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ANNUAL REPORT

CRUISE INDUSTRY



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Oceanology Vessel Technology

**Ship & Boatbuilding
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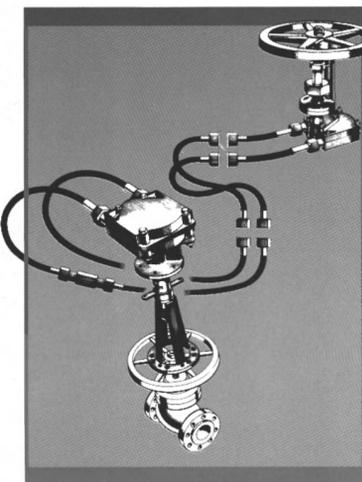
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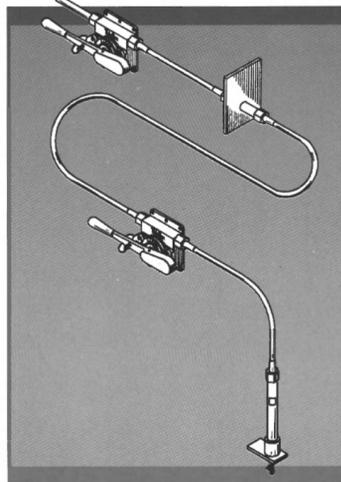
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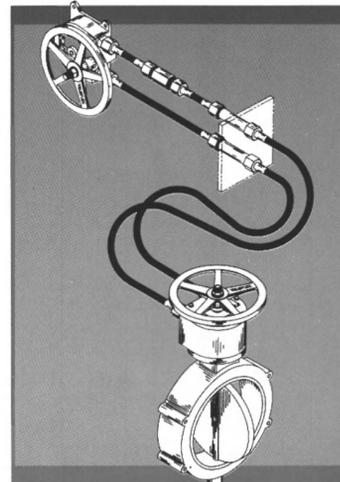
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ON THE COVER

On the cruise shipping side, P&O Cruises' *Oriana*—the 850-ft. (259-m), 67,000-gt ship currently building at Meyer Werft for delivery in 1995—is one of the most exciting examples of cruise ship technology in recent years. Read how P&O subsidiary Princess Cruises, which has the largest cruise ship in the world on order, and other major cruise lines are shaping the cruise vessels of tomorrow in our Cruise Industry Annual section, which begins on page 33. On the commercial shipping side, the Howaldswerke-Deutsche Werft-built *Norasia Kiel* exemplifies the theme of ship and boatbuilding technology: one of the first of a new class of open-top containership which offers myriad advantages in terms of cargo transference. Our Ship & Boatbuilding Technology section begins on page 26.

26 SHIP & BOATBUILDING TECHNOLOGY

What do a pilot boat, an LNG tanker, a fast ferry and an open-top containership have in common? Read on — all incorporate advanced technological features.

33 CRUISE INDUSTRY ANNUAL

The possible emergence of a U.S. cruise industry and international safety codes are just two issues which may shape the cruise industry for years to come. **PLUS:** Directory of Cruise Ship Builders, Repairers & Suppliers.

40 DIESEL POWER ANNUAL

Engine manufacturers face continuing challenges in areas of fuel efficiency and emissions. Find out how engine manufacturers plan to meet their customer's needs today and tomorrow.

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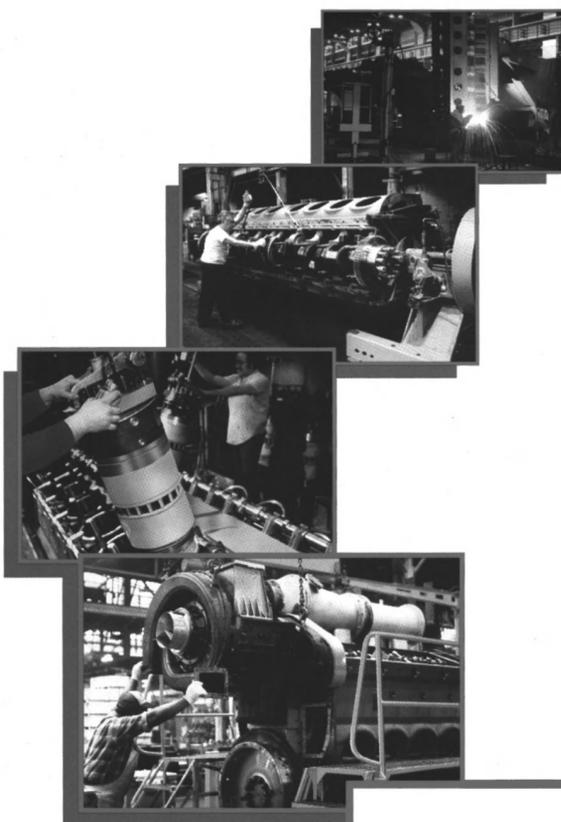
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Volume 56

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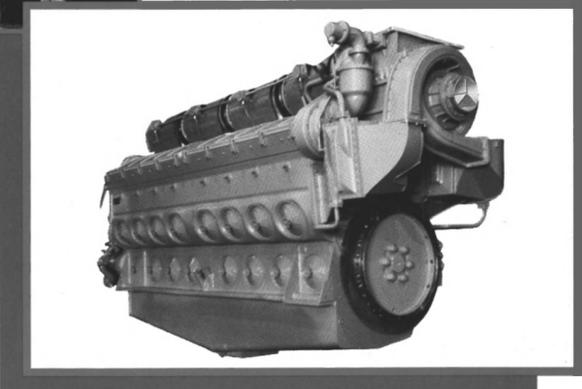
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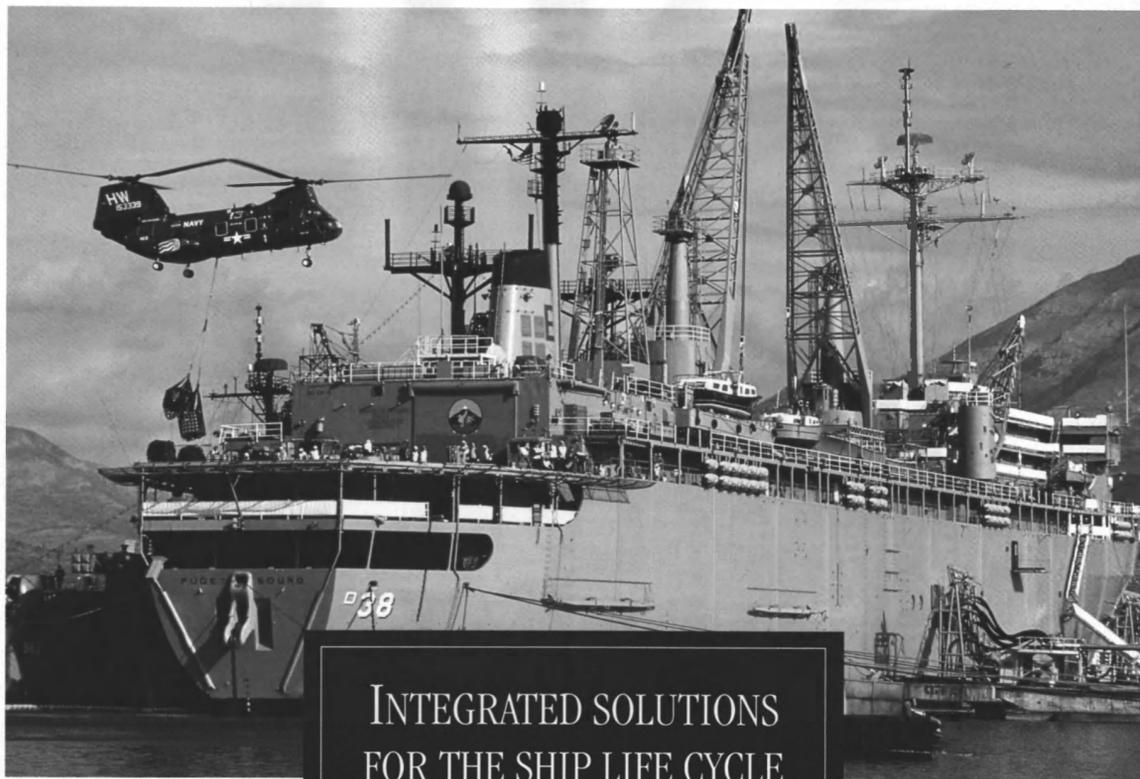
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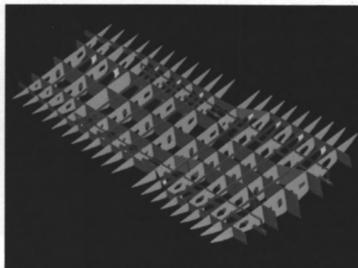


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Good Business Reported At Super Yacht '94

by Carol Fulford & Andy Smith

Nice, on the French Riviera, was the venue for the 4th International Super Yacht Show held in the last week of May. Revitalized under new ownership, the event delighted exhibitors with a marked increase in the number of visitors and good business reported in all sectors. Over 40 superyachts and some 300 companies from across Europe, the Americas, Australia and the Far East attempted to catch the eye.

Diaship/Heesens President **Jorge Robaina** was kept busy negotiating deals and reports orders for three 100-ft. (30-m) plus vessels, two of which are for the Far East, and **David Ross**, president of Burger Boat Company, announced sales of 86-ft. (26-m) and 76-ft. (23-m) motor yachts. Palmer Johnson's **Mike Conrad** declared himself well pleased with the show, having signed contracts for several major refit projects at the company's Savannah repair facility. "Frankly, we never expect to sign deals at shows but this year's Super Yacht has been an exception," he commented. New Zealand's Marine Export Group was equally bullish about the state of the industry and the impact made by advanced technology accrued as a result of the

country's involvement in yacht racing. Generating particular interest were two areas of commercial vessel technology now finding a niche in this market. Karlskronavarvet, a long established builder of military craft, is offering megayacht hulls in the 100-ft. to 230-ft. (70-m) range using GRP sandwich construction techniques identical to those used



for the Swedish Navy's minehunters. Electronic Chart Display and Information Systems (ECDIS) are now available from competing Norwe-

gian electronic concerns, Norcontrol and Simrad Robertson, with arrangements especially designed for sophisticated superyachts with the same features as the full professional versions. Taking advantage of progress made this year, the new owners of the show plan a move for 1995, just a couple of hundred yards away, to a larger single level, custom built exhibition center. The in-water show will also be improved with more facilities.

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Team Of Industry Leaders Creates Assault RIB

A project led by a company called Team One has, with a group of marine industry leaders — American Eagle Mfg., Caterpillar Inc., and North American Marine Jet — created the Team One GB36 Rigid Inflatable Boat (RIB) assault craft. American Eagle Mfg., Inc., LaConner, Wash., constructed the 37-ft. (11.3-m) RIB, with a 3/8-inch boat bottom and solid foam collar.



Caterpillar supplied the diesel engine, model 3176. These engines have electronically computerized control systems, reportedly providing extremely efficient, lightweight 500-hp diesel engines.

North American Marine Jet, (NAMJ) Inc. equipped the vessel with the Nomera 20 Jet propulsion unit, built to deliver cavitation-free thrust at speeds from 0 to 60 knots.

The craft is being tested by the U.S. Navy and has potential for serving many of their high-speed craft demands — and has attracted the interest of the Marines and the U.S. Coast Guard, as well.

Other NAMJ work for the Navy includes completing the delivery of 51 14YJ units to the U.S. Navy; scheduled rebuilding of between six and ten 14YJ units by October; and five conversions of 20YJ units into Nomera 20s. In addition, Western Geophysical placed an order with NAMJ for nine TRAKTOR jet units.

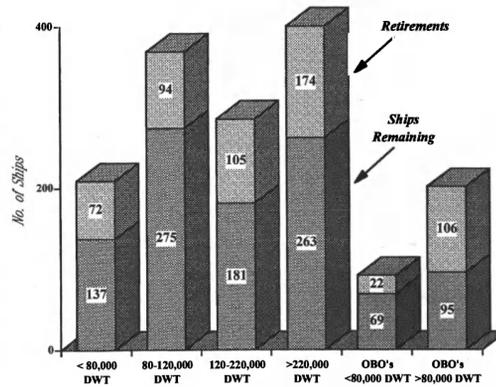
For more information on companies involved with the craft, circle the appropriate number on the Reader Service Card in this issue.

American Eagle Mfg. 97
Caterpillar Diesel 98
North American Marine Jet 99

INDUSTRY TRENDS

by
James R. McCaul, President
IMA Associates, Inc.

Approximately 575 of the 1,590 crude carriers or OBO's now in service will be retired over the next five years — producing a major replacement opportunity for shipbuilders and ship system suppliers.



Source: IMA Associates, Five Year Outlook for U.S. Shipbuilding, 1994

The above figures are taken from the IMA Associates report Five Year Outlook for U.S. Shipbuilding. For more information about the report,

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Adm. Kramek Sworn In As New USCG Commandant

Vice Adm. **Robert E. Kramek** was sworn in as the 20th commandant of the U.S. Coast Guard (USCG) in ceremonies at Ft. McNair.

Adm. **Kramek** relieves Adm. **J. William Kime**. At the time Adm. **Kramek** was nominated for the position, he was serving as Coast

Guard Chief of Staff in Washington, D.C.

Adm. **Kramek** has held a variety of shore and at-sea commands since graduating from the Coast Guard Academy in 1961. He was coordinator of the war on drugs in the Caribbean and, as commander of the Haitian Migration Task Force, led the interdiction and rescue of 37,000 Haitians. Adm. **Kime** became commandant on May 31, 1990 and will retire with 37 years of service.

GE, Raytheon Supply Trinity-Built Electric Plant Barge

Phase I of a barge-mounted combined-cycle plant will soon begin operation. Under a \$120 million turnkey contract, GE Industrial Power Systems (GEIPS) and Raytheon Engineers & Constructors are supplying equipment and services for the 186-MW plant, located in Puerto Plata, Dominican

Republic and owned by Smith/Enron Cogeneration Ltd. The plant will supply power to a Dominican utility under a 16-year agreement.

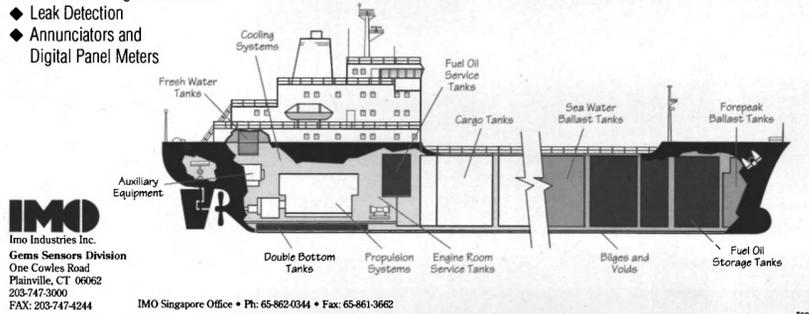
Phase I is a barge-mounted, simple-cycle gas turbine system, constructed at Trinity Marine Group's Beaumont, Texas yard and delivered to the project site May 10 — less than six months from contract signing. In Phase II, a second barge carrying a steam turbine generator, heat recovery steam generator and two power boilers will be added. Combined cycle operation is to begin July 1995, bringing total output to 186 MW. GE is providing plant conceptual design, combined-cycle performance guarantees and major power island equipment, including an MS7001EA gas turbine generator, 118-MW steam turbine generator, an HRSG and a plant control system. Raytheon is providing turnkey construction: engineering and design services, all balance-of-plant electrical and mechanical equipment, project and construction management, installation and erection services, plant start-up and testing services.

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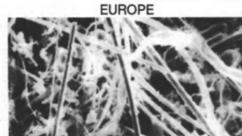
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A Scanning Electron Microscope looks at

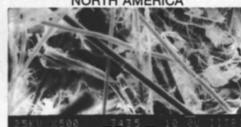
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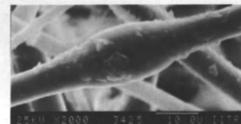
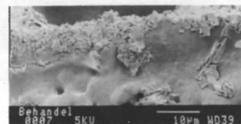


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House Passes Energy Bill

The House of Representatives passed an energy bill authorizing \$726 million for the design, development and testing of improved nuclear propulsion plants for ships and submarines, and \$4.3 billion (\$541 million less than last year) for planning, construction, operation and maintenance of water projects administered by the Army Corps of Engineers. Overall, the bill's funding is \$1.3 billion less than in 1994.

Austal Ships Builds Cats For Tourism Market

Austal Ships Pty. Ltd. recently delivered two cruise catamarans. *Bali Hai II* was delivered in April to operators on the island of Bali. The 118-ft. (36-m) cruise catamaran's main propulsion consists of twin MTU 12V396TE 74L diesel engines, (1,470 kW at 1,940 rpm) driving MJP J650R waterjets through Reintjes gearboxes delivering a fully laden cruising speed of 29 knots. *ONO-ONO*, the first monohull passenger ferry Austal has built, was delivered in June to SPI Maritime. At 157 ft. (48 m), it achieved trial speeds of 37 knots. Main propulsion consists of three MTU 16V396TE 74L diesels, each developing 1,960 kW at 1,940 rpm and driving KaMeWa 63 waterjets through Reintjes gearboxes.

Navy, Computer Sciences Corp. In \$13 Million Pact

Computer Sciences Corp. won a contract for up to \$13 million from the Naval Command, Control and Ocean Surveillance Center. CSC will provide environmental technology studies, development, engineering and analysis to support research in marine sciences.

Avondale, AESA In Tech Exchange Pact

Avondale Industries, Inc. and Astilleros Espanoles SA (AESA) have entered into a cooperative agreement to exchange commercial ship designs, market analysis and ship production technology.

Albert L. Bossier, Jr., Avondale's chairman and CEO, said the agreement was a significant step toward Avondale's goal of acquiring commercial shipbuilding contracts, saying AESA will be a source of competitive commercial ship designs and efficient shipbuilding technology. Juan Taus Rubio, senior vice president for AESA, said his company had embarked on a similar operation to improve efficiency and competitiveness six years ago, resulting in a dramatic improvement in production costs, and he hoped Avondale would realize the same benefits.

For more information on Avondale,

Circle 115 on Reader Service Card

For more information on Astilleros Espanoles,

Circle 116 on Reader Service Card

Rockwell Wins \$10.5 Million Navy SATCOM Contract

Rockwell has received a \$10.5 million award to provide in-service engineering to support the U.S. Navy's Super High Frequency (SHF) Satellite Communication (SATCOM) systems. The five-year, cost-plus-fixed-fee contract was awarded to Rockwell subsidiary Collins International Service Co. (CISCO), by the Navy Regional Contracting Center (NRCC), San Diego.

Rockwell engineers will install and maintain specific components and subsystems that comprise the SHF SATCOM systems. The contract includes Inspect and Repair as Necessary (IRAN) of the systems. This work will be conducted by Rockwell subcontractor Eldyne, Inc., San Diego. For more information on Rockwell,

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Keppel Units Win \$38.6 Million Rig Conversion Deal

Two companies in the Keppel Group, Keppel Shipyard and Far East Levingston Shipbuilding (FELS), have jointly secured a contract to repair and convert a semi-submersible drilling rig, the *Luhua-FPS*, to a floating production system.

FELS will reportedly handle the major portion of the contract, awarded by Reading & Bates Development Company. Completion and delivery is expected in April 1995.

July, 1994

Evergreen To Buy Five Containerships From MHI

Evergreen Group has reached an agreement with Mitsubishi Heavy Industries (MHI) to purchase five 4,900-TEU containerships. A firm contract will reportedly be signed later this year, and delivery of the first vessel is expected in early 1996.

The addition of the vessels will increase Evergreen's fleet to 80 vessels with total capacity of 180,000-TEUs. The new vessels will operate between the Far East and the U.S.

Global Ocean Carriers Names Bahu Chairman

Global Ocean Carriers Ltd. has named Nabil Bahu chairman. Mr. Bahu replaces Alan Kennedy, who will remain a director. Another director, James Davis, has been named deputy chairman, replacing Mr. Bahu.

Stolt Partner Names Olssen New Chairman

Stolt Partner appointed Christer Olssen, president of Wallenius Lines, to replace Jacob Stolt-Nielsen, Jr. as chairman. Mr. Olssen has been on the board since 1990 and a director of Stolt-Nielsen SA since 1993. The board decided Stolt Partner should have an independent chairman, as the majority of shareholders are not affiliated with Stolt Parcel Tankers Inc., which owns 44 percent of the shares. Mr. Stolt-Nielsen will continue to serve as a member of the board.

Peña Announces Vessel Design Compliance Initiatives

Secretary of Transportation Federico Peña announced several initiatives designed to enhance maritime policy reform and has directed the U.S. Coast Guard (USCG) to execute a four-point program to that end. This is the third element of the administration's shipbuilding initiative and its proposed maritime security program. The initiatives involve vessel design compliance programs and eliminating unnecessary regulations which impede U.S. shipbuilding and operating competitiveness.

Secretary Peña said that the initiatives would in no way jeopardize the safety of passengers, crew or the environment. "These critical safety and environmental goals can be achieved while opening new avenues for U.S. shipbuilders and ship operators to compete on a global scale," he said.

The four-point program would include:

- Establishing compliance options so that a shipbuilder or owner can rely on classification society standards, rather than specific USCG regulatory requirements.

- Accepting regulatory compliance verification by qualified, responsible classification societies and not only from the American Bureau of Shipping which, being the official classification society of the U.S. government, inspects U.S. vessels using USCG construction requirements.

- Establishing a model company program whereby the vessels of a

company that instituted a rigorous quality management program would be inspected less frequently by the USCG.

- Establishing a USCG Oversight Program to verify the quality management program of participating shipping companies and classification societies.

Provisions are also included to accept certain items of equipment that have been approved by other governments that have approval systems equivalent to the U.S.'s. "The goal is to make the Coast Guard regulatory requirements less burdensome, more efficient and effective for the U.S. maritime industry," Secretary Peña said.

Provisions will be initiated using a voluntary program developed by the USCG in cooperation with the maritime industry. A pilot program begins this month to evaluate the alternative compliance. Volunteers are being solicited for the program and six companies have indicated interest in participating using ships whose Certificates of Inspection are soon to expire.

Secretary Peña urged the shipbuilding and ship operating communities to familiarize themselves with the initiatives and determine how they may enhance their business plans. "These initiatives, taken together with the administration's other maritime reform initiatives, are important steps toward achieving our goal of an internationally competitive U.S. maritime industry," he said.

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Armed Services Committee Recommends \$263 Billion Defense Budget

The Senate Armed Services Committee recommended a \$263.3 billion defense budget, \$300 million below President Clinton's request. It blocks cuts in the U.S. bomber force, keeps the B-2 bomber alive, and funds another amphibious landing ship. Key elements of the Senate committee proposal include: \$3.6 billion for CVN-76, a nuclear-powered aircraft carrier; \$2.7 billion for three DDG-51 Arleigh Burke class guided missile destroyers; \$601 million as a first payment for an amphibious assault ship. Research and development funds include \$507 million for a new attack submarine.

Phillips Petroleum & Norway Agree On Ekofisk

Phillips Petroleum Company, as operator for Phillips Norway Group (PNG), and the Norwegian Minis-

try of Industry and Energy (MIE) have tentatively agreed to extend the production license for Ekofisk, the PNG's giant oil and gas venture in the North Sea. MIE will extend PNG's production license for Ekofisk fields from 2011 to 2028, eliminate the royalty charged on production when the project is completed, estimated for 1998, and extend pipeline licenses held by Norpipe AS to 2023, subject to increase state ownership. Norpipe is owned 50 percent by the PNG and 50 percent by Statoil.

The Ekofisk IIA plan provides for the construction of two new platforms — a wellhead platform to be completed in 1996, and a combined process and transportation platform to be completed in 1998, linked with the existing Ekofisk Complex. The estimated cost of the IIA facilities is \$3 billion.

Crowley Wins Chevron Contract; Makes Executive Appointments

Crowley Marine Services and Chevron Shipping entered a five-

year agreement for Crowley to move petroleum products between the West Coast and Chevron customer facilities. Related transactions include a five-year bareboat charter of Chevron's barge *Lube Quest* and Crowley's acquisition of a Chevron towing tug.

Crowley Maritime Corporation made some recent executive appointments. **Michael G. Roberts** succeeded **Jack Park** as vice president, governmental relations. Mr. **Park** retired in June. Also, **Gary L. Depolo** and **Leland S. Prussia** were elected to Crowley Maritime's board of directors.

Unitor Acquires Fire Product Co.; Offers Free Guide

Unitor AS of Norway has acquired the Ginge-Kerr Group, a major supplier of fire protection systems, from SNC-Lavalin, Canada. Ginge-Kerr fire protection systems will now be manufactured by the recently-acquired company Svenska Skum AB. Unitor now offers a special ship's log, free of charge, for the storage

and use of substances which can be injurious to health. The log is used for recording the use of such products, or any chemicals on board. It contains a list of over 40 commonly used shipboard chemicals, refrigerants and coatings.

For more information on the log from Unitor,

Circle 114 on Reader Service Card

New Jaya Units Purchase Ships For 5-Year Leases

Shipping company Jaya Holdings Ltd. has formed two subsidiaries, Seadex Pte. Ltd. and Xinet Pte. Ltd., the former a joint venture with Xour Line Pte. Ltd., Singapore.

Seadex has agreed to buy the containership *MV Aurora Maru* for \$4 million to place it on a five-year charter. Xinet has bought a general purpose tweendecker, *MV Thor 1*, for \$6 million, and plans to buy a similar ship, *MV Thorscape*, also for \$6 million. Both ships will be chartered to Norwegian Company AS Thor Dahl for five years.



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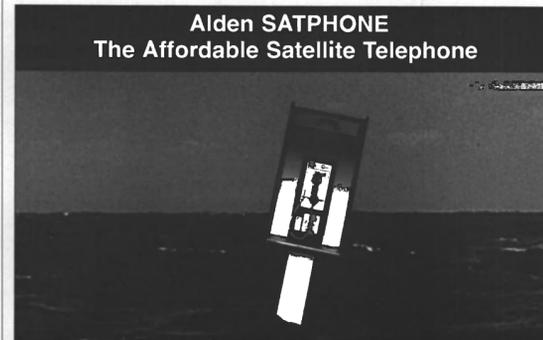
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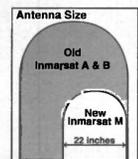


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Circle 202 on Reader Service Card

U.S. Navy

CVN-76: BEYOND VIRGINIA

The debate over CVN-76, the estimated \$4.5 billion nuclear aircraft carrier which would be built at Newport News Shipbuilding (NNS) and commissioned in the year 2002, has moved from the U.S. House of Representatives to the U.S. Senate.

Early indications point to the Nimitz class aircraft carrier becoming a reality, heartening news to many suppliers which have seen once bread-and-butter U.S. Navy business dwindle steadily.

CVN-76 is part of the FY '95 Defense Authorization Bill, dubbed HR 4301 in the House. The House version calls for \$3.6 billion for the project from the FY '95 budget. However, one influential senator sought immediately to push that schedule even harder.

Senator **Charles S. Robb** (D-Va.) immediately offered an amendment to restore full funding for CVN-76. Sen. **Robb** was pushing to have the Armed Services Committee subcommittee authorize \$1.2 billion for CVN-76 from FY '94 defense funds, and the remainder of the money — \$2.4 billion — from FY '95 funds.

"CVN-76 is key to the Navy's future plans for the defense of the country," Sen. **Robb** said. "And it is also essential to Virginia's economic future, particularly to the Peninsula and Newport News Shipbuilding." Sen. **Robb** offered the amendment in the Regional Defense and Contingency Forces Subcommittee mark-up.

While it's logical to reason why state legislators stand squarely behind the CVN-76 project, they by no means constitute the only support

for the project. The size and scope of the project would involve millions of dollars in contracts in nearly every state — contracts for suppliers which have been facing U.S. Navy downsizing (see list of CVN-76 suppliers). It is reported that the carrier affects 42 states and 120,000 jobs. In FY '92, NNS purchased more than \$252 million in goods and services.

"I fully support CVN-76," said Congressman **Owen Pickett** (D-Va.), Second District, Va. "The case has been made for the need of an added carrier to preserve defense needs as well as the industrial base. Carriers are the front line defense for the U.S. Navy..." and we need a steady stream to keep a strong carrier force. Congressman **Pickett's** comments represent the conventional justification for the new carrier: preserving a strong national defense (i.e. not cutting too much) and preserving NNS's ability to build the ships. Let it be forgotten that in the "bottom-up review" of the nation's post-Cold War military needs, released last September and approved by President **Clinton**, then-Defense Secretary **Les Aspin** called for maintaining a fleet of 12 carriers, which is one fewer than the current fleet.



The USS *George Washington* (CVN 73), a Nimitz class aircraft carrier, at Newport News Shipbuilding.

The Nimitz Class Supercarrier

Another argument on the side of funding CVN-76 today is time. Based on the retirement and drydock/overhaul of the current fleet, a CVN-76 funded today will be timed well to maintain fleet strength when it would be commissioned in 2002.

Powered by two nuclear reactors which can operate for 20 years without refueling, the typical Nimitz class ship can be operational for about 50 years. This power plant powers the ship via four bronze propellers, each 21 ft. (6.4 m) across and weighing 66,220 lbs., to top speeds in excess of 30 knots.

It takes five years, 47,000 tons of structural steel and about a million lbs. of aluminum to build a carrier. The finished product measures 1,092 ft. (332.8 m) long, and towers 20 stories above the waterline.

Equipment aboard is varied and plentiful, and encompasses a wide variety of products and services to create and maintain the massive military entity, as well as house and maintain the approximately 6,000 sailors and airmen aboard. For example, ship requirements include: a distillation plant aboard providing 400,000 gallons of fresh water from sea water daily; nearly 30,000 light fixtures; 2,000 telephones; and 900 miles of cable and wiring.

NNS built the first ship designed as an aircraft carrier, the USS *Ranger*, in 1934, and the world's first nuclear-powered aircraft carrier, USS *Enterprise*, in 1961. Newport News Shipbuilding is the sole builder of the Nimitz class carriers.

For more information Newport News Shipbuilding,

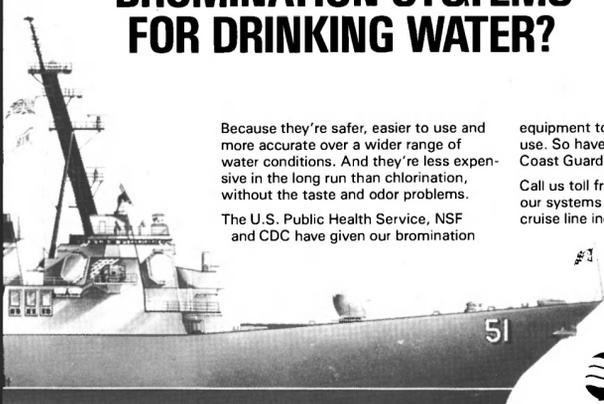
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CVN-76 Suppliers

Company	Location	Product
Bethlehem Steel	Bethlehem, Pa.	Steel Plate
General Electric	Fitchburg, Mass.	Main Propulsion Units
Hopeman Bros.	Waynesburg, Va.	Furniture
Ingersoll-Dresser Pump	Phillipsburg, N.J.	Pumps
Jered Brown Bros.	Brunswick, Ga.	Elevators
Lukens Steel	Coatesville, Pa.	Steel Plate
MKW Power Systems	Rocky Mount, N.C.	Emergency Diesel Generators
SPD Technology	Philadelphia, Pa.	Circuit Breakers & Control Equip.
USS, Div. of USX	Pittsburgh, Pa.	Steel Plate
Westinghouse Electric	Sunnyvale, Calif.	Ship's Service Turbine Generators

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13

GEC Alsthom Slow Speed Drive System Installed On New USCG Vessels



U.S. Coast Guard vessel fitted with Regulateurs Europa Slow Speed Drive System.

A Slow Speed Drive System has been designed and installed for evaluation on a number of U.S. Coast Guard (USCG) 110-ft. (34-m) Island class vessels by GEC Alsthom Regulateurs Europa Ltd. The system is reportedly a low cost alternative for fast patrol boats, which require the ability to loiter. Island class vessels are sometimes needed to tow damaged vessels safely into harbor. At minimum speed with both engines idle the vessel drives at 11 knots, and with one engine engaged, at eight knots—both speeds excessive for towing and slow speed maneuvers. The Slow Speed Drive System achieves loitering speeds by engaging either one or both drive shafts via a pulsed clutch arrangement. A typical installation would be a four-speed combination to give reduced speeds of 2.5, 4, 5.8 and 7.2 knots. The drive reportedly broadens the operational capacity of the vessel without impairing its high-speed capability. The system can also be retrofitted to existing propulsion systems or incorporated into a new installation. For additional information on the Slow Speed Drive System from GEC Alsthom,

Circle 3 on Reader Service Card

Alaska Diesel Names Clark Regional Mktg. Director

Alaska Diesel Electric has named **Peter Clark** as its new director of marketing/Eastern Region. He will be working in Alaska Diesel's Pompano, Fla. office. Mr. Clark has 20 years of experience in the marine industry. He was sales manager of Rampage Yachts and Cruistar Inc. and owner of Western Gulf Yacht Sales/Houston Hatteras. Most recently he was the regional director of sales for Tollycraft Yacht Inc.

Hitachi Zosen Completes Bulk Carrier *Samjohn Spirit*

The *Samjohn Spirit*, a bulk carrier of 71,730-dwt (metric), was completed by the Maizuru Works of Hitachi Zosen Corp. for Nissho Iwai Corp. The *Samjohn Spirit* is equipped with a Hitachi Zosen B&W 6S60MCE-type diesel as the main engine. The vessel is 705 ft. (215 m) long with a breadth of 105 ft. (32 m) and depth of 62 ft. (19 m).

