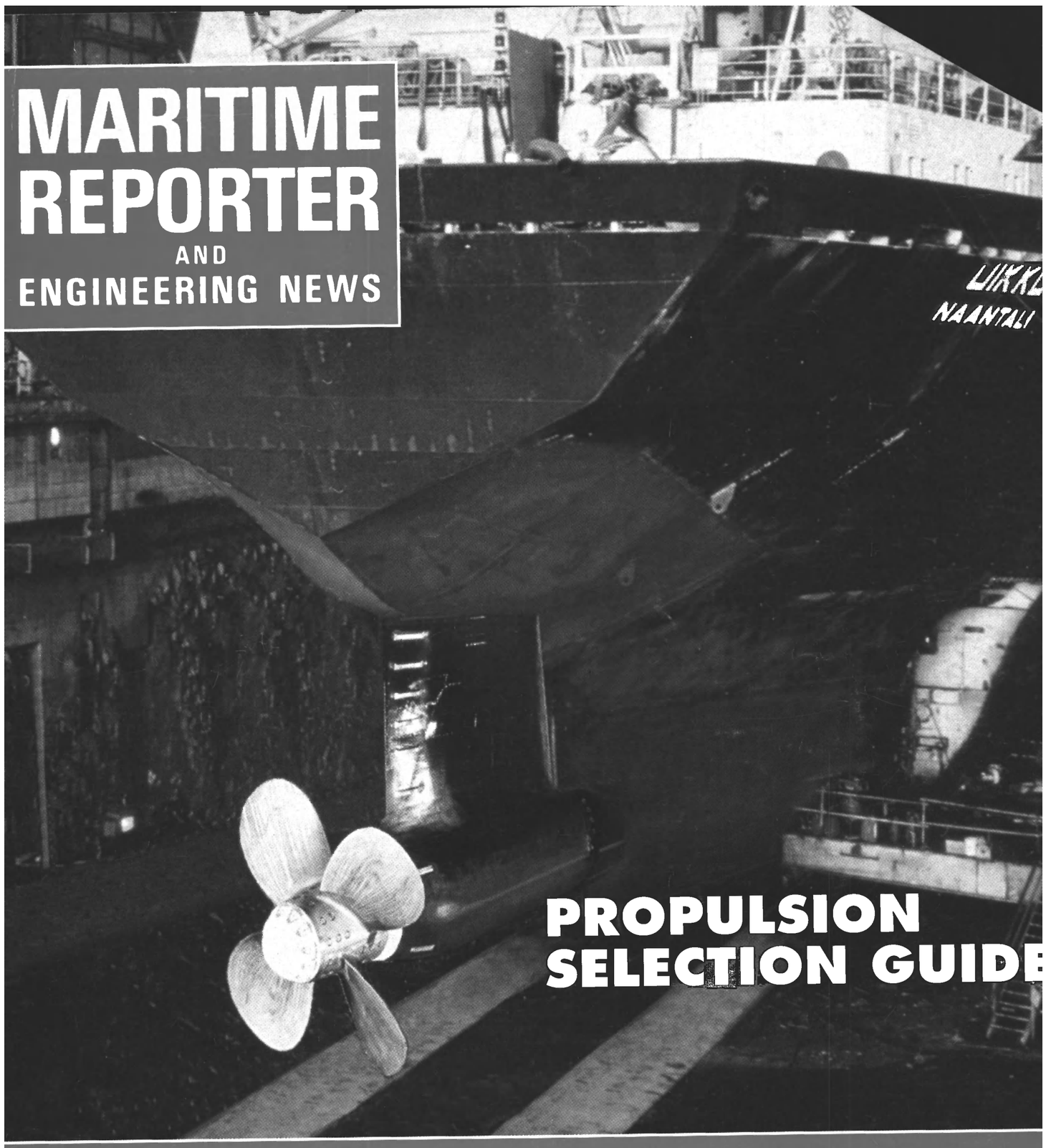
MARITIME
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PROPULSION
SELECTION GUIDE
CRUISE SHIPPING ANNUAL
Outstanding Cruise Ships Of 1993
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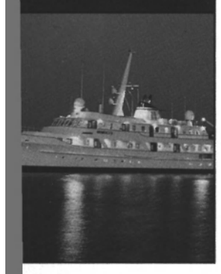
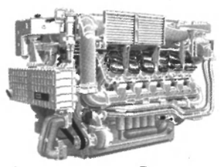
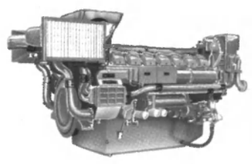
The best name to have on your side





Commercial fleets and naval forces worldwide rely on Paxman compact, high speed diesel technology for propulsion and power generation. The Valenta, Vega and VP 185 engine range offer 560 to 3655 kWb outputs. Operators can depend upon Paxman Life Time Support for training, spares and engineering services from a global network of Support Centres.



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ON THE COVER

Featured on this month's cover is the 11.4-MW azimuthing electric Azipod-propulsion drive, a system jointly developed by Kvaerner Masa-Yards and ABB Industry. Shown is the installation of the Azipod on the 16,000-dwt icebreaking tanker, M/T *Uikku*, owned by NEMARC Shipping Company. For full details on the installation, turn to the story on page 52.

MARITIME REPORTER AND ENGINEERING NEWS

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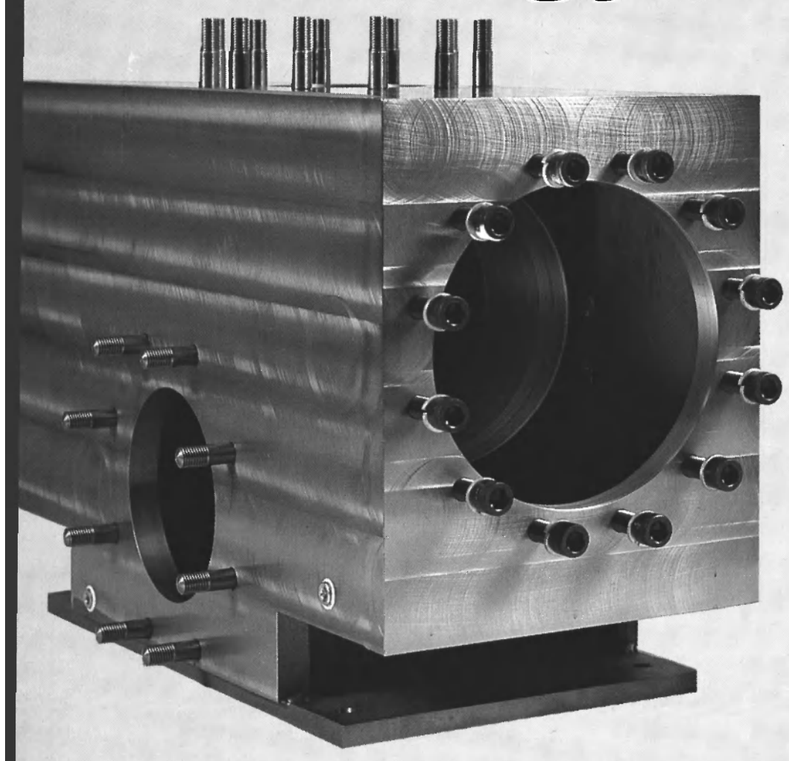
Leistritz rotary pump technology



Leistritz rotary screw pumps—based on 70 years of screw pump experience — are simply the most advanced rotary pumps available. Take advantage of superior technology by including these features in your next rotary pump specification:

Low pulsation for smooth, quiet operation.

Direct-drive for design simplicity.

Hydraulic balance for minimal deflection and load.

Cartridge-type assembly for easy servicing.

Integral relief valve to eliminate external valves and piping.

Built-in heat jacket to facilitate cold start.

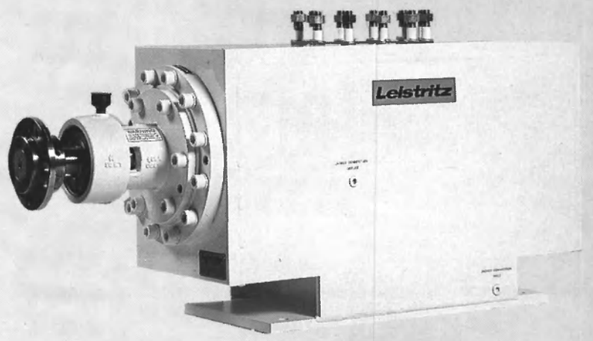
Cartridge-type mechanical seal for easy replacement without disturbing the driver or pipe connections.

Customized ports to adapt to the best piping arrangements.

Selection of materials for the longest service life.

Vertical models available for all pumps.

This cartridge-type pump was specially designed and manufactured by Leistritz in the USA to replace an existing fuel-oil pump.



For further information on the broad line of Leistritz screw pumps, call (201) 934-8262, or write: Leistritz Corporation, 165 Chestnut St., Allendale, NJ 07401.

Leistritz

Circle 31 on Reader Service Card

SOME PEOPLE SAY JULIE MADDEN IS WELL CONNECTED.

Customers who know Julie Madden, IDB MOBILE's Customer Service Coordinator, call her to help them solve everyday communications problems.

IDB MOBILE

Julie connects with customers. Telephone, fax, telex, IDB Mail. They're Julie's communications tools. But it is Julie's philosophy that truly connects the needs of a customer with the solutions of IDB MOBILE:

Help customers to make the best use of mobile satellite services, so communications can be like calling from home.

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You asked for it. Here are examples of IDB MOBILE *solutions* created by our customers:

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Send and receive messages via satellite from wherever you are and distribute to electronic mailboxes, postal addresses, fax, telex machines and more.

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Install an IDB MOBILE phone and interface on board to allow crew and passengers to have flexible methods of payment: debit card, credit card, or collect.

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Transmit a document once. Have all designated recipients receive the document simultaneously at a truly unbeatable rate.

Inmarsat-C and AMSC

Global access to and from Inmarsat-C and AMSC mobile terminals at rates that are revolutionary because they're so *understandable.*

For More Information

CALL JULIE TODAY, IF YOUR COMPANY WANTS TO BE WELL CONNECTED:

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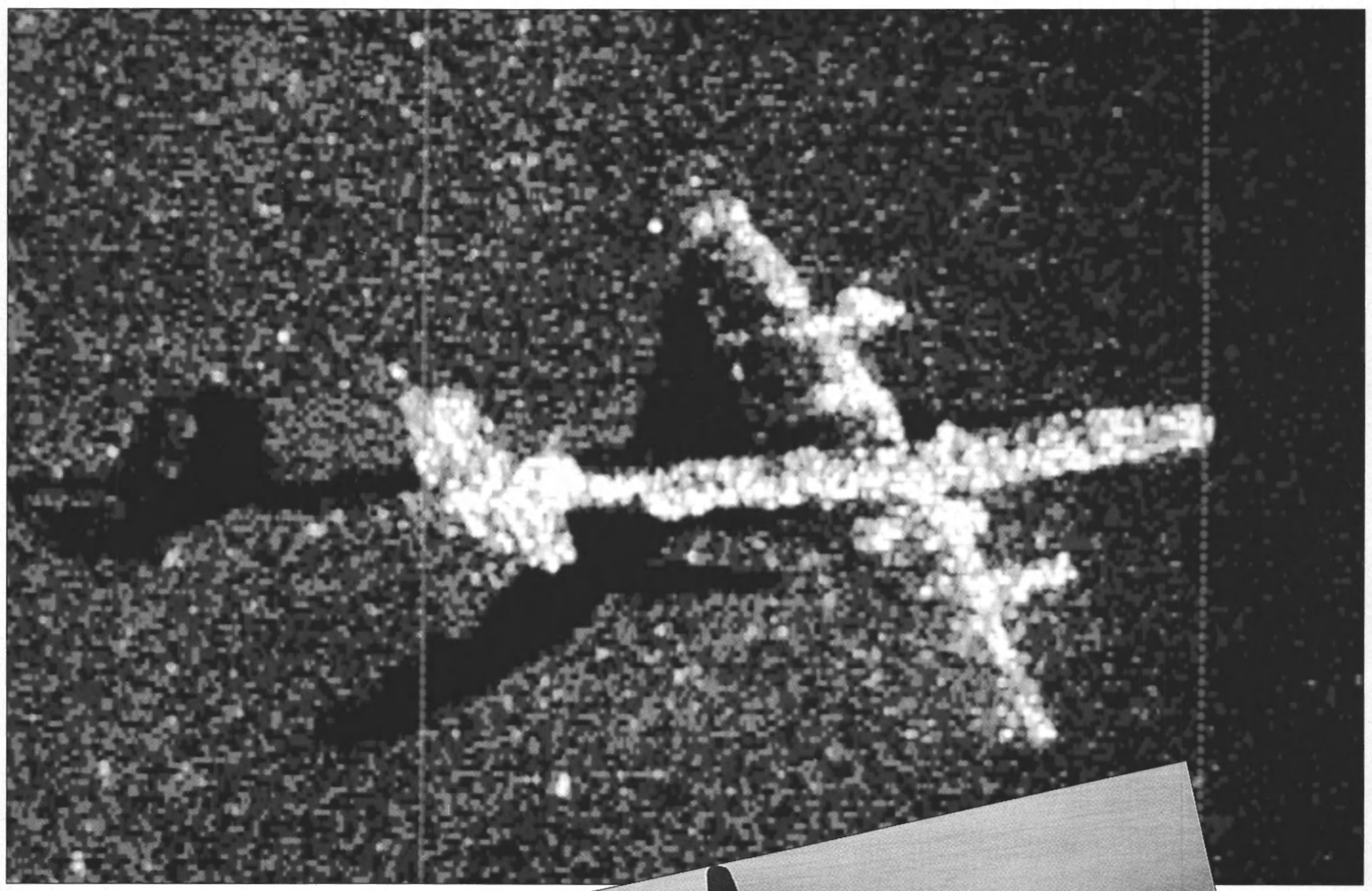
Simrad's image



Sound provided this site survey of an area in Lake Washington, Washington State.

The dominant part of the picture is the wreck of a *Convair PB4Y-2 Privateer*, a single tail naval version of the B-24, lying 50 meters below the surface. In an attempt to recover the aircraft, one of the port engines has been torn off.

The image was produced by a Simrad Mesotech MS 992 Simultaneous Dual Frequency Side Scan Sonar mounted on a tow fish, taken at 200 meters range - another example of what to expect from Simrad instruments, based on more than 40 years of experience in marine electronics.

Simrad marine expertise also includes:
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SIMRAD

C. Raymond Hunt Designs Pilot Boat For Los Angeles

C. Raymond Hunt Associates, Inc. has designed a 52-foot composite fiberglass-aluminum pilot boat for the Port of Los Angeles.

The deep-V hull will be a 52-foot by 16-foot fiberglass build, and the deck and superstructure will be welded aluminum. The new composite construction reportedly takes advantage of the best properties of both materials: below the hull, the fiberglass hull is non-corrosive, has great impact-absorbing and flexural properties and requires minimal maintenance; above deck, the welded aluminum structure allows customizing of the cabin and boarding areas to fit the requirements of the L.A. pilots. Hardware, rails, etc. can be welded on, eliminating penetrations where leaks can occur. Left largely unpainted, the designer says the superstructure requires little care. Scantlings will be to ABS standards with added reinforcement for pilot service. The boat will be a sister to other Hunt-designed pilot boats in service in the East and Gulf Coasts. Deep-V hulls reportedly allow pilots to maintain service in any weather, including hurricanes and winter ice. Two 530 bhp 8V92 DDEC Detroit Diesels will provide a service speed of 22 knots and a top speed of 25 knots. A unique rescue system designed by the pilots will be incorporated, consisting of a two-part transom mounted platform.

American Eagle Marine Completes Salvage Job

A six-week operation to salvage the 900-ton supply vessel *Galveston* was completed by American Eagle Marine, for Maitland Bros. of Pennsylvania, 1.5 miles south of Venice, La. With the former Penrod jack up drilling rig *Zeus*, the *Galveston* was "jacked up" from its resting position at the bottom of the river. A series of four 300-ton capacity link chains were directed and placed under the vessel's hull, each tied off to the deck of the *Zeus*. Then the tremendous amount of silt which had accumulated in the vessel since its sinking was removed, and the rig's dock and the wreck itself were "jacked" up sufficiently to bring the *Galveston* to the surface. The vessel is now safely moored in Venice, awaiting her final determination.

The *Galveston* collided with the 593-foot Panamanian freighter *Atticos* in March 1993 and immediately sank in 85 feet of water. American Eagle Marine was called upon then to help recover missing crew and cargo and stabilize the wreck.

Japanese Ship Orders For December Up 40 Percent From Last Year

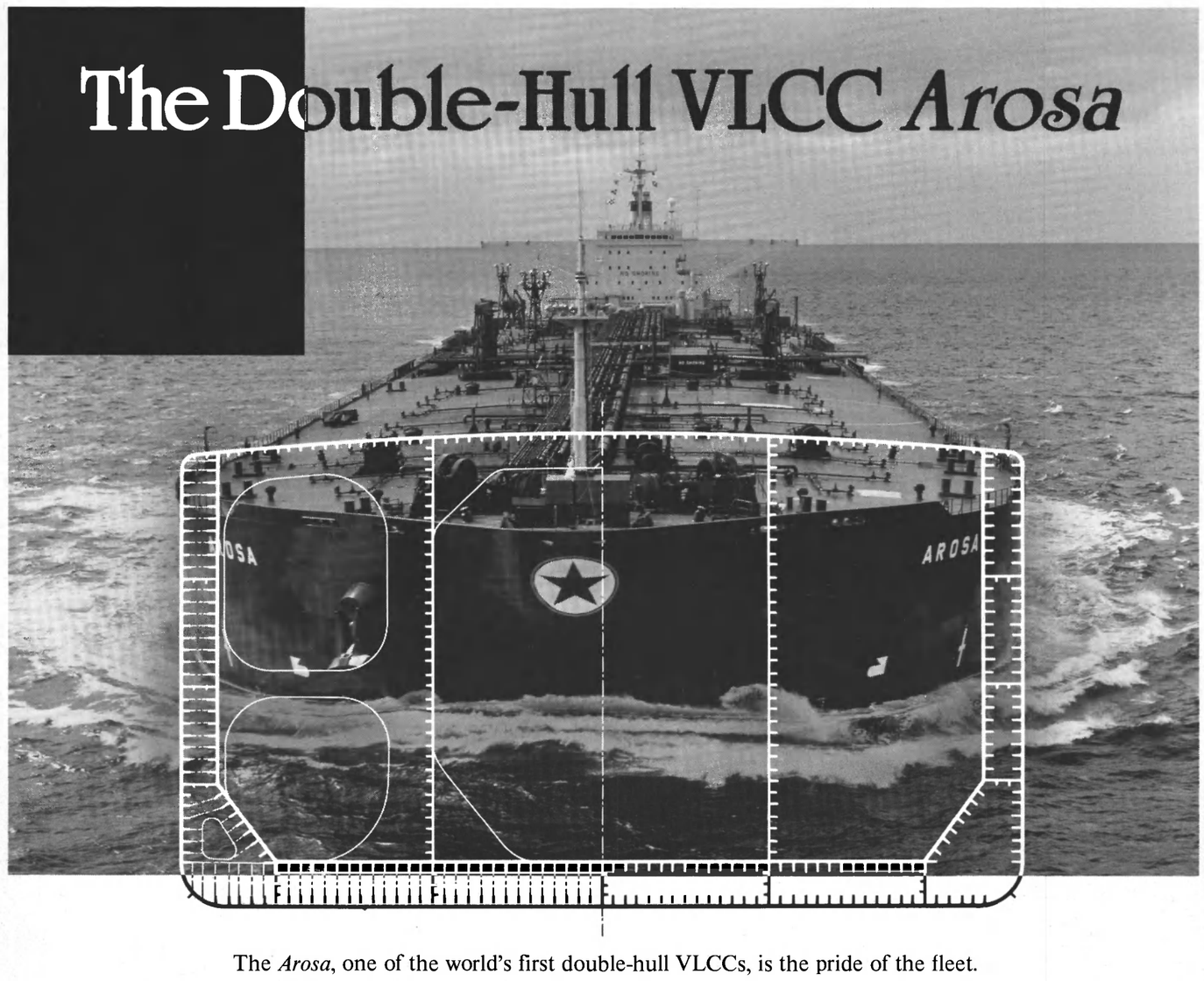
Japanese government statistics reported total new orders of 898,500 gt for December 1993. The figure is 11.4 percent lower than November's figure of 1,013,609 gt, and 41.6 percent higher than the same month in FY '92.

Domestic orders included: one bulk carrier, two car ferries, one general cargo vessel, one oil tanker and two reefer vessels. Export orders included 17 bulk carriers, as well as one chemical tanker, two containerships, one general cargo ship, two oil tankers and two pure car carriers. A total of seven domestic orders were placed, and 25 orders for export, for a total 32 orders. Four vessels were paid for in dollars and cash, all others paid for in yen and cash. New orders this fiscal year total 5,412,262 gt, a 47.7 percent increase over FY '92.

Chevron To Christen Newest Tanker

The newest tanker in Chevron's fleet will be christened March 1 in Brazil as the *Chevron Employee Pride*. Selected to christen the tanker are five employees who represent the diversity and breadth of talent among the 43,000 people of Chevron. Each of the five indivduals has received a Chairman's Award for a significant cost savings plan or process improvement with broad impact on the company. The addition of the new 149,000-dwt double-hulled vessel, built by Ishikawajima do Brasil Estaleiros S.A., brings the number of vessels in Chevron's fleet to 39, 11 of which are double-hulled.

The Double-Hull VLCC *Arosa*



The *Arosa*, one of the world's first double-hull VLCCs, is the pride of the fleet.
This revolutionary new vessel is double-sided and double-bottomed,
and has a deadweight of 290,000 tons. The high-quality double-hull tankers from Hitachi Zosen are
exceptionally easy to operate and maintain thanks to careful design and highly automated and integrated
construction. Hitachi Zosen has an abundance of technology and experience in the construction of VLCCs.
Hitachi Zosen's Ariake Works is one of the most modern and automated in the world.
The works features a FCuB single-side welder that is 2.5 times faster than conventional automated welders,
NC cutting machines, proprietary 20-electrode line welders and portable NC welding robots (HIROBO).
For double-hull VLCCs with efficient and user-friendly automated operation, advanced design
and the highest quality, contact Hitachi Zosen, and judge for yourself.

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Study: Washington State Should Buy 12 New Vessels

Report Earmarks $34.3 Million For New Vessels In Phase I

A recent report commissioned by the Washington State Transportation Commission focusing on passenger only ferry (POF) service in Puget Sound concluded that ultimately the area should purchase 12 new, 350-passenger, 30-knot catamaran type passenger vessels.

The report was created to develop a plan for expanded and improved POF service in Puget sound, which would include service between Seattle and four outlying areas: Bremerton, Southworth, Kingston and Vashon.

Implementation of the plan is recommended in two phases, so as to accurately keep up with passenger demand and to give time for necessary land-based terminal improvements. The core of the program includes the purchase of seven new vessels and the retention of the *Tyee*, a 319-passenger, 23-knot, Caterpillar-powered catamaran built by Nichols Brothers for $2.5 million. Phase II of the project, scheduled for a minimum of seven years later, includes the purchase of five additional vessels to satisfy increased demand.

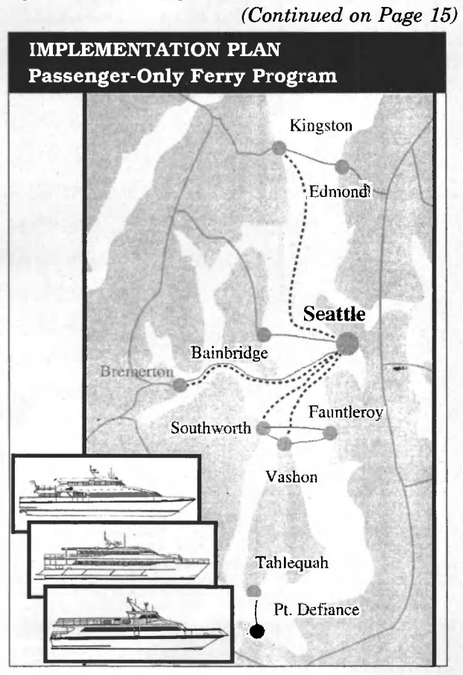
The projected cost for Phase I is $60.5 million, with $34.3 million of that earmarked for vessels; Phase II is projected to cost $50.7 million.

VESSEL SPECIFICATIONS

Currently, the area has three vessels in operation, the already-mentioned *Tyee* and two monohull vessels, the *Skagit* and the *Kalama*. The primary objective of the new POF program is to provide consistently reliable and frequent service. With this objective in mind, and using prior experience, a detailed design and equipment specification list is outlined in the study.

For example, prior experience indicates the need for a high-speed design which causes minimal wake-wash damage. Complaints of wake-wash damage along the Rich Passage shoreline shortly after POF

(Continued on Page 15)



(Continued from page 14)

service was originally started between Bremerton and Seattle resulted in a speed reduction to 12 knots for vessels going through the area. The result: a much slower travel time, ultimately resulting in unacceptable performance. The report recommends a catamaran configuration. Any new vessel procurement will require that the vessel designer provide hull form and weight data so that analytical predictions of wake-wash can be modeled, as well as requiring measurements of the initial vessel's wake-wash before additional vessels are accepted for delivery by Washington State Ferries.

Also, the new vessel specs require a propulsion system which can survive the rigors of the Puget Sound, which has a lot of floating debris such as logs. Puget Sound's high tidal current velocities require a vessel with excellent maneuverability and controllability, particularly at low speeds. As a solution, the new vessels are recommended to have waterjet propulsion, which reportedly can minimize the effects of the previously-mentioned conditions.

The report also advocates a passenger loading system using an over-the-bow ramp concept and retractable doors to provide rapid embarking and disembarking.

One problem area is the language of current Washington State Law, which restricts the state to the purchase of vessels "of a proven and operational design...[that have been] placed in operation within the previous five years" (RCW 47.60.651). The report concludes that the language, if strictly interpreted, could exclude from vessel procurement the latest technology of low wake-wash, speed and reliability. It recommends the state amend the statute so, in essence, Washington State Ferries can benefit from the latest technological developments.

FINAL IMPLEMENTATION

The report states that the implementation of Phase II accomplishes two goals: providing improved service frequency on all routes; and to satisfy estimated future demand for increased capacity on the Kingston and Southworth routes. To allow time for expansion of the Colman Dock facility in Seattle—necessary to accommodate a 13-boat program—Phase II of the plan would not be implemented for a projected minimum of seven years, providing five years for an environmental review and permitting, and another two years for actual construction. Once all facilities and boats are in place, however, the report envisions: three vessels on the Bremerton route; three vessels on the Southworth route; three vessels on the Kingston route; two vessels on the Vashon route; one maintenance rotation boat; and retention of the *Tyee* as an emergency back-up vessel.

At press time, plans to present the report to the Washington State Legislation were being carried out. After the obligatory review and budgetary considerations, the Washington State Transportation Commission will discuss the project for inclusion on its budget request for the years 1995 to 1997.

Chubb Helps To Keep Shipping Safe In Strait Of Gibraltar

To meet the fire protection needs of an automated lighthouse, Middlesex-based Chubb Fire Engineering has designed and supplied an automatic system primarily to "flood" the generator room of the lighthouse at Europa Point in Gibraltar with CO_2 in the event of a fire.

Until now, Chubb Fire extinguishers have been used as first-aid fire protection.

Chubb Fire's sister company, Edinburgh-based Guardall, is to supply intruder detection and alarm equipment. Passive infrared (PIR) sensors will be linked to two Guardall Rascal microprocessor alarm control units: one protecting the lighthouse and the other the keepers' lodges.

Installation will be supervised by Fire Security (Gibraltar) Ltd., a company established by former Chubb Fire manager **Mike Reid**.

Chubb Fire and Guardall are part of Chubb Security Plc.

Dredging News

Working Group Formed On Dredging

Federal agencies which administer more than 60 laws and executive orders regulating port dredging have formed an Interagency Working Group on the Dredging Process, according to Department of Transportation Secretary **Federico Pena**.

The goal of the group is to find a better way to coordinate the process by which essential harbor and berthing area dredging projects can take place and still be consistent with environmental quality controls. A number of factors bring about difficulty and delays, including obtaining federal and state approval and disposal of dredging materials.

Secretary **Pena** also reportedly pointed out that the fastest growing segment of America's economy, international trade, will expand even more under new trade agreements. The Interagency Working Group is comprised of a number of agencies, including the Department of the Army, the Environmental Protection Agency, the Department of the Interior's Fish and Wildlife Service, and the Department of Commerce's National Marine Fisheries Services and Office of Ocean and Coastal Resource Management. The Transportation Department's Maritime Administration chairs the group. The White House's Office on Environmental Policy and the DOT's U.S. Coast Guard are liaisons to the group.

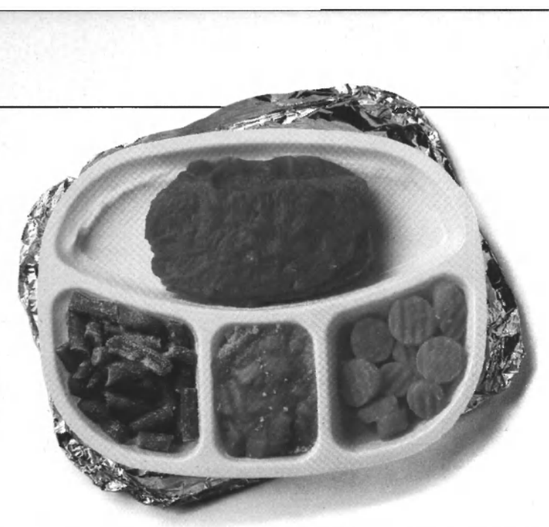
A working committee and a policy level steering committee are the two-tier structures of the group. The working committee has scheduled meetings for a number of dates and locations (see chart, this page) for people and organizations interested in the project. For more information, contact **Carl Sobremisana**, tel: (202) 366-4357 or **John Swank**, U.S. Department of Transportation, tel: (202) 366-5807.

Meeting Schedule At A Glance

Date	*Time*	*Location*
Feb. 7	1:30-4:30 p.m.	FAA Training Center, Room 170, 2300 East Devon Ave., Des Plaines, Ill.
Feb. 8	7-10 p.m.	Robert A. Young Federal Building, 1222 Spruce St., St. Louis, Mo.
Feb. 9	7-10 p.m.	Red Cross Building, 2700 S.W. Freeway, Houston, Texas
Feb. 15	7-10 p.m.	Federal Building, 911 N.E. 11th Ave., Portland, Ore.
Feb. 16	7-10 p.m.	San Francisco Bay Area, Metropolitan Transportation Commission, Joseph P. Bort Metro Center (Auditorium), 108 8th St., Oakland, Calif.
Feb. 17	1:30-4:30 p.m.	Port of Los Angeles, 415 S. Palos Verde St., San Pedro, Calif.

USCG Rule To Require Vessels To Carry Oil Spill Removal Equipment

A U.S. Coast Guard (USCG) Interim Final Rule requires that vessels in U.S. waters transporting oil as bulk cargo must carry appropriate oil spill removal equipment for preventing or responding to oil spills. Required equipment, according to OPA 90, includes absorbent materials, pumps, emergency towing bridles, deck edge coamings and appropriate hoses to transfer cargo from one tank to another internally in the event of an emergency. Another stipulation of the rule is that operators have access to a computer program which can calculate the vessel's stability after it's been damaged. The USCG is seeking additional information on other technology that could be carried aboard tank vessels for preventing or removing oil spills. Send by February 22 to Executive Secretary, Marine Safety Council (G-LRA-2/3406), U.S. Coast Guard HQ, 2100 Second St. S.W., Washington, D.C. 20593-0001.



) There are undeniable advantages to focusing on one hing—and one thing only. Take our competitors. Let's start vith the big ones. You'll see they're all in a lot of different usinesses.

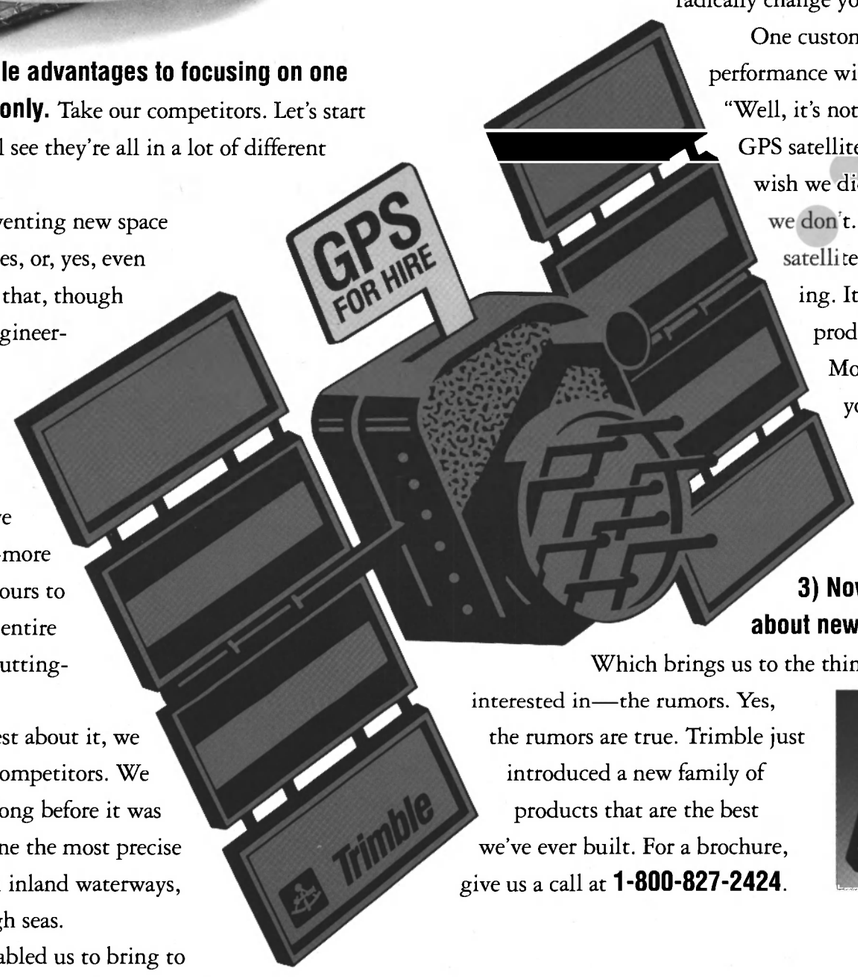
Businesses like inventing new space elescopes, maybe missiles, or, yes, even efrigerators. Businesses that, though hey do develop one's engineer-ng prowess, have very ttle to do with narine GPS.

At Trimble, GPS s all we do. It's where we our our R&D efforts—more han two million man-hours to ate. We've focused our entire ompany on inventing cutting-dge GPS solutions.

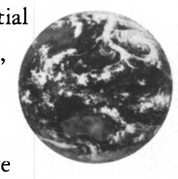
If we're to be honest about it, we ot a head start on our competitors. We ere dedicated to GPS long before it was ven a buzzword, let alone the most precise ay to navigate through inland waterways, ocky coastlines, and high seas.

This head start enabled us to bring to narket the world's first commercial GPS product n 1984. And in 1985, the world's first marine navigation system. nd in 1989, the world's first large flat-screen display and GPS ystem in one—complete with NOAA charts. Then in 1990, the orld's first totally integrated GPS receiver and antenna system, cutis, and then in 1992, our popular hand-held Ensign.

All of which is a long-winded way of saying we're rather xated on building the most innovative, most accurate, and most ependable GPS solutions around.



2) With performance this good, you might think we owned the whole damn GPS satellite network. Here's a true story: Last month, we were out testing some of our new differential products with customers. First, we used one of our differential receivers to prove we can pinpoint any buoy, dock, or isthmus within ten meters—anywhere in the world. Then we showed how Trimble can get a lock on your location within seconds. And then we demonstrated just how true our readings are, even when you radically change your speed.



One customer, comparing that performance with our competitors, said, "Well, it's not fair—you own the whole GPS satellite system." Of course, we wish we did. But we have to admit we don't. The fact is that all GPS satellite data is free for the taking. It's just that not all GPS products are created equal. More than anything else, your accuracy and performance is determined by one thing—whose product you buy.

3) Now about that gossip about new products from Trimble. Which brings us to the thing you're probably most interested in—the rumors. Yes, the rumors are true. Trimble just introduced a new family of products that are the best we've ever built. For a brochure, give us a call at **1-800-827-2424**.

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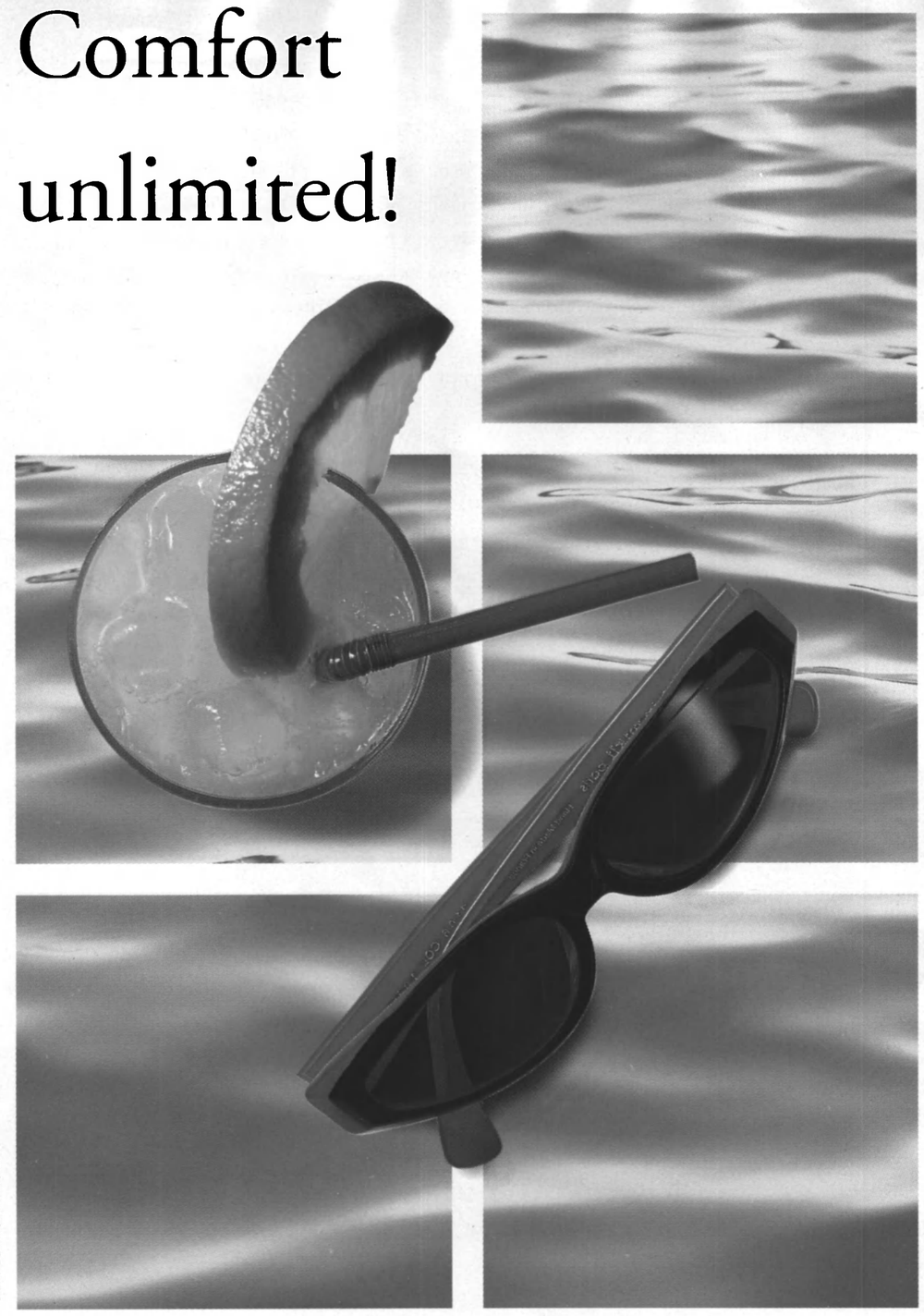

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Simply because we are the world's leading innovators and manufacturers of water chillers for marine air conditioning.

