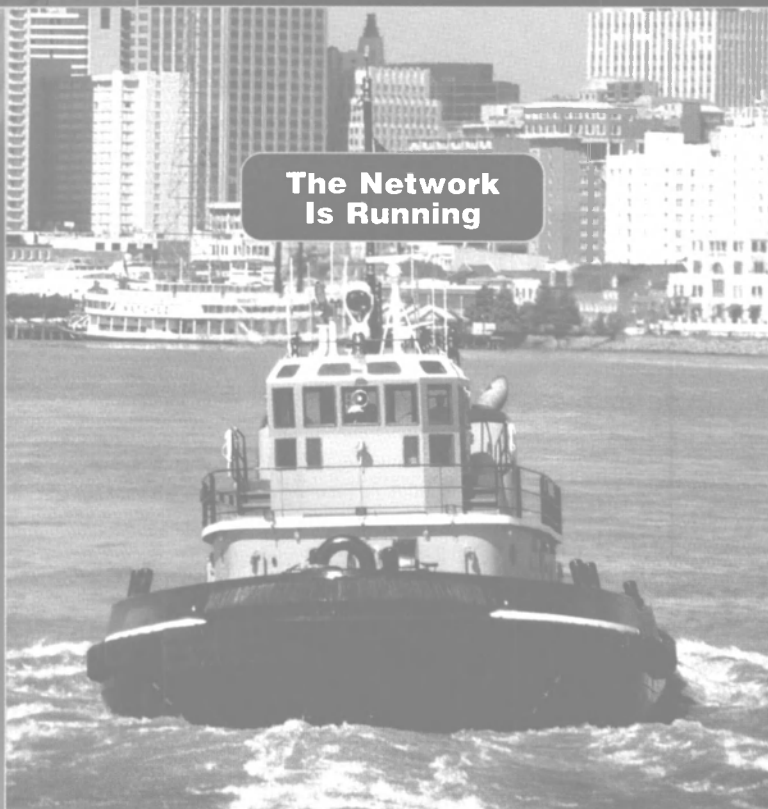
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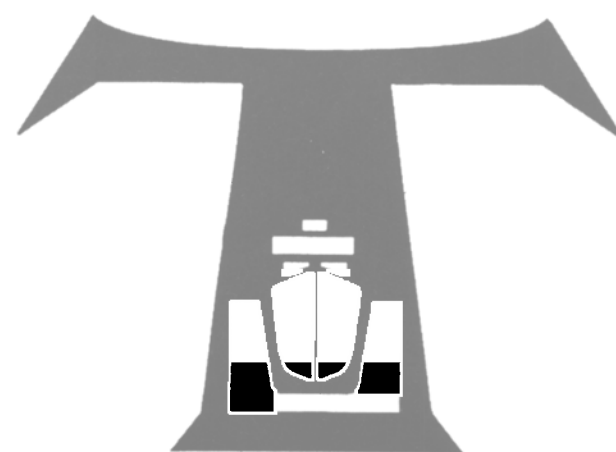
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Maritime History

What Happened to the Hunley?

Since its sinking on February 17, 1864, researchers and historians have pondered the above question for more than a century. What we do know, however is that a piece of Civil War history had been lying on the floor of Charleston Harbor off the coast of South Carolina. For all this time, no one, except showman **P.T. Barnum** (he once offered a \$100,000 for the Hunley's recover during the 19th Century) had attempted to recover the doomed sub.

Things changed however about 20 years ago, when American author, **Clive Cussler**, decided that he would try to explain the unexplained — he and his crew of divers from the National Underwater and Marine Agency (NUMA) ventured into the Charleston Harbor determined to locate the Confederate sub. In

conjunction with the divers, was the South Carolina Institute of Archaeology and Anthropology (SCIAA) who worked with the dives to map out various sites along the coast where the Hunley may have sunk. And on May 13, 1995, after more than 15 years of research and development, Cussler and his team found the piece of iron beneath the sediment. It would later be determined by both the SCIAA and NUMA as the historical sub — which was the first to ever complete a successful wartime attack.

By **Regina P. Ciardiello**,
associate editor

While the search for the Hunley continued throughout those tedious years, the crews ran into quite a few road-

blocks during that time. In fact, a 13-year lapse occurred from 1981 until 1994, when the search was abruptly stopped. While others may have been feeling their frustrations mount that the sub would never be found, Cussler did not allow his emotions to get the best of him, he somehow believed that the Hunley was different from any other expedition that he had spearheaded. In fact, according to a passage in his book "The Sea Hunters", he had penned, "Perhaps I'd developed a mental block or just wasn't in the mood. For various reasons some shipwrecks can never be located. I did not believe this to be the case with Hunley."

Ironically, Cussler's thoughts proved to be true and after resuming the search in the fall of 1994, underwater archaeologists **Ralph Wilbanks** and **Wes Hall** realized that they had found the magnetic anomalies that they had been looking for. The two archaeologists, along with **Harry Pecorelli**, discovered that the Hunley was covered more than three feet below the surface. Resting on its starboard side at a 45-degree angle, the vessel's finding prompted the commencement of the Hunley Commission and the Naval Historical Center, who formed a partnership to provide funding that would get the ball rolling on the recovery of the sub, which had also been named to the National Register of Historic Places by the National Park Service.

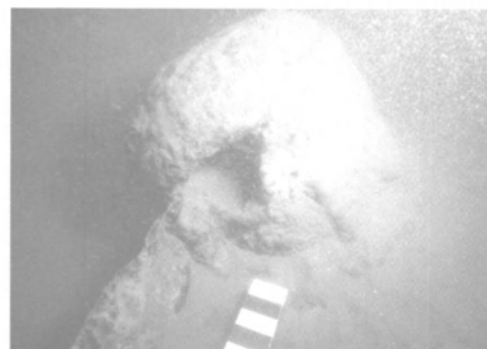
Before any further time could be spent on a recovery plan, it would first have to be determined by both the Park Service and the Naval Historical Center that the buried vessel lying beneath the surface was in fact the Hunley. It was decided in the spring of 1996 that it was not speculation, but pure fact that the vessel was the historical sub. Following this discovery, a decision that involved raising

of the sub was recommended. At this time, an additional organization was formed to assist with the preservation process. Created by the Hunley Commission was a non-profit organization called Friends of the Hunley, whose main mission was to finish off what the vessel could never do, which was to complete its journey home.

With funding in place and the vessel's exact position pinpointed, the next task was assembling a team of divers and a project leader who would spearhead the recovery process. Realizing the project's level of importance, the U.S. Navy tapped its chief underwater archaeologist, Dr. **Robert S. Neyland**, to serve as project director for the Hunley's raising. Neyland, who is head of the Underwater Archaeology Branch at the Naval Historical Center in Washington, D.C.,



Then: An artist's rendering of the Hunley, which sank on February 17, 1864 in Charleston Harbor. All photos are © Friends of the Hunley.



Now: An underwater view of the Hunley as it appeared below the water's surface shortly before its raising occurred this summer.

hired **Claire Peachey**, an archeologist/conservator there to work alongside him as project field conservator. Peachey, who studied underwater archaeology at Texas A&M, has extensive experience in these types of dives, as she has previously worked in the Mediterranean recovering a shipwreck that had occurred during the Bronze Age around 1,300 B.C.

"The biggest question here is why did the Hunley sink," Peachey said. "Through our research and from the raising, we hope to determine that."

Peachey's work on the Hunley began in late 1999, where she and Dr. Neyland and other members of the diving team began fieldwork of collecting data on the sub. Peachey began diving to retrieve and process various artifacts that had been onboard the vessel. Through her dives, Peachey found hollow iron snorkel tubes. She also discovered some other pieces that may have been associated with the sub's hull. According to Peachey, most of the dives were conducted during the summer months so the team wouldn't get caught in the whirlwind hurricane season that customarily pelts the Southern states with heavy wind and rains in the fall.

Diving 30 ft. (9.1 m) beneath the surface, Peachey would use a suction tube to remove some of the sediment that covered the Hunley so that the lifting equipment could be placed there. Sometimes having to work in zero visibility trying to locate a sub that was literally buried in mud, Peachey kept her bearings by just going down beneath the sur-



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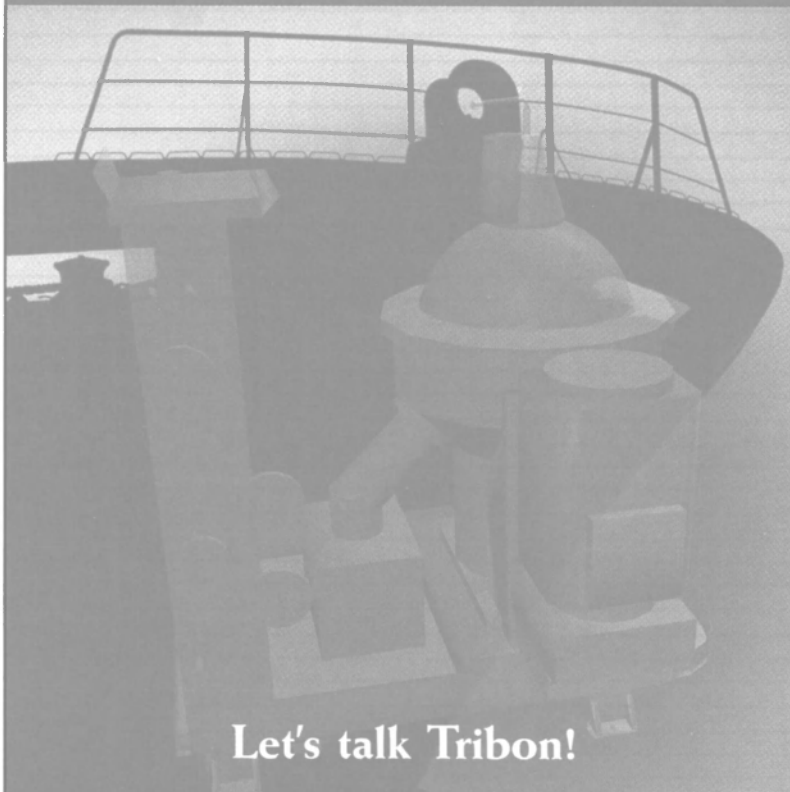
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Circle 348 on Reader Service Card

Maritime History

face and doing what she had to do.

"You get used to it (the poor visibility)," Peachey said. "At first I was a little disoriented, but I knew that I had to just concentrate on the task at hand."

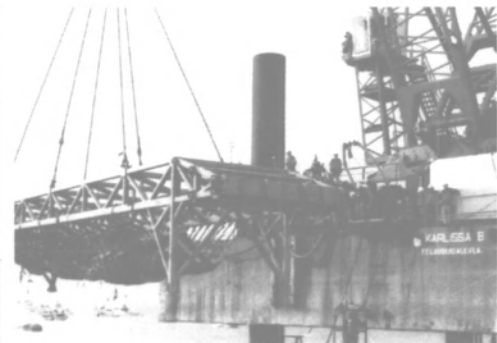
Sometimes performing dives that lasted three hours at 35 ft. (10.6 m) below, Peachey was able to talk with Neyland

and the rest of the crew via a helmet that provided full time communication services.

She mentioned that this was especially helpful when she would locate artifacts or pieces of the vessel and could then describe to her team above exactly what she was viewing.

On A Dark Winter's Night

What historians know about the Hunley is that it set out on that February evening in 1864 from its mooring on Sullivan's Island, South Carolina, setting the stage to meet up with the USS Housatonic, which was anchored approximately three miles outside of



Almost home free: Hunley being lifted clear of the water's surface by Titan's Karlissa-B.



An aerial view of Karlissa-B preparing to lift suction piles and lifting truss from the deck of a material barge.

Charleston Harbor. Supervising the 40 ft. (12.1 m) Hunley, was a young army lieutenant, **George E. Dixon**, who apparently took over the helm subsequent to the drowning of two previous crews on the vessel.

Coming up to the surface of the Harbor, Hunley sidled itself nearby Housatonic's hull, where it was discovered by a union sailor, who had been on watch that night. Feeling threatened by the Hunley's presence, and thinking that it was lining up to detonate its torpedoes, Housatonic let its guard down, and what followed were mass explosions, which alerted Dixon and his crew that trouble was imminent. Attaching its 135-lb. torpedo beneath Housatonic's water line, this allowed Hunley to counterattack with an explosion that would plummet Housatonic beneath the surface.

According to reports that were filed at Confederate military headquarters following the explosion, Hunley had received a signal from a beacon that would guide the sub back to shore. Despite this assurance, the vessel never returned to its homeport — and was never to be seen again until its raising this past summer.

The vessel, which will forever be known as the first submarine to sink an enemy warship in combat, was constructed in July 1863, by **James McClintock**, **Baxter Wilson** and its namesake — **Horace Hunley**.

The sub was shuttled to South Carolina one month later, where it was eventually taken over by Lieutenant Dixon.

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Maritime History

A Smooth Recovery Awaits

Subsequent to the diving research that was performed on the sub, Friends of the Hunley had amassed a salvage plan for the raising, which was halted during June when the initial crane that had been selected for the job was cited as not fit to perform the offshore raising. Friends of the Hunley contacted Titan Maritime,

based in Fort Lauderdale, Fla. to pick up the pieces. Titan enlisted its Jack-Up Crane Barge, Karlissa-B, a 170 x 80 ft. (51.7 x 24.4 m) six-leg crane barge, boasting DeLong jacks and 318 metric ton Manitowac platform ringer crane. Rather than going with a conventional three or four-legged jack up crane, Friends of the Hunley opted to use

Titan's six-legged barge due to the delicate nature of the project. There were specific concerns that a "punch through," would occur (which sometimes happens with a three or four-legged crane), meaning that one of the cranes legs may become submerged deeper within the ocean's surface, forcing it to tip over.



Team Titan: Pictured (L-R) is Hunley Salvage team: **Ken Bradford**, crane operator; **Colin Trepte**, barge captain; **Dan Schwall**, project manager; **Jenkins Montgomery**, crane operator; **Oscar Lopez**, jacking engineer; and **Hank Bergman**, chief engineer.

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Titan arrived onsite on July 21 and just two days later, the crane was in position, where it remained until August 12 - four days after the raising occurred. According to Titan's **Dan Schwall**, a member of Hunley's salvage team, who served as project manager, positioning of the crane was key in this process.

"Since the Karlissa-B was only a few feet away from the Hunley, a concern was that one of the legs would contact the Hunley, ultimately causing damage," Schwall said.

On its final judgment day, August 8, 2000, a gathering of spectators both on land and offshore, assembled to view an historic event in U.S. maritime history. The most crucial moment was when Titan's crane operator, Jenkins Montgomery, who according to Schwall, "was definitely the right man for the job," raised the Hunley out of the Harbor. "He made it (the raising) look easy," Schwall added.

Once the sub was brought to the surface, another crucial moment awaited — the Hunley still had to be safely placed on the barge. What followed was a silence described by both **Claire Peachey** and Schwall, that was so you could hear a pin drop until the sub was safely placed onto the barge — a crucial moment for all involved.

"The most challenging part was the placing of Hunley onboard the barge and being as sensitive as possible," Schwall said.

Crane operator Montgomery, prevailed and the Hunley was safely placed on the barge, where it was subsequently towed to a building on the former Charleston Navy base, which was outfitted specifically for the Hunley. Currently submerged in a tank, the sub is covered with a layer of marine corrosion — to prevent any cracks that would be caused due to drying.

While the main event may be complete, there is still much to be done. Through thorough examinations and X-rays, researchers will determine what is the best way to get inside the vessel so that maybe the mystery that has baffled historians since 1864 can be solved.



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Workboat Report • Salvage and Offshore

Companies Bond Together To Form American Salvage Association

Responding to the need for a presence and to assist in the professionalization of the U.S. marine salvage and firefighting response, nine U.S. salvors have joined together to form the American Salvage Association (ASA). The initial group

has participated in a vast amount of all of the significant salvage and wreck removal cases that have occurred over the last 10 years in the U.S. The Association's current membership is comprised of: Bisso Marine; Crowley Marine Ser-

vices; Donjon Marine Co.; Marine Pollution Control; Resolve Marine Group; Titan Maritime Industries; Weeks Marine; Smit Americas; and T&T Marine Salvage. Membership is currently open to any U.S. salvage contractors



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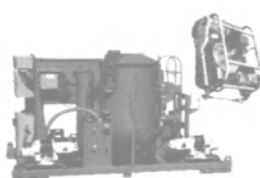
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who are committed to the present and future state of their industry.

At the Association's premiere meeting, **J. Arnold Witte**, a former president of the International Salvage Union and CEO of Donjon Marine was elected president for an initial two-year tenure. **Richard Fairbanks**, general manager of Titan Maritime, was appointed vice president for a two-year tenure as well.

The Association's main focus is to professionalize and upgrade the marine casualty response in U.S. coastal and inland waters. "The emphasis in the past has been on oil spill response and clean up. A prompt salvage has always been the best environmental prevention tool in the marine industry's response capability," Witte said.

ASA also plans to ensure open lines of communication and cooperation with regulatory authorities, both state and federal, the environmental community, and with shipowners and underwriters to promise effective operations in the future.

"The unique nature of U.S. operations heavily contributed to our decision to form a U.S.-based salvage association," Richard Fairbanks said. "We are committed to improved salvage and firefighting response in the near term."

Other pertinent issues, such as safety, insurance, increased training, adequate salvage assets and responder immunity are also at the top of ASA's list of priorities.

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Bisso Marine's 250-Ton Crane Makes Its Debut

Bisso Marine Co. has recently put its new 250-ton revolving crane the D/B Boaz into service. The American R-40 Crane has 175 ft. of boom and three

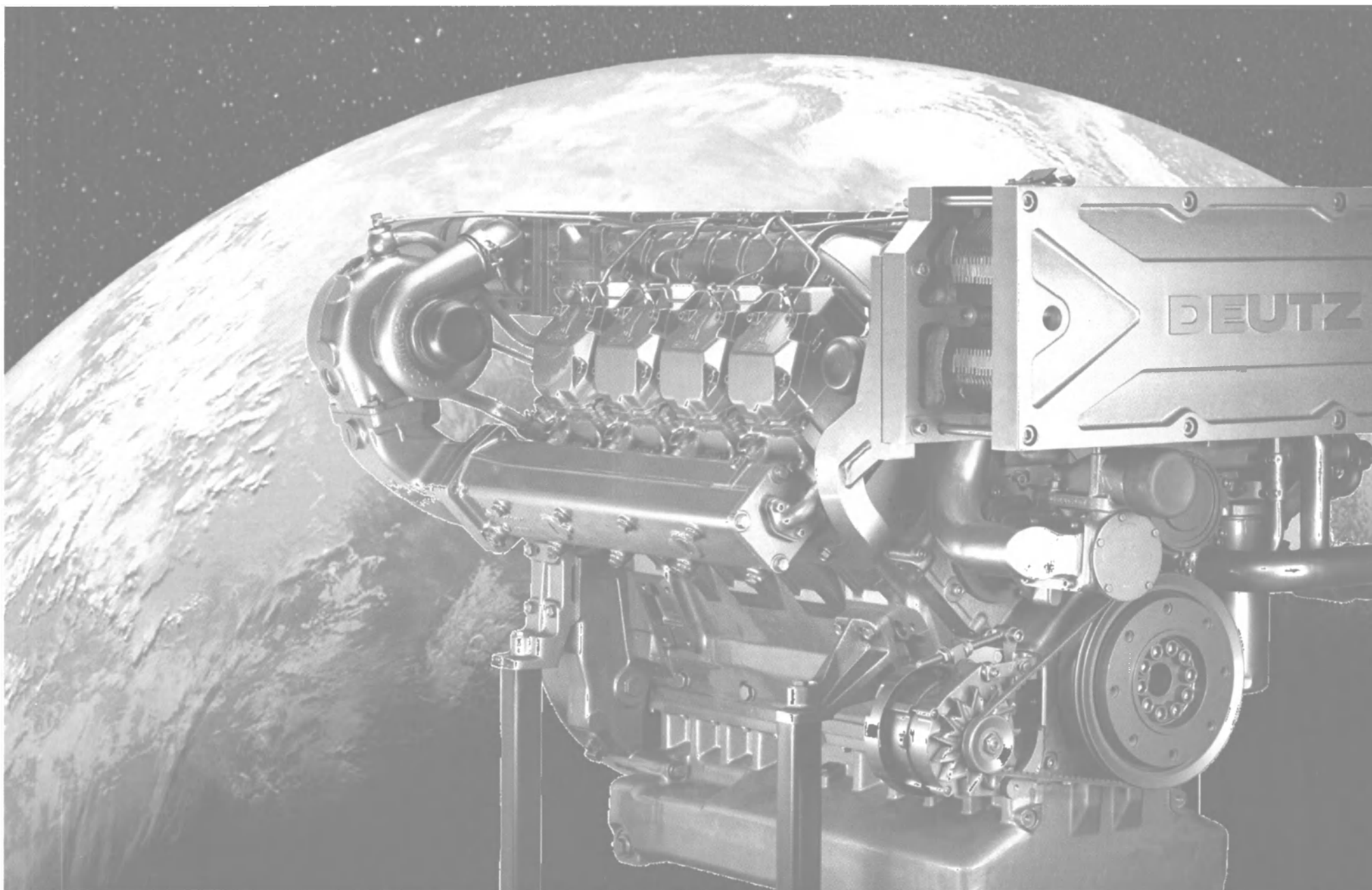


Bisso Marine's D/B Boaz is ABS classified and has living quarters for 34 crewmembers.

blocks with lift capacities of 250 tons, 80 tons and 20 tons. The barge measures 250 x 76 x 17 ft. with an operating draft of 10 ft.

