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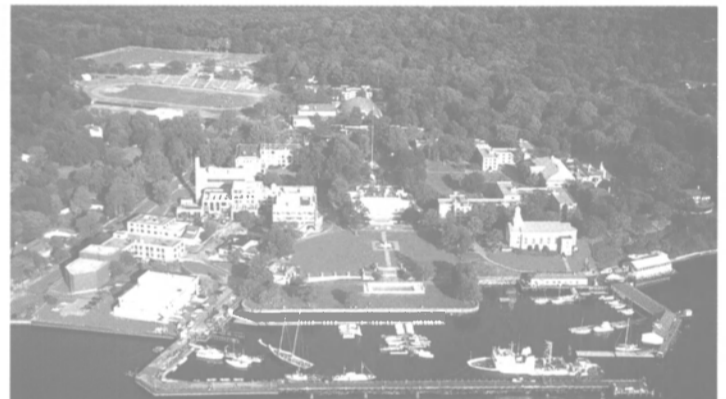
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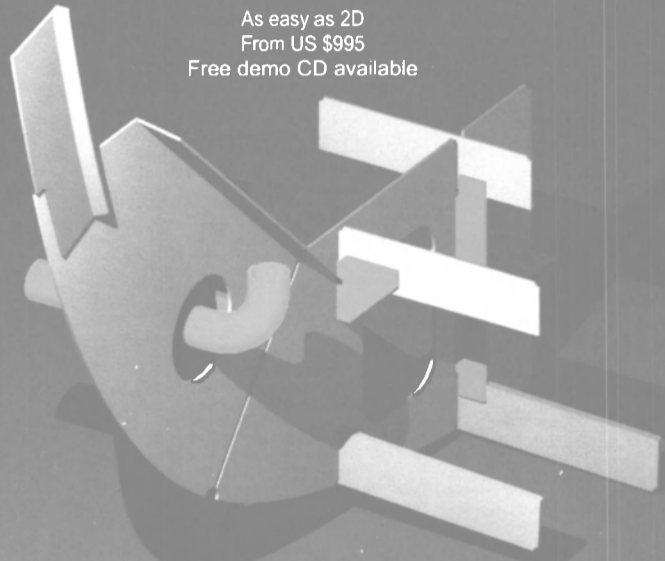
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No. 12

Vol. 62

On the Cover: Royal Caribbean's 88,000-gt Radiance of the Seas, (featured on page 26), recently departed the building dock of Meyer Werft's Papenburg yard. The vessel, which is the first of four, is scheduled for a Spring 2001 delivery.

For further coverage on the state of the cruise industry, turn to page 23.

8 Emerging Electronics

Electronic control of large two-stroke diesel engines has now become a reality.
— by David Tinsley

12 Nine Days

Cascade General performs generator replacement on P&O's Sea Princess in just nine days.

23 Cruise Shipping Prospects

Cunard's new Queen Mary 2 is fit for a "Queen;" Lazard offers cruise financial insights; Crystal signs contract with Chantiers de l'Atlantique for third vessel.

29 Welcome Back

What do you get when you add seasoned shipbuilding veterans to a technologically advanced facility? Kvaerner Philadelphia — a new force in the U.S. shipbuilding scene — by Regina P. Ciardiello

Great Ships of 2000

33 **Maritime Reporter's Great Ships of 2000** features a vast mix of prized vessels — from the largest European-built cruise ship — to a heavy lift ship that made headlines earlier this year with its rescue efforts of the stricken Aegis destroyer, USS Cole.

47 CAD/CAM

Cad/Cam solutions can help medium and small shipyards save time and money.

16 New & Notable

21 Ferliship's New Ship Contracts

38 Marine Innovations

49 Marine Literature Review

54 Classifieds

62 Advertising Index

63 Buyer's Directory

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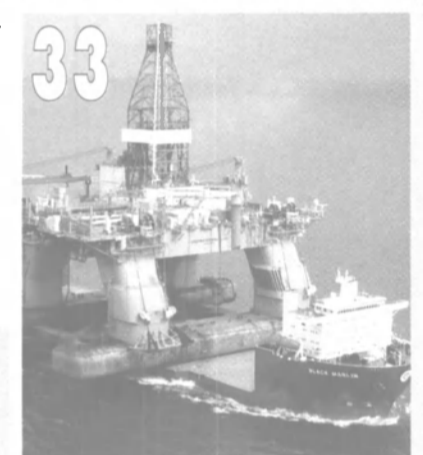
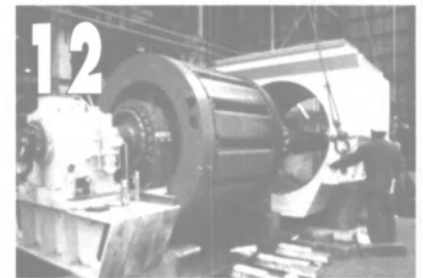
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118 E. 25th St., New York, NY 10010
Tel: (212) 477-6700; Fax: (212) 254-6271
e-mail: mren@marinelink.com
Internet: www.marinelink.com

PUBLISHERS

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

Vice President/Editorial Director

Gregory R. Trauthwein
trauthwein@marinelink.com

EDITORIAL

Associate Editor
Regina P. Ciardiello
ciardiello@marinelink.com

Technical Editor

David Tinsley

Editorial Consultant

James R. McCaul, president, International Maritime Associates

Manager of Information Systems

Susan Cosme
cosme@marinelink.com

MARKETING

Marketing Assistant
Angelica Rivera
arivero@marinelink.com

PRODUCTION

Production Manager
Sharon Griffin
griffin@marinelink.com

Asst. Production Manager

Oksana Martemy
martemy@marinelink.com

CIRCULATION

Circulation Manager
Dale L. Barnett
barnett@marinelink.com

ADVERTISING SALES

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

National Sales Manager

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

Regional Sales Manager

Jennifer Truman
truman@marinelink.com

Regional Sales Manager

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

Regional Sales Manager/Electronic Product Sales

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

Assistant to the Vice President of Sales


Tina Angelino
angelino@marinelink.com

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Editor's Note

The annual parade of Great Ships in our December edition includes a roster of unique vessels, from the record-setting heavy lift ships Black Marlin and Blue Marlin, to Vasco da Gama, the world's largest trailing suction hopper dredger. And while these ships — plus the Marine Innovations feature starting on page 38 — help to highlight the industry's many triumphs over the past 12 months, there are a full-plate of technical and non-technical issues, which will keep the marine industry challenged for many years to come.



The complex matter of ship casualties — the causes, environmental ramifications and potential solutions — is now a top-agenda item of many organizations both inside and out of the marine world. As the number of accidents continues to grab headlines — the most recent of course being the biggest spill in the Mississippi River in 20 years, when the single-hull 83,000-ton Westchester ran aground in late November as a result of losing power due to an engine failure, spilling 13,000 barrels of sweet Nigerian crude — it is a sure bet that increased pressure will be applied by international, national and regional entities to improve safety.

It will be companies, which have a proven record of supplying advanced marine solutions who will prosper. An example of new innovation will be covered in the January 2001 propulsion edition. Litton Ship Systems and American Superconductor Corp. are collaborating on the utilization of High Temperature Superconductor technology — initially the application of HTS motors for electric ship propulsion — in order to make naval and commercial vessels more fuel efficient and quiet.

Greg R. Trauthwein

www.marinelink.com

trauthwein@marinelink.com

International Representatives

International Operations

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

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

AustralAsia

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

Argentina

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

Benelux

PAULA TACQ
Maritime Media ML
Otweg 18 2771 VX Baskoop, Netherlands
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Brazil

JOSE DUARTE DOS SANTOS
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Central America

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Transmarine Media Services, P.O. Box 8579,
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Scandinavia

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Spain

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Turkey

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A Pointer to the Future



by David Tinsley,
technical editor

Developments in vessel powering, propulsion and related systems over the past decade, in particular, have had a fundamental bearing both on maritime technological advance as a whole, and on the ultimate efficiency and competitiveness of shipping in its manifold forms.

Marine engine designers and producers devote considerable resources to driving the technology forward, marrying the client markets' ever-more pressing expectations as to economy and reliability with new environmental standards. The process demands not only a certain scale and the requisite know-how and long-term strategic vision, but also pure industrial will.

Through the endeavors of MAN B&W Diesel's Danish subsidiary, one of the fountainheads of two-stroke technology, a new chapter in ship powering is unfolding with the application of electronic control to a large propulsion plant already in deep-sea service. A true milestone in marine engineering was reached on November 9 when formal

Class approval was obtained to run the 14,200-bhp MAN B&W engine of the modern chemical tanker, Bow Cecil, in full electronic mode. By officially sanctioning the switchover from conventional camshaft to a microprocessor-based system of fuel injection and valve actuation, Det Norske Veritas cleared the way for the world's first electronically-controlled two-stroke diesel engine to show its mettle.

The 37,500-dwt Norwegian vessel has accordingly provided a platform for wholesale electronic operation on quay-to-quay basis, under the highly demanding trading profile characteristic of a parcel tanker, with its intensive and varied loading and discharge patterns. The potential long-term implications of the 10,000-hour evaluation period that has been signaled by the approval are immense.

Scrutiny of the computer-controlled running functions will help shape future product policy by MAN B&W, which has by far the biggest share of the global market for low-speed propulsion

engines. The results will have a signal bearing on whether or not to implement the technology as an option or as a standard feature in the future engine program. For shipowners and operators, the arrangements ultimately promise through-life benefits in terms of engine reliability, flexibility, environmental performance and overall running costs.

The implementation of the 10,000-hour test schedule at sea, to confirm the efficiency and reliability of the engine and systems, is the new highpoint of an initiative launched by MAN B&W back in 1991. Originally dubbed the 'Intelligent Engine' program, its course has included equipping and extensive testing of the licensor's Copenhagen research engine, the 4T50MX, with electronic controls for fuel injection and exhaust valve operation. The systems have been used continually by the test machine in its wider role as a tool of engine development. Bow Cecil, one of the Odffjell fleet, was commissioned from the former Kvaerner Floro yard in western Norway during 1998. It had been fitted


with a 6L60MC main engine delivered with an ordinary camshaft system, but prepared for retrofitting with the necessary electronic elements. MAN B&W has developed both the hardware and the software which has effectively transformed the MC prime mover into an ME engine, the term now favored by MAN B&W over the original IE (Intelligent Engine) designation.

The systems are fitted on the engine's upper gallery, in parallel with the camshaft, facilitating full changeover from a conventional mechanical system to electronic mode, or vice-versa, within three hours.

The twin engines specified for Concordia Maritime's mould-breaking new class of VLCC under construction in South Korea will also be equipped for subsequent switchover to electronic control. The pair of 314,500-dwt, V-Max newbuilds entrusted to Hyundai Heavy Industries are each to be fitted with two MAN B&W seven-cylinder prime movers based on the S60MC-C type, driving two shaft lines and propellers.

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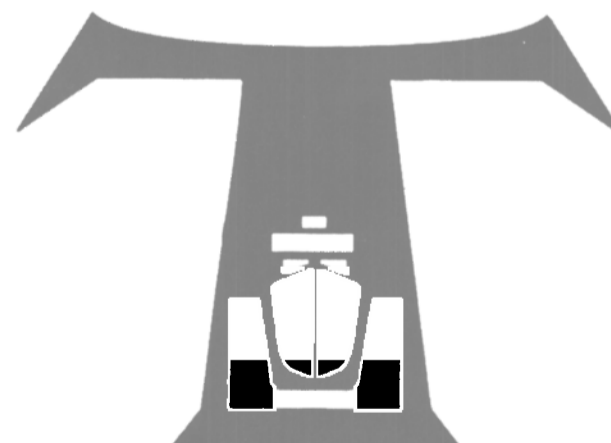
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GL: An Undiluted Brand

With a buoyant orderbook and solid medium-term prospects favoring the classification society's recent decision to maintain its independence, Germanischer Lloyd has embarked on a new course of business development characterized

by closer customer focus.

Rationalization of the organization and an intensification of sales and marketing activities are tenets of the approach. A continuing, substantial commitment to research and development is regarded as pivotal to ensuring the technological strengths widely per-

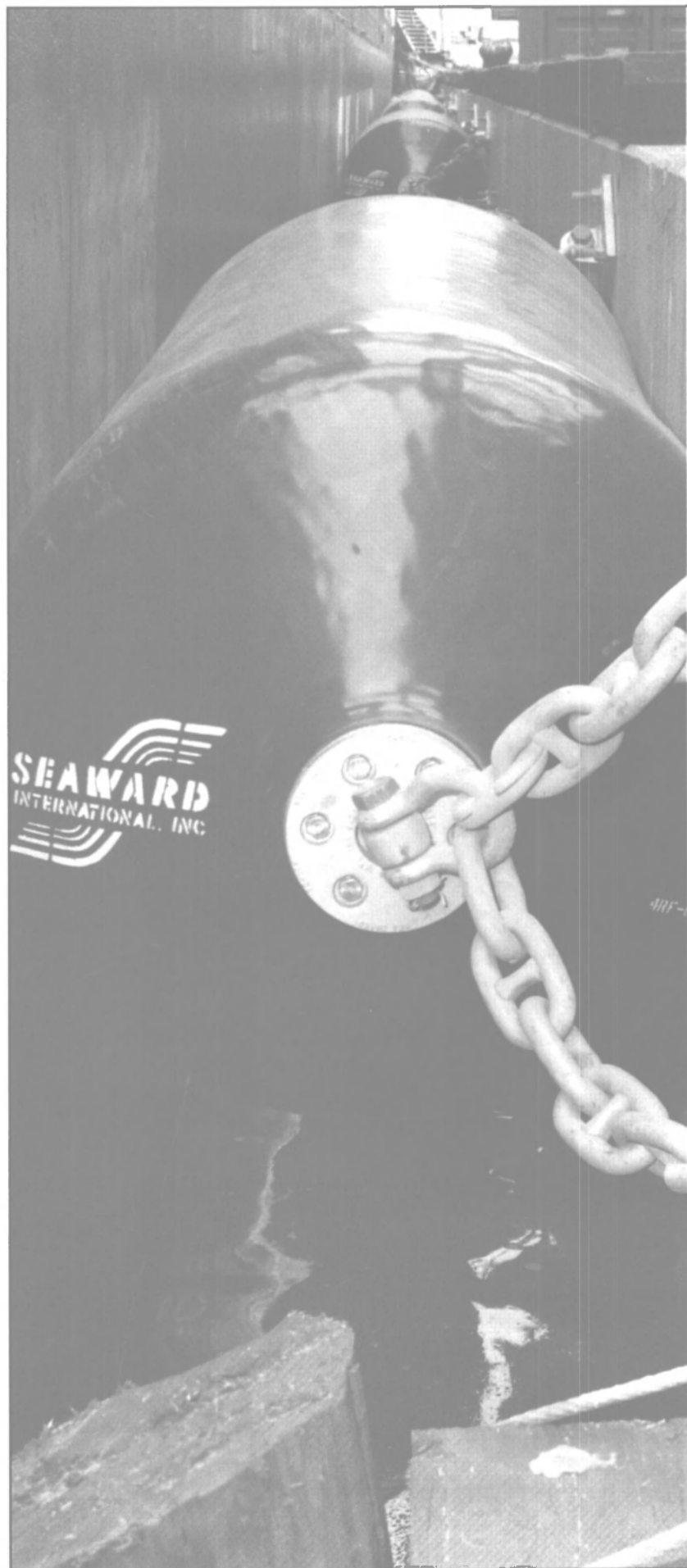
ceived as synonymous with the GL 'brand'.

After several months of deliberations, GL and Det Norske Veritas terminated discussions aimed at far-reaching cooperation in maritime activities. During the latter stages of the talks, the German society had feared that it might eventu-

ally be subsumed within DNV, contrary to the original strategy of collaboration within an operating framework of retained, distinct identities. Following the slide in GL-classed newbuild deliveries in 1999 to 1.9 million gt from a level of about 3 million gt in 1998, the current year will reflect a huge recovery in activity implicit in the handover of a total of some 4 million gt of new tonnage built to the society's class requirements.

Over the course of 2000, the Hamburg-based undertaking has expanded its market leadership in the container vessel category, equating to a 52 percent stake of the current orderbook, and also moved into the top slot in the field of multipurpose cargo vessels, with a 37 percent share of the newbuild classification workload. At the time of writing, the society ranked fourth in the global league in terms of its penetration of the world orderbook, accounting for 14 percent of the 67 million gt global tally.

From a maritime perspective, one of the most significant aspects of GL has been its concentration on its core activities over a period that has seen substantial industrial and business diversification by other classification societies. Around 75 percent of its revenue is derived from the maritime sector, a largely unchanged proportion relative to the picture 10 years ago. Against a backdrop of increased operations, new dimension is being given to the technological base through project leadership of a five-year research effort with the acronym WIPS, translated as 'Competitive advantage through information technology-supported product simulation in shipbuilding'. Drawing in a range of companies and universities besides GL and its specialist areas of know-how, WIPS is addressing the growing capabilities for pre-calculating the performance characteristics of ships and plant, on the one hand, and the increasing IT requirements resulting from concurrent design and construction, on the other.



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CP Ships Commissions Newbuilds For South America

CP Ships has taken the next step in its major fleet retonnaging program by signing a contract with China Shipbuilding Corp. of Taiwan for the construction of five geared 3,200 teu containerships. They are designed to be employed in CP Ships' South American services.

Delivery of the newbuildings will take place between mid-2002 and early 2003.

Measuring 797 x 105 ft. (243 x 32.2 m), the vessels will be equipped with 400 reefer plugs and operate at a service speed of 22.5 knots.

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Ship Repair & Conversion

Generator Replacement Proves Cascade General Capabilities

Cascade General had its knowledge and expertise put to the test with the emergency replacement of a faulty generator on P&O's Sea Princess. Measuring 857 ft. (261.2 m), the vessel, which was built by Fincantieri in 1998, was in

drydock at the Portland shipyard for approximately nine days in September.

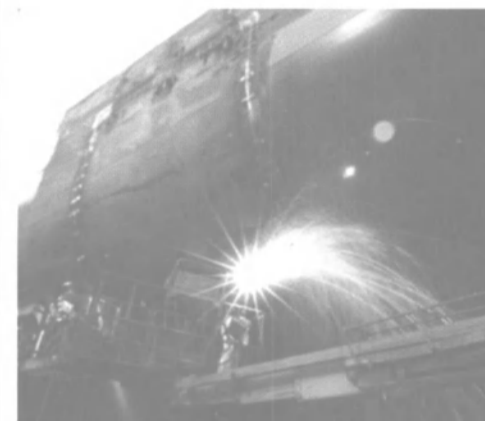
The project began on the vessel's exterior with the rigging crew building a 20-ft. loading platform on the drydock floor. Concurrently, work was complet-

ed inside the engine room to clear an exit path for the 47-ton GEC Alstom generator.

Two of Sea Princess' four propulsion transformers at 20-tons each, were disconnected and moved



P&O's Sea Princess



Cascade General replaced a faulty generator onboard Sea Princess; the job encompassed just nine days at Cascade's Portland drydock.

aside, catwalks lifted and all wiring and piping blocking the exit route labeled and cut. The generator was outfitted with a temporary shaft-support bracket, jacked up and rolled aft on a pair of girders set up as temporary rails. It was subsequently lifted and turned onto a second set of rails running abeam, skidded out of the ship and transported by drydock crane and trailer to an assembly bay.

With approximately six mm of clearance between the generator's 20-ton rotor and 27-ton stator, they were carefully separated using an overhead crane and a high-capacity tri-lifter.

On the fifth day of construction, the generator was returned to the engine room, allowing the bulkhead to be sealed up. The 2,100 volt transformers were then skidded into position and secured - followed by the hull insert welded into place. It was then ultrasonically tested, inspected and approved by RINA.

During this drydocking, Cascade also overhauled Sea Princess' bowthrusters, sea valves, seachests and strainers, prepared and coated the underwater and surface areas and the topside white. The vessel also had its rudder and propeller shafts inspected, ballast tanks surveyed, and all 16 of its lifeboats and davits recertified.

On its ninth and final day of lay-up, the vessel left Cascade with a revamped generator. Minor additional work was continued en route to San Francisco, upon which the fourth engine was restarted, and full power restored.

Circle 8 on Reader Service Card

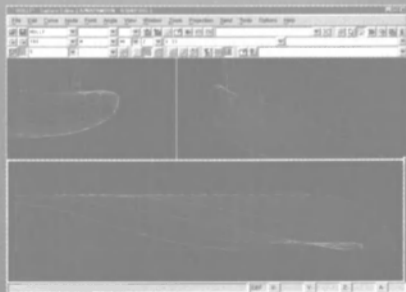
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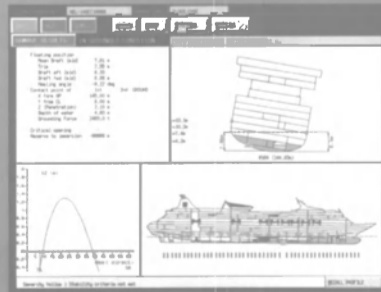
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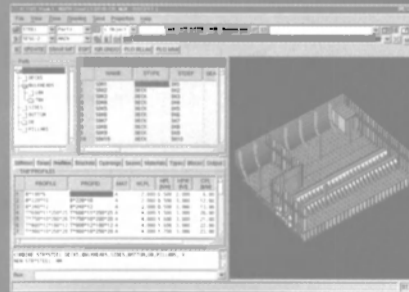
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ASRY Readies Facilities For Increased Demand

ASRY is gearing up for an upswing in the international shipyard market after reporting an increase of 20 percent in orders throughout the last quarter. The total number of vessels scheduled to spend time at the yard now exceeds



Jack-up rig, Leen, which is owned by Mansal Offshore, underwent repairs at ASRY in August/September.

100 for the year — based on current market indications. The company expects to surpass its final year-end forecasts for vessels repaired at its facility. This quarterly upswing has much to do with the notion that a variety of major orders are coming into the yard — specifically a back-to-back order — with Iran Shipping Lines. The request calls for ASRY to drydock six of Iran Shipping's bulk carriers until the beginning of December.

