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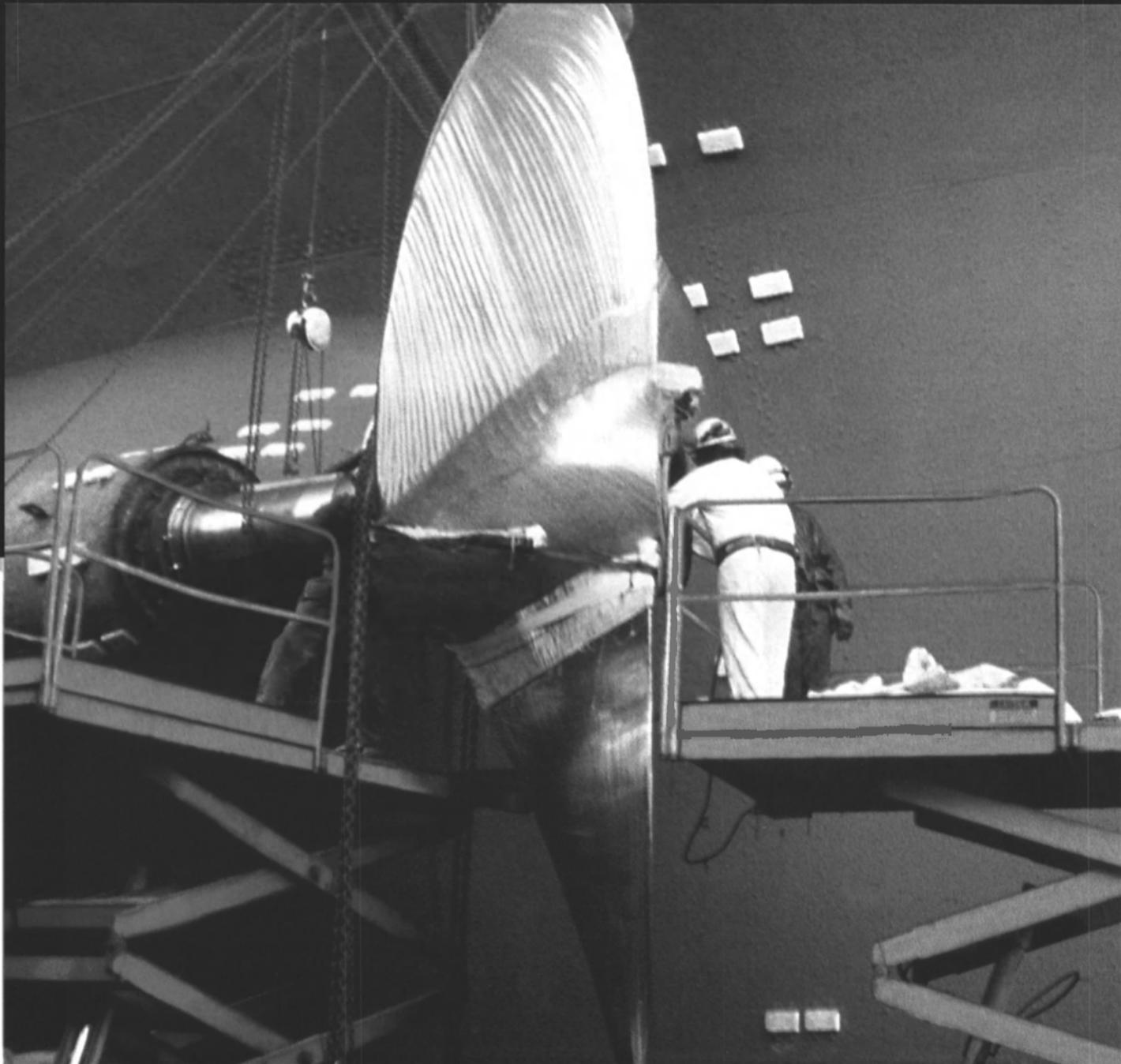
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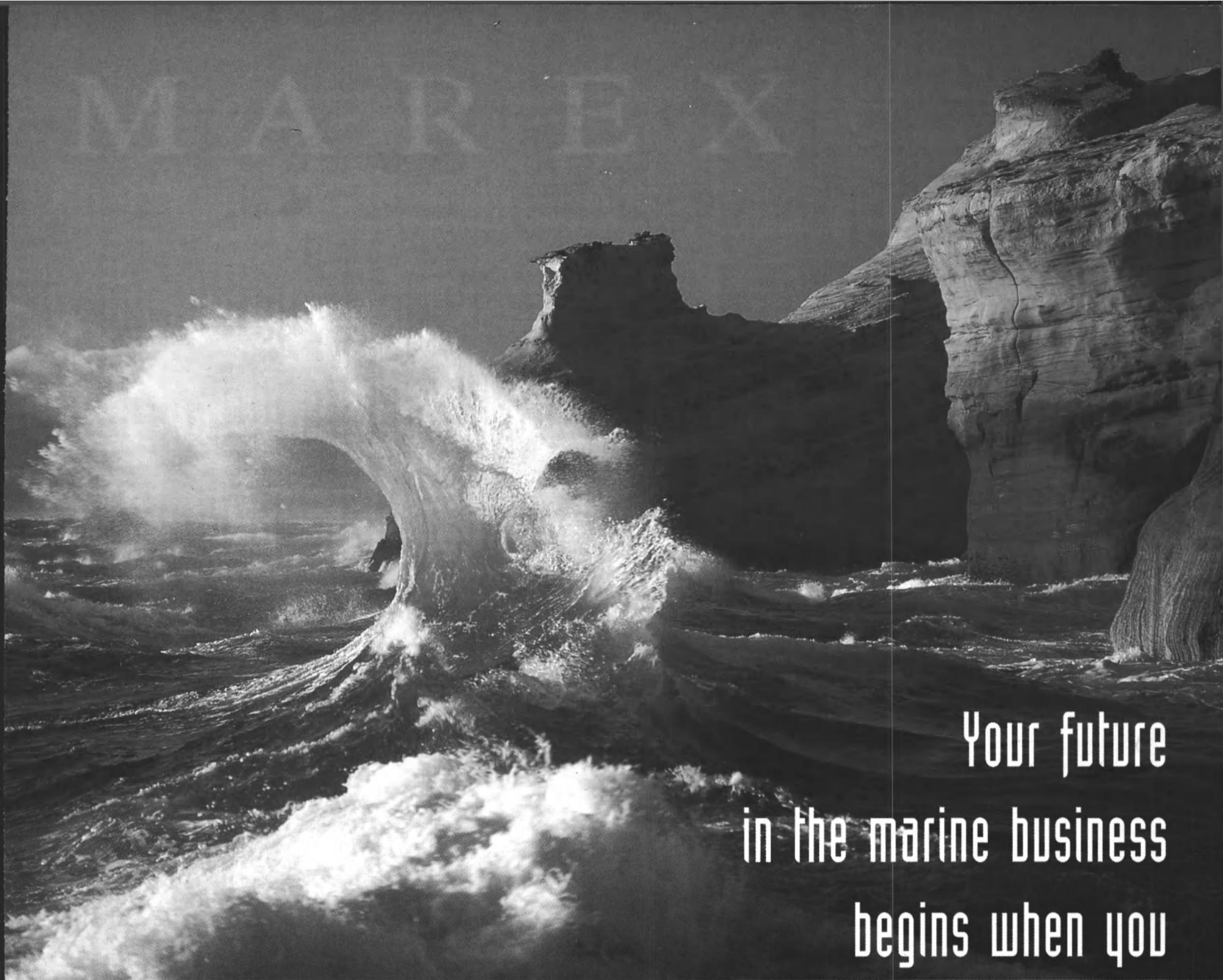


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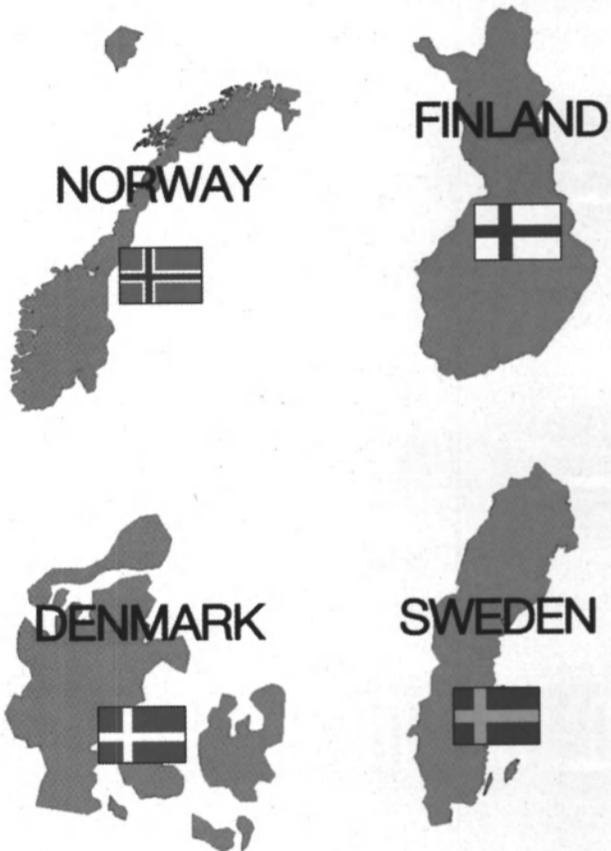
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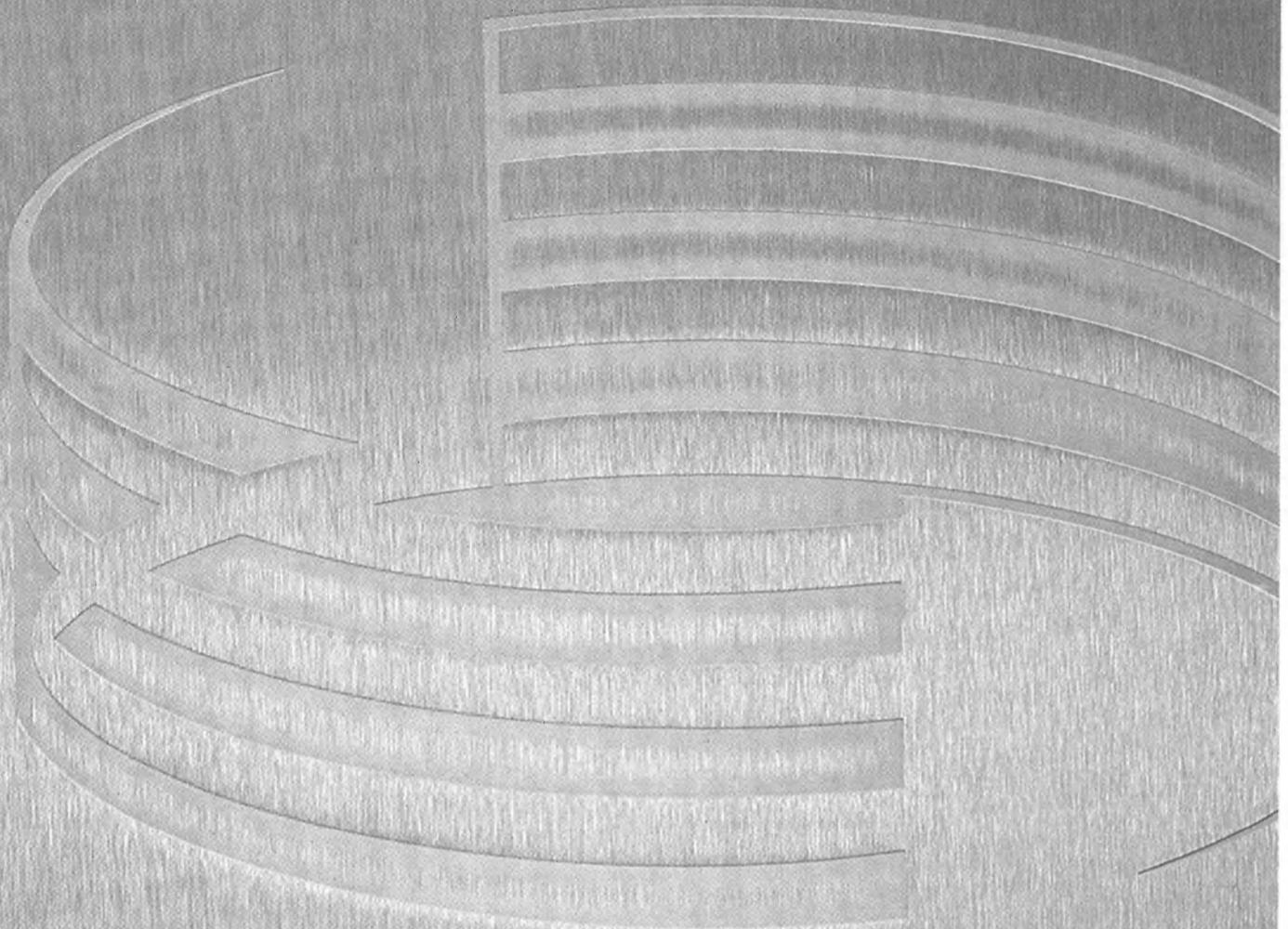


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## EDITOR'S NOTE

The title which adorns this month's cover — Bigger, Faster & Stronger — is truly reflective of the trend toward the use of new, innovative materials in all phases of vessel building and outfitting. While the maritime industry is labeled conservative in terms of incorporating new technology by some outsiders (and some insiders, too!), caution when utilizing new materials is warranted and oftentimes regulated, given the unique and rigorous demands of shipboard service, and the high stakes in the event of a failure.



While advances in hull materials often gets a lion's share of exposure, it is simply one small portion where advanced materials have been incorporated. Cruise ships, for example, can serve as a microcosm of marine materials advances, incorporating everything from longer lasting stair treads to cabin construction to fiber optic cabling. New materials are constantly being evaluated in terms of providing longer-lasting life, structural strength and stability and, of course, for weight savings. Scrutinizing of marine materials, particularly on the cruise ship side with thousands of lives (and potential lawsuits) at stake, is understandably rigid. "Materials Matter" begins on page 22.

While the Bigger, Faster & Stronger title may ring true in terms of marine materials, it is perhaps a paradox in terms of the state of the commercial shipbuilding business today. Last month, two industry giants — Kvaerner ASA and Daewoo — announced plans to walk away from the shipbuilding business. In both cases, the business of building ships is viewed as not profitable enough, although in both cases the shipbuilding component is simply one aspect of a larger conglomerate which is experiencing tough economic times.

It is yet to be determined, and probably never will be, if the moves are influenced more by politics, shareholders or the business itself. Most likely it was a liberal combination of the three. At press time, Kvaerner was set to announce its plans — outright sale, partnership or spin-off — while Daewoo was reported to be in talks with Japan's Mitsui. Regardless of the outcome, the sight of two industry majors heading for the "Exit" door after constructing massive infrastructure with the goal of economizing the shipbuilding process — and constant talk of low to no margins on the ship repair side — should provide a jolting wake-up call to the industry.

*Gregory R. Franthum*

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1999 YEARBOOK EDITION

Country Focus: U.K.

**July**  
Diesel Power Annual • Cruise Industry Report • Safety Products Review • CAD/CAM Systems • SatCom Suppliers • Deck Machinery & Cargo Handling Equip.

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U.S. Ship & Boatbuilding Annual • Software Solutions • Fast Ferry Technology

• Engine Performance Equipment •  
Country Focus: Germany

**September**  
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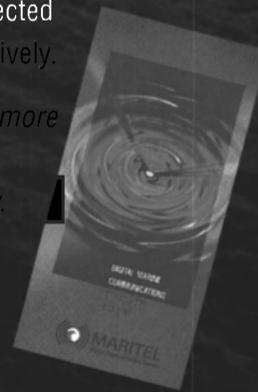
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# Linehaul Ships for the Future



by David Tinsley,  
technical editor

As manifested in its commanding 25 percent global market share of boxship classification, in tonnage terms, Germanischer Lloyd (GL) combines both a sensitivity to the particular needs of a community immersed in container vessel ownership, operation and construction, with a predilection for frontier technological development. The containership component of the world fleet has grown 8.7 percent over the past five years alone, and the prospect of considerable volume growth during the next 10 years drives the industry to achieve ever-higher efficiencies per slot in the face of unremitting competitive and rate pressures.

GL's studies reflect a close understanding of the commercial factors which call for still greater strides to be taken down the path of scale economy and design optimization. In looking to

establish what is technically and structurally attainable within the bounds of safety, long-term dependability and acceptable cost, in a holistic approach to ship design, the society's proactive disposition makes it a valued partner of clients and helps strengthen the wider standing of German maritime technology.

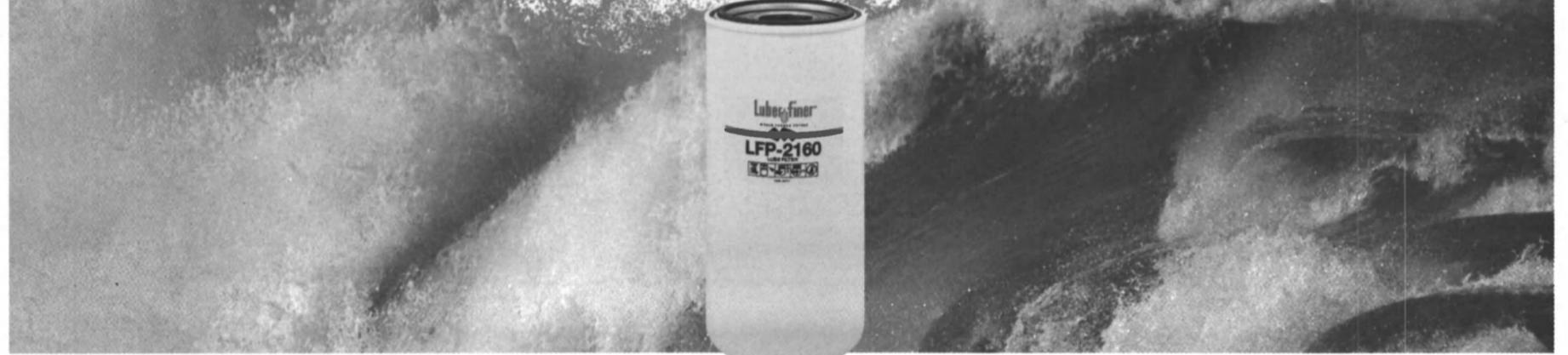
German shipyards delivered the world's first post-Panamax linehaul vessels over a decade ago, to far-sighted American President Lines, and although subsequent record-breaking sizes have emanated from building berths in the Far East and Denmark, the German maritime cluster remains a powerhouse of containership operating and design know-how.

While the somewhat secretive Danish organization A P Moller is thought to have taken the industry towards the



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8,000-TEU environs with its latest breed from Lindo, a German study consortium involving GL has provided the technological launchpad for 'mega' container-ships offering 8,000-plus slots. In addition, the society is participating in projects which are set to break new bounds

in the Panamax category, bringing a 5,000-TEU load capacity within the ambit of a ship dimensioned to transit the Central American waterway.

Well known for his blend of candor, economic appreciation and technical knowledge, GL's executive board mem-

ber Hans G. Payer believes the technological path is open to vessels of 11,000/12,000-TEU in the medium-term, and that a 15,000-TEU unit capacity might be realized within 10 years as part of an integrated service strategy based on a rationalized itinerary using

mega-hub terminals.

Under the federal government-sponsored Container Transport Systems of the Future initiative, project-managed by builder Howaldtswerke-Deutsche Werft (HDW), GL undertook thorough strength and stress analyses. "The results show that nothing now stands in the way of construction of ships carrying 8,000-TEU as far as the structural aspects are concerned," reported the society.

While it is accepted that the considerably higher loads arising in many areas necessitates local reinforcement, the sophistication of analytical methods now available means that potential strength problems associated with still larger ship sizes can be identified dependably during the design phase, and solved accordingly.

The containership component of the world fleet has grown 8.7% over the past five years alone, and the prospect of considerable volume growth during the next 10 years drives the industry to achieve ever-higher efficiencies per slot in the face of unremitting competitive and rate pressures.

It is felt that 25 knots is likely to remain the norm in terms of maximum design requirement for some time, since studies indicate that a 10 percent increase in speed to 27.5 knots carries a 30 percent fuel consumption penalty. Existing top-of-the range machinery from the two-stroke diesel engine specialists would meet the combination of vessel scale and speed requirements, although progression beyond the 8,000-TEU category would require a twin-engine plant or alternative solution. Detailed technical work is now being progressed on the 8,000-TEU type, while one operator is also involved in evaluations for a vessel of around 12,000-TEU, for which two low-speed



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## INVESTMENT IN DESIGN

diesels of the widest-bore types, albeit with something less than the maximum number of cylinders, would be needed to guarantee schedule-keeping up to a top speed capability of 25-knots. An open-top configuration is being investigated, with special consideration of strength and seaway behavior.

A subsequent advance to 15,000-TEU, while technically viable in GL's view, would be subject still further to logistical and port factors, and would necessarily demand turnaround productivity possibly as great as 300 moves per hour and necessitating provisions for simultaneous working of the vessel from both sides.

Such a behemoth of the liner trades, calling at a minimum number of main-line hubs, could spawn a requirement for vessels of 3,000-5,000-TEU to serve regional pivots and feeders of up to 1,500-TEU to sweep the minor ports.

Draft is a key control on future size, since access to many of the major terminals and ports requires that a vessel should draw no more than 46 ft. (14 m). Interrelated with this criterion, Suez

Canal parameters dictate a maximum beam of 190 ft. (58 m) for a draught of 46 ft. (14 m).

On the basis of these considerations, believes HDW's Andreas Kraus, the top capacity for a future generation of containerhips in the foreseeable future would probably be around 11,000-TEU rather than 15,000-TEU, assuming a reasonable deadweight-to-slot relationship.

Speaking in London at the 'Design and Operation of Container Ships' conference organized by The Royal Institution of Naval Architects (RINA), Kraus said that studies under the Container Transport Systems of the Future program demonstrated the economic advantages of the 8,000-TEU size.

Evaluations of various designs from 4,970-TEU upwards at different speeds indicated the competitiveness of the 8,000-TEU type as regards fuel consumption per slot and nautical mile, with the best performance at 22 knots. Overall transport costs, including transshipment and hinterland stages, were also demonstrated to be lowest for an 8,000-

TEU vessel at 22 knots.

From a global logistics point of view, the German research project indicated an optimum service speed of between 24 and 25 knots for the largest linehaul vessels. In his joint presentation at the recent RINA gathering with Marc Lebrun from Bureau Veritas entitled 'Design consideration of very large containerhips,' Wartsila NSD Switzerland's Barend Thijssen confirmed the potency of the Sulzer RTA96C diesel. A single, 12-cylinder model, the most powerful engine in the company's existing two-stroke range, direct-coupled to a single fixed-pitch propeller, could ensure the requisite speed for ships as large as 9,000-TEU.

It was pointed out that technical studies including vibration analysis had demonstrated the feasibility of 13- and 14-cylinder versions of the wide-bore engine design. In 14-cylinder format, the RTA96C would deliver 76,860-kW (104,580-bhp) at 100-rpm.

The question is whether a propeller that can transmit so much power is technically feasible.

"Today's containership propellers are coming closer and closer to the limits set by propeller-induced vibrations and by the manufacturing of the propeller itself," argued Thijssen and Lebrun.

From a two-stroke perspective, it is felt that the alternatives for ships in excess of 9,000-TEU are a twin-engine, twin-screw configuration, or a contra-rotating propeller arrangement. The considerable impact on capital costs of two massive low-speed engines instead of a single unit, however, could be a deterrent in other than the most extreme sizes, i.e. of a minimum 13,000-TEU, it was suggested.

The contra-rotating propeller system option thereby warrants closer examination by the industry.

Where enormous power concentrations are involved, it is felt that this holds certain potential benefits relative to a conventional single screw arrangement through higher propulsive efficiency, and therefore reduced installed power requirement and operating costs, and by offering a degree of redundancy and extra operational flexibility.



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# Booming Oil Boosts OSE

Higher oil prices pushed the Oslo Stock Exchange in a positive direction in March, and had a particularly beneficial effect on offshore shares.

The substantial gains by the majority of offshore shares pushed the Shipping Index, which contains both shipping and offshore shares, up 11.7 percent. The All Share Index, by comparison, rose by 6.9 percent during the month.

The increase by both indices of almost 12 percent during first quarter, promoted the Oslo Stock Exchange to the second-best performing European bourse so far this year.

The background for this success was the performance of North Sea oil which ended the month at around \$14.5, up \$3.5 since the end of February, providing the climate for a drop in market rates and for the Norwegian krone to strengthen.

Of the Main List offshore shares, TGS Nopec enjoyed the best performance with a 60.4 percent increase, recovering some ground after recent negative price movements. Stolt Comex Seaway and Smedvig also performed well rising 55.8 percent and 44.2 percent respectively.

Navis, an SMB-listed company, was one of the worst performing stocks after two months, but rose 77.1 percent in March ending the first quarter about even for the year.

Nortrans Offshore ended the month at

the other end of the scale with a fall of 16.7 percent in its share price. Havila Supply and Awilco A were the only

other two offshore shares to end the period with a fall.

Among shipping shares Frontline were again on top of the losers' list falling 21.4 percent during the period. FRO's performance is still positive this year. The SMB-listed Team Shipping fell 13 percent, while Western Bulk

Shipping dropped 11.1 percent.

Bona Shipholding led all shipping shares in March with a 64.1 percent rise. The rise resulted from the company's announcement on March 29 of its plans to merge with Northwest Maritime Inc., a wholly-owned subsidiary of Teekay Shipping Corporation.



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### March's Winners

Shipping	List	Change
Bona Shipholding	Main	64.1%
Waterfront Shipping	Main	39.9%
Ganger Rolf	Main	14.8%
Odfjell B	Main	13.2%
Wilh. Wilhelmsen A	Main	11.8%

Offshore	List	Change
Navis	SMB	77.1%
TGS Nopec Geoph	Main	60.4%
Stolt Comex Seaway	Main	55.8%
Ocean Rig	SMB	53.1%
Stolt Comex Seaway A	Main	46.5%

### March's Losers

Shipping	List	Change
Frontline	Main	-21.4%
Team Shipping	SMB	-13.0%
Western Bulk Shipping	Main	-11.1%
Tordenskjold	SMB	-7.1%
Bergesen B	Main	-4.8%

Offshore	List	Change
Nortrans Offshore	SMB	-16.7%
Havila Supply	SMB	-7.1%
Awilco	Main	-3.3%
Awilco B	Main	3.6%
District Offshore	SMB	6.4%

## MARINE FINANCE

### ABB Unit Awarded Deepwater Drillship System

The U.S. leg of ABB has won a \$15 million contract for construction of a riser system for a new build drillship designated to operate in up to 10,000 ft. of water.

With a scheduled delivery sometime

during the second quarter of 2000, Saipem SPA of Milan, Italy granted this right to ABB Vetco Gray with construction to be done at Samsung Yard in Korea. The 3.5 million pound rig will be outfitted with an advanced high capacity riser connector to handle its large size.

Circle 55 on Reader Service Card

### Norsk Inova AS Signs \$12 Million Contract

Formerly known as Norsk Hydro Waste Treatment Systems, Norsk Inova has signed contracts for to supply the waste handling system for eight new-build cruise ships, including vessels for Royal Caribbean International, Renais-

sance, Radisson Seven Seas, Festival and RCI/Celebrity Cruise Lines.

Circle 56 on Reader Service Card

### Atlantic Marine Continues Its Steady Stream Of Repairs

With vessels from both the European and U.S. market, Atlantic Marine is in the process of repairing a multitude of ships currently in drydock.

From the U.K., Atlantic is working on E.M.C.'s Castoro 10 trenching/pipe lay barge for extensive hull, superstructure and helideck treatment and painting, as well as fabrication of an extended pipe ramp. Seabird Management, based in Norway has drydocked the Northern Access for repairs to damage that occurred from a fire in the engine room. Reconstruction includes electrical rewiring and insulation, and removal/overhaul renewal of various electric motors and auxiliary systems equipment. Italy-based AR.CO.IN's Ilaria D for drydocking and hull damage repairs, Denmark/Germany-based African Marine & F.H. Bertling's Luena is being repaired for weather hull damage and in Cyprus/Germany C.F. Ahrenkiel's Elebegas was taken in for third special survey drydocking, hull damage and general repairs.

On the domestic side, topside refurbishment was done to the Strong American. Operated by the Jore Group, based in Seattle, Wash., some of the repairs included two side ramps, bow ramp, new D-rings, installed hatches and valve repair. Upcoming, the Moran Services operated barge Massachusetts, is scheduled for a routine drydocking and repair including hull cleaning and painting, sea valves and generator cleaning — to name a few.

Circle 3 on Reader Service Card

### LMS Chosen By Australia

Litton Marine Systems has won an order from the Australian Navy Yard for provision of navigation radar systems for 16 of the the Navy's Fremantle-class offshore patrol vessels.

Circle 57 on Reader Service Card

### Ulstein Wins Fourth Contract In Six Months

Design company Ulstein Nordvest-consult AS (UNVC) has signed a deal with Norway's Remøy Sea Group to devise an ice strengthened, shrimp factory trawler. With delivery scheduled for May 2000, the 200 ft. (61 m) vessel, built by Ørskov Christensens Staalskibvaerft is the first shrimp trawler with a triple trawl system — allowing three trawls to be activated at the same time.



