

**MARITIME
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ENGINEERING NEWS

ANNUAL AWARDS EDITION

*Outstanding
Cruise Ships
of 1995*



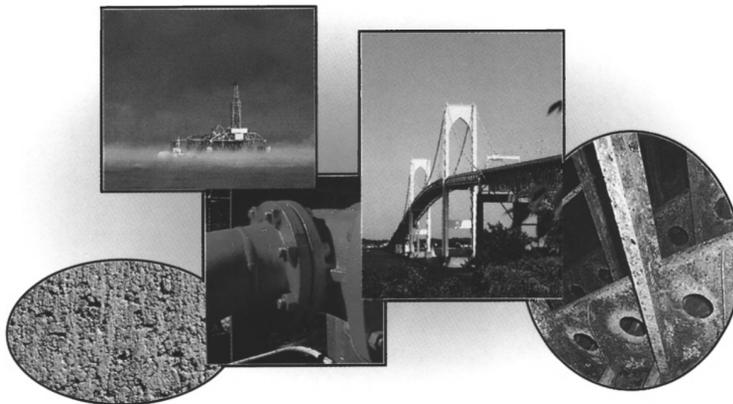
SEA JAPAN '96:

Special Supplement on Maritime Asia

Diesel Engine Directory • The Importance Of Quality Coatings • Information Technology

FEBRUARY 1996

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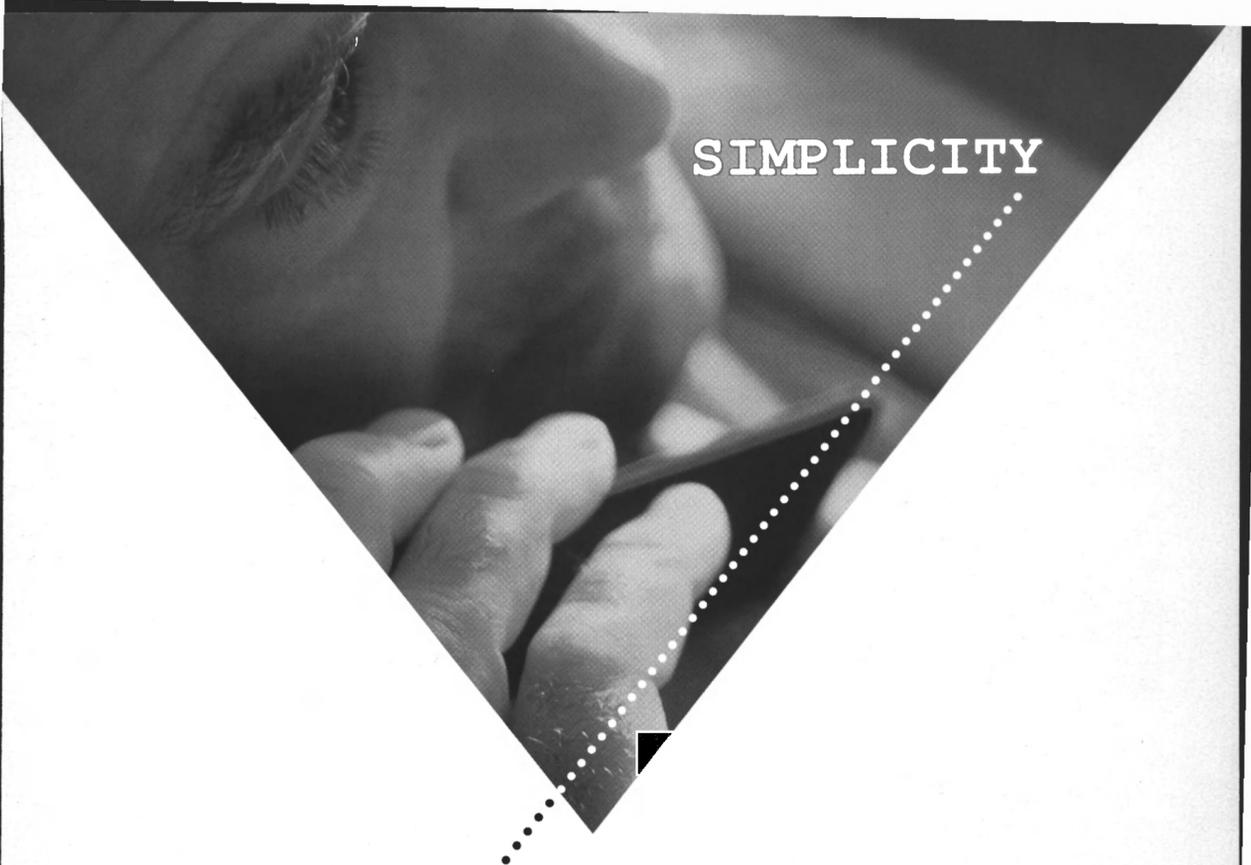
concrete, seals the surface, and forms a strong foundation for overcoating. Used alone, Pre-Prime 167 Sealer strengthens and seals the concrete, and with the proper top coat, provides resistance to water, oil, gasoline, diesel, and mild chemical exposures.

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ON THE COVER

Pictured on this month's cover is Carnival Cruise Lines' *Imagination*. Part of the line's Fantasy series of ships, this 70,567-ton vessel is the fifth superliner built by Kvaerner Masa-Yards for Carnival. *MR/EN's* feature on the Outstanding Cruise Ships of 1995 — of which the *Imagination* is one — begins on page 76.

43 MARITIME ASIA In conjunction with Seo Japan '96, *MR/EN* takes a look at the world's busiest commercial shipbuilding region, with special focus on:

JAPAN: Builders and suppliers answer challenges with technologically advanced solutions. — by Greg Trauthwein, editor

KOREA: Expansion continues.

FAR EAST COLUMN: The first installment of a bi-monthly column by international editor Alan Tharpe, focusing on contract news and negotiation reports.

56 CORROSION CONTROL - Ballast Tank Coatings: Properly selected and maintained coatings are critical to structural integrity. **Clearing the Decks:** New paint stripping system promises to save time and money.

PLUS: *MR/EN's* Coating Product Showcase begins on page 18.

76 OUTSTANDING CRUISE SHIPS OF 1995

Owners, builders and suppliers have once again provided a full roster of outstanding ships to honor.

PLUS: CRUISE SHIP MARKET REPORT — Cruise lines maneuver for control in a sector characterized by increased consolidation and the arrival of a new major player.

— by Bridget A. Murphy, assistant editor

ALSO IN THIS ISSUE:

- 29 EUROPEAN UPDATE:** U.K. dockyard enjoys rare success; FBM in Far East fast ferry deal; London Boat Show showcases propulsion products.
- 37 INFORMATION TECHNOLOGY:** Developments range from management of extensive networks to monitoring multiple NC cutting machines.
- 64 MARINE PROPULSION SELECTION GUIDE:** Complete diesel engine directory, with updates from propulsion product manufacturers.
- 91 SHOW PREVIEWS:** Cruise Shipping '96 & ASNE Day.
- 98 CALENDAR OF EVENTS**
- 101 SHIP & BOATBUILDING TECHNOLOGY:** Total project management.
- 105 FERLISHIP'S PRINCIPAL CONTRACTS RECORDED**
- 106 TANKER SAFETY:** Foss debuts new retrieval system.
- 121 CLASSIFIEDS**

