

August 2000

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On the Cover: Pictured on this month's cover is USNS Observation Island situated on Southwest Marine's 22,000 pride of San Diego drydock. The drydock features a unique Automated Drydock Control System (ADOCS) that can run in both manual and automatic modes — a system supplied by IDAC West. The system has two 20" computer monitors mounted into a console adjacent to the existing manual system. There are two DELL computers inside of the console that are networked together via ethernet each providing redundant backup if the other fails. The computers are connected to a control system that houses Opto 22 control hardware that processes real-time logic relative to the physical devices (e.g. motors, pumps, draft sensors,...). Logically, the control system focuses on information from draft sensors that are located strategically on the exterior of the drydock; one on each corner and two in the center. With information provided from these sensors to the control system, it is possible to calculate deflection (hog and sag), heel, continually and accurately (0.1"). With this information, the control system makes decisions that cycle pumps and valves to minimize deflection that could otherwise allow the dock to be stressed. **Catch up with other development in the U.S. ship repair market, starting on page 25.**

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LR has unveiled plans for a 12,500-TEU containership. — by David Tinsley

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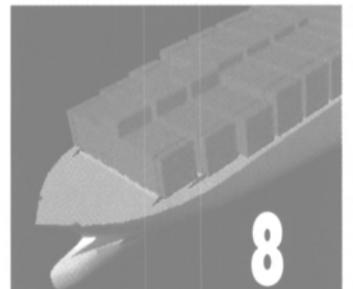
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Editor's Note

This month's edition amply displays how two of the maritime market's driving forces — technology and legislation — simultaneously clash, meld and otherwise work together and apart to dictate the look, design and outfitting of ships and boats of tomorrow. The marine market, which has often and unfairly been labeled conservative, is embracing many sweeping changes, which are designed to enhance safety and operational efficiency. As usual, the impetus for change has been an unsightly and costly — both in terms of sullied beaches, animals as well as tarnished reputations — casualty. In this instance, the name Erika is being thrown about with the same invective as Valdez was more than a decade ago; a name that is sure to become synonymous with the drive for safer ships.

Last month the Alliance of Maritime Regional Interest in Europe (AMRIE) presented a series of recommendations aimed at improving levels of oil tanker safety in response to recent Commission proposals on the safety of the seaborne oil trade. The AMRIE paper specifically calls for maritime "black boxes" to be fitted to all existing cargo ships, thus exceeding the IMO suggestion of outfitting new ships only.

While it is relatively impossible to find a shipowner/operator who would publicly denounce a sweeping safety measure in the aftermath of a highly publicized, politically and emotionally charged disaster, it is fair to say that this-bottom line conscious group will be none too pleased with the latest development, considering the anticipated price range per ship will be between \$75,000 and \$150,000. (see story, page 64).

Regardless of the outcome of AMRIE's suggestion, it is clear that the safety bar — rightfully so — has been raised another notch.



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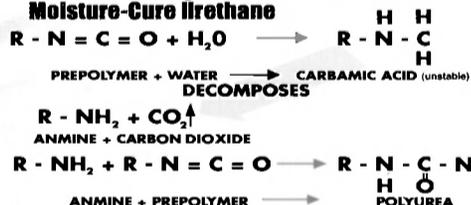
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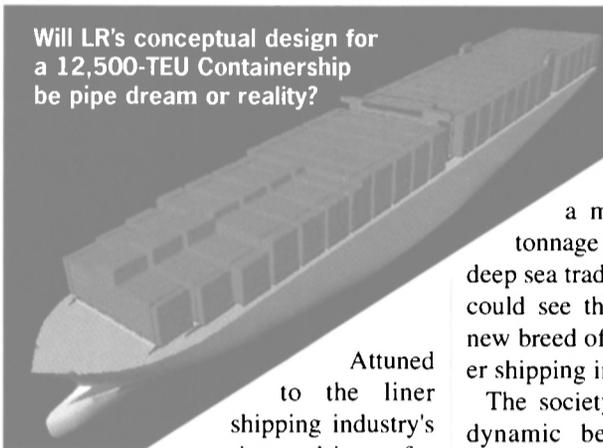
Investment in Design

Behemoth in the offing?



by David Tinsley, technical editor

Will LR's conceptual design for a 12,500-TEU Containership be pipe dream or reality?



Attuned to the liner shipping industry's unerring drive for economies of scale, classification society Lloyd's Register (LR) has developed a conceptual design of container vessel incorporating a 12,500-TEU capacity. Although some 55-60 percent greater in slot capacity than the biggest cellular vessels ordered to date, the envisaged Ultra Large Container Ship (ULCS) would be able to transit the Suez Canal

and access key ports.

LR considers that there are no insurmountable technical challenges to vessels of 12,500 TEU, and believes that it is only a matter of time before such tonnage makes its appearance in deep sea trade. The next five to 10 years could see the uptake of the envisaged new breed of behemoths by the container shipping industry.

The society has examined structural, dynamic behavior and performance aspects relating to the tentative design. Key elements of the program included the development of mid-ship scantlings, investigations into hull girder bending and torsional response, and consideration of maneuvering and propulsion aspects.

The development of the concept design followed on from a study jointly undertaken by LR and the independent

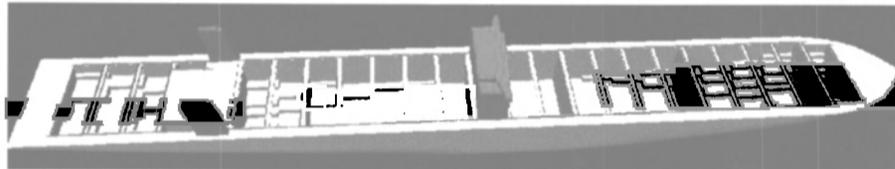
U.K. firm Ocean Shipping Consultants, to identify the optimum size of post-Panamax vessel that could potentially be supported by current and forecast trade demand and the port network.

A primary objective of LR was to subsequently determine possible structural problems that might be encountered with a ship offering a cargo capacity substantially in excess of the currently attained 8,000 TEU category.

While the studies indicated limits to scale economies, it was clear that the upper point had by no means yet been reached. Taking due account of key factors determining maximum vessel size, not least questions of port access and terminal infrastructure, a vessel of

approximately 12,500 TEU was identified as the optimum ULCS. The dimensions of the ensuing design drawn up by LR are compatible with maximum permissible draft restrictions through the Suez Canal, and reflect existing and planned developments at key terminals in the long-haul trades. The largest post-panamax vessels contracted so far have practical container intake capacities in the 7,000-8,000 TEU range. Hapag-Lloyd's recently-ordered quartet of 25-knot vessels from Hyundai Heavy Industries have advertised, nominal capacities of 7,200 TEU, and have been specified with the most potent propulsive power plant currently available.

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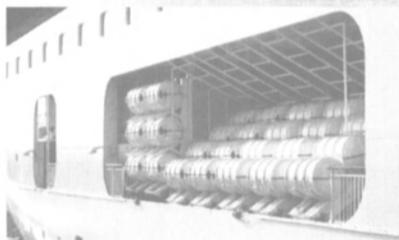
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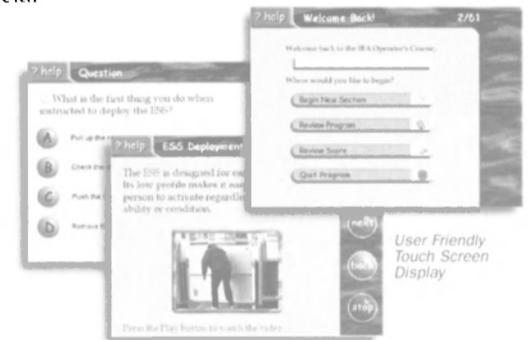
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Investment in Design

wider-than-panamax cellular tonnage has been one of the outstanding features of newbuilding investment in recent years. Post-panamax boxships on order, under construction and in service now account for 20 percent of total slot capacity at sea and to be delivered.

Net gains for yards



In today's tightly competitive, global shipbuilding environment, every opportunity has to be taken to squeeze cost out of the system, notwithstanding the considerable advances already achieved, especially over the past five years, in efficiency and productivity. Each percentage point gain is to the good in an industry confronted with manifold, complex forces influencing reference price levels over-and-above the economics of supply and demand.

The fact that so much of the cost of a commercial vessel newbuild is represented by materials, equipment and machinery, typically accounting for around 60 percent of the total value, has hitherto been regarded as limiting the extent to which a shipyard can drive down costs through further improvements in processes and organization. But the era of e-commerce seems to hold out substantial new opportunities for increased

cost efficiency in ship construction for those willing to grasp the nettle.

As a widely respected supplier of software systems tailored to the needs of shipbuilders and design engineering offices, the Swedish specialist firm Tribon Solutions believes that potential savings of up to 10 percent of total newbuild cost are attainable by using an Internet-based procurement system.

The tribon.com offering, to be launched at Hamburg's SMM Exhibition in September, will link yards, suppliers and shipowners in a global network. It will be centered around a Global Component Database, containing extensive, standardized data about the full universe of shipbuilding components, and modeling and design information facilities.

But the major value creation lies in the scope for savings offered by the companion, e-commerce functionality. This will allow buyers to search for components and suppliers, issue requests for quotations (RFQs), run auctions, and place orders direct. Tribon Solutions, previously known as Kockums Computer Systems (KCS), bases its estimation of possible, aggregate savings on reductions in process costs, lower component costs through increased transparency and wider sourcing, and reductions in lead times. Major, recent initiatives in Japan and South Korea have addressed the scope for cost reduction offered by the application of the concept of the electronic market place to shipbuilding procurement. Tribon Solutions is nonetheless strongly placed in its endeavors by virtue of the fact that its nascent product will lend itself to integration with the company's existing design and information

systems, in service at nearly 300 shipyards and design bureaus around the world.

Following the public unveiling at SMM, tribon.com is due to go live at the Tribon Users' Meeting on October 2 in Sweden.

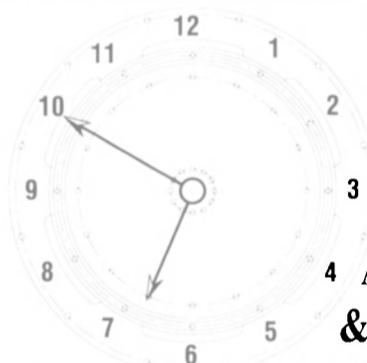
Double act for the Baltic

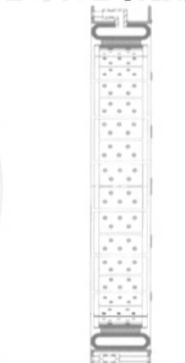
Finnish innovation in ice-going tanker technology will have a major application in the country's own mercantile fleet, albeit with ship construction assigned to the Orient. The pair of 106,000-dwt crude oil carriers booked by Helsinki-based Fortum Shipping, part of Finnish energy group Fortum Corporation, will extend the application of the double-acting tanker (DAT) principle to the type of tonnage for which it was originally, primarily intended.

The DAT concept is the result of development work carried out by Kvaerner Masa-Yards to solve the problem of open-water performance of efficient icebreaking vessels. The ensuing type is formed and equipped to sail in an astern direction in ice-bound waters. This permits an optimized open-water bow form to be adopted, rather than an ice bow, so as to enhance efficiency sailing forward in ice-free conditions. The arrangements also promise good icebreaking capability with reduced power levels, offering fuel consumption savings relative to conventional vessels of comparable capacity.

Running astern is facilitated by the use of podded electric drives, championed by Kvaerner Masa-Yards

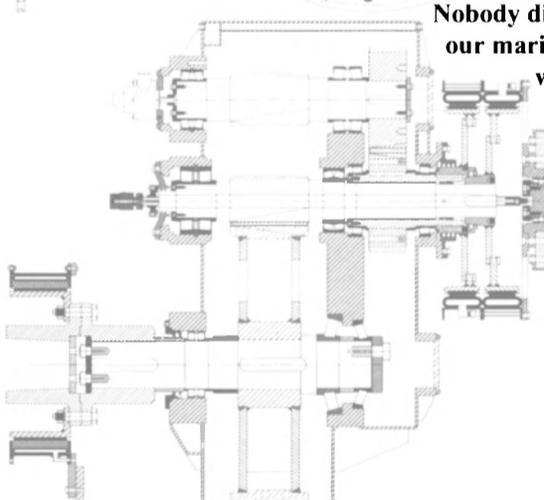
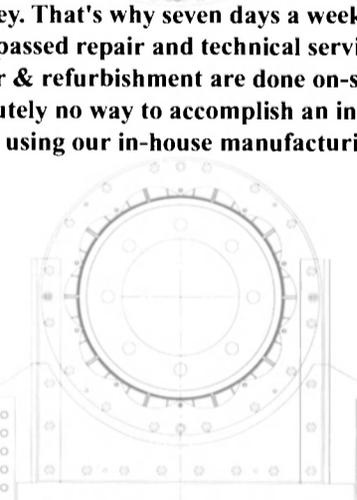
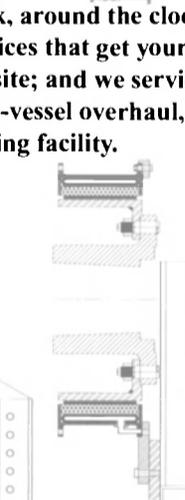
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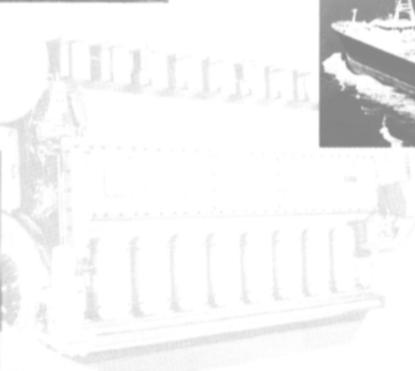
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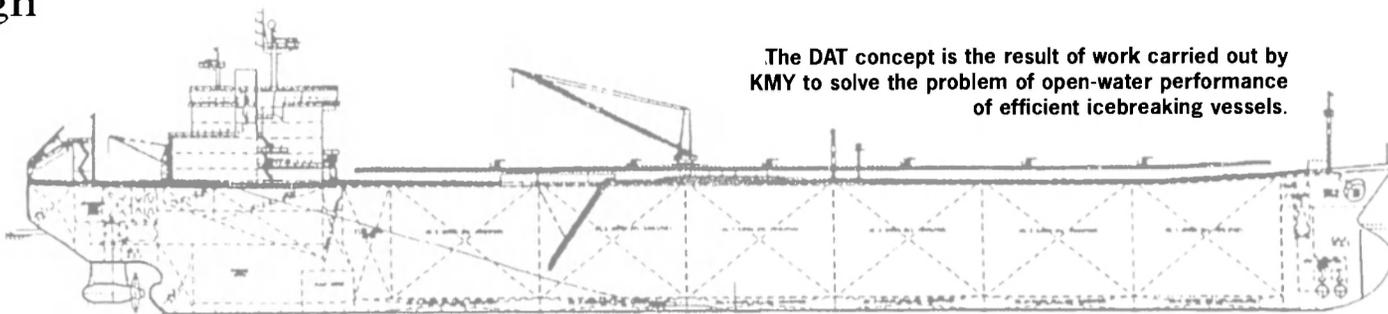
Investment in Design

as a co-originator of the Azipod system, and by the special design of the aftbody. Two 16,400-dwt Arctic tankers, Uikku and Lunni, retrofitted with Azipods in 1993 and 1995, provided early platforms both for podded propulsion and for the DAT principle in rigorous operating conditions. The robust pair is deployed by Nemarc Shipping, a joint venture of KMY and Fortum Shipping, previously known as Neste Shipping. The first DAT newbuilds were two icebreaking supply ships delivered by the Finnish shipbuilder to Wagenborg for Caspian Sea service in 1998. Fortum's newly ordered 106,000-dwt crude oil tankers, to be constructed in Japan by Sumitomo Heavy Industries, give a huge fillip to a design concept, which offers long-term opportunities for opening up the Russian Arctic trade. In the meantime, the Fortum sisters are destined to ensure dependable, year-round supplies of North Sea crude to the group's Finnish refineries at Porvoo and Naantali.

Propeller & Shafting Symposium Set For September

SNAME announced its ninth triennial Propeller and Shafting Symposium. The two-day event is scheduled to be held at the Cavalier Hotel, Virginia Beach, Va. on September 20 and 21, 2000. The symposium is held once every three years and is organized by the M-16 Panel of SNAME. The last symposium was in 1997, and it drew more than 150 attendees who heard 29 technical papers from experts around the world, thus bringing the total of papers read and discussed over the years to 169. In all, 21 countries have contributed. These include countries from the Americas, Europe, the Middle East, and the Orient and Soviet Block nations, even before Soviet re-assimilation into global culture.

The M-16 Panel of SNAME is dedicated to gathering and disseminating information on propulsion shafting and was founded in 1960 as part of the society's Technical and Research Program. Over the years, the panel's mission has evolved to include techniques necessary for selection, design, installation, alignment and maintenance of all shipboard components that comprise and support a shafting system. These include the shaft(s), couplings, bearings, and the propulsors themselves. The panel's scope of activity does not include engines and gears, but the bewildering variety of propulsors and shafting systems seen in contemporary vessel design has added new dimension to these propeller and shafting seminars. Those interested in attending should contact: Mr. Jerry Havel at: tel: (212) 839-5095; fax: (212) 839-5214jhavel@eagle.org



The DAT concept is the result of work carried out by KMY to solve the problem of open-water performance of efficient icebreaking vessels.



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E-Commerce

ShipDesk Strives To Carve A Niche

Phenomenal is perhaps the only word adequately to describe the rampage of new, integrated e-commerce solutions that have recently swamped the maritime industry. The marine market, which has a solid reputation of following rather than leading technological surges, has gone from "zero to sixty" in record time on the e-commerce front.

But while the industry today has a bevy of selections from which to choose — including portals for conducting every transaction conceivable, from fixing cargos to buying bunker fuel, spare parts or a ship's stores — the critical question revolves around not which choices are available today, rather which choices will be available one year from today.

While the market has been consumed with about 70 new choices, some analysts predict rapid and extreme fall-out, anticipating that a mere handful of top companies will survive. While it is practically impossible to determine which



companies will emerge from the .com fray, it is safe to say that those which combine the unique mix of solid industry experience, thorough technical expertise and solid financial backing will have a better shot than other at forging a solid business.

ShipDesk.com is one of the new offerings, which seems to achieve this optimum mix. *Maritime Reporter* recently met in New York with **Peter Rygaard Andersen**, vice president, Marketing and P.R., and formerly of the well-regarded BIMCO, to discuss the creation and launch of ShipDesk.

Lofty Goals

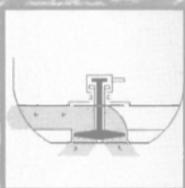
With the aim of becoming the definitive independent chartering exchange, ShipDesk faces a stiff challenge to say the least. It must battle not only the prevailing "business as usual" current which pervades the sometime technophobic marine market, but also deal with literally dozens of new E-commerce solution providers which seek to provide

roughly the same services. "First, we are seeking to build an exchange with

the industry rather than for the industry," explained Andersen, noting the one-

size-fits-all strategy of some high-profile entrants, who are seeking to meld

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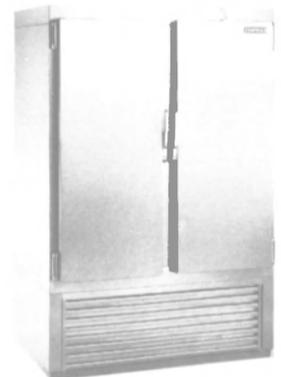
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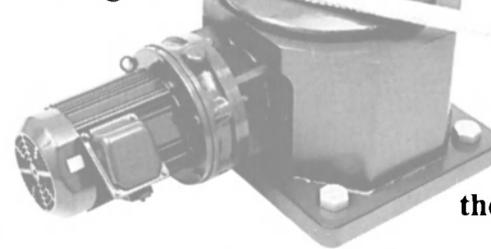


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E-Commerce

systems created for other realms for the maritime market. "Second, we are building a totally neutral site, versus a site that is run and operated by several major buyers and brokers."

To this end, ShipDesk should seemingly succeed as it is heavily loaded with cumulative centuries of industry

expertise, starting at the top with CEO **Dirk Langeveld**, who brings more than 30 years of senior management experience in tanker, dry bulk and container shipping with Stolt-Nielsen, Marine Transport Lines, PLM and Sea-Land. Others in charge of the start-up including:

- **Lars Hjaltman**, ShipDesk's CTO, who was CTO at Gearbulk, the innovative bulk carrier operator, as well as 13 years of IT and Internet experience;
- **Fred Doll**, ShipDesk's content director, who was previously director of H. Clarkson and head of its London shipping consultancy business, as well as

previously with Exxon's chartering group;

- **James Lucas**, ShipDesk's product development director, who has more than 15 years worldwide shipping experience, as well as 12 months experience developing shipping e-commerce applications; and,
- **Christopher Toepfer**, business development director, who was previously with Tufton Oceanic, ADM-Toepfer and **Jacq. Pirot**.

But in the fast evolving technological environment sweeping all industry today, industry experience and know-how sometimes is not enough. To ensure that its system attracts and keeps the high-end cargo moving market it targets, ShipDesk has chosen OptiMark to provide a patented matching engine for the ShipDesk Exchange. It is worthy to note that the privately held OptiMark has proven that its technical solutions handle some of the most demanding markets in the world, including the NASDAQ Stock Market. IBM will provide systems integration.

Key to long-term success will be the ability to improve processes and continuously improve and prove the power of the electronic exchange, according to Andersen. He cites his experience with BIMCO and notes the number of legal disputes that arose simply because information was incorrectly input or transmitted; a situation ShipDesk seeks to eliminate with its streamlined processes.

ShipDesk could potentially have a leg-up on other start-ups through its ownership of netshipbrokers.com, a successful first-generation Internet chartering site. Founded in 1997, the Piraeus-based site has more than 2,500 registered members from 90 countries, and posts more than 4,500 new cargoes and 3,000 vessel positions each month.

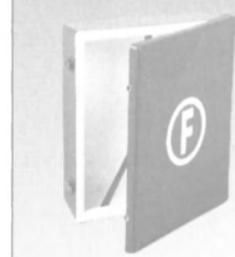
Whitney & Co., with more than \$5 billion invested in private equity, public equity, hedge funds and private and public debt, is lead financier for the operation. In fact the company received a \$350 million facility available to them by Whitney & Co., CVC Capital and Citicorp Venture Capital.

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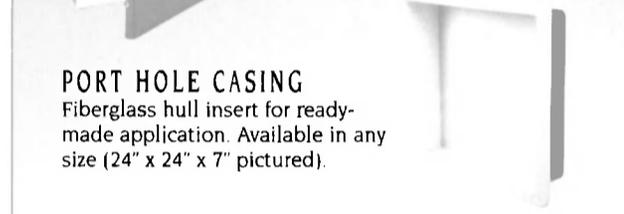
Marex.com Touted In Forbes.com 'Best Of The Web'

Marex.com, a leading marine industry B2B e-commerce company, was selected for inclusion in Forbes.com's first annual Best of the Web: B2B Guide. "We're very pleased to be included in this prestigious group," said **David Schwedel**, president and CEO of Marex.com. "I applaud Forbes.com for

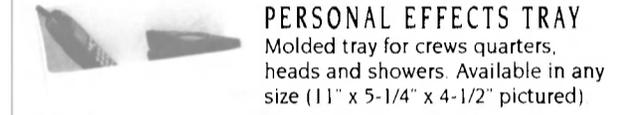
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using solid criteria and for beginning the process of differentiating, in their words, B2Bs from the wannabes." Marex.com has developed a proprietary set of procurement solutions that together address the entire marine industry purchasing lifecycle, from planning through procurement to liquidation.

Circle 57 on Reader Service Card

MaritimeDirect Launches Free Portal

MaritimeDirect announced that phase one of its maritime portal, <http://www.maritimedirect.com>, is now available. This first phase will concentrate on providing detailed and timely commercial information to the maritime shipping industry.

Circle 58 on Reader Service Card

Cargobiz.com Receives Financial Backing

Cargobiz.com, an independent global business-to-business (B2B) Internet trading exchange for the shipping industry, has secured backing of \$5.7 million and will receive operational support from Internet Capital Group. As an on-line shipping trading exchange, Cargobiz.com will facilitate complete transaction processes for the industry including the auction, the Charter Party contract negotiations, the printing of the contract, the matching of cargo with ships and the automated notification service.

The initial focus for the exchange is the dry bulk and tanker chartering markets serving charterers, shipowners and shipbrokers

Circle 59 on Reader Service Card

MarineTalk Expands Portal For Posidonia

The MarineTalk Internet portal was created two years ago to provide marine companies with an exclusive marine web based platform where they would be able to display their products and services and maintain that presence in front of thousands of potential clients who use the Internet in the course of doing business.

MarineTalk's community includes companies and professionals working in the shipbuilding and repair, manufacturing and equipment supply sector, technical and procurement personnel in shipyards, design and consulting engineers, marine surveyors, ship operational personnel and technical ship managers, shipping and marine insurance professionals, research and education personnel, etc.

Circle 60 on Reader Service Card

Atlantis Interactive Inspects With ShipCheck

Following an IMO meeting, which sparked concerns by the secretary-general regarding ship inspections and the impact they were having on safety and on operational efficiency of ships in port, Atlantis Interactive has developed

innovative software called ShipCheck to provide ship inspectors with a consistent format for routine checks made by the crew. When used properly, the program will simplify the inspection process by outside agencies and reduce an inspector's time onboard, thus benefiting all involved parties.

Available in two versions, ShipCheck

carries out and records routine inspections of the ship and its equipment, and provides ship specific historical data.

The program runs under Windows 95/98/2000 or NT, and integrates an industry-standard database with one-click export facility for e-mail or downloads to notebook PC or server.

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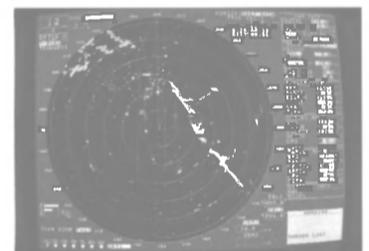
With this one workstation it is possible to operate a multitude of radio communication facilities. A user-friendly design ensures easy operation by all operators.

2 JMA-9800 Color ARPA Radar

This futuristically designed radar unit features a large 29-inch high-definition color CRT display. It enables quick detection of small targets.

3 JAN-3598 ECDIS Total Navigator

This advanced ECDIS system permits fully automatic navigation. It features a large color LCD and abundant functions unique to JRC, including radar video overlay, grounding prevention, NAVTEX data, route safety check, alarm displays and engine data display. The result is greater safety and economy.