Known as Iran Abozar, Iran Afzal, Iran Ashrafi, Iran Ghazi and Iran Ghodousi, the carriers represent more than five-percent of the owner's ocean-going fleet. In addition, the yard has drydocked yet another bulk carrier — the 43,309-dwt Iran Taleghani.

ASRY also plans to jump into the lucrative arena of FPSO and FSO conversions. A recent visit to the yard by a major oil company looking to expand its FPSO fleet proved this assumption to be correct. The respective oil company officials visited ASRY's Bahrain facility, whose large, clear docking facilities make it ideal for FPSO jobs. ASRY's CEO, **Mohammed Al-Khateeb**, furthered that the company recognized the need for this market, subsequent to the completion of Knock Taggart to an FSO for Red Band, followed by Jurupema for Petrobras.

The third quarter was an active time for the yard, which repaired, both alongside and in drydock, a variety of vessels such as Benor Tankers' 76,000-dwt Venture; Bergessen's 360,000 ULCC Berge Pioneer and A.P. Moller's 69,999-dwt tanker Maersk Merlin.

ASRY also completed contracts on specialist vessels including the jack-up ring Leen for Mansal offshore and two DSV's (Diving Support Vessels), Salama and Sharqi for Bapco.

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Ship Repair & Conversion

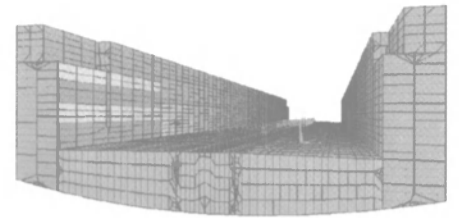
Elliott Bay Design Applies FEA To Todd's Drydocks

Elliott Bay Design Group (EBDG) has already established a name for itself with its finite element analysis (FEA) work that has enhanced designs on a variety of vessels on a broad-spectrum

range — from passenger vessels to off-shore oil platforms. The Seattle-based design firm recently set its sights on Todd Pacific Shipyards, specifically on two of the yard's large floating drydocks to assess their capability for lifting Navy vessels and cruise ships.

EBDG project manager, Steve Harris,

has cited that one of the drydocks is rated at 40,000 tons capacity, and is used for lifting U.S. Navy destroyers and larger cruise vessels, such as Holland America's Stattendam Class. Key in this process is extensive computer modeling along with a comprehensive on-site physical inspection of the drydocks,



Above: An FEA representation of the drydock that is pictured in the photo below, as prepared by EBDG; the different colors signify varying material thicknesses throughout the structure.



including thickness measurements and corrosion analysis.

With end results verified by independent strain gauge testing, it was determined through the FEA that the drydocks met the Navy's requirements and were suitable for their assigned duties.

At the same time, EBDG offered recommendations for improvements to the larger drydock that would minimize stresses present in large ship lifts. Todd immediately implemented these recommendations, which included the addition of internal bracing.

Circle 11 on Reader Service Card

Celebrity's Millennium Arrives At Newport News

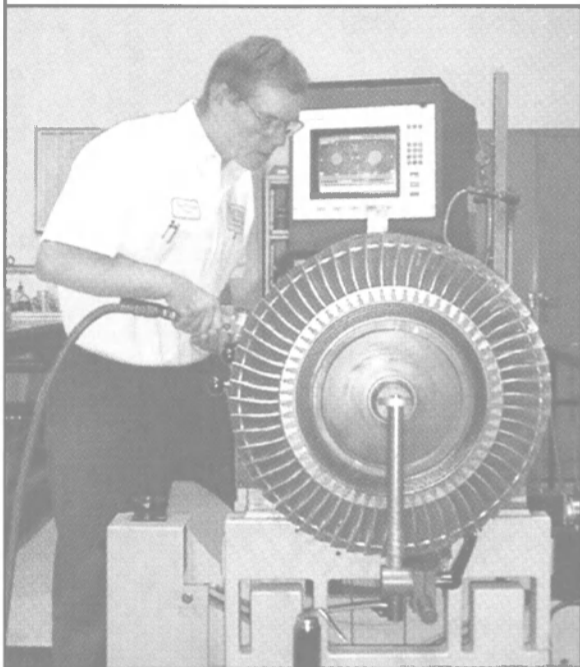
Celebrity Cruise Line's innovative gas-turbine powered Millennium arrived at Newport News Shipbuilding (NNS) on November 18 for drydock and repair work.



The vessel, which is expected to remain in drydock at the yard for one month, will undergo modifications to its stern hull structure, underwater hull equipment inspections and underwater hull painting.

According to Becky Stewart, director, ship repair at NNS, "NNS is working in conjunction with the vessel's builder to manufacture structural components to be added to the exterior of Millennium that will modify the hull shape."

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NUPAS-CADMATIC 3D model is courtesy of Slovenske Lodenice Komarno shipyard

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New & Notable

CSO Deep Blue Launched

CSO Deep Blue, an ultra deepwater pipelay and subsea construction vessel being built in Korea at Hyundai Mipo Dockyards in Ulsan for Coflexip Stena Offshore, was launched late this summer and is expected to begin operations in mid-2001.

The vessel's laying system is designed around a powerful tiltable ramp, equipped with two quad trac tensioners capable of sustaining 550 metric tons. The unique tensioning capacity is reinforced by its ability to lay rigid (reeled), flexible, rigid (J-Lay) pipes and umbilicals, offering Coflexip Stena Offshore and its customers a wide range of possibilities.

The vessel is part of an overall strategic investment by the company to adapt its fleet to the deep and ultra deepwater requirements of its clients in Brazil,

Gulf of Mexico, West Africa and the North Sea.

CSO Deep Blue is the cornerstone of the investment, showcasing a wide variety of technical capabilities for depths to 8,202 ft. (2,500 m).

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Main Particulars — CSO Deep Blue

Shipbuilder	Hyundai Mipo Dockyard
Length	676 ft. (206 m)
Breadth	105 ft. (32 m)
Depth	59 ft. (18 m)
Max displacement	50,000 tons @ 10 m
Total Power	35 MW
Accommodation	120
Max Water Depth	2,500 m
Max. Pipe Diameter Range	
Rigid Reeled:	3 to 18" OD
Flexible:	3 to 16" ID
Rigid J-Lay:	4 to 20" OD, quad joint
Umbilicals:	.50 to 250 mm
Tensioning Capacity	550 tons
Laying Angle	60 to 90 degrees
Heavy Lift Capacity	400 tons
ROV Equipment	2



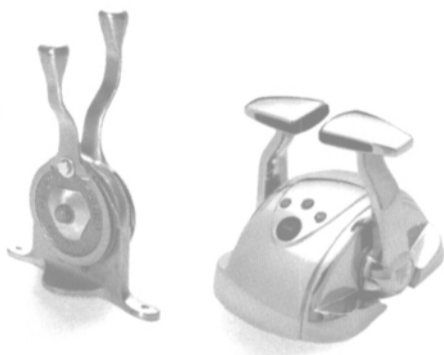
CSO Deep Blue being towed through Ulsan Harbor.

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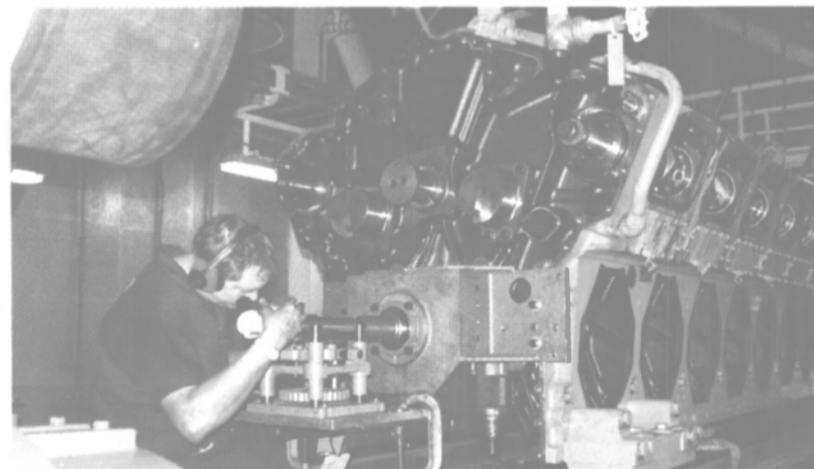


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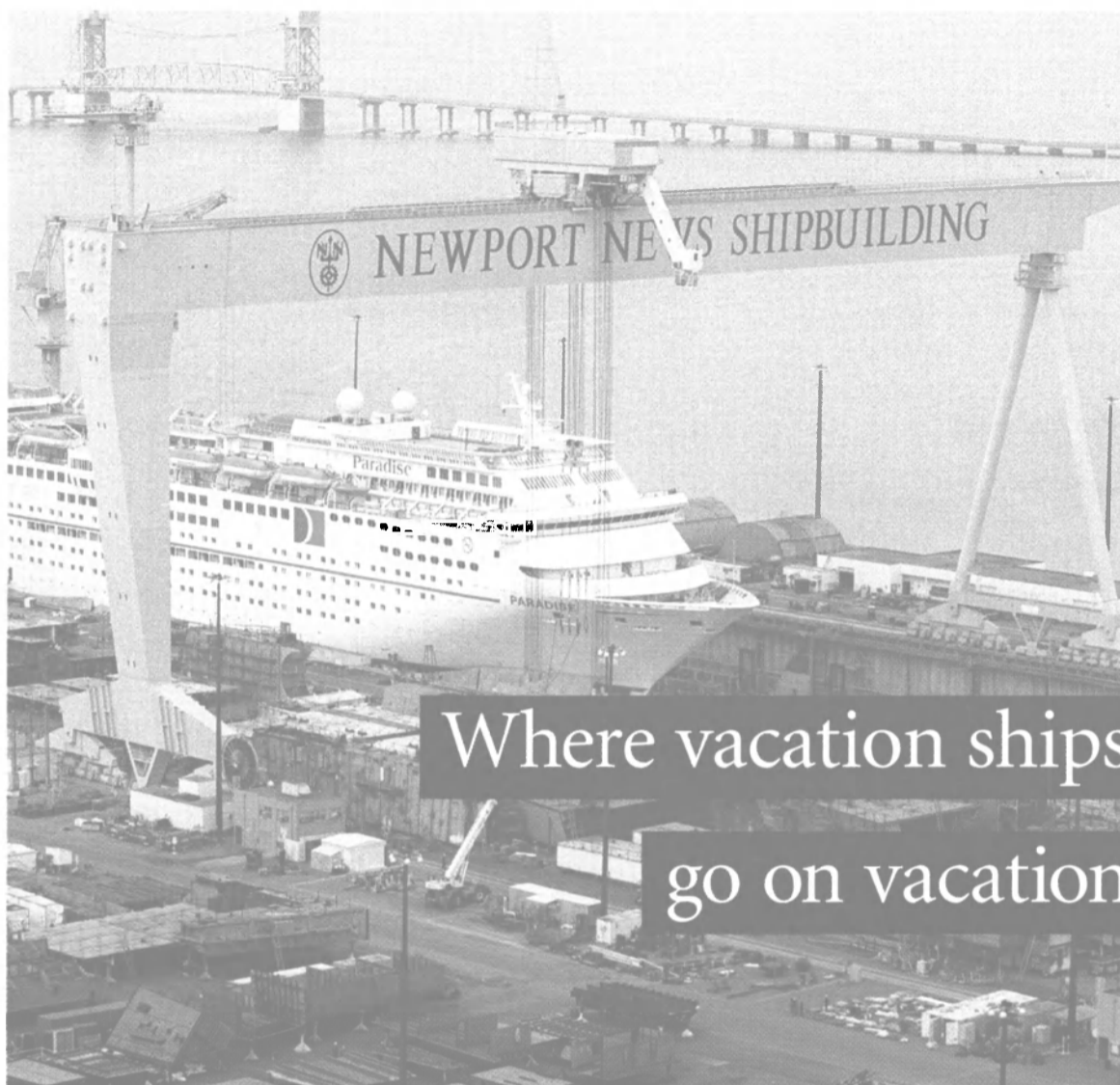


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New & Notable

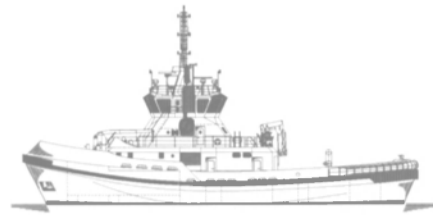
Enhanced Escort Tug Ajax Delivered to Østensjø Rederi

Østensjø Rederi AS of Haugesund, Norway has received Ajax, one of the most powerful dedicated tanker escort tugs in the world, and the most powerful in Europe, for service on the west coast of Norway.

Constructed by Astilleros Zamakona S.A. of Vizcaya/Bilbao, Spain, beginning in early 1999, the tug was built in accordance with DNV Regulations as an Escort Tug, with Fire-Fighter I and Oil Recovery certification, and also in full

compliance with the National Regulations of the Norwegian Maritime Directorate.

Created by Robert Allan Ltd., the design of this powerful new tug incorporates a number of unique hull form



OUTBOARD PROFILE

Outboard profile of Escort Tug Ajax

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were verified by the individual marine pilot associations. The end result is a one-of-a-kind program for marine pilots that provides evaluation, standardization, and above all, an internationally recognized marine pilot continuing professional development program of training assessment.

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Quality in Command

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developments which are the result of an extensive series of model tests and research by the firm over the past several years into the performance of escort tugs. Model tests were conducted at the Institute of Marine Dynamics in St. John's, Newfoundland and at Voith Schiffstechnik's laboratories in Heidenheim, Germany to verify the predicted performance, and to refine the design of the hull and appendages. The model test program which included evaluations of speed and seakeeping in both directions, and measurement of steering and braking forces in both calm water and seastates, has been the subject of a number of recently published technical papers. The enhancements incorporated into this design contribute to significant improvements in the escort towing performance and to the safety of the tug during high-speed escort towing operations.

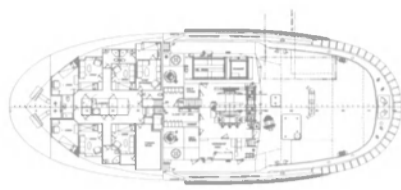
The minimum performance requirements for the new tug at the outset of the design program were for a bollard pull of 90 tons, a free-running speed of 15 knots, and an escort steering force of 150 tons at 10 knots. The latter requirement was to be in compliance with the stability and heel limitations of DNV's Escort Tug notation. The tug has exceeded all expectations on trials with a bollard pull of 95 tons, and a free-running speed in excess of 15 knots. Escort towing performance has yet to be demonstrated full scale, however the final stability characteristics of the tug will support a sustained steering force of 160 tons at 10 knots in compliance with DNV Escort Tug Regulations and reinforcing the model test results.

The tug is configured to operate in the skeg first direction for all escort operations, but the hull form has been refined for best possible sea-keeping capabili-

Main Particulars - Ajax

Length, (o.a.)	136 ft. (41.6 m)
Beam, (max.)	52 ft. (15.9 m)
Depth, molded	20 ft. (6.2 m)
Maximum draft	22 ft. (6.8 m)
Power	2 x 3,800 kW
Propulsion	Voith Cycloidal Propellers
Fuel capacity	242 tons
Reserve fuel	350 tons
(for extended voyages)	
Fresh water	72 tons
Recovered oil	430 cu. m
Fire-fighting foam	28 cu. m
Oil dispersant	17 cu. m

New & Notables



LOWER DECK PLAN

MAIN DECK PLAN

ties in both directions.

Ajax's propulsion is provided via a pair of Caterpillar 3612 diesel engines, each delivering 3,800 kW at 900 rpm to a Voith cycloidal propeller, model 36GII-270 through a Voith Turbo coupling. Each main engine also drives a fire-fighting pump and a hydraulic pump via a PTO and step-up gear at the forward end.

Electrical power is provided by a pair of Caterpillar 3306B diesel gensets, each rated 165 kW at 1,500 rpm.

The tug has a split-level accommodation and service space, oriented about the major forward working deck. The main deck area features a fully enclosed winch room, with a double-drum Karmoy winch, containing a 250m x 90mm Superline Steelite Xtra HMPE escort towing hawser and a 1,200 m x 64 mm steel towline. Adjacent to the winch room is a large "garage", containing an oil spill recovery skimmer and oil containment boom on a common bed frame.

DH Tanker Launched

Exxon Mobil Corp. announced that M/T Kestrel, a new double-hull very large crude oil carrier (VLCC), was delivered for leasing to a Trust established by Marcare Shipping Co., a joint shipping venture among subsidiaries of ExxonMobil, the Onassis Group and Petros J. Goulandris Sons Group. Kestrel, the second of two sister vessels to be leased to the Marcare Trust, will be chartered by International Marine Transportation Limited (IMT), a subsidiary of Exxon Mobil Corporation based in the UK. The joint venture, in which all three partners hold an equal share, was formed in December 1998. Kestrel was built by Hyundai Heavy Industries and delivered at a naming ceremony today at Hyundai's Ulsan, Korea shipyard. The 307,000 dwt Kestrel is 1,100 x 190 x 206 ft. (335 x 58 x 63 m) from keel to masthead and can carry a cargo of 2.25 million barrels of crude oil worldwide. The ship's design, construction and capabilities exceed even the stringent tanker safety standards set out in OPA '90 and the IMO rules. Kestrel is equipped with such state-of-the-art facilities as automatic bridge controls for main propulsion systems, automated machinery and cargo systems, and onboard electronic charts.

Circle 46 on Reader Service Card

December, 2000

A large Effer model 80-000-3SL knuckle-boom crane serves to launch and recover this equipment as well as handle deck equipment and stores. Aft of these critical service areas there is a wet lobby which accesses the crew accommodation spaces.

The wheelhouse is fully appointed with the latest in electronic control and

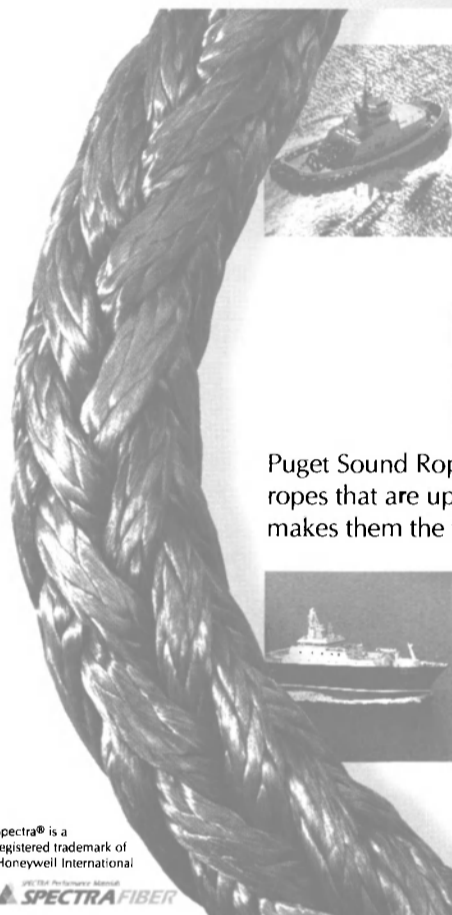
navigation systems for operation of a tug with a fully automated machinery space, and includes two separate Voith steering and control consoles, one forward and one aft for maximum operational visibility and control when operating in either direction.

Ajax represents the latest in escort towing technology; a high-performance

vessel purpose-designed for maximum reliability, steering and towing performance, and safety in the execution of high-speed escort towing.

The tug assumed its duties at the Norsk Hydro Oil terminal on the west coast of Norway in early November, 2000.

Circle 18 on Reader Service Card



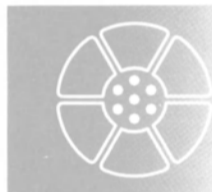
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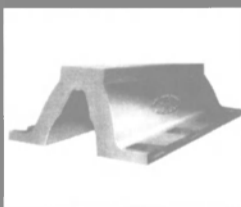
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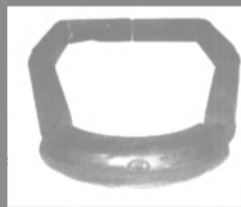
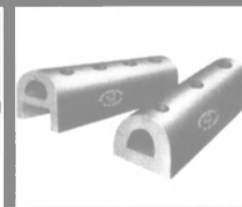
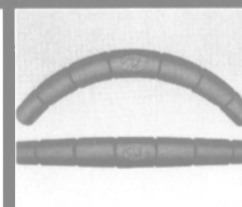
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Circle 220 on Reader Service Card

Contracts

Cammell Laird Secures Upgrading And Drydocking Of RFA Argus

Cammell Laird has been awarded a multi-million dollar contract to drydock and upgrade the RFA helicopter support ship Argus.

This award follows the successful refit of the RFA Fort Rosalie earlier this year.

The RFA Argus is designated as a helicopter support

vessel and plays a vital role in the support of U.K. overseas operations. A significant portion of the upgrading of the vessel is to replace the existing internal modular hospital.

A new state of the art hospital facility will be built into the existing vessel. The primary casualty receiving station (P.C.R.S.) is capable of handling 90 people and will be used to provide emergency hospital facilities with 20 high dependency units and 4 operating tables.

Argus is scheduled to arrive at the Tyneside yard early January 2001 and depart in May 2001. This will be a return visit for the vessel, which previously visited the Hebburn facility in 1996. The company is also currently undertaking the conversion of a rail ferry into the world's largest commercially operated floating hospital, the Africa Mercy, which is owned by the U.S. charity Mercy Ships.

Circle 49 on Reader Service Card



Maritime Week

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Damen Receives Jumbo Order



The CargoVessels Division of Damen Shipyards signed a \$62.3 million contract with Dutch shipping company, Jumbo, for the building of two heavy lift ships, each measuring 469 ft. (143.1 m) with a beam of 87 ft. (26.5 m).

They have a lifting capacity of 1,600 tons, and will be constructed at Damen's Romanian yard.