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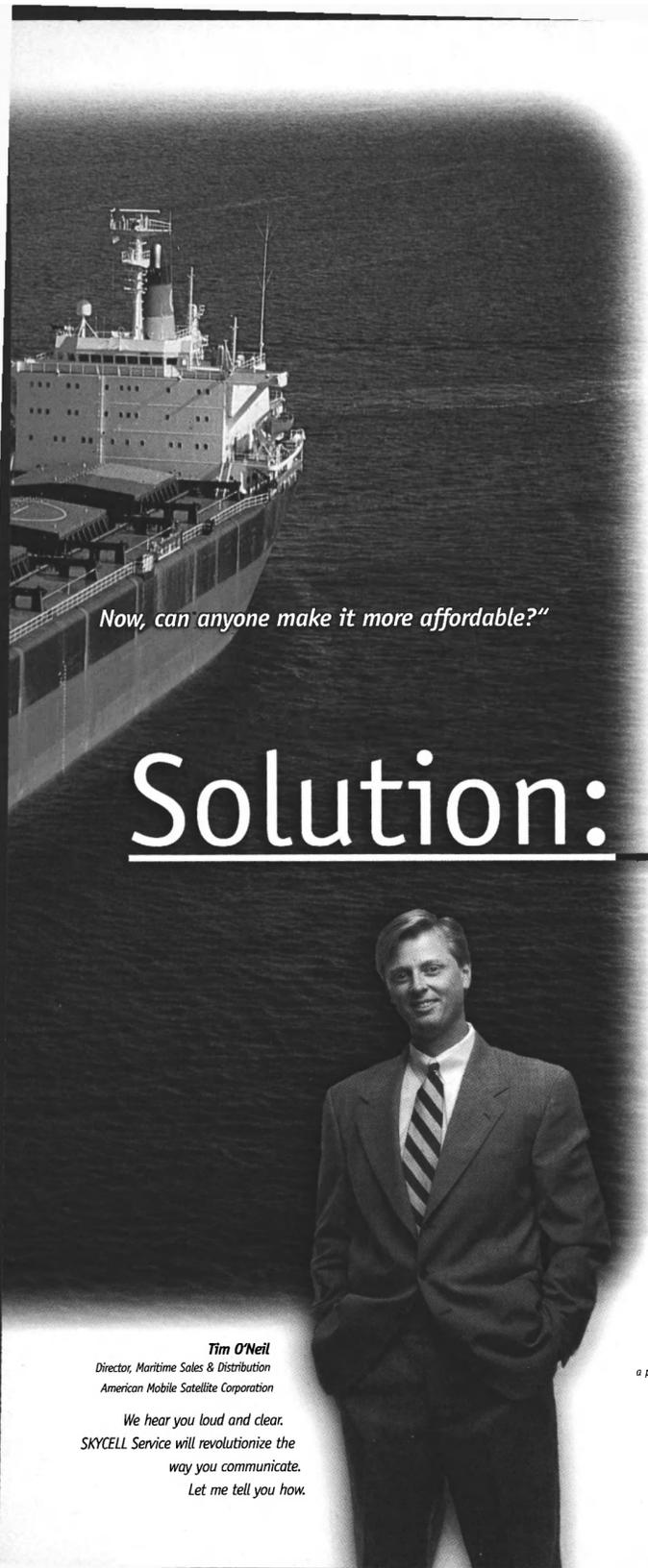
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Disney Wonder Will Be Sistership To Disney Magic

Disney Cruise Line has named its second ship *Disney Wonder*. The estimated 85,000-ton vessel is scheduled to enter service in November 1998, and will be a sistership to the *Disney Magic*, which will be launched in January 1998.

"Our decision to launch both the *Disney Magic* and the *Disney Wonder* in 1998 demonstrates our belief that there will be a strong consumer demand for our exclusive Disney land/sea vacation experience," said Arthur Rod-

ney, president of Disney Cruise Line. Both the *Disney Magic* and *Disney Wonder* are being built at Fincantieri Shipyard in Trieste, Italy. Construction on the *Disney Wonder* is scheduled to begin in late 1996.

• For a comprehensive view of the cruise ship industry, turn to page 76 •

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A FPSO able to continue to produce well into the 21st century

The "Uisge Gorm" looks set to prove itself a valuable North Sea asset for Bluewater which was formerly most active in the Far East market. When Fife and Fergus have come to the end of their field lives, Bluewater will have a FPSO which should be able to continue production well into the 21st century.

An innovative arrangement for SweFerry

The cargo area of this rail-trailer-passenger ferry is configured in two lower tweendecks and features an innovative arrangement for a train lift.

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Discharges eight products simultaneously

Astilleros Españoles continues to win interesting new contracts.

For instance a trio of chemical

parcel tankers, two for the Norwegian Jo-Tankers and one for the British owner Botany Bay.

The hulls have 34 stainless steel cargo tanks and the ship is able to discharge eight different products simultaneously.

First tuna ships to have processing decks –and more– on board

Three of the four seiners being built at Barreras yard are even longer than the biggest tuna seiner ever built.

Two of them will break new ground in the industry by

having processing decks and plate freezing equipment on board.

The ships will rely on seawater temperature and seawater colour charts from satellites, bird-spotting radars, speed boats and chartered spotter planes. This spotting-mix seems to be more economical than the costly helicopter landing pad and associated firefighting equipment installation.



AFSA in Sestao, Seville, Cadiz and Puerto Real; ASTANO in Ferrol; ASTANDER in Santander; JULIANA in Gijón; BARRERAS in Vigo and MDE in Manises

EDITOR'S NOTE

Like most everyone involved in business, I research and read data and statistics with great interest. But numbers perse tell only a portion of any story.

For instance, newbuilding statistics indicate that in 1995, Japan was the top shipbuilding country in the world. While number of ships, gross tonnage and hard currency are indeed excellent indicators of maritime business, numbers alone do not touch upon the many challenges that this great shipbuilding nation — and for that fact, all great shipbuilding nations — will face in the coming years.

Many factors — far too many to mention in this short column — play large roles in determining the eventual course of the maritime industry. But the bottom line, in any and all scenarios, is money. The ultimate survivors in this reportedly razor-thin profit margin business will be the companies which design, build, equip and operate vessels in the most efficient, cost-effective manner.

The Japanese maritime industry is profiled in MR/EN's Maritime Asia section, which starts on page 43. The section, prepared to coincide with the second Sea Japan exhibition in Yokohama next month, focuses mainly on



the Japanese shipbuilding and equipment supply industry (with plenty of statistics and data on page 117). As the article explains, Japanese builders and suppliers, already renowned for their technologically-efficient ways, are striving to become even more efficient. The section also includes the Far East Column, the first of a bi-monthly series from International Editor Alan Thorpe, as well as a look inside the marine markets of Korea and Singapore.

The cruise ship market provides another interesting study of statistics. While recent passenger capacity data indicate a market lull, Assistant Editor Bridget Murphy found that owners are generally bullish on the market in the long term. Her report starts on page 82, and is accompanied by MR/EN's annual honoring of Outstanding Cruise Ships (page 76).

Finally, coatings and corrosion control is the product feature of the month, and an ABS-authored article (page 56) presents a strong case for owners to select and properly maintain ballast tank coatings.

Gregory R. Trauthwein

Gregory R. Trauthwein, editor

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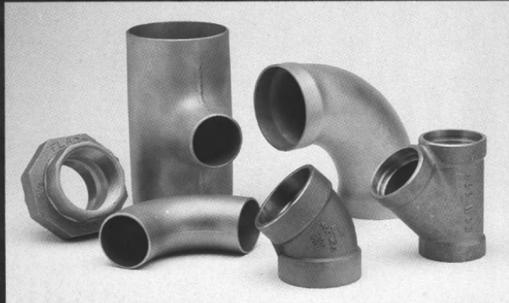


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Research Breakthrough: New Streamers Successfully Debuted In Gulf Of Mexico

Western Atlas Inc. announced the successful sea trials in the Gulf of Mexico of a new generation of streamers. The company's Houston-based Western Geophysical division deployed a 24,934-ft. (7,600-m) streamer in a 2-D production mode, a world record for seismic vessels, and is currently acquiring 3-D data in the Gulf of Mexico using a single vessel towing four 19,684-ft. (6,000-m) streamers.

The new streamers, which are reportedly much slimmer than the previous generation, will also enable the company to add more streamer capacity to its fleet of multi-array vessels at very low cost. Currently, Western Geophysical is preparing to re-rig vessels for up to 10 streamers.

Richard White, president of Western Geophysical, said, "This new streamer technology, the WG-24A, is based on our original WG-24, the first marine streamer to acquire 24-bit data, which greatly increased signal range and data quality. Now, we have been able to reduce the diameter of the streamer and build it in a modular form.

"These design advances dramatically reduce weight and drag in the water, allowing us to adjust the length to the geologic and customer requirements, and especially to increase vessel capacity at a very low incremental investment."

The new modular, slim streamer has shown excellent noise characteristics, a prerequisite for acquiring high-quality seismic data. Western Geophysical expects a number of competitive advantages from the new product.

In deepwater and subsalt surveys, the longer streamers will enable the company to achieve "long offsets" with a single ship, eliminating the necessity to use a separate shooting boat.

Western Geophysical has tested a 28,871-ft. (8,800-m) single cable and plans to deploy up to 32,808-ft. (10,000-m) streamers for this application in the near future.

In a multiple-streamer market such as the North Sea, more streamers can be added to the company's vessels without the cost of major reconstruction of boats and with usage of the existing propulsion system. The modular construction also reportedly allows for easy maintenance.