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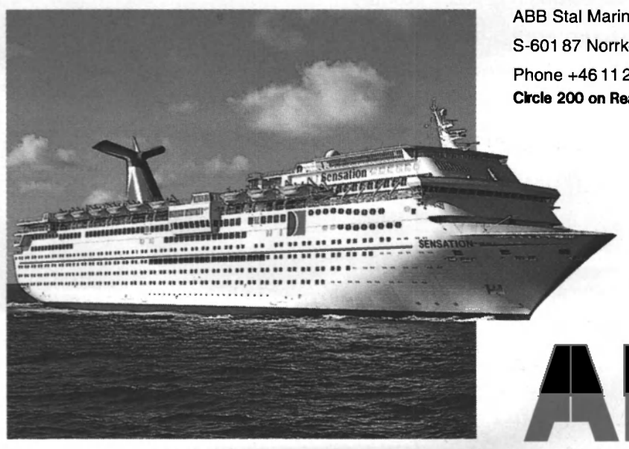
Because our chillers are the result of decades of co-operation with the leading yards and owners.

And because there is service at hand in any port.

So when it comes to marine chillers – no one beats ABB Stal Marine!

Stalicon, Staloduct, Stal Ductless, Stalectronic, VSB, VSM and VRM brine and water chiller units are examples of innovative marine chiller products from ABB Stal Marine.



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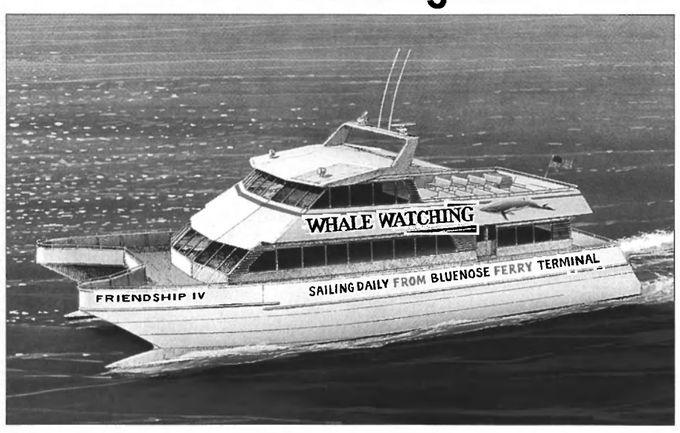
GRAFFITI REKLAMBYRÅ, NORRKÖPING, SWEDEN.

Gladding-Hearn Builds Whale-Watching Cat



Gladding-Hearn plans to deliver a 92-foot catamaran to Bar Harbor Whale Watch Co. in June.

The success of fast ferries for commuter and excursion trips during the past decade has led to an order for the nation's first Incat-designed high-speed passenger vessel, specifically built for whale-watching. According to the builder, Gladding-Hearn Shipbuilding of Somerset, Mass., licensee for Australia-based International Catamaran Designs (Incat), the new 92-foot, 149-passenger catamaran is being built for Bar Harbor Whale Watch Co., a whale watch and excursion vessel operator in Bar Harbor, Maine. Delivery of the vessel, for which keel was laid in December 1993, is set for June 1994. The vessel will have a beam of about 30 feet and a depth of eight feet.

Unlike other catamarans built by Gladding-Hearn, the all-aluminum vessel incorporates Incat's unique Z-bow configuration, adapted from the designer's wave-piercing catamaran. The resulting longer waterline improves the vessel's high-speed performance and adds buoyancy for passenger crowding on the foredeck, explained shipyard officials. It also includes bow pulpits and wide walk-around decks.

Powered by twin 815-hp Detroit Diesel DDEC engines, the catamaran is designed for 25- to 27-knot speeds, which owner **Marc Brent** said will allow him to make three daily whale watch trips instead of two. "We generally travel about 33 miles offshore to find whales," Mr. **Brent** explained. "In our older boats, this trip would take two hours; now we can make the same trip in half the time, and by running smaller, more efficient engines, we can travel farther without increasing our fuel costs."

Mr. **Brent** added that the vessel's 25-foot-wide main cabin should increase his dinner cruise business. The heated main cabin features upholstered seating, tables, a snack bar and three heads, including one for disabled passengers. Resilient mounts between the hulls and superstructure reduce noise and vibration.

For more information on Gladding-Hearn Shipbuilding,

Circle 119 on Reader Service Card

Equipment List

Engines	Detroit Diesel
Propellers	Hall & Stavert
Compass	Ritchie
Radar	Furuno
Reduction gear	Twin Disc
Engine controls	Morse
Generators	Kuboltz
Generator controls	Industrial Power Systems
Mounts	McKay

VIS Delivers Monitoring Systems For Four Oil Carriers

Vessel Information Systems, Inc. (VIS) has delivered and commissioned pump room monitoring systems for four U.S.-flag crude oil carriers. The systems integrate combustible gas and O_2 concentration monitoring in the pump room atmosphere with pump vibration and temperature monitoring to increase the safety of cargo rooms.

Elliott Bay Design Group of Seattle worked with VIS to develop the system in compliance with U.S. Coast Guard and ABS regulations.

A standard "Vessel Information and Alarm System" (VIAS-128) processes data from the different sensors and displays all measured values and alarm conditions in the cargo control room on a color CRT with customized screens.

In addition, combustible gas alarms are displayed and/or sounded in the wheelhouse, at the pump room entrance, and in the lower pump room.

For more information on the system from VIS,

Circle 166 on Reader Service Card

MORE POWER FOR YOU

With increased horsepower, more engine choices, and an expanding on-water service network, Deere Power is better than ever.

Additions include the 300 hp 6076AFM and 195 and 220 hp 6068TFM. Unlike some, these quiet, dependable, smooth-running diesels don't scream for your attention. But their fuel-efficient, high-torque, powerful performance will have you taking notice.

The Deere Power fleet includes seven 4- and 6-cylinder diesels in naturally-aspirated, turbo-charged, and aftercooled configurations. All are loaded with features that'll help keep your boat on the water, and your business on an even keel.

For reliable auxiliary, gen-set or propulsion power from 70-300 hp, see your John Deere marine dealer or engine distributor. Or call Deere Power Systems, 319/292-6060. FAX: 319/292-5075.

To find out more about John Deere diesel engines for marine applications, contact one of our authorized distributors listed below.

For North America contact:
BELL POWER SYSTEMS
677 Cromwell Avenue, P.O. Box 769
Rocky Hill, CT 06067
Tel: (203) 563-5176 • Fax: (203) 257-7899

CK POWER PRODUCTS
9290 West Florissant, St. Louis, MO 63136
Tel: (314) 868-8620 • Fax (314) 868-9314

CK POWER PRODUCTS CORPORATION OF FLORIDA
229 Southwest 54th Court, Ocala, FL 32674
Tel: (904) 237-7660 • Fax: (904) 237-0855

CN POWER SYSTEM
220 Harter Avenue, P.O. Box 650
Woodland, CA 95695
Tel: (916) 666-6624 • Fax: (916) 661-1226

DIESEL-BEC, INC.
2805 Pitfield Boulevard
St. Lauren, Quebec H4S1T2 Canada
Tel: (514) 335-0940 • Fax: (514) 335-0080

EMERSON POWER PRODUCTS
426 South Cloverdale Street
Seattle, WA 98108
Tel: (206) 764-3850 • Fax: (206) 764-3832

ENGINE DISTRIBUTORS, INC.
1709-B South Slappey Boulevard
Albany, GA 31701
Tel: (912) 888-1900 • Fax: (912) 435-2946

ENGINES, INC.
U.S. Hwy. 49 South, P.O. Box 425
Weiner, AR 72479
Tel: (501) 684-7361 • Fax: (501) 684-7338
Branch Office:
U.S. Hwy. 61 South, P.O. Box 1154
Cleveland, MS 38732
Tel: (601) 843-0083 • Fax: (601) 843-0856

HEARTLAND ENGINE COMPANY, INC.
2113 East Smithville-Western Road
Wooster, OH 44691
Tel: (216) 345-5068 • Fax: (216) 345-7339

NORTH AMERICAN ENGINE COMPANY
3003 Thurston Rd., Greenboro, NC 27406
Tel: 1 (800) 543-2289
Tel: (919) 370-4776 • Fax: (919) 370-4993

SUPERIOR DIESEL
1632 N. Stevens Street, P.O. Box 1187
Rhinelander, WI 54501
Tel: (715) 369-5900 • Fax: (715) 369-5918
Branch Offices:
461 East Fen Road, Coldwater, MI 49036
Tel: (517) 278-2445 • Fax: (517) 278-8272
and
204 North 37th Road, Mendota, IL 61342
Tel: (815) 538-1818 • Fax: (815) 538-3200

WESTERN ENGINE DISTRIBUTORS
321 Industrial Street, Bakerfield, CA 93307
Tel: (805) 327-3881 • Fax: (805) 327-1731
Branch Office:
3301 Hill Street, Long Beach, CA 90804
Tel: (310) 494-6733 • Fax: (310) 985-0718

YORK POWER SYSTEMS
804 West Cotton, P.O. Box 3939
Longview, TX 75606
Tel: 1 (800) 322-1980
Tel: (903) 757-4700 • Fax: (903) 757-9927
Branch Office:
4601 Pinemont, Suite 114, Houston, TX 77041
Tel: (713) 460-1134 • Fax: (713) 460-9532

For Europe contact:
JOHN DEERE SARAN
B.P. 13, 45401 Fleury Les Aubrais, France
Tel: (33) 38 82 60 23 • Fax: (33) 38 82 60 00

For Asia, Caribbean, Central and South America contact:
JOHN DEERE INTERCONTINENTAL, LTD.
400 19th Street, Moline, IL 61265-1388
Tel: (309) 765-3310 • Fax: (309) 765-3197

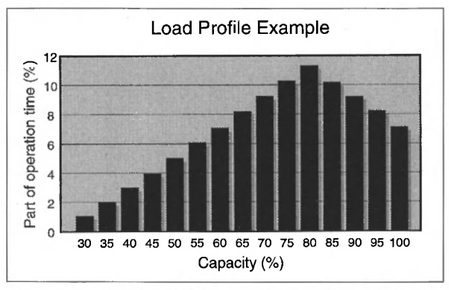
Circle 212 on Reader Service Card

ABB Stal Introduces New Generation Of Quiet Screw Compressors With Low Operating Cost

ABB Stal Refrigeration launched its new S80 series, a new generation of five Stal-Maxi screw compressors.

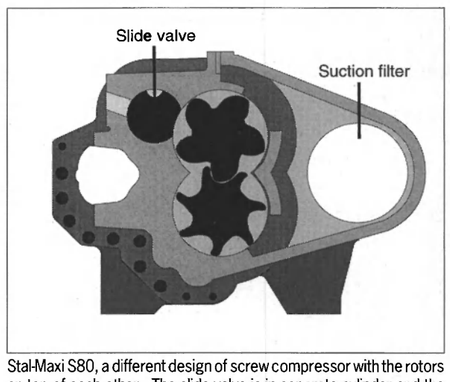
The S80 series is reportedly different from any screw compressor design. By placing the rotors above each other, it has been possible to place the discharge connection at the side and make the compressor lower. Additionally, the mass of the compressor housing is evenly distributed around the rotors, and as a result, the compressor has a compact design, and reduces vibrations and sound level significantly compared to earlier models.

The new models have fewer connections than previous models; instead most oil and gas passages are integrated as channels within the housing, reportedly increasing operating reliability and minimizing risk of oil and refrigerant leakages.



Since a considerable part of the operating time is normally in the reduced capacity range, efficiency at part load is as important as efficiency at full load.

The economizer port in the S80 series is movable and integrated with the capacity slide valve, enabling the compressor to maintain an optimal intermediate pressure within a wide operating range. The compressor can reportedly be used optimally at varying loads, providing higher efficiency even at reduced capacities. All five models have been provided with two independent systems for regulating volume ratio and capacity, reportedly improving part load efficiency.



Stal-Maxi S80, a different design of screw compressor with the rotors on top of each other. The slide valve is in separate cylinder and the compressor incorporates an integrated suction strainer.

The ratio between the length and diameter of the rotors is individually optimized for each model, reportedly giving increased overall efficiency and lower operating costs. Another detail distinguishing the S80 series from its predecessors is the introduction of an integrated suction strainer. At the same time, the strainer area has been increased to reduce the pressure drop and increase efficiency.

A designed advantage of the new series is optimal performance at reduced capacities. Depending on operating conditions, choice of refrigerant and load profile, the new compressors can reduce operating costs by as much as 10 percent.

A completely new digital controller is designed to simplify operations and facilitate communication with other process control and supervision systems.

Up to eight compressors may be connected for sequential operation. ABB Stal envisions a large potential market for the new line, including reefer operators.

For free information on the new S80 line from ABB Stal,

Circle 187 on Reader Service Card

Hollywood Casino Corp. Purchases Mississippi Casino Project

Hollywood Casino Corp., a Texas-based gaming and lodging company, announced its purchase of a dockside gaming facility which is currently under construction in Tunica County, Miss.

The project, which will be renamed Hollywood Casino-Tunica, is slated for a June 1994 opening.

Hollywood Casino Corp. purchased the project from Summit Casinos International, Inc.

The total purchase price of $15 million includes all assets currently in place, as well as all rights of Summit Casinos International, Inc. in the project.

The total cost of the project is estimated to be $70 million.

"When the prospect of purchasing a facility which was already under construction arose in an area with 4.1 million people within a 150-mile radius, we saw an excellent opportunity for a quality gaming operation," said **Jack Pratt**, chairman and CEO of Hollywood Casino Corporation.

Maritime Progress Now Exclusive Distributor For TVP2000 Voltage Protectors

Maritime Progress is now the exclusive distributor to the marine industry for Unity Transient Voltage Protectors (TVP2000). The TVP 2000 reportedly has a long and successful history of protecting sensitive electronic equipment against damage and/or disruptions arising from transient voltage both on land and in marine applications. Reportedly the TVP2000 is easily retrofitted to motors, generators and distribution panels, and will effectively eliminate voltage disturbances created by lightning, power line switching and cycling of electrical equipment. For more information on the TVP2000 from Maritime Progress,

Circle 161 on Reader Service Card

For more information on Hayward Industrial Products' 950B fabricated strainers,

Circle 162 on Reader Service Card

Clean-Up Advanced In Puerto Rico Spill

The U.S. Coast Guard (USCG) reportedly claims that most of the oil spilled from the *Morris J. Berman* barge which ran aground off San Juan on January 7 has been recovered. The barge was sunk about 16 miles off shore after being towed away by the USCG. The natural shape of the shore line was a factor that reportedly helped to create a pocket for much of the spilled oil, working to clean-up crews' advantage. At the request of the USCG, the Marine Spill Response Corp. (MSRC) assisted in the cleanup. MSRC dispatched the oil spill response vessel *Caribbean Responder* from St. Croix in the Virgin Islands to the scene. In addition, MSRC provided two GT-185 skimming systems and a DESMI skimmer with crews for nearshore operations. MSRC has had more than 25 personnel involved in the response operations. National Response Corporation (NRC) of Calverton, Long Island also responded to the spill. NRC's initial response within hours of the spill included 90 men, 17,000 feet of boom deployed to prevent the oil from spreading, seven recovery devices for skimming surface oil from the water, and other support materials. Crowley Maritime Services, Inc. also dispatched more than seven hundred workers to fight the spill. From the East and West Coast ports of Philadelphia, Baltimore, San Francisco, Seattle and as far north as Anchorage, Alaska, remediation experts, cleanup chiefs and salvage experts traveled to Puerto Rico to work on the spill.

The Crowley tug *The Mariner* towed the *Berman* 20 miles out to sea for scuttling.

So far the USCG has allocated $19 million from the $1 billion Oil Spill Liability Trust Fund for the cleanup, but substantially more aid is expected to complete the work and to pay claims from damaged parties.

Hapag Lloyd To Order Six Boxships

Hapag-Lloyd is reportedly ready to order six 4,000-4,400-teu containerships from Far East yards, possibly in Japan or South Korea, by the end of the first quarter of this year.

The vessels to be ordered will be used in the Pacific/Atlantic Express service (PAX), which was introduced in 1993 and is operated by Hapag-Lloyd in a joint agreement with Nippon Yusen Kaisha (NYK) of Japan and Neptune Orient Lines (NOL) of Singapore.

PAX connects northern Europe with the eastern and western U.S. coasts by way of the Panama Canal and the Far East.

The new vessels will replace six vessels of between 2,700 and 3,000-teu, provided by Hapag-Lloyd, which will either be sold off or placed out on charter.

Players International Applies For Missouri Gaming License

Players International Inc. has received approval from the City of Maryland Heights, Mo., a St. Louis suburb, to develop a riverboat casino complex.

The company has also applied to the Missouri Gaming Commission for a license to own and operate a riverboat casino. The company is moving forward to seek other approvals, including one from the Army Corps of Engineers, for the development site. Upon completion, the proposed facility will be the third riverboat casino developed and operated by the company.

Plans for the multi-complex facility, located on 132 acres, include a riverboat that will cruise on the Missouri River with approximately 25,000-sq.-ft. of gaming space, a pavilion to include a ticketing center, restaurants, gift shop and VIP lounge.

The site will also feature a large multi-purpose sports complex, including retail shops, restaurants, nightclubs and many other recreational facilities.

Ed Fishman, chairman and CEO, stated, "This represents an important achievement as we continue to focus on the development of casino and entertainment complexes in locations where we can achieve a significant market position."

Avondale Repairs Holland America's *Noordam*

Holland America's *Noordam* was repaired in ten days at Avondale after a collision with a Greek cargo ship.

Avondale Industries Inc.'s Shipyards Division recently completed emergency repairs to Holland America Lines' cruise ship M/S *Noordam*.

In mid-November the 654-foot-long luxury liner pulled into Avondale's Algiers facility with a gaping 85-foot by 60-foot hole in her aft starboard side — covering nearly four decks, including parts of the galley, crew quarters and promenade deck — which was the result of an accident with a Greek cargo ship in the Gulf of Mexico.

Avondale steel workers and welders replaced the steel plate outer skin and then turned their attention to repairing the interior damage. During the turnaround, the *Noordam* was moved to the Shipyards Division's main yard, where she was lifted in Avondale's 81,000-ton drydock for inspection. After 10 days of around-the-clock repair work performed by several production crafts — including welding, shipfitting, electrical, piping and sheet metal — the *Noordam* departed and was immediately put back in service. She is now on her regular schedule cruising the high seas.

Damage to the *Noordam* covered nearly four decks.

Avondale Industries, Inc., headquartered in metro New Orleans, is one of the nation's leading steel fabricators. In addition to building and repairing ships and boats to Navy and commercial standards, the company is also involved in modular construction of plants and components for a variety of land-based industries.

For more information on Avondale Industries,

Circle 114 on Reader Service Card

Carolina Cockpit Builds Control Station For Research Ship

Carolina Cockpit Inc., Portland, Ore., designed and built a six-foot by nine-foot insulated fiberglass control station for Oregon State University's ocean research ship *Wecoma*. The vessel is currently undergoing extensive upgrading at Maritime Contractors' Bellingham, Wash. shipyard. The foam-cored structure was delivered to the shipyard ready to install on its integral mounting flange. Three custom consoles will provide for vessel propulsion, deck machinery and A-frame controls for the launching of the ship's scientific gear. The anodized aluminum ladder and rail system, and the removable wiring duct, equipment racks and console tops will facilitate change of mission set-up chores. These items were all installed prior to shipment. For more information on Carolina Cockpit,

Circle 87 on Reader Service Card

Coming In March:
MR/EN's "Marine Electronics Yearbook"

Lender To Marine Industry Acquired By NationsBank

NationsBank Corporation completed its acquisition of a majority of the assets and businesses of U.S. West Financial Services, which lends to the marine industry worldwide.

The newly acquired enterprise is now known as Nations Financial Capital Corporation and will operate as a wholly-owned subsidiary of NationsBank Corporation.

"Only our name has changed," said **Joel F. Raven**, senior vice president, manager - capital asset finance division for Nations Financial. "Our professionals will continue to apply their in-depth knowledge of the marine industry to package even the most complex transactions quickly and efficiently."

Nations Financial operates in niche markets that are not traditionally served by banks and other finance companies. In addition to marine transport, the company provides capital for corporate finance transactions, commercial real estate, and many other industries ranging from manufacturing to transportation, including independent power production and other project finance. For more information on the services of NationsBank,

Circle 195 on Reader Service Card

Bilspedition Sells Majority Holdings In Cool Carriers

Bilspedition has made an agreement for the sale of 50.1 percent of the shares in the refrigerated shipping line Cool Carriers for $30.5 million. The buyer is an international consortium Avrista, of which the listed Norwegian shipping line, Leif Hoegh & Co. owns 75 percent and the U.K.-based International Shipping Investmen Co. owns 25 percent.

In connection with the realization of the deal the consortium will also take over the ownership responsibility for Cool Carriers.

Cool Carriers will continue to be located in Stockholm and its operations will remain unchanged.

EG&G Forms Marine Management Uni

EG&G has formed EG&G Marine Management, headquartered in its Norfolk, Va. office The move represents a corporate decision on the part of EG&G to renew its focus on maritim operations as a primary business.

EG&G's maritime interests began in the earl 1960s when it owned and operated the researc vessels *Patrick Kiley* and *Daniel Harris*. Th company has performed numerous maritim operating, design, oceanography, and technic contracts since then and currently operates tw Antarctic support ships through a joint ventur EG&G's Marine Instruments and Technical Se vices Groups have long provided equipment an services to oceanographic and marine scien efforts.

Moran Towing Names Patten Director Of Corporate Accounting

Moran Towing Corporation of Greenwic Conn., named **Robert J. Patten** director corporate accounting. Mr. **Patten** has been wi Moran Towing Corporation since 1976, and h been assistant controller since 1985. Mor Towing Company is reportedly one of the large and best known tugboat companies worldwid

Diesel Engine Selection Guide

The following directory is a listing of a select group of marine engines available. Due to space restrictions, the criteria selected were limited to model, cylinders, bore, stroke, length, width, height, weight and rpm. For full technical and performance details on any of the engines listed, please circle the appropriate number on the Reader Service Card in this issue. For uniformity, measurements are provided in inches and pounds. For some manufacturers, under the "cylinder" heading there is a range provided (ex. 12-18V). Please contact the manufacturer for the specific range of cylinders available on a particular model. *(Publisher is not responsible for errors or omissions.)*

ALASKA DIESEL ELECTRIC/LUGGER

Circle 3 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
L439D	4L	4.17	4.3	45.0	24.0	35.8	1,070	2,800
L439T	4L	4.17	4.3	45.0	24.0	36.6	1,160	2,800
L668D	6L	4.17	5.0	54.3	25.0	36.6	1,450	2,500
L668T	6L	4.17	5.0	54.3	25.0	36.6	1,475	2,200
L6108A	6L	4.25	5.1	46.2	30.2	37.1	1,622	2,600
L6125A	6L	4.9	6.3	55.3	33.3	43.9	2,400	2,300
L6140AL	6L	5.5	6.5	61.6	39.2	46.4	3,222	2,100
L6170A	6L	6.6	6.6	78.9	45.2	61.1	5,525	2,100
L12V140	12V	5.5	6.5	77.7	48.8	53.9	6,976	2,100

ANGLO BELGIAN CORP.

Circle 117 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
DX	3,6,8L	9.5	12.6	—	—	—	—	750
DZ	6,8L	10.1	12.2	—	—	—	—	1,000
PA4.185	6,8L	7.3	8.3	—	—	—	—	1,500

CATERPILLAR, INC.

Circle 1 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
3116	6L	4.1	5	46.5	32.2	33.9	1,834.2	2,800
3208	8V	4.5	5	43	38	42.4	2,469.2	2,800
3304B	4L	4.8	6	45.7	34.7	41.4	1,895.9	2,200
3306B	6L	4.8	6	57.5	38.5	49.9	2,081.1	2,200
3406C	6L	5.4	6.5	62.6	43	61.7	3,240.7	2,100
3408C	8V	5.4	6	58.4	52.3	54.8	3,705.9	2,300
3412C	12V	5.4	6	71.8	60.3	63.9	5,070.6	2,300
3508	8V	6.7	7.5	81.8	67.1	71	11,499.2	1,800
3512	12V	6.7	7.5	102.5	67.1	80.9	14,400.4	1,800
3516	16V	6.7	7.5	123.8	67.1	85.6	17,284.1	1,925
3606	6L	11	11.8	137.5	68.8	113.3	34,568.1	1,000
3608	8L	11	11.8	169.8	68.8	113.3	41,887.4	1,000
3612	12V	11	11.8	150.1	74.7	127.3	55,423.6	1,000
3616	16V	11	11.8	186.3	74.9	127.3	66,027.7	1,000

CUMMINS ENGINE CO., INC.

Circle 2 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	Cont. Duty (rpm)
4B3.9-M	4L	4.02	4.72	42	26	32	906	2,500
4BT3.9-M	4L	4.02	4.72	49	26	32	939	2,500
6B5.9-M	6L	4.02	4.72	57	26	33	1,315	2,500
6BT5.9-M	6L	4.02	4.72	57	26	34	1,275	2,500
6BTA5.9-M1	6L	4.02	4.72	57	30	33	1,350	2,500
6BTA5.9-M2	6L	4.02	4.72	57	30	31	1,292	—
6C8.3-M	6L	4.49	5.32	63	33	36	1,734	2,500
6CTA8.3-M1	6L	4.49	5.32	63	33	37	1,814	2,500
6CTA8.3-M2	6L	4.49	5.32	63	36	37	1,834	2,500
VT-903-M	8V	5.5	4.75	66	41	40	3,200	2,600
VTA-903-M	8V	5.5	4.75	74	38	41	3,650	2,600
N-855-M	6L	5.5	6.0	84	37	61	3,435	1,950
NT-855-M	6L	5.5	6.0	87	37	63	4,410	2,100
NTA-855-M	6L	5.5	6.0	87	37	63	4,620	2,100
KT19-M	6L	6.25	6.25	93	43	72	5,360	2,100
KTA19-M1	6L	6.25	6.25	107	45	79	6,800	2,100
KTA19-M2	6L	6.25	6.25	110	42	76	6,800	2,100
KTA19-M3	6L	6.25	6.25	—	—	—	3,800	1,800
VTA28-M	12V	5.5	6.0	120	52	79	8,800	2,100
KT38-M	12V	6.25	6.25	149	53	76	11,700	1,950
KTA38-M	12V	6.25	6.25	152	53	75	13,450	1,950
KTA50-M	16V	6.25	6.25	132	53	75	10,700	1,950

DAIHATSU DIESEL MANUFACTURING COMPANY LTD.

Circle 120 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
M2	6L	4.7	5.9	—	—	—	—	1,800
M3	6L	5.5	6.3	—	—	—	—	1,800
M5	6L	5.7	6.3	—	—	—	—	1,800
DL-16	6L	6.5	8.3	—	—	—	—	1,200
DL-19	6L	7.5	9.1	—	—	—	—	1,000
DL-20	6L	7.9	10.2	—	—	—	—	1,000
DL-22	6L	8.7	11.8	—	—	—	—	900
DL-24	6L	9.5	12.6	—	—	—	—	750
DL-26	6L	10.2	13.4	—	—	—	—	750
DL-28	8L	11	14.2	—	—	—	—	750
DL-32	8L	12.6	15.8	—	—	—	—	600
DL-40	8L	15.8	18.9	—	—	—	—	514
DV-22A	16V	8.6	11	—	—	—	—	1,000
DV-26A	16V	10.2	11.8	—	—	—	—	750
DV-32	16V	12.6	14.9	—	—	—	—	720
DK-16	12V	6.5	7.1	—	—	—	—	1,800
DK-32	8L	12.6	14.2	—	—	—	—	750
DK-32	16V	13	14.2	—	—	—	—	750
GS-22	6L	8.7	11	—	—	—	—	1,000
GS-22	16V	8.7	11	—	—	—	—	1,000
DK20	6L	7.9	11.8	—	—	—	17,196	—
DK20	8L	7.9	11.8	—	—	—	21,164	—
DK28	6L	11.0	15.4	—	—	—	39,683	—
DK28	8L	11.0	15.4	—	—	—	50,706	—

DEERE POWER SYSTEMS GROUP

Circle 4 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
4039DFM (M1)	4L	4.1	4.3	36.1	26.8	33.6	1,007	2,500
4039DFM (M2)	4L	4.1	4.3	36.1	26.8	33.6	1,007	2,500
4045TFM (M1)	4L	4.1	5	41.2	30.9	36.3	1,150	2,400
4045TFM (M2)	4L	4.1	5	41.2	30.9	36.3	1,150	2,400
6068DFM (M1)	6L	4.1	5	50.8	29.6	35.8	1,370	2,400
6068DFM (M2)	6L	4.1	5	50.8	29.6	35.8	1,370	2,400
6068TFM (M1)	6L	4.1	5	50.8	29.6	35.8	1,400	2,400
6068TFM (M2)	6L	4.1	5	50.8	29.6	35.8	1,400	2,400
6068TFM (M3)	6L	4.1	5	50.8	29.6	35.8	1,400	2,500
6068TFM (M4)	6L	4.1	5	50.8	29.6	35.8	1,400	2,600
6076AFM (M1)	6L	4.5	4.7	59.5	32.8	37.3	1,950	2,200
6076AFM (M2)	6L	4.5	4.7	59.5	32.8	37.3	1,950	2,200
6076AFM (M3)	6L	4.5	4.7	59.5	32.8	37.3	1,950	2,400

DETROIT DIESEL CORP.

Circle 6 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
3-53	3L	3.9	4.5	36	30	34	1,195	2,400
4-53	4L	3.9	4.5	41	30	36	1,345	2,400
6V-53	6V	3.9	4.5	50	40	40	1,680	2,400
6V-53T	6V	3.9	4.5	48	34	41	2,200	2,600
4-71	4L	4.3	5	58	35	41	2,275	2,100
6-71	6L	4.3	5	77	36	44	3,045	1,800
6-71TI	6L	4.3	5	63	34	40	2,575	2,500
8V-71	8V	4.3	5	62	46	47	3,100	1,800
12V-71	12V	4.3	5	83	48	57	5,715	1,800
12V-71TA	12V	4.3	5	83	50	60	5,962	1,800
12V-71TA								
DDEC	12V	4.3	5	83	50	60	5,962	1,800
6V-92TA	6V	4.9	5	61	41	46	3,265	1,800
6V-92TA								
DDEC	6V	4.9	5	63	42	45	2,800	1,800
8V-92	8V	4.9	5	65	46	47	3,480	1,800
8V-92TA	8V	4.9	5	67	48	47	5,010	1,800
8V-92TA								
DDEC	8V	4.9	5	59	43	58	3,545	1,800
12V-92TA	12V	4.9	5	97	50	64	7,562	1,800
12V-92TA								
DDEC	12V	4.9	5	104	50	51	4,950	1,800
16V-92TA	16V	4.9	5	109	49	54	5,600	1,800
16V-92TA								
DDEC	16V	4.9	5.0	109	45	50	5,635	1,800
12V-149	12V	5.8	5.8	109	58	71	8,864	1,800
12V-149TI	12V	5.8	5.8	109	62	70	9,110	1,800
12V-149TI								
DDEC	12V	5.8	5.8	109	56	71	9,110	1,800
16V-149	16V	5.8	5.8	148	58	71	16,000	1,800
16V-149TI	16V	5.8	5.8	126	64	72.5	11,950	1,800
16V-149TI								
DDEC	16V	5.8	5.8	126	59	72.5	11,980	1,800

DEUTZ-MWM

Circle 7 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
D226	4L	4.1	4.7	34.5	21.7	32.7	749.6	2,500
D226	6L	4.1	4.7	45.1	21.9	34.7	981.0	2,500
TD226	6L	4.1	4.7	52.2	21.9	34.7	1,058.2	2,500
D226B	6L	4.1	4.7	47.6	20.5	33.9	1,179.5	2,800
TD226B	6L	4.1	4.7	47.6	22.5	33.9	1,234.6	2,500
TBD226B	6L	4.1	4.7	47.6	22.5	33.9	1,234.6	2,500
TBD616	8V	5.2	6.3	67.8	47.3	51.2	3,791.9	2,100
TBD616	12V	5.2	6.3	82.7	47.3	51.2	5,291.0	2,100
TBD616	16V	5.2	6.3	100.5	50.4	53.2	5,731.9	2,100
TBD604B	6L	6.7	7.7	86.4	45.0	62.3	4,662.7	1,800
TBD620B	8V	6.7	7.7	75.4	54.7	65.7	6,613.8	1,800
TBD620B	12V	6.7	7.7	103.6	54.7	71.3	8,983.7	1,800
TBD620B	16V	6.7	7.7	123.3	54.7	71.3	12,114.3	1,800
TBD625	6L	6.7	10	90.4	39.9	65.9	6,305.2	1,200
TBD625	8L	6.7	10	107.4	41.5	74.6	7,936.6	1,200
TBD626	9L	6.7	10	115.8	41.5	68.8	8,730.2	1,200
TBD4406K	6L	9.1	10.1	120.7	60.1	89.6	16,534.5	1,000
TBD4408K	8L	9.1	10.1	144.8	60.1	89.6	19,841.4	1,000
BV6M628	6L	9.5	11	139.4	53.9	104.9	20,943.7	1,000
BV8M628	8L	9.5	11	166.8	53.9	109.9	25,352.9	1,000
BV9M628	9L	9.5	11	179	53.9	109.9	29,541.6	1,000
BV12M628	12V	9.5	11	171.1	76.5	105.6	35,934.9	1,000
BV16M628	16V	9.5	11	201.9	78.0	110.7	46,737.5	1,000
BV6M645	6L	13	17.7	204.7	84.7	139.1	56,217.3	600
BV8M645	8L	13	17.7	245.7	84.7	139.1	71,649.5	600
BV9M645	9L	13	17.7	280.3	84.7	139.1	81,570.2	600
BV6M640	6L	14.6	15.8	250.1	87.9	160.6	63,933.4	650
BV8M640	8L	14.6	15.8	301.9	88.8	160.6	81,570.2	650
BV12M640	12V	14.6	15.8	261.6	151.3	152.7	105,820.8	650
BV16M640	16V	14.6	15.8	314.5	151.3	152.7	132,276.0	650

DORMAN DIESELS LTD.

Circle 121 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	Cont. Duty (rpm)
DF615	6L	4.1	4.8	—	—	—	—	2,600
DT615	6L	4.1	4.8	—	—	—	—	2,400
6LS2-MH	6L	5.1	5.8	—	—	—	—	2,200
6LS2TX-MH	6L	5.1	5.8	—	—	—	—	2,200
6LS2T-MH	6L	5.1	5.8	—	—	—	—	2,200
6LS2TCW1-MH	6L	5.1	5.8	—	—	—	—	2,200
6LS2TCW2-MH	6L	5.1	5.8	—	—	—	—	2,200
6LS2TC W3-MH	6L	5.1	5.8	—	—	—	—	2,200
SEAKING6X	6L	6.3	7.5	—	—	—	—	1,500

(Continued on page 29)

PROPULSION SELECTION GUIDE

12V183TE61	12V	5	5.6	70.6	50.4	46.6	—	2,100
12V183TE62	12V	5	5.6	72.0	51.1	46.6	4,749	2,000
12V183TE72	12V	5	5.6	72.0	61.1	46.6	4,749	2,100
12V183TE92	12V	5	5.6	72.0	51.1	46.6	4,586	2,300
12V183TE93	12V	5	5.6	72.6	52.3	47.0	4,740	2,400
12V331T C92/KS	12V	6.5	6.1	108.6	57	58	9,149	2,340
12V396TB94	12V	6.5	7.3	119.6	58.2	63.1	14,548	2,100
12V396TE64	12V	6.5	7.3	110.6	60.2	66.5	12,490	1,600
12V396TE74	12V	6.5	7.3	114.4	60.8	62.9	12,412	1,900
12V396TE74L	12V	6.5	7.3	113.0	60.6	62.9	12,423	1,900
12V396TE84	12V	6.5	7.3	113.3	60.6	62.9	—	1,900
12V396TE94	12V	6.5	7.3	113.3	60.6	66.5	12,457	2,000
12V595TE60	12V	7.5	8.3	132	59.0	101.8	—	1,600
16V396TB84	16V	6.5	7.3	139.7	68.3	65.3	—	2,000
16V396TB94	16V	6.5	7.3	139.7	58.2	65.3	17,551	2,100
16V396TE64	16V	6.5	7.3	131.1	60.2	66.9	16,149	1,600
16V396TE74	16V	6.5	7.3	131.8	60.6	64.9	16,205	1,900
16V396TE74L	16V	6.5	7.3	135.0	60.6	68.9	16,271	1,900
16V396TE84	16V	6.5	7.3	135.0	60.6	68.9	—	1,900
16V396TE94	16V	6.5	7.3	135.0	60.6	68.9	16,094	2,000
16V595TE60	16V	7.5	8.3	154.7	59	102.3	—	1,600

NEW SULZER DIESEL LTD.