The first vessel will be delivered during the first quarter of 2003 — the second will arrive in the third quarter.

Circle 28 on Reader Service Card

FGH To Undertake \$53 Million Of New Projects

Friede Goldman Halter (FGH) will undertake a variety of new projects with a combined value of more than \$53 million, excluding options.

Halter Marine has agreed with Vessel Management Services for the construction of a 150,000-barrel oceangoing, double-hulled ATB, with options for up to five additional units. The barges will be constructed at Halter's Port Bienville shipyard in Pearlington, Miss. and the tugs will be built at the Moss Point Marine shipyard in Escatawpa, Miss.

The company will also build, integrate and commission a pair of 150-ft. (45.7 m) power-generating barges for Waller Marine of Houston, Texas. The barges will be constructed at Halter's Moss Point yard and outfitted at Friede Goldman Offshore's Pascagoula East facility.

Friede & Goldman has been granted a contract from Noble Drilling Corp. to perform design engineering for phase one of the upgrade of the Noble Iliion semisubmersible — involving hull upgrade — to be complete at Friede Goldman Offshore.

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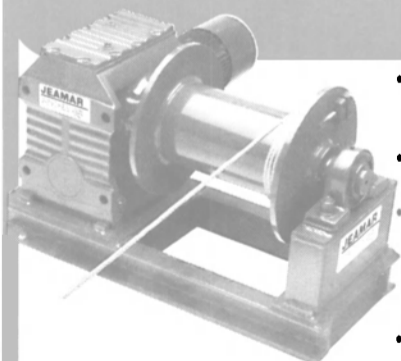
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Circle 231 on Reader Service Card

Ferlship's New Ship Contracts • Sept. - Oct. 2000

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OWNER OPERATOR	SHIPYARD	TYPE	No	DWT	DELIV	\$M	OWNER OPERATOR	SHIPYARD	TYPE	No	DWT	DELIV	\$M
VESEL MANAGEMENT SERVICES	HALTER MARINE INC.	BARGE	1	20000	2	—	NIPPON EXPRESS	NAIKAI	RO-RO	2	4000	1	57
LALLOTIS	TSUNEISHI	BULK CARRIER	2	106000	2	—	G&G SHIPPING	SUN STATE MARINE	RO-RO	1	700	1	—
ROYAL MARITIME CORP	SANOYAS CORP.	BULK CARRIER	2	51800	2	40	EGE RORO	CANTIERI NAVALE VISENTINI	RO-RO	1	—	2	28.5
ITOCHU CORP	KAWASAKI H.I.	BULK CARRIER	1	50000	2	—	UK / GERMAN GOVT	FLENSBURGER	RO-RO	4	—	2	160
YASA	TSUNEISHI	BULK CARRIER	1	46495	2	—	UK / GERMAN GOVT	HARLAND & WOLFF	RO-RO	2	—	2	80
OLYMPIA MARITIME	SHIN-A SHIPBUILDING	BULK CARRIER	1	28200	2	15	UND RORO ISIETMELERI AS	FLENSBURGER	RO-RO	2	14200	2	—
NIPPON STEEL CORP.	mitsui	BULK CARRIER O.S.	1	184550	2	—	TRASMEDITERRANEA	ASTILLEROS ESPANOLAS (SEVILLA)	RO-RO / FERRY	1	—	2	—
DOUN KISEN	TSUNEISHI	BULK CARRIER O.S.	1	70000	1	—	NORTHLINK	FERGUSON SHIPBUILDERS	RO-RO/FERRY	1	—	2	29
COSCO	ONOMICHI	BULK CARRIER O.S.	2	52800	2	40	OTTO CANDIES	DE HOOP	SUPPORT VESSEL	1	—	1	—
JAPANESE INTERESTS	mitsui	BULK CARRIER O.S.	1	50000	2	—	GULF OFFSHORE NS	SOVIKNES VERFT	SUPPLY VESSEL	1	—	1	—
mitsui & CO.	mitsui	BULK CARRIER O.S.	1	50000	2	—	UK NAVY	APPLEDORE SHIPBUILDERS	SURVEY VESSEL	2	0	3-Feb	0
ORIENT MARITIME	mitsui	BULK CARRIER O.S.	1	50000	2	—	KRISTEN NAVIGATION	DAEWOO	TANKER	1	300000	3	76
NEPTUNE LINES	BARRERAS	CAR CARRIER	2	—	1	60	TANKERSKA PLOVIDBA	BRODOREMONT SPLIT	TANKER	2	160000	3	—
IRAN SHIPPING LINE	FLENDER WERFT	CONTAINER	2	26000	2-Jan	—	FRONTLINE	SASEBO	TANKER	2	160000	1	108
ANDHIKA GROUP	DAEWOO	CONTAINER	4	—	3	200	NEREUS	NKK CORP.	TANKER	1	149300	3	48
HANS PETERSON	GDYNIA	CONTAINER	1	—	2	—	SEAWORLD MANAGEMENT	TSUNEISHI	TANKER	2	106000	3-Feb	—
DELMAS	HANJIN	CONTAINER	3	—	2	75	GEDEN LINE	SAMHO NEW SHIPYARD	TANKER	2	105000	3-Feb	82
LEONHARDT & BLUMBERG	HANJIN	CONTAINER	2	—	2-Jan	—	SOPONATA	SUMITOMO	TANKER	2	105000	3-Feb	78
CUNARD	CHANTIERS DE L'ATLANTIQUE	CRUISE SHIP	1	—	3	780	SHIPPING CORP OF INDIA	COCHIN SHIPYARD	TANKER	1	83000	2	35
GRUMANT JOINT STOCK	KIMEK	FISHING	3	330	1	—	OAK MARITIME	DAEWOO	TANKER	2	300000	3-Feb	148
WJINNE & BARENDS	NIESTERN SANDER	GENERAL CARGO	4	2000	2-Jan	—	COSCO	DAEWOO	TANKER	2	300000	3-Feb	148
UKRRICHFLOT JOINT STOCK S.C.	OLTENITA SHIPYARD	GENERAL CARGO	3	—	2	—	BP AMOCO SHIPPING	NASSCO	TANKER	3	185000	3/4/05	210
ENZIAN SHIPPING	DAMEN SHIPYARDS	GENERAL CARGO	1	5000	0	—	ARCADIA SHIPMANAGEMENT	SAMHO NEW SHIPYARD	TANKER	1	165000	3	48
INTERSEE SCHIFAHRTS	DAMEN SHIPYARDS	GENERAL CARGO	1	9000	0	—	CENTROFIN MANAGEMENT	DAEWOO	TANKER	1	115000	1002	38.5
KAHN SCHEEPVAART	GALATZ	HEAVY-LIFT CARGO	2	10000	3	64	UNKNOWN	DAEWOO	TANKER	4	110000	3-Feb	154
SIBA	ULJANK	LIVESTOCK CARRIER	1	—	202	—	GREAT EASTERN SHIPPING CO	SAMSUNG	TANKER	1	105000	3	—
EXMAR	DAEWOO	LNG	1	—	—	—	GREAT EASTERN SHIPPING CO.	SAMHO NEW SHIPYARD	TANKER	1	105000	3	37
MISC	mitsubishi H.I.	LNG	1	68200	3	165	LMZ TRANSOIL	DAEWOO	TANKER	1	69000	2	—
TOKIO GAS	KAWASAKI H.I.	LNG	2	—	5-Mar	300	ANGLO EASTERN SHIP MGT.	BRODOSPLIT	TANKER	2	47500	3-Feb	—
BP AMOCO	SAMSUNG	LNG	2	75000	2	320	LAURIN MARITIME	TROGIR	TANKER	2	47000	3	60
mitsui O.S.K. LINES (MOL)	KAWASAKI H.I.	LNG	2	75000	5-Mar	—	QATAR SHIPPING CO	SHIN-A SHIPBUILDING	TANKER	2	37000	2	50
SHELL INTER./ STASCO	mitsubishi H.I.	LNG	2	67300	3-Feb	330	BOTTIGLIERI NAV	HYUNDAI MIPO	TANKER	2	35000	2	—
UNKNOWN	BALENCIAGA	LOGISTICS	1	800	1	—	BROSTROM	FERUS SMIT	TANKER	2	7000	—	—
CONSOLIDATED MARINE	HYUNDAI HEAVY INDUSTRIES (HHI)	LPG	2	50000	3-Feb	124	SIRIUS REDERI	CELUKTEKNE SANAYII	TANKER	1	5700	2	—
NAFTOMAR	NAMURA ZOSENSHO	LPG	1	—	1202	34	UNDISCLOSED INTERESTS	CELUKTEKNE SANAYII	TANKER	1	4000	1	—
NAFTOMAR	NAMURA ZOSENSHO	LPG	2	18000	2	—	DYNACOM	NKK CORP.	TANKER	1	—	3-Feb	50
I. M. SKAUGEN	ZHONGHUA SHIPYARD	LPG	4	8000	2	88	UGI AND NORDIC SHIPPING	SAMSUNG	TANKER	2	105000	3-Feb	96.3
US INTERESTS	HYUNDAI HEAVY INDUSTRIES (HHI)	LPG	1	—	3	60	J.O. TANKERS	KLEVEN FLORO	TANKER	1	37000	103	57
GEOGAS TRADING	KANDA SHIPBUILDING CO.	LPG	1	8000	2	—	GESCO	SAMHO NEW SHIPYARD	TANKER	1	105000	102	37
IINO KAIUN	NAMURA ZOSENSHO	LPG	1	—	2	—	NORDEN	SUMITOMO	TANKER	1	105300	1101	37.5
UNKNOWN	SHITANOE ZOSEN	LPG	1	3678	0	—	FORTUM OIL & GAS	SUMITOMO	TANKER	2	106000	2	80
IINO KAIUN	KAWASAKI H.I.	LPG	1	48000	3	—	INTL. MARITIME AGENCIES	DAEWOO	TANKER	1	300000	2	84
NAFTOMAR	NAMURA ZOSENSHO	LPG	1	—	—	—	STELMAR TANKERS	DAEWOO	TANKER	4	70000	2	128
DANISH INTERESTS	EOS	MISCELLANEOUS	1	—	1	—	TURKISH INTERESTS	GELBOLU GEMI	TANKER	1	7000	1	—
FLINTER GRONINGEN	FERUS SMIT	MULTI-PURPOSE	2	9000	2-Jan	—	NIPPON YUSEN KAISA (NYK)	ISHIKAWAJIMA HARIMA H.I.	TANKER	2	280000	2	—
mitsui O.S.K. LINES (MOL)	SHIN KURUSHIMA	MULTI-PURPOSE	2	8500	2-Jan	—	KNUTSEN OAS SHIPPING	NAVAL GUON	TANKER	1	35800	2	41.2
SCHOELLER HOLDINGS	XIAMEN	MULTI-PURPOSE	2	34000	3-Feb	50	TOKIO TANKER	NKK CORP.	TANKER	1	120000	502	46.5
COLUMBIA SHIPMANAGEMENT	XIAMEN	MULTI-PURPOSE	2	—	2	—	STAR TANKER	SAMHO NEW SHIPYARD	TANKER	1	300000	2	71
WAGENBORG SHIPPING BV	BODEWES VOLHARDING	MULTI-PURPOSE	2	9600	1	—	EURONAV AGENCIES	DAEWOO	TANKER	2	300000	3-Feb	146
GRAIG SHIPPING	ZHONGHUA SHIPYARD	MULTI-PURPOSE	3	—	00/01	—	NIARCHOS	DAEWOO	TANKER	1	300000	2	71
GRAIG SHIPPING	ZHONGHUA SHIPYARD	MULTI-PURPOSE	1	—	—	—	DSD	DALIAN SHIPYARD	TANKER	1	110000	2	—
SCHOELLER HOLDINGS	DALIAN SHIPYARD	MULTI-PURPOSE	2	34000	3-Feb	50	D'AMATO	SHIN-A SHIPBUILDING	TANKER	2	37000	3-Feb	48
COLUMBIA SHIPMANAGEMENT	DALIAN SHIPYARD	MULTI-PURPOSE	2	—	3-Feb	59	FULLSHIP SRL	SHIN-A SHIPBUILDING	TANKER	3	37000	2	72
INTERSHIP NAV.	CHENGXI SHIPYARD	MULTI-PURPOSE	1	8000	1	—	NIPPON YUSEN KAISA (NYK)	HITACHI ZOSEN	TANKER	1	300000	2	73
GOLDEN GATE BRIDGE DISTRICT	NICHOLS	PASS/FERRY	1	—	1	8.5	NIPPON YUSEN KAISA (NYK)	NKK CORP.	TANKER	1	300000	2	73
US INTERESTS	NICHOLS	PASS/FERRY	1	—	1	—	MOLIVA DENIZCILIK	YARDIMCI	TANKER	1	10000	1	—
NEW YORK FAST FERRY SERV.	DERECKTOR SY.	PASSENGER / FERRY	2	—	1	10.5	FAFALIOS SHIPPING	ARIAKE	TANKER	2	75000	1	48
NEW WORLD SHIPPING	DAMEN SHIPYARDS	PASSENGER / FERRY	1	—	1	—	KYKLADES MARITIME	NKK CORP.	TANKER	2	150000	3-Feb	94
NEW WORLD SHIPPING	GDANSK	PASSENGER / FERRY	1	—	1	—	JAPANESE INTERESTS	KURINOURA	TANKER	1	4999	—	—
STENA LINE	HYUNDAI MIPO	PASSENGER / RO-RO	1	—	3	—	HELLESPOINT	DAEWOO	TANKER	1	440000	902	87.5
STENA RO-RO	HYUNDAI HEAVY INDUSTRIES (HHI)	PASSENGER / RO-RO	1	—	2	70	MOSVOLD FARSUND	SAMSUNG	TANKER	1	308000	3	74.1
NORTHLINK	AKER FINNYARDS	PASSENGER / VEHICLE FERRY	2	—	2	102	EUROCEANICA	SAMSUNG	TANKER	1	155000	3	43
WESTERN FERRIES	FERGUSON SHIPBUILDERS	PASSENGER / VEHICLE/FERRY	1	—	1	—	SCINICARIELLO AUGUSTEA	NAMURA ZOSENSHO	TANKER	1	105000	2	—
UK MINISTRY OF DEFENCE	MCTAY MARINE	PASSENGER / VEHICLE/FERRY	1	—	1	5.8	TEMAR DENIZCILIK	DEARSAN	TANKER	1	6573	1	—
UNKNOWN	AUSTAL SHIPS	PASSENGER / VEHICLE/FERRY	1	—	1	—	GEDEN LINE	HYUNDAI MIPO	TANKER	2	37000	3	48
HARDESHOJ-BALLEBRO	ASSENS SKIBSVAERFT A/S	PASSENGER / VEHICLE/FERRY	1	—	1	3.4	LMZ TRANSOIL	SAMSUNG	TANKER	1	285000	3	71.5
BALEARIA	CANTIERI NAVALE RODRIQUEZ	PASSENGER / VEHICLE/FERRY	1	—	1	45	ARCADIA SHIPMANAGEMENT	HYUNDAI HEAVY INDUSTRIES	TANKER	1	165000	2	45
KYUETSU FERRY	mitsubishi H.I.	PASSENGER / VEHICLE/FERRY	2	—	1	80	ARCADIA SHIPMANAGEMENT	HYUNDAI HEAVY INDUSTRIES	TANKER	1	165000	2	45
KAWASAKI KISEN KAISA (K-LINE)	USUKI	PCTC	2	8000	1	—	GLAFKI MARITIME	NKK CORP.	TANKER	2	150100	3-Feb	96
JAYA HOLDINGS	JAYA SHIPBUILDING	PLATFORM SUPPLY VESSEL	1	—	1	—	CHINA CHANGJIANG SHPG	BOHAI SHIPYARD	TANKER	2	46000	2	—
OLYMPIC SHIPPING	ULSTEIN VERFT	PLATFORM SUPPLY VESSEL	1	—	1	34.42	TORM A/S	DAEDONG SHIPBUILDING	TANKER	2	46000	2	—
HORNBECK OFFSHORE	LEEVAC SHIPYARDS	PLATFORM SUPPLY VESSEL	2	—	1	—	SINCERE NAVIGATION	DAEWOO	TANKER	1	105000	2	34
UGELSTAD REDERI	BREVIK MARINE	PLATFORM SUPPLY VESSEL	1	—	501	13.7	DAITOH TRADING CO.	FUKUOKA SHIPBUILDING	TANKER	1	12300	1	—
NANJING CHANGJIANG	BOHAI SHIPYARD	PRODUCT CARRIER	2	46000	2	56	BERK DENIZCILIK	SEDEF GEMI	TANKER	1	5000	1	—
BYZANTINE	3 MAJ	PRODUCTS TANKER	2	47000	2	56	UNKNOWN	SEI AH SHIPYARD	TANKER	1	6500	1	—
JAPANESE INTERESTS	ONOMICHI	PRODUCTS TANKER	1	46500	2	—	UNKNOWN	SEI AH SHIPYARD	TANKER	1	2000	1	—
CTGM	DAEDONG SHIPBUILDING	PRODUCTS TANKER	4	45000	3	112	COSCO	BOHAI SHIPYARD	TANKER	1	150000	2	—
ALBACORA	BARRERAS	REEFER	1	7000	1	—	NORDEN AS	DAEDONG SHIPBUILDING	TANKER	2	35000	2	49
GERMAN GOVERNMENT	THYSSEN NORDSEEWERKE	RESEARCH	1	3500	2	—	VELA INTERNATIONAL MARINE	HYUNDAI HEAVY INDUSTRIES	TANKER	4	300000	3-Feb	340
UNDISCLOSED INTERESTS	DAMEN SHIPYARDS	RESEARCH	1	—	1	—	W.WIDE	DAEWOO	TANKER	1	300000	3	72.5
UNKNOWN	MERWEDE SHIPYARD	RIVER CRUISESHIP	1	—	1	—	VESEL MANAGEMENT SERVICES	HALTER MOSS POINT	TUG	1	20000	2	—

Contracts

Bollinger To Build Two Liftboats For Cardinal Services

Bollinger Shipyards, Lockport, La., has signed a contract to build two 245-ft. (74.6 m) class liftboats for Cardinal Services, a subsidiary of Superior Energy Services, Inc., Harvey, La. Construc-

tion will begin at Bollinger Marine Fabricators, Inc., Amelia, La. this month with deliveries scheduled for February 2002 and June 2002.

The liftboats, which will be able to operate in water depths of up to 180-ft., will expand Superior's fleet from 49 to 51. Superior owns and operates the

largest and most diverse liftboat fleet in the world.

The 245-ft. (74.6 m) class liftboats will be 141 ft. (42.9 m), with molded hulls of 67 ft. (20.4 m) and hull depths of 13 ft. (3.9 m). Their 6,550 sq. ft. deck capacities will be more than one million lbs. each and the liftboats will have the

longest leg lengths and largest cranes of any conventional liftboat in service today. Jacking will be provided by completely closed loop hydraulic systems. Each of their two cranes will have capacities of 150 tons and 30 tons. Each will have air-conditioned accommodations for 42.

The self-propelled 245's will each be powered by two Caterpillar 3512 diesel engines driving through Twin Disc reverse/reduction gears. Electrical power will be supplied by two 150 KW generator sets of 480 volts, three phase, 60 HZ with one main switchboard and one remote.

The new liftboats have been designed for domestic (Gulf of Mexico from U. S. ports) services only. They will be USCG certified Subchapter L with an ABS loadline.

"These liftboats will be the largest of their kind serving the oil and gas industry," said **Terry Hall**, president and CEO of Superior Energy Services.

"We will have the flexibility to put on these liftboats large spreads of our production-enhancing equipment, including mechanical wireline units, coiled tubing units, electric line units, pumping and stimulation equipment and hydraulic workover units (from recently acquired ISS).

Providing multiple production-related services from a single liftboat differentiates Superior from the others because we can improve scheduling, logistics and overall project efficiency for our customers. These additional liftboats will enhance our ability to further improve project efficiencies and provide complementary well services to oil and gas producers worldwide."

Rolls-Royce Wins \$3.1 Million Contract

Rolls-Royce has landed a \$3.1 million order from Ferguson Shipbuilders in Port Glasgow for an equipment package comprised of Rauma Brattvaag deck machinery, bulk handling systems and Tenford steering gear and rudders.

The package has been ordered for a new 246 ft. (75 m) Stirling Shipping anchor handling tug-supply vessel (AHTS), which will be an enhanced version of M/V Stirling Iona, which was delivered by Ferguson earlier this year.

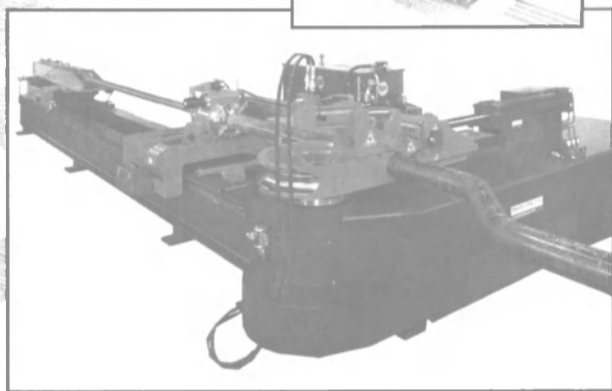
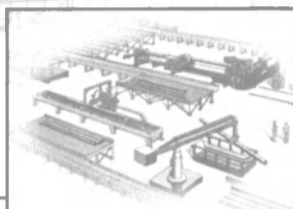
The new AHTS will house an anchor handling and towing winch with a capacity of 380-tons pull; the winch will be the largest ever fitted to a U.K.-built ship by Brattvaag.

The 2,350-gt, dynamic positioning state-of-the-art outfitted vessel is scheduled to be delivered during February 2002.

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Cruise Shipping Prospects

New Deliveries, Consolidation Drive Cruise Industry

As the world's two major cruise lines, Carnival and Royal Caribbean International, wage a continual battle to increase market share and draw additional passengers, the real war is waged in the board rooms of these and all other major cruise companies to increase revenue per passenger and decrease discounting. A record number of new ships and a sluggish North American economy prompting fare cutting, and cruise lines are fighting to maintain buoyant bottom lines. A recent report from Lazard Freres helps to shed some light on the economic strength of the cruise majors.