"This design secures our investment far into the future," said Mr. White. "With all of the control electronics in the electronic modules, we can quickly respond to any changes in cable technology, but continue to utilize our electronic modules."

The WG-24 and WG-24A systems were designed by Western Geophysical and are now being manufactured by Input/Output Inc.

Western Geophysical currently

operates eight vessels that can be upgraded with up to 10 streamers, and an additional eight vessels for special-purpose surveys, such as very long offset shoots and shallow-water data acquisition.

"The objective of our R&D and investment efforts is to deliver superior seismic surveys with a faster turnaround time and constantly reduce costs to our customers," Mr. White said. "Our

new marine streamer, ocean bottom cable technology and recent investment into a new generation of supercomputers are the latest examples of this ongoing commitment."

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Victoria Clipper IV Scheduled For Conversion To AlliedSignal Gas Turbines

Detroit Diesel snags \$4 million contract to supply TF40 engines

Clipper Navigation Inc. is installing gas turbines in its *Victoria Clipper IV*, which will reportedly make it the fastest passenger vessel in the western hemisphere with a top speed of 53 mph

(45 knots). The new AlliedSignal gas turbine engines, which will be installed by April 1996, will reduce the *Victoria Clipper IV's* travel time between Seattle, Wash., and Victoria, B.C., from 2.5 hours to 1.75 hours.

Equally important are the emission and noise benefits that are expected to be gained.

Clipper Navigation Inc. signed a \$4 million contract with Detroit Diesel Corp. to fit the *Victoria Clipper IV* with its TF40 engines. Detroit Diesel Corp. distributes TF40 gas turbines for yachts and commercial marine applications.

The new gas turbines will double the *Victoria Clipper IV's* horsepower from 5,000 to 10,000 hp.

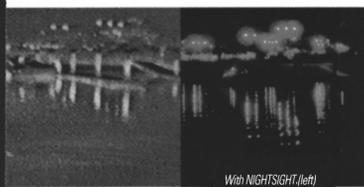
Darrell Bryan, vice president and general manager of Clipper Navigation said, "The new gas turbines in the *Victoria Clipper IV* will enable us to get passengers to Victoria more quickly, allowing a longer day to experience Victoria."

Clipper Navigation Inc. owns and operates four *Victoria Clipper* twin-hulled, high-speed luxury catamarans.

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The weatherproof NIGHTSIGHT camera is available alone or with pan-and-tilt unit, remote control, cables, mounting ring and video monitor (left).



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Seabourn Cruise Line To Acquire Queen Odyssey

Seabourn Cruise Line announced that an agreement has been concluded for its acquisition of the vessel, *Queen Odyssey*, sistership of the line's two elegant all-suite cruise ships, *Seabourn Pride* and *Seabourn Spirit*. San Francisco-based Seabourn said the vessel had been purchased for \$55 million from Kloster Cruises Ltd. of Oslo, Norway. Financial details of the acquisition were not released. Seabourn Cruise Line is jointly owned by Norwegian Industrialist **Atle Brynestad** who founded the line in 1987, and Carnival Corp. The purchase agreement was signed in Oslo by **Atle Brynestad**, who serves as chairman and CEO of the line, and as a representative for Kloster Cruises Ltd.

The 10,000-ton *Queen*, which has been operated by Royal Cruise Line, and earlier by Royal Viking Line, was originally slated for Seabourn back in 1990 as part of an agreement with a German shipyard, Schichau Seebeckwerft. Seabourn acquired the first two vessels, the *Seabourn Pride* in 1988 and the *Seabourn Spirit* in 1989. It had an option for the building of the third ship, but declined to continue with the arrangement as its price escalated. The now-defunct Royal Viking Line built the vessel and operated it until late 1994, when the line was dismantled and various Royal Viking Line vessels were acquired by Cunard Line and Royal Cruise Line.

From Seabourn's San Francisco headquarters, **Larry Pimentel**, president of Seabourn Cruise Line, said, "It is always unfortunate when a major company fails. Royal Cruise Line has a long business history and we regret that it has been forced to take this action, particularly when it comes on the heels of the dismantling of Royal Viking Line."

"However, I do believe strongly that the acquisition of the *Queen Odyssey* by Seabourn will be viewed widely as a vindication of our judgment in not choosing to build the ship originally. The economic environment for purchase of the ship at that time was not right for us. Now it is."

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NRC Exec Blasts NRDA Guidelines For Baseline Recovery

by Bridget A. Murphy, assistant editor

Despite efforts to create non-punitive, restoration-oriented natural resource damage assessment (NRDA) guidelines, the National Oceanic & Atmospheric Administration (NOAA) is taking hits from oil spill interests as its newly approved guidelines go into effect. Speaking on trends in oil spill response on January 25, before an audience assembled by the Connecticut Maritime Association

(CMA), Don Toenshoff, Jr., executive vice president of National Response Corporation (NRC), offered comment on the NRDA policy: "It basically says that if you are a R.P. — Responsible Party — you will pay ... One of the problems with NRDA is that you are basically guilty until you are proven innocent ... You, the evil spiller, are supposed to tell everyone what you've done." Mr. Toenshoff pointed out perceived weaknesses in "contingency valuation," which is the method used to measure

baseline assets of pre-spill environments, and unleashed his own guidelines for spill incident survival focused on restoring public opinion by establishing a positive working relationship with the U.S. Coast Guard (USCG).

Functioning in the restoration, rehabilitation, replacement or acquisition of equivalent natural resources and services in oil spill disaster areas, NRDA policy is a close cousin to OPA 90. In fact, natural resource damage assessment policy was created in order to real-

ize the OPA goal of making the environment public and whole. (See *MRE/EN* December 1995, p. 25, *NOAA Prepares To Release Final OPA 90 Standards*.)

In 1994, NOAA published a set of proposed NRDA regulations in the *Federal Register*, which were criticized by many as being overly focused on punishing owners and operators. Targeted compensation formulas aimed at recovering damages from spill parties are notably absent from the new NRDA standards, which were enacted after being greenlighted by public approval. NRC "abstained from commenting on NRDA guidelines because we didn't want to appear self-serving," said Mr. Toenshoff, who added: "We felt it would be a conflict of interest."

But how do you value the life of a seagull? As pointed out by the NRC executive, NRDA guidelines leave room for interpretation that literally grants NOAA the power to inflict financial ruin on R.P.s. "It asks the public ... What's the present value of loss of aquatic life for your children, grandchildren, generations on end?" said Mr. Toenshoff. And while the value of natural resources seems inherently unquantifiable, some say that contingency valuation places a price tag on the environment, and imposes an unreasonable "you break it, you bought it" policy on shipowners and operators.

Alluding to a recent spill incident off the coast of Point Judith, R.I., Mr. Toenshoff discussed self-protective measures that can be taken by R.P.s in the event of a spill, in order to successfully direct cleanup efforts before authorities assume jurisdiction over a spill area. He said that the primary problem for owners is that after a spill occurs, USCG representatives are often met at the accident site by agents and lawyers instead of a spill response management team, which inevitably casts the R.P. in an unfavorable light. Accordingly, Mr. Toenshoff advised owners to "respond heavily and aggressively immediately," in order to command a favorable impression to the USCG, which "wants to see responsible management in a spill operation." He emphasized that owning companies should stockpile oil spill response equipment, and in the event of a spill, R.P.s should "go heavy upfront, and start sending equipment back that you don't use."

Referring to the NRDA guidelines that allow R.P.s to be represented on the NOAA team that performs the contingency valuation, Mr. Toenshoff said: "The key here is to remember that if you are the R.P., to be a part of the NRDA process from the beginning." He also explained the importance of having friendly people working with the USCG, Environmental Protection Agency (EPA) and NOAA, warning, "If you are found not to have acted in good faith, you can be thrown off the team." As a final note, he added that R.P.s retain financial responsibility for damages incurred by spills, whether or not they participate in the injury assessment process.

Forecasting more changes for the oil spill response sector in the near future, Mr. Toenshoff used two examples to illustrate the tightening grip of oil spill regulations. Speaking to bulk operators, he said, "The OPA responsibility falls on you just as hard as if you were a tanker." And on a legislative note, he added, "We're starting to see an encroaching into the world of oil spills not just by the federal government, but by state governments."

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Kvaerner Masa-Yards build cruise liners and passenger ferries, gas carriers, icebreakers and ice-going tonnage as well as all types of special technology vessels, such as tankers, cable ships, research vessels, offshore vessels, dredgers and crane ships.