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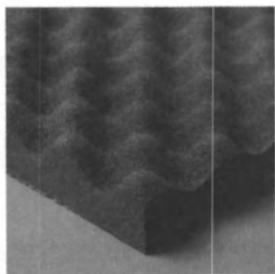
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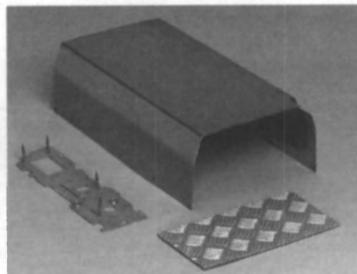
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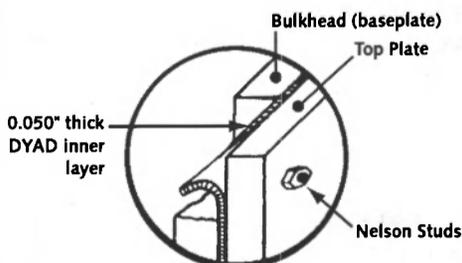
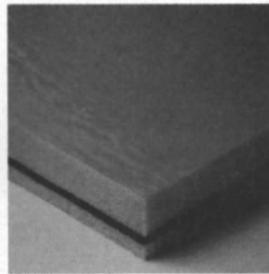
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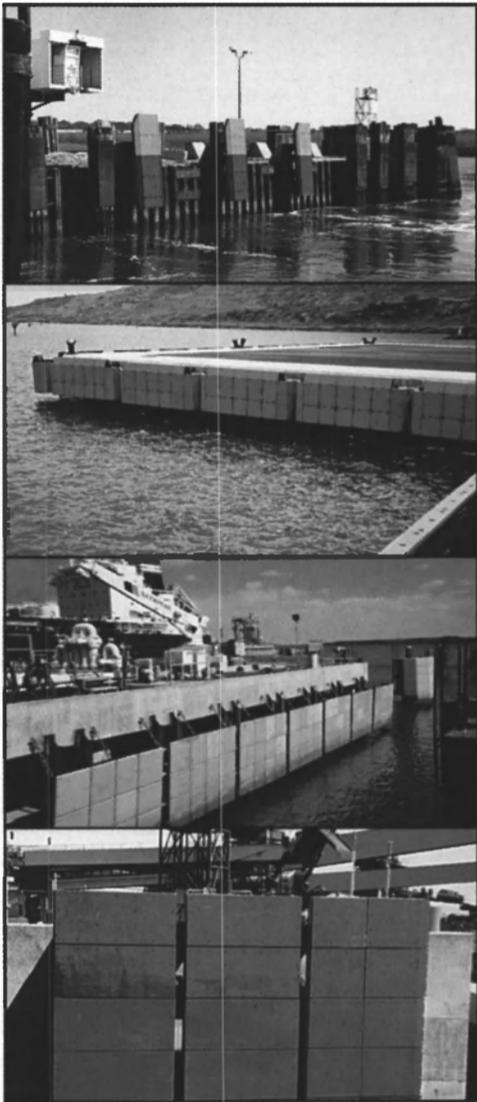
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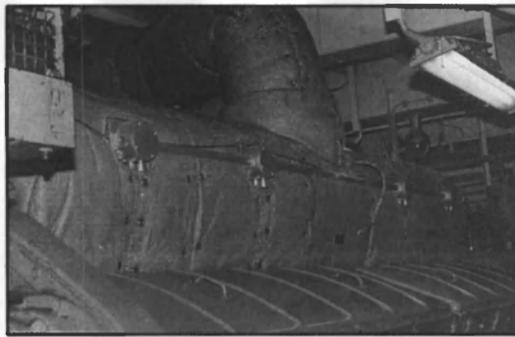
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## MARINE FINANCE

### Daewoo To Sell Shipbuilding Unit

In another stunning development last month, Daewoo Group announced plans to sell its shipbuilding unit, as well as other non-maritime-related assets, in an effort to raise cash and distance itself from low-margin businesses. It was announced that the shipbuilding division would be sold to Mitsui & Co. Ltd or other Japanese firms. There is apparently worry regarding the financial viability of the company, following a downgrade by Standard & Poors in mid-April, and creditor banks were reportedly concerned that Daewoo Group had not done enough to reduce debts.

### Freighters To Be Fitted With KH Radar

Ten new multi-purpose freighters built by Splithoff Bevrachtungskantoor are to be fitted with Kelvin Hughes radar sets with a scheduled delivery of August 2000. Each set will feature a Nucleus2 6000 ARPA split radar system with display, Nucleus2 5000 True Motion radar with display and HRC-A9 interswitch unit.

Circle 88 on Reader Service Card

### Eaton And Robicon Sign Contract

The Navy Controls Division of Eaton Corporation and Robicon have entered into an agreement to develop new variable frequency drives products for electric propulsion systems and other shipboard applications for U.S. Navy Ships.

Robicon pays special detail to application specific, power conversion solutions, while Eaton focuses on the manufacturing of specialized electrical motor controls and power control systems.

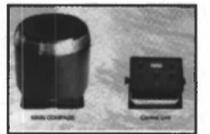
### Unique Engine Slated For Greek VLCC

Korean-based Daewoo Heavy Industries received an order from Kristen Navigation of Greece for a VLCC (plus options) with propulsion by an MAN B&W 6S90MC-C. With an output of 40,000 bhp at 76 rpm., the engine is the first of its kind to be ordered and will be built and tested in Korea by MAN B&W licensed Hyundai Heavy Industries. The six cylinder engine is tailor made for the demands of higher speed VLCC's.

Circle 5 on Reader Service Card

### Scan-Steering Lands Order

Manufacturers of electronic and hydraulic marine equipment, Scan-Steering has received an order for the five complete ship set of Scan2000



gyrocompasses with accessories for five new vessels. Currently being constructed in Malaysia, the high speed vessels are owned by the country's Marine Department.

Circle 4 on Reader Service Card

### Hawk IV To Patrol New Zealand Coast

Chosen by New Zealand Customs, Salthouse Marine Group has developed a high speed, wide body patrol boat, the Hawk IV, based on the company's Sovereign 52. Fitted with twin Scania 400 hp engines, the Hawk IV will be used to patrol the country's sea borders to prevent individuals from entering the country illegally.

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# Cruise Industry Enjoys Unprecedented Growth

By  
William N. Myhre and  
Darrell L. Conner

The U.S. flag cruise industry is on the verge of the most significant expansion in decades. Not since the early 1950s

has there been such interest in building and operating U.S.-flag passenger vessels. American Classic Voyages, the

largest operator of U.S. flag passenger ships, has two new cruise projects well underway (Project America in Hawaii and the Delta Queen Coastal Cruise Line) which will more than quadruple its capacity in the coming decade. SeaAmerica Cruise Lines has announced its plans for three new mid-sized cruise ships to operate on the U.S. coasts. And America West Steamboat Co., a riverboat cruise company in the Pacific Northwest, is planning a new overnight cruise vessel for the Alaska and Hawaiian trades. At the same time, the U.S. continues to have a vibrant and growing fleet of dinner cruise, casino and gaming boats, and passenger ferries.

Virtually across the industry there are new opportunities available for further expansion, using existing programs or by taking advantage of recent changes in the law. But keep a weather eye on Congress. Changes being debated there could impact the entire U.S.-flag cruise industry. Navigating the uncharted waters of the "new" U.S.-flag cruise industry will require an astute captain and crew.

## Project America – A New Era in the U.S.-Flag Cruise Industry

The most notable development in the U.S.-flag cruise industry is American Classic Voyages' Project America. Enacted in 1997, the U.S. Flag Cruise Ship Pilot Project statute sponsored by Sen. Daniel K. Inouye of Hawaii has enabled American Classic, the parent of American Hawaii Cruises and of The Delta Queen Steamboat Company, to take the Defense Department's MARITECH program to new levels. Where earlier projects focused solely on proposed cruise ship designs, it will now result in actual construction, helping to jump start cruise ship construction in the U.S. and to sustain the U.S. shipbuilding industrial base. Modeled after U.S.-flag cruise ship development bills from the early 1990s that never got out of Congress, the new law enables American Hawaii, which following the removal of service of the SS Constitution had only the venerable SS Independence to serve its Hawaii market, to again expand its operations in Hawaii. Just last month American Classic signed an \$880 million contract with Ingalls Shipbuilding to construct at least two new 1,900-passenger cruise ships for the Hawaiian Islands trade (with options for four additional vessels).

In return for assuming the consider-

## L27/38 The new generation grows

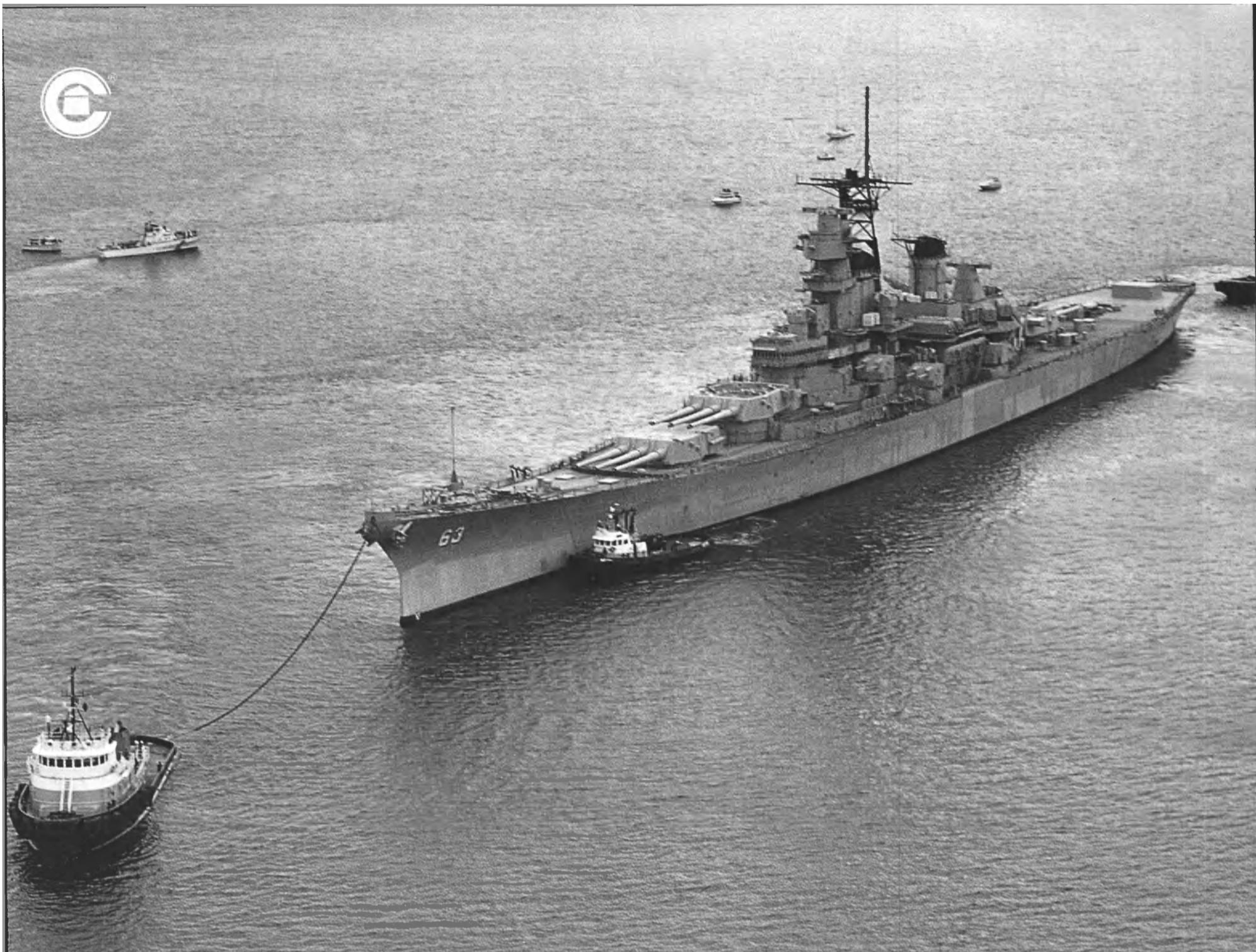
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The "Mighty Mo" is now retired, and Crowley Marine Services was chosen to take it to its final berth. Towing an 887' historic battleship with a 149' tug from Bremerton, Washington to Astoria, Oregon and then on to Pearl Harbor, Hawaii was a monumental job of logistics. But, doing seemingly impossible jobs well is why we were chosen.

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able "first mover" risk associated with building the first major cruise ships in a U.S. shipyard in forty years, American Classic was given a trade preference for the new vessels operating in regular coastwise service among the Hawaiian Islands and the right to temporary use of a foreign-built cruise ship (re-flagged U.S. and employing American crews) in those trades until after delivery of the new ships.

**Employing Old Programs and Understanding the New**

Perhaps the most utilized current program for new ship construction in U.S. yards is the U.S. Maritime Administration's Federal Ship Financing Program. The Title XI program, as it is commonly called, provides for a full faith and credit guarantee by the U.S. government of private capital invested in new ship construction for the purpose of promoting the growth and modernization of the U.S. merchant marine and U.S. shipyards. This program enables prospective shipowners to qualify for more favorable long-term financing that is comparable to what's available to large and financially strong companies. Several cruise companies, including dinner cruise and the ferryboat operators, have

utilized Title XI guarantees to make their projects more viable and cost effective. The most recent example is AMCV's use of Title XI to guarantee financing for its two new Hawaiian cruise ships.

Another option available to help finance new cruise ship construction is the Capital Construction Fund. Under an often overlooked provision in the tax code, the CCF program allows for the deferment of federal income taxes on certain deposits of money or other property placed into a CCF account. There are certain restrictions on the use of CCF funds (e.g., currently the new ships built with CCF must operate in the non-contiguous trades). But if you are an operator of U.S.-flag excursion boats in the Puget Sound area, for example, you can put income from those operations into a CCF account for the purposes of expanding your operations to Alaska. Other opportunities for CCF construction may be just around the cor-

**... keep a weather eye on Congress. Changes being debated there could impact the entire U.S.-flag cruise industry.**

ner as there are proposals being floated to expand the program to allow use of CCF accounts for other cruise trades.

Aside from these more conventional financing arrangements, recent changes in the law also allow opportunities for increased foreign investments in ships to be operated in the coastwise trades. The Vessel Lease Financing provisions of the 1996 Coast Guard Authorization Act is an example. It allows a vessel owned by a U.S. entity that is itself wholly foreign-owned to operate in coastwise trade under bareboat charter to a qualified U.S. operator, provided the foreign owners, a parent, or a subsidiary of that parent is engaged primarily in leasing or other financial transactions.

**Are Other Public Policy Changes Forthcoming?**

The growth in the worldwide cruise industry has increased its visibility – both in the public eye and on Capitol

Hill. Changes being proposed could dramatically impact the cruise industry – from repeal of the of Passenger Vessel Services Act which governs domestic passenger carriage to bills that would restore State authority to regulate (or eliminate) certain types of U.S. gaming and gambling vessels. Foreign cruise lines have also been the subject of intense Congressional and media scrutiny, not always favorable. Questions have been raised about safety on board these vessels, intentional ocean dumping, and the taxation (or lack thereof) of foreign cruise ships.

Notwithstanding such talk, the U.S.-flag cruise industry continues its unprecedented resurgence. There are programs available to encourage continued development, and recent changes in the law could stimulate even further activity. How it all plays out may not yet be certain, but the U.S. cruise industry is unquestionably embarked on an exciting voyage.

*William N. Myhre is a partner and Darrell L. Conner is a government affairs analyst at Preston Gates Ellis & Rouvelas Meeds LLP, a leading maritime policy law firm with expertise in the U.S.-flag passenger vessel industry.*

# Get the Cover, Not the Shaft.

The old style R4 Enterprise subcovers have a nasty habit of cracking, especially when the last capscrew is being torqued down. Designed to withstand only 180 Lbf-Ft torque, they have a history of cracking under much less. **Powerhouse Diesel Services** has engineered an answer to this problem. By increasing the support cast surrounding the bosses and rocker shaft pads, metal fatigue from rocker arm motion is greatly reduced. Combine this with a beefing of the areas around the mount pads and you have added insurance against over-torquing maintenance strong arms. In fact, Powerhouse added iron to ALL of the mounting areas of the subcover. That's why we call it the "Heavy Boss". This subcover was designed to withstand 680 Lbf-Ft.... tough enough to handle just about any kind of over-torquing. Keep in mind that the Powerhouse redesign has not changed the original configuration of the original R4 cover. The "Heavy Boss" covers are directly interchangeable with the old style.

Compare that with other redesigns requiring you to purchase not only the head subcover, but two new rocker shafts as well. *Why?* Well, we're not quite sure. Forcing a customer to purchase three new parts to fix one old problem is beyond our reasoning. Powerhouse understands the Enterprise better than anybody in the business. We are not a house divided; Enterprise is the ONLY engine Powerhouse manufactures parts for and services.

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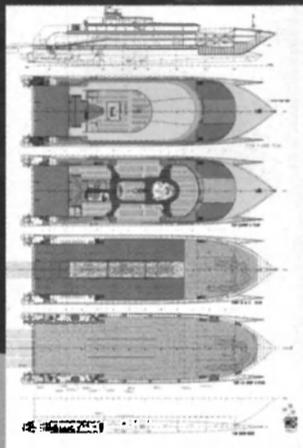
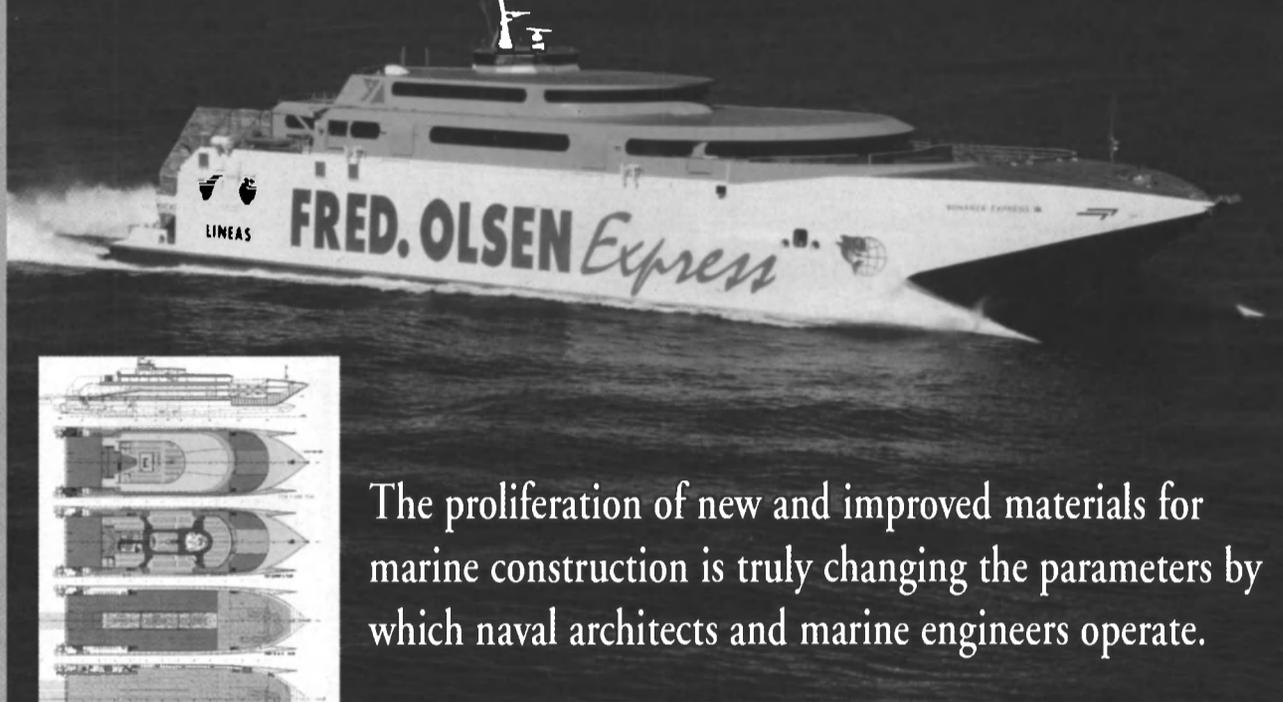
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Circle 287 on Reader Service Card

# Materials Matter



The proliferation of new and improved materials for marine construction is truly changing the parameters by which naval architects and marine engineers operate.

While Incat extensively used aluminum extrusion for dramatic weight savings in Bonanza Express, strength and stability were not sacrificed, as the 315-ft. (96-m) vessel is almost capable of carrying its own weight.

Materials for all phases of marine construction — from hulls to superstructures to interiors — and machinery are increasingly stronger, lighter and more durable. The end result: ship owners and operators are able to better optimize space onboard. Whether it be a cruise ship or containership, the ability to squeeze in 10 additional staterooms, or 100 additional containers, or the ability to sail one knot faster while maintaining equal fuel consumption, can have a dramatic effect on an owner's profitability.

While new materials come with much promise, there is always an equal amount of caution sure to follow. While every businessman may welcome a means to bolster the bottom line, ship owners and operators are notoriously conservative, although that is rapidly changing as this group assimilates new technical systems such as integrated bridges, advanced satellite communication systems and innovative podded propulsion solutions.

## Coasters

Air Ride Craft Inc. has developed and is now selling its Seacoaster boats, an innovative design which is suited well for commercial, pleasure and military purposes. The new vessel combines the best of SES and catamaran designs, and is subject to

ongoing patent efforts in the U.S. and abroad. The first of the new vessels — with a fiberglass hull — will go into service on Lake Erie this summer as a 44-knot, 150 passenger ferry for Island Express Boat Lines in Sandusky, Ohio. The Island Rocket will measure 72 ft. (21.9 m) and feature Caterpillar 3412 diesels rated at 1,015 hp (757 kW).

Larger passenger and passenger/vehicle ferry Seacoaster designs — up to 328 ft. (100 m) — are underway.

Seacoaster is being touted for many attributes which would surely turn the heads of a potential customer, including: it requires only 60 percent of the power and fuel at cruise speeds; it provides better ride qualities in rough seas at all headings; and it produces a minimal wake.

Seacoaster inventor Don Burg took a radical new approach to SES design in the late 1980's — the result being the new Seacoaster. Based on governmental studies in the mid-90s, the Department of Energy (DOE) made a grant as a top rated energy saving invention to the Seacoaster program through its Energy Related Inventions Program in 1996.

Following positive model tests, private investors funded the 48 ft. (14.6 m) test and demonstrator Seacoaster.

The project was expanded, and the boat stretched to its present 65 ft.

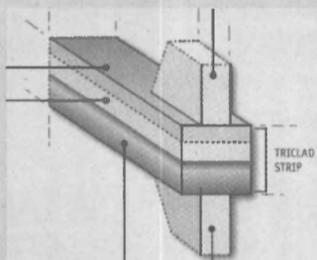
(19.8 m) length over main deck and 72 ft. (21.9 m) length overall, when support from the industry came in 1997. This support came in the form of two Caterpillar 3406E marine diesel propulsor engines, and a Caterpillar 3116 marine diesel blower engine from Pantropic Power Products; two Twin Disc 5114 gearboxes; and two Arneson ASD12 surface propeller drives from Twin Disk.

## The Cat's Meow

Australia's Incat has again extended its lead into the high speed ferry realm with delivery of Bonanza Express to Fred. Olsen SA. Launched earlier this year, the 315-ft. (96-m) wavepiercing passenger/vehicle catamaran is close in style to the company's first dedicated RoPax vessel DevilCat. The vessel is truly amazing in that it is able to carry a broad mix of light and heavy road freight, and is almost capable of carrying its own weight (almost 800 tons of deadweight). The builder claims to have achieved this using a diligent approach to weight minimization during construction, coupled with a subtle hull re-design from the 300 ft. (91 m) class to suit the larger vessel. The extensive and increasing use of aluminum extrusion at Incat has also contributed mightily to the dramatic

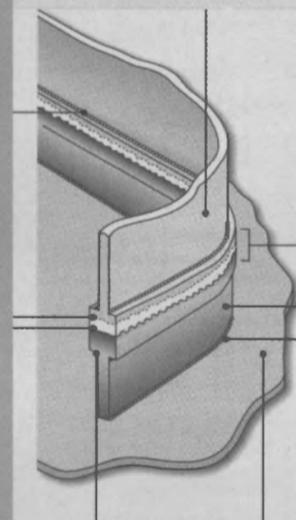
## Joining Aluminum To Steel

As vessel designers and owners search for new and innovative methods to reduce a vessel's weight, the use of aluminum, often-times in conjunction with steel, will increasingly be employed to minimize deadweight.



Triclad Structural Transition Joints — or STJ — as marketed by Merrem Andre de la Port of the Netherlands, is being touted as an advanced method to effectively join aluminum to steel.

Transition joints are bimetallic strips or pads, used to facilitate the joining of dissimilar metals by welding, particularly where those metals cannot be joined by conventional welding processes. Their use are found in examples throughout the industry, but are particularly prevalent in the marine market, where long-lasting maintenance free joints between aluminum and steel are mandatory. Typical applications for STJ in marine include: to join aluminum superstructures to steel decks; to join aluminum decks (or bulkheads) to steel hulls; to fit shelter decks to fishing boats; to retrofit "containers" of electronic equipment to steel decks of warships during refit; and to add additional accommodation to existing vessels. The STJ, however, could also be used to fit steel components to aluminum hulls (engine mounts on high speed catamarans, for example); repair or strengthen corroded mechanical-gasketed joints on ships where transition joints were not originally specified; and to provide a wear resistant keel on beach launched aluminum vessels.



Triclad is a special clad, designed generally to facilitate the joining of marine grade aluminum structures to steel structures. It is produced as a standard sized parent plate in the as clad size 5 x 13 ft. (1.5 x 4 m), with a usable area of 51 x 146 in. (1,300 x 3,700 mm).

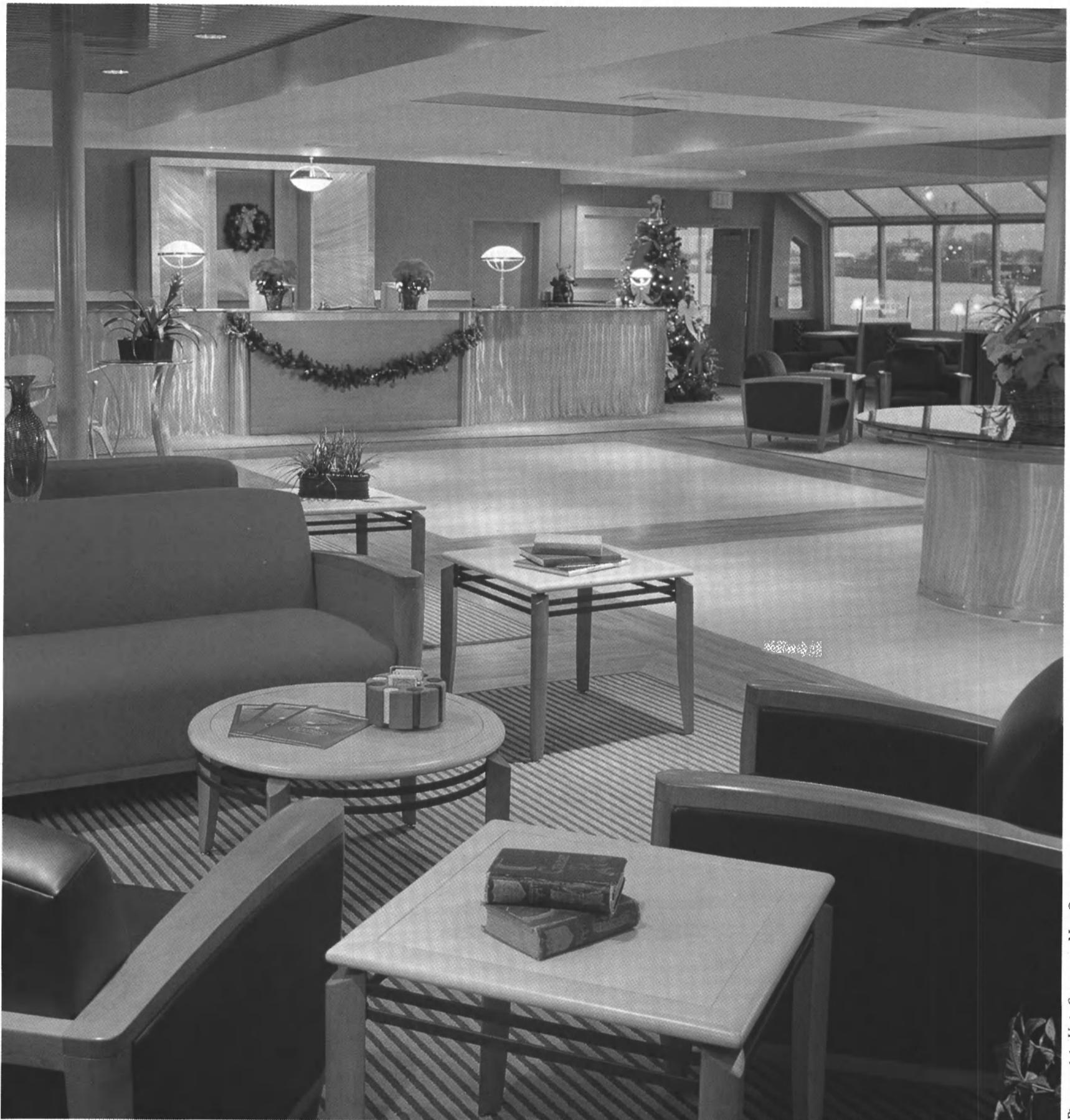
The metal grades chosen are designed to be compatible with the commonly used marine grades of aluminum and steel.

A free brochure detailing the many technical qualities and fabrication guidelines of this product are available.