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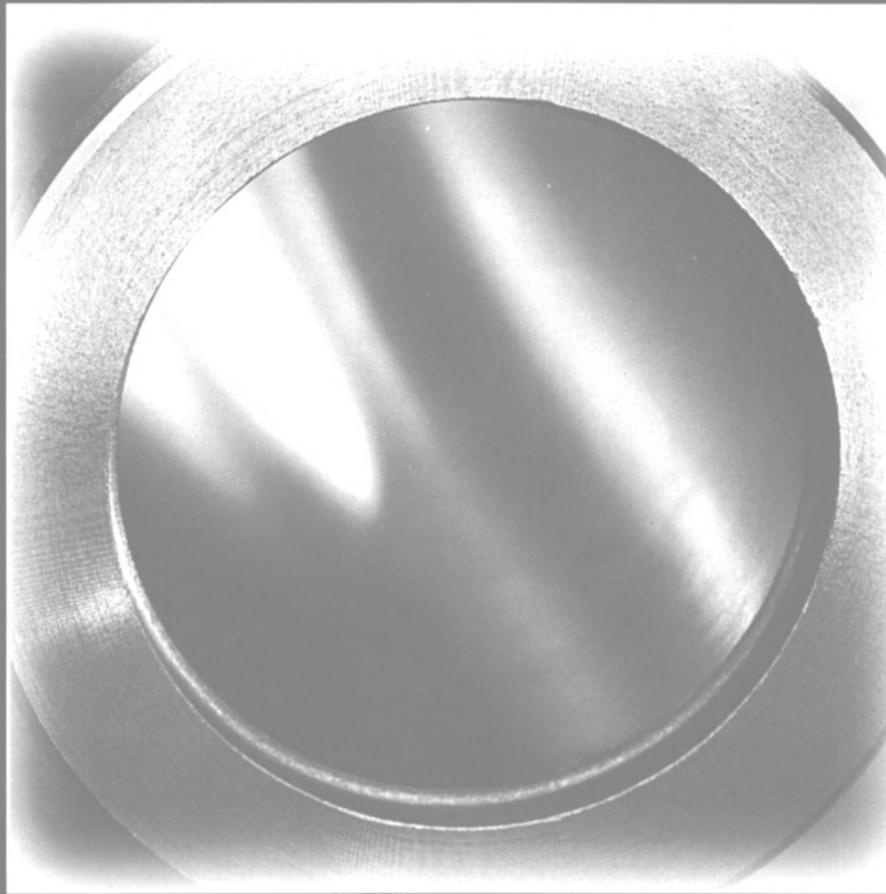
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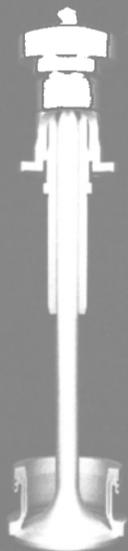
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Keppel Hitachi Zosen Wins \$74.6 million Contract

Keppel Hitachi Zosen has clinched a contract to build two cable laying and repair vessels for a total contract value of more than \$74.6 million from C. S. Tycom Reliance, Inc., a subsidiary of Tyco Submarine Systems Ltd.

Work on the two newbuildings has commenced, with the first vessel scheduled for delivery in the third quarter, and the second vessel in the fourth quarter of 2001. The cable laying and repair vessels, each 7,800-dwt, are twinscrew, diesel electric-driven and dynamically positioned ships. Measuring 459 ft. (140 m), a breadth of 69 ft. (21 m), with a designed load draft of 25 ft. (7.8 m), the vessels will both have a speed of 13.9 knots.

Bath Iron Works Lands \$9.2 Million Project

The Office Of Naval Research awarded \$9.2 million to General Dynamics Bath Iron Works to design and manufacture an advanced propulsion system for a technical demonstration vessel. Known as Advanced Hull Form Inshore Demonstrator (AHFID), the project directly supports the Navy's decision to implement electric drive in future naval combatants. The AHFID award is the culmination of the Office of Naval Research technology symposium for Maine businesses and educational institutions held in Portland during June 1999. The propulsion motor will be housed in a pod fabricated with advanced composite materials designed by the University. The pod, which will contain embedded sensors that can calculate the performance of the propulsion motor, will be able to monitor the structural health of the composite materials.

Circle 16 on Reader Service Card

Globe Wireless Establishes New Office

Globe Wireless has established a new office in Houston, Texas, and appointed **Greg Halverson** as regional manager of Offshore Sales.

Halverson will lead the company's GlobeOffshore sales efforts in the Gulf of Mexico as well as lending support to Offshore sales worldwide.

Damen Group Acquires Kvaerner Fjellstrand Yard

Damen Shipyards Group has formulated an agreement with Kvaerner ASA to acquire the Singapore shipyard, Kvaerner Fjellstrand. An agreement has been signed for the acquisition by Damen of all shares in KFJS. Following

the acquisition, the Singapore operation will be known as Damen Shipyards Singapore and will employ the current staff of Kvaerner Fjellstrand Singapore.

FastShip And Schneider Reach Partnership Agreement

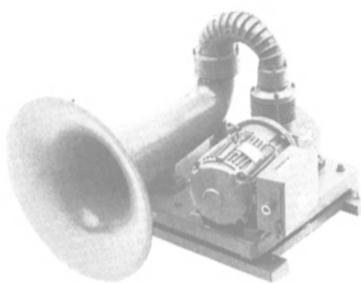
FastShip has come to an agreement for international transportation and

logistics provider Schneider International to provide three major services to support the FastShip transportation network. The agreement calls for Schneider National, operating through logistics subsidiaries, to act as the North American third party logistics provider, managing alliance partners and engineering through a supply chain that will provide a logistics solution for shippers.

EDG Elects New Marine Engineering Head

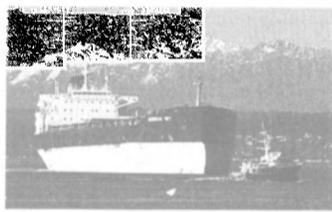
Bruce Malcolm, who previously served as president and CEO of Friede & Goldman, has been appointed by EDG, Inc. to head a marine engineering department. Malcolm will focus on providing creative engineering solutions on floating production systems including

HEAVY-DUTY SIGNALS by *Kahlenberg*



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Kahlenberg Signals were developed to withstand the punishing use of commercial and military service. Their durability has been demonstrated over decades of service on ocean-going vessels ranging from naval warships to commercial vessels. Military specifications have required extensive testing for many of these whistles and the accessories supplied with them, which have proven the exceptional qualities of Kahlenberg design and manufacturing.

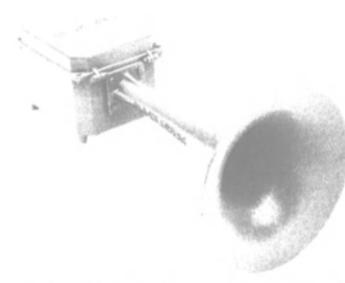
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submersible, semisubmersible and vessel design.

Malcolm, whose official title is director of engineering for floating production systems, boasts more than 30 years of experience within the design of offshore vessels and floating production systems. The company has also elected

Philip Myint as project manager. Myint, who has experience in both shallow and deepwater prospects, previously spent nine years with Chevron, including a stint as lead engineer of the deepwater Gemini Subsea Development Project.

International Ship Valuation Panel Formed

An International Ship Valuation Panel has been created to provide service to the maritime community by offering the all-encompassing opinion of ship values from four long-time established interna-

tional ship brokerage firms. Comprised of Barry Rogliano Salles, Paris; Clarksons, London; Jacq. Pierot Jr. & Sons, N.Y.; and R.S. Platou Shipbrokers, Oslo, the panel will offer an alternative to individual valuations that will be especially significant in more complex cases, such as purchase options/obligations, public offerings, fleet mortgages and disputes between parties.

Circle 8 on Reader Service Card

Keppel Corp. Appoints New Director

Sven Bang Ullring has been appointed to the Board of Keppel Corp., effective July 1, 2000.

Ullring has extensive experience in the field of engineering, having been involved in building numerous international industrial projects. He is also chairman of the Supervisory Board of Storebrand, a Norwegian insurance company and Norsk Hydro, a global Norwegian company engaged in oil and energy, light metals and fertilizers.

McVey Appointed VP And General Counsel NASSCO



NASSCO has elected **Lane McVey** as vice president and general counsel. McVey, who joins the company from the San Diego law

firm of McKenna & Cuneo, will be responsible for the daily management of the company's legal activities. He brings 25 years of expertise to NASSCO, including experience in commercial and government contracting.

Long-Time Yachtsman Purchases Palmer Johnson

Palmer Johnson signed a letter of intent with **Andrew J. McKelvey**, a businessman, who is the founder, chairman and majority stockholder of TMP Worldwide.

Plans have already been established for additional newbuild facilities at Palmer Johnson's Sturgeon Bay, Wisc. location, as well as the enhancement of PJ's 30-acre large-yacht service, paint and refit yard in Savannah, Ga.

Sherman Elected New Assistant Chief Of Corps

Jim H. Sherman was appointed as the new assistant chief of Planning, Programs and Project Management Division for the New Orleans District, U.S.

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Norwegian Society of Chartered Engineers

Army Corps of Engineers.

Sherman, who previously served as chief of program development and lead program analyst at the Corps' Mississippi Valley Division, has been with the Corps for more than 33 years. He will oversee the district's range of planning studies, and manage all ongoing and new project development.

Kvichak's Pilot Boat Comes Back From Flunking Test

During a 360-degree stability test of Chinook by Kvichak Marine, the 72-ft. (21.9 m) pilot boat failed because a fire extinguisher broke loose during the roll and shattered a port window, allowing the pilothouse to flood. Since the flooding altered the center of gravity on Chinook, the vessel was then laid on its side until all the water was pumped out.

Following this procedure, three hours later, the vessel's window was replaced and the roll was attempted again — this time with successful results.

Kvichak is near completion of this all-aluminum pilot boat for the Columbia River Bar Pilots Association of Astoria, Ore. Designed by Camarc, the vessel is intended to right itself during a rollover due to its center of gravity, buoyancy and hull design.

The rollover was accomplished with a Foss supplied barge crane and strapped belts under the hull. As the crane lifted the belts, Chinook was turned over 180 degrees, upon where the straps released themselves — allowing the vessel to successfully right itself.

Circle 3 on Reader Service Card

Autostructure Is Being Tested Globally

Autoship Systems has reported that Estaleiros Navais De Viana Do Castelo of Viana Do Castelo Codex, Portugal; Lung-Teh Shipyard of I-Lan, Taiwan and Navtech Inc. of Quebec are members of the Autostructure Early Adopter Program.

Circle 14 on Reader Service Card

Navies Select BV

The Moroccan Royal Navy has appointed leading classification society Bureau Veritas (BV) to supervise the construction of two frigates to be built at Chantiers de l'Atlantique shipyard. BV is scheduled to launch a complete set of new rules for naval ships, which will help them, benefit from advanced civilian technology.

VT Secures Major Share

Vosper Thornycroft (VT) is scheduled to play a significant role in the design and construction of the initial batch of Type 45 destroyers for the Royal Navy.

VT will share in the design and production of the first three ships as well as the assembly of the second ship, which will be named HMS Dauntless. The company is currently working with the prime contractor BAE Systems on the design of the new class. Production work will commence in early 2002, with the second ship, to be assembled by VT.

Circle 69 on Reader Service Card

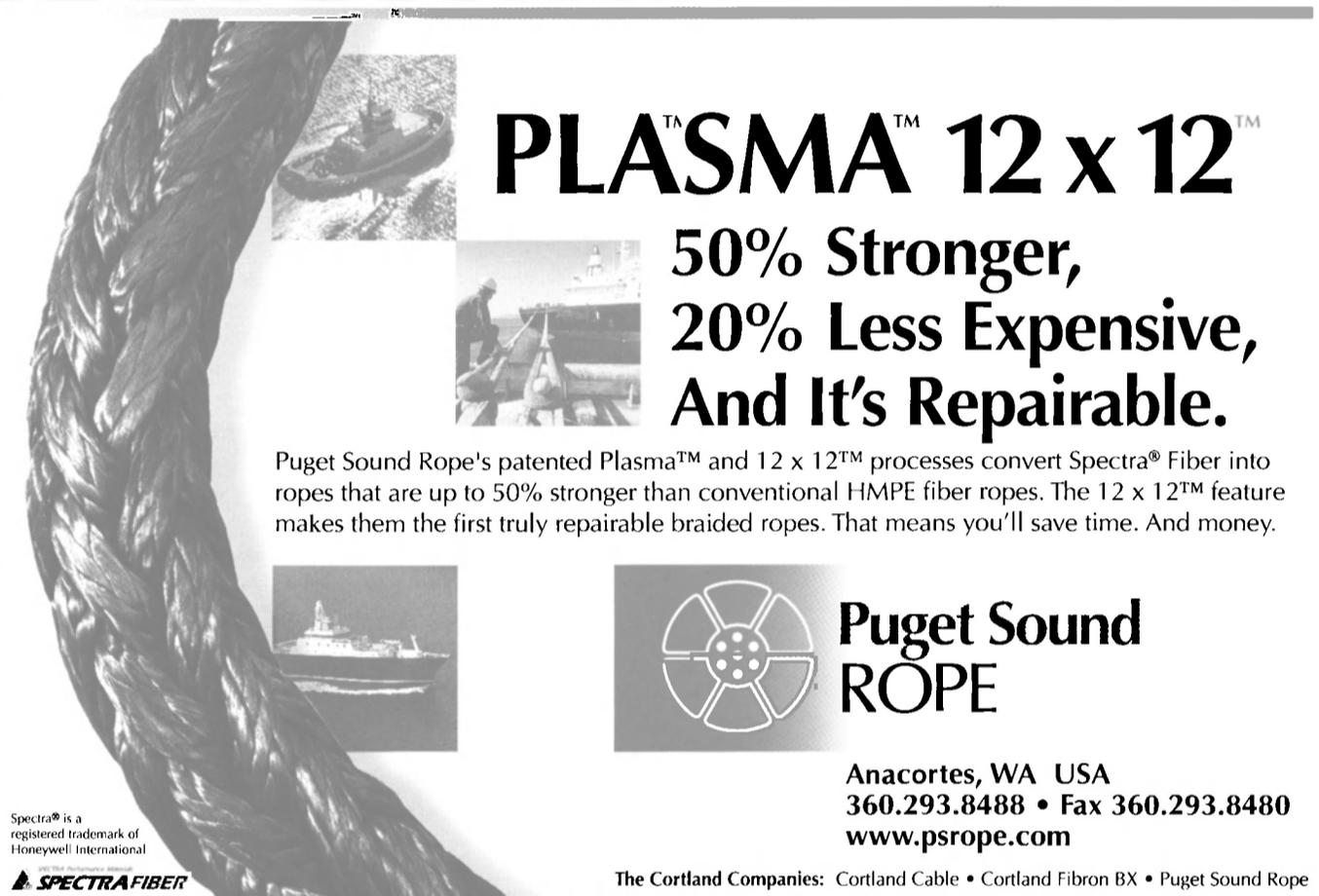
Sea Hawk Industries Sends Off Second Patrol Boat

Following the delivery a few months ago of a Wide Beam 360 Enforcer patrol boat to a Salem, Mass. harbormaster, Florida-based Sea Hawk Industries has answered the call yet again for the harbormaster with Sea Watch — a twin-powered boat used for patrol, enforce-

ment, search and rescue. Paul Milone, the harbormaster, opted for a closed heated cabin, as well as a transom door, dive platform and fire pump on the 315-hp vessel.

With a top speed of 32 knots, Sea Watch is outfitted with separate raised pedestal seats for both the pilot and co-pilot.

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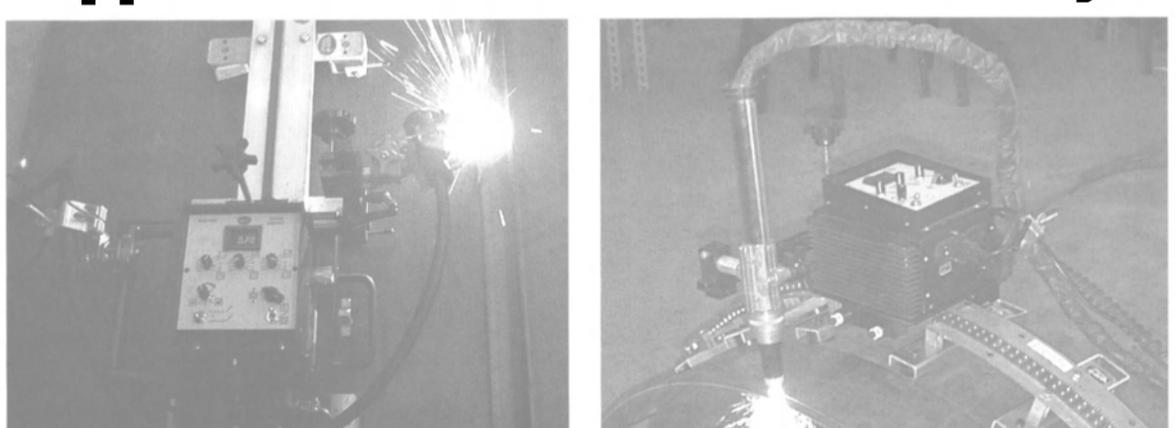
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Offshore Inland Secures Semisubmersible Upgrade

Offshore Inland Services (OIS) Commercial Division is performing upgrades to Cal Dive International's Semisubmersible DSV Uncle John, in Galveston, Texas. The project, which commenced in mid-May and is scheduled for a mid-

July completion, includes upgrades to a variety of systems including hydraulic controls, sewage piping and cranes. OIS also completed piping installations on Alabama Shipyard's newbuild Hollywood II Casino project, which entailed chill water piping, condensate drain piping and hydraulic piping.

Circle 19 on Reader Service Card

Wallenius Wilhelmsen Receives Second Mark IV

Wallenius Wilhelmsen has added its newest addition that will serve the automotive industry, as well as other specialized RoRo cargoes — Mark IV M/V Talisman. The second of a four-part ship series, Talisman was commissioned by

Wallenius Wilhelmsen and delivered to Daewoo Heavy Industries on June 30. The vessel will operate specifically in Wallenius' core RoRo trades: Far East-U.S. Coast via Panama-Europe-U.S. Coast-Australia/New Zealand via Panama. Talisman will be officially named in Baltimore, Md. on August 17.

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Repair Market Gains Muscle

Shipyards around the world are facing increasingly stringent environmental rules and regulations, adding additional expense to a business sector with an already reputed thin bottom line. Nonetheless, to stay in business shipyards must continuously enhance their capabilities and compliance, in order to successfully woo and complete lucrative jobs. U.S. shipyards have aggressively been augmenting traditional repair expertise with the tools and systems needed to prosper in 2000 and far beyond. The ensuing editorial updates significant activities and enhancements at U.S. ship repair yards.

Detyens Shipyards based in North Charleston, S.C., is continuing its upbeat course of developing trusted relationships with customers along the U.S. East Coast — specifically with Hvide Marine, Inc. The yard completed two jobs for Hvide this past year — ITB Seabulk Magnachem and tanker M/V Seabulk America. The latter visited Detyens' drydock for routine work and had its KORT nozzle, which had been installed several years earlier, removed from its hull and discarded. A new owner-supplied propeller was machined and fitted to the existing.

Detyens has also worked with Tyco Submarine Systems with the drydocking of various cable layers. Global Mariner has been at the yard's drydock on several occasions, as well as other Tyco-owned ships, mainly Global Link, Charlie Brown and Long Lines. Most of the work completed for Tyco encompassed cleaning and painting of hulls, repairs to bowthrusters, and in the case of Global Mariner, the rebuilding of its port and starboard propulsion thrusters this past March.

Seaboard Ship Management has also worked diligently with Detyens by bringing in six of their vessels to the yard throughout the past 16 months. Each vessel was outfitted with controllable pitch propellers and almost all required major repairs, including disassembly and overhaul of the hubs and blades. In general, ramp repairs take place as well, stressing on the renewal of wasted steel members, blasting and painting.

More notable was the yard's closing of the largest commercial reactivation and conversion in the U.S. with work on LNG Carrier Galleoma. Formerly known as Arzew, the vessel, which is on charter from Argent Marine Services to Shell Bermuda Overseas, Ltd., received a new compressed air system, and conversion of its storeroom into an auxiliary machinery room, as well as new steering gear. The vessel also had its mooring arrangement and life boats modified, along with an upgrade of its integrated bridge and work on its cargo tank, fire and main sprinkler system and electric motors.

Newport News Shipbuilding received a call on July 21 to perform emergency repairs on Carnival Cruise Lines' Paradise. The job is significant in that it will be the first time ever that a U.S. yard will perform

a repair to an Azipod unit. The vessel experienced a problem with one of its Azipod propulsion units shortly after departing from Miami on July 16. Scheduled for a seven-day Caribbean cruise, the vessel was brought back to port for observation, where Carnival engineers subsequently contacted Newport News later that week to perform the repair job. Carnival expects that the ship will resume service on August 13. Regularly scheduled for work at Newport News is M/V PFC James Anderson, Jr., a 755 ft. (230.1 m) Military Sealift Command (MSC) pre-positioning ship with a beam of 90 ft. (27.4 m), which arrived at the yard on July 21. Chartered by Maersk Lines, the vessel is scheduled to undergo hull blasting and painting; overhaul of four deck cranes; survey and repair of main propulsion equipment; repair of machinery components; cargo equipment and deck equipment survey and repair.

The vessel will remain at Newport News for approximately one month. Its trio of sisterships — Bonnyman, Baugh and Phillips — have all been drydocked



Newport News Shipbuilding was selected to get Carnival's Paradise back up and running after the ship experienced problems with its Azipod unit. This is the first time an Azipod unit has been repaired in the U.S.

and repaired by the yard within the last nine months.

San Diego-based NASSCO commenced a six-month complex overhaul this past February of USS Peleliu — the first overhaul of a U.S. Navy amphibious assault ship by a private-sector contractor. With work set for completion this August, at a cost of more than \$100 million, major tasks to be performed by the yard include hydroblasting and painting of the hull and flight deck, tank and well-deck repairs, re-piping of the onboard sewage system, installation of a new air conditioning plant and a reverse-osmosis water-purification system. Various electronics modifications and upgrades were also completed onboard. The vessel's

'Waterfront Academy' To Teach Students About Shipbuilding

National Steel and Shipbuilding Company (NASSCO) and the Sweetwater Union High School District announced the creation of a "Waterfront Academy" that will train high school seniors in ship manufacturing technologies beginning in the next school year.

This innovative program is expected to bring 60 to 75 incoming seniors to NASSCO's bayfront shipbuilding facility for both academic classes and career preparation. During a six-hour school day in classrooms currently under construction at NASSCO, students will receive hands-on training from the company's industry experts and will study academics with their Sweetwater teachers. Training and mentoring will be offered in trades such as electrical, machinery, pipefitting, sheet metal, ship fitting, rigging, and welding. Students will learn skills in applied mathematics, physical science and blueprint reading, and the use of computers, manufacturing tools,

machinery, and rigging equipment. Students who successfully complete the ship manufacturing and academic courses will earn their high school diploma. After graduation and a 240-hour internship, students will qualify for available entry-level employment at NASSCO. They can also choose to work at other companies or continue their education at a community college or university.

NASSCO's President **Richard Vortmann** said, "The Waterfront Academy offers the high school student interested in pursuing a course of study in the skilled manufacturing and contractor trades an opportunity to obtain needed training and education. The typical high school, today, no longer offers this type of training through traditional "shop" classes. Based on NASSCO's need for additional people to work on our current and future shipbuilding programs, as well as replacing employees who are expected to retire or leave through normal attrition, we expect to



NASSCO welder **Ramon See** speaks with students about training opportunities at NASSCO's Waterfront Academy, scheduled to open in the fall.

be hiring up to 1,000 people over the next three to four years. NASSCO is looking at students in this program as our future core of skilled craftsmen and a future source of supervisors, managers and engineers."

There are several local community partners supporting the creation and administration of the new Waterfront Academy. The Regional Occupational Program (ROP) will work with NASSCO's instructors.

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industrial work totals more than 1.2 million manhours, which is representative of 1,800 jobs.

Atlantic Dry Dock in Jacksonville, Fla. situated on 81 acres along the St. John's River and Intra-coastal waterway, now houses a 16,000-ton floating drydock, as well as a pair of two marine railways with a lifting capacity of up to 4,000 tons. Named *Sustain*, the floating drydock was awarded to Atlantic per the U.S. Navy through a five-year contract. The addition of *Sustain* has

allowed the company, which is a subsidiary of Atlantic Marine Holding Co., to repair commercial and Navy ships measuring up to 620 ft. (188.9 m) since this past May. Norfolk, Va.-based **Colonna's Shipyard** has been filling its facilities consisting of two floating dry-docks and four railways on a consistent basis throughout the first half of 2000. Going beyond shipyard availabilities, the yard's recent projects encompass major conversions of two cable-laying vessels and the fabrication/installation of a mid-body insert to a commercial fishing vessel. Other undertakings include significant repairs to several dredges, research vessels and ferries. Presently, Colonna's is completing the conversion and activation of Seaforce Marine's Tug Norfolk.

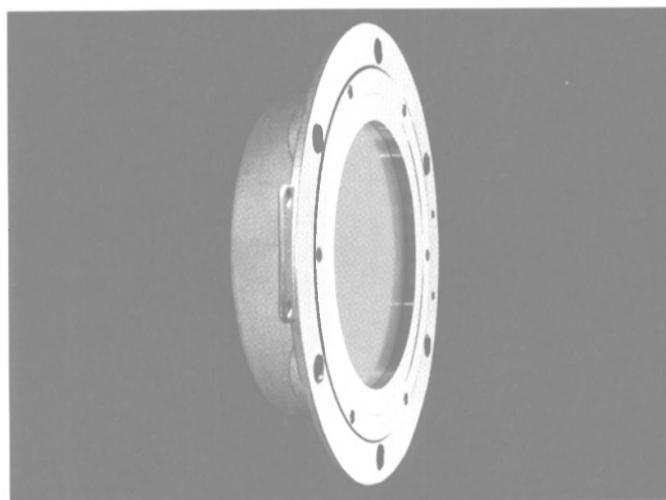
Subsequent to an intensive five-month conversion project at Portland, Ore.-based **Cascade General**, the shipyard delivered the luxury riverboat *Columbia Queen* to the Delta Queen Steamboat Co. on May 24. Only three days later, the 218 ft. (66.4 m) riverboat commenced its maiden voyage up the Columbia through the Snake River canyon to Lewiston, Idaho.

The vessel's conversion project began when it

arrived at the yard as a mere bare hull. Transported by barge from the Gulf Coast, the vessel began its transformation process within days of its arrival. With shipyard crews working on all five decks, the vessel quickly received new stairways, walls and windows. Working on a concurrent basis were wiring and plumbing crews, who installed all utilities overhead on racks in the ceiling void, as well as television, ship-to-shore and data lines to all 105 cabins.

Columbia Queen was intended for use as a casino boat when initially outfitted with a pair of 700-hp

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Cummins engines for electrical generation and two 950-hp Cummins for slow-speed propulsion. In order to perform its new role as an inland cruise ship, a complete reconfiguration of the drive system was specified by naval architects **Rodney Lay & Associates** of Jacksonville, Fla. The company suggested a large increase in propulsion power from 1,900-hp to 4,600-hp — thus enabling Columbia Queen to maneuver through the eight locks of the Columbia and Snake Rivers, and high winds — providing a cruising speed of 12 knots. Cascade's crew accomplished this task by opening

four access panels in the main deck, and building new machinery space in the stern compartment. The existing 950-hp mains were then raised out of the engine room, and lowered into the stern where they became the auxiliaries, connected to upward-angled shafts turning azimuthing sternthrusters. The 950-hp auxiliaries were joined to Schottel azimuthing drives with fore and aft propellers fitted in new transom wells.

Contractors for the vessel's passenger and public spaces was **Hopeman Brothers** of Waynesboro, Va., who approached the project with a meticulous layout of the new floor design on the original steel deck, followed by the welding of U-section "shoe plates" to the deck wherever walls were indicated. This served as a foundation for a modular wall system, allowing a team of local craftsmen to rapidly subdivide the cavernous interior into recognizable spaces.

During sea trials, the vessel achieved a speed of 12 knots with all four engines, and was able to cruise under mains at only 10.5 knots. The combined azimuthing drives with the 350-hp bowthruster gives off a high degree of maneuverability, while fully-equipped, wing steering stations give the captain total visibility during docking.