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Circle 171 on Reader Service Card

SeaBeam Strikes Agreement With Allied Signal; Wins Japanese Contract

SeaBeam Instruments, Inc. of East Wapole, Mass., and Allied Signal ELAC Nautik GmbH of Kiel, Germany, have entered into a strategic agreement which will allow the companies to jointly market, sell and technologically support selected segments of their commercial marine electronic product lines. SeaBeam specializes in the design and pro-

duction of deep ocean multibeam survey systems, which are deployed aboard ocean survey vessels for conducting bathymetric studies of the sea floor for geophysical exploration, as well as for engineering and military purposes.

Allied Signal ELAS Nautik GmbH equips hydrographic survey vessels with completely integrated suites of marine electronic equipment — from single-beam fathometers and sub-bottom profilers to shallow-water multibeam echosounders.

SeaBeam has also recently been awarded a

contract from the Japan Marine Science & Technology Center (JAMSTEC), Yokosuka, Japan, for its SeaBeam 2100 Series multibeam bathymetric survey sonar.

The survey system will include a fully integrated sub-bottom profiler, and will be installed on the R/V *Kaiko*, a vessel building at the Kawasaki Shipyard.

For more information on SeaBeam Instruments, Inc. Circle 120 on Reader Service Card

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Circle 281 on Reader Service Card

Tugz Int'l Places Trinity Order For Series Of Reverse Tractor Tugs

Tugz International L.L.C., a new affiliate of The Great Lakes Towing Company group of companies, has placed its first order for a series of up to four multi-role reverse tractor tugs that will be capable of operating on the Great Lakes, as well as in coastal and ocean towing operations.

Reverse tractor tugs are known for being technically advanced workboats in which the conventional propeller and rudder is replaced by an integrated unit which performs both propulsion and steering duties, greatly enhancing maneuverability.

This tug order, to be filled by Trinity Marine Group, Gulfport, Miss., is the initial phase of the group's fleet expansion program which could exceed a value of \$14 million if Tugz exercises its options. The first two tugs of the expansion program will be financed with Title XI loan guarantees.

The tugs will measure 95 ft. x 32 ft. (28.9 m x 9.7 m), and will be powered by two Caterpillar 3516BTA diesel engines with 4,400 hp driving Ulstein 1650H Z-drives equipped with nozzles.

Jensen Maritime Consultants, Inc., the designers of the tug series, reports that the vessels should operate at a speed of 14 knots, and will have a bollard pull of 110,000 lbs.

Tugz International initiated development of this multi-role design tug in order to accommodate an entire range of services performed by its affiliates and charterers. The new tugs will reportedly be able to carry out conventional ship handling duties, as well as rescue and assistance to grounded or damaged vessels, fire-

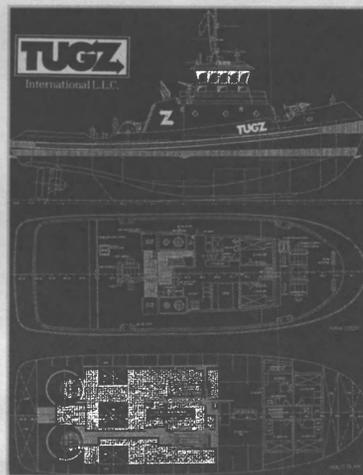
fighting, oil recovery, icebreaking, escort and ocean and coastal towing of vessels and barges. According to company reports, the flexibility of the new Tugz design can accommodate the broadest range of job opportunities, which ultimately lowers costs.

"It is becoming increasingly difficult to justify the economics of operating single-purpose harbor tugs," said **Ronald Rasmus**, president of Tugz International.

He continued, saying: "It's far less expensive to equip a harbor tug for a specialized role, such as firefighting or oil pollution, than to provide a dedicated vessel which is under-utilized for lengthy periods of time while waiting for an emergency to happen."

The Great Lakes Towing Company group of companies, headquartered in Cleveland, Ohio, is reportedly the largest U.S.-flag tugboat company engaged in towing on the Great Lakes.

The company operates in more than 35 U.S. ports, and in all eight Great Lakes states.



Tugz International's multi-role reverse tractor tug design specifications.

Maritime Reporter/Engineering News

Avondale Awarded \$206.4 Million Navy Contract

Avondale announced the awarding of a \$206.4 million contract for construction of an additional Strategic Sealift ship for the U.S. Navy. After consideration of certain additional components and cost escalation, the contract is expected to total more than \$235 million. This represents the fourth ship contract which Avondale has been awarded in the Sealift program, a multi-ship initiative intended to support the nation's ability to deploy military materials and equipment quickly throughout the world.

Aker Omega Tension Raft Jacket Project Underway

In November 1995, Aker Omega Inc. (AOI) held the fifth and final meeting of Phase 1 of the Tension Raft Jacket (TRJ) Joint Industry Project (JIP). In addition to Aker companies, seven oil companies were represented at the meeting; namely: Amoco Production, Co.; BHP Petroleum Americas Inc.; BP Exploration Inc.; Exxon Production Research Co.; Norsk Hydro A.S.; Shell Development Co.; and Texaco Inc.

Phil Abbott, AOI's manager of the project, stated: "Phase 1 has been greatly successful and offers as evidence the fact that all oil company participants have requested AOI to propose an extension to Phase 1 to do additional work on the TRJ concept in 1996."

Aker Omega will propose a "Phase 1A" extension which will include a detailed investigation of the "pressure compensated raft" alternative suggested during Phase 1. As part of this Phase 1A work, AOI will subcontract Failure Modes and Effects Analysis (FMEA) of the pressure compensated raft concept to an internationally accepted certification agency.

Pinpoint Launches New Product Line

PinPoint Systems International introduced its new line of products at the New York National Boat Show. The new line reportedly includes both hardware and software enhancements to its electronic charting systems.

The PinPoint Nautical Navigation Basic System, an electronic charting and navigation system which uses the new NOAA electronic nautical charts in conjunction with Lorán C or Global Positioning System (GPS) positioning input, plots and updates the ship's position each second, providing real time visual presentation of the situation. Originally a hardware/software system, PinPoint

February, 1996

Nautical Navigation software is now available separately for installation.

For more information from Pinpoint Circle 178 on Reader Service Card

Atlantic Marine Launches Trump Princess

The *Trump Princess*, a 290- x 76-

ft. (88- x 23-m) luxury gaming yacht, was set afloat in late December by Atlantic Marine. The vessel features more than 37,000 sq. ft. of gaming space, which will include approximately 1,620 slot machines and 73 table games, for a total of more than 2,200 gaming positions. The vessel is designed to carry 2,700 passengers and crew.

The *Trump Princess* is on target for delivery in April.

Chile Selects Racal To Enhance Safety

Chile's general directorate of the Maritime Territories and Merchant Marine selected Racal's HF and VHF communications equipment to enhance maritime safety along its 2,500-mile coastline. The turnkey contract is worth approximately \$5 million.



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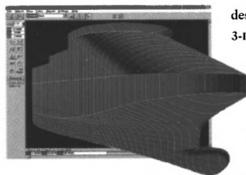
Next, we define all the tanks and compartments in **Autohydro**. Calculating volumes and balancing the ship is easy and quick, so we can spend more time to optimize the layout.

We define the structural members in **Autobuild**; the program automatically checks for interference and generates a bill of materials and a complete list of weights. That eliminates manual drafting, saves the yard manhours, and reduces the usual worry about weight.

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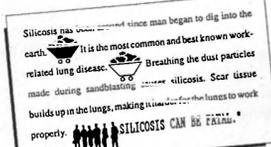
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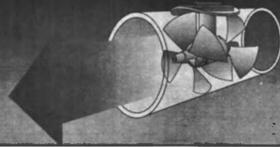
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Circle 296 on Reader Service Card

Coating Products News

Sigma R&D Targets Future

With greater demands for safety and higher economic returns, Sigma Coatings has established the necessary research and development programs to meet future needs. The company offers a wide range of solutions, from high grade tin-free self-polishing antifouling Sigmaplane Ecol, to solvent free tankcoating systems, such as the combined spray and fill solvent free epoxy Sigmaguard CSF and Sigmaguard BT for ballast tanks. An interesting example of successful treatment was on the 136,000-dwt ore carrier *Daghild*. When owner **John P. Pedersen** took over this 17-year-old ship, the condition of the main weather decks and hatch tops was reportedly poor. Not much of the previous coating system remained, and extensive pitting had occurred. The owner realized the situation had to be addressed quickly, and wanted to carry out the upgrade work at sea using the ship's crew and its own equipment. The process adopted was to extensively machine descale the total area, followed up by progressive grit blasting. Sigma Multimastic — a self-priming surface tolerant epoxy coating — was then directly spray-applied in two coats, finishing with a standard red-brown shade.