Circle 46 on Reader Service Card

(Continued on page 26)

# *Creating... Places to be*



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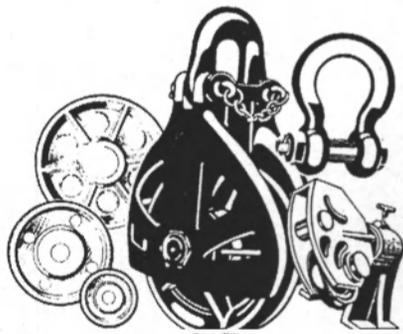
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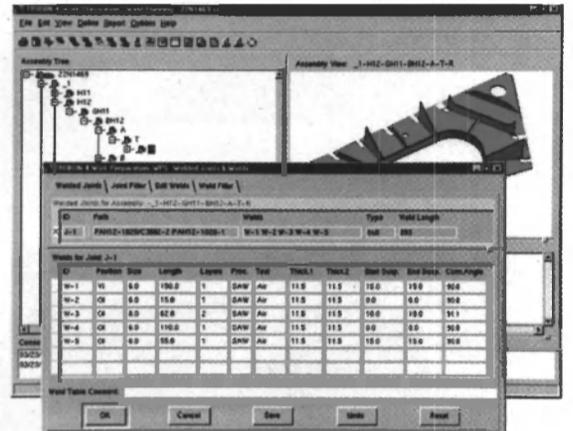
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Circle 221 on Reader Service Card

## MARINE ENGINEERING • Materials

### Tribon 4 Offers New Weld Planning System



KCS' new Weld Planning System for Tribon 4 is designed to make welding more accurate and cost effective. Pictured is an example of a weld report. This information, together with the geometry of the assembly and the welds can be exported to welding robot control systems.

A new Weld Planning System offered on the well-respected Tribon 4 product from Sweden's Kockums Computer Systems is designed to improve accuracy and reduce costs for planning, welding and assembly operations. The new software module provides the user with precise weld path data, allowing weld joints to be collected into weld sequences, automatically calculating weld parameters and selecting a weld process by automatically extracting the welding information for each stage of production from the assembly definition in the Tribon product information model.

The weld joints can be split and analyzed using user configurable rules. Weld parameters include weld size, orientation and welding process. Intelligent algorithms map the weld orientation at a particular stage of assembly to the welding position and then selects the appropriate welding process. The Weld Planning System can also automatically calculate the required weld size.

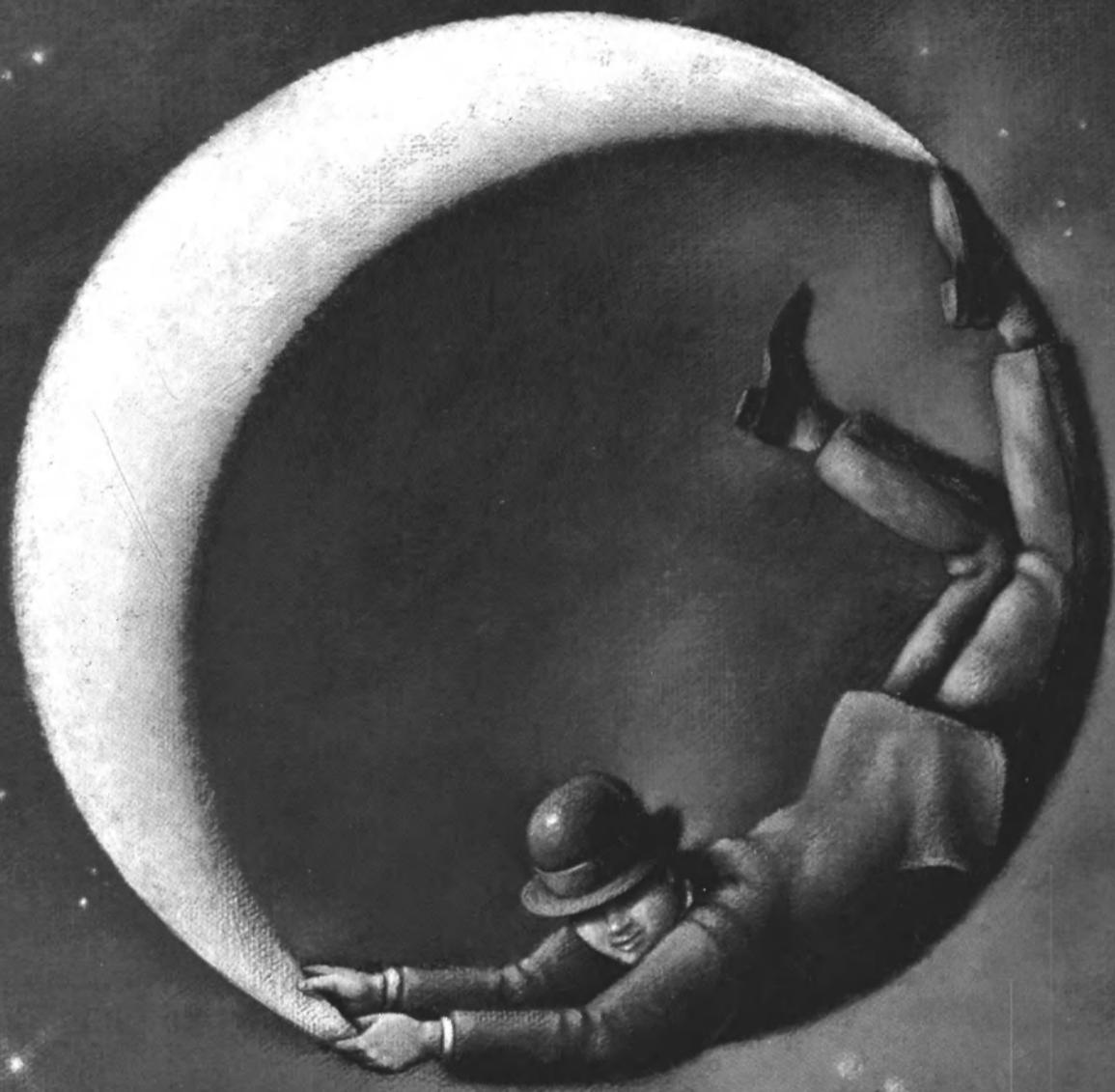
Weld data is accessible through a state-of-the-art browser and navigator technology and can be viewed as a 3-D graphic or in tabular format. Tribon Welding Planning System support the majority of robot systems, and data can be exported in Comma Separated Value format for use in Microsoft Excel and Access.

The Weld Planning System is available on Windows NT and can work with Tribon Product Information Models on all available operation system platforms HP-UX, OpenVMS, Digital UNIX, Solaris and AIX.

Circle 45 on Reader Service Card

### Kvaerner Mandal Floats Out "Invisible" Patrol Boat

Late last year Kvaerner Mandal delivered the prototype of a new, technologically advanced fast patrol boat which is constructed of anti-magnetic composite materials, designed to provide the vessel a very low radar profile making it virtually invisible. Not only is the hull designed for hard detection, it is also touted as possessing high tolerance of direct impacts. The vessel is part catamaran, part hovercraft, and is designed to be fast and highly maneuverable, while able to carry a heavy payload. Powered by three engines (twin gas turbines with a 500-kW diesel to power the hovercraft system), the 154 ft. (47 m) vessel is designed for a cruising speed of 45 knots in waters as shallow as 3.3 ft. (1 m).



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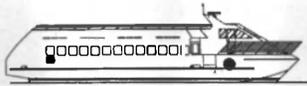
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**MARINE ENGINEERING • Materials**



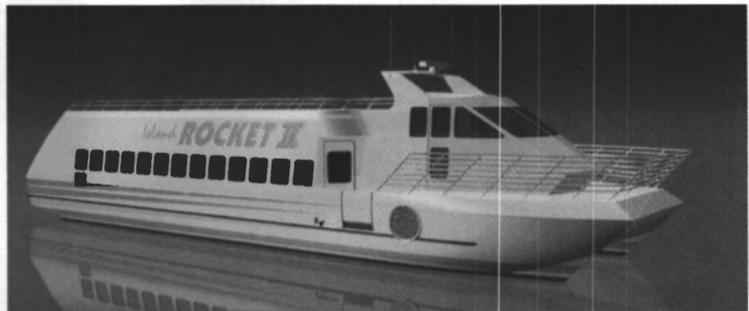
Strong industry support, namely the supply of equipment from Caterpillar and Twin Disk, helped exponentially in the advancement of the Seacoaster design.



**Far Left:** Seacoaster test.



**Far Right:** Model of vessel to enter service this summer on Lake Erie.



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weight savings. To achieve the required nine-ton axle loadings for the main vehicle deck, an extruded hollow box planking was developed. Tunnel underside plating achieves maximum strength for minimum weight by the use of corrugated aluminum extrusion.

To minimize weight further, the superstructure features some advanced materials applications as well. Specifically, the increased use of adhesives to bond non-structural superstructure side panels instead of welding allow the use of much thinner plating. Aluminum honeycomb panels are also used extensively, not only as non-structural interior partitioning but also in the newly developed movable mezzanine vehicle decks.

On the inside, noise and vibration damping are of utmost concern to ensure the paying customers a pleasant ride. The ship's interior was designed by Incat's In House Design Group, which sought to mix functionality with aesthetic appeal. The use of flexible mounts between the hull and the superstructure is designed to ensure that minimal noise permeates the passenger cabin. Noise levels in the passenger areas are not to exceed 70 dBA.

All interior materials, including seats, carpet and wall coverings, were selected to not only produce an integrated interior, but also to comply with the most stringent IMO standards for fire, smoke and toxicity.

### Maritime Dynamics Helps Meet Weight Demands

Maritime Dynamics ride control systems are widely used on the most advanced fast craft being built today, with references including Incat's Hull 050; Trico Marine's Stillwater River; Derecktor Shipyard's Ernest Hemingway; and Fincantieri's Superseacats. The Lexington Park, Md. company reports that builders and owners are increasingly challenging suppliers to deliver lighter equipment, a challenge which Maritime Dynamics has apparently exceeded. In the past, dedicated hydraulics were required to operate ride control systems. Now, Maritime Dynamics offers hydraulic packs which in addition to the ride control system, operate the propulsion waterjet steering

and reversing system.

This summer, the company will install its first commercial computer-based ride control system with an embedded Microsoft Windows operating system. System interconnection will be via fiberoptic cable, and preliminary estimates show that the switch from conventional copper cable will result in a 40 percent weight savings.

Finally, Maritime Dynamics now offers composite trim tabs. The trim tabs — which are proven for controlling pitch and roll — were extensively tested before the first set was even fabricated. The company undertook an extensive stress investigation using finite element analysis. Preliminary estimates predict a 70 percent weight savings over an equivalent steel trim tab.

Circle 36 on Reader Service Card

**Segesta Jet Delivered To  
Ferrovia dello Stato**



Ferrovia dello Stato (Italian State Railways) took delivery of an innovative new fast ferry dubbed Segesta Jet from Italy's Rodriquez Cantieri Navali SpA. The 165.5 x 29.5 ft. (50.5 x 9 m) vessel was delivered March 11, and is the first of three vessels for the operator, with the additional vessels due later this year. The three will be deployed on the Messina (Sicily) - Reggio Calabria route. Powered by a pair of MTU 16V 396 TE 74L diesel engines driving Kamewa 715 waterjets, the 183 ton displacement vessel has a cruising speed of 30 knots fully loaded. The ship is fitted with the Rodriquez Stabilizing System SMS (Seaworthy Management System), which is composed of four non-retractable fins, a set-up designed to reduce the movement of the vessel in rough seas. Classed by RINA, the ship also features a 10-knot bowthruster for additional maneuverability.

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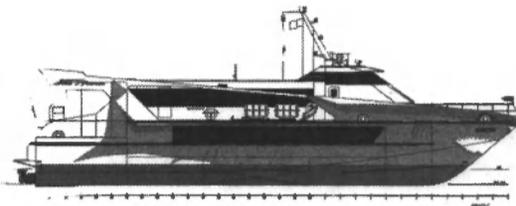
**Segesta Jet Equipment List**

Length	.....165.5 ft. (50.5 m)
Waterline, full load	.....141 ft. (43 m)
Beam, max.	.....29.5 ft. (9 m)
Hull depth	.....13.7 ft. (4.2 m)
Draft, max.	.....4.4 ft. (1.35 m)
Displacement, full load	.....183 ton
Passengers	.....500
Main engines	.....(2) MTU
Max. cont. output	.....(2) 2,000 kW @1,975 rpm
Waterjets	.....Kamewa
Cruising speed	.....30 knots
Range	.....280 nm
Class	.....RINA

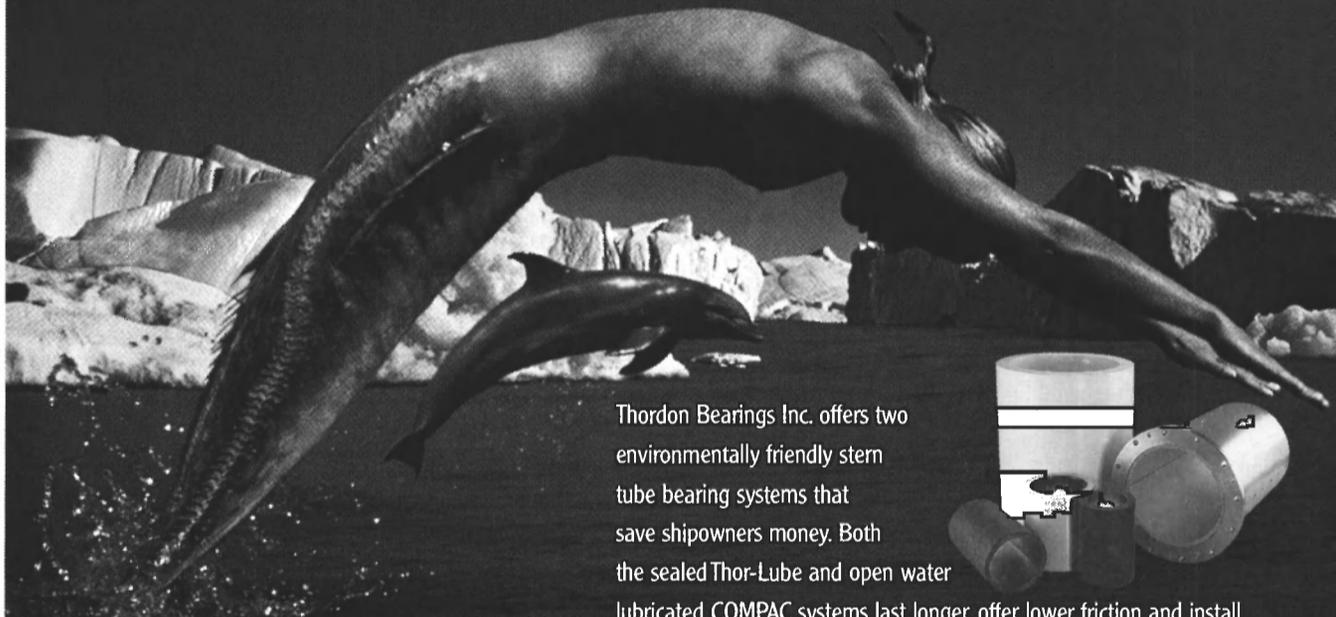
**Wavemaster International  
Introduces New Fast Ferry**

After years of development, Wavemaster International has presented its latest vessel, a 30 meter Wavemaster. With Manila-based Jet Ferries signing on as its latest customer, the Wavemas-

ter possesses a three class layout equipped to hold 187 passengers for its run between Manila Bay and the industry-oriented area of Mari-Velles. The ferry serves a much needed service of transportation between the two areas after the recent eruption of



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## MARINE ENGINEERING • Materials

Mount Pinatubo, which forced the road from Manila impassable as a result of mud and landslides.

The Wavemaster is powered by three MTU 12V 183 TE92s, with only the wing engines equipped for maneuvering and a guaranteed speed of 29 knots and a deadweight of 12 tons. The excess

amount of space around each engine and auxiliary is a prime example of the industry's preference to monohulls rather than catamarans. Exhausts are dry and are funneled through a utility stack including access stairs, vents and CO2 storage.

Circle 38 on Reader Service Card

### Main Particulars

Flag	Philippines
Classification	DNV
Length, o.a.	100 ft. (30.5 m)
Length, b.p.	83 ft. (25.4 m)
Beam (molded)	21 ft. (6.5 m)
Depth (molded)	12 ft. (3.8 m)
Draft	4 ft. (1.1 m)
Fuel cap.	5,000 ltrs.

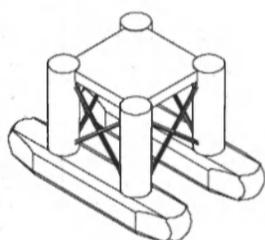
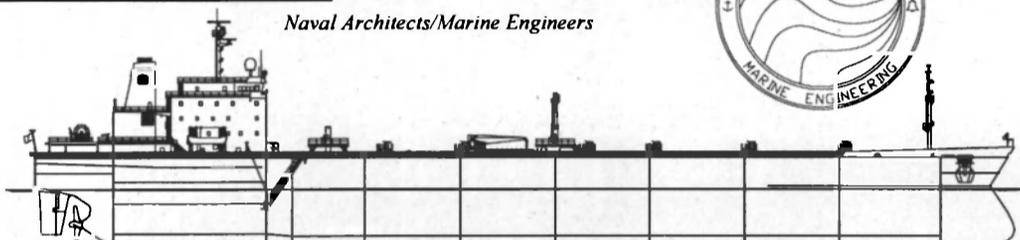
Fresh water	1,000 ltrs.
Main engines	MTU
Water jets	Hamilton
Auxiliaries	Cummins-Onan
Speed	29 knots
Deadweight	12 tons
Range	250 nm for 95% fuel
Passengers	176
Radar	Furuno
Sounder	Furuno
Radio	Sailor DSC VHF

## Maritime Design, Inc.

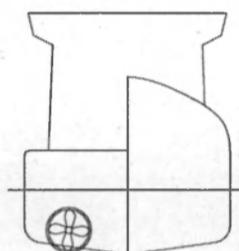
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### JJMA: Stern Wedge Boosts Speed 22%

The Victoria Clipper III recently gained as much as five knots increased speed due to the fitting of a stern wedge. The 95-ft. (29-m) catamaran passenger ferry was built by Gladding-Hearn Shipbuilders and powered by a pair of Detroit Diesel 16V149 engines driving Kamewa waterjets. Over the years, the vessel's performance deteriorated, mainly due to capacity increases and other weight changes, to about 22.5 knots when fully laden.

Unsatisfied with performance, Clipper Navigation Inc. contacted John J. McMullen Associates (JJMA) to explore its options. "Service expectations in the ferry industry are constantly moving higher," said Clipper executive vice president and general manager Darrell Bryan. "We'd like our ships to be as fast as possible, always within the bounds of the affordable."

We discussed a wide range of options, from repowering to weight reduction. Finally, JJMA convinced us that a stern wedge would improve both craft trim and powering performance."

JJMA reportedly used the Shipflow Computational Fluid Dynamics (CFD) software to analyze the ship. "We built a simple computer model of the hull of the ship. Then we added various wedges and characterized their performance," said Chris Higgins, a JJMA naval architect. "We found the most effective wedge to be quite short and steep, almost surprisingly so."

The wedge was fabricated at Marco Seattle Shipyard. Fabrication included modifying the pre-existing trim tabs to relocate them into the bottom of the new wedge, and removal of the waterjet intake guards. "Our total investment was less than \$30,000," said Bryan. "I'm very pleased at getting four to five knots speed gain for this investment."

Circle 44 on Reader Service Card

### Tuflex Makes The Grade In Tug Applications

Tuflex rubber flooring is used throughout a variety of industries, and has found a popular niche to be the rigorous use tugboat market. The product has proven to be durable, and is non-



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porous so that water will not seep through. It is skid resistant, and has an acoustical rating which dramatically reduces noise above and below deck. Produced from recycled materials, the non-allergenic product is available in a wide variety of colors.

Circle 54 on Reader Service Card

**Blount Continues To Innovate**

At 82, Luther Blount has added once again to his reputation of providing unique solutions to maritime challenges. Blount has recently introduced a new composite catamaran designed to go faster, cost less and generate less wake than similar sized vessels currently sold. The 40 ft. high speed experimental catamaran is dubbed EXP-299 and is being tested on Narragansett Bay. Powered by twin Mercury's (cumulative 500 hp), the 5,000 pound vessel is built on the principle of lightweight permanent buoyancy, and includes a novel means of attaching fiberglass to aluminum. In fact, Blount has created a separate company — HiTech Ultralight Catamarans Ltd. — to design, build and license the vessels.

**Computerized System Enhances Design Accuracy When Using Aluminum**

A new computerized design system from The Aluminum Association is available to engineers who work with aluminum. The Aluminum Design System (ADS) is a computerized version of The Aluminum Design manual, yet it is far more powerful because it not only explains how to solve a problem, but actually performs many of the calculations. The software also includes the ability to perform parametric analysis, solving problems using multiple input variables in order to determine an optimum solution.

Circle 52 on Reader Service Card

**Chase And Aerostar Invest In Metals**

Chase Capital Partners (CCP) and Aerostar Capital L.L.C. announced they have made a joint investment in Production Supply Company (PSC) and Pioneer Aluminum, two leading distributors of high performance metals to the transportation industry.

Together, Pioneer and PSC will form Transtar Metals, Inc., a new company that becomes the largest provider of high performance metals and related services to transportation customers worldwide.

Circle 17 on Reader Service Card

**Crane Plastics Issues New Videotape About C-LOC**

Crane Plastics Co. has issued a new 8.5-minute videotape on its C-LOC engineered vinyl sheet piling, an erosion control product that replaces conventional bulkhead materials.

C-LOC is made from durable, heavy-duty, exterior grade vinyl in two models—the 12-inch wide CL-4500 and the CL-9000. The clay-colored C-LOC panels are designed to not rust, rot, corrode, crack, or peel, and are unaffected by sunlight, salt water, or marine borers.

Circle 18 on Reader Service Card

**Plexus MA555 Approved By Lloyd's Register's Survey**

The Plexus MA555 has been recognized by Lloyd's Register's Statement of Acceptance, approving the product for use in marine craft. Plexus MA555 is commonly used to bond stringers and

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**Broadcast From: Houston, TX**

"We are looking for two (2) BBC turbochargers model VTR-354-11.  
New or used in good condition. Please respond via fax to (Service and Repair Company)"

**Broadcast From: Spelle, Germany**

"For Sale: Reconditioned crankshafts: Deutz BA16M716, RBVBM545, BV12M 628, MAK 6M331AK, 6M452AK, 8M453AK, MAN 8120/27, V8V22/30A, V6V16/18, MWM TBD510-6, TBD440-8, TBD441-16, MTU 12V331, 16V396, Warstila 6R32, Daihatsu 6DS22, Pielstick 18PA6-280, SKL 8NVD48-A2 and 40 Others. (Supplier)"

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The Marine Parts Information Network

## MARINE ENGINEERING • Materials

liners into fiber glass boats, and virtually no surface preparation, offering fatigue endurance, impact resistance, and toughness. Plexus Adhesives can be used in place of glass tabbing for bulkheads as well, and according to Plexus, the product is environment friendly.

Circle 19 on Reader Service Card

### Halter & SSI Finish First Project

Halter Marine and Surface Systems Inc., completed their first TUFFLEX decking project on the '94 research trawler Maloekoe. The TUFFLEX waterproofing membrane was applied with rubber granules for texture, and two aliphatic paint topcoats, that gives all exterior decks a yacht-like finish. The Daniello Corp. trained the SSI staff, who applied the system, and as a result SSI is now certified to conduct future projects involving the TUFFLEX system.

Circle 20 on Reader Service Card

### Structural Composites Acquires Sigma Technology

Structural Composites Inc. acquired Sigma Technology Laboratories and are now fully ready to operate for destructive and non-destructive testing of composite materials.

Structural Composites Inc. provides engineering design, testing, R&D and applications development under contract to government and industry.

Circle 24 on Reader Service Card

### Automated Dynamics Develops New Valve Plates For High Temperatures

Automated Dynamics has developed new high-temperature, continuous carbon fiber reinforced thermoplastic valve plates for the worldwide compressor industry.

The new valve plates are manufactured using continuous carbon fiber with PPS or PEEK thermoplastic resin systems. The carbon fiber/PPS valve plate will work at temperatures up to 425 degrees F while the carbon fiber/PEEK valve plate can see continuous service up to 525 degrees F. The carbon fiber/PPS and PEEK valve plates have resistance to most chemicals and solvents and the new continuous fiber plates are much lighter than metal plates. The new valve plates are offered in ant diameter and configuration from .90" to .50+" thick.

Circle 21 on Reader Service Card

### New Literature Available On TopForm

A new 20-page publication on Klemp's TopForm Fiberglass Grating and Products is now available.

The Klemp Corporation, a manufacturer of metal and fiberglass grating

products, offers TopForm fiberglass grating for corrosive environments such as petrochemical, chemical, paper mills and wastewater treatment because of its corrosive resistance properties.

It is also well suited for non-magnetic, electrical, and food applications.

Circle 22 on Reader Service Card

### Smooth-On Introduces New Brushable Urethane Rubber

Smooth-On Inc., a manufacturer of mold rubbers as well as casting resins, announces a new addition to its line of urethane rubber compounds, Brush-On 40, a softer, more pliable version of Brush-On 50. Brush-On 40 paints onto vertical surfaces without sagging. It cures overnight to a durable rubber that excels in production of a variety of materials including concrete, gypsum and wax.

Circle 23 on Reader Service Card

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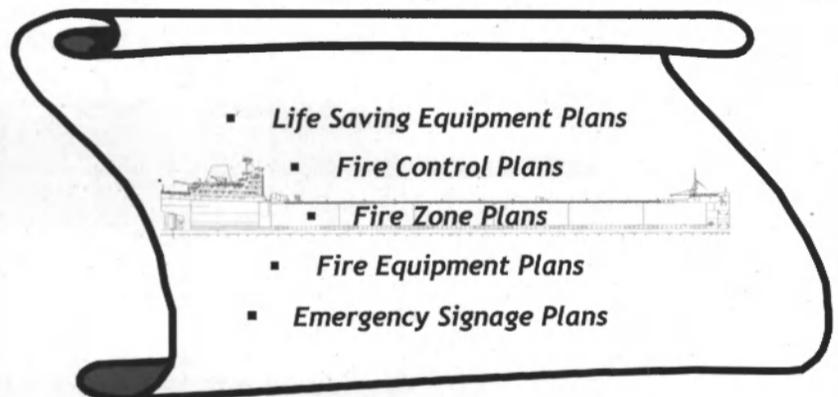
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## Germanischer Lloyd

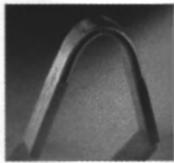
ADVANCED SHIP TECHNOLOGY

## MARINE ENGINEERING • Materials

### Hoogovens Innovates To Fill Customer Needs

Hoogovens NV has been a leading marine materials developer in the quest to provide lighter yet stronger materials for marine applications.

As part of its program to develop advanced materials, a wrought Al-Mg alloy plate — which is significantly



Bend test according to DNV-specification for a thickness of 8 mm, MIG welded with AA5183 filler wire.

stronger than AA5083 — has been developed. Although stronger, the new alloy has corrosion resistance and formability similar to those of AA5083.

Welded panels of the AluStar alloy reportedly have a significantly higher yield and ultimate tensile strength with a similar level of ductility in comparison to AA5083 and AA5383 (after MIG welding).

The bendability of the AluStar alloy is demonstrated by both three-point and wrap-around bend tests.

Circle 53 on Reader Service Card

### Leaving No Loose Ends:

#### FN Tape Puts Quick Wrap On Various Problems

It provides easy application without special tools, is an alternative to metal shielding and offers what is touted as the best combustible oil splashing prevention in the industry. These features are functions of Nishiyama Corporation's newest sales offering — FN Tape.

With a 22-year-old U.S. subsidiary based in Great Neck, Long Island, the import/export trading company distributes technical industrial products and machinery. Focusing on new maritime clients — while still remaining attentive to current customer relationships, the subsidiary began touting FN Tape about a year ago (Japanese Tokyo Nishin Jabara boasts as manufacturer of the tape) — its first product for the maritime industry. Intended to prevent the outbreak of fire caused by a splash of flammable oils, the tape shields a vessel's pipes from vibration, fatigue and pinholes.

By simply placing FN Tape over both pipes and joints, this safety measure is one that can easily be remedied. Exhibiting both durability and workability, FN Tape is composed of aramid woven cloth wrapped in superimposed aluminum foil for lamination. An adherent is then applied to one side of the tape finished off with a separator film.

FN Tape can tolerate high pressure levels up to 30 kg/sq. cm, and has a shelf life for an extended time period due to its exceptional oil/wear/weather resistance.

Developed in response to the International Maritime Organization's (IMO) amendment of SOLAS regulation II -2 / 15. 2. 11, which deals with provisions related to this safety issue, a regulation was entered into force by the Organization on July 1, 1998 stating that all new ships giving off an output power of 375 kw must comply in order to meet this preventive safety rule.

After the effected SOLAS amendment, FN Tape also obtained an additional Type Approval Certificate as requested by various ship classification societies, namely NK, ABS, LR, BV, GL and NV.

In the wake of consolidation becoming a fixture in many industries, the company's marketing plan calls for targeting companies whose industry issues reflect upon regulatory and government agencies, demand for new ships/vessels and condition of existing vessels — all driving forces in the demand for Nishiyama's FN Tape.