While Lazard Freres is revising its fourth quarter EPS estimate for Carnival Corp. (CCL) to \$0.38 from \$0.42, the downgrade takes into account weaker operating results at Airtours and the benefit of a lower tax rate for Costa Cruises. CCL recently purchased Italy-based Costa.

The low Airtours returns, combined with restructuring charges have Lazard's analysts predicting that CCL's 4Q EPS is expected to hit \$0.05. In more certain terms, Airtours specified that its German tour operator, Frosch Touristik (FTi) would incur losses during the fourth quarter that would be \$28.7 million higher than anticipated. The company also expressed that it plans to take a \$129.3 reorganization charge. Airtours will also recognize a \$337.6 million gain on the sale of its remaining interest in Costa to CCL. Despite this, CCL reported that it would take into consideration this gain in its equity accounting of Airtours' fourth quarter earnings. It is estimated that these unfavorable variants at Airtours are to have an impact of \$0.09 per share to Carnival in the fourth quarter. However, the cruise line decided that it would recognize a non-cash gain of approximately \$0.04 per share due to the reduction of Costa's net deferred tax liabilities, resulting from the reduced tax rate that went into effect upon registering Costa's fleet within the Italian International Ship Registry.

With a reported F2000 EPS Estimate Cut to \$1.63 from \$1.67, Lazard reports that CCL remains a sound investment in the midst of a rocky industry environment. While analysts do not foresee signs of improved pricing (the company's stock has see-sawed between \$20 and \$25 three times in the past six months), it is believed that increasing pressure on smaller competitors could continue the ongoing spurt of industry consolidation, which would benefit CCL's advantage on a long-term basis.

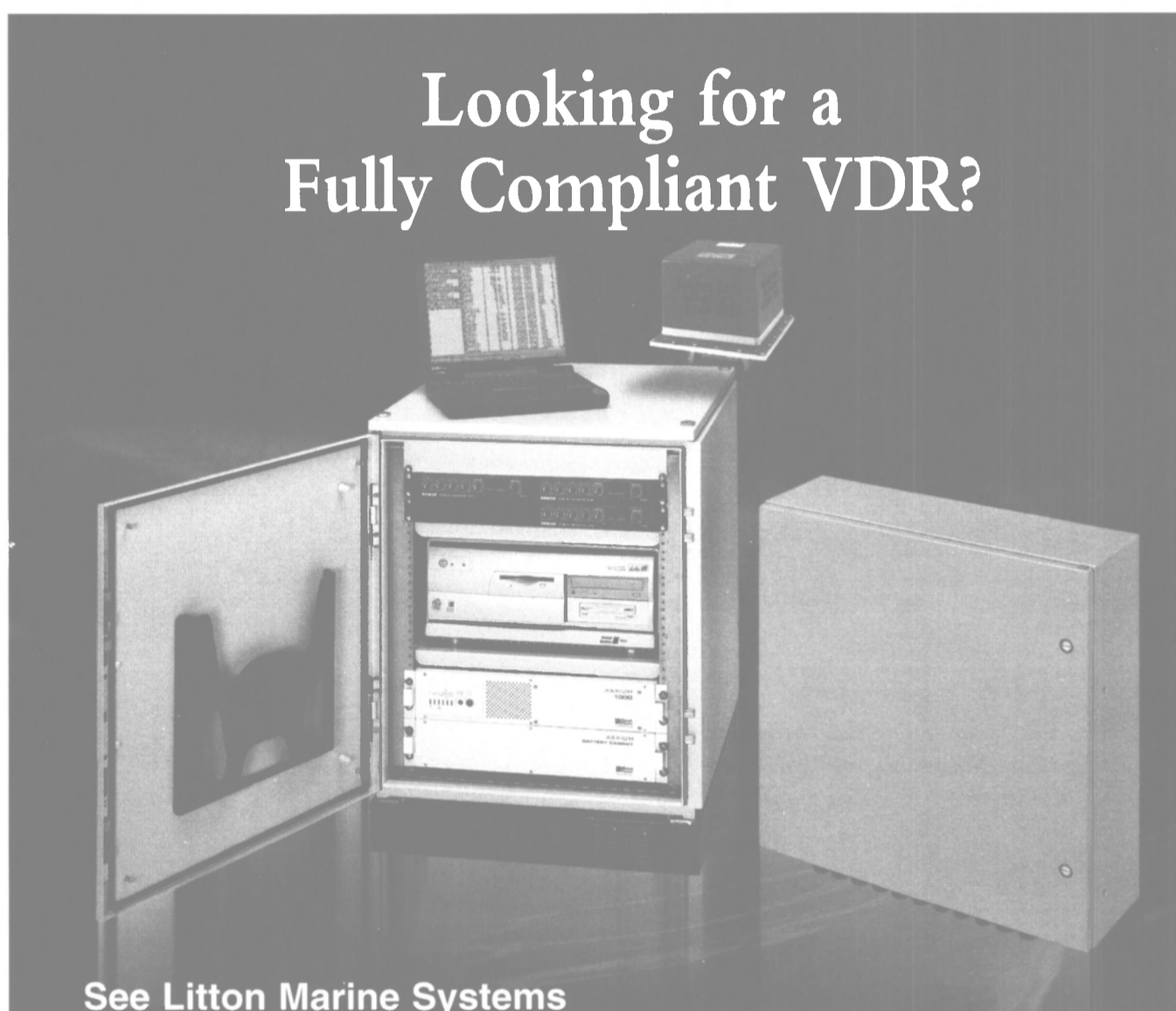
This prediction, coupled with the company's F2001 estimate currently standing at \$1.73, has led Lazard to maintain its Outperform rating for CCL.

Royal Caribbean (RCL) reported, on October 18, its third quarter EPS at

\$1.04 — up 13 percent from \$.92 one year ago. This growth is driven by an 18 percent increase in capacity, subsequent to the line's premiere vessel of the new Eagle Class series, Voyager of the Seas, which was introduced last November. A

firm contributor to the company's growth is its subsidiary company, Celebrity Cruise Lines, which has come through with the successful debut of Millennium, the first member of the line's new ships series that bears the same name. Introduced this past summer, the vessel is a firm contributor in the company's 109.7 percent capacity

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Cruise Shipping Prospects

increase — up approximately one percent from last year.

Despite these positive returns, RCL's yield has dipped slightly with a net decline of one percent in the third quarter, and its air/sea mixture lowered to 23 percent from 27 percent this time last year. Lazard has predicted that there is no relief for the yield decline in the near future, with fourth quarter yields expected to be down four to five percent — due to lower pricing in newly introduced short itineraries.

While its yields may be diving, RCL should concentrate its sights on the coming year, as analysts have predicted that it will be an important one for the cruise company. It plans to expand its fleet by 20 percent and will implement a \$2.1 billion Capex program.

On a quarterly basis, RCL is expected to grow by 14 percent, 30 percent, 20 percent and 18 percent in the first through fourth, respectively. Despite Lazard's yield predictions for 2001, RCL's management noted that it was too premature to comment on yield outlook for the coming year, they did however indicate the persistence of pricing pressure during the first quarter 2001. The company expects that yields will be down six percent in that period, specifically due to difficult comps with first quarter 2000, which benefited from Millennium's sailings. Booking levels for 2001 have remained at the same level they were in 1999. Management noted that it was holding back some capacity on the much-in-demand new releases, such as Voyager, Explorer and Millennium. Lazard has lowered RCL's EPS estimate to \$2.30 from \$2.47, most likely taking into consideration that higher fuels costs are expected to have a \$0.01-\$0.02 per quarter impact — assuming that bunker prices remain at current levels. Analysts have therefore rated RCL as Hold.

Cruise Lines Agree To Install Local Smoke Alarms

The 16 members of the International Council of Cruise Lines (ICCL) have unanimously decided to install audible local smoke alarms on all of their ships. The installation of the alarms, which comes in response to a recommendation by the National Transportation Safety Board (NTSB), calls for the new detectors and alarms to sound in passenger and crew cabins and adjoining corridors. They will be implemented in addition to the already present smoke alarms that are required by international SOLAS (Safety Of Life At Sea) regulations.

Michael Crye, ICCL president, commented that particular attention must be given to prevent audible alarms from rendering the public address system.

December, 2000

American Hawaii Names Master Of S.S. Independence

American Hawaii Cruises has named Captain **Evans W. Hoyt** master of the S.S. Independence, which sails to five major ports on four Hawaiian Islands every seven days with room for 860 passengers.



Most recently, he was master of the MV SP5 Eric Gibson for

Hoyt's 18 years of maritime experience includes officer positions aboard several ocean-going cruise, cargo, and military vessels.

Osprey Ship Management. From 1992 to 1999, he commanded ships for Crowley American Transport, carrying cargo for U.S. and U.N. armed forces. From 1991 to 1992, he was a chief mate for Star Clipper, Inc., and in 1990, at the age of 29, he performed his first deep-sea command, aboard the S.S. Gulf Trader during the Gulf War.

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Cruise Shipping Prospects

Radiance Of The Seas Departs Building Dock

Following extensive dock trials, Royal Caribbean's 88,000-gt Radiance of the Seas departed the covered building dock at Meyer Werft's Papenburg shipyard. The vessel was then towed to the fitting-out quay for further completion of the

interior, precedent to its sea trials, which are scheduled for January.

The first of a four-part vessel series built by Meyer Werft for RCCL, Radiance of the Seas measures 962 ft. (293.2 m) with a breadth of 106 ft. (32.2 m). With its top service speed of more than 24 knots, the vessel can accommodate up to 2,500 passengers in 1,050 cabins;

850 crewmembers.

Propelled via two 20 MW azipods, the vessel is the first of its kind to house a combination gas and steam turbine power package.

The vessel is scheduled for a spring 2001 delivery.

Circle 31 on Reader Service Card



Main Particulars - Radiance of the Seas	
Classification	Det Norske Veritas
Length, (o.a.)	962 ft. (293.2 m)
Breadth, (molded)	106 ft. (32.2 m)
Draft	26 ft. (8.1 m)
GT	88,000
DWT	8,900 tons
Speed	24 knots
Propulsion	Pod drives
Propulsive power	2 x 20,000 kW
Passengers	2,100
Crew	858

Crystal Cruises Finalizes Letter Of Intent

NYK, Crystal Cruises' parent company, has signed a Letter of Intent with Chantiers de l'Atlantique for the construction of a new 68,000-ton, 1,800 passenger cruise ship to be completed in 2003.

The vessel, which is yet to be named, is expected to increase Crystal's capacity by approximately 60 percent. It will boast environmentally safe diesel engines with azimuthing podded propulsion system for greater maneuverability.

Delta Queen Coastal Voyages Launches Second Ship


Just five months after the shipyard launch of Delta Queen Coastal Voyages' first vessel, the second ship in the new fleet was christened at Atlantic Marine, Inc., in Jacksonville, Fla., Friday, November 17, 2000.



CV Cape Cod Light will debut on August 4, 2001

The 226-passenger coastal vessel will inaugurate nine cruise itineraries featuring the Great Lakes, Canadian Maritime Provinces and U.S. eastern seaboard in 2001.

The CV Cape Cod Light, will debut Aug. 4, 2001; its sister ship, CV Cape May Light, will enter service on May 5, 2001.



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Circle 260 on Reader Service Card

Cruise Shipping Prospects

GE Marine Engines' Gas Turbines To Be Used On Princess Newbuilds

GE Marine Engines will install LM2500+ aeroderivative gas turbines in Combined Diesel And Gas (CODAG) turbine configurations on four Grand Princess-class cruise ships currently on order from Princess Cruises.

One LM2500+ gas turbine will be used on each vessel in conjunction with medium-speed diesel engine-driven alternators.

Mitsubishi Heavy Industries Ltd. (MHI) will construct two 113,000-ton cruise ships at its Nagasaki, Japan shipyard. Each ship will use four diesel engine-drive alternators. Chantiers de l'Atlantique will build two 88,000-ton vessels at its facilities in Saint Nazaire, France, each of which will use two diesel engine-driven alternators.

The Mitsubishi-constructed vessels are the largest cruise ships ever ordered by Princess and the first to be commissioned from MHI. All four Grand Princess-class ships are part of a five-year expansion program that will see the Princess fleet grow to include 14 ships carrying more than 1.5 million passengers annually.

According to Princess Cruises, the diesel and gas turbine propulsion arrangement employs environmentally sound technology that supports their ongoing commitment to this important issue. At the same time, this design incorporates better space usage through installation of the gas turbine in the funnel area of the ships, thereby enabling an even wider range of public rooms and onboard facilities to be introduced.

Circle 65 on Reader Service Card

Grandeur of the Seas Docked In Curacao After Power Outage

Royal Caribbean's cruise ship, Grandeur of the Seas, was docked in the port of Willemstad, Curacao, after experiencing a loss of electrical power on October 31. Within hours, all air conditioning, lighting and plumbing functions were fully restored.

French Yard Tapped To Build \$780M Queen Mary 2



The most recent rendering of Cunard's Queen Mary 2 was unveiled at a press conference in London last month.

At 1,132 ft. (345 m) and 17 decks high, the vessel will stretch nearly four football fields in length with a height equal to a 23-story building.

Queen Mary 2 will also have a beam of 135 ft. (41.1 m), making it the longest and widest passenger ship ever constructed. Its unprecedented size provides for the widest variety of modern amenities and facilities aboard any ocean-going vessel.

The vessel's numerous technological advancements will include a Mermaid podded propulsion system comprised of two fixed and two rotating units allowing for easy maneuverability, along with a diesel and gas turbine power plant capable of creating 157,000-hp, which will enable the ship to sail at 30 knots, significantly faster than other cruise ships.

Queen Mary 2 will have 1,310 staterooms, nearly three-quarters of which will feature a private balcony. More than 90 suites, including six penthouses offering private butler and concierge service, and five 1,650-square-foot "duplex apartments."

According to **Jack Williams**, Royal Caribbean's president, all 2,040 guests and 842 crew members were kept safe and out of harm's way throughout the repair process.

Once the electrical problem was resolved, the ship was expected to remain on its original itinerary, which included a day at sea Wednesday, November 1.

The electrical problem appeared to be related to a component in an electronic board, and it was reported that it was fixed in a minimal amount of time.

The correction returned power to the ship's propulsion system, the last area of the ship needing its electricity restored.

Solar Solve Installs Sunscreens On Award Winning Vessel

Solar Solve Marine, which has enjoyed high success in the cruise market, has installed its Solasolv anti-glare sunscreens at the wheelhouse windows of P&O Nedlloyd's Southampton, which recently received the 1999 Ship of the Year Associated Award from the Society of Naval Architects Japan (SNAJ).

The 984 x 140 ft. (300 x 42.8 m) VLCC, which was built by Ishikawajima-Harima Heavy Industries in 1998, is outfitted with 26 Solasafe sunscreens.

Circle 50 on Reader Service Card

Carnival Pride's Homebase To Be Port Canaveral

Carnival Cruise Lines will position its new 86,000-ton Carnival Pride on year-round alternating seven-day eastern and western Caribbean departures from Port Canaveral, Fla., beginning in January 2002.

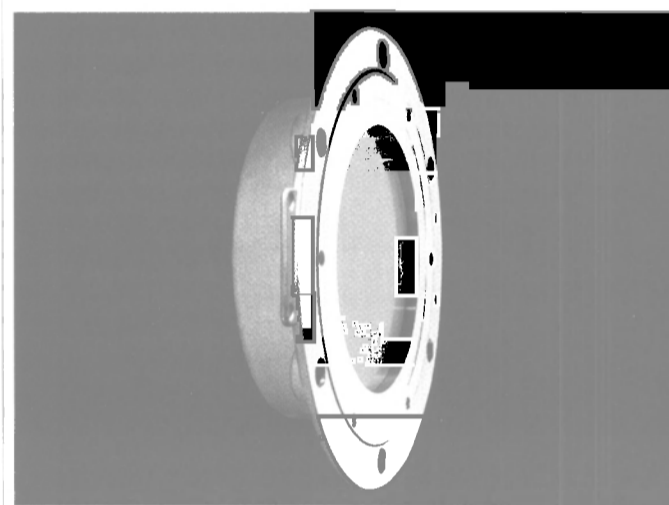
Carnival Pride will offer the only western Caribbean cruise program departing from Port Canaveral.

It will feature two ports rarely offered on cruise itineraries — Belize City, Belize; and

Progreso/Merida, Mexico. The 960-ft. (292.6 m) Carnival Pride will kick off its seven-day Port Canaveral-based schedule with an eastern Caribbean voyage departing Jan. 12, 2002; the first western Caribbean sailing will depart Jan. 19, 2002.

Currently under construction at the Kvaerner Masa-Yards in Helsinki, Finland, the 2,124-passenger Carnival Pride will be the second in the line's Spirit Class.

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Cruise Shipping Prospects

Royal Caribbean Crew Honored For Rescue At Sea

The crew of Royal Caribbean International's Splendour of the Seas was honored for its heroic efforts in rescuing 11 crew members of a sunken cargo ship in stormy seas.

The crew received the New York

Council Navy League's AMVER Award (Automated Mutual-Assistance Vessel Rescue System) at the League's anniversary dinner in New York. Splendour of the Seas is the first cruise ship to receive this award, presented only in those years when a rescue at sea of appropriate significance takes place.

The award, which was accepted by

Tor Isak Olsen, captain of Splendour of the Seas, commends a rescue effort on December 16, 1999, after the 250-ft. (76.2 m) cargo ship, Capricorn, was overtaken by a storm approximately 90 miles northwest of Aruba. Its 12-man crew was forced to abandon Capricorn as it sank in 30-knot winds and 10-ft. seas.



RCCL's Splendour of the Seas was utilized to rescue crewmembers of a sunken cargo ship.

During those events, the U.S. Coast Guard received distress calls and automated distress signals from an unknown vessel — later found to be Capricorn. Unsuccessful attempts were made to contact the nearest ship in the area. At the same time, the crew of Splendour of the Seas, sailing in the area, saw flares shooting over the horizon and immediately sailed in their direction. Within 30 minutes, Splendour came upon two liferafts holding 11 members of the Capricorn crew, at which time the Splendour crew safely managed to guide them onto the ship.

Manpower Software Steams Ahead With Sun Cruises

Sun Cruises has signed a contract for onboard security measures by using Manpower Software (MSW) MAPS Souls-on-Board solution.

The cruise line will be utilizing two MAPS software modules — Souls-on-Board and Passenger Check-in-Desk. Souls-on-Board, which is also in operation on P&O Cruises' fleet, ensures compliance with MSN 1729(M), and will enable Sun Cruises to know exactly who is on-board their entire fleet at any moment in time. In addition, it will provide Access Control to ensure only authorized people are allowed on the ships — monitoring passengers, crew, visitors and contractors.

The Passenger Check-in-Desk will allow Sun Cruises to easily and quickly capture the passport and personal details of its passengers.

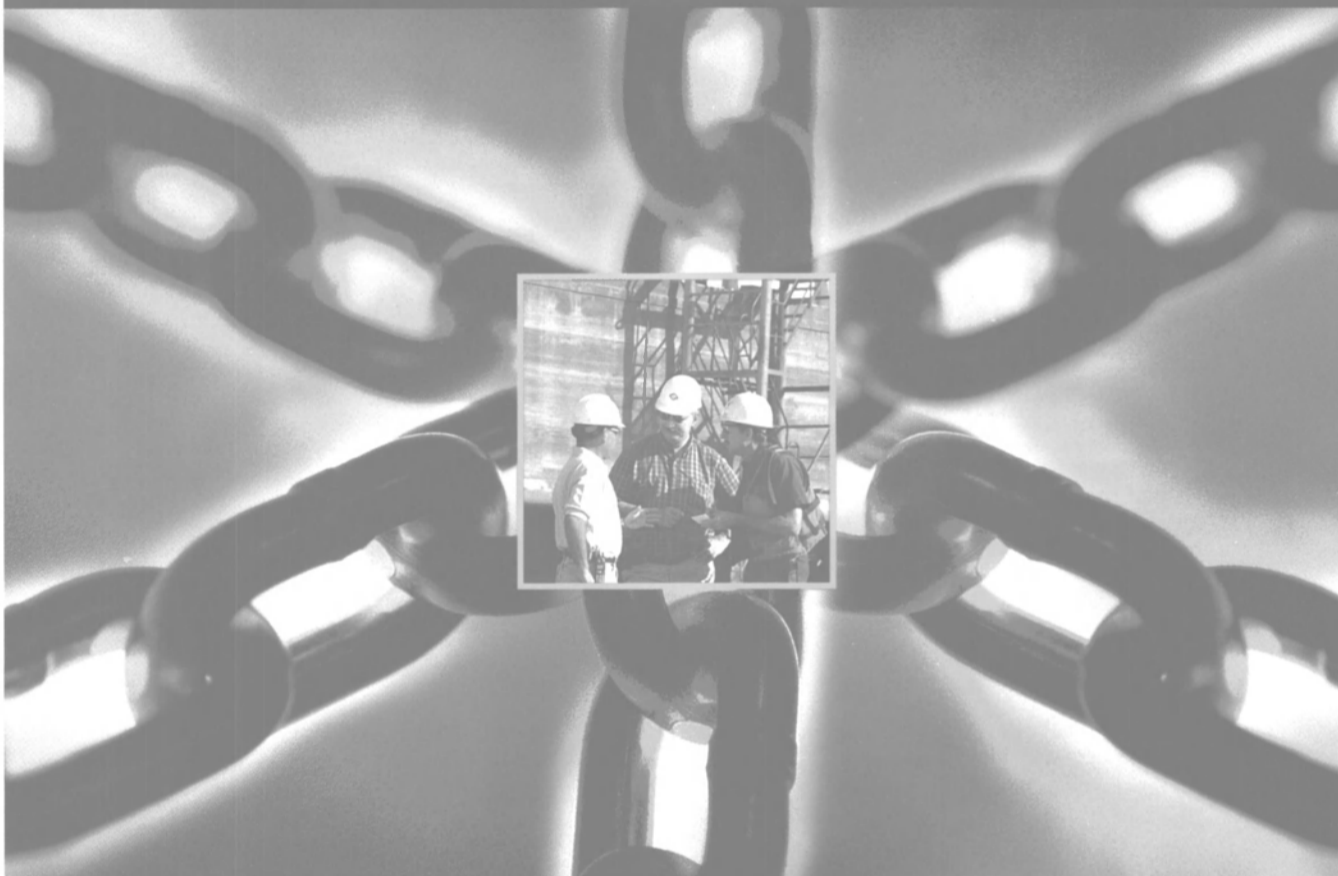
Circle 30 on Reader Service Card

AMCV Appoints Director Of Shipboard Systems

American Classic Voyages (AMCV) has named **David J. Lehman** director of shipboard systems, responsible for delivering all related commercial systems for AMCV's fleet.