The derrick has completed the swap out of a 90-ton compressor at an elevation of 125 ft. on a platform at Grand Isle Block 102 in 225 ft. of water.

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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

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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
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Vessel Focus on LNG Carriers

Gas Ship Design Challenges

by Syd Harris, F. S. Harris & Associates, Norwich, U.K.

Sophisticated they may be, but the designs of today's LNG, LPG and ethylene carriers are in reality based on the

simple parameters of the ideal gas laws governing the relationships between pressure, temperature and volume. In addition, the materials in direct contact with the cargo must be matched with the properties and characteristics of the

cargo. The key to the designs is the atmospheric boiling temperature of the cargo, i.e. ambient for fully pressurised LPG, -33 deg. C for anhydrous ammonia, -48 deg. C for propane, -104 deg. C for ethylene and -163 deg. C for LNG.

In terms of fleet numbers the total number of gas ships is small compared with oil tankers, general cargo ships or



Polar Eagle, an LNG Carrier built by IHI

passenger vessels. The current overall fleet of gas ships in service is a touch over 1,000, of which about 800 are LPG carriers, and just over 100 are LNG carriers, with the 90-strong ethylene carrier fleet making up the remainder.

Secret Cargo

Cargo tank designs can range from those on fully pressurised LPG carriers, for service at ambient temperature, at a pressure of 18 bar, to those on fully refrigerated LNG carriers operating with cargo at -163 deg. C, at a pressure of 0.25 bar.

The first purpose built LPG carrier Agnita was delivered to the Anglo-Saxon Petroleum Company in 1931, as Hull No 578, from the north of England shipyard Hawthorn Leslie & Co. Ltd., Hebburn, on the south bank of the river Tyne. The ship was fitted with 12 riveted cylindrical pressure vessel tanks for butane, mounted vertically in her oil cargo tanks, with a total capacity of 1,200 cu.m and a design pressure of 5.5 bar.

In keeping to the ship-owner's request, having spent a great deal of money in constructing a vessel for a special trade, any reference to the fact that the vessel had been specially constructed for the carriage of high pressure petroleum products was to be avoided. Hence, the Particulars of Class in Lloyd's Register of Ships described the tanker as: Carrying Petroleum in bulk — Fitted with cylindrical tanks of Sulphuric Acid.

Today, 69 years on, there are many trading routes where butane and propane are still transported under pressure at ambient temperature. 44 percent of the total number of LPG carriers in service are fully pressurised ships, with most operating coastal services in Japanese, Korean and Chinese waters.

The most versatile group of gas carriers are the small to medium sized pressurised and refrigerated vessels, up to 30,000 cu.m, capable of loading and discharging a wide range of LPG and chemical gases. Generally designed for a minimum temperature of -48 deg. C, a maximum pressure of 5 to 8 bar and a liquid cargo density of 0.97 for vinyl chloride (vcn), with independent low temperature steel cargo tanks.

Of similar capacities are ethylene car-



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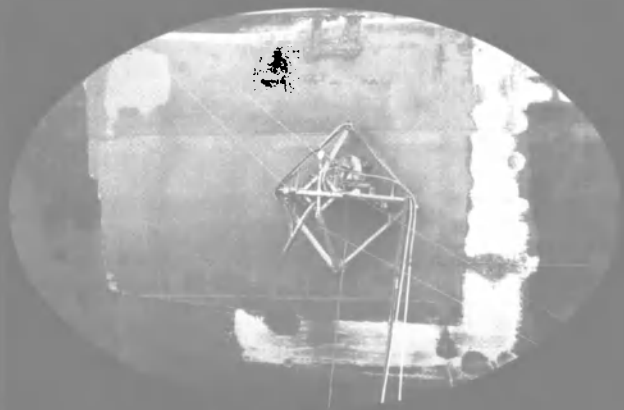
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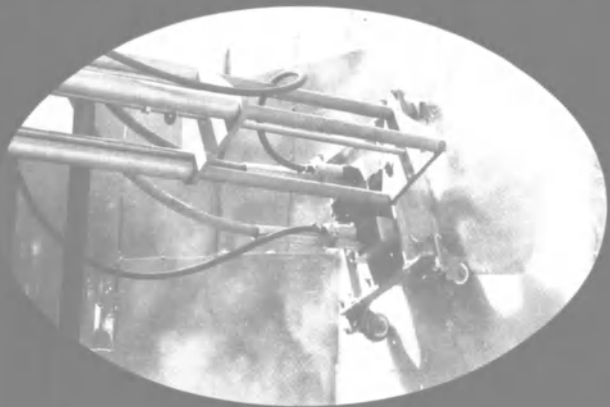
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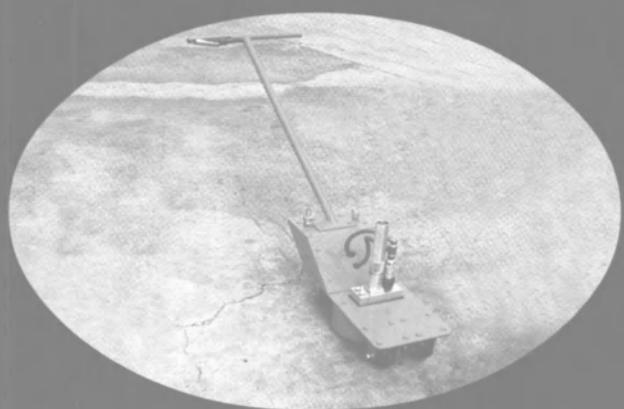
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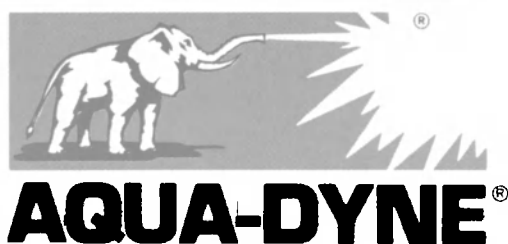
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Vessel Focus on LNG Carriers

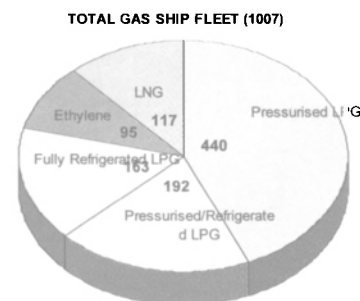
riers but with cargo tanks and cargo handling systems designed for a cargo temperature of -104 deg. C and constructed with nickel steels or stainless steels.

The larger LPG carriers, up to 100,000 cu. m, are fully refrigerated, with low temperature steel prismatic cargo tanks designed for a minimum temperature of -48 deg. C and a maximum pressure of

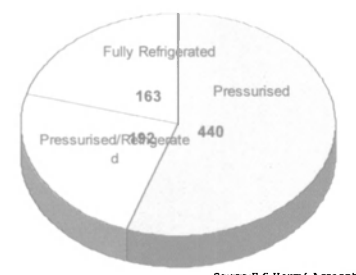
0.25 bar. The independent cargo tanks are not directly connected to the ship's structure, but are positioned with steel and timber supports, chocks and keys, which hold the cargo tanks in place.

LNG carriers are in service up to 138,000 cu.m capacity and are also fully refrigerated, with material in direct contact with the cargo being able to with-

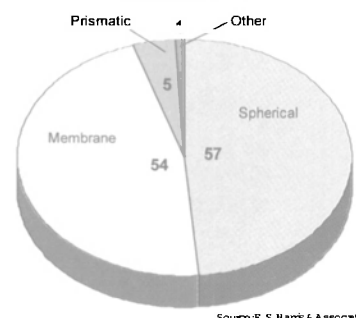
stand an operating temperature of -163 deg. C. Current designs incorporate independent aluminium alloy cargo tanks or have membrane containment systems. Independent spherical tank designs have a distinctively recognisable profile with the upper half of the tanks prominent above the main deck, while prismatic tank designs have a flush deck



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LNG FLEET (117)



arrangement. In the case of the more compact membrane systems, stainless steel or 36 percent nickel steel invar is used as the primary barrier.

Safety Features

No matter what the size or type of gas ship, ranging from the fully pressurised 1,500 cu.m An Long, trading between Chinese ports, to the 135,000 cu.m Zekreet, moving LNG from Qatar to Japan, they all need additional safety features to ensure the safe carriage of the cargo.

Cargo tanks must be protected from damage from grounding or collision. Accommodation and main machinery spaces need to be separate from the cargo area. Electrical installation are to be flame proof and intrinsically safe.

Cargo piping systems need to be free to contract and expand under the temperature changes, and free to move with cargo tank or hull deflections. Pressure relief systems should be fitted at each cargo tank and throughout the cargo piping, set to lift at the design limit of the system.

An emergency shut-down system is required to operate automatically in the event of loss of electrical or control power, valve actuator power or fire at the cargo manifolds or at the tank domes.

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Maritime Reporter/Engineering News

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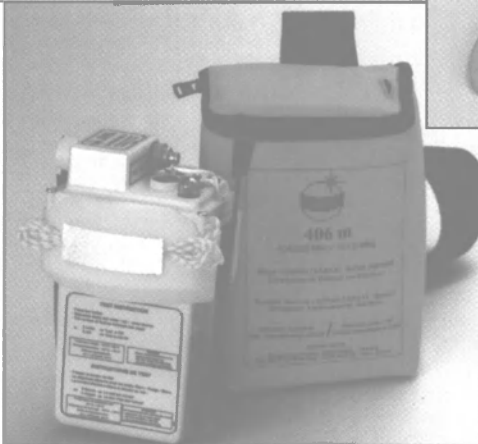
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systems are required, including structural protection, water main, water spray, dry chemical powder and fixed fire extinguishing systems in enclosed gas-dangerous spaces.

Extensive instrumentation is required to monitor all aspects of the cargo handling systems. Level indicator, liquid level alarms, pressure gauges and thermome-

ters are fitted throughout the cargo tanks and cargo handling systems. Crew members engaged in cargo operations require suitable safety equipment.

Steady Progress

Since that important day of 20th March 1931 when Agnita was delivered to her owners the development of gas

ship technology has been gradual and steady. Safety is always of paramount importance. This is represented in the outstanding progress made to arrive at today's sophisticated LNG, LPG and ethylene carriers fleet.

About the Author

Naval architect and marine surveyor

Syd Harris has been involved with liquefied gas carriers for over 25 years. An independent consultant since 1978, he invites you to visit his web page at www.fsharris.co.uk.

WMG Breaks Into Containership Realm

Washington Marine Group (WMG) is broadening its horizons by moving into the world of deepsea container shipping with two new companies names Seaspan Container Lines (SCL) and Seaspan Ship Management. Through WMG's newly formed subsidiary, SCL has ordered five 4,050-teu containerships from Samsung Shipyards. The vessels will be on a 10-year time charter to the China Shipping Group (CSG) - a state-owned shipping company based in Shanghai, China.

Samsung will commence the vessels' construction in November 2000, with the first scheduled for a July 2001 delivery — the last by November 2002. Designed to carry 4,050 20 ft. (6 m) containers at a service speed of 24.5 knots, the containerships measure 852 ft. (259.8 m), with a breadth of 106 ft. (32.2 m) and 50,000-bhp engines.

INTERTANKO's Marine Director Joins Acomarit Group

The International Association of Independent Tanker Owners (INTERTANKO) announced that its marine director, Captain **Robert Bishop** is to leave the Association and join one of INTERTANKO's members, the Acomarit Group.

Bishop has made significant contributions to INTERTANKO's achievements during his five-year period with the Organization. His work on behalf of the tanker industry at the IMO and his efforts in relation to ship vetting were but two important areas where his contribution has been particularly valuable.

Schoellhorn-Albrecht Introduces Newest of Capstan Series

Schoellhorn-Albrecht of St. Louis has presented the newest member of its high performing Capstan series. Model SA0814-10E features an 8-in. diameter barrel, a 10-hp motor with 20,000-lbs. starting pull, 10,000-lbs. running pull at 30-fpm. Schoellhorn-Albrecht Capstans are constructed to withstand severe operating conditions with minimum maintenance. Units can be electric, hydraulic or pneumatic. Electrical powered Capstan options include special marine coating and explosion proofing for hazardous applications.

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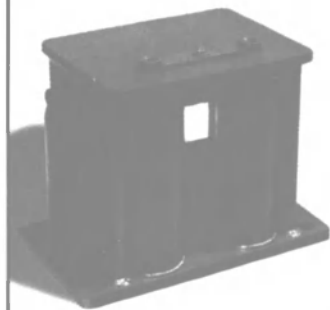
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Towing Vessel Manning Rules Postponed

The implementation of new rules on manning requirements and licensing of operators of towing vessels, scheduled for November 20, is being postponed until May 21, 2001, according to an Interim Rule (IR) that is being published in a Federal Register Notice. The additional six months will allow time for the Coast Guard to reevaluate some of the new requirements, as well as fine tune agency policies related to the rules, and give mariners and others affected by the rules additional time to familiarize themselves with them.

For additional information, please contact: Lt. Cmdr. Luke Harden, USCG Office of Operating and Environmental Standards, 2100 Second St., SW, Washington, D.C. 20593, tel: (202) 267-0229.



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McAlear Named CEO Of Kvaerner Philadelphia Shipyard

Kvaerner, the Anglo-Norwegian engineering and construction Group, has elected **Ronald J. McAlear**, as CEO of its Philadelphia Shipyard. He replaces **Baard Bale**, who has been acting CEO of the yard since June, and will be returning to Kvaerner's international headquarters in London in December.

McAlear has spent his entire professional career in the maritime industry, and currently holds a senior executive position with Litton Avondale Industries. He will assume his new position with Kvaerner in Philadelphia at the beginning of November.

McAlear, a well-known figure within the U.S. shipbuilding industry, boasts a solid background in shipbuilding, ship repair, ship-operations and marine equipment marketing and manufacturing.

He has held a number of senior positions with Avondale since 1988, and is currently vice president of Operations, reporting to the president of the company.

McAlear's appointment is expected to make the yard, which has been touted as one of the most state-of-the-art shipyards currently in operation, a solid investment for both customers, and future prospective owners.

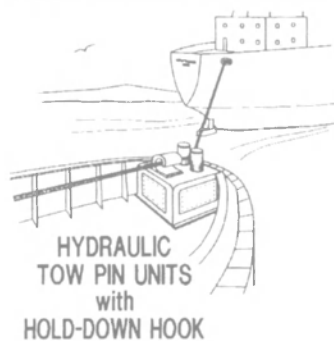
Trained in naval architecture and marine engineering at the Massachusetts Institute of Technology, and the University of Michigan, McAlear also undertook various management courses at Harvard, Tulane University and the University of New Orleans. He is a member of the American Society of Naval Architects and Marine Engineers and has an affiliation with the Propeller Club, the American Society of Naval Engineers, the Navy League, and the Surface Ship Navy Association. McAlear is also licensed in the state of Louisiana as a Professional Engineer.

IMO Undergoes Staff Changes

Various changes in senior technical positions have occurred recently at the International Maritime Organization (IMO). Beginning with **E. Mitropoulos** as director of the Maritime Safety Division (MSD), who has also been appointed to a newly created position as assistant secretary general.

O. Khalimonov (Russian Federation), has been elected as special advisor to the Secretary General on MARPOL-related matters. Meanwhile, **Koji Sckimizu** was appointed director of the Marine Environmental Division with **Du Dachang** assuming Sckimizu's former position. **A. Petrov** was appointed as senior deputy director in the Sub-Division for Technology and TC Implementation of the Maritime Safety Division, following the retirement of **F. Plaza**.

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Historical Keel Laying Occurs At Ingalls

A page was added in the history books of U.S. shipbuilding on October 11 when the keel was laid for a new 1,900-passenger United States Lines' ship — the largest ever to be constructed in a U.S. shipyard. The ceremony marked

the groundbreaking partnership between the Line's parent company, American Classic Voyages (AMCV), and Litton Ingalls Shipbuilding, who is the builder of this all-American cruise line.

The ship, which is yet to be unnamed, will be known for now as Project America Hull number one — it is the first of the two 1,900-passenger, 72,000-ton

ships that Ingalls will construct for the line. With a potential value of \$1.4 billion, the ships will begin cruising among the Hawaiian Islands in early 2003 and 2004.

However, the premiere ship of this series, the former ms Nieuw Amsterdam, which was owned by Holland America, will make its debut as ms

Patriot on December 9. Subsequent to transfer of ownership from its current owners to AMCV on October 18, the vessel will go to Cascade General Shipyard in Portland, Ore. for renovation in time for its inaugural sail date.

Yanmar To Launch 500-Hp Engine

Subsequent to the success of its 465-hp engine, Yanmar Diesel America introduced its new 500-hp, 7.4-liter, 6CX-GTE2 powerplant.

Based on the idea that there is a need for medium-to-high horsepower diesel power, Yanmar's engineers modelled the new engine on the efficiency of its 6CX-ETE, 420-hp engine. A newly designed head, fuel injection system, exhaust valves and other internal changes help to boost the engine's power by 16 percent over the 420-hp and seven percent over the 465-hp model.

Specifically suited for boats under 60 ft. (18.2 m), the new motor weighs 1,815 lbs. without gear, and measures 59 x 34 x 36-in. Boosting a power-to-weight ratio of 3.63-lbs per hp, the engine develops 500 maximum hp at 2,900 rpm and 440 hp at the high-speed cruise of 2,800 rpm. A quiet design technology promotes smooth, low-noise performance throughout the entire power band.

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R&D Program Expands Activities, Changes Name

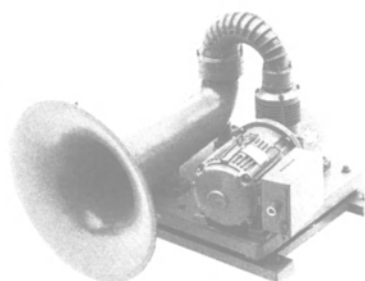
The Executive Control Board of the National Shipbuilding Research Program (NSRP) has changed the name of its flagship research and developmental program from Maritech Advanced Shipbuilding Enterprise (ASE) to NSRP ASE. This move is a reflection of the substantial growth of activities occurring beyond the initial R&D scope, thereby reducing confusion with the Darpa Maritech program — a predecessor to the NSRP ASE program.