Circle 126 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
RTA 38	4-9L	14.9	43.3	221	91	242	200,000	196
RTA 48	4-9L	18.9	55.1	283	106	313	420,000	154
RTA 52U	4-8L	20.5	70.9	276	119	358	480,000	135
RTA 58	4-9L	22.8	66.9	334	129	391	640,000	134
RTA 62U	4-8L	24.4	84.7	328	140	367	760,000	113
RTA 68	4-8L	26.8	78.8	—	—	—	—	114
RTA 72U	4-8L	28.4	98.5	382	161	425	—	97
RTA 76	4-12L	29.9	86.7	431	162	493	—	104
RTA 84	4-12L	33.1	94.5	473	177	535	—	102
RTA 84T	5-9L	33	124	448	197	591	—	74
RTA 84C	4-12L	33	94.6	473	170	533	—	95
RTA 84M	4-12L	33	114.3	473	185	573	—	81
ZAV 40	12-18V	15.7	18.9	—	—	—	—	580
ZAL 40	6-9L	15.7	18.9	—	—	—	—	580
ZAV 40S	12-18V	15.7	22	—	—	—	—	500
ZAL 40S	6-9L	15.7	22	—	—	—	—	500
ZAV 40	12-18V	15.7	18.9	—	—	—	—	580
ZAL 40	6-9L	15.7	18.9	—	—	—	—	580
ZAL 40S	6-9L	15.7	22	—	—	—	—	510
AT 25	5-8L	9.8	11.8	141	41	90	23,800	1,000
AT 25	12-16V	9.8	11.8	141	41	90	23,800	1,000
S20	4-9L	7.8	11.8	125	38	95	19,000	1,000
ZA40S	6-9L	15.8	22.1	274	69	166	118,000	510
ZA40S	12-18V	15.8	22.1	274	69	166	118,000	510

PAXMAN DIESELS LTD.

Circle 64 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
Valenta	6L	7.7	8.5	109.5	47.3	72.9	9,618.6	1,600
Valenta	8V	7.7	8.5	79.2	62.3	72.9	10,178.6	1,600
Valenta	12V	7.7	8.5	126.4	62.3	100.1	14,706.9	1,640
Valenta	16V	7.7	8.5	132.2	61.1	100.1	18,437.1	1,640
Valenta	18V	7.7	8.5	143.9	62.3	101.2	20,659.3	1,640
Vega	12V	6.3	7.5	92.6	55.2	77.2	9,259.3	1,800
Vega	16V	6.3	7.5	122.7	55.2	77.2	11,419.8	1,800
VP185	12V	7.3	7.7	116.8	57.2	78.9	15,321.9	1,950

RUSTON DIESELS LTD.

Circle 72 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
6RK215	6L	8.47	10.8	102.3	58.3	84.5	6,605	1,000
8RK215	8L	—	—	96.2	67.2	106.1	8,800	—
6RKC	6L	10.00	12.01	171.3	60	102.8	12,110	1,000
8RKC	8L	—	—	135.9	65.0	109.3	14,210	—
12RKC	12V	—	—	189.9	72.1	107.3	19,290	—
16RKC	16V	—	—	203.6	72.1	105.3	23,860	—
6RK270	6L	10.6	12.01	158.3	78.4	110.3	13,000	1,000
8RK270	8L	—	—	208.8	66.9	120.1	17,500	—
12RK270	12V	—	—	197.3	82.7	114.2	22,000	—
16RK270	16V	—	—	220.6	80.7	120.1	26,000	—

SCANIA MARINE DIESELS

Circle 59 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
DS9 (208)	6L	4.5	5.4	52.4	29.7	42.7	1,929	1,900
DS9 (245)	6L	4.5	5.4	53.2	30.9	43	1,973	1,900
DSI9 (286)	6L	4.5	5.4	55.6	30.9	42.6	1,984	1,900
DS11 (311)	6L	5	5.7	61.3	29.5	41	2,425	1,800
DSI11 (367)	6L	5	5.7	61.3	29.5	43.5	2,458	1,800
DSI14 (450)	8V	5	5.5	51.3	46.1	46.1	3,086	1,800
DSI14 (532)	8V	5	5.5	51.3	46.1	46.1	3,086	1,800

SEATEK

Circle 65 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
6-4V-9D	6L	4.8	5.1	60.6	26.9	40.5	1,631	2,650

S.E.M.T. PIELSTICK

Circle 68 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Weight (lbs.)	rpm
PA4-185V6	6-8	7.3	8.3	7,495.6 - 17,416.3	1,500
PA4-200V6A	8/12/16	7.9	8.3	12,125 - 22,046.0	1,500
PA5-255	5-18	10	10.6	20,943.7 - 191,359.3	1,000
PA6-280	6-20	11	11.4	30,864.4 - 79,365.6	1,050
PA6-880CL	6-20	11	13.8	33,950.8 - 88,184.0	750
PC2-6400	6-18	15.8	18.1	76,609.8 - 198,414.0	520
PC2-6 B400	6-18	15.8	19.7	110,230 - 286,598	530
PC4-2-570	6-18	22.5	24.42	359,349.8 - 723,108.8	429
PC4-2B-570	10-18	22.5	26	451,943-727,518	429
PC40L	5-10	22.5	29.5	295,416.4 - 551,150	375

ULSTEIN BERGEN USA INC.

Circle 66 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
BRM-6	6L	12.6	14.2	219	68.4	148.9	58,863	750
BRM-8	8L	12.6	14.2	260	73.2	156.2	79,365	750
BRM-9	9L	12.6	14.2	280.5	68.4	156.2	88,184	750
KRM-6	6L	9.8	11.8	152.6	50.6	114	27,998	750
KRM-8	8L	9.8	11.8	186	57.7	123.9	33,069	750
KRM-9	9L	9.8	11.8	201	56.5	123.9	36,816	750
KRMB-6	6L	9.8	11.8	152.6	50.6	114	27,998	825
KRMB-8	8L	9.8	11.8	186	57.7	123.9	33,069	825
KRMB-9	9L	9.8	11.8	201	56.5	123.9	36,816	825
KVM-12	12V	9.8	11.8	189.4	90.6	129	49,603	750
KVM-16	16V	9.8	11.8	227	90.6	132.6	61,728	750
KVM-18	18V	9.8	11.8	246	90.6	132.6	67,240	750
KVMB-12	12V	9.8	11.8	189.4	90.6	129	49,603	825
KVMB-16	16V	9.8	11.8	227	90.6	132.5	61,728	825
KVMB-18	18V	9.8	11.8	246	90.6	132.5	67,240	825

VOLVO PENTA NORTH AMERICA INC.

Circle 67 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
AD 31	4L	3.6	3.5	39.6	27.6	19.4	970	4,000
D 41	6L	3.6	3.5	48.9	26.9	19.4	1,124	3,900
AD 41	6L	3.6	3.5	48.9	27.6	19.4	1,146	3,900
KAD42	6L	3.6	3.5	48.9	31	19.5	1,195	3,900
TAMD 31	4L	3.6	3.5	45.2	27.1	19.6	848	3,900
TMD 41	6L	3.6	3.5	54.5	26.1	19.6	1,003	3,900
TAMD 41	6L	3.6	3.5	54.5	27.1	19.6	1,131	3,900
KAMD 42	6L	3.6	3.5	54.6	31	19.6	1,102	3,900
TAMD 61	6L	3.8	4.7	63.5	29.8	25.5	1,828	2,800
TAMD 62	6L	3.8	4.7	63.5	29.8	25.6	1,828	2,800
TAMD 71	6L	4.1	5.1	62	34.1	27.2	2,295	2,600
TAMD 72	6L	4.1	5.1	62	34.1	27.3	2,355	2,600

WARTSILA DIESEL AB

Circle 71 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
Nohab 25	6L	9.8	11.8	157.4	53.1	112.2	24,000	1,000
Nohab 25	8-18V	9.8	11.8	var.	var.	var.	var.	1,000

STORK WARTSILA DIESEL BV

Circle 128 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
F 240	6-9L	9.5	10.2	—	—	—	—	1,000
SW 280	6-9L	11	11.8	—	—	—	—	1,000
SW 280	12-18V	11	11.8	—	—	—	—	1,000
TM 410	6-9L	16.1	18.5	—	—	—	—	600
TM 410	12-18V	16.1	18.5	—	—	—	—	600
TM 620	6-9L	24.4	26	—	—	—	—	428
SW38	6-9L	15	19	—	—	—	—	—
SW38	12-18V	15	19	—	—	—	—	—

WARTSILA DIESEL OY

Circle 129 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
Vasa 22	4-8L	8.7	10.2	—	—	—	—	1,100
Vasa 22	12-16V	8.7	10.2	—	—	—	—	1,200
Vasa 32	4-9L	12.6	13.8	—	—	—	—	750
Vasa 32	12-18V	12.6	13.8	—	—	—	—	750
Vasa 46	4-9l	18.1	26.8	—	—	—	—	514
Vasa 46	12-18V	18.1	26.8	—	—	—	—	514

WARTSILA WICHMANN DIESEL AS

Circle 130 on Reader Service Card

Model	Cylinder	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Weight (lbs.)	rpm
6L28B	6L	11	14.2	—	—	—	—	600
8V28B	8V	11	14.2	—	—	—	—	600
10V28B	10V	11	14.2	—	—	—	—	600
12V28B	12V	11	14.2	—	—	—	—	600

WESTINGHOUSE ELECTRIC CORP.

Circle 141 on Reader Service Card

Model	Cyl.	Bore (in.)	Stroke (in.)	Dimension(in.) L	W	H	Wt. (lbs.)	rpm
S20	4	7.9	11.8	100.9	83.3	113.1	16,980	1,000
S20	6	7.9	11.8	130.2	83.3	113	20,950	1,000
S20	8	7.9	11.8	156.8	87.3	113	26,460	1,000
S20	9	7.9	11.8	169	87.3	113	28,670	1,000
AT25	5	9.9	11.8	118.8	65.8	89.4	21,600	1,000
AT25	6	9.9	11.8	141.2	68.2	89.4	26,240	1,000
AT25	8	9.9	11.8	180.6	71.1	89.4	33,080	1,000
AT25	12	9.9	11.8	165.9	81.6	124.1	44,540	1,000
AT25	18	9.9	11.8	202	93.4	124.1	55,570	1,000
ZA40S	6	15.8	22.1	274	112.2	166.3	130,100	514
ZA40S	8	15.8	22.1	341.8	112.9	182.5	172,000	514
ZA40S	9	15.8	22.1	369.5	112.9	182.5	189,600	514
ZA40S	12	15.8	22.1	299.1	135.6	194.8	224,900	514
ZA40S	14	15.8	22.1	329.8	135.6	194.8	253,600	514
ZA40S	16	15.8	22.1	367.5	165.1	198.8	291,060	514
ZA40S	18	15.8	22.1	398.2	165.1	198.8	318,700	514
RTA38	4-9	15	43.3	303.9	109.1	320.3	308,644	196
RTA48	4-9	19	55.2	397.7	135	313.0	650,357	154
RTA52	4-8	20.5	71	369.8	192.3	357.5	661,380	135
RTA58	4-9	23	66.9	477.1	194.6	390.5	1,036,162	134
RTA62	4-8	24.4	84.7	439.5	234.6	418.8	1,058,208	113
RTA72	4-8	28.4	98.5	512	254	483	1,609,358	97
RTA76	4-12	30	86.7	830	243.1	493	2,921,095	104
RTA84	4-12	33.1	94.6	906.2	261.4	534.9	3,858,050	95
RTA84C	4-12	33.1	94.6	920.6	250	532.7	3,747,820	100
RTA84M	4-12	33.1	114.3	921.3	278.5	572.5	3,979,303	81
RTA84T	5-9	33.1	124.1	696.6	287.6	589	2,877,003	74
Frame 5 (steam)				408.8	280.4	129.3	236,500	130

YANMAR DIESEL ENGINE (U.S.A.) INC.

Circle 70 on Reader Service Card

Model	Cyl.	Bore (in.)	Stroke (in.)	Dimension (in.) L	W	H	Wt. (lbs.)	rpm
6LY-UTE	6L	3.9	4.3	51.8	28.2	27.9	1,307	—
6CX-ETE	6L	4.3	4.9	63.3	26.5	39.1	2,183	—

Orders & Innovation Drive Propulsion Gear Manufacturers

Using recent orders—recieved and fulfilled—and technical innovation as a barometer, MR/EN has found that propulsion gear manufacturers, in general, have been busy in efforts to tweak product and service performance.

Drawing definitive conclusions or defining trends encompassing the broad universe of propulsion gear manufacturers would be presumptuous at best; inaccurate at worst. Instead, please read on to discover the moves manufacturers have made lately to optimize product performance.

For additional technical information on a particular manufacturer's product line, please circle the appropriate number on the Reader Service Card bound in this issue. For a complete listing of manufacturers and corresponding circle numbers, refer to the box on page 37.

Thrusters & Water Jets

Lips Jets, 100 percent owned by Lips BV of The Netherlands, engineers, markets and produces high quality water jet systems. Lips Jets' range covers the complete market demand, with units designed and built to match a shipyard's or operator's specifications. This level of customization is possible, thanks to a few special features on the units, including the location in-board of the thrust bearings, the proven cavitation characteristics of the adopted pump and the reportedly easy-to-use control system.

Lips waterjets are fabricated by welding in AISI 316 L stainless steel plates, a process which allows a light and resistant construction. Lips Jets is focused on fast passenger and car ferries on the commercial side, as well as naval ships and the leisure market.

MJP Waterjets' J500S-DD double drive propulsion system was shown by the Swedish Coast Guard to power 10 new vessels, which are being built by Karlskronavarvet in Sweden. MJP has previous experience supplying waterjet propulsion systems to the British Navy, the U.S. Army and Danish Farvandsvaesendet. The units were reportedly chosen for their efficiency in both forward and reverse, and the unit's patented flexible shaft coupling, which allows the drive shaft to flex without disturbing the tip clearance of the impeller blades. This arrangement allows the drive shaft to be directly mounted to the engine-mounted gearbox without the need of cardan shafts or support bearings.

MJP will deliver 10 complete shipsets of J500S-DD jet propulsion systems, including intakes, hydraulics and remote control system RMC-DD. The order is reportedly the largest placed for jet propulsion systems from a Swedish yard during the decade, and the order includes an option for three more shipsets during 1996.

Hamilton water jets are available to match most gasoline, high-speed diesel and gas turbine engines up to 3,000 kW. The HamiltonJet series of water jets is available in the HJ, HS and HM

(Continued on page 32)

Rolla SP Propellers supplied surface piercing propellers for this Trinity Marine-Built "XFPB" (Extra Fast Patrol Boat).

(Continued from page 31)

series models, for vessels of all different hull structures and sizes. The HJ series is a range of high efficiency, single-stage axial flow units. Offering a large number of models and impeller rating combinations allows these jets to be directly driven by all common gasoline and marine diesel engines up to 1,200 kW in high speed craft, eliminating the need of a gearbox. The HS series is a range optimized specifically for very high speed craft operating in the 45- to 60-knot speed range. The series features a multi-stage axial flow pump design. The HM series is an extension to the HJ series, is suitable for power inputs up to 3,000-kW, and designed for the propulsion of fast ferries, workboats and patrol boats in the 66- to 164-foot range.

Norway's **Brunvoll Thruster** has delivered more than 2,500 thruster systems throughout the world since 1965. Brunvoll was the supplier for the Finnyards-built Icebreaker *Fennica*, a vessel honored as an Outstanding Oceangoing Vessel of 1993 by *Maritime Reporter & Engineering News* (December, 1993). The company focuses on controllable and fixed-pitch bow and stern thrusters, azimuthing thrusters, complete drive system packages (both diesel electric and hydraulic) and related control systems.

Also featured on the *Fennica* were **Aquamaster-Rauma** propulsion units. Known worldwide for its Z-drive and winch systems, Aquamaster-Rauma recently formed a new company on the Gulf Coast to exclusively handle the marketing and distribution of its Aquamaster propulsion and Rauma deck equipment in the U.S. Headquartered in Metairie, La., Aquamaster-Rauma will be responsible for the distribution of Z-drives, ice-strengthened Z-drives and contra-rotating propeller drives.

Shipwrights recently introduced a new Twin Prop bow thruster system.

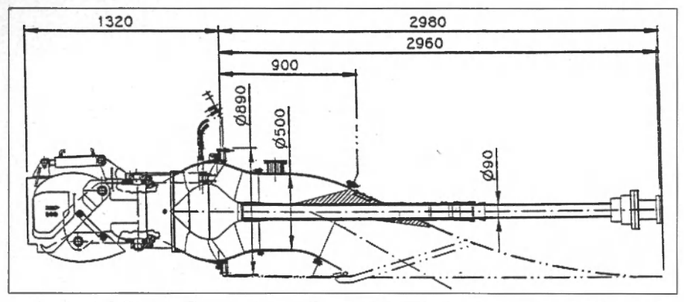
In addition, the Louisiana-based company will offer Aquamaster-Rauma's experience in vessel design concepts which optimize the propulsion system. Within the last year in the U.S., Aquamaster-Rauma has sold Z-drive systems for a multipurpose tug under construction at Nashville Bridge and the $60-million overnight passenger ship *American Queen* being built at McDermott Shipyard.

The Nashville Bridge project, the twin screw 6,000-hp tug *Kinsman Hawk,* will be the most powerful Aquamaster tug delivered to date.

Shipwrights Inc. recently unveiled a new Twin Prop bow thruster, a system the manufacturer claims can exceed the effective use of 10-hp in an eight-inch tunnel, and in fact effectively use up to 50-hp in an eight-inch tunnel.

Shipwrights claims that since the system is only about one-fourth the size of that required by systems of comparable power, the openings can be located lower and further forward in most hulls, resulting in greater leverage, while maintaining hull integrity and hydrodynamic efficiency.

The tunnels are constructed of GRP composite, aluminum or steel.



(To the left): A technical diagram of the MJP Water Jet J500S.

A special Stator Screen is available with the eight-inch system to keep debris out of the tunnel.

The thruster system, which feature twin NiBrAl propellers, is available in 25- to 50-hp models for boats in the 40- to 100-foot range, while boats in the 100- to 200-foot range can be accommodated using multiple tunnels, the manufacturer claims. For corrosion protection, each Twin Prop unit is constructed using 316 L stainless steel housings and propeller shafts.

Schottel Pump-Jets and propulsion units have proven ideal for use in a variety of vessels. Recently, the *Mare Azul* of the Sines port authority in Portugal was equipped with two Schottel Pump-Jets, type SPJ 22. One pump-jet was installed in the bow and one in the stern. The Schottel Pump-Jets reportedly give the *Mare Azul* exceptionally high maneuverability, while allowing the boat to operate in extremely shallow water. Schottel propulsion units have also proven effective for use in a minesweeper and a research vessel.

The types of propulsion used in the vessels, SRP 300 E in the minesweeper and SRP 3030 LS in the research vessel, are new designs by Schottel.

Schottel designed the SRP 300 E with the goal of minimizing noise emission. The actual generation of sound is reportedly minimized by using hypoid gear trains in the underwater gearbox.

Development of the SRP 3030 LS was prompted by the demand for a rudder propeller rated at 3,000 kW and optimized from the point of view of sound emission.

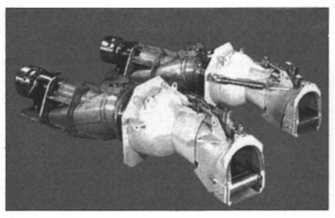
The use of high-performance materials such as GRP and polyamide for the hydrodynamic optimization of the underwater part of the unit, and the tractor-type propeller, all play a major role in reducing flow-induced noise generation.

KaMeWa offers an extensive product range, including thrusters, water jets (tunnel and rotatable) and controllable- and fixed-pitch propellers. The company designs and manufactures cp and fp propellers of all types from conventional propellers to highly-skewed propellers for low vibration/pressure pulse levels and quiet running. A technical leader in the water jet field, the company has supplied water jet units rated as high as 27,880-bhp, and by the end of 1993, the aggregated power of KaMeWa's water jets amounted to 1.4 million bhp.

Thrustmaster of Texas, Inc. has found a hot market in supplying Z-drives and tunnel thrusters to the casino boats currently being built in Louisiana. To date, ten 600-hp Z-drives (two per vessel) have been supplied, along with four 450-hp tunnel thrusters. Controls include full follow up controls for the Z-drives. The company is currently negotiating to supply thrusters for a second series of vessels, the specifications of which call for 700-hp Z-drives with automatic hydraulic kick up of the outdrive leg.

Another company which supplies both thrusters and water jets is **North American Marine Jet, Inc.** The company builds two different types of marine jet propulsion systems. Nomera 12-14-20 units cover gasoline or diesel engines from 140- to 800-hp and are designed for ves-

(Continued on page 34)



(Continued from page 33)

sels from 16- to 90-feet, attaining speeds of 20 to 50 knots.

The Traktor jet units from North American Marine Jet operate at 100- to 600-hp and are for vessels from 17- to 150-feet, attaining speeds from five to 20 knots.

(To the left): Lips water jets

Propellers

Known worldwide for its propeller production, **Bird-Johnson Co.** now offers water jets from 400 to 9,000 kW, built under license from MJP Marine Jet power.

The units reportedly offer high efficiency, low vibration and feature advanced reversing/steering & control systems.

Bird-Johnson also offers intermediate controllable pitch propeller systems from 500 to 5,000 hp, systems which were designed for affordability and ease of installation and servicing.

On the inland front, Bird-Johnson offers the "New Generation" Workwheel Series, a five-blade propeller designed to optimize the performance of workboat wheels. The New Generation series—which incorporates technology routinely used in the design of large commercial and military propellers, the company announced—features: .60 blade area ratio, approximately; optimized variable pitch distribution; and nonlinear blade skew.

The bottom line benefits according to the manufacturer: a two to five percent increase in propeller efficiency; approximately 50 percent reduction in ship vibration levels due to propeller-induced unsteady hull pressure; and an approximately 50 percent reduction in ship vibration levels due to propeller-induced unsteady shaft forces.

Another propeller manufacturer with a well-established reputation is **Rolla SP Propellers**.

The company is presently involved in a number of fast propulsion and propeller system projects, custom designing and manufacturing surface piercing propellers for military projects such as: the Trinity Marine-built "XFPB" for the U.S. Navy and Mexico; Peterson Builders' "US Navy Mk V" Cougar Cat; McDonnell Douglas' "Magnum 40;" and Swede Ships' "Swedish Customs."

Voith Schneider America, Inc. touts not only its vast array of products, but also its pre- and after-sales service.

The company offers engineering, production, R&D, testing, consulting, supervision, sales and after sales service of the Voith Schneider Cycloidal propulsion system.

Suitable for a wide range of vessels—oil skimming tugs, shuttle ferries and oceanographic vessels to name a few—the Voith Schneider cycloidal system is known for many positive traits.

Named manufacturer of the year in 1992 by Hatteras Yacht for its work on N/C machined propellers, **Michigan Wheel** utilizes fully-integrated CAD/CAM to all ISO propeller tolerances. Aside from its line of thrusters and propellers, Michigan Wheel also offers the Towmaster Rudder System and nozzles.

Sound Propeller features a product line complete with shafting, nozzles, bearings and shaft accessories. Sound Propeller also uses computer technology to analyze and design propellers for optimum efficiency.

The company offers its own standard configurations, and can manufacture its own or supplied custom designs to meet the needs of a specific vessel.

The company also offers field repairs.

135 Foot Crew Utility Boat

241 Foot Tow Boat

82 Foot Extra Fast Patrol Boat

220 Foot Supply Boat

200 Foot, 10,000 BBL Tank Barge

467 Foot Double Hull Tank Barge/127 Foot Tug

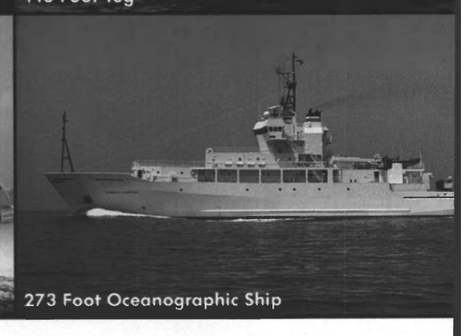
208 Foot Oil Recovery Ship

Need A Vessel?

140 Foot Tug

97 Foot Motoryacht

189 Foot Casino/Excursion Boat



273 Foot Oceanographic Ship

Trinity's Probably Already Designed And Built It.

Since the 1800's, our 13 shipyards have designed and built over 14,000 ships, boats, and barges. Name the type of vessel you need, and we've probably already designed and built many. You can use one of our designs, modify one, or let us design to your specifications. And we meet the requirements of worldwide regulatory agencies.

We employ leading edge technology in design and construction, and are backed by the financial strength and stability of our parent company, Trinity Industries, Inc., a "Fortune 500" company.

Because of our high quality and on-time deliveries, we have built vessels for 27 foreign nations, scores of private customers, and the U.S. Navy, Army, Air Force and Coast Guard. We also have five dry docks for ship repair, overhaul and conversion.

No other shipbuilder can match Trinity's experience in building such a wide variety of vessels in steel, aluminum and GRP. We can, and want to build your next vessel.

TRINITY MARINE GROUP

Trinity Industries, Inc.

13085 Industrial Seaway Road, Gulfport, MS 39503 USA
Tel: 601-896-0029, Fax: 601-897-4828, Telex: 6821246, Cable: HALMAR, Easylink: 62218740

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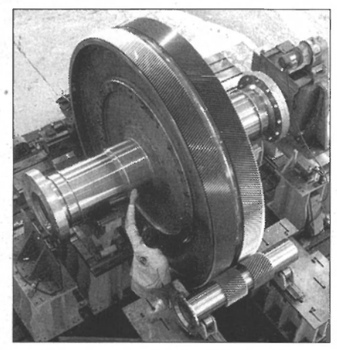


A 50-ton crane capacity allows Cincinnati Gear to manufacture very large components, such as this 52,000-hp (39,000-kW), 140-rpm unit.

Gears

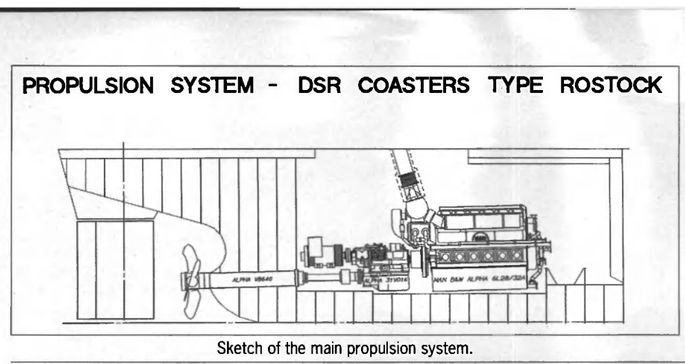
The **Cincinnati Gear Company**, well-known for its marine reduction gears for military and commercial applications, has drawn upon its extensive gas turbine experience to develop the "MA" series of gearboxes. These include a variety of parallel shaft and epicyclic gearbox designs for gas turbine applications of 1,000-hp and up. The gearboxes feature modular construction which permits them to be configured in a variety of turbine-only or turbine diesel (CODOG and CODAG) arrangments.

Chosen for a 19,720-kW Ro/Ro ferry project were **MAAG** type MG-150 W/P gearboxes. Two of the gearboxes transmit the total 20 MW power developed by the Wartsila Diesel engines to two variable pitch KaMeWa propellers, to give the 538-foot ship a speed of about 22 knots. Each main gear train consists of two pinions that engage with an eight-foot diameter bull gear. Each gearbox weighs 25 tons complete with lubrications system.

All rotating parts run in MAAG plain bearings. Additional PTO layshafts drive on-board generators with an output of 1.6 MW. Integral tilting pad thrust bearings with a thrust collar on each side of the bull gear take up the propeller thrust. The axial thrust is therefore transmitted directly from shaft to casting, and hence to the foundations, resulting in a minimum of friction losses. MAAG gearboxes were chosen recently for another high-profile project, the building of the largest catamaran ferry ever for Stena. For the project, MAAG will supply a split power PROPJET Gearbox System Type HPG-185/C system.

FOR MORE INFORMATION

For additional, detailed technical information on the products of any of the companies reviewed in this story, circle the corresponding number on the Reader Service Card bound in this issue.



Sketch of the main propulsion system.

PROPULSION UPDATE

Sixth MAN B&W-Powered Ship For DSR Christened *Frischland*

The M/S *Frischland* is the sixth of a 999-grt coaster series built by Slovenske Lodenice A.S. (Komarno, Slovakia) for Deutsche Seereederei Rostock GmbH (DSR).

The first three vessels of the series—the *Rugen, Hiddensee* and *Poel*—are currently operating in the U.S. and Mediterranean trade. The fourth vessel, the M/S *Usedom*, was commissioned in November, and the fifth vessel, the M/S *Vilm,* was commissioned at the end of last year.

Each of the vessels measures 288 feet with a 42-foot breadth and an 18-foot draft and has a 168-teu container capacity.

THE PROPULSION

All of the vessels are powered by a MAN B&W Alpha four-stroke medium-speed propulsion package manufactured at MAN B&W's Frederikshavn Works in Denmark. The package consists of a MAN B&W 6L28/32A-D main engine, an Alpha 31VO16 reduction gear, an Alpha

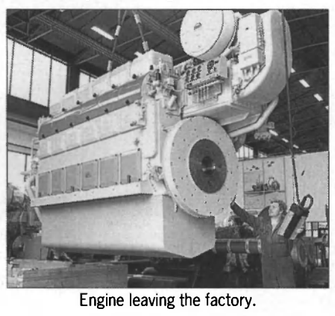

Sistership M/S *Poel* off of Istanbul, Turkey.

VB640 propeller and an Alphatronic control and safety system.

The main engine, rated at 1,020 kW at 760 rpm (max. 1,470 at 775 rpm) operating with diesel oil drives an 8.2-foot four-bladed controllable pitch propeller via a 1:3.1 vertical offset gearbox. The main engine, which is delivered with a complete starting air compressor package, is air-motor started direct on flywheel, constant pressure turbocharged, wet sump lubricated and fresh water cooled via a centralized system with plate coolers connected to twin Bloksma box coolers.

Electrical power is supplied via two generating sets based on 230-kW high-speed MAN engines, type D2866LE.

The propeller system, complete with blades (NiBrAl) monoblock hub shafting and oil lubricated stern tube, together with the reduction gearbox and main engine, is controlled by the Alphatronic remote


Engine leaving the factory.

control and safety system. The entire package is classed to Germanischer Lloyd (GL) requirements notation AUT for unmanned machinery.

All of the above mentioned vessels are equipped for operation by a crew of 10, and GL-classed. Additionally, the last three vessels are built and classed to GL E2 ice class requirements.

During the last few years, the six-cylinder version of the 28/32A engine series has been one of the best selling models built at MAN B&W Alpha, the manufacturer reports, accounting for approximately 38 percent of the deliveries, to date. Worldwide sales of this 11-inch (28 cm) bore, 12.6-inch (32 cm) stroke engine generation, including licensees production, equals more than 1,735 engines, with 1,630 operating as marine engines.

Frischland Particulars

Length	288-feet (87.9 m)
Breadth	42-feet (12.8 m)
Depth (to main deck)	23-feet (7.1 m)
Draft	18-feet (5.5 m)
Capacity (at 5.5 m draft)	3,650-dwt
Container Capacity	168 teu's
Propulsion Configuration	Single Screw
Speed (at 1,020 kW)	10 knots ballast
Speed (at 1,470 kW)	11.7 knots ballast

Density-Specific Gravity Control Available For Fuel And Diesel Engines

Automation Products, Inc. of Houston, Texas offers the Dynatrol™ System, designed for measurement and/or control of density-specific gravity for fuel and diesel engines and gas turbines. Response is reportedly immediate and continuous. The company claims the system is simple, rugged and accurate.

Kvaerner Builds Diesel-Electric Icebreaker, Renovates Russian Vessel

The M/S *Rossiya*, a Russian river-passenger vessel to be modernized at Kvaerner Masa-Yards' Turku New Shipyard.

Kvaerner Masa-Yards' Helsinki New Shipyard has received an order for a river icebreaker for the Austrian Osterreichische Donaukraftwerke AG. The vessel, to be delivered in spring 1995, will operate in assisting river traffic and break ice formations at the power stations in the Danube river.

The new icebreaker has a shallow draft (only 6.5 feet). In spite of this, the vessel can break more than two-foot-thick level ice in continuous mode of operation. This is the result of extensive development work, done at Kvaerner Masa-Yards Arctic Research Center. The vessel will be equipped with two azimuthing electric propulsion drives. The new "Azipod" propulsion system has been jointly developed by Kvaerner Masa-Yards and ABB Industry in Finland. The ice trails of the vessel will be made in the Baltic in winter 1995.

The icebreaker is about 139 feet long with a breadth of 33 feet.

The contract is worth about $4.3 million. Kvaerner Masa-Yards has also signed a contract with A/O Rechflot for the modernization of a tourist and charter vessel, owned by the Moscow River Shipping Company. The contract is worth nearly $5 million. The vessel to be modernized is the nearly 20-year old river-passenger vessel M/S *Rossiya*. The vessel has already arrived at the company's Turku New Shipyard, where the conversion will take place.

The contract covers the refurbishment of the entire interior spaces. The luxury cabins, saunas and pantry will be replaced. The work will be completed during the spring of 1994. The M/S *Rossiya* is 274 feet long, with a breadth of 42 feet and draft of eight feet. She is able to travel at 15 knots.

Companies In Southern Region Of U.S. Adjust Product, Market Focus To Remain Competitive

Marine industries situated in the south U.S. are indicative of the maritime business in other regions of the country: buoyed by niche markets—the casino gaming vessel market a prime example—and making strides towards providing an economical, internationally viable product and service to burgeoning commercial markets in the face of declining Navy markets. The following is an update on the activities of a few manufacturers.

Cospolich Refrigerator Co., founded in 1937, has long been a leading manufacturer of stainless steel marine refrigerators, freezers, combination units, undercounters and other related marine equipment. Cospolich counted on the U.S. government, as did many other manufacturers of marine equipment, as a prime market for many years. But in the face of a changing market, the company realized it must adjust to prosper, and adjust it did.

After 10 years in development, Cospolich launched its modular unit line: a refrigeration line designed to meet the needs of naval and commercial new construction, as well as keep replacement costs down in the repair market. The units, which can be disassembled with the use of a common ship's tools and by ship's personnel, can be installed without modifications to bulkheads or hatchways.

A company which has taken advantage of the booming gaming vessel market is Insulations, Inc., an insulation and interior finish contractor. The company recently finished work on the Leevac Shipyards-built *Players II* riverboat casino, a vessel which was designed by Rodney E. Lay & Associates; interiors are by Directions in Design, Inc.

Insulations Inc. was chosen by Leevac Shipyards to be the major specialty contractor for the vessel, and the company was involved in the installation of fire boundary, thermal, acoustical, mechanical system, engine exhaust and boiler stack insulations and interior finishes. The scope of the work performed by Insulations, Inc. included installation of joiners and sheathing for bulkheads and overheads, all windows and doors, interior and exterior (except watertight), and much more.

Another company which sees the potential in the gaming vessel market is Bohnet & Assoc., one of the area's fastest growing equipment and fabrication suppliers. Bohnet, with 23 years of experience in the marine market, offers a wide array of products including: Walter Machine keel coolers and gear drives; Red Fox Environmental sewage treatment and trash compactors; Olympic Foundry marine castings in bronze, aluminum and stainless; Nordic Machine deck equipment, anchor winches/windlasses; Mar-Quipt cranes, davits and boarding equipment; Eacco Marine windows, doors and seating; L.S. Baier cast aluminum and steel manholes and hatches; as well as a host of custom fabrication capabilities.

The Yards

Mention of the southern Marine Industries would be remiss without a look at some of the vessel builders which have helped to keep the area thriving. As coverage of every Southern yard is not possible within the confines of one article, please see the U.S. New Construction Update (starting on page 76) for complete

information on business in yards throughout the country.

The Trinity Marine Group (TMG) is comprised of 13 shipyards, together reportedly representing the largest shipbuilding capacity for small- to medium-size ship construction in the world. TMG is able to diversify its capabilities and tap a variety of markets, and the company builds commercial, military and pleasure vessels in steel, aluminum and composites. TMG also designs and builds a wide variety of barges, including double hull barges. Trinity shipyards, which have delivered more than 14,000 vessels, reportedly lead the U.S. in cycloidal propulsion vessels as well as diesel-electric vessels. Two of the company's designs are in the finals in the U.S. Navy's Mark V high-speed patrol boat.

Bender Shipbuilding & Repair Co. has grown to be one of the world-leading builders of mid-size steel and aluminum vessels. Bender builds a wide range of vessels, from tugs to riverboat casinos, and also offers topside and drydock repair. Bender was one of the first area shipyards to supply vessels to the riverboat casino market, and less than eight months after opening its Louisiana yard, Bender delivered the first riverboat casino to operate in Louisiana, the *Star Casino*.

Atlantic Marine-Mobile, Inc. specializes in major vessel repairs, conversions, retrofits, overhauls and regular drydocking for the commercial shipping industry. The yard is situated on the 45-foot deep Mobile River channel, with direct access to the Gulf of Mexico, and offers a 250,000-dwt and a 40,000-dwt dry dock, plus 5,000 feet of full-service quay space. Certified to ISO 9002 standards, Atlantic Marine's primary markets consist of tankers and bulkers trading in the U.S. Gulf, Caribbean and East Coast.

For more information on the companies in this story, circle the corresponding number on the Reader Service Card.