Lehman, who has 16 years of experience in the information technology industry, will focus on providing strategic solutions that will enable the onboard business units to offer the utmost in service levels. He had previously been with Royal Caribbean Cruises as a software development manager.

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Excellence in Safety award for the *sixth* consecutive time. *Locations* — Facilities in the Houston Ship Channel and in Galveston are ideally located near Gulf of Mexico petroleum operations, inland barge fleets and one of the busiest shipping ports in the U.S.

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Company Profile

History Repeats Itself In the "City of Brotherly Love"

A new development within the realm of U.S. Shipbuilding — the new Kvaerner Philadelphia Shipyard (KPSI) is poised to be one of the most efficiently outfitted commercial shipyards in the world. The shipbuilding company, which occupies approximately 114 acres on what used to be the Philadelphia Naval Shipyard, utilizes a section of the former Naval yard, which was closed down in 1996 by the U.S. Government due to lack of funds. Further revitalizing this historical landmark, was KPSI's decision to utilize the yard's original drydocks that date back to WWII. But the facility is hardly stuck in the 1940s as it boasts a full array of modern shipbuilding technology and systems. Recently, **Ron McAlear**, hailing from Litton Avondale and a U.S. shipbuilding leader for decades, was tapped to lead the new yard to commercial success. Complete with a network of competitive suppliers, this offers the yard the potential to reach the level of achievement that matches the current status of its Finnish and German sister-yards.

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

Driving up to the front entrance of Kvaerner Philadelphia Shipyard, one is engulfed by not only the size of the yard's new facilities, but by the history that is surrounding the foundation on where the yard is built. The land on which KPSI sits, once occupied the Philadelphia Naval Shipyard that had its heyday during WWII — it constructed a variety of vessels for U.S. Defense, subsequent to the attack on Pearl Harbor, which officially marked U.S. entry into the War. These activities are literally just history and a new generation of U.S. shipbuilding is about to begin, not for defense, but for transportation purposes, specifically the domestic U.S. cargo ship market.

KPSI will focus on design, hull construction and partnering in outfitting at its new yard. In fact, the yard is already in the process of constructing a containership with an overall length of 712 ft. (217 m) and beam of 106 ft. (32.2 m). Able to hold a capacity of 2,600 TEUs at a speed of 22.7 knots, the vessel, which is simply called Ship 001 as of press time — does not have a cur-

rent owner. However, KPSI executives are confident that a potential buyer will emerge in the near future — and not just to purchase the containership. It was confirmed by shipyard executives that the yard is for sale as well.

Its little secret is that KPSI's parent company, Kvaerner, has been selling off its international shipbuilding assets since April 1999, and to date, has sold nine of its operating yards worldwide. Prior to this, a decision had been made in 1997 to establish the KPSI operation — with yard construction commencing the following year. This of course, all occurred prior to Kvaerner's decision to start selling off. How does this effect the Philadelphia yard? According to **Eero Mäkinen**, presently senior vice president sales and marketing for Kvaerner Masa-Yards, "operations were not effected by this decision."

He continued that although the Philadelphia Shipyard Development Corp. (PSDC) was concerned about the selling of the yards, it was not something that was of great concern, specifically since Kvaerner's main Masa-yards facilities in Finland are here to stay — the yard is filled to capacity with cruise ship jobs throughout the next few years making it one of the busiest and lucrative yards worldwide.

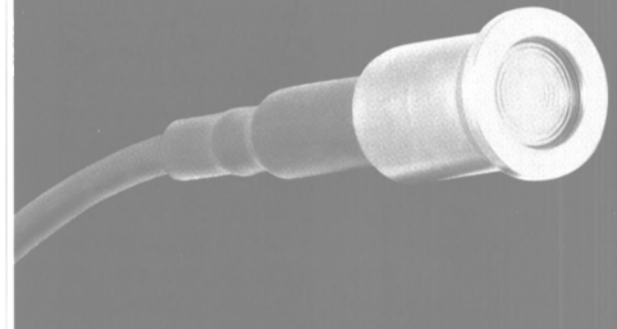
Another factor that comes into play is that KPSI does not actually own the facility — it is on long-term lease from PSDC. Owned by the State of Pennsylvania, City of Philadelphia and the Delaware River Port Authority, PSDC has not only overseen the design and construction of the yard, but is also facilitating the workforce training during the early years of the yard's operation. To date, \$430 million of public grants have been designated for these functions.

Training Produces Quality Results

On a recent visit to KPSI, *MR/EN* toured the central function of the yard — its fabrication

shop, which is housed in a large blue and silver building surrounded by the Delaware and Schuylkill Rivers. While the yard does contain a grand block shop, paint

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Company Profile



shop, executive offices, and building and outfitting docks, the fabrication shop marks the commencement of a vessel being taken from paper to reality.

Occupying 428,000 sq. ft., (approximately the size of 7.5 football fields) the fabrication shop is currently home to more than 200 KPSI workers, who will fabricate steel plate and profile components, prepare pipe and equipment modules and assemble ship sections up to 300 tons. In addition, the grand block shop measures 85,000 sq. ft. and two paint shops are each capable of holding a 600-ton grand block. A gantry crane that can lift 660 tons and two 50-ton cranes serve the graving dock — in addition to a pair of two heavy lift transports with a capacity of 420 tons each.

The yard also holds an intermediate 1,000 x 150 ft. (335 x 45 m) drydock (a piece of the original Navy yard), which has an intermediate gate and skidding system allowing for simultaneous assembly of two hulls. Furthering its commitment to advanced technology, much of KPSI's production will be completed by robotic devices, such as automatic welding equipment that includes an off-line robot welding system. Its benefit is that it can perform difficult welding tasks that may be difficult for a welder to reach - not to mention a precision that could be surpassed by even the most experienced welder.

Even though the yard is forging ahead into the new millennium by embracing new robotic technology, this does not mean that it will balk at hiring skilled workers to construct vessels. In fact, KPSI, which as of December 2000, employs approximately 385 workers — expects to hold approximately 970 individuals (including management and production) in active employment by this time next year. The yard has held a series of job

fairs where potential workers who possess the skills that the yard is looking for can apply on-site for a variety of production positions.

At press time, KPSI was averaging a total of 25 new hires a week from these fairs. Many who apply are either former employees of the Naval Shipyard, and all must have prior experience. The bottom line is that all must be willing to undergo Kvaerner's rigorous training program, which commences upon hiring. Similar to the same process that workers at the Masa and Warnow yards undergo, the program begins with a 12 week course that covers welding, outfitting, pipe welding and machine operation — followed by two additional four week sessions. The total process lasts approximately 22 weeks or five months, which may seem lengthy, but according to **Pertti Rinta-Pantilla**, vice president, Production, "The length of training is long, but workers are released to production quite soon after training," he said. "From European standards this time frame (five-six months) is the standard amount of time to train welders and outfitters."

McAlear Takes the Helm

Shortly before press time, Kvaerner announced that it had elected **Ron McAlear** to head the new KPSI venture as president and CEO. McAlear, who has been an intricate part of the U.S. shipbuilding industry, most recently as vice president of Operations at Litton Avondale Industries, had been following the KPSI project from the very beginning. These two components melded together, prompted Kvaerner to call upon McAlear in September to discuss the head position at the yard. Excited at the prospect of leading this yard was something that McAlear wanted to pursue, and after several exchanges between him and Kvaerner executives, there was no doubt that he shared KPSI's vision — establishing it as the leading commercial shipyard in the U.S.

A firm believer in teamwork and, "open and honest communication among employees," McAlear can't stress enough that these are the core ingredients for achieving the yard's goal of becoming number one.

"A successful operation is built by the people involved...Everyone is a part of it and has a role to play to produce a quality product," McAlear said.

He is also committed to operating a safe yard, in fact, he cites this as something that is high on his list of priorities. "Safety is number one," McAlear said. "A safe yard is a good yard — you don't make any compromises when people's lives are concerned."

While those who work in the shipyard need to have a safe environment, they also need to be properly trained — McAlear is steadfastly pledged to running an operation that follows the guidelines based upon Kvaerner's training programs. He's all about helping employees find their niche within the company, and will work to find the right position for them — even if it means moving them from the initial department where they began. He mentioned that if a specific employee was not performing up to his/her potential, he would provide them



Ron McAlear, KPSI's, newly-elected president and CEO, cites safety as his number one priority. The former Litton Avondale executive will work to build KPSI into one of the leading commercial shipyards in the U.S.

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Company Profile

with additional training and resources that they would need to raise their skills and performance level.

McAlear's game plan to further KPSI's future not only lies in "skilled technicians applied to a world class shipbuilding facility," but within himself, and how he will work to improve the yard by

thoroughly scrutinizing the operation — from all sides.

No stranger to the maritime industry, McAlear, who was born and raised in Boston, Mass., experienced his first taste of the maritime world when he signed up for a sailing course that was given by the Boston Parks & Recreation

Department. At just 15, he knew that he wanted to have a career that dealt with the sea. He took the necessary steps in high school to accomplish this, and did so by applying and accepting an offer to enroll at the Massachusetts Maritime Academy. After graduating in 1968 with a B.S. in Marine & Electrical Engineer-

ing, McAlear furthered his education at both the University of Michigan and MIT where he received a B.S.E. Naval Architecture & Marine engineering in 1973, and an S.M. Naval Architecture & Marine Engineering in 1974, respectively.

After MIT, he began his tenure at Avondale as a naval architect Advanced Programs and Marketing — a position he stayed in until 1979, when he left to join Waterman Steamship Corp. as assistant to senior vice president Marine Operations. He remained at Waterman until 1985, when he departed for a position at Iron Mountain, Mich.-based Lake Shore as vice president Marine Defense Division. While there, he received an offer in 1988 to return to his roots at Avondale, this time as an intricate part of strategic planning and marketing within the company's Shipyard Division. He eventually worked his way up to corporate vice president of Advanced Programs and Marketing in December 1997, and then in 1999 to what was until now, the apex of his career — vice president of Operations at Litton Avondale Industries. Leading a workforce of approximately 5,000 employees, McAlear was responsible for production, engineering, material, planning and scheduling, until Kvaerner tapped him for his current position this fall.

When word got out that McAlear accepted his new position, the executives at Litton Avondale were disappointed to hear of his departure — on both a personal and professional level. But, they also recognized that this was the kind of opportunity that was a chance in a lifetime. According to McAlear, they are probably one of the most classy, professional groups of individuals that he has dealt with throughout his career.

While the U.S. as a whole will never be able to match the orderbooks of the Asian yards in some areas, such as VLCCs and bulk carriers, McAlear feels that the U.S., and KPSI will, in the future, be able to compete with the European yards in the realm of higher value-added, higher-quality vessels, such as containerships, shuttle tankers and reefer vessels. The yard is on the right track to achieving this with a strong leader, who is a firm supporter of the Jones Act. Mixed together, these two components have positioned the company to raise the "big six" group of shipyards to "big seven."

McAlear would strongly agree, as he feels the company has an excellent opportunity to capture that position in this coveted group with two assets that the company holds: European technology coupled with world-class facilities.

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Vessel Name Black Marlin, Blue Marlin
Type Heavy Lift Ship
Owner Offshore Heavy Transport
Shipbuilder CSBC, Kaohsiung, Taiwan

The Marlin class heavy lift ships — Black Marlin and Blue Marlin built at CSBC, Kaohsiung, Taiwan — are the largest of their kind in the world. While the latter is perhaps better known for its role in transporting the stricken USS Cole home from the Middle East, both vessels embody the latest marine technology and unique design features that are inherently necessary in such a unique marine structure. The large stowable deck is 584 ft. (178.2 m) long and 137.8 ft. (42 m) wide amounting to more than 77,672 sq. ft. (7,216 sq. m.). This is large enough to stow three large jack-up rigs of Marathon LeTourneau 116-C class simultaneously. The extra long deck can also support very long structures like floating docks or offshore SPAR buoys.

Designed for Stability

The ships were designed with a priority objective to obtain low motions and accelerations in heavy seas. Many of the cargoes OHT aim to transport are not designed to move in heavy seas and be exposed to accelerations from rolling from one side to another. The Marlin class hull form is designed similar to a sea going ship and not as the traditional flat- and wide barge. The deep and smooth ship-shaped hull is designed to generate smaller wave forces. To ensure that the ship is neither too stiff nor too flexible, thus allowing it the capability to handle the widest variety of cargoes and thus maximize its profitability, OHT has installed double deck and double bottom ballast tanks. By filling double deck tanks, stiffness will be reduced and better motions gained. By filling double bottom tanks stability can be maintained for very heavy and high cargo.

The Marlin class ships was specially designed to meet the new requirements from the offshore industry for exploration and production in deeper waters, as the rigs and platforms constructed to perform these taxing duties tend to be large, heavier and taller. The new Marlin class has nearly twice the deadweight and stability capacity and can now offer safe transport of the largest jack-up rigs and the heaviest semi submersible rigs as well as self-elevating and twin hull production platforms, TLPs and SPAR-buoys. The ships are equipped

Black Marlin/Blue Marlin Main Particulars

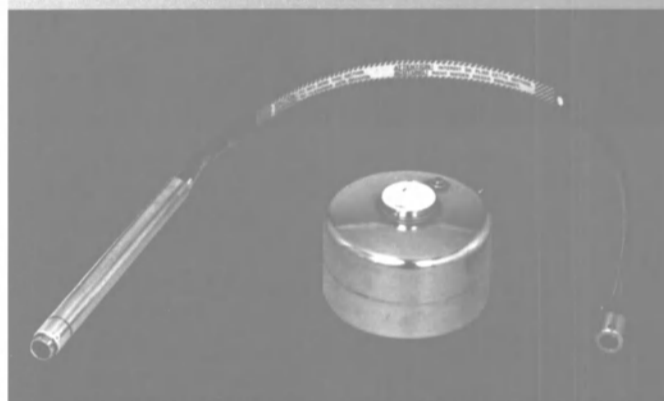
Length, o.a.	712 ft. (217 m)
Length, bp	677 ft. (206.5 m)
Breadth, molded	137 ft. (42 m)
Summer Draft	33 ft. (10.1 m)
Deadweight	56,000 mt
Submerged Depth above Deck	32.8 ft. (10 m)
Free Deck Length	584.6 ft. or 515.7 ft. (178.20 m or 157.20 m)
Free Deck Area	More than 7215 m ²
More than	77,672 m ²
Main Engine Output	12,640 kW (17,160 bhp)
Bow Thruster	2,000 kW (2,712 bhp)
Cruise Speed	(14.5 kn)
Cruise Range	25,000 nm

with four large capacity ballast pumps, with a total capacity of 12,000 mt per hour, allowing the ship to perform loading and discharge operations quickly and efficiently, a big benefit given the severe weather in which it will often operate. In addition to the pumps, 36 ballast tanks can be free flooded. With all four ballast pumps in operation and flooding of tanks, the ship can change the draft at a one-meter per 20-minute clip. Once the deck is submerged, the rate is one meter per five minutes. A number of new features are built into the ballast system. For example, the ships have double redundant ballast lines and valves. This double system makes it possible to pump directly from any one tank to any other. This will specifically be useful during skid-on operations to compensate for large heel moments and tidal changes. In addition, all main valves are operated remotely from a control room overlooking the cargo deck area. A computer system is connected to double redundant level gauges in each tank. The computer system will calculate with online information all ship loading parameters to high accuracy even when the ship and cargo is submerged. The same computer can also be used to simulate complex ballasting operations to address all safety features before execution and to prepare safe ballasting procedures. Propelled by a main engine generating more than 17,000 bhp, the vessel can maintain a 13.5-knot speed with large cargoes, and is capable of a maximum durable speed of 15.5 knots. Due to the ship hull form and size; the ships will experience little loss of speed due to high seas. When designing the Marlin class ship, OHT wanted a ship with ballast tanks in three height layers, a configuration that is more expensive to build, but offers many of advantages. The three layers triple the number of ballast tanks. This gives the wanted flexibility to find suitable ballast conditions to balance the ship for stability and bending stresses. The large flexibility of tanks makes the Marlin class ship ideal for complex skid-on operations. Smaller tanks are easier to control for free surface and better compensation for weight transfer and tidal compensation can be found.



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Vessel Name Costa Atlantica
Type Cruise Ship
Owner Costa Crociere
Shipbuilder Kvaerner Masa-Yards, Helsinki



This past summer marked a milestone in European cruise ship construction with the debut of the 85,700-gt RINA-classed vessel, M/S Costa Atlantica, which was constructed by Kvaerner Masa-Yards at a cost of \$340 million. Touted as the largest ever built for a European cruise line, the ship also holds the distinction as the largest in the Costa Crociere fleet.

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. Built 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. Costa Atlantica gives first form to the so-called Panamax-Max generation from Kvaerner Masa-Yards, embodying the 8000-class design concept developed in conjunction with the Italian operator and its parent Carnival group. While providing a further, prestigious reference for the diesel-electric mode in conjunction with podded outboard drives, encapsulated in two 17.6-MW Azipod propulsors, Costa Atlantica also ushers in a new power rating for the popular Wartsila 46 medium-speed diesel. The vessel's six diesel engines mark the seagoing debut of the D version of the Wartsila 46 design in a key sector of the market. The new model yields a 10 percent power increase over the 46C series, already one of the industry's most competitive designs. The cumulative effect of the uprating amounts to 5,670 kW in the case of the multi-engine installation employed in Costa Atlantica. Making for a 62,370 kW powerhouse, each of the 9L46D units develops 10,395 kW at 514 rpm, and is connected to an ABB alternator delivering electricity into the main 11 kV system. An important aspect of the machinery installation aboard Costa Atlantica is its division into two, completely independent systems, conferring full redundancy. Each 'half plant' incorporates three main diesel gensets plus fuel and ancillary systems, main electrical distribution, control and automation. **Circle 34 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

Vessel Name: Vasco da Gama
Type: Dredger
Owner: Jan de Nul Group
Shipbuilder: Thyssen Nordseewerke



Vasco da Gama, upon its delivery in June 2000, was dubbed by its owner Jan De Nul as the world's largest trailing suction hopper dredger. By the middle of July, the 33,000 cu. m. megatrailer joined the jumbotrailer Gerardus Mercator (18,000 cu. m.), and the trailing suction hopper dredger J.F.J. De Nul (11,750 cu. m.) in Singapore, where the Jan De Nul Group is executing a major sand supply contract.

At 60,000 dwt, the vessel offers a hopper volume approximately 40 percent greater and a carrying capacity, which is more than 80 percent greater than that of the largest jumbo-dredgers available on the market to date. The vessel's massive size and power incorporates a high level of performance on the ongoing and forthcoming large land reclamation projects in the Far East. Jan De Nul was established in 1938, as a civil engineering and maritime construction company in Belgium.

The company owns and operates 11 cutter suction dredgers with total installed diesel power ranging from 1,574 hp to 27,524 hp including the world's most powerful self propelled cutter suction dredgers, the Leonardo da Vinci and the Marco Polo; 13 trailing suction hopper dredgers with hopper capacities — ranging from 2,399 cu. m. to 33,000 cu. m. including the jumbotrailer 'Gerardus Mercator' — and the Mega dredger Vasco da Gama.

Proceeding 19 months of construction time, the suction dredger Vasco de Gama — with a hold of 33,000 cu. m. — was launched at the Thyssen Nordseewerke construction yard on November 5, 1999. Krupp Fordertechnik GmbH supplied the dredging systems and components.

Circle 36 on Reader Service Card

Main Particulars -Vasco da Gama

Length	656 ft. (200 m)
Width	119 ft. (36.2 m)
Draft	46 ft. (14 m)
Dredging depth	148/197/262/430 ft. (45/60/80/131 m)
Deadweight	58,000 tons
Hopper Capacity	33,000 cu. m.
Pumps (Trailing)	2 x 4,500 kW
Propulsion	2 x 14,700 kW
Total Installed Engine Power	37,060 kW

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Vessel Name: MS Tamesis
Type: RoRo
Owner: Wallenius Wilhelmsen
Shipbuilder: Daewoo Okpo Shipyard



MS Tamesis, the first of a new generation of RoRo vessels boasting innovative designs has joined the Wallenius Wilhelmsen fleet. Joining three sister-ships to be delivered throughout the next 10 months, Tamesis was commissioned in 1998 by Wilh. Wilhelmsen of Norway — one of two equal shareholders in Wallenius Wilhelmsen. Delivered on April 13 by Daewoo Okpo Shipyard, the Mark IV RoRo provides 35 percent more covered capacity for specialized RoRo cargo than the previous Mark III design. Suitable for carrying a total capacity of 5,400 cars, the vessel is specifically designed for project and other unique or heavy lift cargo such as power generators, construction and agriculture equipment. Measuring 787 x 106 ft. (240 x 32.2 m), the vessel, whose name in Latin means River Thames, has a deadweight of 38,300 tons.