For more information from Sigma
Circle 38 on Reader Service Card

Gel-Filled Molded Boot Protects Joints

Raychem Corp.'s new GelTek silicone gel-filled molded boot is designed to protect all metal joints and connectors from corrosion. The new GelTek molded boot reportedly prevents corrosion-causing electrolytes, such as salt water and spray, water vapor or exhaust gases from coming into contact with metal joints on industrial equipment. GelTek was tested by the Naval Surface Warfare Center (Port Hueneme Division) on waveguide flanges aboard ships.

For more information on Geltek
Circle 42 on Reader Service Card

Graco Offers Airless Sprayer

Graco's new GM 7000 is a gasoline-powered airless sprayer designed for high-production industrial and commercial applications. Reportedly, it is capable of supplying up to four guns with .021 tips. Maximum fluid pressure of the unit is 3,000 psi, with 1.75-gpm maximum delivery.

For more information on the sprayer
Circle 44 on Reader Service Card

Rusteco: Value In The Field

The Rusteco cleaning technology was recently put to the test by California Marine Diesel, Inc., which was involved in the removal of the air coolers aboard the vessel *M/V President Eisenhower*. From past experience, California Marine Diesel was naturally skeptical that a cleaning agent would be able to restore the air cooler to optimum performance, given the difficulty of cleaning the air side of such large coolers. As the company noted, it is usual to replace it with a new one. In this case, upon visual inspection, it was not possible to see daylight through any part of the air side. The air cooler was sent to the Rusteco Service Center for cleaning, and upon its return and reinstallation, it was found that the cleaned unit performed as well as a new unit.

For more information
Circle 179 on Reader Service Card

Maritime Reporter/Engineering News

Cygnus Offers Revised Gauges

Cygnus Instruments is offering its "new" completely revised Cygnus 1 Basic Model. Cygnus gauges measure metals through coatings accurately without including the coating's thickness in the measurement displayed. They are used in the marine industry to measure the wall thickness of decks, bulkheads, tanks and hull plates. They will also measure on rough or corroded surfaces with minimal preparation.

For more information from Cygnus
Circle 45 on Reader Service Card

E Paint Adds Product To No Foul Line

E Paint Company has added another product to its No Foul line of antifouling coatings. No Foul ZDF Commercial Grade (ZDF-CG) is a copper and TBT-free antifouling paint designed for use on commercial vessels. Testing conducted since 1993 on fishing vessels, ferries and other work boats has reportedly proven ZDF-CG to be compatible with all hull types, including aluminum.

For more information from E Paint
Circle 162 on Reader Service Card

the choice of shop primers is often made with productivity concerns as a leading factor. Hempel's new product is being marketed as the high-technology, state-of-the-art shop primer, offering the lowest possible content of organic materials. It has been specially developed to offer minimal influence on modern steel and welding techniques. It also reportedly offers excellent corrosion protection and heat resistance.

For more information from Hempel
Circle 163 on Reader Service Card

U.S. Yacht Paint Has New Antifouling

U.S. Yacht Paint Co.'s Commercial and Waterman's Division has announced the release of Workboat Ablative, an ablative copper-based antifouling coating. This tin-free antifouling coating is reportedly effective for antifouling protection even in severe conditions.

For more information on U.S. Yacht
Circle 102 on Reader Service Card

Hempel Introduces New Shop Primer

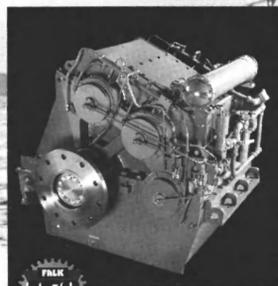
Hempel Coatings (USA) is now offering Hempel's Shop Primer ZS 1589, a two component modified ethyl silicate ship primer, formulated with a low level of zinc. As a direct result of the increasing demands on productivity, shorter and shorter building periods are the trend. Optimized productivity has become the competitive edge for most modern yards, and

The Coating Products News continues on page 20. Turn to page 56 for two additional feature articles on:

- Ballast tank coatings and structural integrity; and
- A new cleaning technique to save time and money

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Coating Products News

Bio-Dur 561 Rises To The Challenge

A large, oil-fueled power station located on the Gulf of Mexico in California receives fuel oil from tankers which unload at a deepwater terminal. The discharge terminal is built at the end of a 1.2-km. long concrete pier built on 30 and 36-in. diameter steel pilings.

The integrity of the pier is critical to the operation of the power station. In order to maintain the protective coating system, it was necessary to apply a barrier type system under conditions of vigorous wave action or complete submer-

sion. Because of the size of the project, old-fashioned "splash-zone" type putties were too difficult and slow to apply. Bio-Dur 561 is formulat-

ed to be of a thick and pasty, but easily spreadable viscosity.

Using putty knives, divers were able to obtain a consistent 30-50 mm. thickness under all conditions — even at the waterline when applying in wave action.

Bio-Dur 561 was applied over the steel piling surface which had been freshly blasted using 4,000 psi water with entrained river sand abrasive. The surface obtained

was a mixture of white metal with islands of roughened, tightly adhering, existing coating which is highly suited for this application.

The divers and other workers employed in this project had little previous experience in this type of work, but were reportedly able to properly mix and apply the Bio-Dur 561 and obtain an excellent result. Under the conditions of application in approximately 65-85 degree F water, the Bio-Dur 561 cured to a firm film after six to three hours, respectively, and was hard overnight. Wave action reportedly had no effect, even immediately after application, before any curing had taken place.

The "wind and water" area of this structure is now protected with 30-50 mm. of tough, impermeable and tenaciously attached epoxy coatings. According to reports, the work was performed with excellent productivity and without the need for complicated mixing or application equipment.

For more information on Bio Dur 561
Circle 34 on Reader Service Card

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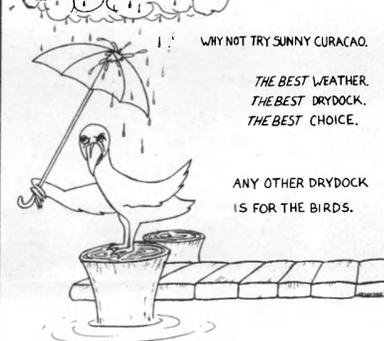
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New Coating For Chemical Cargo Tanks

A new coating for chemical cargo tanks was developed by Advanced Polymer Sciences, Inc. (APS), which the company claims will "revolutionize the chemical and products carrier industry's thinking."

The tank coating, dubbed MarineLine, "eliminates the requirement for stainless steel tanks and the currently-used ranges of specialty epoxy or inorganic zinc silicate coatings," said Don Keehan, technical director. The bottom line is potential cost savings and improved earnings.

MarineLine is a high performance tank lining, formulated with the patented Siloxirane polymer resin technology. This cross-linked aerospace polymer structure is engineered to provide improved protection against corrosion and contamination by total prevention of cargo permeation.

The coating can reportedly handle the marine environment and virtually all sea-approved bulk cargoes. The total range is available in the company's Marine Tank Lining Guide, which lists more than 4,000 chemicals and products.

For more information on MarineLine
Circle 35 on Reader Service Card

For a free copy of the
Marine Tank Lining Guide
Circle 36 on Reader Service Card



MarineLine

High Performance
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For the Marine
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ADVANCED

Isotrol Now Available In The Americas

Isotrol, a new corrosion-control paint with a reported high degree of penetration, is now available in the U.S., Canada and Central and South America. Rights to all of these countries for the manufacturing and marketing of the product have been acquired by Perma-StopRust of Hamden, Conn. The corrosion control agent debuted in Sweden and has been used for more than 30 years. Reportedly, it has a wide range of applications in shipyards, on ships and in other marine applications.

For more information on Isotrol
Circle 37 on Reader Service Card

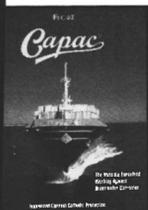
Carboline Debuts VOC-Compliant Coating



Carboline has debuted Therma-line 450, a phenolic-modified epoxy novalac, that provides corrosion resistance to steel and concrete substrates exposed to chemical spills, immersion or heat peaks up to 450 degrees F. It was designed to conform to the National Association of Corrosion Engineers (NACE) recommendation for coating insulated pipes and vessels where the insulation actually holds moisture against the steel.