Atlantic Marine-Mobile	325
Bohnet & Assoc.	326
Bender Shipbuilding & Repair Co.	327
Cospolich Refrigerator Co.	328
Insulations Inc.	329
Trinity Marine Group	330

International Grating Offers New Brochure

A new full-color brochure from International Grating, Inc. describes fiberglass-composite products the company manufactures for vessels, offshore structures, dockside facilities and other marine applications. Among the products presented are nonskid gratings for walkways, platforms and decks, intake louvers and cable trays. Color photos show these products in actual applications. For a free brochure from Intl. Grating,

Circle 152 on Reader Service Card

New Video Examines Onboard Drill Procedures

The seventh videotape in the Marine Survival Equipment Training Program has been released by John Sabella & Associates, Inc. Titled *Conducting Onboard Drills*, the 17-minute instructional video is designed to assist vessel owners and operators in preparing their crews for coping with potential emergencies and meeting new federal regulations. It delineates the importance of crew preparation and practice in responding to potential emergencies, the role of the skipper or leader, mechanisms for developing emergency plans, and detailed procedures for conducting abandon ship and fire drills. For further information about the video,

Circle 153 on Reader Service Card

Riede Systems' LS-10 Tip Switch Certified By CSA

The LS-10 Tip Switch from Riede Systems, Inc. received certification from the Canadian Standards Association (CSA). The LS-11 Tip Switch, which only differs from the LS-10 by its ball and swivel mounting, also received CSA certification. The LS-10 can detect level changes in bulk solids, liquids and slurries, and operates without mercury. For more information,

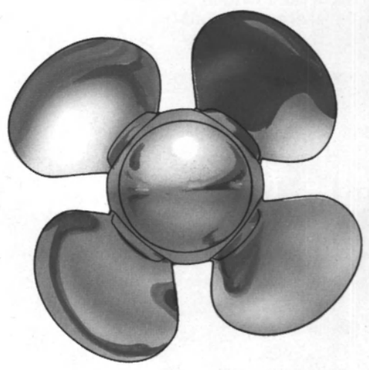
Circle 110 on Reader Service Card

From propeller pioneers to Propulsion by KaMeWa

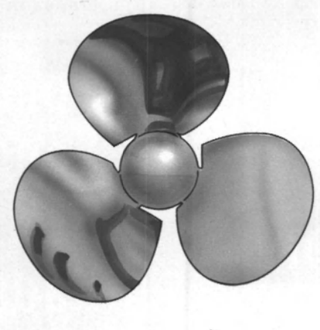
Swedish-born inventor John Ericsson pioneered the practical application of the propeller. Following in his footsteps, KaMeWa then pioneered the development of the high-tech propulsion systems of today.

Whatever your priorities - speed, good manoeuvrability, high comfort, stealth properties, fuel economy, reliability, quality or world-wide availability of service - KaMeWa propulsion systems have more to offer.

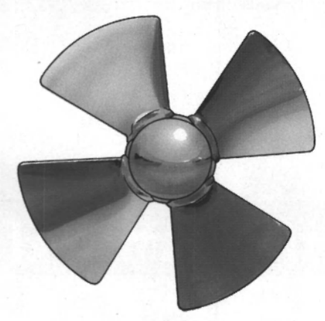
Propulsion by KaMeWa includes high-skew propellers of controllable pitch and fixed pitch designs, thrusters, water-jet units and the electronic controls that make the individual building blocks into an efficient propulsion system. So whatever your propulsion needs, KaMeWa has more to offer.



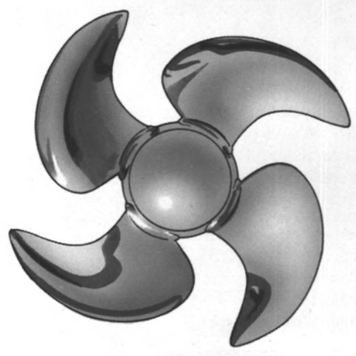
Propeller for multi-purpose cargo vessel for service in Arctic waters, conforming to the highest USSR strength class. (5.6 m diameter, 15400 kW, 17 knots)



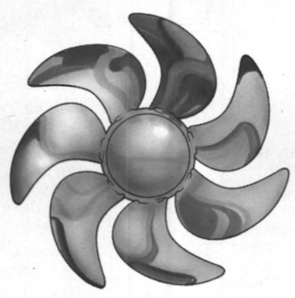
Super-cavitating propeller for a gunboat. (2.35 m diameter, 13250 kW, 31.2 knots)



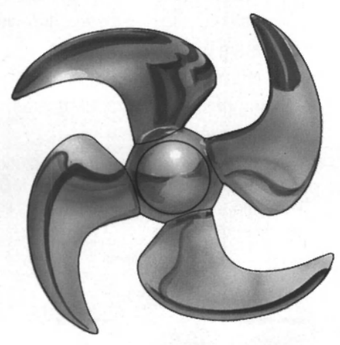
Tunnel thruster propeller with Kaplan blades. (1.1-3.3 m diameter, 310-3500 kW)



Propeller for car-passenger ferry. High-skew blade shape for low noise and minimized vibrations. (5.1 m diameter, 15640 kW, 23.2 knots)



Propeller for frigate. High-skew blades for silent operation. (6.3 m diameter, 35660 kW, 32.8 knots)

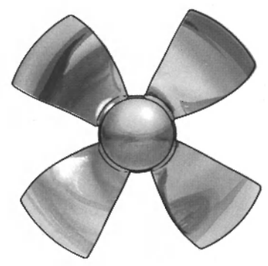


Propeller for cruise ship. High-skew type for low noise and vibration level. (5.2 m diameter, 11820 kW, 22.6 knots)

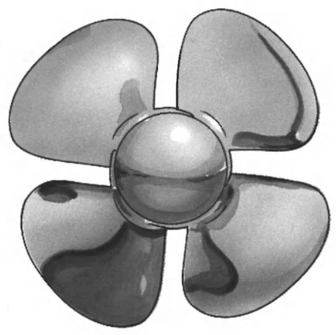
KaMeWa's Marine Laboratory provides unique facilities for comprehensive development work, as demonstrated by the selection of model propellers shown here.

*John Ericsson (1803-1889) led the practical development of the propeller and is regarded as its true originator. During the North American Civil War, he designed the Union ironclad 'Monitor' that emerged victorious from a battle with the Confederate 'Merrimack' on 9 March 1862.

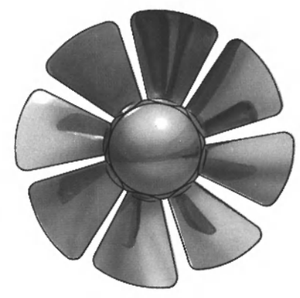
High-skew propeller for frigate, designed for silent operation. (4.2 m diameter, 19180 kW, 31.6 knots)



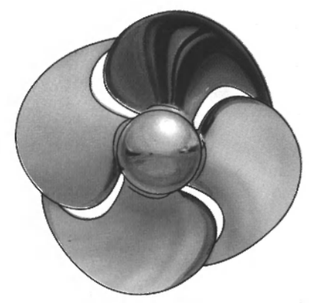
Propeller adapted for tip fins. Heavy duty propellers for trawlers, tugs and coasters.



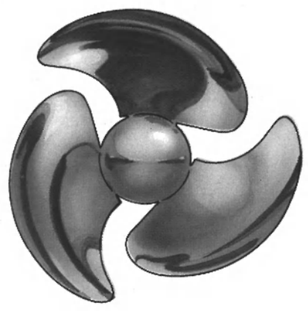
Propeller for car-passenger ferry. (5.0 m diameter, 26470 kW, 31 knots)



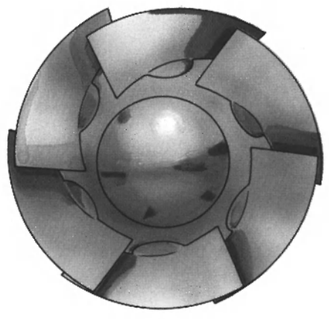
Experimental tunnel thruster propeller with 8 blades for silent operation.



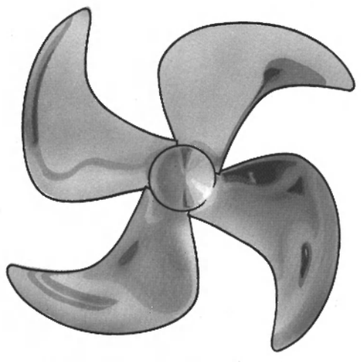
Tunnel thruster propeller with high-skew blades for silent operation. (1.1-3.3 m diameter, 310-3500 kW)



Propeller for patrol vessel. High skew type for low noise and minimized vibrations. (1.6 m diameter, 2030 kW, 24.5 knots)



Impeller for water-jet propulsion of 75 m yacht. One type 160 booster unit rated at 13800 kW, two type 112 units rated at 3680 kW for cruising, steering and reversing.



High-skew fixed pitch propeller for a chemical-tanker. (6.2 m diameter, 10.400 kW, 16,7 knots)

EXCELLENCE IN PROPULSION

KaMeWa

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Circle 235 on Reader Service Card

Bisso Wins Turnkey Platform Installation Contract

Bisso Marine of New Orleans, La. has been awarded a turnkey platform installation by the Offshore Group of Houston, Texas. The platform is located in the Mississippi Sound Block 71 in 15 feet of water. The jacket was set by Bisso Marine's Mobile-based 600-ton derrick barge *Lili Bisso*. The piles were driven by the 80-ton derrick barge *Big Eagle* with a hammer supplied by Conmaco of Belle Chasse, La.

Singmarine Delivers Tugboats Ahead Of Schedule; Wins $35 Million Shipbuilding Contract From Petroships

Singmarine Industries Limited (Singmarine) completed and delivered two harbor tugs to its owner, Keppel Smit Towage Pte. Ltd.

The $7.5 million contract to construct the vessels was completed ahead of schedule. They were the first to be built by Singmarine's subsidiary, Singmarine Dockyard & Engineering Pte. Ltd. for Keppel Smit Towage.

The tugboats, *KST 31* and *KST 32*, are powered by two units of 1,500 bhp Niigata diesel engines and a Z-peller propulsion system. Each of the 92-foot vessels has a bollard pull of 45 tons.

The primary role of *KST 31* and *KST 32* is mainly to assist in berthing and unberthing of ships in the port of Singapore. They will also be deployed for towage within port limits as well as coastal towage in Malaysia and Indonesia.

With *KST 31* and *KST 32*, Keppel Smit Towage's fleet of tugboats has grown to eight. In line with its regionalization efforts, the company currently has two tugs chartered out in Malaysia and two more to follow in early 1994. It is working on expanding its fleet both in the port of Singapore and other ports in the region.

Singmarine Dockyard & Engineering Pte. Ltd. has also recently signed a $35 million contract to build two product tankers for Petroships Pte. Ltd.

The contract is to construct two 6,500-dwt product tankers, each capable of carrying 7,800-cu.-meters of clean petroleum products.

The two tankers will be built in Singmarine Dockyard's 140,000-sq.-meter Main Yard. The vessels will be 361 feet long with a breadth of 57 feet, capable of running at a service speed of 12 knots.

The first vessel is expected to be completed in the first quarter of 1995 and the second vessel in the fourth quarter.

For more information on Singmarine,

Circle 340 on Reader Service Card

Zetec, SMIS In Joint Agreement To Expand Marketing Efforts In U.K.

Zetec, Inc., a developer and manufacturer of eddy current testing equipment, has signed a joint agreement with Surrey Materials Inspection Systems (SMIS) to hire a field sales manager to help bolster Zetec's marketing efforts in Western Europe. SMIS, based in England, is a manufacturer of ultrasonic testing equipment.

Zetec and SMIS have named **Fred Couch** as field sales manager to oversee the two companies' existing sales rep networks, effective January 1, 1994.

"By teaming up with a well-respected company like SMIS, we hope to significantly increase our market share in western Europe and provide customers with the same fast, reliable calibration and repair services we currently offer our U.S. customers," said **Bill Chevalier**, Zetec's marketing manager.

Mr. **Couch** has considerable experience in the field of non-destructive testing, particularly with eddy current instrumentation in the aircraft industry. Prior to his appointment as field sales manager, Mr. **Couch** worked for Staveley, British Aerospace and a variety of other NDT equipment manufacturers.

Zetec designs and manufactures hardware, software, probes and accessories for a variety of industries, including aerospace, power, HVAC and marine.

For more information on Zetec,

Circle 341 on Reader Service Card

Thomas Marine Delivers 27-Foot, Mercury-Powered Rescue Vessel To Calvert County, Md.

Thomas Marine recently delivered a 27-foot Emergency Service Vessel (ESV) to Calvert County, Md. The boat is trailerable and will provide emergency services to the Patuxent River and Chesapeake Bay sides of the Calvert County Peninsula. It was delivered completely equipped with electronics and rescue equipment.

The ESV-27's deep-V hull provides a soft ride with reportedly excellent high and low speed handling. Twin Mercury 175-hp outboard engines provide a top speed of 46 mph with five passengers and 100 gallons of fuel aboard. The new all-welded aluminum ESV is available in lengths of 27 and 30 feet. Inboard and outboard power is available in both models, as are diesel generator power and air conditioning.

In addition to more space in the cabin interior and on deck, adjustable deck rollers reportedly make medical board handling easy. Numerous pipe, safety and lashing rails are installed throughout the boat to enhance passenger and crew safety. All controls and electronic equipment are controlled from the helm chair. The radar, plotter and GPS are mounted on a unique swinging fixture that offers the captain or mate easy viewing and access. When not in use the equipment may be swung to a storage position behind the control console. Numerous pipe, safety and lashing rails are installed throughout the boat to enhance passenger and crew safety.

ESV-27 Equipment List

Engines	Mercury
Propellers	Mercury
Engine controls	Mercury
Steering	Hynautic
Coatings	Ameron
Fendering	Johnson Duramax
Hatches	Freeman Marine, Bomar Marine
Search Lights	Rayline
Gov't radios	Motorola
GPS	Micrologic
Plotter	Micrologic
Radar	Raytheon
Fathometer	Sitex
VHF	Standard Communications
Scanner	Unidine Bearcat
Flood lights	Hobbs Quartz

ABS Extends SafeHull System To Existing Vessels

American Bureau of Shipping (ABS) chairman **Frank Iarossi** announced that the class society's SafeHull™ System has been adapted for use with existing tankers. This application is now available to the marine industry. Later in the year it will be available for use with existing bulk carriers followed by other vessel types.

"We were very excited about the development and launching of the ABS SafeHull System last September," Mr. **Iarossi** said, "as it provided the industry with an innovative dynamic-based design and evaluation method for enhancing the structural safety of new tankers. But now, we are even more enthusiastic at being able to offer services for applying SafeHull to existing tankers."

The services are called ABS SafeHull Condition Assessment Services and will reportedly afford owners, operators, charterers, underwriters and others a new risk-management method associated with hull structures. "Through the SafeHull Condition Assessment Services, ABS can apply advanced dynamically-based strength criteria to assess the corrosion and fatigue state of a hull structure. Then, with this technical information, we can identify critical areas and make recommendations as appropriate for their enhancement. The result is a better performing, safer hull structure," said Mr. **Iarossi**. He also pointed out that the new ABS SafeHull Condition Assessment Services are available to all existing tankers, not just those under ABS class.

Hitachi Zosen Completes Superjet-30 Foil-Assisted Catamaran *Dougo*

Hitachi Zosen completed the *Dougo*, a foil-assisted catamaran in its Superjet-30 series, at its Kanagawa Works and delivered the vessel to Setonaikai Steamship Co., Ltd. (headquartered in Minami-ku, Hiroshima Prefecture) in December 1993. The vessel is commissioned in the Hiroshima-Kure-Matsuyama service, together with the *Zuiko* of Ishizaki Steamship Co., Ltd. The high-speed passenger vessel is the fourth of the seven Superjet-30 ships ordered from Hitachi Zosen last year. *Dougo* is about 103 feet long with a breadth of 32 feet, depth of 11 feet and draft of six feet. The vessel is able to reach speeds of about 38 knots and can carry 156 passengers. *Dougo* is equipped with a computerized rolling control device in its hydrofoils, with its control effectiveness proven by the excellent cruising performance of the series. *Dougo* is a hybrid-type vessel with twin hulls equipped with submerged hydrofoils fore and aft. The weight of the vessel is supported both by the buoyancy of the two hulls and the lift of the two hydrofoils. The features of the vessel also include a wide deck and spacious cabin unique to a twin-hull ship. Furthermore, the high-speed capability and fuel economy of a hydrofoil vessel are attained.

The computerized automatic control of the flaps attached to the hydrofoils reduces the ship-body motion to about one-eighth of that for an ordinary catamaran, thus ensuring greater passenger comfort.

Two diesel engines and two water jets, manufactured by Niigata Engineering Co., Ltd., ensure excellent maneuverability and uncompromised passenger comfort by minimizing noise and vibration.

Hitachi Zosen has to date produced more than 50 aluminum hydrofoil vessels, as well as patrol boats for the Maritime Safety Agency and a number of prefectural governments; super-deluxe motor yachts; and various types of sightseeing vessels.

Oceandril Ranger Returns To Market Under Contract To Chevron

Oceandril Partners, L.C. (OPLC) announced that the *Oceandril Ranger* has gone to work for Chevron USA, Inc. following recently completed retrofit and survey work. OPLC purchased the rig, formerly known as *Rio Grande Uno*, from a Norwegian KS company in late 1993.

Automated Tool Control System Delivers Savings To Shipyards

Locating the correct tool and managing tool costs has been achieved at many yards by a bar-code driven computerized tool control system called Automated Tool Inventory Control and Tracking System (ATICTS).

ATICTS has reportedly been installed in numerous U.S. shipyards including: Electric Boat; Bath Iron Works; NASSCO; Ingalls; Peterson Builders; Todd Shipyards; and the U.S. Navy Shipyards at Bremerton, Mare Island, Norfolk, Charleston, Philadelphia, Portsmouth and Guam.

ATICTS has several modules, including tool check-in and check-out, maintenance and test equipment tracking, calibration scheduling, and a purchase order system. It also monitors minimum and maximum inventory levels at each individual tool crib and for all crib sites combined. The guts of tool control and management revolve around the check-in and check-out process. The objective of a good tool control system is to have the right tool at the right place at the right time.

Most shipyards have multiple tool rooms with separate inventories. Without good information, the typical solution to having tools available where needed is to have each tool room have an excess inventory. Tool hoarding is another reason why shipyards have excess inventories. Tool shrinkage through theft and hoarding is almost eliminated by a good automated system.

Management at shipyards that use ATICTS report that the results of capturing the data are endless. The cost of all tools are entered into the system when building the files. Consequently, it is possible to know exactly how much tooling costs by employee, by department, by shift, by vendor, etc. These reports can be used to achieve the primary goal of tool control: having the right tool in the right place at the right time. However, a by-product of this control is tremendous cost savings.

General Dynamics reported $4 million of savings in just the first two years of use of ATICTS to the manufacturer. The U.S. Navy determined that this same system saved between 12 percent and 24 percent of tooling costs in its first year of use. In fact, every user of such a system reportedly realized a nine month or less full payback of all costs to implement the bar-code driven system.

For more information on ATICTS,

Circle 5 on Reader Service Card

Korte Joins Intergraph As Federal Marketing Manager

George Korte, P.E., joined Intergraph Corporation's Federal Systems Division as executive marketing manager. In this position, Mr. **Korte** is responsible for marketing Intergraph's facilities and natural resources solutions to federal customers. Prior to joining Intergraph, Mr. **Korte** was director, geographic information systems, for INET Inc., a Bethesda, Md. systems integrator. From 1988-1991, he was an independent consultant in geographic information systems (GIS). Mr. **Korte** is also the author of *The GIS Book*, as well as numerous articles about GIS and CADD.

Intergraph Corporation develops, manufactures, sells and supports computer systems for the Technical Desktop—the combination of compatible technical applications and personal productivity tools in a single desktop computer. Hardware products include workstations, servers, scanners and plotters. The company's integrated software applications are used for CAD, engineering, analysis, manufacturing, publishing, and earth sciences such as mapping/GIS.

For more information on Intergraph,

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Fifty Two $\frac{2}{52}$ Into Two Does Go

No other Drydocking system can make your Sales figures look like this. A total of 52 drydocking contracts being conducted simultaneously by just two Drydocks - or more correctly - by just two SYNCROLIFTS® with Transfer Systems.

You are looking at something which happens often - a SYNCROLIFT® owner who is so pleased by the first SYNCROLIFT® he bought, that he goes out and buys another, either at the same location (as in the above picture) or at another location. More than 60 SYNCROLIFT® owners have ordered their first installation and come back for more.

Why? Because today's shipbuilder has to be even more certain that his investment will yield returns, and the proven SYNCROLIFT® and Transfer System does just that. Not ony that, when you get a quote from SYNCROLIFT® we will quote you for all your needs and won't leave you with 50% of the problems to solve yourself, nor will we keep 50% of the costs hidden in order to give you a false price.

SYNCROLIFT® will give you a proven system based on our 37 year track record of 200 installations in 64 countries around the world. Our field - proven concept uses the very latest patented state of the art control techniques which means that your SYNCROLIFT® and Transfer System can be used as a design tool for your Naval Architect as well as performing as the finest Drydocking system available to you today.

Look to the system that can give you more than 50 drydocking contracts all at one time!!!

200 operators around the world can't be wrong, but you could be if you ignore figures like these. Contact SYNCROLIFT® today to find out how to make our math work for you.

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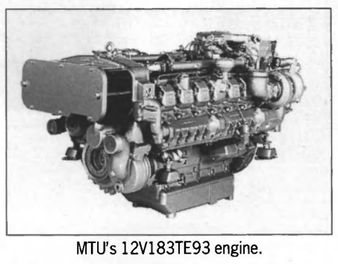
MTU To Debut Uprated 183TE93 At Miami Show

At the Miami International Boat Show MTU will introduce an uprated version of the 183 series of engines originally introduced in 1989, targeting the production and mid-size motor yacht market. And to round out its product range in the active market up to 1,600 hp, MTU will emphasize its 12V331, an engine designed for compact, lightweight power density.

The 183s introduced many of the high-tech innovations later incorporated into MTU's 396TE Series. Now the 183 has adopted features from the 396TE: split-circuit cooling system and a triple-wall exhaust system — and the 6R183TE93, 8V183TE93 and the 12V183TE93 have been uprated to 600 hp, 767 hp and 1,150 hp respectively. The new 183 also uses a heat exchanger with titanium plates that reportedly will not corrode, and a waste-gate turbocharger which provides more air for improved combustion and operational efficiency, and lower gas emissions for environmental friendliness. MTU will continue to offer the current TE92 ratings for the 6R, 8V and 12V at 500, 665 and 1,000 hp in a new, lower-profile package, providing builders with a wide choice of power options.



MTU's 12V183TE93 engine.

MTU also presents a new version of the 331 Series — the 12V331KS. The 331 is a "non-electronic," short-stroke version of the 396. Rated at 1,600 hp, the engine is available with VDO-type monitoring for simpler installation and greater flexibility for production builders. The 331KS is also fresh-water aftercooled, eliminating a major cause of possible unreliability.

For more information on MTU,

Circle 144 on Reader Service Card

RGF Debuts Portable Oil/Water Separator

RGF's new portable oil/water separator.

RGF Marine Environmental Technologies offers a new portable oil/water separator designed for quick response spill clean-up, fuel farms, marine bilge water treatment, tank clean out and more. The handcart-mounted system has a diaphragm pump operated with a self-contained 12-volt battery and a float switch for automatic operation. Free oil is automatically discharged to an oil reservoir for easy disposal. For more information on RGF Marine Environmental Technologies,

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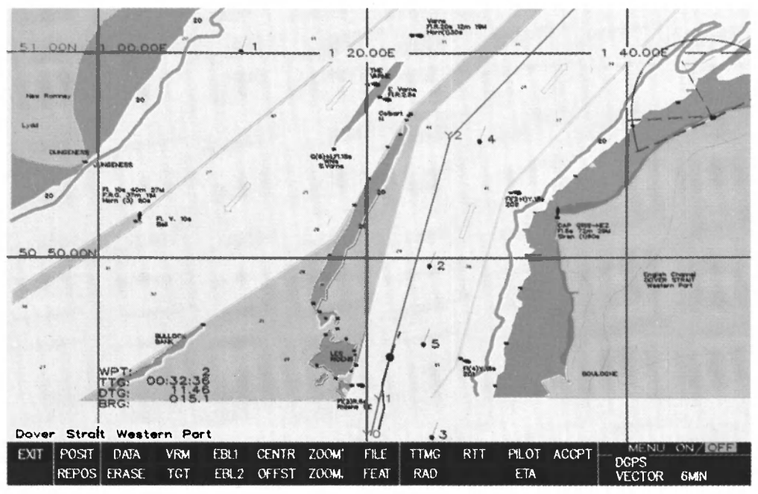
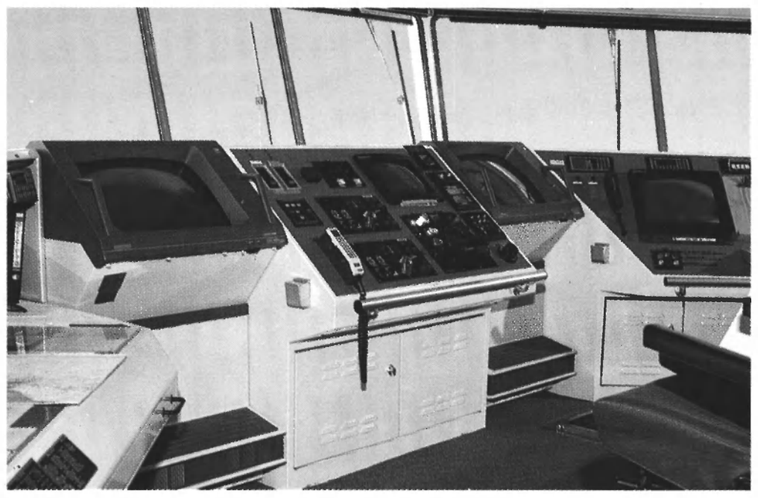
Increased Safety & Reduced Cost

Meeting the two goals of today's bridge integration!





Increased Safety

Eighty percent of vessel groundings can be avoided by improving navigation information, monitoring the vessel's advance and increasing the watch officer's effective conning time. This fact is the driving force behind Sperry Marine's integrated bridge design.

Our bridge design increases the watch officer's effective conning time by automating appropriate bridge tasks, enhances navigation information and control by fusing important data and control functions into centralized work stations and monitors the vessel's advance, alerting the watch officer to off-track conditions and approach to hazardous waters. The result is a substantial improvement in navigation safety.

Reduced Cost

Increased navigation safety means greater operating flexibility and reduced operating costs. By supporting minimum manning levels (DnV W-1, Lloyds LNC, ABS) and bolstering fuel savings, Sperry Marine's Integrated Bridge brings strong economic benefits to owner and operator.

Shipbuilders save on construction costs with Sperry Marine's turnkey integration approach and drop-in bridge modules.

The Sperry Marine Integrated Bridge is a proven system, installed on over 100 vessels including tankers, container ships, cruise ships, ferries, high speed craft, research vessels, private yachts and naval vessels.

For further information on this and other Sperry Marine products contact:

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WaveMaster: Offering Speed & Safety In One Package

MTU Powers Fully-Loaded, 175-Ton Ferry To 46.5 Knots

WaveMaster International has found its niche in the production of high-speed, high performance aluminum craft, and offers customers a wide selection from which to choose.

The WaveMaster-built Nansha 18 fast ferry, a 175-ton, 386-passenger vessel built for the Panyu Nansha Port Passenger Transport Co. of Hong Kong, reportedly travelled 46.5 knots during trials, fully-loaded, exceeding its specified speed by a full three knots.

The 138-foot vessel is one of the latest catamarans from the WaveMaster stable of aluminum craft.

The power behind the performance is provided by four series 396 MTU 16V engines driving four KaMeWa 635 waterjets through Reintjes VLJ 930 gearboxes.

The engines are mounted in tandem on the two hulls, and are arranged to allow service in the event of an engine shutdown or maintenance.

Nansha 18 can achieve a fully-loaded speed of 36 knots on three engines. The Nansha 18 is also built for comfort and safety, featuring an aircraft-style interior incorporating a noise dampening system. The wheelhouse of the vessel includes a specially upgraded Vistar night vision system with two monitors to facilitate navigation through busy waterways. An additional safety feature is an extra Bremshey seat—four instead of the usual three—to maximize good vision in the dark.

Peng Jiang Challenge: High Speed, Low Wake

The Jiangmen Hong Kong-Macau Joint Passenger Transportation Co. specified a vessel with maximum speed and minimum wash, so it could negotiate some of China's inland waterways without causing damage to riverbanks and small craft. The result: the 113-foot *Peng Jiang*, a 193-passenger, 40-knot vessel. Marking the fourth vessel WaveMaster has built for the Jiangmen operator, the vessel required the WaveMaster design team to devise a vessel which had no more than 15.8" in wave height. Months of design work, balancing between high speed and low disturbance, resulted in a vessel which reportedly beats the specifications comfortably at full speed. The *Peng Jiang* is constructed of Marine Grade aluminum and powered by a pair of series 396 MTU 16V engines, driving KaMeWa waterjets through ZF gears.

Super Flyte Garners Design Award

In October, WaveMaster won a design award in the 1993 Western Australian Industry and Export Awards, for its entry, the 550-passenger *Super Flyte*.

The 146-foot monohull vessel is powered to 27 knots by a pair of series 396 MTU 16V engines, and was delivered to Boat Torque Cruises in early 1993.

Features which helped earn the award include a wave control system, a system developed by WaveMaster with the assistance of Maritime Dynamics at the company's Henderson Shipyard. The effect of the computer-operated hydraulic system, which includes four large lifting surfaces at the ship's transom, has been to reportedly reduce the vessel's rolling by 65 percent and pitching by 35 percent.

The vessels also sports a new window application in which the glass panes are fixed directly to the superstructure with a special adhesive, making the normal fixtures of frames, screws or rivets unnecessary, while reportedly minimizing corrosion and maintenance.

For additional information on the capabilities of WaveMaster,

Circle 76 on Reader Service Card

Aanderaa's Coastal Monitoring Buoy: Accurate Weather At 6 To 8 Km

Coast guards, harbor authorities, research institutions, offshore industry and others interested in immediate, accurate data on coastal conditions now have a new product available to them: the Coastal Monitoring Buoy 3280 from Aanderaa Instruments A/S. Currently undergoing one year of rigid testing outside Bergen, Norway, it is intended for use along the coast, outside harbors and by offshore installations. It can be moored into a fixed position from a small boat and operates on solar power.

The Coastal Monitoring Buoy measures waves, currents, temperatures, wind velocity and barometric pressure. It may also be equipped with other sensors for special user requirements. The buoy transmits data by VHF radio signals with a range of 6 to 8 kilometers in line of sight. On shore or aboard a ship or offshore installation, the data is made computer compatible for flexible use. The data can also be presented as a voice message. Readers are encouraged to test this feature by dialing +47 55 131006 for a real-time update on the coastal conditions outside of Bergen, Norway.

For more information on the Coastal Monitoring Buoy from Aanderaa Instruments,

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Comsat Inmarsat-C Service Available In Atlantic Ocean Region-East

Comsat Mobile Communications announced that its Inmarsat-C data service, called C-Link™, is now available in the Atlantic Ocean Region-East by choosing land earth station "101." The new ocean region coverage will expand Comsat's service into Eastern Europe and Africa, as well as much of the Middle East.Comsat's C-Link service is an enhanced version of the store-and-forward Inmarsat-C service that provides text and data messaging using small, inexpensive Inmarsat-C satellite terminals available in maritime, aeronautical, vehicle-mounted and portable models.

The Comsat C-Link service allows Inmarsat-C-equipped customers to send messages to fax machines and provides access to more than 60 electronic mail systems worldwide from anywhere in the world.According to Comsat, uses of C-Link include vessel or vehicle tracking and monitoring, receiving weather reports, remote monitoring and control, and ship management functions. In addition, the C-Link service meets the International Maritime Organization's requirements for the Global Maritime Distress and Safety System.

For more information on Comsat,

Circle 163 on Reader Service Card

Norwegian-Based TTS Signs Contracts With Shanghai Shipyard, German Shipyard

The Norwegian company TTS has signed a contract with the Chinese yard Shanghai Shipyard for the design and delivery of a one side welding station and modernization of an existing panel production line. The investment will enable Shanghai Shipyard to increase both productivity and capacity as well as quality.

Furthermore, TTS has signed a contract with the German yard Elbewerft Boizenburg GmbH for the design and delivery of a profile cutting line and upgrading of an existing panel production line.

The contract will be carried out by TTS's subsidiary company in Rostock, TTS GmbH. TTS has been a major supplier of technology to the shipbuilding industry since 1971 and more than 120 production lines have been installed in shipyards worldwide.

For more information on the Norwegian-based TTS,

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USA Catamarans Debuts Its Foil-Assisted Planing Catamarans

USA Catamarans, Inc., of Fort Lauderdale, Fla., introduced its line of high-performance planing aluminum catamarans, all of which are foil-assisted with the foils reportedly carrying in excess of 50 percent of the total weight. The first vessel built by the company is the 65-foot *Harbor Bay Express II Alameda*, a vessel which was due for delivery to the City of Alameda on San Francisco Bay at press time. The vessel, powered by MAN D2842LYE engines, is designed to shuttle commuters between Alameda and San Francisco, a distance of approximately seven miles. This is the Andromeda Class catamaran design, which has asymmetric demi-hulls with one main foil between the hulls. Canards at the forward step and flaps at the aft step are hydraulically operated with trim controls to optimize planing angle. The main engines, rated 1,000 hp at 2,300 rpm, drive France Helices four-blade surface props through ZF 165PI gears. Full load speed is 30 knots, and the vessel was designed for partially protected waters and Sea State 3 (for the 65-foot Cats). The pilot house is arranged like an aircraft cockpit, with console and D.C. panel on center between pilot and co-pilot seats. The electronic package onboard includes a Raytheon R81X and a R41XX radar; a Ray 390 GPS; a Ray 420 loud hailer; two Ray 90 VHF radios; Sail Comp digital compasses; and Robertson autopilot.

The passenger cabin is arranged similar to an airliner, with passengers facing each other generally, rather than facing forward. The vessel is certified to carry 147 passengers and crew.

USA Catamarans also offers vessels from two additional lines, the Dynacat and the Cyclocat. USA Catamarans was organized in 1989 by **Manny Kaluris**, president and CEO of Yacht Basin, Inc. Mr. **Kaluris** is a marine engineer and propulsion specialist with extensive experience. The other principal is **Chuck Baum**, a naval architect and marine engineer in aluminum boat building, with experience in high-speed catamarans. For more information on USA Catamarans,

Circle 149 on Reader Service Card

***Harbor Bay Express II Alameda* Equipment List**

Main engines	MAN
Gears	ZF
Propellers	France Helices
Radar	Raytheon
GPS	Raytheon
VHF radio	Raytheon
Autopilot	Robertson

Converted Tanker *Uikku* Delivered By Kvaerner Masa's Helsinki New Shipyard

Tanker Features New Azipod Azimuthing Electric Propulsion Drive

The 16,000-dwt icebreaking tanker M/T *Uikku* was delivered by Kvaerner Masa-Yards' Helsinki New Shipyard, and the vessel features a 11.4 MW azimuthing electric Azipod-propulsion drive, a system jointly developed by Kvaerner Masa-Yards and ABB Industry.

The vessel was delivered to NEMARC Shipping Company, and recently started oil transportation in the Baltic.

During the Arctic shipping season, the vessel will traffic in the Barents Sea area for the joint-venture company Arctic Shipping Services.

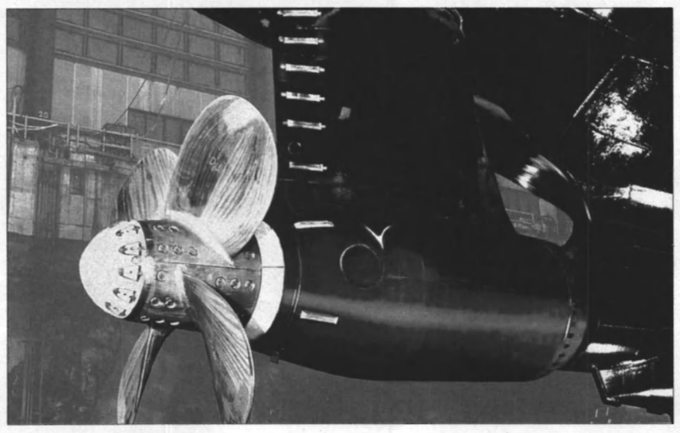
The Azipod Drive

Azipod is an azimuthing electric propulsion drive, with a propulsion motor normally an electric alternating current (AC) synchronous motor, located inside the azimuthing unit.

The motor, which drives a fixed-pitch propeller, is speed controlled by a cycloconverter.

The system effectively eliminates the need for conventional shaft lines and rudders, and the need for stern thrusters or controllable pitch propellers and reduction gears.

The unit on the *Uikku* is the world's largest single azimuthing propulsion drive built. The unit is constructed to the requirements of the Det Norske Veritas ICE 10 ice class.



For maximum operational safety and redundancy, the synchronous propulsion motor has two windings, each separately controlled by its own cycloconverter. The propulsion shaft line of the Azipod unit of this size is accessible through a manhole and can be inspected without drydocking the vessel.

The rotatable Azipod drive enables full power thrust in any desired direction, a feature helpful in problematic ice conditions. The M/T *Uikku* is equipped with a pusher version of the Azipod; a tractor version is also available.

The Conversion

M/T *Uikku* arrived at the Kvaerner yard for modernization last August. The conversion involved replacing the existing installation (diesel reduction gear and controllable pitch propeller) with a cycloconverter-controlled 11.4 MW (15,500 hp) Azipod drive powered by two Wartsila Vasa 12V32 (2 x 4,920 kW) diesel engines, each coupled to a ABB 6200 kVA generator and one Wartsila Vasa 12V22 (1,950 kW) diesel generator using the existing shaft generator. Two Alfa Laval heavy fuel separators and four lube oil separators were also installed.

The M/T *Uikku* is one of a series of four special tankers built for Neste Shipping at the end of the 1970's, and the modernization is geared to significantly extend the service life.

The first prototype 1.5 MW Azipod unit was installed on the Finnish waterway service vessel *Seili* in late 1990. The results were so encouraging that Kvaerner Masa-Yards and ABB Industry signed an agreement for further development and sale of the Azipod in spring 1992. Azipod units, to date, are available up to 20 MW.

The latest Azipod order is for a river icebreaker for the Austrian Osterreichisch Donaukraftwerke AG, to be delivered in spring 1995 from Kvaerner Masa-Yards' Helsinki New Shipyard. The vessel will operate in assisting river traffic and break ice formations at the power stations in the Danube river. The vessel will be equipped with two azimuthing electric propulsion drives with a total power of 1.1 kW.