Circle 37 on Reader Service Card

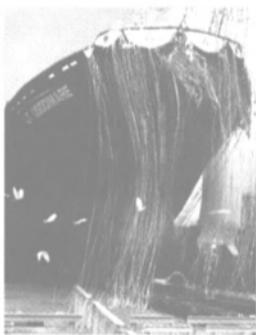
Main Particulars - MS Tamesis

Length, (o.a.)	787 ft. (240 m)
Breadth, (molded)	106 ft. (32.2 m)
DWT	38,300 tons
Stern ramp width	39 ft. (12 m)
Stern ramp capacity	320 tons unit load
Number of decks	8
Deck area capacity	45,889 sq. m
Volume capacity	125,620 cu. m
Car unit capacity	5,400
Engine	B&W 8L 70MC (MK5)
Service speed	20 knots
Crew	28

Vessel Name: LT Usodimare
Type: Container Vessel
Owner: Lloyd Triestino
Shipbuilder: Mitsubishi Heavy Ind.

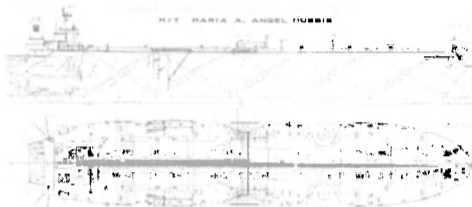
LT Usodimare, the first post-Panamax container vessel ordered by Lloyd Triestino from Mitsubishi Heavy Industries' Kobe shipyard, was launched on September 1.

The new vessel is 935 x 131 ft. (285 x 40 m) with a draft of



42 ft. (12.7 m). With a capacity of 5,364 teu, and a service speed of 25 knots, the Italian-flagged vessel has been classified by RINA. LT Usodimare is named after Antoniotto Usodimare, the 15th century Italian seafarer said to have discovered the Cape Verde Islands. LT Usodimare will be delivered on November 24 and will be deployed on the service connecting China to the Mediterranean and Northern Europe (CEM). The service is being retonnaged with several 25-knot post-Panamax vessels. Circle 38 on Reader Service Card

Vessel Name: Maria A. Angelicoussis
Type: DH VLCC
Owner: Kristen Navigation Inc./Chevron
Builder: Daewoo Shipbuilding & Marine Engineering Co.



Maria A. Angelicoussis is a double hull crude oil tanker, delivered by Daewoo Shipbuilding & Marine Engineering Co. to Kristen Navigation Inc. The vessel was designed to ABS standards, and is classed A1(E), "Oil Carrier, ESP", +AMS, ACCU, SH, SPM, RES, UWILD. The ship is intended for the trade of oil having a flash point below 60 degrees Celsius in its cargo tanks. Built with a double side and bottom, the vessel features five center/side tanks and two slop tanks. Cargo handling, of paramount concern in a vessel this size, consists of three cargo pumps with a capacity of 5,500 cu. m/hr., each driven by steam turbine and three cargo manifolds on deck for three segregation of cargo loading and discharging. The hull has been designed to ABS Safe Hull require-

ments, and features enhanced scantling for a safer, stronger and more durable structural integrity. Powered by a B&W 6S 90MC-C with an MCR output of 40,000 PS at 76 rpm, the ship's 33-ft. (9.9-m) FP propeller helps to drive the vessel to a service speed of 16.8 knots. The wheelhouse is arranged for the One Man Bridge concept. The Integrated Navigation System includes an Electronic Chart Display and Information System (ECDIS), and a CCTV system is installed with provisions of a camera at radar mast platform and a monitor in the wheelhouse in aid of safer operation with better forward visibility.

Vessel Name: Terra Nova FPSO
Type: FPSO
Owner: Terra Nova Alliance/Petro Canada
Builder: Daewoo Shipbuilding & Marine Engineering Co.

Terra Nova FPSO was completed by Daewoo Shipbuilding & Marine Engineering Co., and delivered to the Bull Arm Fabrication Site for the work to install the topsides production module. The vessel is designed to work on the Terra Nova Field. The Canadian-flagged vessel is registered by LR. The ship shape is designed to provide optimum seakeeping performance with internal turret mooring system with the assistance of thrusters. The analysis for the assessment of seakeeping performance such as vessel motion and mooring has been performed in consultation with the owner, was verified through model tests. Designed to withstand the harsh environments with extreme 100-year wave height in excess of 98 ft. (30 m), the vessel has also been strengthened

for an ice impact of 100,000 tons. Terra Nova FPSO has a forward deckhouse accommodating up to 80 people, aft offloading systems with a maximum offloading rate of 8,000 cu. m/hr. and topside process plant on the deck with a maximum production rate of 20,000 cu. m./day. Two sets of gas turbine generators — 46 MW each using dual fuel for main electrical power — are situated on the process deck, and two sets of key service diesel generators (6.5 MW each) are installed in the forward machinery space. The system is designed to hold the vessel on station and to propel the ship in transit condition with the electrical power. The system is comprised of 5 azimuth thrusters, 5 MW each, electric motors and drive systems.

Circle 43 on Reader Service Card



Main Particulars - Terra Nova FPSO

Classification	LR
Length, (o.a.)	958 ft. (292 m)
Length, (b.p.)	909 ft. (277 m)
Breadth, molded	149 ft. (45.5 m)
Displacement	212,235 t
Lightweight	58,300 t
DWT, design	154,000 t
DWT, scantling	154,000 t
Draft, design	66 ft. (20 m)
Speed	10 k (with thruster propulsion)
Fuel Consumption	185 g/kwh + 5%
% High Tensile Steel	47
Propellers	Kamewa
Diesel Driven Alternators	Wartsila
Boilers	Aalborg
Hatch Covers (for thrusters)	McGregor

Vessel Name: Conti Fremental
Type: Containership
Owner: Conti Reederei, Putzbrunn, Germany
Shipbuilder: Hanjin Heavy Industries & Construction Co., Ltd.

Delivered June 30, 2000, the 5,600-TEU containership Conti Fremental built by Hanjin Heavy Industries for Conti Reederei, and chartered by Hanjin Shipping, is designed for worldwide service. The vessel is powered by a Wartsila 10RTA 96C, a unit which helps to power the vessel to a service speed of 26.3 knots (making it one of the fastest vessels in its class) at 90 percent MCR with 15 percent sea margin on design draft of 12 m. Container capacity is 5,608 TEU (on deck : 3,034 TEU, in hold : 2,574 TEU) and lashing bridge facility and 500 reefer sockets (on deck : 300 FEU, in hold : 200 FEU) are provided.

Circle 41 on Reader Service Card

Conti Fremental Main Particulars

Length, o.a.	915 ft. (279 m)
Length b.p.	869 ft. (265 m)
Beam	132 ft. (40.3 m)
Scantling Draft	46 ft. (14 m)
Main engine	Wartsila 10RTA 96C
MCR	74,700 PS @ 100 rpm
NCR	67,230 PS @ 96.5 rpm
Speed	26.3 knots
Fuel oil consumption	126gr/BHP/hr.
Flag	Panama
Classification	Germanischer Lloyd
Deadweight	67,900 t
GRT	66,500
TEU	5,608

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Circle 247 on Reader Service Card



Vessel Name Sea Turbot
Type DH Oil Tanker
Owner German Tanker Shipping
Shipbuilder Lindenu

Lindenu GmbH is no stranger to the Great Ships column, and the year 2000 is no exception as the 32,230 dwt double hull Oil Tanker MT Seaturbot — one of its Safety Tanker Class 2004 — garners the North German shipyard its latest honor. In particular, the latest ship — built under Germanischer Lloyd classification — provides high safety against collision damage by construction of the hull according

class notation COLL 3, giving the vessel a four times higher collision resistance than conventional ones. This is the highest safety class notation ever given by Germanischer Lloyd for a tanker. To protect the structurally critical tank areas, a high-grade (epoxy) coating — Camcote MX — was used in the ballast and cargo tanks to ensure long-term strength and safe operations. Even tank surfaces for short discharge times, less cargo residues, short tank cleaning times and less slop amount.

With an eye on the future, the ship incorporates an advanced, efficient and economically sound propulsion choice in the MAN 6L 58/64, which produces 8,340 kW and a speed of 15.1 knots at 100 percent MCR. Main and auxiliary engines already fulfilling requirements of future MARPOL Annex VI, (Prevention of air pollution from ships). The shipyard has built a model of the engine room in co-operation with the shipping company to optimize the economical arrangement of all aggregates including the pertaining pipes, cable trays and airducts as well as to design all workplaces along ergonomic aspects. The integrated engine control system and the power management system of auxiliary diesel engines and shaft generator ensure an economical and safe operation of the engines. In addition to the manual control of the electrical energy generation in the machinery control room, the wheelhouse is fitted with a workstation, enabling the crew to choose the most economic form of energy generation.

The cargo space consists of 2 x 5 tanks, which are separated from each other by volume longitudinal and transversal bulkheads. This ensures smooth tank surfaces with the following advantages: short discharge time; minor cargo residues; double safety against cargo contamination; and short tank cleaning time. The arrangement is highly flexible due to different cargo tank sizes and high cargo tank volume/deadweight ratio. The high quality (Epoxy) cargo tank coating protects the cargo tanks against corrosion and enables a wide range of oil and oil products to be transported safely and with highest possible protection of the cargo. To ensure a smooth transfer of cargo from shore to ship to shore, the vessel is equipped with an integrated cargo monitoring and indication system which provides: cargo tank level indication with tank radars; cargo temperature indication and monitoring with three sensors installed at different heights; cargo tank pressure monitoring with adjustable alarms; and manifold pressure monitoring with given alarms.

In addition, the ship comes equipped with a loading computer, which is connected to the integrated cargo monitoring and indication system as well as to the tank level measurement system for ballast and engine room storage and consumable tanks.

This loading computer enables the crew to control the longitudinal strength and stability during loading and discharging as well as pre-calculation of loading conditions.

Finally, Seaturbot comes with a unique Emergency Cargo Discharge System, which allows, via crude oil washing pump, with connection to all cargo tanks, closed discharging in case of cargo pump failure.

Circle 42 on Reader Service Card

(See page 53 for more GREAT SHIPS of 2000)

MT Seaturbot Main Particulars

Delivery	June 30, 2000
Length, o.a.	583 ft. (177,75 m)
Length, b.p.	551 ft. (168 m)
Breadth, molded	92 ft. (28 m)
Depth to main deck, molded:	55.1 ft. (16.8 m)
Draft	33 ft. (11 m)
DWT	32,030 tons
Gross tonnage (ITC 69)	21,353
Reduced Gross tonnage (ITC 69, SBT-Status)	16,286
Cargo tank capacity 100%	37,440 cu. m
Slop tank capacity	318 cu. m
Main engine output:	8,340 kW
Main Engine	MAN 6L 58/64
Reduction Gear	Renk
Variable pitch propeller/bowthruster	Lips
Aux. engines / generators	Yanmar/HHI Siemens
Boiler plant	Aalborg Ind.
Cargo pumps	Frank Mohn,
Crane	HMB
NavComm	STN Atlas
Electrical Installation	Siemens
Thruster	Kamewa
Emergency Generator	Deutz
Couplings	Vulkan
Steering Controls	Rolls Royce (Frydenbo)
Deck Machinery	Rolls Royce (Brattvaag)
Bearings	Blohm + Voss
Coatings	International Paint
Compass	STN Atlas Marine
Compass, Autopilot	Raytheon Marine
GPS	Trimble
FiFi System	Unitor
Ballast Control System	Danfoss
Tank level measurement	Saab
Ballast Pumps	Framo
Computers	Kockumation Loading Computer
Saab Cargo Monitoring Systems	
Janssen Engine Monitoring System	
Shaft Generator	STN

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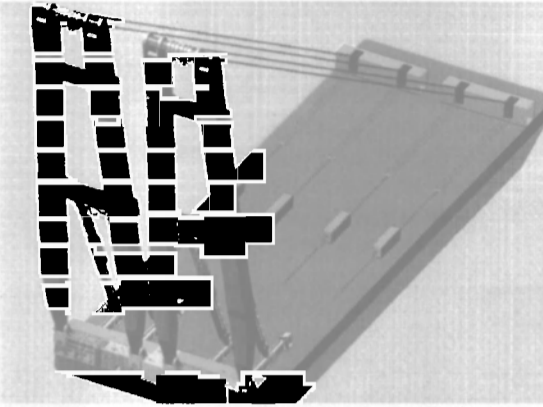
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New Crane Set To Revolutionize Salvage Work

Marine and salvage company Titan Maritime plans to debut the **world's first disassembling/portable shearleg crane**. The Heavy Lift Salvage tool is comprised of two portable 1,000 metric ton capacity shearleg cranes and corresponding 1,000 metric ton deck tackle. Working in tandem, the crane pair, when combined with Titan's linear chain pullers, can lift up to 4,000 metric tons - a feat reportedly never before accomplished in this application. Shearleg cranes of many different magnitudes and sizes are currently used in different locations worldwide. All of these cranes were purpose built as permanent structures on floating barges. Titan's concept is unique because it is portable and not logistically limited by the location of the barge, or its registered flag. The Heavy Lift tool can be assembled on any available 300 x 900 ft. (91.4 x 27.4 m) barge, or individually put together on a 250 x 72 ft. (76.2 x 21.9 m) barge. Each crane is designed to be taken apart and loaded into standard size intermodal shipping containers. Portions of the assembled cranes are similar in shape to that of shipping containers. This was implemented to reduce the volume of crane components for shipping. Once disassembled and containerized, the Lift Tool can be shipped and reassembled anywhere in the world. But if an extreme circumstance should occur, the units can be air lifted for quick deployment. Titan's Heavy Lift Salvage Tool is the brainstrom of **David Parrot**, the company's founder and president. "Titan's success has been built on our ability to remain completely portable. All our equipment is highly portable, allowing Titan to rapidly respond to maritime casualties anywhere around the globe," Parrot said.

While a significant portion of existing shearlegs have been designed in Holland and Germany, Titan opted to wage a competition between firms based in both countries. Each company was told to submit their best "portable" shearleg concept - Overdick and Partners of Hamburg, Germany received the honor. The builders of the shearlegs will be Malaysian-based shipbuilding and repair company, Muhibbah Marine Engineering, who will construct the Tool to Germanischer Lloyd Class. **Circle 44 on Reader Service Card**



Rendering of Titan Maritime's Heavy Lift Salvage Tool.

WR-21 Enters Critical Phase

Northrop Grumman and Rolls-Royce have signed an agreement with DCN to market and produce the WR-21 marine gas turbine, effectively establishing a world class team for the inter-cooled and recuperated WR-21. The WR-21 successfully completed the development phase of the U.S. Navy, Royal Navy and French Navy funded full-scale development program in February 2000. The engine accumulated approximately 2,100 fired test hours, including a 500 hour endurance test in Pyestock, England in 1998 and a 500-hour endurance test at the U.S. Navy's test facility in Philadelphia in late 1999. The final phase of the program has started, with DCN's facility performing the 3,000-hour endurance qualification. Upon completion in early 2002 and subsequent shock tests, the engine will be qualified for service under standards set by the U.S. Navy and will meet or exceed standards set by other Navies around the world. The WR-21's advanced cycle **recovers energy from the engine's exhaust gas to increase fuel efficiency** across the operating range. "The intercooled and recuperated WR-21 has already demonstrated more than 25 percent annual fuel savings in mechanical drive configurations compared with existing simple cycle gas turbines and is on track to reach more than 27 percent in its final production configuration," said **Jim Hupton**, vp of Northrop Grumman Marine.

Circle 55 on Reader Service Card

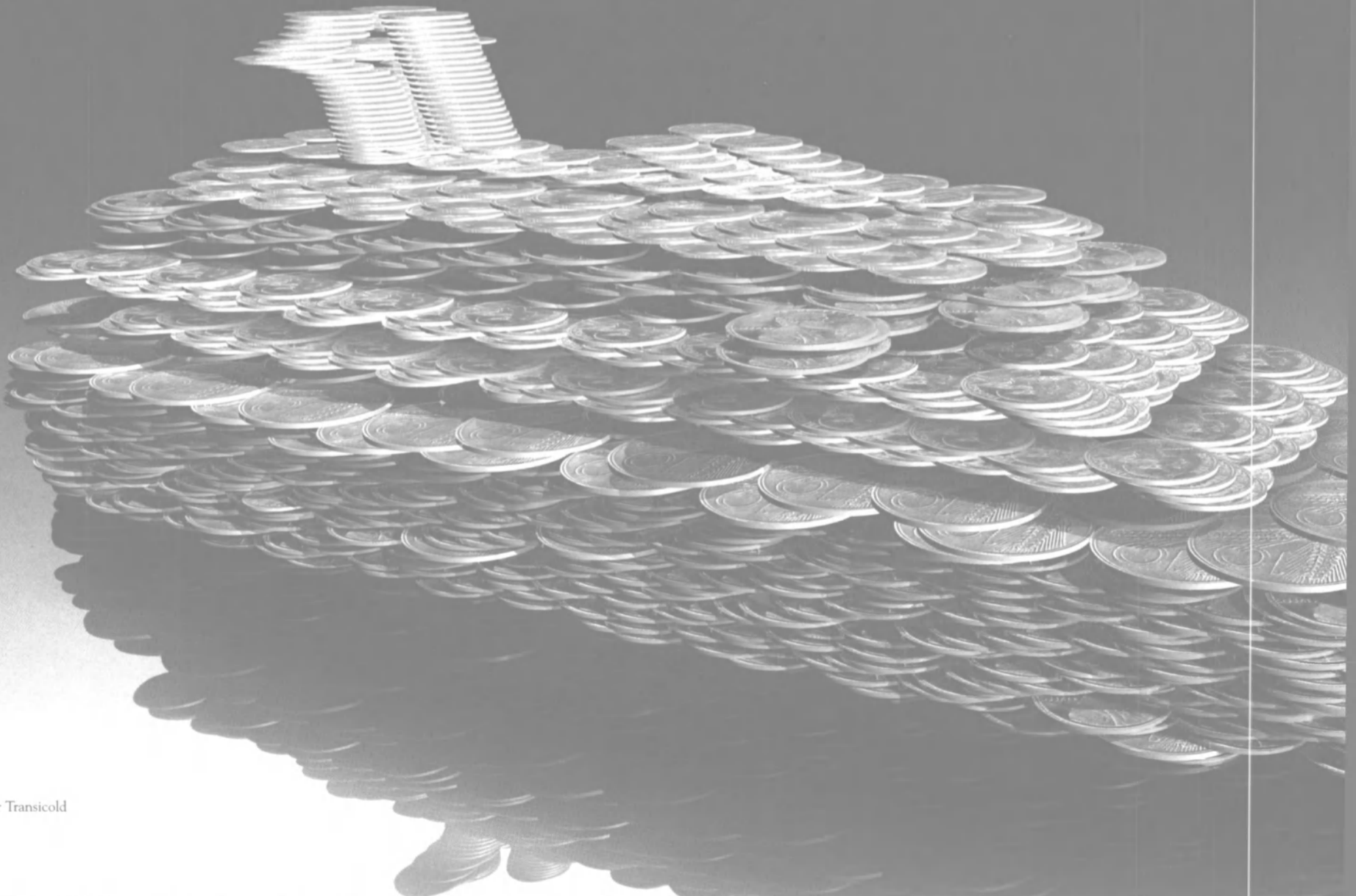


ABB Offers Compact Pod

ABB launched the Compact Azipod to cover the power range from 400 kW to 5 MW. The product is designed to meet the demand for **enhanced maneuverability and operational economy in smaller vessels**. It is a podded propulsion system providing either unlimited, 360 degree or limited, + 100 degree steering angles. It incorporates permanent magnet synchronous motors with a FP propeller that is directly mounted on the motor shaft.

Circle 58 on Reader Service Card

COREX Chosen For RoRo

COREX panels, an innovation from MacGregor, was chosen for installation aboard two 692-ft. (211-m) 30,000 gt Stena RoRo ferries on order at Hyundai Heavy Industries (HHI). This was the first order for COREX panels, and the product was chosen because of its **impact on reducing weight** and reduced thickness compared to conventional car decks. The low profile and low weight of the COREX panels allow new design concepts to be adopted, helping to improve RoRo ship profitability and flexibility. COREX car decks have substantially reduced profiles, approximately one-third the depth, and are about half the weight. The advantages include reduced lightship weight, reduced molded depth and increased stability. In the COREX panel, a 3-D truss-core is built up between top and bottom steel plates. The symmetric construction allows an even load distribution in all directions.

Circle 62 on Reader Service Card

No Smoking Allowed

The dilemma facing the marine diesel engine manufacturing industry today is as complex as it has ever faced. Through a forest of demands from shipowners and legislators, diesel engine makers are being challenged to produce power plants, which perform to a broad spectrum of quality levels, which are seemingly at odds with one another. The demand for better reliability, lower fuel consumption and better NOx and SOx emission values are the industry norm. Now, engine makers are challenged to produce powerplants that significantly reduce Particulate Matter, or, effectively, create little to no smoke. While all major engine manufacturers are individually addressing this problem and producing solutions, MAN B&W recently unveiled its progress on the **development of an invisible smoke engine**, a top priority for all engine makers given the heightened environmental legislation which exists today. Starting with its L/V 48/60, MAN B&W has committed significant effort and monetary resources to develop engines which operate with invisible smoke exhaust gas, thus allowing for cruising in environmentally sensitive regions with stringent environmental regulations. MAN B&W in 1998 introduced a smoke reduction package for cruise operators travelling in the Arctic Seas of Alaska, and was in effect the first step to the IS (invisible smoke) engine L/V 48/60. IS engines are based on two engine-linked subsystems: Fuel Water Emulsification (FWE), that requires only a moderate amount of water; and Low-load, electrically driven auxiliary blower operating at only very low engine loads. This equipment is supplemented by a matched engine setting, with regard to special turbocharger specification, MAN B&W turbochargers featuring Jet-Assist, low-load bypass, soot suppressing injection and matched injection timing. The FWE avoids the need for a second injection system and its drawbacks, and helps to improve the opacity of smoke, particularly at low levels. **Circle 54 on Reader Service Card**



14V 48/60 - 14,700 kW for Star Cruises.