Teekay Chooses DNV For Services Contract

Teekay Shipping has chosen Det Norske Veritas (DNV) for a variety of services including: classification, fuel testing, bunker quantity survey, training and emergency response services for 34 vessels and International Safety Management certification services for the entire Teekay fleet.

Teekay has also implemented DNV's new ship classification concept Nauticus operation, which provides electronic access to comprehensive data regarding a ship's design, construction, operation and history.

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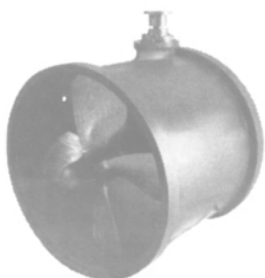


Model S-203C S-203 CHT

For vessels over 75 meters in length, this design allows both whistles to exceed 143 dB (1/3 octave band). The S-2036 and S-203 CHT are virtually maintenance free. Durability is ensured by the use of bronze and marine aluminum construction materials through out. For the most extreme cold weather operation, Model S-203 CHT (shown) includes a thermostatically controlled, heated enclosure for both the combination manual/electric valve, and the horn sounding body.

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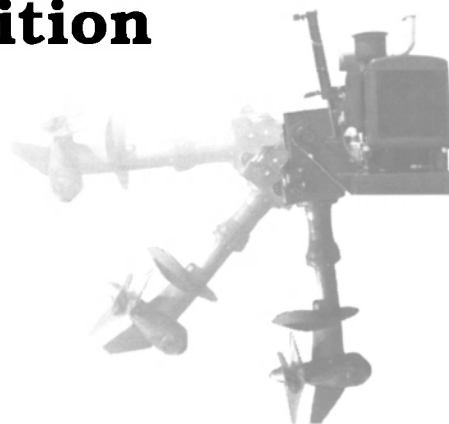
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Poland

Polish Shipbuilding Industry Consolidates, While Competition Continues To Boom

Poland boasts a varied and capable ship and boat building and repair base, a core of shipyards and marine equipment suppliers tested and proven to provide advanced marine solutions for owners both domestic and foreign. The companies, which constitute the Polish marine industry, are not unlike their colleagues from around the globe, in that the market forces of consolidation and competition continue to

shape and re-shape the industry today. A sign of arrival was seen earlier this year, when Stocznia Gdynia was one of the more active participants in the push to purchase Kvaerner's two high-valued Masa-Yards facilities in Finland, and its announcement of an impending Initial Public Offering. The following serves as an update on Polish marine activities.

Stocznia Gdynia Preps For Mid-2000 IPO

Poland's biggest shipyard Stocznia Gdynia plans to list on the Warsaw and London exchanges next June and invest its IPO proceeds in further developments. In business since the early 1950s, the shipyard has built more than 500 ships comprising more than seven million tons.

Gdynia, that has in past months been an active par-

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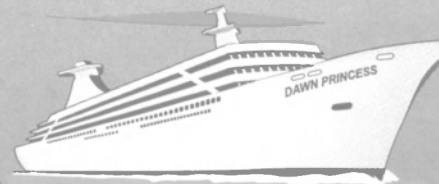
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Janusz Szlanta, president of Stocznia Gdynia's management board, is steering the yard towards its IPO next year while trying to position the yard to bolster ship sales 40 percent in 2000.

participant in the potential purchase of Finland's Masa-Yards, is owned by its management and employees, the state treasury and several minority shareholders. Last year Gdynia, the world's fourth biggest maker of container vessels, bought the neighboring bankrupt Gdansk shipyard.

With the IPO and the ensuing cash

flow, the company will be in a more favorable position for expansion, either organically or through acquisition, and plans on bolstering its internal logistical system, which allows the firm to cooperate with 800 suppliers in order to gain new contracts. The listing is seen by the yard as also bolstering its image and reputation among its customers and the

banks.

As of early autumn, Gdynia, located on Poland's Baltic Sea coast, has signed agreements to build 61 ships worth \$2.2 billion through 2003. Gdynia provides vessels that carry chemicals, gas and cars, as well as container ships.

Stocznia Gdynia entered this year with the ambitious plan of increasing ship sales by 40 percent to \$570 million through the delivery of 25 vessels. In the midst of its restructuring program initiated several years ago, the company is also reportedly making plans to acquire Poland's Polnocna shipyard, as well as to buy jointly a majority stake in ship engine maker H. Cegielski with smaller Szczecin shipyard and other partners.

Nauta Nears 75

The history of the Shiprepair Yard Nauta — which will turn 75 next year — goes back to early twenties and it is linked with construction of the seaport at Gdynia. It was obvious that the port could not exist without a workshop capable to carry repairs and to build small vessels needed to run a port.



Ya Troivo left Nauta Shipyard as the biggest and the most modern ship of its kind worldwide.

The first workshop was established in 1922 but the name Nauta came to light in 1926, afterwards it disappeared, but this year is recognized as the beginning of Nauta.

The important date in the yard's history was in 1954 when the first floating dock of 1,200 tons lifting capacity was installed. Further development was marked with further lifting facilities: 1966 — dock 3,500 tons; 1979 — dock 4,500 tons; and in 1993 elevator 600 tons.

Naturally those new facilities have not been the only factor in the shipyard's journey to become a diverse and efficient production facility, capable of accepting complicated jobs and completing them to a world-class technical standard. While it is efficient in any specter of work, the yard has a strong presence on the technically challenging end, particularly in bigger ships and lengthenings and conversions.

An example of this is the conversion

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of the British salvage vessel Challenger — originally in service for the British nuclear submarines — to a unique ship for excavation of diamonds from the sea bed.

Under its new name Ya Toivo, the vessel left the shipyard as the biggest and the most modern ship of its kind in the world. It was lengthened from 443 to 482 ft. (135 to 147 m) and widened from 59 to 79 ft. (18 to 24 m). The entire

structure was strengthened and the internal part was completely modernized.

The yard keeps prices competitive by employing a skilled yet flexible workforce of 870, 320 of which are employed by outside suppliers.

One of those companies the Velasalen Nauta Shipyard Ltd., possesses a specific status of a joint venture company with the Icelandic partner. Establishment of Velasalen derives from Nauta's orienta-

tion and expansion on Icelandic markets in the field of conversions of fishing vessels. In that area the Icelandic owners became main customers. Up to now more than 50 trawlers were modernized or restructured for Icelandic fishermen. Recently Nauta extended its activity on Dutch, Italian, and French markets with a wide offer of building tugs, barges and dredgers. The overall balance shows that export is increasing steadily and in 1999

it represented 90 percent of revenues. About 70 percent of revenues originated from conversions and newbuildings, with the remaining 30 percent coming from ship repairs.

While the yard has enjoyed a successful history, it is quickly entering a vibrant future with the planned modernization and its eventual privatization.

The first step to privatization — transformation from the state owned enterprise into the joint stock company — has been already completed. The next step is complete privatization, which will result in a reduction of employment with a parallel increase in production and services by about 50 percent. To achieve these goals, management is currently mulling several options, on of which is consolidation with the Naval Shipyard Gdynia.

Cenal Launches Stern Trawler

Cenal Shipyard in August launched the hull of the fishing vessel — stern trawler — measuring 126 ft. (38.3 m) with a beam of 34 ft. (10.5 m). The vessel, which has been built according to



DNV rules and regulations, has been approved for class notation DnV X1A1-Fishing Vessel Ice C. Approximately 416-tons, the hull was side launched on August 18 for Karstensens Skibsværft A/S. After voyage preparation, the vessel, which boasts main engines by MAN B&W, will be towed to Karstensens for outfitting and commissioning. The launching of two additional fishing vessels from the yard was executed in the same month.

Northern Shipyards Posts Profit

1999 was a profitable year for Northern Shipyard, not a claim many shipyards around the world can make. In all, the builder delivered 10 ships to foreign customers, including two partially outfitted trawlers and 105 ft. (32 m) tug hulls. As has become the custom around the world, Northern has established close working partnerships with some of its fellow national yards, and to this end delivered last July a multipurpose logistics support ship for Euroafrica Shipping Lines. As evidence that the yard is capable of delivering fully outfitted ships, it is building — with Gdansk Shiprepair Yard Remontowa (GSR) — a car-passenger ferry of its B590 design for a demanding Norwegian ship owner.

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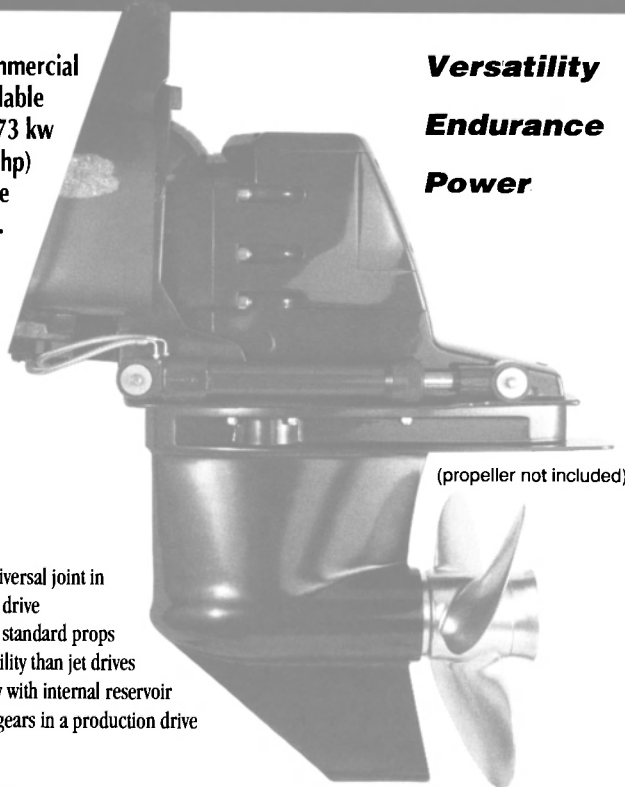
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PRS Seeks Strong Comeback, Stresses Safety

A large number of high profile tragedies over the last decade — despite the marine industry's overall good record for the safe transport of materials and people — have resulted in the loss

of many lives and ships. Even in the face of increasing technology and training, the industry is oftentimes humbled by the power of the sea.

The reasons these tragedies happen are

diverse, from human error to equipment faltering. However, another type that is equally insidious is structural failure, which has been identified as a significant reason for the loss of some types of ship, particularly older bulk carriers and tankers.

To minimize deterioration of a ship's structure throughout its whole lifetime, information on the ship's condition — as variously noted by class, ship owner, crew, administration, PSC, insurers, etc. — needs to be recorded and accumulated in a single, ship-based logbook.

The concept of this new, integrated method of tracking a ship's condition — which PRS has dubbed Consolidated Supervision System (CSS) — will create the basis for a single-source, centrally maintained record of relevant information.

Under the proposed system each vessel will carry a CSS Record Book to be issued by and registered with PRS. Observations relating to the hull structure and equipment condition, as made by the ship's crew and all other parties working on or inspecting the vessel, will be entered in the CSS Record Book to provide a single, central reference point for the accumulated information.

The system foresees that minor repairs may be considered as an element of the on-going maintenance process, provided that such repairs are carried out by appropriately qualified crew members and in accordance with approved procedures.

PRS proposes to develop and introduce a new tool to meet the needs of CSS. Provisionally called "frame technology" (FT), this will be planned individually for each ship applying and approved for CSS entry, and will be delivered approximately one year after the date of introducing the system. The FT instrument will contain information on particulars concerning design, structural areas requiring special attention, guidelines for inspections, permissible corrosion diminution of structural elements, as well as PRS accepted repair technology (diagrams, materials, welding sequence, etc.) to be applied by the crew. Crew training will be provided as an integral part of the FT-system implementation, with "hands on" training undertaken on board the ship by PRS surveyor-instructors. It will cover the Owner Officers-supervisors (e.g. Chief Engineer, Chief Mate, etc.) appointed by the Owner, as well as the crew members (fitters) who may obtain authorization to perform specified repairs (as prescribed and detailed in a ship's FT).

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SMM Update

New Marine Technology: The Hallmark of SMM 2000

The SMM exhibition in Hamburg has once again proven that it is the cradle of marine technology and the grand-daddy of all marine exhibitions. On display in 12 separate halls were more than 1,300 exhibitors from more than 50 countries, launching new products and discussing business with an estimated 37,000 visitors.

More telling than sheer numbers, in this case, is the feeling of the exhibition and the ubiquitous marine technology theme. The quality of attendee and exhibitor is always high, but this edition of the bi-annual exhibition seemed especially charged due to the many positives currently running throughout the full spectrum of the maritime market. While the show is generally equated more closely with the blue water market, there were some interesting statements from individuals, several claiming that it was indeed the best workboat show in the world.

Following is a synopsis of a whirlwind week of new offerings to make the process of designing, building, owning and operating ships and boats more efficient, cost-effective and with a higher degree of excellence.

Propulsion

Caterpillar and **Scana Industrier** signed a cooperation agreement to jointly develop, produce and distribute on a global basis all **MaK** propulsion packages (MPP), including MaK engines, Scana gearboxes, propellers and control systems.

MAN B&W meanwhile, has rounded out what it dubs the world's most advanced genset engine program with the introduction of the new L21/31 medium speed design joining **MAN B&W's Høleby** genset division portfolio. The 210 mm bore, 310 mm stroke design bridges the power gap between the L16/24 and the L27/38, which have already logged more than 600 genset engine sales. The L21/31 is available in 5,6,7,8 and 9 cylinder version, offering an output of 190 kW/cyl. at 900 rpm and 200 kW/cyl. at 1,000 rpm. the engine is poised to slowly replace the L28/32H series.

Innovation, particularly in the area of reducing emissions, has been a core R&D principle for all diesel engine manufacturers, and **Wartsila** is no exception. The company, which has recently re-grouped and re-named under the well-known Wartsila banner, has extended its EnviroEngine concept and the Wartsila common rail injection system for heavy fuel. The Enviro-Engine concept is the area under which

new technologies designed to provide Wartsila power solutions with an environmentally friendly edge are grouped. Earlier this year, a joint effort between Wartsila and Carnival Corp. under the EnviroEngine concept was announced.

The project intended to use common rail fuel injection for smokeless operation and to use direct water injection for NOx reduction down to 5 g/kWh.

Subsequently, interest from other owners in the broad realm of emissions

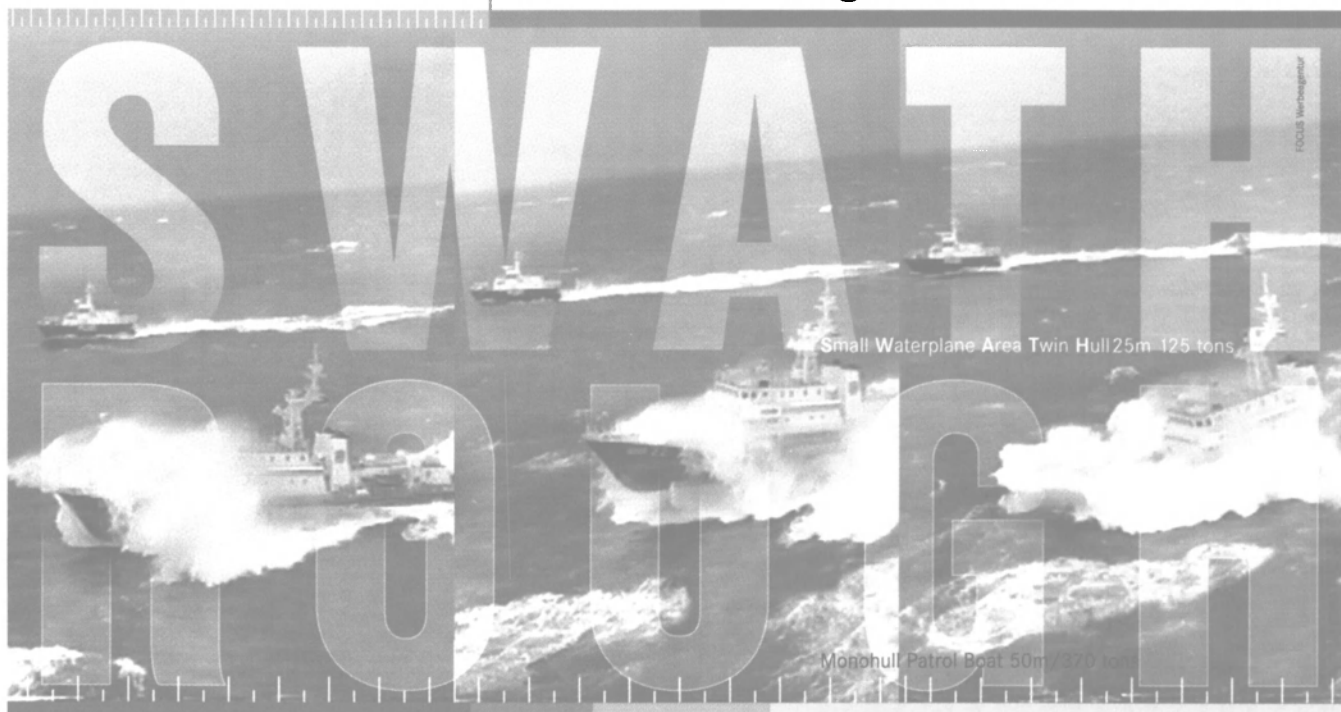
control — namely Low-NOx combustion and Compact SCR — have been brought within the scope of the Enviro-Engine concept, and it is intended that these technologies will be offered not only on new Wartsila engines, but to retrofit existing units.

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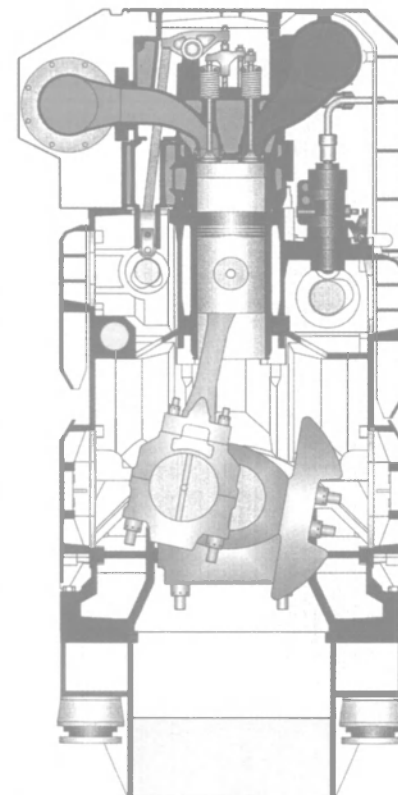
SMM Update

diesel engines, **Markisches Werk Halver (MWH)** at this year's show introduced its new pitch, "The Gas Exchange Optimizer," which represents the company's from a manufacturer of high quality gas exchange components to cover the entire system and its interactions. MWH's head of marketing, Torsten Ludwig, explained: "At first we

are listening to the specific customer needs to find solutions in our portfolio of products and services. We leave the choice to our customers whether they want to purchase individual components, our services or entire systems."