Mjellem & Karlsen Fast Ferry Progressing

Work on Mjellem & Karlsen's 312-ft. (95-m) monohull ferry for European Ferries Denmark AS in Copenhagen is reportedly progressing smoothly.

The \$32 million contract for the ferry was signed in December 1993. The four main engines are to be delivered by MTU and are of the 20V1163TB 73L type. KaMeWa will supply four 112S11 waterjets. Brunvoll, Vosper Thornycroft, and

Lohmann & Stolterfoht will also supply equipment for the newbuilding. The fast ferry will have a capacity of 600 passengers and 160 cars and the possibility to carry 12 tourist buses, and travel at approximately 35 knots.

Argosy Opens Riverside Casino In Missouri

Argosy Gaming Company and its wholly-owned subsidiary, the Missouri Gaming Company, announced the opening of its Argosy Riverside Casino in Riverside, Mo., the first to open in the Kansas City area. The Argosy Riverside Casino will initially utilize the former *Par-A-Dice* vessel, which the company recently acquired. The company anticipates delivery of the permanent Argosy Riverside Casino vessel later this summer. The new 57,000-sq.-ft., three-level vessel under construction will accommodate 1,800 passengers and crew and have approximately 30,000-sq.-ft. of gaming space. The new vessel will be 240 ft. (73 m) long and 77 ft. (23 m) wide.

Ingalls-Built Destroyer Named *Stethem*

The newest Arleigh Burke (DDG 51) class Aegis guided missile destroyer was named *Stethem* (DDG 63) on July 16, 1994 in honor of Petty Officer **Robert Dean Stethem**, killed by terrorists on TWA Flight 847 in Athens, Greece.

The new ship is the sixth Aegis destroyer to be launched by Ingalls. DDG 63 will join the Pacific Fleet after commissioning in 1995.

ABS Extends SafeHull™ To Bulk Carriers

The American Bureau of Shipping (ABS) extended its SafeHull system to new and existing bulk carriers, providing for improving their structural safety. The system concentrates on five main areas: dry cargo hold transverse corrugated bulkheads; vertical hold frames; cross deck structure; forebody; and cargo loading.

Weidman Named Additive VP For AlliedSignal Inc.

The Performance Additives unit of AlliedSignal Inc. named **David N. Weidman** its new vice president and general manager. Mr. Weidman succeeds **Frederick Karasek**, who retires after 33 years with the company. Mr. Weidman will oversee all operations within the Performance Additives area, including marketing, product development, customer service, and quality management, among other responsibilities. Mr. Weidman also spent almost 15 years with American Cyanamid.

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Westport Delivers Two Ferries For Catalina Service

Westport Shipyard, Inc., Westport, Wash. delivered two 100-ft. (30-m) by 23-ft. (7-m) "Super Express II" passenger vessels to Catalina Express Lines. The boats were dedicated in ceremonies in Southern California on June 6.

The boats, *Catalina Express* and

Islander Express, will carry 149 passengers at 32-knot speeds. Speed and increased ride comfort resulted from development of a new, semi-tunnel hull form and a newly designed integrated steering and stabilizer system from Maritime Dynamics of Lexington Park, Md.



The *Catalina Express*, one of two Super Express II passenger vessels built by Westport Shipyard, Inc. for Catalina Express Lines.





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The vessels are driven by two 2,000-hp 16V149TIB DDEC Detroit Diesel engines with MGN4336V Marine gears (3:1 reduction). Propellers are Lips four-blade 50 x 66/ABS type #4 alloy. The vessels are also equipped with prototype infrared night vision systems produced in a joint venture between Hughes Aircraft and Texas Instruments.

Catalina Express Lines, equipped with an all-Westport fleet, operates between ports in San Pedro and Long Beach, to Avalon and Two Harbors on Catalina Island.

For more information from Westport Shipyard,

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Catalina Express and Islander Express Equipment List

Main engines	Detroit Diesel
Engine controls	Detroit Diesel
Generator sets	Northern Lights
Propellers	Lips
Radar	Furuno
GPS	Furuno
Shafts	Aquamet
Bow thruster	Wesmar
Air compressor	Granger
Coatings and antifouling	International Paint

Keppel Completes Refurbishment And Upgrade Of Barge

Keppel Shipyard, the main shiprepair arm of the Keppel Group, has completed a \$3.1 million refurbishment and upgrading contract on the oil production and storage barge *San Jacinto*.

Awarded by the oil company Conoco Indonesia, Inc., the contract included extensive refurbishment work and modifications carried out at the Telok Blangah yard.

Work on two other major conversion contracts is progressing at Keppel Tuas.

In a contract worth \$25 million, *Nanhai Kai Two*, a 152,404-dwt steam tanker, is being transformed to a Floating Production Storage and Offloading Facility (FPSO).

The other contract is for the tanker *Bavi* to be converted to a Floating Storage Offloading (FSO) facility.

For more information on Keppel Shipyard,

Circle 27 on Reader Service Card

Ingalls-Built USS Port Royal Commissioned



The U.S. Navy commissioned its 27th Ticonderoga (CG 47) class Aegis guided missile cruiser on July 9, when USS *Port Royal* (CG 73) joined the U.S. Pacific Fleet during commissioning ceremonies in Savannah, Ga. Captain **Nick Richards**, USN, accepted command of CG 73, with Lieutenant Commander **Derek Kemp**, USN, as executive officer.

CG 73 is the 19th Aegis cruiser to be delivered to the Navy by Ingalls Shipbuilding division of Litton Industries in Pascagoula, Miss.

USS *Port Royal* is the second U.S. Navy ship named to commemorate battles of the American Revolution and the Civil War fought in the waters of Port Royal Sound and on the adjacent South Carolina sea islands. The first *Port Royal* was a wooden, sidewheel gunboat commissioned in 1862. The gunboat *Port Royal* was decommissioned in 1866.

Aegis cruisers are 567 ft. (173 m) long, with a

beam of 55 ft. (17 m). Four gas turbine engines power the 9,500-ton ships to speeds in excess of 30 knots.

For more information from Ingalls,

Circle 8 on Reader Service Card

Bender Delivers MTU-Powered Patrol Boat To Colombia



Bender Shipbuilding & Repair Co., Inc. delivered the first of two 116-ft. (35-m) patrol boats it is building for the Colombian Navy's Coast Guard. The A.R.C. *Juan Nepomuceno Eslava* began its drug enforcement mission in Colombia in June.

The *Eslava* and its sistership are the first vessels built for Colombia's Coast Guard, a new branch of the Colombian Navy. The two patrol boats will be used for drug detection and enforcement, search and rescue missions and fisheries control within Colombia's Economic Exclusion Zone.

The vessels have a maximum speed of 28 knots, a maximum displacement of 131 tons and

carry a crew of five officers and 20 enlisted personnel. Powered by two MTU marine diesel engines, the boats have an endurance of more than 2,000 nautical miles.

The patrol boats are armed with a 25mm cannon on the bow and two 50-caliber machine guns on the flying bridge. The vessels have modern command and control, data processing and equipment monitoring capabilities.

For more information on Bender Shipbuilding & Repair Co.,

Circle 12 on Reader Service Card

Queen Of Norway Sponsors Minehunter Oksoy



Her Majesty the **Queen of Norway** sponsoring the minehunter KNM *Oksoy*, the first of a series of nine advanced Mine Countermeasure Vessel (MCMV) Surface Effect Ships (SES) for the Royal Norwegian Navy. The vessel was built by the Kvaerner yard of Mandal. The yard presently has three identical minehunters under construction. To the **Queen's** right is **Roger Sprimont**, managing director of Kvaerner Mandal a.s.

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Crowley Forms Fuel Company In Puerto Rico

Crowley Marine Services (CMS) announced the formation of a new bunker fuel business, named Crowley Marine Fuel Service, which will operate in the San Juan Harbor area, and the appointment of U.S.A. Marine Sales, Inc. as exclusive sales agent for the new company.

Raul Iglesias, CMS general

manager, Caribbean, said that Crowley Marine Fuel Service started operations on June 15 and offers a wide variety of quality bunker fuels, including a selection of Intermediate Fuel Oils (IFOs), blended with advanced technology computerized blending system from Jiskool. Other fuels for sale range from No. 2 diesel to No. 6 fuel oil (bunker C). According to Mr. Iglesias, initial deliveries will be made from a 35,000-barrel-capacity bunker barge, with

a second 10,000-barrel barge scheduled to enter service by July 1.

Crowley's experience in West Coast bunker transportation includes services in the harbors of Seattle, San Francisco and Los Angeles. For more information on the service, U.S.A. Marine Sales, Inc. can be contacted at (809) 725-3006 in Puerto Rico or 1-800-496-3006 worldwide; or

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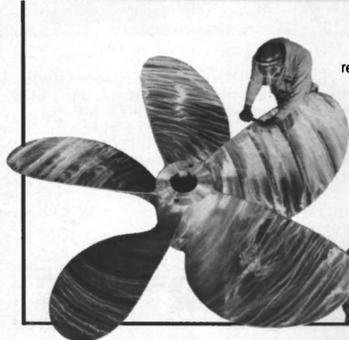
For more information on Aquamet shafting,

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OSI Wins First Tanker Contract For ECDIS System From Chevron

Offshore Systems International Ltd. has sold two Electronic Chart Precise Integrated Navigation Systems (ECPINS) — the company's own brand of Electronic Chart Display Information System (ECDIS) — to Chevron Shipping Co. of San Francisco.

The two ECPINS are to be installed on the 760-ft. (231.6-m) MVR *Hal Dean* and the 760-ft. MVR *Charles B. Renfrew*.

These systems will be integrated into the ships' radar to provide radar image overlay capability in addition to all the standard sensors, such as gyrocompass, depth sounder, GPS, etc. For more information on OSI,

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Report Claims Marine Bunker Fuels Industry Changing

The international marine bunker market, which costs ship operators upwards of \$15 billion a year at current prices, is undergoing a period of fundamental change, according to a report from Drewry Shipping Consultants.

"Marine Bunker Fuels - Markets, Economics and Technical Developments," indicates that worldwide demand for marine bunkers is now in excess of 150 million tons, of which 83 percent is accounted for by fuel oil. Total demand has oscillated widely in the last two decades, with the most recent low in the market occurring in 1985, when consumption dropped to 123 million tons as a result of the collapse in world trade and the requirement for ships.

To obtain a copy of the report, contact Drewry Shipping Consultants, 11 Heron Quay, London E14 4JF, England, tel: +44-71-538-0191; fax: +44-71-987-9396.

Maritime Reporter/Engineering News

Bay Ship & Yacht Expands Operations

Bay Ship & Yacht Co. (BSY) now operates a drydock facility in Alameda, Calif. in addition to its Richmond, Calif. facility. The drydock is 390 ft. (119 m) long, with a 2,800-long-ton capacity. BSY is a full-service yard with certified welders, machinists, electricians, mechanics, sandblasters and painters, shipwrights and pipefitters offering service on the drydock or pierside at any location. BSY provides drydocking and repair to commercial and government customers in the Bay area, as well. For more information on BSY,

Circle 83 on Reader Service Card

Stolt Comex CEO Retires

Guy Fleury, president and CEO of Stolt Comex Seaway SA, is retiring from the company, but will remain an advisor on special projects. **Gilles de Naurois** will be acting CEO until the company finds a replacement for Mr. Fleury. Stolt Comex Seaway is a diversified contractor to the offshore oil and gas industry with a focus on subsea activities.

SBVE: Ball Valves For Manifold Uses

Specialty Ball Valve Engineering (SBVE) markets a line of high-pressure ball valves, Navy-approved for 4,500-psi service and qualified to MIL-V-22687, which have been sold for use as nitrogen fill valves, external hull; fill and drain valves in skirt; and emergency ballast blow valves with hydraulic actuators. SBVE now offers a variety of pneumatic, E/M and hydraulic actuators to naval and commercial markets. SBVE has worked with the Navy on an upgrade of valves on NEDU (Navy Experimental Dive Unit), and with Lockheed Marine and Paramax on the new SDV (Swimmer Delivery Vehicle), which incorporated a complex titanium manifold of eight valves for six ballast functions. For more information on SBVE,

Circle 104 on Reader Service Card

NACE Publishes Technical Papers On Corrosion

NACE International, Houston, has released *Corrosion and Corrosivity Sensors* — a collection of technical papers presented at Corrosion '94, NACE's 49th annual conference. The book focuses on the use of sensors as a corrosion control method. Special emphasis is placed on applications in the chemical, process, and transportation industries. For information on the book,

Circle 85 on Reader Service Card

July, 1994

Magnavox's Inmarsat Fax Type-Approved

Magnavox's MX 3400 MAGNA-Phone M has been type-approved by Inmarsat for ship-to-shore fax transmission. Magnavox will immediately ship MX 3400s with optional factory-installed 2400bps fax interfaces. The unit is a new digital satellite telephone system small enough to be fitted on vessels down to 40 ft. (10

m). Other advanced options are currently under development and will be announced in the next few months. For more information from Magnavox,

Circle 86 on Reader Service Card

C-MAP Relocates To Utah

C-MAP Systems, Inc. has completed the relocation of its corporate offices from Houston, Texas to Park

City, Utah. The move comes in response to continued growth of the company and an increased demand for its "Mission Manager" "VideoRuler," and custom mapping software packages, used in the offshore petroleum, nuclear power and transport fields. Contact C-MAP at the new address: C-MAP Systems Inc., PO Box 2430, Park City, UT 84060; tel: (801) 647-9981. Or,

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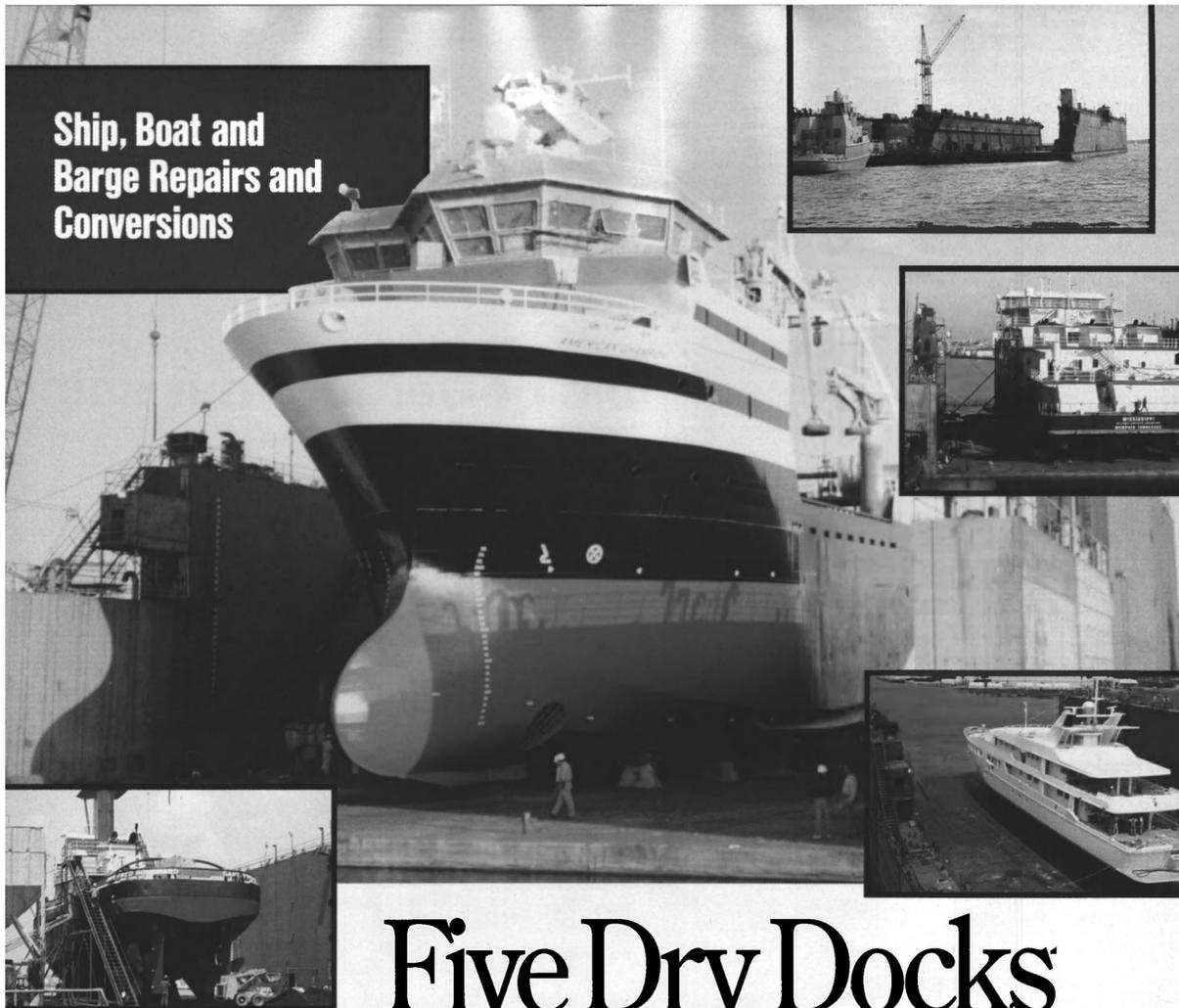
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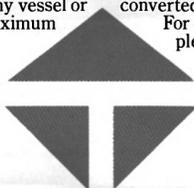
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Circle 25 on Reader Service Card

Tri-Star Marine Delivers Tractor Tug To Coos Bay



Tri-Star Marine of Seattle has delivered a 4,000 hp tractor tug, *Tioga*, to Coos Bay Towboat Co. of Oregon. The new 85-ft. (26-m), ice-strengthened boat was designed and built by Tri-Star, with engineering services provided by Jensen Maritime Consultants.

The *Tioga* is the first vessel built by Tri-Star for Coos Bay Towboat, and the first new-built vessel to enter service in the operator's fleet since 1974.

Tioga has a pair of Caterpillar 3516 diesels providing 4,000 hp that give the tug an estimated bollard pull rating of 106,000 pounds. The engines drive two Ulstein 1650H Z-Drive units with 87-inch bronze propellers, giving the *Tioga* a speed in excess of 13 knots.

Auxiliary power for the *Tioga* comes from two Caterpillar 3306 diesels with 60 kW generators. On deck, the new tug is equipped with a McElroy bow winch. Electronics include two Furuno 1931 36-mile radars with daylight display; a Furuno FCV-665 depth sounder; a Furuno GP-70MK2 global positioning system; a Sperry MK-37 gyrocompass and AP-10 autopilot; a Ritchie magnetic compass; a Motorola Maxtrac 800 UHF and a Standard LH-10 intercom system.

McDermott, Offshore Pipelines Merge Construction Businesses

McDermott International, Inc. and Offshore Pipelines, Inc. (OPI) agreed to combine their worldwide marine construction businesses into a new jointly-owned company.

The agreement specifies that a new Panamanian Corp. will be created, J. Ray McDermott, S.A., into which McDermott International will contribute substantially all of its marine construction assets and businesses. Subject to shareholder approval, OPI will merge into this new company with OPI's shareholders receiving 50 percent of the common stock of the new company in exchange for its common stock outstanding or subject to issuance under its outstanding preferred stock, options and warrants.

McDermott International would also receive securities to be issued by J. Ray McDermott with a combined face value of approximately 785 million as follows:

- \$400 million stated value, non-voting nine percent Cumulative Preferred Stock;

- \$160 million stated value, voting 4.5 percent Cumulative Convertible Preferred Stock, convertible into common stock after five years at a price equal to 120 percent of the average market price of OPI's common stock over the last 10 days prior to closing;

- \$225 million face amount of nine percent Senior Subordinated Notes due in 2001.

The agreement also specifies that the initial Board of Directors of J. Ray McDermott will be comprised of nine directors, five appointed by McDermott International and four appointed by OPI.

Bessemer Completes Sale Of Tidewater Stock

Tidewater Inc. has been informed by Bessemer Capital Partners, L.P., that Bessemer sold its remaining shares of the company's common stock. Salomon Brothers Inc. acquired the Tidewater stock for resale and has now placed the shares with institutional investors.

Bessemer had acquired approximately 7.8 million shares as a result of Tidewater's acquisition by merger of Zapata Gulf Marine Corp. in January 1992, and had previously sold approximately 3.8 million shares in a secondary offering in June 1993.

Foss Adds 4,000 HP Tractor Tug To San Francisco Fleet

Foss Maritime Company added the *Andrew Foss* to the Foss/SeaRiver fleet in San Francisco.

The *Andrew Foss*, a 4,000 hp cycloidal propulsion tractor tug with a certified ahead bollard pull of 133,404 lbs., was moved from the Puget Sound, where it has operated since 1982. The tug will supplant the 3,000 hp *Brynn Foss*, which will move to Puget Sound after operating in the Bay Area for about a year.

The *Andrew* is part of the Foss/SeaRiver fleet which includes large, conventional tugs providing a range of harbor services, including tanker escorts in San Francisco Bay.

Tidewater Appoints O'Malley To Succeed Laborde

Tidewater Inc.'s board of directors appointed **William C. O'Malley** as chairman, president and CEO to succeed **John P. Laborde**, who is retiring in the fall. Mr. Laborde has served as Tidewater's only chief executive since its inception in 1956. Mr. O'Malley, since 1988, has served as chairman and CEO of Sonat Offshore Drilling Inc., headquartered in Houston.

Mr. O'Malley will be appointed president and CEO of Tidewater on September 19, and will hold that office until Mr. Laborde's retirement becomes effective at the company's annual meeting in October.

Racal Acquires Techno Transfer Industries

Racal Electronics has acquired an 80 percent majority shareholding in Singapore-based Techno Transfer Industries (TTI), specialists in the manufacture and operation of remotely operated submersible vehicles (ROVs), for \$14 million in cash. The acquisition, which has been supported by the directors of Techno Transfer Industries, includes the wholly-owned subsidiary Asiatic Underwater Contractors which provides ROV operation services to the offshore industry and to more than 50 percent of the drill rig-support market in South East Asia. **Frank Vespa** and **Sam Sassoon** will each retain a 10 percent shareholding in TTI and will continue as managing director and finance director, respectively. TTI becomes part of the Racal Energy Group, which includes Racal Survey and Racal Positioning Systems, providers of survey and positioning services to the offshore oil and gas industries worldwide.

David Elsbury, chief executive of the Racal Electronics Group, said, "The acquisition of Techno/Asiatic, with its modern fleet of 11 ROVs, provides us with a cost effective entry in a market which is currently worth (\$146 million) per annum and is expected to increase as the pace of offshore exploration and development quickens in the second half of the decade."

Astilleros Espanoles In European Consortium To Build Electric Power Plant

The consortium of Spanish companies in the INI/TENEIO Group formed by Astilleros Espanoles, Auxini, Babcock Wilcox Espanola and Union Electrica de Canarias (Unelco), together with the Dutch firm Holec Projects BV, signed an \$80 million export contract to construct an electric diesel power plant with two MAN B&W engines, each of 30 mW, to be erected in Kingston, Jamaica. Jamaica Private Power Corp. (JPPC) will operate the plant and sell energy to Jamaica Public Services (JPS), the island's electric company.

During the two year construction period, Astilleros Espanoles, the consortium leader, will be in charge of the commercial management and organization, as well as building the two engines through its subsidiary Manises Diesel Engine Company.

IDB Mobile Opens Operating Center In Maryland

IDB Mobile Communications, Inc. opened its International Operating Center at its new headquarters in West Bethesda, Md. The center provides Inmarsat operator services to customers around the

globe. A staff of fully-trained IDB Mobile personnel serve customers 24 hours a day, 365 days a year, in bridging the language barriers brought on by placing international phone calls. Worldwide directory assistance, person to person, collect and credit card calls are also handled by operators. For more information on IDB Mobile,

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BFGoodrich Names Distributor

BFGoodrich Engineered Polymer Products, a unit of BFGoodrich Aerospace, has appointed Johnny's Propeller Shop the master distributor for its CUTLESS[®] bearings and other marine products in south Louisiana.

Headquartered in Morgan City, La., Johnny's Propeller Shop will inventory and market the complete line of naval brass shell bearings from its main facility.

For more information call (504) 384-6940 or,

Circle 88 on Reader Service Card

Sonsub Adds Three ROVs To Gulf Fleet

Sonsub is expanding its Remotely Operated Vehicle (ROV) capability with the addition of three new vehicles.

The company is adding one 20-hp Viper ROV and an Advanced Cable Maintenance Work Skid (ACMV), both built by Perry Tritech to Sonsub specifications. The company is also taking delivery of a 50-hp HySub, which will be used to support drilling operations in the Gulf.

For more information on Sonsub,

Circle 89 on Reader Service Card

IDB Mobile Wins Inmarsat Contract

IDB Mobile Communications, Inc., a unit of IDB Communications Group, Inc., has been awarded a five-year contract for a Satellite Spectrum Monitoring System (SSMS3) in the Atlantic Ocean from Inmarsat.

The contract also has a five-year option for the Pacific Ocean Region. The contract consists of two phases, one being the installation of

Inmarsat-provided hardware and software, and the other including the maintenance and operation of the Spectrum Monitoring System.

The SSMS3 is required to perform RFPower, frequency and bandwidth occupancy monitoring of carrier traffic, satellite performance measurements, as well as fault finding and investigation into RF interference within Inmarsat's operational satellites and ground station network.

For more information on IDB Mobile,

Circle 90 on Reader Service Card

Salvage Union Lauds Report On Safer Ships

Lord Donaldson's report, *Safer Ships, Cleaner Seas*, calling for more salvage resources to protect vulnerable coastlines from pollution threats, has been welcomed by the International Salvage Union (ISU).

The report endorses ISU's view of cooperation between countries in the same region for effective salvage resources, and its observations on regional franchises will reportedly be considered at ISU's annual general meeting in September.

Wartsila Selected For MARITECH Funding

Wartsila Diesel was involved in three projects selected for funding under the Clinton Administration's \$440 million Maritime Systems Technology program (MARITECH). (For a complete list of MARITECH funding recipients, see *Maritime Reporter/Engineering News's* June 1994 edition.) ARPA is coordinating the

program and awarding matching funds for developing technologies to allow U.S. shipbuilders to compete in the international market.

The three Wartsila projects include one to develop Internationally Competitive, High Technology Tanker Vessels; one for a Market and Productivity-Driven Shuttle Tanker Design for the World Market; and one for Penetrating the International Market for Small Ships.

Wartsila's role extends beyond that of a typical engine supplier to encompass marketing and financial planning, project management, technology transfer, propulsion system design, modular build design, and environmental/safety advising.

For more information on Wartsila Diesel,

Circle 91 on Reader Service Card

Stolt Partner Invests \$260 Million For Seven Ships

Stolt Partner SA recently added details to its \$260 million decision to buy five second-hand ships and place two newbuilding contracts. The investment is the largest by the company since it was established in 1990.

A public offer of common shares is intended to raise \$75 million for modernization of the company's fleet. The five parcel tankers, to be purchased from Stolt Parcel Tankers, Inc., are the 38,700-dwt *M/T Stolt Topaz*; the 12,700-dwt each *M/T Stolt Taurus* and *M/T Stolt Titan*; and the 32,000-dwt each *M/T Stolt Integrity* and *M/T Stolt Sincerity*.

The two newbuilding contracts are for two 37,000-dwt all stainless steel parcel tankers to be built at Danyard SA in Denmark, for delivery in February 1996 and February 1997 for \$65 - \$70 million each. The ships will have diesel electric propulsion, 100 percent full scantling duplex steel and integrated computer systems for the control of cargo, ballast, bunkers and many other shipboard operations.

New Drewry Report Optimistic For Shiprepair Market

A new report from Drewry Shipping Consultants, U.K., *The Global Shiprepair and Conversion Markets — On the Brink of an Era of Prosperity?*, forecasts an explosion in revenue for the industry over the next few years. But the report says there is still considerable overcapacity and further yard closures are inevitable.

Although prospective revenue may almost triple to over \$23 billion by 2000, tanker and dry cargo sectors may lag behind that derived from passenger ferries and cruise ships. Ship conversion work and the growing tank coating and steel replacement sectors are areas of predicted prosperity. In sum, the report forecasts a prosperous market for progressive shiprepairers able to provide value for money in the value-added sector of the market.

For more information on receiving the report,

Circle 92 on Reader Service Card

Singmarine's New Floating Dock Takes In First Vessel

The new 14,000-tlc floating dock of Singmarine Dockyard & Engineering Pte. Ltd. (Singmarine Dockyard), a subsidiary of Singmarine Industries Ltd. (Singmarine), is now fully operational.

It docked its first vessel, *MV Stoja*, a 24,432-dwt container/dry cargo carrier from United Shipping Services One, Inc. of Norway. The vessel came in for general repair, and since the dock has taken in two other vessels, a log carrier and a barge.

The 40,000-dwt floating dock was built at a cost of \$26 million.

Maritime Reporter/Engineering News

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Daewoo Wins \$100 Million In Containership Contracts From Canada Maritime

Daewoo Shipbuilding & Heavy Machinery Ltd. signed a contract with Canada Maritime Service Limited for the construction of two 2,200-TEU containerships.

The new containerships will feature satellite navigational equipment as well as the latest in environmental protection equipment. The Sulzer 7RTA72U engines for the containerships have been designed for 28,000-hp, 5,000 more than others of the same class. The twin ships will each be 708 ft. long (216 m) and travel at speeds of 20 knots. Daewoo has also contracted with the National Navigation Company of Egypt to build a \$30 million Panamax bulk carrier.

For more information on Daewoo,

Circle 26 on Reader Service Card

Sperry Wins Sea-Land Orders; Names New Facility

Sperry Marine Inc. received an order from Japanese shipyard IHI for complete integrated bridges to be fitted on four new 4,000-TEU containerships being built for Sea-Land Service Inc. Delivery of the new vessels is expected to begin in June of 1995.

Also, Sperry Marine Inc. selected Naval Dockyard Sdn. Bhd. of Lumut, Malaysia as its Pacific Rim gyrocompass overhaul and repair center. Under the agreement Naval Dockyard will be responsible for repair and overhaul of Sperry Marine commercial and naval gyrocompasses through its Sperry Marine certified maintenance facility. In addition, Naval Dockyard will be responsible for gyrocompass service within Malaysia. For more information on Sperry Marine,

Circle 24 on Reader Service Card

Singmarine And Textron Sign Hovercraft Agreement

Singmarine Industries Ltd., a subsidiary of Keppel Corp., said its subsidiary has entered into a licensing arrangement with Textron Marine Systems to build hovercraft for a number of Southeast Asian countries. Singmarine Dockyard & Engineering Pte. Ltd. will have exclusive rights to build the multi-purpose C7 hovercraft at its yards, with full Textron support. The interior of the hovercraft can be customized to meet specific needs like a VIP transporter, a business class watertaxi, a rapid cargo carrier, and a rescue and fire-fighting craft. For more information on Singmarine,

Circle 46 on Reader Service Card

For more information on Textron,

Circle 47 on Reader Service Card

July, 1994

COMSAT Adds Data Transmission Service

COMSAT Mobile Communications introduced a duplex high-speed data service (DHSD) service in the Indian Ocean Region (IOR) through its Anatolia land earth stations in Turkey. Ships can now send and receive large data files as well as compressed video and studio-quality audio from virtually anywhere on the high seas.

The new service's coverage includes all of Asia, Africa, W. Europe and W. Australia. Maritime coverage includes all of the Indian Ocean, the Mediterranean and North Seas and portions of the E. Atlantic and W. Pacific Oceans.

For more information on COMSAT's new service,

Circle 93 on Reader Service Card

The Search For Spare Parts Made Easier By ILS

Inventory Locator Services, Inc. now provides direct point-to-point communications capabilities for its worldwide marine parts database users. The new service, named ILS Direct, enables ILS users around the world to communicate with each other using private electronic mailboxes residing on the ILS mainframe computer. In addition, users can access a fax server from a PC to send messages to almost any fax machine in the world, or to send multiple faxes virtually simultaneously.

ILS users access the information from remote locations using a PC modem. Users can search the databases to locate needed items in seconds. With ILS Direct, users can incorporate the information directly from the parts search report, and create electronic messages to transmit to any or all of the suppliers they select. ILS Direct software is designed to help users organize their buying and selling services.

For more information on the services of ILS,

Circle 72 on Reader Service Card

OMI To Sell Three U.S.-Flag Single-Hull Tankers

OMI Corp. signed a memorandum of agreement with Kirby Corp. for the sale of three of its U.S.-flag single-hull tankers.

Each of the three 1969-built tankers has a total capacity of 266,000 barrels with a deadweight tonnage of 37,853.

Kirby Corp. is a marine transportation company engaged through its subsidiaries in the operation of vessels on the inland waterway system of the U.S. and in the U.S. coastwise and foreign trade.

OMI's fleet, including vessels on order and vessels chartered-in, currently totals 48 ships.

Bollinger CEO Is Propeller Club's Man Of The Year

Donald "Boysie" Bollinger, chairman and CEO of Bollinger Machine Shop & Shipyard, Inc., was honored as this year's Man of the Year at the Propeller Club's gala dinner/dance, which was held in New Orleans on Saturday, May 21.

Mr. Bollinger is also chairman of the board of Chand Corporation, a

trading company specializing in integrated logistics support of both foreign and domestic marine operations. He also serves on the board of Tidewater Inc. and Premier Bancorp, Inc. Other professional commitments include: boards of directors of the Shipbuilders Council of America and the Coast Guard Foundation, and former board member of the Offshore Marine Services Association, among many others.