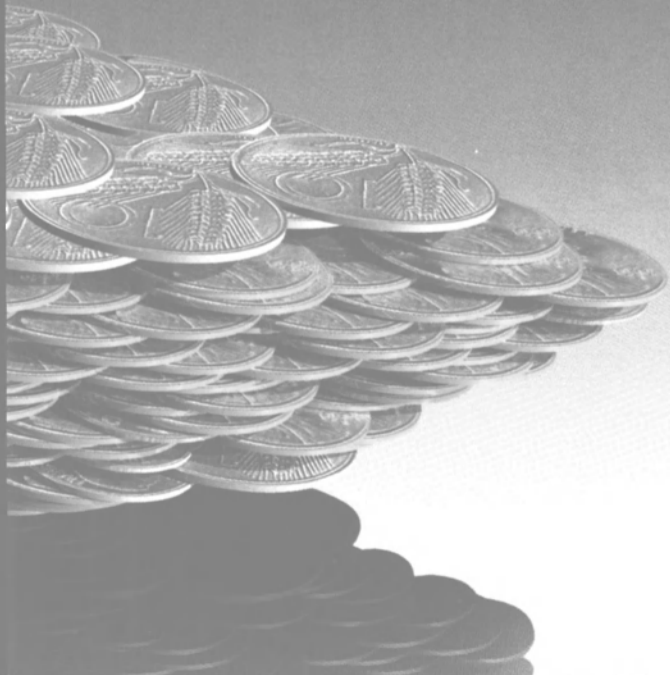
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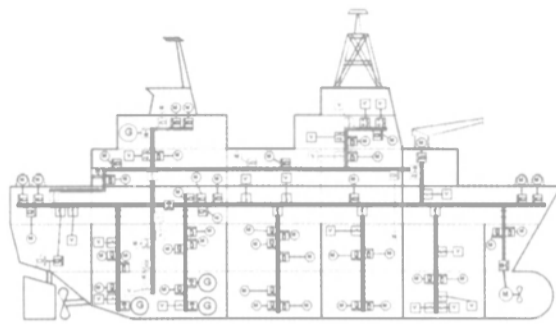
Circle 212 on Reader Service Card



STN Atlas Debuts PPB System

STN Atlas Marine Electronics has introduced a new Primary Power Bus (PPB) distribution system designed for ships of all types, and conforming to major classification society standards. The system — which is operational in an introductory variant version aboard Star Cruises' Norwegian Sun — features **individual switchgear together with a central control station** for direct supply of generator power to all sectors of a ship. The PPB's concept is designed to supersede conventional methods of "beam type" cable connections, which otherwise inhibit pre-installation of cabling throughout individual sections of modular-designed vessels due to attendant intersections of power cables.

Individual power buses are provided for each onboard voltage system. For primary voltage systems, power sources comprise main or emergency alternators, with supply of power effected via feeder breakers and subsidiary feeder cables. High load demands, such as those associated with thrusters, chillers and shore con-



nections, are connected to the PPB via linking busbars without use of intermediate power cables. Overall remote control and monitoring is centralized via a single console with onscreen displays or mimic diagrams of all switchgear operations. The system is designed to rationalize vessel power distribution requirements while improving operational efficiencies and installation downtimes. **Circle 60 on Reader Service Card**

PropacRudder Benefits Confirmed In Service

Wartsila NSD has completed shipboard trials with the new Wartsila NSD PropacRudder, and results are promising, according to the manufacturer. The innovative propulsion system was designed to reduce propulsive power requirement, with reduced hull vibration and noise, while providing for exceptional maneuverability. The trials, undertaken last October and November aboard the 5,175-dwt paper carrier Lysbirs, reportedly confirm all of this. Norwegian owner Lys-Line AS of Oslo was the willing test partner and the vessel was equipped with a Propac propulsion package, which consisted of a 6,300 kW Wartsila 6L46C medium speed diesel engine, a 4.5 m diameter Wartsila CP propeller, gearbox and PropacRudder. The PropacRudder's signature is its streamlined torpedo shaped bulb on the rudder horn. The bulb is designed to ensure a more homogeneous water flow both in front of the propeller and in the propeller slipstream. The bulb is designed to increase propulsion efficiency via a wake gain effect, meaning that it reduces the water speed into the propeller so that less power is needed to produce the same thrust. The bulb also has been shown to reduce propeller-induced hull noise and vibration by eliminating hub vortices and separation, and cavitation behind the propeller hub collapsing on the propeller. While model tests showed that solely by applying the PropacRudder, the presence of the bulb gives a large **reduction in power of about 10 percent for the same ship speed** compared to using conventional flap rudders, the full-scale trials actually demonstrated an even greater power savings. It was noticeable during the trial on Lysbirs that propeller-induced noise level is very low right across the range of pitch settings with constant propeller revolutions, without any noisy face cavitation or local hull vibration problems.

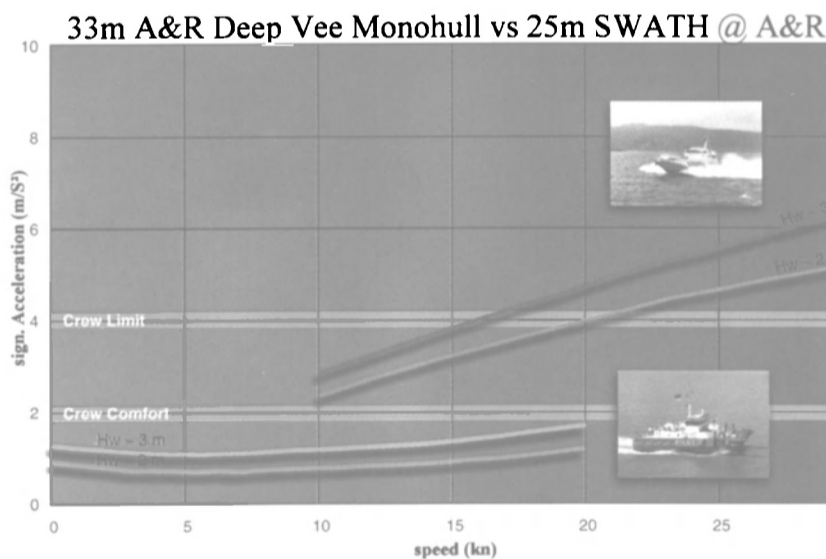
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A&R Introduces New SWATH Concept

Abeking & Rasmussen introduced its SWATH vessel concept under the brand SWATH@A&R, a design which takes into account the effects of a vessel's motion on the crew's ability to maintain concentration, and thus the proper control. The vessel offers unique features that are designed to ensure superior seakeeping performance. For example, by minimizing the waterplane area of the vessel, Abeking & Rasmussen believes it has succeeded in minimizing the forces, which lead to sea response motion. The yard contends that various stabilization systems have been developed to reduce rolling and pitching of existing vessels, but notes that all of these systems have their limits. As humans are built to live on shore, extended periods of motion at sea lead directly to lack of concentration, fatigue and seasickness, even in the most experienced sailors. In order to keep crew and passengers fairly comfortable and enable them to perform their main duties, the motion parameters of a vessel must be limited. Therefore limits have been defined, e.g. by the U.S. Navy or by ISO standards for the permanent accelerations on board of seagoing vessels. The following limits have been widely accepted:

Crew and passenger comfort: 0.2g (~2 m/s²)
 Operating limit experienced crew: 0.4g (~4 m/s²)

Figure 1 shows a comparison between the accelerations measured onboard of a 108-ft. (33-m) Abeking & Rasmussen built DeepVee Mono-



hull and a slightly smaller 82 ft. (25-m) SWATH@A&R Pilot Tender. Both vessels are sailing in a head sea of approximately 6 ft. (2m) and 10 ft. (3m), respectively, significant wave height. The above-referenced 108 ft. (33-m) monohull vessel was designed for a top speed of 39 knots. However, to keep its movements within the Crew Limit of 4m/s², the maximum speed it can achieve is approximately 15 to 20 knots.

In comparison, the 82 ft. (25-m) SWATH@A&R Pilot Tender can maintain its top speed of 20 knots, without even exceeding the limit for Crew Comfort of 2m/s², making it a faster vessel in rough seas.

The results noted are far from theoretical, as a pair of aluminium 82-ft. (25-m) Pilot Tenders with a displacement of 12.5 tons have been in con-

tinuous operation since the summer of 1999, with a reported great success. Recently, both 82-ft. (25-m) Pilot Tenders were docked to carry out minor modifications with respect to retrofitting of a hydraulic platform to make boarding of large ships more convenient. An inspection showed no signs of structural fatigue.

In Hamburg A&R exhibited the versatility of the design. For offshore services SWATH@A&R Crewboats would be desirable as it reportedly will be able to operate more often in bad weather, creating fewer off-hire days. Although a SWATH will be slower than a semi-planing monohull of equal size and displacement under calm water conditions, A&R contends that it will be much faster when the sea gets rough.

Circle 70 on Reader Service Card

Remote Minehunting System Passes Critical Test

Lockheed Martin Integrated Systems announced the successful completion of the first Critical Item Test (CIT) required for development and fielding of the AN/WLD-1(V)1 Remote Minehunting System. AN/WLD-1(V)1 is being developed by Naval Electronics & Surveillance Systems-Undersea Systems (NE&SS-Undersea Systems) in Syracuse and Riviera Beach, Fla., under a contract awarded in December, 1999 by the U.S. Navy. It will provide Arleigh Burke Class DDG-51 Flight IIA ships with its **first-ever offboard mine reconnaissance capability**.

Key elements of AN/WLD-1(V)1 include a diesel-powered, semi-submersible Remote Minehunting Vehicle (RMV) with a deployable Variable Depth Sensor (VDS), line of sight and over-the-horizon real-time data links and a shipboard launch and recovery subsystem. The 28 days of testing off West Palm Beach, Fla., completed July 12, were aimed at reducing program risk and providing data to support the program's Preliminary Design Review, which took place in October. Test objectives included demonstrating RMV stability and control; demonstrating underway launch and recovery and demonstrating RMV speed and endurance.

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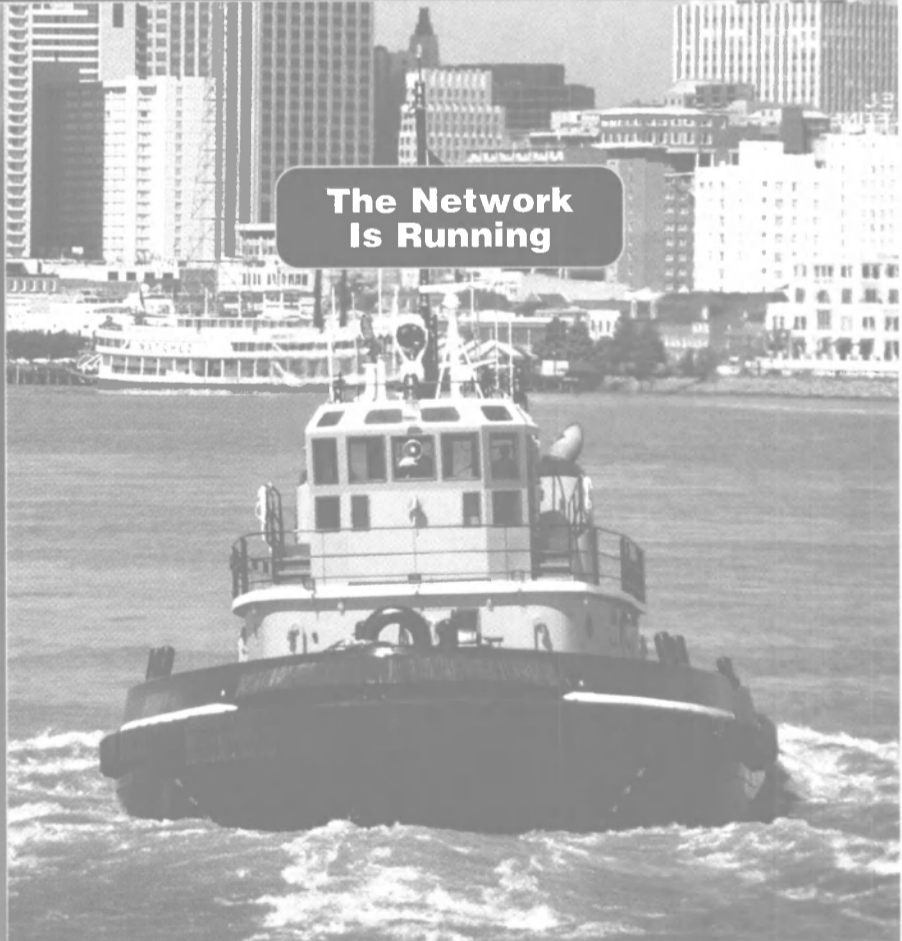
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People & Company News

Graykowski Ends Reign At MarAd, Joins Dyer Ellis

U.S. Secretary of Transportation Rodney E. Slater made it known that acting Maritime Administrator, **John Graykowski**, resigned his position, effective November 4.

President Clinton initially appointed Graykowski as deputy maritime administrator in 1994. He subsequently served as acting maritime administrator, most recently from this May — up until the present.

Subsequent to the end of his term at MarAd, Graykowski, joined the law firm of Dyer Ellis & Joseph as a shareholder.

Beginning with his tenure at MarAd, Graykowski has been principally responsible for the implementation of the National Shipbuilding Initiative, with particular emphasis on the revitalization of the Title XI loan guarantee program, as well as programs related to the inland waterways and the Great Lakes.

Cummins Appoints New Manager of Auxiliary Markets



Cummins Marine has named **Simon Tandy** as sales manager — Worldwide Auxiliary markets. Tandy, who boasts 10 years of experience with Cummins,

previously held positions in Sales and Product Development at the company's distributor in the U.K., and with the Cummins Wartsila joint venture in North America.

W&O Supply Attains Valve Automation & Controls

W&O Supply, Jacksonville, Fla., has acquired San Diego, Calif.-based Valve Automation & Controls (VAC). Specializing in marine actuation and automation, VAC is a supplier of commodity pipe, valves and fittings to the San Diego marine and Navy marketplace.

ACR Offers Survival Methods With New Pouch



ACR Electronics launched a new product that will help mariners organize their survival gear in a convenient, cost-effective pouch. The buoyant Survival Gear Pouch is a carry-

all that can hold basic survival components, such as a signal light, extra batter-

ies, signal mirror, whistle and Personal Locator EPIRB. Comprised of water-resistant nylon pack cloth, the pouch features a small front zippered compartment for easy access. A double-pull coil zipper for headphone, antenna or other access is also present in the pouch.

Circle 1 on Reader Service Card

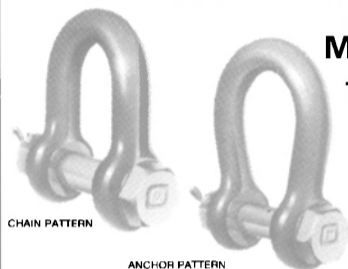
Flender Werft Appoints Board Chair

The Supervisory Board of Flender Werft Aktiengesellschaft has elected **Dirk Rathjens** as chairman of the board of directors, effective November 1. The board has also designated Jürgen-A.

Hansen as an official member of the board, on which he formally served as deputy member.

In addition, the Board of Directors, which is comprised of **Martin Krause** and **Reinhold Hinz**, are scheduled to retire from the company, effective June 30, 2001.

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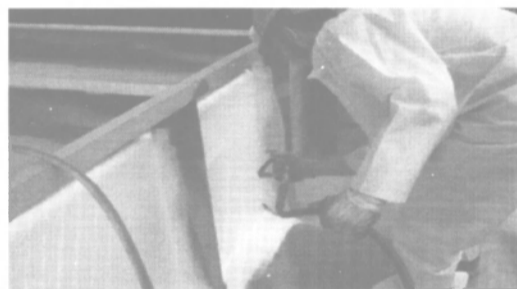
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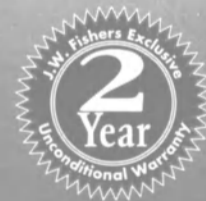
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People & Company News

Cospolich Launches USCG-Approved Cooler At WorkBoat Show

Cospolich displayed a sample of the A-60 Walk-In-Cooler door that has been granted Type Approval from the Lifesaving and Fire Safety Standards Division of the U.S. Coast Guard. Developed and tested to comply with SOLAS requirements that are being applied to Offshore Supply Vessels, the door will be launched at this year's International Workboat Show along with Cospolich Hot-Food-Counters. While the primary focus will be concentrated on these two products at the show, the company will also have on hand its Arctic

Safe Modular Cold Storage Units and Custom Yacht Cabinets on display.

Circle 7 on Reader Service Card



Krohne Premieres Its New Marine Division

Krohne, manufacturer of flow and level meters, has launched a new marine division, which will be based in Hamburg, Germany. The new division will provide products and services with

responsibility and control over all marine contracts — from tendering through to final installation and commissioning. The responsibilities also cover barges and tankers on inland waterways.

The division will offer a complete package including planning, engineering and product procurement — specifically complete cargo control systems.

The key instrument in the cargo control system will be Krohne's BM 70 Nautic, a proven (Frequency Modulated Continuous Wave) level meter for marine applications.

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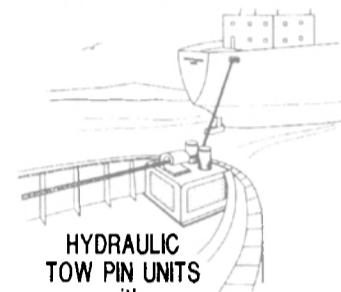
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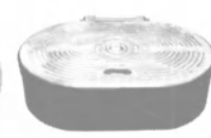
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Solar Solve Nabs Export Orders At SMM

Following its return from the SMM Exhibition in September, Solar Solve Marine clinched two export orders from buyers in China and Italy.

The company, which exports 90 percent of the Solasolv anti-glare sunscreens for ships' wheelhouse windows has fitted more than 25,500 of these screens to more than 2,500 vessels world-wide throughout the past 12 years.

Circle 68 on Reader Service Card

AMCV Elects New Directors

American Classic Voyages, (AMCV) has appointed **John Douglas Cross** to director of operations, Information Technology. Cross, who has developed and managed information services for more than 30 years, will be responsible for daily information technology operations, including voice and data communication networks, end user support and data center services.

Delta Queen Coastal Voyages, which is a subsidiary of AMCV, elected **W. Ronald Adams** director of marine operations. He will be in charge of the start-up, staffing and operations of the company's first two coastal vessels, as well as oversee regulatory compliance, logistics, quality control and the operational efficiency of this new vessel pair.

Art Anderson Wins GSA Contract

Art Anderson Assoc. has been granted a five-year, Multiple Award Schedule contract for Professional Engineering Services by the General Service Administration.

According to **Ralph Duncan**, vice president of Marine Projects and Business Development, the new contract is the federal government's most important procurement vehicle for contracting out design services, and provides a convenient vehicle for any federal agency to obtain Art Anderson's services.

Sun State Marine To Construct New Vessel

Sun State Marine Services, a subsidiary of Hvide Marine, has commenced construction on the second in a series of new U.S.-flag cargo ships at its Green Cove Springs, Fla. shipyard. Measuring 190 ft. (57.9 m), the landing craft-type freight vessel is specially designed and suited for conducting trade in areas that have minimal or unimproved shore facilities.

The new vessel will house a ramped bow for RoRo cargo and more than 6,100 sq. ft. of open cargo deck. Powered by two 720-hp Caterpillar 3412

DITA main diesel engines driving Twin Disc MG 5 2 0 2 reduction/reverse gears at 4.59 reduction, the vessels will have a Wesmar 200-hp bow thruster. A pair of John Deere generator sets rated at 60 kW each will power the vessel.

Circle 6 on Reader Service Card

Saab Transponder Gets Significant Order

Sweden-based Saab TransponderTech has won an important order for a fleet tracking/management system that is fully compatible with the AIS standards and will be installed in Portugal.

The Port of Lisbon will combine one base station and 44 vessel units in the Norcontrol IT VTS system.

In addition, the AIS system will be outfitted on vessels sailing in the bay of Lisbon — enhancing safety and surveillance and the possibility of fleet management.

Circle 4 on Reader Service Card

U.K. Hydrographic Office Gets New Chief Executive

Dr. **David Wynford Williams** has been named chief executive of the U.K. Hydrographic Office (UKHO) and U.K. National Hydrographer, effective January 2001. He succeeds Rear Admiral

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John Clarke, who completes his five-year term at the end of this year.

Williams, who will join UKHO from the MoD's Defence Evaluation and Research Agency (DERA), will be responsible for managing the Taunton-based Office, which is one of the world's leading producers of nautical charts and publications, supplying a large proportion of commercial shipping worldwide.

Coflexip Stena Offshore To Acquire The Deepwater Division Of Aker

Coflexip Stena Offshore has entered into a conditional agreement to acquire Aker Maritime ASA's deepwater operations, headquartered in Houston for \$513 million plus the assumption of net debt estimated to amount to \$112 million.

This transaction transforms the

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Coflexip Stena Offshore Group, fulfilling in one stroke, its most important strategic objectives: increasing the Group's front-end and full field engineering capabilities; expanding and strengthening its geographic presence in deep water markets, particularly the Gulf of Mexico; and enlarging the scope of technologies, services and products offered by the Group.

Merging the Deepwater Division with CSO's expertise in subsea technologies and operations will provide new opportunities that neither of the groups could have accessed independently. The deep-

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People & Company News

water division's strong presence in the Gulf of Mexico and its ability to access West African markets and the Caspian Sea completes CSO's strong operations in the North Sea, Brazil, West Africa and Asia Pacific. After this transaction, the CSO Group will gain critical mass and access a market estimated at \$19 billion for the year 2000.

Crowley Promotes Sweeney; Gleason Joins As Director

Crowley Marine Services has promoted Alex Sweeney to vice president, Valdez Business Unit. Sweeney is responsible for all marine activities in support of the Alyeska Pipeline Service Company's Ship Escort Response Vessel System (SERVS) in Alaska.