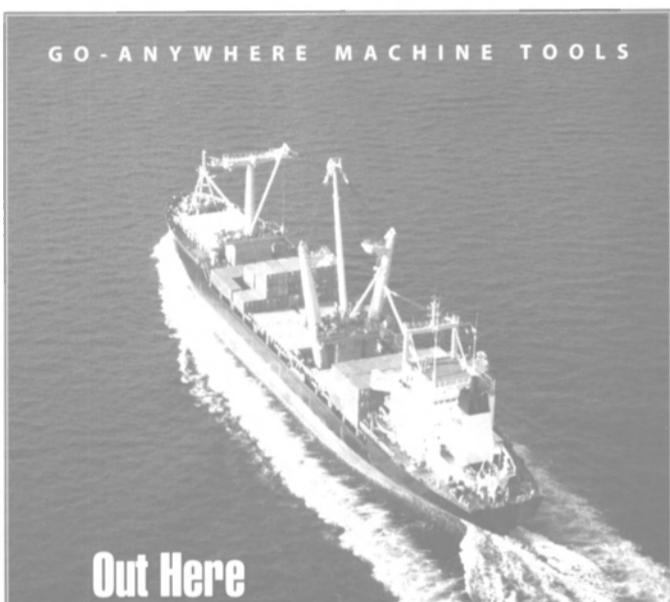
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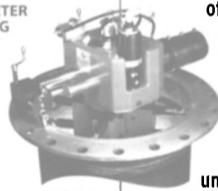
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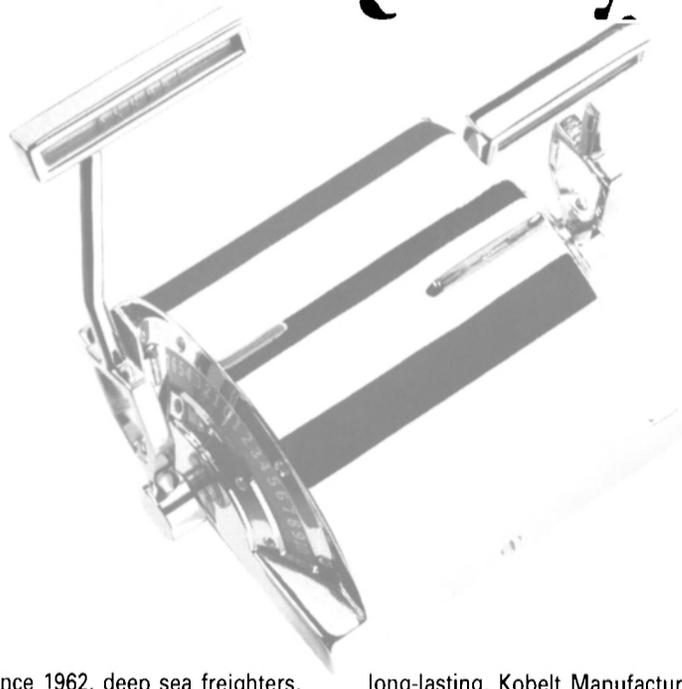
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Oceaneering Helps Historic Sub Recovery

Oceaneering International is providing support services in the recovery of H.L. Hunley — a Civil War submarine that sank in the Atlantic — off the coast of Charleston, S.C. Oceaneering is under contract to Friends of the Hunley, which is providing overall project management. The company will engineer the vessel's recovery system and procedure; procure the recovery system; and provide divers to assist archeologists with excavation on the bottom and accomplish the dig-out, rigging and recovery.

The company is also supporting the U.S. Navy Supervisor of Salvage (SUPSALV) and Navy divers in the retrieval of ironclad Monitor's engine. This vessel perished in heavy seas 16 miles off Cape Hatteras, N.C. in 1862. Oceaneering's role in this project is to provide the lift vessel and equipment to stabilize and support the hull. The company is also designing, procuring and rigging the bridge frame to be installed over Monitor and used by Navy divers to recover the engine.

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Computer-generated graphic of H.L. Hunley. (courtesy of artist Dan Dowdy)

ABS Is Authorized By USCG

The U.S. Coast Guard has authorized ABS to act on its behalf to issue the Document of Compliance (DOC) for U.S.-flag vessels transporting dangerous goods under SOLAS 74. ABS will hold technical reviews and confirm compliance of these vessels to the statutory requirements. With ABS authorized to issue the dangerous goods DOC under SOLAS, 74, and review responsibilities under ACP, U.S.-flag operators in the international arena are experiencing a reduction in the regulatory burden placed upon them without compromising safety.

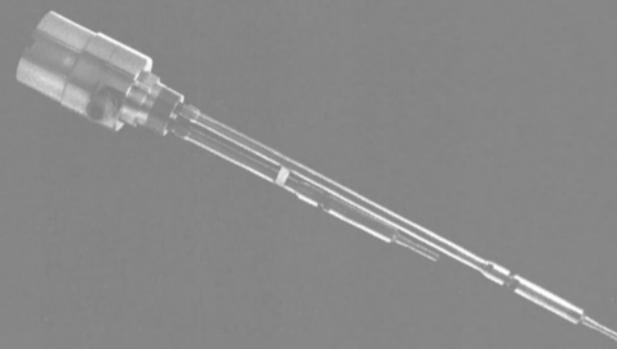
Kawasaki Inaugurates GOM Service

Kawasaki Heavy Industries has expanded with the addition of a new service center to its worldwide network for marine machinery. Established in the New Orleans area to support Kawasaki's marine propulsion systems, the new operation is the end result of an agreement with AmClyde Engineered Products Company - to utilize AmClyde's parts and service center in Covington,

La. Kawasaki supplied a set of four propulsion thrusters for Tidewater's ROV support vessel Nautical Tide. The equipment package was comprised of two azimuth thrusters for main propulsion, one tunnel bow thruster and one retractable azimuth bow thruster. The vessel was constructed at Yantai-Raffles Shipyard in China under subcontract from the company's U.S.-based partner - Friede Goldman Halter.

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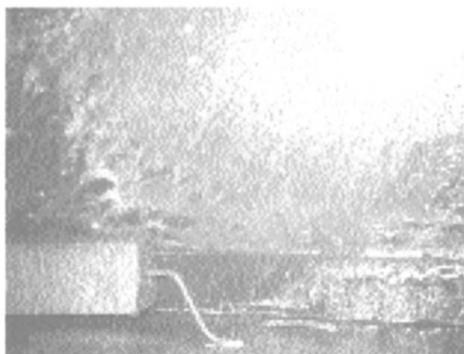
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U.S. Vessel Loan Guarantees: Myths And Realities

In September 1993, as the Secretaries of Defense and Transportation announced a new commercial shipbuilding initiative, the President declared that "[s]hipbuilding is one of the keys to America's national defense, and helping our shipbuilders succeed commercially is an important goal of defense conversion." A cornerstone of the 1993 Shipbuilding Initiative was the revival of the Federal Ship Financing Program (commonly known as the "Title XI Program" because its statutory authority is spelled out under Title XI of the Merchant Marine Act, 1936). Administered by the Maritime Administration ("MarAd") of the U.S. Department of Transportation, the program has prospered since 1993 under a rigorous review process mandated by the Federal Credit Reform Act of 1990 ("FCRA").

Now, despite this success, the Title XI Program struggles with a historic low level of funds due to a precipitous drop in annual appropriations in the last two years and an even lower recommendation from the Administration for the coming year. There are certain misconceptions or myths that have formed in official circles about the funding for this program. For Title XI appropriations to be restored to prior levels, these myths about how the program functions must be dispelled.

Background

Prior to the implementation of the FCRA in the early 1990s, appropriations were not required for the issuance of a federal loan guarantee. However, thanks to the passage of the FCRA, the risk of default for every loan to be guaranteed by the U.S. Government must now be subsidized by appropriated dollars. Therefore, funds have been appropriated annually for Title XI loan guarantee "subsidies" from fiscal year 1993 to the present. In recognition of the long-term nature of shipbuilding projects, appropriations Acts do not require Title XI appropriations to be spent in a particular fiscal year but are carried forward from year to year until spent (such appropriations are called "no-year money").

Before a Title XI loan guarantee may be issued, MarAd and the Office of Management and Budget evaluate the loan's default risk in light of a number of statutorily prescribed risk factors, and determine the amount of subsidy required. The most common subsidy cost of Title XI guarantees is five percent of the amount of the guarantee.

From 1993 to 1997, the annual appro-

priations to subsidize the default risk of Title XI guarantees ranged between \$50 million and \$32 million. In the last two years, however, the annual level has

dropped drastically to \$6 million, a decrease of more than 80 percent. To make up just for the amount lost will require an appropriation of \$84 million

for FY 2001. Yet, regrettably, the President's budget request for that year is only \$2 million. This disturbing trend can be traced, at least in part, to various



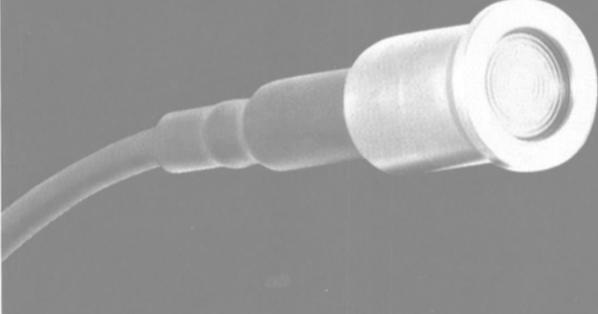
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myths about the Title XI Program.

Myths & Realities

Myth: MarAd has not been spending the current funds.

Reality: Already \$41.5 million in subsidy funds have been obligated in FY 2000.

Although some argue that demand for guarantees is so low that MarAd cannot spend the money appropriated, the reality is that with three months remaining in the fiscal year, available subsidy funds for Title XI have dropped to a historical low of about \$28.1 million. This is sufficient to cover only about \$562

million in guarantees. In contrast, at present, applications for guarantees totaling more than \$4 billion await MarAd approval. Although not all of these applications will be approved, the existing funds plus the amount requested by the President will be adequate to guarantee only 15 percent of these cur-

rently pending projects. Applications for other major projects are expected to be submitted to MarAd in the next several months.

The reality is that in FY 1994-1999 the Title XI Program obligated on average \$45 million per year in loan guarantee subsidy funds. These were the six full fiscal years after the program's revival in FY 1993. Even when the startup year of FY 1993 is included, the average obligation level is just under \$40 million per year.

Myth: Additional funds are not needed until current funds are spent.

Reality: At least \$50 million in Title XI appropriations is needed each and every year to attract the very large shipbuilding projects, especially those that support the national defense industrial base.

Title XI guarantees provide financing every year for a steady stream of small and medium-size projects and periodically for very large shipbuilding projects. Major shipbuilding projects, which provide supplemental commercial work to national defense shipyards, are a central objective of both the Shipbuilding Initiative and the Title XI Program, and require from two to four years to put together.

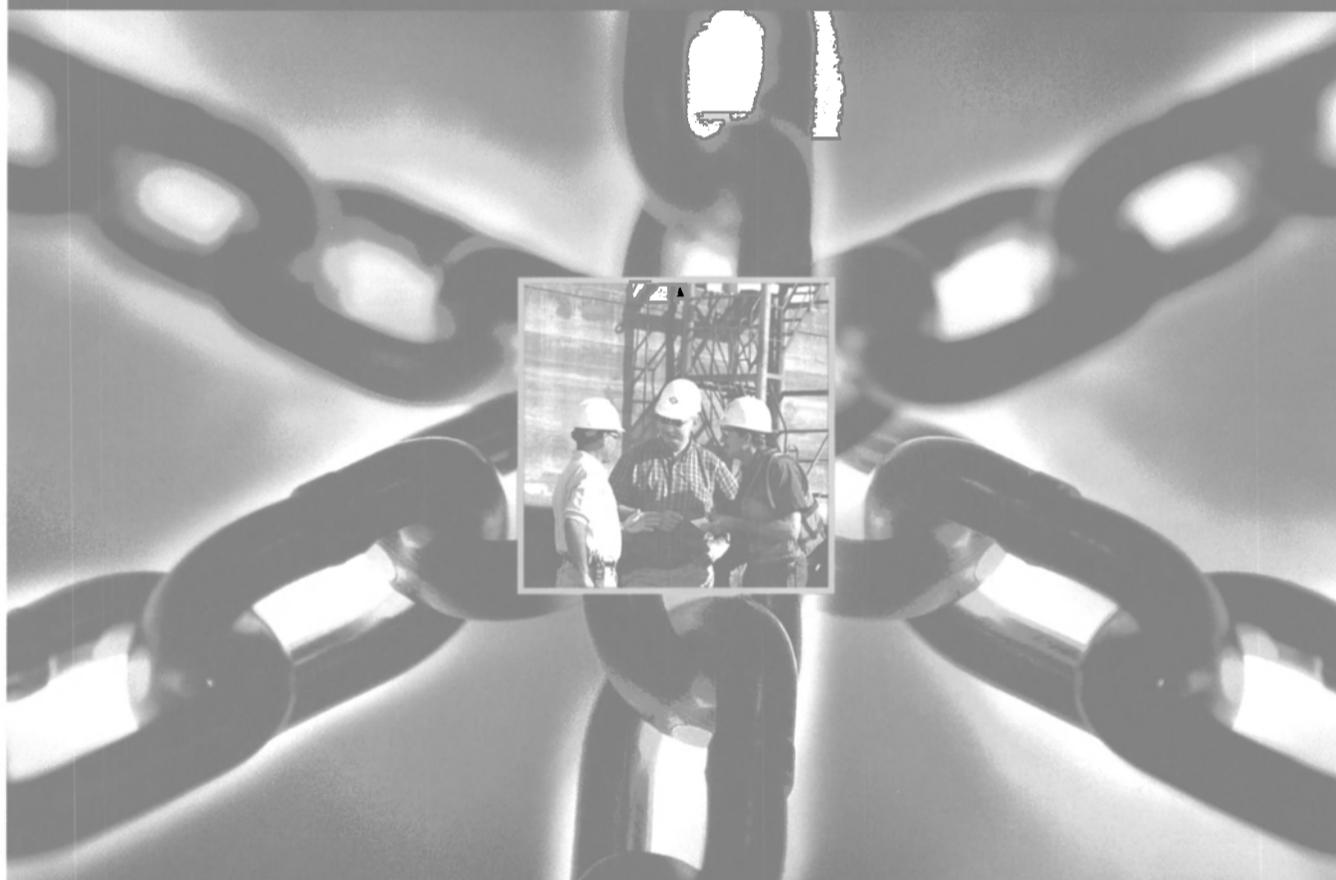
Investors in these larger projects will not proceed unless they can depend on the necessary funds being available once they raise the millions of dollars in equity required before MarAd will consider a loan guarantee application. During FY 1994-1999 the available level of funding averaged \$110.2 million annually, ranging from a low of \$94.3 million to a high of \$126.8 million. With this level of funds available, an investor interested in a very large project can be confident that Title XI funds will be in the account when needed for the project, even if \$35-40 million every year goes to smaller projects.

Myth: Title XI is a costly program for the Government to run.

Reality: Title XI makes money for the U.S. Treasury.

Fees collected from the Title XI program since FY 1993 are \$95.7 million. When interest is included, this number rises to almost \$150 million. Of projects approved since FY 1993 under MarAd's rigorous review, only \$1.9 million (a single project) was lost due to default. This is less than two percent of the amount gained in fees. Even when including the worst-case outcome of the recent default of the Massachusetts Heavy Industries loan for the shipyard at Quincy (which was approved under special legislation), the fees are still almost double the total defaults. The loss from

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the Quincy default will be mitigated by any amounts recovered from the sale of assets at the shipyard.

In addition, since FY 1995 a total of \$1.076 billion in MarAd Title XI funds has been returned to the Treasury under the liquidation and periodic re-estimation procedures of the FCRA. Under the FCRA, all balances in the financing account from accumulated fees and interest have to be transferred to the General Fund of the U.S. Treasury. In addition, vessel loan guarantees periodically are "re-estimated" to determine whether they are more or less risky. If less risky (presumably a vessel loan becomes increasingly less risky as it is being paid off over time), a proportional amount of the subsidy appropriation originally set aside to cover a potential default is also returned to the U.S. Treasury for general use.

Prospects for Increased Funding

Can Title XI funding be restored to the levels of the mid-1990s? While uncertain, there are signs that a sizable number of Members of Congress are recognizing the value of making up for the funding lost in recent years. Important steps have been taken to lay the groundwork for the actual appropriations. Earlier this year, 24 Senators and more than 50 Congressmen sent letters in support of \$50 million for the Title XI Program to the Senate and House Appropriations Committees, respectively. Since then, the House of Representatives voted for legislation recommending authorization for a \$50 million program, and the Senate committee responsible for maritime issues also voted in favor of \$50 million for Title XI. However, the actual appropriations for Title XI are provided separately every year in the Commerce-Justice-State ("CJS") appropriations bill, and an appropriation for the full \$50 million could be difficult under current budget constraints. The House, for example, passed an FY 2001 CJS appropriations bill in late June that provides only \$10.621 million for Title XI subsidy costs.

Although the Senate has not yet (as of this writing) acted on its version of the CJS appropriations bill, the Senate customarily has taken a more favorable view of the Title XI program than the House. However, the overall budget allocation for the Senate CJS appropriations bill is severely limited and funding for all programs within the bill, including for Title XI, may be held to levels that Senators would not normally desire. For this reason, in addition to regular appropriations, alternative sources of funding may have to be considered. They range from an allocation to the Title XI program from the ever-burgeoning budget surplus, to transfers from Department of Defense appropriations, as was the case in FY94 and FY95. Surely the amounts transferred to the U.S. Treasury over the years should count for something as the current budget is debated. The hope is that Congress will continue the shipbuilding initiative that began in the early

1990s and be creative in finding the resources to maintain a strong, vibrant, and fully funded Title XI program.

*The preceding was authored by
Duncan C. Smith III and James S.W. Drewry, Dyer
Ellis & Joseph.*

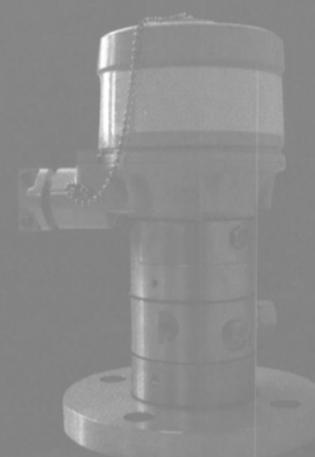
Offshore Companies Take Legal Action

Chevron, Conoco and Murphy Exploration & Production filed a lawsuit against the U.S. government for denying the companies' "timely and fair review" of plans, permits and an appeal concerning a lively natural gas field in the eastern Gulf of Mexico.

The company trio is partners in a proposed natural gas development project focused on federal offshore leases in the Destin Dome 56 Field, 25 miles south of Pensacola, Fla. The U.S. Department of Energy cites that the field is comprised of potential reserves at up to 2.6 trillion cu. ft. of natural gas. The complaint, which was filed in the U.S. Court of Federal Claims, alleges that the U.S. government delayed and ultimately blocked the partners from developing the field. Currently, the project is pending a decision by the Department of Commerce, who will not render a settlement on

the project until the EPA has completed environmental permits. The partners are seeking compensation for lease bonuses and rentals paid to the federal government; exploration costs; and expenses incurred for the preparation of environmental studies.

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The Bubbler is an electro-pneumatic level transmitter that allows remote level measurement using a 4-20mA analog output. The lack of air pressure poses no operational problems, due to an automatic one-way valve which closes as soon as the pressure drops below 1 bar, this prevents back flow in the bubbling line towards the transmitter. Over pressure is also protected against by an automatic one-way valve.

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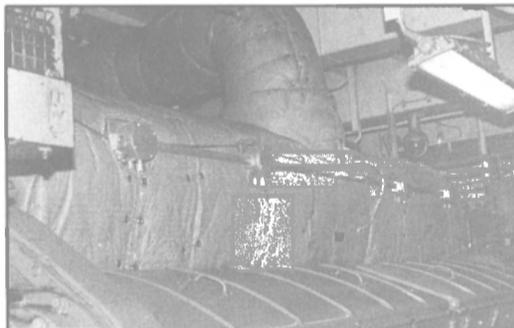
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OpSail 2000: Parade Of Tall Ships Graces New York's Waters

Founded in 1961 by President **John F. Kennedy**, Operation Sail (OpSail) has since found its way back to New York Harbor for significant events such as the Bicentennial celebration in 1976 and the 100th anniversary of the Statue of

Liberty in 1986. MR/EN was invited to step aboard the historic Schooner Wavertree, prior to OpSail 2000.

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

Stepping aboard the historic Schooner Wavertree docked at New York's South Street Seaport, one would feel instantly immersed by the constant whirring of drills, hammering and workers being pulled up onto the vessel's masthead.



The historic Wavertree docked at the South Street Seaport. (MR/EN photos: **Regina P. Ciardiello**).

No, it's not a group of 19th Century shipbuilders, but a modern-day group of individuals, some of who are volunteers, working to prepare the historic Schooner for its OpSail appearance. MR/EN spent the morning of the vessel's last day at the seaport, prior to its departure for a Staten Island shipyard where it would undergo any last minute alterations before the famed Parade of Ships during July 4 weekend.

Measuring 325 ft. (99 m) with a 40 ft. (12.1 m) beam and 22 ft. (6.7 m) draft (loaded) Wavertree was built in Southampton, England in 1885 for R.W. Leyland & Co. of Liverpool. Originally constructed to transport jute, which was used for making rope and burlap bags, between India and Scotland, the vessel was decommissioned in December 1910 — after sailing for more than 25 years — following a near de-masting in a gale off Cape Horn. Deciding against derigging, Wavertree's owners opted to sell the vessel, which was then utilized as a floating warehouse at Punta Arenas, Chile. Prior to its acquisition by the South Street Seaport Museum in 1968, the vessel performed one more duty, serving as a sand barge in Buenos Aires, Argentina for more than two decades — beginning in 1947.

Following the purchase of the vessel by the museum, Wavertree was prepped and then towed to New York in August 1970, where it remained to undergo conversions and repairs to help rejuvenate it back to its original appearance.

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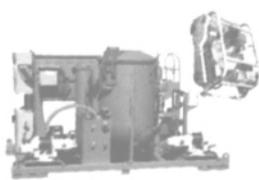
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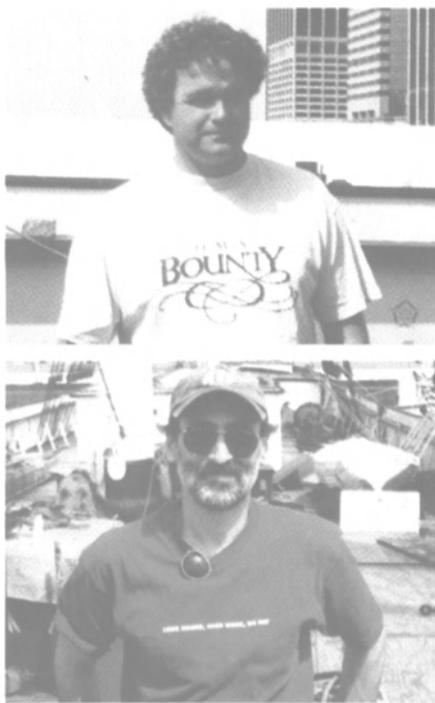
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A piece of Wavertree's original beam rests in the vessel's workshop.



Top: **Jim Barry**, Wavertree's chief rigger; Bottom: **Richard Dorfman**, weekend volunteer coordinator for Wavertree.

Beginning this past February, workers recruited from around the globe, as well as weekend volunteers from the New York area poured all their efforts into refurbishing the ship. Led by chief rigger, **Jim Barry** of Seacock, Mass., the regular work crew performed daunting tasks that encompassed rigging wire onto new masts, (the crew managed to put up 19 spars in 23 days), reinstating the main deck and restoring a raised foredeck structure that initially never existed.

Barry, an accomplished rigger who has worked on noted restoration jobs, such as the Moshulu in Philadelphia; and the Glen Lee in Glasgow, Scotland, first heard about the restoration job from friends. Barry decided to try out his talents in New York, eventually landing his current position as chief rigger — where a 12-hour day is typical. According to Barry, the bulk of Wavertree's work was completed in the morning by the regular workers, with volunteers joining the crew every Saturday and Sunday.

Headed by **Richard Dorfman**, who is Wavertree's weekend volunteer coordinator, the group consisted of about 25-30 individuals, who according to Dorfman, "even showed up when we had to shovel snow off the vessel's deck on a cold February morning."

An architectural lighting designer by trade, Dorfman, who also volunteered his efforts on the Elissa restoration project, supervised the volunteers in performing tasks, such as sanding and painting, to galley rigging and constructing forms for ballast blocks. He credits one particular volunteer, **Josh Payne**, who helped build the shape for the vessel's main top mast.

On a typical weekend, Dorfman's

main concern was to not only support the volunteers, but to also work with them in outlining specific tasks for the day, as well as working to coordinate the influx of information to the volunteers from the regular crew.

"The 25 volunteers that worked on this project dove right into it," Dorfman said. "It's exciting to see people who are

so dedicated — it made the project that much easier."

On the day of *MR/EN's* visit to the Seaport, the regular crew — as well as Dorfman — were readying the vessel for its pre-OpSail stint at Staten Island, N.Y.-based Caddell Shipyard. The historical ship had its handiwork shown off at the Parade of Ships, where it sailed

among other historical vessels as the *Amistad* and the aircraft carrier *John F. Kennedy*. Wavertree will not end its run at OpSail though, interested visitors will be able to view the restoration project in all its glory at the Seaport Museum. "The prize here is a spiffy, well pointed, well fitted out ship that we can take sailing and take care of," Dorfman said.

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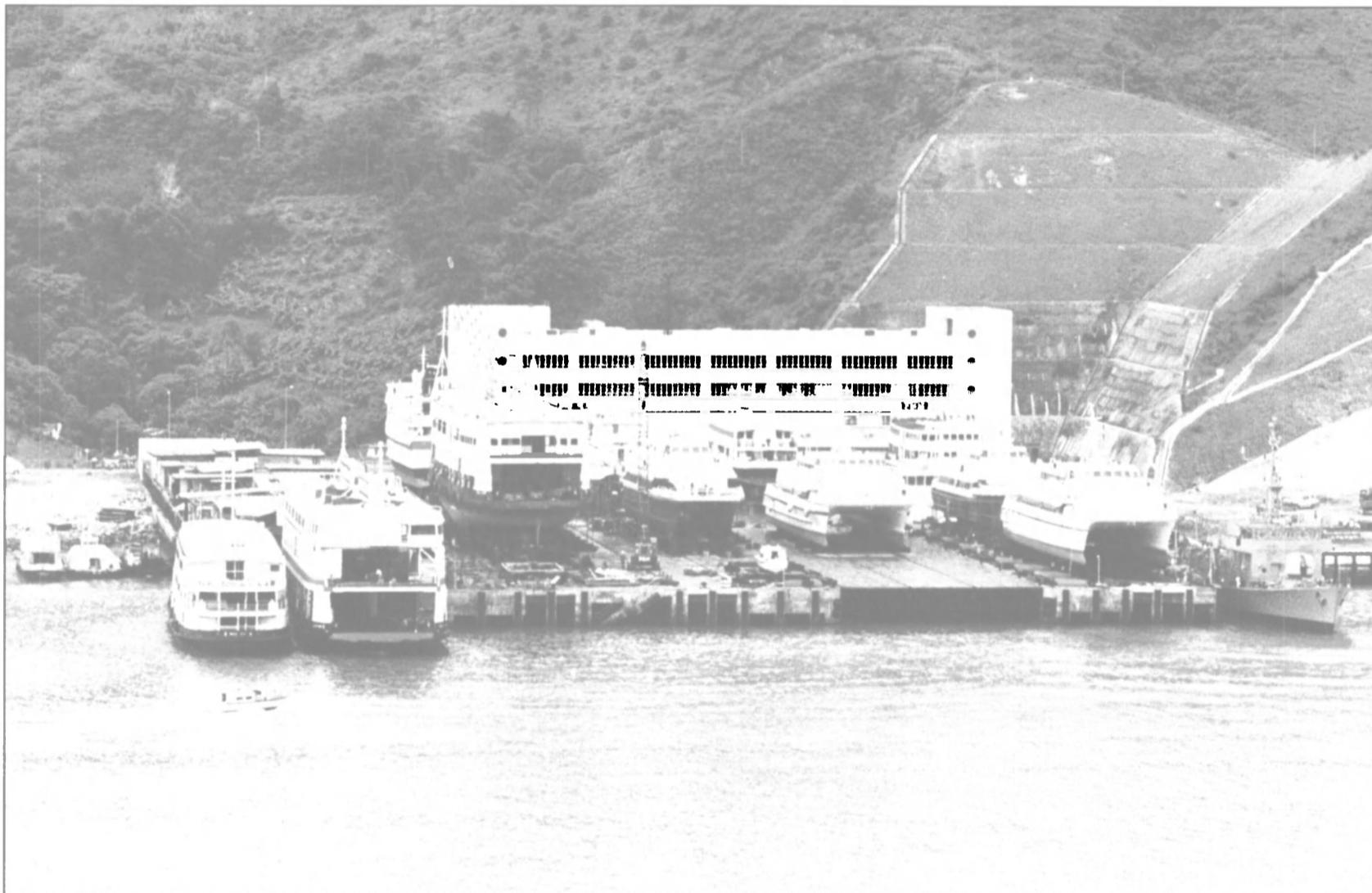


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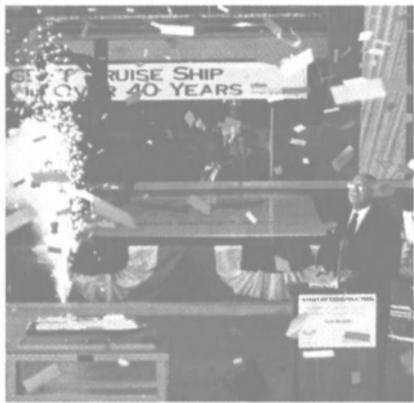
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Construction Commences On Milestone Cruise Vessel



Litton Ingalls kicked off the construction process of the first cruise ship to be built in the U.S. in 40 years, with a pre-July 4th ceremony at the yard's Pascagoula, Miss. headquarters celebrating the vessel's hull fabrication.