For technical specifications
Circle 40 on Reader Service Card

Free Info On Benefits Of Cathodic Protection



A new color brochure is available from Electro-catalytic Inc. (ELCAT) which details the long-term performance and cost benefits that can result from the use of ELCAT's patented Capac impressed current cathodic protection system.

For a free brochure
Circle 41 on Reader Service Card

Drew Ameroid Offers "Life Preserver" Program

The Life Preserver Program from Drew Ameroid — a division of Ashland Chemical — reportedly offers a proven 10-year track record in the area of advanced corrosion control technology. Drew Ameroid offers the Life Preserver Program with warranties of five years for its Magnakote Plus rust

February, 1996

preventative, and two years for the original Magnakote formulation. Both are corrosion inhibitors offering inspection and long-term protection advantages. Fundamental to the program are thorough inspections at regular intervals, prompt attention to areas needing touch-up work and careful documentation of conditions.

For more information
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Next Month in *MR/EN*...

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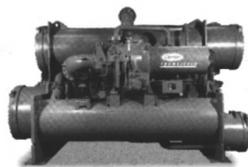
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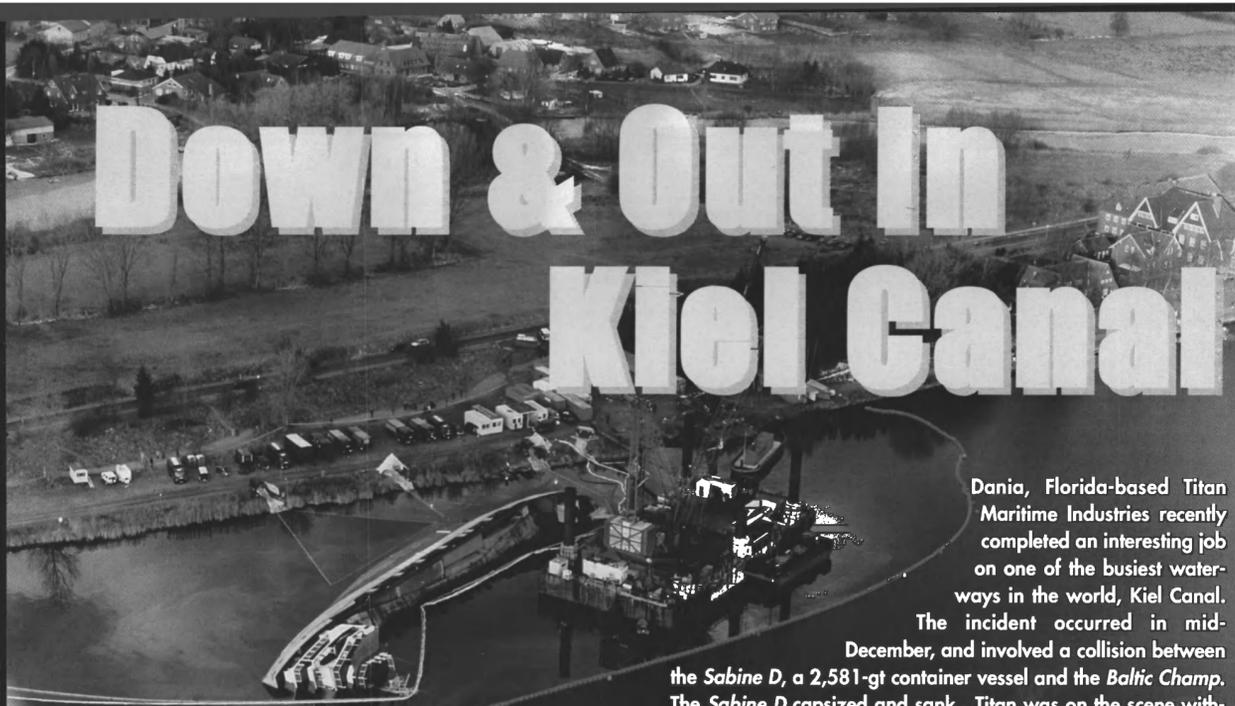
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Down & Out In Kiel Canal



(Photo credits: top: Uwe Bock; bottom: Frank Behling)



Dania, Florida-based Titan Maritime Industries recently completed an interesting job on one of the busiest waterways in the world, Kiel Canal. The incident occurred in mid-

December, and involved a collision between the *Sabine D*, a 2,581-gt container vessel and the *Baltic Champ*. The *Sabine D* capsized and sank. Titan was on the scene within 36 hours, and put in its proposal to the Kiel Canal authority, Wasser-und Schifffahrtsamt Kiel-Holtenau. To the company's surprise — considering the excellent local competition — it was awarded the contract, in part because its methods would not require the canal to be closed during the wreck removal operation. Other proposals reportedly would close the canal for three days. Titan set about to refloat the vessel by means of a precisely calculated, computer generated de-watering sequence, together with its jack-up crane barge. The process of re-floating the vessel was complicated further (and delayed seven days) when divers discovered that the only hazardous cargo container was damaged and trapped under the edge of one of the 20-ton hatch covers, which had slid off when the ship capsized.

For more information on Titan Maritime
Circle 197 on Reader Service Card

ACBL Expands In South America

American Commercial Barge Line Co. (ACBL) has launched a service along the Paraguai-Parana River to transport iron ore from Corumba, Brazil to San Nicolas, Argentina. ACBL has contracted with Siderar, an Argentine steel mill, to transport a quarter-million metric tons of iron ore annually.

A submersible vessel with two towboats, 18 hopper barges and two tank barges arrived recently at ACBL's San Lorenzo terminal. In conjunction with local partners, ACBL has established a corporation, ACBL Hidroviavia, to operate the service. The service represents a multi-million dollar initial investment by ACBL in towboats, barges and other equipment. The company has opened an office in San Lorenzo, Argentina, which is staffed locally.

"This agreement is the first step in a long-term plan to help promote the development of this river system into a major thoroughfare for

the Mercosur countries. Given the long-term economic prospect of these countries, we're looking forward to many more opportunities," said **Michael C. Hagan**, president and CEO of American Commercial Lines Inc. (ACL), ACBL's parent company. "We believe there will be explosive growth in the movement of products such as soybean, fertilizer, oil products, wheat and manganese. ACBL intends to play a major role in promoting this growth."

Shipowning Interest Merges Reefer Operations With Cargo Operator

Safmarine, Unifruco Ltd. and Outspan International Ltd. announced plans to merge their respective reefer shipping interests. In practice, this involves merging the Safmarine-owned Universal Reefers Ltd. company based in New Jersey, and all the shipping interests of

Unifruco and Outspan which have been managed by Serva Ship from the Isle of Man.

The new company will be called Universal Reefers Ltd., and will be based in Europe. The board will include senior executives from the three shareholding companies, including **John Stanbury**, managing director of Outspan International; **Anton du Preez**, managing director of Unifruco South Africa; **Erik van Vlaanderen**, managing director of Unifruco Investments; and **Jan Rabie**, chief executive of Safmarine International.

In announcing the establishment of the joint venture, **Tony Farr**, managing director of Safmarine, and chairman of the new company, said that the joining of a shipowner/operator and a cargo-based operation offers exciting opportunities for both parties. Based upon its own estimates, the company expects to gross \$150 million per annum, and handle in excess of one million pallets of fruit from South Africa annually.

Commercial Satellite Company Formed

A new company, Commercial Satellite Systems Inc. (CSSI), was created in August 1995 to integrate, market and distribute commercial communications products and systems for users in the commercial, government and military marketplaces. Headquartered in Herndon, Va., with offices in Rochester, N.Y., and Boca Raton, Fla., CSSI has a management and professional staff with many years of experience in satellite and radio communications product design and program management, as well as Department of Defense (DOD), federal and commercial contracting.

As a satellite communications solution provider, CSSI satellite systems and products address a broad range of applications, from portable Inmarsat terminals through high data rate C-band and Ku-band VSAT communications systems. These systems and products meet a wide variety of applications, including:

- Multiplexed voice and/or high-speed data systems to interconnect remotely located commercial offices, facilities or military installations.
- Portable, transportable and vehicular systems providing voice, fax and data service to customers requiring mobility or rapid deployment.
- Shipboard Inmarsat and C/Ku-band communications systems for voice and high-speed data using data rates from 2,400 bps through 1,544 kbps or greater.
- Deployable voice and e-mail systems, including debit cards for morale, welfare and recreational purposes.
- Distance learning using satellite communications with remote interactive video conferencing systems.