Renk AG of Augsburg was recently awarded an order for the construction of special purpose gear units for four

corvette-type MEK A200 navy ships under construction at **Blohm + Voss** and **HDW** for the South African Navy. The gear unit system is a novelty, a so-called WARP-propulsion system (WARP=Waterjet and Refined Propeller), which comprises two diesel engines and one gas turbine driving a pair of CP propellers and a centrally



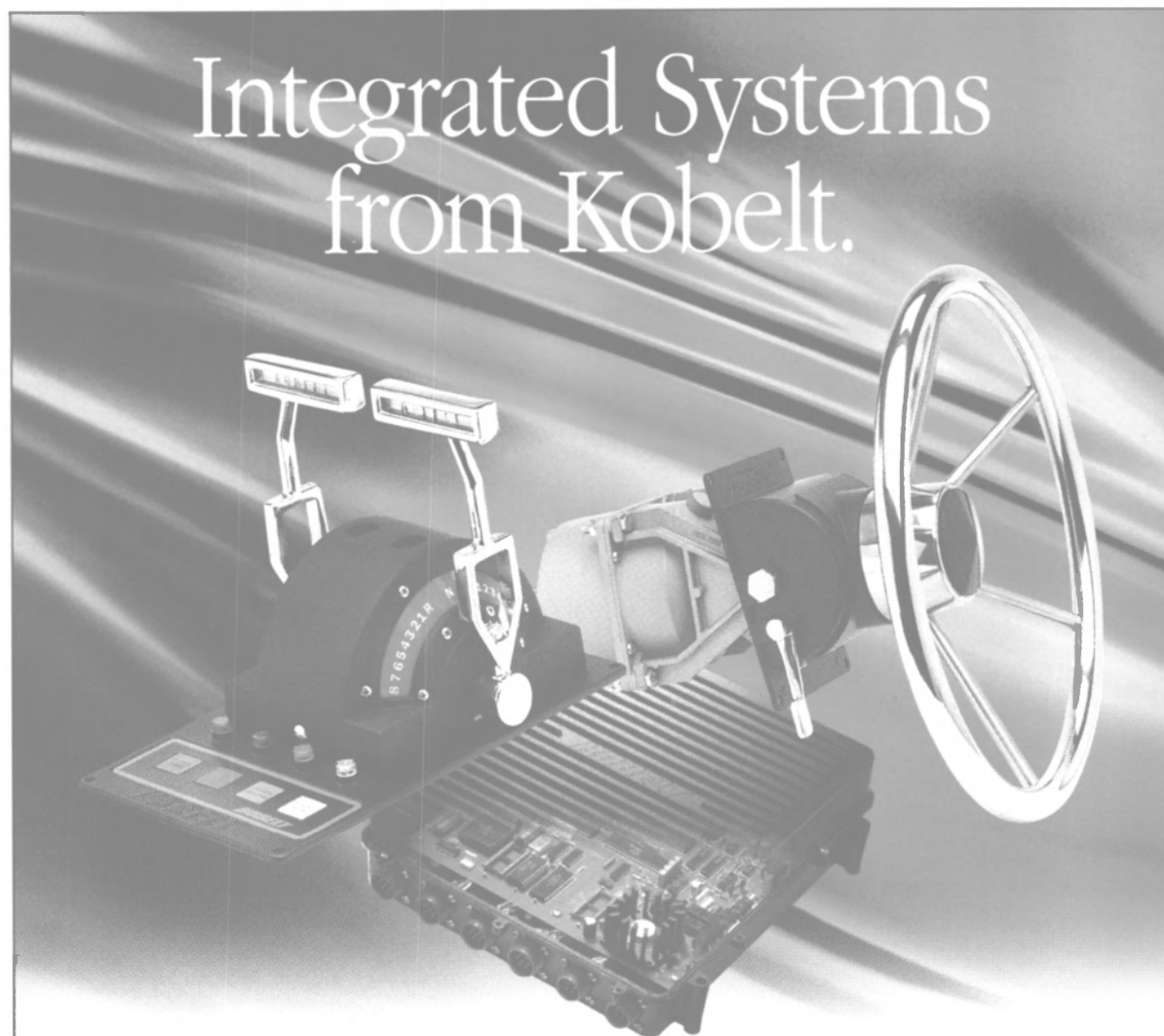
The L21/31 rounds out MAN B&W Holeby's genset portfolio.

arranged waterjet. In contrast to the customary CODAG system, the gas turbine does not transmit power to the CP propellers that are linked with the diesel engines, but to a separate waterjet thus acting as a booster turbine.

An innovator by the name of **Voith** has apparently struck again, as the company has proven in tank tests that the addition of the Voith Turbo Fin (VTF) results in an 18 percent increase in steering force, which obviously equates to greater safety in the operation of Voith Water Tractors. For years, the Voith Water Tractor has been renowned for its performance in its duties of escorting hazardous goods vessels, having been awarded the rating BAT - Best Available Technology - for tanker escort by Alaska's environmental authorities. A rotating tube at the end of the fin provides a specific boundary layer influence for a flow acting on the ship's hull, and a considerable increase of lift. According to the manufacturer, the relatively inexpensive retrofit can increase steering force up to 18 percent.

Electronics

Jotron Electronics introduced the latest edition to its maritime range in Hamburg, the new GMDSS float free satellite emergency beacon, Tron 40 GPS 406 MHz EPIRB with integrated GPS module. The Tron 40 GPS EPIRB features an integral 12-channel parallel GPS receiver within the compact Tron 40 GPS 406 MHz EPIRB, designed to operation with the COSPAS-SARSAT system. **Leica**, another name synonymous with quality marine electronics, introduced a new high-performance



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SMM Update



Leica's new MX 421 GPS/DGPS offers increased accuracy.

marine GPS/DGPS receiver designed to provide optimum accuracy and reliability. The new MX 421, powered by IBM's silicon germanium (SiGe) integrated circuit technology, is the first new commercial GPS/DGPS to emerge from a two-year R&D program by Leica and IBM. Gunnar Mangs, Leica's business manager for marine GPS, describes the new unit's advantages: "Field trials have shown that the MX 421 consistently achieves accuracy levels of under three meters in a stand-alone mode, and 0.8 meters when using differential error correction."

In Norway will reside the new company formed from **Premas AS** of Norway and **Satpool AB** of Sweden, two companies that have joined forces by establishing a new group of companies focusing on maritime communication and IT. In Norway, Satpool Software Solutions (ex-Premas) will have offices in Aalesund and Moss, while Satpool AB is located in Gothenburg, Stockholm and Malmo. "The main reason for joining forces is the obvious synergy creating better possibilities to become a leading international supplier of optimum solutions within Maritime IT and Communication," said **Eldar Foss**, managing director.

OceanView from **C-Map Norway** is a new product launched for use in the office environment. It is an electronic chart information system developed to meet the demand for a global marine information system, with its main purpose for the maintenance and easy distribution of various types of geo-referenced information using global coverage of electronic navigational charts. OceanView has recently been installed at IMO headquarters in London, where it is being used as a tool in day-to-day operations.

Cargo Handling

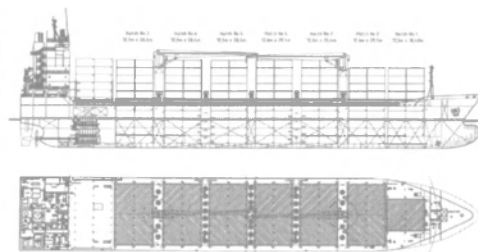
Dubbing it a new era in cargo planning and ship stability software, the formation of **Loadmaster International** was formerly announced at SMM. The new company is actually the merger of

two well-known entities — Sweden's **Kockumation AB** and the U.S.' **Herbert Engineering Corp.** — who believe that the new company creates an unmatched knowledge base in cargo planning and ship loading programs.

The two company's flagship products — **Loadmaster** and **Cargomax** — enjoy respective excellent reputations and are

featured in more than 9,000 installations.

The Bremen operations of **Hamworthy KSE's** Dry Cargo Handling Division announced several recent contracts for vessels building in Germany, Korea and the U.S. The first to be built by the **Kvaerner Philadelphia Shipyard** (Hull no. 001) is a 2,600 TEU contain-



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ership building for the yard's own account. It will feature 32 Hamworthy KSE lift-on/lift-off pontoon hatch covers. The German company's contract calls for the design and delivery of hatch covers weighing about 750 tons, as well as supervision of installation. In Korea at Hyundai Heavy Industries, two 3,300 TEU containerships building for Germany's Bernhard Schulte will feature Hamworthy KSE pontoon hatch covers.

Scana Skarpenord of Norway launched the fifth version of its Cargo-master tank monitoring system at SMM. Based on Windows NT/2000, Cargomaster v. 5 has already been installed and commissioned onboard the chemical carrier Stolt Aquamarine, one of Stolt's K-40 class, which is generally regarded as one of the most complex chemical ships in the world. Built at Daewoo in 1985 and originally fitted with Cargomaster v. 1, the ship features 58 stainless steel cargo tanks.

E-Commerce

The e-commerce side of the marine business has warmed considerably, ironically, as many dot com companies in the consumer sector are struggling for survival amid a crush of new offerings and a cooling on such issues by consumer company investors. Yet com-

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panies will continue to service the marine market with innovative solutions designed to save money and speed service, companies such as **B2B Netserve Ltd.**, which introduced its business-to-business Internet platform using the reverse auctioning technique. Beginning this fall, buyers and suppliers of maritime engine spare parts can meet in the Internet using this new platform. mespas.com is designed as a highly specialized platform, addressing itself to an international market of about 8,000 ship operators who have a cumulative 35,000 vessels under flag. The goal: to simplify the procurement of bids by buyers of maritime engine spare parts and, at the same time, to provide suppliers a new sales concept for their products.

A familiar addition to the e-commerce surge is **Wartsila Corp.**, which announced a new concept that will allow its engine users to order spare parts directly via the Internet, starting in February 2001. Each engine will have their

respective pages, and the site will be tailored to individual owners and operators so that a design and spares parts list is readily available for each and every engine. The move is part of the company's overall strategy to expand e-commerce operations and streamlining overall operations.

Nexus TradeLink is the name of a systems engineering marketplace being established by the Oslo-based **MAS Group**, designed as a B2B solution offering consulting and turnkey solutions within the field of marine systems engineering. Nexus TradeLink is targeting shipping and offshore engineering and manufacturing companies, particularly small and medium-sized enterprises.

Seeking to bring a unified solution to the world's shipyards in a package designed to link the yards, equipment suppliers and ship owners in a broad and comprehensive global network is **Tribon Solutions**, with its launching of the

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SMM Update

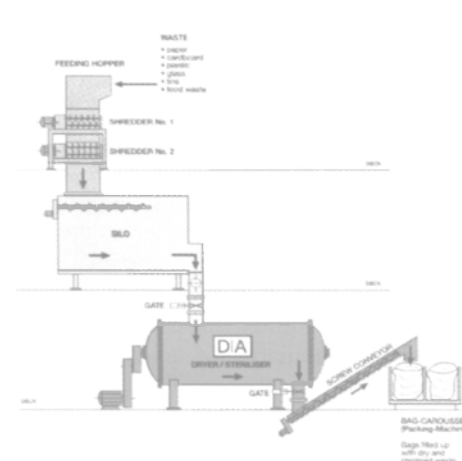
tribon-com marketplace. The company, former KCS, just a few months ago changed its name to reflect the introduction of this new business concept.

Another project designed to facilitate the flow of information between players is under the aegis of European Marine STEP Association, and at SMM there was a live EMSA demonstration to

exchange STEP data between the shipyard HDW, using NAPA Steel and three classification societies (GL, LR and DNV).

Deerberg Systems used a unique cruise aboard the Mississippi Queen to highlight its latest Green Ship Philosophy, as well as several other product and

technological developments. Deerberg offers a wide range of support systems, including the design and installation of components, or entire waste management systems, on a turnkey basis. A new idea highlighted by Deerberg Incinerator Alternative (DIA). Designed for smaller ships, the system can also be used to complement an incinerator



The DIA, Deerberg Incinerator Alternative

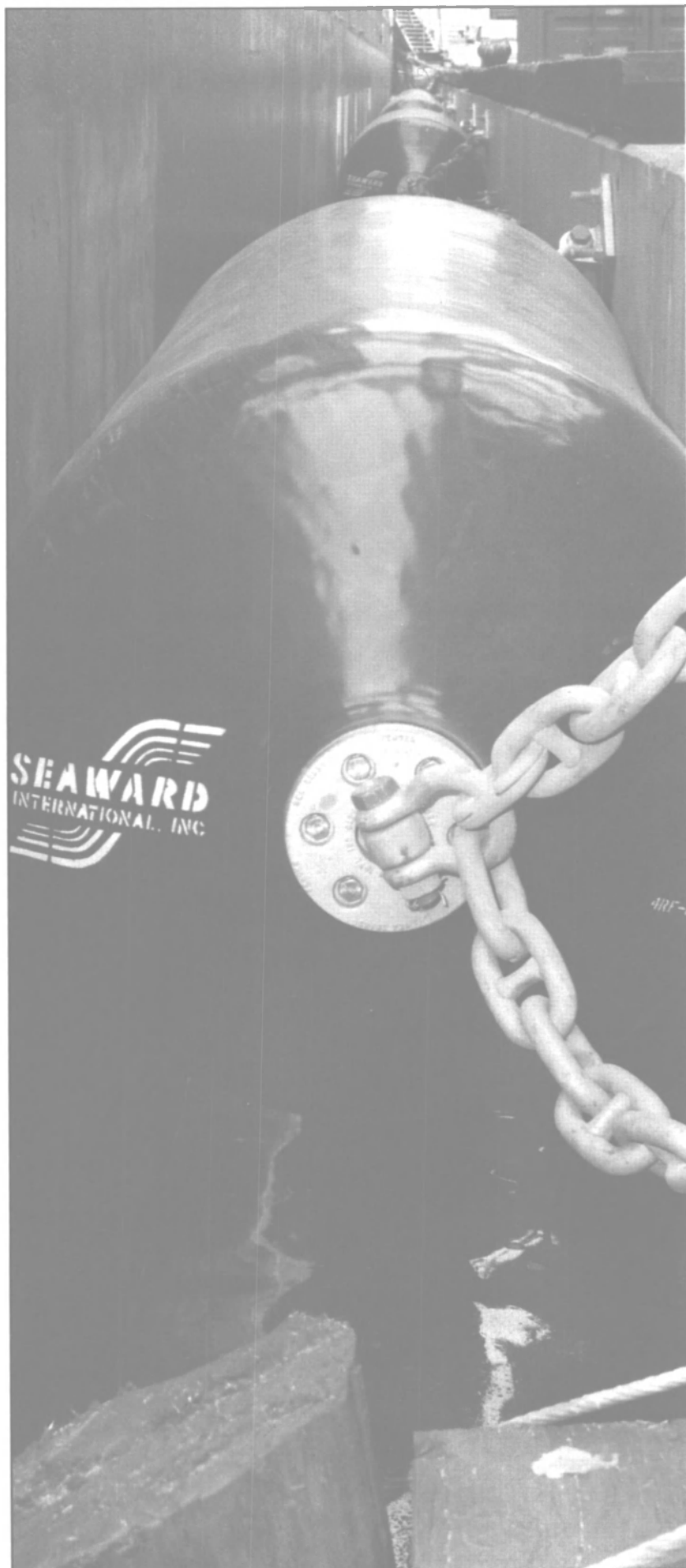
onboard larger vessels. Deerberg has proven that its system transcends theory as it has landed orders for Waste Management Systems onboard 10 new cruise liners.

In a move designed to foster electronic communications between ship designers and classification societies, **ABS** and **SENER** have developed STEP translators for FORAN and ABS SafeHull, respectively, based on the European Marine STEP Association scheme. This means that the entire hull cross section, including all plates, stiffeners and properties created with FORAN, can be automatically entered as input into ABS SafeHull, thus reducing the time for shipyards to comply with ABS rules, paving the way for efficient data transfer and cost reduction from the outset.

A unique pipe coupling systems, which should be of interest to both shipyards and shipowners was on display in Hamburg under the **Straub** banner. The Straub pipe couplings are unique because, depending on the diameter of the pipes involved, pipes are perfectly joined together in about two minutes without any need to machine the pipe ends first and without any risk of fire through brazing or welding. The simple installation of the maintenance free Straub pipe couplings mean that they can be fitted and serviced by semi-skilled workers quickly and safely. Some notable references for the company include the Fincantieri-built Grand Princess; Royal Olympic's Olympic Voyager; and Vasco da Gama, the world's largest floating dredger.

Bremen shipyard **SSW** announced a new contract during SMM, comprised of the building of three new 2,500 TEU containerships of the new SSW Super 25 design for Reederei ER Schiffahrt. There are options for an additional seven ships.

In addition, the yard won an approximately \$9 million contract for the conversion of a TT-Line passenger ferry, which will encompass reducing the passenger capacity and increasing the cargo capacity of Nils Holgersson.



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SMM Update



SSW received a contract to build three 2,500 TEU containerships of the new SSW Super 25 design, with an option for seven additional ships.

Schenker has re-launched a special service product for the needs of the global maritime industry: Schenker Marine Parts Service. Schenker's competence center for this upgraded logistics product for spare parts is located in Singapore. Six regional support centers covering Europe, Asia Pacific and the Americas guarantee local presence, proximity to the customer and speedy response, 24/7, 365 days a year. The service is a specialized transportation concept, offering ship owners, ship management companies, ship builders and manufacturers a global modular logistics service from door to vessel which aims at substantially reducing costs by way of incorporating Schenker's airfreight time-definite service options, as well as trucking, warehousing, seafreight and value-added services in any combination as required.

"Our upgraded product is an industrial solution for ship spares logistics. Our know-how, coupled with our experience as a logistics provider puts us at a competitive edge.

We are competent in transporting spare parts to all over the world, not only from door to door on the major trade lanes, but also into exotic harbors, off-line destinations, anchorage and even on board a moving vessel," said global

product manager **Peter Gunzelmann**, speaking at SMM.

Drew Marine and Lincoln Electric Europe bv of The Netherlands announced an agreement, which is an alliance to distribute welding electrodes with proven performance in a wide range of common shipboard applications. The electrodes to be supplied

under the initial agreement are manufactured by Lincoln's subsidiary, Lincoln Smitweld bv.

Drew Marine will distribute the full Lincoln Smitweld line, including Supra, Universalis and Baso general-purpose electrodes for mild steel; Conarc low-hydrogen electrodes for high-strength steels; and Kryo electrodes for low tem-

perature applications.

Saab Marine Electronics and Onboard-Napa signed a cooperation agreement to use their load computers as standard in all future deliveries. The agreement means that Saab Marine Electronics' customers will benefit from the most advanced computer program vessels.

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SMM Update

The "Wired" Ship

Saving space and weight onboard any vessel is tantamount to efficient operation and ultimately profitability. **Telenor Fiber**, a wholly owned subsidiary of Telenor, last month at SMM introduced a fiber-optic solution for

ships and maritime installations, a solution which replaces traditional copper cables and effectively shaves away precious pounds from any ship design.

Based on fiber optics, Telenor Fiber has developed communication solutions, sensors and other components for ships and maritime installations. Along

with its subsidiary Safety-One, which has developed and patented the hull-monitoring sensor, Telenor Fiber will increase its efforts in the development and production of optical sensors for structural monitoring and gauging pressure and temperature on ships.

In addition to weight savings, the fiber

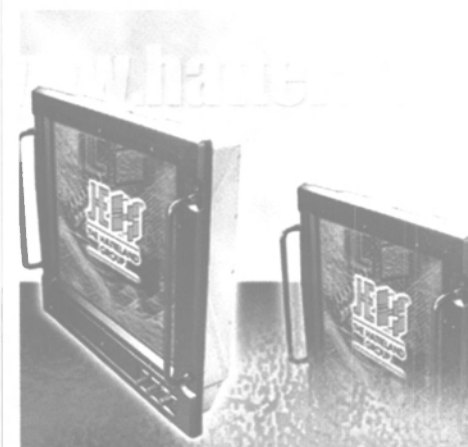
optic solution is anticipated to enhance safety as it can be installed in areas where the danger of explosion is greatest without undue risk or additional expense. Along with the hull monitoring systems, the ship's personnel will also be able to register stresses on the hull and symptoms of metal fatigue.

Norway's Navion has installed a fiber optic redundant network and hull monitoring sensors on their ship MT Navion Oceania, reportedly the first such installation in the world.

Circle 45 on Reader Service Card

Flat Screens, Big Images

The latest in navigation systems, machinery monitoring and control, internal and external shipboard management and communications feature flat screen displays, many of them from-



Jakob Hatteland Instrument AS of Norway.

Jakob Hatteland Instrument AS (JHI), part of the Hatteland Group, was established in 1987. The company offers a wide range of Industrial and Maritime monitors and displays for most applications. It uses components from the most reputable manufacturers, a list that includes Hitachi, Sharp, Fujitsu and NEC of Japan. All of the displays are fully tested before delivery and, where required, ruggedized to meet harsh working environments.