Located among a patriotically-centered flag waving crowd was Uncle Sam, the yard's guest operator, who went aboard a plasma arc plate cutting machine to cut the initial steel plate for Project America Hull #1 — the first in a series of cruise ships built by Litton Ingalls for American Classic Voyages (AMCV).

The commencing of the hull fabrication marked the start of the construction of the first of two 1,900-passenger cruise ships for AMCV. The vessels, which will be U.S.-owned and crewed as well, will offer exclusive service to the Hawaiian Islands beginning in early 2003. Ingalls has an additional agreement with AMCV for a twin ship to follow in 2004, as well as an option for a third in a program worth more than \$1.4 billion. Initially labeled Project America, this vessel series is the result of the U.S.-Flag Cruise Ship Pilot Project, which is designed to rejuvenate the U.S.-flag oceangoing cruise ship fleet. The project is expected to help sustain and modernize the U.S. shipbuilding industrial base, and is strongly supported by both the U.S. Department of Defense and the U.S. Maritime Administration (MarAd). The project was formulated as a result of the passage of the U.S.-flag Cruise Ship Pilot Project Statute in 1997. In order to ensure an efficient construction process, Litton Ingalls is engaged in a \$130 million construction project at the yard. Already covering approximately 300,000 sq. ft. of assembly space, the yard expects to add a mammoth crane capable of 600-ton lifts, measuring 411 x 329 ft. (125.2 x 100.2 m)

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August, 2000

FirstWave And PPL Join Forces

FirstWave has formed an alliance with PPL Shipyard Pte Ltd. in order to offer expanded options and greater cost savings in the area of rig construction. Extending beyond FirstWave's alliance with A&P Group U.K., this merger with PPL will capitalize on the multi-site

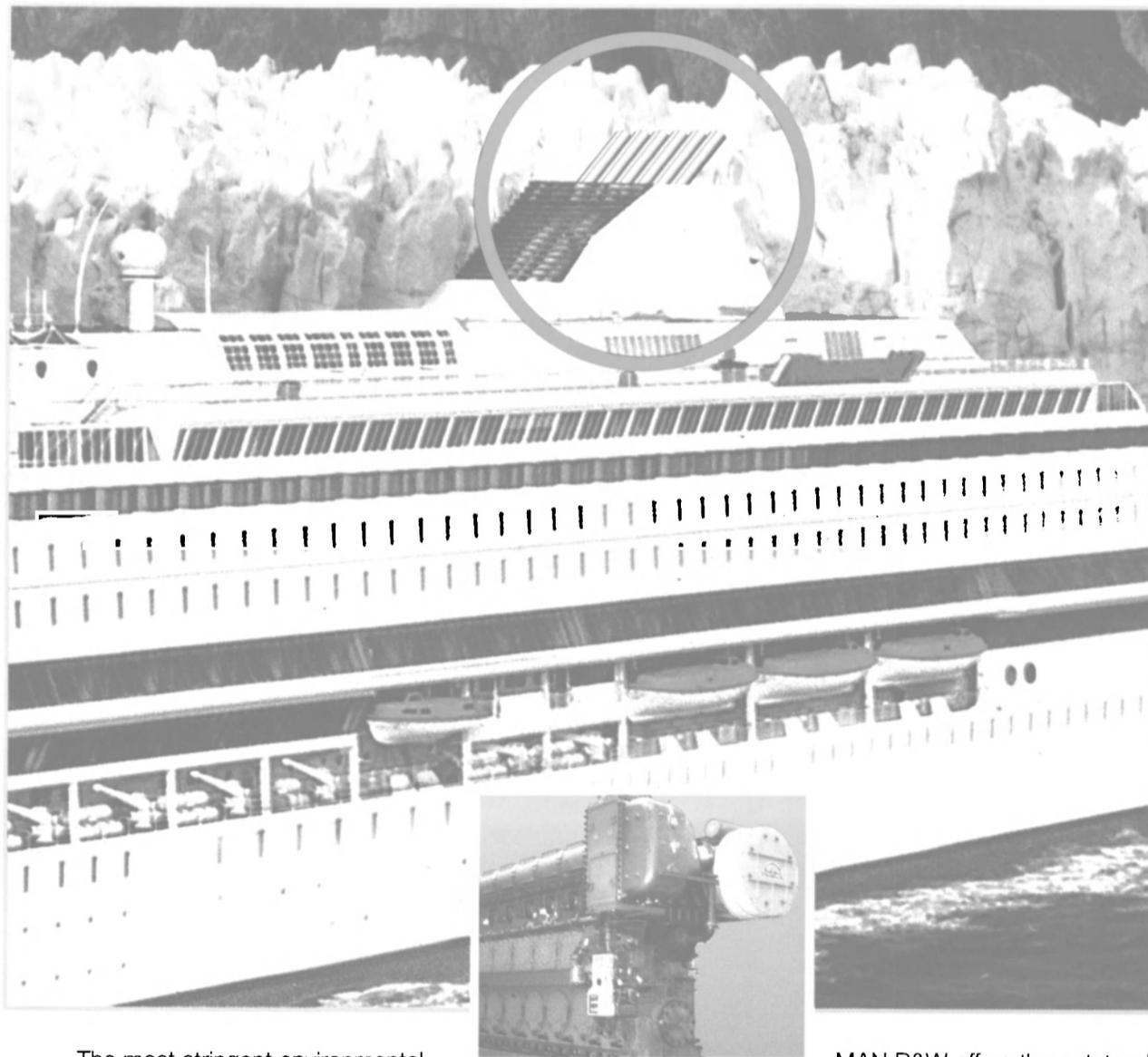
facilities and expertise of both companies in offshore rig new construction and complex conversions.

Both companies will be able to meld marketing and project management knowledge for the delivery of new construction and conversion services throughout the world.

Bollinger Delivers 254 ft. Multi-Service Vessel

Bollinger Shipyards delivered a 254 ft. (77.4 m), 4,000-hp multi-service (MSV) for Oceaneering International, Houston, Texas. The vessel, which had its hull launching on Jan 1, was christened on May 19 by Cynthia Huber, wife of

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Dave Huber, director of deepwater projects, Mariner Energy.

Measuring 254 x 54 x 19 ft. (77.4 x 16.4 x 5.7 m), Ocean Intervention is an MSV designed for deepwater installation work. Two striking differences between this vessel and other offshore support vessels are its nearly flat bottom and two very large bowthrusters. The flat bottom was created to allow easier operation of remotely operated vehicles (ROV) and other equipment from the vessel's forward and aft 18 x 18 ft. moonpools. Also implemented on the vessel are 6.5 ft. diameter bowthrusters — elements within the vessel's dynamic positioning system — that help to meet the ABS DPS-2 certification.

The diesel electric powered vessel develops a total of 5,470 EKW from two Caterpillar 3516B and two Caterpillar 3508 generators. Propulsion is provided by a pair of 2,000-hp-DC Aquamaster azimuthing thrusters (Z-drives) and two 1,000-hp Kamewa bowthrusters. The vessel's positioning is controlled by a fully redundant Kongsberg Simrad positioning system.

Able to carry 222,703 gallons of fuel; 3,000 gallons of lube oil and 74,371 gallons of potable water, the four deck vessel was constructed for the post delivery addition of a heliport, and is equipped with a 40-ton deck crane, 60-ton slewing stern A-frame and an anchor windlass.

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SCA Commercial Vessel Repair Contract Released

The Shipbuilders Council of America (SCA) released a Commercial Vessel Repair Contract form for use by U.S. shipyards when negotiating domestic and foreign-flag vessel repair contracts.

American shipyards are encouraged to propose the contract form to their customers. It is aimed at making ship repair contract negotiations more simple and efficient, a goal shared by shipyards and vessel owners and operators alike. The contract form, which can be found on the SCA website at www.shipbuilders.org, includes several blanks that will be completed by users based on specific yard and vessel criteria. The drafters recognize that the form will need periodic modification.

An ad hoc committee of SCA members prepared the contract form with input from outside law firms. The committee members included **Bruce Croushore** from Bender Shipbuilding & Repair; **Sue Kean** of FirstWave Marine; and **Andy Rowe** of Cascade General.

Shipbuilding in a Box?

Kit concept allows facilities with little expertise, technical resources, to build world-class vessel

In June 1998, Kvaerner Masa Marine signed a contract with NICO International of Dubai, U.A.E. to develop a 120 ton anchor handling supply vessel. This project was carried out by KMM's engineering group in Vancouver, Canada and gave KMM further involvement in the challenging and attractive market of "kit build" vessels.

The twin screw anchor handling supply vessel Team Salalah has recently been delivered to its owners. The lead vessel of a series of six, it is the first vessel in the NICO fleet, custom designed for operations in both the extremes of the Persian Gulf and worldwide trading.

Team Salalah measures 61 x 15.2 x 5.5 m, and is a standard supply vessel layout: 350-sq.-m. sheathed working deck area aft; liquid mud and cement tanks arranged amidships and fuel oil; drill water and fresh water tanks distributed throughout the vessel's length. A 120-ton double drum tow winch is located immediately aft of the accommodation for anchor handling operations. The vessel is equipped to FiFi Class 1 requirement, and accommodation is arranged for a crew of 24 and features a hospital accessible from the open deck. In addition to the normal list of owner's requirements, KMM were advised that the vessel was to be built at NICO's shipbuilding arm of Adyard, situated in Abu Dhabi, U.A.E. This is an existing repair and pressure tank fabrication facility with essentially no traditional shipyard equipment for new construction. It was thus decided that the vessel be constructed in kit form with KMM extending their normal design services to supply production level detail drawings.

The main hull structural components were cut and formed by Centraalstaal of Groningen, Netherlands in accordance with KMM's detailed design and lofting drawings. The vessel's hull features a deliberate attempt to simplify construction by eliminating all double curvature plating. Centraalstaal delivered the flat and formed components for each of the hull units by container. The unit breakdown was thus specifically tailored to suit the maximum internal dimension of the shipping containers. The deckhouse was fabricated and outfitted in advance of the main hull by Adyard itself.

KMM provided production level drawings for all outfit, mechanical and electrical systems using 3-D Cad modeling software to ensure proper utilization of space and to prevent interferences between systems. Piping systems were extracted in isometric spool drawing format complete with bills of material for fabrication at site.

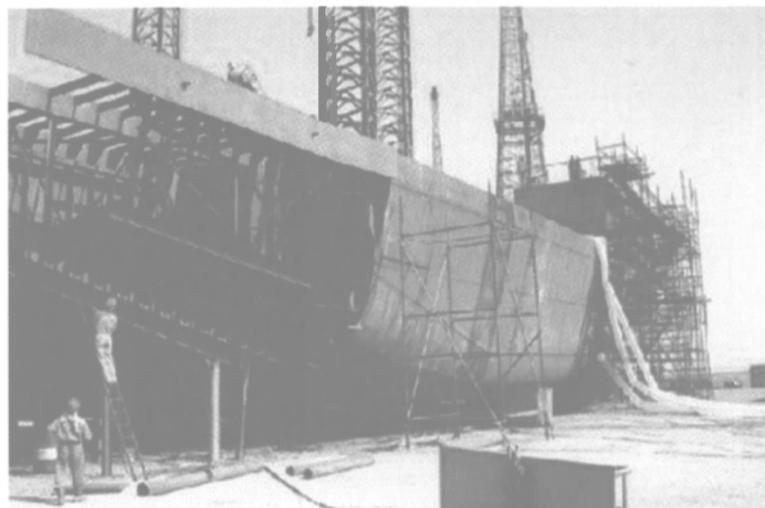
M.V. Team Salalah Specifications and Principal Particulars

Owner	.....	NICO International, Dubai U.A.E.
Builder	.....	Adyard, Abu Dhabi, U.A.E.
Designer	.....	Kvaerner Masa Marine, Vancouver
Class	.....	ABS XA1 AMS ACCU Fi Fi 1
Length overall	.....	61 m
Breadth	.....	15.2 m
Depth	.....	6.4 m
Load line draught	.....	5.52 m
Power	.....	2 X 2,600 kW
Trial Speed	.....	15+ knots
Bollard Pull	.....	85+ tons
Complement	.....	24 plus hospital
Cargo Area	.....	350 sq. m. at 5t/sq. m.
Int. Propulsion System	.....	Wartsila NSD
Thrusters	.....	Brunvol
Gearboxes	.....	Volda
Aux. power	.....	Cummins
Steering gear	.....	Jastram
Capacities:		
Cargo Fuel Oil	.....	628 cu. m.
Drill Water	.....	426 cu. m.
Cargo Fresh Water	.....	345 cu. m.
Bulk Cement	.....	162 cu. m.
Liquid Mud	.....	280 cu. m.

ACG 600H gearboxes to a Propac CPP system drives 2.95 m propellers in fixed 19A nozzles. Wartsila also supplied the 430 kW Brunvoll bow and stern thrusters. The propulsion and ancillary alarm and monitoring system was supplied by CSI of Holland and coordinated through Wartsila. The vessel is classified FiFi 1 with 1,200-cu.-m./hr. fire monitor pumps driven off each gearbox with the deluge system supplied from Wormald. Auxiliary power was also from Wartsila and is provided by two Cummins NTA855-G2M diesels gensets with 284Kw generators and a Cummins model 6CTA8.3G emergency genset with 160 kW generator. The ship's switchboard and MCC's were supplied by CMR of Singapore. The steering gear system is Jastram model S2-80-1-45.

The deck equipment package was supplied by Plimsoll of Singapore and consists of a 120 ton double drum tow winch, two 10 ton tugger winches, tow pins, shark jaw, combined anchor windlass and nylon rope storage winch and two five-ton capstans. The vessel was launched in January, 2000 and underwent extensive sea trials in the Arabian Gulf prior to being accepted by the owners and chartered in March of this year.

The "kit-build" method of construction has allowed NICO to construct these vessels within their own limited facility making use of their ship repair and Oil industry personnel who have limited new construction experience. NICO procured all machinery and equipment in accordance with technical specifications and evaluation supplied by KMM. A Wartsila NSD integrated propulsion system comprising two of 8L26 engines each delivering 2,600 kW through Volda



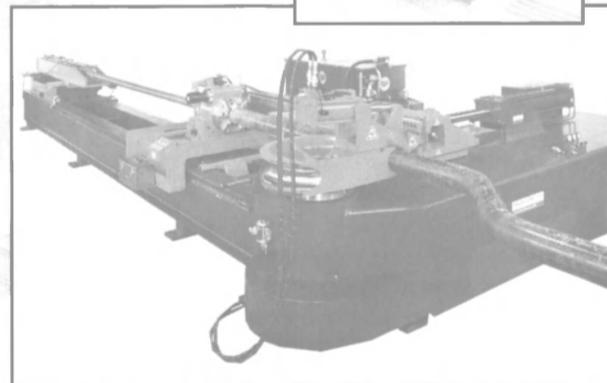
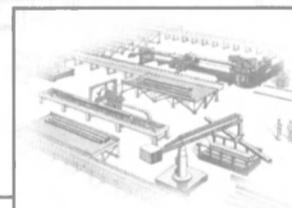
KMM's "kit" concept allowed Adyard — which is a repair and tank fabrication facility — to build a world class anchor handling supply vessel

The kit concept is seen by KMM as particularly attractive, particularly to shipyards of limited manpower, technical capacity and equipment resources. The concept allows them to compete by providing the basic building elements in an accurate and complete package with full technical backup in support of their construction effort. This in turn provides owners with increased options when soliciting bids for vessel construction on the international market.

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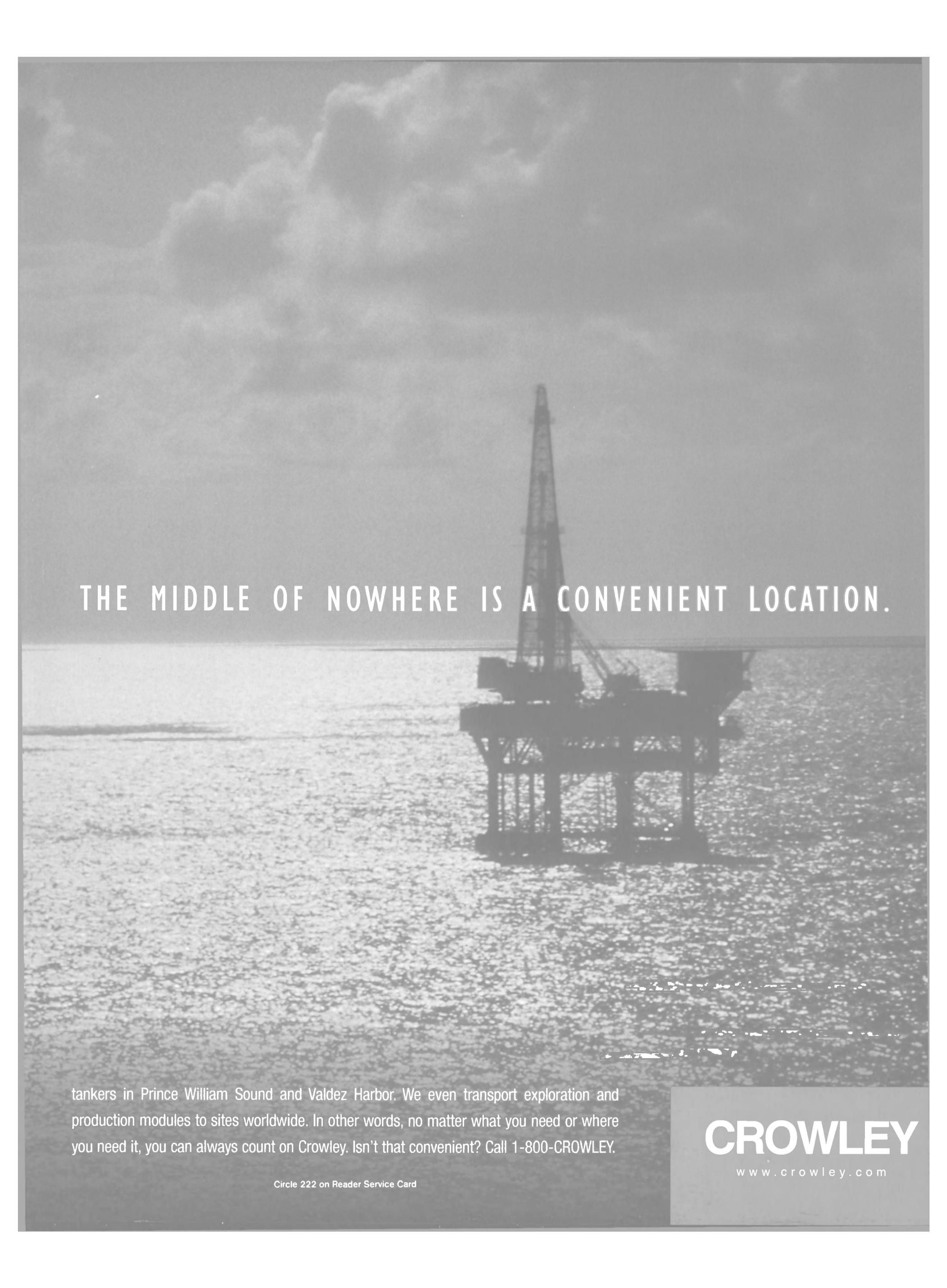


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The U.S. Coast Guard uses four small steel barges specifically engineered to provide a safe working platform and reduction in pollutants from painting operations during routine maintenance of Coast Guard Cutters.

Gone are the days of the staging or boson chair rigged over the side with a crew member welding chipping iron and paint roller. The U.S. Coast Guard identified the need for an improved system to prevent paint chip and spatter

from entering the environment, and after considerable research it was decided to design and construct a steel pilot model Paint Float to provide a safe working platform to conduct topside maintenance.

The original float measures 30 x 12 ft. (9 x 3.7 m), with draft of just 1.5 ft. (.5 m) and displacement of 32,000-lbs. It has a water ballasting system consisting of four capped 24-in. diameter steel pipes, each 12 ft. long, two per side. The system was designed so paint crews could adjust the trim of the barge to accommodate the flair or tumble home of the cutter. The transferring of ballast water was by hand pump. In retrospect, the system was inconvenient and rarely used, as the paint crews found it easier to use lines from the upper level of the scaffold to the deck of a cutter to provide heel. The painting scaffold is a two level working platform constructed of three-in. square steel tubing and plate with expanded steel deck gratings. The foot flanges of the scaffold frame bolt to raised deck pads. The bolt connection permits removal of the scaffold for repair and maintenance. In addition, the workers' safety is protected on the deck and each of two levels by lifelines that are easily arranged to suit the location of work at hand.

Bolted on deck under the scaffold is an expanded metal box providing for stowage of the anti pollution boom, which is routinely deployed during painting and fueling operations. The box was later removed, as the new and improved booms were too large for the container. This pilot model paint float has been in daily operation since 1990. Three years after the first float was launched, two additional paint floats were constructed for Coast Guard units at Long Beach, Calif. and Seattle Wash. These two floats were similar in design and construction to the first float, but with minor design changes, such as replacement of water ballast with internal lead ballast.

The rub rails were changed from original split pipe to bolt on rubber "D" sections. In 1998 responding to additional requirements for topside maintenance/preservation and increasingly stringent environmental regulations, a new float was designed and constructed at Coast Guard Island, Alameda Calif. by Coast Guard personnel.

The fourth float construction modifies the previous three designs with deck camber and replacement of cast lead ballast with commercial lead bricks secured below in a steel box. Deck drains have a more efficient closure device that will prevent paint or other toxic liquids from inadvertently going overboard, yet allow for rain water drainage. The added length provides space for vacuum collection and separation equipment for use with standard tools, and possibility for negatively



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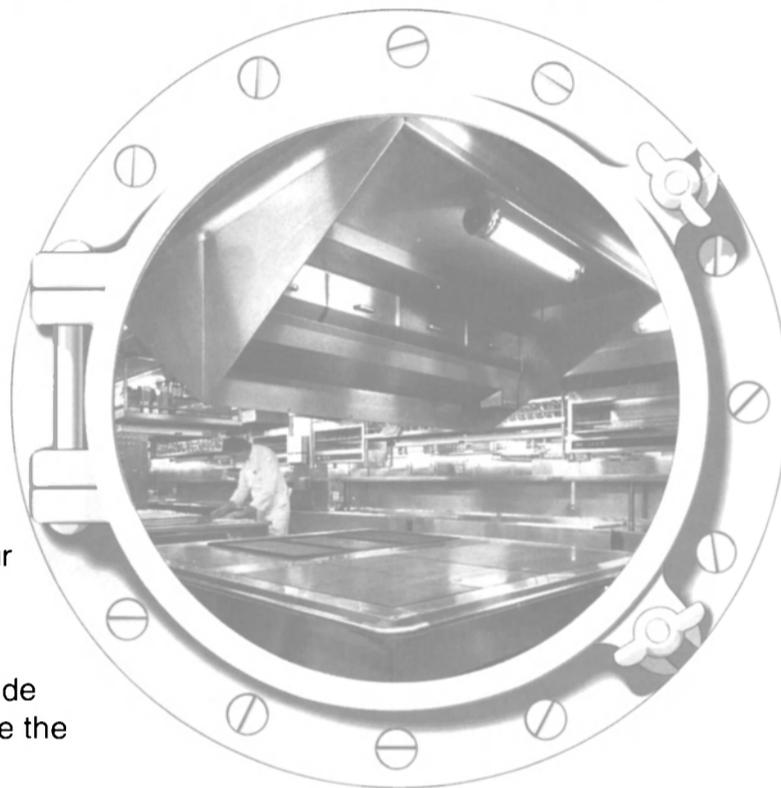
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Coatings & Corrosion Control

pressuring the containment space. Additional protection is by double horizontal runs of rubber "D" rub rails in place of the previous single runs.

Coast Guard Yard early in 1997 began to research various methods and systems to reduce the amount of pollution resulting from topside preservation

methods and initially their work concerned only the main deck and above. As a result of their effort, pollution from painting operations have been reduced considerably on Coast Guard vessels.

The next step was to incorporate a system to accomplish the same goals as used on the hull topsides. To support this

goal, the newest paint float has been constructed with the added feature of a containment shroud that totally encloses the scaffold — and is an additional component in Coast Guard's goal of attaining zero paint emissions to the environment.

The fore and aft containment shrouds

can be opened and closed like a theater curtain, adjusting the opening to fit the job. The forward and aft ends of the scaffold are similarly closed in, but have doors for access. Along the port and starboard deck edges there is a fold down fabric horizontal bib, which is extended to the vessel's hull during paint operations, held in place with a series of magnets. This extension is flexible enough to allow for the relative motion of barge and cutter. The bib will allow the painting crew to recover debris which otherwise would have fallen into the water. At the forward and after corners of the scaffold there is a vertical fabric bib that can be extended to the cutter's hull and a sealing edge maintained with attached magnets. The containment enclosure will afford a secure storage space for equipment, such as an air compressor and other tools used in painting operations.

Control and positioning of the barge can be attained by lines to portable pad eye magnets attached to the steel hull of the cutter. A sufficient number of cleats are installed around the deck and scaffold of the float/barge to provide additional line control. During actual workday practice, the floats are often left moored outboard of the cutter or pier after work hours, and are liable to damage resulting from wash of passing vessels. Therefore the scaffold and barge are protected with additional installed and portable rubber fendering.

Operational guidelines require, when possible, the floats are to be secured inboard of the piers and cutters after working hours with a required number of lines of sufficient size for security with enough scope and fleet angle to accommodate the rise and fall of the tide. On account of the additional sail area due to the containment shroud, Coast Guard personnel performed an Incline Experiment soon after launch to establish the location of the vertical center of gravity and to record necessary measurements necessary to calculate a maximum allowable wind load for safe operation. This information forms the basis of a "Safe Operation Booklet," to be published by Coast Guard Yard technical personnel. Coast Guard Yard further supports the project by providing periodic on site user training for the cutter painting crews.