CSSI is the North American distributor for the STN Atlas Elektronik product line of Inmarsat terminals, and offers the terminals with 1,000 minutes of traffic, delivered already commissioned for immediate use.

For more information on Commercial Satellite Systems
Circle 95 on Reader Service Card

Intertanko Director Addresses Pollution Risk Conference

"Intertanko's members have (a) clear commitment to oil pollution prevention," **Dagfinn Lunde**, Intertanko's managing director, told the conference on "Managing Oil Pollution Risks in Shipping Operations" held in London this past December. Mr. Lunde said that Intertanko's members have been working for improvements in safety and pollution prevention since the organization was established in 1934. Attempting to put oil pollution in

perspective, Mr. Lunde quoted some figures: Oil pollution from tanker accidents, he said, accounts for 4.7 percent of all marine pollution; oil pollution from legal discharges amounts to 6.6 percent. Mr. Lunde stressed that 99.99 percent of all oil arrives safely at its destination, and that Intertanko's goal is to make it 100 percent.

The method to that goal includes

adopting Loss Control Measures together with increased training, safety programs and early implementation of the new Standards of Training for Certification and Watchkeeping (STCW). More activity is planned for Intertanko's newly established Environmental Subcommittee.

Mr. Lunde also said that while the tankers owned by Intertanko's members accounted for more than

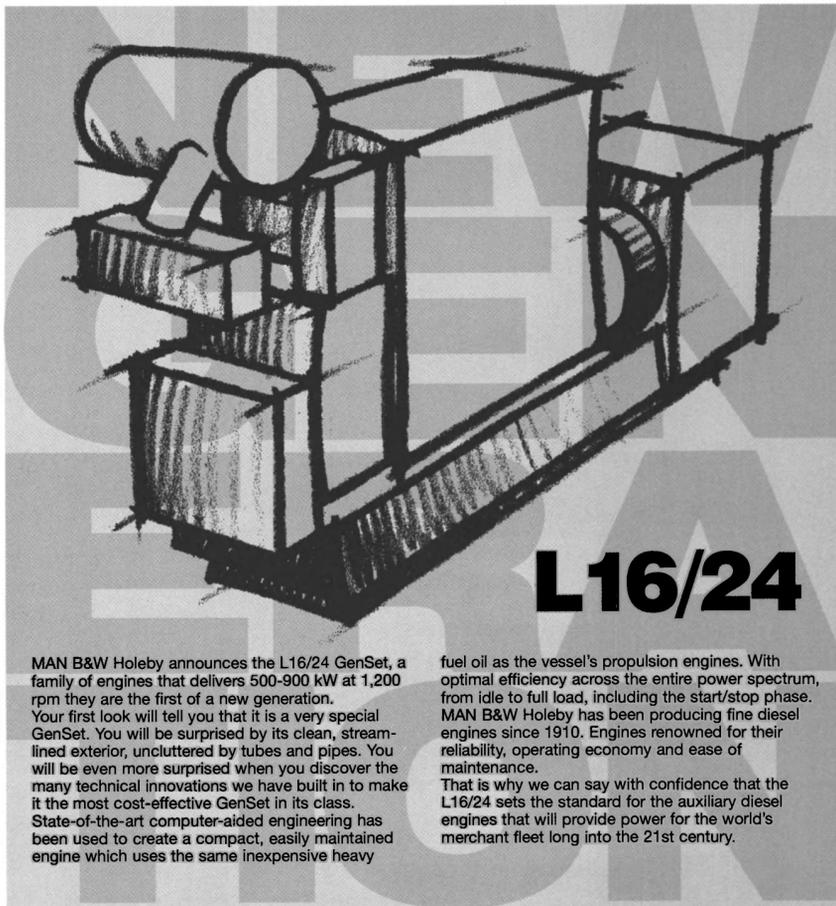
half of the world's tonnage, they also accounted for less than one percent of Port State Control detentions.

For more information on Intertanko
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Oceaneering To Expand ROV Fleet

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HOLEBY
GENERATING SETS

board of directors has authorized a significant expansion of the company's Remotely Operated Vehicle (ROV) fleet. Seven new Hydra Magnum and Quantum work-class vehicles will be manufactured at Oceaneering's Morgan City, La., facility for delivery between January and July. The units are being built to meet increased market demand for ROVs around the world, specifically for use in water depths greater than 1,000 ft.

(304.8 m) of seawater (FSW) and in severe weather conditions, such as those encountered west of Shetlands and in the North Sea.

Hydra ROVs are high-thrust, high-payload, cage-deployed vehicles designed to accommodate a variety of sensor and work packages for performing a wide range of underwater intervention tasks that support oil and gas drilling, and construction and production activities. The new vehicles are

75- and 100-hp units capable of operating in 6,000 FSW or more, and are being manufactured using the latest technology in advanced control systems for high performance, optimum adaptability and maximum reliability.

Jay Collins, executive vice president of Oilfield Marine Services, stated, "The expansion of our fleet underscores the company's commitment to maintain a worldwide leadership position in providing

deepwater work-class ROVs to the oil and gas industry. Last year we provided ROV services on 33 percent of the wells drilled in 1,000 FSW or more, and we supported 45 percent of the wells drilled in 3,000 FSW or more. Developing oil and gas fields in deepwater and harsh environments places greater demands on ROVs for carrying out intricate underwater intervention tasks with a high degree of reliability. Hydra vehicles are specifically designed to perform this work."

For more information on Oceaneering
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XTRA International Opens Milan Office

XTRA International, the marine container leasing division of XTRA Corporation headquartered in San Francisco, Calif., has opened a full-service office in Milan, Italy. The new office services Italy, Croatia, Slovenia (formerly part of Yugoslavia), Greece, Turkey, Lebanon and Malta, and marks the opening of XTRA's 13th branch location.

The new Milan office is headed by Area Director **Maurizio Grumelli**, who has worked as XTRA's agent in Italy since 1989. Mr. Grumelli has more than 25 years of field experience in container leasing and insurance brokerage, specializing in the shipping industry.

XTRA International was created in mid-1995 when XTRA Corporation acquired the assets of Matson Leasing. XTRA International currently operates offices in Asia, Europe, Australia and North and South America.

For more information on
XTRA International
Circle 99 on Reader Service Card

Tidewater Adds New Barges Onto Upgrades List

Continuing a \$30 million equipment expansion program introduced last summer, Tidewater recently announced that it would add one grain barge and one double-hulled liquid barge to its fleet, as well as spend \$4 million for a terminal modernization program at its East Pasco, Wash., petroleum terminal.

The two additional barges, each the fourth in a series of new acquisitions of their type, will be built at Zidell Marine of Portland, Ore. Three grain barges are being built by Sundial Marine in Troutdale, Ore.

"The grain barges will increase Tidewater's capacity to move over 500,000 more tons per year, while the four new liquid vessels will be

capable of carrying all of the company's petroleum orders in double hulls," said Tidewater official **Ray Hickey**.

The terminal renovation is expected to be completed June 1, well in advance of the state of Washington's Clean Air requirements, which go into effect in the late summer. Installation of a three-bay service bottom load rack, a terminal automation system and a new administration building highlight the facility improvements.

STN Atlas To Provide VTS To Bombay

STN Atlas Elektronik has been awarded a contract by the Port of Bombay Trust, the supervisory authority for India's largest port, for design and installation of a proprietary Atlas 9730 radar-based vessel traffic management system (VTS), which is expected to commence service early in 1997.

Providing extensive 24-hour monitoring and control of all cargo and oil terminal traffic within the main port area and channel approaches, the system will comprise three strategically located Atlas X-band radar sites with dual transceivers and track processing facilities at Colaba, Jawahar Dweep and near the adjoining Jawaharlal Nehru Port Trust control center on the eastern side of the port. The sites will be variously connected to two main control centers using a combination of microwave and fiber optic links.

The Bombay contract follows recent orders for similar STN Atlas Elektronik VTS systems from the Ports of Guangzhou and Yantai in mainland China, in projects supported by the Australian Agency for International Development (AusAID).

For more information on
STN Atlas Elektronik
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P&O Containers North America Plans Expansion

P&O Containers North America is in the middle of an aggressive expansion project, which it says will double the size of the company's U.S. business by the end of 1998 with the introduction of a new trans-Pacific service.