For more information on the project from Kvaerner Masa-Yards,

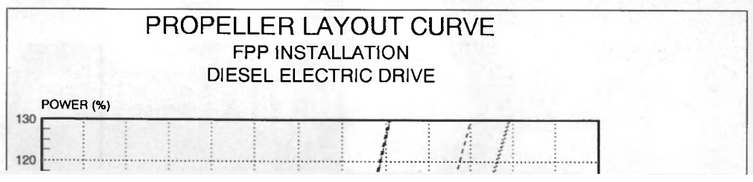
Circle 131 on Reader Service Card

For more information on the project from ABB Industry,

Circle 132 on Reader Service Card

PROPULSION UPDATE

Propeller Selection For



"Engineer a better fiber, and ultimately you've engineered a better product."

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Through a program of intense fiber research, AlliedSignal engineers discovered the solution. By applying a unique and proprietary SeaGard® finish to the ACE polyester fibers, a better performing wet abrasion resistant rope was now able to be constructed.

In independent testing and in field testing by several rope manufacturers, ACE Polyester SeaGard ropes -- 3-strand and braided -- outlasted and out-performed ordinary polyester ropes by incredible margins, even under the most severe wet abrasion conditions.

Today, rope manufacturers have found that they require a higher level of performance plus cost-effectiveness for the most demanding applications, such as: tethers for balloons, underwater surveillance systems, offshore oil rigging and transmission and distribution (T&D) lines. ACE Polyester SeaGard meets these requirements. And, for the sailor who wants the best in performance, SeaGard ropes offer that certain added security plus easy, smooth handling.

For further information and test results, contact: Dept. A-S, Suite 1500, 224 West 35th St., NY, NY 10001.

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Propeller Selection For Diesel Electric Machinery

Diesel electric machinery has become more common in newbuilding projects in the last few years. The vessels are normally cruisers or ferries that have a high auxiliary electric power consumption. Also, vessels with high power demand for cargo handling, such as tankers, may be suitable for electric drive.

This article will highlight some of the most important aspects concerning fixed pitch (fp) propellers and controllable pitch (cp) propellers for diesel electric machinery, not only from a hydrodynamic point of view but also mechanical, such as propeller shaft arrangement and vibrations.

Propeller Layout

From the propeller viewpoint the diesel electric machinery has the advantage of continuous variable speed over the whole range from 0 to + or - 100 percent rpm. Another advantage is that 100 percent torque can often be utilized within the whole operating range. One disadvantage is that it is not possible to utilize over-speed, due to electrical limitations.

For the above reason the fp propeller must be designed to reach the MCR point at trial condition, i.e. full load, clean hull and calm weather.

In order to operate at full power in various sea margin conditions, the propulsion system is normally calculated for 10 to 20 percent overtorque.

In practice this means 10 to 20 percent over-sizing of the propeller/shaftline/gear/motors/converters, etc. (Fig. 1).

For a diesel mechanical arrangement the fp propeller is designed somewhat light-running at the trial condition, making sure that full power can be reached also in conditions of increased resistance (hull fouling/wind and sea). In trial condition the diesel engine's over-speed capability will be utilized.

Diesel electric machinery with cp propellers should ideally have a pitch/rpm combinator between 65 and 100 percent rpm.

This will secure a fast maneuvering response and simple shaft arrangement (further described below). The CPP arrangement does not need any over-torque capacity, since the MCR point always can be reached by pitch adjustment (Fig. 2).

One Motor Operation

For safety reasons, a redundancy is normally applied to the electric motors and this is typically done by two 50 percent motors, mounted in line or in parallel via a gear.

When running one motor only, the fp propeller will be too "heavy" and the maximum allowable torque limit for the motor and gear will reduce the available power. In heavy weather condition this limit will be reached at about 30 percent power. This is a rather low level considering an emergency situation (Fig. 1).

This tendency is even more pronounced for a diesel mechanical installation, since the load curve for a diesel is lower. This is one of the reasons why multi-diesel installations with fp propellers are very rare.

Stopping Maneuvers

A fp propeller together with a DE drive must be equipped with some sort of torque absorption system, normally electrical brake resistors, in order to take care of the "turbine" power during the initial stage of the stop maneuver.

As the stopping proceeds, the fp propeller will work with reversed rotation at 100 percent torque, but since the rpm is low, the utilized power is also low. This explains why the stopping properties of a fp propeller is poor and not substantially improved by the variable speed control, which comes with a diesel electric machinery.

With a cp propeller the stopping maneuver is more effective. As soon as the ahead pitch has been reduced by a few degrees, a powerful braking action occurs which reaches a maximum at low pitch setting, with full power available astern.

The result is that the stopping time and head reach can be reduced considerably with a cp compared to a fp propeller.

Comparative calculations made for a twin screw ferry with Loa=180 m gives the following result:

	Head reach
FPP w/ diesel mechanical drive	612m
FPP w/diesel electric drive	492m
CPP w/diesel electric drive	384m

Maneuverability

The maneuvering properties of the propeller installation can be divided into two different aspects: thrust response or maneuver command; and maximum available thrust. The thrust response, i.e., how fast the propellers will respond on a maneuver command, with the fp propeller is solely dependent on time needed to increase the electric motor speed. Fifteen seconds is a common value from 0 to + or - 100 percent rpm.

The thrust response of a cp pro-

(Continued on page 56)

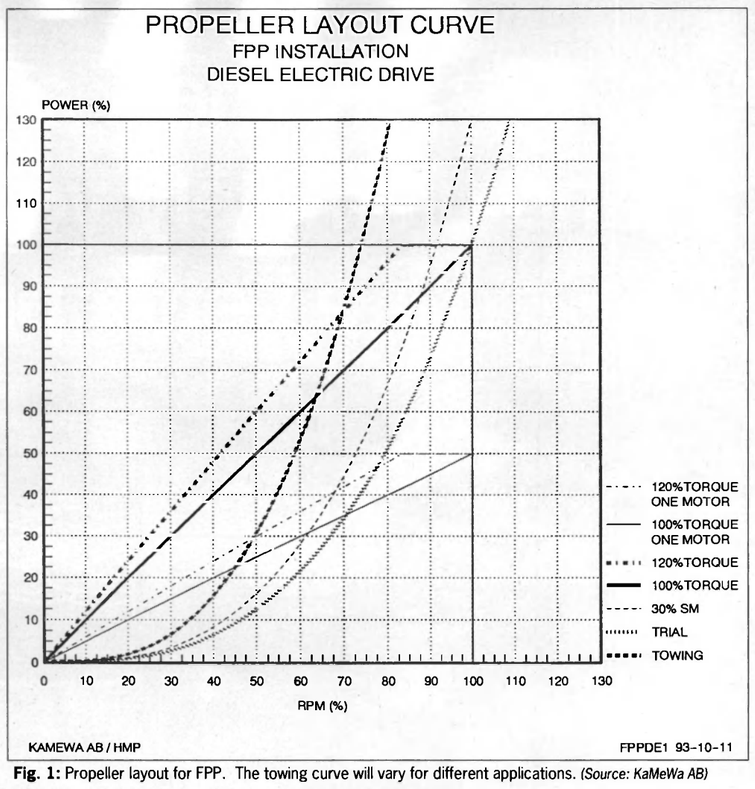


Fig. 1: Propeller layout for FPP. The towing curve will vary for different applications. *(Source: KaMeWa AB)*

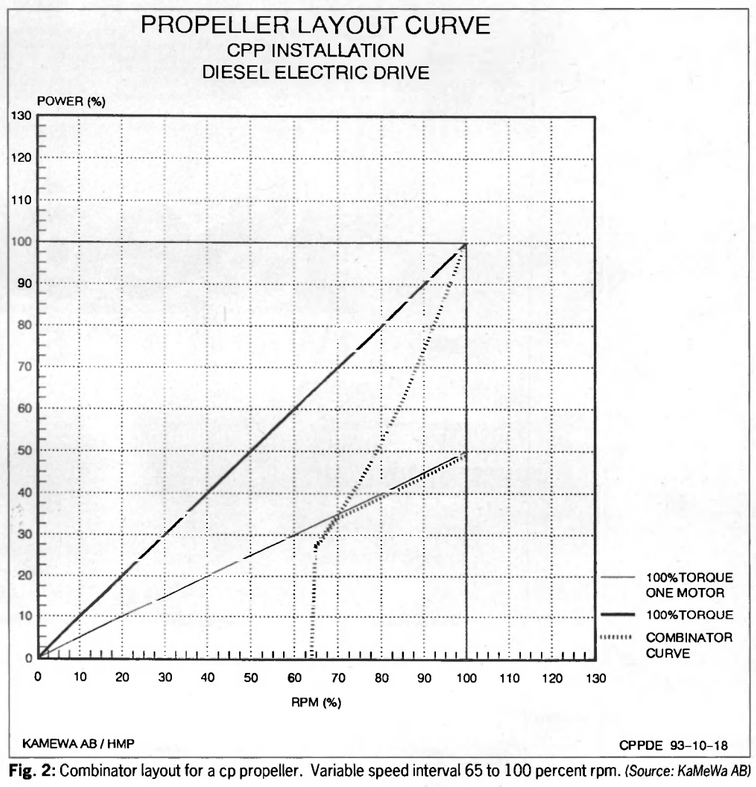
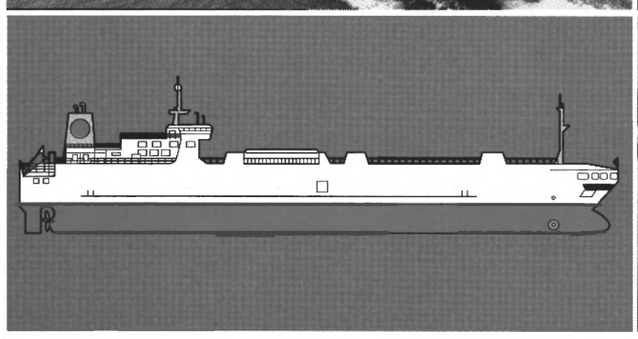


Fig. 2: Combinator layout for a cp propeller. Variable speed interval 65 to 100 percent rpm. *(Source: KaMeWa AB)*

Top quality new vessels.



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(Continued from page 54)

peller depends on the rpm acceleration and the pitch setting time in combination. Since the idling speed is ideally about 65 percent rpm there will be a safe thrust response even with a normal pitch setting time of 2.5 degrees per second.

For example, after five seconds the available thrust is four times higher for a cp compared to a fp propeller on ahead command and two times higher on astern command.

Maximum available bollard thrust ahead for the cp propeller is in this example about 50 percent higher compared to the fp propeller and in bollard astern roughly the same thrust for both propeller alternatives.

The thrust level for the fp propeller is somewhat restricted by the 100 percent torque limit and will improve somewhat if the 120 percent torque limit is applied, but thrust breakdown due to excessive cavitation will most likely occur due to the high apparent angle of attack for the fp propeller blade profile in this mode.

Propeller Shaft Lateral Whirling Vibrations

In order to avoid lateral vibrations in the propeller shaft line, the critical whirling frequencies are always kept outside the operating rpm-range. This is achieved by spacing the supporting bearings accordingly. The first critical mode normally affects the aft part of the shafting. This will most likely result in hull vibrations and sometimes in bearing wear down, if within the operating speed range.

In a DE installation with a fp propeller, the continuously variable speed with high torque necessitates that the first critical mode is above the maximum rpm and this requires, especially for twin screw installations, additional supporting brackets for the outboard shafting. This leads to increased hull appendage resistance and increased building costs.

With a cp propeller the first critical mode is kept below the idling speed, and the second mode is above the maximum rpm. This is a standard solution which gives slender outboard shafting with a minimum of supporting brackets and consequently low hull appendage resistance and less complicated production.

Vibration And Noise

Vibrations and noise from the propellers has been one of the most unpredictable problems for ships. Thanks to the high skewed propellers, these problems are very rare in today's newbuildings.

This solution is a simple and reliable way to minimize pressure pulse excitation. Other methods such as increased clearance and/or hull stiffness are of course important as well, but not as predictable, because it is only a method of reducing the consequences of already induced propeller forces.

It is a fact that the excitation level will be 30 to 40 percent lower for a CPP compared to a FPP, due to the ability to use a greater skew angle on a unidirectional propeller. For a specified pressure pulse level it is normally possible to reduce the propeller of larger diameter and higher efficiency can be installed.

The reduced pressure pulse level of a CPP also makes it possible to reduce the outboard length of the shafting, as a consequence of smaller tip-hull clearance. This will improve the total arrangement as well as the appendage drag.

Low vibration level is not only a question of comfort for crew and passengers, it has also a major influence on maintenance costs for various equipment on board the vessel.

Shafting

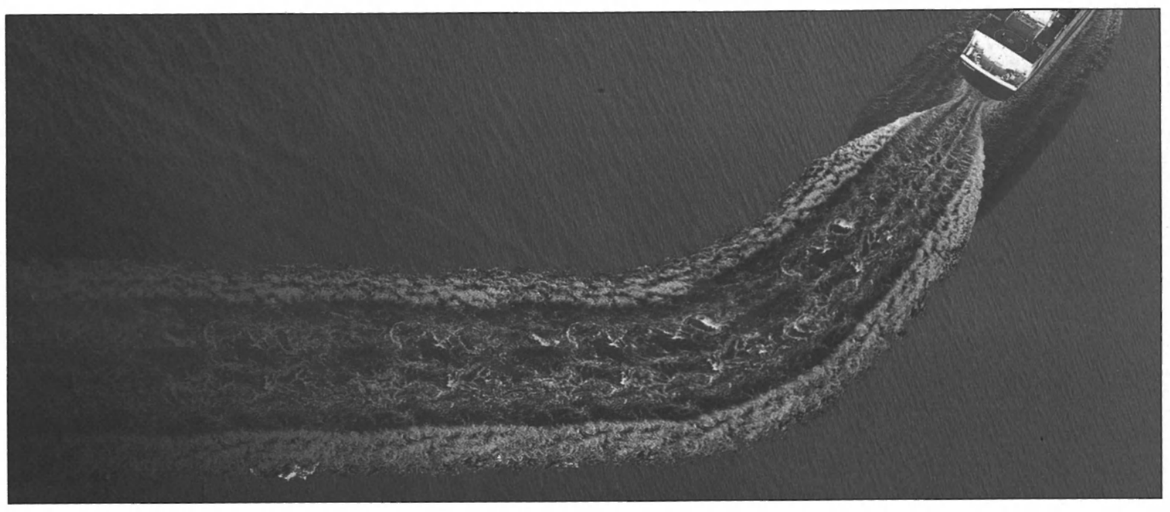
The continuously variable speed of DE machinery calls for hydrostatic lubrication of the bearings at speeds lower than 15 rpm.

The highly loaded stern bush is especially sensitive to rapid wear down if the oil film is too thin.

With a cp propeller the minimum rpm can be kept at a safe level at all times giving an increased bearing life.

"Selection of Propellers for Diesel Electric Machinery" was written by ***Per Holmstrom****, KaMeWa AB, Sweden*

Technology that changed the course of the marine business for the better



Deteriorating heavy fuel qualities and a growing demand for better cost-efficiency and reliability were challenges faced by the marine business in the 1970s.

Wärtsilä Diesel was the first engine manufacturer to meet these challenges with customized medium-speed technology for even the poorest quality heavy fuels available. The Wärtsilä Vasa 32 marked the beginning of a new era and set the course for the entire marine business towards higher profits with lower-quality fuels.

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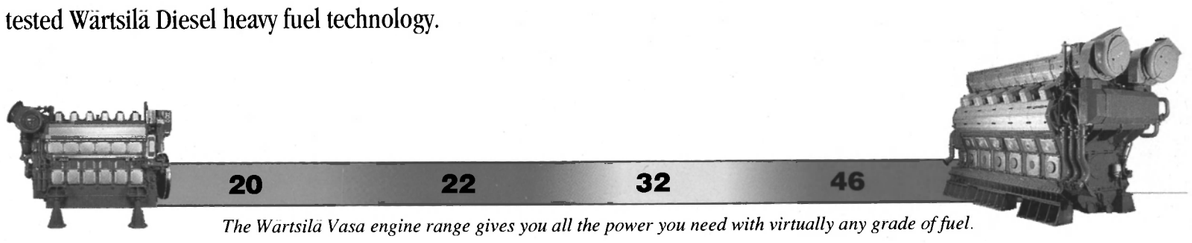

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THIS AD IS FOR PEOPLE WHO THINK ALL MARINE DIESEL ENGINES ARE ALIKE

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Your EMDs will run like they always have, except more efficiently then ever before, and more efficiently than the competition.

If you're in a hurry, at your 30,000 hour overhaul, we will turn you around in 24 hours, and still bill you less than our competitors.

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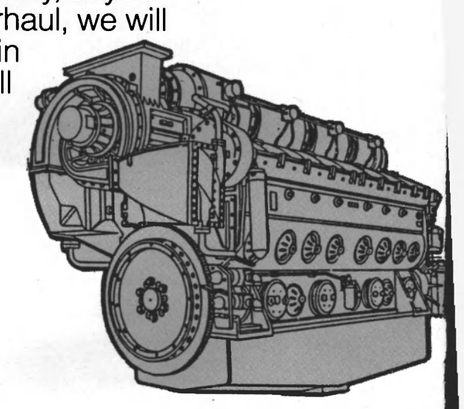

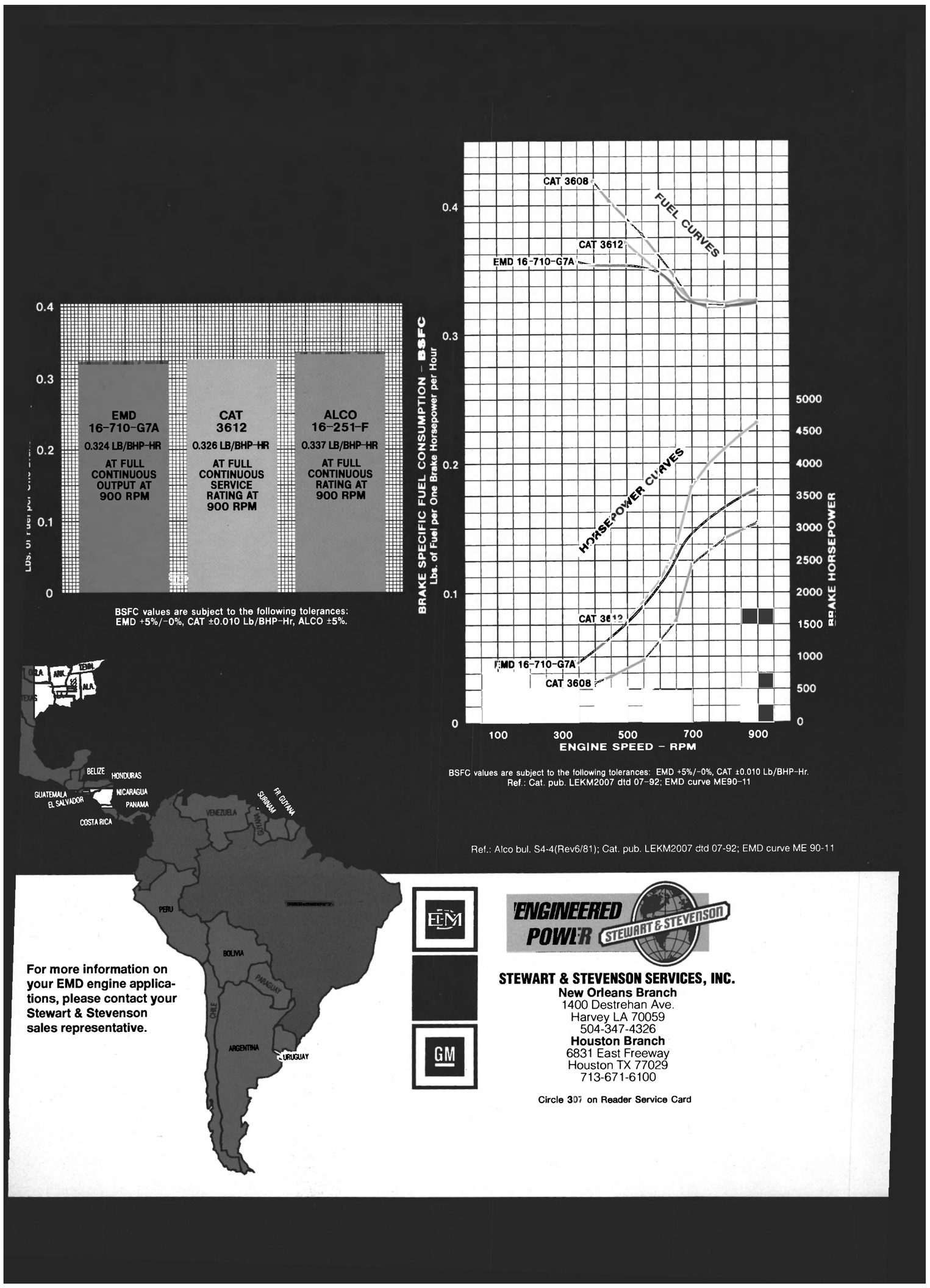
0.4
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EMD
16-710-G7A
0.324 LB/BHP-HR
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CAT
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CAT 3612
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HORSEPOWER CURVES
CAT 3612
EMD 16-710-G7A
CAT 3608
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4500
4000
3500
3000
2500
2000
1500
1000
500
0
BRAKE HORSEPOWER
100
300
500
700
900
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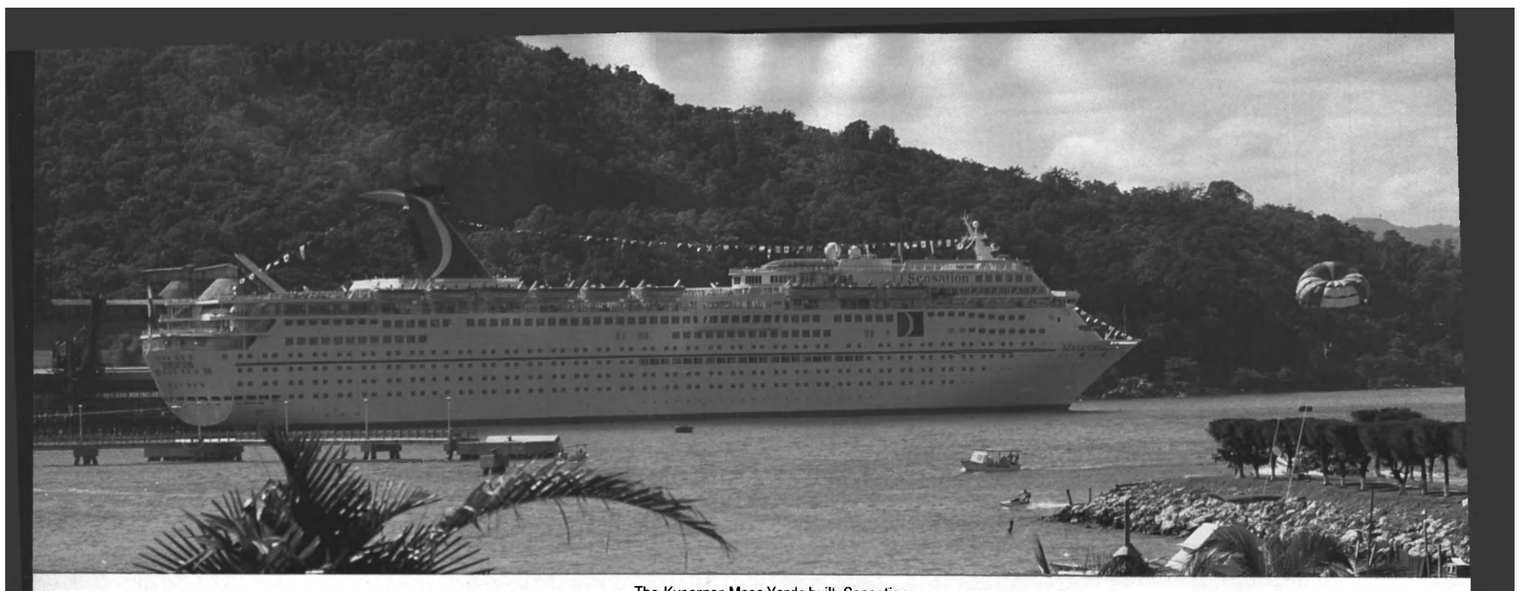


The Kvaerner Masa-Yards-built *Sensation*.

Outstanding Cruise Ships Of 1993

Several fine cruise ships were delivered in 1993, the details of which are spelled out in the following pages. Read on for information on the shipbuilders, suppliers and owner operators.

While the delivered cruise ships are obviously the focus of this editorial, there was a significant amount of new tonnage ordered, including an order for the largest cruise ship ever (see MARKET REPORT, page 64).

Attribution for the flood of new cruise ship orders is given to a variety of reasons, including a projected cruise industry boom and adherence to impending international safety regulations.

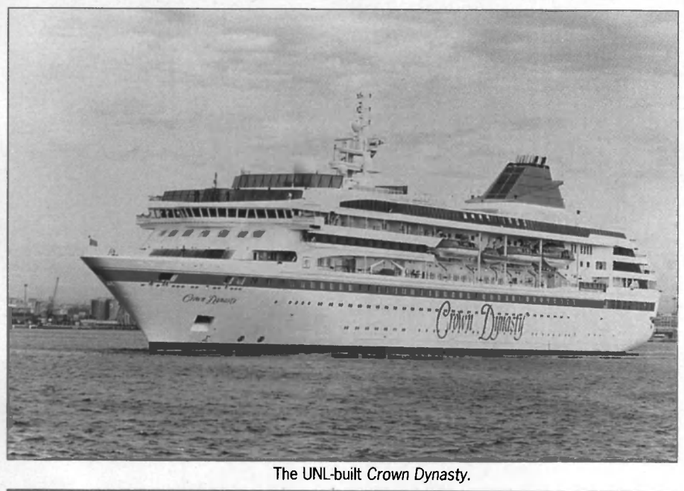
But no matter the reason, the bottom line result of recent activity in this high-profile market segment is an outstanding opportunity for all who build, supply and operate the ships.

Vessel: ***CROWN DYNASTY***
Yard: **Union Naval de Levante**

In June of 1993, the shipyard Union Naval de Levante (UNL), located in Valencia, Spain, delivered the *Crown Dynasty*, the second and, for the present, last unit of the twin cruisers built on order by Eff John International.

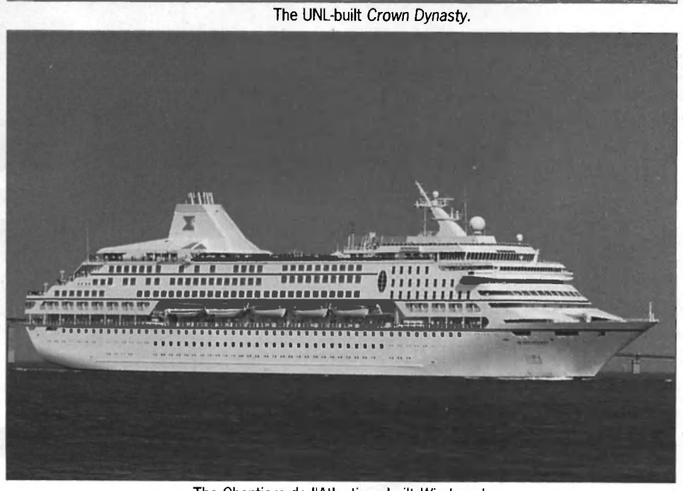
Cunard operates a total of five ships under the trade name "Cunard Crown," three of which were built by UNL.

The 19,089-dwt *Crown Dynasty*, along with her sistership *Crown Jewel*, is reportedly the largest-capacity and highest quality cruising vessel built in Spain.



The UNL-built *Crown Dynasty*.

The Fincantieri-built *Maasdam*.



The Chantiers de l'Atlantique-built *Windward*.

Outstanding Cruise Ships of 1993

ard	Vessel	Engine	Delivery Date	Owner
nion Naval de Levante	*Crown Dynasty*	Wartsila	June 1993	Eff John International/Cunard
ncantieri	Costa Romantica	GMT-Sulzer	October 1993	Costa Cruise Lines
incantieri	*Maasdam*		December 1993	Holland America Line
.vaerner Masa-Yards	*Sensation*	Wartsila	October 1993	Carnival Cruise Lines
Chantiers de l'Atlantique	*Windward*	MAN B&W	April 1993	Kloster Cruise Limited

The interior design of the ship, by Yran & Stoorbraten, features an atrium rising upwards through cutouts in five decks. There is an immense panoramic glass wall on its seaward side. The ship is arranged with eight decks and a capacity for 916 passengers and 304 crew members.

An outstanding feature is her reported low noise and vibration readings.

The four main engines on the *Crown Dynasty* are Wartsila Vasa, model 8R32E units which produce 3,280 kW per unit at 750 rpm.

Through Renk-Tacke reduction gears, each pair of engines drives a "high skew" KaMeWa propeller rotating at 175 rpm.

The auxiliary engines are also supplied by Wartsila. Two are model 6RD 32 and supply 2,100 kW each, and two are the 1,472 kW capacity model 4RD 32.

The *Crown Dynasty* is 537 feet long and has a cruising speed of 19.20 knots.

For more information on Union Naval de Levante,

Circle 143 on Reader Service Card

CROWN DYNASTY
EQUIPMENT LIST

Main engines	Wartsila
Generator engines	Wartsila
Thruster engine	ABB
Generators	Siemens
Reduction gears	Renk-Tacke
Propeller	KaMeWa
Thruster	KaMeWa
Fin Stabilizers	Sperry
Couplings	Geislinger
Engine Control	ABB Stromberg-Selma Marine
Steering Control	Tenfjord/Sperry
Deck Machinery	Aquamaster-Rauma
Shafting	KaMeWa
Bearings	Deep Sea Seals
Coatings	Jotun
VHF Radio	Radio Holland
SSB Radio	Radio Holland
Radar	Sperry
Compass	Sperry
Loran	JMC
Autopilot	Sperry
Collision Avoidance	Sperry
SATNAV	Sperry Standard A
Pumps	Azcue
Heat exchangers	Termojet
Air conditioning	Novenco
Lifeboats	Harding
Liferafts	Viking
Davits	Inmetusa/Schatt
Fire fighting system	Autronica/Unitor
Waste management system	Seebeck Technoproduct
Desalination equipment	Serckomo
Oil purifiers	Westfalia
Boilers	Sunrod
Tank gauging	Auxitrol
Automation	ABB Stromberg
Components	SBA Finland
Vibration study	TSI (Spain)

Vessel: ***MAASDAM***
Yard: **Fincantieri**

The 55,451-gt M/S *Maasdam* is Holland America Line's newest cruise ship, which entered service in December 1993. The ship is the fifth in the company's 120-year history to bear the name.

The 720-foot long *Maasdam* was built at the Fincantieri shipyard in Monfalcone, Italy. The *Maasdam* can carry 1,266 passengers and a crew of 571. The *Maasdam* features a $2 million collection of art and artifacts. Treasures from the 17th, 18th and 19th centuries reflect a time of adventure and discovery, with the theme of Dutch worldwide exploration. Original works of art created especially for the *Maasdam* are also featured in public rooms and staterooms.

The *Maasdam* has 10 passenger decks. A three-deck grand atrium, featuring a monumental glass sculpture by **Luciano Vistosi** of Murano, Italy, extends from Lower Promenade Deck to upper Promenade (see photo, this page).

The *Maasdam* features, among other luxuries, five lounges, two swimming pools, library, casino and penthouse suite.

For more information on Fincantieri,

Circle 145 on Reader Service Card

MAASDAM
EQUIPMENT LIST

Generator engines	GMT Sulzer Diesel
Stabilizers	Sperry
Radar plotter aids	Atlas
Navigation	Atlas
Speed log	Atlas
Compasses	Anschutz
GPS	Magnavox
IPS	Racal
Autopilot	Anszuth
Joystick controls	KaMeWa

Vessel: ***SENSATION***
Yard: **Kvaerner Masa-Yards' Helsinki New Shipyard**

On October 18, 1993 the 70,400-grt, 2,600-passenger cruise liner M/S *Sensation* was delivered to Carnival Cruise Lines by the Kvaerner Masa-Yards' Helsinki New Shipyard in Finland.

The ship is the third of five luxury cruise ships for the same owner. The *Sensation* is 853 feet long with a breadth of 103 feet. The maximum crew number is 980. All 980 passenger cabins on decks 4-7 were made from prefabricated units at the Kvaerner Masa-Yards Piikkio Works and brought to the Helsinki yard as below-type constructions with all items in place. The main entrance on deck seven leads into the six-deck-high Grand Atrium. The atrium is illuminated by hidden neon tubes running along the side on all decks (see photo, above). The hull of *Sensation* is designed with transversal framing along

The *Sensation*'s Grand Atrium.

the side shell, longitudinal framing for the bottom and decks, and more than 2,000 pillars supporting the decks, placed six in a row. There are special bulkheads to stiffen the structure between the outer pillar and the side shell. The noise and vibration levels on these cruise liners are lower than on any previously built by the yard. Four Wartsila Sulzer 12ZAV40S and two 8ZAL40S medium-speed diesel engines with a total output of 42,240 kW (57,430hp) at 514 rpm power the *Sensation*. Each engine drives an AC alternator. The four bigger alternators have an output of 10.3 MVA each and two smaller ones of 6.8 MVA each. These six generators produce electric power for the two switchboards at a rate of 6.6 kV. Propulsion power is provided by two 14 MW (19,000-hp) water/air cooled synchronous cyclo converter-controlled electric AC mo-

(Continued on page 62)

Glass sculpture in the *Maasdam* Atrium (below).

tors directly coupled to each of the two propeller shafts driving a KaMeWa highly skewed controllable pitch propeller at a maximum of 140 rpm. The configuration ensures the ship a maximum speed of 22 knots. The electrical power and propulsion package has been engineered and supplied by ABB Marine. For more information on Kvaerner Masa-Yards,

Circle 146 on Reader Service Card

***SENSATION* EQUIPMENT LIST**

Main engines	Wartsila	Windows	Dalmas	Telephone system	TELE/Northern Teleco
Propellers	KaMeWa	Glass domes	Lamino	Steel	Rautaruuk
Steering gears	Frydenbo	Vacuum toilet system	Evac	Paints	Tekno
Electric drives	ABB Stromberg Drives	Fire alarm system	Consilium Marine	Painting work	Aurakori
Side thrusters	Brunvoll	Ventilation	Flakt Marine	Cabins	KMY Piikkio Work
Fin stabilizers	Brown Brothers	AC-compressors	Stal Marine	Toilet modules	Master-Productic
Mooring, anchor winches	Aquamaster	Sewage treatment	Hamworthy	Main galley	Atlas Marin
Integrated bridge	Sperry	Evaporators	Serck	Stainless steel equipment	SeaKin
Purifiers, fuel boosters	Alfa Laval	CO2 system	Heien Larssen	Bars	Loipa
Life boats	Mulders & Rijke	Boilers	Sunrod	Provision stores	Porkk
Lifts	MacGregor Navire	Pumps	Iron	Cabin installation	Ika
Life boat davits	Schat-Davit	Cables	Nokia	Shops	Huuhk
		Automation	Lyngso-Valmet	Fire & comfort insulation	Partel
		PA, sound, TV systems	Phillips	Celing panels	Laute
		TV sets	Zenith	Fire doors	Saajo

Vessel: *WINDWARD*
Yard: Chantiers de l'Atlantique

The cruise liner *Windward*, built by GEC Alsthom's Chantiers de l'Atlantique subsidiary at Saint Nazaire in France for Kloster Cruise Limited, was delivered in April 1993 and christened by **Barbara Bush** in Los Angeles on June 5, 1993.

Windward has 13 decks with accommodation for 1,500 passengers. The 39,277-gt, 3,600-dwt *Windward* is the sistership of the *Dreamward*, which was delivered by Chantiers de l'Atlantique in November 1992.

Four MAN B&W 6/82 40/54 medium-speed propulsion engines drive two CP propellers for a total power output of 18,480 kW at 510 rpm.

Windward is the seventh cruise liner built by Chantiers de l'Atlantique.

For more information on Chantiers de l-Atlantique,

Circle 147 on Reader Service Card

***WINDWARD* EQUIPMENT LIST**

Main engines	MAN B&W
Propellers, shaft lines	Ulstein
Thrusters	Ulstein
Generator engines	Bergen
Rudders	Becker
Radar	Sperry
Compass	Sperry
Loran	Racal
Autopilot	Sperry
Boilers, ex. gas heat recovery	Sunrod
Incinerator	Norsk-Hydro
Reducing gears	Lohman & Stolterfoht
Steam evaporator	Clark/Sutcliffe
Alarms, monitoring systems	Lyngso Valmet Marine
Purifiers	Westfalia Separator
Bilge pumps	Iron
Davits (lifeboats, rescue boats)	Harding
Davits (rafts)	Schat Davit
Winches, windlasses	Brissonneau & Lotz
Steering gears	Frydenbo
Ladders	Verhoef Aluminum
Fire doors	Baggerod Horthen
Windows, side scuttles	Dalmas Production
Shell watertight doors	MacGregor Navire
Lifts	R.C.S.
Stabilizers	Blohm & Voss
Laundry equipment	A.S. Edco
Galley, bars, pantry equipment	SeaKing
PA, stage lighting	H.M.S.
Steering system	Sperry
Automatic telephones	Opus Alcatel
Sound powered telephones, . intercoms	Stentofon
Fire detection	Cerberus Guinard
Walkie talkie	Motorola
Medium voltage transformers	GEC Alsthom
Butterfly valves	AMRI
Hull remote gauging system	Auxitrol
CO_2	SEPCI
Heeling pumps	Iron
Black water treatment unit	EVAC
Sprinkler	SEPCI
Refrigerating plant	Stal
Air conditioning	Clima Neu/Flakt
Lifeboats, rescue boats	Harding Safety
Pneumatic rafts	Zodiac
Fire extinguishers, hoses	Unitor Ships Service
Cabin furniture	Chantiers de l'Atlantique

ssel: ***COSTA ROMANTICA***
ard: **Fincantieri**

In November 1993, the $325 mil-n *Costa Romantica* set sail from e Port of Miami on her maiden yage. The arrival of this 53,700-n, 1,350-passenger vessel marked e completion of Costa Cruise ne's first $1 billion investment in et expansion and development.

The vessel is powered by four MT-Sulzer 8ZL40S engines—de-loping 7,200-hp each—driving ps propellers through Renk-Tacke duction gears.

The vessel is outfitted with the test array of navigation and com-unication electronics. Included the Sperry integrated naviga-on package is radar, compass, lo-n and autopilot. VHF radios were applied by Standard Communica-on and ICOM, and Sailor pro-ided SSB radios.

The *Costa Romantica* will divide er time between the Caribbean in ne winter and the Mediterranean n summer.

Constructed at the Fincantieri hipyard in Mestre, Italy, and de-vered to her owner in October, the Costa Romantica measures 718 feet ong with a 98-foot draft.