None of the four paint floats have been specifically designed for open water towing. However, the first and fourth floats have made a number of successful open water transits across windy San Francisco Bay that is notorious for rip tides and less than ideal sea conditions.

Turn to page 68 for more on Coatings & Corrosion Control.



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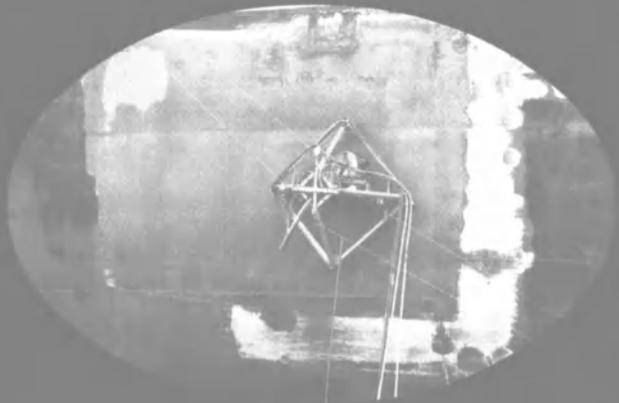
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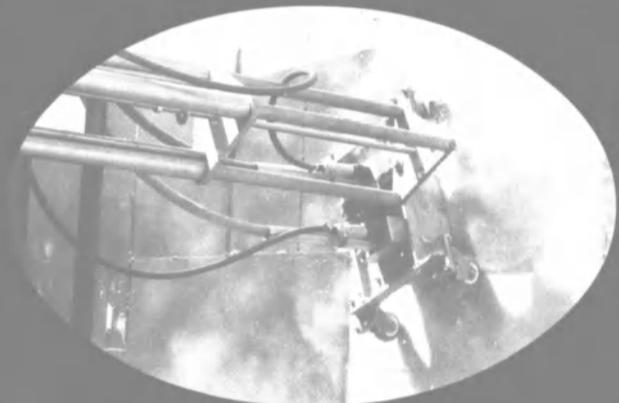
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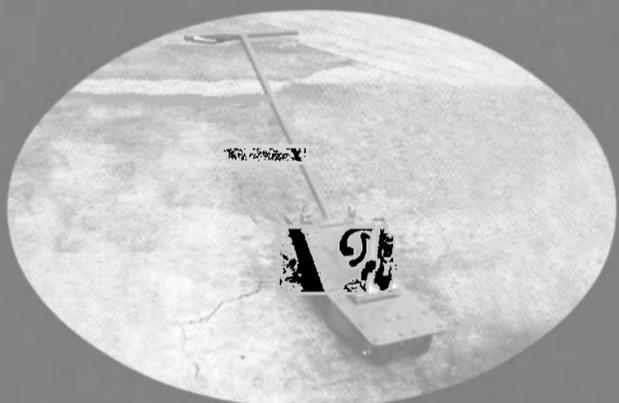
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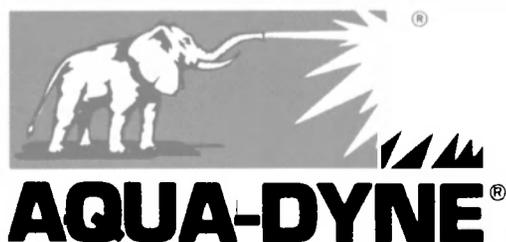
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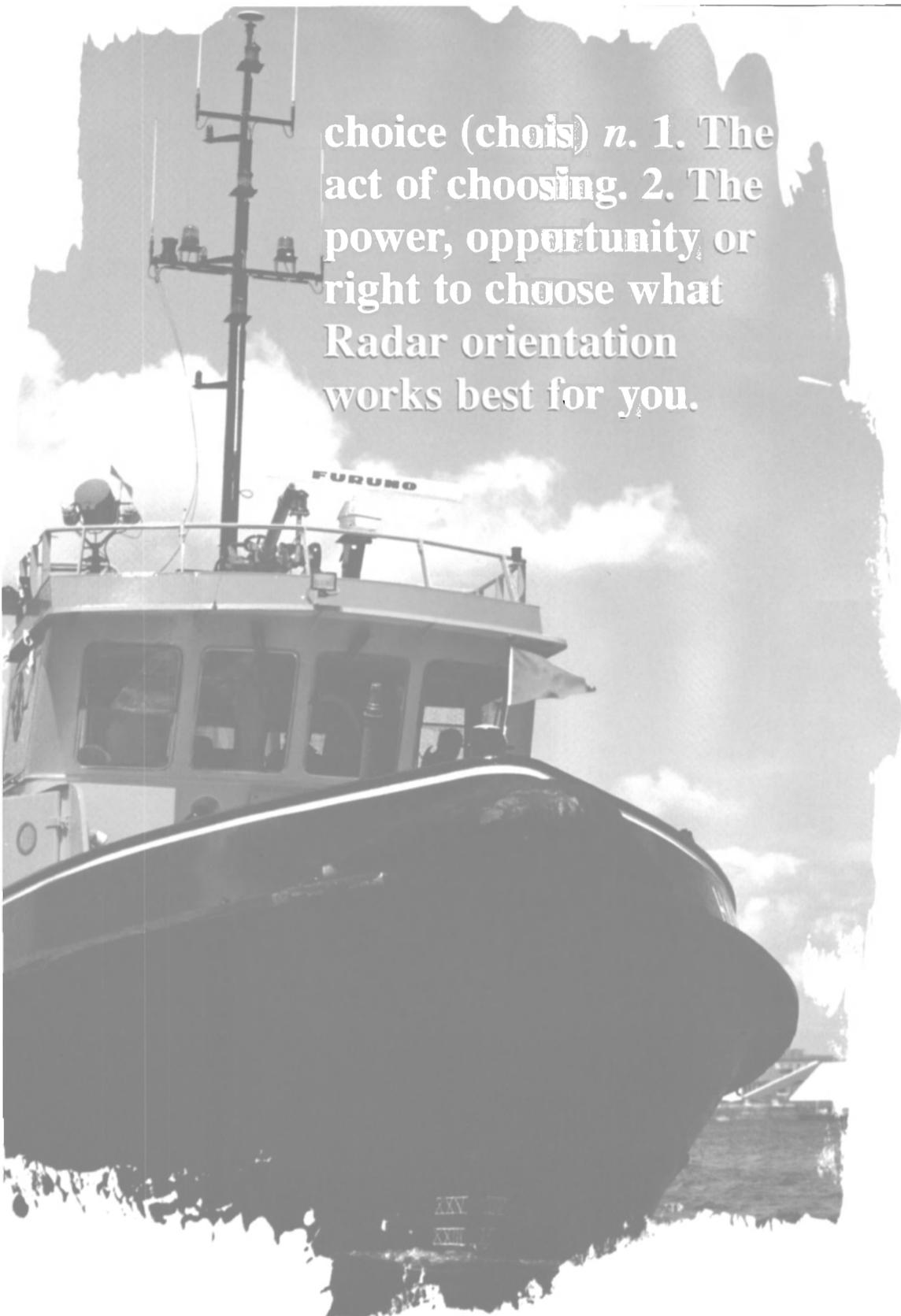
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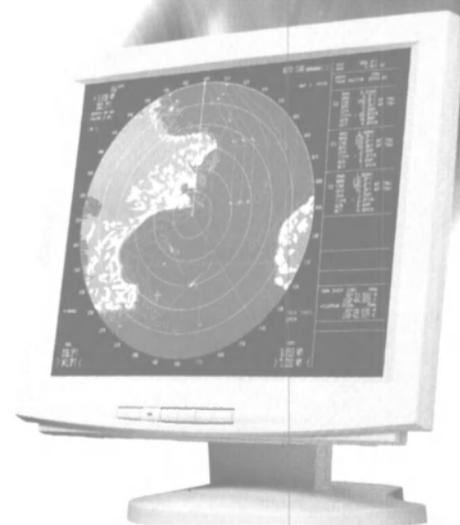
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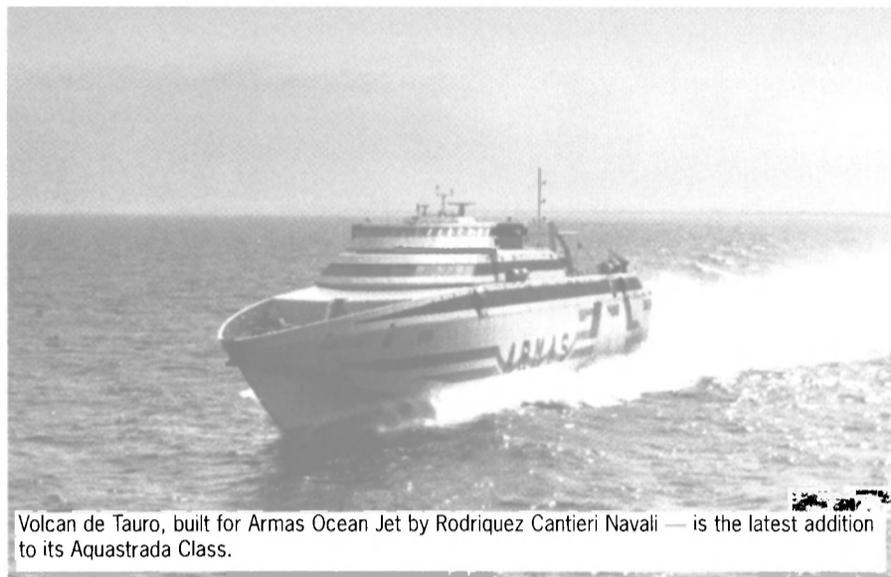


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Passenger Vessels With Pedigrees



Volcan de Tauro, built for Armas Ocean Jet by Rodriquez Cantieri Navali — is the latest addition to its Aquastrada Class.

Italian prowess in the field of passenger vessel design, outfitting and technology is near legendary status in the international marine community. Even as the grip on these high-value, niche vessels loosens — largely due to cost-cutting competition from the Far East — a quick peak at the world orderbook and recent deliveries of cruise ships quickly tells who currently reigns supreme in the cruise shipping market.

Evidence of Italian influence in the passenger vessel segment is undeniable, and over the years the country's shipbuilders have catered to some of the world's most discerning and quality demanding customers, such as U.S.-based Disney Cruise Line.

A recent delivery, which espouses the expertise of the Italian ship construction community was delivered this spring from Fincantieri's Venice-Marghera shipyard. Built for Holland American Line of the Carnival Corp., Zaandam is a 61,000-ton ship, which measures 780 x 115 ft. (238 x 35 m) and can cruise at up to 23 knots. The luxury ship is in stark contrast toward the trend of "bigger is better," (which, by the way, Fincantieri has helped to foster and delivered ably with its construction of such mega-ships as Grand Princess) and embodies the shipowner's desire to re-develop and renew the tradition of excellence, which has been the hallmark of the Holland America Line, one of the world's oldest lines specializing in passenger transport.

Zaandam's 720 cabins are designed to afford maximum luxury and space for its 1,824 passengers, and every detail of the ship — from its technologically advanced marine products and systems to its interior materials and artistic

accents — were chosen with purpose. Zaandam is the seventh vessel built by Fincantieri for HAL, and this ship is the third to carry the name for the company, with the first ship debuting in 1882 and the second in 1939. Fincantieri will also deliver another five ships for the line over the next few years. Among these to be built is Amsterdam, a sistership to Rotterdam, which will feature the Azipod propulsion system. The other four in the program are a new class of 84,000-ton Panamax vessels.

Headquartered in Trieste, Fincantieri is separated into three business units: the Merchant Ship Business Unit, the Naval Vessel Business Unit and the Cruise Ship Business Unit. The company offers seven shipyards strategically positioned throughout Italy, as well as two of the largest and most renowned centers for ship design in Genoa and Trieste.

Bigger, Faster, More

While cruise ship design, development and construction sometimes seemingly dominate the Italian shipbuilding scene, it is far from the Italians' exclusive area of expertise. Shipyards such as Rodriquez Cantieri Navali SpA have long served the lucrative niches of producing technologically advanced people and car carriers.

Volcan de Tauro (pictured) is the latest incarnation of the company's popular and proven Aquastrada class, and was delivered to her owner Armas Ocean Jet in the spring.

The 374 ft. (114 m) steel construction monohull exhibited a maximum speed of 45 knots and a service speed of 40 knots at 90 percent MCR and a full load at sea trials. The former and latter were made possible through Rodriquez' own

SMS stabilization system installed, a Seaworthiness Management System, which is comprised of four lateral fins and two keels.

The Aquastrada TMV 114 is the 220th vessel delivered by the specialty yard since 1956, when the first commercial high speed vessel was launched. Currently, the yard is building 32 patrol boats capable of 40 knots for the Italian Coast Guard, and scheduled for delivery over the next two years.

Main Particulars - Volcan De Tauro

Type	Aquastrada TMV 114
Owner	Armas Ocean Jet
Builder	Rodriquez Cantieri Navali SpA
Class	BV
Flag	Spanish
Home port	Las Palmas
Length (o.a.)	374 ft. (114 m)
Length (waterline)	316 ft. (96.2 m)
Beam	54 ft. (16.5 m)
Draft	8 ft. (2.5 m)
DWT	547
Passengers	880
Car capacity	200
Hull material	High tensile steel
Superstructure material	Light alloy
Main engines	(6) Caterpillar 3616s
Power	6 x 6,000 kW
Aux. engines	(4) Caterpillar
Gearboxes	(3) BHS
Propulsion	(3) Lips waterjets
Max. speed	45 knots
Cruise speed (90% MCR, Full Load)	40 knots

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Italian Maritime Report

Crockford Named Commercial Director

Rodriquez Cantieri Navali has named **Sam Crockford** as the commercial director to oversee the sales and marketing of all products manufactured by the shipyard.

The current product range includes high-speed commercial vessels, patrol boats, luxury yachts and the Seaworthiness Management System. Crockford has a degree in marine engineering from the State University of New York Maritime College, and has served in several related industry posts including posi-

tions with a major diesel engine manufacturer, and with a supplier of advanced propulsion systems for high speed ferries.

"Classic Italian" From Finland?

Bragging rights for the title of most prolific cruise ship builder has lately



centered on Italy and Finland, Fincantieri and Kvaerner Masa Yards to be exact. While the Italian contingency has pulled ahead of late, the Finnish shipyard located in Helsinki has recently delivered M/S Costa Atlantica for Costa Crociere SpA, a 85,700-gt, RINA-classed cruise ship which is the first in series of a Panamax-Max size liner.

The 700 billion Italian lira (approx. \$340 million) ship is particularly noteworthy, as it is the largest in the Costa Crociere fleet, and the largest built for a European cruise line.

Considering that the ship is a first-in-series, the timeframe from order to completion has been remarkably compact: the order for the new ship was placed in early 1998; hull assembly began March 19, 1999; launching took place November 11, 1999; first cruise was July 16, 2000. Designed to carry 2,680 passengers in 1,057 staterooms and 902 crew, the interior styling of the ship is described as "classic Italian," designed by **Joe Farcus**. To add an extra bit of Italian flair, each of the ship's 12 decks has been named after movies directed by the famous **Federico Fellini**.

Costa Atlantica is powered by diesel-electric machinery, consisting of six Wartsila NSD 9L46D diesel engines, providing a total power of 62,370 kW. Each is connected to an alternator producing electricity to the ship's main electric network.

The engines provide power for a pair of azimuthing electric Azipod propulsion units, providing a service speed of 22 knots.

Circle 87 on Reader Service Card

Main Particulars - Costa Atlantica

Owner	Costa Crociere SpA
Cost	\$340 million
Builder	Kvaerner Masa-Yards - Helsinki
Classification	RINA
Length	960 ft. (292.5 m)
Breadth	106 ft. (32.2 m)
Draft	26 ft. (7.8 m)
Diesel engines	(6) Wartsila NSD 9L46D
Propulsion	(2) Azipod
Alternator	ABB
GT	85,700
Passengers	2,680
Cabins	1,057
Crew	902
Crew Staterooms	509



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Costa Atlantica First To Earn RINA's Green Star

Italian classification society RINA has launched Green Star, which it is dubbing the new environmental standard for shipping. The recently delivered Costa Atlantic from Kvaerner Masa-Yards for Costa Crociere is the first ship to meet the green standard, earning both the Clean Sea and Clean air voluntary nota-



tions from RINA.

The Clean Sea notation means that bunker tanks must be installed over double bottoms to prevent accidental discharge of oil in a low-speed accident. Ships must also be fitted with holding tanks for all black and gray water waste, and must meet the standards set down in the voluntary IMO Marpol Annex IV. Special requirements ensure garbage is disposed of safely, and ships must not use TBT-based anti-fouling.

The Clean Air notation sets limits on SOx and NOx emissions from the engines, and requires compliance with the voluntary standards of Annex VI to Marpol. There is a three percent limit on sulfur content in fuel that can be burnt, and RINA also sets requirements for refrigeration gases and their containment in the case of an accident.

Carnival Corp., the world's largest cruise line, has applied for the Green Star logo for three sisterships currently under construction at KMY.

Circle 73 on Reader Service Card

NOL Elects Deputy Chair And New Directors

NOL has named **Cheng Wai Keung** as deputy chairman, and has further expanded by appointing **Marvin J. Girouard** and **Dr. Friedbert Malt** as non-executive directors.

He has been with NOL since 1992 and has further developed his working knowledge of the company as a member of the executive committee since 1997, while Girouard, the current chairman and CEO of Pier One Imports, and Dr. Malt, a prominent German banker, both bring a wealth of knowledge to NOL's board.

August, 2000

Wijsmuller Granted Major SPM Job

Through its subsidiary, Cory Towage Limited, The Wijsmuller Group has been awarded a contract for marine services at the Ash Shihr oil export terminal in Yemen for Canadian Occidental Petroleum Yemen, which is familiarly known as CanOxy Yemen.



The Ash Shihr terminal deals with crude originating inland, which is piped to the terminal storage tanks from where it is then pumped to loading tankers at the single point mooring buoy (SPM) — three miles offshore. The SPM can handle the largest tankers and regularly receives vessels of 300,000-dwt.



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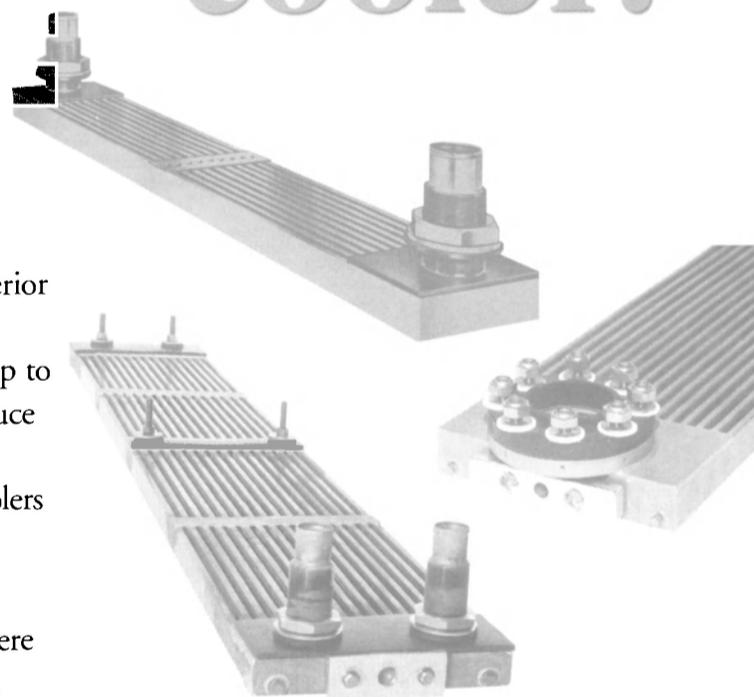
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NNS Receives Top Rating

Newport News Shipbuilding (NNS) has received the U.S. Government's highest rating for excellence in workplace health and safety. Federal Authorities from the Occupational Safety and Health Administration (OSHA) awarded NNS on June 26 with re-certification at the Star level of OSHA's Voluntary Protection Program (VPP).

OSHA grants this specific achievement to those companies with comprehensive, successful safety and health programs that promote employee protection while demonstrating continuous improvement. The shipyard first received the star rating in 1995. Star VPP Plants are revisited by OSHA every three to five years to verify the site is still compliant with VPP Star Standard.

Myriad Of Orders For Wartsila 200 Engines

Transocean SedcoForex of Houston, Texas, has ordered four Wartsila 12V200-generating sets for repowering their Transocean 135D semi-submersible offshore platform. These 2020 kW generating sets will be delivered in October this year and will be installed

while the semi-submersible is on station in Brazil. This is the fifth platform for which Transocean SedcoForex has selected Wartsila 200 generating sets.

In addition, Fincantieri in Italy has ordered two 12V200 main engines to power the diesel-electric propulsion system of a new multipurpose support vessel contracted by the Italian Navy. These engines have a combined output of 4,800 kW at 1,500-rpm.

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MacGregor To Supply For RoRo Carrier

MacGregor is scheduled to retrofit three sets of flood control doors to a RoPax freight carrier constructed in 1990. The flood control barrier system from MacGregor includes the retrofit of three sets of single-section top-hinged flood control doors. MacGregor's specialists will perform this work during the vessel's docking from September - November of this year.

Circle 4 on Reader Service Card

MSS Marine Safety Patents Launching Device

Sweden-based MSS Marine Safety Systems introduced a patented launching device for fast rescue boats.

Drop tests, side impact tests and sea trials, including docking at a speed of eight knots on open sea, have been finalized — proving successful performance in open sea conditions.

In order to launch and retrieve a fast rescue boat safely and quickly, MSS Marine has formulated a floating dock, which corresponds to the motion of the boat. The dock is launched and retrieved together with the boat by conventional davits or a crane — either as a single point lift or the more stable tow point lift.

Circle 2 on Reader Service Card

Hvide Adds \$5 Million Tug

Hvide Marine Towing has taken on the newest addition to its tractor tug fleet with the christening of its Ship Docking Module — the 90 ft. (27.4 m), 4,200-hp Suwannee River. Designed solely for harbor assist work, the \$5 million saucer-shaped tug is able to push and pull in any direction with complete control in close quarters. Twin 360-degree azimuthing drives set fore and aft, and offset from center give the tug a greater range of maneuverability and power. Currently operating 37 tugs in the harbor and offshore towing industry, Hvide Marine Towing's Suwannee River is the fourth SDM to join the fleet. With a bollard pull of 120,000-lbs. and increased hp, the vessel holds a 3,000 gallons per minute firefighting motor.

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Circle 101



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Damen Shipyards has developed into a leading, internationally operating enterprise in the fields of newbuilding and repair of ships as well as maritime services. Damen Shipyards

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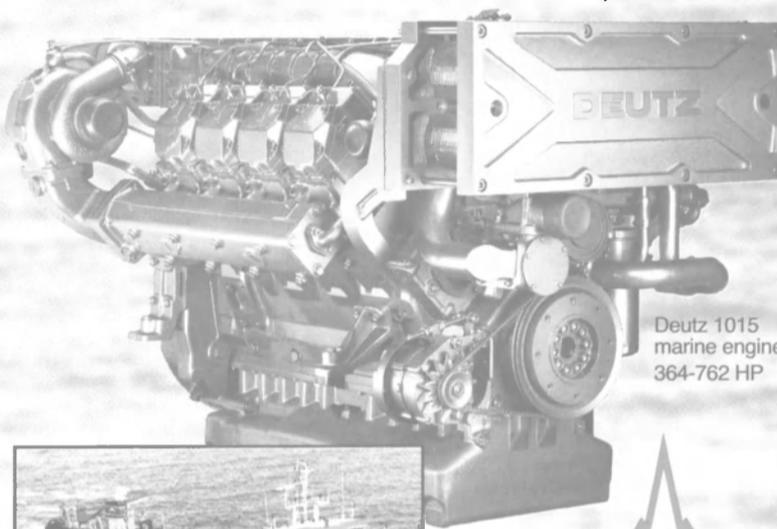
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Marine Literature Review



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polishers. Swirl-Off reduces the time needed to clean and refinish almost any floor or other structure. **Circle 108**

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by the tankerman in less than a minute without venting to the atmosphere. It comes complete with intrinsically safe barriers and on deck weatherproof LCD display, which names the tank in alarm. The Sea Switch also comes with complete Mil Spec Self-Diagnostics. **Circle 109**



analysis, naval architecture, marine engineering, CAD, CAE electrical engineering, weapons engineering, Ocean Engineering & Electronics Engineering. **Circle 110**



products as durable and high quality. Visualize tapered roller bearing, special seals pressurized oil for lubrication and cooling, SAE 4140 steel shafting, precisely engineered shim sets, and bronze components. **Circle 111**



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has the experience and capability to design, supply and install complete joiner systems. **Circle 113**

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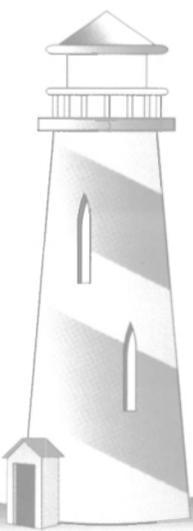


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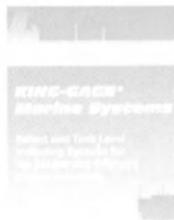
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August, 2000

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initial design though commissioning. For prompt retrofit service, Jastram maintains a full stock of ABS type approved steering cylinders. **Circle 114**

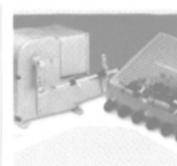


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for tank level gauging and vessel draft measurement. System components are well suited to the unique rigors of marine service. Options include analog or digital readout, electronic or pneumatic output. **Circle 115**

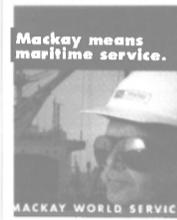
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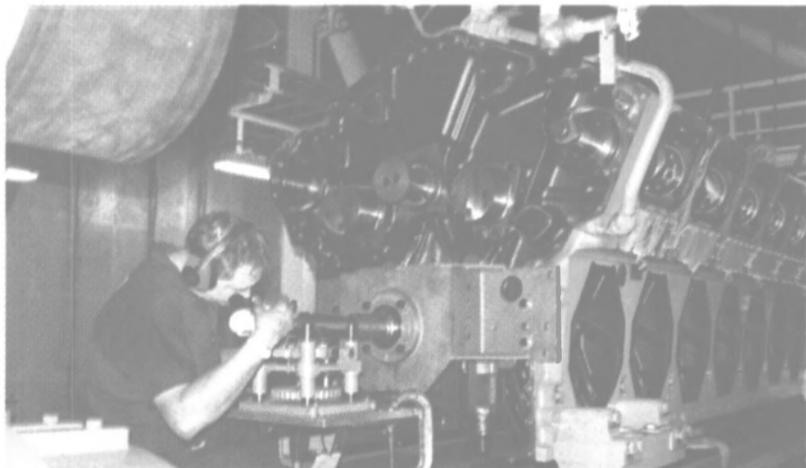


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Owens Klean Tank

Marine Waste Water Treatment Systems — The Owens Klean Tank uses aeration and operates as an extended biological aeration system. It is self contained and delivered to a site ready for operation when site electrical and mechanical connections are in place. The Klean Tank can be designed for small, hard to fit areas and has a capacity from 33 GDP to thousands of gallons per day. **Circle 120**



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Thermax

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major regulatory body certificates (USCG, Canada, DNV et al) and meets the requirements of IMO/SOLAS resolutions. Thermax is sold, distributed, warehoused laminated and cut to size in North America by PSI.