Circle 58 on Reader Service Card

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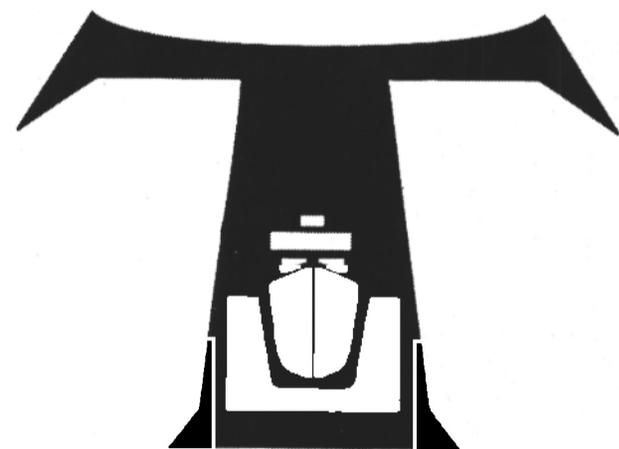
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# Finnish *Flair*

*While Kvaerner's exit from the shipbuilding business has created some uncertainty regarding the Helsinki and Turku shipyards, the Finnish Maritime infrastructure will undoubtedly maintain its technological edge to meet evolving customer needs. — by David Tinsley*

During earlier, concerted attacks on its markets from the industry in the Far East, West European shipbuilders were exhorted to concentrate ever-more closely on higher-value, or specialized tonnage.

With each new phase of expansionism or business diversification by established or emergent yards in the Orient, West European dependency on the more specialized categories has necessarily increased. Having effectively relinquished its involvement in whole sectors of the market where it has ceased to be cost-competitive, and with a corresponding reduction in critical mass, its reliance on the less populous tonnage forms makes it extremely vulnerable to the new onslaught from the Far East.

Sectors which have hitherto been largely the province of European builders, including RoRo passenger ferries and special-task vessels for European owners, are now under assault. Finnish propensity for the most advanced vessel types is legion, but recent instances of cruise vessel, RoRo and cablesip projects being awarded to, or broached with, yards in the Far East are of direct concern to an industry whose core markets are represented by such specialized and often highly-sophisticated newbuildings.

The Finnish response has been to seek to safeguard its hard-won business position by enhancing its competitive edge through a proactive design approach, by bringing extra added-value to the shipowner by technological or design means, and by marrying quality and contractual performance with an acceptable market price.

As one of the jewels in the crown of the Nordic maritime industries, Kvaerner Masa-Yards (KMY) inspires confidence for its ability to ensure prompt delivery with projects of a particularly work-intensive and technically demand-

ing nature (In mid-April, Kvaerner ASA announced plans to exit the shipbuilding business. See related story on page 41). Europe's position as a bastion of luxury passengership construction is in part attributable to KMY, which furthermore contributes to the region's continuing endeavors in advanced technology markets such as cryogenic tankers and specialized ice-going vessels.

While a series of eight vessels of rather more workaday type would be regarded as a substantial achievement for any shipyard, the Finnish builder afforded a measure of its prowess last fall when it delivered the eighth in the highly successful Fantasy-class of cruise ships for Carnival Cruise Lines. Continuous refinement has been reflected throughout the program, culminating in the adoption of the Finnish-developed Azipod podded propulsion system for seventh and eighth representatives of the class, Elation and Paradise.

Notwithstanding the drive to still greater unit scale economies as encapsulated in follow-on cruise ship series production at KMY's two yards, the company's parallel business enthusiasm for singletons of more modest size is demonstrated by its construction of the prestigious new Europa for Hapag-Lloyd.

She will be an exceptional ship by virtue of a passenger complement of just 408, in 204 suites, relative to a gross measurement of 28,600-gt and length overall of 612 ft. (198.6 m). Categorized as a five-star vessel, construction of the Europa has proceeded rapidly since keel-laying at Helsinki last November. Production efficiency has gained markedly from the optimization of section pre-outfitting. Float-out took place in March, in keeping with a build schedule geared to the vessel implementing her cruise program out of Hamburg on September 17 this year.



With Kvaerner pulling out of the shipbuilding business, speculation has run rampant as to the future of the shipyards in Helsinki and Turku, which are widely regarded as two of the best in terms of quality of build for the high-value vessel market.

Europa will combine proven German medium-speed diesel engineering know-how with innovative Finnish electrical propulsion, employing a total of four MAN B&W 40/54-series engines to power twin Azipod units. The aggregate output from the pairs of Augsburg-manufactured seven-cylinder and eight-cylinder diesels will be 21,600-kW (29,376-bhp) for a service speed of 21 knots.

Underscoring the capital intensity of KMY's operations, the orderbook volume at the close of 1998 was around \$2.4 billion, compared with \$1.9 billion at the end of 1997. The remarkable work program comprises three 140,000-gt Eagle-class cruise liners at the Turku yard for Royal Caribbean International. Notwithstanding a fire aboard the lead ship, Voyager of the Seas, while fitting out in February, the \$500 million build project remains on schedule for delivery in mid-October of this year, and ranks as the world's largest passenger vessel.

The milestone design features accommodation for 3,840 passengers and a triple Azipod installation with a combined output of 42 MW. At 157 ft. (48 m), the beam is almost 50 percent greater than the maximum for Panama

Canal transits, while length overall is 1,020 ft. (311 m). Explorer of the Seas is due in the fall of 2000, with Adventure of the Seas expected in the first half of 2002. From the Helsinki establishment, Europa is set to be followed at the turn of the millennium by Costa Atlantica, the first of a new breed of Panamax-beam cruise ships for the Carnival group. As her name implies, the lead vessel will be deployed by the U.S. organization's Italian affiliate, Costa Crociere.

A second-of-class has been firmly booked for operation as Carnival Spirit under the Carnival Cruise Lines' banner, to which will be assigned two further vessels currently represented as options with KMY. With the wholesale adoption of podded drives in KMY's cruise ship program, each of the 84,000-gt series will incorporate two Azipods of 17.6-MW unit power.

The fact that its perception of business opportunities is based on unit value rather than scale alone was demonstrated last year with the rapid output of two support vessels tailored to the specific

*(Continued on page 40)*

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# Wärtsilä NSD: Powering Up For the New Millennium

*Following its restructure, engine maker is geared for profitability well beyond 2000*

While implementing a far-reaching restructuring program to put its business on a sounder footing after last year's severe deterioration in financial results, Wärtsilä NSD's unshakable belief in an integrated manufacturing capability has been underlined by its recent takeover of Grandi Motori Trieste (GMT).

The Finnish group had obtained a 40 percent stake in the Trieste factory, one of Europe's biggest diesel engine production plants, attendant to the 1997 merger of Wärtsilä Diesel and New Sulzer Diesel. The common link in the transaction had been Fincantieri, the former proprietor of NSD and owner of GMT.

The early assignment of a Finnish manager to the Trieste works had signaled Wärtsilä NSD's determination to make the factory a cohesive part of the engine group's international manufacturing network. In addition, the allocation of production of the extremely powerful, Wärtsilä 64 medium-speed design to GMT had denoted the application of Wärtsilä NSD's focused-factory concept to the Italian

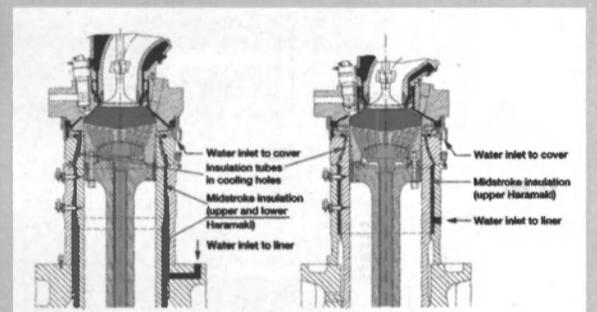
domain. The process of assimilation of the extensive Italian complex has now been given added momentum through the transaction which gives Wärtsilä NSD full 100 percent ownership of GMT. In return, Fincantieri's holding in the Finnish undertaking has been increased to 15.4 percent from 12.2 percent. The Trieste site offers the capacity to machine, assemble and test the largest two-stroke and four-stroke diesel machinery, and its current activities are built around both Sulzer low-speed and medium-speed models as well as a growing orderbook for wide-bore Wärtsilä 64 units.

Plus factors for a 1998 fiscal period in which a heavy loss was sustained included the strength of the marine orderbook and the completion of the bulk of an extensive investment and product development plan which has sharpened Wärtsilä NSD's manufacturing competitiveness while renewing the engine portfolio.

The company bit the bullet by incorporating a

FMk312 million restructuring provision into last year's results, reflecting measures central to the main goal of restoring profitability.

The process of what the company describes as



Technical superiority is the heart of Wärtsilä NSD, past and present. Pictured is the comparison of the combustion chambers of the original RTA84T (left) and Version B (right). Both designs result in the same component temperatures around the combustion space, while the Version B design is much simpler to manufacture.

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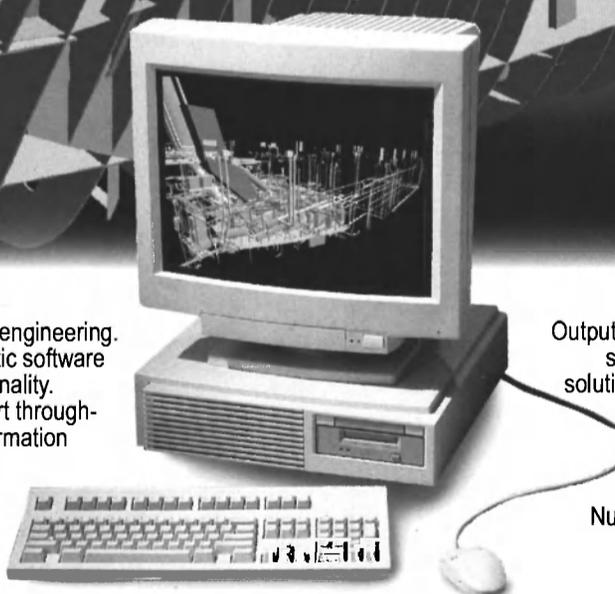
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NUPAS-CAD/MATIC 3D model is courtesy of Slovenske Lodenice Komarno shipyard

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## FINLAND FOCUS

realigning itself to market demand was instituted in the fall of 1998, and by the end of 1999 will have seen a reduction of some 1,000 employees, the discontinuation of all engine manufacturing at Trollhattan, Sweden, and therefore the ending of Wartsila 25 production, and

the closure of Cummins Wartsila sites at Surgeres, France, and Ramsgate, England.

Most salient to the company's long-term well-being has been the institution of entirely new organizational structure in which operations are now generically

oriented to marine, power and service business areas. The arrangements have entailed a thorough-going redistribution of responsibilities at senior management level, and mark a fundamental switch to a more customer-attuned structure, compared with the earlier approach geared

to individual product companies.

"Our restructuring, cost cutting and reorganization measures are aimed at increasing efficiency and responsiveness in order to restore our profitability in a volatile market environment," confirmed Wartsila NSD president **Ole Johansson**.

Among the changes, **Mikael Maki-nen**, **Stefan Fant** and **Tage Blomberg** have been appointed from within the organization to lead the respective marine, power plant and service business areas. Blomberg's reassignment from the marine front is salient to the Wartsila NSD's bid to raise the volume of stable and profitable service business as one of its priority objectives. The aim is to offer customers operation and maintenance services throughout the life-cycle of the marine installation or landside power plant.

The company's financial performance in 1998 had been beset largely by problems in its power plant business, compounded by the Asian crisis. A major advance in the aggregate power of seagoing machinery rolled-out of group factories had buoyed combined deliveries of marine and stationary diesel engines to 4,182 MW, although power plant deliveries actually dropped by 19 percent.

Its market share in the stationary power generation sector slid from 22 to 17 percent.

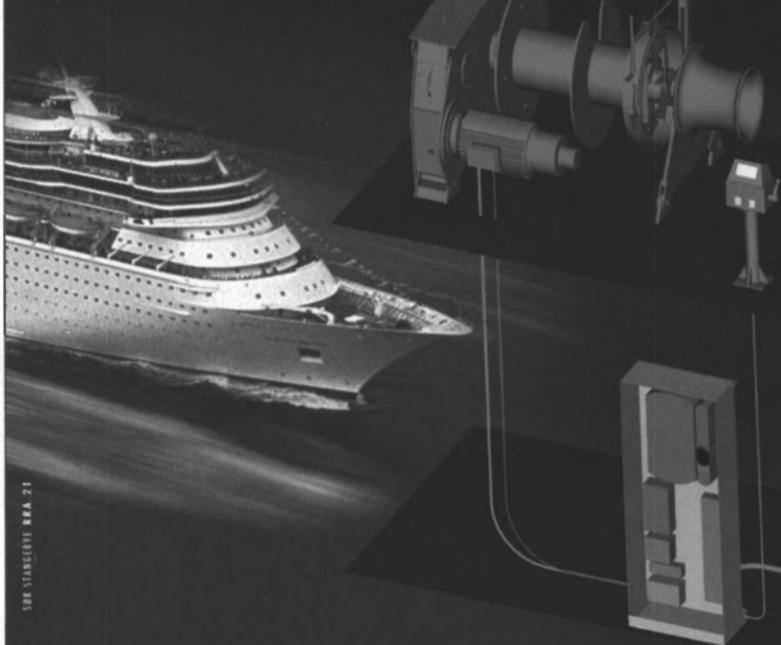
But earlier growth in demand from the passenger and cruise ship, containership and offshore sectors had a considerable impact on the surge in four-stroke engine deliveries to 2,512-MW, compared with 1,995-MW the year before, augmented by increased output from GMT to 303-MW. Licensees of the Sulzer two-stroke range rolled-out 2,748-MW, up 348-MW from 1997. Wartsila NSD's market share of low-speed engines ordered over the course of 1998 rose to 31 percent, and its stake in the medium-speed field amounted to 28 percent.

While considerable renewal and development of the medium-speed portfolio, and the introduction of new high-speed models, points to a period of consolidation in the four-stroke category, Wartsila NSD is looking to strengthen the mid-range of the Sulzer RTA two-stroke, low-speed offering.

As a further indicator of long-term intent, R&D expenditure amounted to four percent of net sales.

A notable development was the phasing-in of the Wartsila 64 engine-equipped Wasa Pilot Power Plant at Vaasa, Finland, as a platform for evaluating high-efficiency diesel combined cycle technology. — *David Tinsley*

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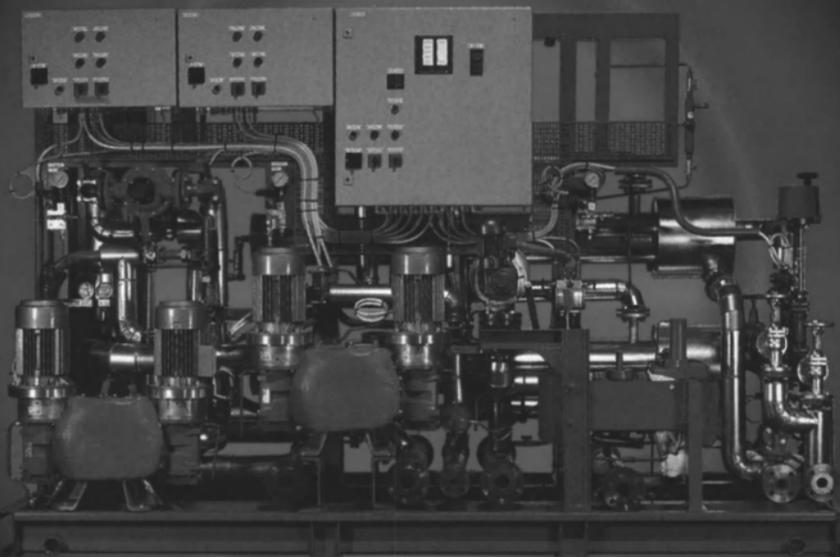
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*(Continued from page 34)*

needs of offshore activities in the shallow and sometimes ice-bound waters of the northern Caspian Sea.

Although diminutive in relation to the luxury, multi-deck cruise ships from KMY, the 214 ft. x 54 ft. (65.1 x 16.4 m) Wagenborg icebreaking supply vessels pack a tremendous capacity for year-

round support of drill platforms. Arcticoborg and Antarcticoborg were of added technical significance as the first newbuilds to apply the 'double-acting'(DA) operating principle developed

by KMY, using twin Azipods of 1,620-kW.

KMY has signed a letter of intent with RAO Gazprom and Neste Shipping for the construction of a 90,000-dwt tanker embodying the DA concept and purpose-designed for the rigors of Russian Arctic as well as Baltic trade. If the deal is formalized, delivery could be effected in a couple of years' time.

**Wider market for Finnish know-how**

Finnish maritime technology will be central to two schemes which, if realized, will undoubtedly prove seminal to the reassimilation of U.S. shipbuilding prowess in ocean-going passengership construction. One agreement calls for Kvaerner Masa-Yards (KMY) to play a key technical role in the much-vaunted Project America contract implemented by American Classic Voyages (AMCV), while the other involves KMY and ABB in SeaAmerica Cruise Lines' plan for a 1,000-passenger U.S.-flag newbuild.

KMY has been retained by contractor Ingalls Shipbuilding to provide design and production expertise to the AMCV project, initially entailing two 1,900-passenger vessels for registry in the U.S. and operation in Hawaiian waters. Ingalls' deal with the Chicago-based

*(Continued top, right of next page)*



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# Kvaerner, Daewoo Calling It Quits In Shipbuilding Businesses

*With alarming — if not admirable — expediency, in April two of the world's premier shipbuilders decided to pull out of the shipbuilding market.*

April 1999, in years to come, could prove to be a watershed in the shipbuilding business. While shipbuilders around the globe have openly and loudly complained about stagnate pricing and too much capacity, two of the world's biggest players — faced with mounting financial crises on the corporate scale — decided to completely pull out of the business of building ships. Meanwhile, General Dynamics bid to become the dominant shipbuilding force in the U.S. via the acquisition of Newport News Shipbuilding lacked the necessary political and defense department backing, and thus fell to the wayside less than a month after the billion plus dollar deal caused chins to collectively drop. Skeptics, however, panned the deal from the start, noting that placing 75 percent of U.S. Navy shipbuilding business in one company's coffers was a long-shot at best.

The decision by Kvaerner ASA and Daewoo to sell off their shipbuilding assets is ironic, indeed, considering that the two companies were central figures in the above-mentioned controversy of piling on additional commercial shipbuilding capacity in the face of low ship prices. Subsidies, politics and industry in-fighting aside, though, the decision by both companies largely took the market by surprise, and could effectively help to shift the balance of shipbuilding power for years to come.

For instance, Daewoo was (at press time) in discussions to sell its shipbuilding business to Japan's Mitsui. With Japan and Korea jockeying for shipbuilding supremacy for the past half decade, the sale to Mitsui or another Japanese yard would clearly shift the balance of power to Japan.

In Kvaerner's case, the divestiture of shipbuilding assets will more than likely not be as clear and easy, as its holdings encompass more than a dozen yards in four countries. At press time, the company — which saw its shipbuilding operation profits plummet from \$95.8 million in 1997 to \$12.4 million in 1998 — was considering several options, including company spin-offs to shareholders, joint ventures and an outright sale. The picture is also murky for the company's Philadelphia project, which

is well underway but not yet complete.

An immediate reaction to the news has been from a niche, yet high value market of the sector, cruise ship owners and operators. As Kvaerner's Finland facili-

ties in Turku and Helsinki are undoubtedly two of the top cruise shipbuilding yards in the world, their "for sale" status, coupled with brimming orderbooks at the other major European cruise ship-

building yards in Germany, France and Italy have shipowners eyeing Far East yards for new cruise tonnage, a development that was imminent but until recently still seen as far off.

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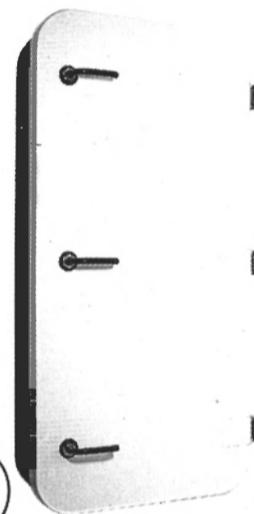
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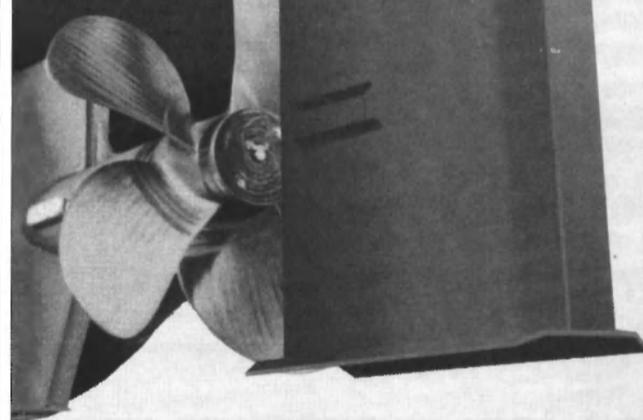
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# Aker Finnyards' drive as part of a bigger group

Within the body now of a united North European shipbuilding force, Aker Finnyards is reasserting itself as one of the Nordic region's leading practitioners in specialized vessel construction. The delivery of the 9,700 dwt RoRo freight ship Estraden inaugurated the 1999 delivery program, which will also see the imminent completion of a seismic research vessel for a Norwegian contractor. In addition, the Finnish yard's turnover will reflect the commissioning of a pair of 11,000-dwt RoRo trailerships, due to be phased into North Sea service in the latter part of the year.

The Rauma yard's reaffirmation of its capabilities in the RoRo domain is pertinent both to the prognoses for newbuild demand and to the new endeavors and recent successes, by yards in South Korea and China, along with the established Japanese competition, on the European market.

Most of the 50 RoRo equipped vessels delivered from Aker Finnyards and its predecessors since 1970 are still engaged in the original or similar traffic for which they were designed. The latest issue from the company's modern shipyard at Rauma, the 2,270 lane-meter Estraden, has entered the North Sea and Baltic trade under charter from Finnish owner Engship to the Anglo-German operator ArgoMann Ferry Services.

ArgoMann saw immediate virtue in the newbuild's combination of capacity, cargo flexibility and speed for its Turku-Bremerhaven-Harwich-Cuxhaven-Tallinn-Turku sailing rotation linking markets in Fin-

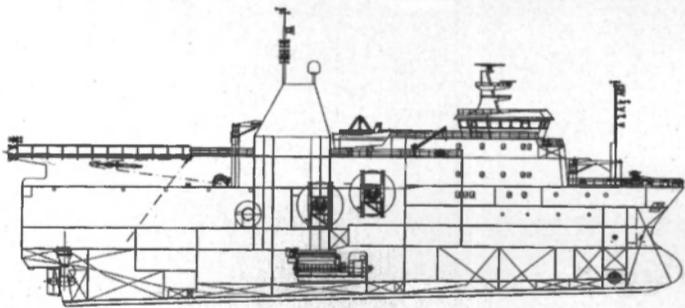
land, Germany, the U.K. and Estonia. The broad stern ramp and inter-deck ramp connections between the three freight-carrying levels and hoistable car deck provide for efficient turnarounds, across a range of cargo permutations including a maximum trailer intake of 160 units. Necessarily incorporating the highest, 1A ice-class for year-round Baltic navigation, Estraden has 14,000-kW of propulsive power engendered by twin Wartsila 46 engines for a service speed of 19 knots.

In a further project entailing Finnish ownership and British chartering interests, Aker Finn-

the 2,100 lane-meter Northing and Norqueen, to the Teesport/Rotterdam-Europort crossing.

The upcoming delivery of a seismic research vessel to Oslo-based Aker Geo reflects the versatility of Aker Finnyards, which has used a Romanian-built trawler hull of 223 ft. x 46 ft. (68 m x 14 m) as the basis for the creation of a sophisticated, \$54.3 million newbuild of 276 ft. x 61 ft. (84 m x 18.5 m) final dimensions.

The contract marked a return by the Finnish yard to a field where it has a track record of 20 vessels for scientific, geotechnical, biological, Antarctic and seismic research, and signals the market entry by Aker Geo at a time when all the main seismic ship operators have new ships coming into service



Aker Finnyards' development of advanced seismic research vessels has, in essence, helped fuel its own newbuild market. As the yard has continued to develop vessels which make oil discovery (and recovery) more cost effective, oil explorers are more likely to invest in new ships.

yards is scheduled to deliver two larger, 20-knot trailerships in August and December this year. The vessels will become the mainstays of P&O North Sea Ferries' trade between Teesport and Zeebrugge, effecting a 35 percent increase in service capacity. At 2,600 lane-meters, the vessels will be the most capacious pure freight RoRos in the U.K.-Continental European traffic.

The contract strengthens the reputation of a well-known Finnish name in the shortsea trades, that of Bore Line. The introduction of the two newbuilds to its Belgian freight link will enable P&O North Sea Ferries to redeploy two RoRos already on charter from Bore,

or on order. It is also illustrative of the shipbuilder's policy of maintaining an income stream from the offshore sector in its manifold forms.

It is anticipated that Aker Finnyards' niche market strengths and build competitiveness will be enhanced over time as a result of the exploitation of synergies within the Aker Yards group. Joint purchasing and the exchange of expertise are regarded as key areas where benefits are obtainable for the companions in the Norwegian-owned shipbuilding enterprise, which brings together Aker MTW, Aker Brattvaag, the Langsten Group and Aker Finnyards, from German, Finnish and Norwegian domains.

company includes options on up to four additional vessels of the luxury 72,000-gt class, and represents a major milestone in the U.S. shipyard industry's commercial newbuilding history.

Indicative of the challenges presented in the design task, the owner's specification calls for 85,850-sq. ft. of open deck space, a four-deck atrium, panoramic viewing possibilities from the three uppermost decks, 77 percent of passenger accommodation in outside cabins, and private balconies for 64 percent of cabins.

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## FINLAND FOCUS

KMY's fixed-price contract with Ingalls includes transfer of know-how in commercial shipbuilding manufacturing techniques.

Letters of intent signed by KMY and the ABB electrical engineering group

with SeaAmerica Cruises Lines arise from another U.S. project of considerable potential significance.

SeaAmerica's agreement calls for KMY to develop both the preliminary and contract design for the envisioned

1,000 passenger, U.S.-flag newbuild. The two arms of the group retained for the program are Kvaerner Masa-Yards Technology and Kvaerner Masa Marine. The understanding with ABB commits SeaAmerica to incorporate ABB propul-

sion, heating, ventilation and air-conditioning, plus control and monitoring systems into the ship in consideration of the Finnish company's provision of support for the project.

While meeting essential technical needs of the scheme, the Finnish cooperation has also ensured the development of the project itself. The understanding with KMY clears the way to SeaAmerica soliciting definitive proposals from U.S. yards, while the ABB agreement has the added merit of providing a share of the private funding necessary under U.S. Title XI financing arrangements.

KMY is no stranger to the contribution of technological know-how to the industry in the U.S., as demonstrated by its work on the design of the U.S. Coast Guard's 30,000-shp polar icebreaker Healy, built by Avondale.

### Export-led fleet investments

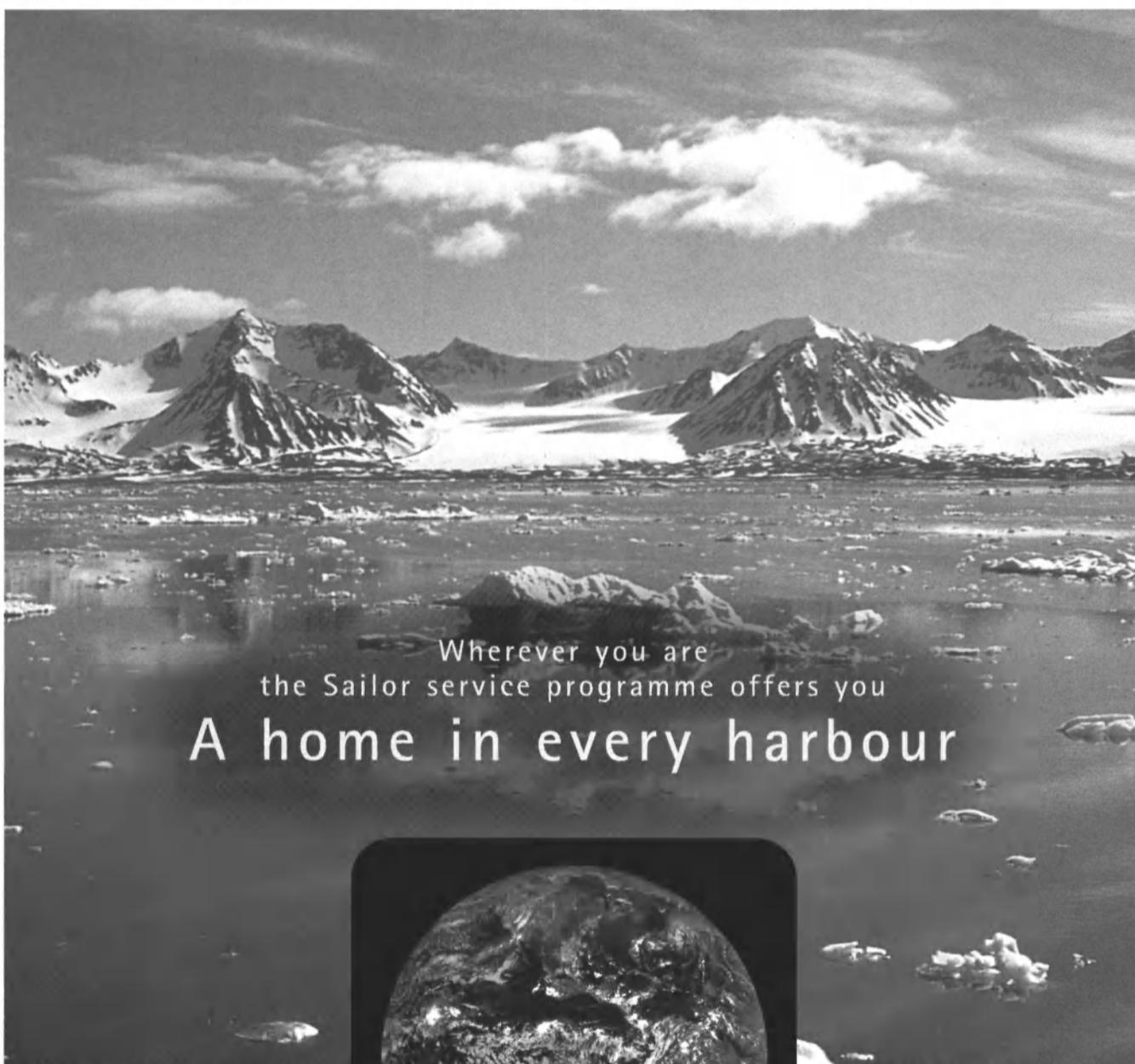
With its major export role in the Finnish economy, the country's vibrant forestry industry continues to have an important influence on investments in ships and shipping systems.