The vessel also embodies the rend toward luxurious interiors nd features a blend of traditional nd contemporary artistic features. Mahogany and burled briarwood ontrast with polished marbles and lowing fountains.

Furnishings in the tradition of Thonet, Morris and other design-rs of the last century are juxta-posed against a contemporary back-drop of sweeping glass window walls and futuristic sculptures.

A sculpture named "The Cloud," by **Susumu Shingu**, a Japanese sculptor, is the focal point of the ship's dramatic Grand Lobby. Ac-tually a suspended mobile, the sculpture's panels move continu-ally and change color against the Cararra marble walls and floor.

Costa Romantica's 1,350 passen-gers are arranged in 644 state-rooms, rooms which average ap-proximately 200-sq.-ft. each.

The vessel features 16 luxury suits, and 18 mini-suites. To attract the business crowd, the ship offers a full-service Conference Center, which offers a flexible layout and one large meeting room which can accommodate up to 150 people. The conference center also features state-of-the-art audio/visual equipment and flip-top desks. For more information on the building capabilities of Fincantieri,

Circle 145 on Reader Service Card

COSTA ROMANTICA
Equipment List

Main engines	GMT-Sulzer
Propellers	Lips
Thrusters	Lips
Generator engines	GMT
Thruster engines	Ansaldo Lips
Generators	Ansaldo
Reduction gears	Renk-Tacke
Engine controls	ASEA Brown Boveri
Steering controls	Sperry-Frydenbo
Deck machinery	Norwinch
Shafting	Simplex
VHF radios	Standard Communications/ICOM
SSB radios	Sailor
Radar	Sperry
Compass	Sperry
Loran	Sperry
Autopilot	Sperry
Pumps	Garbarino/Iron

• *Interior Outfitting*

• *Fire Rated Glass; Sprinklers*

Cruise Ship Segment Once Again Recipient Of Good News, Orders

Legislator Preps Bill Aiming To Jump-start Cruise Ship Building In The U.S.

By Greg Trauthwein, managing editor

In the eyes of many insiders cruise ship owner/operators were over-optimistic in ordering several new ships at the beginning of 1993. The impressive run of orders gave business to Chantiers de l'Atlantique, Fincantieri Cantieri Navali Italiani, Kvaerner Masa-Yards, and Meyerwerft, and included an order for the largest cruise ship ever, the 95,000-gt Carnival Cruise Line (CCL) vessel being built at Fincantieri.

To the chagrin of number crunchers and delight of cruise ship builders, suppliers and owner/operators, a mini-ordering spree has started again. And there has been a rumbling of legislation in the U.S., a bill in its infancy (at press time, it was being redrafted) which aims to help U.S. shipyards get in on the cruise ship building action.

RECENT ORDERS

At the end of 1993, shipbuilders Kvaerner Masa-Yards and Chantiers de l'Atlantique received early Christmas presents in the form of cruise ship orders.

Kvaerner Masa-Yards received orders for three ships (one is an option), with a total value of $871 million. Carnival Cruise Lines Inc. (CCL) signed a letter of intent for the sixth M/S *Fantasy* class cruise liner. To be built at Kvaerner Masa-Yards'Helsinki New Shipyard and delivered in the beginning of 1996, the value of the order is for $270 million. The shipyard has already built three 70,000-gt vessels for the CCL fleet—the *Fantasy, Ecstasy* and *Sensation*—and is currently building the *Fascination* and *Imagination.* "The consumer acceptance of *Fantasy, Ecstasy* and *Sensation* consistently went beyond our expectations with the introduction of each new ship," said CCL president **Bob Dickinson**, in a prepared statement. "It has provided a clear indication that there is a need for additional tonnage and passenger demand to support it."

In addition, Royal Caribbean Cruise Lines (RCCL) signed a letter of intent for two (approx.) 73,000-gt cruise liners (the second vessel is an option).

The order is for approximately $610 million, bringing the Kvaerner Masa-Yard take for the three ships nearly $900 million. The first RCCL ship is scheduled for delivery in late 1996; the second is scheduled for September 1997. RCCL already has contracted with Chantiers de l'Atlantique to build a pair of 1,800-passenger ships for delivery in April 1995 and March 1996 under the working project name Project Vision. RCCL recently confirmed the order for the second 1,800-passenger vessel with Chantiers de l'Atlantique.

The two additional ships, coupled with the two vessels already on order, would increase Royal Caribbean's capacity by as much as 53 percent, giving the line a fleetwide total of up t 21,728 lower berths double occupancy.

New cruise ship orders seem to ensure passenger terminals w be kept busy for years to come. *(Credit: Photo courtesy Moran Town F.J. Duffy)*

"The commitment to build these additiona ships is a reflection of our belief in the health o the cruise industry, and the strength of Roya Caribbean's position within that industry," sai **Richard D. Fain**, chairman and CEO of Roya Caribbean.

U.S. SHIPYARDS: READY FOR ACTION

As U.S. shipbuilders work toward being more competitive on commercial contracts on an inter national level, there is a piece of legislation brew ing which aims to help the U.S. builders do just

at. Representative **Jolene nsoeld** (D-Wash.) is currently eparing the final draft of a bill, ntatively dubbed the U.S. Passenr Vessel Development Act, which geared to immediately bolster the askan cruise business out of Setle and in the long run provide uise ship business for U.S. shiprds. According to Representative **nsoeld's** chief of staff, **Jim Hoff**, ancouver is experiencing a boomg cruise ship business, business hich very well could be U.S.-based. he key feature to the proposed bill, ccording to Mr. **Hoff**, is a provision hich would provide for U.S.-flag essels to capture business on the oute. In the plan, foreign-flag vesels would be offered an Interim ertificate of Documentation by the ecretary of Transportation, which ould in essence demand the vessel perate as a U.S.-flag ship. The ertificates would require the oprator to replace the vessel with a J.S.-built ship, requiring construction to begin within three years of he issuance of the certificate.

The highlight of the bill focuses on means to jump-start the U.S. shipbuilding industry; the guts of the bill includes a myriad of incentives for the owner/operators, including specifics on allocations from the Capitol Construction Fund, Title XI Loan Guarantees and tax credits. The specifics are scheduled to be unveiled soon.

NSI Releases Version 2.1 Of SHIPHUL 2000

Northstar Software Inc. (NSI) released version 2.1 of SHIPHUL 2000 PC Stability Analysis Program. Version 2.1 will replace the popular version 2.0 as the production version of SHIPHUL 2000 that will be available to the ship design, operations and shipbuildling community.

The major focus of Version 2.1 has been a complete re-write of SHIPHUL 2000's Stability Evaluation Routing, which analyzes calculated stability data against criteria specified by various governmental bodies or regulatory agencies such as U.S. Coast Guard, U.S. Navy, Canadian Coast Guard, Canadian Forces and IMO.

The new Stability Evaluation Routine includes 32 different stability criteria as well as four user definable custom criteria.

For free technical and price information on the new Version 2.1 from Northstar Software,

Circle186 on Reader Service Card

ASTM Committee Discusses Future Marine Technology

ASTM F-25 recently held its seminar "Shipbuilding in the 21st Century." Topics discussed included "Virtual Shipyard: A 21st-Century Imperative;" "Open Top Container Ships: A 21st Century Opportunity;" "Maritime Regulatory Reform: Compliance Options for the 21st Century, A Status Report;" and "ASTM F-25/ISO TC-8 Standards Partnership: A 21st Century Necessity."

The concept of the Virtual Shipyard was laid out, and it was discussed how modular construction techniques, with subassemblies from a variety of sources, is a new way of doing business which could lead to the capturing of emerging markets and competing in a global economy.

The seminar "Shipbuilding in the 21st Century" is the third in a series of information exchanges sponsored by F-25 Committee on Ships and Marine Technology.

The first was "ISO 9000 in the Shipbuilding Industry," the second was "Protection of the Marine Environment: A Global Priority."

A fourth seminar is scheduled for the F-25 Montreal meeting on May 18, 1994, at the Queen Elizabeth II Hotel. The theme is "Export Strategy and the Standards Contribution."

For more information on this or future seminars, contact the ASTM at: 1916 Race St., Philadelphia, Pa. 19103-1187; tel: (215) 299-5400; fax: (215) 299-2630.

Foss To Assist Puerto Rico Cleanup

Foss Environmental Services said the U.S. Coast Guard (USCG) named it a decontamination contractor to assist cleanup efforts in San Juan, Puerto Rico. In a press release, the company reportedly said it will decontaminate the shoreline and clean commercial and pleasure craft docked at marinas affected by the Jan. 7 oil spill. Foss Environmental is one of dozens of environmental contractors assisting the USCG, the company reportedly said.

Foss Environmental, a unit of Foss Maritime Co., is a spill prevention and response contractor. Foss Maritime provides harbor tug and barge services, ocean transportation, vessel repair and environmental services.

Raytheon Introduces New GPS/Loran Display With Built-In Plotter

Raytheon Marine Company introduced the latest technology which combines a GPS/Loran display with an easy-to-use trackplotter.

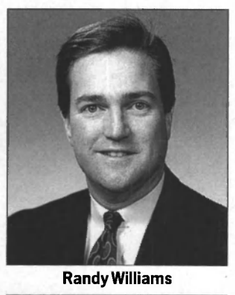
The Nav 598 allows the boater to switch back and forth between GPS, Loran and plotting functions at touch of a button.

When connected to Raytheo Raynav 508 or 508A Loran C S sor, the company claims the N 598 allows the boater to go a where.

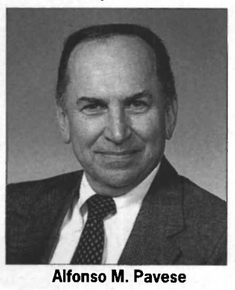
Even if the boater is fishing m than 300 miles offshore or cruisi in coastal waters with poor Lor coverage, the eight channel Rayst 108 GPS Sensor provides preci fixes.

Plus, the company claims th Raytheon's VeridicalView™ featu improves accuracy by 25 percer using all eight satellites to calcula position information.

Carrier Appoints Williams, Pavese To New Positions



Randy Williams



Alfonso M. Pavese

Randy Williams has been named vice president of Carrier Transicold's Replacement Components Group. He was previously senior manager of strategic planning and business development.

In his new position, Mr. **Williams** will direct the group's worldwide operations, which supply service parts and aftermarket support to Carrier Transicold's transport refrigeration and air conditioning equipment.

Cazenovia resident **Alfonso M. Pavese** has been appointed vice president, purchasing and quality, for Carrier. Previously vice president of the Replacement Components Group, he will direct Carrier Transicold's worldwide purchasing and quality initiatives. He has held a number of responsible positions, including: engineering manager for container, bus and rail products; program manager, nuclear pressure vessels; sales manager, government products; manager of strategic planning; and manager of engineering. He was named vice president of Carrier Transicold's Replacement Components Group in 1988.

a-Land To Expand ntainer Fleet

Sea-Land Service Inc. said it will ild four high-performance, fuel- icient container vessels and is nsidering modification of three ssels in its current fleet. Capital ocated for the total program is proximately $250 million over a ree-year period (1994-1996).

The four new vessels will replace gher cost capacity in the very com- titive trans-Pacific trade. Desig- ted as "Express Class," the 4,000- u vessels are being built to comply th the highest international stan- rds and will operate at a speed of knots. Sea-Land will be signing ntracts with Ishikawajima- arima Heavy Industries (IHI) call- g for construction at the company's apanese shipyards. The vessels ill be delivered in the second half 1995 and early 1996.

Sea-Land is also close to conclud- ig agreements to modify three U.S.- ag, 3,800-teu Atlantic Class ves- els. Sea-Land is evaluating bids by nalists for the shipyard work, hich will be completed in late 1994.

MAN B&W Adds S90MC-T o Engine Line

The expansion of MAN B&W Diesel's engine program by a long- troke 35.5-inch (900 mm) bore nodel has widened the choice for wners, yards and ship designers in choosing propulsion plants for VLCCs.

VLCCs with speed requirements of more than 15 knots can take advantage of the new S90MC-T, ei- ther as a full-powered six-cylinder model or an economy-rated seven- cylinder. It shares the design char- acteristics of the S80MC model, which has reportedly assumed a leading status in "new generation" VLCC installations. The key design parameters reflect factors influenc- ing the selection of propulsion plant for a VLCC, notably the projected ship speed and the propeller diam- eter that can be accommodated, as well as compact physical dimensions, not exceeding those of the S80MC. The layout flexibility allows the op- erator to select maximum continu- ous speeds between 75 rpm and 64 rpm for optimum propeller effi- ciency. An output of 4,650 kW per cylinder is delivered at the nominal speed of 75 rpm on a mean effective pressure of 18 bar.

Foss Christens *Lindsey Foss*, World's Largest Tractor Tug

Foss Maritime Co. christened the *Lindsey Foss*, reportedly the world's largest and most powerful tractor tug, on the Seattle waterfront on Jan. 6. The vessel was built by Trinity Industries.

The 155-foot, 8,000-hp *Lindsey Foss* was designed specifically for tanker escorts, and for unique ma- neuvering ability. "A circular pro- pulsion system located near the tug's center allows it to turn 360 degrees within the ship's length," explained **Tom Van Dawark**, Foss president and CEO. "The unique propulsion system provides full thrust in any direction. The tug's exceptional ma- neuverability makes it better equipped to steer and stop a tanker in the event of an emergency."

The christening ceremony, car- ried out by nine-year-old **Lindsey Bauhofer**, the tug's namesake and great-great granddaughter of the company's founders, included a dem- onstration of the *Lindsey Foss*, as well as onboard tours for guests at the event.

The *Lindsey Foss* began service in December for ARCO Marine, Inc., escorting tankers in northern Puget Sound.

"Through [a] study, we found that tractor tugs, properly designed for the requirements of escort, can control a stricken tanker in signifi- cantly less time than conventional tugs," Mr. **Van Dawark** noted.

The *Lindsey Foss* is powered by two 4,000-hp engines through Voith Schneider cycloidal propellers. Cy- cloidal propulsion tractor tugs are 20 times more capable than conven- tional tugs in steering and retard- ing the speed of a tanker under way at 10 knots, according to Foss.

Integrated Ship Design's Role In

Making Ship Production More Profitable

By
Jonathan M. Ross, Director of Engineering
Ross/McNatt Architects

An important trend in increasing shipbuilding productivity is integrating the computer-aided ship design process. The ship design process is increasingly being performed with the help of computer programs, either individual programs that address single aspects of the design or integrated programs comprised of modules that address a range of ship design aspects.

In the case of integrated computer programs, the ship design process is enhanced through individual program modules sharing their results with each other, preferably from a common database.

Modern integrated ship design programs not only improve the efficiency of ship design, they also improve the efficiency and ease of ship production, from lofting and numerical cutting to providing workshop drawings and production information.

Talking The Talk

A helpful guide to common abbreviations.

CAD ..... Computer Aided Design
CAE ..... Computer Aided Engineering
CAL ..... Computer Aided Lofting
CAM ..... Computer Aided Manufacturing
CAPP ..... Computer Aided Process Planning
DXF ..... Data eXchange Format
ESPRIT...European Strategic Program for Research ..... & development in Information Technology
IGES ... Initial Graphics Exchange Specification
NC ..... Numerical Control
PC ..... Personal Computer
STEP .....STandard for the Exchange of Product ..... data

ADVANCING THE PROCESS

The integrated ship design program is a compelling concept, and one whose time has come.

It aims to digitize the traditional ship design 2-D drawing, bills of materials and schedules, and carry out complex calculations, as well as, perhaps most importantly, advance the ship design process into the multi-user environment, and provide the designer and the production shipyard with a full-ship, 3-D database.

The advantages of such a system are numerous, and include: decreased design hours; reduced lead time; increased productivity; reduction of information errors; and the availability of production-oriented data.

Although many U.S. shipbuilders have invested millions of dollars in CAD/CAM systems, few have reached the ultimate goal, which is total integration of all processes, from early design through production.

For example, a yard may have one CAD system for structural design and another for outfitting design.

Integration of a ship design program may be viewed from two levels:

- Integration among the modules of a ship design program is the most basic level of integration. This level of integration means that the various modules of a program are designed to communicate and share data with one another to at least some extent. This level of integration is characterized by some as an interfaced system rather than an integrated system.

- The more advanced level of integration is by means of a product model, which is a detailed, 3-D description of the ship and its major systems. The product model is a common database that is shared by all the modules.

ENHANCING SHIP PRODUCTION

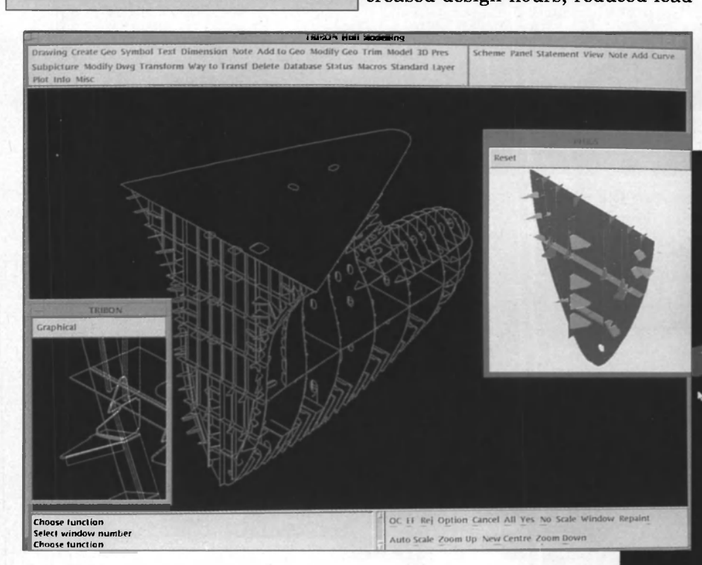
A powerful potential advanta of integrated ship design progran is that the data generated durir the design process can be tailored i format and content so that it ca help support the ship productio process.

Virtually all of the programs re viewed for the purpose of this articl provide at least some input to th ship production process, and sev eral programs provide significan input.

The following paragraphs de scribe eight examples of integrate design programs. Space constraint and program complexity prohibit full listing of all features.

For additional information on particular program and which inte gration level it fits under, see pro gram and company information or page 69.

HULLTECH uses interactive fa cilities and computer graphics tc provide shell plate surface curves, and a breakdown into individual plates for their development, complete with all marked-on lines (2-dimensional definition, green, minimum rectangle, sight line templates and pin-jig bed). HULLTECH also provides relevant production information for ship floor personnel and



There are a plethora of computer programs on the market, such as Kockums Computer System's TRIBON systems shown here, which can ultimately help shipbuilders cut costs and boost productivity.

AD/CAM: Helping To Make Ship roduction More Profitable

formation that supports interac- ve nesting and automatic NC path neration.

Inverse frame-line bending data included for both longitudinals d transverses.

NAVSEA CAD-2 support to the roduction process includes plate esting capabilities (including the bility to address doubly contoured late, and to include NC cutting nes as well as sight lines) and NC ipe bending and production instruc- ions.

Autoship Systems Corp. plans to xtend its Autoship System capa- ilities to defining shapes, but not to NC cutting and robotics, preferring o leave those functions to third- party systems.

FORAN provides information for se in steel production, and in ma- chinery and outfitting production. In the case of machinery and outfit- ting production, FORAN's capabili- ties include: automatic 3-D genera- tion of fittings as parametric ob- jects; equipment 3-D solid model- ing; layout of equipment, ducts, cable trays, piping and similar systems with respect to the steel structure or any other component; full integra- tion of diagram information with the 3-D module definition; on-line interference detection; and, finally, the generation and handling of manufacturing and assembly docu- ments, from parts lists to bills of materials.

HICADEC places great empha- sis on supporting the ship produc- tion process, with information pro- vided to name, describe and specify exact cutting and assembly opera- tions to the level of individual parts. Odense Steel Shipyard has used HICADEC on several recent com- mercial new construction projects. On these projects the system auto- mated the production of steel detail and outfitting fabrication and as- sembly drawings; automated the detail planning and budgeting for steel work; and automated material takeoff and requisitioning. It also created a structural database from which the automated welding pro- grams for a series of very large crude carriers (VLCCs) (prepared by one person) which resulted in the auto- mated welding of 100 percent of the midbody sections by Odense weld- ing robots.

IMSA's modules ShipCAM and NC-PyrosLofting address develop- ment of the table of offsets through all stages of fairing and lofting to the NC code for computerized plate burning. The program is interac- tive, and all surfaces can be ex- panded to flat plate with all mark- ings for frames, stringers, bulbs or thrusters.

TRIBON provides tools to plan the assembly stage of production for hull and outfit items. The TRIBON structural system handles compre- hensive bracket generation, nest- ing of plate parts, workshop draw- ings and production information, parts and profile lists, templates for bending plates and stiffeners and assembly jig data. TRIBON's outfit- ting system covers standard mate- rial and specification libraries, sche- matic diagrams, equipment defini- tion and location, modeling of pipes, cableways and ventilation ducts, isometric drawings, material lists for prefabrication and assembly, weld records, NC bending data, in- terference control, weight and cen- ter of gravity calculations and com- posite drawings. The electrical modules cover the areas of cable specification and registration, equip- ment definition and location, cable- way registration, automatic rout- ing of cables and installation in- structions and feedback.

*This article was excerpted from a presentation given by **Jonathan M. Ross** of Ross-McNatt Naval Architects, at the recent National Shipbuilding Research Program (NSRP) 1993 Ship Production Symposium, sponsored by the Hampton Road Section of the Society of Naval Architects and Marine Engineers.*

A REVIEW OF THE SYSTEMS

For the purposes of this article, eight integrated ship design programs are reviewed: HULLTECH, Autoship System, FORAN, HICADEC, IMSA, TRIBON, NAPA and NAVSEA CAD-2. Different programs focus on different phases of the design/production sequence. Information on the programs was obtained from interviews, literature and correspondence with the organizations that have developed the programs. The programs, or at least the modules from which the programs are comprised, have been developed over a period of years and, without exception, are still being improved. Following is a quick rundown on each.

1 ***System: HULLTECH***
Company: BMT Icons, Limited (formerly British Ship Research Assoc.)
Focus: Supports from initial concept to providing production information. Covers wide range of applications for designers and production engineers, including hull shape design, arrangements, lines development, hydrostatics, stability, longitudinal strength, resistance and power, seakeeping and maneuvering, shell plate and internal steelwork definition, as well as plate nesting and cutting information for production.
Techmcal: Widely available on UNIX workstations and PCs. Presently being adapted for use on MS-Windows for the PC and X-Windows/Motif for workstations.
Circle 77 on Reader Service Card

2 ***System: NAVSEA CAD-2***
Company: Intergraph Corp.
Focus: NAVSEA CAD-2, developed under contract to the Naval Sea Systems Command (NAVSEA) is a CAD/CAM systems and services to support the design, construction, maintenance, overhaul, alteration and repair of Navy ships and shipboard systems. The organization of CAD-2 is reflected in the company's Vehicle Design System (VDS), the commercial version of the program. VDS is comprised of three modules, encompassing equipment design, structural systems design and a routing package that includes piping, HVAC and electrical raceway design.
Technical: Run on UNIX-based workstations.
Circle 84 on Reader Service Card

3 ***System: Autoship***
Company: Autoship Systems
Focus: Preliminary design through lofting, with capabilities in hull definition and fairing, weights, stability, hydrostatics, longitudinal strength, resistance and power.
Technical: Developed for use by small- and mid-sized yards, the program aims to be user-friendly and can run on PCs, capable of running entirely on Windows.
Circle 78 on Reader Service Card

4 ***System: NAPA***
Company: Napa Oy (developed by Wartsila Corp.)
Focus: Used from the early stages of design through detail design, and following construction, for development of a ship's documentation. Capabilities include general arrangements, capacity lists, hull form design and fairing, lofting, intact and damage stability, container loading, grain stability, weight and cost calculations, and more.
Technical: Written in FORTRAN 77 and runs on Sun, VAX and HP workstations, and 486 PCs.
Circle 83 on Reader Service Card

5 ***System: FORAN***
Company: Senermar
Focus: CAD/CAM/CAE system. Latest version, FORAN V30, covers all of the aspects of general design, drafting, steel structure, machinery and outfitting design and production.
Technical: May be run on UNIX and VMS operating systems and with X-Windows and OSF/MOTIF.
Circle 79 on Reader Service Card

6 ***System: HICADEC***
Company: Hitachi Zosen Corp. (Odense Steel Shipyard is the marketing agent for the systems in the west)
Focus: Addresses integrated CAD/CAM design of ship structure, piping, outfitting and electrical design, through the use of a three-dimensionally processed database. Also supports robotic ship production tasking. The program is designed to make extensive use of standards.
Technical: Runs on UNIX workstations, available under X-Windows.
Circle 80 on Reader Service Card

7 ***System: IMSA***
Organization: International Marine Software Associates (a cooperative venture carried out by several American firms to integrate five existing programs into modules of an integrated ship design program.)
Focus: Capabilities in hull design, structural analysis, hydrostatics, stability, propulsion design and analysis, lofting and support for numerical cutting.
Technical: IMSA programs run on workstations and PCs.
Circle 81 on Reader Service Card

8 ***System: TRIBON***
Company: Kockums Computer Systems A/S (KCS)
Focus: Contains selected features from three of its programs, AUTOKON, STEERBEAR and SCHIFFKO, and builds on the technology of STEERBEAR. Applications for hydrostatics, stability, longitudinal strength, lines fairing, steel design, piping, cabling, ventilation, foundation and accommodations, as well as production info.
Technical: TRIBON is coded in UNIX C++ and will run on a DEC VAX/VMS workstation. Later versions will run on Hewlett Packard (HP) workstations, and if customer demand warrants, IBM workstations.
Circle 82 on Reader Service Card

Tuck Named Int'l Business Developmer VP Of Sundstrand Corp.

Hazen Tuck

Sundstrand Corporation named **Hazen Tuck** vice president of international business development. Mr. **Tuck** will replace **Kenelm A. Groff**, who will retain the position until his retirement in July 1994.

Mr. **Tuck** joined Sundstrand in 1975 and held various corporate accounting positions until 1982 when he was named division controller, Sundstran Fluid Handling. After several other positions, i 1991 Mr. **Tuck** was named to the position h currently holds and will hold until July, director c corporate audit services.

The Falk Corporation, a wholly-owned subsic iary of the Sundstrand Corporation, is a leader i the manufacture and sale of high-quality me chanical power transmission equipment. Th Sundstrand Corporation is a leader in the design manufacture, and sale of a variety of proprietary technology-based components and subsystems.

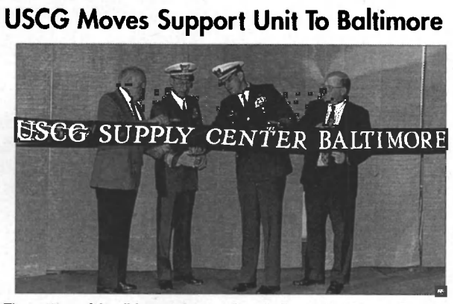
For more information on Sundstrand Corp.,

Circle 154 on Reader Service Card

Marathon Electric Acquires Fidelity Electric

Marathon Electric Manufacturing Corp. of Wausau, Wis., manufacturers of AC electrical generators, purchased the assets of Fidelity Electric, Inc. in York, Pa. The acquisition adds an additional line of quality AC generator designs to the current LIMA and Marathon product lines, and further broadens the Marathon AC generator product line from five to 2,000 kW, for prime, portable and standby generator designs.

USCG Moves Support Unit To Baltimore



The cutting of the ribbon at the new Supply Center Baltimore. From left to right: Dr. **Charles Ecker**, County Executive of Howard County; Radm. **Peter Bunch** of USCG Headquarters; Capt. **William Bowen**, commanding officer of Supply Center Baltimore; and **Michael Lofton**, executive VP of the Anne Arundel Economic Development Corporation.

The U.S. Coast Guard (USCG) recently commissioned Supply Center Baltimore, a logistics support unit which relocated to the Baltimore area after 72 years of operation in Brooklyn, N.Y.

USCG Supply Center Baltimore is the premier facility for general and electronic support items for worldwide USCG activities. Unit headquarters are located in Glen Burnie, Md., a suburb of South Baltimore in Ann Arundel County. The Supply Center's 175,000-sq.-ft. warehouse is in the Howard County City of Columbia, Md. Nearly 240 military and civilian employees work in the administrative and warehouse offices.

Megayacht Market Poised For Growth

Luxury Tax Repeal, Economic Upswing Spur Market

Last year there were many significant events which had direct and direct impact on the megayacht arket. But standing out as perips the biggest development was e repeal of the 10 percent "luxury" x on new yachts. The repeal, plus ıe perception that the recession is :versing itself, have together en-:ndered a sense of optimism in the ıcht-building industry that ranges om the reserved to the enthusias-c.

s The Market Coming Back?

"There isn't any question that he market has picked up," said **Mike Kelsey**, chairman of Palmer ohnson of Sturgeon Bay, Wis., who s also on the board of the National Marine Manufacturers Association NMMA). "People are feeling confilent in the economy. When that ıappens, the market picks up."

"I think it's definitely better than a couple of years ago," said **Bruce Reagan**, president of Sovereign Yacht, Seattle, Wash. "There's still some hesitation as people wait to see what's going to happen with the economy."

Those words were echoed by **Michael Hodgson**, design engineer with Schoell Marine, affiliated with Infinity Yachts. "I do see it picking up due to the repeal, but there's still some hesitancy parting with dollars. Things are still too tight. It's close to a major breakthrough, but it's still got a ways to go."

Mr. **Kelsey** cautioned that the situation, while improving, is not ideal. "The luxury tax in combination with the recession dealt a double blow. It's gone away, but the market doesn't come back instantly," he said. "This last year was the worst I've ever seen in the custom boatbuilding business." But as evidence of his contention that things are indeed looking up, Mr. **Kelsey** said that Palmer Johnson has received orders for three boats in as many months, and is currently engaged in five major boatbuilding projects. He said the yard is finishing up one 150-foot yacht for delivery this spring, one 108-foot sailboat and a 140-foot heavy displacement motor yacht.

135-foot motoryacht by Palmer Johnson.

"Some of the builders are still having trouble getting work," said **Randy Rust** of Westport Shipyards, Westport, Wash. "We probably have a little more work than a year ago. I guess it's gradually improving now that the uncertainty of the tax is gone." Mr. **Rust** reports the delivery of a 106-foot yacht recently, with work continuing on two more 106-footers. Another yacht, this one 112 feet, is about to be launched by Westport.

The Effect Of The Tax

"Traditionally (the sales of) large boats have more stability than small boats, but we still experience some fluctuations," said Mr. **Rust**. Mr. **Kelsey** agreed that the high-end yacht market was not quite so mercurial as the markets for less expensive boats: "The top end tends to go on," he said. Mr. **Hodgson** also said he saw more of a high-income crowd which remain consistent buyers, while the market for less expensive vessels fluctuates.

"You're dealing with a discretionary, high-ticket item," Mr. **Kelsey** said. Palmer Johnson weathered the storm well, but even it has been affected by the tax and recession. "We went for a substantial amount of time, almost a year, when we didn't have any orders to speak of," said Mr. **Kelsey** .

If a buyer wanted a yacht immediately, he could avoid the tax by buying foreign, or buying a used yacht until the tax "blew over," as many felt it would — and time has proven out their view. "It wasn't that the clients couldn't afford to pay, they just refused," Mr. **Kelsey** said. Buying a brand-new, state-of-the-art yacht is, he said, "an absolutely postponable thing." All this effectively put U.S. yacht builders at extreme disadvantage in the new yacht market. The lack of orders for new yachts thwarted the original intent of the tax, which was to raise revenues.

But there were a handful of builders who weren't affected by the tax. When asked if Sovereign Yacht was hit hard by the tax, Mr. **Reagan** answered: "Frankly, no." He said the larger, more expensive jobs his company has done for the most part either had foreign registries or were for people who could comfortably pay the tax. "I think where that's more important is in the smaller boats."

The *Westship Lady*

William S. Smith III, of Trinity Yachts, said Trinity wasn't affected by the tax as much as yards which do smaller boats, because a lot of the large yachts they work on will have foreign registries. He cited the conversion of a 180-foot yacht into the 192-foot *October Rose*, a massive undertaking for a foreign owner. Trinity also delivered the *Lima* in 1993, a hybrid yacht/fishing boat catamaran from its Aluminum Boats division in Crown Point, La., to a foreign owner. But he still said the tax was a regrettable action on the part of Congress. "History has proven that those kinds of taxes just don't work," he said. He said all the tax managed to do was cause U.S. buyers to have their yachts built and sailed overseas.

When U.S. buyers are turning to the foreign or used markets, where do U.S. yacht builders turn to for work? The answer seems to be twofold: Palmer Johnson remained vital through pursuit of the repair and foreign markets. "When the luxury tax killed the U.S. market — and that's what it did — we had the European and Asian markets to fall back on," said Mr. **Kelsey**. He also said that Palmer Johnson's Savannah, Ga. facility had expanded its refit base, turning to repair to make up for lack of newbuilds.

"The NMMA, plus a lot of hard-working individuals, raised a lot of heat," Mr. **Kelsey** said of the tax's eventual defeat. "Unfortunately, a lot of people in the industry just disappeared."

Market Developments

"The demands for quality have gotten more stringent," said Mr. **Smith**. "As the investments get higher, the owners bring in more professional people. The numbers are just too high for the old system of owner and yard getting together and seeing if they can do something together." Mr. **Smith** mentioned one yacht in which the owner had a motion picture theater installed, complete with THX sound.

"Quality of the vessels has been

(Continued on Page 72)

Megayacht Market Report

(Continued from page 71)

increasing, and so therefore has average cost," Mr. **Rust** concurred. "But money is obviously a concern for today's buyer, or else they wouldn't *have* these boats. We're seeing an emphasis on higher value rather than quality at any cost."

Those sentiments were echoed by **Herbert Postma**, president of Westship of Fort Lauderdale, Fla., which has units that deal in both new and used yachts "I think the trend is to quality. People are realizing you *do* get what you pay for," said Mr. **Postma**. "We have a more astute buying group," he said of today's yacht buyers. In the eighties when the economy was booming and more people could more easily afford such a luxury, yacht buyers didn't necessarily have to know much about boats. But in these days of tighter belts, more buyers are knowledgeable about what they're getting into. "The discretionary buyer is coming back into the marketplace," said Mr. **Posti**

Trinity's 192-foot conversion *October Ro*

"There's a definite trend tow value," said Mr. **Reagan** of Sov eign Yacht. "There's more of a pr tical approach toward less osten tious cruising quality. We're bui ing some really serious, nice-lo ing yachts, but they're also seric engineering efforts — li *Venturosa*, which was elegant b understated." The *Venturosa* is 109.5-foot technologically advanc sailing yacht that Sovereign del ered to a European owner in t summer of 1993.

Mr. **Reagan** said—at least in h region—owners were looking f boats that share the functionali and longevity of their distant cor mercial cousins. "Here in the Nort west, there's a tendency to bui boats for long-term application," h said. Mr. **Hodgson** of Schoell Ma rine/Infinity Yachts said that today

"The owners are looking for fully-rigged boats — not bargain-basement boats with no equipment" — Michael Hodgson

yacht owner wants basically what he's always wanted. "Things have improved in terms of design and technology," he said, "but when someone orders a boat, it's going to be fast and able to run the rough seas, and they want to get their money's worth.

"The market's good for high-speed sport yachts," Mr. **Hodgson** continued. "The owners are looking for fully-rigged boats — not bargain-basement boats with no equipment."

Palmer Johnson's Mr. **Kelsey** would seem to agree, with an emphasis on advanced gadgetry. "As always, pleasure boat owners are very interested in new developments, primarily in navigational and communications equipment: the new satellite navigation technology, integrated bridge systems. Many yachts over 100 feet have better systems than commercial vessels. They don't need that, but it's part of the experience." Mr. **Kelsey** said the communications equipment in particular was actually having an effect on the popularity of yachting. "People are in constant contact with their offices. They don't have to say they're going off and won't be reach-

e for two weeks. That keeps m interested in boating."

With the new communications, se yachts do become their second nes, mobile offices," said Mr. **ith** of the new tech-equipped ht-buyers. "They can do busi- ss from almost any spot in the rld. The only thing they need to ne ashore for is provisioning the at, and they can get smaller boats do that. Now communications ve caught up with the ocean-cross- r ability of the yacht."

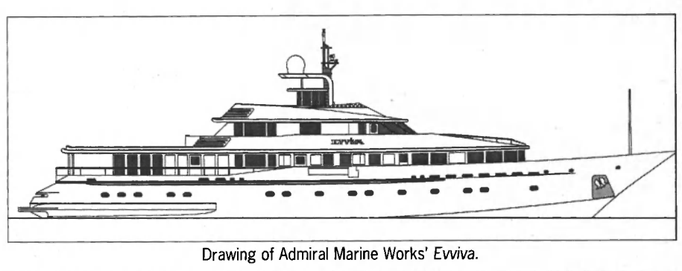
Mr. **Hodgson** said that aside m environmental regulations that andate different bottom paints — ade in plants with low Volatile ganic Compound (VOC) emissions his organization had been in- lved in some impressive strides in cht-building over the past year. Ve have a design company that as done two major design improve- ents," he said. First, the "Duo elta Conic" hull shape. The origi- al shape, patented in the 70s, is fset on the bottom for enhanced erformance, and is now produced r four other companies. "The other a trimmable surface drive. Maybe vo other manufacturers have them. hey're built in a material that can t in salt water; items that can't ake salt water are kept inside the oat." Mr. **Hodgson** said that amaha and three other manufac- urers had tested the drive with ossible production intent.

Hull Structures

Noteworthy among the engineer- ng achievements of 1993 is *Evviva*, eportedly the largest fiberglass re- nforced plastic (FRP) vessel ever built, delivered by Admiral Marine Works, Inc. of Port Townsend, Wash. The 161-foot vessel is the product of advanced composite engineering and contains no structural wood, with a cruising speed of 20 knots and a maximum speed of 25 knots. And true to the electronic trend Mr. **Hodgson** and Mr. **Kelsey** observed, *Evviva* is outfitted with a host of advanced electronics, including North-Star GPS; Furuno depthfinder, sonar and weather fax; C-Plath gyrocompass; and an Alden EPIRB.

There's still two main schools of thought regarding hull material: aluminum and fiberglass. "Fiberglass's penetration of the market keeps increasing," said Westport's Mr. **Rust**. "We've been delivering large fiberglass boats for many years. They've dominated the West Coast for a long time, but recently they've begun to get very big on the East Coast, too. Our boats are built with a sandwich-type composite technique, so the performance of the boat is increased."