JHI offers a range of displays, type approved by the leading classification societies, for use in equipment operating under international regulations. In addition to the commercial marine sector, JHI flat screen technology is also supplied to many of the world's navies.

Among the latest products from Jakob Hatteland Instruments are the JH 20T02 M20, offering a 20.1-in. TFT display and the JH 18T01 M31, providing an 18.1-in TFT screen. Both these units have a full color maximum resolution of 1280 x 1024 pixels and a viewing angle of 160 degrees and 170 degrees, respectively.

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Propulsion Update

Wärtsilä Unveils Plans For The Future

As the business of providing power to marine vessels around the world continues to consolidate into the hands of fewer, larger companies, one of the more active companies — Wärtsilä Corporation — recently gave more insight into its long-term strategy as "The Ship Power Supplier."

Earlier this year, the company announced that, as The Ship Power Supplier, it offered complete marine power systems for all types of vessels, together with all associated services. As attested by the variety of companies both inside and out of the marine propulsion realm that are attempting to reshape their companies as a "one-stop-shop", such solutions are intended to add value and better satisfy the group's customers and business partners.

An essential tool in this strategy — in Wärtsilä's case — is the new e-business channel, which gives direct access to Wärtsilä's information and services, as detailed in the SMM wrap-up report starting on page 81.

Shipbuilders increasingly outsource work and look for cost savings to be more competitive. At the same time, shipowners are seeking greater performance from their vessels' machinery and propulsion installations and trying to achieve even greater reductions in life-cycle costs. There are clear market signals that customers want stronger relationships, including an emphasis on a single responsibility for ships' entire power systems. In that way, they can be assured that all equipment is well matched with no interface difficulties.

Wärtsilä's response is to take a holistic approach. It is shifting business focus from hardware sales through customized service concepts to being a supplier of systems. Wärtsilä is building on existing skills and competence to develop its applications, products and services to create highly functional and compatible total marine power solutions from a single supplier — The Ship Power Supplier.

Today, Wärtsilä offers a comprehensive range of marine diesel engines, of four- and two-stroke types under the Wärtsilä and Sulzer brand names, with outputs of 720-65,880 kW, together with reduction gearboxes and propulsion controls. Wärtsilä also offers gas diesel engines to run on gas from the wells. Wärtsilä's main market segments cover all types of commercial vessels, including container ships, bulk carriers, tankers, ferries, RoRo vessels, cruise ships, car carriers and reefers, as well as the specialized marine markets of naval ships, dredgers, tugs, offshore vessels

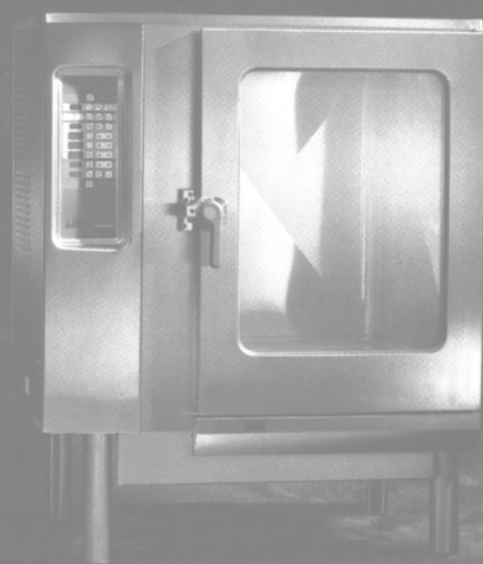
and fishing craft.

Shipbuilders and shipowners will both benefit from having a single supplier for a complete power system. Mainly shipbuilders will see important service benefits in system design, and project man-

Wärtsilä Corp. aims to become "The Ship Power Supplier."



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Propulsion Update

agement. In addition, they can be assured that all elements of the power system are well matched, and interface problems are avoided. For shipowners, a single-supplier system gives benefits in terms of operation and maintenance on board ship, as well as the availability of

extended after-sales support. Through a high degree of integration, shipowners will also reap the benefits of lowest life-cycle costs for their investment.

Product and Application Development

An important feature of The Ship

Power Supplier strategy is that Wartsila, as the single supplier, acts as the prime contractor to the shipbuilders and shipowners taking responsibility for the complete system and providing all related services. As part of this responsibility, Wartsila will apply its skills and

competence to identify and develop new products and applications, and integrate them into the product portfolio.

As necessary, Wartsila is also entering into strategic alliances with leading manufacturing companies. Such alliances, through their long-term working relationships, give particular benefits in ensuring that resulting marine power systems are well optimized and fully compatible. The first of these alliances was formed earlier this year with John Crane-Lips. This makes an important contribution to the range of hardware available to Wartsila as The Ship Power Supplier. To Wartsila's engines, gearboxes and controls, John Crane-Lips adds a range of propellers, both fixed-pitch and controllable-pitch types, with all types of thrusters.

Wartsila To Provide Power On Unique Icebreaking Tankers

Wartsila Corp. diesel engines were selected to power a pair of 106,000-dwt Aframax icebreaking tankers of the revolutionary new double-acting concept. The two tankers were contracted by the Finnish energy group Fortum Oil & Gas for building at Sumitomo Heavy Industries Ltd. in Japan with delivery by mid 2002.

Each ship will be powered by a 22.9 MW diesel-electric plant supplying all propulsion and ancillary power requirements. Each plant includes two Wartsila 9L38B diesel engines each of 6,320 kW output at 600 rpm, two Wartsila 6L38B diesel engines each of 4,220 kW and one Wartsila 6L26 diesel engine of 1,860 kW at 900 rpm. Electric propulsion is provided by a single 16 MW podded drive.

These icebreaking tankers will be employed between the North Sea and refineries in the northern Baltic ports of Porvoo and Naantali, which experience some 110-115 days of ice each year. They are thus being built to Ice Super class and will follow a revolutionary Double Acting Tanker (DAT) concept developed by the Arctic Technology Center of Kvaerner Masa-Yards in Helsinki.

In the DAT concept, the ship is designed for running astern as an ice-breaker, and ahead in open water. Thus the ship's stern is designed for optimum performance when breaking ice, making best use of the bow propeller effect to create a strong lubricating flow of water reducing friction between the hull and ice.

The forebody is designed to be more efficient in open water than a conventional icebreaking hull design.

Circle 47 on Reader Service Card



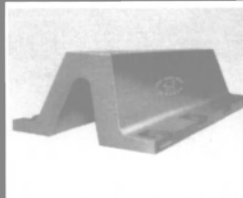
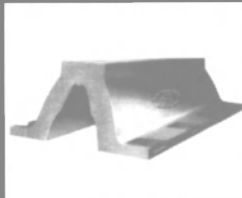
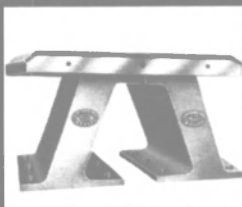
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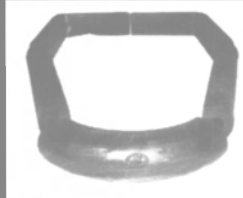
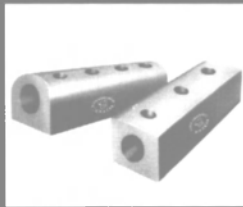
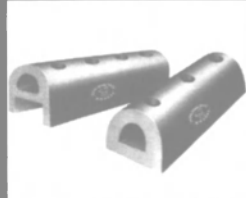
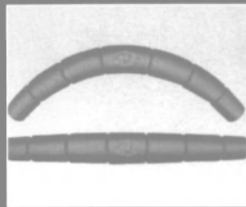
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People & Company News

Bollinger Promotes Roussel And Delaune To VP

Bollinger Shipyards has promoted **Craig Roussel** to vice president Corporate Procurement and development from his previous position of director of Corporate Procurement and Development.

The company also promoted **Freddie Delaune** to vice president Administration and Risk Management. Delaune previously served in various positions including director of Administration, Special Projects Administration and MIS director.

Deerberg Strengthens After Sales Market

Deerberg Solutions has formed a strategic alliance with TMS, Total Marine Solutions of Fort Lauderdale, Fla. Both companies will work to develop support for shipowners and operators in their quest to meet continually increasing regulatory compliance in relation to safety and environmental protection.

TMS' management team is headed by **Alexandra Anagnostis**, who combines more than 20 years of experience both in marine operations and more recently as director, Technical Purchasing for Royal Caribbean Cruises.

Circle 78 on Reader Service Card

AMCV Secures Financing For Delta Queen Coastal Vessels

American Classic Voyages (AMCV) has issued \$76.4 million of bonds guaranteed by the Maritime Administration of the U.S. Department of Transportation (MarAd). The financing will be utilized for the construction of two coastal cruise vessels that will be built at Atlantic Marine, Jacksonville, Fla., for Delta Queen Coastal Voyages — a subsidiary of AMCV.

MarAd's guarantee is made possible under the authority of Title XI of the Merchant Marine Act, 1936 — it represents approximately 87.5 percent of the total anticipated cost of the two coastal vessels — which includes shipyard and design costs, vessel furniture and fixtures, and interest during construction and guarantee fees.

The vessels covered under the funding are known as Cape May Light and Cape Cod Light. Named for historic lighthouses, they will be designed to resemble the classic coastal ships of the late 1800s.

Cape May Light's hull was launched in June, while Cape Cod Light's hull is scheduled to be launched on May 5, 2001.

Glasfeld Returns To Spirit Marine

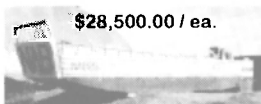
Spirit Marine, operator of harbor cruise entertainment vessels, has appointed **Michael Glasfeld** to the position of president.

Glasfeld, who had worked with Spirit in most of its markets for 14 years, became managing partner (a position that he will continue to hold) of Bay State LLC, a ferry and charter vessel company based in Boston, Mass., before rejoining the company.

First Cruise Vessel Answers The Call At Ystad

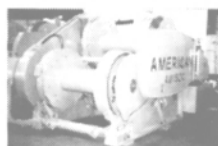
Hebridean Spirit, which was formerly known as R VI from Renaissance Cruises, called at Ystad in conjunction with the bi-annual International Military Tat-

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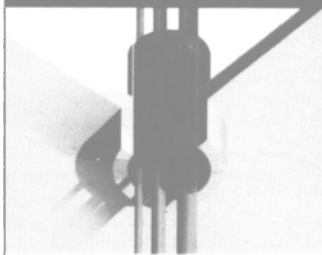


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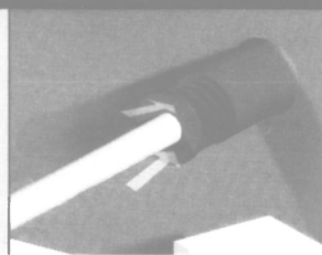
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People & Company News

too that took place this summer.

The vessel, which arrived in Ystad on August 18, was part of the Military Tattoo, which gathers more than 10 International orchestras and a city festival, that occurs in the streets of the medieval city — stretching from the port quays to the ancient monastery.

ABS Nautical Systems Chosen As Software Provider

ABS Nautical Systems LLC has been selected by Transpetro/Fronape, to provide fleet management software, consulting and implementation services for their 58 vessels and corporate headquar-

ters.

Transpetro/Fronape has contracted to use ABS Nautical Systems' fully integrated, practical operational management software, ABS SafeNet. This suite of software makes fleet management easier and more efficient by linking management operations with onboard

personnel to create a seamless information stream. The contract calls for use of eight modules: Maintenance and Repair, Purchasing and Inventory Control, Financial Reporting, Crew Management, Crew Payroll, ISM/STCW Compliance, Document Management and Commercial Modules.

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Quality in Command

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Solar Solve MD Elected To British Marine Council

Julie Lightfoot, managing director of Solar Solve Marine in South Shields, U.K., was elected to the British Marine Equipment Association Council. The first woman to be appointed to the council, Lightfoot has extensive experience within the marine industry.

Jamestown Metal Names Powell To VP Post

Jamestown Metal Marine Sales, Boca Raton, Fla., has elected **Allen A. Powell** to vice president, business development. Powell, who has been with Jamestown since 1996 when he joined as director, marketing and sales, will assume additional corporate responsibilities as well as new business opportunities for the company.

Horizon To Build Survey Vessel

Horizon Shipbuilding has commenced construction of a 48 ft. (14.6 m) aluminum survey vessel for the U.S. Army Corps of Engineers (ACOE), Galveston District. The vessel, which is an aluminum version of Stolkraft design, has an estimated cruising speed of 30 knots. It will be outfitted with a full suite of survey equipment including a multi-frequency retractable sonar.

According to **Travis Short, Jr.**, Horizon's president, the vessel's design was completed by Art Anderson & Associates, who will also serve as representative for the ACOE during construction.

Circle 5 on Reader Service Card

Duramax Holds Ground Breaking

Duramax Marine, manufacturer of water-lubricated bearings, broke ground on a new facility that will streamline the company's current manufacturing operations. The facility, which will be comprised of approximately 65,000 sq. ft. of factory and office space, will consolidate production and administration into one location in Troy Township, Ohio. It is scheduled to open during the first quarter of 2001.

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New Commander For Navy's Carderock Division

Captain **John H. Preisel** turned over command of the Carderock Division to Captain **Steven W. Petri** on September 26. Captain Preisel moves to the Naval Sea Systems Command (NAVSEA) in Arlington, Va. advancing mine and undersea warfare. Captain Petri, comes from NAVSEA where he guided development of the Navy's next attack submarine, the USS VIRGINIA Class (SSN-774). In the early 1990s Petri served as officer-in-charge of the Division's Acoustic Research Detachment in Bayview, Idaho. And from 1994-1997 he headed the U.S. Navy Hydrodynamic/Hydroacoustic Technology Center, a tenant unit here.

A 1978 Naval Academy alumnus, Captain Petri began his career as a submarine officer. Following designation as an engineering duty officer he studied at MIT, earning a master's in ocean engineering and a PhD in applied mechanics. He has been awarded three meritorious service medals.

Meyer Werft Commences Construction On New Passenger Vessel Series

Meyer Werft Shipyard, Papenburg, Germany has begun construction on the second in a series of new cruise vessels for Royal Caribbean. The ship will be

known as **Brilliance of the Seas**, and is part of a four-part series for the cruise company — setting new standards in both design and technology with so-called podded drives. Energy required will be generated by environmentally friendly gas and steam turbines, which will have a total output of 59,600 kW. The propellers will be directly driven by electric motors each with an output of 20,000 kW installed in a pod under the ship's hull.

Measuring 961 ft. (293 m), with a breadth of 105 ft. (32 m), the vessels will hold a service speed of more than 24 knots and will be able to carry 2,500 passengers in more than 1,050 cabins.

Delivery of the series' premiere vessel — **Radiance of the Seas** — is scheduled for early 2001 — with **Brilliance of the Seas** is due for delivery in mid-2002.

ExxonMobil Adds To International Team

ExxonMobil Marine Fuels (EMMF), has elected **Ahmed Zaki** and **Boris Nigbur** to its international

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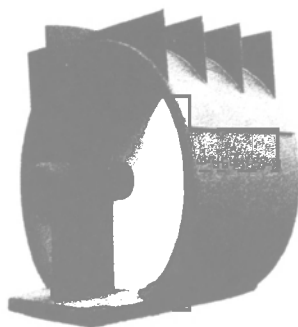
www.wortelboer.nl

Ahmed comes to EMMF from its local affiliate in Egypt where he worked in Marine Fuels Business Development.

Nigbur was transferred from the company's subsidiary in Germany, where he was involved in marine sales.



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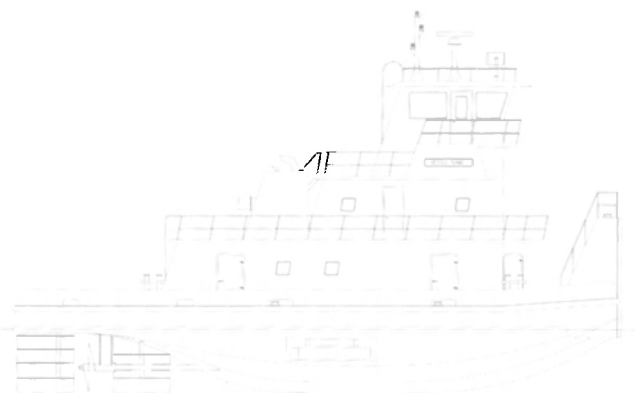
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Kvaerner Delivers Explorer of the Seas

Explorer of the Seas was delivered by Kvaerner Masa-Yards' Turku shipyard on September 28 to Royal Caribbean in time for its dedication and naming ceremony, which was held in New York on

October 21. The second member of RCCL's Project Eagle series, the vessel follows the successful delivery of the class' premiere vessel, Voyager of the Seas, which was delivered last October.

Known as a member of the largest class of vessels in the world, Explorer has a gross tonnage of 137,300 and is able to hold 3,840 passengers. Measuring 1,020 ft. (311.1 m), the vessel boasts a breadth of 126 ft. (38.6 m) at waterline level and holds a height of 237 ft. (72.3

m) from keel to the top of the funnel. The vessel's Post-Panamax size allows for the option of unique design features and interior solutions.

Upon its departure from New York, the vessel will steam south towards its homeport in Miami, Fla. to begin its first run of seven-day cruises to the Eastern Caribbean.

Explorer's production process commenced in June 1998 with its dock out occurring in November 1999. Successful sea trials took place in June of this year. Classified by DNV, the vessel was constructed by the yard in conjunction with a variety of turnkey suppliers. Design teams and architects that contributed to the project are comprised of the Norwegian firm Nijal R. Eide; Howard Snoweiss Design Group; Tom Graboski & Associates; Tillberg Design and Wilson Butler Lodge.

The vessel's power encompasses three azimuthing electric 14 MW Azipod units through 360-degrees, which was developed jointly by Kvaerner and ABB.

This podded electric propulsion system incorporates an electric AC motor located inside the propeller pod, which directly drives a fixed-pitch propeller.

So that it is able to manage four knots side winds, there are four 3 MW tunnel thrusters in the bow in addition to the Azipod units in the stern.

Sea trials proved that the vessel can move sideways with a speed of three knots.

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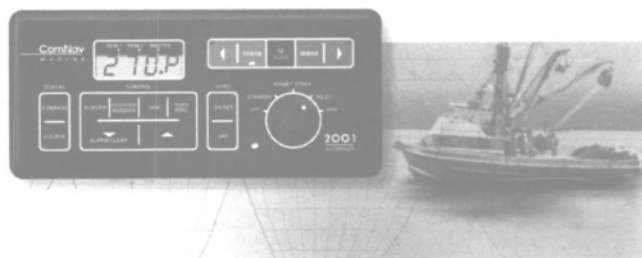
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The SatCom Shakeout

The satellite communications sector of the marine market has not been immune from the corporate consolidations that have swept all other corners of the industry, and while this particular niche has been widely regarded as fragmented, it is yet to be seen what the end effect will be for the communication users.

However, it can be assumed that competition is still keen, and the name of the communication game continues to center on quality, reliability and capabilities. With an increasing emphasis on the transmission of data rather than traditional voice or fax, it can be assumed that continued efforts will center on widening the information "pipeline" between vessel and shore.

Stratos Global Corporation in late August signed definitive agreements to acquire the Inmarsat, VSAT and aeronautical businesses of British Telecommunications plc for approximately CDN\$340 million. BT A&M is a provider of remote communications solutions, providing a full range of Inmarsat, VSAT and terrestrial solutions to customers in a variety of industries. BT A&M operates four teleports including two Inmarsat earth stations located at Goonhilly in the southwest of England and Netley in New Zealand.

At the time of the announcement, Stratos president and CEO, **Derek Woods** said "The transaction expands the geographic reach of our service offerings, gives us a strong entry into the North Sea oil and gas market, adds to our maritime capability and expands our portfolio of value-added products including the addition of a maritime portal with e-commerce capabilities."