Among the current examples of fleet projects backed by commitments to the Finnish trade is a newbuild program instituted in China by the Swedish company Nordic Forest Terminals. The first two 8,050-dwt RoRo forest products carriers firmly booked with Jinling Shipyard at Nanjing will be chartered to Finnlines on scheduled delivery in March and April 2000. The Swedish firm has options on four further vessels of the same class at Jinling, providing the Chinese yard with the prospect of serial production in a field of construction which brings it into direct competition with the industry in Europe.

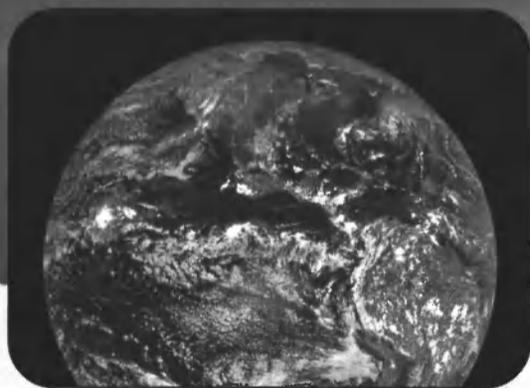
Each of the 1,900-lane meter capacity RoRo cargo vessels will feature stern access only via twin ramps, designed by the Swedish arm of marine equipment specialist Hamworthy KSE. Meanwhile, shipments generated by Finnish forestry group UPM Kymmene will provide baseload business for a new generation of 21,500-dwt multi-purpose cargo vessels ordered by Amsterdam-based Spliethoff's Bevrachtingskantoor.

A total of 10 self-sustaining newbuilds, incorporating heavy-duty deck cranes, sideloaders and removable tweendecks, have been entrusted to yards in Japan and Poland by the Dutch operator, which controls one of the world's largest fleets of general-purpose traders.

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## FINLAND FOCUS

the new Spliethoff class has been developed in mind of the particular requirements associated with year-round shipments of paper from Finland to North America. It is anticipated that up to six of the series of 10 new vessels will be required for the UPM Kymmene transport system.

The adoption of sideports for a total of five sideshifters, in addition to conventional hatch covers,

is a pointer to future operations involving handling-sensitive, high-value goods emanating from the Finnish paper industry.

Three ships apiece have been placed with Mitsubishi Heavy Industries and Tsuneishi Shipbuilding, and four similar vessels have been contracted at Stocznia Szczecinska in Poland.

All will be built to the highest ice-class, and the

series will provide a showcase for the world's potentially most powerful medium-speed diesel engine, the Finnish-developed, Italian-manufactured Wärtsilä 64. In addition to its suitability for timber, paper, general cargo, bulk commodities and also dangerous cargoes, the type has been moduled for a substantial container intake equivalent in each case to more than 1,100-TEU.

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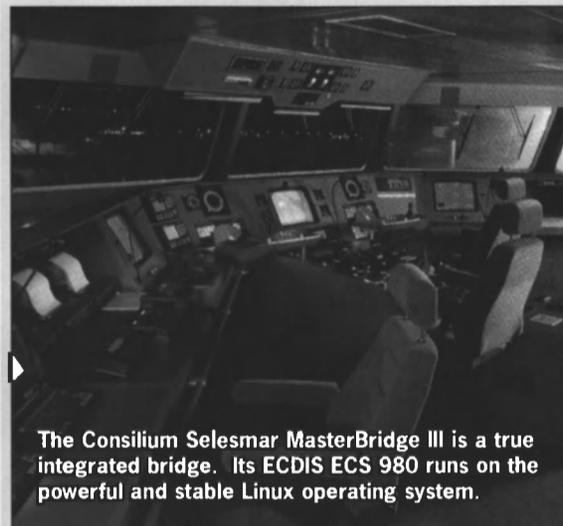
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## Consilium Selesmar To Present Latest IBS In Oslo



The Consilium Selesmar MasterBridge III is a true integrated bridge. Its ECDIS ECS 980 runs on the powerful and stable Linux operating system.

Consilium Selesmar will show its integrated bridge system, MasterBridge III, at this year's Nor-Shipping '99 exhibition, scheduled for June 8-11 in Oslo, Norway. This is the company's second-generation bridge system and replaced the vector system two years ago. Since then, it has enjoyed a number of enhancements, which were made possible largely by its versatile architecture. This allows the system to receive frequent software and hardware upgrades, as new technology warrants.

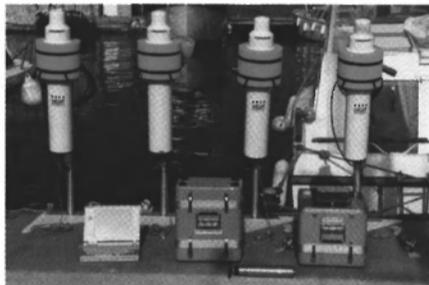
The centerpiece of the system is the IND 970 graphic conning station — a station which displays critical navigation information gathered from a number of sensors and systems strategically placed throughout the ship. On display are the ship's heading, course to steer, rate of turn, speed, shaft speed, propeller pitch, rudder angle, voyage monitoring, position, drift, depth under keel and alarms. Separately windowed pages show weather chart facsimiles and navigational telex data.

MasterBridge III is touted as a fully integrated bridge system that includes all of the ship's navigation instruments interfaced over a local area network. Consilium Selesmar delivers an entire turn-key bridge, consisting of ARPA radars, ECDIS, gyro and magnetic compasses, autopilot, steering gear remote control, speed log, DGPS/GPS/Loran navigators, echo sounder, anemometer, indicators for rate-of-turn and rudder angle and external sound system. The IB also includes a modern alarm transfer system and dead man's alarm for vessels designed for one-man bridge operations. The Consilium Selesmar ECDIS ECS 980 runs on the Linux operating system, a powerful and extremely stable OS invented by Linus Torvalds of the University of Helsinki. Its main benefit to ECDIS is its stability.

Circle 39 on Reader Service Card



## ORCA/ACSA Provides Breakthrough



French-based companies, Orca Instrumentation and ACSA have joined forces in the development of the GPS Intelligent Buoy (GIB) System which provides offshore oil companies, research institutions and navies an improved way for tracking, position monitoring and trajectory observation of underwater vehicles.

The satellite-based global positioning GIB system, which uses a differential GPS, is a set of four or more buoys and one or more pingers, it is able to provide a precise tracking of underwater activity such as the motions of submarines, autonomous underwater vehicles (AUVs) torpedoes and seismic rays. After the pingers transmit the signal of the arrival of the tracked object to the buoys, dates of arrival are then measured and forwarded to a local radio network unit.

Circle 41 on Reader Service Card

## Converted Shuttle Tanker Joins Knutsen Fleet



Norwegian shipowner Knutsen OAS Shipping recently accepted delivery of the former crude carrier, Tanana after a three month conversion performed at Astilleros Espanoles group's Cadiz yard. Renamed Catherine Knutsen, the refurbished 150,000 dwt vessel is the

### Main Particulars

Length, o.a.	869 ft. (265 m)
Breadth	143 ft. (43.7 m)
Depth	78 ft. (23.8 m)
Deadweight	41,720 tons
Configuration	double side/double bottom
Power output	15,650 bhp
Auxiliary engines	3,130 kW
Thrusters (bow)	2,140 kW
(stern)	1,355 kW
Cargo capacity	160,307 cu./m.

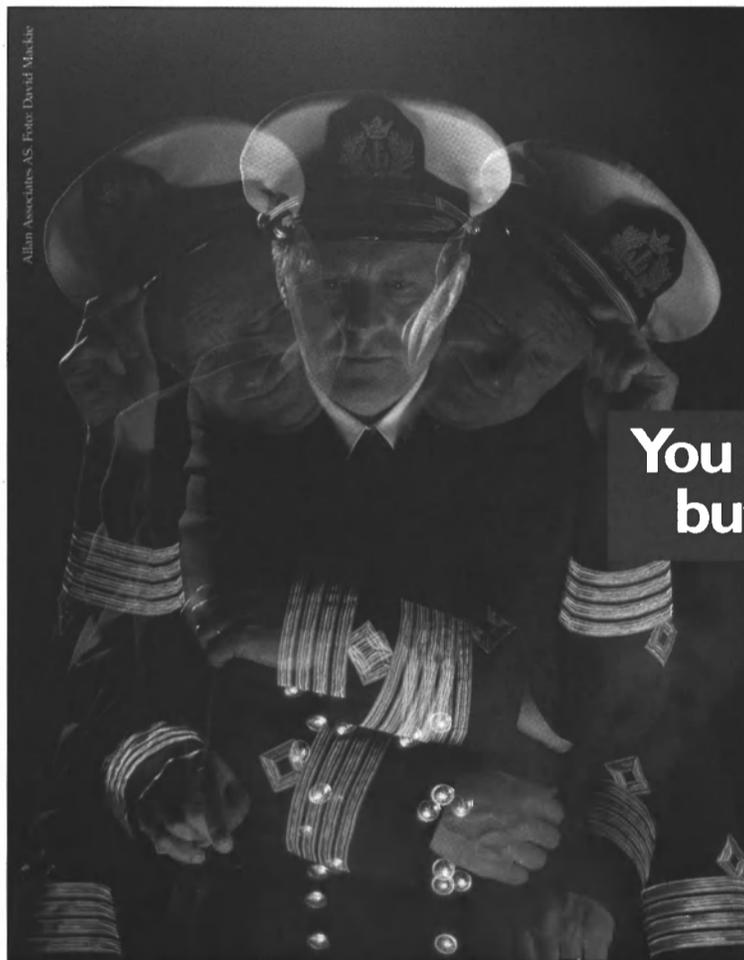
newest member of Knutsen's shuttle tanker fleet. Changes made to Catherine Knutsen included a bow-loading system (BLS), remodeled shaft line and new cp propeller. In accordance with safety requirements, the tanker also houses a station keeping system satisfied by a DPS (Dynamic Positioning System) furthered by an HPR (Hydroacoustic Posi-

tioning Radar), system, four thrusters and two dedicated auxiliary engines.

Third in a series of conversions done by Cadiz for Knutsen since 1992, Catherine Knutsen joins former crude carriers Tove Knutsen and Dicto Knutsen — the latter being the first to receive a submerged Turret Loading System (STL).

## ASAS Offers Advanced Ship Positioning Capabilities

Maneuvering ships in rivers and confined waterways are difficult, time-consuming, and potentially dangerous operation. Because ships are slow to respond to rudder movements, controlling a ship is a reactive and iterative process,



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requiring continuous rudder adjustments even in a straight track. Delayed reaction could cause accidents while unnecessary rudder movements reduce ship speed and, therefore, decrease fuel efficiency. The safety and efficiency of ships navigating in confined waterways

can be improved by using an advanced autopilot that is able to maintain a ship within a few meters from a pre-set track. Coretec is currently developing the Advanced Ship Autopilot System (ASAS), which is expected to be market-ready next year.

ASAS will reportedly be able to:

- Integrate an accurate predictor;
- Maintain a pre-set track within a few meters;
- Use familiar autopilot interface;
- Offer an optional prediction and scenario simulator;
- Be capable of autopilot berthing;
- Offer reduced wear and tear on

steering system;

- Offer improved safety and reduced accidents.

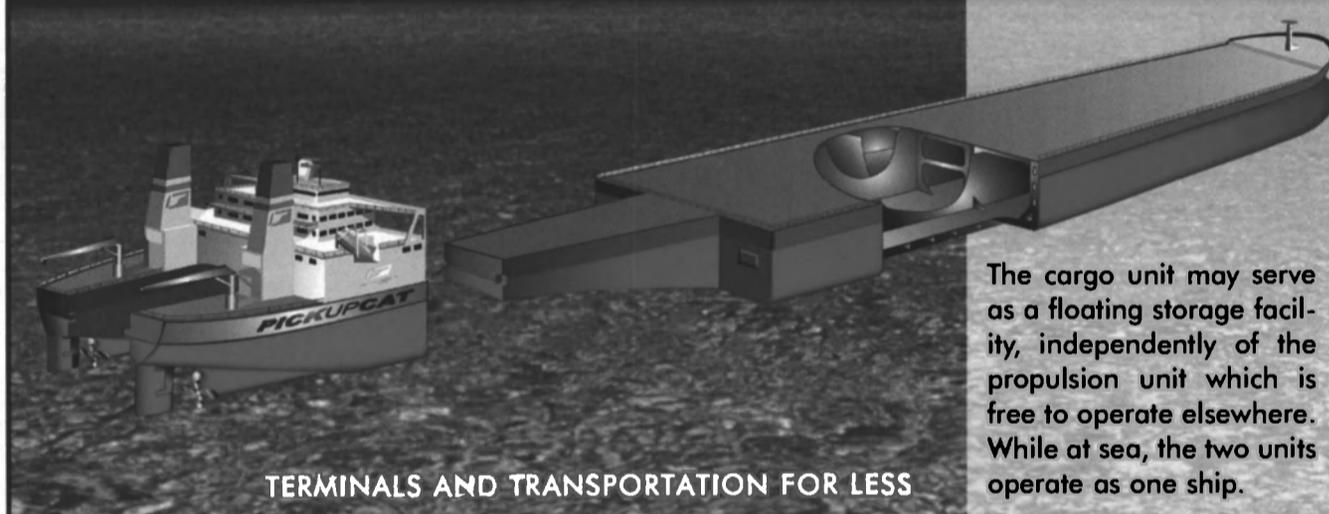
Set for launching at the NorShipping exhibition is Coretec's Ship Predictor System (SPS), designed for improved navigation safety and efficiency in confined waters. The SPS is an advanced system that provides, in real time, short-term high-precision prediction of a vessel's maneuvers in confined waterways. This prediction assists the ship's captain in accurately maintaining the vessel tracking, substantially improving the safety and fuel economy of its operation. The SPS is fully integrated with the ship's propulsion and steering systems and Electronic Chart Display and Information System (ECDIS).

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## PICKUPCAT™

The PICKUPCAT concept is based on dividing a vessel in two separate parts: a self contained catamaran containing power, propulsion and steering functions and an interchangeable cargo carrying unit.

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### Ulstein Verft Delivers Normand Pioneer



Ulstein Verft has delivered its latest vessel to Solstad Rederi, the multi-functional offshore support vessel, Normand Pioneer. With the ability of trenching, laying flexible pipe and other sub-sea construction, the UT742 vessel will be followed by a sister ship in November 1999. Measuring 312 ft. (95 m), with a 79ft. (24 m) beam, the Pioneer also offers a 500 ton-pull allowing the vessel to meet deep water platform requirements. The ship's structure is also prepared for a 1,650 ton-meter offshore crane to be fitted at a later date. Powered by both an eight and six cylinder engine, the Normand Pioneer is designed to hold position in a variety of conditions existing in the North Sea.

Circle 48 on Reader Service Card

#### Main Particulars

Length, o.a.	312 ft. (95 m)
Breadth, (moulded)	79 ft. (24 m)
Depth	32 ft. (9.7 m)
Deadweight	5,300 tons
Deck cargo	3,500 tons
Cargo deck area	1,000 sq. m
Trial speed	17 knots
Horsepower	27,800 hp
Bollard pull	280 tons

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## Daleside Shipping Wins Piracy Case

Daleside Shipping Services of Norway recently won a case against Technotrading Schiedam B.V. for illegal copying of spare parts for its Rustibus product.

Rustibus is the rust removal system using rotating chains. With a result of SA 1.5 and a capacity of 30 sq. m. per hour at an approximate cost of \$1 per sq. m., it is positioned as a cost effective, environmentally friendly alternative to grit blasting. Daleside Shipping Services announced that for some time, it had noticed that patented parts of the Rustibus were copied and sold illegally. "Our major concern is that the piracy copies are inferior in quality to our patented originals," said Tore Daleside, managing director. "This does not only frustrate our clients, but these piracy spare parts give a bad-will to our well-known Rustibus."

Circle 40 on Reader Service Card

## Drew Marine Offers Variety Of New Products

On display at Ashland Specialty Chemical's Drew Marine Div. stand at NorShipping '99 will be a host of new products. The company recently signed a new distribution alliance with the Henry Sealants Div. of The Henry Group, allowing Drew Marine to now feature the Henry Diplomatic Marine hatch cover sealant and sealant system. Ram-Neck Heavy Duty Marine Tape is recognized as a premier hatch cover

sealing tape. When used as a sealing system with Koaming-Aide coaming gasket, it provides excellent protection for water-sensitive cargoes.

In Oslo, Drew Marine will formally introduce a wire-welding package, which includes the Amerarc 1-400 GMS inverter arc welding machine, Amerarc F-4 wire feeder and Amerarc No. 4 MIG gun. The system is designed for high-volume, fast-turn-around shipboard projects, while the package permits the use of the traditional Gas Metal Arc Welding process, as well as Flux Cored Arc Welding.

Two new fuel treatments formulated to address combustion problems with heavy fuel will be featured at the Drew Marine stand: Amergy 5000 combustion improver and Amergy 5800 Plus deposit modifier/combustion improver.

Circle 42 on Reader Service Card

## Poseidon Sells 100th GMDSS Simulator

Poseidon Simulation AS recently sold its 100th GMDSS simulator, a landmark which the company considers a significant indicator of its leading marketplace role. The unit was sold to the Tromsø Maritime Institute in Norway. Company director **Bjarne Pedersen** touts the company's GMDSS simulator as a cost-effective means of training, and an integral part of a complete training concept, including text book and instructor training. He noted that the simulator is fully STCW '95 compliant at a GOC certificate level.

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## FastShip Speeds Forward

The Delaware River Port Authority (DRPA) and FastShip Inc. added more credibility to the possibility that a new, fast-craft vessel and system will be servicing the North Atlantic trade lines. The recently revised agreements designate both the Port of Philadelphia and Camden as the North Atlantic hub for the new generation of high-speed cargo ships — a vessel and complex fast transport system that is expected to revolutionize trans-Atlantic shipping.

FastShip also reached an agreement with Interocean Uglan Management of Voorhees, N.J., stipulating that Interocean will operate FastShip's fleet of vessels.

Utilizing an innovative hull design and specially modified jet engines for propulsion, FastShip is designed for carrying premium, time-sensitive cargo on a seven-day, trans-Atlantic door-to-door cycle. FastShip would specifically call on its North American and Cherbourg, France homeports, unlike conventional ships which ferry cargo to multiple ports. The ship, while the centerpiece of the program, is indeed simply one piece, as the system entails a proprietary loading and unloading system, terminal and intermodal system, ensuring that containerized cargo at both hub ports would move quickly to its final destination.

FastShip has engaged the service of J.P. Morgan Securities Inc. to act as the company's exclusive financial advisor.

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## Hitec Appoints New Managing Director

Frederik Hvistendahl has been appointed managing director of Hitec Drilling & Marine Systems AS, Stavanger. Mr. Hvistendahl most recently

worked as marketing director for Schlumberger Oilfield Services Scandinavia.

## Catia Upgraded With New Releases

IBM and Dassault Systems announced the general availability of CATIA Ver-

sion 5 Release 1 for native Windows NT and UNIX. At the same time, three new products and 28 enhancements are being announced for CATIA Version 4 Release 2.1.

CATIA Version 4 Release 2.1 expands mechanical and construction industry competitiveness and productivity in advanced modeling, digital manufactur-

ing, and plant design domains.

Version 5 Release 1 can be used as a stand-alone product or alongside Version 4. Customers implementing CATIA for the first time, or existing customers expanding their installation, may choose a phased implementation.

IBM and Dassault Systems are also introducing a range of pre-packaged service offerings to help customers maximize the advantages of CATIA Versions 4 and 5.

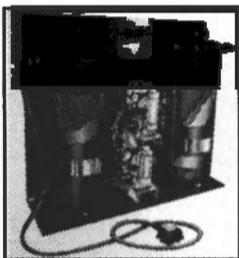
Version 5 Release 1 delivers next-generation object technologies and architecture. It is built using leading-edge standards such as STEP, Java, CORBA and OLE. The combination of scalable architecture and ease-of-use is designed to make Version 5 Release 1 unique in its ability to deliver scalable applications in the areas of function, process coverage and modeling technology.

In manufacturing, Version 4 Release 2.1 delivers different high-speed milling strategies in both interactive NC definition and semi-automatic approaches. This is designed to increase the quality of surface finish and reduces bench time for manufactured parts.

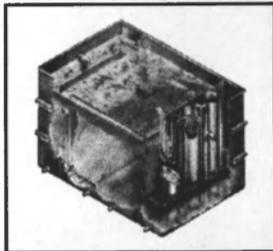
In digital plant creation and simulation, CATIA Version 4 Release 2.1 delivers a new product dedicated to conveyor design. Complementing the other products from the CATIA-CADAM Plant and Ship Solutions, CATIA AEC Conveyor Design addresses the full conveyor design process from preliminary design, including automatic bill of material and precise cost estimation, to 'catalog-driven' detail design.

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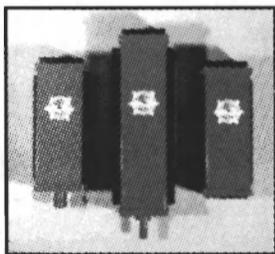
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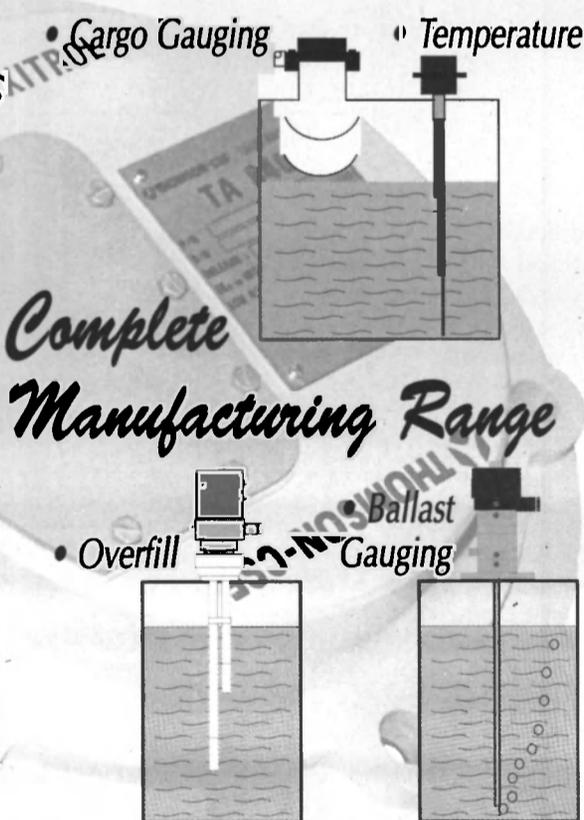
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## Automation Advance Sparks Ignition Touchpad

Designed specifically for the marine environment and mounted directly on the vessel's panel, Cole Hersee has developed a multi-functional touchpad switch and keyless ignition.

A leader in the manufacturing of electrical and electronic switches, Boston-based Cole Hersee's flat pad offers various levels of remote functions, as well as elimination of the manually-started ignition. With capability of adapting to any user, the Flat Pad is activated via a security-protected PIN number. Electronically coded signals are then fused through a slim wire, turning on the likes of the vessel's engines, motors, lights and navigation. Distribution of harness weight throughout the ship is also reduced since the pad's control circuit is a single wire pair, fusing together all the electrical functions. The Flat Pad can be customized to any size, shape, color and choice of electrical equipment operation, including pilot lights.

Circle 50 on Reader Service Card

## Soft Market Equals Shortfall In Hull Premiums

Marine hull premiums are generating only 50 percent of the income the London market needs to meet commitments when there are casualties, a leading underwriter claims. Peter Christmas, Hull Underwriter at Lloyd's with the Wren Syndicates Management Limited, said the market faced a premium shortfall when risks were increasing. "My view is that the premium pot is about half what is required to pay the attritional losses and the increasing incidence of larger casualty."

Marine insurers now faced the prospect of providing cover for ever bigger vessels — with a new generation of cruise ship carrying more than 4,000 passengers and crew and containerships with major increases in TEU carrying capacity.

Christmas outlined the state of the market at the Clifford Chance Richards Hogg Lindley Practical Course in Marine Insurance and Average held recently in London. He said, "We have experienced in recent years a period of low incidence of major loss. If this changes, there will be insufficient money flowing through the system to pay the losses."

Owners had taken advantage of a soft market and excessive capacity has driven down premiums, he explained. Christmas saw little opportunity to underwrite marine hull business sensibly at the moment.

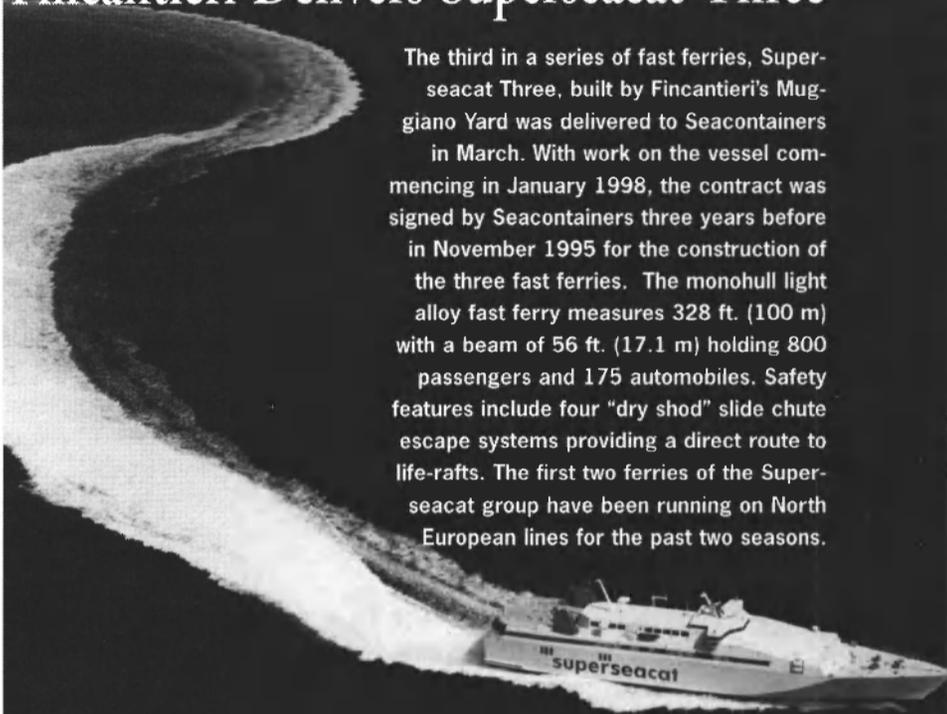
He said that the marine market is moving towards the aviation market with the potential for the majority of the premium income generated by the class to be needed to meet one major claim. This happened in aviation with the Swiss Air disaster. According to Nicholas Platt from Gard (U.K.) Ltd., P&I Clubs were in a "relatively more advantageous position." There are fewer Clubs than hull underwriters and they do have the ability to ask members for more money — they may not like to do it but they can.

He agreed that the trend was towards bigger, more complicated claims.

Thanks to the softer market, the International Group had been able to obtain some reductions in its reinsurance costs. Platt said that owners faced poor freight rates and P&I Clubs had acknowledged this in their recent renewal negotiations.

## Fincantieri Delivers Superseacat Three

The third in a series of fast ferries, Superseacat Three, built by Fincantieri's Mugliano Yard was delivered to Seacontainers in March. With work on the vessel commencing in January 1998, the contract was signed by Seacontainers three years before in November 1995 for the construction of the three fast ferries. The monohull light alloy fast ferry measures 328 ft. (100 m) with a beam of 56 ft. (17.1 m) holding 800 passengers and 175 automobiles. Safety features include four "dry shod" slide chute escape systems providing a direct route to life-rafts. The first two ferries of the Superseacat group have been running on North European lines for the past two seasons.



Main Particulars		
Classification	RINA, DNV	Depth . . . . . 35 ft. (10.7 m)
Flag	Italian	Propulsion . . . . . 4 diesel engines
Length "	328 ft. (100 m)	Speed . . . . . 40 knots (approx.)
Length, b "	288 ft. (88 m)	Passengers . . . . . 800
Beam	56 ft. (17.10 m)	Vehicles . . . . . 175
		DWT . . . . . 340

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## MAN B&W Diesel Toasts A New Century

It's 100 times two and a little dose of irony at MAN B&W Diesel A/S. This past December, the engine company

held a double ceremony celebrating two milestones to go down in the company's history log — the delivery of the 100th MC-engine which coincidentally occurred the day of MAN B&W's centennial celebration.

Stepping back to 1898, when MAN B&W accepted its first engine from

Frederikshavns Jernstøberi og Maskinvaerksted, (now known as Frederikshavn Iron Foundry and Engineering Works), the unit was given the name "Alpha One." Its duplicate, the Alpha Nine was constructed that same year, with a horizontal design. Known as the U-series, the pair of "Alphas" made their

mark in 1901 when combustion engines were main propulsion machinery with the eventual adaptation of the horizontal design to vertical below-deck installation. The Alpha One, a single-cylinder, four stroke hot bulb engine was first used was for a winch-drive aboard a

(Continued on bottom of page 51)

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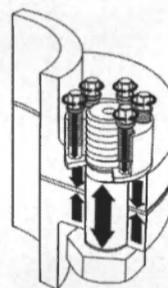
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## Simek A/S Delivers Supply Vessel

Built according to the highest class in Det norske Veritas, the M/S Havila Hidra was recently delivered to Havila Shipping ASA based in Fosnavaagen, Norway. Constructed by Simek A/S Yard Number 87, the vessel is of Ulstein Ship Technology AS, UT 745 — frequently spotted in the North Sea.