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IMO Further Amends SOLAS

The Maritime Safety Committee, the senior technical body of the International Maritime Organization (IMO), the United Nations agency concerned with shipping safety and the prevention of pollution from ships, ended its 63rd session recently with some important decisions regarding the Safety of Life at Sea (SOLAS).

Amendments to SOLAS

The Committee adopted amendments to the International Convention for SOLAS, 1974 — including changes to chapter II-2, regulation 15, which deals with fire protection arrangements for fuel oil, lubrication oil and other flammable oils. Other amendments affect several regulations in chapter V, which deals with navigational safety. Three new regulations have been added:

- Regulation 15-1 requires all tank-

ers of 20,000-dwt and above built after January 1, 1996 be fitted with an emergency towing arrangement at both ends. Existing tankers must be fitted with a similar arrangement at the first scheduled drydocking after January 1, 1996, but not later than January 1, 1999.

- A new regulation 22 is designed to improve navigation/bridge visibility.
- The third new regulation, 8-1, makes the use of IMO-approved ship

reporting mandatory. The systems are used to provide, gather or exchange information through radio reports, and are used for search and rescue operations, vessel traffic services, weather forecasting and prevention of marine pollution.

Amendments To IGC Code

The International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) and the Code for the Construction and Equipment of Ships Carrying Liquefied Gases (Gas Carrier Code) were both amended. The changes deal with the filling limits for cargo tanks. The IGC Code, mandatory under SOLAS, applies to ships built after July 1, 1986. The Gas Carrier Code applies to ships built before that date. The amendments are expected to enter into force under the tacit acceptance procedure on January 1, 1996.

The 1995 STCW Conference

The Committee agreed to revise the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978. The revision will amount to a complete re-writing of the Convention, and is being carried out under a specially expedited procedure in the hope of effecting changes several years ahead of the original schedule.

Westinghouse To Assemble, Test ICR Engines At Philadelphia Naval Yard

The Westinghouse Marine Division, headquartered in Sunnyvale, Calif., will locate its Intercooled Recuperated (ICR) Gas Turbine propulsion engine assembly and test operation at the Philadelphia Naval Shipyard.

The ICR development program was recently accelerated by two years. Westinghouse, teamed with Rolls Royce, has been developing the advanced engine system since 1991. The company also plans to assemble generator sets for the CVN-76 aircraft carrier at the site.

To date nine foreign navies have expressed interest in the engine, which is being considered for the Anglo, French and Italian Common New Generation Frigate. The engine also has commercial marine and power generation applications.

Coastal Sells 23 Percent Interest In Oil, Gas Fields

The Coastal Corp. agreed to sell its subsidiary's 23.33 percent interest in five producing oil and natural gas fields and related facilities in Tierra del Fuego Province, Argentina, for \$68 million plus contingent consideration. The sale will be to other joint-interest owners in the venture. Coastal said sale of its Tierra del Fuego interests is subject to certain approvals. Coastal Corp. is a Houston-based energy holding company with consolidated assets of more than \$10 billion.

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Circle 206 on Reader Service Card

Maverick Demonstrates Vest System At Holland Show

The Maverick Foam Vest System was demonstrated at the 13th International Tug & Salvage Convention by IMSSCO distributor Van der Sch Trading & Shipping bv. The live burn demonstration was performed by the Smit-Tak Fire Fighters. The Maverick Foam Vest System is designed to be worn as a vest holding five gallons of foam, and allows the fire fighter to switch from foam to sea water. For more information on the system from IMSSCO,

Circle 60 on Reader Service Card

Spectrex Debuts Optical Flame Detector

Spectrex Inc. introduced the SharpEye 20/201 optical flame detector, a self-contained triple spectrum unit and the latest in the SharpEye series. The unit is designed for a host of uses in a variety of industries, where the threat of accidental fire involving hydrocarbon fuels is possible.

The new unit can detect a one-q.-ft. fire at 200 ft., and incorporates a host of features, including: alarm relay able to be set to latching or non-latching, accessory relay can be used as a select automatic I.I.T. with manual override, and more. The detector, approved by Factory Mutual, is rated at 100,000 hours (11+ years) for mean time between failures. For more information on the Spectrex flame detector,

Circle 61 on Reader Service Card

OverFoam Services Offers New Absorbent

Safe Harbor™ A.C.T. is a new capillary absorbent material designed to absorb all hydrocarbons, petroleum-based liquids and most water-soluble fluids. Offered by OverFoam Services, Inc., the product absorbs up to 60 times its weight, quality which can help reduce labor and disposal costs, and makes it versatile for many applications. For more information from OverFoam Services Inc.,

Circle 62 on Reader Service Card

New Loop Antenna Eliminates Grounding

Starlink Inc. of Austin, Texas has introduced an H-field cross-loop ferrite antenna for the Starlink IRB-2A Beacon Receiver. The CLA-2 loop antenna is not the standard antenna on the MRB-2A and is available for immediate delivery. The manufacturer said the CLA-2 loop antenna has low vulnerability to "precipitation noise" from static discharges or pulses

which are typical on vessels. It also eliminates the need for a ground at the antenna, easing installation.

"A significant feature of the CLA-2 loop antenna is that it is only sensitive to the H-field component of the transmission," said David Hirsch, Starlink's vice president of business development. Starlink said this means reception will not be interrupted by metal structures (cranes, antennas, rigging, etc.) located either in narrow channels or

on deck. Starlink Inc. designs, develops and manufactures GPS navigation products. For more information on the new loop antenna,

Circle 63 on Reader Service Card

Giant Offers High-Volume, High-Pressure Water Pumps

Toledo-based Giant Industries introduced two new water pumps,

the GP5136 and the GP5145, both standard with ceramic plungers, aluminum bronze connecting rods, heavy duty roller bearings and cast iron fluid end.

The GP5136 is rated for 35gpm at 2,200psi; the GP5145 is rated for 43gpm at 1,500psi.

For more information on Giant's entire line of high pressure pumps and accessories,

Circle 64 on Reader Service Card



PATHFINDER/ST ARPA: 34-cm or 25-cm PPIs (16" or 12" diagonal CRT IMO equivalents) provide automatic tracking of up to 40 targets with vectors and readouts for the most dangerous 20. Have auto and manual acquisition, and unique trial maneuvers.

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The Enhanced Navigation Package (ENP) is the latest innovation to the PATHFINDER/ST ARPA and TM Radar. ENP adds significant navigational and operational features that keep the PATHFINDER/ST raster display at the forefront of industry design. All Raytheon PATHFINDER/ST systems now offer ENP as standard supply, and systems already in use can be easily upgraded.

The PATHFINDER/ST raster display with ENP includes a navigation sensor interface, stored Navline maps (ARPA only), new "pop-up" menu operation, and configurable serial data output ports.

Navigation sensor input can accept NMEA sentence structure from conventional sensors such as differential GPS, GPS, or LORAN-C. A second input port is available that will accept information from a Syledis precision positioning system. The navigation sensor is used to position and stabilize

Navline maps on the PATHFINDER/ST ARPA display.

Operation of the PATHFINDER/ST ENP is simplified by the "pop-up" menus. Three main menus are: MAPS, OPERATE, and ARPA. The MAPS page is used to save, retrieve, edit, and control Navline maps. The OPERATE page contains operational functions such as: Vector Selection, Trial Maneuver, and Course Up. The ARPA page allows selection of features such as Collision Assessment Mode, Auto Drift, and Auto Acquisition.

Comparison Tests Prove PATHFINDER/ST Radars See What Others Can't.

In side-by-side comparison tests, a PATHFINDER/ST display and a conventional radar display were connected to the same radar system. PATHFINDER/ST consistently displayed targets not detected by the conventional display.

As we constantly strive to improve Raytheon products, all specifications are subject to change without notice.

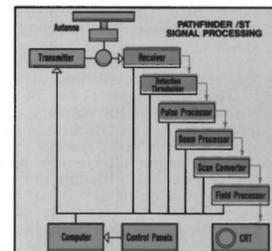
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PATHFINDER/ST Radars satisfy a very wide range of installation and operating requirements. Signal multiplexing reduces connections between PATHFINDER/ST receivers and displays. This, combined with electronic interswitching for dual systems, the ability to mount transceivers "up" in antenna pedestals, or "down" in separate cabinets, and keyboard entry of all setup parameters, makes any installation straightforward, simple, and economical. In addition to having the optional IMO-required, antenna-mounted performance monitors, PATHFINDER/ST Radar software provides menus for extensive self-testing of virtually every function.

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SHIP & BOATBUILDING TECHNOLOGY

Voyager — A Technologically Advanced Pilot Boat

by Carol Fulford & Andy Smith

Voyager, the latest vessel to enter service with the Dutch Pilotage Organization, is the result of an in-depth investigation into long-established operating practices by the pilots themselves and close cooperation between a Dutch boat builder and a U.K.-based naval architect. By breaking with tradition, an innovative and effective pilot boat has been developed.

Dutch pilots operate in extremely difficult conditions. A majority of The Netherlands' ports, including the largest (Rotterdam) are at the head of the huge tidal deltas formed as the arterial Rhine, Maas and Schelde rivers — and a host of smaller tributaries — meet the North Sea. Unprotected from the prevailing westerlies, navigation is made challenging not only by the geography and meteorology, but also by the extraordinarily heavy traffic.

To cope with these exacting conditions, five pilot cutters are kept on permanent station offshore (two others are available in reserve), pilot transfer being effected by small daughter craft. Although many of these transfer tenders have been replaced over the last few years by sophisticated 23-ft. (7-m) glass fiber, waterjet-propelled fast RIB look-alike boats, the operation is still perilous, even in moderate seas.

To study better methods of operation, Loodswezen Nederland BV, the umbrella organization of which the 600 registered pilots are shareholders, formed a project group in October 1990. Influenced by the success of the latest breed of high speed Dutch lifeboats, the group eventually concluded that many problems would be solved by a 28-knot

waterjet-driven vessel capable of carrying 12 pilots. Furthermore, the vessel would need to have good seakeeping qualities in wind force 8

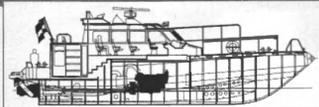


and sea state 6, be able to maintain 20 knots in 6.5-ft. (2-m) waves and meet the requirements of the Netherlands Shipping Directorate for operations up to 30 miles off the coast.

High speeds to get from base to the ship quickly would obviate the need to keep a vessel permanently on station. Twin waterjets were deemed able to provide that extra level of maneuverability to facilitate safer boarding. The pilots' own experience showed that once a helmsman had perfected the art, a waterjet-propelled boat could be handled with greater precision than conventionally-screwed craft.

But could such a demanding specification be met? A preliminary design was produced by the pilots' own technical department and model tank tested. As a result of these tests the original design was modified to give an increased length overall of 59 ft. (18 m), a waterline length of 49.2 ft. (15 m) while the beam was slightly reduced. The wheelhouse was also moved further aft, in order to reduce vertical accel-

(Continued on page 28)



The new Voyager class of pilot vessels incorporates a number of technological innovations which will help the Dutch Pilotage Organization handle adverse conditions encountered in the North Sea area.

26



The *Hyundai Utopia*, Korea's first LNG carrier, was loaded at Korea's Pyung-Taek LNG Terminal for gas trials.

Hyundai Delivers Korea's First LNG Ship

Korea's first-ever liquefied natural gas (LNG) ship was delivered in June from Hyundai Heavy Industries' (HHI) Ulsan yard. The 125,000-cu.-m., 900-ft. (274-m) Moss-type ship, named *Hyundai Utopia*, will be put into service by her domestic owner, Hyundai Merchant Marine Co., Ltd. (HMMC) to transport one million tons of Indonesian LNG per year.

The *Hyundai Utopia*, 155 ft. (47.2 m) wide, 87 ft. (26.5 m) deep with a design draft of 36 ft. (10.95 m), is the first of three identical ships built by HHI for Korea GAS Corporation's (KGC) long-term LNG import plan. The second ship (Y.K. *Sovereign*), due for delivery in March 1995 to Yukong Line Ltd., another domestic owner, was launched on December 22 of last year. Construction of the cargo tanks for the third ship, scheduled for delivery to HMMC in December 1996, commenced in June. *Hyundai Utopia* was launched in February 1993 with sea trials completed in November of the same year.

Cargo Containment/Handling

Hyundai Utopia has a flying passage on the tank covers, which reportedly gives easy access to the compressor room and to the upper deck for easy survey, inspection and maintenance of the cargo piping and the electric cable.

The cargo containment system is of the Moss Rosenberg concept, which consists basically of a single wall and an insulated spherical tank supported by a vertical skirt. Cargo loading is performed by shore pump facilities after the cargo tank is cooled down. Generated vapor during loading is returned to shore by using high-duty, on-board compressors. During a loaded voyage, generated boil-off gas is heated up and delivered to the main boilers as fuel gas by low-duty compressors and a

boil-off gas heater. The cargo is discharged by two electric motor-driven submerged pumps with a capacity of 1,400-cu.-m. per hour on the bottom of each cargo tank, and supplementary gas is received from shore during discharging operation to maintain cargo tank pressure. The ship's pressure discharge system pressurizes one cargo tank and shifts cargo to the other tank, in case both pumps in a single tank fail at once.

Vessel Control

The *Hyundai Utopia*'s Centralized Administration and Control Center (CACC), situated just below the wheelhouse, is arranged on the accommodation deck and allows for centralized control of loading, discharging, ballasting, deballasting and continuous monitoring and control of the cargo handling system. It features an integrated automation system; a shipboard management system; a CACC console, or personal machine interface-style operation panel; communication system; operating lever of the main engine, etc. and a custody transfer system.

Propulsion

Main propulsion machinery consists of a marine steam turbine driving a single propeller through double reduction gears and two sets of main boilers of the gas/oil dual burner type. The machinery is remotely controlled from the wheelhouse. CACC. Unattended operation of the main engine is possible.

Equipped with four independent spherical tanks 131.2 ft. (40 m) in diameter, the ship has a lower mooring deck, transom stern and a single screw propeller driven directly by a steam turbine. In the forward part, a fore peak water ballast tank, a bowthruster room and a void are arranged. For more information,

Circle 35 on Reader Service Card

Maritime Reporter/Engineering News

The Open-Top Containership Arrives

Norasia Fribourg Is Germany's First; Three More On The Way

The *Norasia Fribourg* is the first "open top" containership from Howaldswerke-Deutsche Werft AG (HDW) of Kiel, Germany — reportedly the first in all of Germany, and one of the first in the world — and it is also what HDW deems a successful beginning for a new generation of ships. According to the company, the ship is based on ideas developed in the seventies, but the difference between HDW's open top ship and the few comparable ships built so far, says the company, lies in the various material novelties:

- The HDW lightweight shelter: offers protection from tropical rainstorms and — combined with the leekhouse tower's small area of wind pressure and the windbreaking front hood — reduces wind drag, resulting in four percent less power consumption.

- The engine plant: fitted compactly as far aft as possible to conform to the consumption aftership. The main engine juts into the skeg gondola, which forms the end of the aftership. This design offers a good compromise between propeller inflow and the broad waterlines which increase stability.

- The one-man bridge: fitted out as a ship's operation center. Its equipment reportedly complies with the most modern technological standards and permits ship operation day and night by one person. Tower and integrated stack arrangement offer the greatest possible all-around view.

- Reduced loading and discharge costs, optimum ratio of the number of containers to the propulsive power, optimized arrangement of the main engine with its low fuel requirements, and the ship's very good lines reportedly make the vessel one of the most economical of its size in the world.

Special Features of the HDW Open Top Containership

Usually containerships have four to five layers of containers on the hatch covers. On an open top ship, hatch covers no longer need to be stored on land during loading and discharging and the containers no longer need to be lashed to the deck. The molded depth was increased and the cell guide frames for the containers were raised to the uppermost layer. Of the 11 container layers, eight are in the hold and three jut out topside.

HDW conducted extensive seakeeping tests with a model in order to counter possible dangers caused by breaking seas in heavy weather. In order to prevent water collecting in the holds during monsoons and to protect the containers from water, the ship was fitted with lightweight rain shelters, each covering one container bay, laid on the drainpipes on the upper edge of the

cell guide frames' bulkheads, which lead the water off to the side of the ship. In spite of the shelters, HDW did not reduce the lavish pumping plant prescribed for the ship. There are drainage channels along the sides of the cargo holds. The bilge pumps' capacity corresponds with the upper values of International Maritime Organization (IMO) regulations. The pumps, equipped to handle 5.9 in. (150 mm) of rainfall, were installed in the engine room as well as in the foreship. The watertight subdivision of the ship complies with IMO regulations as well. The first three holds are fitted with hatch covers. They will be used to carry dangerous cargoes. Two layers of containers can be carried lashed onto these hatch covers.

- **Flexibility.** With regard to stowage, HDW placed special emphasis on the ship's flexibility, which re-

(Continued on page 32)



The *Norasia Kiel*, sistership to the *Norasia Fribourg*, both part of a series of open-top containerships to be built by Howaldswerke-Deutsche Werft.

Mexican Itinerary Planned For Innovative Ferry

By

Kathleen Gleaves, contributing editor

The recent flurry of NAFTA debates has sparked a renewed interest in Mexican ports by American travelers. Cadenza Marine and Maritime Transport of San Diego are planning on capitalizing on the new, less-restrictive borders. They are working together with the Hydrolance company to manufacture a futuristic, 149-passenger catamaran for passenger-only ferry service between San Diego and Northern Baja. A passenger service to this area — quickly becoming a tourist hot spot — is deemed necessary to help develop tourism in the face of inadequate roads, bridges and airports.

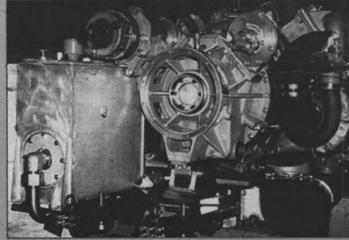
According to Ken Brody, manager of Cadenza Marine, its newest project, *Liberated Lady*, is the first in a new class of SSHARP ferries designed to fill this need.

The initial port of call will be a

small harbor south of Rosarita Beach. Expansion plans include Puerto Salina where construction on a new harbor and marina should be complete by late 1995.

The *Liberated Lady* will have a cruising speed of 35 knots, able to make the trip in about an hour and a half. A second-generation vessel still in the planning stage will cut travel time to under an hour. Further, the vessel will feature wave-piercing rails to mediate adverse sea state, ultra-quiet engines and first-class amenities to further enhance passenger comfort.

Mr. Brody and Maritime Transport's CEO, Gordon MacDonnell, are excited over the technological features of the new vessels. The Hydrolance Wave Piercer rails — 160-ft. (49-m) nar-



A two-rotor, Wankel engine which will be used on the SSHARP ferries.

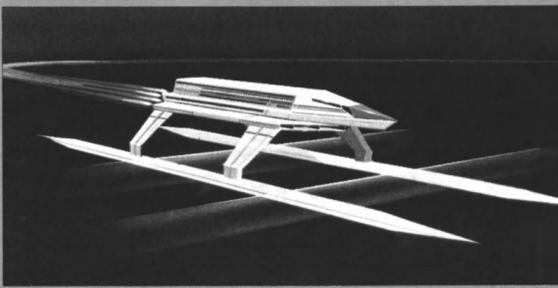
row pontoons — are designed to produce nearly no wake. Skin resistance of the Hydrolance rails is reduced using a proprietary system which produces a layer of bubbles along the surface of the pontoons. A proprietary Ram Jet water drive provides vessel thrust.

Another unique approach is the SCORE (Stratified Charge Omnivorous Rotary Engine) engines. Cadenza will purchase Wankel rotary engines, a type used in experimental military tanks, and refit them for marine use. The modified two-rotor, series 20 engines weigh 1,700 lbs. and produce 1,250 hp at 3,600 rpm.

"The weight savings over, say, a similar powered (diesel) engine, equals the total passenger weight," said Mr. Brody.

The engines also reportedly offer fuel saving advantages, and feature relatively few moving parts, while

(Continued on page 29)



An artist's rendition of a 350-passenger version of the Hydrolance ferry.

Ship & Boatbuilding Technology: Voyager Class Pilot Boat For North Seas

(Continued from page 26)

eration levels. More importantly, however, came the realization that lightweight construction would have to be employed.

Designs were evolved, specifications written and finally the project

was approved in March 1992 — and of two Dutch yards invited to bid, Engelaer Scheepsbouw, collaborating throughout with naval architect Alastair Cameron of Camarc Ltd., was awarded the contract. The builder had been impressed with this designer's track record and in

particular the innovative and successful 28-knot, 39.4-ft. (12-m) pilot vessel he had produced for the Scottish Port of Dundee some years earlier.

Mr. Cameron told *Maritime Reporter* that he agreed with the Pilotage Organization's conclusions and proposed that the yard base its offer on his own double chine hull form which has been proven over 10 years in applications ranging from 23 ft. (7 m) to 69 ft. (21 m). After further

detailed discussion the final design was refined to a length overall of 61.2 ft. (18.7 m), 49.5 ft. (15.1 m) at the waterline, a beam of 20.8 ft. (6.3 m) and 3.3 ft. (1 m) draft.

Initially it was envisaged that total engine output of 1,800 kW would be required to give a 30-knot vessel the contract speed of 28 knots. However, calculations indicated that an ideal engine choice would be a pair of Deutz/MWM TBD 234 V1 diesels each developing 852 hp (620 kW) at 2,200 rpm (continuous rating) providing the weight could be reduced to 26 tons. Employing smaller engines in itself contributes to weight reduction, but to achieve higher thrust at maneuvering speed a larger, therefore heavier waterjet model was selected. Hamilton H57 jets were incorporated, coupled via long cardan shafts and Centaflex couplings to ZF BW195 2:1 reduction gearboxes, included to match engine speed to the optimum jet impeller design. Electrical power is provided by gearbox PTO driven alternators. The total propulsion system finally weighed in at just over nine tons.

Voyager is built in aluminum alloy to ABS rules for high speed craft but with weight reduction the driving factor, yard and designer worked closely with ABS to ensure every saving opportunity was taken without bending the rules. As a result longitudinal flat bar stiffeners were cut from 5083 plate, having a higher tensile strength and better yield qualities than extrusions and both longitudinal and web frame dimensions were reduced in the aft third of the hull.

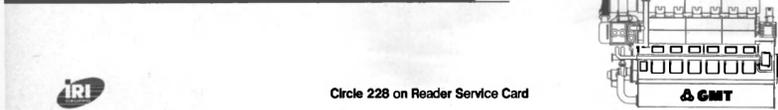
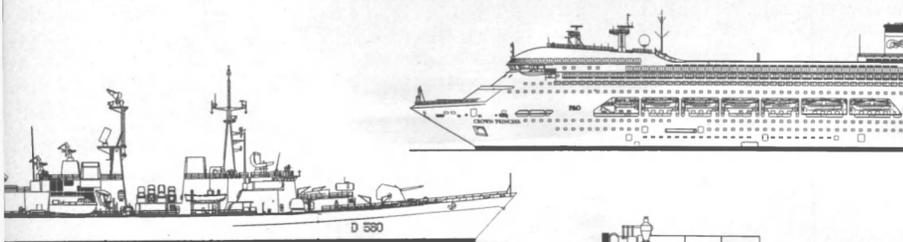
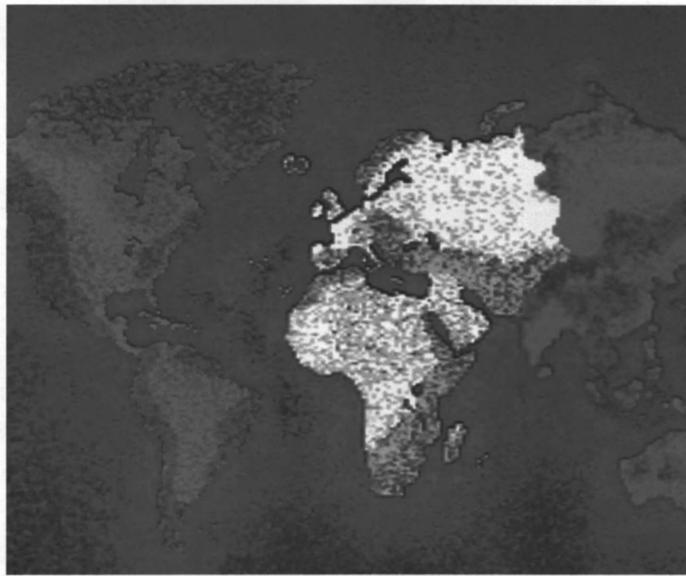
Moving the wheelhouse to a position directly over the engines prompted a decision to make it flexibly mounted, making for easy removal for major engine work. Again to reduce weight in what now had to be a self-supporting structure, alternatives were sought to the conventional stiffened, insulated and lined aluminum construction with a probable weight of around 20 kg per sq.-m. Various sandwich construction materials were investigated but a panel incorporating Cetex sheets with a Nomex core was ultimately selected. These are supported on an aluminum frame and finished internally with a Dibond decorative panel leaving a 2-in. (50-mm) insulating air gap giving an average weight of only 6.5 kg per sq. m., a third of conventional construction. All bulkheads, doors and cupboards in the wheelhouse, galley, toilet and storage are made of composite panels and Dibond sandwich panels were used for air ducts. Further weight savings were achieved by using polycarbonate instead of glass for the side windows.

For the 23-ft. pilot transfer boats, Engelaer had developed and patented a novel active fendering system which proved entirely satisfactory. These craft often make 50 boardings each per day, and not surprisingly the pilots insisted that this system was chosen for *Voyager*. Known as Pop-Safe, it utilizes standard polyethylene tubes and bends located in a U-shaped section fixed to the hull, which is part filled with

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IRI

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Circle 228 on Reader Service Card

Maritime Reporter/Engineering News

polyethylene foam to absorb impact. A steel wire with tensioners holds the welded tube fender in position.

Considerable care was also taken in the design and layout of the control console. The builder created a timber mock-up and all interested parties, including an ergonomics expert from the local university, were called in to offer views and advice. Despite the inevitable conflict of opinions, a format was agreed and the mock-up was used as a mold for the finished glass fiber console. Every instrument is clearly visible and nothing obstructs the helmsman's view. The helmsman's position is dead central immediately behind the Raytheon radar with engine and reverse bucket controls and Robertson autopilot close to hand on the starboard side. To port is the ISIS 700 engine monitoring system and Raychart plotter. Behind the three seats for the crew there are twelve passenger ferry-style seats for the pilots. *Voyager's* main deck is at a relatively high level forward which steps down to a low aft deck. This is extended further aft with a welded aluminum platform above the waterjet buckets and steering nozzles, not solely to protect, but also forming part of a hinged MOB recovery system/ladder designed by the builder. Icing of the stainless steel deck handrails in winter is prevented by the simple but effective technique of lining them with plastic pipework connected to the vessel's hot water central heating system. The plastic lining ensures a more even distribution of heat and reduces the weight penalty of a large water volume.

All three parties contributing to its realization are proud of *Voyager* and pleased with the interest it has created. On every count it has been a success. It weighed slightly less than the target weight of 26 tons. On sea trials it achieved 35 knots in calm conditions and is reported by the pilots to be able to consistently maintain 30 knots in an operational environment. The vessel is currently about halfway through a lengthy evaluation period with each of the four regional divisions of the Dutch Pilotage Organization. Estimates of the total number of *Voyager* class vessels that will eventually be built varies between seven and 12, although the present dilemma facing the Organization appears to be whether the first order will be for two or four.

Hydrolance Ferry Prototype Under Construction

(Continued from page 27)

operating at a low, easy-to-muffle sound frequency.

In the SCORE engine the fuel/air mixture is set off in layers, producing an even burn and further improving fuel efficiency. The engines, capable of burning anything from jet fuel to alcohol, will be set to burn No. 1 and No. 2 diesel oil. The electric drive, measuring only 30 in. long and 20 in. in diameter, will provide variable speed power to the Cadenza Ram Propulsors. This tiny unit is fluid-cooled and produces 1,000-hp continuous with a 1,500-hp peak capability. It connects to the rotary engines via the computer-controlled power grid, which replaces mechanical reduction gearing. The drive unit is installed as a module in the Hydrolance pontoon for easy removal and replacement. The entire propulsion system is designed to operate at efficiencies as high as 97 percent.

A 40-ft. (12-m) prototype hull balanced atop 90-ft. (27-m) rails is under construction. If everything goes according to plan, construction on the 65-ft. (20-m), 100-ton vessel should begin in late 1994, and will be completed at Cadenza's San Diego facilities, with additional work being done at both Campbell and Tillotson Shipyards.

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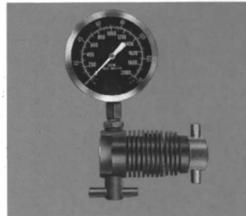
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Nashville Bridge Delivers Two Inland Service Tank Barges To Olin Chemicals



Shearer & Assoc.-designed barge OL 102.

Nashville Bridge Co. delivered the OL 101 and OL 102 to Olin Chemicals. The barges were designed by Shearer & Associates, Inc., a naval architecture firm in Metairie, La., and are 200-ft. (61-m) by 35-ft. (11-m) by 12-ft. (3.6-m) inland service double skin tank barges, each having a capacity of 1,500 short tons of product.

Shearer & Associates designed the barges to the latest (and proposed) U.S. Coast Guard regulations for transportation of hazardous products. The barges will have a closed gauging system including provision for inclusion of a vapor control system at a later date. Shearer & Assoc. developed the barge design after extensive analyses of Olin's operating requirements and cargo handling needs.

For more information on Shearer & Associates,

Circle 9 on Reader Service Card

James S. Krogen & Co. Awarded Dive Boat Conversion Contract

Naval architects and marine engineers James S. Krogen & Co., Inc. won a contract from Out Island Divers, Ltd. of Nassau, Bahamas for

conversion plans of a 100-ft. (30-m) crew boat into a dive boat for the Bahama Islands. The vessel was given a new bow and stern extensions plus a full superstructure with yacht-like appearance for a new overall length of 124 ft. (38 m). Powered with a pair of GM 12V71TL engines rated at 510 hp at 2,100 rpm, the boat will have a maximum speed of 14 knots. The vessel is under construction at Service Marine Industries, Inc. of Morgan City, La. For more information on James S. Krogen & Co.,

Circle 34 on Reader Service Card

Munson Manufacturing Completes Dive Boat For Saudi Arabian Customer



Munson Manufacturing of Edmonds, Wash. completed a 45-ft. (14-m) dive boat for a customer in Saudi Arabia. Designed to operate at speeds in excess of 46 knots, its deep-vee hull

features all-welded aluminum construction. Unique features of the vessel include a folding radar arch and custom hull cradle — provided to facilitate moving the boat over road to dive locations throughout the Middle East and Europe. The main engines are twin Caterpillar 3408 DITA engines rated at 800 hp at 2,300 rpm, installed with an electronic control and monitoring package and coupled to Hamilton 362 jets. Electrical/electronic equipment includes an eight-kW Northern Lights generator, GPS, sonar, Furuno radar, VHF and 100 amp shore power. Other equipment includes Crusair air conditioning/heating. The vessel is painted using a Sterling paint system. For more information from Munson Manufacturing,

Circle 7 on Reader Service Card

Sperry Marine Wins Orders From USCG, Norway And Japan

Sperry Marine, Charlottesville, Va., has won several recent orders from the U.S. Coast Guard (USCG), and also from organizations in Norway and Japan.

Marinette Marine Corp. of Marinette, Wis. awarded Sperry contracts for navigation systems to be used on a USCG Seagoing Buoy Tender (WLB) and a Coastal Buoy Tender (WLM).

The Norwegian Defense Department's research vessel *Marjata* will be equipped with Sperry's new MK-39 ring laser gyro attitude and heading reference system (AHRS). In addition, the vessel will have a triple Sperry Marine RASCAR radar/ARPA system, MK-37 gyrocompass, ADG-6000 adaptive digital gyropilot and a full GMDSS

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radio station.

United European Car Carriers (UECC) has ordered Sperry Marine VMS-4000 integrated bridges for its two automobile transport vessels, plus options for two more ships. The 459-ft. (140-m) vessels are to be built by Bratvaag Shipyard in Norway.

Sperry has also received an order for a gyrofin "lift control" ship stabilizer system from Miura Shipyard, Japan. The size one stabilizer will be installed on a new RoRo vessel being built by the shipowner Ohkawa Kaiun Bussan.

For more information on Sperry,

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Port Engineers' Dinner Dance Honors Propeller Club

Over 350 guests attended the 46th Annual Dinner Dance honoring the Propeller Club of the U.S., given recently by the Society of Marine Port Engineers of New York at the Marriott Financial Center Hotel. The gala event was a fundraiser to help provide scholarships for the National Maritime Institution.

Entertainment co-chairman **Don Kadlac** provided an evening of 1950s music and enlisted the aid of **George P. Efthimiou**, president of GMG Controls in New Hyde Park, who helped sponsor the music for the event.

Winninghoff Boats Delivers Research Vessel To Cornell University

Winninghoff Boats, Inc. of Rowley, Mass. delivered a 27-ft. (8-m) by 9-ft. (3-m) welded aluminum research vessel to Cornell University. The vessel is a versatile research platform with capabilities for a variety of fish sampling tasks. The hull is a modified vee; a stretched version of the Winninghoff 23-ft. (7-m) Cape Ann Sea Skiff hull form. A Volvo AD31B/DP diesel powers a Volvo DuoProp outdrive and the shaft-driven hydraulics system which consists of two winches and a net hauler.

Funded by the Hudson River Foundation, the vessel is to be used initially for a three-year research project on Atlantic sturgeon of the Hudson River.