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The primary mission of the USMMA Global Maritime and Transportation School is 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 interest. **Circle 126**



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Schuyler

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Ballast Technologies, Inc. (BTI) has been the premier provider and installer of fixed ballast materials since 1983. Our product and service known as Perma Ballast™, is widely acknowledged to be the quickest and most cost-effective. **Circle 130**



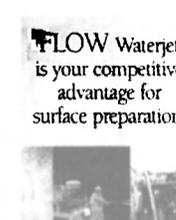
LO-REZ

LO-REZ VIBRATION CONTROL LTD. has been dedicated to the design and manufacture of vibration control equipment since the 1950. Committed to system performance LO-REZ provides extensive services and test facilities, providing certification prior and subsequent to overhaul when required. Comprehensive technical specifications and performance data is available upon request on all LO-REZ systems and components. **Circle 131**



Enercon

Enercon Engineering Inc. has served the needs of the power generation industry since 1975. They are a listed BI manufacturer for engine generator controls and switch gear under UL 891 and UL 1558. **Circle 132**



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Corpus Christi - Sept. 11th

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Surface Preparation for Marine Applications

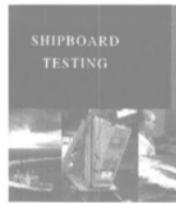
NLB Corp.'s latest brochure demonstrates high-pressure and ultra-high pressure water jetting for marine surface preparation applications. NLB's new HydroPrep™ quickly removes coatings, rust and other tough adherents from hulls. NLB's ship bottom cleaner, VORTEX™

floor and deck cleaners and other popular accessories are also highlighted. **Circle 136**



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21st Century Coatings, Inc. manufactures Fluorinated Polyurethane Coatings. Outstanding characteristics. Interior Coating of Navy jet fuel tanks. Born at the NRL, the FPUWC™ series are ideal for: Marine, CHT, steel & concrete structures, anti-graffiti. **Circle 137**



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The Dayton T. Brown Engineering and Test division is one of the most complete, Independent engineering and testing facilities in the United States. Providing objective and independent test and commercial companies. Dayton T. Brown tests include some of the following: Hammer Shock, Vibration and EMI/EM. **Circle 138**



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A multi-discipline architectural and engineering firm, Art Anderson Associates has been providing professional services to clients in the northern U.S. since 1957.

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G.R. Bowler, Inc. is a member of SNAME, NFPA, ISA and CSIA (Control Systems Integrators Association) and is a Preferred Integrator of Systems for Siemens-Moore (originally Moore Products Company). G. R. Bowler, Inc. Marine



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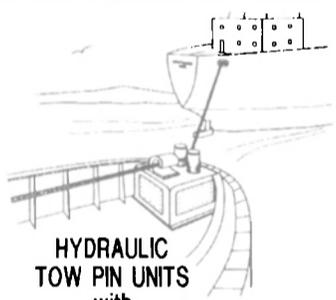
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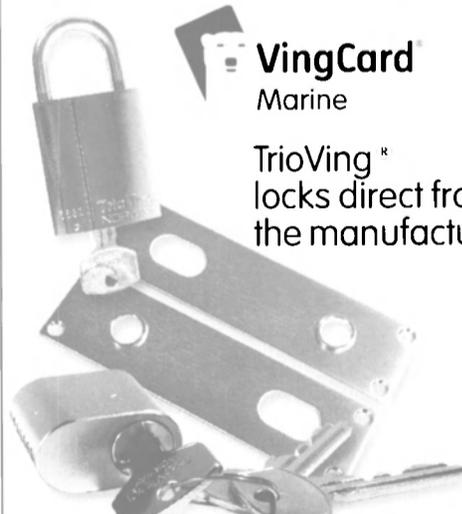
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Cruise & Ferry Report

Incat Launches Its Own New "Milenium"

The latest catamaran to pierce the waves from Incat Tasmania is Milenium, which was delivered to Transmediterranea for operation in the



Mediterranean. Launched this past April from Incat's Coverdales shipbuilding facility at Hobart's Prince of Wales Bay, the 315 ft. (96 m) vessel entered service this past May.

Milenium offers a total of 330 truck lane meters at 3.1 x 4.3 m clear height, making it suitable for heavy road transport vehicles, and 370 car lane meters at 2.3 x 2.1 m.

The vessel's control station is equipped with the most innovative electronic, navigation and communication equipment to comply with High Speed Craft Code Sea Area 2, and an aft-facing docking console and television monitors cancel out the necessity for bridge wings with their associated structural weight and windage.

Powered by four Ruston 20RK270 marine diesel engines developing in excess of 28,000 kW, the vessel's 20-cylinder engines drive transom-mounted steerable Lips 150D waterjets via Reintjes gearboxes. All four of Milenium's waterjets are designed for steering and reversing, while an independent hydraulic system in each hull controls the steering and reverse functions.

In a joint effort with Maritime Dynamics, Incat has developed a fully integrated Ride Control System, which is comprised of transom mounted trim tabs and a new retractable T-Foil located at the aft end of the centerbow.

Circle 38 on Reader Service Card

Main Particulars — Incat Milenium	
Classification	DNV
Length, (o.a.)	315 ft. (96 m)
Length, (waterline)	282 ft. (86 m)
Beam, (o.a.)	85 ft. (26 m)
Draft	13 ft. (4 m)
DWT	710
Trial speed	48 knots
Main engines	Ruston 20RK270 marine diesels 7,080 kW @ 1,030-rpm
Transmission	Reintjes Gearboxes
Waterjets	Lips
Alternators	Caterpillar 3406B 230 kW

Mayflower Lines Is Newest U.S.-Flagged Operation

Based in Fort Lauderdale, Fla., Mayflower Ocean Lines is laying out the blueprints for the design, construction, and operation of a 75,000-ton, 2,000 passenger U.S.-Registered passenger ship.

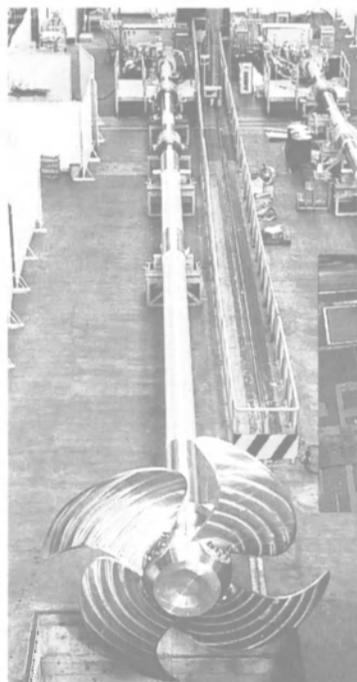
The South Florida cruise line is following the recent trend of U.S.-built, flagged and crewed passenger ships.

While the inaugural company is focused on catering to the modern vacationer, with a large, custom-built vessel, the line will not market the vessel exclusively within this realm. The company has an additional mission to operate the

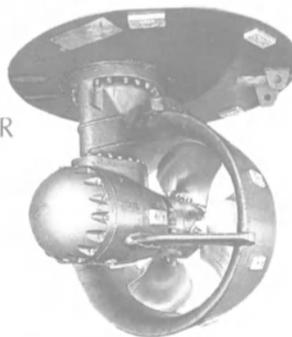
ship in an untapped niche market, specifically for business meetings, conventions and incentive travel programs onboard U.S.-Flag cruise ships sailing on U.S.-ports-only destinations. Named Mayflower II, the projected vessel will become a venue-at-sea for the \$110+ billion per year business meetings industry. Subsequent to extensive

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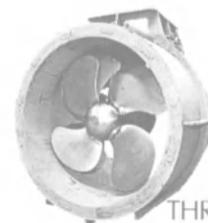
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Cruise & Ferry Report

research by the line, the vessel will offer several meeting rooms, conference center, exhibit space and approximately 32,000 sq. ft. of meeting space in addition to public lounges, business centers and dining facilities.

Operating through a strategic partner-

ship with a major hotel corporation, the passenger vessel, will operate seven-day cruises through ports in the American Caribbean from its homeport in South Florida.

The ship's meeting facilities will be comparable to that of land-based offer-

ings, and will offer such features as live video-conferencing, satellite-based Internet access and audio-visual equipment. Mayflower II's wireless and satellite-based technology will be provided through a partnership with a Silicon Valley communications firm.

Still in the preliminary design stages, Mayflower Ocean Lines expects to negotiate a ship-construction contract with a U.S.-based shipyard to ensure that the vessel is in compliance with all specifications, configurations and design outlines required for its service. The company aims to work closely with the U.S. Maritime Administration (MarAd), as it plans to apply for the Federal Ship Finance Program (Title XI), which will provide for a credit guarantee by the U.S. Government of debt obligations for up to 87.5 percent of the cost of ship construction.

Machinery onboard Mayflower II will be comprised of gas-turbine engines with an Azipod propulsion system, allowing for greater maneuverability while reducing overall space requirements. Measuring 870 ft. (265 m) with a draft of 26 ft. (7.9 m), the vessel will cruise at a speed of 22 knots.

From a design standpoint, Mayflower II will focus on America's maritime heritage and history by featuring museum-like displays, such as artifacts and charts from the original Mayflower era through the last of the high style Trans-Atlantic liners. Overseeing the Mayflower Lines project is **Robert Chamberlin** — an 18-year veteran of the maritime and cruise industries. Chamberlin, who will serve as president/CEO on the project, has played an active role in the cruise industry in both South Florida and the Pacific Northwest.

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Circle 314 on Reader Service Card

Maritime Reporter/Engineering News

Cruise & Ferry Report

WaveMaster Lands Ten Ferry Order

WaveMaster International has won a contract for ten 118 ft. (36 m) high-speed aluminum monohull ferries for delivery to Singapore. With firm contracts for the initial six vessel order already placed, financing has been arranged through Singapore-based Caterpillar Credit Services Asia, a subsidiary of Caterpillar Financial Services. Both the shipyard and purchaser have signed options for the remaining four vessels.

The WaveMaster design team developed this 118 ft. (36 m) monohull directly in sync with stringent safety requirements of the High Speed Craft Code, as set out by the International Maritime Organization (IMO) and Singapore Marine Authorities. Estimated design and build time is nine months for the initial six vessel order. Hulls and superstructures will be built in separate halls to speed up construction, although the real key to speed of production is WaveMaster's 3-D Unigraphics design solution.

This innovation, which is used traditionally in the production of motor vehicles and aircraft — produces a solid model of the vessel — allowing customers to gain a realistic insight of WaveMaster's design. This ensures that everyone involved fully understands the design before construction — helping to avoid costly reworks. Expected to revolutionize fast ferry travel between Singapore and Indonesia's Rau Islands, the 10-vessel fleet is scheduled for delivery in early 2001.

Circle 55 on Reader Service Card

MAN B&W Diesel Selected By TOTE

Totem Ocean Trailer Express (TOTE), Tacoma, Wash., has chosen MAN B&W four-stroke engines for their new RoRo vessels. Each vessel's diesel electric propulsion plant will be outfitted with six MAN B&W Diesel engines comprised of four MAN B&W 9L58/64 engines of 11,700 kW each, and two 9L27/38 engines with 2,700 kW each, for a total output of 52,200 kW.

The vessels, which are scheduled for delivery in 2002, will be constructed at NASSCO in San Diego, Calif. for operation between Alaska and Washington. The vessels' resiliently-mounted engines are designed to withstand extreme roll requirements as part of their regular operating scenario.

MAN B&W's latest innovation, the 27/38 series engine, will be implemented for power generation on board. The 27/38 series covers output ranges between 1,500 kW and 3,060 kW, and is part of a new breed of medium-speed engines from MAN B&W, which provides easy installation and maintenance, as well as economic operation.

Circle 74 on Reader Service Card

ICCL Addressed Safety, ADA Features Of Cruise Ships

The International Council of Cruise Lines (ICCL) attended the meeting of the National Transportation Safety Board (NTSB) on July 11 where the Board discussed a safety recommendation issued to the cruise industry in 1997. The Board thoroughly criticized the industry for not

imminently installing the recommended action, which states that "automatic smoke alarms that sound locally in crew and passenger accommodation areas should be implemented on foreign flag cruise ships." The NTSB states that as a result of this device, both crews and passengers will receive immediate warning of the presence of smoke and will therefore have the maximum escape time during a fire.

While the safety of passengers and crew is paramount to ICCL, the Council does not disagree with the intent of the NTSB's recommendation. However, ICCL believes that this recommendation, as written, could result in adverse operational and technical consequences that could conflict with safety systems and procedures onboard a passenger vessel.

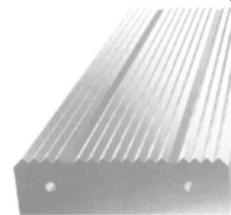
ICCL is also in the process of reviewing the federal court ruling requiring that all passenger vessels must comply with the Americans with Disabilities Act (ADA) standards onboard ships. There are currently no ADA regulations specific to the passenger vessel industry for accessibility. However, ICCL-member cruise vessel operations have gone to great lengths throughout the past 10 years to build vessels that are fully accessible to passengers with disabilities.

U.S. Court Of Appeals Rules On Disabilities Act

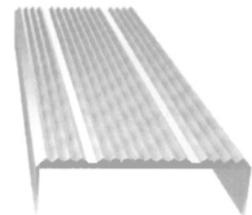
The U.S. Court of Appeals for the Eleventh District (state of Florida), ruled that the Americans with Disabilities Act (ADA), applies to foreign vessels that embark passengers in U.S. ports. Stevens v. Premier Cruises (11th Cir. June 22, 2000) is a direct example of this Act. The first of its kind, and significant for all passenger operators with U.S. operations, the Stevens case involved a passenger confined to a wheelchair

who booked a vacation aboard the Bahamian flag Cruise ship S.S. Oceanic departing from Florida. The passenger alleged that she was charged an excess fee in order to book a wheelchair-accessible cabin. The lawsuit stated that the passenger also found that neither the cabin nor the ship itself were wheelchair accessible, as well as alleging violations of Title III of the ADA, which bars discrimination in public accommodations.

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OWNER OPERATOR	COUNTRY SO	SHIPYARD	COUNTRY SB	TYPE	No	TEU	DWT	DELIV	M US\$
HAVILA SHIPPING	NORWAY	LANGSTEN SLIP & BAABYGGERI AS	NORWAY	AHSV	1				30.6
MACDONOUGH MARINE	US	BOLLINGER	US	BARGE	1			201	-
CANFORNAV	CANADA	WUHU SHIPYARD	CHINA	BULK CARRIER	2		27,000	2	32
NAVARONE MARINE	GREECE	WUHU SHIPYARD	CHINA	BULK CARRIER	2		27,000	2-Jan	0
VRONTADOS	GREECE	JIANGNAN	CHINA	BULK CARRIER	2		51,000	3-Feb	38
IRAN SHIPPING LINE	IRAN	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	BULK CARRIER	2		73,500	-	54
NIPPON YUSEN KAISA (NYK)	JAPAN	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER	1		90,000	502	-
KAWASAKI KISEN KAISA (K-LINE)	JAPAN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	1		88,000	2	-
DAIICHI CHUO KISEN	JAPAN	MIITSUI	JAPAN	BULK CARRIER	1		177,000	2	37
UNICORN LINES (CLIPPER DENMARK)	SOUTH AFRICA	XINGANG SHIPYARD	CHINA	BULK CARRIER	2		34,300	2	33
FIRST SS	TAIWAN	TSUNEISHI	JAPAN	BULK CARRIER	2		46,700	1	-
YASA	TURKEY	TSUNEISHI	JAPAN	BULK CARRIER	2		45,400	2	-
NOMIKOS LONDON	UK	JIANGYANG	CHINA	BULK CARRIER	1		51,000	1	17.8
UNKNOWN	UNKNOWN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	3		73,000	2-Jan	63.9
OLYMPIA MARINE	UNKNOWN	SHINA SHIPBUILDING	CHINA	BULK CARRIER	1		28,200	2	15
GOUMAS	GREECE	SPLIT	CROATIA	BULK CARRIER	1		51,000	1	20
GEARBULK	NORWAY	GDYNIA	POLAND	BULK CARRIER	2		48,000	3-Feb	53
SHINKISHIMA	JAPAN	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER	1		46,000	1	0
MST SCHNAITTENBACH	GERMANY	JIANGSU YANGZJIANG	CHINA	BULK CARRIER	1		25,500	1	15
CHINESE INTERESTS	CHINA	JIANGSU YANGZJIANG	CHINA	BULK CARRIER	1		10,000	1	0
JINHUI SHIPPING	NORWAY	SUMITOMO	JAPAN	BULK CARRIER	1			900	20.9
ORIX MARITIME	JAPAN	ISHIKAWAJIMA HARIMA H.I. (IHI)	JAPAN	BULK CARRIER ORE STRENGTHENED	1		48,000	1	-
BICO KISEN	JAPAN	MIITSUI	JAPAN	BULK CARRIER ORE STRENGTHENED	2		50,000	2-Jan	-
MIITSUI & CO.	JAPAN	MIITSUI	JAPAN	BULK CARRIER ORE STRENGTHENED	3		50,000	2	-
NISSSEN KAIUN KKK	JAPAN	MIITSUI	JAPAN	BULK CARRIER ORE STRENGTHENED	1		50,000	2	-
AKTIF DENIZCILIK	TURKEY	ONOMICHI	JAPAN	BULK CARRIER ORE STRENGTHENED	2		53,000	2	-
HADLEY	UK	SUMITOMO	JAPAN	BULK CARRIER ORE STRENGTHENED	1		73,500	1	21.7
CIDO SHIPPING	JAPAN	SHIN KURUSHIMA	JAPAN	BULK CARRIER ORE STRENGTHENED	2		52,000	2	0
COSCO	CHINA	ONOMICHI	JAPAN	BULK CARRIER ORE STRENGTHENED	2		51,000	2	40
COSCO	CHINA	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER ORE STRENGTHENED	2		51,000	3-Feb	40
JINHUI SHIPPING & TRANSP.	HONG KONG	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER ORE STRENGTHENED	2		50,800	1	20.9
ALCATEL	FRANCE	HYUNDAI MIPO	KOREA	CABLE SHIP	1		8,000	1	45
SOLSTAD SHIPPING	NORWAY	ULSTEIN VERFT	NORWAY	CABLE SHIP	1		10,000	1	47.89
TARNTANK	SWEDEN	SHANGHAI EDWARD	CHINA	CHEMICAL TANKER	1		14,000	502	20.9
J.O. TANKERS	NORWAY	KLEVEN FLORO	NORWAY	CHEMICAL TANKER	1		37,000	103	57
KNUTSEN OAS SHIPPING	NORWAY	NAVAL GIJON	SPAIN	CHEMICAL TANKER	1		35,800	2	0
TURKISH INTERESTS	TURKEY	GELIBOLU GEMI	TURKEY	CHEMICAL TANKER	1		7,000	1	0
SCAN CHART	DENMARK	BEIHAI	CHINA	CONTAINER	3	1,122		2	48
SCAN CHART	DENMARK	WEIHAI SHIPYARD	CHINA	CONTAINER	3	1,122		2	48
SCAN CHART	DENMARK	ZHOUSHAN SHIPYARD	CHINA	CONTAINER	3	1,122		2	48
RITSCHER AND TANKE	GERMANY	KVAERNER WARNOV WERFT	GERMANY	CONTAINER	2	2,500	33,750	1	60
WAN HAI LINES	TAIWAN	NAIKAI	JAPAN	CONTAINER	4	2,500		-	84
CHINA SHIPPING CONTAINER LINES	CHINA	SAMSUNG	KOREA	CONTAINER	1	4,000		2	43
HANJIN SHIPPING CO.	KOREA	HANJIN	KOREA	CONTAINER	5	4,350		2	220
NORDEUTSCHE VERMOGEN	GERMANY	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	CONTAINER	2	5,551		2	112
CHINA SHIPPING GROUP	CHINA	HUDONG SHIPYARD	CHINA	CONTAINER	4	5,600		3-Feb	240
CHINA SHIPPING GROUP	CHINA	DALIAN NEW	CHINA	CONTAINER	4	5,600		3-Feb	240
NEPTUNE ORIENT LINES (NOL)	SINGAPORE	AKER MTW WERFT	GERMANY	CONTAINER	4	2,470	33,900	2-Jan	125.8
UNKNOWN	GERMANY	SZCZECIN SHIPYARD	POLAND	CONTAINER	1	1,730	23,000	2	55
NIPPON YUSEN KAISA (NYK)	JAPAN	ISHIKAWAJIMA HARIMA H.I. (IHI)	JAPAN	CONTAINER	4	6,200		2	0
KAWASAKI KISEN KAISA (K-LINE)	JAPAN	IMABARI SHIPBUILDING	JAPAN	CONTAINER	4	6,000		2	0
HANSA TREUHAND	GERMANY	HANJIN	KOREA	CONTAINER	2	4,367		402	92.5
REEDEREI LAEISEZ	GERMANY	HANJIN	KOREA	CONTAINER	5	4,367		2	231
D OLTMANN SEESCHIFFAHR	GERMANY	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	CONTAINER	1	3,900		1	0
SCHULTE GROUP	GERMANY	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	CONTAINER	2	3,312		2	0
HERMAN WULFF	GERMANY	GDYNIA	POLAND	CONTAINER	1	2,700		2	0
SUISSE ATLANTIQUE	SWITZERLAND	HYUNDAI MIPO	KOREA	CONTAINER	2	2,600		2	65
ANDHIKA GROUP	SINGAPORE	DAEWOO	KOREA	CONTAINER	1	2,400		1	30
CSAV	CHILE	SZCZECIN SHIPYARD	POLAND	CONTAINER	2	1,730		2	55
OSCAR WEHR	GERMANY	SZCZECIN SHIPYARD	POLAND	CONTAINER	2	1,726		2	0
THIEN & HEYENGA	GERMANY	MUTZELFELDTWERFT	GERMANY	CONTAINER	4	1,102		2-Jan	0
BUILDER'S ACCOUNT	UNKNOWN	JJ. SIETAS	GERMANY	CONTAINER	2	868		1	0
ARMIN KLINGENBERG SCHIFFS	GERMANY	JIANGZHOU	CHINA	CONTAINER	2	670		2	0
LUXUS HOLDINGS		HARLAND & WOLFF	UK	CRUISE SHIP	2			3	350
RADISSON SEVEN SEAS	US	CHANTIERS DE L'ATLANTIQUE	FRANCE	CRUISE SHIP	1			2	250
DRAGAGES PORTS	FRANCE	ASTILLEROS ESPANOLES (JULIANA)	SPAIN	DREDGER SUCTION HOPPER	1		12,150	2	-
DRAGAGES PORTS	FRANCE	ASTILLEROS ESPANOLES (JULIANA)	SPAIN	DREDGER SUCTION HOPPER	1		7,000	2	-
A. P. MOLLER	DENMARK	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	DRILLING UNIT	1			2	-
UNKNOWN	KOREA	HYUNDAI MIPO	KOREA	FERRY	1			302	35
BOCKSTIEGEL REEDERI	GERMANY	MARMARA SHIPYARD	TURKEY	GENERAL CARGO	1		5,250	1	0
MISC	MALAYSIA	MIITSUI	JAPAN	LNG	1			-	165
DYNEGY		KAWASAKI H.I.	JAPAN	LPG	2		50,000	2-Jan	-
NAFTOMAR	GREECE	NAMURA ZOSENSHO	JAPAN	LPG	2		18,000	2	0
US INTERESTS	US	NICHOLS	US	MULTI-HULL PASS FERRY	1			1	0
GOLDEN GATE BRIDGE DISTRICT	US	NICHOLS	US	MULTI-HULL PASS FERRY	1			1	8.5
PARAKOU SHIPPING	HONG KONG	SHANGHAI EDWARD	CHINA	MULTI-PURPOSE	2		22,600	1	-
PACIFIC CARRIERS	SINGAPORE	JIANGSU YANGZJIANG	CHINA	MULTI-PURPOSE	2		25,000	2	39.8
COLUMBIA SHIPMANAGEMENT	CYPRUS	XIAMEN	CHINA	MULTI-PURPOSE	2	1,840		2	0
SEAFRANCE	FRANCE	AKER FINNYARDS	FINLAND	PASSENGER RO-RO	1			901	77
STENA RO-RO	SWEDEN	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	PASSENGER RO-RO	2			3-Feb	0
SHIN NIHON-KAI FERRY	JAPAN	ISHIKAWAJIMA HARIMA H.I. (IHI)	JAPAN	PASSENGER VEHICLE FERRY	1			2	-
PUKWAN FERRY	KOREA	HYUNDAI MIPO	KOREA	PASSENGER VEHICLE FERRY	1			302	35
UNKNOWN	UNKNOWN	AUSTAL SHIPS	AUSTRALIA	PASSENGER VEHICLE FERRY	1			1	0
VAN OMMEREN PASHA GROUP	US	HALTER MARINE INC	US	PCTC	1		13,000	502	70
GREAT AMERICAN LINE	US	SUMITOMO	JAPAN	PCTC	1			2	60
KAWASAKI KISEN KAISA (K-LINE)	JAPAN	IMABARI SHIPBUILDING	JAPAN	PCTC	4		17,300	2-Jan	0
KAWASAKI KISEN KAISA (K-LINE)	JAPAN	TSUNEISHI	JAPAN	PCTC	2		11,000	2-Jan	78.4
KAWASAKI KISEN KAISA (K-LINE)	JAPAN	USUKI	JAPAN	PCTC	2		8,000	1	0
FARSTAD SHIPPING	NORWAY	SIMEX FLEKKEFJORD	NORWAY	PLATFORM SUPPLY VESSEL	1			501	21.7
OLYMPIC SHIPPING	NORWAY	ULSTEIN VERFT	NORWAY	PLATFORM SUPPLY VESSEL	1			1	34.42
HORNBECK OFFSHORE	US	LEEVAAC SHIPYARDS	US	PLATFORM SUPPLY VESSEL	2			1	0
NORDEN	DENMARK	DAEDONG SHIPBUILDING	KOREA	PRODUCTS TANKER	2		35,000	2	41.4
SUN ENTERPRISES	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	PRODUCTS TANKER	1		71,050	2	30
NEIMR DIAB	LEBANON	SPLIT	CROATIA	PRODUCTS TANKER	3		45,000	2	90
STENA BULK	SWEDEN	GDYNIA	POLAND	PRODUCTS TANKER	2		10,000	2-Jan	40
DENIZCILIK NAKLIYATIA	TURKEY	DAEDONG SHIPBUILDING	KOREA	PRODUCTS TANKER	2		37,000	2-Jan	48
LAURIN MARITIME	UK	TROGIR	CROATIA	PRODUCTS TANKER	2		47,000	2	64
ELKA SHIPPING (EUROPEAN NAVIGATION)	GREECE	SPLIT	CROATIA	PRODUCTS TANKER	1		45,000	2	26.5
MEDITERRANEA DI NAVIGAZIONE	ITALY	HYUNDAI MIPO	KOREA	PRODUCTS TANKER	1		35,000	2	25
SOPONATA / ARMINTER	PORT. MONACO	HYUNDAI HEAVY Ind.	KOREA	PRODUCTS TANKER	2			1	43
JAPN MARINE SCIENCE	JAPAN	MIITSUBISHI H.I.	JAPAN	RESEARCH	1			4	-
TORGHATTEN TRAFIKKSELSKAP	NORWAY	CAMMELL LAIRD	UK	RO-RO FERRY	1			1	7.57
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UGLAND NORDIC SHIPPING	NORWAY	SAMSUNG	KOREA	SHUTTLE TANKER	2		105,000	3-Feb	96.3
UK NAVY	UK	APPLEDORE SHIPBUILDERS	UK	SURVEY VESSEL	2			3-Feb	0
VALLES STEAMSHIP CO	CANADA	IMABARI SHIPBUILDING	JAPAN	TANKER	2		105,000	2	76
KLAUS OLDENDORFF	GERMANY	SAMHO NEW SHIPYARD	KOREA	TANKER	1		302,000	2	70
ATHENIAN TANKERS	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	TANKER	1		160,000	3	43
CHARTWORLD	GREECE	SAMHO NEW SHIPYARD	KOREA	TANKER	2		113,000	3-Feb	68
CERES HELLENIC (G P LIVANOS)	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	TANKER	1		160,000	2	56
TSAKOS GROUP	GREECE	SAMHO NEW SHIPYARD	KOREA	TANKER	1		165,000	2	43.5
DYNACOM	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	TANKER	1		160,000	902	46
SHIPPING CORP OF INDIA	INDIA	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	TANKER	4		110,000	3	-
RIMORCHIATORI RIUNITI	ITALY	SAMSUNG	KOREA	TANKER	1		159,000	3	44
MIF	NORWAY	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	TANKER	3		164,000	3-Feb	-
KRISTIAN GERHARD JEBSEN	NORWAY	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	TANKER	2		160,000	2	87
NEPTUNE ORIENT LINES (NOL)	SINGAPORE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	TANKER	2		319,000	2	144