Powered by two Ulstein Bergen type BRM-8 engines, developing at 3,530 kW at 750 rpm, the Havila Hidra vessel

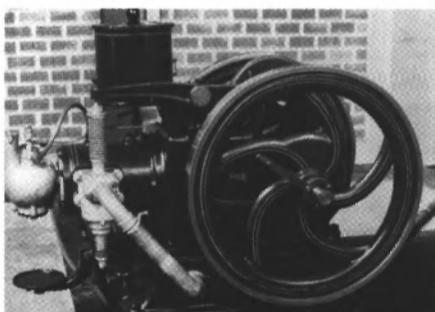
also houses a retractable Ulstein thruster, type TCNS 73/50-180. Measuring 960 sq./m., the ship's deck is designed for transporting deck cargo — complete with loading stations located outside the cargo rail.



### Main Particulars

Classification	DNV
Flag	Norwegian
Length, o.a.	275 ft. (84 m)
Length, b.p.	249 ft. (76.2 m)
Beam	62 ft. (18.8 m)
Depth	25 ft. (7.6 m)
Draft	21 ft. (6.31 m)
Deadweight	4,640 tons
Gross tonnage	3,102 grt
Main engines	Ulstein Bergen
Fuel oil	1,117 cu./m
Fresh water	1,104 cu./m
Water ballast	1,579 cu./m
Methanol	168 cu./m
Base oil	231 cu./m
Mud	692 cu./m
Brine	719 cu./m
Oil recovery	1,006 cu./m
Drill water	1,072 cu./m
Slop	392 cu./m
Dry bulk	400 cu./m
Cargo deck	960 sq./m
Speed	16.4 knots

(Continued from page 50)

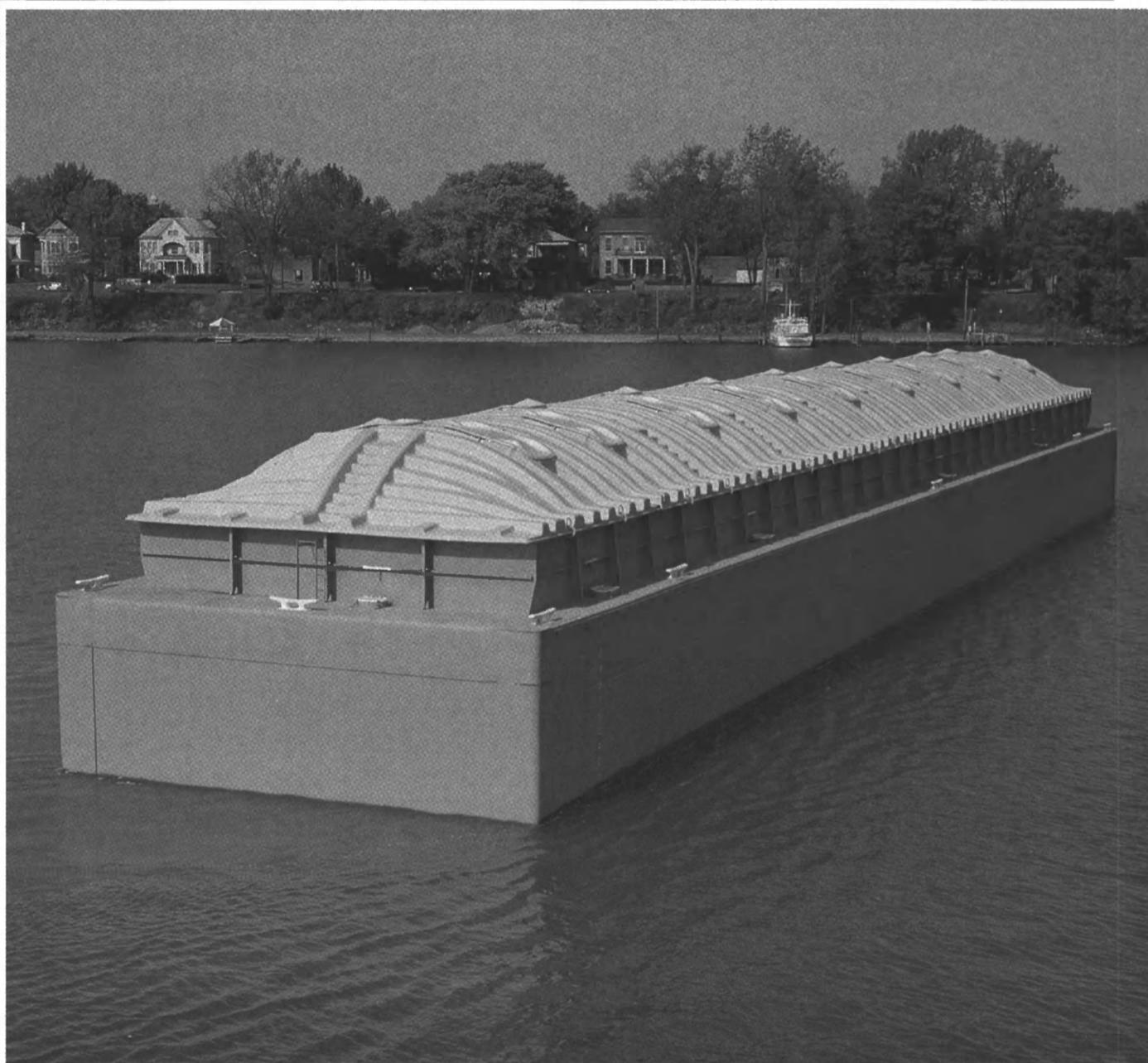


fishing vessel with an hp of 4 at 420 rpm.

Part two of the company's festivities concerned the medium-sized cargo vessel sector — the factory's production of its 100th two-stroke MC-engine was complete and ready for distribution. With outputs ranging from 2,000 to 93,000 bhp, the eight-cylinder S-types will be utilized for a new tanker currently under construction at German-based Aker MTW Shipyard for Russian-based LUKoil Arctic Tankers.

A ceremony honoring the company's achievements was held in the factory's assembly hall and included the unveiling of the restored Alpha Nine. The original engine currently stands in the entrance hall of the company's administration building in Frederikshavn.

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# CANADIAN MARITIME



*A traditional maritime country with 3,000 km of waterways — including the St. Lawrence Seaway — and a vast array of ports located along the Canadian coastline, the Canadian Maritime Industry continues to offer technological and operational innovation.*

The second largest country in the world, the Canadian coastline stretches out 243,791 km. Aside from the St. Lawrence Seaway, port activity remains high in Thunder Bay, Toronto and Vancouver with a merchant marine of 60 ships, including chemical and oil tankers, and passenger and RoRo ferries totaling 775,391 DWT.

Canada is not only bustling with exporting ships carrying timber, crude petroleum, natural gas and aluminum, the country is also home to a variety of companies that provide the means to allow these vessels to run smoothly and efficiently. In St. Catherine's, Ontario, Canada, **Port Weller Dry-docks** is known for its extensive knowledge of engineering connecting the design, installation and testing aspects of inter-disciplinary projects. Port Weller and its parent company, **Canadian Shipbuilding & Engineering** are equipped to perform both the conversion and construction of vessels while still adhering to the capability of the full-service repair facility.

A \$5.5 million project to enhance the company's steel-cutting, welding and fabrication capabilities was established this November. Consisting of a Plasma Arc Cutting Machine with Beveling Capacity, Robotic Profile Cutting and Welding Lines and Semi-Automatic Panel Production Line, these upgraded components will be further enhanced by a

newly-designed material flow inside Port Weller's steel workshops. The dock credits its most recent project to be the \$100 million hull replacement program of **Canada Steamship Lines** former J.W. McGriffin.

Since entering the maritime scene in 1977, Ontario-based **Thordon Bearings** installed its first composite bearings in a river boat strut and stern tube more than 15 years ago. The secret of Thordon's success — the inner lining of the GM2401 polymer alloy, fused to a high strength polymer outer jacket, providing the utmost stability.

As an exhibitor last September at the SMM Exhibition in Hamburg, Germany, Thordon showed its **SeaLion** marine mechanical face seals. Constructed as a necessary part of the company's stern tube bearing systems, the **SeaLion** is able to function via water or Thor-Lube lubrication. The system also features a rotating carbon-graphite face, supporting the protection of lubricating liquid loss.

Providing leak free performance, the **SeaLion** guarantees for complete elimination of stern tube oil pollution.

Princess Cruises can thank Thordon for the development of its new **COMPAC** system. The pollen-free water lubricated propeller shaft bearing system is installed on the line's **Grand Princess**. Using seawater as lubrication, and built to fit shaft liners mea-

suring in diameters of 642 mm and 607 mm, **COMPAC** allows for bearing removal without shaft pulling.

In Vancouver, the joint venture between maritime application developer **Rydex** and global mobile communications company **ICO** exhibits Canada's advanced technological base. Effective March 1, the two signed a memo of understanding enabling **ICO's** maritime distributors access to services across a variety of market areas. **Rydex**, responsible for maritime communication operations including automatic data communication, e-mail and ship-board IT support, is currently engineering a satellite service for availability in the year 2000. The handsets, which can easily be slipped into a pocket, permit for roaming between **ICO** and any mobile network. No cellular network availability? — providing unrestricted mobility, **ICO's** satellite network will search until one is located.

Multi-network international mobile satellite service provider, Ottawa-based **Stratos** will be at the forefront this August as first global provider of the new **Inmarsat M4** service. Delivering high quality voice, fax and a variety of data services via portable terminals the size of a laptop computer, the **M4** will be introduced this August.

A product currently available from **Stratos** is its new **Iridium** World Page Service. Offered either by

itself or in conjunction with Iridium voice services, this option allows paging customers to receive messages from anywhere throughout the world via a 4 oz. pager which can easily be clipped to one's belt. Iridium will soon have a new supplier as well. Stratos and **Hughes Global Services** recently formed an agreement making the latter a supplier of Iridium services by way of a U.S. government contract. HGS will deliver the full selection of Iridium services and related products through its General Services Administration contract.

In the area of heating, ventilation and air conditioning, **Stork Canada** leads the way with its recent supply and installation for the staterooms of **B.C. Ferries Pacificat**. The fast ferry, in conjunction with its project managers — **Catamaran Ferries International**, have a second ship in the works, as well as a third on the way the end of this year. Stork's HVAC package consists of 37 individual heat pumps grouped into 11 control zones with outdoor air ducted to each indoor cassette. Exhaust ventilation from the spaces is provided via a group of galley and washroom exhaust systems. No stranger to the highly specific fast ferry design, Stork has therefore modeled its criteria with this type of vessel in mind, mainly: climate comfort and control level, equipment dimensions, and reliability and weight of the

installation. Located in Vancouver, the Stork plant is also equipped for production of refrigeration packages up to 50 tons, as well as the selection and supply of all HVAC and refrigeration equipment necessary to complete the system's implementation.

Another Vancouver company, Off-

shore Systems, was granted orders from Marinette Marine Corporation Shipyard for ECPINS® systems for U.S. Coast Guard Sea Going Buoy Tenders. The contract also includes an option for nine more systems through 2003. Offshore Systems International, the company's wholly-owned U.S. subsidiary was also

chosen by the USCG (and Bollinger Shipyards) to provide the Yokogawas Electromagnetic Speed Log from the USCG Coastal Patrol Boat Program. The two contracts awarded to Offshore and its Fife, Wash.-based subsidiary are estimated at a value of \$1 million, with the open possibility for new orders in the future as per the same options.

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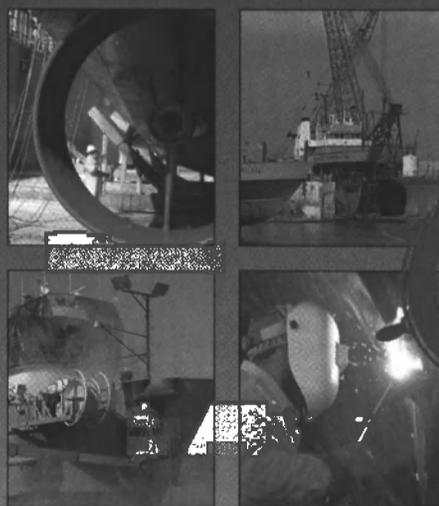
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To receive additional information on the following companies mentioned in this article, please circle the corresponding numbers on the Reader Service Card in this edition.

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## CANADIAN MARITIME

Since 1980, **Autoship Systems** has provided the maritime industry as the key supplier of naval architecture programs with over 1,700 installations in more

than 50 countries. Presently, the Vancouver, B.C.-based company has initiated its generic marine gear and equipment models library collection. Presented in .PR3

format, there are 39 models currently available to intensify rendering ability, and assisting the designer in space management. Not only do the files lessen CAD general arrangement production time by facilitating the preliminary assessment of space and layout — they also provide a sharp, polished presentation when presented to owners and investors, making all the difference in a professional showing. The library is a free service for all Autoship purchasers.

The latest in the Autoship fleet of products is **Autoyacht** — a welcome addition to the company's CAD/CAM programs designed to comply with the surface modeling requirements per yacht designers.

Since relocating to its new home at: 230-1639 West 2nd Avenue in Vancouver, BC, Naval Architectural firm, **Robert Allan Ltd.** has designed a 136 ft. (41.6 m) VSP escort tug for Johannes Østensjø dy AS. Based in Haugesund, Norway, the company will use the vessel to serve oil terminals on the country's West coast.

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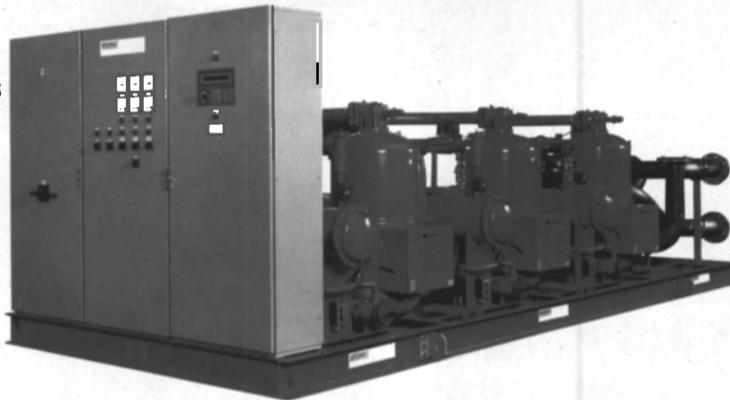
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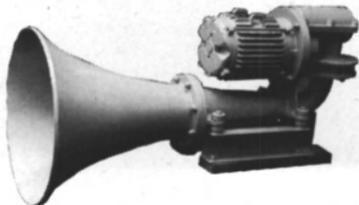
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maintenance, **PCS Marine** enhances its fire fighting, life saving and egress safety plan services by providing no cost amendments and secured off-site media storage for five years. The Ontario-based company's accomplishment that remains on the forefront is its recent installation and refinement of its Hull Structure Maintenance Management System for 40 ships operating within the St. Lawrence River and the Great Lakes Basin. This precedes the updated version of PCS Hull Manager, providing database replication, 2-way synchronization and ship structure inspections.

Family owned and operated **Dynamic Engineering** in British Columbia is the largest turbocharger facility of its kind in Canada. Split into two divisions — Small and Large, the company was appointed last year by **MAN B&W** as authorized repair station for its turbochargers in Western Canada. Known for its computerized dynamic balancing and

specialized welding techniques, the company is celebrating 35 years of service this year.

Quebec-based **Hermont Marine** has a mission — to help cruise ship operators with two common problems. The first is the difficulty of oil removal from the

complex mess of oily bilge water on HFO burning ships, the second is the necessity of being viewed as an operator of an environmentally-safe ship. Hermont aids the cruise ship industry with its bilge water polishing system. Comprised of functions responsible for oil,

emulsion and solids removal, the product proves that oil free discharges are possible.

Construction of the first phase of **Vancouver Shipyards** salmon farming ocean catamaran net cage systems was completed in March. Launched from the

Pictured on page 52

### ECTUG Nabs New Addition

Indicative of Canada's investment in the latest maritime technology, **Eastern Canada Towing Ltd.** (ECTUG) purchased and received a premier azimuthing stern drive (ASD) harbor tug for \$3.7 million. With a bollard pull of 45 tons, the Point Valiant will run out of the Port of Halifax. Replacing the 24 ton bollard pull Point Vigour built in 1962, the Valiant is an upgraded version powered by twin 2038 bhp Mitsubishi engines driving ZP-21 (Z-drive) propellers for increased power and maneuverability. Ectug's newest 80 ft. (24.4 m) tug is designed specifically for the handling of smaller vessels, in addition to operating in tightly closed situations.

#### Main Particulars

Name .....	Point Valiant
Flag .....	Canadian
Length, o.a. ....	80 ft. (24.4 m)
Engines .....	Two 16 cylinder Mitsubishis
Horsepower .....	2,038 bhp
Bollard pull .....	45.9 metric tons
Speed .....	13.5 knots
Propulsion .....	Niigata
Throttle .....	Mechtronics
Fuel .....	.14 gallons
Fresh water .....	100 gallons
Lube oil .....	100 gallons
Waste water .....	.75 gallons
Radar .....	Racal Decca
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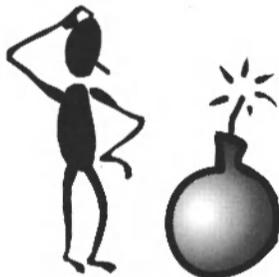
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# MANLY DOORS

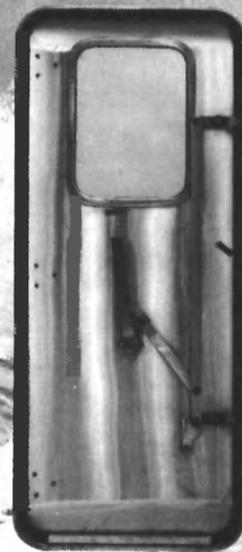
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## CANADIAN MARITIME

company's location in North Vancouver for towage to **Omega Seafarms** in Port Hardy, the cage allows for salmon farms to be located in exposed areas off the coast.

"Marine construction contracts related to B.C.'s aquaculture sector is a growth industry waiting to happen," said Vancouver Shipyards director, David Reid.

"When you combine over 30 years of steel fabrication experience, leading-edge catamaran design, 600,000 pounds of steel and 100 skilled trades people, you have a recipe for a new industry and new jobs for B.C. Workers."

Upon completion, the contract as requested per Norwegian design firm **PROCEAN**, is estimated to be worth

\$10 million.

Celebrating its 70th anniversary this year, Langley, B.C.-based **Airchime Manufacturing** not only produces more than 150 models of air, electric and steam operated horns — the company also houses a complete line of accessory and control equipment to go along with their products.

Airchime's model **KMJ/JM** series, cast in lightweight marine grade aluminum allowing for exceptional corrosion resistance and dubbed as its most innovative product to date, features a self-draining design, along with low psi requirements resulting in an energy efficient device. Suitable for small workboat and commercial vessels measuring under 246 ft. (75 m), in addition to models **KM**, **ENC** and **SCKM** appropriate for vessels over 75 m. The whistles are designed for marine applications as well as meeting or exceeding all performance standards as required for **IMO Coast Guard** certification.

Responsible for the building of marine autopilots and related accessories, **ComNav** has recently introduced a new line of drive units suitable for non-hydraulic steering systems and include: the **Rotary Drive Unit** is a 12-volt chain drive motor suitable for small boat applications and three **Cable Drive Units** created to replace the existing Morse titled and straight shaft helm station, and the **Teleflex Performance** and **Standard Tilt** helm stations. **ComNav's** pilots may be found in fishing vessels, tugs, tankers and freighters measuring up to 984 ft. (300 m).

(Continued on page 74)

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### Institute Gears Up For Mari-Tech '99

Comprised of mostly design, manufacturing and supervisory engineers, the **Canadian Institute of Marine Engineering** will hold its annual **Mari-Tech Conference** from June 8-10.

Beginning as a technical conference more than 20 years ago, **Mari-Tech** now offers as many as 60 booths displaying the products and services of shipbuilders, supply industries and support industries. Naval architects, certification, survey organizations and government departments are represented as well.

Unbeknownst to many, **Canadian marine and shipbuilding activities** are alive and kicking — especially in terms of offshore energy and the marine engineering assistance it requires. **Mari-Tech** builds upon this by holding various technical and social events, including an opening reception on the conference's inaugural evening. The purpose — so that maritime industry members can network and gain knowledge from industry veterans.

For further information on **Mari-Tech '99**, and to check out a list of this year's exhibitors, log onto **CIMA's** website at: [www.cimare.org](http://www.cimare.org)

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## SOFTWARE SOLUTIONS

### Partnership Provides Innovative Maintenance Management

Seaworthy Systems, Inc. and Decision Dynamics, Inc. have announced a partnership whereby Seaworthy will market and support SeaStar, a comprehensive solution for shipboard maintenance management. SeaStar is the result of a

joint venture between Seaworthy and Decision Dynamics that combines Seaworthy's extensive knowledge of ship operations and marine engineering expertise with DynaStar 2000 computerized maintenance management system from Decision Dynamics.

SeaStar is designed to enable ship owners and operators to make informed

and cost-effective strategic and operational decisions including spare parts inventory and machine preventive maintenance schedule optimization. Seaworthy offers each SeaStar customer a complete spectrum of associated maintenance engineering services on a turnkey or individual basis including: maintenance and inventory database develop-

ment; systems installations; training; hardware configuration and supply; and on-line support.

"The SeaStar maintenance management system is very flexible and can be customized to address operator specifications for large and small fleets of all types of vessels. The addition of SeaStar to our spectrum of products and services extends our ability to provide comprehensive shipboard maintenance engineering software and systems support in order to achieve individual customer maintenance goals," said **Thomas J. Pakula**, executive vice president of Seaworthy.

With SeaStar, customers manage the entire range of ship maintenance requirements. SeaStar is designed for today's cost competitive operating environment and includes a comprehensive maintenance module, as well as inventory, work order, and purchasing modules and interfaces. The program allows users to implement or streamline preventive maintenance requirements through a variety of user initiated work orders.

The system is ODBC compliant, allowing it to interface with other systems and various data formats; it is also Y2K compliant.

Circle 93 on Reader Service Card

### Ship To Shore Messaging For Windows

A new fully-integrated 'Ship to Shore for Windows' communications package has been launched by GN Comtext Ltd. To be marketed under the brand identity STSWin, the new electronic messaging system has been developed by GN Comtext's specialist Shipping Business Unit (SBU), which was awarded full ISO9002 quality accreditation earlier this year.

STSWin is designed to handle varied information such as stowage plans, accounting records, operational and maintenance data as well as ordinary electronic mail messages. Messages created off-line can be addressed as telex, fax or e-mail and can be prepared and sent in batches once or twice a day to ensure the most economic use of satellite time.

Circle 94 on Reader Service Card

### AFT Pipe Flow Software Chosen For Application

CH2M-Hill has adopted the pipe flow modeling software for process pipe modeling from Applied Flow Technology Corp. (AFT), on a firmwide basis. CH2M-Hill originally purchased multiple licenses of AFT Fathom and AFT Arrow for Windows in 1997 for use at



All the boats in the Whitbread Around the World Race 1997/98 have chosen Inmarsat terminals from Nera to keep in touch with the rest of the world during this extremely tough regatta.

Nera's well-tested Saturn B and Saturn C terminals ensure the participants standard phone connections, fax, e-mail and video recording transmission.

By the end of 1997 Nera had delivered nearly 2 000 B Marine terminals, which represents a market share of more than 40 percent.

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During the autumn of 1997, Nera introduced a new satellite station which is well suited for small crafts and pleasure boats, but also ideal as



relief or back-up for larger commercial vessels or passenger ships. The Nera WorldPhone Marine is small, light, easy to use and install, and above all, affordable.

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## SOFTWARE SOLUTIONS

multiple corporate locations.

After a number of successful project applications during its first year, CH2M-Hill announced that AFT Fathom and AFT Arrow are now recommended on all process pipe projects. AFT Fathom offers an advanced, drag-and-drop graphical interface for building models of incompressible (i.e. liquid) flow in complex pipe network systems. AFT Arrow models the more complex phenomenon of compressible (i.e. gas) flow in pipe networks.

Circle 95 on Reader Service Card

### New Monitoring System For Rotating Plant, Machinery

Guardian from Icon Research is a fully featured system used for on-board monitoring of rotating plant and machinery, as well as measuring temperatures and pressures on-board. The system consists of an industrial network for gathering data and software for displaying plant condition and storing results. Guardian uses a color-coding system to show the status of each area containing sensors. For example, green means all clear, yellow is alert and red denotes an alarm. When an area shows up as yellow or red, a few clicks with the mouse will lead to the vibration analysis of the area and suggested corrective action to be undertaken. The system is designed to compliment planned maintenance and allows the plant to be maintained on the basis of its condition rather than age.

Circle 96 on Reader Service Card

### Coastal Oceanographics Offers Training Seminars

Coastal Oceanographics conducted HYPACK training seminars in Shanghai and Qindau, China during fall 1998. The three-day seminars provided detailed training in all areas of the hydrographic survey package. The company is currently running two-day training seminars in Memphis, Tenn., San Francisco, Calif., and Seattle, Wash.

Circle 97 on Reader Service Card

### Evergreen Uses New Program To Navigate Shipping Reform

Evergreen America Corp. has chosen to implement Rate Explorer, a suite of integrated tariff applications developed by Management Dynamics, Inc. (MDI), which meets the regulatory and commercial challenges carriers face with U.S. shipping reform.

"Carriers without a way to electronically publish their tariffs via a user friendly Internet solution are now pressed to find a reliable resource," said John W. Preuninger, managing director of Management Dynamics. The

May, 1999

other challenge carriers face is how to deal with an explosion in the number of confidential service contracts. Rate Explorer can be deployed over privately leased lines or over the Internet. Management Dynamics will customize Rate Explorer to fit the unique needs of individual carriers.

Carriers using Rate Explorer can:

- provide shippers access to an Inter-

net-based retrieval system to search common tariff rates as well as entering requests for confidential contracts;

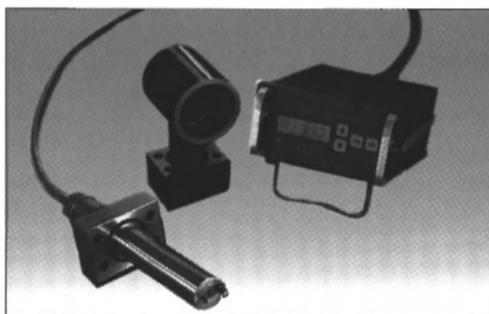
- process high volumes of service contract rate requests with intelligent routings and messaging through a work flow manager;
- auto publish service contracts and file applicable terms;

- calculate bottom-line charges from service contracts including the base ocean, inlands and assessors in a single session;

- auto rate bookings and bills-of-lading;
- track key performance indicators and provide management reporting.

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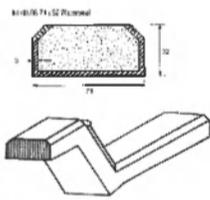
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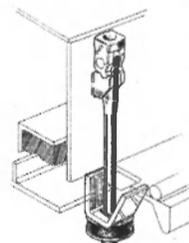
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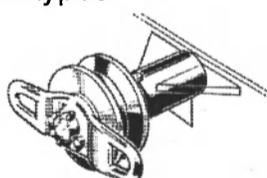


#### Quick Acting Cleats



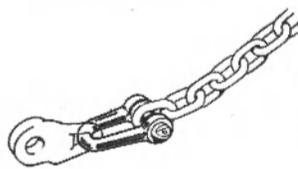
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Circle 230 on Reader Service Card

## VTS Planned for New Orleans in 2000

The USCG will release a proposed rule requiring transponders and electronic charts on most vessels operating in the New Orleans VTS zone. Project officers outlined their plans at a meeting

of the Lower Mississippi River Waterway Safety Advisory Committee.

Under the new VTS system, vessels will use Automatic Identification System (AIS) technology, including

transponders and electronic charts, to locate and identify other vessels in their vicinity. The question before the USCG is: which vessels should be required to carry the equipment? The USCG will propose the following vessels be required to carry full AIS systems,

including both transponders and electronic chart display units:

- Power-driven vessels of 131 ft. (40 m) or more;
- Towing vessels of 26 ft. (8 m) or more, while engaged in towing activities;
- Vessels certified to carry 50 or more passengers for hire; and,
- Dredges or floating plants.

The USCG would require power-driven vessels between 66 to 131 ft. (20 to 40 m) (including most ship assist tugs) to carry a transponder, but these vessels would have the option of not carrying the display unit.

The USCG is setting a target date of March 2000 for starting the New Orleans VTS system. However, project officers say they will be willing to delay carriage requirements for an acceptable phase-in period. They also readily admit the operating VTS system is likely to be delayed beyond the March 2000 target date. At the presentation, the USCG indicated, if bought today, the full cost of a permanently attached AIS unit (transponder and display) would be between \$9,700 and \$13,000. The cost of a portable unit would be \$12,000 to \$16,000 and the transponder alone would cost \$4,800 to \$6,500. However, they indicated current prices are based on limited production of a small number of transponders used in testing. The cost is expected to drop with competition and increased demand.

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Circle 307 on Reader Service Card

### WSF Experiments With E-mail Warnings

Washington State Ferries has introduced a new service to help commuters plan their trips, in spite of breakdowns or weather problems. The new service, e-mail notification, sends electronic messages to customers signed up for a specific route or routes. The service is working for many ferry commuters. More than 900 have signed up, even though the new system is still in the testing mode.

The system was created by WSDOT Webmaster **Wayne Szydtowski**, who set about devising the system after listening to the complaints and frustrations of the WSF customer information staff.