The proposed transaction is subject to regulatory approvals.

Meanwhile, SpecTec's parent company Visma ASA signed an agreement to sell its marine division — SpecTec Group — to Netherlands-based Station 12 for about \$85 million. Station 12 has a service portfolio for voice, fax and (high) speed data mobile solutions based on the Inmarsat platform, and has been a leading player within the maritime industry for more than 15 years, that has aggressively pursued and captured a significant portion of complimentary companies during the past 12 months. It is 65 percent owned by Dutch telecommunications operator KPN and 35 percent by Australian telecommunications operator Telstra.

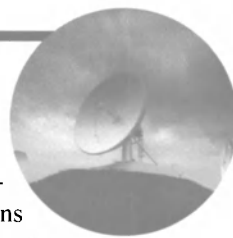
The SpecTec acquisition is significant because the company has a portfolio of IT tools and application software to increase maritime operational efficiency

November, 2000

includes database construction, training, outsourcing and consulting services. These capabilities are complementary to Station 12's activities and portfolio.

Knut Reed, CEO of Station 12 added: "We are very excited about this acquisition. It is line with our strategy. The combination of the world's leading maritime communication and software providers sets a new standard for service providers to this industry. Station 12 sets the pace in the convergence of mobile

satcom, applications and e-commerce, to provide innovative solutions to our current and new customers". The much-anticipated takeover of Comsat by Lockheed Martin — which was initially announced in September 1998 — was finalized towards



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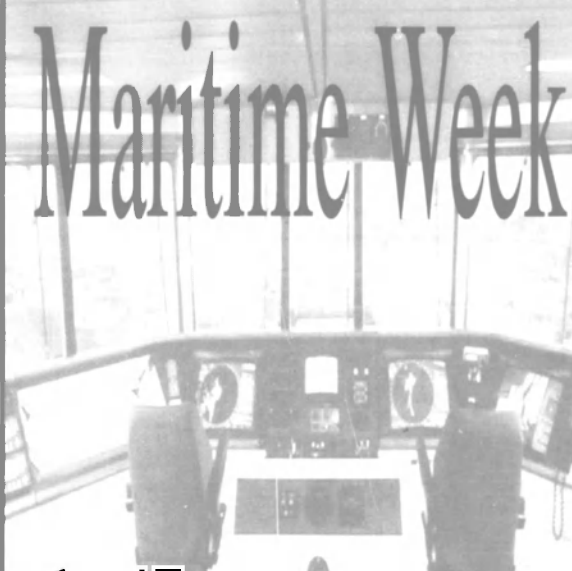
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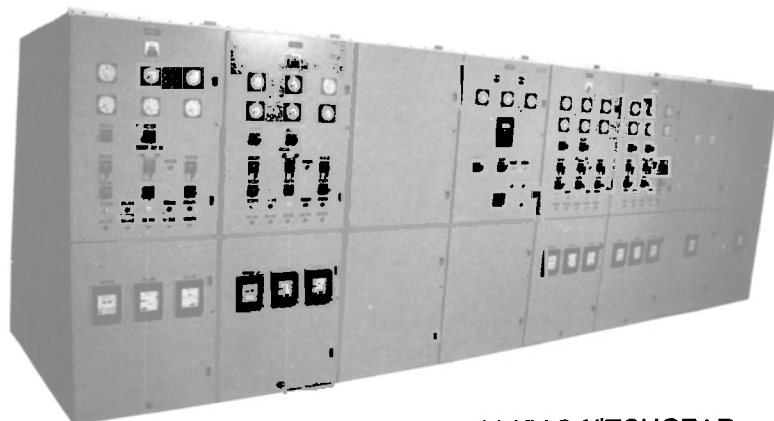
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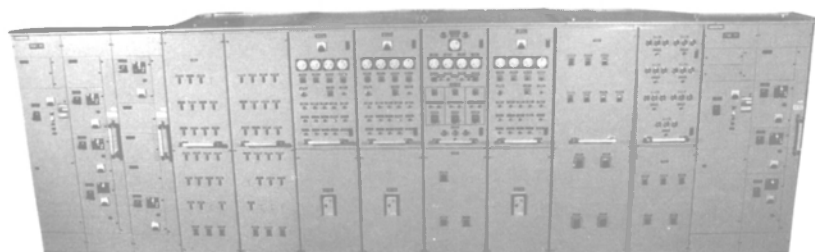
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Satellite Communications

the end of the summer, and the result is Lockheed Martin Global Telecommunications (LMGT), a new business with revenues estimated to approach \$1 billion/year. Services in the U.S. will be offered under the LMGT banner, while offshore Comsat International operations will retain their current designations. Falling back on the vast resources of both companies, the new entity is sure to be a major force in all markets it serves, including of course the marine market. LMGT becomes the U.S. owner, and the largest shareholder, in both Intelsat and Inmarsat systems.

Input Onboard

Ship and boat owners are harnessing the power of advanced communications capabilities in many different forms: such as a profit center for specialized vessels such as cruise ships; and as employee benefits for seamen forced to spend months at a time away from home. But the core value of increased and cheaper communication lies in the ability to share information between vessel and shore. Increasingly, companies are empowering onboard personnel with the responsibilities for the input and upkeep of valuable databases of information — information, which in turn is helping owners to operate and maintain fleets more efficiently and cost effectively.

One of the more innovative competitors in the realm of shipboard communications has been Boatracs, business unit of Advanced Remote Communication Solutions, Inc. (ARCOMS). In September the company announced that it had reached an agreement to develop an integrated information management system for the Seabulk Offshore Gulf of Mexico workboat fleet. The deal calls for an information system that allows for the crew to enter data directly into a database resident onboard the vessels. The data will then be transmitted via Satellite to Seabulk's offices and imported into a corresponding database. Initially the information system will allow Seabulk to receive daily master's logs, produce all payroll information, track and account for all fuel and lube, report all accidents and incidents and provide Seabulk customers with information via the Internet.

According to **Bill Merritt**, operations manager of Crew Boats, U.S. Gulf of Mexico for Seabulk Offshore, "The beauty of the Boatracs system is that it enabled us to address our early communications needs with a relatively simple solution that required a smaller investment and provided greater flexibility than other available systems. Our company is now ready to migrate from basic

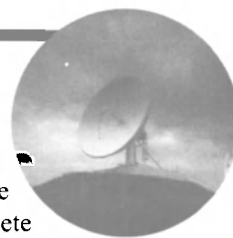
communication and positioning into a seamless information system between our vessels and our offices."

MarineOne Corporation recently released three -(3) new product lines: MarinePC, Marine Navigator and Marine Guardian, and subsequently

announced a contract to place the systems aboard five ENSCO vessels.

MarinePC is a High-Speed Marine Hardened Computer available in both Type Approved- ABS, DNV, Lloyds and Industrial Grade versions. The Marine Navigator is an Electronic Chart and


Integrated Navigation System. The Marine Guardian is a complete series of Alarm, Monitoring, Control and Automation systems. The company sold five integrated MarinePC and Marine Navigator systems for use



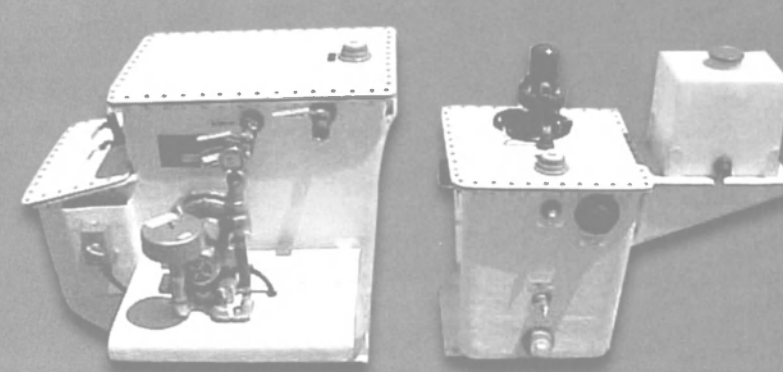
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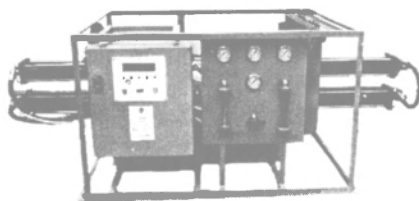
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"We are very excited about the introduction of these new product lines, and believe that we have developed unique and innovative products for the marine marketplace that will be distributed by our direct sales efforts as well as through distributors, dealers and on-line at The Marine Store, our internet shopping portal," said **Steve Weems**, president and CEO of MarineOne.

Shipowner Increases Security, Reduces Communication Cost

Greek shipowner and operator Marine Management Services (MMS) has been a firm advocate of technology-based communications systems for more than 15 years, as it was a leader in the use of e-mail messaging as far back as 1984. Its Piraeus office is the hub of its communications network, serving the U.K. and U.S. regional offices in London and New York, as well as its fleet of bulk carriers and tankers.

Since the 1980s MMS has progressively upgraded its computer systems to maintain a state-of-the-art system. "In the late-1980s offshore communications were costing us about \$100 per vessel per day (\$3,000 per month), mainly because of our extensive use of less economical and efficient communication systems and technologies available at that time," said **Constantinos Psomopoulos**, Marine Management's Information Services (I.S.) manager. "From early 1991 onwards very significant reductions were made — down to an average of \$1,200 per vessel per month — achieved with newer messaging technology and the use of GN Comtext's global communications network. This was some 80 percent lower than our actual costs would have been, with a real saving of about 60 percent when taking the growth of our traffic volumes into account."

During the January-June 2000 period the company's communications costs were between \$900-1,100 per vessel per month, "which is considered to be a further, very satisfactory reduction in this area of operational expense," according to Psomopoulos. "When compared with the 1980s figure of \$3,000 per month, and taking into account the underlying impact of cost increases driven by inflation during the past 15 years or so, the present result is even more significant," he added.

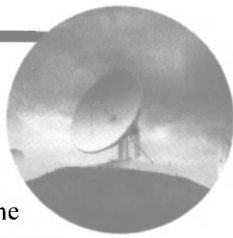
At end-1998 MMS moved to upgrade again, and Psomopoulos selected Lotus Domino for all office-based messaging control and management requirements. Although the system provides a very

secure environment under the Lotus Domino's cross certification process, the service available from GN Comtext at this point in time — for switching messages over SMTP — is limited to the protocol security. The total security of communications necessary to meet MMS's particular demands is an aspect Psomopoulos is currently working on with GN Comtext's office in Greece.

"All incoming and outgoing telex, fax and e-mail messages will be in the same environment," explains **Maria Kartali** of GN Comtext Hellas' Athens office. "Messages will be "encrypted" from our customer's Domino server through to the Internet then on to GN Comtext's server, where they will be decrypted and delivered to all destination addressees."

The company recently strengthened its line with the development of a low-cost messaging service specifically tailored to meet seafarer's needs. Dubbed Ocean-Connect Ocean-Mail, the system allows crew to send and receive private messages round the clock, worldwide, with no impact on shipboard communications systems. The system was developed in conjunction with Inmarsat, Stratos and Thrane & Thrane, and is designed to avoid onboard administration as well as easy installation.

Globe Wireless offers a similar system, a system it says provides sailors with the benefits of e-mail with no cost to the vessel. GlobeCrew allows crew



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Satellite Communications

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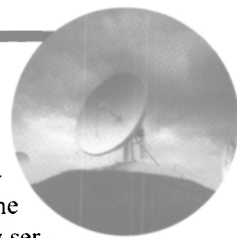
sages are always transmitted to and from shore using the Globe Wireless Digital HF Radio Network, ensuring that crew messages do not increase the company's satellite connection time and cost.

MCS Wins Costa Contract

Maritime Communications Services (MCS) signed a five-year agreement with Costa Crociere SpA. to provide global voice and data communications

for Costa's fleet including the newest ship, the Costa Atlantica. The new service will integrate Local and Wide Area Networking with Broadband technology to facilitate cost-effective and rapid transfer of large data files, while offering passengers, crew and staff the choice of voice, internet and video conferencing capabilities.

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Thrane & Thrane Capsat Messenger Enhanced

The first of many upgrades for the TT-3080A Capsat Messenger is now available from Thrane & Thrane. The Capsat Messenger terminal, may now be combined with the very robust TT-3008B antenna, that allows for a weather proof fixed installation at a remote site.

It allows access to a vast range of applications at the site via the many interfaces built in to the terminal. At the same time if everything else fails and the user loses complete power, there is still an integrated telephone and battery ensuring that contact is always possible.

Circle 196 on Reader Service Card

Globe Wireless Debuts GlobeRelay 2

Globe Wireless at SMM in Hamburg introduced GlobeRelay v. 2, the latest in its suite of shipboard communication products.

GlobeRelay is designed to allow shipboard users to use most common software packages for their day-to-day messaging. E-mail client software such as Outlook, Outlook Express, Lotus Notes, Eudora, Spectec AMOS Mail and many other can be used. GlobeRelay can also transport data and messages for most shipboard applications.

Circle 195 on Reader Service Card

Global Communications Offers Inmarsat B Terminal

Global Communications Solutions (GCS) now has available the Ocean-Link B Inmarsat B terminal for maritime voice, fax and data communications.

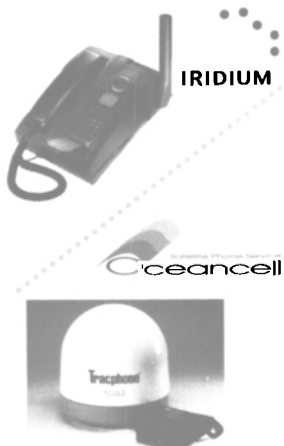
The system is touted as offering the world's smallest maritime antenna package on any Inmarsat B terminal.

The 56/64 kbps data capability combined with the compact antenna arrangement is seen as making the system desirable for both commercial vessels and yacht owners alike.

Circle 194 on Reader Service Card

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Circle 335 on Reader Service Card

Gulfcoast Transit Company has the largest U. S.-flag oceangoing fleet specializing in dry bulk cargo. We seek experienced mariners for both deck and engine positions. Our company, founded over 40 years ago, boasts a fleet of conventional tug-barge units, ITB's and ships.

Because we're owned by large, well established international company, team members enjoy generous benefits. Gulfcoast Transit's parent company, TECO Transport, is a subsidiary of TECO Energy, a diversified family of energy related companies.

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Interested candidates are encouraged to apply:

Gulfcoast Transit
Marine Human Resources
2101 GATX Drive, 2nd Floor, Tampa, FL 33605

Tel: 813-209-4261 e-mail: cramstromenergy.com
Fax: 813-677-5514 www.gulfcoasttransit.com