Although most of the yachts worked on at Trinity are made of steel with aluminum superstructures, "Aluminum is getting bigger and bigger," according to Mr. **Smith**. "Fiberglass construction is growing



Drawing of Admiral Marine Works' *Evviva*.

For more information on the companies mentioned in this feature, circle the appropriate number on the Reader Service Card bound in this issue:

Admiral Marine Works	**331**
Falcon Maritime Ventures	**332**
Infinity Yachts/Schoell Marine	**333**
Palmer Johnson	**334**
Sovereign Yacht	**335**
Trinity Yachts	**336**
Westport Shipyards	**337**
Westship	**338**

rapidly in boats up to 120 feet. I see fiberglass becoming dominant for vessels up to that size." Why that size range? "As you get bigger and bigger, the stress properties of fiberglass become more difficult to manage, and it's very difficult to build a fiberglass hull modularly."

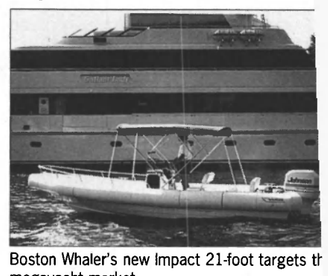
Mr. **Postma** puts his sentiments on the benefits of fiberglass very succinctly: "More fun, less maintenance."

However, some interesting developments have been made in aluminum hull construction. Falcon Maritime Ventures of Fort Lauderdale this past year licensed a process of building aluminum hulls to Lurssen Shipyards, which has a unit that is also in Fort Lauderdale, Lurssen Yachts America. Patented by **Dan Johnston** in 1988, the method is in essence an application of the monoque construction process, where the hull panels take on an induced curvature in either a convex or concave shape. Reportedly the need for internal framing is substantially reduced due to plate-to-plate compressive loading of the hull panels, and the frames are attached to the heel plate only at the keel, chine and gunnel. The process reportedly reduces production time and total weight of the finished product, while maintaining strength and quality.

Mr. **Smith** said Trinity recently received an inquiry to adapt the design of the AGOR 23, a 274- oceanographic survey vessel b built by Trinity under a Navy tract, into a megayacht — very m in the spirit of combining milit and commercial applications, as federal government is advising I shipbuilders to do. The theori vessel would have flume tank st lization, working without moti unlike usual fin stabilizers. "A lo things we've done for the Navy h application in the superyacht m ket," he said. "The big AGO displacement hull lends itself t yacht design."

Mr. **Smith** also said he saw thir like diesel electric propulsion a steerable Z-pellers with omnidir tional thrusting and dynamic po tioning growing in megayacht a plications.

Boston Whaler Introduces Impact 21-Foot Yacht Tende



Boston Whaler's new Impact 21-foot targets th megayacht market.

The Lauderdale Marina, Inc. of fers a new Boston Whaler Impac 21-foot specially customized to mee the megayacht owner's desire for a soft-sided tender that resists sur and salt water, stands up to harc use and will reportedly never de flate. After years of supplying Rigic Inflatable Boats (RIBs) to the megayacht market, the Lauderdale Marina, Inc. purchased a Boston Whaler Impact 21-foot for customizing and use as a high-quality, highly versatile megayacht tender.

The Impact 21-foot reportedly incorporates luxury appointments and seating arrangements suited to the needs of the large yacht owner who is looking for an elegant, dry, soft-riding tender able to carry guests in comfort and handle a variety of other tender duties with equal facility. Powered by a 200-hp OMC outboard, this all-fiberglass yacht tender comes with a host of built-in features for megayacht operators. Based on Boston Whaler's Deep-V hull design which makes for a fast, comfortable trip on open water, the new Impact 21-foot bridges the gap between RIB and Boston Whaler's strong, rugged unibound hull construction. The vessel features a wraparound foam fendering system designed to absorb the shocks and bangs of hard use. With a beam of 8.25 feet, the Impact 21-foot has plenty of stowage space and a dive door for accessibility to swimmers. Lifting rings are provided to meet the requirements of any megayacht davit system. For more information on Boston Whaler's Impact 21-foot,

Circle 339 on Reader Service Card

otal Quality: Companies Near And Far Jump On The ISO Bandwagon

by
Dan Maniotis, assistant editor

Total Quality," the catchphrase ıe '80s and '90s, is embraced by ıstrial leaders around the world.) 9000" is a quality standards tem with growing support, as denced by the increasing num- of organizations seeking certifi- ion to those standards. The fol- ring is a primer on ISO 9000: to olain why so many builders and oplier seek it; why owners and erators might require it; and how, the end, it will result in a better oduct and service for all.

hat Is It?

ISO 9000 certification, described some as the key to doing busi- ss internationally, is when a com- ıy is certified as in compliance ith the ISO 9000 series of stan- ards for operating a company. xactly what those standards are mited to in terms of company type a difficult question to answer. "I on't think there *are* any limita- ons," said **Anita Flematti,** mar- et analyst for ABS Quality Evalu- tions, a certifying company, or reg- strar, based in Houston. However, he said, "Not all registrars have he capability to certify for certain industries." What such certification means in terms of a company's operation is, in a word, efficiency. "It has to do with how you run your business," said Ms. **Flematti**. "It's looking at what your processes are: how you do purchasing, contract review ... You have to have a system to fulfill the client's contract."

The same ISO 9000 labels apply to all industries, but signify different standards of quality assurance. Those labels are as follows:

- ***ISO 9000:*** a document meant to provide guidance to companies interested in pursuing the ISO 9000 as a quality assurance mechanism. It tells companies interested in ISO 9000 what level they should aspire to, and how to achieve it.
- ***ISO 9001:*** The most comprehensive of the ISO 9000 series of standards, it covers design, production, servicing and installation.
- ***ISO 9002:*** This standard covers only production and installation. Often a company certified to ISO 9002 is engaged only in production and installation.
- ***ISO 9003:*** An even more specific standard that covers only final inspection and test operations.
- ***ISO 9004:*** Like ISO 9000, a guidance document, but issued to companies already in the ISO process to help them implement and maintain its chosen standard.

Certification to the ISO 9000 standard involves an application, a review of documentation, a possible pre-assessment, then an actual assessment. The process requires exhaustive examination of company documentation to ensure all the elements of the ISO 9000 standard are being addressed and implemented. If a company is certified, there follows periodic surveillance to ensure adherance. The pre-assessment is often optional.

A company is either approved, approved conditionally/provisionally until minor flaws are corrected, or disapproved. Conditional/provisional approval means the registrar will make certain the minor flaws are corrected and then engage in periodic surveillance; and disapproval means the company must repeat the procedure.

Who Does It?

The International Organization for Standardization (ISO) in Geneva, Switzerland established the ISO 9000 series of standards, but does not certify compliance with those standards. "There is no such thing as ISO-certified," according to **Roger Frost**, press officer of the ISO. The structure of the ISO certification system has three tiers:

- ***Certifying Organizations (Registrars):*** these organizations perform extensive examinations of companies wishing ISO 9000 certification to determine if they meet the standards. Some certifying organizations are in turn given approval by accrediting organizations. These organizations are more often called registrars in the U.S.
- ***Accrediting Organizations:*** these accredit registrars, in effect certifying the certifier: ascertaining that certifications are done properly, studying the documentation and procedures of certifying bodies extensively. Two of the main accrediting organizations are the National Accreditation Council for Certifying Bodies (NACCB), U.K., and the Raad voor de Certificatie (RvC), The Netherlands. Some registrars are accredited by more than one organization: for example, ABS Quality Evaluations is accredited by the RvC and Registrar Accreditation Board (RAB), a U.S. accrediting organization.

The third tier is made up of the companies seeking certification, but there are other organizations involved. The American National Standards Institute (ANSI) is the U.S. member body to the ISO. The American Society for Quality Control (ASQC) was designated by ANSI as the administrator for the Technical Advisory Group through which the U.S. participates in the ISO. ANSI and RAB, an ASQC subsidiary, joined forces and now offer a joint program for evaluating and accrediting registrars.

(Continued on page 79)

Skimmer Support	28 x 11 x 7	Caterpillar	NRC	n/a	Hull 301	75 x 30 x 9	Caterpillar	U.S. Army	4/95
Oil Spill Response	33 x 12 x 4	OMC	Clean Seas	n/a					

SURVEY OF U.S. SHIPYARDS

(Continued from page 90)

Ferro Corporation

CopperClad® Bottom Coating System is a permanently-attached antifouling hull coating that can be sprayed in-mold by the manufacturer of fiberglass boats or post-applied by an authorized applicator to existing fiberglass boats. Reportedly, CopperClad coatings are environmentally acceptable alternatives to ablative bottom paints — cost-effective coatings that do not leach or "fall off" and provide a safe, long-lasting finish. CopperClad is registered with the EPA. For more information on Ferro Corporation,

Circle 192 on Reader Service Card

Hempel Paints Ltd.

Ballast spaces are a problem Hempadur LTC 4514 and 4515 were designed to solve. These products are reportedly suited to the total protection of such areas due to their chemical structures. The products reportedly afford: no restriction in use through coal tar or isocyanate content; light colors to ease inspection during application and subsequent surveys; and better temperature resistance.

"Hard" coatings with abrasion-resistant properties, they also embrace tolerant recoating intervals and reportedly are equally suitable for segregated and combined cargo/ballast spaces.

The high volume solids (82-85 percent, depending on shade) provide not only low VOC emissions, but increased area coverage. The low-temperature curing Hempadur LTC 4514 provides an application temperature down to minus 15 degrees F.

For more information on Hempel Coatings,

Circle 95 on Reader Service Card

Sigma Coatings

With today's demands for higher safety, economic benefits and more stringent environmental concerns, Sigma Coatings is already well-established in R&D programs directed toward the future.

Products range from the high-grade, tin-free self-polishing antifouling Sigmaplane Ecol to solvent-free tank coating systems such as the combined spray and fill epoxy Sigmaguard CSF and the ballast tank coating Sigmaguard BT.

Sigma Alumastic is a high-solid, VOC-compliant self-priming surface tolerant epoxy coating. Specially developed for rusted areas where only surface preparation by power tool or hydroblasting is possible, it provides resistance to abrasion, impact, water and mild chemicals, and can reportedly be overcoated with epoxy, polyurethane, alkyd, acrylic and chlorinated rubber paints.

For more information on Sigma Coatings,

Circle 116 on Reader Service Card

Stan-Blast Abrasives

Stan-Blast has added new items to their product line that will help customers comply with the stricter regulations imposed by the Department of Environmental Quality (DEQ) and the EPA. The new items are: Blastox, containment screens and other low free silica abrasives, such as garnet and glass beads.

Blastox is blended with abrasives before blasting to render spent abrasives non-hazardous and acceptable for disposal in standard landfills. Containment systems are meant to meet most stringent environmental regulations by containing and capturing overspray and spent abrasives. Stan-Blast abrasives are listed on the Navy's Qualified Products List.

For more information on Stan-Blast products,

Circle 199 on Reader Service Card

The T.D.J. Group

T.D.J. is an environmental services company that markets dry chemistry for use in a variety of markets to render heavy metal waste non-hazardous under TLCP testing. Blastox™ is a blasting additive used with traditional abrasives and equipment to render spend abrasive waste non-hazardous for lead and other metals under TLCP testing without RCRA permitting.

Blastox blended abrasives are reportedly being used on Navy vessels and in ship yards to reduce the cost of handling abrasive waste. Regional capabilities for beneficial reuse of spent abrasives (versus landfills) are being set up regionally, which reduces potential liability for the generator. For more information on the T.D.J. Group,

Circle 104 on Reader Service Card

Unitor

Unitor's Corroless Rustk
range comprises two rust-stal
ing primers for convention
reachable ship areas, and two c
sion-inhibiting aerosol sprays
other areas. The surface-tole
Anti-Rust primers can report
be painted on after removing l
rust for long-term corrosion pro
tion. Anti-Rust Spray 1 report
protects nuts, bolt heads, flan
crevices, window frames and
holes, hinges, valves and stored c
ponents. Anti-Rust Spray 2 is
electrical spray that dries to a cl
thin film and can reportedly be u
to protect the internals of electr
junction boxes, switchgear, navi
tion lights, communications equ
ment, electrical motors and tools
storage. For more information
Unitor,

Circle 193 on Reader Service Card

U.S. Paint

AWLGRIP High Solids Urethan
Coating Systems reportedly me
rigorous performance standards e
tablished during five years of l
and field research, and are current
being globally test marketed in fres
and salt water. AWLGRIP Hig
Solids were developed in respons
to concerns of lowering solvent emi
sions while offering the exception
performance advantages of the cor
ventional urethane AWLGRIP proc
uct line. Reportedly low in VOCs
AWLGRIP High Solids reportedl
have high impact and chip resis
tance, high gloss retention, excel
lent flow control and flexibility o
application. Manufactured in quart
and gallons, a wide range of stock
and custom colors have been formu
lated. For more information on
AWLGRIP High Solids Urethane
Coatings Systems from U.S. Paint,

Circle 194 on Reader Service Card

U.T. Technologies

HYCOTE Epoxy Coatings and adhesives, from U.T. Technologies, reportedly perform under adverse environmental conditions — providing all the expected benefits of epoxy-based systems. Application can usually be made using one of the seven Product Application Modules (PAMs) which help guarantee a properly mixed and prepared product. U.S. government agencies have reportedly been applying HYCOTE 151 to ship hulls without removing them from the water. Oil companies in the U.S., Mexico and Brazil have used HYCOTE 151 for applications along the waterline of offshore platforms and inland on pipelines where condensation prevents the use of traditional coatings systems. For more information on HYCOTE from U.T. Technologies,

Circle 198 on Reader Service Card

Ultra Safety Systems

ef-Gel, a specially formulated thick waterproof e, helps eliminate corrosion prevalent in modern water and manufacturing environments where similar metals are used and problems like paint tering, galling, seizing of hardware and dissimilar tals corrosion often occur. Ultra Safety Systems d Tef-Gel's unique waterproof base is unaffected by tergents and water. Tef-Gel can also be used for eping metal to metal moving surfaces free-sliding id free of rust, as well as for chain drive lubrication, isuring secondary protection for bearings, easing ssembly and removal of collars, pulleys, mounting ardware and all other mechanical parts. For more nformation on Ultra Safety Systems,

Circle 97 on Reader Service Card

Cygnus Instruments, Inc.

Cygnus Multiple Echo ultrasonic digital thickness gauges are able to ascertain the thickness of metal without removing the coating. The gauges are reportedly easy to use and durable for gauging shell plate, bulk heads, ballast tanks, cargo lines, steamlines, etc. Cygnus gauges are also used for classification society inspections. They are available in a variety of hand-held models. For more information on Cygnus,

Circle 88 on Reader Service Card

GF Marine Wins Stena Contract

GF Marine AS of Norway won a contract to supply heating, ventilation and air conditioning for the Stena HSS (High Speed Service) project. GF Marine Group reportedly has extensive experience in HVAC design and product development, including high-speed aluminum-hulled catamarans. Stena's HSS ferry will reportedly be the biggest high-speed ferry in the world. Its cruising speed will be about 40 knots, with a capacity to carry 1,500 passengers and 375 cars.

Trinity Delivers Second Double-Hull Oceangoing Barge To Allied Towing

The second of two 332-foot double-hull oceangoing barges has been delivered by Trinity-Beaumont, a subsidiary of Trinity Industries, to Allied Towing Corporation of Norfolk, Va. Tank Barge ATC 81 has a 74-foot beam, a 25-foot depth and a fully-loaded draft of 22 feet. The barge is equipped with ten cargo tanks for a carrying capacity of 80,000 barrels, transferred by two Detroit Diesel-driven Johnston deepwell pumps. On deck, Tank Barge 81 is equipped with one, two-ton capacity Trident cargo hose handling crane, two Nabrico Equipment wire rope winches, one McElroy equipment anchor windlass and one New England Trawler capstan. The cargo tank level and alarm system was furnished by Bergan Tank Control. The barge is equipped with one diesel-driven generator to supply power to the hydraulic system and deck lighting. A sister to Tank Barge ATC 81 was delivered by Trinity in May 1993.

Chevron President Wolcott To Retire; Moore Appointed Successor

Chevron Shipping Company, Chevron Corporation's marine transportation subsidiary, announced that its president, **Douglas C. Wolcott**, will retire April 1, 1994, whereupon **Thomas R. Moore** will succeed Mr. **Wolcott**. Mr. **Moore**, currently vice president and general manager, operations, Chevron Shipping Company, holds a B.S. and a Master's degree in chemical engineering from Cornell University. He joined Chevron in 1968 and was appointed to his current position in 1988. Mr. **Wolcott** has been an active leader in the shipping industry, serving as chairman or director for a number of organizations and associations.

MarAd Studies Growing Trade Within Americas

The Maritime Administration (MarAd) released the first of three studies being conducted to determine how water transportation could be utilized for the growing trade among the nations of North America, Central America, the Caribbean and the northern rim of South America.

For the U.S., trade within the Americas is the fastest growing of all its commerce.

The trade potential these nations could realize as a result of the North American Free Trade Agreement prompted the research.

However, the study will extend beyond the three nations that are directly involved.

The study examines prospects for intermodal freight systems on the waterways and rivers which link the central portions of the U.S. and Canada to Mexico, Central America, Caribbean countries and the northern rim of South America. The transportation system, referred to as the "Maritime System of the Americas," includes the Great Lakes, the Mississippi River and its navigable tributaries, the Tennessee Tombigbee Waterway and its tributaries, the Gulf Intracoastal Waterway, the Gulf of Mexico and the Caribbean Sea.

Because water transportation has generated a great deal of interest, MarAd has requested that the second and third phases of the research be conducted concurrently.

The first report may be purchased from the National Technical Information Service, 5285 Port Royal Rd., Springfield, Va. 22161, tel: (703) 487-4650, order number PB94-721407.

U.S. Transportation Needs Innovative Technology

At the Transportation Research Board's annual meeting, Secretary of Transportation **Federico Pena** cited the development and use of innovative technology as tools that will be critical to providing the transportation America needs.

The government's Interagency Coordinating Committee on Transportation Research and Development has reportedly identified almost $3 billion in transportation-related research in varied areas of the government. Secretary **Pena** also claims the Technology Reinvestment Project (TRP), which provides grants for the development of technologies applicable to both d fense and civilian uses, is a feder initiative important to transport tion. The DOT sponsored a series seminars held last year which ac dressed such dual-use technologies among the projects receiving grant are demonstrations of advanced composite materials in bridge construction and radar that can provide simultaneous weather and air traffic information.

The DOT is also reportedly working to enhance civilian use of Global Positioning System (GPS), a satellite-based navigation system developed by the military.

SUNY Maritime Training Ship To Become Troop Ship

The U.S. Maritime Administration advised the president of the State University of New York Maritime College, RAdm. **F.H. Miller**, that the college's training ship, *Empire State*, was being activated as a ready reserve force troopship to participate in a trooplift from Somalia. The vessel would be activated by the OMI Corp. of New York for the Military Sealift Command.

The *Empire State* is 565 feet long with a 76-foot breadth. She is powered by a 17,500-hp steam turbine plant and has a cruising speed of 20 knots.

The vessel was originally built by Newport News Shipbuilding and Drydock Company and was converted to a training ship at the yard of Bay Shipbuilding in Sturgeon Bay, Wis.

Maritime College is hoping the ship will be back in the spring in time for the summer sea term.

ALENDAR

EBRUARY

5th Dockmaster's Training eminar: February 7-10, San Di-go, Calif.
ontact: Crandall Dry Dock Engi-eers, Inc., P.O. Box 505637, helsea, Mass., 02150, tel: (617) 884-464; fax: (617) 884-8466.

Underwater Intervention '94: ebruary 7-10, Town & Country onvention Center, San Diego, Ca-if.
ontact: Underwater Intervention 94 Committee, P.O. Box 261149, San Diego, Calif. 92196; tel: (619) 22-8918; fax: (619) 426-4421.

'Fundamentals of Corrosion and Its Control" Course: Febru-ary 8-10, LaQue Center for Corro-sion Technology, Wrightsville Beach, N.C.
Contact: **Sherree Darden**, LaQue Center for Corrosion Technology, P.O. Box 656, Wrightsville, Beach, N.C. 28480, tel: (919) 256-2271; fax: (919) 256-9816.

International Boatbuilders' Exhibition & Conference (IBEX) 1994: February 10-12, Miami Radisson Center, Miami, Fla.
Contact: **Tina Sanderson**, tel: (203) 852-0500; fax: (203) 838-3710.

53rd Miami International Boat Show & Sailboat Show. Febru-ary 17-23, Miami Beach Convention Center, Miami Beach & Biscayne Bay Marriott Marine, Miami, Fla.
Contact: **Dale Robbins**, tel: (305) 531-8410; fax: (305) 534-3139.

Intermodal Association of North America Annual Membership Meeting and Intermodal Conference: February 20-23, Loews Coronado Bay Hotel, Coronado, Calif. Contact: **John McQuaid**, tel: (301) 864-2661.

Ship Production Committee Panel Meeting: Surface Prepa-ration and Coating: February 21-22, Houston, Texas.
Contact: **Kay Freeman**, tel: (601) 935-3919.

ASNE Naval Engineering for a Better Environment: February 23-24, Sheraton National Hotel, Arlington, Va.
Contact: **Margaret New** (exhibits) or **Melinda Sergent** (registration) at ASNE, tel: (703) 836-6727; fax: (703) 836-7491.

MARCH

Gulf Coast Business & Industry Expo '94: March 1-3, Mississippi Gulf Coast Convention Center, Miss.
Contact: Tel: (601) 863-2933 or 1-800-999-EXPO.

Oceanology International '94: March 8, Brighton, England
Contact: **Judith Patten**, Public Relations, OI 94, Neville House, 55 Eden Street, Kingston upon Thames, Surrey KT1 1BW, U.K., tel: +081-547-1566; fax: +081-547-1143.

Sea Japan '94: March 9-13, Japan
Contact: The Events Dept., The Seatrade Organization, Seatrade House, 42-48 North Station Road, Colchester CO1 1RB, U.K., tel: +44 206 45121; fax: +44 206 45190.

Portuaria '94 Set For May

Portuaria '94, the International Ports Exhibition, will take place from May 23-28, 1994 in Seville, Spain, within the Congress of Navigation of PIANC (Permanent International Association of Navigation Congresses).

Portuaria '94 was presented during November ana December 1993 at Europort '93, the 32na Nautical Exhibition of Barcelona and Intermodal '93. Enormous interest has been shown in Portuaria '94 by companies belonging to the shipping sectors. Companies most interested in exhibiting their products and services at Portuaria '94 include those in the sectors of machineries, equipment, port, shipping and nautical complements, port logistics, data processing and telematics, signaling, container and intermodal transports. For more informa-tion on Portuaria '94, contact **Ana Soto**, tel: +34-93-419-6041.

Shipping '94 To Examine Improved Service, Safety

The Connecticut Maritime Association's (CMA) annual ship-ping conference and trade show, "Shipping '94 - The Risks and Re-wards of Quality Shipping," will be held March 14-16, 1994 at the Sheraton Stamford Hotel and Tow-ers in Stamford, Conn.

The conference will examine the strides the industry has taken over the past several years to improve service, to protect the environment and the safety of those at sea, and to meet the challenges of global re-sponsibility and competition.

This year's speakers include a variety of leaders in the shipping industry who will be discussing "The Costs of Shipping - Does Quality Pay?", "The Benefits of Quality Ship-ping - What are They?", "The Proof of Quality Shipping - Where Has Quality Paid?"; and "The Threat of Ignoring Quality."

Among those scheduled to speak and participate in panels are **Philip J. Loree**, chairman, Federation of American Controlled Shipping; **Richard Quegan**, Texaco, Inc.; Rear Adm. **A.E. Henn**, Chief Office of Marine Safety, Security and Environmental Protection, U.S. Coast Guard; and **Frank Iarossi**, Ameri-can Bureau of Shipping. In con-junction with Shipping '94, the CMA Board of Governors will present the CMA Commodore award. For more information, contact **James R. Lawrence**, International Market-ing Strategies, Inc., tel: (203) 622-4014; fax: (203) 622-1929.

FOR MORE INFORMATION

ON

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3 - Gear Boxes, GE, Class 10,500 H.P., 3588 - 720 rpm.

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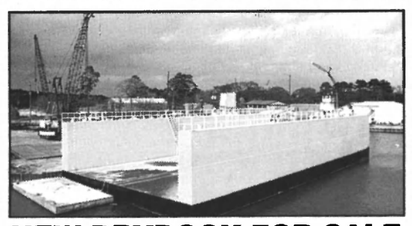
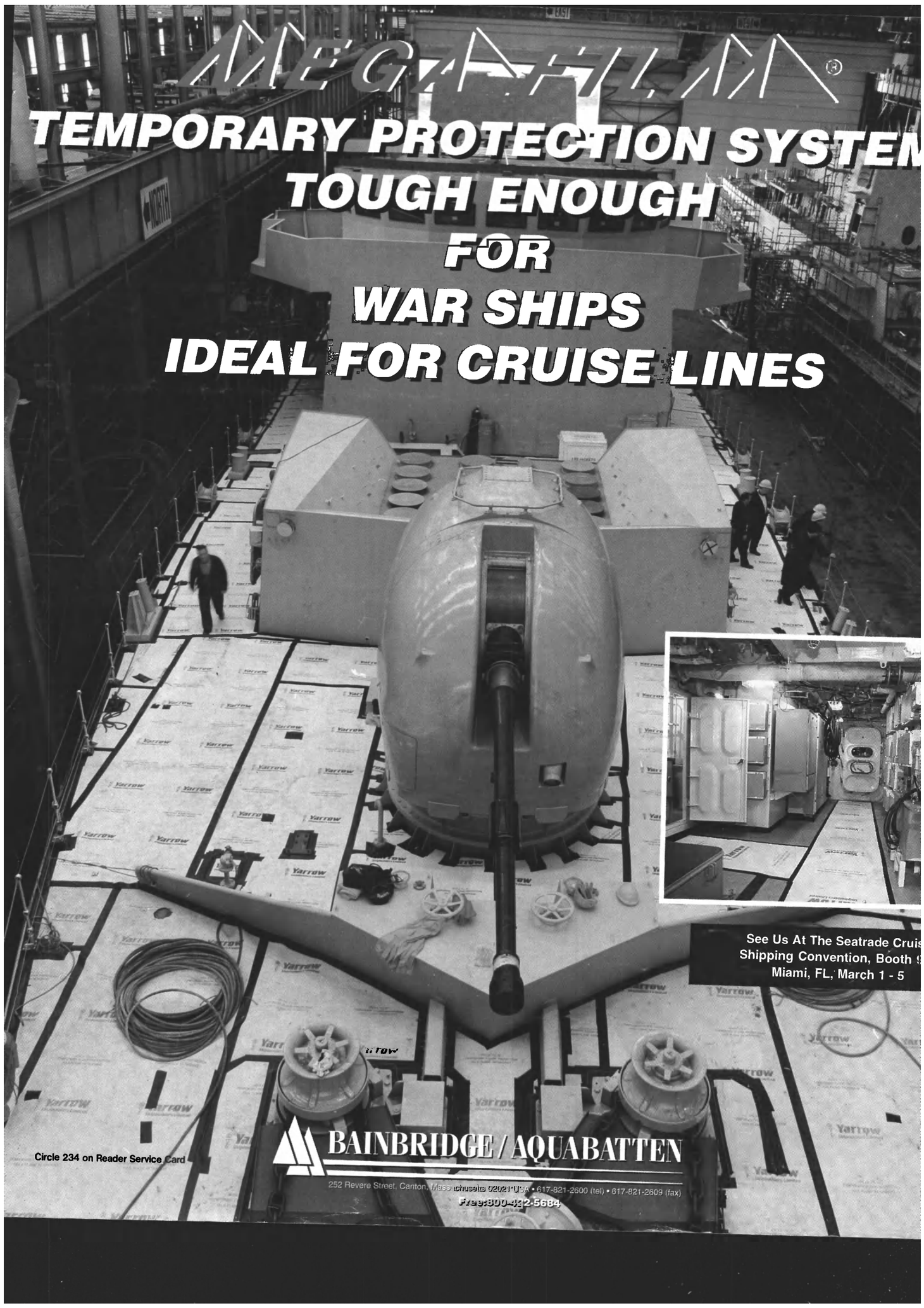
Mr. Gallagher
(718) 237-4040



NEW DRYDOCK FOR SALE

1000 ST capacity, 120'x60'x6'3"x52' inside width, 8 ballast tanks, all hull plating & hull bulkheads .385", wingwalls 5/16" plate 120' long x 16' high x 4' wide, 8-8" lo-lift pumps driven by 7.5 HP electric motors, 8 quick-opening butterfly valves, electric system 3 ph 220/440 V, floodlights, flat keel blocks, exterior painted with 2 coats coal tar epoxy, interior coated with tank preservative, weight 300 ST, immediate delivery Orange TX. $500,000. firm, call Jim Brooks for further information c/o HOUSTON BARGE & BOAT SALES (713) 558-1199.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ISO 9000 Certification

(Continued from page 75)

Classification societies are in a better position than most to judge maritime standards, so many have affiliates that do certifications, among them the American Bureau of Shipping (ABS), Lloyd's and Det Norske Veritas.

Why Do It?

The trend has even penetrated post-Communist Russia: that country's largest tanker operator, Novoship, is reportedly seeking certification. An estimated 2,000 sites have been certified in the U.S. and Canada. In Europe, the number of certified sites is estimated at 25,000.

There are several very good reasons for this boom. Certifying a level of quality can increase operational efficiency and control, and lower costs. A lot of customers just flat out demand that certification be acquired by any company they buy from, to manage their own costs.

Also, just having the market know your company has achieved ISO 9000 certification can bring in business. In short, ISO has become a poweful marketing tool.

Many believe ISO 9000 certification may become a prerequisite for tapping into the coalescing European Community (EC). Solar Turbines, a wholly-owned subsidiary of Caterpillar, Inc., recently achieved ISO 9000 certification. According Solar's **Larry Sera**, a marketing/communications specialist, Solar does most of its business outside the U.S. and its customers requested this certification. "It's sort of a requirement to play the game nowadays," he said.

Even companies like shipyards that don't necessarily export have to answer the question: Is ISO 9000 certification worth it? *"Yes,"* was the emphatic response of **Darrell Green**, a spokesman for Atlantic Marine, Mobile, Ala., who said a lot of U.S. companies are now learning about the respect for ISO 9000 in other world markets. "Once you mention ISO, they seem very interested in bringing a ship to the yard."

"One of the benchmarks of the commercial world is the ISO standard," said **Ed Waryas**, director of commercial marketing for Newport News Shipbuilding (NNS), which recently achieved ISO 9001 certification. Mr. **Waryas** said it required no small amount of effort to be certified — and it was done on the first attempt, something a reported 30 percent of companies manage to do — but it was worth it. "Everybody's identifying with those standards. It's something we needed to do. It shows our commitment to making it in the commercial market. The international owners can look at that and see that Newport News is right up there, meeting those standards."

Ms. **Flematti** said the eventual goal in the European community is to have one accrediting organization in each country, each with an accreditation quality level acceptable to all.

This would be achieved through Mutual Recognition Agreements (MRAs) to signify that one accrediting organization recognizes the validity of another, and therefore of its registrars. Such a system could also mean that products from companies not certified to ISO 9000 might be at a disadvantage, or even outright disqualified.

What Should A Company Look For In Becoming Certified?

Every company must evaluate ISO 9000 certification for itself, but certain questions must be asked: Are its competitors ISO 9000 certified? Does it wish to do business with the EC?

If so, are your products governed by one of the EC Directives which may mandate certification? (This last question can be answered by the Office of the European Trade Representative, U.S. Department of Commerce.)

Once a company opts for certification, who will certify it? Must the registrar be accredited, and if so, by whom? If your object is to access a given market, it pays to make certain that market will accept certification by the registrar you choose. There are no simple answers about ISO 9000, and answers vary — depending not only on what a company does, but who it asks. Ask them carefully, and get answers from multiple sources.

Only then should your company make the a decision whether to become part of the immense market trend toward ISO.

Marco Completes Modifications On Russian Trawler

Marco Shipyard, Seattle, Wash., welcomed the 213-foot factory trawler *Admiral Zavoiko* to the Seattle shipyard in late October 1993. The *Zavoiko*, which has undergone scheduled maintenance, painting, engine overhauls, extensive factory modifications (including installation of Baader 212 machinery and Marel roe grading equipment), was the first Russian vessel to be berthed at Marco's Seattle shipyard.

The *Admiral Zavoiko* is owned by UTRF, reportedly the largest fishing company on Kamchatka. The vessel returned to Russian waters in December 1993.

In other shipyard activity, Marco is repowering the F/V *Liberty Bay*, as well as replacing her shafting and generators. Marco Shipyard recently completed routine maintenance on the U.S. Navy vessel YTT11 *Discovery Bay*, and Clean Sound Cooperative's oil spill response vessel *Arctic Tern*. Earlier, Marco converted the trawler *Dona Martita* to a crabber.

Russian factory trawler *Admiral Zavoiko* (third from left) at Marco's Seattle Shipyard.

For more information on Marco Shipyard,

Circle 73 on Reader Service Card

IMSSCO Names European Distributor For Firefighting System

Van Esch Trading & Shipping BV of Rotterdam, The Netherlands has been appointed the European (EEC) exclusive distributor for the Maverick Foam Vest System by International Marine Supply & Service Co. (IMSSCO).

The Maverick Foam Vest System was demonstrated for the first time in the EEC at the Dutch Educating & Training Center in Rotterdam.

"We initially purchased Maverick Foam Vests for use on board our new ISO 9002 M.V. Crane Barges...One person can immediately control foam or water spray with the flick of a lever," said **Hank Van Esch**, managing director. "In addition to fighting fire, the vest can be used to dispense oil spill dispersants and the Haz-Mat Vest provides immediate vapor suppressing foam for hydrocarbons, alcohol resistance fuel and certain chemicals." For more information on the Maverick Foam Vest System from IMSSCO,

Circle 182 on Reader Service Card

IDB Mobile Enhances Inmarsat-C Service

IDB Mobile Communications, Inc., a joint venture of IDB Communications Group, Inc. and Teleglobe International of Canada, has announced that it now offers its own enhanced Inmarsat-C service.

IDB has implemented advanced Inmarsat-C access technology to benefit customers with improved ease of use and simplified pricing.

The service enables customers to integrate the full array of Inmarsat-C tracking and messaging applications for ships, aircraft and vehicles on one system with global visibility using any Type-Approved Inmarsat-C terminal.

To subscribe, registration forms are available from IDB Mobile representatives. For more information, contact Lori Gutknecht, IDB Communications, tel: (213) 240-3758; or Marc Newman, IDB Mobile, tel: (202) 973-5120. Service can be made available within 24 hours of registration.

Hitachi Zosen Completes Two More "Superjet-30" Foil-Assisted Catamarans

Following the delivery of the *Trident Ace*, the first "Superjet-30" high-speed passenger vessel, to Fuke Kaiun on September 28, 1993, Hitachi Zosen's Kanagawa Works delivered two more "Superjet-30" catamarans: the *Artemis* was delivered to Fuke Kaiun (head office in Osaka Prefecture) on November 25, 1993, and the *Zuiko* was delivered to Ishizaki Steamship Co., Ltd. (headquartered in Matsuyama, Ehime Prefecture). The *Artemis* and the *Zuiko* are two of seven foil-assisted catamarans for which orders were received last year. The Superjet series, with its advanced design, reportedly meets the requirements of a high-speed passenger vessel: superb passenger comfort, high-speed capability, and fuel economy. Both vessels are hybrid-type vessels that have twin hulls equipped with submerged hydrofoils fore and aft. The weight of the vessels is supported both by the buoyancy of the two hulls and the lift of the two hydrofoils.

The vessels also feature wide decks and spacious cabins unique to a twin-hull ship. Furthermore, the high-speed capability and fuel economy of a hydrofoil vessel are reportedly attained. Two diesel engines and two water jets, manufactured by Niigata Engineering Co., Ltd., reportedly ensure excellent maneuverability and uncompromised passenger comfort by minimizing noise and vibration. Since the hulls are made of corrosion-free aluminum alloy, the ships can endure the rigors of the environment. Both vessels are 103 feet long with a breadth of 32 feet, depth of 11 feet and draft of 6 feet. The *Artemis* is scheduled to be commissioned on the Fuke-Sumitomo route. After the opening of the New Kansai International Airport, however, it will be put into service on the access routes between the airport and Awajishima Island. The *Zuiko* was put into the Matsuyama-Hiroshima service in late December 1993.

For more information on Hitachi Zosen,

Circle 75 on Reader Service Card

The *Artemis*, built by Kanagawa Works of Hitachi Zosen Corp. for Fuke Kaiun.

The *Zuiko*, built by Kanagawa Works of Hitachi Zosen Corp. for Ishizaki Steamship Co., Ltd.

vaerner Unit Wins Tanker ontract For Almost $40M

Kvaerner Industrier AS report-lly said its Kvaerner Kleven divi-on has won a $39.9 million order to uild a chemical tanker for Bras ipping NV of The Netherlands, ith an option for a second vessel of e same type.

The company reportedly said the 5,000-dwt tanker's design was de-loped in cooperation with Bras to tisfy international standards, par-cularly environmental and safety quirements.

lorthstar Shipping Applies or ODS Transfer

The Maritime Administration MarAd) has received an applica-on from Northstar Shipping, Inc. r permission to transfer its opera-on-differential subsidy (ODS) con-act covering the liquefied natural as (LNG) carriers *Lake Charles* nd *Louisiana* to Lachmar Ship-ng, a subsidiary of Panhandle astern Corp., Lake Charles, La. he contract expires at the end of 997. Lachmar has filed a separate pplication for worldwide carriage LNG. The application states that orthstar acquired the ODS agree-ent as part of the bankruptcy re-ganization proceeding of Pruden-al Lines, Inc. As a result, the ankruptcy court ruled that the ODS ontract remained an asset of the ankrupt entity.

tevens Towing Gets MarAd ermission To Sell Barge

Stevens Towing Co. has received ermission from MarAd to sell the 074-gt *Loveland 2761*, a deck arge, to Terminal De Contenedores e Catagena SA. The buyer of the arge, which was built in Chesa-eake, Va., is located in Botega, olombia, where the barge will be egistered. It will be one component a floating container pier to be cated in Cartagena, serving an stimated 10 years as a temporary ockside pier for Colombia's expand-ng container trade.

larAd Reports Become vailable

MarAd has announced the avail-bility of three reports. The first, vailable from the National Techni-l Information Service, evaluates ptimum inspection intervals for nkers. Entitled *Probability Based nspection Planning for Marine tructures*, the report's focus is to nd the best intervals between in-pections, balancing cost against ojected damage caused by fatigue d corrosion between inspections, sing previous inspection data to nhance the accuracy of forecasts. he report, order number PB94-5853, may be obtained for $19.50 by calling (703) 487-4650.