### Reinauer Selects JMS For Barge Fleet

JMS Naval Architects & Salvage Engineers has nearly completed Cargo-Max installations for all of Reinauer Transportation's fleet of oil transportation barges. This is in alignment with the recent installation of Reinauer's

operations/tracking transportation system, TBSS and general activity in computerizing operations.

The CargoMax loading software program allows Reinauer to more efficiently and effectively plan barge loading arrangements of varying cargoes and destinations. CargoMax enables Reinauer to calculate complex cargo arrangements while ensuring the vessel's strength, stability and trim are maintained within acceptable guidelines. Because CargoMax shares the same data format as the salvage engineering software, HECSALV, Reinauer is also able to ensure significantly increased salvage engineering response time in the event of a salvage incident.

### Software Specialists Sign Sales Agreement

U.K.-based Dataworks and ShipNet AS, Oslo, Norway, have signed an exclusive agreement regarding sales of Dataworks products. ShipNet was also selected as the worldwide agent for Dataworks communications and systems, effective immediately.

With both companies utilizing a complimentary product range, Dataworks provides software for message handling and shipbrokering via an international distribution network, while ShipNet offers solutions for shipowners and operators, liner companies and agents.

Circle 99 on Reader Service Card

### Kongsberg's FleetMaster To Enhance Maritime IT

Kongsberg Norcontrol has unveiled a ship-to-shore information network called FleetMaster Information Management System. FleetMaster gathers sensor data and calculates operations information from a vessel's machinery, cargo, navigation and administration systems and then organizes the data into an onboard database.

Subscription of data from this database is controlled by shore-based supervisors who can define exactly which data can be transmitted when, according to their current needs. During the past few years, Kongsberg Norcontrol has been refining FleetMaster based on the critique and analysis of fleet operators, their decision-making strategies and their response to prototype versions of the product.

Circle 199 on Reader Service Card

### MARINOR Concludes Contract With DSND

MARINOR Shipping & Offshore Systems AS, a leading supplier of marine

software systems, recently signed a contract with DSND Offshore AS and DSND Subsea AS for implementation of the RASTwin maintenance systems onboard the company's vessels. The contract with the two DSND companies is a continuation of a pilot project ini-

ated in June 1998 with the Dutch offshore company Seateam. RASTwin was installed onboard the pilot vessel STM Atria.

In the second half of 1998, Seateam merged with DSND and after a successful trial period with the RASTwin sys-

tem, the merged company decided to extend the RASTwin project. The system will be installed onboard five of the fleet's 28 vessels. In addition to software installations, the contract includes staff training and consultancy services.

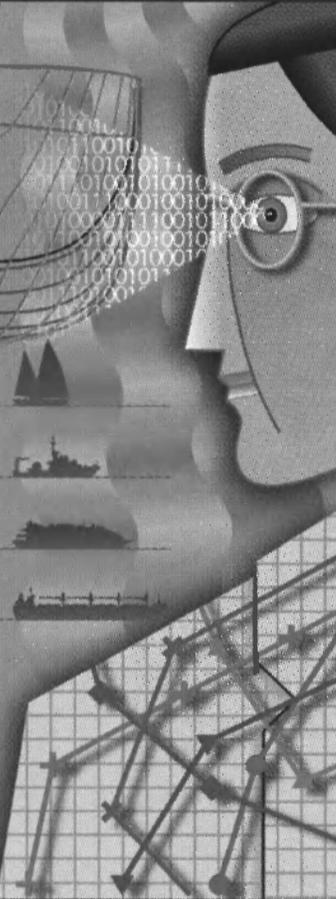
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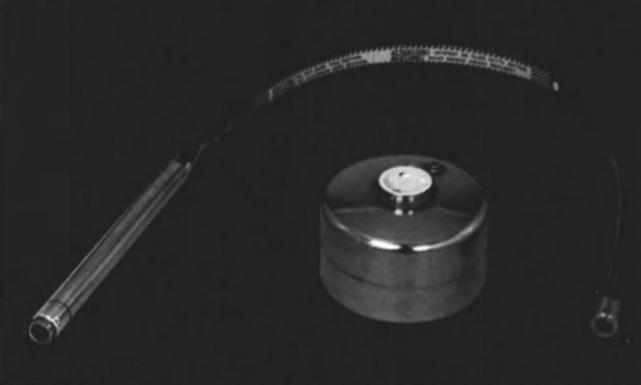


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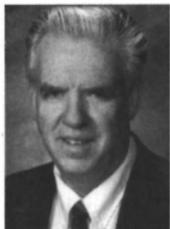
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Circle 231 on Reader Service Card

## Wheelabrator Adds To Its North American Operations

Wheelabrator Alleward Enterprises, producer and marketer of metallic abrasives has strengthened its North American outpost with the promotion of **Brian Schultz** to vice president Marketing and Sales North America and **Lloyd Burrow** to vice president of Operations North America. Schultz, who has been with Wheelabrator for 15 years will promote operations in the U.S., Canada and Mexico, while Burrow will oversee manufacturing facilities in the U.S., Canada and Mexico as well.



Burrow

## TurboCare Opens New Office; Adds New Engineers

In dedication to its expansion efforts, turbo industry supplier, TurboCare

recently cut the ribbon on its newest office located in Fitchburg, Mass. TurboCare's expansion also brought with it the addition of the following new officers: **Bob Beck**, manager, Steam Turbine Design; **Bruce Gans**, principal engineer; and **Alan Beecher** and **Richard Olivier**, senior engineers.

## New VP Appointed At Maritel

New York City-based Maritel has appointed **Jim Tindall** to vice president of Sales & Marketing. Tindall, who has been involved in sales and marketing of marine electronics for more than 25 years, previously held the position of president at a national marine electronics dealership.



Tindall

## Keppel Completes Conversion

Keppel Singmarine Dockyard has

completed a \$6 million floating diesel power plant conversion for Wartsila NSD Finland Oy (Wartsila). Named the Haripur Commodore I, the plant has a total output of 120 MW. The Haripur will be deployed in Bangladesh for a 15-year contract.

## ASRY Adds Svendsen

**Per Otto Svendsen** was appointed sales department head of ASRY, and will be located in the company's London office. Svendsen, who has a combined technical, commercial and academic knowledge of the maritime industry, will head the company's Estimating and Invoice Department.

## Pinnacle Awarded Drilling Rig Accommodation Contract

Pinnacle Building Systems, LLC, has been granted the drilling rig accommodation unit for the BP/Amoco Marlin Tension Leg Platform (TLP) living quarters. Situated in 3,000 ft. of water South-

east of Venice, La., the vessel will be located at Visco Knoll Block 915.

The 50 bed, welded steel living units will be designed via a two-story modular system of 10 mini-modules, interconnecting each module so that it forms a hallway.

With construction to be completed this summer, all units are being built in Erath, La.

## Austal Adds New GM

**Bob McKinnon** was appointed general manager of Austal, the Australian-based shipbuilder. Previously, McKinnon was employed at Capral Aluminum where he held senior positions in finance, distribution and manufacturing operations.

## OCIMF Chooses New Director

Oil Companies International Marine Forum (OCIMF), has elected **John Hughes** as director. Hughes, who has been with Esso for the past 30 years,

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was until recently, director and operations vice president of the Southampton-based company.

### Pon North America Buys Into W&O Supply

A wholly owned subsidiary of Pon Holdings, B.V. — Pon North America, New York, has purchased 100 percent of stock in Jacksonville, Fla.-based W&O Supply, Inc.

With a locale in The Netherlands, Pon Holdings leads in the U.S. as supplier of engineered products, valves and piping to shipyards. With offices throughout the U.S. and in Vancouver, B.C. and Antwerp, Belgium, Pon Holdings also owns Transmark, a distributor of industrial valves.

### R&B Falcon Names New CEO

The board of directors at Houston-based R&B Falcon announced that **Steven A. Webster** will step down as the company's current president and CEO. Current chairman of the board of directors, **Paul B. Lloyd, Jr.** replaces Webster on May 31.

### Amsted Enters Agreement To Sell Macwhyte Division

Chicago-based Amsted Industries has entered into a definitive agreement to sell its Macwhyte Company division to Wire Rope of America, Incorporated (WRCA). With sale still subject to approval, the agreement states that WRCA will acquire all operating assets and business of Macwhyte's Sedalia, Mo.-based manufacturing facility, as well as the company's fabrication plant in Portland, Ore. and manufacturing equipment from its Kenosha, Wis. plant.

### Blount And Associates Relocates; Names New VP

Upon its relocation to Chesapeake, Va., Donald L. Blount and Associates announced that **Robert Barte** was appointed vice president of the firm. Barte, who has been with Blount for seven years, previously served as manager of the company's Electrical Engineering and Computer Technology Div.

### Art Anderson Announces Addition Of Tweedie

After months of dealing with immigration, Art Anderson Associates was able to bring aero/hydrodynamicist, **Mike (Dingo) Tweedie** to the United States from Australia. Tweedie will be an integral part of Art Anderson Associates' Stolcraft design team. In Australia, he worked as a consultant with Stolcraft International, on their innovative hull form. His experiences will be utilized on the research of marine projects for

NOAA, WSDOT, and private clients.

### Maritime Progress Introduces Guide for 1999

Maritime Progress has released its 1999 guide to marine signage and associated products — The Maritime Progress Book. This edition of the book includes the latest regulations on garbage management and ballast water

monitoring. The book covers subjects such as, lifeboat and liferaft launching and galley and engine room safety.

### Lloyd's Register Offers New Safety Registration Course

Lloyd's Register will be holding a course detailing how to comply with the new Control of Major Accident Hazards Regulations (COMAH). The course,

hosted by LR's Risk Management specialists, is aimed at plant managers, safety managers, safety engineers and those responsible for compliance with the new regulation. Dealing comprehensively on how to adapt existing safety management systems to comply with new regulations, sessions will be held in Warrington on May 12-13, and June 8-9, 1999.

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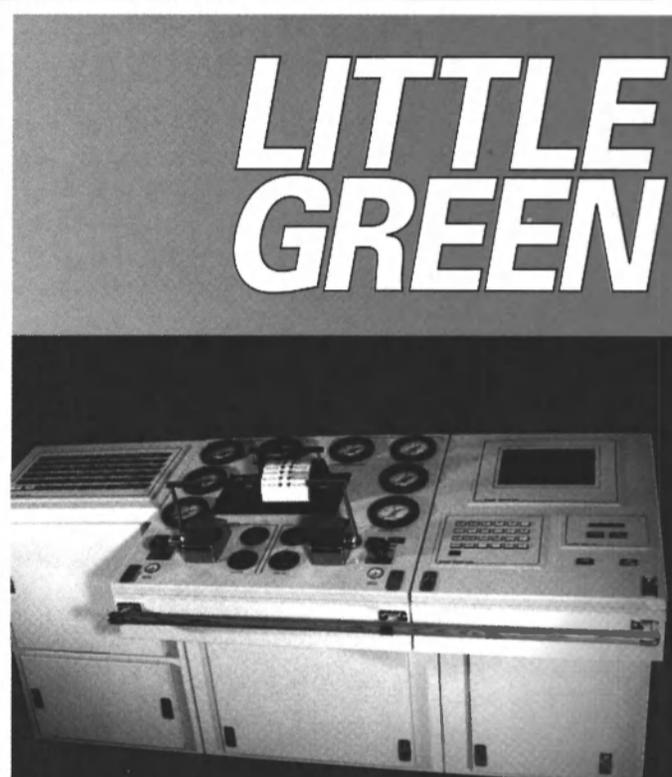
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Circle 233 on Reader Service Card

## BP Calls For New Controls on Bunker Fuels

Marine fuel standards need to be reassessed to avoid a significant mismatch between the quality described by the fuel specifications that are demanded by the industry, claims BP Marine.

BP Marine is calling for firmer controls on the practice of adding used lubricating oil to marine fuel oil. It is apparent that there are still ongoing concerns and suspicions about the effects of used lubricants at low levels even though these concerns are not yet documented or substantiated. After the Kalamos legal case in the U.S., the question of acceptability of ULO (used lubricating oil) has become even more confused. Some interpreting the judgment as implying that ULO at levels up to 5 percent is a technically acceptable lift which does not interfere with the stipulations of ISO 8217.

In response, an increasing number of users are buying fuels against "no ULO" clauses, even though this

can be difficult to manage in a global industry. BP Marine is therefore calling for an industry-wide agreement on the practice. "We believe that the only option to improve the clarity of the situation is to insert a specific limit for the ULO fingerprint elements into the specification tables in the ISO-8217. The intention would be to limit the ULO inclusion to low-level where there is wide agreement that no problems will be encountered while avoiding needless concerns when very low-levels of some fingerprint elements are detected," said Dr. John Liddy, BP Marine's technical manager.

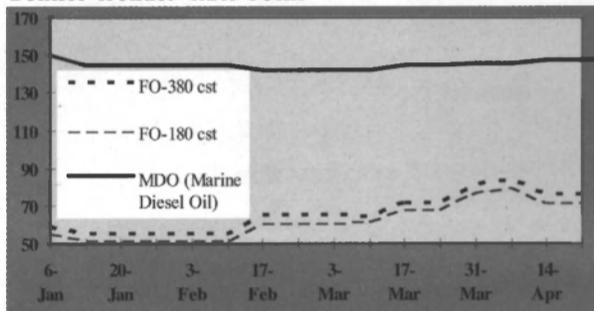
One practical problem with restricting ULO within the present ISO and CIMAC guidelines arises from ULO's varying compositions and potential confusion with trace elements in crude oil. It has become very difficult for fuel buyers to manage this issue effective-

ly and there is a real risk that fuel suppliers and users will inadvertently be driven towards making unrealistic standards and expectations. "Even when marine engine design is more tolerant of "poorer" quality fuel, there are nevertheless, limitations that must be recognized and respected," says Dr. Liddy. "Our challenge to our own industry is to protect fuel buyers against the introduction of unwanted contaminants or unacceptable quality standards and we firmly believe that the industry needs to move forward collectively on this issue."

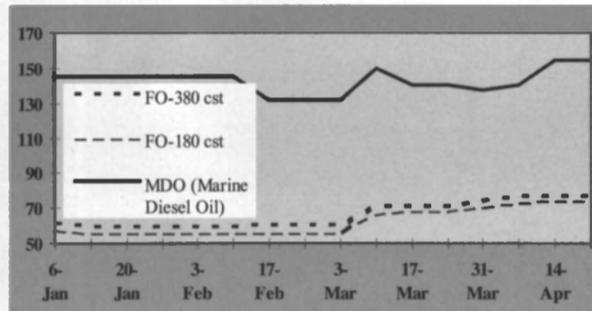
### WFL Acquires Bunkerfuels

World Fuel Services Corp. announced it has entered into an agreement to acquire all of operations pertaining to the Bunkerfuels Group, one of the leading providers of bunker services. Its chairman, **Robert Fitzgerald**, who is retiring after a 40-year career in the oil industry, founded Bunkerfuels in 1978. World Fuel already operates Trans-Tec Services Inc. and feels Bunkerfuels can only compliment their existing opera-

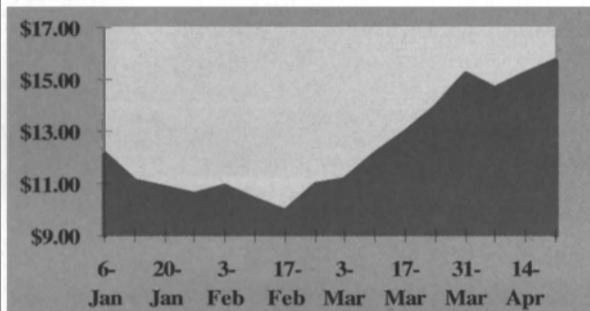
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tions. Both companies however, will continue to operate separately.

### EXXON Offers Gear Oil And Diesel Lubricant

Exxon's Spartan Synthetic EP industrial gear oil is designed to face the challenges of the frigid arctic and the sweltering tropics. Designed to keep flowing at -22 degrees F and colder, Spartan Synthetic is able to function in temperatures as high as 250 degrees F.

The lubricant can be applied to a variety of gear oil problems: limited product life, high-temperature losses, sludge formation, low temperature stalling, even inadequate load-carrying capabilities. It can also prevent oil-resistant gearbox seals from shrinking or swelling.

For riverboats, tugs and other harbor crafts, DE-MART XT, a premium heavy-duty crankcase lubricant, is now available for both main and auxiliary diesel engines. DE-MART was approved by the General Electric Company, and has performed in field trials for the Caterpillar 3600 and yielded top results. DE-MART XT is a 13-TBN high-detergent zinc-free lubricant designed to reduce existing deposit levels in engines, as well as control deposits. It also has been proven to keep intake ports clean while minimizing ring and cylinder wear.

Circle 197 on Reader Service Card

### Shell Argina Oil Passes The Test

Recent testing of Argina technology demonstrated the influence of the lubricant in preventing plunger sticking. Fuel pump plunger sticking is a problem that can be attributed to the lubricant used on the lacquer barrel of the fuel pump.

Following a 4000-hour trial running heavy fuel (mfo 180 cst, average sulfur 3.27 percent) in the Wartsila 16V46 engine; and a 500-hour trial testing 380 cst in the Warstila 4L20, both engines were stripped and inspected. Reportedly, all parts remained in excellent condition. The engine was clean, without any black sludge, along with the piston undercrown and cooling galleries. Both the piston ring and linear wear showed low-levels of iron and aluminum.

Circle 196 on Reader Service Card

### Drew Marine Offering Its Fuel Mill Homogenizer As Management Program

Drew Marine, worldwide supplier of marine chemicals and water treatments, is offering its Fuel Mill homogenizer as a comprehensive fuel management program. The Fuel Mill is a milling machine that physically alters fuel characteristics. Once the heavy fuel is pumped through the machine's concentric, cone-shaped gears, it is exposed to frictional forces that shear asphaltenes as large as 70-100 microns - to five microns. The decrease in asphaltenes, is designed to have the fuel pass through the purifier without forming sludge. The system can also be used to homogenize fuel with fresh water. Combining high-temperature and pressure, the process will then create a fine spray of water droplets that coat the fuel. Because of the high temperature, the water will flash into gaseous states of oxygen and nitrogen, which will combust, and create a reduction of air in the engine. As a result, there will be a decrease in NOx emissions.

Circle 195 on Reader Service Card

### The AMOS 30/30

The American Marine Oil Systems (AMOS) 30/30, touted as a revolutionary oil and evacuation and delivery system, comes equipped with two 75-ft., .75-in. I.D., yellow non-scuff hoses on recoiling reels. The product is now available to commercial and military boat facilities.

The AMOS 30/30 was designed as an environmentally safe way to change oil on diesel and gasoline fueled inboard vessels of any size.

The oil is delivered through a commercial gear pump, which can be controlled by a digital metered oil gun. The two-tank system can suck-out recyclable waste into one tank and contaminated waste into another. As

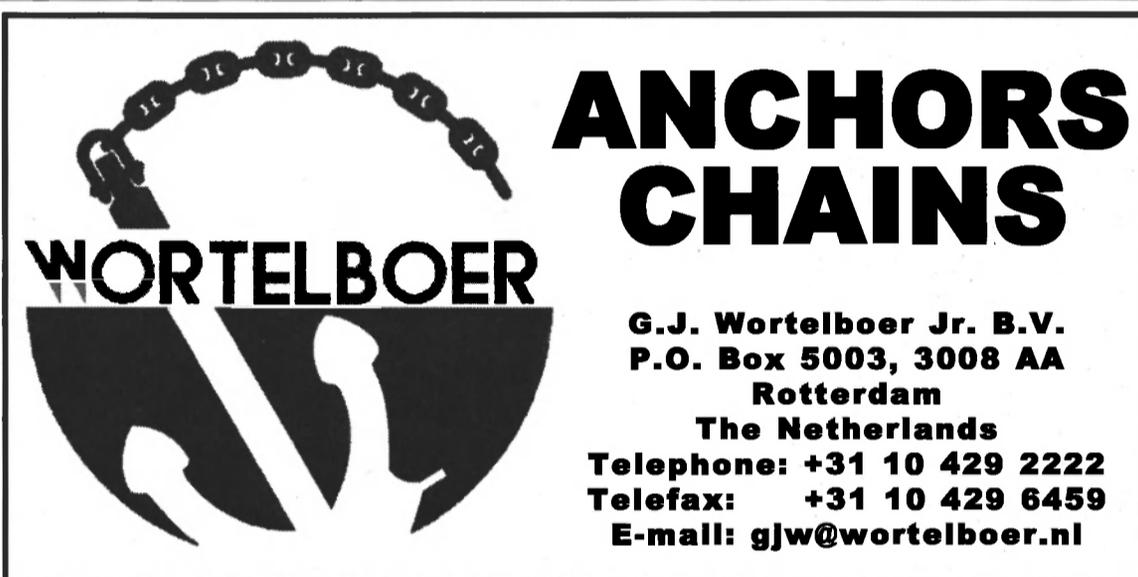
a result, it is designed to maximize cost-efficiency while avoiding cross-contamination.

Circle 194 on Reader Service Card

### Shell Updates "Know Your Fuels" Leaflet

"Know Your Fuels," a series of leaflets, launched by Shell Marine Service Worldwide, that provide background technical information for individuals involved in the marine fuel industry have been updated to introduce new trends in the market. The leaflets highlight marine fuel specifications with emphasis on water contamination, energy evaluations, as well as a description of fuel costs and cleanliness.

Also introducing The Shell Marine Computer, the



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Circle 315 on Reader Service Card

## MARINE FUELS, LUBRICANTS & ADDITIVES

information packets are designed to assist the bunker purchaser and ships staff so that accurate bunker calculations are performed. Its software, the Shell Bunkercalc C gives specific energy calculations based on density, sulfur, water and ash levels of fuel. It also rates

the ignition performance of fuels, viscosity/temperature conversion, and gives other blending calculations.

Along with this new addition, another expert system the "SEAFUEL," a software package that combines the expertise of Shell's Group Research, Devel-

opment and Analytical divisions, to obtain information and advice on storage, handling and pre-treatment of marine residual fuels. The user-friendly system can be accessed by personnel ashore or aboard.

Circle 193 on Reader Service Card

### Drew Displays Wares In Miami

At the Seatrade '99 exhibit Drew Marine displayed a variety of engineering systems and chemical programs that are designed to optimize performance of critical shipboard systems. With the help of a representative, Drew Marine demonstrated the latest editions to its product line, Diagnostics, its fuel management program, and MAR-TECH, the onboard testing equipment that samples bunker fuels. Along with the display, the company also featured its newest microemulsion product, ACC/ME Air Cooler Cleaner, and its environmentally-safe products, AMEROID 2000 and DAWFRESH 2000, heavy duty cleaner.

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### BP Marine Sponsors C&W Network

BP Marine, a leading supplier of fuels and lubricants to the world's shipping industry, technically sponsored the Cable Wireless Adventure, an attempt to circumnavigate the world in 80 days. The 26,000-mile, 15 port journey was to be completed in under 75 days by the Cable & Wireless Adventurer, a 115 ft. (35 m) stabilized mono-hulled powerboat. The vessel was made from the latest composite glass reinforced polymer/foam sandwich construction complete with the newest navigation and communications equipment. BP Marine and Cummins Marine worked alongside the project team chosen to construct the boat to develop a complete lubrication package and refueling schedule for the vessel, they also provided the two 8.3 liter turbo engines. BP monitored en route product performance by way of its Enercare Used Oil Analysis service.

Circle 191 on Reader Service Card

### ALGAE-X Upgrade Gets Positive Lab Results

After receiving a sample of fuel from the Naval Surface Warfare Center filled with black agglomerations, and bacterial and fungal growth, ALGAE-X was assigned the task of testing its upgraded and reengineered system. Before running the sample through their fuel conditioning system, a part of the initial sample was sent to Analyst Inc. for a fuel analysis. The remaining fuel was then pumped through the companies MMI 1245-4 Diesel Fuel Polishing System and the upgraded ALGAE-X Unit. The first sample contained heavy fungal and slight bacterial growth, and a combination of contaminants. The second sample underwent two hours of circulation in the ALGAE's total filtration solution and showed negative bacterial and fungal growth, with no sign of microorganisms and restoration in the fuel's color.

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Circle 243 on Reader Service Card

## MARINE FUELS, LUBRICANTS AND ADDITIVES

### Mobil Introduces Revised Version of Synthetic Lubricants

Mobil has introduced an improved version of its Mobil SHC 600 Series of synthetic lubricants for gears and bearings, lasting up to eight times longer than mineral oil. In addition to providing longer life, the reformulated synthetic lubricants offer substantial anti-foam capability, as well as outstanding stability and performance in the presence of water, while maintaining viscosity in extreme temperatures.

Circle 189 on Reader Service Card

### BP Marine's New Engine Offers Quality and Quantity

Claiming to provide a more economic option to synthetic engine oil, BP Marine has developed an extended drain, high performance engine oil.

The new oil, BP Energol HPDX 40 is specifically suited to marine diesel engines burning distillate fuel while operating under severe conditions — mainly fast ferries and coastal vessels.

Formulated with a new generation of additive technology, the product fills the need for a strong engine oil with a longer service drain period, sans the price penalty of synthetics.

### Castrol Celebrates 100 Years Of Service

Known for its high performance engine oils, Castrol has reached its centennial year of service. With a full range of lubricants for the consumer, commercial, industrial and marine markets, the 100-year-old company's products have been featured on such famed vessels as the QE2, which underwent an engine refit in the late-1980s, when the ship's steam turbines were replaced with four stroke medium speed engines. Even after this upgrade was performed, Castrol remained as the QE2's lubricator.

Circle 182 on Reader Service Card

### A/S Dan Bunkering Eases With Fixed Price Agreements

In response to the decline of crude oil prices and reduced volatility, A/S Dan Bunkering has developed two programs to aid in risk minimization: Fixed prices and Fixed prices with downside opportunity.

The company's Fixed price plan allows agreement of total volume for a fixed period with offers based on a fixed volume of +/-5%. With Dan Bunkering requiring a seven day notice prior to each delivery date, the agreed volume must be lifted from one particular port.

Dan Bunkering also provides fixed prices with downside opportunity. In conjunction with the former, the latter allows the client opportunities to retain benefits if prices drop below a certain level.

An advanced cash premium is paid by the client, dependent on the agreed

price, time frame and outside market conditions.

Circle 181 on Reader Service Card

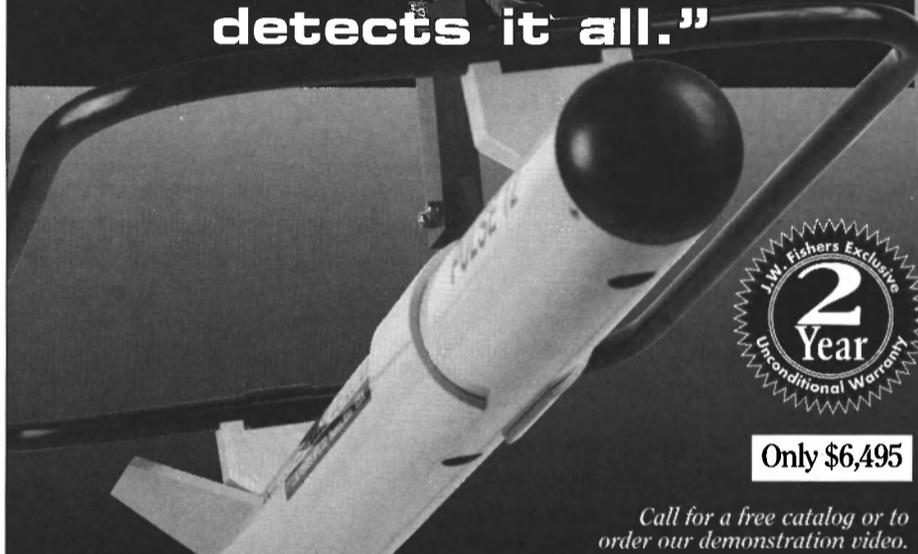
### World Fuel Services To Form Indonesian Subsidiary

World Fuel Services, based in Miami

Springs, Fla., is set to form a wholly owned subsidiary — PT Trans-Tec World Fuel Services Indonesia. Francis X. Shea, a former president of World Fuel subsidiary Trans-Tec Services, will serve as the company's Jakarta-based representative.

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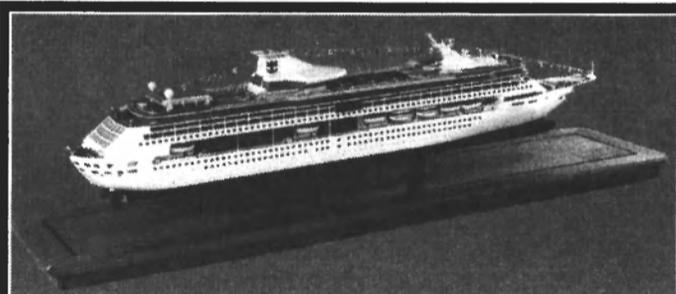


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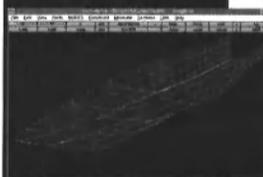
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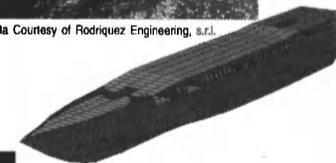
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## ASNE Day '99: Plotting A Course Beyond 2000

With events occurring from May 21-22, 1999, this year's American Society of Naval Engineers annual exhibition will commence in Washington, D.C. at the Hyatt Regency with a keynote ses-

sion on Friday — the conference's premiere day.