For more information on Winninghoff Boats,

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Equipment List	
Main engines	Volvo
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Bilge pumps	Rule
Misc. hatches & deck plates	Viking Marine
Winches	Hawboldt

Event Hails Navy-New Orleans Ties



From left to right: **Tony G. Miller**, Braswell superintendent; **John Weldon**, Braswell marketing director; Honorable **Mark Morial**, Mayor of New Orleans; and Capt. **Jeffrey M. Perin**, Supship New Orleans.

Supship New Orleans Capt. **Jeffrey M. Perin** hosted opening ceremonies for his "Salute to the Red, White and Blue" on Friday May 27. The exhibition, co-hosted by the New Orleans First National Bank of Commerce and held in the bank's spacious lobby, ran through June 30. Capt. **Perin's** objective is to educate the public about the critical economic impact of the Navy's shipbuilding and repair activities in the New Orleans area.

Braswell Services Group, which is currently contracting repairs to the MarAd ship *SS Diamond State* in New Orleans, participated in the exhibition along with other Gulf Coast shipyards. Braswell also operates shiprepair facilities in Charleston, Jacksonville, Port Canaveral and the Panama Canal Zone.

Zodiac Hurricane Launches Patrol Boat For Canadian Dept. Of Fisheries



Zodiac Hurricane Technologies Inc. launched its fifth 24-ft. (7-m) cabin patrol boat. The patrol boat is for the Canadian Dept. of Fisheries in

Vancouver, B.C. Previous customers have been the Royal Canadian Mounted Police and the Canadian Coast Guard. The model is a Hurricane 733 Cab and is based on the company's 24-ft. hull which was originally developed for and is now in service with the U.S. Navy, and is also in service with the Royal Canadian Navy and the Royal Australian Navy. The boat is powered by two 150-hp outboards, giving a speed of 43 knots in a lightly laden condition. Fuel capacity is 150 gallons. For more information from Zodiac Hurricane Technologies,

Circle 10 on Reader Service Card

Smit Salvage Team Refloats French Passenger Ferry



The *Monte Stello*, 4,711-grt Ro/Ro passenger ferry, which grounded on the Sardinian coast.

A Smit Tak salvage team completed an operation to refloat the French passenger ferry *Monte Stello*, which went aground on the Sardinian coast earlier this year. The 4,711-grt vessel was towed to Livorno for provisional repairs.

The grounding happened amid 60-mph winds and heavy seas. Helicopters rescued all 51 passengers and 25 crew.

Working under a lump sum "Wreckon" wreck removal contract, the team developed a refloating plan and began work on the salvage under a joint arrangement with Livorno company Neri.

The salvage team made steady progress in pumping out the vessel's engine room and other flooded spaces — despite bad weather. By the third week of April, sealing and patching were well advanced, preventing further leakage and preparing the vessel for a tow to safety.

By April 27, more than 80 steel patches had been completed and the *Monte Stello* was ready for refloating.

On May 2 the *Monte Stello* was finally lifted free of the rocky bottom and towed to a safe position. On May 4 the Ro/Ro ferry was towed to Palau and then on to Livorno, where she arrived on May 11. The vessel was declared a constructive total loss.

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Ship & Boatbuilding Technology: The Containership *Norasia Fribourg*

(Continued from page 27)

portedly allows it to carry up to 47 percent of the containers as 20-footers. The Panamax breadth allows 11 containers in the hold and 13 over deck in the athwartships lattice. The gaps between the 13

containers stowed next to each other topside amount to only 1.8 in. (45mm). Consequently there are T-shaped cell guides and, for easier container handling, insertion guides placed alternately high and low.

• **Propulsion Package.** HDW says the slow-speed, 2-stroke diesel

Mitsubishi 7UEC 85 LSC engine plant driving a fixed-pitch propeller is economical, reliable and easy to maintain. The streamlined aftership and arrangement of the main engine in the hold area called for a very compact engine room, making optimum use of space. The engine has a nominal output of 27,290 kW (37,100 hp) with 102 min⁻¹ rpm and a low specific fuel consumption of 165 g/kWh (121 h/hp). The main principle of the generator's

design is flexibility with a minimum of maintenance. At sea the entire shipboard network, including 100 reefer containers, can be powered by thruster-controlled, shaft-driven generators (1,500 kW). The two diesel generators (1,450 kW each) can be added if needed. The two generators can provide the entire electrical requirements, including reefer containers — so the ship can be driven, depending on the number of reefers and the rate of speed, by either the shaft-driven generator alone or just by the generators. The diesel generators are set up to be run on heavy oil for continuous operation, or on diesel oil. Fully laden, the open top containership has a service speed of 22.5 knots with the main engine running at 90 percent MCR and 15 percent sea margin. In its trials, the *Norasia Fribourg* achieved a speed of 24.2 knots. The ship is also fitted with a Becker rudder and a 1,300 kW bowthruster to improve maneuverability.

• **Automation and Electronics.** The entire ship's operation is monitored and controlled by the ship's operating center. In addition, the engine plant can be operated from the ship's management center.

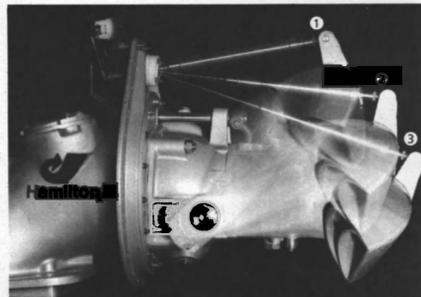
The *Norasia Fribourg* is fitted with HDW's integrated automation system, CAMAC (Centralized Alarm, Monitoring and Control). This system comprises, among other things, two master computers and four workstations. The data is gathered decentrally by intelligent substations; in the event the master computers fail, these stations can operate the ship safely. The ship's log is compiled automatically, saving work and relieving the ship's personnel.

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Six Additional Severn Class Lifeboats Ordered

by Carol Fulford & Andy Smith

The Royal National Lifeboat Institution (RNLI) in the UK has placed orders for six additional Severn class lifeboats as part of its ongoing replacement of the aging Arun and Wavney classes. The order involves three South Coast yards — Berthon Boat Co., Halmatic and Isle of Wight-based FBM Marine — each of which is to build two vessels. The news brings total orders to date to nine. A powerful propulsion package of twin Caterpillar 3412TA 12-cylinder marine diesel engines is combined with a weight-conscious design of FRC (fiber reinforced composite) hull, Kevlar glass superstructure and composite/carbon-based materials for the deck.

The first Severn will enter service in early 1995 at the Stornaway lifeboat station with the second, for Harwich, scheduled for delivery in the spring. Although no firm decisions have, as yet, been made by the RNLI, it is believed that around 50 of the new class will eventually enter service.



Royal Caribbean Cruise Line's *Sun Viking*, delivered by Wartsila in 1972. At 563 ft. (171.6 m) long, it is one of the smallest vessels in RCCL's fleet, which is populated by increasingly larger vessels. The *Sun Viking* will reportedly be moved to a European cruise route for summer 1995.

Cruising In The U.S.A.

Issues Affecting Cruise Shipping's Future

by Dan Maniotis, assistant editor

The cruise ship industry has been driven to new heights in the past year under the impetus of a variety of forces — including steady economic recovery and a growing demand for cruise vacations. The cruise industry's blush of health has led to equally healthy newbuilding activity; a legislative proposal for a U.S. cruise industry; plans for the refurbishment of the only two U.S.-flag cruise ships, the work on at least one of which will be done by Newport News Shipbuilding (NNS); and an announcement heralding the largest cruise ship in the world.

A Steady Swell Of Orders

Some have described the newbuilding pace as healthy, others as constituting a spate of newbuilding activity. "I think it's planned expansion based on optimistic and hopefully realistic expectations," said Jack Estes, president of the International Council of Cruise Lines (ICCL), which represents a vast number of world cruise lines. He said he believed the expansion was carefully considered, and "based primarily on a market-driven analysis."

Richard D. Fain, chairman and CEO of Royal Caribbean Cruise Line (RCCL) and also chairman of ICCL, said he wouldn't describe recent

newbuilding activity as a "rush" of new ships. "I think there has been a fairly steady flow of orders, but I don't think the orders we've seen are out of line with what we've seen in the past."

"Orders tend to be placed in pockets," Mr. Fain explained. Unfavorable exchange rates, for example, can make a country's yards less attractive to owners, a scene perhaps played out most noticeably in Japan's battle against its own distending yen.

"I think it's been fairly healthy," said Norwegian Cruise Line Vice President of Sales Jackie Johnson of newbuilding activity. She said the recovering economy certainly affected the number of new orders, but that recent orders were part of a long-range planning process.

Al Wallack, senior vice president of marketing and passenger services for Celebrity Cruises, agreed the newbuildings had come about to meet expanding demand, but also suggested several other reasons. "We're building with the understanding that the tonnage may not be available to us in the future."

Safety: Bad News And Good

Part of the reason the tonnage may not be there has to do with the Amendments to the SOLAS Convention in April 1992 regarding fire safety and damage stability on RoRo

passenger vessels, which go into effect in October 1994. Overhauling fire safety systems poses an expense few seem to consider outrageous, but the damage stability requirements for existing vessels mean extensive retrofit or retirement for some older vessels which do not comply — and those vessels with less existing compliance will be required to comply first.

Mr. Fain termed the SOLAS requirements "retro-active enforcement." "You build something to a certain standard and then someone says you have to rebuild it," he said. "Some retrofits are significant improvements in safety. Fire detection systems should be a mandatory retrofit." As to the damage stability requirements, he said, "Many of the vessels would be expensive to retrofit. The industry would have to remain quite strong to justify those retrofits."

"Anything that requires construction work is good for shipyards and repairers," said Mr. Fain, and even retired tonnage might be good news for cruise shipbuilders, which would presumably receive orders for replacement tonnage. But while Mr. Fain did say that all safety measures are worth taking, he hoped the benefits of more expensive requirements were clearly understood, as cruise customers might see them

reflected in ticket prices. And conventional wisdom holds that higher prices could impact on the popularity of cruising.

Mr. Estes said the ability to phase out non-compliant tonnage will help the retrofit situation. "There is sufficient opportunity to phase out in most cases," he said, but in others a financial analysis will have to be made to determine the cost-effectiveness of keeping a given ship.

Other recent movements toward greater safety include the International Safety Management Code, a ship operations guide developed by the International Maritime Organization. It is presently voluntary, but may become mandatory if it is incorporated into SOLAS in 1998.

Everyone agrees that safety is a good thing as long as it doesn't drive the lines out of business. But according to Celebrity's Mr. Wallack, there is at least one more reason for building new ships: quite simply, passengers expect more — and that affects many aspects of cruising. Older tonnage may not draw passengers like new ships will, another reason lines are building. But higher passenger expectations will also affect the kinds of ships being built.

"We're seeing the age when the world cruise fleet is moving toward purpose-built rather than converted liners," Mr. Wallack said. "We're

pushing the marble forward."

Next Generation Cruise Ships

"Ships are obviously getting larger," said RCCL's Mr. Fain. "The *Sovereign* ships have inaugurated the age of the megavessel." *Sovereign of the Seas* is an 880-ft. (268-m) vessel delivered to RCCL by long-time collaborator with RCCL on its fleet needs, Chantiers de l'Atlantique, France, in 1987. It was followed by *Monarch of the Seas*

and *Majesty of the Seas*, also from Chantiers, which share a length with the *Sovereign* and have even greater tonnage and passenger capacity — 73,941-gt to *Sovereign's* 73,192. Mr. Fain said larger vessels are more economically viable for the owner/operator and more desirable for the customer. And any time you can please the customer and save the owner/operator money, said Mr. Fain, "you've got a winner." But he did say he couldn't see ships getting

much bigger than the ones currently being built.

Mr. Wallack said two issues have affected the size of ships: the economic one Mr. Fain mentioned, and those heightened passenger expectations. Bigger cabins as well as a higher level of onboard service and activities — which requires more space to work with — have contributed to increasing ships' sizes. As Mr. Wallack said, some look for Las Vegas in a cruise line,

and some look for more luxury. Those who don't provide either may be missing out on a segment of the market.

The biggest ship presently on order is the Princess Cruises vessel to be built by Fincantieri of Italy, a ship of futuristic design which will carry 2,600 passengers. At the time of the ship's announcement in early April 1994, Princess President Peter Ratcliffe said, "The additional tonnage will enable us to make the new ship unique. We're creating an entirely new cruising experience by offering an unprecedented number of passenger options."

The cruising experience seems to be entirely the point. Lines are offering customers different options, thus capturing sub-markets within the aggregate cruise market. The large ships seem to be coalescing into one market segment — one that, as of now, is increasingly popular.

"Different vessels are built for different kinds of cruising," said Mr. Wallack, with different levels of luxury and itinerary lengths. That's why more-than-adequate levels of luxury aboard Celebrity's *Horizon*

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and *Zenith*, which are in the 40,000-gt range, are being topped with the line's new 70,000-gt *Century* series of vessels — the first of which is scheduled for a Christmas 1995 inaugural cruise from New York.

The Princess vessel will offer such attractions as a virtual reality theater and other interactive technology — technology Norwegian's Ms. Johnson also sees playing a role in cruising's future. Mr. Wallack said he sees such things becoming part of the vacation experience as well. "We're building some of that into our new vessels," he said. But he said it will be there to support the vacation, not take it over, emphasizing the meals, sights and lifestyle cruises offer. "It will be part of the mix, and an interesting part, but not the only thing," he said. "We don't want our passengers locked in dark rooms, pressing buttons."

But if Norwegian implements such technology, it will most likely not be on a newbuilding megavessel, according to Ms. Johnson. She is confident that the next generation of Norwegian's ships will be of moderate size, in the 1,600- to 1,800-passenger range. "The *Dreamward*

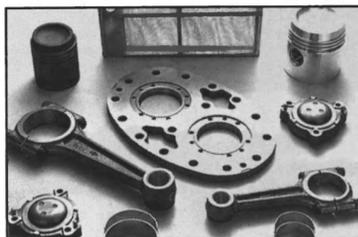
(Continued on page 59)

Maritime Reporter/Engineering News

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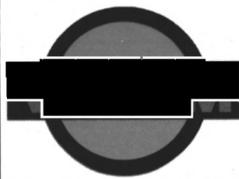


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Circle 281 on Reader Service Card

Directory of Cruise Ship Suppliers

Following is a limited directory of cruise ship suppliers and repair yards, collected by the editors of *Maritime Reporter/Engineering News* as a service and source to our readers. Publisher is not responsible for errors or omissions.

Suppliers & Manufacturers

ABB Flakt Marine AB
P.O. Box 1043, S-436 21 Askim, Sweden
Tel: +46 31 689800; Fax: +46 31 284289
(Air conditioning and refrigeration, emission controls, fire detection systems, and fire and smoke control)

ABB Stal Marine AB
Bulungsgatan 14-16, S-601 87 Norrköping, Sweden
Tel: +46 11 21 40 00; Fax: +46 11 10 29 80

(Refrigeration plant [air conditioning for accommodations, engine rooms], water chillers)

ABB Turbocharger
1460 Livingston Ave., N. Brunswick, N.J. 08902
Tel: (908) 932-6103; Fax: (908) 932-6178
(Turbochargers, power turbines, repairs and reconditioning)

Alfa-Laval
955 Meams Road, Warminster, Pa. 18974-0556
Tel: (215) 433-4000; Fax: (215) 957-4159
(Equipment for fuel and lube oil treatment, desalination and engine cooling)

Aquamaster-Rauma Ltd.
Soutantie 5, SF-26100, Rauma, Finland
Tel: +358 38 3791; Fax: +358 38 379 4804
(Thrusters, deck machinery, boilers, incinerators, sewage treatment)

Atlas Marine Services, Inc.
6960 N.W. 46th Street, Miami, Fla. 33166
Tel: (305) 594-7433; Fax: (305) 593-2371
(Provides galley, bar and pantry design, layout)

Autronica Marine
Drammensveien 126, N-0277, Oslo, Norway
Tel: +47 22 55 34 10; Fax: +47 22 55 30 46
(Engine room monitoring systems, condition control systems, fire detection systems)

Bainbridge/Aquabatten Inc.
252 Revere Street, Canton, Mass. 02021
Tel: (800) 422-5684; Fax: (617) 821-2609
(U.S. distributor for Megafilm, a flame retardant temporary flow and wall protection system)

Bailey Refrigeration Co., Inc.
2323 Randolph Ave., Avenel, N.J. 07001
Tel: (800) BAILEYS, (908) 382-1225;
Fax: (908) 382-1048
(Design, install equipment, repair and spare parts for all HVAC-R including reefer doors and walk-in boxes)

Bauer Interiors, Inc.
914 Jena Street, New Orleans, La. 70115
Tel: (504) 895-8604
(Marine, hospitality and health care interior design and space planning)

BFI Shipboard Waste Services
612 Corporate Way, Valley Cottage, N.Y. 10989
Tel: (800) 950-2010
(Shipboard waste disposal)

Balich Synthetic Products
Edisonweg 14, NL-2952 AD Alblassterdam, Nether.
Tel: +31 1859 13444; Fax: +31 1859 16148
(Manufactures, installs synthetic resin-based deck coverings)

Brintons Ltd.
P.O. Box 16, Exchange Street, Kidderminster, Worcs DY10 1AG, England
Tel: +44 562 820000; Fax: +44 562 515597
(Carpets)

Brown Brothers and Co. Ltd.
Rosebank Works, Broughton Road, Edinburgh EH7 4LF, Scotland
Tel: +44 31 556 2440; Fax: +41 31 556 3253
(Specializes in all aspects of motion control, including latest VM Series folding fin stabilizers)

Brunvoll A/S
P.O. Box 370, N-6401, Molde, Norway
Tel: +47 71 25 19 66; Fax: +47 72 53424
(Manufactures transverse thrusters and azimuth propulsion thrusters)

Casino Supplies GmbH
Oldenburger Allee 18, D-3000 Hannover 51, Ger.
Tel: +49 511 610987; Fax: +49 511 614443
(Gaming equipment)

Carrier Transicold
P.O. Box 4805, Syracuse, N.Y. 13221
Tel: (315) 432-7540; Fax: (315) 432-6218
(HVAC and refrigeration plants including full control systems, heat recovery and filtration)

C.C. Jensen A/S
Rodeledsvej 60, DK-5700 Svendborg, Denmark
Tel: +45 62 21 20 14; Fax: +45 62 22 24 50
(Ships windows and side scuttles)

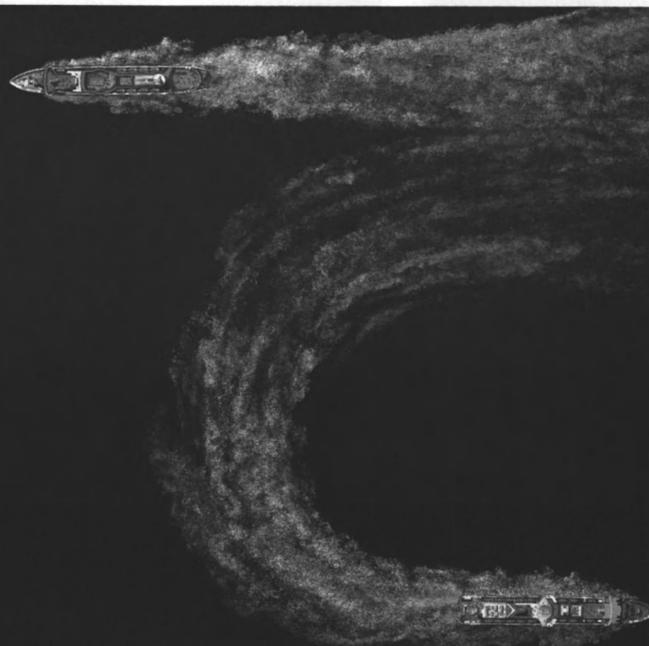
Cogelec
13 rue Antonin Raynaud, 92309 Levallois Perret Cedex, France
Tel: +33 1 47 48 70 00; Fax: +33 1 47 48 74 85
(Electric propulsion, production, management)

CELLNET Corp.
400 Main St., Stamford, Conn. 06901
Tel: (203) 359-6333; Fax: (203) 359-6826
(Cellular pay phones)

Chicago Trashpacker
290 N. Prospect St., Marengo, Ill. 60152
Tel: (815) 568-5116; Fax: (815) 568-7551
(Trash compactors for on-board storage)

COMSAT Maritime Services
22300 COMSAT Drive, Clarksburg, Md. 20871
Tel: (800) 424-9152; Fax: (301) 601-5950
(Ship-to-shore communications)

Consilium Marine AB
Box 8763, S-40276 Gothenburg, Sweden
Tel: +46 31 500040; Fax: +46 31 231217
(Salvico fire detection systems)



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Maritime Reporter/Engineering News

Directory of Cruise Ship Suppliers

CruisePhone
2100 Park Central North, Suite 900, Pompano Beach, Fla. 33064
Tel: (305) 974-9601; Fax: (305) 979-2943
(Cellular and satellite passenger communications)

Dampo Marine Ceiling Systems
DK-5690 Tommerup, Denmark
Tel: +45 64 76 13 11; Fax: +45 64 76 14 99
(Fire-rated marine ceiling systems)

Datrex Inc.
P.O. Box 1150, Kinder, La. 70648-1150
Tel: (318) 738-4511; Fax: (318) 738-5675
(Photoluminescent IMO signs and escape path markings, emergency drinking water & rations)

Deutz MWM (member of the KHD group)
Carl-Benz-Str. 5, D-6800 Mannheim 1, Germany
Tel: +49 621 3840; Fax: +49 621 384328
(Diesel engines)

Drew Ameroid Marine Division, Ashland Chemical Co.
One Drew Plaza, Boonton, N.J. 07005
Tel: (201) 263-7977
(Biologically-active products for handling of shipboard organic wastes. For cruise ship needs, Ameroid Draingard cleaner and drain treatment and Ameroid MSD-PAK organic waste treatment)

Durastic Ltd.
Blackett Street, Hebburn, Tyne and Wear NE31 1ST, England
Tel: +44 91 489 3121; Fax: +44 91 483 3004
(Field and deck coverings)

Electrolux Marine
S-44182 Alingsås, Sweden
Tel: +46 322 74000; Fax: +46 322 37747
(Plans, installs and services food service facilities)

Eitech
110 Industrial Blvd., Sugarland, Texas 77478
Tel: (713) 240-6770; Fax: (713) 240-6762
(Sanitation devices, water purification machinery, water purification chemicals)

Envirovac Inc. (EVAC Marine)
1260 Turret Dr., Rockford, Ill. 61111
Tel: (815) 654-8300; Fax: (815) 654-8306
(Evac toilet systems, whirlpools)

Existelite Ltd.
Project House, Hutton, Essex CM13 1TZ, England
Tel: +44 277 263600; Fax: +44 277 263592
(Emergency lighting engineers)

F.R. Fassmer GmbH & Co.
Industriestraße 2, D-2876 Berne 2, Germany
Tel: +49 4406 42-0; Fax: +49 4406 42-11
(Lifeboats)

Freeman Marine Equipment Inc.
P.O. Box F, Hunter Creek Road, Gold Beach, Ore. 97444
Tel: (503) 247-7078; Fax: (503) 247-2114
(Hatches, doors, portlights and windows)

GEC Alstom Diesels
Vulcan Works, Newton-Le-Willows, Merseyside WA12 8RU, England
Tel: +44 925 225151; Fax: +44 925 222055
(Diesel engines)

GE Marine & Industrial Engines
1 Neumann Way, Cincinnati, Ohio 45215
Tel: (513) 552-5376 or (513) 552-5459; Fax: (513) 552-5001
(Gas turbine engines)

G&H Montage
Grabenstraße 17, D-2800 Bremen 44, Germany
Tel: +49 421 45801-50; Fax: +49 421 45801-65
(Custom interior outfitting)

Glamox International A/S
N-6400 Molde, Norway
Tel: +47 72 52777; Fax: +47 72 18540
(Lighting fixtures, electrical heaters)

Hagenek Multicom GmbH
P.O. Box 2345, Projensdorfer Str. 324, D-2300 Kiel 1, Germany
Tel: +49 431 3013-0; Fax: +49 431 3013-398
(Telecommunication products)

Harding Safety AS
N-5470 Rosendal, Norway
Tel: +47 54 81 166; Fax: +47 54 81 784
(Lifeboats, rescue boats, davits, launching systems)

Hallapa
Tornescher Weg 5-7, D-2082, Uetersen, Germany
Tel: +04122 711 0; Fax: +04122 711 104
(Deck machinery, steering gear, compressors)

Helkama Cable
Kalevantie 15, SF-20520 Turku, Finland
Tel: +358 21 372 122; Fax: +358 21 372 428
(Cables)

Hopeman Brothers, Inc.
433 Essex Ave., P.O. Box 820, Waynesboro, Va. 22980
Tel: (703) 949-9200; Fax: (703) 949-9259
(Interior outfitting)

Hose-McCann
1241 W. Newport Center Drive, Deerfield Beach, Fla. 33442
Tel: (305) 429-1110; Fax: (305) 429-1130
(Sound powered telephones, alarm signals and visual

indicating devices)

IDB Mobile
1828 L Street N.W., Suite 660, Washington, D.C. 20036
Tel: (202) 973-5100; Fax: (202) 973-5101
(Mobile satellite communications, ship-to-shore voice, fax, telex and data transmission)

INMARSAT
40 Mellon Street, London NW1 2EQ, England
Tel: +44 71 728 1505; Fax: +44 71 728 1163
(Satellite communication services)

Interior Design International
701 Dexter Avenue N., #307, Seattle, Wash. 98109

Tel: (206) 284-2220; Fax: (206) 281-4366
(Interior designs)

IPH Automation A/S
Boellevæg 1, DK-8680 RY, Denmark
Tel: +45 86 89 23 11; Fax: +45 86 89 22 80
(Level gauging, emergency stability control)

Jamestown Metal Marine Sales
4710 N.W. 2nd Avenue, Boca Raton, Fla. 33431
Tel: (407) 994-3900; Fax: (407) 994-3969
(Marine accommodation interiors)

Jets Vacuum AS
6060 Haried, Norway
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While COMSAT can compete with all other providers on price, none can compete with COMSAT on service. As the acknowledged world leader in providing satellite communications, COMSAT is first in every category.

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- First to introduce a broad range of



value-added services like shipboard public telephone services, 56/64 kbps data service, FaxMail, MARIPRESSSM News Service, SeaMailSM Electronic Mail Services...and many others.

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...between COMSAT and all other providers: Only COMSAT provides an experienced team of operators who are 100 percent dedicated to mobile satellite services to offer you free time and charges, free operator assistance and free translation assistance in 140 languages.

Plus...COMSAT's applications engineering and sales staffs work around the clock to develop new technological innovations for customizing our service to suit your special needs.

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22300 COMSAT Drive, Clarksburg, MD 20871
Outside the U.S., telephone: +1-301-428-2379;
Fax: +1-301-601-5950 Telex: 229717

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July, 1994

Directory of Cruise Ship Suppliers

(Vacuum sewage systems)

KaMeWa AB
Box 1010, S-681 29 Kristinehamn, Sweden, Tel: +46 550 84010; Fax: +46 550 84778 (Propellers, waterjet propulsion, tunnel and rotatable thrusters, related electronic controls)

Kure Shipping AB
Grågassatan 21B, P.O. Box 24047, S-440 22 Gothenburg, Sweden, Tel: +46 31 187050; Fax: +46 31 189871 (Fire fighting, watertight fire door, fireproof glazing, etc.)

Kvaerner Eureka A.S.
P.O. Box 38, 3401 Lier, Norway, Tel: +47 3 859013; Fax: +47 3 852993 (Integrated bridge systems, pumping systems, cargo access systems, incinerators and inert gas systems)

Lips B.V.
P.O. Box 6, NL-5150 BB Drunen, Netherlands, Tel: +31 4163 88115; Fax: +31 4163 73162 (Propellers, thrusters, control systems)

Lohmann & Stollerfoht
Mannesmannstrasse 29, D-58455 Witten, Germany, Tel: +49 2302 877 248; Fax: +49 2302 877 400 (Power transmissions for propulsion systems)

Maag Gear Company Ltd.
P.O. Box, CH-8023 Zurich, Switzerland, Tel: +41 1 278 78 78; Fax: +41 1 278 78 80 (Gear drives)

MacGregor-Navire (USA)
135 Dermody Street, Cranford, N.J. 07016, Tel: (908) 272-8440; Fax: (908) 352-6048 (Cargo access equipment)

MAN B&W Diesel AG
Stadtbachstr. 1, D-89000 Augsburg, Tel: +81 322 32578; Fax: +81 322 3448 (Diesel engines)

Mareno Marine Equipment
Via Cal Resana 13, I-31029 Tezze di Vazzola (TV), Italy, Tel: +39 438 488081; Fax: +39 438 28969 (Food service equipment)

Marine Accommodations, Inc.
8535-3 Baymeadows Rd., Suite 140, Jacksonville, Fla. 32256
Tel: (904) 448-6460; Fax: (904) 448-9525
(Exclusive distributor/agent for BIP Accommodation Package consisting of rockwool core (thermal, noise & fire insulated) bulkhead linings and partitions; continuous ceilings; floating floors; A, B & C class doors; pre-tab bathroom units; furnishings and accessories; CAD engineering; and supervision and/or turnkey installation)

Marihoff Hi-Fog Oy
P.O. Box 25, SF-01511 Vantaa, Finland, Tel: +358 0 870 1900; Fax: +358 0 822 482 (Water fog fire extinguishing systems)

Maritime Associates, Inc.
P.O. Box 1788, Crystal Bay, Nev. 89402, Tel: (702) 832-2422; Fax: (702) 832-2424 (Photoluminescent materials for markers and tapes covering IMO, SOLAS and low location lighting requirements, LED low location lighting, evacuation systems to IMO specifications)

Maritime Services Corp.
3457 Guignard Drive, Hood River, Ore. 97031, Tel: (503) 386-1010; Fax: (503) 386-2269 (Bulkheads and linings, floating floors and coverings, ceilings and luminaires, furnishings)

Markisches Werk GmbH
Haus Heide 21, W-5884 Halver, Germany, Tel: +49 2353 917 274; Fax: +49 2353 917 255 (Diesel engine parts)

MAVCO, Inc.
555 N.W. 95th Street, Miami, Fla. 33150-1957, Tel: (305) 757-5000; Fax: (305) 759-1624 (Design and install cruiseship audio and video entertainment systems)

Mitel, Inc.
11911 Freedom Drive, Suite 700, Reston, Va. 22090, Tel: (703) 818-1771; Fax: (703) 818-1776 (Telecommunications switching equipment)

Mivan Marine Ltd.
Newpark, Greystone Road, Antrim, Co. Antrim BT41 2QN, Northern Ireland, Tel: +44 8494 63665; Fax: +44 8494 64536 (Ship interiors)

MTU Motoren- und Turbinen-Union
P.O. Box 20 40, D-7990 Friedrichshafen 1, Germany, Tel: +49 75 41 90-0; Fax: +49 75 41 90-22 47 (Motive systems with diesel engines, gas turbines, transmissions, monitoring)

Mulder & Rijke
P.O. Box 48, 1970 AA IJmuiden, The Netherlands, Tel: +31 02550 191 29; Fax: +31 02550 226 42 (Lifeboats, lifeboat/cruise tender combinations)

Norac AS
P.O. Box 1593, N-4801 Adrendal, Norway, Tel: +47 41 98201; Fax: +47 41 98416 (Fireproof interior panels)

Norwegian Telecom International
P.O. Box 6701, St. Olavs plass, N-0130 Oslo, Norway
Tel: +47 22 48 72 48; Fax: +47 22 41 53 65
(Satellite communication services)

O.M.I.T. - Officina Meccaniche Torino S.p.A.
Via Ferrero 67/A, 10090 Cascine Vica, Rivoli/Torino, Italy, Tel: +11 957 5334; Fax: +11 957 5474 (Fuel injection equipment)

Olin er Design
Avenida Del Angel 26, E-48990 Algorta-Vizcaya, Spain, Tel: +34 4 465 1081; Fax: +34 4 4608205 (Naval architects and designers working in different fields of ship design developing total design concepts for cruise ship.)

Patricia Hayes and Associates, Inc.
2823 Coral Way, Suite 450, Miami, Fla. 33145, Tel: (305) 448-5900; Fax: (305) 448-2300 (Commercial, hospitality and marine interior design & space planning)

Pauluhn Electric Mfg. Co. Inc.
1615 N. Main, P.O. Box 53, Pearland, Texas 77581, Tel: (713) 485-4311; Fax: (713) 485-4398 (Stainless steel and bronze marine-grade aluminum lighting fixtures)

Paxman Diesels
Paxman Works, Hythe Hill, Colchester, Essex CO1 2HW, England, Tel: +44 0206 795151; Fax: +44 0206 794325 (Diesel engines)

Pelnic AB
P.O. Box 8951, S-402 74 Gothenburg, Sweden, Tel: +46 31 64 77 00; Fax: +46 31 64 77 90 (Engineering services)

Radio Holland USA B.V.
150 S.W. 1st Ave., Fort Lauderdale, Fla. 33315, Tel: (305) 764-0130; Fax: (305) 764-0197 (Marine electronics)

Rex Ionsfield Ltd.
Holland Road, Oxted, Surrey RH8 9BD, England, Tel: +44 883 717033; Fax: +44 883 717890 (Furniture, floating floors and decks)

Sabre Marine
Chr. K's vej 201, DK-8270 Højbjerg, Denmark, Tel: +45 86 271266; Fax: +45 86 274538 (Refrigeration systems)

Safevare USA
1621 North Miami Ave., Miami, Fla. 33136, Tel: (305) 377-4422; Fax: (305) 358-4771 (Photoluminescent signage systems and Leda-Lite low location lighting system)

SBA Interior Oy Svarta Bruk AB
10300 Svarta, Finland, Tel: +358 12 48487; Fax: +358 12 48487 (Accommodation paneling, cabin furniture and B-class doors)

Scanlinavon Micro Systems
P.O. Box 155, 1411 Kolbotn, Norway, Tel: +47 66 80 7107; Fax: +47 66 81 8095 (Cabin and public-area information systems)

Scanhip Engineering AS
Storg. 20, P.O. Box 220, 3101 Tonsberg, Norway, Tel: +47 333 100 44; Fax: +47 333 18 257 (Advanced shipboard waste treatment systems)

Schal Watercraft Ltd.
Mumby Road, Gosport, Hampshire PO12 1AE, England, Tel: +44 705 581331; Fax: +44 705 582565 (Lifeboats, rescue boats, davits)

Schauman Wood Oy
P.O. Box 22, SF-15211 Lahti, Finland, Tel: +358 18 86 611; Fax: +358 18 86 6427 (Processed plywood for walls, decks, etc.)