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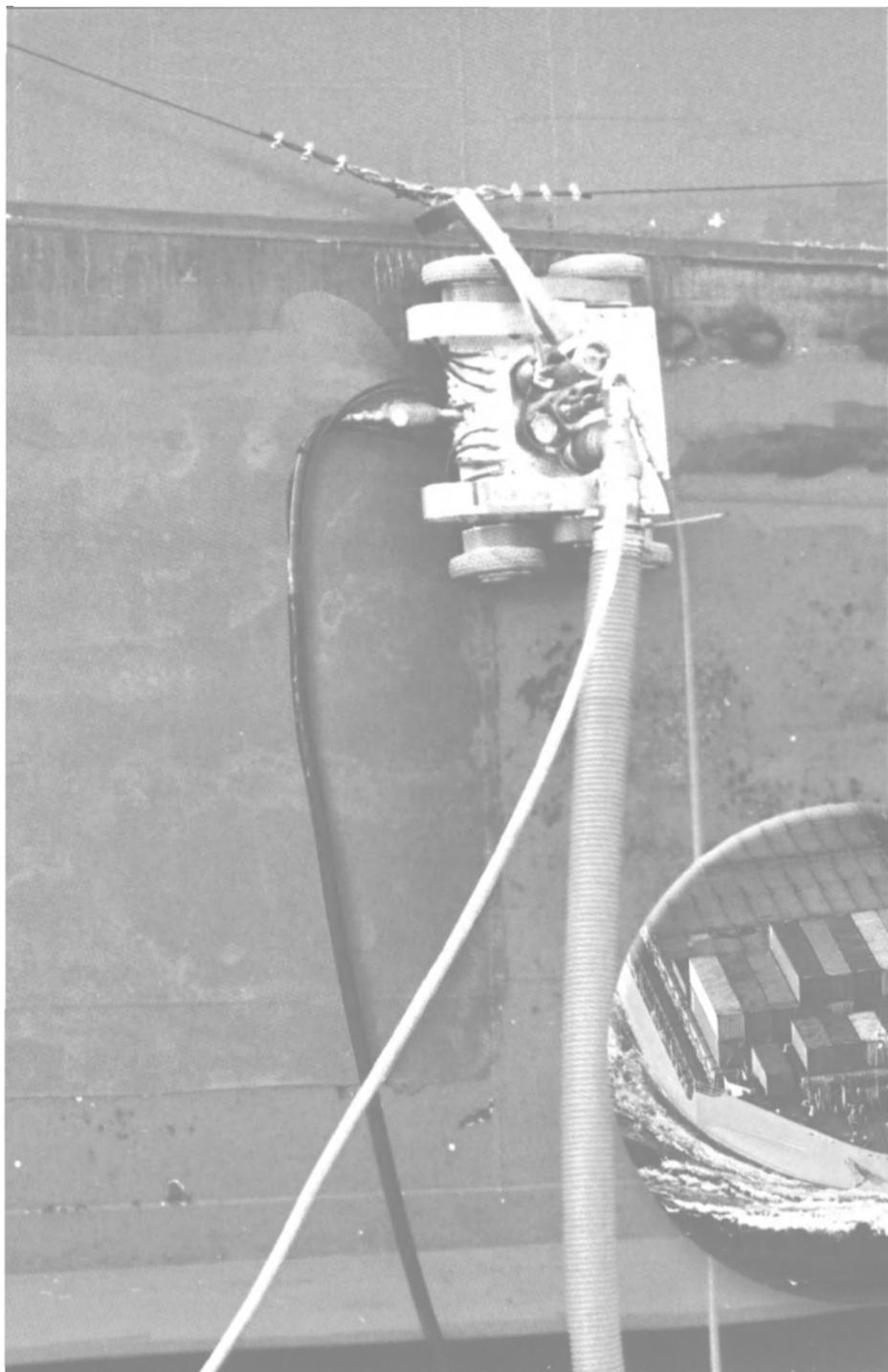
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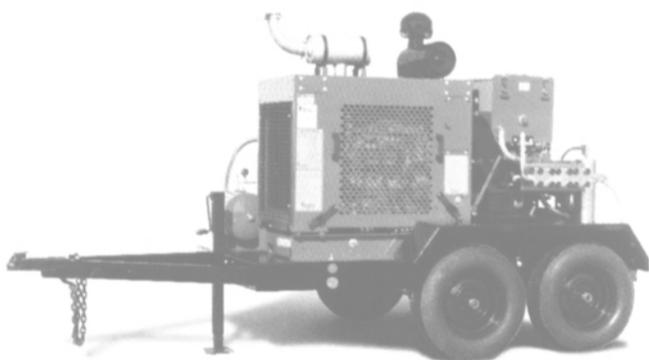
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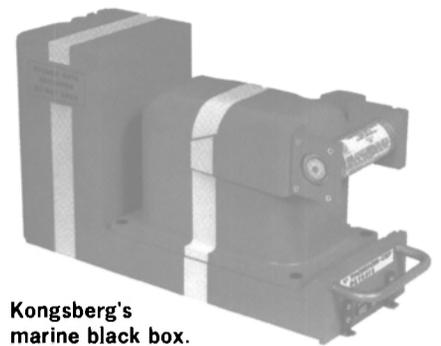
Welcome The Little Black Box

There is a groundswell of commitment for mandating the installation of "black boxes" aboard ships, so that in the unlikely case of a disaster, history will not repeat itself. At an estimated cost of \$75,000 to \$150,000 per ship, however, safety will not come cheaply.

If it has not already, in a few years time the name Erika will conjure many of the same emotions and financial aching as the name Valdez. The tanker that broke up and sank off the coast of France just prior to Christmas 1999 has resulted in a veritable groundswell of

political and industry activity which will likely result in fundamental changes to the way in which ships — particularly those carrying oil products or hazardous materials — are outfitted and operated.

The 25-year-old ship, which before its sinking had been inspected and stamped suitable for operation by Italian classification society RINA, has had profound effects, already, on everything from tanker rates — which are soaring due to



Kongsberg's marine black box.

fear surrounding older tonnage, to classification societies, which are now under a public and political microscope.

Surveillance for Safety?

While the notion of outfitting ships with Voyage Data Recorders (VDR) — a.k.a. "Black Boxes" — had previously been linked primarily to passenger-carrying vessels, since Erika the concept of outfitting other ships has picked up momentum.

"The IMO felt it was past time to take some sort of action to improve safety at sea," said **Jon Fredrik Lehn-Pedersen**, vice president, navigation, Kongsberg Norcontrol. "Their solution was the VDR directive."

Safety, as always, comes at a price, and it's a price that most shipowners, particularly those operating large fleets, will have a tough time swallowing. According to Norcontrol, a complete MBB system with Protected Storage Unit and Replay Unit will cost about \$90,000, with commissioning and engineering not included. For a complete system stipulated by IMO and the Norwegian Ship Owners Association, expect a price range for an IEC 61996 compatible system to vary from \$75,000 to \$150,000, depending on the complexity of the system.

Much as in the airline industry, VDRs would be utilized to capture and maintain critical shipboard information that could be recovered and analyzed in the event of a ship sinking. In turn, the information could be analyzed and used to not only discover an accident's likely cause, but to enact design changes that ensure that future such incidents could be avoided.

The IMO has adopted the Voyage Data Recorder requirement as part of the revised SOLAS directive, which is scheduled to take effect July 1, 2002. It now awaits ratification by the individual national governments.

Once these sanctions are in place, Voyage Data Recorders will be required on passenger ships as well as ships carrying hazardous cargo like oil, gas and chemicals. Within seven years all vessels over 3,000-grt must employ VDRs. Approximately 30,000 ships will fall under the directive.

Just last month the Alliance of Maritime Regional Interest in Europe (AMRIE) presented a series of recommendations aimed at improving levels of oil tanker safety in response to recent



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Commission proposals on the safety of the seaborne oil trade. The AMRIE Paper calls on the Commission to lead the way in introducing requirements for Black Boxes to be fitted in all existing cargo ships, going beyond the IMO suggestion of new cargo ships only. AMRIE believes that the speedy introduction of Voyage Data Recorders to all vessels is imperative if the Commission is to achieve a 'Safety Culture' in Shipping.

While such recommendations are generally heralded by organizations that sell, service and install the units

aboard ships, the measure is not likely to illicit many cheers from the shipowning community due to the costs of purchasing, installing and maintaining the units. Despite anticipated protests regarding the matter, the shipping community is faced with a public relations crisis anytime it actively debates proposed safety measures, and will most likely be brought to the change quickly and quietly.

Kongsberg Claims "World's First Complete VDR"

Kongsberg Norcontrol, an industry leader in ship automation systems, has released what it is calling the world's first voyage data recorder (VDR) fully satisfying IMO demands. Called Maritime Black Box (MBB), it plays the same role for ships as the flight recorder — gathering and storing vital data regarding ship operations. Such information is key to improving vessel safety, which is currently far below that of air travel, says Kongsberg's Lehn-Pedersen.

The VDR is constructed of two main elements; a data-collecting unit (DCU), which collects information, and a protected storage unit (PSU), which holds it. According to Lehn-Pedersen, the MBB's storage unit is the first to meet all maritime authority demands. The storage unit protects the data against explosion, fire and deep-sea submersion. The MBB combines expertise from both Kongsberg and Thomson CFX Detexis, developer of black boxes for the aircraft industry. The two companies have teamed for the production and marketing of the unit.

A Newfoundland developed and produced "black box" for ships is from Rutter Technologies. The recorder, officially known as the Rutter VDR-100 Voyage Data Recorder, was on display at the offices of Sigma Engineering Ltd. recently. Sigma and another local firm, Consolidated Technologies Ltd., came together to form Rutter, each bringing its own technology to work on the development of VDR.

"The International Maritime Organization (IMO) has already passed a resolution related to the performance standard for the mandated version of this product and the European Union has initiated a parallel initiative," says **Byron Dawe**, president of St. John's-based Rutter Technologies Inc. VDR will interface with other navigational aids and record positioning data, compass heading, and orders and responses to and from the engine room. The recordings will also include all radar images and all sounds.

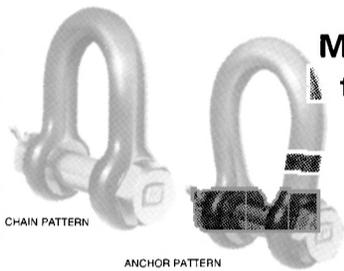
Consilium Navigation of Sweden has also entered the Black Box fray, offering a new VDR dubbed VDR M2, which it touts as fully compliant with IMO performance standard A861 (20), and Test Standard IEC 61996. The VDR M2 also incorporates support for acoustic control of the bridge microphones, as well as support for final recording media. The final recording medium itself will be ready for delivery in early fall. Type

approval of the system is in progress with BSH Germany. The system will be able to record up to four radars, and other non-mandatory sources of information, such as multiple high-resolution video inputs and CCTV, as well as shipborne LAN data. Currently, Consilium is fulfilling large orders for the new units to both Royal Caribbean Cruises and Moby Line.

For information, circle appropriate number on the RSC:

Kongsberg Norcontrol	70
Rutter Technologies' VDR	71
Consilium Navigation's VDR	72

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Product Report

Ruggedized Panasonic Notebooks Fit For Maritime Use

The advent of increasingly advanced technology used onboard boats, rigs and ships, and the computers and software designed to make them work, has resulted in the demand for a new breed of ruggedization. While rugged computer equipment has been used for years in many industries, including maritime, the very nature of the marine business demands performance above and beyond conditions found anywhere else on earth. Panasonic — in an attempt to answer the calls for rugged technological capability onboard boats, rigs and ships — offers its Toughbook series of portable computers, designed to meet most any technological need while beating the elements. Panasonic recently unveiled the newest version of its Toughbook ruggedized notebook PC, a unit that incorporates the Intel Pentium II 333MHz CPU. "By offering PII 333MHz speed, outdoor-viewable 13.1-in. active matrix color LCD with tough screen, and integrated wireless com-

munications solutions, the new Toughbook 27 surpasses all other ruggedized notebook PCs in performance and features," said **John Harris**, vice president of marketing for Panasonic Personal Computer Co.

Aside from its full ruggedization — a feature available through accrued Panasonic technological know-how which allows the chip to be mounted internally in a manner which dissipates heat from key components — Panasonic's new DayBrite ARX LCD monitor, which incorporates sophisticated anti-reflective filter technology combined with a brilliant TFT color display, dramatically reduces light reflection while providing readability even in bright sunlight.

In addition, the unit uses a fully integrated, internally powered modem together with a compact HOT (High-Gain, Omni Directional, Telescopic) antenna, the wireless capabilities of the Toughbook 27 open new opportunities for computing. The Toughbook 27 offers: a housing in full magnesium alloy case; an LCD mounted in an anti-torsion, water-resistant magnesium frame; a removable shock-mounted HDD enclosed in a stainless steel case; and a water resistant keyboard and touch pad. In addition, the unit is designed using MIL-STD 810E test procedures for drop shock, vibration, dust and moisture. The unit, as described, is available for an estimated price of about \$5,199. In addition to the Toughbook 27, Panasonic offers the: Toughbook 34, Toughbook 71; and Toughbook CF-37.

Panasonic is hardly a new name to electronics, but the name stamped upon ruggedized notebook personal computers may be new to some. A unit of Matsushita Electric, which has annual sales in the \$70 billion range, Panasonic has manufactured notebooks for the past 16 years under a variety of brand names, Harris said. It was about six years ago that the company decided to attach the Panasonic name to the product and aggressively pursue the lucrative business to business market. Today notebook sales alone garner approximately \$350 to \$400 million per year for the company, with 30 percent of those sales going to the U.S. government. In fact, the company has approximately 7,000 to 8,000 units operating aboard ships owned by perhaps the marine industry's most discerning customer, the U.S. Navy.

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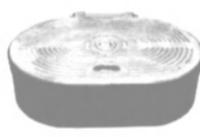
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Toughbook 27 Main Particulars

Dimension	2.3 (H) x 9.5 (D) x 11.8 (W) in.
Weight	8.2 lbs.
CPU	Intel Pentium II 300MHz processor 512KB L2 cache
Storage & Memory	64MB SDRAM/expandable to 192MG 6.3GB HDD standard/up to 12GB available 1.44MB FDD
Display	12.1 in. 800 x 600 TFT Active Matrix Color LCD with Touch Screen Sealed LCD is spill and dust resistant DayBrite ARX anti-reflective LCD for viewing in even bright sun

Ship Repair & Conversion

Legal Matters Top Ship Repair And Conversion Agenda

London's Grand Olympia Hall will be the setting for this year's Shiprepair & Conversion 2000 exhibition and conference from November 15-16. Topics of discussion highlighted in a keynote debate at the conference include conflict between regulators, owners and repair yards over ship standards.

An international panel, along with 150 delegates representing all facets of the industry — will look at a common shipyard complaint — the delays of repairs by owners, which has become all too easy by obtaining class extensions. These extensions can be granted with little effort, despite classification society claims of tougher crackdowns on this issue.

The conference's opening session is comprised of the industry debate on market trends, price levels, new opportunities and yard competition. Session two will then turn to coatings regulations. **Dr. Frank Runge** of the Copper Suppliers Association will correct the misconception that copper is scheduled to be banned from all anti-fouling, including tin-free; **Dr. David Arnold** of Jotun U.K. will examine the effect of the upcoming ban on TBT anti-fouling. Also included is the case for environmentally friendly high-pressure water blasting to be discussed by Norbert Platz of Blohm + Voss.

Shipyard developments will be discussed via two contrasting case studies: Werner Lucken will elaborate on Lloyd Werft's decision to build a new yard in the Bahamas — while **Donald McLean** describes the market changes that have influenced Lisnav to centralize their repair activities. Conclusive of the opening day will entail discussions on the benefits of e-business and IT as explained by **George Bruce** of the University of Newcastle, U.K., who will discuss how integrated business systems can improve repair yard performance.

The conference concludes by examining myriad of aspects of shipyard productivity. The role of civil engineers will be presented by **Adrian Byrom** of Posford DuVivier, U.K.; shiplift and transfer systems are featured by **Geoff Stokoe** of Syncrolift, Miami, Fla.

For further information on Shiprepair & Conversion 2000, log on to the event Web site at: www.shiprepair2000.com or call +44 (0) 20 7453 5492.

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Astano Repairs Largest In Five Years

Spain's Astano Shipyard has embraced the first quarter of the new millennium with high demand for its docking and repair services, including the accommo-

modation of the yard's largest vessel since 1994. A steady visitor to Astano is Greece's Good Faith Shipping, who called upon Astano to repair two vessel for the company — 143,745-dwt bulk carrier Optimist this past March and Nafiska M — a 162,465-dwt OBO

repaired in 1994. These vessels hold the distinction of the two largest ever to enter the Spanish yard.

Astano has also undertaken various other tonnage this year ranging from reefer vessels to self-unloaders, as well as car carriers and LPGs.

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(Continued from page 44)

Hempel Launches Antifoulings

Hempel has launched its Globic SP-Eco range of 2003 IMO-compliant antifoulings. This high performance, self-polishing antifouling is comprised of an innovative fiber composite structure within the paint — offering exceptional mechanical strength and polishing control — as well as anti-fouling protection for all international fouling conditions up to 60 months. Globic SP-Eco reportedly has the highest solids content of any of the new 2003 IMO-compliant products, translating to less use of costly solvents and lower air pollution. Extensively tested on a broad range of vessel types, the product successfully performed during these trials due to its controlled polishing rate and high release of powerful antifouling agents.

Circle 85 on Reader Service Card

NASA Lab Develops Paint Stripping Technology

NASA's Jet Propulsion Laboratory, Pasadena, Calif. took environmental safety into its own hands with the development of a new robotic device that safely strips paint from the hulls of ships without polluting the environment. Based on NASA robotics technology, the system could possibly revolutionize paint removal in the shipping industry, which is under ever-increasing pressure to ensure that its methods are environmentally friendly.

Circle 82 on Reader Service Card

Aqua-Dyne's Spider Preps Surface

Aqua-Spider manufactured by Houston, Texas-based Aqua-Dyne is a surface cleaning tool that provides a means to efficiently maneuver waterjetting nozzles over an inclined surface, such as a vessel's hull. Designed with a waterjetting carriage, which is moved over an inclined surface by cables tied to four corner tackle blocks, the patent pending Aqua-Spider system relies on the anchored cables to keep waterjets at a steady working distance from the surface that is being cleaned. Variable speed hydraulically powered winches control vertical and horizontal movement of the waterjetting carriage, while simultaneous reciprocation and rotation of the nozzle assemblies distributes the water energy over a path stretching one meter. Aqua-Spider is equipped with 40KPSI nozzles.

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Wasser Topcoat Provides UV Resistance

Wasser High Tech Coatings' MC-Ferrox A High Performance Topcoat is based on Micaceous Iron Oxide, and is a single component, moisture-cure aliphatic urethane, offering resistance to UV, abrasion and weathering. MC-Ferrox A is appropriate for any painted surface where maximum weather resistance, color retention and chemical resistance are required. It provides resistance to yellowing, chalking or degradation by sunlight, chemical fumes and abrasion.

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NoFire Technologies Develops Compliance Paint

NoFire Technologies of Upper Saddle River, N.J. has successfully designed a compliant paint to deal with the problems of fire at sea. The company's NoFire A-18 Marine paint has been tested at Southwest Research Institute of San Antonio, Texas, exceeding the requirements and complying with Resolution A.653(16) and Resolution MSC.41(64). NoFire's A-18 paint has Type Approval by various classification societies for use on all vessels.

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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 Buyers Directory Section, contact Susan Cosme at (212) 477-6700.

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Crandall Dry Dock Engineers Inc., P.O. B. 505804, MA 02150
Washington Chain Inc., Box 3645, Seattle, WA 98124
Willems Pot, P.O.B. 29102, 3001 GC Rotterdam

ASSOCIATION

Marine Machinery Assoc., 2300 Clarendon Blvd., Arlington, VA 22201

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ComNav Marine, 1915 Stainsburg Ave., Vancouver, B.C. CANADA
Raytheon Marine Co., 22 Colton Rd., NH 03063-4219

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

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Bichm & Voss Industries GmbH, P.O. B. 112289, D-2042 Hamburg 1, GERMANY
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Onion Corp., 1111 Cedar Creek Rd., Graton, WI 53024
Oikot Inc., 2535 Prairie Rd., Unit D, Eugene, OR 97402
Oikot Composites Ltd., Bradmarsh Business Park, Rotherham S60 1BX
Thordon Bearings Inc., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6
Vesco Plastics, P.O. B. 40647, Cleveland 2022 SOUTH AFRICA

BLOCKS & RIGGING

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BOATBUILDER

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Kvichak Marine, 469 NW Bowdon PL, Seattle, WA 98107
Washburn Doughty, P.O. Box 296, E. Boothbay ME 04544

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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

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King Wholesale Supply, Co., Inc., P.O. Box 4002, New Orleans, LA 70178-4002
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

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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
IMSA, 13 Jenkins Court, Suite 200, Durham, NH 03824
Kockums Computer Systems AB, PO Box 50555, S-202 15 Malmö SWEDEN
Scientific Marine Services, Inc., 101 State PL, Suite F, Esccondido, CA 92029
Ship Motion Associates, 10 Danforth St., Portland, ME 04101-4567

CAP TREADS

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

CAPSTANS

Schoellhorn-Albrecht, 575-105 Rudder Rd., St. Louis, MO 63026
G.J. Warteboer Jr. BV, P.O.B. 5003, 3008 AA Rotterdam, Netherlands
Superior Lidgerwood Mundy, 1101 John Ave., Superior, WI 54880

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

CAST IRON REPAIR

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

CHAINS

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

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Unitor Ship Service Inc., 2375 W. Esther St., Long Beach, CA 90813

CLASSIFICATION SOCIETY

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Schmidt, P.O. Box 37, Fresno TX 77545
Sawtec, 6215 Aluma Valley Drive, Oklahoma City, OK 73121

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

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Brite Products, 14650 Dequindre, Detroit, MI 48212
Jotun 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
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Mascoat Products, 3500 E. T.C. Jester, Suite N, Houston, TX 77018
Nace Intl., 1440 South Creek Dr., Houston, TX 77084
NoFire Technologies, 21 Industrial Ave., Upper Saddle River, NJ 07458
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Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
Ferro Corp., 1301 North Flora St., Plymouth, IN 46583
Jamestown Distrib., P.O. Box 348, Jamestown, RI 02835
Graeco, Inc., P.O. Box 1441, Minneapolis, MN 55440-1441
Sigma Coatings, P.O. Box 816, Houston, TX 77029, 330 Harvey, LA 70059,
Atlantic Systems Supply Co., 1100 Adams St., Hoboken, NJ 07030
Sound Specialty Coatings Corp., P.O. Box 13160, Burton, WA 98103
TNO Institute of Industrial Technology, P.O.B. 3, 2600 AA Delft, Netherlands
Unitor Ship Services Inc., 2375 West Esther Street, Long Beach, CA 90813
Chlor-rid, P.O. Box 908, Chandler, AZ 85244
Chesapeake Specialties Products, 5055 North Points Blvd, Baltimore Md 21219
Wasser High Tech Coatings, 8041 South 228th St., Kent, WA 98032

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ICG Satellite Services, 8400 NW 52nd St., Suite 110, Miami, FL 33166
Maritime Telecommunications Networks, Inc., 8400 NW 52nd St., Suite 110, Miami, FL 33166
Ascom Tateco AB, Eppendorfer Weg 234, D-20251 Hamburg, GERMANY
Maritel Marine Communications, 16 E. 41st St., NY, NY 10017

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Watercom, 458 E. Park Place, Jefferson, IN 47130

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

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COMPRESSOR PARTS

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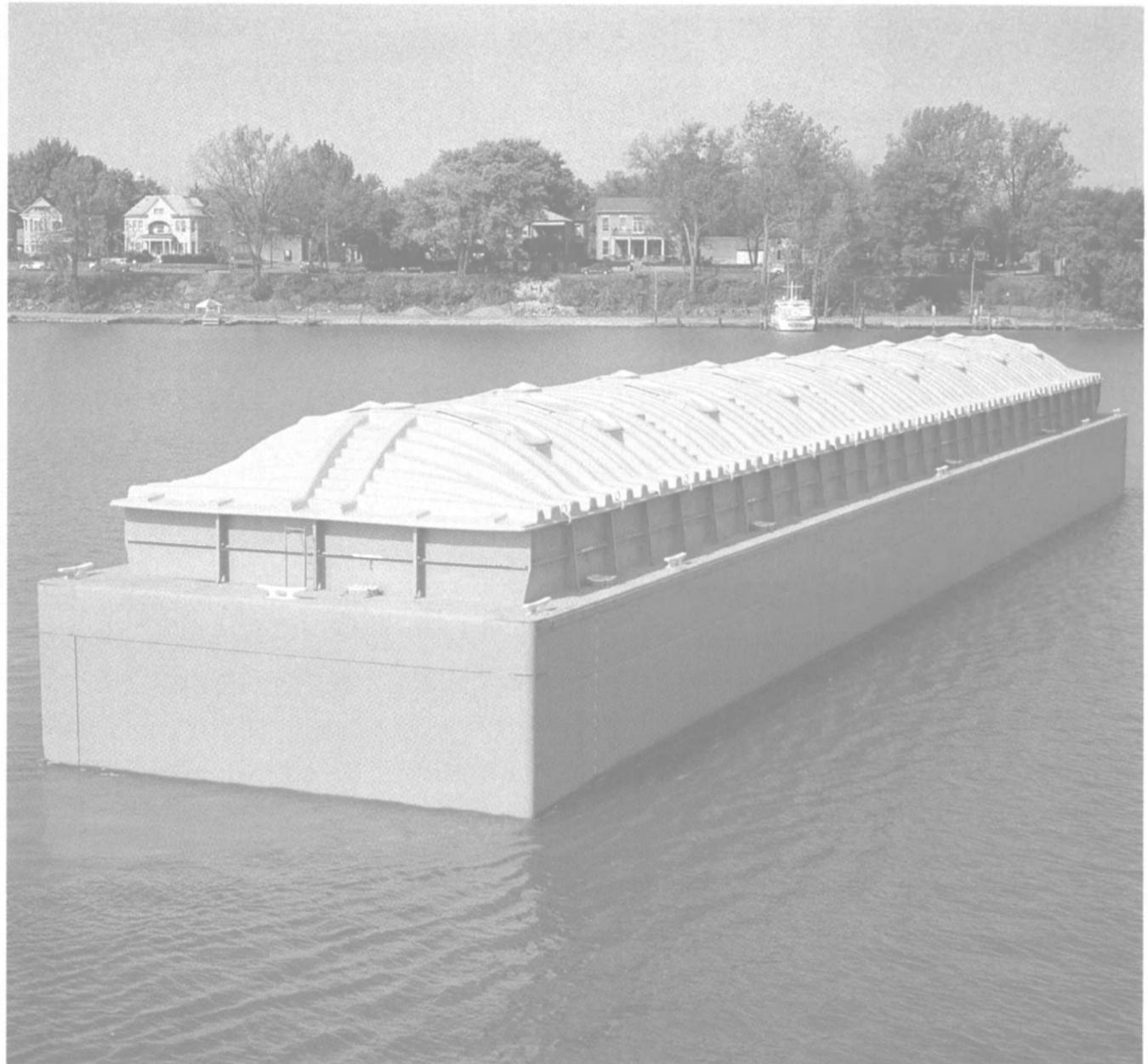
Barataria Lofting Co., Inc., 1616 Barataria Blvd., Ste. 4, Marrero, LA 70072