V.Adm. **Arthur K. Cebrowski**, USN, president, Naval War College, will speak on behalf of future challenges that await

naval warfare systems development for the year 2000 — and how to explore them. Attendees will also view the latest new industry products, as well as attending the Society's Awards Luncheon at

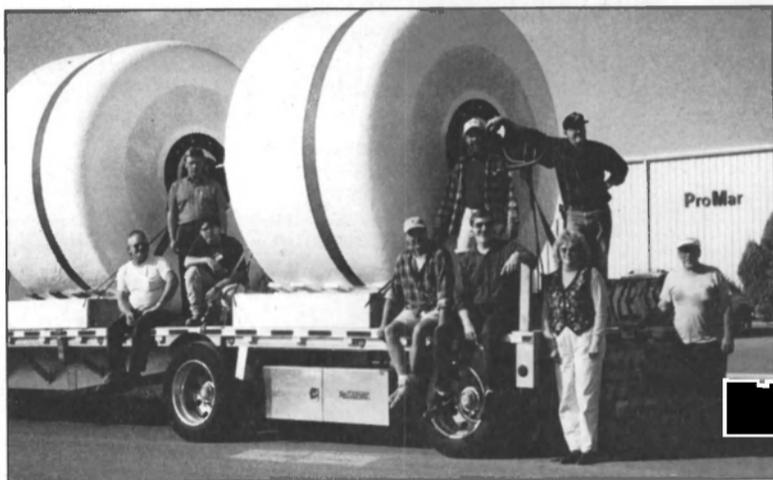
which U.S. Atlantic Fleet Commander in Chief, Adm. **J. Paul Reason**, USN will be the featured speaker. Following, that same afternoon, and on Saturday, will be the technical paper sessions. Three concurrent sessions of discussion include: Marine Engineering, Future Ship Designs, Combat Systems, Marine and Environmental Engineering, Shipbuilding, Maintenance and Maintainability, and Ship Design Process.

Former Secretary of the Navy, the Honorable **James H. Webb, Jr.** will deliver Saturday's keynote speech and will also be available to sign copies of his latest work, "The Emperor's General."

Culminating the conference will be the Society's banquet on Saturday evening with Virginia State Senator and chairman of the Senate Armed Services Committee the Honorable **John Warner** as guest speaker. ASNE's Harold E. Saunders and Gold Medal Awards will also be presented at the banquet.

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### New Leader Elected At NSWC

**Thomas Allen**, a senior executive member with the Department of the Navy, was appointed associate director of machinery for the Carderock Division of the Naval Surface Warfare Center. Allen will lead two components of both the Division's Machinery Research and Development, and the Machinery In-Service Engineering Directorates.

### Bath Iron Works Launches

#### 18th Guided Missile Destroyer

Bath Iron Works, launched its 18th vessel, an Arleigh Burke Class AEGIS guided missile destroyer — **Winston S. Churchill**. Named for the British Prime Minister, the vessel was sponsored by **Janet Langhart Cohen**, wife of Defense Secretary **William S. Cohen**.

### Marinette Marine Launches

#### Eighth Buoy Tender

Marinette Marine Corporation launched the eighth USCG Coastal Buoy Tender, **Barbara Mabrity** (WLM-559).

The vessel, measuring 175 ft. (53.3 m) features a Z-drive propulsion system enabling unparalleled maneuverability.

With its designation as a vessel that will serve to install and maintain navigational aids, **Barbara Mabrity** also has the capacity for a quick response to search and rescue operations.

## Changing Of The Guard At Gibbs & Cox

Gibbs & Cox's president, **Henry E. Buttelman**, has retired after more than 40 years of service with the company. Proceeding his retirement, Buttelman will continue to serve as consultant and member of the company's board of directors.

**Robert J. Scott** was elected as Buttelman's successor this past March.



## Ingalls Shipbuilding Commissions Newest Vessel



Built for the U.S. Navy, Ingalls Shipbuilding has commissioned the newest in a series of advanced Aegis guided missile destroyers — USS Porter. The vessel was commissioned last month in a ceremony at Port Canaveral, Fla. Its namesake honors Commodore **David Porter** and his son, Vice Admiral **David Dioxin Porter**, whose joint naval achievements earned them honorable spots within USN history.



## CDI Wins USN Contract

The CDI Marine Company, a division of staffing and outsourcing leader CDI Corp., announced the renewal of its contract with the U.S. Navy's Naval Sea Systems Command to provide advance planning and project management for the Enhanced Quality of Life program to improve habitability of select aircraft carrier compartments. The contract is expected to generate \$5.4 million in revenues for CDI over the next five years.

CDI Marine has been awarded this contract three times consecutively and will continue to advise the Navy on all aspects of the program, from recommending habitability improvements for enhancing the aircraft carrier compartments to managing individual project completion.

## Litton Marine Services Names New General Manager

Dr. **Clark Graham**, president of Litton Marine Systems, has announced the appointment of **Malcolm Bruce** as general manager of Litton Marine Systems U.K. Bruce replaces Graham as general manager of U.K. operations. The

U.K. operation, located in New Malden, is Litton's marine radar business area that focuses primarily on engineering, marketing, sales, service and support for all radar products worldwide.

Bruce has been operations director of Litton Marine Systems U.K. since 1997. He will continue to serve as operations director.

## Corbett & Holt, L.L.C.

Corbett & Holt, a Washington D.C. based firm specializing in transportation economics, logistics, maritime safety and marine environmental protection, announced that **Thomas Davis** has joined the firm's logistics and management practice.



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### Flender Werft Hosts Launching; Delivers Sister Vessel



Scheduled to arrive at the Hamburg-based shipping company Claus Peter Offen, Flender Werft launched its newest all-containership, P&O Nedlloyd Singapore. The delivery of the Singapore's sister ship P&O Nedlloyd Seoul also took place at the March 26th celebration at the Lubeck, Germany-based shipyard.

The fourth and fifth containerships of the Flender 2100 type, both F-class newbuildings contain a stowing capacity for 14 tons — while consuming low levels of fuel at a speed of 20 knots. Surveyed under Germanschier Lloyd for the class notation GL 100 A5 E, the vessels are powered by four auxiliary diesel generators totaling 3,670 kW, with a propulsion output of 12,240 kW.

#### Main Particulars

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Breadth .....	98 ft. (29.8 m)
Depth .....	51 ft. (15.6 m)
Draught .....	38 ft. (11.54 m)

### Keppel Shipyard Ahead Of The Game In Construction Of Offshore Vessel



Smedvig Asia reports that Keppel Shipyard is ahead of schedule on the completion of its Semi-Submersible Self-Erecting Tender Rig (SSETR). Contracted last February by Smedvig, the vessel is the first of its kind to be assembled at the Singapore-based shipyard.

Built under survey by the American Bureau of Shipping, with confirmation to the International Maritime Organization (IMO), the semi-submersible hull allows lifting operations onto platforms up to 90 ft. (27.4 m), above mean sea level, as well as exceptional motion stability and rig-ups from drilling position.

### Chevron Celebrates New Tanker

Chevron christened its newest 308,500 dwt ton ship, J. Bennett Johnson. Named for the company's director, the vessel was inaugurated in Koje, Korea by Johnson's wife, **Mary Gunn** and is number two in a series of four new double hull very large crude carriers (VLCC's) under construction at Samsung Heavy Industries, located at its Koje Island shipyard. Carrying approximately 2.2 billion barrels, the VLCC will serve as a transporter of crude oil from the Middle East to Chevron's U.S. Gulf coast and West coast refineries.

### Port of Lisbon Secures Nautica 90 Workboats

Based on a deep vee hull with a long, raking bow, two Nautica 90 RIBs were recently delivered to the Port of Lisbon. The first of its kind to be built with a standard production design, Nautica 90 has also been modified with a wider chine with squared off bow just below deck level. Engines include twin 320 hp Yanmar diesels. Measuring 39 ft. (11.8 m), the RIBs can attain a top speed of 35 knots. Communications equipment includes a Raytheon radar and loud hailer as well as Twin Sailor VHF radios and White Star magnetic compass.



#### Main Particulars - Nautica 90

Flag .....	Portugal
Length, o.a .....	39 ft. (11.8 m)
Length, b.p. ....	13 ft. (4 m)
Engines .....	Yanmar diesels
Gearbox .....	Twin Disc V-drive
Top speed .....	35 knots (approximately)
Fuel capacity .....	320 gallons
Radar .....	Raytheon
Loud hailer .....	Raytheon
Radio .....	Twin Sailor VHF
Compass .....	White Star

### Navatek Relaunches Passenger Vessel

Based in Honolulu, Hawaii, Navatek Ships has relaunched the 45-knot Westmaran Foilcat 2900. With a passenger capacity of 149, the vessel was originally developed by a Norwegian company focusing on high-speed hydrofoils.

The revived Foilcat was designed with U.S. technology in mind and will be constructed as such combining the highest properties of a slender hull catamaran with speed capabilities of a hydrofoil craft equipped with fully submerged foils.

The history behind the beginning of the Foilcat began in 1992, when the commercial service vessel ran between Sweden and Denmark, until Navatek picked up the rights to the ship in 1997 from its original builder, Westamarin.

Circle 89 on Reader Service Card



#### Main Particulars

Classification .....	DnV
Flag .....	U.S.
Length, b.p. ....	96 ft. (29.2 m)
Breadth (molded) .....	27.6 ft. (8.36 m)
GT .....	243
Draft .....	12 ft. (3.65 m)
Speed .....	45 knots
Main engine .....	MTU diesel
Auxiliary engines .....	Mitsubishi
Propellers .....	Ulstein
Generators .....	KVA
Fin stabilizers .....	Dynamica
Anti-heeling system .....	Simrad Robertson
Engine controls .....	Ulstein
VHF radio .....	Sailor
SSB radio .....	Skanti
Radar .....	Furuno
Compass .....	Krohn Nor
Autopilot .....	Robertson
Liferafts .....	Viking

### Adriana M Delivered to Ustica Lines

Intended for a run between Naples and Trapani, Egadi Islands, the Adriana M was recently brought to Italian based Ustica Lines. Manufactured by Rodriquez Cantieri Navali SpA, the Hydrofoil, hull number 265 began regular service this March.

Circle 90 on Reader Service Card

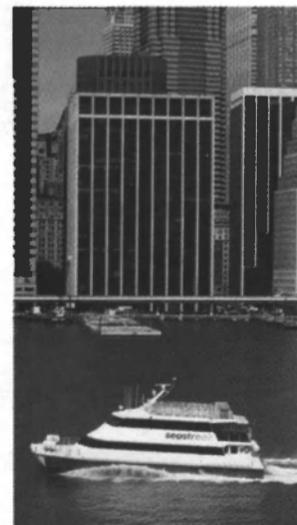
#### Main Particulars

Classification .....	RINA
Flag .....	Italian
Length, o.a. ....	102 ft. (31.2 m)
Waterline .....	87 ft. (26.4 m)
Beam .....	44 ft. (13.27 m)
Hull depth .....	13 ft. (3.9 m)
Main engines .....	MTU 16V 396
Max. output .....	2,000 kW at 2,000 rpm
Water jet .....	Kamewa
Cruise speed .....	42 knots
Passengers .....	240

### Operation Seastreak America Offers Speedy Commute

Since its acquisition of Express Navigation, SeaContainers Ltd. has incorporated a new name — Seastreak America. Boasting a new livery, Seastreak's first new vessel — commuter passenger ferry Express II was recently released from drydocking.

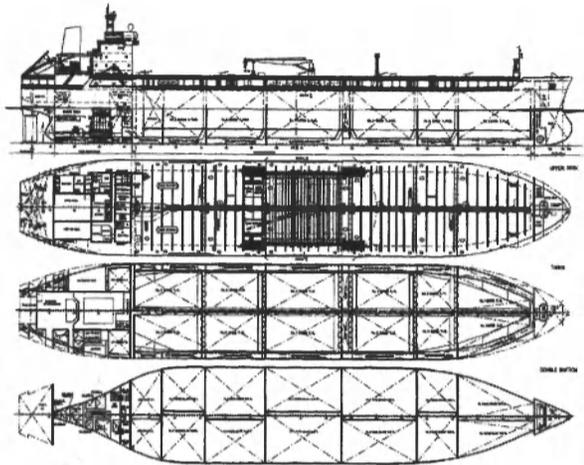
Designed by Vignelli Associates, the Express II will provide service between Wall Street's Pier 11 to the Jersey Shore locale of Atlantic Highlands as well as Brooklyn's Pier 4. With



## NEW & NOTABLE

immediate plans to expand both its fleet and departure/arrival schedule, Seastreak currently operates a 3-member fleet of the ferries which are time chartered via Hydrrolines.

### Croatian Shipbuilder 3.Maj Brodogradiliste Lands New Contracts



Croatian shipyard 3.Maj Brodogradliste agreed to two (separate) contracts with Italian Calisa SpA for the building of three new tankers. Each of the 35,000 ton tankers will be used to transport chemicals and oil products. The contract for the first tanker was signed in October, followed by an agreement of the additional two vessels sealed this March. Deliveries are scheduled for 2000 and 2001.



### Golden Disa Ready For Operation

A 75,462-dwt bulk carrier, the Golden Disa ordered by Golden Key Corporation of Liberia was recently completed at Japanese Hitachi Zosen's Maizuru Works. Registered in Panama, the vessel was delivered on Mar. 19.

#### Main Particulars

Classification	ABS	Depth	.63 ft. (19.1 m)	Main engine	Hitachi Zosen-Man-B&W
Flag	Panama	Full draft	.45 ft. (13.8 m)	Derated maximum output	12,590 PS x 99 rpm
Length, o.a.	.712 ft. (217 m)	Gross tonnage	.39,714	Speed	.16.36 knots
Breadth	.106 ft. (32.2 m)	Deadweight tonnage	.75,462 metric tons	Complement	.25

#### Main Particulars

Length, o.a.	.577 ft. (176 m)	Length, o.a.	.604 ft. (184 m)
Breadth	.98 ft. (29.8 m)	Breadth	.98 ft. (30 m)
Depth	.55 ft. (16.8 m)	Depth	.52 ft. (15.9 m)
Draft	.36 ft. (11 m)	Draught	.34 ft. (10.5 m)
DWT	.35,000 tons	DWT	.37,300
Main engines	.Wartsila	Main engines	.Wartsila
MCR	.9,000 kW @ 130 rpm	MCR	.9,000 kW @ 130 rpm
Cargo tanks capacity	.43,150 sq./m	Trial speed	.15.2 knots
		Cargo tanks capacity	.43,150 sq./m

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Westfalia Separator Mineraloil Systems GmbH  
Wildauer Kurbelwelle GmbH  
WIWA Wilhelm Wagner GmbH & Co. KG

## CANADIAN MARITIME

(Continued from page 56)

Ottawa-based engineering and marine equipment company **EMAR Services** has structured a comprehensive web page ([www.emar.achilles.net](http://www.emar.achilles.net)) including a detailed description of the equipment and services it offers. A representative of several equipment manufacturers, some of EMAR's recent projects (as

described on the site) entail its sale of azimuth thrusters to the **Irving Group** and oily separators for offshore platforms under construction by Halter Marine. EMAR has been at the forefront in providing government departments, and all major shipyards throughout Canada with its products and services since 1993.

### Seaway Introduces New Computerized Vessel Tracking

It's a giant step into the 21st Century for the St. Lawrence Seaway. The Seaway had two reasons to celebrate this year — its opening of the new season as well as the debut of its new Traffic Management Improvement Project (TMIP).

The project is a joint venture between the St. Lawrence Seaway Management Corporation on the Canadian side and the U.S.-based St. Lawrence Seaway Development Corporation.

Installed at the St. Lambert, St. Catherine and Massena control centers, the system is able to monitor and schedule vessel traffic on both sides of the border. Via transponders placed aboard the ship as it enters the Seaway, the system provides controllers with vital information such as the vessel's inbound position, course and destination.

### BC Ferries Finishes Queen of Cowichan Investigation

Victoria-based **BC Ferries** has completed a further analysis of an incident occurring on April 3 that involved its vessel, *Queen of Cowichan*. Unusually strong winds caused the ship to break free from its mooring lines at Departure Bay, drifting onto an adjacent dock. Moored at the outside terminal berth, the *Queen* twisted free of the dock, sustaining damage to its berth. No harm was done to the vessel, but the adjacent dock succumbed to some minor damage as a result of the incident.

BC Ferries plan to initiate precautionary methods including intensification of mooring procedures during stormy weather and more advanced strict testing of the mooring lines' strength.

### Global Carrier Relocates To Deltaport

Based in Taiwan, global carrier **Evergreen Marine Corporation** has decided to move its operations from its current location, the Port of Vancouver — to Deltaport. Equipped with four post-Panamax cranes, Deltaport has on-dock capability for two 7,000 ft. (2,130 m) trains shipside, thanks to its adjacent 35-acre rail yard. With four sets of tracks, the yard boasts as Vancouver's largest. Service upgrades include, fewer congestion delays, greater equipment control and improved container tracking functionality for cargo inbound to and outbound from the cities of Ontario, Quebec, Alberta, Manitoba and the Maritime provinces.

Circle 183 on Reader Service Card

### SBS Worldwide Forms Relations With ITN Canada

**SBS Worldwide**, the global ocean and air freight forwarder has signed an agreement with international logistics provider, **ITN Canada**. With five offices located throughout Canada, the two companies have connected to form an exclusive cargo agreement. The joint



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## CANADIAN MARITIME

trans-Atlantic effort will cover both air and ocean activities between the U.K. and Canada.

### Deutz Canada Offers And Services Variety Of Engines

A subsidiary of Deutz AG of Germany, **Deutz Canada, Inc.** sells and services both medium- and large-sized Deutz and MWM engines in North America. In addition, high speed Deutz engines are offered in Canada at Deutz's Montreal location situated near the St. Lawrence Seaway.

With a complete power range from 10kW to 7,060 kW, the engines can be provided in marine configuration with water-cooled exhaust manifolds or by air-cooled design.

Circle 188 on Reader Service Card

### Jastram Cylinders Receive ABS Type Approval

**Jastram Engineering** has been granted ABS Type Approval status for its Model S hydraulic steering cylinders. Installed mainly on workboats, supply vessels and tankers — to name a few, the cylinders are designed with the commercial marine hydraulic steering service in mind under the ABS Approval. Jastram also offers custom design and engineering support to customers upgrading their existing steering systems so that they are in compliance with current marine safety standards and classification societies.

Circle 187 on Reader Service Card

### Companies Form National And Marine Fire Services

Providing representation for a variety of marine fire protection equipment **Canal Fire Protection, Alarm Services & Installation and Marine Fire Protection** have melded together to form National and Marine Fire Services. With a combined experience of more than 35 years, the trio has expertise with the servicing of vessels on the Great Lakes and the Atlantic Seaboard both in Canada and the U.S.

Circle 186 on Reader Service Card

### Western Marine Works To Supply Trio of Shipsets

**Western Marine Works**, a division of North Vancouver-based **Allied Shipbuilders**, was granted the contract to supply three shipsets of tow pin units for new Crowley tugs. The tugs, built by Dakota Creek Industries are fitted with the newly-designed tow pins measuring a 16 in. diameter x 16 in. rise pin. The greater-sized pins were developed to

suit the needs of a new generation of ship berthing, tanker escort tugs.

Circle 185 on Reader Service Card

### QBM Recognized For Dependable Service

Founded in 1974, **Quality Belt Main-**

**tenance**, an industrial rubber products service company has always remained dedicated to providing its customers with reputable maintenance products and conveyor accessories. Certified under ISO 9002, QBM has an international scope with involvement in the mining, shipping and conveyor belt-

intensive industries.

Circle 184 on Reader Service Card

### Eastern Canada's Leading Facilities Join Forces

Late last year, six of Eastern Canada's front-running shipbuilding, ship repair

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Circle 322 on Reader Service Card

# Marine Literature Review

## Boat Hoists

The Levitator is capable of lifting 5,000 lbs. The lift is supported on a single stanchion (piling) that includes a sleeve assembly mounted for slideable movement on the stanchion. Similar in design to a forklift, the Levitator features a low profile, parallel-to-pier docking, and extraordinary stroke capabilities. The Levitator is one of eight unique boat hoists manufactured by Holly Hoist Corporation.



Circle No. 164

## AquaMist



## Grinnell Fire Protection Systems

Grinnell designs, engineers, manufactures, installs, inspects and services fire alarm and detection equipment, sprinkler and special hazards equipment and systems, integrated facility management systems, security, life safety, and access control systems for installations worldwide.

Circle No. 101

## Skookum

The latest addition to the line of blocks built by Skookum is the new 18" 25-ton BCM full-sided trawl block with improved wear resistant steel sheave. An additional feature is an elongated eye stem, designed to be stronger and longer lasting. Skookum is "engineered for extremes."



Circle No. 102



## ComNav

Since their introduction in 1982, ComNav Autopilots have been trusted worldwide for high performance and reliability. Backed by a 3 year warranty program, ComNav Autopilots and accessories will handle most applications. Regardless of vessel size, type or usage, this guide will help you select the correct options and features for your vessel.

Circle No. 103

## Autoship Systems

Autoship Systems Corporation is the world's leading developer of PC software for naval architects. Building on their expertise in hydrostatics software, Autoship created stowage planning soft-

ware to meet shipping industry needs. Other Autoship software capabilities include hull design and surface modeling, resistance and powering prediction, and internal structural modeling.



Circle No. 104



## Aurand

Aurand introduces "Cetrifi-Clean," a new generation of time, money and work-saving tools that literally "peel" almost any accumulation from any hard surface. Here is the power of sandblasting in a compact, hand-held tool that can be used wherever iron, steel, brick or concrete need to be prepped prior to painting or refinishing.

Circle No. 105

## Schuyler Rubber Company

Schuyler Rubber Company designs and manufactures proprietary laminated rubber fendering systems for tugs, barges, workboats, drilling rigs, docks, piers, and other marine vessels and offshore facilities. Schuyler Rubber Company is located in the Seattle, WA area and has serviced the private and military industries since 1950.



Circle No. 106



## Tampa Bay Shipbuilding & Repair Company

Tampa Bay Shipbuilding & Repair Company is a full-service new construction, conversion, and repair organization with facilities in Tampa, Florida. Tampa Bay Shipbuilding & Repair Company is conveniently located in the protected harbors of Tampa Bay directly accessible from the Gulf of Mexico via a 43ft. (13.11m) channel, and is the largest, most complete shipyard between Pascagoula, Mississippi, and Hampton, Roads, Virginia.

Circle No. 107

## Offshore Systems International

Offshore Systems International distributes Yokogawa Denshikiki Ltd. manufactured ISO approved navigational equipment. Gyrocompasses, electro-



magnetic logs and autopilots are only a few of the items they offer. All of these devices are the latest in the technology field and each comes with a multitude of

features for ease of use, as well as versatility.

Circle No. 108

## Electronic Marine Systems, Inc.

Big Blue, manufactured by Electronic Marine Systems, Inc., is designed for use by shipboard personnel to view the complete loading operation in one glance. It is built for the harshest environments of temperature, water, salt and vibration and is approved by both the ABS and USCG in full compliance for on-deck cargo operations.



Circle No. 109



## Thermax

Thermax non-combustible, non-toxic, marine construction boards are used worldwide for joiner bulkheads, panels, liners, ceilings, door and furniture cores. Thermax has all major regulatory body certificates (USCG, Canada, DNV et al) and meets the requirements of IMO/SOLAS resolutions. Thermax is sold, distributed, warehoused, laminated and cut to size in North America by PSI.

Circle No. 110

## Desmond-Stephan

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



Circle No. 111

## Thordon

Thordon Bearings, a pioneer in the development of pollution-free bearing designs, offers Thor-Lube, an environmentally friendly, stern tube bearing system. The Thor-Lube sealed system is comparable to conventional oil lubricat-



ed white metal systems, but uses proven non-metallic THORDON XL bearings and Thor-Lube, a non-polluting water-soluble lubricant.

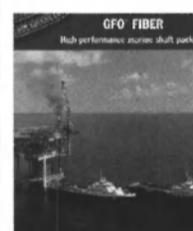
Circle No. 112

## Owens Kleen Tank Marine Wastewater Treatment Systems

The Owens Kleen Tank uses aeration and operates as an extended biological aeration system. It is self-contained and delivered to site ready for operation when site electrical and mechanical connections are in place. The Kleen Tank can be designed for small, hard to fit areas and have a capacity from 33 GDP to thousands of gallons per day.



Circle No. 113



## W.L. Gore

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Circle No. 115

## In-Place Machining Crankshaft Grinding of Crankpins and Main Journals while the Crankshaft is in the engine, Optical and Laser measurement of Main Bearing Bores, Line Boring, Metalstitch repair of broken or cracked Cast Iron, machining Water Jackets, all types of on-board machining is accomplished by In-Place Machining Company, phone: 414-562-2000; fax 414-265-1000.

Circle No. 116

Circle No. 116



## Dayton T. Brown

The Dayton T. Brown Engineering and Test Division is one of the most complete, independent engineering and testing facilities available in the United States, providing

objective independent test and engineering information for Fortune 1000 industrial and commercial companies, as well as defense and government entities. Dayton T. Brown tests include some of the following: Hammer Shock, Vibration, EMI/EMC, Climatics, Inclination, Shipboard Power and Noise.

Circle No. 117

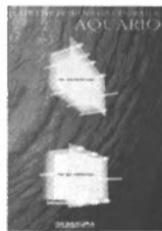
#### Hornblower Marine Services



Hornblower Marine Services is a privately held company serving the high-speed ferry, car ferry and riverboat casino industry. It provides professional, effective management solutions through comprehensive marine management programs to vessel owners and operators. We help clients meet changing market conditions with high-technology resources and sophisticated management programs.

Circle No. 118

#### Sasakura



Sasakura, the world's leading manufacturer of Marine Water Makers and industrial use Desalination Plants, has developed a new generation of Plate Type Fresh

Water Generators. Sasakura has combined almost 50 years experience in the designing and manufacturing of Marine Water Makers with the latest technology to create a new Plate Type Fresh Water Generator design which is sure to revolutionize the industry.

Circle No. 119

#### Schaefer, Inc.



Schaefer specializes in developing and building switchmode converters and inverters as well as thyristor-controlled power supplies and battery chargers. Schaefer designs modification of standard modules to meet requirements and production at a high quality level. Manufactured according to DIN EN ISO 9001, Schaefer's products are used for applications that require high reliability, mechanical strength and operation over a wide temperature range.

Circle No. 120

#### MMC International Corp.



MMC Vapor Control Valves are available in four models. All are constructed of 316 stainless steel with flanged bases for easy installa-

tion and accurate positioning on both shipboard and land-based tanks.

Designed to fit all MMC sampling and gauging instruments, these valves can be fitted with adaptors to accept non-MMC instruments as well.

1-800-645-7339, mmcintl.com, mmcintwd@aol.com.

Circle No. 121

#### Baier Hatch Company

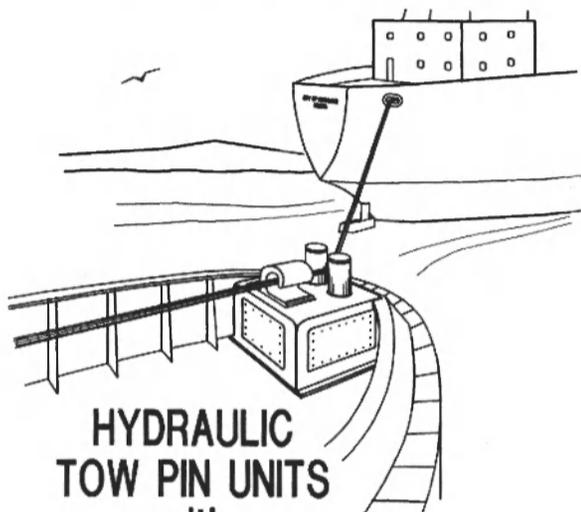
Baier Hatch Company manufactures a complete line of cast aluminum, steel, and stainless steel flush deck hatches. The product lines includes round, oval,



hinged, liftout, and coaming hatches. The company maintains a large inventory of hatches and parts for immediate delivery.

Circle No. 122

## TRACTOR PINS FOR TODAY'S TUGS



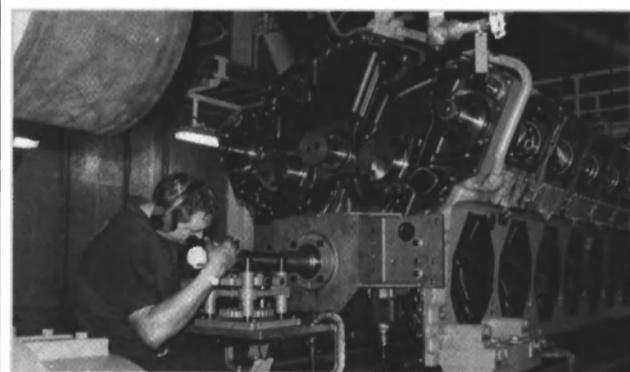
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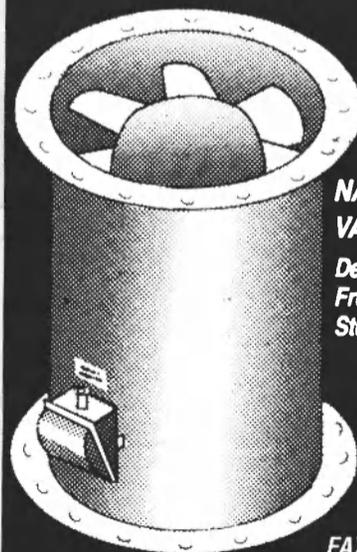
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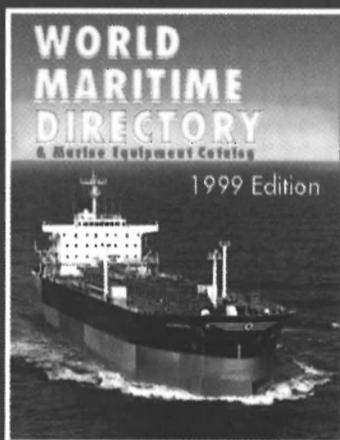
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