MarAd has also released *Vessel Inventory Report* and *U.S. Merchant Marine Data Sheet as of May 1, 1993*. The first contains information on all U.S. registered oceangoing merchant ships 1,000 gt and over and may be obtained by calling MarAd's Office of Trade Analysis and Insurance, Division of Statistics, Room 8117 at (202) 366-2400; or the Office of External Affairs, Room 7219 at (202) 366-5807; the second statistical report may also be obtained from the Office of External Affairs at the above number.

Seminar On Littoral Warfare Theorizes On Future Of U.S. Naval Operations

A seminar will be held on Littoral Warfare in the Holiday Inn at Crowne Plaza in Bethesda, Md. and at the Sheraton Premiere at Tysons Corner in Washington, D.C.

The seminar's focus is reportedly based on the belief that future conflicts will take on many of the aspects of the Gulf War, reflecting a shift in focus from deep water, navy vs. navy operations to close-to-shore littoral warfare.

The seminar will be given by **Dr. Norman Friedman**, a consultant on Naval Technology and Systems and former director of National Security Studies at the Hudson Institute. For more information on the seminar, call (310) 534-3922.

(Continued from page 78)

Vessel Name/Type	Dimensions	Engines	Owner	Delivery
Western Flyer/SWATH Oceanographic	117 x 53	GE	Monterey Bay Aquarium & Research Institute	4/95
Superior Boat Works, Inc., Greenville, Miss. **Circle 42 on Reader Service Card**				
Chris Way MacMillian/ Towboat (Rebuild)	200 x 45 x 10	EMD	n/a	4/94
Tidewater Equipment Corp., Norfolk, Va. **Circle 43 on Reader Service Card**				
Split Hull Hopper Barge	250 x 54 x 21	n/a	Norfolk Dredging Co.	2/94
Deck Barge	80 x 26 x 5	n/a	State of Maryland	2/94
Trinity Marine Group, Gulfport, Miss. **Circle 44 on Reader Service Card**				
Yard 85-Equitable, New Orleans				
Hull 1352/Patrol Boat	82 x 18	GM	n/a	12/93
Hull 1347/Tow Boat	85 x 30	Caterpillar	U.S. Army C.O.E.	1/94
Hull 1348/Tow Boat	85 x 30	Caterpillar	U.S. Army C.O.E.	1/94
Hull 1392/SOC	82 x 18	GM	U.S. Navy	2/94
Hull 1393/SOC	82 x 18	MTU	U.S. Navy	2/94
Hull 1382/ Paddlewheel Riverboat	323 x 90	Caterpillar	n/a	11/94
Yard 81-Moss Point Marine				
Hull 121/Ocean Tug	127 x 37	EMD	n/a	2/94
Hull 1280 Support Vessel	272 x 60	EMD	U.S. Army	3/94
Hull 122/Ferry	263 x 65	EMD	State of Texas	12/94
Hull 123/Ferry	220 x 50	Caterpillar	State of N. Carolina	12/94
Hull 124/Ferry	263 x 65	EMD	State of Virginia	9/95
Yard 86-Halter Moss Point				
Hull 1261/TAGS Oceanographic Survey	329 x 58	LIPS	U.S. Navy	1/94
Hull 1262/"	329 x 58	LIPS	U.S. Navy	7/94
Hull 1315/"	329 x 58	LIPS	U.S. Navy	11/95
Hull 1358/AGOR Oceanographic	273 x 52	GE	U.S. Navy	5/96
Yard 84-Halter Lockport				
Hull 1353/Tractor Tug	155 x 46	EMD	n/a	11/93
Hull 1354/Tractor Tug	155 x 46	EMD	n/a	1/94
Hull 1383/FOC'SLE Tug	124 x 37	EMD	n/a	4/94
Hull 1386/Riverboat	245 x 62	Cummins	n/a	4/94
Hull 1389/Tug-Supply	218 x 46	Caterpillar	n/a	12/94
Hull 1391/Riverboat	245 x 62	Cummins	n/a	6/94
Yard 82-Aluminum Boats				
Hull 370/Dive Boat	38 x 12	GM	n/a	11/93
Hull 372/Crew Boat	100 x 23	GM	n/a	5/94

Vessel Name/Type	Dimensions	Engines	Owner	Deliver
Yard 88-Trinity Gulfport				
Hull 1385/DH Tank Barge	287 x 54	n/a	n/a	11/9
Hull 1390/DH Tank Barge	287 x 54	n/a	n/a	12/9
Hull 1394/DH Tank Barge	287 x 54	n/a	n/a	1/9
Hull 1395/DH Tank Barge	287 x 54	n/a	n/a	2/9
"1397/DH Chemical Barge	195 x 54	n/a	n/a	3/9
"1398/DH Chemical Barge	195 x 54	n/a	n/a	4/9
"1399/DH Chemical Barge	195 x 54	n/a	n/a	5/9
"1400/DH Chemical Barge	195 x 54	n/a	n/a	6/9
Yard 37-Gretna				
Hull 257/Crane Barge	110 x 52	n/a	n/a	11/9
Hull 258/Crane Barge	110 x 52	n/a	n/a	11/9
Hull 259/Casino Barge	200 x 73	n/a	n/a	1/9
Hull 261/Drilling Barge	200 x 85	n/a	n/a	3/9
Hull 260/DH Tank Barge	300 x 50	n/a	n/a	6/9
Yard 83-Beaumont Texas				
Hull 1309/DH Tank Barge	325 x 60	n/a	n/a	1/9
Hull 1396/Casino Barge	200 x 73	n/a	n/a	1/9
Hull 1402/Drilling Barge	200 x 85	n/a	n/a	3/9
Hull 1404/Drilling Barge	200 x 85	n/a	n/a	6/9
Hull 1403/Drilling Barge	200 x 85	n/a	n/a	4/9
Yard 80-Brownsville-Trinity Inland Marine Group				
Yard 38-Madisonville				
(146) Hopper Barges	195 & 200	n/a	n/a	5/93-12/9
(12) Hopper Barges	n/a	n/a	n/a	5/93-12/9
(5) Deck Barges	195 & 200	n/a	n/a	5/93-12/9
Washburn & Doughty, Boothbay, Maine **Circle 45 on Reader Service Card**				
Emerald Empress/Dinner	150 x 34 x 11	Caterpillar	Neuman Boat Line	4/9
Double Hull Tank Barge	36 x 14 x 8	n/a	Boston Harbor Comm.Svc.	4/9
Maquoit II/Ferry	81 x 30 x 11	Detroit Diesel	Casco Bay Island Transit	5/9
Westport Shipyard, Westport, Wash. **Circle 46 on Reader Service Card**				
Hull 7606/Yacht	112 x 23	MTU	n/a	2/9
Hull 8501/Passenger	100 x 23	Detroit Diesel	n/a	5/9
Hull 8502/Passenger	100 x 23	Detroit Diesel	n/a	5/9
Hull 7609/Yacht	106 x 23	MTU	Westship	9/9
Hull 7516/Yacht	106 x 23	Detroit Diesel	n/a	10/9
Zidell Marine Corp., Portland, Ore. **Circle 47 on Reader Service Card**				
Hull 649/Petroleum Barge	272 x 84 x 19	n/a	Tidewater Barge Lines	4/9
Hull 650/Deck Cargo Barge	335 x 76 x 22	n/a	Zidell Marine	5/9

Waller Marine Develops Power Barges For The Future

Waller Marine, Inc. has become focused on the application of modern electrical generating technology to the marine industry with the design of several power barges for the international market. The company has designed several barge-mounted power plants using diesel, gas turbine and steam generating technology, with installed capacities varying from 30- to 220-MW. Applications for Waller Marine designed power barges have been in the Caribbean and South and Central America, also in the Philippines, China and West Africa. The company has focused upon the use of American equipment and construction. For more information on the capabilities of Waller Marine, Inc.,

Circle 165 on Reader Service Card

Western Machine Works Grabs Intl. Business In '93

Western Machine Works reported sales to the U.S., Singapore and The Netherlands in 1993. The North Vancouver, B.C., Canada-based company is reportedly the original developer of remote control hydraulic tow pin units and has been manufacturing them for more than 30 years. In 1994, the company plans to add a compact two-pin unit to its product line for use on smaller tugs. The compact unit is reportedly effective in restricting the tow line. For more information on the products offered by Western Machine Works,

Circle 167 on Reader Service Card

Simplex-Turmar Becomes U.S. Rep For Klehma's Hatch Cover Seal Products

Dusseldorf-based Klehma Rubber Engineering has appointed Simplex-Turmar, Inc. of New York as its U.S. representative.

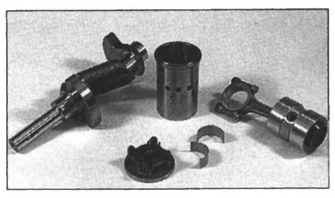
Klehma has pioneered and continues to develop its unique process of hatch cover seal repair for various vessels, including but not limited to bulkers and reefer vessels. The Klehma process is also applicable to Ro/Ro or door seals.

The Klehma process utilizes cold-vulcanization of a complex rubber compound which is unique to the industry. Klehma claims that no other product can rejuvenate seals time and time again to the original shore hardness and specifications. Klehma's process is reportedly acknowledged by major shipowners to be a cost-effective remedy for hatch cover seal wear. The Klehma process meets the watertightness requirement of most major class societies and regulatory bodies. For more information on Klehma's hatch cover seal products from Simplex-Turmar,

Circle 168 on Reader Service Card

CMP Expands A/C, Refrigeration Compressor Part Line

CMP Corp., an independent manufacturer and supplier of OEM-quality air conditioning and refrigeration compressor parts, has expanded its line of parts manufactured for the cooling systems in the marine and other industries. CMP's full line includes pistons, rods, cylinder liners, valve plates, pumps, crankshafts and other compressor parts to fit some of the biggest names in the business. CMP has been manufacturing replacement compressor parts for more than 25 years. For more information on CMP's products,



CMP has expanded its line of OEM-quality cooling system parts.

Circle 176 on Reader Service Card

MegaFilm Breaking Into New Markets

MegaFilm, a flame retardant temporary floor and wall protection system prevalent in the cruise line industry, reports recent breakthroughs in the passenger ferry and riverboat casino markets.

The recently-commissioned 230-foot passenger/vehicle ferry *Martha's Vineyard* (pictured), built for the Woods Hole, Martha's Vineyard and Nantucket Steamship Authority in Massachusetts, used MegaFilm for protection of new flooring materials during construction at Atlantic Marine. **James Swindler,** design supervisor and engineer for the Steamship Authority, reportedly re-used the material on another Steamship Authority re-fit project.

Seaward Ship's Drydock, Inc. is currently using MegaFilm for temporary protection of floors on the Alaska Marine Highway System's passenger ferry *Tustumena*. Said

MegaFilm was used on the Atlantic Marine-built *Martha's Vineyard* ferry.

D.J. Whitman, general manager of the yard, "MegaFilm was easy to install...and the labor savings more than offsets the cost of the material."MegaFilm's New Orleans and Gulf Coast agent, **Charles Morris,** president of Alexander Industries, has reportedly received a number of inquiries in regards to the product's use in the riverboat casino market. "The high-cost finishes being used on these vessels demands a temporary protection material that can guarantee performance," said Mr. **Morris.** The system is reportedly being used on Hilton's 2,400-passenger paddlewheel casino *Queen of New Orleans*, being built by Trinity Marine Group.

The system was also reportedly used in the final construction phases on the Bender Shipbuilding-built *Star Casino;* and the Atlantic Marine, Inc.-built *Empress II.*

Also, MegaFilm by Bainbridge/Aquabatten, Inc. announced the appointment of **John Callahan** as product marketing manager. Mr. **Callahan** will be responsible for marketing the MegaFilm line of products to the U.S. maritime market. MegaFilm Ltd. of Newbury, England has announced the appointment of **Tony Hutton** to the position of Export Sales Manager.

For more information on MegaFilm,

Circle 174 on Reader Service Card

Astilleros Espanoles Wins Order For Two Ferries

Spanish shipbuilder Astilleros Espanoles will construct two 3,600-dwt passenger ferries for the Spanish owner Autonio Armas, SA.

Both vessels will be built by the company's Barreras yard (in Vigo, Northwestern Spain) for an undisclosed price.

The twin ferries have been designed for transporting passengers, cars and trucks between the Canary Islands and have received yard numbers 1544 and 1545. They are slated for delivery in 1995.

The vessels will be about 394 feet long and 64 feet wide, with a capacity for 250 passengers and 62 trucks of about 16 feet in length.

Last year, the Barreras yard delivered the IBN *Battouta II* for the Moroccan shipowner Limadet, a Ro/Ro ferry for the Tangier-Algeciras crossing. In a recent two-week period, Astilleros won orders for building three Ro/Ro vessels from the Swedish shipowner Gorthon Lines, to be built at Astilleros' Seville yard, and for two containerships from the Malaysian International Shipping Corporation (MISC) to be built by the Juliana shipyard in Gijon (Northern Spain).

NASSCO And Kawasaki Reach Tech Exchange Pact

Kawasaki Heavy Industries and National Steel and Shipbuilding (NASSCO) of San Diego have reportedly agreed to exchange shipbuilding technology.

The agreement for the exchange of information on methods of ship

frame processing and manufac
ing was reportedly signed, but c
mercial shipbuilding technolog
also something which may be
changed in the future. An excha
of designs and materials has
ready reportedly been planned.

SHI Wins Double-Hulled Tanker Order

Sumitomo Heavy Industri
Ltd., Japan, has received an or
to build a double-hulled very la
crude carrier (VLCC), reportedly t
first such order for a Japanese co
pany following a strict safety reg
lation enacted by the Internatio
Maritime Organization in July 19

Sumitomo will build a 280,000-
tanker for the Onassis Group
Greece.

Delivery is scheduled for Octob
1995. The ship will be built at t
company's shipyard in Yokosul
City near Tokyo.

Kvaerner German Unit Win Containership Orders For More Than $140 Million

Kvaerner Industrier AS repor
edly said its German shipbuildin
unit, Kvaerner Warnow Werf
GmbH of Warnemuende, won o
ders to build five containerships fo
about $140.3 million.

The orders, all for 20,100-dw
vessels, were placed by four Ger
man shipping companies. Kvaerne
reports 11 vessels are now on orde
and its Warnemuende yard is fully
booked until 1995.

Marine Accommodations Wins MarAd Vessel Contract

Marine Accommodations Inc. (MAI) of Jacksonville, Fla. has been awarded a turnkey contract to design, supply and install the BIP Rockwool core joiner (thermal, noise and fire insulated) system including complete galley equipment and furnishing for MarAd's M/V *Cape Trinity* at Houston Ship Repair, Inc. Shipyard.

MAI is the exclusive agent/distributor for BU-IL Industries BIP Rockwool core accommodation system consisting of (preinsulated) joiner bulkhead linings and partitions, continuous ceilings, A,B & C class doors, prefab bathroom units, floating floors, furnishings and accessories. MAI just celebrated its third anniversary of servicing the cruise ship and commercial vessel industry. MAI boasts a distinguished list of business partners, including the State of Maine Port Authority, MARITRANS, Norfolk Shipbuilding Co., Bender Shipyard, Atlantic Marine, Inc., Premier Cruise Lines, Cunard and P&O Cruise Lines. For more information on MAI,

Circle 183 on Reader Service Card

iladelphia Gears Chosen For Ferries

del of the TriCat ferry, five of which will be outfitted with iladelphia Gear reduction gears.

Philadelphia Gear Corporation has been varded a contract to supply 1000VMGH-HP2S duction gears for the propulsion turbines of ve new 332-passenger TriCat high-speed pasnger ferries. The gears, built for classification the requirements of Det Norske Veritas, will ansmit the power of the vessel's two Solar 'aurus" marine gas turbines to waterjets, which n at 734 rpm. The engines are rated at 7,000p at 12,900 rpm and can propel the TriCats at peeds exceeding 47 knots. Carburized and recision tooth ground single helical gearing is tilized in a vertically offset double reduction ear train. Lightweight construction is emloyed throughout, with an aluminum housing provide stiff support for the gears while keepng weight to a minimum. The lubrication sysem is dry sump, with a combined pressure and cavenge pump driven from the intermediate haft. A shaft brake is mounted on the intermeiate shaft. The five 147-foot TriCat ferries will e built by FBM Marine, based in the Isle of Vight, U.K., with a further two to follow next ear. For more information on Philadelphia Gear,

Circle 155 on Reader Service Card

ust Joins Nyman Marine

Bryan Lust has joined the Engineering Department of Nyman Marine Corporation's BoatLift Division. Formerly with Dowty Aerospace in Yakima, Wash., Mr. **Lust** has experience in fluid dynamics, kinematic analysis, and computerized data inventory systems. He holds a 1992 B.S. in mechanical engineering from Washington State University and is a member of the American Society of Mechanical Engineers. Mr. **Lust** will be assigned to the engineering, research and development section of Nyman's BoatLift Division at the company's manufacturing facility in Monroe, Wash.

The Nyman Marine Corporation manufactures a complete line of marine hoists for pleasure boats, seaplanes, and personal watercraft. For more information on Nyman Marine,

Circle 93 on Reader Service Card

The TM 21: Raytheon's 12-Inch, IMO-Compliant Radar

Raytheon introduced the TM21 Radar, which meets the International Maritime Organization's (IMO) specifications for vessels up to 10,000-gt as a primary radar. The TM21 also fulfills the IMO secondary radar requirements for all vessel greater than 10,000 gt. The company said the radar is for use on high seas vessels, as well as large fishing, workboat and yachting vessels. Raytheon's TM21 Radar includes the following features on the standard model: True Motion, making it easier to track and differentiate between non-moving or moving targets; North Stabilization and Electronic Plotting of up to 10 targets. It features built-in Nav Lines (five sets of up 128 points each) with an optional 15 more sets.

For more information on Raytheon,

Circle 150 on Reader Service Card

Atlantic Marine Delivers *Empress II*

Atlantic Marine, Inc. of Jacksonville, Fla. d livered *Empress II*, a 238-foot by 66-foot gami vessel, to Empress River Casino Corporation late December 1993.

Empress II has 26,000-sq.-ft. of gaming area the three casino levels, plus an observation dec The 1,500-passenger-capacity gaming vessel h 1,200 gaming positions, including more than 5(slot machines.

Designed by Rodney E. Lay & Associates, In of Jacksonville, Fla., the vessel is powered by tv Caterpillar 3412TA marine engines with Tw Disc reduction gears. Caterpillar also supplie two 3508, 715 kW generator sets for shipboa electrical service; a 3208, 160 kW generator s for emergency power, and a 3208TA engine power the bow thruster.

Interiors were designed by Interior Desig International, Inc., Seattle, Wash.

Empress II is the second gaming vessel bui for Empress River Casino Corp. *Empress I* wa delivered in May of 1992. Presently under cor struction, *Empress III* will be delivered in Au gust 1994.

For more information on Atlantic Marine,

Circle 156 on Reader Service Card

Sonsub Makes Engineering And Marketing Position Appointments

Sonsub has appointed **Espen Moller** to the position of engineering manager, and **Lee Gilette** to the position of senior project engineer.

Among Mr. **Moller**'s immediate responsibili ties will be supporting Saipem's ATES project and Statoil's diverless PRS development, as well as tendering and marketing Sonsub's services in the region. Mr. **Moller** has very extensive subsea and remote technology experience, having worked on a number of North Sea projects.

Mr. **Gilette**, who will be based in Sonsub's Houston office, will be responsible for the engineering and design of subsea equipment, tooling and systems and the project management of Sonsub's key subsea development projects. Mr. **Gilette** has extensive project management and engineering experience, particularly in the area of subsea production systems and deepwater construction, and has supervised major projects in South America, the North Sea, the Asia/ Pacific region and the U.S.

In Sonsub's Perth, Australia unit, **Fraser Ralley** has rejoined the company as marketing manager. He will be responsible for the company's marketing efforts in Australia and the Asia-Pacific region. Mr. **Ralley** will coordinate closely with Sonsub's Singapore facility.

For more information on Sonsub,

Circle 94 on Reader Service Card

Atlantic Marine Signs Contract For *Empress III*

Atlantic Marine, Inc. of Jacksonville, Fla. signed a contract with Empress River Casino Corp. of Joliet, Ill. to build the *Empress III*, a triple-decked gaming vessel. The 280-foot, 1,800-passenger boat is to be delivered this August, and is the first gaming vessel built for the State of Indiana, pending approval from the Indiana Gaming Commission.

Designed by Rodney E. Lay & Associates, the vessel is powered by a pair of Caterpillar 3512TA marine engines. Three ballroom-sized casinos on the main and upper decks, with an area of approximately 35,000-sq.-ft. will have 1,200 gaming positions, including more than 500 slot machines. Interiors were designed by Interior Design Intl. For more information on the product and services range on the companies involved in the *Empress III* project, circle the corresponding number on the Reader Service Card bound in this issue

Atlantic Marine	170
Caterpillar	171
Interior Design Intl.	172
Rodney E. Lay & Assoc.	173

Willard Delivers R.I.B. To Military Sealift Command

Willard Marine, Inc. delivered a Sea Force 540 to the Military Sealift Command (MSC) in Oakland, Calif. The 540 Rigid Inflatable Boat (R.I.B.) is powered by a 150-hp Cummins diesel coupled to a Hamilton waterjet. The R.I.B. will be carried aboard the USNS *Kilauea* T-AE 26. With more than 35 years of experience, Willard Marine is a leading manufacturer of fiberglass boats for the U.S. Navy and the U.S. Coast Guard, as well as for commercial applications.

Circle 179 on Reader Service Card

Wartsila Diesel In Norway Changes Name

The Wartsila Diesel Group company in Norway, Wartsila Wichmann Diesel, has changed its name to Wartsila Propulsion AS. The change is based on the company's present product range, which mainly comprises propulsion packages for different vessels. Wartsila Propulsion will continue supplying the company's own Wichmann 28 engines as well as marketing and selling the other Wartsila Diesel Group products in its home market. It will also supply service and spare parts for the group's entire product portfolio in Norway. For more information on Wartsila Propulsion AS,

Circle 169 on Reader Service Card

Uniservice SA Expands Into The Americas

Uniservice SA, a European company specializing in the manufacturing and distribution of marine and industrial chemical treatments for more than 15 years, has expanded its worldwide network to include all of the Americas. This was accomplished by the formation of a minority shareholder positioning the recently established Uniservice Americas, Inc., a company based in New Orleans. Uniservice SA, combined with Uniservice Americas, Inc., will provide the maritime industry with a service and supply network of more than 150 port cities. For more information on the new Uniservice Americas, Inc.,

Circle 177 on Reader Service Card

M.P.W. To Display New SEPAR 2000 Filter

M.P.W. of South Florida will display the SEPAR 2000 high-performance, light diesel oil filter and water separator at the Miami Boat Show. Developed over the past four years, the new design incorporates a multiple centrifugal system and a fuel filter. The SEPAR 2000 reportedly ensures that the maximum separation of water and solids is achieved before the fuel passes through the filter element. The SEPAR 2000 operates with fuel being drawn into the filter by the action of the lift pump. The fuel then flows into the first stage where, due to a centrifugal effect, a high proportion of water and solids is separated off into the lower bowl.

Although the SEPAR 2000 is small in size, its powerful range has efficient flow rates of 1.3, 2.6, 4.68 and 10.4 gallons per minute in simplex and duplex forms. For more information on M.P.W. of South Florida, the distributor of SEPAR 2000,

Circle 178 on Reader Service Card

Maritime Services Corp. Ranked As One Of Fastest-Growing Companies

Maritime Services Corp. is ranked 375th on *Inc.* magazine's list of the top 500 fastest-growing companies. Maritime Services provides quality interior materials, installation and planning to the marine industry, active in most market segments including cruise ships, ferries, gaming vessels, tugs, tankers, tour and dinner boats. For more information on the products and services of Maritime Services Corp.,

Circle 181 on Reader Service Card

HydroComp To Support America's Cup Team

In support of the Team Dennis Conner (TDC) design team of **Chris Todter** and **Dave Pedrick**, HydroComp, Inc. of Durham, N.H. has been contracted to provide technical services for TDC's 1995 America's Cup campaign. While specifics to date are confidential, HydroComp's **Donald M. MacPherson**, vice president technical director, confirmed that HydroComp will supply computer services to TDC.

HydroComp is a recognized leader in numerical propulsion and performance prediction. For more information on the products and services of HydroComp,

Circle 175 on Reader Service Card

CORROSEAL, Inc.

Marine Coatings

CORROSEAL™

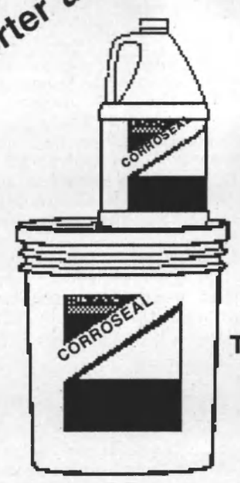
Rust Converter and Polymer Metal Primer

VOC Compliant
60 grams/liter
8 oz/gal

Non Flammable

No Toxic Pigments

Pleasant Smell



Corroseal is ideally suited for water blasted surfaces. It solves the rust and moisture problems before top coating.

You can save up to $1.00 per sq.ft. over White Metal blasting by using Corroseal.

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1045 12th Ave. NW F5A
Issaquah, WA 98027

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1 Gallon - 4 per case
5 Gallon Pail w/spout

1 gallon covers approx. 200 sq ft & converts up to 40 mils of t rust. Your cost will be less than 15¢ per sq ft

The color change of the converter from creamy white to violet/black tells you the converter is working.

You can wait up to 30 days to top coat.

Converts Rust to Magnetite, a non-rusting barrier layer on the steel, protected by a polymer primer (latex).

An iron monument in India was covered with a barrier coat of magnetite. It shows little rust after 2,500 years. Magnetite coats the water jacket in most automotive engines. It works!

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503 287-3947 fax
Rodda Paint Co.
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503 244-4218 fax

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Circle 267 on Reader Service Card

MARINE COATINGS & Corrosion Control

Suppliers of marine coatings and corrosion control products have faced and continue to face stiff challenges regarding environmental protection and worker safety. The industry has answered and will continue to answer these challenges with a host of technological and procedural advances.

To quantify the efforts of suppliers in this market segment — which includes not only the coatings manufacturers, but also companies which supply equipment for surface preparation and coatings application, etc. — *Maritime Reporter/Engineering News* presents a product and technological update.

American Corrosion Services

In 1993, American Corrosion Services built a new automated facility in the U.S. The 55,000-sq.-ft. facility is located in New Orleans, close to all major means of transportation. It is designed to produce high-quality anodes on demand, at low production cost, and is reportedly capable of manufacturing more than 20 million pounds annually. American Corrosion provides a complete service from design to manufacturing and installation. For more information on American Corrosion Services,

Circle 96 on Reader Service Card

Ameron

Ameron marine coatings systems are designed to meet specific performance, application, environmental and budget requirements for a broad range of anti-corrosive, anti-fouling and topside services. Drawing upon decades of worldwide industrial field chemists, technicians and corrosion control experts, Ameron first identifies a client's corrosion control needs, then makes specific recommendations which include products, procedures and application techniques.

For more information on Ameron's line of coatings,

Circle 191 on Reader Service Card

The Arnessen Corporation

The Arnessen Corporation manufactures rust, scale, and paint removal equipment. The Arnessen deck scalers, powered by air, electricity, or gasoline engine, provide heavy duty removal of undesirable deposits on large flat areas and deck areas. They are reportedly easy to maintain, with 44 hardened steel striking wheels that can be quickly replaced when worn, according to the company. Arnessen portable electric or pneumatic chipping hammers can be used on vertical, horizontal or irregular-shaped surfaces, with a choice of 15 different types of rotating heads. For more information on The Arnessen Corporation,

Circle 105 on Reader Service Card

Chesapeake Specialty Products

Chesapeake Specialty Products, Inc. manufactures steel abrasives and high-density ballast materials. METgrain steel abrasive is an abrasive product for blastcleaning ship hulls, tanks and for new construction. METgrain generates virtually no dust and can reportedly be reused many times, thus reducing hazardous waste. Chesapeake Specialty Products also manufactures high-density ballast material for shipbuilding applications. For more information on Chesapeake Specialty Products,

Circle 98 on Reader Service Card

Corroseal, Inc.

Corroseal, Inc. produces Corroseal™, which reportedly converts rust to an inert substance

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(Continued from Page 89)

called magnetite. At the same time the product reportedly polymer-primes the metal for top coating.

When Corroseal is applied to clean, light rust it reportedly creates an effective barrier layer. The product is VOC compliant at 1.8 lbs. per gallon, non-flammable, reportedly has no offensive odor and a mild pH of 3-4.

Corroseal is used for ship, tug or barge maintenance of corroded surfaces, used by major marine firms on heavily corroded ballast tanks, rake ends, steering compartments, bilges, superstructures, winches and winch drums.

Corroseal also reportedly makes an effective concrete waterproofer and hardener used on piers, dams, docks, concrete hulls and other shoreside structures.

For more information on Corroseal, Inc.,

Circle 99 on Reader Service Card

Devoe Coatings

Since its founding in 1754, Devoe Coatings has consistently been a leader in technological advances. Today it is a leader in performance systems to eliminate or greatly reduce VOC content with water base epoxies, high solids epoxies and 100 percent solids epoxies with adequate working life. The company's primers contain no heavy metals and its bar-rust line of epoxies can reportedly eliminate the need for abrasi blasting, yet still provide underw ter protection. First Devoe pr vided a tin-free ablative antifoulin with its ABC #3, and today offe non-toxic foul release coatings wit its DEVCLEAR line. For more i formation on Devoe Coatings,

Circle 100 on Reader Service Card

Ervin Industries

Ervin manufactures cast ste shot and grit abrasives used f blastcleaning steel surfaces in prepa ration for coating. This type abrasive medium has been a popu lar choice for many years, becaus of a recycle capability in shop stationary blastcleaning operation Now, with advances in enclosur technology, cast steel abrasives ar being recognized as a further co tribution for blastcleaning in fiel or portable environments. This d velopment reportedly provides sig nificant environmental, cost an technical advantages for surfac preparation. For more informatio on Ervin Industries,

Circle 101 on Reader Service Card

Esgard

Esgard, Inc. has marketed Bi Kote for preservation of ballast an void areas for more than 15 years Bio Kote cures to a firm film whic reportedly won't wash out, is sur face-tolerant and safe for applica tion and inspections. Bio Kote ha been independently tested for per formance in Norway and pollutio in Alaska, and recognized by sev eral classification societies and gov ernment agencies. Technical sup port for surface preparation an application helps ensure optimum service life. Worldwide sales an distribution help provide complete economical project support. Fo additional information on Esgar and its products,

Circle 102 on Reader Service Card

Eureka Chemical Company

Eureka Chemical Company manufactures the Fluid Film line o ballast tank coatings and wire-rope dressings that are non-solvent base According to the company, these qualities make them safer for the applicator and the environment as well as longer-lasting. Relative t the requirements for long-term pro tection against corrosion inside wa ter ballast tanks, the Gel BW coat ing has reportedly been documented by classification societies to 9.5 years of service performance, reportedly the longest of any soft-type coating. For more information on Eureka Chemical Company,

Circle 103 on Reader Service Card

(Continued on page 92)

Paint Underwater with Epoxy

Some have been keeping the information secret; others cannot believe it. If you maintain a stationary or mobile marine structure, you can easily repair and coat steel or concrete surfaces underwater using one of the HYCOTE™ underwater paints, fairing compounds or adhesives. It's true.

For years, offshore platform and jetty owners have struggled to apply epoxy putty-like compounds to steel and concrete surfaces. Adherence problems and application challenges often turned the project into an economic and engineering disaster. In 1984, an Australian company promoted HYCOTE™ 151, a thin, durable epoxy coating engineered for underwater application. Hundreds of marine structures have been coated with HYCOTE™ since then, with outstanding results .

What kind of coating protection should you expect? Expect a smooth, hard, non-toxic surface only an epoxy can provide. Some customers have found that HYCOTE™ is the only coating which withstands the unusual abrasion given to rudders and stabilizing fins.

One coat application, 100% solids (no VOC's).

If it works well underwater, think of where condensation or continuous washing prevents the application and adherence of your traditional epoxy system - e.g. operating machinery, storage tanks, fish processing decks, bilge areas

We've got the Americas covered. In fact, if you maintain a U.S. Government owned ship, we've got the world covered! For technical assistance and the names of licensed suppliers of the HYCOTE™ family of paints, fairing compounds, and adhesives, call or fax David Allan, Vice-President at: **1 (902) 422-1219.**

U.T.Technologies Limited, Box 31114, Robie Street RPO, Halifax, Nova Scotia, Canada, B3K 5T9 .
Products manufactured in Canada and the USA under license.
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Supplier inquiries from established paint companies welcome.

Circle 314 on Reader Service Card

(Continued from page 90)

Ferro Corporation

CopperClad[R] Bottom Coating System is a permanently-attached antifouling hull coating that can be sprayed in-mold by the manufacturer of fiberglass boats or post-applied by an authorized applicator to existing fiberglass boats. Reportedly, CopperClad coatings are environmentally acceptable alternatives to ablative bottom paints — cost-effective coatings that do not leach or "fall off" and provide a safe, long-lasting finish. CopperClad is registered with the EPA. For more information on Ferro Corporation,

Circle 192 on Reader Service Card

Hempel Paints Ltd.

Ballast spaces are a problem Hempadur LTC 4514 and 4515 were designed to solve. These products are reportedly suited to the total protection of such areas due to their chemical structures. The products reportedly afford: no restriction in use through coal tar or isocyanate content; light colors to ease inspection during application and subsequent surveys; and better temperature resistance.

"Hard" coatings with abrasion-resistant properties, they also embrace tolerant recoating intervals and reportedly are equally suitable for segregated and combined cargo/ballast spaces.

The high volume solids (82-85 percent, depending on shade) provide not only low VOC emissions, but increased area coverage. The low-temperature curing Hempadur LTC 4514 provides an application temperature down to minus 15 degrees F.

For more information on Hempel Coatings,

Circle 95 on Reader Service Card

Sigma Coatings

With today's demands for higher safety, economic benefits and more stringent environmental concerns, Sigma Coatings is already well-established in R&D programs directed toward the future.

Products range from the high-grade, tin-free self-polishing anti-fouling Sigmaplane Ecol to solvent-free tank coating systems such as the combined spray and fill epoxy Sigmaguard CSF and the ballast tank coating Sigmaguard BT.

Sigma Alumastic is a high-solid, VOC-compliant self-priming surface tolerant epoxy coating. Specially developed for rusted areas where only surface preparation by power tool or hydroblasting is possible, it provides resistance to abrasion, impact, water and mild chemicals, and can reportedly be overcoated with epoxy, polyurethane, alkyd, acrylic and chlorinated rubber paints.

For more information on Sigma Coatings,

Circle 116 on Reader Service Card

Stan-Blast Abrasives

Stan-Blast has added new items to their product line that will help customers comply with the stricter regulations imposed by the Department of Environmental Quality (DEQ) and the EPA. The new items are: Blastox, containment screens and other low free silica abrasives, such as garnet and glass beads.

Blastox is blended with abrasives before blasting to render spent abrasives non-hazardous and acceptable for disposal in standard landfills. Containment systems are meant to meet most stringent environmental regulations by containing and capturing overspray and spent abrasives. Stan-Blast abrasives are listed on the Navy's Qualified Products List.

For more information on Stan-Blast products,

Circle 199 on Reader Service Card

The T.D.J. Group

T.D.J. is an environmental services company that markets dry chemistry for use in a variety of markets to render heavy metal waste non-hazardous under TLCP testing. Blastox™ is a blasting additive used with traditional abrasives and equipment to render spend abrasive waste non-hazardous for lead and other metals under TLCP testing without RCRA permitting.

Blastox blended abrasives are reportedly being used on Navy vessels and in ship yards to reduce the cost of handling abrasive waste. Regional capabilities for beneficial reuse of spent abrasives (versus landfills) are being set up regionally, which reduces potential liability for the generator. For more information on the T.D.J. Group,

Circle 104 on Reader Service Card

Unitor

Unitor's Corroless Rustkil range comprises two rust-stabil ing primers for conventiona reachable ship areas, and two cor sion-inhibiting aerosol sprays other areas. The surface-tolera Anti-Rust primers can reportec be painted on after removing loc rust for long-term corrosion prot tion. Anti-Rust Spray 1 reportec protects nuts, bolt heads, flang crevices, window frames and pc holes, hinges, valves and stored co ponents. Anti-Rust Spray 2 is electrical spray that dries to a cle thin film and can reportedly be us to protect the internals of electric junction boxes, switchgear, navig tion lights, communications equi ment, electrical motors and tools storage. For more information Unitor,

Circle 193 on Reader Service Card

U.S. Paint

AWLGRIP High Solids Urethar Coating Systems reportedly me rigorous performance standards e tablished during five years of la and field research, and are currentl being globally test marketed in fres and salt water. AWLGRIP Hig Solids were developed in respons to concerns of lowering solvent emi sions while offering the exceptiona performance advantages of the cor ventional urethane AWLGRIP proc uct line. Reportedly low in VOCs AWLGRIP High Solids reportedl have high impact and chip resis tance, high gloss retention, excel lent flow control and flexibility c application. Manufactured in quart and gallons, a wide range of stocl and custom colors have been formu lated. For more information o AWLGRIP High Solids Urethan Coatings Systems from U.S. Paint

Circle 194 on Reader Service Card

U.T. Technologies

HYCOTE Epoxy Coatings and adhesives, from U.T. Technologies reportedly perform under adverse environmental conditions — providing all the expected benefits of epoxy-based systems. Application can usually be made using one of the seven Product Application Modules (PAMs) which help guarantee a properly mixed and prepared product. U.S. government agencies have reportedly been applying HYCOTE 151 to ship hulls without removing them from the water. Oil companies in the U.S., Mexico and Brazil have used HYCOTE 151 for applications along the waterline of offshore platforms and inland on pipelines where condensation prevents the use of traditional coatings systems. For more information on HYCOTE from U.T. Technologies,

Circle 198 on Reader Service Card