SERVS' mission is to prevent oil spills

by assisting tankers in safe navigation through Prince William Sound and to protect the environment by providing rapid and effective response services.

Crowley has also reported that Tim Gleason has joined as director of Business Solutions at the company's Jacksonville locale. In this position, Gleason will be working with the business development group to devise and coordinate supply chain solutions for customers.

SAAB/ICAN Wins Major AIS Contracts

Saab Transponder Tech and International Communications and Navigation Limited (ICAN) have been awarded contracts by Lockheed Martin Overseas Corp. to provide Automatic Identification System (AIS) solutions for Greece

and Turkey. Complying with all IMO performance standards, the software delivers vessel position and related information from ship to ship and from ship to shore. It is formatted to provide collision avoidance capability on the ship's bridge and to augment vessel traffic management systems. Ships will carry a transponder that broadcasts the ship's identity, position, speed, course and other information to all other AIS users within VHF Radio range.

Circle 25 on Reader Service Card

Sait-Stento Goes Inland With Satcom

Sait-Stento has expanded its satellite communication services to address the communication needs of onshore users in addition to its maritime user base. The

company's services include traffic accounting activities, airtime selling and value added services. Adding on to this will be ISDN high-speed data technology. Sait-Stento's Airtime Services Business Unit (ATS) is launching a special program for mobile users and telecommunication operators called M4Land, which is one of the largest Inmarsat providers in the world.

Circle 26 on Reader Service Card

Litton Marine Introduces IMO-Compliant Bridge System

Litton Marine Systems has introduced a new Integrated Bridge System (IBS), which has been designed to provide a cost-effective solution to basic navigation requirements in an IMO-compliant package.

Litton's new Pilot Series IBS consists of a scalable set of pre-configured system modules, which are mounted in standard bridge console units. The system is based on Litton's proven Voyage Management System (VMS) with Electronic Chart Display and Information System (ECDIS). The basic Pilot Series package includes a VMS/ECDIS console kit, BridgeMaster E ARPA radar console kit, doppler speed log, gyro-compass, steering console with adaptive autopilot, echosounder, magnetic compass and wind sensor. A range of optional modules is also available.

Circle 23 on Reader Service Card

Leica Introduces New GPS Chart Plotter

The new Leica MK 40 GPS chart plotter provides a combination of an advanced high-accuracy GPS receiver, built-in C-MAP NT vector cartography and a high-resolution direct sunlight readable screen.

The MK 40 is the first chart plotter to be based on IBM's leading-edge silicon germanium (SiGe) chip technology. The embedded 12-channel high-accuracy GPS receiver board in the MK 40 was the result of a two-year R&D project by Leica Geosystems and IBM Microelectronics.

The combination of Leica's GPS receiver architecture and IBM's advanced SiGe integrated circuit technology has resulted in a GPS receiver with unprecedented processing power, sensitivity and accuracy.

The GPS receiver and optional dual-channel DGPS beacon receiver are sealed inside the MK 40's low-profile "smart" antenna unit. The waterproof ultra-thin MK 40 display and control unit can be mounted below decks or in an open cockpit.

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CAD/CAM Report

Is 3-D Product Modeling Practical For Small U.S. Shipyards?

Over the past 30 years, computer-aided ship design and construction has progressed from mainframe computers to PCs, from independent programs to fully integrated programs, and from large shipyards to all sizes of shipyards. More to the point, key advances during the past several years have made 3-D product modeling a tool that can significantly improve small yard efficiency, quality, and profit. However, 3-D product modeling can do these things only if implemented in a planned and well thought-out manner, tailored to the specific yard. 3-D product modeling, when combined with other innovations such as NC production equipment and the workstation approach to production, can make a small shipyard remarkably more competitive than when using traditional methods for new ship construction and major conversions.

Small shipyards, at least those in the U.S. today, are typically faced with tough competition and a shrinking market. In addition, those yards serving the petroleum industry face a cyclical market that wreaks havoc with attempts at maintaining a consistent workload and staff stability.

These yards often use traditional design, engineering, and lofting techniques, though some computer-

aided design tools are entering the mainstream, as described in the following section. Traditional construction methods, notably stick building, are the norm. Construction expertise resides not in a computer database, but in the minds of senior foremen, leadermen, and craftsmen. When these people leave a shipyard, their corporate knowledge and shipbuilding expertise leave with them. These yards have small or non-existent internal research and development budgets. Their management and production personnel are wary of far-reaching innovations, which they perceive to hold risks of disrupting present practices and not delivering improvements to the yard.



Astilleros Zamakona is just one small shipyard, which reaped huge savings in materials, production and design hours by integrating a computerized 3-D modeling system.

Finally, small shipyards' time scales, for example, the time allocated to design, fabrication, or erection, is much shorter than those of the large yards. In these aforementioned yards, a change of several days may be of small consequence, but this may have a large impact

Table 1

Characteristics of Three Example Small Shipyards

Yard	Crane Capacity	Employees	# Ships Bit. 10 Yrs
Astilleros de Murueta	40, 30, 30	255	15
Astilleros Zamakona	15, 15, 8, 60	300	80+
Construcciones Navales P. Freire	110, 45, 20	280	50+

Table 2

Upgrading to the 3-D Product Model System Modules and Date of Installation (FORAN CAD/CAE/CAM System)

Yard	Fairing	Steel	Machinery and Outfitting
Astilleros de Murueta	1988	1988	1998
Astilleros Zamakona	1993	1993	1995
Construcciones Navales P. Freire	1989	1989	1994

Table 3

Improvements Resulting from Upgrading to 3-D Modeling (Coupled with Process and Facility Modernization)

Yard	% SAVINGS			
	*1	*2	*3	*4
Astilleros de Murueta	20	30		
Astilleros Zamakona	25	35	25	30
Construcciones Navales P. Freire	25	35	30	50

*1 Materials Cost; *2 Production & Labor Cost; *3 Construction Schedule; *4 Design Labor Hours

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on a project in a small yard.

CAD Tools in the Small Shipyard

Small shipyards in the U.S. typically implement computer-aided technology on an incremental basis. From the authors' experience, these yards are far behind their European and Far Eastern competitors in the extent to which such technology (and associated production

processes) are put into use. Typically, small yards may have some or all of the following computer tools: Word processing (Word); Spreadsheet (Excel); CAD (usually 2D)(AutoCAD); NC cutting machine software; Engineering programs (FastShip for hull design, HecSDS). Sometimes, data can be transferred between programs. However, each program is usually a separate, self-con-

tained entity with its own database, graphical user interface, software code, and operating procedures.

Unlike 3-D product modeling systems, the above example programs support traditional shipyard processes. The 3-D product model systems can support traditional processes, but their real value comes only when they are used in conjunction with modern shipbuilding

processes. Three example shipyards provide compelling evidence of the great advantages that can come from upgrading to 3-D product modeling. All three yards are privately owned and are located in the north of Spain. Table 1 provides information describing the yards, and all tables (on page 47), present overviews of the facilities. All the yards design a wide range of vessels, typically including merchant ships, fishing vessels, tugs, and offshore supply vessels. Prior to adopting 3-D product modeling, the yards used CAD or manual drafting and full scale or 1:10 scale lofting. Little design information flowed to the workshops, and outfitting was carried out on board the ship. The yards adopted 3-D product modeling, along with improved production processes and upgraded facilities, in steps, as shown in Table 2. The savings in materials and production labor costs, and reduction in schedule are quite astounding, ranging from a savings of 20 to 25 percent in terms of material cost; 30 to 35 percent in terms of production/labor cost; and a 30 to 50 percent savings in hours spent on design. The results are presented in Table 3.

In addition to the savings shown in this table, all yards reported improvement in the quality of production work. The main reasons for these improvements were more and better information provided to the shops, a drastic reduction of design errors during production, just-in-time information to the shops, pre-outfitting of steel blocks, improved accuracy of materials estimates, earlier availability of bill of materials, automatic generation of information for NC cutting and pipe bending machines, and information available to the planning department. Materials cost savings were realized because of less production rework, less material wastage in steel lofting, less need for piping margin, and shorter piping routes.

It is relatively clear that small shipyards using 3-D product modeling have improved production quality and have realized significant savings in materials cost, labor cost, construction time, and labor hours. While design staff training is straightforward, it may be problematic if the entire staff is trained simultaneously. The end result, however, is design staff proficiency in product modeling is attained by the end of the design of the first vessel (a modest level of technical assistance by the 3-D product modeling supplier is helpful during this first design).

About the Author

Jonathan M. Ross, P.E., is Director of Engineering at Proteus Engineering in Stevensville, MD. He is the North American representative of SENER, Ingeniería y Sistemas, S.A., the developers of the FORAN CAD/CAE/CAM system.



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Marine Literature Review



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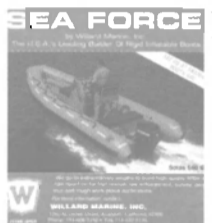
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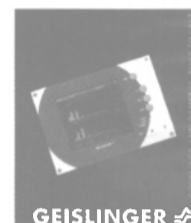


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Marine Literature Review



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Parker Hannifin

Parker's 711 hose and 71 series fittings, an assembly combination designed specifically for injection molding applications, are featured in a new product bulletin published by Parker Hose Products. Detailed product specifications are provided in the four-color bulletin. For a copy of Bulletin 4480-B61-USA, contact Parker Catalog Services, 8940 Tyler Blvd.,

Mentor, Ohio 44060, (440)205-7799. Circle No. 104



Prime Mover Controls

Integrated Machinery Alarm and Control System featuring the IMACS (Integrated Machinery Alarm and Control System), PMC's color brochure describes the various features of this system.

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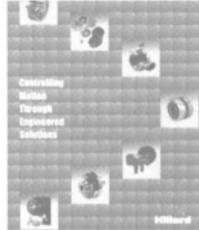
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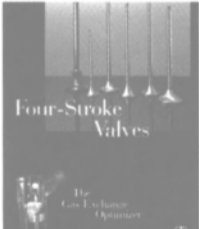
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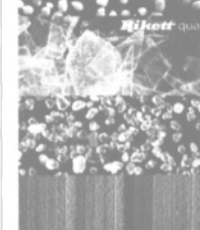


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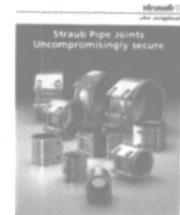
Marine Literature Review



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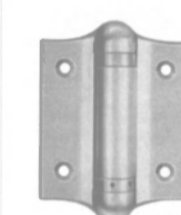
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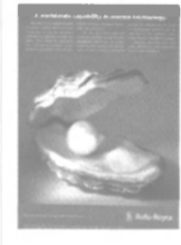
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Circle No. 134



Vessel Name Sea-Land New York
Type Containership
Owner Costamare Shipping
Shipbuilder Hyundai Heavy Industries

SeaLand New York is a 6,250 TEU containership built by Hyundai Heavy Industries (HHI), delivered to Costamare Shipping Company S.A. Upon delivery, the vessels will be employed on its owner's Far East-PSW service. The vessel has an overall length of 997 ft. (304 m), width of 131 ft. (40 m) and depth of 79 ft. (24.2 m) with a design draft of 39 ft. (12 m). It is powered by a Hyundai-B&W 1098MC-C model, developing an MCR of 77,600 bhp at 104 rpm that enables the ship to sail at a service speed of 25.6 knots.

This Hyundai containership design features a wider beam that is designed to ensure a better stability when loading and unloading at international container terminals. The vessel is also designed to have superior propulsion efficiency against the various drafts, which will be caused by loading scheme.

The vessel has 8 holds, 6 of which are arranged forward of the engine room (20 ft. container/26 bay) and two are backward (20 ft. container/8 bay) and a maximum of 14 rows and 9 tiers of 20 ft. containers can be stowed in the holds. Two air changes per hour are provided to NO. 1-5 hold in which dangerous cargoes of SOLAS classes two to eight can be carried.

The Hyundai containership is girderless type and can carry the maximum 14 rows of containers. Total TEU is 6,250 of which 3,130 TEU in holds and 3,120 TEU of deck, with 500 FEU reefer sockets provided. Pontoon type hatch covers close the seven holds.

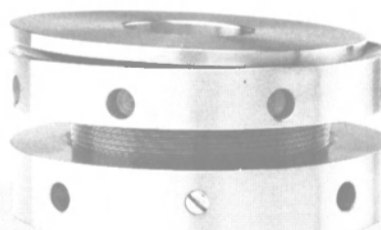
Each hatch cover is made up of three panels with maximum panel weights kept below 40 tons to suit handling by port cranes. The vessel is arranged to

carry 20 ft., 40 ft. and 45 ft. containers. Cargo holds are provided with 40 ft. fixed cell guide that can load five tiers of 20 ft. container.

Athwartship lashing bridges for 40 ft. and 45 ft. containers are arranged with necessary fittings so that the containers on hatch cover/stool on upper deck can be conveniently and securely lashed up to 5/6 tiers. The Hyundai containership is provided with both optimum section profiles of rudder and tip-raked propeller to reduce the possible cavitation. For durability of outside shell, self-polishing paint of five-year lifetime and ICCP is applied to the vessel, and anode of five-year lifetime provided in water ballast tank.

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Vessel Type Millennium Cruise Ship
Owner Celebrity Cruise Lines
Builder Chantiers de l'Atlantique



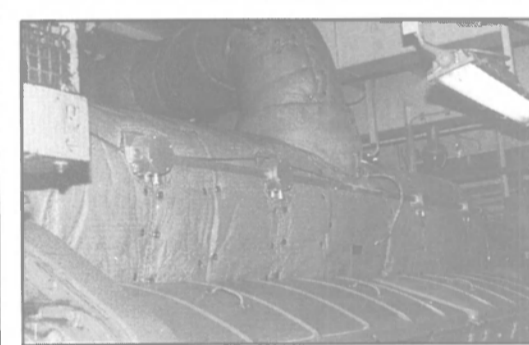
Millennium — Celebrity's newest vessel built by Chantiers de l'Atlantique — combines old-world elegance with new age technology, as it is the first cruise ship to feature gas turbine as the main propulsion engines.

While the the 965-ft. (294 m), 91,000-ton Millennium had a slight hull design problem which caused a bit a vibration (a problem which is being addressed on Millennium at Newport News Shipbuilding (see story, page 14) and by the builder on each sister ship), it will undoubtedly serve as a watershed newbuilding on the cruise market. The vessel is designed to cruise at 24 knots holding 1,950 passengers and 999 crew. Celebrity opted to install a pair of GE LM2500+aeroderivative gas turbines, using a combined gas and steam turbine integrated electric drive system (COGES) configuration — an extremely efficient use of energy: Energy that would otherwise be lost in the exhaust from the gas turbines is captured to produce steam from boilers for the steam turbines. The gas turbine-based system powers electric motors that move the vessel through the water. COGES is also responsible for all onboard power requirements, including ventilation systems, electrical power to light cabins and air conditioning. While the gas turbines offer the environmentally friendly 80 to 90 percent reduction in exhaust emissions and noxious gases, Celebrity has gone a step further in its environmental safety precautions with a flue gas cleaning system and de-ashing incinerators. This concept ensures a "green ship" status at all times with no discharge and stringent monitoring of emissions and residuals at sea and port conditions. The company has contracted Chantiers to construct three additional vessels that will round out the Millennium Class series — Infinity, Summit and an unnamed vessel, respectively scheduled for completion in January 2001, August 2001 and April 2002.

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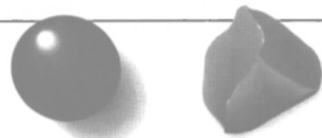
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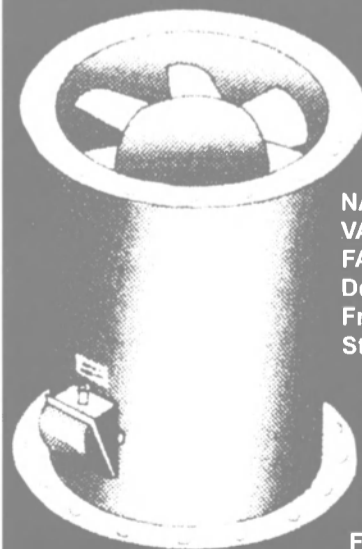
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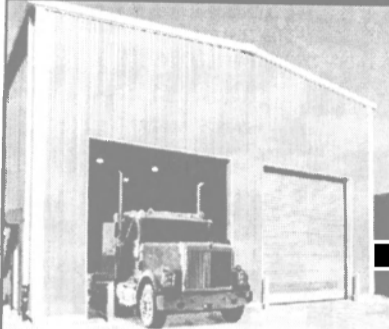
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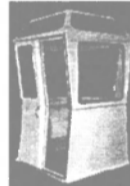
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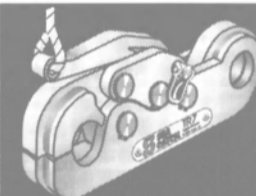
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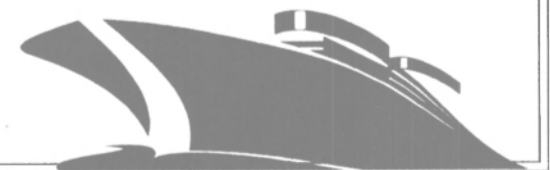
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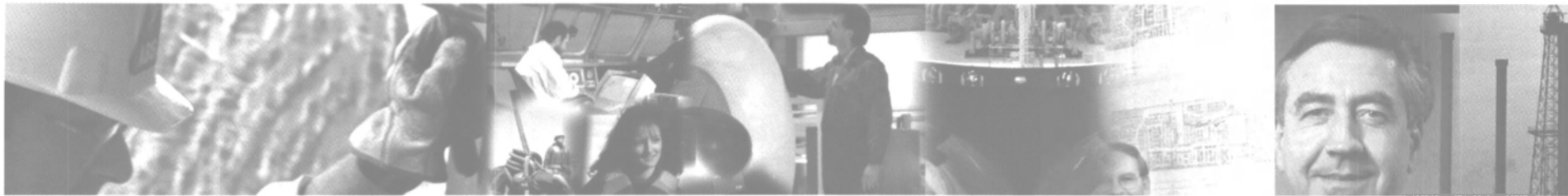
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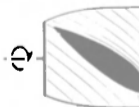
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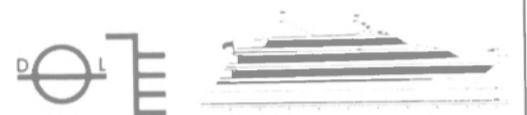
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46	A. R. Larsen	refrigeration	200	c4	Karl Senner	propulsion equipment	240
6	ABB Turbo Systems AG	marine equip. & supplies	201	36	LC Doane	lightingn systems & equip.	277
2	Albacore Research	CAD-CAM	202	3	Leica Navigation	marine navigation	241
47	Anchor Marine	marine equipment & supplies	204	23	Litton Marine Systems	navigation	242
37	Atlantic Marine	shipyard	205	53	Machine Support	align. & mounting specialists	279
49	Azonix Corp.	electronics	206	46	Marco	shipyard	243
44	Baier Hatch Co	hatches	207	1	Marex	on line marine marketplace	244
22	B2B Netservice	e commerce	208	41	Maritel Marine	communications	274
34	Brookdale	survival equipment	209	C3	Maritimetoday.com	employment website	278
15	Cadmatic	CAD/CAM	210	51	Marcon International	brokers	275
11	Carhartt	marine workwear	211	43	Mascoat Products	coatings & insulation	245
38-9	Carrier Transicold	refrigeration	212	16	Mathers Controls	propulsion equipment	246
19	Cortland Cable Co.	ropes	213	36	Mercy Ships	job oppurtunities	247
7	Craft Bearing	bearings	214	14	Motor Services Hugo Stamp	diesel engine spare parts	249
45	Creative Systems	software	215	12	Napa Oy	software	250
24	Curaco Drydock Co	ship repair yard	216	46	Neptune Research	water act.pipe repair tape	251
36	Custom Ship Interiors	interiors	217	17	Newport News	shipbuilding	252
5	Daewoo Ship/Marine Eng.	shipyard	218	2	Northern Airborne Tech	search & recue instruments	253
4	Deytens Shipyards Inc	shipbuilder	219	14	Owens	sanitation devices	254
19	Dolphin International	ship fenders	220	48	PTC	CAD-CAM	255
27	Electronic Marine Systems	technology	221	49	Rice Propellers	propellers	256
29	Electronic Marine Systems	technology	222	18	RTM Star Center	training	257
31	Electronic Marine Systems	technology	223	25	RW Fernstrum & Co	cooling products	258
33	Electronic Marine Systems	technology	224	42	Samsung	shipyard	259
26	Estaleiros	shipbuilder	225	26	Sasakura Engineering Co.	fresh water generator	260
50	Europort 2001	event	276	10	Seaward International	fenders	261
47	Ferro Corp	coatings	226	18	Stork Kwant	heat/air/ventolation	262
28	First Wave	shipbuilder	227	53	Superior Energies Inc.	manufacturing & contracting	263
45	G.J. Wortelboer	chains	228	9	Tampa Bay Shipbuilding	shipyard	264
8	Gibbs & Cox	naval architects	229	47	Titan Maritime Industries	salvage/lighting	265
30	Hanjan Heavy Ind/Construct. Co	shipyard	230	13	Urethane Products	foam filled fenders & buoys	266
20	Houston Marine	marine training services	231	c2	USMMA	merchant marine academy	267
32	Hyundai Heavy Industries	shipyard	232	13	Van Hall Health	medical management	268
45	Icom	marine equipment & supplies	233	44	VingCard AS	locks	269
16	In Place Machining	crankshaft repair	234	43	Washington Chain	cleats & shackles	270
20	Jeamar Winches	winches & sheaves	235	22	Waterman Supply	marine equipment & supplies	271
20	Jeamar Winches	winches & sheaves	236	44	Western Machine Works	tractor pins	272
22	Jesse Engineering	flanges	237	8	Westmont Industries	cranes, gangways & convey- ors	273
44	John J. McMullen Assoc.	naval architects	238				
43	JW Fishers	underwater cameras	239				

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