Equal Opportunity Employer

Circle 260 on Reader Service Card

Ferliship's New Ship Contracts • July-Sept. 2000

OWNER OPERATOR	COUNTRY SO	SHIPYARD	COUNTRY SB	TYPE	No	TEU	DWT	DELIV	PRICE M \$
AUGUSTA	ITALY	ORSKOV	DENMARK	AHSV	1	0	0	901	0
CHINA OFFSHORE OIL NORTHERN	CHINA	JINLING	CHINA	AHTS	2	0	3100	01	0
CHINA OFFSHORE OIL NORTHERN	CHINA	WUCHANG SHIPYARD	CHINA	AHTS	2	0	2630	01	0
KLYNE TUGS (LOWESTOFT)	UK	YANTAI RAFFLES SHIPYARD	CHINA	AHTS	1	0	1620	01	0
SWIRE PACIFIC OFFSHORE	SINGAPORE	INP HEAVY INDUSTRIES	KOREA	AHTS	6	0	0	2-Jan	82.2
SEA COAST TOWING INC.	US	HALTER MARINE INC.	US	BARGE	1	0	12000	01	0
IUM SHIPMANAGEMENT	UNKNOWN	TSUNEISHI	JAPAN	BULK CARRIER	2	0	106600	02	80
UNKNOWN	JAPAN	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER	3	0	51000	02/03	0
COSCO	CHINA	SHANGHAI EDWARD	CHINA	BULK CARRIER	2	0	50000	03	0
INUI STEAMSHIP	JAPAN	SAIKI	JAPAN	BULK CARRIER	1	0	31000	01	0
UNDISCLOSED INTERESTS	UNKNOWN	SHIKOKU DOCKYARD	JAPAN	BULK CARRIER	1	0	28200	01	0
COSCO	CHINA	ONOMICHI	JAPAN	BULK CARRIER	2	0	51000	2	40
COSCO	CHINA	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER	2	0	51000	3-Feb	40
JINHUI SHIPPING & TRANSP.	HONG KONG	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER	1	0	50800	1	20.9
CIDO SHIPPING	JAPAN	SHIN KURUSHIMA	JAPAN	BULK CARRIER	2	0	52000	2	0
ANANGEL SHPG. ENT.	GREECE	DAEWOO	KOREA	BULK CARRIER	2	0	75000	3-Feb	46
FAPALIOS	GREECE	HITACHI ZOSEN	JAPAN	BULK CARRIER	2	0	75000	1	48
KAWASAKI KISEN KAISA (K-LINE)	JAPAN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	1	0	170000	1	32
KUMIAI SENPAKU	JAPAN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	1	0	170000	1	32
NISSHIN KAIUN	JAPAN	KANASASHI CO	JAPAN	BULK CARRIER	1	0	75500	1	22
XIANG LONG SHIPPING	CHINA	KANASASHI CO	JAPAN	BULK CARRIER	1	0	75500	1	0
mitsui & CO.	JAPAN	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER	1	0	74200	2	0
UNKNOWN	UNKNOWN	SAIKI	JAPAN	BULK CARRIER	2	0	31300	1	0
JAPANESE INTERESTS	JAPAN	SASEBO	JAPAN	BULK CARRIER	3	0	71000	1	0
DOWA LINE	JAPAN	SHIN KOCHI JUKO	JAPAN	BULK CARRIER	1	0	13000	1	0
BLUE PLANET SHIPPING	GREECE	JING JIANG	CHINA	BULK CARRIER	4	0	44000	2-Jan	72
TODA KISEN	JAPAN	HAKODATE DOCK	JAPAN	BULK CARRIER	1	0	33200	0	0
CHINESE INTERESTS	CHINA	MINAMI NIPPON	JAPAN	BULK CARRIER	1	0	28100	1	0
MARMARAS	GREECE	SASEBO	JAPAN	BULK CARRIER	1	0	169770	2	37
NISSHO Iwai	JAPAN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	4	0	28100	2-Jan	0
IINO KAIUN	JAPAN	mitsui	JAPAN	BULK CARRIER	2	0	77000	2	0
RAINBOW MARITIME	JAPAN	HAKODATE DOCK	JAPAN	BULK CARRIER	1	0	24000	1	0
RAINBOW MARITIME	JAPAN	HAKODATE DOCK	JAPAN	BULK CARRIER	1	0	32000	1	0
KAWASAKI KISEN KAISA (K-LINE)	JAPAN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	1	0	88000	3	30
ALLIED MARITIME	GREECE	mitsui	JAPAN	BULK CARRIER	3	0	50000	1	0
ITOCHU CORP.	JAPAN	NAMURA SHIPBUILDING CO	JAPAN	BULK CARRIER	1	0	74000	2	0
mitsui OSK LINES LTD	JAPAN	NAMURA SHIPBUILDING CO	JAPAN	BULK CARRIER	1	0	176000	3	0
mitsui OSK LINES LTD	JAPAN	SANOYAS CORP.	JAPAN	BULK CARRIER	2	0	55000	2	0
mitsui OSK	JAPAN	NAMURA ZOSENSHO	JAPAN	BULK CARRIER	1	0	176000	-	0
GLOBAL MARINE SERVICES	JAPAN	VAN DER GIESSEN	NETHERLANDS	CABLE SHIP	1	0	8000	01	0
SOLSTAD SHIPPING	NORWAY	ULSTEIN VERFT	NORWAY	CABLE SHIP	1	0	10000	1	47.89
TYCO SUBMARINE SYSTEM	US	KEPPEL HITACHI	SINGAPORE	CABLE SHIP	2	0	7800	00/01	75.8
ASEAN CABLESHIP	UNKNOWN	JURONG	SINGAPORE	CABLE SHIP	1	0	9650	2	66
ACIN LIMITED	BELGIUM	MALAYSIA SHIPYARD	MALAYSIA	CAR CARRIER	2	0	6000	01/02	0
DOHLE/CSAV	GERMANY/CHILE	SZCZECIN SHIPYARD	POLAND	CONTAINER	3	3100	42500	02/03	111
BELLORE	FRANCE	HANJIN	KOREA	CONTAINER	3	1600	0	02/03	75
COSTAMARE SHIPPING CO	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	CONTAINER	3	6252	0	03	180
PACIFIC INTERNATIONAL LINES	SINGAPORE	SHIN KURUSHIMA	JAPAN	CONTAINER	4	1098	0	01/02	0
ARKAS	TURKEY	PEENE-WERFT	GERMANY	CONTAINER	2	1150	0	01	0
OSKAR WEHR	GERMANY	J.J. SIETAS	GERMANY	CONTAINER	6	1700	0		0
RICKMER/DOHLE	GERMANY	GDYNIA	POLAND	CONTAINER	4	4370	0	03/04	184
UNKNOWN	UNKNOWN	SZCZECIN SHIPYARD	POLAND	CONTAINER	1	1700	0	02	0
UNKNOWN	GERMANY	GDYNIA	POLAND	CONTAINER	2	1600	0	02	0
COSTAMARE SHIPPING CO	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	CONTAINER	1	4890	0	02	48
HAPAG LLOYD	GERMANY	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	CONTAINER	1	4890	0	02	48
NYK/MOL/K-LINE/SHOWA/IINO	JAPAN	IMABARI SHIPBUILDING	JAPAN	CONTAINER	2	6200	0	03	0
PACIFIC INTERNATIONAL LINES	SINGAPORE	SHIN KOCHI JUKO	JAPAN	CONTAINER	4	1100	0	01/02	0
ER SCHIFFAHT	UNKNOWN	SSW FAHR UND SPEZIALSCHIFFBAU	GERMANY	CONTAINER	3	2500	0	02	93
HERMAN WULFF	GERMANY	GDYNIA	POLAND	CONTAINER	1	2700	0	2	0
OSCAR WEHR	GERMANY	SZCZECIN SHIPYARD	POLAND	CONTAINER	2	1726	0		0
D OLTMANN SEESCHIFFAHT	GERMANY	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	CONTAINER	1	3900	0	1	0
ARMIN KLINGENBERG SCHIFFS	GERMANY	JIANGZHOU	CHINA	CONTAINER	2	670	0	2	0
SUISSE ATLANTIQUE	SWITZERLAND	HYUNDAI MIPO	KOREA	CONTAINER	2	2600	0	2	65
KAWASAKI KISEN KAISA (K-LINE)	JAPAN	IMABARI SHIPBUILDING	JAPAN	CONTAINER	4	6000	0	2	0
THIEN & HEYENGA	GERMANY	MUTZELFELDTWERFT	GERMANY	CONTAINER	4	1102	0	2-Jan	0
THIEN & HEYENGA	GERMANY	CONSTANTZA	ROMANIA	CONTAINER	4	1100	0	1/2/03	72
ZODIAC MARITIME (OFER GROUP)	NETHERLANDS	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	CONTAINER	5	6500	0	-	330
RAINER DREVIN	GERMANY	J.J. SIETAS	GERMANY	CONTAINER	1	868	10750	1	0
GERD BARTELS	GERMANY	J.J. SIETAS	GERMANY	CONTAINER	1	868	10750	1	0
WAN HAI LINES	TAIWAN	SHIN KURUSHIMA	JAPAN	CONTAINER	2	1675	0	2	50
GEBAB	GERMANY	AKER MTW WERFT	GERMANY	CONTAINER	2	2648	0	2	63.6
DIORYX MARITIME	GREECE	DAEDONG SHIPBUILDING	KOREA	CONTAINER	2	2500	0	2	62
NORDDEUTSCHE VERMOGEN	GERMANY	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	CONTAINER	2	5551	0	2	112
GERMAN INTERESTS	GERMANY	GDYNIA	POLAND	CONTAINER	6	4370	0	3-Feb	0
RICKMERS/DOHLE	GERMANY	GDYNIA	POLAND	CONTAINER	6	4370	0	3-Feb	273
OFER BROTHERS	ISRAEL	SAMSUNG	KOREA	CONTAINER	2	4000	0	3	0
NIEDERELBE SCHIFFAHT	GERMANY	AKER MTW WERFT	GERMANY	CONTAINER	2	2470	0	2	0
CHINA SHIPPING CONTAINER LINES	CHINA	SAMSUNG	KOREA	CONTAINER	4	4051	0	3-Feb	0
SZIDAT KG,HOLGER & HERBERT	GERMANY	GDANSK	POLAND	CONTAINER	2	1129	0	1	0
A. P. MOLLER	DENMARK	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	CONTAINER	5	4300	0	3-Feb	0
P&O	UK	ESTALEIRO ILHA SA	BRAZIL	CONTAINER	2	1712	0	3	60
WEHR, OSKAR	GERMANY	KVAERNER WARNOW WERFT	GERMANY	CONTAINER	2	2524	0	1	62
TURKON LINES	TURKEY	SEDEF GEMI	TURKEY	CONTAINER	3	1300	0	1	0
O.WEHR	GERMANY	K. WARNOW	UNKNOWN	CONTAINER	2	2524	0	-	70
UNKNOWN	GERMANY	YANGZUJIANG SHIPYARD	CHINA	CONTAINER	2	1180	0	2	0
LEONHARDT & BLUMBERG	GERMANY	GUANGZHOU	CHINA	CONTAINER	3	1200	0	3-Feb	54
COSTA CROCIERE	ITALY	FINCANTIERI	ITALY	CRUISE SHIP	2	0	0	03/04	776
UNDISCLOSED INTERESTS	UNKNOWN	LLOYD WERFT	GERMANY	CRUISE SHIP	2	0	0	02/03	737.4
COSTA CROCIERE	ITALY	KVAERNER MASA-YARDS INC	FINLAND	CRUISE SHIP	1	0	0	3	0
JAN DE NUL	BELGIUM	ASTILLEROS ESPANOLAS (SESTAO)	SPAIN	DREDGER	1	0	25000	2	70
NIIGATA PREFECTURE	JAPAN	ISHIKAWAJIMA HARIMA H.I. (IHI)	JAPAN	DREDGER	1	0	3700	2	0
THAILAND GOVT HARBOUR	THAILAND	DEGGENDORFER	GERMANY	DREDGER	3	0	500	1	0
SINGAPORE INTERESTS	SINGAPORE	WAVEMASTER	AUSTRALIA	FAST FERRY	6	0	0	-	0
SINGAPORE INTERESTS	SINGAPORE	WAVEMASTER	AUSTRALIA	FAST FERRY	6	0	0	-	0
UNKNOWN	UNKNOWN	HALTER MARINE INC	US	FERRY	2	0	0	01/02	0
AUSTRALIAN INTERESTS	AUSTRALIA	OCEANFAST FERRIES	AUSTRALIA	FERRY	1	0	0	2	0
CLEARWATER ATLANTIC	CANADA	ARMON	SPAIN	FISHING	2	0	750	1	0
UNDISCLOSED INTERESTS	FRANCE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	FSO	1	0	0	03	150
VOSCO	VIETNAM	BACH DANG-VINASHIN	VIETNAM	GENERAL CARGO	1	0	12500	01	0
BOCKSTIEGEL REEDERI	GERMANY	MARMARA SHIPYARD	TURKEY	GENERAL CARGO	1	0	5250	1	0
HIRAMATSU SHOKAI	JAPAN	HONDA	JAPAN	GENERAL CARGO	1	0	2500	0	0
COSCO	CHINA	GUANGZHOU	CHINA	GENERAL CARGO	2	0	20000	1	70

Buyer's Directory

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR assumes no responsibility for errors. If you are interested in having your company listed in this Buyer's Directory Section, contact Susan Cosme at (212) 477-6700.

ACTUATORS, VALVE

J.A. Moody Equipment Specialist, Inc., 3223 Phoenixville Pike, Malvern, Pa 19355, (800) 355-3810 (Northeast); 809 Pecan Forest Court, Chesapeake, VA 23322, (757) 641-0080 (Southeast); 2130 7th Ave. W, Seattle, WA 38119, (206) 691-1000 (West); www.jamescoi.com

AIR CONDITIONING AND REFRIGERATION

Adrick Marine, 81 Mahan St., W. Babylon NY 11758
Repair & Installation, Equipment & Services
Carter Transcold, P.O. B. 4805, Syracuse, NY 13221
Stork Canada, 47 boul. Mané Victorin, Candiac, Quebec, Canada J5R 1B6

ALRHORN/SIGNALING EQUIPMENT

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

ALARMS, FACTORY MUTUAL-APPROVED

SELCO 353 A Asbury Commons Dr., Atlanta, GA 30338
Hermont Marine, 3528 Griffith St. Laurent Quebec Canada H4T1A7

ALUMINUM BOATS

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

ANCHORS AND CHAINS

Crandall Dry Dock Engineers Inc., P.O. B. 505804, MA 02150
Washington Chain Inc., Box 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
CornNav Marine, 1915 Stainesburg Ave., Vancouver, B.C. CANADA
Raytheon Marine Co., 22 Cotton Rd., Nashua NH 03069

BAKING MACHINE

Erika Record Inc., 20 Vanderhoof 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, Two Rivers, WI 54241
Orkot 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

BLOCKS & RIGGING

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

BOATBUILDER

Kvaerner Masa Marine, 1525 W. 8th Ave., Vancouver B.C. Canada V6J115
Kvichak Marine, 469 NW Bowdoin Pl., Seattle, WA 98138
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

BULKHEAD SEALS/PANELS

CSD North America, 880 Candia Rd., Unit 10, Manchester, NH 03109
Thermax, 15006 Shaw Rd., Tampa, FL 33625-5500

BUOYS

Datrex, 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

Albacore Research, 4196 Kashtan 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 Malmö SWEDEN
P.T.C., 128 Tech Drive, Waltham MA 02543
Scientific Marine Services, 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

CAPTAINS

G.J. Worleboer 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 Gulf Freeway, Houston, TX 77017
Hermatic Inc., 4522 Center St., Deepark, TX 77536

CAST IRON REPAIR

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

CHAINS

New England Marine & Industrial, 200 Spaulding Turnpike, Portsmouth, NH 03801
Washington Chain, P.O. Box 3645, Seattle, WA 98124

CLUTCHES

Haley Clutch and Coupling Corp., 1820 Hwy 1 North, Greenville, MS 38702

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
Brite Products, 14650 Dequindre, Detroit, MI 48212
Jntun Paints Inc. 1401 Severn St., Baltimore, MD 21230
Eureka Chemical Co., 234 Lawrence Ave., South San Francisco, CA 94080
Corrosal Inc., 70 E. Sunset Way, #251, Issaquah, WA 98027
Flow International Corp., 23500 64th Ave. South Kent, WA 98032
Mascoat Products, 3500 E. T.C. Jester, Suite N, Houston, TX 77018
Nace Int'l., 1440 South Creek Dr., Houston, TX 77084
NoFire Technologies, 21 Industrial Ave., Upper Saddle River, NJ 07458
Esgard, Inc., P.O. Drawer 2658, Lafayette, LA 70502
Fero Corp., 1301 North Flora St., Plymouth, IN 46563
Jamestown Distrib., P.O. Box 348, Jamestown, RI 02835
Chesapeake Specialties Products, 5055 North Points Blvd. Baltimore Md 21219
Wasser High Tech Coatings, 8041 South 228th St., Kent, WA 98032

COMMUNICATIONS SERVICE

Boatrac, 10675 Sorento 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

COMPOSITES PROCESSING

Composite Technology Consultants, Inc. 12310 Northwinder Row, Bayonet Point, Fla. 34667
Mektech Composites Inc., 40 Strawberry Hill Rd., Hillsdale, 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 Leggett Dr., Karata, Ontario, Canada K2K 1Z8
MIL Systems, 200-1150 Morrison Drive, Ottawa, Ontario K2H 8S9
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., Billerica, MA 01821
Spar Associates, 927 West St., Annapolis, MD 21401
Creative Systems, Inc., P.O. B. 1910, Port Townsend, WA 98368

COMMUNICATIONS

Hose McCann 1241 W. Newport Center Deerfield Beach, FLA 33442
Mackay Comm Inc. 2721 Discovery Dr. Raleigh NC 27616-1851

CONSULTANTS

Hornblower Marine, Pier 3 Ferryboat Santa Rosa, San Francisco, CA 94111

CONSOLE - GMDSS

Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851
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, FL 33315
MMC International, 60 Imp Dr., Inwood NY 11096
Raytheon Marine Co., 22 Cotton Rd., Nashua NH 03069
Scientific Marine Services, Inc., 101 State Pl., Suite N, Escondido, CA 92029
Stork Kwant, P.O. Box 23, 8600 AA Snnek, Netherlands
Kobelt Mfg Co., Ltd., 8238-129 St., Surrey, B.C. V3W0A6
Electronic Marine Systems, 800 Ferndale Pl., Rahway, N.J. 07065
Kookum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068

COUPLINGS

American Vulkan, 2525 Dundee Rd., Winter Haven, FL 33884
Mapco Products, 91 Willenbrook Rd., Unit B, Oxford, CT 06478
Centa Corp., 815 Blackhawk Dr., Westmont, IL 60559
Lo-Rez Vibration Control, Ltd., 186 West 8th Ave., Vancouver, B.C. V5Y 1N2
American Vulkan, P.O. Drawer 673, Winter Haven, FL 33882
MMC Int'l, 60 Imp Drive, Inwood, NY 11096

CRANE-HOIST-DERRICK-WHIRLES

E. Crane 241 Executive Dr. #3 Marion OH 43302
Bisso Marine Co. P.O. Box 4113, New Orleans, LA 70178
Holly Host Corp. P.O. Box 86, St. Clair Shores, MI 48080-0086
Edgewater Machine & Fabricators, P.O. Box 358, Edgewater, FL 32132-0358
Westmont Industries, 10805 Painter Ave. Santa Fe Springs, CA 90670

CRANKSHAFT DEFLECTION ANALYZER

FCS, Inc., 22 Main St., Centerbrook, CT 06409
Prisma Teknik AB Sweden, www.prismateknik.com

CRANKSHAFT GRINDING

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

CRANKSHAFT REPAIR

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

CUSTOM CLOSURES

Waltz & Krenzer, 91 Willenbrook 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 Chippendale Rd., Lutherville, MD 21093
DECK MACHINERY - Cargo Handling Equipment
Skookum, Inc., P.O. Box 280, Hubbard, OR 97032
Intercontinental Engineering, P.O. Box 9055, Kansas City, MO 64168
Edgewater Machine & Fabricators, P.O. Box 358, Edgewater, FL 32132-0358
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Rapp Hydram, 4433 27th Avenue West, Seattle WA 98199
Smith Berger Marine Inc., 7915 10th Ave. S., Seattle WA 98108
Superior Lidgerwood-Mundy, 1101 John Ave., Superior, WI 54880

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
Pall Rochem, 5775 Rio Vista Drive, Clearwater, FL33760-3114
Matrx Desalination, 3295 S.W. 11th Ave., Fort Lauderdale, FL 33315
Reverse Osmosis of South Florida 12301 SW 133 Court Miami, FL 33186

DESIGN CONSULTING

Fleet Technologies, 311 Leggett Dr., Kanata, Ont. K2K 1Z8 Canada

DIESEL ENGINE ANALYZER

Kiene Diesel, 325 South Fairbanks, Addison, IL 60101
FCS, Inc., 22 Main Street, Centerbrook, CT 06409
Hermont Marine Inc., 3528 Griffith St. Laurent, Quebec Canada

DIESEL ENGINE - Spare Parts & Repair

Baltic Spare Services Ltd 8 Astronomow St. 80-299 Gdansk Poland
Scardania Amecas Bkg., 502 Empire St., Montreal, QC H4R 2A3
Hermont 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, QC H4R 2A3
Goltens - New York Corp., 160 Van Brunt St., Brooklyn, NY 11231
Governor Control Systems, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
MAN B&W Diesel AG, Städtchstrasse 1, D-86153 Augsburg 1, GERMANY
MAN B&W Diesel AS, Tegholmegade 41, DK-2450 Copenhagen SV, DENMARK
MAN B&W Diesel, 17 State St., New York, NY 10004

Manso USA, Inc., 160 Davidson Ave., Somerset, NJ 08873
Motor-Service AB, Box 2115, S-144 04 Rönneby, SWEDEN
Motor Service-Hugo Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
Warsila Diesel, 201 Defense Highway, Annapolis, MD 21401

DIESEL ENGINE OVERHAUL

Goltens - NY Corp., 160 Van Brunt St., Brooklyn, NY 11231

DIESEL FUEL DECONTAMINATION

www.bunkerbuoy.com

Fuel Dynamics, 707 Mullet Dr. #110, Cape Canaveral, FL 32920

DISTRESS SIGNALS

Datrex, Inc., P.O. Box 1150, Kinder, LA 70648

DIVING & SALVAGE

Bisso Marine Co. P.O. Box 4113, New Orleans, LA 70178
H.J. Merrhu, P.O. Box 23123, New Orleans, LA 70183
JW Fishers, 65 Anthony St., Berkley, MA 02279
DOCK FENDERING SYSTEMS
Plastic Plings Inc., 1485 South Willow Ave., Rialto, CA 92376
Urethane Products Corp., 17007 South Broadway, Gardena, CA 90248

DOORS - MARINE & INDUSTRIAL

Mapco, Inc., 90 Forest Ave., Locust Valley, NY 11560
Juniper Int'l., 72-15 Metropolitan Ave., Middle Village, NY 11379
Waltz & Krenzer, 91 Willenbrook Rd., Unit B4, Oxford CT 06478
Manly Marine, PO Box 86788, N. Vancouver B.C. Canada V7L 4L3
DRY DOCKS-Design
Crandall Dry Dock Engineers Inc., P.O. Box 505804, Chelsea, MA 02150
Heger Dry Dock Engineers, Inc., 13 Water St., Holliston, MA 01746

EDUCTORS

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

ELECTRICAL EQUIPMENT

MMC International, 60 Imp Dr. Inwood NY 11096
ELECTRONIC INFORMATION SUPPORT
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolboten, NORWAY
Scientific Marine Svcs., 101 State Pl., Ste. F, Escondido, CA 92029

ELECTRICAL INSTRUMENTS

Seico USA, 2508 Lake Brook Ct., Atlanta, GA 30360

ELECTRICAL MOTOR DRIVES

Tech Power Controls, 10507 Faldstone, Houston, TX 77059

ELECTRONIC CHARTS

C-Map Commercial 133 Falmouth Rd., Mashpee, MA 02649

ELECTRONICS

Azonix Corp., 900 Middlesex Tpke., Billerica, MA 01821
C-MAP, P.O. Box 212, 4371 Egersund Norway
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Sure Seal Connects, 3951 South Plaza Dr., Suite 240, Santa Ana, CA 92704
ELEVATORS
C-Map Commercial, 133 Falmouth Rd., Mashpee, MA 02649

EMPLOYMENT

Boat Crews, 1 Seine Court, Suite 309, New Orleans, LA 70114

Peler D. Juan ESO, 14 Lafayette Court, Greenwich CT 06830

ENGINEERING SERVICES / MARINE ENGS

Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
U.S.M.M.A., 300 Steamboat Rd., Kings Point, NY 11024
Vibtech, Inc., Box 435, N. Kingston, RI 02852
DB Engineering, 1000 South Main St., Mansfield, Texas 76063