Seabam Instruments, Inc.
141 Washington Street, E. Walpole, Mass. 02032-1155, Tel: (508) 660-6000; Fax: (508) 660-6061 (Multibeam bathymetric and hydrographic survey systems)

Seaking Oy
P.O. Box 94, Vallimotie 22, SF-01511 Vantaa, Finland, Tel: +358 0 870 1911; Fax: +358 0 870 1080 (Catering systems)

Selanic Industrier A/S
N-6710 Selje, Norway, Tel: +47 57 56 350; Fax: +47 57 56 515 (Marine evacuation systems)

Selby
8810 W. 100th Street South, Sapulpa, Okla. 74066, Tel: (800) 523-0129; Fax: (918) 227-0603 (Flooring and decking)

Serck Como GmbH
Pankewer Strasse 16, W-2054 Geesthacht, Germany, Tel: +41 52 805 0; Fax: +41 52 805 105 (Heat exchangers, desalination plants, etc.)

Servoteknikk A/S
P.O. Box 6670, Rodelokka, 0502 Oslo, Norway, Tel: +47 22 38 14 85; Fax: +47 22 35 27 48 (Fire detection and alarm systems)

Siemens Nixdorf
Ueberseeering 33, 2000 Hamburg 60, Germany, Tel: +49 40 6371 4350; Fax: +49 40 6371 1399 (Modular management systems)

Sims Pump Valve Co., Inc.
1314 Park Ave., Hoboken, N.J. 07030, Tel: (201) 792-0600; Fax: (201) 792-4303 (Graphite composite pumps and pump parts)

Somat Corp.
855 Fox Chase, Coatesville, Pa. 19320, Tel: (610) 384-7000; Fax: (610) 380-8300 (Waste reduction systems)

Tahtu Oy
Itäinen Rantakatu 58, SF-20810 Turku, Finland
Tel: +358 21 351 500; Fax: +358 21 351 687
(Steering gears, watertight bulkhead doors and valves)

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Directory of Cruise Ship Suppliers

Traulsen & Co.
114-02 15th Ave., P.O. Box 560169, College Point,
N.Y. 11356-0169
Tel: (718) 463-9000
(Refrigerators and freezers)

Unitair Ships Service Inc.
6301 N.W. 37th Ave., Miami, Fla. 33147
Tel: (305) 836-1557; Fax: (305) 836-1431
(Welding gases & equipment, air tools, H.P. cleaning
equipment, corrosion products, refrigerants & ser-
vices, etc.)

Vecom Refrigeration USA
3913 Hartzdale Dr., Suite 1306, Camp Hill, Pa.
17011
Tel: (717) 763-8802; Fax: (717) 763-8861
(Refrigeration)

Viking Life-Saving Equipment
P.O. Box 3060, DK-6710 Esbjerg V, Denmark
Tel: +45 75 15 06 44; Fax: +45 75 15 80 55
(Inflatable rafts and other buoyant apparatus)

Walport USA
840 Bond Street, Elizabeth, N.J. 07201
Tel: (908) 527-1223; Fax: (908) 527-8772
(Entertainment)

Wartsila Diesel Group
P.O. Box 244, SF-65101 Vaasa, Finland
Tel: +358 61 3242 111; Fax: +358 61 171 906
(Diesel engines)

York International
Gardiners Lane South, Basildon, Essex SS14 3HE,
England
Tel: +44 268 287676; Fax: +44 268 281765
(Refrigeration equipment)

Builders & Repairers

Aeliers et Chantiers du Havre
30 rue Jean-Jacques Rousseau, B.P. 1390 76066 Le
Havre Cedex, France
Tel: +33 35 26 81 77; Fax: +33 35 25 09 70

Atlantic Marine, Inc.
8500 Heckscher Drive, Jacksonville, Fla. 32226
Tel: (205) 690-7886; Fax: (205) 690-7107

Austal Ships
126 Egmont Road, Henderson, WA 6166, Australia
Tel: +61 9 410 1111; Fax: +61 9 410 2564

Bazan
Castellana 55, E-28046 Madrid, Spain
Tel: 34 1 441 5100; Fax: +34 1 441 5090

Bethship
Sparrows Point Yard, Sparrows Point, Md. 21219
Tel: (410) 388-6383; Fax: (410) 388-6687

Blohm + Voss AG
P.O. Box 10 07 20, D-2000 Hamburg 1, Germany
Tel: +49 40 3119 0; Fax: +49 40 31193333

Blaunt Marine
461 Water St., Warren, R.I. 02885
Tel: (401) 245-8300; Fax: (401) 245-8303

Bremer Vulkan Verbund AG
Lindenstrabe 110, P.O. Box 75 02 61, D-2820
Bremen 70, Germany
Tel: +49 421 668 2569; Fax: +49 421 668 2296

Cascade General, Inc.
5555 N. Channel Ave., Building 71, Portland, Ore.
97217
Tel: (503) 285-1111; Fax: (503) 289-7179

Chantiers de l'Atlantique
38 Avenue Kleber, F-75116 Paris, France
Tel: +33 1 47 55 20 00; Fax: +33 1 47 55 27 69

Delamarin Ltd.
Kaislatie 2, SF-21200 Raisio, Finland
Tel: +358 21 817311; Fax: +358 21 810378

Fincantieri-Cantieri Navali Italiani
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Tel: +39 40 3193111; Fax: +39 40 3192305

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15 55, D-26855 Papenburg, Germany
Tel: +49 4961 810; Fax: +49 4961 81300

Kvaerner Fjellstrand A.S.
NI-5632 Omastrand, Norway

Tel: +47 5 55 41 00; Fax: +47 5 55 42 44

Kvaerner Masa-Yards Inc.
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Tel: +358 0 194 2409; Fax: +358 0 650 051

Lloyd Werft Bremerhaven GmbH
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Bremerhaven 12, Germany

T. Mariotti S.p.A.
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Mitsubishi Heavy Industries Ltd.
5-1 Marunouchi 2-chrome, Chiyoda-ku, Tokyo 100,
Japan
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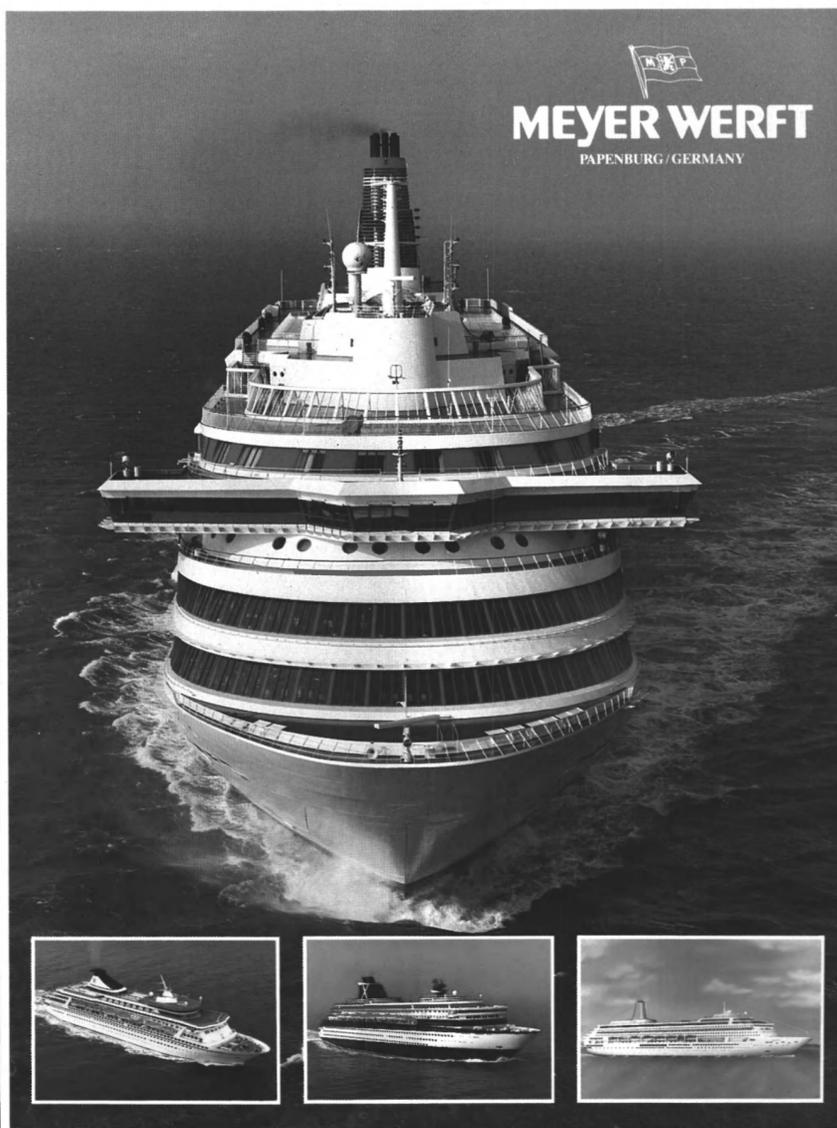
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97217
Tel: (503) 240-3000; Fax: (503) 240-3080

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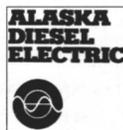
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Admiralty Road East, Singapore 2775
Tel: +65 752 2222; Fax: +65 758 1025

WestState, Inc.
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97217
Tel: (503) 285-9706; Fax: (503) 285-1305



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1994 Diesel Engine Directory



Lugger Diesels (67 to 1,300 hp) and Northern Lights generator sets (3.5 to 750 kW), made by Alaska Diesel Electric, can be used in the commercial, fishing and pleasure boat markets. Lugger has modified the existing L6170A engine to provide 700 hp at 1,800 rpm on the continuous duty rating, increased 60 hp from the previous rating. New ratings have also been given to several of the Northern Lights gensets based on Deere blocks. The C-series (commercial) line of Northern Lights sets has been popular with commercial operators. Alaska Diesel has developed Soot Trap And Regeneration System, a catalytic system to reduce generator set emissions. Three Lugger 12V140As, rated at 950 hp at 1,800 rpm, have recently been installed in a Mississippi River pushboat. For more information on Alaska Diesel Electric,

Circle 29 on Reader Service Card



The Engine Division of Caterpillar Inc. provides diesel or gas engines for medium and heavy duty commercial and pleasure boats, on-highway trucks, stationary and mobile industrial applications, construction equipment, locomotives and power generation. Seven families of Cat engines range from 54 to 8,000 bhp (40 to 5,970 kW). Caterpillar's current marine propulsion offerings range from 85 to 7,270 bhp (63 to 5,420 kW), and Caterpillar also offers marine auxiliary packages from 50 to 5,200 kW. The latest marine engine, the 3412C, is rated at 1,250 bhp (932 kW) at 2,300 rpm and includes a number of enhancements, among them electronic engine controls. A silver anniversary edition of the 3208 TA diesel is also available with ratings ranging from 210 to 435 bhp (157 to 325 kW). For more information on Caterpillar Inc.,

Circle 100 on Reader Service Card



CKD Hradec Kralove, a Czech Republic company, was created as part of Skoda Works. CKD develops and produces medium-to heavy-speed diesel engines. A 140-mm bore four-stroke four-cylinder motor is among the company's earlier units. Also available is the S6-350-PN for marine propulsion, genera-

40

tor sets with engines ranging from four to 12 cylinders, suitable for power plant generators or marine propulsion. Some CKD motors are capable of using heavy fuels (bunker) or a mix of diesel fuel and gas. For more information on CKD,

Circle 78 on Reader Service Card



Cummins Marine is celebrating its 75th year of service to the marine industry. Cummins recently introduced a new continuous-duty rating of 600 bhp (447 kW) at 1,800 rpm for its K19 engine. The KTA19-M3 engine, designed for use in pushboats, barges and fishing vessels, is built with an enhanced turbocharger and other performance features aimed at achieving lower operating costs. Cummins Marine is a division of Cummins Engine Co. Inc. and is responsible for designing, manufacturing and providing after-sales support worldwide for the company and its products in the marine engine marketplace. Cummins Marine offers a broad application range with available ratings from 64 to 1,385 bhp (47 to 1,033 kW). For more information on Cummins Marine,

Circle 103 on Reader Service Card



Daytona Marine builds performance engines solely for the marine industry. Daytona's engines are built on either Mack or Ford blocks. This enables Daytona to provide design features such as: four valves per cylinder; gear-driven accessories; carbide-faced lifters; spin-on centrifugal filters; and fuel economy. Daytona offers a full range of power options in four-cylinder in-line (Daytona's DME-4 Series), six-cylinder in-line (its DME-6 and DME-7 Series), and V-8 configurations (its DME-9 Series) - turbocharged and inter-cooled diesels that deliver ratings ranging from 120 to 820 hp. For more information on Daytona Marine,

Circle 23 on Reader Service Card



One year after the introduction of its new 616 diesel engine series (ex 234B), Deutz MWM already has orders for 200 engines. Deutz attributes the flow of orders to the success of the established 234 series and the 234Y yacht engines, which formed the basis for the new 616 series. The series covers a power range from 380 to 1,360 kW with eight, 12 and 16 cylinder V-engines.



HDW says this slow-speed, two-stroke diesel, Mitsubishi 7UEC85 LSC engine plant installed on its *N. Fribourg* open-top containership driving a fixed-pitch propeller is economical, reliable and easy to maintain. The engine has a nominal output of 27,290 kW (37,100 hp) with 102 min⁻¹ rpm and a low specific consumption of 165 g/kWh (121 h/tp).

Deutz claims the Hallo^R swirl concept adopted for the 616 series optimizes combustion at low load and idling, minimizing fuel consumption and exhaust emissions. For more information on Deutz MWM,

Circle 82 on Reader Service Card



U.K.-based Dorman Diesels Ltd. produces a low-emission marine engine range suitable for main and auxiliary duties, covering the power band of 42 bhp to 1,970 bhp (32 kW to 1,470 kW). The Sea Prince direct-injection range, launched in late 1993, is the latest addition to Dorman's line and is the result of its collaboration with DAF BV of The Netherlands. The SP6L, 6-cylinder, in-line range, comprised of TD3, TD5 and TD7 models, covers the power band 300 bhp to 368 bhp (224 kW to 275 kW) workboat rating. The Sea Prince range is designed to operate alongside Dorman's Sea King marine engine range (295 bhp to 1,970 bhp), which has six, eight, 12 and 16 cylinder models. For more information on Dorman Diesels,

Circle 51 on Reader Service Card



Dieselmotorenwerk Rostock GmbH (DMR) offers diesel engines, gear units, propulsion units, shafts, sterntube glands and seals,

remote control units, monitoring systems, diagnosis systems, spare parts, repairs and performance of ordered labor operations.

In April 1994, DMR inaugurated the first building phase of its new production site on the river Warnow in Rostock/Warnemunde. The site's most important feature is its new production/assembly/test bed shop, which will deliver completely assembled engines of all sizes (up to 50,000 kW) which have been tested for optimum installation in ships; reduce production costs by elaboration of process-optimized product centers; concentrate on in-house production of know-how components; and offer marine propulsion installations in-line which meet the highest quality standards. For more information on DMR,

Circle 21 on Reader Service Card



The Electro-Motive Division (EMD) of General Motors Corporation produces diesel power for marine propulsion, offshore and other industries. A complete line of GM/EMD engines is available for marine propulsion and marine generator set applications. A complete power package with engine, reverse-reduction gear or generator and accessories is available from EMD distributors worldwide. The propulsion units are also available without skid mounting for direct application to the vessel structure. For marine propulsion, EMD offers eight-, 12- and 16-cylinder Roots-Blown 645E6 Series engines and eight-, 12-, 16-

(Continued on page 42)

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The Wärtsilä Vasa 46 proves that a modern reliable medium speed engine offers a competitive alternative to slow speed main engines. – Not only in total economy and performance but also when it comes to optimized emission control. The compact size and low weight of the Vasa 46 allow a smaller engine room thus contributing to a bigger payload capacity and bigger profits. The low noise and vibration levels of the Vasa 46 are the result of its rigid design and unique resilient mounting which make it ideal for even the most demanding marine applications. Combined with the fact that the Vasa 46 comes from the leading manufacturer of medium speed engines, there is only one conclusion left; The Vasa 46 is truly an engine you can put your confidence in.



The Wärtsilä Vasa 46 engine has an output range of 3,620 to 17,550 kW.

WÄRTSILÄ DIESEL

Wartsila Diesel Oy
P.O. Box 244, 65101 Vaasa, Finland
Telephone +358-61-3270. Telefax +358-61-3171 906

Wartsila Diesel, Inc.
201 Defense Highway, Annapolis, MD 21401
Telephone (410) 5732 100. Telefax (410) 5732 200

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Diesel Engine Directory

and 20-cylinder turbocharged 645F7B and 710G7B diesels. The Roots-Blown models offer a power range from 1,050 to 2,100 hp at 900 rpm. The turbocharged 710G7B engine has new ratings of 2,000, 3,000, 4,000 and 5,000 hp for the eight-, 12-, 16- and 20-cylinder models. The turbocharged engine rating range begins at 1,700 hp for the eight-cylinder 645F7B. For genset applications, EMD engines cover a continuous output range from 745 to 3,580 kW at 60 Hz-900 rpm and 570 to 2,980 kW at 50 Hz-750 rpm. For free literature on EMD marine diesels,

Circle 20 on Reader Service Card



GEC Alsthom Diesels produces high or me-

dium speed engines for marine propulsion and auxiliary generating requirements. GEC Alsthom Paxman Diesels manufactures compact high speed diesel engines, suitable for high speed marine craft propulsion, power generation and offshore/industrial power generation. The Paxman range currently covers the 560 to 3,655 kW (750 to 4,900 bhp) power band. The Paxman Vega and Valenta engines have been joined by the VP185. The first model is a 12-cylinder, low maintenance high speed diesel engine in the 1,860 to 2,611 kW (2,493 to 3,500) power range; but the 12VP185 will be joined by other versions. GEC Alsthom Ruston Diesels manufactures a range of medium speed diesel engines (distillate and heavy fuel), dual fuel and spark ignition engines providing main propulsion and auxiliary power for a variety of vessels. The RK series of engines has a power range from

750 to 5,500 kW (1,005 to 7,375 bhp). GEC Alsthom Kelvin Diesels serves the fishing and marine industry, manufacturing the T range of medium speed diesel engines with a power rating from 75 to 820 kW (100 to 1,099 bhp). For more information on GEC Alsthom Diesels,

Circle 30 on Reader Service Card



As of April 1994, Innovation Marine became the sole North American distributor for the SeaTek diesel engine line. SeaTek was formed in 1986 in response to a market which called for engines in the 550 to 1,400 hp range. Innovation Marine is a full service marine engine facility featuring a full engine machine shop, state-of-the-art dyno, and rigging shop on premises. Innovation Marine builds high performance pleasure boat, racing and commercial grade engines for both domestic and international markets. A full stock of SeaTek engines and parts is now available in the U.S. Innovation Marine is also a warranty station for Mercury Marine, OMC, Volvo and Crusader, as well as SeaTek. For more information on Innovation Marine Corp.,

Circle 32 on Reader Service Card



Deere Power Systems Group offers five marine diesel engines in 3.9, 4.5, 6.8 and 7.6L configurations, ranging from 70 hp to 300 hp for propulsion uses. Multiple horsepower ratings are available for different marine needs. The 4039DFM 3.9L naturally aspirated, four-cylinder engine is available with 71 or 80 hp at 2,500 rpm, while the 4045TFM 4.5L turbocharged, four-cylinder unit produces 102 or 115 hp at 2,400 rpm. Also available are six-cylinder 6.8L naturally aspirated and turbocharged powerplants: the 6068DFM and 6068TFM. The 6068DFM produces 117 or 130 hp at 2,400 rpm. The 6068TFM provides 153 or 175 hp at 2,400 rpm, 195 hp at 2,500 rpm and 220 hp at 2,600 rpm. The 6076AFM, an aftercooled 7.6L engine, has 215- and 250-hp ratings available at 2,200 rpm, along with a 300-hp rating at 2,400 rpm. John Deere marine engines are also available for genset and auxiliary power applications. For more information on John Deere,

Circle 76 on Reader Service Card



MAN B&W Diesel, Inc., a wholly owned subsidiary of MAN Aktiengesellschaft, Munich, Germany, manufactures and designs two- and four-stroke diesel engines and turbochargers — with facilities in Augsburg and Hamburg, Germany; Copenhagen, Friederikshafen and Høleby, Denmark; and more than 30 licensees around the world.

At Augsburg, medium-speed diesels with a power range of 610 to 25,704 hp are manufactured, as well as dual fuel engines rated from 550 to 2,205 hp, and high efficiency exhaust gas

(Continued on page 45)

Maritime Reporter/Engineering News

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Circle 282 on Reader Service Card



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White Plains, NY 10650
Phone: 914 253 4000
Fax: 914 253 6002

Texaco London
Fuel and Marine Marketing Dept.
1 Westferry Circus
Canary Wharf, London E14 4HA
Phone: 44 71 719 4651
Fax: 44 71 719 5161



Texaco is dedicated to manufacturing and marketing the highest quality products in the industry and to serve all our customers in the most efficient and effective manner possible.

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Circle 262 on Reader Service Card

JOHN DEERE ENGINES ARE COMIN' ON STRONG

IN CRUISE BOATS.

Why are more and more cruise boats being outfitted with John Deere engines? We asked Captain Bill Davis, operating the 85' Crystal Queen out of Morehead City, NC.

"They're smooth throughout the power range."

According to Captain Davis, "Those 4-stroke Deere engines are very smooth throughout the RPM range. Low end torque and throttle response is excellent."

"Engine noise is minimal."

Quiet operation is important on boats operating in tourist areas. "The John Deere engine is much quieter than a comparable 2-stroke engine. I really like the way they sound."

"Very low fuel consumption."

"They're a wonderful running engine, said Davis. "They don't burn a lot of fuel and top speed on the vessel is about 5 knots faster than we had anticipated."



Why are more and more crane barges being outfitted with John Deere engines? We asked Joel Smith, of R&D Maintenance Service. Smith is supervising a project near Columbus, Mississippi for the Corps of Engineers.

"Very little maintenance."

Smith operates a new 54' x 160' crane barge with two Deere genset engines. He also uses two Deere powered compressors elsewhere in the project. "To my knowledge we haven't had to do anything but routine service on any of them."

"Seven years old and the engines run with no problems."

Smith likes the way even older Deere engines keep delivering the performance he needs. "The compressor engines have been in service for 7 years now, and they still work like the new ones."

"Just plain dependable."

"They just keep running...doing the job with no problems," said Smith. "They give us the dependability we need on projects like ours."

IN CRANE BARGES.



COMIN' ON STRONG.

Dependable, fuel efficient, high torque, smooth-running John Deere engines in the 70-300 hp (52-224 kW) range are being used on more workboats of all kinds every day. Talk to the people who use them and find out why.

(Continued from page 42)

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
36 Plains Road, P.O. Box 980
Essex, CT 06426-0980
Tel: (203) 767-7502 • Fax: (203) 767-7290

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

CK POWER PRODUCTS CORPORATION OF FLORIDA
100 Southwest 52nd Avenue
Ocala, FL 34474-1894
Tel: (904) 237-7660 • Fax: (904) 237-0855

CN POWER SYSTEM
220 Harter Avenue, P.O. Box 650
Woodland, CA 95776
Tel: (916) 666-6624 • Fax: (916) 661-1226

DIESEL-BEC, INC.
2805 Pitfield Boulevard
St. Laurent, 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 • (601) 843-0856

HEARTLAND ENGINE COMPANY, INC.
884 Medina Road, Medina, OH 44256
Tel: (216) 239-2252 • Fax: (216) 239-2672

NORTH AMERICAN ENGINE COMPANY
3003 Thurston Rd., Greenboro, NC 27406
Tel: 1 (800) 543-2289
Tel: (910) 370-4776 • Fax: (910) 370-4993

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Rhineland, WI 54501
Tel: (715) 369-5900 • Fax: (715) 369-5918
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461 East Penn Road, Coldwater, MI 49036
Tel: (517) 278-2445 • Fax: (517) 278-8272
and
204 North 37th Road, Mendota, IL 61342
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For Europe contact:
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For Asia, Caribbean, Central and South America contact:
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Circle 220 on Reader Service Card

ily, 1994

turbochargers for two- and four-stroke engines. The latest four-stroke engine from MAN B&W is the 32/40. Using the same design concept as MAN B&W's three large-bore engines, the 32/40 employs dual camshafts, allowing varying intake charges to maximize fuel economy while minimizing exhaust emissions. Developing a cylinder output of 600 hp (440 kW), the 32/40 covers the power range from 3,000 to 10,800 hp (2,200 to 7,920 kW).

The facilities at Copenhagen design the MC, L-MC, K-MC and S-MC series of low-speed, two-stroke diesel engines for the 1,480 to 74,640 hp output range. The Holeby works manufactures four-stroke diesel gensets for oceangoing, coastal and fishing vessels from 720 to 5,400 hp (500 to 4,000 kW). The Friederichshafen works offers engines and complete propulsion systems in the 1,090 to 16,730 range, and CP propellers up to 26 ft. (8 m) in diameter, capable of absorbing up to 20,400 hp. The propulsion systems are based on both two- and four-stroke engine series, and are packaged with Alpha reduction gearboxes, CP propellers and an Alphatronic remote control system. For more information on MAN B&W Diesel,

Circle 101 on Reader Service Card



MAN Nutzfahrzeuge AG produces compression ignition internal-combustion engines. MAN introduced its newest diesel engine, the six-cylinder in-line D 2866 LE401, at the 1994 Miami International Boat Show. The D 2866 LE401 carries the design familiar from V engines over into the in-line models. MAN claims the engine achieves higher output (441 kW or 600 hp from 12 liters displacement) with a smaller size. MAN also says the D 2866 LE401 has:

- a new combustion system with high-pressure injection cylinder head with reduced swirl and newly designed pistons
- larger heat exchanger
- improved acceleration using smaller, lower-inertia turbines with a higher charge pressure in the low-speed range, and the introduction of a waste gate to limit the charge pressure and turbine speeds under full load conditions
- prevention of black smoke by introduction of an RQVK governor, and of white smoke by integration of a heater section in the intercooler to operate at low load and idle
- reduction of overall dimensions of nine percent in length and 11 percent in height
- introduction of a new oil sump of reduced depth for operating angles up to 30 degrees
- advanced development of combustion, turbocharger sizing and intercooling and exhaust emissions.

For more information on MAN,

Circle 80 on Reader Service Card



MKW Power Systems, Inc. is an original equipment manufacturer, custom fabricator and packager of power supply systems. MKW provides base load, propulsion and stand-by power systems.

In addition to power generation packages, MKW offers engine-driven chillers and engine control equipment. MKW Power Systems' support includes customized engineering solutions, training, service, parts and special consultation. EnChill by MKW Power Systems is a



Wartsila Vasa 6R32. This model, as well as a Wartsila SACM Diesel JUD25 auxiliary engine (see pg. 46), was recently installed on seven tankers under construction in the South East Asia region.

custom fabricator and assembler of gas and liquid fueled engine driven chillers.

For more information on MKW Power Systems, Inc.,

Circle 102 on Reader Service Card



MTU North America was incorporated in 1978 to provide compact high-power density diesel engines for pleasure, commercial and military vessels in North America and the Caribbean. MTU North America is the marketing, sales and service subsidiary of MTU Friedrichshafen, a manufacturer of high-speed marine diesel engines and a member of Daimler-Benz. The product range starts at 100 hp and goes up to 10,000 hp. MTU has recently supplied engines to two new gaming boats and two shore barge facilities, and MTU-NA won two of the three MARK V test vessels for the U.S. SOCOM. Other recent military programs utilizing MTU power around the world include 40-ft. (12-m) patrol boats and Coastal Mine Hunters for Egypt, Mine Hunters for Norway and SAAR V frigates for Israel. In January 1994 MTU Friedrichshafen put a new magnetic ranging facility into operation for its low magnetic signature engines destined for minehunter vessels. MTU also recently delivered gensets for the U.S. Army's Ground Based Radar Advanced Power System Development Program. For more information on MTU North America,

Circle 77 on Reader Service Card



New Sulzer Diesel Ltd., based in Winterthur, Switzerland, is a designer, manufacturer and supplier of diesel engines ranging from 460 kW to 48,600 kW (620 bhp to 66,120 bhp). New Sulzer's low-speed two-stroke and medium-speed four-stroke engines are employed in marine propulsion, auxiliary applications and land-based power plants worldwide. The Sulzer RTA low-speed two-stroke series, with cylinder bores from 380 to 840 mm, propel all types of deep-sea ships. The ZA40S medium-speed engine has a rotating piston and provides propulsion for new ferries, Ro/Ro vessels and cruise ships. At the lower end of the power spectrum, the faster-running AT25 and S20 engine types are both used for marine auxiliary duties and for the propulsion of smaller vessels.

For more information on New Sulzer Diesel,

Circle 50 on Reader Service Card



SEMT Pielstick offers high and medium speed four-stroke diesel engines, covering a range from 1,000 kW to 23,850 kW (1,300 to 32,500 hp).

The high speed PA type is used for merchant marine, naval propulsion and power generation, and a variety of land applications. The PA range of high speed diesels offer three cylinder bores:

- PA4.200 rated from 1,060 kW to 2,650 kW (1,440 hp to 3,600 hp) and from 1,200 to 1,500 rpm. The PA4-type is fitted with a variable geom-

etry combustion chamber.

- PA5.255 rated from 1,050 kW to 3,960 kW (1,430 hp to 5,385 hp) and from 900 to 1,000 rpm.

- PA6.280 rated from 1,745 kW to 7,920 kW (2,375 hp to 11,000 hp) and from 720 to 1,050 rpm. The PA6.280 type comprises a CL version (so-called long stroke), a STC version with a sequential turbo-



Wartsila SACM Diesel UD25 L6 auxiliary engine.

charged system and a B version with improved performance. The PA engines are also available in gas version.

The medium speed PC type is used for merchant marine (propulsion); navies (propulsion); and for diesel power plants (up to 200 MW). The PC range of medium speed diesel engines offer two cylinder bores:

- PC2.400 rated from 3,300 kW to 12,600 kW (4,490 hp to 17,135 hp) and from 500 to 530 rpm in two versions: PC2.6-400 rated at 550 kW/cyl. (747 hp/cyl.) and PC2.6B-400 rated at 630 kW/cyl. (857 hp/cyl.).

- PC4.570 rated from 6,625 kW to 23,850 kW (9,000 hp to 32,435 hp) and from 360 to 430 rpm in three versions: PC4.2-570 rated at 1,215 kW/cyl. (1,650 hp/cyl.); PC4.2B-570 rated at 1,325 kW/cyl. (1,800 hp/cyl.); and PC4.0L-570 rated at 1,325 kW/cyl. (1,800 hp/cyl.).

These engines run on diesel oil as well as heavy residual fuels. The PC2 engines are available in a gas version. For more information on SEMT Pielstick,

Circle 31 on Reader Service Card



Wartsila Diesel produces medium-speed and high-speed diesel engines for both commercial and naval propulsion as well as auxiliary power. Within the last 12 months, Wartsila Diesel has introduced two new engine models: the Wartsila Vasa 20 and the Stork Wartsila 38. The Vasa 20 engine is a heavy fuel auxiliary engine; the SW 38 is a heavy fuel diesel engine running at 600 rpm.

The Wartsila Vasa 32 engine now utilizes carbon scraper rings in the combustion chamber to decrease wear on the cylinder liner and also to further decrease the lube oil consumption. The Wartsila Vasa 4 has recently been approved by NAVSEA (the engineering group of the U.S. Navy) for use in Navy vessels having completed a 1,000 hour endurance test. Wartsila Diesel says that all of its engines will meet the NOx requirements set forth by the IMO in 1995 by means of built-in engine technology without the need for any secondary methods. For more information on Wartsila Diesel,

Circle 52 on Reader Service Card

Is Your Diesel Mist-Behavin'?

Install A Nelson EcoVent™ Recirculator And Eliminate The Noxious Mist Caused By Diesel Crankcase Blowby.

Diesel engines. We love their might. We dread their mess—especially in engine rooms. But there is a solution. The Nelson EcoVent recirculator can keep your diesel from mist-behavin'!



You see, the Nelson EcoVent recirculator was developed to prevent crankcase fumes from fouling the air intake filter and coating the engine room with noxious mist from diesel crankcase blowby.

In fact, the Nelson EcoVent recirculator removes 99% of the oil mist and airborne particles, so you can duct the now-clean blowby fumes to either the inlet side of the air cleaner, or the clean side for a completely closed system. The result? A Nelson EcoVent recirculator system removes 100% of blowby mists and gases from the atmosphere without engine damage. No wonder it's used by the U.S. Navy, Coast Guard, yacht owners, engine builders, packagers and work boat operators.