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Coastal Oceanographics, Inc., 11-G Old Indian Trail, Middlefield, CT 06455
Fleet Technology, 311 Legget Dr., Karaia, Ontario, Canada K2K 1Z8
Sener, C/Severo Ochoa, 4 Parque Tecnologico 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
Proteus Engineering, 345 Pier One Rd., Stevensville, MD 21666
Information Management Consultants, Media House,
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Raytheon Marine Co., 22 Cotton Rd., NH 03063-4219

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Control General Corporation, 2845 Hwy 311, Schriever, LA
Motor Services Hugo Stamp, 3190 S.W. Lauderdale, FL 33315
Engine Monitor, Inc., 175 Hickory Ave., Harahan, LA 70123
MMC International, 60 Inip Dr., Inwood NY 11396

Raytheon Marine Co., 22 Cotton Rd., NH 03063-4219

Robertson Marine Systems, 3000 Kingman St., Suite 207, Metairie, LA 70006
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
Stork Kwant, P.O. Box 23, 8600 AA Sneek, Netherlands
Kobelt Mig Co., Ltd., 8238-129 St. Surrey, B.C. V3W0A6
Stork-Kwant BV, P.O. Box 23, 8600 AA Sneek, Netherlands
Prime Mover Controls, 3600 Gilmore Way, Burnaby V5G 4R8 Canada
Electronic Marine Systems, 800 Femdale Pl., Rahway, N.J. 07065
Kocum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
G.R. Bowler, 2261 Lake Rd., Ontario, NY 14519

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Haley Clutch and Coupling Corp., 1820 Hwy. 1 North, Greenville, MS 38702
Fetterolf Corp., P.O. Box 103, Skippack, PA 19474
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 Intl, 60 Inip Drive, Inwood, NY 11096

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Kroll Cranes, 17432 Chelmeur Hwy, New Orleans, LA 70129
Liebherr-Werk Nenzing GMBH, A-6710 Nenzing/Austria,
Tschalerga 3, P.O. Box 10
Xtek, Inc., 11451 Reading Road, Cincinnati, OH 45241

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Pusnes, PO Box 102, N-4818, Faervik, NORWAY
Schoellhorn-Albrecht, 575-105 Rudder Rd., St. Louis, MO 63026
Rapp Hydema, 4433 27th Avenue West, Seattle, WA 98199
Smith Berger Manne Inc., 7915 10th Ave. S., Seattle, WA 98108
Timberland Equipment, P.O. Box 490, Woodstock, Ontario N4S 7Z2 CANADA
Superior Lidgerwood-Mundy, 1101 John Ave., Superior, WI 54880
Jered Industries, Inc., P.O. Box 904, Brunswick, GA 31521

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

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FCS, Inc., 22 Main Street, Centerbrook, CT 06409
Icon Research, 8 Market Street, Eilemser, Shropshire SY12 OAN, England
Hermont Marine Inc., 3528 Griffith, St. Laurent, Quebec Canada

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Brigantine Services Ltd, 48 Wang Lok St., Yuen Long
Hermont Marine Inc., 3528 Griffith, St. Laurent, Quebec Canada
Industrial Estate, New Territories, HONG KONG
Catepillar, Inc., Engine Div., P.O. Box 610, Mossville, IL 61552-0610
Castoldi S.p.A., Viale Mazzini, 161, 20081, Abbategrasso, ITALY
Cummins Engine Co., 4500 Leeds Ave., Ste. 301, Charleston, SC 29405-8521
Cummins Mid-South, Inc., 110 E. Airline Highway, Kenner, LA 70062
John Deere, John Deere Rd., Moline, IL 61265
Deutz Canada Inc., 4420 Garand St., Montreal, Que H4R 2A3
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Governor Control Systems, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
Kawasaki Heavy Industries, Ltd., Tokyo Head Office, World Trade Center Bldg.,
4-1 Hamamatsu-cho 2-chame, Minato-ku, Tokyo 105-6116 Japan
MAN B&W Diesel AG, Stadtbachstrasse 1, D-86153 Augsburg 1, GERMANY
Cenofanti Marine Systems, Inc., P.O. Box 660, West Elizabeth, PA 15088-0660
MAN B&W Diesel, 17 State St., New York, NY 10004
Mariso USA, Inc., 100 Davidson Ave., Sommerset, NJ 08873
Motor Service AB, Box 2115, S-144 04 Ronninge, SWEDEN
Motor Service-Hugo Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
Paxman Diesels, P.O. Box 8, Paxman Works, Colchester,
Essex, CO1 2HW, ENGLAND
Ustlein Bergen AS, PO Box 924, N5002 Bergen, NORWAY
Wartsila Diesel, 201 Defense Highway, Annapolis, MD 21401
CMB Cummins Engine Co., 500 Jackson St., Columbus, IN 47202
FM / Alco 701 Lawton Ave., Beloit, WI 53511
Kiene Diesel, 325 South Fairbanks, Addison, IL 60101
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Miramar, FL 33025
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Anglo Belgian Corp., 9958 N. Alpine Rd., Machesney Park, IL 61115
Powerhouse Diesel, 5505 Broadway, American Canyon, CA 94589

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Walz & Krenzer, 91 Wilenbrock Rd., Unit B4, Oxford, CT 06478
Manly Manne, PO Box 86788, N. Vancouver B.C. Canada V7L 4L3
Railway Specialties Corp., 2979 State Rd., P.O. Box 29, Bristol, PA 19007
Beclawat Manufacturing Inc., #2-200 Jameson Bone Rd., Belleville,
Ont, Canada K8N 5T3

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Vacu-Blast, P.O. Box 37, Fresno, TX 77545

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Applegate Industrial, 1440 Government Street, Baton Rouge, LA 70802

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Seaward In/Pr, 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

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MISSCO, 2040 Harbor Island Dr., Suite 201A, San Diego, CA 92101

Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807

Gnneil Fire Protection Systems, 835 Sharon Drive, Westlake, OH 44145

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

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Lang Manufacturing, 6500 Merrill Creek Pkwy., Everett, WA 98203

Richard Galley Supply, PO Drawer 4035, Houma, LA 70361

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Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

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Nico Marine Specialties, 39 Louisiana St., West Wago, LA 70094

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

Manne Gears, P.O. Box 689, Greenville, MI 38702

Cenofanti Marine Systems, Inc., P.O. Box 660, West Elizabeth, PA 15088-0660

Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227

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

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Maritime Design, 13000 Sawgrass Village Circle, Ponte Vedra Beach, FL 32082
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Nautical Designs, Inc. 2101 S. Andrews Ave, Suite 202, Ft Lauderdale FL 33316
Olsen Marine Surveyors Co., P.O. Box 283, Port Jefferson, NY 11777
M. Rosenblatt & Son, Inc., 2341 Jefferson Davis Hwy, Arlington, VA 22202
Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112
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Sea School, 10812 Gandy Blvd. St. Petersburg, FL 33702
Seaworthy Systems Inc., P.O. Box 965, Essex, CT 06426
George G. Sharp, Inc., 100 Church St., New York, NY 10007
R.A. Steam, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
MSCI Inc., 1452 Duke Street, Alexandria, VA 22304
Sea Transport Corp., PO Box 1043, Southport Qld 4213 Australia
Vibtech, Inc., Box 435, N. Kingston, RI 02852
Washburn Doughty, P.O. Box 296, E. Boothbay, ME 04544

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C-Map/Commercial, 133 Farnouth Rd., Mashpee, MA 02649
C-Map, P.O. Box 212 4371 Egersund Norway
Cotec Inc., Prince Charles Bldg., 120 Torbay Rd., Suite E100, St. Johns, Newfoundland, Canada A1A 2G8
Electronic Marine Systems, 800 Femdale Pl., Rahway, N.J. 07065
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
ICS Electronics Ltd., Unit V, Rutford Industrial Estate, Ford, Arundel, West Sussex, UK
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851
Negron Marine Consultants, 840 Bond Street, Elizabeth, NJ 07201
Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017
Raytheon Marine Co., 22 Cotton Rd., NH 03063-4219
Scandinavian Micro Systems P.O. Box 155, N-1411, Kolboten, NORWAY
Scand. 19210 33rd Avenue West, Lynnwood, WA 98036
Simrad Robertson, 10801 Hammerly, Suite 100, Houston, TX 77043-1923
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Trimble Navigation, 585 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94086
Waterway Communications System, Inc. 453 E. Paik Pl., Jeffersonville, IN 47130
Offshore Systems International, 5013 Pacific Hwy East, File, 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
Magellan Systems Corp., 960 Overland Cr., San Dimas, CA 91773-1742
Icom America, Inc., 2380 116th Ave. NE, Bellevue, WA 98004
KVH Industries, Inc., 110 Enterprise Center, Middleton, RI. 02842-5268

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Soundcoat, 1 Burt Dr., Deer Park, NY 11729
Noise Control Engineering, 799 Middlesex Turnpike, Billerica, MA 01821
NOZZLES/NOZZLE SYSTEMS
Harrington Metals, 8720 124th Ave., Fennville, MI 49408
Schmidt, P.O. Box 37, Fresno TX 77545

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Castrol North America, 1500 Valley Rd., Wahne, NJ 07470

OIL TANK CLEANING

Brain Industries Australia, Pty. Ltd., 21 Bearing Rd., Seven Hills, NSW 2147 AUSTRALIA

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Alfa-Laval Separation, Inc., 955 Meams Rd., Warmminster, PA 18974-0556
Alfa-Tec, Inc., 4027 21st Ave. West, Seattle, WA 98199
Blohm & Voss Industrie GmbH, P.O. B. 100720, D-2000 Hamburg 1, GERMANY
Fast Systems, 3240 North Broadway, St. Louis, MO 63147
MMC International, 60 Inip Dr, Inwood NY 11096
Nelson Industries, Highway 51 West, Stoughton, WI 53589

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

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Georg Fischer DISA Pipe Tools Div., 407 Hadley St., Holly, MI 48442
Lokring Corp., 398 Hatch Drive, Foster City, CA 94404
Blucher Josam, 2501 S. Front Street, Philadelphia, PA 19148
POLLUTION CONTROL PRODUCTS
Erecon Corporation, 125 Baylis Rd., Melville, NY 11747-3800

PORT DEVELOPMENT

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

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Byrne Rice & Turner, 1172 Camp St., New Orleans, LA 70130
Holland Roer Propellers, 2273 Batastria Blvd, New Orleans LA 70072
Rice Propeller, Av Rios Espinoza No. 88, Col. Benito Juarez, Mazatlan, Sin, Mexico 82180
Mazzari, P.O. Box 314, Seybويه, DE 19975

PROPULSION EQUIPMENT

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American Air Filter, P.O. Box 35690, Louisville, KY 40432
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
Aquamaster Rauma Ltd., Box 220, SF-26101, Rauma, FINLAND
Kamewa America Inc., 106 Park Place, Suite 200, Covington, LA 70433, USA
Kamewa AB, Box 1010, S-68129, Kristinehamn, Sweden
Kamewa Finland Oh., "Aquamaster", Box 220, FIN-26101 Rauma, Finland
Kawasaki Heavy Industries, Ltd., Tokyo Head Office, World Trade Center Bldg., 4-1 Hamamatsu-cho 2-chame, Minato-ku, Tokyo 105-6116 Japan
Mak America, Inc., 3450 Executive Way Miramar Park of Commerce Miramar, FL 33025
Mathers Controls Inc., 875 Pease Rd., Burlington, WA 98232
Brunvoll A/S, P.O. Box 370, N-6401, Fode, Norway
ZF Marine 3131 SW 42nd St., Ft. Lauderdale, FL 33312
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320
Centa Corp., 8185 Cass Ave., Darien, IL 60561
The Falk Corp., PO Box 492, Milwaukee, WI 53201-0492
Fincantieri, Diesel Engines Div.—GMT, Bagnoli della Rosandra 334, Trieste, ITALY
Jan Verhaar Omega Thrusters, P.O. Box 119, 2340 AC Oegstgeest, NETHERLANDS
GEC ALSTHOM Diesels Inc., 10801 Kempwood Dr. Ste 1, Houston, TX 77043-1412
Golsen Worldwide, 160 VanBrunt St., Brooklyn, NY 11231
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Kaplan and Association, 30808 Crest Forest, Farmington MI 48331
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Markisches Werk, P.O. Box 1442, D-5884 Halver GERMANY
MAN B&W Diesel, 17 Slate St., New York, NY 10004
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Høleby, DENMARK

MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15 DK-9900 Frederikshavn, DENMARK
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Renold Hi-Tec, 512 W. Crescentville Rd., Cincinnati, OH 45246
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Schotte-Werf, Josef Becker GmbH & Co. KG, HRP, 432 Realty Dr., Dretna, LA 70056

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Advanced Environmental Systems, 2 Sulton Rd., Webster, MA 01570
Hamworthy Marine, Inc., 1129 Hospital Dr. Ste 3C, Stockbridge, GA 30281
Via Motivator, 566 Parker St., Newark, NJ 07104

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G o i t ens, 1 6 0 Van Brunt St., Brooklyn, NY 11231

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Pelcan Rope Works, 4001 W.Carriage Way,Santa Ana, CA 92704
Rasmussen Equipment Co., P.O. Box 81206, Seattle, WA 98108

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

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MGI International, Ste. 113 980 West 1st Street
N. Vancouver, BC CANADA V2P 3r4
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

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Exceltech International Corp., 1110 Industrial Blvd., Sugarland, TX 77478
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
Fast Systems, 3240 North Broadway, St. Louis, MO 63147
Alfa-Tec, Inc., 4027 21st Ave. West, Seattle, WA 98199
Microphor, 452 E. Hill Rd., Willits, CA 95490
Owens Mfg., Hwy 92, Youngsville, LA 70592

SATCOM

Motorola, 1500 Dundee Dr., Arlington Heights, IL

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ICG Satellite Communications 8400 NW 52nd St., Suite 110, Miami, FL 33166
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27604-1851

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Norwegian Telecom, Postboks 6701 St. Olavs Plass, N-0130, Oslo, Norway
PTT Telecom, Station 12, P.O. Box 30150-2500 JD The Hague, NETHERLANDS
Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017
Raytheon Marine Co., 22 Cotton Rd., NH 03063-4219
Singapore Telecom, 15 Hill Street, Telephone House, 2nd Storey, Singapore 0617
Telstra Mobile Satellite & Radio Services, 79 St. Hilliers Rd., Auburn NSW 2144, AUSTRALIA
Magellan Systems, 960 Overland Court, San Dimas, CA 91773
Stratos, 150 Melkotte St., Suite 1900, Ottawa, Ontario K2P 1P1 Canada
Comsat Maritime Services, 6560 Rock Spring Drive, Beltsdale, MD 20817-1146
Station 12, P.O. Box 30150, NL-2500 JD Den Haag, Netherlands

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Desmond-Stephan, P.O. B. 30, Urbana, OH 43078
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Sawtec, 6215 Alumna Valley Drive, Oklahoma City, OK 73121

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Duramax Marine, 16025 Johnson St., Middlefield, OH 44062
Circle Seal Controls Inc., 2301 Wardlow Circle, P.O. Box 3300 Corona, CA 92610
2535 Prairie Rd., Unit D, Eugene, OR 97402

SEATING

H.O. Bostrom Co. Inc., Progues Ave., Waukesha, WI

SENSORS

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

SEPARATORS- LUBE OIL/FUEL OIL

SOTECO, 276-16010 Curamense, Genova, ITALY
American Ship Repair, 1011 38th St., Brooklyn, NY 11219
Westalia Separator, 100 Fairway Ct., Northville, NJ 07847

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Instruments Computers & Controls, 78 Londonderry Tpke, Suite E 12 Hooksett, NH 03106

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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
Friede Goldman Haller, 525 E. Capitol Street, Suite 402, Jackson, MS 39201
Goltens - New York Corp., 160 Van Brunt St., Brooklyn, NY 11231
Gulf Coast Fabrication, Inc., P.O. Box 539, Lakeshore, MS 39558
HDW, Kiel, Germany, USA Rep.: Roland Marine Inc., 90 Broad St., NY, NY 10004
Halter Marine Group, Inc., 13085 Industrial Seaway Rd, Gulfport, MS 39503
Hitachi Zosen, Hitachi Shipbuilding & Engineering Co., 1-1-1 Hitotsubashi Chiyoda-Ku Tokyo 100 Japan
In-Place Machining Co., Inc. 929 North Buftum Street, Milwaukee, WI 53212-3793
Jacksonville Shipyards, 750 E. Bay St., Jacksonville, FL 32202
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Kawasaki Heavy Industries, Ltd., Tokyo Head Office, World Trade Center Bldg., 4-1 Hamamatsu-cho 2-chame, Minato-ku, Tokyo 105-6116 Japan
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Motor-Service AB, Box 2115, 144 04 Roninge, SWEDEN
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Samsung Heavy Ind., 25, 1-ka, Bongrae-dong, Chung-ku, Seoul, Korea
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Swath Ocean, 979 G Street, Chula Vista, CA 92011
Talleres Navales del Golfo, Isote San Juan de Ulva S/N, 91800 Veracruz, Ver, Mexico
Tampa Bay Shipbuilding, 1130 McClosky Blvd., Tampa, FL 33605
Thomas Marine, 37 Bransford Street, Paltchogue, NY 11772
Washburn Doughty, P.O. Box 296, E. Boothbay, ME 04544
Westport Shipyards, P.O. Box 308, Westport, WA 98595
Willard Marine, Inc., 1250 N. Grove St., Anaheim, CA 92806
Zodiac of North America Inc., Thompson Creek Rd., P.O. Box 400, Stevensville, MD21666

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Atlantic Marine, 8500 Hecksher Dr., Jacksonville, FL 32226
Damen Shipyards, POBox 1, 4200AA Goninchem/Holland
Tampa Bay Shipbuilding, 1130 McClosky Blvd., Tampa, FL 33605
Marco, 2301 W. Comrose Way, Seattle, WA 98199
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Skookum, P.O. Box 280, Hubbard, OR 97032
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Beard Industries Inc., P.O. Box 31115, Shevropat LA 71130
Nelson Division, Exhaust & Filtration Systems, Hwy. 51 West, P.O. Box 428, Stoughton, WI 53589
Houston Marine Training Services, 5728 Jefferson Hwy, New Orleans, LA 70123
Applied High Technology, 4 Place De Commerce
Brossard, Suite 201 Quebec Canada J4W-3B3
SIMULATION TRAINING
Ship Analytics, Inc., Rte. 2 & 184, N. Stonington, CT 06358
Marine Safety, Marine Air Terminal, Laguarda Airport, NY 11371
SKILLED LABORERS
Amenforce, 650 E. 27th St., Jacksonville, FL 32206

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Summer Equipment, 24 West 4th Ave., Vancouver, B.C. V5Y1G3
Kobei Manufacturing Co., Ltd., 823n-129 street, Surrey, B.C. V3W0V4
Jastram Engineering, 485 Mountbain Hwy N., North Vancouver, B.C. CANADA V7J 2L3

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Blohm & Voss Industries GmbH, P.O. B. 112289, D-2042 Hamburg 1, GERMANY
U.S.A. Reps: Simplex-Turnar Inc., P.O. B. 675, Tonawanda, NY 14151
Raikio Ltd., Loudwater, High Wycombe, Bucks Hamshire ENGLAND HP1090V
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

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Duramax Marine, 16025 Johnson St., P.O. Box 67, Middlefield, OH 44062-0067
IHC Lagersmit, P.O.B. 5 - 2960 AA Kinderdijk - HOLLAND
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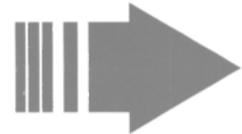
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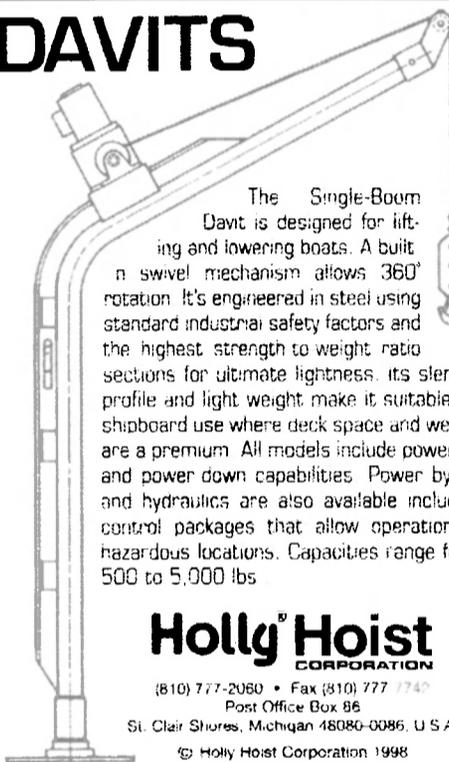
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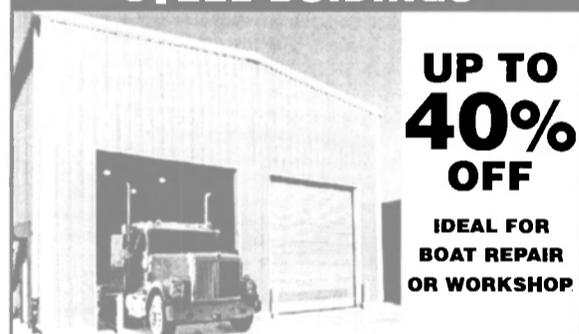


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DESIGNER: Skipskonsulent, Bergen, Norway

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OWNER: Seattle Central Community College Maritime Training Center

MISSION: Marine Technical & Vocational Training

TYPE: Anchor Handling/Tug/Supply (AHTS) Vessel with Icebreaker Rating

CLASS: DNV 1A1 ICE "C"

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RANGE: 13,300 Nautical Miles

STEERING SYSTEM: Hydraulic with Becker Type Rudders

CONTROLS: (4) B&W Alpha, Wheelhouse and Engine Room

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DECK SPACE: (CLEAR): 2,718 Sq. Feet

DECK LOAD RATING: 450 Metric Tons

DECK CARGO FITTINGS: Cloverleaves; ISO Pads for TEU containers

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NAVIGATIONAL EQUIPMENT: GPS - Trimble NAVTRAC XL; Loran C Units - Furuno LP-1000 and Japan Marine Co. JMC C-100; Radars - Kelvin Hughes Series 1600 (96-mile range) and Kelvin Hughes Series 500 (48-mile range); Echosounder - Simrad EC-205; RDF - Taiyo TD-A131; ADF - Taiyo Musen TD-L1510; Satellite Navigator - Kelvin Huges Navstar 601S; Gyro Copasses - Anschutz Standard 12 and Anschutz Standard 6; Automatic Pilot - Anschutz Pilot Star; Weather Fax - Japan Marine Co. FX-200

CONSTRUCTION: Steel

BERTHING: 23 Bunks (Expandable to 35)

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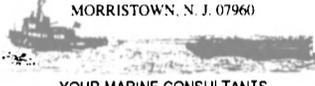
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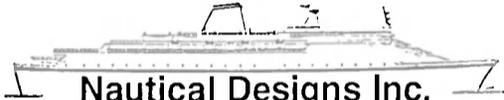
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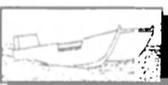
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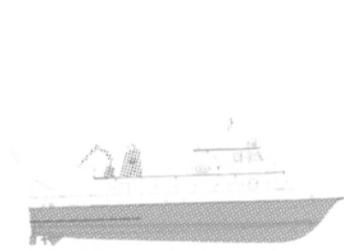
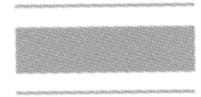
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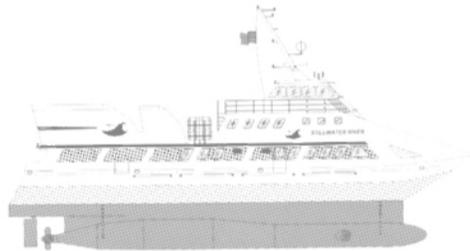
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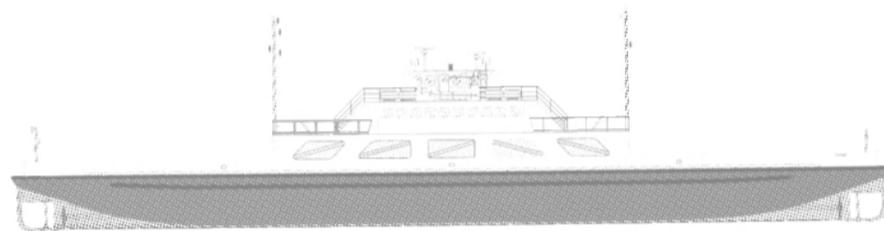
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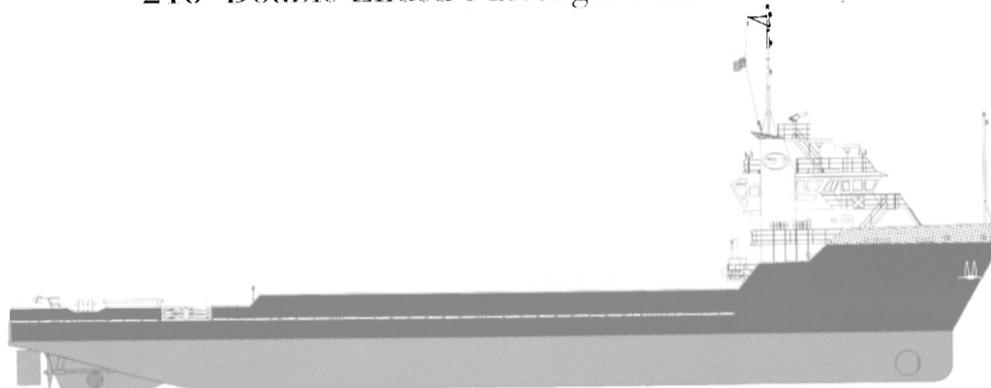
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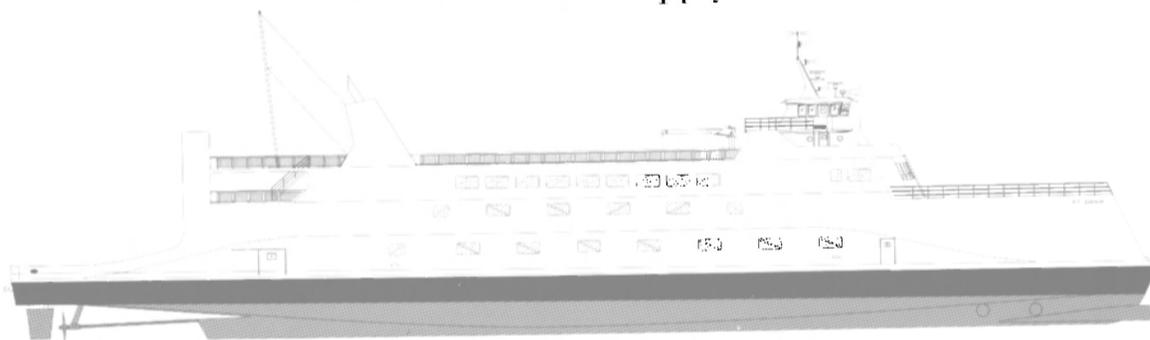
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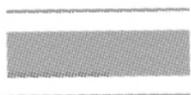


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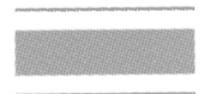


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