ENGINE ROOM LIGHTING/MONITORING & CONTROL

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

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

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

ENGINE ROOM REPLACEMENT PARTS

Manso USA, Inc., 160 Davidson Ave., Somerset, NJ 08873

ENGINES

GE Marine Engines, 1 Neuman Way, Cincinnati, OH 45215
Fairbanks Morse, 701 White Ave., Beolui, WI 53111
WARTSILA NSD CORPORATION, Box 252 Vasa Finland Fin-65101

EVACUATION SYSTEMS

DBC, 12351 Bridgeport Rd., Richmond, BC Canada

EVAPORATORS

Sasakura Engineering, 7-32 Takeshima, 4-chome, Nishiyodogawa, KY, Osaka555, Japan
Alfa-Laval Separation, Inc., 955 Meams Rd., Warrminster, PA 18974

EXHAUST GAS CLEANER

Gyro Chemical, P.O. Box 853, Deer Park, TX 77536-0853

EXTRUDED RUBBER PRODUCTS

Clean Seal Inc., P.O. Box 2919, South Bend, IN 46880

FAIRING COMPOUND

Philadelph Resins, P.O.B. 309, Montgomeryville, PA 18936

FANS - VENTILATORS - BLOWERS

Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA 94402

FASTENERS

Jamestown Distributors, P.O. Box 348, Jamestown, RI 02835
Superbolt, P.O.B. 683, Carnegie, PA 15106

FENDERING SYSTEMS/BUOYS - Dock & Vessel

Plastic Plings Inc., 1485 South Willow Ave., Rialto, CA 92376
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Duramax Marine, 16025 Johnson St., P.O. Box 67, Middlefield, OH 44062-0067

Seaward Int'l P.O. Box 98, Clearbrook, VA 22624

Viking Fender Co., 1160 State St., Perth Amboy, NJ 08861

Ultra Poly, Inc., 2926 South Steele St., Tacoma, WA 98409

Urethane Products Corp., 17007 South Broadway, Gardena, CA 90248

Schuyler Rubber Co., 16901 Woodred Rd., Woodville, WA 98072

Dolphin Int'l 881 SW 59th Ave Ft. Lauderdale FL 33317

FILTERS/FILTER SYSTEMS

www.bunkerbuoy.com

Boil-Filter Corp., 15 Int'l Dr., E. Granby, CT 06026
Luber-Finer, Inc., 200 South 4th St., Alton, FL 62806-1313

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

FINANCING

Summit Bank, 65 Madison Ave., Morrisown Ave., NJ 07960

FIRE HOSE BOXES

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

FIRE & SAFETY PRODUCTS

Brookdale International, 1-8755 Ash St., Vancouver BC, V6P6T3
Fr. Fassmer & Co. D-27804 Berne/Motzen, Germany, Industriestraße2
Nautical Safety Products, P.O. Box 590462, Houston, TX 774259
Gnnell Fire Protection Systems, 835 Sharon Drive, Westlake, OH 44145
NoFire Technologies, 21 Industrial Ave., Upper Saddle River, NJ 07458

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Fleet Technology, 311 Leggett Dr., Karala, 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. Kroger, 799 Brickelli 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, Bloomington, MS 39535-4454

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

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

Marine Design & Operations, Inc., 225 E. 1st Ave., Roselle, NJ 07033

Maritech, Seadiff, Bay Road, Newmarket, NH 03857

Maritime Design, 13000 Sawgrass Village Circle, Pomona, CA 92682

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 06428

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

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

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

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

NAV/COMM EQUIPMENT

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

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

St. Johns, Newfoundland, Canada A1A 2G8

Electronic Marine Systems, 800 Ferndale 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, Koboton, NORWAY

Standard Communications, P.O. Box 92151, Los Angeles, CA 90093

Waterway Communications System, Inc. 453 E. Park Pl., Jeffersonville, 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

Liton 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

NOISE & VIBRATION

Soundcoal, 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

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

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

MMC International, 60 Inip Dr. Inwood NY 11096

PAINTS/ANTI-FOULANTS

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

Wasser High Tech Coatings, 8041 South 228th St., Kent, WA 98022

PARTS LOCATOR SERVICE

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

PIPE FITTINGS/CUTTINGS/CONNECTING/ SYSTEMS

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 10648

POLLUTION CONTROL PRODUCTS

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

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

PROPULSION EQUIPMENT

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

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

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

ZF Marine 3131 SW 42nd St., Ft. Lauderdale, FL 33121

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 334, Trieste, ITALY

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

Gollens Worldwide, 160 VanBrunt 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

VSY 1N2

Mapeco, Inc., 91 Willenbrook 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, Ostervag 2, DK-4560 Højeby, 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

Omnihtruster 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 Courtnepark Rd., Mississauga, ONTARIO

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

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

Schotte-Werft, Josef Becker GmbH & Co. KG, HRP, 432 Realty Dr., Dreina, LA 70056

PUMP—Repair—Drives

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

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

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

RADARS —ARPA'S

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

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

REFER COMPRESSORS

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

REFRIGERATION COMPRESSOR REPLACEMENT PARTS

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

REPLACEMENT TREADS

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

RH PROPULSION

Gollens, 160 Van Brunt St., Brooklyn, NY 11231

RIGID INFLATABLE BOATS

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

ROPE—Manila—Nylon—Hawfers—Fibers

Cortland Cable Co., 44 River St.(FSR), 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

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

SAFETY PRODUCTS

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

MGI International, Ste. 113-980 West 1st Street N.Vancouver, BC CANADA V7P 3A4

Viking Life Saving, 1625 N. Miami Ave., Miami, FL 33136

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

Nautical Safety Products, P.O. Box 590462, Houston, TX 77259

Norwegian Maritime Equip. AS, Box 244, NO-5460 Husnes, Norway

SANITATION DEVICE—Pollution Control

Exceltech International Corp., 1110 Industrial Blvd., Sugarland, TX 77478

Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111

Hydroxyl Systems Inc., 9800 McDonald Park Road, Sydney, Bc V8L 3S8 Canada

Microphor, 452 E. Hill Rd., Willis, CA 95490

Owens Mfg., Hwy. 92, Youngsville, LA 70592

SATELLITE COMMUNICATIONS

Boatracas, Inc., 10675 Sorrento Valley Rd., Ste. 200, San Diego, CA 92121-1609

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

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

Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27604-1851

Norwegian Telecom, Postboks 6701 St. Olavs plass, N-0130, Oslo, Norway

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

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

Straios, 150 Metcalfe St., Suite 1900, Ottawa, Ontario K2P 1P1 Canada

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

SCARIFIERS

Desmond-Slephan, P.O.B. 30, Urbana, OH 43078

SEALS

Duramax Marine, 16025 Johnson St., Middlefield, OH 44062

Circle Seal Controls Inc., 2301 Wardlow Circle, P.O. Box 3300 Corona, CA

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

Sure Seal Connects, 3951 South Plaza Dr. Suite 240, Santa Ana, CA 92704

SENSORS

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

SEPARATORS—LUBE OIL/FUEL OIL

(www.bunkerbuyer.com)

SHAFT HORSEPOWER MEASURING SYSTEM

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

Instruments Computers & Controls, 78 Londonderry Tpke, Suite E 12 Hockset, NH 03106

SHAFT SEALS

Duramax Marine, 16025 Johnson St., Middlefield, OH 44062

SHAFTS

American Vulkan, 2525 Dundee Rd., Winter Haven, FL 33884

SHIP LIFTS

Synchroift Inc., Two Dakran Center, 9130 S. Dadeland Blvd., Miami, FL 33156-7850

SHIPBOARD MANAGEMENT SYSTEMS

Spar Associates, 927 West St., Annapolis, MD 21401

SHIPBOARD TESTING

Dayton T. Brown, 555 Church St., Bohemia, NY 11716

SHIPBUILDING—Repairs, Maintenance, Drydocking

Astilleros Espanoles, S.A. Ochandiano, 14-16 28023 El Plantio SPAIN

Atlantic Marine, Inc., P.O. Box 3202, Mobile, AL 36652

Atlantic Marine, Inc., 8500 Hecksher Dr., Jacksonville, FL 32226

Atlas Metal Sales, 1401 Unalilla St., Denver CO 80204

Bender Shipbuilding & Repair, P.O. Box 42, Mobile AL 36601

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

Blount Marine, 461 Water St., Warren, R.I. 02885

Bollinger Lockport & Larose, P.O. Box 250, Lockport, LA 70374

Cascade General Inc., 5555 N. Channel Ave., Bld. 71, Portland, OR 97217

Eastern Shipbuilding Group, 2200 Nelson Street, Panama City, FL 32402

Fincantieri SpA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY

FirstWave/Newark Shipbuilding, 2102 Broadway, Houston TX 77102

Frede Goldman Haller, 525 E Capitol Street, Suite 402, Jackson, MS 39201

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

Haller Marine Group, Inc., 13085 Industrial Seaway Rd, Gulfport, MS 39503

In-Place Machining Co., Inc. 929 North Buftum Street, Milwaukee, WI 53212-3793

Mariso USA, Inc., 100 Davidson Ave., Sommerset, NJ 08873

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

Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607

Tampa Bay Shipbuilding, 1130 McClosky Blvd., Tampa, FL 33605

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

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

SHIPYARD / CABLES

Atlantic Marine 8500 Hecksher Dr., Jacksonville, FL 32226

Damen Shipyards, POBox 1, 4200AA Gonnichem/Holland

Tampa Bay Shipbuilding, 1130 McClosky Blvd., Tampa, FL 33605

Marco, 230 W. Commorse Way, Seattle, WA 98199

SHIPYARD FOR SALE

Office of Shpbuilding & Marine Technology, 400 Seventh St., S.W., Washington, DC 20590

SHEAVES

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

SILENCERS

Houston Marine Training Services, 5728 Jefferson Hwy, New Orleans, LA 70123

SIMULATION TRAINING

Marine Safety, Marine Air Terminal, Laguardia Airport, NY 11371

SLIDING DOORS

Walz + Krenzer, 91 Willenbrook Rd. Unit 4, Oxford, CT. 06478

SOFTWARE

Autoship Systems, Suite 312-611 Alexander St. Vancouver, BC V6A1E1

SOUND CONTROL

Soundcoal, One Burt Dr., Deer Park, NY 11729

STEEL SERVICE CENTER

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

STEERING GEARS/STEERING SYSTEMS

A. Van der Velden B.V., Rotterdam, P.O.B. 2061, 2930 AB Krimpen a/d Lek, NETHERLANDS

Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken, NJ 07030

Engine Monitor, Inc., 179 Hickory Ave., Harahan, LA 70123

Summer Equipment, 24 West 4th Ave., Vancouver, B.C. V5Y1G3

Kobelt Manufacturing Co., Ltd., 8238-129 street, Surrey, B.C. V3W0A6

Jastram Engineering, 485 Mountain Hwy N., North Vancouver, B.C. CANADA V7J 2L3

STERN TUBE BEARINGS/ BUSHES

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

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

Vesco Plastics, P.O. Box 40647, Cleveland 2022, South Africa

STERN TUBE SEALS

Superbolt, P.O. Box 683, Carnegie, PA 15106

SURFACE PREP TOOLS

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

Aurand Mfg., 1210 Ellis St., Cincinnati, Ohio 45223

NLB Corp., 29830 Beck Rd. Wixom MI 48393

Graco, Inc., P.O. Box 1441, Minneapolis, MN 55440-1441

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

Schmidt, P.O. Box 37, Fresno TX 77545

TANK GAUGING SYSTEMS

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

TANK LIQUID GAUGES

Technical Marine Services, 6040 N. Cutter Circle, Portland, OR 97217

TANK LEVELING INDICATORS

ERL Marine Products div, PO Box 1026, New Albany, IN 47151-1026

MMC International, 60 Inip Dr, Inwood NY 11096

Prime Mover Controls, 3600 Gilmore Way, Burnaby V5G 4R8 CANADA

Saab Marine Electronics AB, P.O. Box 13045, S-402 51 Goleborg SWEDEN

Technical Marine Service, 6040 North Cutter Circle, Portland, OR 97217

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

King Engineering Corp., P.O. Box 1228, Ann Arbor, MI 48106

Technical Marine Service, 6040 N.Cutter Circle, Portland Ore 97217x

TESTING SERVICES

Wyie Laboratories, 7800 Govern's Dr. S.W., Huntsville, AL 35807

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

M.A.C.E., 5910 N.E. 15th Ave., Fort Lauderdale, FL 33331

THRUSTER SYSTEMS

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

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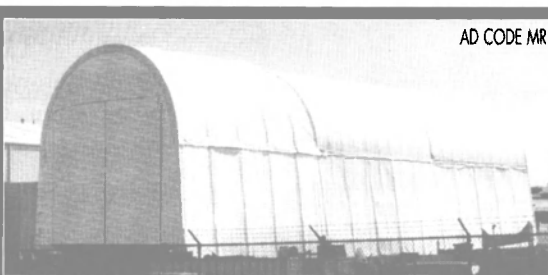
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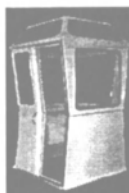


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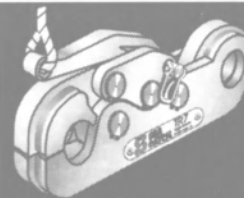
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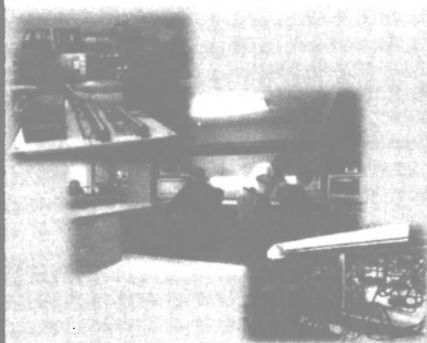
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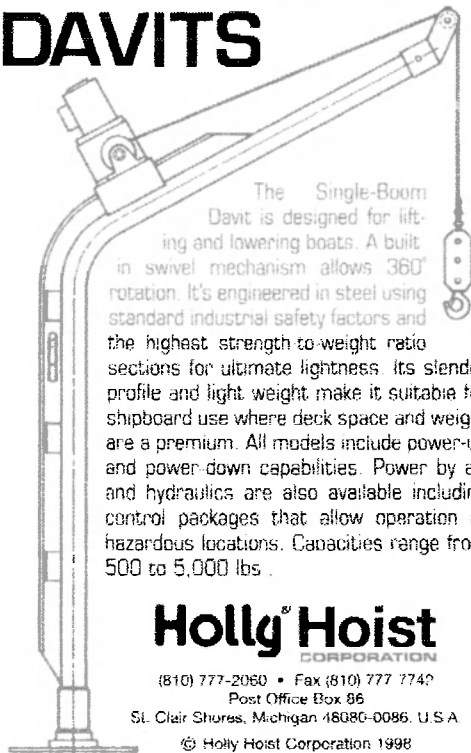
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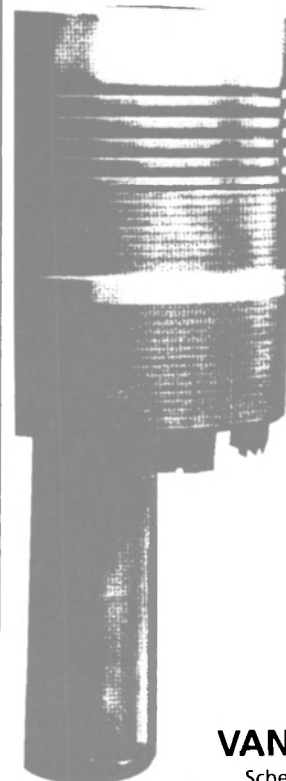
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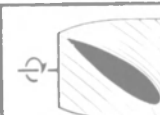
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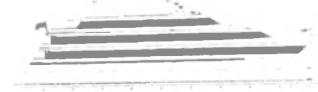


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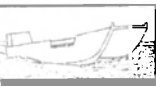
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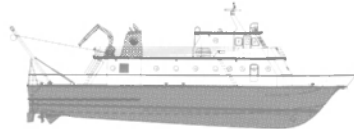
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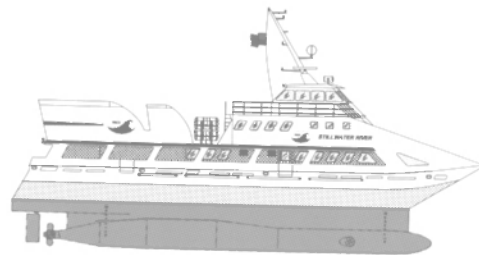
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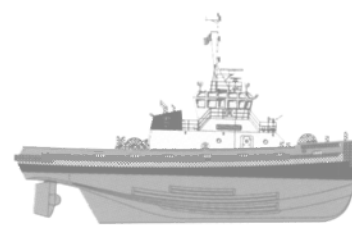
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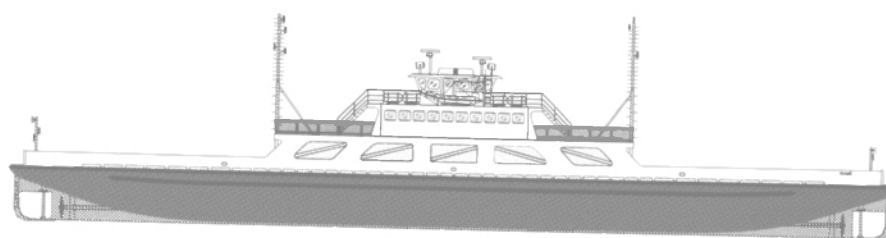
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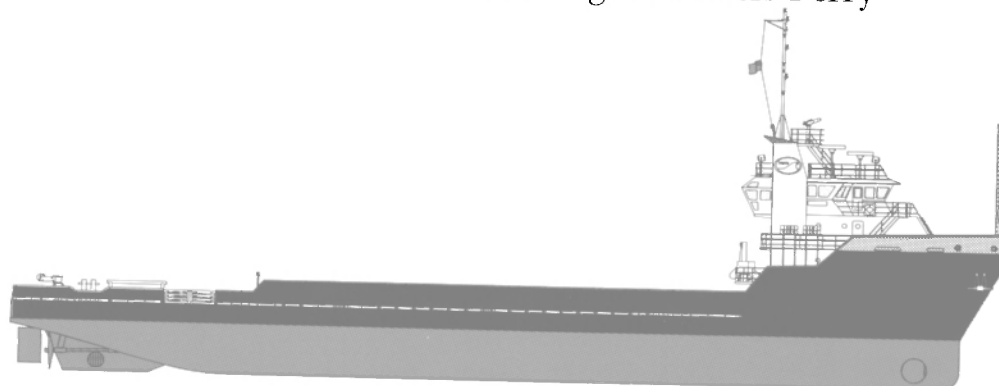
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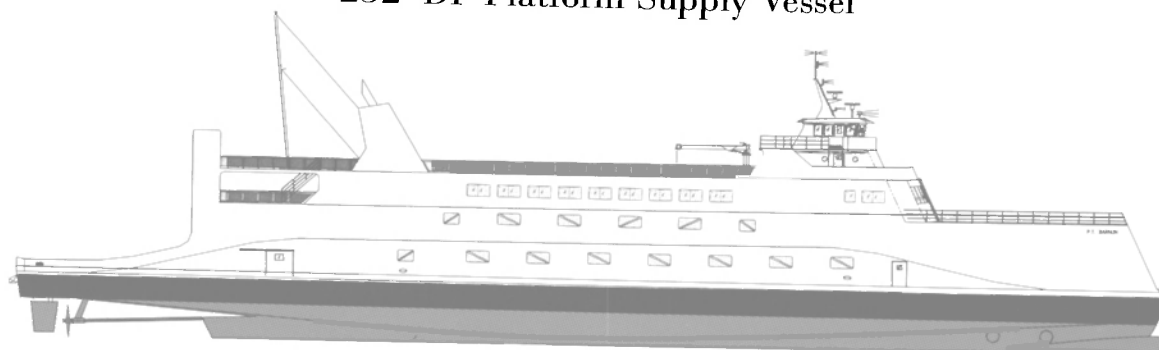
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