What's more, with the Nelson EcoVent recirculator, there's less oil consumption, installation is easy and maintenance is a snap. And you won't find a more competitive price anywhere!

Best of all, with the Nelson EcoVent recirculator on duty, a messy engine room will never be *mist*.



P.O. Box 428, Stoughton, WI 53589 1-800-356-6606 Fax 1-608-873-1532

Circle 25 on Reader Service Card

Diesel Engine Directory

DAIHATSU

Daihatsu Diesel, Inc. manufactures medium-speed diesel engines, reduction gears and systems for use as marine propulsion plants. Daihatsu has a four marine diesel engine series - M, DLM, DKM and DVM models - ranging in power from 200 to 6,000 hp in single unit installations. The four-stroke M Series features three in-line six-cylinder models, ranging from 240 hp at 1,850 rpm to 430 hp at 1,800 rpm. The DLM Series has 11 in-line models with six or eight cylinders ranging from 600 hp at 1,350 rpm to 4,200 hp at 500 rpm. The DKM Series has two in-line models, one a six cylinder, ranging in power from 3,000 hp at 720 rpm to 4,000 hp at 720 rpm. The DVM Series has six V models, three six- and three eight-cylinder diesels, ranging from 2,100 hp at 900 rpm to 6,000 hp at 600 rpm. Models with

bore of 240 mm or more of the DLM, DVM and DKM Series can burn heavy fuel oil.

For more information on Daihatsu Diesel,

Circle 107 on Reader Service Card



Detroit Diesel Corp. provides a complete line of premium marine engines to meet each commercial marine customer's different demands for propulsion and auxiliary power. Detroit Diesel propulsion engines provide power for pumps, hoists, generators and other accessories. The Detroit Diesel Electronic Control (DDEC) system is a totally integrated electronic control technology supplying built-in engine synchronization, on-board system diagnostics and early warning for engine malfunctions - before damage occurs. The totally integrated system

maintains constant governed speed by automatically compensating for intermittent accessory loads. The DDEC system enables commercial boat manufacturers to offer five power options from the Detroit Diesel 6V-92TA with 325 bhp at 1,800 rpm to the 16V-149TI with 2,400 bhp at 2,100 rpm.

Detroit Diesel, with Textron Lycoming, markets fully integrated combined diesel and gas turbine marine propulsion installation packages, capable of operating as either diesel or turbine or as diesel and turbine. The Textron Lycoming/Detroit Diesel combined diesel or gas turbine and combined diesel and gas turbine (CODOG/CODAG) marine propulsion packages are fully engineered, offering a total package of a high-horsepower, light-weight, economical and maintainable operation of marine craft. For more information on Detroit Diesel Corp.,

Circle 108 on Reader Service Card



The Diesel Engine Division of Fincantieri appears on the market with two trademarks, GMT and Isotta Fraschini, following the merging of Isotta Fraschini.

The GMT and Isotta Fraschini production range covers high-speed and medium-speed diesels with power outputs extending from 150 to 40,500 kW per engine.

In addition to the usual forms of technical assistance, the Diesel Engine Division of Fincantieri offers special, fixed-fee maintenance contracts.

By each contract, the Division assumes the responsibility for the maintenance and operational efficiency of the engines.

For more information on Fincantieri,

Circle 110 on Reader Service Card

The 65' passenger ferry *Edge* at 30 knots and designer Roger Hatfield.

Think about your future. Think Luggers.

"Our cruise speed at 2100 rpm is 28 kts light and 26 kts fully loaded. We had guaranteed 24 knots to the client, so we are all happy."

— Roger Hatfield, Gold Coast Yachts

The 65' Wave Piercer *Edge* is Roger Hatfield's look at the future, so it was fitting that he chose the most advanced engines for power.

Like the Wave Piercer, the Luggers L6125A is made for the future. The turbocharged and aftercooled engine's advanced



Circle 278 on Reader Service Card

design incorporates unique features like nodular iron pistons. Single side servicing and individual cylinder heads make Luggers a mechanic's favorite. Thorough factory testing ensures engine performance.

"The Luggers fit the bill perfectly. Fuel use seems to correlate exactly as the specs had predicted. We use about 12 gal/hr going 18 knots at 1600 rpms," reports Hatfield.

If you want to power the design of the future, or simply power your workboat with the engine of the future, think Luggers.

Mfg by: Alaska Diesel Electric.
Box 70543, Seattle, WA 98107 USA
Tel. (206) 789-3880.
Fax (206) 782-5455.



STEEL-SPRING FLEXIBLE COUPLINGS LO-REZ



LO-REZ helical steel-spring couplings, with their low, constant and accurately-controlled torsional stiffness factors, provide excellent torsional characteristics for geared marine reciprocating propulsion systems, engine and reciprocating compressor drives of many varieties, locomotive drives, etc.

LO-REZ was one of the first coupling manufacturers, 40 years ago, to recognize the importance of torsionally-soft couplings in power transmission systems, particularly in reciprocating, variable speed systems and those involving gearing.

HF (HUB-FLANGE) ARRANGEMENT

STEEL-SPRING VIBRATION ISOLATORS

LO-REZ manufactures a broad line of sturdy steel-spring vibration isolators. The BR series isolators (shown here) with their ample thrust capacity and rubber-cushioned, adjustable stops (to limit excess vertical excursion) are widely used for marine auxiliary, other mobile and seismic applications. No external chocks are required. BR-T series isolators have special spring-loaded thrust housings to carry the full propeller thrust effects, the full engine torque, and still provide excellent isolation. They are ideal isolation supports, also, for machinery rafts in ships.

With the growing demand for acoustical and vibration attenuation treatment in ships, the isolation of main propulsion engines is fast becoming a necessity rather than a luxury. LO-REZ has many years of experience in analyzing the dynamics of soft-mounted propulsion engines, and has the products to provide integrated isolation systems which include two-directional thrust-type RT flexible couplings for the gear output shaft.



BR4-LS

Designed & Manufactured by

LO-REZ VIBRATION CONTROL LTD.

156 WEST 8th AVE., VANCOUVER, B.C., CANADA V5Y 1N2 • TEL. (604) 879-2974 • FAX (604) 879-6588

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Diesel Engine Directory



Stewart & Stevenson Services, Inc., with branches in Harvey, La. and Houston, Texas, distributes Detroit Diesel and General Motors EMD engines from 50 to 4,300 hp.

Stewart & Stevenson has a staff of experienced mechanical, electrical and marine engineers to provide a support network for its customers.

Full service branches, two remanufacturing plants, and more than 200 dealers provide services to customers, from financing a vessel to training and technical support.

Stewart & Stevenson provides custom-engineered power systems for all marine applications.

For more information on Stewart & Stevenson,

Circle 113 on Reader Service Card



Hedemora Diesel AB is a manufacturer of diesel engines six to 18 cylinders, 500 to 3,000 kW at 1,000/1,500 rpm for several applications.

Hedemora's engines have successfully undergone 35 degree inclination tests and also satisfy all other DNV requirements for offshore in-

stallations. Hedemora Diesel is able to offer the market a comprehensive engine selection with output per unit from 20 kW up to 15,000 kW by utilizing a variety of fuel and combustion technologies applicable to heavy oil, marine diesel, gas oil and natural and biogas fuel systems.

For more information on Hedemora Diesel AB,

Circle 109 on Reader Service Card



Mitsubishi Heavy Industries, Ltd. (MHI) extended the power range at the lower end of its two-stroke UEC engine series with a small bore diesel design, adding the 330mm bore UEC 33LSII, offered in four- and eight-cylinder versions.

The engine covers an output range from 1,570 to 5,870 bhp at 158 to 210 rpm.

The model has a longer stroke, as compared with the 370mm stroke model, which was the smallest bore model in the UEC family prior to the UEC33LSII's introduction.

The longer stroke provides enhanced fuel economy, according to MHI.

MHI also has two large bore models in the UEC series for the bulk and very large crude carrier markets.

For more information on MHI,

Circle 112 on Reader Service Card

SEMT Pielstick Will Power Chantiers-Built Car-Ferry

The car-ferry Societe Nationale Maritime Corse-Mediterranee (SNCM) has ordered from Chantiers de l'Atlantique, St. Nazaire, France, will be powered by four diesel engines from SEMT Pielstick, St. Denis. The engines will be model 18 PC 2.6 B. The 18-cylinder engine is supercharged by a single MAN turbo-blower type NA 57, driven by the exhaust gases through a Modular Pulse Converter (MPC) system. This SEMT-patented system offers easy maintenance of the exhaust manifolds and expansion bellows. For more information on SEMT Pielstick,

Circle 84 on Reader Service Card

MAN B&W Chosen To Power Kvaerner-Built RCCL Ships

Royal Caribbean Cruise Line (RCCL) of Miami selected MAN B&W four-stroke engines, typ V 48/60, as the propulsion unit for its new cruise ship recently contracted with Kvaerner Masa Yards of Helsinki. The package includes four 12-cylinder engines which will develop a total output of 68,500-hp (50,400-kW), and will be the core of the diesel-electric propulsion system. The vessel will be capable of carrying 1,950 passengers and will have a service speed of 22.5 knots.

For additional information on MAN B&W,

Circle 16 on Reader Service Card

Fluid Mechanics Opens Puerto Rico Operation

Fluid Mechanics, Inc., a diesel fuel injection specialist located in Cleveland has opened a new branch operation in San Juan, Puerto Rico, allowing the company to serve the large bore engine population in the Caribbean, Central America and South America. The new address is: Fluid Mechanics, Inc., Caribbean Division, 283 Matadero Road, Puerto Nuevo, Puerto Rico 00920; tel: (809) 782-6601; fax: (809) 782-3332. For more information,

Circle 6 on Reader Service Card

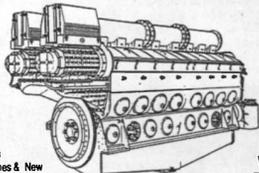
Vessel Evaluation System Helps Owners Save Money

The Stellar Vessel Evaluation System (VES) measures engine and related fuel data, enabling ship owners to quantify in monetary terms the parameters which effect vessel performance. In real terms, fleet owners can immediately determine the cost impact of vessel performance and take active measures to optimize vessel efficiency. Information presented by the Stellar VES includes: hp; rpm; fuel consumption (each engine, total engines, trip total, day total, voyage total); fuel on board; total fuel burned; vessel speed over the bottom; and vessel position. The VES measures engine rpm to less than .25 to 1 rpm. These measurements are used to determine real-time fuel consumption and horsepower. For more information on the Stellar VES,

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ALCO® CLEVELAND® EMD® FAIRBANKS-MORSE® NORDBERG®

MARINE & INDUSTRIAL POWER!



Hatch & Kirk Maintains
Remanufactured Engines & New
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Rebuilding Slow & Medium Speed
Diesel, Dual Fuel & Natural Gas
Engines.

WORLD WIDE
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24 HRS A DAY

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Protect Valuable Equipment with Advanced Damping Technology of Holset Resilient Couplings

- Absorb Vibration & Shock Loads
- Eliminate Resonant Vibration
- Extend Life, Heavy Duty Design
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- Quick & Efficient

Vibration Engineering Consulting

- Holset's Vibration Engineering Group offers a proven, state-of-the-art complete drive system
- Holset combines 45 years experience with the latest and best technology to ensure your system is safe from damage by torsional vibration
- Services range from system design, modeling and computer analysis to on-site measurement of vibration
- Holset also offers custom engineered couplings, utilizing their proprietary rubber compound, for your specific requirements
- Holset specializes in practical solutions to torsional vibration problems in many industries, including diesel & marine drives, electrical drives, metal working mills, mining, petrochemical, and utilities.

Call the vibration engineering experts today
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HOLSET

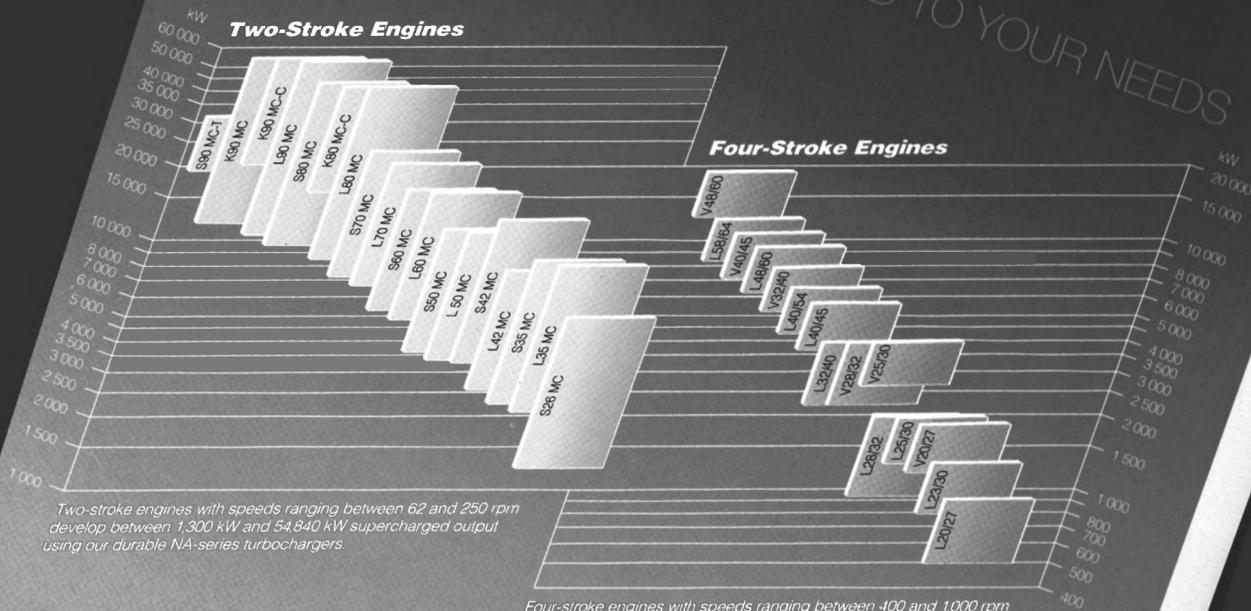
Holset Inc., P.O. Box 100
Newport News, VA 23601
1720 Kemper Meadows Drive
Farmingdale, NY 11737
FAX: 516-824-2567

Circle 237 on Reader Service Card

Maritime Reporter/Engineering News



DIESEL TECHNOLOGY TAILORED TO YOUR NEEDS



Two-stroke engines with speeds ranging between 62 and 250 rpm develop between 1,300 kW and 54,840 kW supercharged output using our durable NA-series turbochargers.

Four-stroke engines with speeds ranging between 400 and 1,000 rpm develop between 500 kW and 18,900 kW supercharged output. NR and NA-Series turbochargers for optimum utilization of fuel.

FT 370 E

WORLDWIDE SERVICE
Circle 277 on Reader Service Card

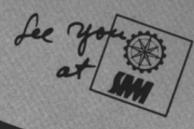


ABB Introduces Diesel And Gas Engine Monitoring System To U.S.

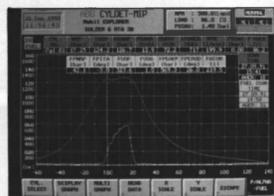
CYLDET, a system which continuously measures and evaluates cylinder pressure directly from the combustion chambers of large, slow

diesel and natural gas engines, has been introduced to the U.S. market by ABB Industrial Systems, Inc., Weighing and Force Measurement Division.

Applications include engines used for marine propulsion and auxiliary power supply, power generation by electric utilities and non-utility facilities, as well as natural gas compression.

CYLDET systems are reportedly best used on engines operating at or below 1,500 rpm.

On the system's relevance to owners, **Robert Sarnelli**, manager-sensor products, said, "On-line performance monitoring can optimize operating conditions and improve fuel economy, availability, maintenance, safety and emissions."



The CYLDET system continuously measures and evaluates key engine performance criteria, helping to save costs and boost efficiencies.

JETS FAST SLOW

High Speed vs Low Speed

Two totally different applications deserve two equally different jets. A high speed jet should be efficient in the range of 25 to 60 knots. A low speed jet should offer zero cavitation at full power from 0 to 25 knots. One utilizes high velocity . . . the other mass flow. A jet drive built to combine the two will suffer in performance. But is there a jet manufacturer who makes two such radically different Jets?

Yes, There Is!

NORTH AMERICAN MARINE JET

NOMERA®

- ◆ High Speed (25-60 knots)
- ◆ Excellent Maneuverability
- ◆ Unbeatable Acceleration
- ◆ Correct Reverse Steering

TRAKTOR®

- ◆ High Thrust
- ◆ Low R.P.M. (1000 R.P.M.)
- ◆ No Cavitation (0-25 knots)
- ◆ Correct Reverse Steering

North American Marine Jet, Inc. • P.O. Box 1232, Benton, AR 72018 U.S.A.
(501) 778-4151 • FAX (501) 778-6381

Circle 284 on Reader Service Card

CYLDET also measures injection pressure, scavenge air and crank angle, and is able to monitor up to 10 engines with 20 cylinders each.

Data from individual sensors is stored and interpreted in a data processing unit, and can be graphically displayed as a combustion curve on a personal computer. The system can also connect to a supervisory automation system.

As the system operates 24 hours a day and 365 days a year, over time the plotting of mean value deviations allow the operator to detect combustion irregularities, said Mr. Sarnelli.

Additionally, it can be configured to set off an alarm when pressure deviates from specific parameters, ultimately helping to increase engine safety and helping to avoid operating failures.

In the area of fuel economy, the CYLDET system computes start of combustion and ignition delay. Inadmissibly high engine loads and poor efficiency levels are then known and can be countered by adjusting engine settings or operating modes.

While fuel efficiency varies from engine to engine, ABB estimates efficiency increases from one to 10 percent are possible.

CYLDET's engine-mounted sensors detect pressure changes by using ABB's patented PRESSDUCTOR measuring principle, which operates on the magnetoelastic effect, which states that the magnetic properties of steel are directly influenced by the mechanical forces (such as pressures applied to it).

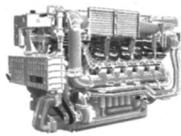


ABB Weighing and Force Measurement Division developed a new brochure on the CYLDET system. For a free copy,

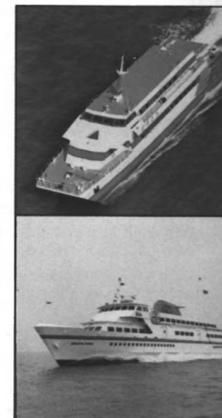
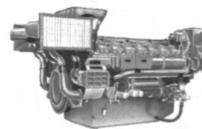
Circle 2 on Reader Service Card



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.



GEC ALSTHOM

PAXMAN DIESELS

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A Management Company of GEC ALSTHOM Diesels Limited
Circle 233 on Reader Service Card

Stewart & Stevenson In Flow Enhancer Products Agreement With Norlock

Stewart & Stevenson International, Houston, Texas, and Norlock Technologies have entered into an agreement to design, manufacture and sell flow enhancer products patented by Norlock.

Flow enhancers boost the power

output and fuel efficiencies of gas turbines by evenly distributing the turbine's exhaust flow and reducing back pressure.

LM2500 testing after retrofitting a flow enhancer has demonstrated improvement of power output and fuel efficiency ranging from 1.0 to 2.4 percent. In addition, flow enhancers reduce exhaust noise and mechanical stress on heat recovery systems.

MacGregor To Supply Valve System For Tanker

MacGregor's Liquid Cargo Handling Division won an order to supply the company's hydraulic remote controlled valve system to a 260,000-dwt tanker. The tanker is now under conversion to a floating production, storage and offloading unit

(FPSO) at Keppel Shipyard, Singapore.

Formerly the *Chevron London*, the vessel is to be renamed *Cossack Pioneer* and is now owned by Woodside Petroleum Pty. Ltd. of Perth, Western Australia.

The MacGregor order covers 94 remote actuators and their operating system, the actuators comprising 90 open/close units and four variable-opening (throttling) units.

Operation of all actuators will be from a centralized valve stand interfaced with, and controlled from, a cargo control computer.

While the vessel's piping system will be altered to meet its new role, it will employ the existing valves.

The MacGregor actuators will be matched to these valves both in terms of mountings and valve spindle profiles. This illustrates the system's suitability for retrofitting and updating purposes.

USCG Selects Syncrolift[®] For Shiplift And Transfer System

Syncrolift Inc., part of the Rolls-Royce Industrial Power Group, won a contract to supply its shiplift and transfer system to the U.S. Coast Guard (USCG). The Syncrolift[®] system will be used at the Curtis Bay yard in Maryland to dock the 270-ft. (82-m) USCG medium endurance cutters, the Famous Cutter class.

The 5,400-ton maximum capacity shiplift will be 334 ft. (102 m) by 55 ft. (17 m) and will be equipped with 24 Syncrolift hoists, each rated at 249 tons. The system's platform length will be extended later to handle the Hamilton and Hero classes of high endurance cutters, both 378 ft. (115 m) long.

The contract has been placed by the Naval Regional Contracting Center at Washington, D.C., the purchasing arm and project manager for the USCG in this project.

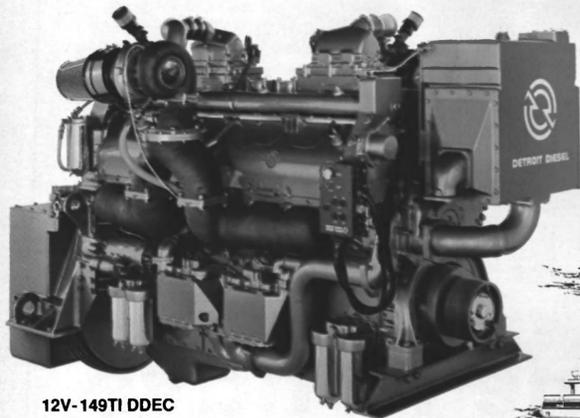
Crowley Co. Wins Two Industry Awards

Shaughnessy & Co., a Crowley Marine Services company based in Auburn, Wash., received two awards from the Specialized Carriers and Rigging Association — one for the *Rigging Job of the Year* and the second for the *Hauling Job of the Year*. Shaughnessy's winning entry for the *Rigging Job of the Year* award was the movement and placing of three autoclaves for a new Boeing Company facility at Frederickson, Wash. Shaughnessy used a Scheuerle platform trailer to move the heavy units into the facility and position them over a pit.

The Shaughnessy project that won the *Hauling Job of the Year* award involved modules weighing up to 5,397 tons each and measuring as much as 253 ft. (77 m) long by 88 ft. (27 m) wide by 124 ft. (38 m) high (more than 11 stories tall). Built for the Gas Handling Expansion Phase 2 (GHX02) project at Prudhoe Bay Alaska, the modules were reportedly the largest and heaviest oil field modules ever transported to the Alaskan North Slope.

Maritime Reporter/Engineering News

Over 50 Years of Diesel Experience Combined With The Latest In New Engine Technology... Makes Detroit Diesel The Commercial Marine Engine of Choice.



12V-149TI DDEC

Detroit Diesel Marine Engines have long been familiar sights on the waterways of the world. While certain features, proven by years of reliable performance, have been retained, other features have been added that improve the durability and performance.

Advances in component technology, new materials, manufacturing and assembly procedures are reflected in the consistently high level of quality found in Detroit Diesel products. Continuous improvements in the design and manufacture of our engines ensure that *Detroit Diesel marine engines are the best engines on the market and they're getting better all the time.* New Detroit Diesel Marine Engines feature the following innovations:

- Detroit Diesel Electronic Controls (DDEC).
- A crankcase vapor collector system that not only separates vapors and returns them to the crankcase, but also filters turbocharged intake air and serves as a silencer to reduce noise.
- Engine exhaust systems are cooler to the touch making engine rooms more hospitable.
- More efficient turbochargers that allow for an increase in horsepower without a corresponding increase in fuel consumption.
- Environmentally sound non-asbestos gaskets for improved sealing.
- Increased capacity fuel pumps that circulate more fuel through the system for greater cooling and lubrication of fuel system components.
- Silicone hoses which are Coast Guard approved and are able to withstand high and low temperatures.



- Constant torque hose clamps that allow for thermal expansion of engine and hoses without loss of clamping pressure.
- Production Dyno test time has been extended for each marine engine ensuring a high quality product.
- All fuel fittings are to a SAE standard external flare spec for reliable sealing.
- Lighter weight components such as oil pans, flywheel housings and cooling systems are used without sacrificing durability or reliability.
- O-Rings are used for superior sealing of all fuel jumper lines.
- Improved Appearance and Unpainted Hoses.

Parts and Service Support

Detroit Diesel Marine Engines are sold and serviced by a worldwide network of DDC distributors and authorized service dealers.

DDEC is fully warranted under the Detroit Diesel Warranty Provisions. The electronic control module (ECM) and the Electronic Unit Injectors (EUI) are serviced on an exchange basis.



Circle 22 on Reader Service Card

Alden Offers New Satphone

Alden Electronics recently introduced the new Alden Satphone, model SP1600M, which allows a vessel to make or receive a call over the public switched telephone network while at sea. The Inmarsat-M satellite telephone also provides for fax and data connection services (data transmitted and received at 2400 baud). For more information on the new Alden Electronics unit,

Circle 65 on Reader Service Card

Maritime Medical Companies Join Forces

SOS Maritime Services, a provider of emergency medical assistance, and Universal Marine Medical Supply Co., a provider of medical supplies to the maritime industry, have agreed to exchange vital information about ships medicine chests, inventory systems and radio-medical advice in order to provide a higher level of medical service to the maritime industry. For

more information on the services of SOS Maritime Services,

Circle 66 on Reader Service Card

McMurdo SART Wins FCC/GMDSS Type Approval

The McMurdo 9GHz search and rescue transponders (SARTs), models SART RT9 and RT9L, have won FCC and GMDSS type approval. Both feature retro-reflective tape; high-intensity LED in visible switch housing which flashes when the unit is in standby mode and when the unit is transmitting; audible and visual operating signals; and two means of preventing inadvertent activation. The RT9 carry-off unit is self-contained and can be carried to the survival craft. The RT9L life raft SART is designed for permanent installation in survival craft. Negron Marine Consultants is the exclusive representative in the U.S., Canada and Mexico for McMurdo's survivor location equipment. For more information on the SARTs,

Circle 67 on Reader Service Card

SMR Technologies Acquires Inflatable Raft Manufacturer

SMR Technologies has acquired SEACO/Elliott from Johnson Worldwide Associates. SEACO/Elliott, also known as Elliott Inflatable Rafts, manufactures a complete line of commercial grade marine inflatable rafts with operations in Riviera Beach, Fla. and Seattle. The transaction also grants SMR the exclusive right to distribute in North America a recreational line of life rafts manufactured in France under the trade name of Plastimo.

SMR Technologies was formerly a division of BF Goodrich Company and designs and manufactures a diverse line of highly engineered rubber products for marine, aviation and industrial markets.

Scana Skarpenord Names Controls Unlimited Authorized Service Center

Controls Unlimited, Inc. of Long Beach, Calif. was appointed an authorized service center for Scana

Skarpenord's valve remote control systems division. The main areas served will be the U.S., Canada, Mexico, Central America and the Caribbean. The Long Beach company will remain an authorized service center for Scana Skarpenord's level gauging and cargo monitoring systems. For more information from Controls Unlimited,

Circle 69 on Reader Service Card

Jeamar Winches Introduces Line Of Horizontal Capstan Winches

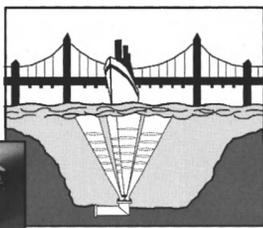
Jeamar Winches introduced a full line of horizontal capstan winches as a complement to its comprehensive range of power winches. Eight standard models are available with starting line pulls from 2,000-lbs. to 20,000-lbs. Larger sizes can be supplied, with optional line speeds, as required. All sizes come in either electric, air or hydraulic power configurations. For more information on the new line from Jeamar Winches,

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Min-O-Matic Couplings Weigh Less Than An Ounce

The new Min-O-Matic couplings from the Adel Wiggins Group offer quick disconnect operation, and are compatible with both liquids and gases. They are reportedly suitable for electronics cooling as required for Klystrons, magnetrons and electronic guidance packages. Min-O-Matic couplings operate in one motion: push to connect, pull to disconnect, with no twisting needed. Standard units are available for .25-in. lines, and can be supplied for .125-in. and .375-in. lines. Adel Wiggins specializes in fluid transfer and connector products. For more information on the new coupling,

Circle 71 on Reader Service Card

Plastic Energy Carriers Help Reduce Downtime

To lessen the risk of cable and hose failures — in essence minimizing downtime and maintenance requirements — igus, inc. provides a solution with its plastic energy carriers.

The manufacturer cites NASSCO's integration of Series 40 Energy Chain carriers from igus, inc. to help minimize downtime. The carriers used are made of a proprietary composite plastic, called igumid G, which is reportedly strong, light and self-lubricating. The carriers are reportedly ideal for use in harsh outdoor and industrial environments. For more information on igus, inc.'s plastic energy carriers,

Circle 73 on Reader Service Card

Maritime Database On CD-ROM

Version 2.0 of "The U.S. Maritime Information System," a CD-ROM from Marine Information Systems, contains the entire U.S. Merchant Vessel Documentation database, Manufacturer's Identification Code (MIC) database, Manufacturer's 20-year recall and defect notice database, and 20 years of U.S. Coast Guard boating accident reports. The databases are reportedly easy to search and fully interlinked through a Windows user interface. Version 2.0 includes the latest information available through December 31, 1993. For more information from Marine Information Systems,

Circle 75 on Reader Service Card

Television Series Focuses On The Sea

Sea Power: A Global Journey is a six-part series from Maryland Public Television airing on PBS Jul 5, 12, 19, & 26, as well as August 2 and 9.

Episode three, "Trade Winds/Trade Wars," (Jul 29) looks at how trade affects communities around the world, and follows a containership from Hon Kong to Seattle. Episode five, "Who Owns the Oceans" (August 2) looks at the struggles between human and nature, highlighting fishermen fighting for their rights.

Vecom Adds Refrigeration Products To Marine Line

Vecom Group has added Vecom Refrigeration USA, Inc. to its divisions of various marine products and services. Vecom Refrigeration USA, Inc. feature stocking and supply of more than \$1 million in spare and equipment; service and maintenance on manufacturer's equipment; overhaul of compressor and equipment sailing onboard or in its fully stock ship; retrofits and conversions within EPA compliance; and more. Vecom Refrigeration will be head by Douglas Bolinger, president. For more information on the products and services offered by Vecom Refrigeration USA,

Circle 79 on Reader Service Card

Maritime Reporter/Engineering News

BoatLIFE Offers Deck Protection Experience, Products To Cruise Ship Industry

Targeting the cruise ship market, BoatLIFE of Old Bethpage, N.Y. offers a complete line of marine deck care materials. BoatLIFE specifically offers a wide assortment of teak deck sealing and maintenance products.

The products are developed and manufactured to high standards,

and the company has considerable experience in large ship deck design and maintenance.

Marketing its experience to the cruise line industry, the BoatLIFE "Deckperts" (the company's copyrighted name) have provided engineering reports with detailed recommendations on various deck design aspects for architects and builders.

On the refurbishing side, BoatLIFE deck inspections are geared toward providing a comprehensive plan for cost-effective repair procedures, materials and application methods.

When necessary, the Deckperts design and manufacture customized products, machinery and tools for special applications.

The company also offers training for customer crews, technical advice on maintenance and repair, and turnkey project packages that include personnel, equipment and materials.

"Our reputation as a pioneering authority on wood deck maintenance and repair was established by years of dedication and hard work, in our research laboratory and manufacturing facility," said Grace "Louise" Schmidt, the company's president.

For additional information on BoatLIFE products and services,

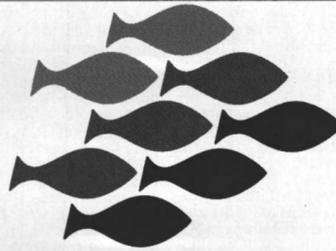


Custom BoatLIFE products and machinery are designed to ease deck sealing and maintenance operations.

Circle 1 on Reader Service Card

Nor-Fishing '94: The 15th International Fishing Exhibition and Seminars

August 9-13, Trondheim, Norway



Nor-Fishing '94

Nor-Fishing '94 — The 15th International Fishing Exhibition and Seminars, will consist of a series of seminars addressing topics pertinent to Norway's fishing industry.

Seminars 1 and 2 will show that enhanced value-adding in the fishing industry depends on ever-improving resource management and raw material utilization, highlight-

ing central issues related to value-adding and employment in the Norwegian fishing industry.

Although recently there have been significant improvements in the resource base and the supply of raw materials for the Norwegian fishing industry, the seminars will attempt to answer the question: "Has this provided the industry with the freedom to maneuver necessary for adapting to future challenges, or has it simply led to passivity?"

Seminar 1's sessions address "Value-adding in the Norwegian Fishing Industry" with seminars titled *The Future for the Norwegian Fishing Industry - Value-Adding and Jobs*; *The Grocery Trade's Views on the Fishing Industry - Attitudes and Requirements to Fish and Fish Products*; *Quality Assurance - A Prerequisite for Survival in an International Food Market*; *The Fishing Industry's Advantages and Drawbacks in Relation to Other Norwegian Food Industries*; and *Norwegian Fishing Industry in an International Context*.

Seminar 2's sessions address "Responsible Harvesting of Marine Resources - Multispecies Management: Fish and Marine Mammals" with seminars titled *The Scientific Basis for Management and Harvest*; *Results of the Norwegian Multispecies and Marine Mammals Research Programs*; *Economic Multispecies Modeling of the Barents Sea Fisheries*; and *Multispecies Management: Institutional Challenges*.

For more information on Nor-Fishing '94, contact The Nor-Fishing Foundation, 7030 Trondheim, Norway, tel: +47 73 92 93 44; fax: +47 73 51 61 35; or the Norwegian Trade Council, Knut Bolstad, N 0243 Oslo, Norway, tel: +47 22 92 62 00; fax: +47 22 92 64 00.

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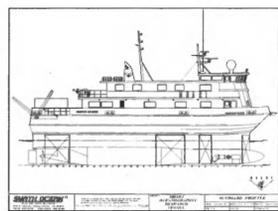
A high-technology, multi-functional oceanology vessel requires state-of-the-art design and construction, as well as proven electronics and propulsion packages to successfully (and economically) complete its missions. The following is a look at some recent and ongoing projects.

Vessel: R/V *Western Flyer*
Yard: SWATH Ocean
Delivery: Summer 1995

The primary mission for the SWATH vessel R/V *Western Flyer* is to be employed as a stable platform in Monterey Bay and the immediate offshore waters in the prevailing conditions of wind and sea native to these areas for the purpose of deploying, operating and recovering a tethered remotely operated submersible vehicle (ROV), untethered vehicles and/or conducting hydrocasts (CTD) to a depth of 11,000 ft. (3,500 m).

To complete its missions for owner Monterey Bay Aquarium Research Institute, SWATH Ocean has incorporated the latest technology in design and outfitting.

The *Western Flyer* will be outfitted with a dynamic positioning and tracking system which will enable the vessel to maintain station within 150 ft. (46 m) or less in sea state 5,



with a 25-knot wind and a two-knot current. This dual function will allow the vessel to follow a preset navigation track, as in transiting a grid, or to maintain position relative to the moving ROV within predetermined limits. This will be achieved by manual or automated control of the main propeller with individual rudder movement, bowthrusters, canards and stabilizers. As speed control in the zero- to three-knot range is critical to operation, stability is of the essence and the *Western Flyer* will reportedly perform quite well in rough waters.

Vessel & Systems Design

The *Western Flyer's* pontoons provide the major updrift for the vessel as well as provide space for the main engines, bowthrusters, canard and stabilizer equipment, fuel tanks and ballast tanks. The main propulsion consists of two Caterpillar 3512, 850-kW prime movers continuous duty generator sets driving two 1,250-hp main propulsion motors. The propulsion units were the determining factors in sizing the aft pontoons, and the pontoon shape selected allows for direct drive installation of the power train and for normal maintenance/repair access. The wetdeck's main function is to structurally connect the two hulls and provide support for main deck loads, while the main deck is dedicated to oceanographic activities. The cen-

Diagram of SWATH Ocean-built Western Flyer.



"Western Flyer" under construction for the Monterey Bay Aquarium Research Institute.

Specifications: LOA: 117 feet (35.6 meters) Beam: 55 feet (16.75 meters)
 Draft/Ballast Variable: 12 feet (3.66 meters) Disp.: 416 Long Tons

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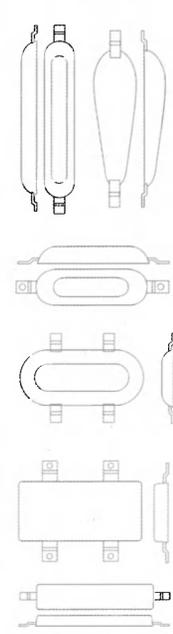


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The *Zirfaea* works in the rigors of the North Sea.

terpiece of the main deck is the moon pool area, which is recessed two ft. below the main deck. Located starboard in the center area is a Hiab 290 crane opposite from the Tether Management System (TMS); located adjacent to the moon pool area are the ROV control room and the scientific labs. A Hiab 290 crane is also located on the port side to support scientific or shipboard activities.

Vessel: *Zirfaea*
Yard: Bodewes Volharding
Delivery: 1993

Designed and built for the Dutch Ministry of Transport, Public Works and Water Management, North Sea Directorate, by Bodewes Volharding of Groningen, The Netherlands, the *Zirfaea's* main task is as a hydrographic surveying and research vessel, working on the North Sea and the Dutch part of the Continental Shelf. Designed by Nevesbu of The Hague, the *Zirfaea* incorporates a wide range of the latest in hydrographic instrumentation.

Survey and research ships differ in design from other small vessels based on their tasks, layout and, in the *Zirfaea's* case, special requirements for working in areas like the North Sea. Specifically the vessel features: acoustic standards of high level in machinery, hull and working/living areas; adequate room for

expansion; low operating costs to allow future vessel replacement; a good stability range for all operations, including the handling of relatively heavy equipment over both sides; good course stability at very low speeds; good maneuverability; roll suppression; and large open deck space. The *Zirfaea* is fitted out with a three-tier superstructure consisting of a bridge deck, a state deck and a forecastle deck which runs continuously from the stem to the working deck amidships aft. The wheelhouse/survey room on the bridge deck has a 360-degree view; the state deck below the bridge deck features a spacious director's room for meetings; the forecastle deck is used mainly as living quarters.

A diesel-electric main propulsion plant — consisting of four generator sets, each of them comprising a Mitsubishi type S6RMPTA marine diesel engine coupled to an Indar generator — power the *Zirfaea*. Two Indar electromotors are coupled to two Lips steerable Azimuth thrusters (five-blade). A Valmet diesel, type 620D, 90 kW, 1,500 rpm driving an Indar generator, type LCB-250-M/4, serves as the emergency generator. The deck equipment gets its power from a central hydraulic

powerpack system via a hydraulic power ring. The powerpack comprises a storage tank, two 22-kW feed pumps and two 160-kW main pump sets. The 220cc open system-type pumps have a constant hydraulic pressure control system, designed so that one main pump set in conjunction with one feed pump delivers enough power for all normal working conditions.

In order to execute its diversity of operations, the vessel is equipped with a wide range of special instruments, systems and facilities, including: Simrad ADP-701 dynamic positioning system; a 12.5-ft. by 12.5-ft. (3.8-m by 3.8-m) moonpool; Eekels closed-circuit television; Theunissen open-loop intercom; and (two) Datawell Hippy-120C MK II heave compensators.

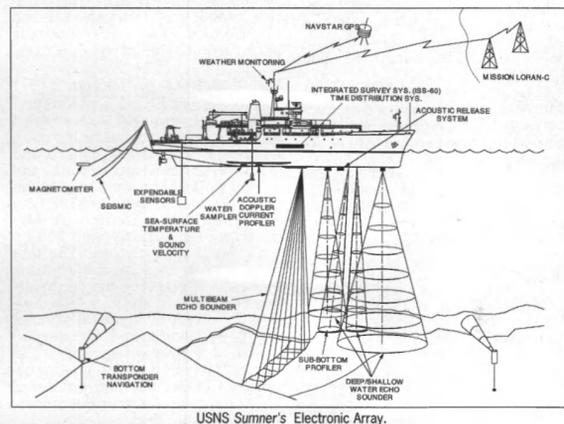
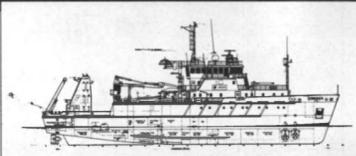
Vessel: USNS *Sumner*
Yard: Halter Marine, Inc. (Trinity subsidiary)
Delivery: May 1995

Trinity Marine Group subsidiary Halter Marine, Inc., located in Moss Point, Miss., recently launched T-AGS 61, dubbed USNS *Sumner*. The

direction control, which provides excellent ship control and maneuverability, enabling precise position keeping and track following.

A pair of 2,435-kW and a pair of 1,825-kW diesel generators are integrated to provide power to the propulsion system, ships service and laboratories through a power conditioner. Propulsion power is from two General Electric 4,000-hp DC motors, enabling the vessel to sustain a 16-knot speed.

Incorporating a full array of the latest electronics and oceanographic equipment, the *Sumner* will be able to measure water depth over an area as great as 12 miles wide in the deep ocean; continuously determine its position to within 50 ft. (15.3 m), at any time in any weather condition; and measure oceanic acoustic qualities. A typical mission might include oceanographic sampling and data collection of surface, midwater and ocean floor areas; launch and recovery of scientific packages including ROVs; and shipboard oceanographic data processing and analysis. The *Sumner* will be operated for the Oceanographer of the Navy by the Military Sealift Command. Mission scientists and technicians will come from the Naval



vessel is the second of three T-AGS 60 class multi-purpose oceanographic survey ships under construction at Halter Marine for the U.S. Navy.

Sumner was preceded by T-AGS 60, USNS *Pathfinder*, which will be delivered in October 1994, and will be followed by T-AGS 62, USNS *Bowditch*, which is scheduled for delivery in November 1995.

Sumner, which measures 329 ft. (100.3 m) long, with a 58-ft. (17.7-m) beam and a 19-ft. (5.8-m) draft at full load, is designed with a common bus diesel electric propulsion system consisting of twin screw propeller drives through Z-drives. The Z-drives include gear reduction and 360-degree thrust direction control in a compact unit. Elimination of conventional reduction gears and long propeller shafts free space to be used for oceanographic purposes.

Sumner features complete thrust

Oceanographic Office in Bay St. Louis, Mo.

Trinity Marine Group possesses vast experience in the building of oceanographic vessels, having built T-AGOS 13 through 18 (oceanographic surveillance ships); T-AGS 51 and 52 (hydrographic survey ships); and AGOR-23 and AGOR-24 (both are oceanographic ships; AGOR-24 is now under construction at Halter Marine).

The T-AGS 60 class of ships are designed and built to provide multi-purpose oceanographic capabilities in coastal and deep ocean areas, and are U.S. Coast Guard-certified and ABS-classed. The class boasts 3,500-sq.-ft. of working deck, and is equipped with three multi-purpose cranes (Allied Marine telescoping boom crane; Hiab foldable boom crane; Appleton towing crane); one articulated davit, both side and stern U-Frames (from Fritz Culver); and five winches (from Dynacon).



The launch of the Halter Marine-built USNS *Sumner*.

(Continued from page 34)

and the *Windward* are exemplary of the next generation of cruise ships," said Ms. **Johnson**, referring to Norwegian's 624-ft. (190-m), 41,000-gt sister vessels delivered in 1992 and 1993, respectively. She said Norwegian was emphasizing lifestyle rather than size in its ships, noting their fitness rooms and spas and greater number of intimate dining rooms. On the other hand, Norwegian ships like the *Sea-ward* and the *Norway* — which represent the larger end of Norwegian's fleet at a respective 700 ft. (213 m) and 42,000-gt, and 1,035 ft. (315 m) and 76,049-gt — may indicate that Norwegian, like other major operators, understands the importance of diversification to serve as many sub-markets as possible.

Serving today's cruiser is what the lines are here to do, but Mr. **Wallack** says it's even better if you can bear tomorrow's in mind as well. "You want to be able to project what people want, and not just add technology for the sake of technology," he said. "The kind of technology you put on a vessel has to allow you flexibility to adjust the amenities. Ships have a long lifespan — and you have to consider today's passenger, and passengers ten to fifteen years from now."

The Tonnage Tax & U.S. Flag

Recent legislative proposals have called for increasing the tonnage tax vessels pay when entering a U.S. port, and increasing the maximum number of times it must be paid in a given year, to subsidize the U.S.-flag fleet. "Funding is the issue," said Mr. **Fain**. "The proposal now on the table in the House calls for a 1,400 percent increase in our tonnage tax. The problem is, people's vacations are price sensitive, and these expenses get passed along."

"We're in the kind of times when the government's looking at every resource," said Mr. **Wallack**. "The cruise industry is successful and growing, and people see it and say, 'There's a way to make money.'" He described the tax as short-sighted and possibly damaging to an industry that is a great source of jobs and revenue. "It will slow the industry's growth," he said, resulting in fewer passengers and possibly the repositioning of ships. "And that's not a healthy thing," he said.

"I think the foreign-owned lines and travel industry in general are an easy target for a lot of legislation," said Ms. **Johnson**. "People explore the easiest and most lucrative paths," she said, agreeing that this is indeed a pass-along expense.

"I testified before Senator **Breaux** (John Breaux, D-La.) and laid out in some detail the position of the industry," said Mr. **Estes**. He said while ICCL generally doesn't involve itself in how a country supports its maritime fleet, he feels it necessary to testify "when a tax is discriminatorily applied to a foreign carrier, and singles it out." Mr. **Estes** testified that the major

concern of ICCL and its members is that of freedom of the seas. That is, if prohibitive costs keep vessels from entering U.S. ports, the freedom of vessels to call what ports they wish is effectively impaired. Additional tonnage for the U.S.-flag fleet may indeed be a problem, said Mr. **Estes**, but it is a defense problem — and "we do not think it is appropriate to place this burden on the cruise passenger."

At press time, a version of the subsidy package containing the tonnage tax had recently passed the House Merchant Marine Subcommittee of the House Merchant Marine and Fisheries Committee. The version adopted limits the amount of times the tax can be incurred to 12 a year (the previous cap was five). While its subsidization measures are seen as a godsend by many in the industry, the legislation has been criticized by U.S. as well as foreign carriers for its funding mechanism.

A U.S. Cruise Industry?

Congresswoman **Jolene Unsoeld** (D-Wash.) introduced the U.S. Passenger Vessel Development Act on February 9, 1994 — a legislative package comprising two bills (HR 3821 and 3822) intended to jumpstart the American cruising and shipbuilding markets.

Although 85 percent of all cruise ship passengers are reportedly American, the only two U.S.-flag cruise vessels left are American Hawaii Cruises' *Independence* and *Constitution*, the first of which is undergoing a \$25 million overhaul at NNS. Since current U.S. law prohibits foreign cruise vessels from transporting passengers between U.S. ports, the proposed legislation would allow foreign-flagged vessels to operate *as de facto* U.S.-flag ships,

if they begin construction of a U.S.-built replacement vessel within three years. An April hearing by the House Subcommittee on Merchant Marine reportedly saw enthusiasm from various passenger vessel, cruise, port, shipbuilding and labor factions.

"It's a noble experiment," said Mr. **Fain**, but he expressed personal reservations on whether the bill would pave the way for a U.S. cruise industry. "The whole concept of the Jones Act and privileged trade made sense when water was the main form of transportation. Today, cabotage trading is very small. I personally believe (these measures) have served to make the U.S. flag less viable," he said. "The U.S.-flag does not thrive when the only way it can operate is protected. And there's no reason why the U.S.-flag can't be viable," he said.

"Philosophically it sounds like a good idea," said Mr. **Wallack**. "But as an industry we would have to see what kind of ships U.S. yards could build." He said the legislation's offer to lines could expand their market, but whether that makes it economically viable to place orders in U.S. yards, he couldn't say. He said if U.S. builders presented the lines with a workable plan for how they intend to construct cost-effective ships, it might make the proposal more tangible. Both Ingalls and NASSCO have won MARITECH funding to do just that, perhaps bringing the proposal a step closer to reality.

"It's in the interest of the U.S. to have a good, solid shipbuilding industry, and we have no interests in standing in the way of that," said Mr. **Estes**. In fact, he indicated a strong U.S. shipbuilding base would give foreign lines someplace closer

to their operations to turn for newbuilds. "The U.S. has the capacity and ability to build good cruise ships," he said.

However, according to Mr. **Estes**, the legislation might eventually limit foreign ownership of a cruise line, reserving a majority of ownership for U.S. interests — and this he criticized. "Our members are not interested in being minority partners in a business," he said. "We are not investors, we are operators."

That argument aside, the problem remains that U.S. yards haven't built cruise vessels in competition with foreign yards for a great many years, and the trick is to inspire the lines to place orders in U.S. yards, giving them needed experience and an invaluable opportunity to demonstrate their abilities. Whether the right to transport passengers from U.S. port to U.S. port will be a sufficient incentive remains to be seen.

A number of U.S. yards, including Newport News, National Steel and Shipbuilding Co. (NASSCO), Ingalls Shipbuilding Division of Litton Industries and Avondale, have made it plain that they intend to pursue the cruise ship building business. Many have been engaged in repair work, and McDermott Inc.'s Amelia, La. yard is building the *American Queen*, reportedly the largest overnight cruise vessel constructed in the U.S. in 40 years.

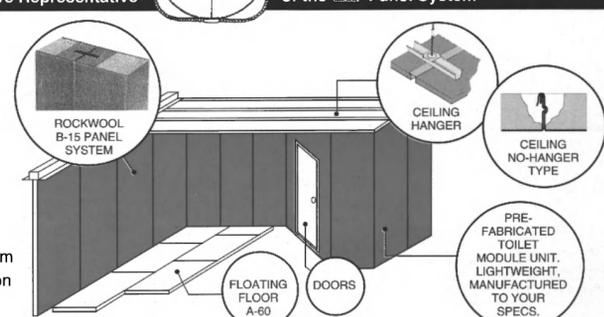
"When we took the *Norway* through some refurbishment, we took it to Newport News," said Norwegian's Ms. **Johnson**. She said that by all reports, the work on that vessel was performed to a high standard of quality, on time and on budget. "I think the quality is there, and that may be demonstrated in the near future."

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**Marshall Branson Builds OSRV;
Building Two Vessels For South Korea**



Cleansea Bravo 120 Oil Spill Response Vessel built by Marshall Branson Marine, commissioned by Caltex Services Ltd.

Marshall Branson Marine of the U.K. completed a Bravo 120 Oil Spill Response Vessel (OSRV) commissioned by Caltex Services (U.K.) Ltd. The vessel, named *Cleansea*, is bound for Bahrain where it will be stationed at the BAPCO Oil Refinery. The *Cleansea* Bravo 120 will also serve as a maintenance, logistics and dive support boat.

Propulsion of the craft is by twin Caterpillar 3116TA turbocharged marine diesel engines developing 250 hp at 2,600 rpm. Twin Disc MG5061A gearboxes drive twin Teignbridge four-bladed AquaQuad 87 propellers in tunnels.

A cathodic protection system is fitted to the aluminum alloy hull to cope with the high temperature and high salinity conditions experienced in the Gulf area.

Oil Skimming and Boom Deployment Craft

On completion of the Bravo 120, Marshall Branson commenced work on two Traktakat-

type craft for Korea. The Traktakat 150 oil skimming vessel and the Traktakat 120 boom deployment vessel will work in tandem at the Honam Oil Refinery in South Korea. Both craft are of the catamaran hull-type. Propulsion is by twin Cummins 6BTA5.9M1 marine diesel engines developing 250 hp at 2,600 rpm. Each engine is fitted with a Twin Disc MG505A gearbox driving Teignbridge sterngear and a four-bladed AquaQuad 87 propeller, giving each vessel a light speed of 20 knots. For more information on Marshall Branson Marine,

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Cleansea Bravo 120 OSRV Equipment List

Main engines	Caterpillar
Gearboxes	Twin Disc
Propellers	AquaQuad
Generator	Onan
Radio	Sailor
Speed/depth indicator	Koden
Wind display	Autohelm
GPS	Magellan
Marine crane	Palfinger
Windlasses	Pacific
Deck hatches	Bowmar

representatives from the shipping industry present. The package will be class-approved according to the requirements.

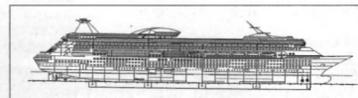
To date, a number of installations on newbuildings have been secured, and the manufacturer anticipates more contracts in the coming weeks.

Orca Marine A.S. is providing the prefabricated towing unit together with the complete engineering package, including class-approved drawings. The ORCA ETA will also meet the OPA '90 requirements.

For more information on the emergency towing arrangement from Orca,

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**GF Marine To Supply HVAC On
Kvaerner-Built Royal Caribbean Ship**



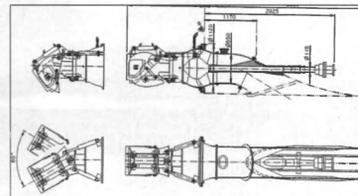
GF Marine A/S of Oslo, Norway, has been awarded a contract to design, supply and install of the Heating, Ventilation and Air Conditioning (HVAC) system for Royal Caribbean Cruise Line's 74,000-gt ship being built at Kvaerner-Masa Yards, Helsinki, Finland.

The contract is the single largest order in the company's history. It includes more than 60 air-handling systems, in addition to smoke and fire controls. The HVAC plant will be controlled by three master computers running parallel in a local area network (LAN). The concept reportedly gives a maximum redundancy and ensures a high level of safety and comfort. The plant will be delivered in January 1996.

For more information on GF Marine,

Circle 96 on Reader Service Card

Bird-Johnson To Manufacture Waterjets



Bird-Johnson Company, a manufacturer of marine propellers and thruster systems, signed an agreement with Marine Jet Power AB (MJP) of Sweden to produce MJP waterjet propulsion equipment in the U.S.

Under the terms of the agreement, Bird-Johnson Co. will have exclusive responsibility for the manufacture, sales and service of MJP waterjet systems for North America.

The products will be marketed as Bird-Johnson Co./MJP waterjets. The waterjets are offered in a range of standard sizes compatible with power inputs from about 500 hp to 12,000 hp. Custom-designed units to suit higher power installations can also be provided.

Bird-Johnson has five facilities in the U.S. dedicated to the production, testing and service of marine propulsion propeller and waterjet systems.

For more information on Bird-Johnson Co.,

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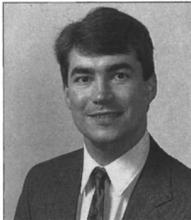
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Anthony Del Gavio
President

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**Raytheon Appoints Fellows
VP of N. American
Operations**



Jeffrey O. Fellows

Raytheon has appointed **Jeffrey O. Fellows** vice president, North American operations. Based in Hudson, N.H., Mr. **Fellows** will be responsible for overall sales, marketing, product and facility planning for the Apelco, Autohelm and Raytheon brands in North America. Mr. **Fellows** joined Raytheon in 1984, and since then has held positions of increasing responsibility, including his most recent post as North American marketing manager, Apelco Marine Electronics.

**Solar Turbines Appoints
Lauriat Marine Regional
Manager**



Thornton B. Lauriat

Solar Turbines, San Diego, a subsidiary of Caterpillar, Inc., appointed **Thornton B. Lauriat** as regional manager of marine applications. He will be based at Solar's Asia-Pacific headquarters in Singapore as the company continues to intensify its activities in the high-speed marine industry. A graduate of the U.S. Merchant Marine Academy, Mr. **Lauriat** recently joined Solar Turbines and has more than 30 years of experience in marine gas turbine applications, including pioneering efforts with a variety of high-speed craft.

**Klein Named CEO Of
CruisePhone**

CruisePhone, Inc. of Pompano Beach, Fla., a provider of cellular and satellite communications to the cruise industry, has named **Jonathan F. Klein** CEO of the company. The move was reportedly prompted by the company's expansion into other mobile telecommuni-

cations areas. **John L. Kimbrough** remains president of the firm.

Mr. **Klein** most recently served as president and CEO of IDB Mobile Communications Inc., reportedly the first non-signatory Inmarsat provider. He has served as vice president of sales for COMSAT and vice president of operations for Sealand's fleet of more than 60 vessels. He is a graduate of the Merchant Marine Academy and sailed for four years a licensed deck officer.

**Nautronix Signs Navy
Contract**

Fremantle-based Nautronix Ltd. has signed a \$2.7 million contract with the Royal Australian Navy for the development of a prototype underwater acoustic measurement range. Nautronix has devised an acoustic technique to measure the low noise levels emitted by the Collins class submarines. Work has

already commenced and a prototype range is due to be installed in Spencer's Gulf, S.A. during March 1995. Noise trials will be conducted using HMAS *Collins*, the first of the Collins class submarines. As a result of this contract and other projects which are either underway or planned, Nautronix is expanding its Australian operations based in Fremantle. For more information on Nautronix,

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Trinity Wins \$27.5 Million Navy Patrol Craft Contract



Trinity Industries, Inc. said its Halter Marine unit was awarded a \$27.5 million U.S. Navy contract involving the construction of 11 fast patrol craft for the Philippine Navy. Four of the boats are to be built completely at Halter's Equitable Shipyard in New Orleans. Construction of the seven other vessels is to be partially completed at AG&P Shipyard, Halter's partner in the Philippines. Halter's Equitable Shipyard has built 25 of the 78-ft. (23.8-m) fast patrol craft as part of the U.S. Navy's Foreign Military Sales Program. The boats are powered by Twin Detroit Diesel 16V92TAB engines driving Rolla propellers through ZF reverse/reduction gears and inclined shafts, and can attain a flank speed in excess of 28 knots and a full-load cruising speed of 24 knots. The vessels have a 1,200 nautical mile range, and can operate in open ocean and inland environments — with a stable design for the handling and maneuverability needed for effective operations.

For more information on Trinity,

Circle 41 on Reader Service Card

Bahamas Joins Inmarsat

The Bahamas has become the first Caribbean Community nation to join Inmarsat, bringing the total number of member nations to 74. The country's shareholding signatory in Inmarsat will be the Bahamas Telecommunications Corporation (Batelco). Inmarsat, based in London, operates a satellite system providing global communications on land, at sea and in the air.

DOT, McDermott, Others Design Production System

Deep Oil Technology (DOT) has announced the engineering design of a Spar-based production system for possible use in 1,900-ft.-plus (over 580-m) water depths at Oryx Energy Company's *Viosca Knoll 826* unit in the Gulf of Mexico.

The work is being performed by a consortium

consisting of DOT, Rauma Offshore Contracting, McDermott Inc., and Hudson Engineering Corporation. A project decision may be made as early as the end of the year.

Also in the Gulf, Sonsub Inc., under contract from McDermott, has completed a site survey in preparation for the installation of Marathon's *Ewing Bank 873A* jacket.

Sonsub will assist the jacket setting, pile driving and grouting, and is supplying intervention hardware mounted on the jacket for contingency ROV-assisted grouting. The work is being conducted in 720 ft. (219 m) of water.

MEMOSS '94: Key To A Growing Market

MEMOSS, the Middle East port operation, management and cargo handling exhibition, combined with the Middle East International Shipping Exhibition and the Third Middle East Naval Technology and Marine Security Trade Show, is reportedly among the most important events of its kind in the region.

It will be held in Dubai, United Arab Emirates (UAE) on October 17-20, 1994. Nearly 75 percent of the goods imported into Dubai are re-exported, making Dubai a major point of access to the Persian Gulf market.

For more information on the show, contact Glahe International at tel: (202) 659-4557; fax: (202) 457-0776.

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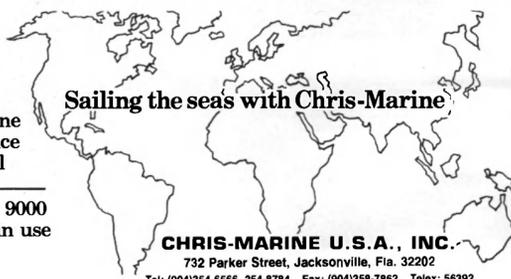


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Astilleros Zamacona Delivers Two Voith Tractor Tugs



Astilleros Zamacona, member of the Construnaves group of shipyards, made the first two deliveries of an order for four multi-purpose Voith tractor tugs to Spanish towage company Cia. de Remolcadores Ibaizabal. These super-tugs are fitted with Voith-Schneider water tractors driven by two 1,930-bhp Wartsila Diesel engines.

The first of these four Voith water tractor escort, rescue, firefighting and anti-pollution tugs, *Getxo*, was delivered by Astilleros Zamacona in March. The second, the *Gernika*, was delivered in April. *Galdames* and *Gatika* will be delivered in July and December, respectively.

The prototype seagoing and harbor tugs are specifically designed for the following tasks: escort maneuvers; harbor maneuvers and towage; high-seas towage; external water/foam firefighting service; and oil spillage cleanup via liquid dispersant spray system.

For more information on Voith-Schneider,

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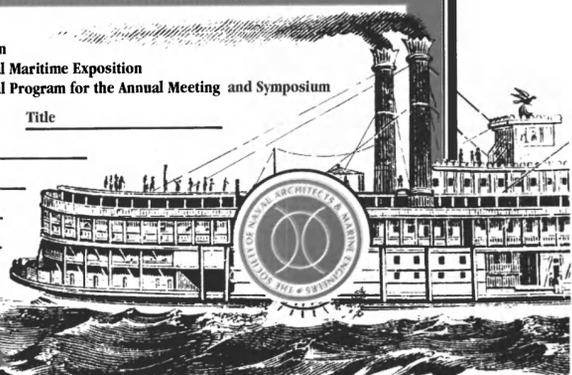
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Thordon Bearings, Inc., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6

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Kockum Computer Systems AB, P.O. Box 50555, s-202 15 Malmö, SWEDEN
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Beard Industries Inc., P.O. Box 31115, Shreveport LA 71130

CONTROL SYSTEM—Monitoring

Autonica Marine AS, Drammensveien 126, N-0277 Oslo 2, NORWAY
Electronic Design Inc., 3020 20th St., Melaine, LA 70002

IMO Industries, Gema Sensors Division, One Cowles Rd., Plainville CT 06062

Kobel Manufacturing Co. Ltd., 11720 Horseshoe Way, Richmond, BC, Canada
MMC International, 50 Inco Dr., Inwood NY 11696

Marine Electric RPD, Inc., 50 Carrol St., P.O. Box 1135, Clifton, NJ 07014-1135

Robertson Marine Systems, 3000 Kingman St., Suite 207, Melaine, LA 70006

Telflex Naval Technologies, 205 Church Rd., North Wales, PA 19454

CONTROL SYSTEM—Steering

KGW Schweitzer, Wisnarsche Strasse 380, 19065 Schwentin, GERMANY
Kobel Manufacturing, 11720 Horseshoe Way, Richmond, BC, CANADA, V7A 4V5
Kocum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068

CONVERSIONS & REPAIRS

Gulf Coast Fabrication, Inc., P.O. Box 639, Lakeshore, MS 39558

Vancouver Shipyards, 50 Pemberton Ave., N. Vancouver, B.C. CANADA V7P 2R2

CONVEYOR BELT REPAIR

Rothens Rubber Engineering, GERMANY

U.S. Rep. Simplex-Turner Inc., P.O. Box 168, Little Neck, NY 11363-0168

CORROSION CONSULTANTS

S.C. Finney & Assoc., P.O. Box 9220, Port St. Lucie, FL 34965

COUPLINGS

American Vulkan, P.O. Drawer 673, Writter Haven, FL 33882

Aquadine Systems, Inc., 55 Oak St., Ocean Grove, NJ 07756

Lo-Rez Vibration Control Ltd., 156 West 8th Avenue, Vancouver, BC
CANADA V5Y1N2

Mapeco Products, 30 Forest Avenue, P.O. Box 282, Locust Valley, NY 11580

Okalo Steel Inc., 1447 New Lightfield St., Torrington, CT 06790

CRANE—HOIST—DERRICK—WIRHELS

Biiso Marine Co., P.O. Box 4113, New Orleans, LA 70178

Del Gavio Marine Hydraulics Inc., 619 Industrial Rd., Carlstadt, NJ 07072

Hagglunds Inc., Marine Div. Headq., 50 Chestnut Ridge Rd., Montvale, NJ 07645

Leibner-Werk Menzing GEB.mbh, P.O. Box 10, A-6710 Neuzing, AUSTRIA

Marine Travelift, Inc., 49 E. Yew St., Surgeon Bay, WI 54235

J.D. Neuhaus Hebezeug GmBH, D-5810 Witten, GERMANY

McElroy Machine & Mfg. Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454

New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150

Pelton-Tiffin Corp., 235 Miami St., Tiffin, OH 44883

CRANES

Morgan Marine, 1300 Nomandy Place, Santa Ana, CA 92705

Pallinger, Inc., 8040 Dorchester Rd., Niagara Falls, Ontario, CANADA L2E 6V6

Tecon Trans Intl., Inc., P.O. Box 21130 Timberland Dr., Lacombe, LA 70445

DECK CAULKING/REPAIR

Life Industries, Corp., 205 Sweet Hollow Rd., Old Bethpage, NY 11804

DECK MACHINERY—Cargo Handling Equipment

MacGregor-Navire Group, 34 Bedford Rd., Clapman North, London SW4 7HH

Markey Machinery Co., Inc., P.O. Box 24788, Seattle, WA 98124-0788

McElroy Machine & Mfg. Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454

New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150

Skokulum/Rope Master, P.O. Box 280, Hubbard, OR 97032

Smith Berger Marine Inc., 518 South Chicago St., Seattle, WA 98108

Willem Pot b.v., P.O. Box 29102, 2001 GK Rotterdam, The Netherlands

DECK MACHINERY

Loeffler Corp., US #1 & Robbins Ave., Pennell, PA 15947

McElroy Machine & Mfg. Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454

NEI Clarke Chapman Canada, 1075 N. Service Rd. W., Unit 4, Oakville, Ontario
CANADA L6M 2Z2

New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150

Puuses, PO Box 102, N-4818, Faevik, NORWAY

Skokulum/Rope Master, P.O. Box 280, Hubbard, OR 97032

Smith Berger Marine Inc., 518 South Chicago St., Seattle, WA 98108

Waterman Supply Co., P.O. Box 596, Wilmington, CA 90748

DESALINATION—REVERSE OSMOSIS

Rochim Separation Systems, Inc., 3094 Del Amo Blvd., Ste. 801, Torrance, CA
90503

Rochim Separation Systems, P.O. Box 156, 54 Rue Agasse, 1211 Geneva 17,
SWITZERLAND

DEPTH SOUNDING EQUIPMENT

Innerspace Technology, Inc., 36 Industrial Dr., Waldwick, NJ 07463

DIETSEL ACCESSORIES

Coltec Industries Fairbanks Motor Engine Div., 701 Lawton Ave., Beloit, WI 53511

General Thermodynamics Corp., 210 South Meador Rd., P.O. Box 1105,
Plymouth, IA 52264

Hatch & Kirk, Inc., 601 McFarland Rd., Houston, TX 77011

Kiene Diesel Accessories, 325 S. Fairbanks St., P.O. Box 386, Addicks, IL 60101

McElroy Machine & Mfg. Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454

Atlantic Yacht Sales, P.O. Box 4010, Middletown, NJ 07748

Caterpillar, Inc., Engine Div., P.O. Box 610, Mossville, IL 61552-0610

Coltec Industries, Parts & Repair, 701 Lawton Ave., Beloit, WI 53511

Cummins Engine Co., 4500 Leeds Ave., Ste. 301, Charleston, SC 29402-8521

Cummins Mid-South, Inc., 110 E. Airline Highway, Kenner, LA 70062

John Deere, John Deere Rd., Harlow, IL 61810

Diesel Engine & Parts Co., 8123 Hillboro Ave., Houston, TX 77029

Electro-Motive Division-GMC, 9301 W. 55th St., LaGrange, IL 60525

Geiger Truck Parts, P.O. Box 365, Waukegan, IL 60070

Giro Engineering Ltd., Talisman, Durcan Road, Park Gate, South Hampton, 503
7BX ENGLAND

Gottens Worldwide, 160 Van Buren St., Brooklyn, NY 11231

Hatch & Kirk, Inc., 525 West Sophia St., Maumee, OH 43437

Kattenberg Marine, 17 Grandview Ave., W. Orange, NJ 07052

MAN B&W Diesel AG, Suddeutschestrasse 1, D-86153 Augsburg 1, GERMANY

MAN B&W Diesel, A/S, Center Syd, Starsholmen 161, DK-2650 Hvidovre, DENMARK

Wartsila Diesel, 201 Defense Highway, Annapolis, MD 21401

MTU of North America, 10450 Corporate Dr., Houston, TX 77478

Markisches Werk GmbH, P.O. Box 1442, D-5884 Halver 1, GERMANY

Motor Service AB, Box 2115, S-144 04 Rönninge, SWEDEN

Motor Service-Huso Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315

New Sulzer Diesel, Inc., 200 Park Ave., New York, NY 10166

Paxman Diesels, P.O. Box 6, Paxman Works, Colchester, Essex, CO1 2HW,
ENGLAND

Paxman Diesels USA, (A Div. of Ruston Gas Turbines, Inc.), 15950 Park Row,
Houston, TX 77064

Pow-Clean Corp., 3301 Chapline St., Wheeling, WV 26003

Textron Lycoming, 550 Main St., Stratford, CT 06487

Ulsanin Bergen AS, PO Box 524, N5002 Bergen, NORWAY

Wartsila Diesel, 201 Defense Highway, Annapolis, MD 21401

DIVING & SALVAGE

Biiso Marine Co., P.O. Box 4113, New Orleans, LA 70178

H.J. Meribius, P.O. Box 23123, New Orleans LA 70183

Muldon Marine Services, Inc., P.O. Box 3221, Terminal Island, CA 90731

DOORS—MARINE & INDUSTRIAL

Mapeco Walk & Kneeler, Inc., 89 Forest Ave., Locust Valley, NY 11560

Marine Accommodations Inc., 8535-3 Baymeadows Rd., Jacksonville, FL 32256

DRILLING & BLASTING

Marine Drilling & Blasting, PO Box 10455, Jacksonville, FL 32247-0455

DRY DOCKS-Design

Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381

North Florida Shipyards, P.O. Box 3255, Jacksonville, FL 32206

ELECTRICAL EQUIPMENT

Bender Inc., 400 Gordon Dr., Bldg 501, Exton, PA 19341

L.F. Gashler & Co., Inc., P.O. Box 56520, New Orleans LA 70150

MMC International, 60 Inco Dr., Inwood NY 11696

SPD Technologies, 1300 Roosevelt Blvd., Philadelphia PA 19116

ELECTRONIC CONTROL

MCR Engineering, 206 Dedham St., Norfolk, MA 02056

ELECTRONIC DISPLAY

Kocum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068

Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY

ELECTRONIC INFORMATION SUPPORT

Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY

ELECTRONIC SALES & SERVICE

Fishermans Wholesale Marine Supply Co., Inc., 4540 B. Downman Road
New Orleans, LA 70126

Bohrt Electronics, Inc., 171 Main St., South River, NJ 08882

EMERGENCY MEDICAL ASSISTANCE

International SOS Assistance, 8 Neshaminy Interplex, Ste., 207, Trevose, PA 191

EMISSION CONTROL

ABB Flakt Marine, Box 1043, 436 21 ASKIM, SWEDEN

Haidor Topsoe Nymollev 55, DK-2800, Lyngby, Denmark

Seaworthy Systems, Inc., P.O. Box 965, Essex, CT 06426

ENGINEERING SERVICES

MCR Engineering Co., Inc., 206 Dedham St., Norfolk, MA 02056

Seaworthy Systems, Inc., P.O. Box 965, Essex, CT 06426

ENGINE CONTROLS - SHIFT AND THROTTLE

Marine Systems, Inc., 1000 NW First Avenue, Bldg 20, Boca Raton, FL 33432

ENGINE REPAIR

Marine Spares Intl., 53 Richards St., Brooklyn, NY 11231

ENGINE ROOM LIGHTING

Foss Electric Mfg. Co., Inc., 1616 N. Main, P.O. Box 5

INTERIOR DESIGN

Directions in Design, 633 Emerson Suite 100, St. Louis, MO 63141
Interior Design Int'l, 701 Dexter Ave. N., Ste. 307, Seattle, WA 98109

INTERIORS

Hopeman Brothers, 435 Essex Ave., Waynesboro, VA 22980
Marine Accommodations Inc., 8535-3 Baymeadows rd., Jacksonville, FL 32256
Maritime Services Corp., 3457 Guignard Dr., Hood River, OR 97031

JOINER—Waterlight Door—Paneling—Ceiling System—Decking

Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123
Marine Accommodations Inc., 8535-3 Baymeadows Rd., Se 140, Jacksonville, FL 32256
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031
Walz & Krenzer, Inc., 90 Forest Ave. Locust Valley N.Y. 11560

KEEL COOLERS

R.W. Fernstrom & Co., 1716 Eleventh Ave., Menominee, MI 49858
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

LIFEBOATS/RAFTS

The Water Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

LIFESAVER EQUIPMENT

American Eagle Mfg., Inc., 780 Peate Jensen Way, LaComer, WA 98257
Ft. Fissermer GmbH & Co., D-2878 Beme 2, Wese, GERMANY 02370
Caley Ocean Systems, Mayor Avenue, East Kilbride, Scotland, G74 4PU

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights

ACR Electronics, Inc., 5757 Ravenswood Rd., P.O. Box 5247, Ft. Lauderdale, FL 33310-5247
Fishermans Wholesale Marine Supply Co., Inc. 4540 B Downman Road, New Orleans, LA 70126

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights

Blanco, 44 Austin Street, P.O. Box 13522, St. John's, NF CANADA A1B 4B8
Gollen Marine, 160 Van Brunt St., Brooklyn, NY 11231
Kookam Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068

LINEN

Julian A. McChesney, 1539 Stephens St., Ridgewood, NY 11385
Pauluhn Electric Mfg. Co., Inc. 1616 N. Main, P.O. Box 53, Pearlard, TX 77581
France Searchlights/Stam Supply Co., 4415 8th N.W., Seattle, WA 98107

LIQUID LEVEL INDICATORS

Mentace, P.O. Box 2386, Littleton, MA 01460
Sector, 2 Dean St., Tenally, NJ 07870

LIQUID OVERFILL PROTECTION SYSTEMS

E.R.L. Marine Products, P.O. Box 1050, New Albany, IN 47151-1026
Mentace, P.O. Box 2386, Littleton, MA 01460
Sector, 2 Dean St., Tenally, NJ 07870

LOCK SETS

HMS Marine Hardware, 333 W. Merrick Road, Valley Stream, NY 11580

LOGISTICS

Chand Corporation, 157 Hwy 654, Mathews, LA 70375
QED, 4846 N. Wildchuck Road, Virginia Beach, VA 23455
V.L. Logistics Consultants, 3405 Belleville Blvd., Ocean Springs, MS 39564

LUBRICANTS

Exaco, International, 2300 Westchester Avenue, White Plains NY 10650
Machinery Maintenance, Repair, Overhaul, and Testing
Del Gavio, 619 Industrial Rd., Carlstadt, NJ 07072

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING

Gollen Marine Company, Inc., 160 Van Brunt Street, Brooklyn, NY 11231
New England Traveler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150

MACHINERY MONITOR AND CONTROL SYSTEMS

Electronic Marine Systems, 800 Fendale Pl., Eahway, NJ 07065

MARINE ACCOMMODATIONS

Directions in Design Inc., 633 Emerson, Suite 100, St. Louis, MO 63141
Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980
Jamestown Metal Marine Sales, Inc., 4710 Northwest Second Ave., Boca Raton, FL 33431

MARINE ELECTRONICS

Marine Accommodations Inc., 8535-3 Baymeadows Rd., Ste 140, Jacksonville, FL 32256
Maritime Services Corp., 3457 Guignard Dr., Hood River, OR 97031

MARINE CEILING

Rae Storage Battery Mfg. Co. Inc., 51 Deming Rd., Berlin, CT 06037

MARINE CEILING

The Gage Corp., 803 S. Black River St., Scarra, WI 54556
Hydro-Aluminum, Via Verk, N-5800 V1 SOGN, Norway
Marine Accommodations, Inc., 8535-3 Baymeadows Rd., Jacksonville, FL 32256

MARINE ELEVATORS

Frank L. BeerRadio, 2001 RidgeLake Drive, Metairie, LA 70001
Kookam Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Stash Marine Electronics AB, Box 13045, 402 S1 Goleborg, SWEDEN

MARINE ELEVATORS

Alimak Elevator Co., 1100 Boston Ave., Bridgeport, CT 06801

MARINE ENGINEERS

CDI Marine Co., 4040 Woodcock Dr., Suite 200, Jacksonville, FL 32207

MARINE FENDERS

Wing Fender Co., 340 Leigh Ave., Perth Amboy, NJ 08861

MARINE FIRE PROTECTION

Hiller Corp., 3710 Lakeside Court, Mobile, AL 36693

MARINE FURNITURE

Directions in Design, 633 Emerson, Ste. 100, St. Louis, MO 63141
Engineered Data Products, P.O. Box 565, Woodbury, NJ 08096-7565
Jamestown Metal Marine Sales, Inc., 4710 NW Second Ave. Boca Raton, FL 33431

MARINE HARDWARE

Marine Accommodations Inc., 8535-3 Baymeadows Rd., Ste 140, Jacksonville, FL 32256
Maritime Services Corp., 3457 Guignard Dr., Hood River, OR 97031

MARINE HARDWARE

Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
HMS Hardware, 333 W. Merrick Rd., Valley Stream, NY 11580
Marine Accommodations Inc., 8535-3 Baymeadows Rd., Jacksonville, FL 32256

MARINE PUMPS

Bill Brown Enterprises, Inc., 4995 Ocean Pines, Berlin, MD 21811

MARINE SHIP MANAGEMENT

Barbarkon, 1910 Chapel Ave. West, Cherry Hill, NJ 08002

MARINE SURPLUS SALES

Defense Reutilization & Marketing Service, 2163 Airways Blvd., Memphis, TN 38114

METAL PRODUCTS

Engineered Data Products, P.O. Box 565, Woodbury, NJ 08096-7565

MONITOR CONTROL ALARM

Tracor Miron, 800 Fendale Pl., Rahway, NJ 07065

MULTI-CABLE PENETRATION DEVICE

NMP, 12437 E. 85th St., Tulsa, OK 74145

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS

Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
CDI Marine Co., 4040 Woodcock Dr., Suite 200, Jacksonville, FL 32207
Childs Engineering Corp., Box 333, Medfield, MA 02052

NAVIGATION EQUIPMENT

Crandall Dry Dock Engrs., Inc., 21 Pottery Ln., Dedham, MA 02026
Crane Consultants, 13301 First Ave S., Seattle, WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007

NAVIGATION EQUIPMENT

Arthur D. Darden, 3200 RidgeLake Dr., Suite 403, Metairie, LA 70002
Daubing & Lecal, Inc., 1734 Emerson Street, Jacksonville, FL 32207
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129

NAVIGATION EQUIPMENT

Diversified Technologies, 612 Live Oak Dr., Chesapeake VA 23320
Dixon Myn&S Engineering Consultant Services, P.O. Box 7780, Beaumont, TX 77706
GHM Inc. (Ind. Measurement Consultants), P.O. Box 1936, Newport News, VA 23601

NAVIGATION EQUIPMENT

Gibbs & Cox, Inc., 50 West 23rd St., New York, NY 10010
John W. Gilbert & Assoc., Inc., 58 Long Wharf, Boston, MA 02110
The Glaston Assoc. Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104

NAVIGATION EQUIPMENT

Guido Perla & Assoc., 4059 21st Ave., Ste. 300, Seattle, WA 98199
Morris Guralnick Associates, Inc., 130 Sutter St., Ste. 400, San Francisco, CA 94104
C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110

NAVIGATION EQUIPMENT

Hydrocomp, Inc., 45 James Farm-Lee, P.O. Box 865, Durham, NH 03824
J.H. Inc., No. 4 Executive Campus, Culbert Blvd. & Route 70, P.O. Box 5031, Cherry Hill, NJ 08034
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073

NAVIGATION EQUIPMENT

James S. Kroger, 1515 NW 7th St., Ste. 124, Miami FL 33125
Rodney E. Lay & Associates, 13691 Atlantic Blvd., Jacksonville, FL 32225
NCA Engineers, Inc., 2960 Anway Ave., #4-103, Costa Mesa, CA 92626
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063

McEnroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39526-4454
John J. McMullen Associates, Inc., 1 World Trade Cir., Ste 3000, N.Y. NY 10048

Fendall Marbury, P.O. Box 2321, Annapolis, MD 21401
Marine Design & Operations, Inc., 223 Chestnut St., Roselle Park, NJ 07024
Marine Management Systems Inc., 102 Hamilton Ave., Stamford CT 06902

Marine Power Associates, 1010 Turquoise St., Ste 217, San Diego, CA 92108
Maritech, Seaford, Bay Road, Newmarket, NH 03857
Maritime Design, Inc., 3020 Hartley Rd., Jacksonville, FL 32257

R.J. Melus & Co., 71 Hudson St. New York, NY 10013
Nautical Designs, Inc., 2101 S. Andrews Ave. Suite 232, Ft. Lauderdale FL 33316
Olsen Marine Surveyors Co., P.O. Box 283, Fort Jefferson, NY 11777

QED Systems Inc., 4846 Wildchuck Rd., Virginia Beach, VA 23455
M. Rosenblatt & Son, Inc., 300 Broadway, New York, NY 10013 and 620 Fulcom St., Ste. 301, San Francisco, CA 94107

Sargant & Herkes, 225 Barone St., Suite 1405, New Orleans, LA 70112
See School, 10812 Gandy Boulevard, St. Petersburg, FL 33702
Seaworthy Systems Inc., P.O. Box 965, Essex, CT 06428; 17 Battery Pl., New York, NY 10004; P.O. Box 975, Barnegat Light, NJ 08006; 2 Skyline Pl., 5203 Leesburg Pike, Suite 700, Falls Church, VA 22041;

50 Vashell Way, Orinda, CA 94563
George G. Sharp, Inc., 100 Church St., New York, NY 10007
R.A. Steam, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235

WMSCO, P.O. Box 91363, Mobile AL 36691

NAVIGATION & COMMUNICATIONS EQUIPMENT
American Radio Corp., 914 164th St. S.E. B-1688, Mil Creek, WA 98012

AT&T, High Seas Dept., 412 Kemble Ave., Room C260, Montclair, NJ 07060
Autronica Marine AS, Drammensveien 126, N-2277 Gjøa 2, NORWAY
CAST, Inc., 5450 Katiella Ave., Los Alamitos, CA 90720

Central Corp., 400 Main St. Stamford, CT 06901-9204
Consat Marine Services, 950 Entand Plaza SW, Washington DC 20024
C. Plath, 222 Seven Ave., Annapolis, MD 21403

Electronic Marine Systems, 800 Fendale Pl., Rahway, NJ 07065
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Fuji Electric Mfg. Co., Inc., 1816 N. Main, P.O. Box 53, Pearlard, TX 77581

Joe-McCormick, 1241 Park Central N., Pompano Beach, FL 33064
IDB Mobile Communications, 1828 L Street NW, Suite 660, Washington, D.C. 20036
Mackay Communications, 300 Columbus Circle, Edison, NJ 08857

Marine Electric, P.O. Box 50, 50 Canal St., P.O. Box 1153, Clifton, NJ 07014-1153
Megapulse, Inc., 8 Preston Court, Bedford MA 01730-2380
Negron Marine Consultants, 840 Bond Street, Elizabeth, NJ 07201

Norwegian Telecom, P.O. Box 6701, Oslo 1, NORWAY
Offshore Systems Int'l., 19015 38th Ave., W., Ste. BC, Bldg. F, Lynnwood, WA 98036
Pauluhn Electric Mfg. Co., Inc., 1616 N. Main, P.O. Box 53, Pearlard, TX 77581

RD Instruments, 3655 Businesspark Ave., San Diego, CA 92131
Raytheon Marine Co., 46 River Road, Hudson, NH 03051
SPD Technology, 15501 Raintree, Philadelphia, PA 19116

Scandinavian Micro Systems P.O. Box 155, N-1411, Kolbotn, NORWAY
Simrad, 19210 33rd Avenue West, Lynnwood, WA 98036
Simsco, 10525 W. Washington Blvd., Culver City, CA 90232

Sound Propeller, 1608 Fairview Ave. E., Seattle, WA 98102
Sperry Marine Inc., 1070 Serrano Trail, Charlottesville VA 22901
Standard Commercial Equipment, P.O. Box 15, CANADA

Summer Equipment Ltd., 24 West 4th Ave., Vancouver V5Y 1G3, CANADA
Timber Navigation, 565 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94086
Waterway Communications System, Inc., 453 E. Park Pl., Jeffersonville, IN 47130

OIL—Marine—Additives
Mobil Oil Corporation, 3225 Gallows Road, Fairfax, VA 22037-0001

Texaco, International, 2000 Westchester Avenue, White Plains NY 10650

OIL SPILL CONTAINMENT
Toss Environmental, 7440 W. Marginal Way S., Seattle, WA 98108-4141

OIL SPILL KIT
First Northern Environmental, Inc., 32 Brill St., Newark, NJ 07105

OIL/WATER SEPARATORS
Alfa-Laval Separation, Inc., 955 Meams Rd., Warrimster, PA 18974-0556

Bloom & Voss AG, P.O. Box 10, D-2000 Hamburg 1, GERMANY
U.S.A. Filter-Simplex-Turner Inc., P.O. Box 188, Little Neck, NY 11363-0168
Fast Systems, 3240 North Broadway, St. Louis, MO 63147

MCM International, 80 Inpp Dr., Inwood NY 11686
National Fluid Separators, 977 Hawley Industrial Ct., St. Louis, MO 63144
Neilon Industries, Highway 51 West, Slough, WI 53589

Oil/Water Separator Control
Allied Signal, Inc., A-C Performance Additives, P.O. Box 1039, Morristown, NJ 07962
The Amreson Corp., Corrosion Dynamics Div., 1100 Walnut St., Roseell, NJ 07203

Corrosel, Inc., 1045 12th NW, SA, Issaquah, WA 98027
Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
Jamestown Distrib., 26 Narragansett Ave., P.O. Box 348, Jamestown, RI 02835

Hempel Coatings, Fort of Cuffe Avenue, Roseland, NJ 07068
Microphor, Inc., Marine Div., 452 E. Hill Rd., P.O. Box 1460, Willis, CA 95480
Royal Chemical, 2705 Concord Road, Belle Chasse, LA 70037

Sigma Coatings, 8970 Market St., Houston, TX 77038-2309
Harvey, LA 70059, 1100 Adams St., Hoboken, NJ 07030
UT Technologies Ltd., Box 31114, Robie St. RPO, Halifax Nova Scotia Canada B3K 3A7

Vecon USA, 236 St. George Avenue, Jefferson, LA 70121

PAINT REMOVAL
White Metals, Inc., 6300 Midvale, Houston, TX 77067

PIPE FITTING/CONNECTING SYSTEMS
U.S.A. Pipe-Fitter-Turner Inc., P.O. Box 188, Little Neck, NY 11363-0168
Pollution Control Products, Marina Way, Seattle, WA 98108-4141

POLLUTION PACKER CONTROLS
TFC Corporation, 77415 Cahill Rd., Minneapolis, MN 55439

PORT SERVICES
Port of Portland, 5555 N. Channel Ave., Portland, OR 97217

PROJECT TRACKING, PLANNING & MANAGEMENT
Tracking Systems of America, 8789 San Jose Blvd., Jacksonville, FL 32217

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
Anvalde Industries, Honey Quick Repair, P.O. Box 116, Harvey, LA 70058

American Air Filter, P.O. Box 35980, Louisville, KY 40432
ABB Drives Inc., P.O. Box 372, Milwaukee, WI 53201-0372, USA
ABB Industry Oy, P.O. Box 165, 00261 Helsinki, FINLAND

ABB TURBOCHARGER, Inc., 1460 Livingston Avenue, N. Brunswick, NJ 08902
Aquamaster-Raumal Ltd., Box 220, SF-26101, Rauma, FINLAND
Aquamaster-Raumal Inc., 2315 North Woodlawn Ave., Ste. 103, Metairie, LA 70001

Bird Johnson Company, P.O. Box 1528, Pascagoula, MS 39367
Brunoll A/S, P.O. Box 370, N-8401, Molde, Norway
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320

Collec Industries (Farbanks Morse Engine Div.), 701 Lawton Ave., Beloit, WI 53511
Fincantieri, Diesel Engines Div.—GMI, Bagnoli della Resandra 334, Trieste, ITALY
GE Nava & Drive Turbine Systems, 189 Boulder Dr., Fitchburg MA 01420

Holset Engineering, Inc., 1320 Kemper Meadow, Ste. 500, Cincinnati, OH 45240
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Krupp MAR, 7555 Danbro Crescent, Mississauga, Ontario, CANADA L5N 6P9

Kobot Manufacturing, 11720 Horseshoe Way, Richmond, BC Canada V7A 4V5
LIPS B.V., P.O. Box 5, 5151 RP Drunen, The Netherlands
LIPS U.S.A. Inc., 3617 Koppens Way, Chesapeake, VA 23323

Lohmann & Stolterfoth, P.O. Box 1860, D-58408 Witten, Germany
Mapeco Products Inc., 90 Forest Ave., Locust Valley, N. Y., 11580
Markisches Werk, P.O. Box 1442, D-5884 Halver GERMANY

MAN B&W Diesel, 17 State St., New York, NY 10004
MAN B&W Diesel A/S, Cassevej 1, DK-4980 Hvideb., DENMARK
MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15, DK-9000
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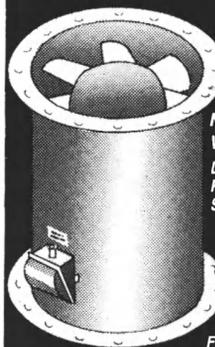
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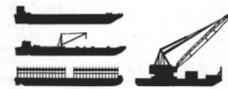
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Port of Miami opened a new office in Vina del Mar, Chile, to increase the volume of trade between Miami and South America, particularly the countries of Argentina, Chile and Peru. The office is to be headed by **Gabriel J. Fozzo**, president and CEO of Integrity Investing.

Lykes Mourns Senior VP

Ralph Walter Kreuger II, a senior vice president of Lykes Bros. Steamship Co., Inc., died May 28 at West Jefferson Hospital, Gretna, La., of cardiac artery disease. Mr. Kreuger joined Lykes in 1979 as director, Planning & Analysis and was named vice president of that division in 1983. Mr. Kreuger was selected to head the then-newly-formed Intermodal Division in January 1986 as senior vice president responsible for procuring intermodal equipment, transportation beyond ship's tackle (domestically and foreign), equipment repairs and controlling equipment flows and balances worldwide. In July 1992, he assumed the duties of senior vice president, Operations with worldwide responsibilities for Lykes' fleet including all activities related to their seaworthiness and operation, new ship design and construction, and intermodal operations.

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Innovative engineering and design capabilities, comprehensive program management, integrated logistics support skills, strict quality assurance, special testing and qualifications capabilities, and overall manufacturing flexibility have made Lake Shore worldwide in scope, supplying a broad base of domestic and foreign customers. Major product and system categories within the marine products group include: mooring winches, boat-handling equipment, underway replenishment systems, special cranes, anchor windlasses, fairleads, cargo/weapons elevators, capstans, electric motor brakes, and traction winches. Lake Shore is a leading supplier of

marine deck equipment in the U.S. and is expanding in both commercial and international markets with its array of deck machinery, winching technology and specialized handling systems.

Lake Shore continues to be on the leading edge of technology. Lake Shore's automatic tension mooring winches in use on the Great Lakes and oceangoing containerships provide customers with cost-effective, state-of-the-art technology. Lake Shore constantly strives to integrate new technology into its equipment. The company designed the first application of adjustable frequency AC drives for mooring winches for the Corps of Engineers. Lake Shore, in conjunction with Louis Allis, pioneered the use of VFDs for deck machinery tension control, resulting in less complex design, fewer moving parts and reduced mechanical maintenance requirements.

Recently Lake Shore was awarded a contract by National Steel and Shipbuilding Co. (NASSCO) to supply seven cargo/weapons elevator systems for the AOE-10 fast combat support ship. Lake Shore was also awarded a contract by Avondale Industries to provide lift platforms, elevators, boat-handling equipment, capstans, warping capstans, in-haul capstans, 30-ton crane, anchor windlass, and a Type III gravity lowered strongback davit for the LSD (CV) 52 cargo variant dock landing ship. Lake Shore has been the sole supplier of deck machinery since the inception of the LSD 41 class program.

Lake Shore's long experience supplying such items as winches, windlasses, boat davits, capstans and other special purpose deck machinery has translated into the company's longevity and is evidence of Lake Shore's well-proven designs. In the marine market sector, some of Lake Shore's maritime customers include Avondale and NASSCO, Bath Iron Works, FEL, Ingalls Shipbuilding, Newport News Shipbuilding, Electric Boat, Penn Attranco, Peterson Builders, the U.S. Marines, the U.S. Navy and a number of international shipbuilders and owners.

Lake Shore continues to advance designs in marine and land system equipment as well as expand in both the commercial, military and international markets. This effort is carried on with total focus on satisfying the customer's requirements for the best product performance at the best price and schedule.

For more information on Lake Shore Inc.,

Circle 106 on Reader Service Card

Philseco Renamed Subic Shipyard; Yeo Named President

The former Philippine Shipyard & Engineering Corporation (Philseco) was renamed Subic Shipyard and Engineering, Inc. by the yard's new shareholders at a recent board meeting.

Nelson Yeo has been appointed president of Subic Shipyard. Mr. Yeo was the yard manager of Keppel's Pioneer Yard in Singapore prior to this appointment.

The Keppel Group will have a 49 percent stake, held through Keppel Corporation Ltd., Singapore and its Philippine subsidiaries, Kepphil Shipyard and Cebu Shipyard and Engineering Works.

For more information on Subic Shipyard,

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Grill Retires As Chairman & CEO Of Chantiers, ACB

The board of directors of shipbuilder Chantiers de l'Atlantique, St. Nazaire, France, accepted the resignation of **Alain Grill** as chairman and CEO as he retires.

Jean-Noel d'Acremont, formerly managing director of Chantiers de l'Atlantique, was appointed to succeed Mr. Grill, who will remain on the board of directors as honorary chairman. **Philippe Guyon**, formerly managing director of ACB, succeeds Mr. Grill as ACB chairman and CEO.

Cole Joins Elliott Bay Design Group



James A. Cole

James A. Cole, a longtime veteran of the marine industry in the Pacific Northwest, has joined Elliott Bay Design Group, the Seattle-based naval architecture and marine engineering firm, with responsibilities in the area of business development and vessel design. Mr. Cole's tenure on the Seattle waterfront includes his most recent role as sales manager for Foss Shipyard, plus positions at Marco Shipyard, J.M. Martinac Shipbuilding and Tacoma Boatbuilding, to name a few.

Former SWATH CEO Re-Enters Maritime Law

Timothy D. Kelley, chairman and CEO of SWATH International, Ltd. in the U.K. from 1990 to 1994, has joined the U.S. law firm of Jones Waldo Holbrook & McDonough as International Maritime Counsel.

Mr. Kelley will concentrate on representing U.S. or foreign interests on U.S. export newbuilds, advising the selection and contracting of advanced technology marine newbuilds (especially fast ferries), and in contract, trade secret and competition law disputes relating to such craft. His firm can be reached at tel: (801) 521-3200 in Salt Lake City or (202) 296 5950 in Washington, D.C.

AmerCable Makes Key Management Appointments

AmerCable, El Dorado, Ark., recently named **Grover Stell** its vice president of operations. Mr. Stell brings 25 years of experience in the wire and cable industry. **Carl Landinger** was named vice president of engineering at AmerCable. Also with 25 years of industry experience, Mr. Landinger is active on industry committees, including ICC, IEEE and ICEA.

Fernie Named Portland's Marine Facilities Manager

John Fernie has been named manager of the Port of Portland's Terminal 6. Mr. Fernie, who has been the Port's general superintendent of vessel operations, replaces **Dick Boyle** who takes over as manager of marine facilities. Mr. Fernie joined the port's Marine Department in 1981 after working for States Steamship Line and Bakke/East Asiatic. He graduated from the U.S. Naval Academy in Annapolis, Md. and served 11 years in the Navy.

Tranter Acquires ReHeat AB

Tranter, Inc., a wholly-owned subsidiary of Dover Corporation, has purchased ReHeat AB of Taby, Sweden, which manufactures plate and frame heat exchangers under the trade name ReHeat Ultra Flex®. Tranter President **Ken Kaltz** said the acquisition was part of Tranter's ongoing program to expand its leadership position in plate heat exchangers to international markets.

ReHeat AB maintains sales, product development and administration in Taby, a suburb of Stockholm, and a fabrication plant in Vanersborg. Tranter, headquartered in Augusta, Ga., also recently purchased HTT Heat Transfer Technologies SA of Fribourg, Switzerland.

Keese Appointed Mktg. Mgr. For Haley Marine Gears

Haley Marine Gears appointed **David W. Keese** as marketing manager, where he will coordinate all aspects of marketing programs. Mr. Keese will utilize his extensive experience in sales and promotion, and his strong background in diesel engine repair and maintenance — calling on shipyards, marine operators and customers in the Gulf Coast region. Haley Marine Gears is based in Greenville, Miss., with sales and services facilities in New Orleans. For more information on the products and services of Haley Marine Gears,

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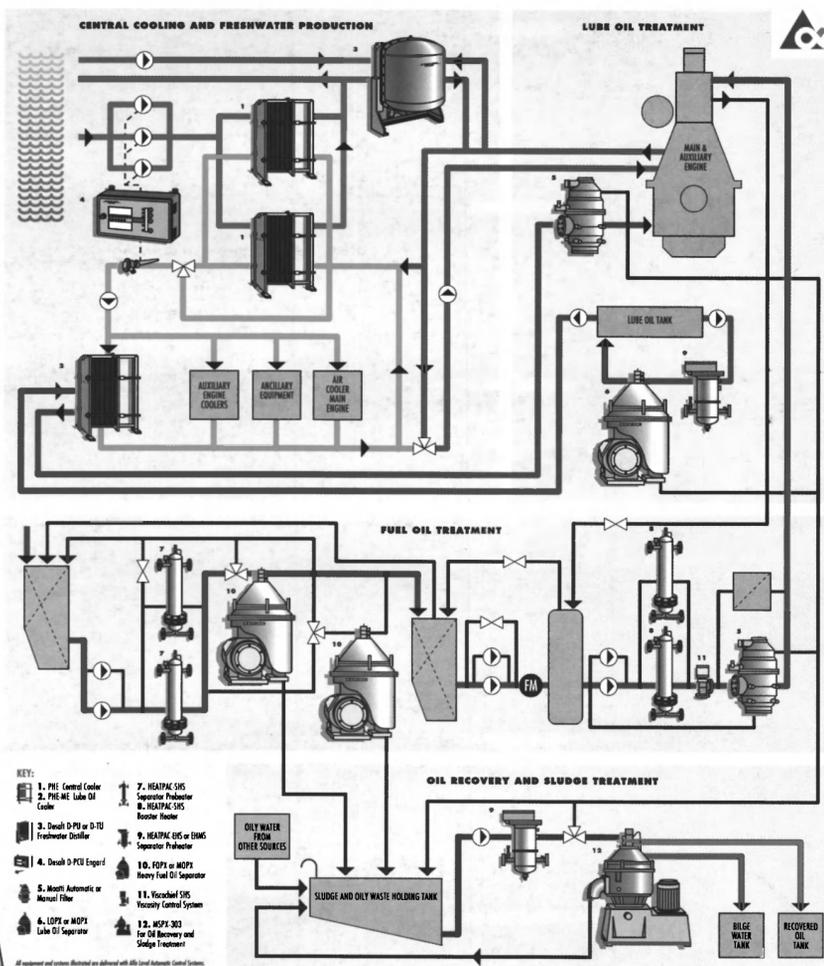
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