Since September 1995, P&O Containers North America has announced 31 new management positions in sales, customer service, pricing and intermodal operations. Twenty-one were promotions from within the company's existing management ranks, and 10 were from outside — including one from outside the shipping industry altogether — all part of a plan to make the expansion a success with an increased emphasis

on customer satisfaction.

The company has even instituted what it calls a "customer-focused culture" called POSH, for the P&O Service Habit, which encourages company efforts directed toward building long-term relationships, and rewards employee efforts to that end.

Christopher Rankin, president of P&O Containers North America, said the company was increasing

its ability to react quickly to the marketplace. "As an industry, we can no longer afford to be looking at the business solely from the ocean carrier's viewpoint," he said. "P&O's global customers are interested in vendors who understand supply chain management. They have new logistics and sourcing requirements and we see ourselves as an integral part of that supply chain."

Kepphil Shipyard Delivers First Of Two Tankers

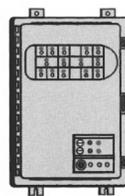
Kepphil Shipyard Incorporated, a subsidiary of Keppel Philippines Holdings, Inc., recently completed and delivered its largest clean product tanker. The 4,990-dwt vessel is the first of a two-tanker contract with the owner, Terban Marine Corporation.

GEMS Closed Loading Liquid Level Indicators

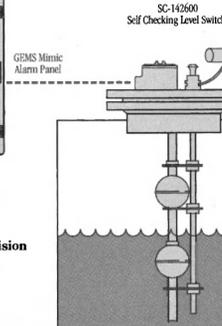
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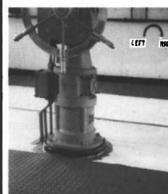
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In a delivery ceremony, **Adriana Willems** — spouse of **Reiner Willems**, who is the CEO of Pilipinas Shell Petroleum Corporation — named the vessel *Carla 2*. "The decision to build *Carla 2* is in line with our fleet modernization program, a move aimed to provide our valued charterers with higher quality ships and services," said Terban Marine Vice President **Vic Ignacio**.

"Its successful delivery testifies

to Kepphil Shipyard's expertise not only in ship repair but also in the field of shipbuilding," he added.

Hoe Eng Hock, president of Kepphil Shipyard, said, "*Carla 2* demonstrates that shipbuilders here are capable of meeting demands of local shipowners embarking on the modernization of their fleet. With more incentives and support from the government, shipbuilders will be able to further expand our services to better serve

the Philippine market."

Carla 2 has an overall length of 323.2 ft. (98.5 m) and a cargo capacity of 6,000-cu.-m. It is installed with two cargo pumps, each delivering 500 cu. m. of petroleum products per hour. Powered by a single, 3,080-bhp @ 90 rpm engine, the vessel is capable of a service speed of 12 knots.

The vessel is built in accordance with the classification rules of the American Bureau of Shipping

(ABS) with the notation Maltese Cross A1 Oil Carrier/AMS Circle E. The vessel will accommodate a crew of 22, and will be chartered by Pilipinas Shell Petroleum for servicing outposts in Philippine territorial waters.

Carla 2's sister vessel is expected to be completed in the first quarter of this year.

Kepphil Shipyard is also busy with the conversion of a 5,700-dwt product tanker, *Reta Link III*, to an asphalt carrier, as well as the repair of local and foreign vessels.

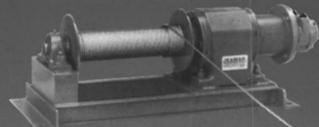
For more information on Kepphil Shipyard

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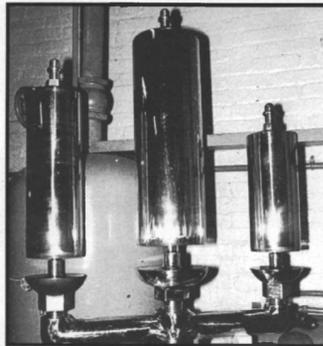
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Steamers Maritime Orders Two Ships

Steamers Maritime Holdings Limited has ordered two new containerships and is buying a third vessel. The two 360-TEU vessels on order are being built by Wuhu Shipyard in China's Anjui Province near Nanjing.

The first ship is scheduled to be delivered in the first quarter of 1997, and the other in the second quarter. The reported contract value for each is approximately \$10 million. With a deadweight of 5,000 tons and a service speed of around 15 knots, each ship will be equipped with two 40-ton cranes and 50 reefer points, and will be classified by Germanischer Lloyd.

"We intend to charter these ships to feeder operations around the world. There is particularly strong demand for this type of vessel for trade in the Mediterranean, Caribbean and Asian regions," said **C.N. Watson**, executive chairman of Steamers. Elaborating on the specifications of the newbuildings, **Mr. Watson** said, "Their capacity and size are especially ideal for the smaller ports in the Asia-Pacific region. With their fast speed, these vessels can achieve a quick turnaround time."

In addition to these two newbuildings, Steamers will purchase five-year-old containership *Wotan*. The vessel has been chartered by Steamers subsidiary Straits Shipping for the Singapore-Haiphong trade since September 1995. This 270-TEU vessel has a dwt of 3,500 tons, a service speed of 13 knots, two units of 35-ton cranes and 30 reefer points. The vessel, to be renamed *Straits Joy*, will continue to trade on the Singapore-Haiphong route for Straits Shipping.

Crowley American Moves Into New Miami Office

Crowley American Transport has moved into new offices and a container freight station warehouse at

3200 N.W. 112th Ave., Miami, Fla. 33172. Sixty-one administrative employees working in South Florida Sales, Central America Services, Credit and Collections, Port Documentation, Traffic, Warehouse/Equipment Control Operations and Telecommunications are housed at this location. In addition, 25 teamsters are working in the warehouse and storage areas, discharging and loading cargo containers and trailers.

The building occupies an area of 85,424 sq. ft., consisting of 73,100 sq. ft. of warehouse space with 10 cargo doors and 12,324 sq. ft. of office space. "The construction and signing of a 10-year lease for this facility further demonstrates Crowley's commitment to the South Florida market and our continued desire to provide state-of-the-art facilities to meet our customers' needs," said **Rinus Schepen**, vice president and general manager, Central American Services.

Crowley American Transport provides container and RoRo service between the U.S., Canada, South America, Central America, Mexico, the eastern Caribbean, Puerto Rico and the Bahamas, with a fleet of 24 ships and 17 tugs and barges.

Cygnus Revamps Basic Model Gauges



The revised Cygnus I Basic Model gauge.

Cygnus Instruments has introduced its completely revised Cygnus I Basic Model. Cygnus gauges reportedly measure metals through coatings accurately, without including coating thickness in the displayed measurement. These gauges are used in the marine industry to measure the wall thickness of decks, bulkheads, tanks and hull plates. The reworked Cygnus I Basic Model features an enlarged display; operator selectable switch for metric or imperial measurement; enhanced multiple echo measuring technique with signal strength indicator; increased battery life; and an automated low battery warning.

For more information on Cygnus
Circle 4 on Reader Service Card

Adrick Marine Delivers AC/Refrigeration Equipment

Adrick Marine Corporation has announced the expansion of its marine product line with the addition of in-house sheet metal design and fabrication capabilities. Adrick has completed and shipped its

seventh ship set of central station air conditioning units to the government of Israel for the SAAR 4 project, and its third ship set of ship stores refrigeration equipment to Marinette Marine Corp. for the U.S. Coast Guard (USCG) WLB program. Adrick is also proceeding with the second, third and fourth ship sets of marine heat-pump air conditioning systems for the USCG WLB program at

Marinette Marine.

Adrick's sheetmetal facility has completed and tested a U.S. Navy high shock, self-contained air conditioning unit built to MIL-SPEC requirements for Avondale shipyards. Additionally, the facility is building three ship sets of commercial marine upright fan coil units for chilled water application.

For more information on Adrick
Circle 5 on Reader Service Card

Alfa Laval Equips New Facilities In Manila; Wins Goutos Lines Order

Alfa Laval AS, Norway, recently supplied the Norwegian Training Centre in Manila with a complete range of engine room systems and equipment which included Alcap separation systems for fuel and lube

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Circle 254 on Reader Service Card

oil, a booster module and ancillary equipment. The center has moved its operation to Taguig, Metro Manila.

Alfa Laval A.E.B.E., Greece, has won an order to supply oil treatment and freshwater generation systems for a catamaran ferry, reportedly the first to be built in Greece. The vessel is under construction at the private shipyard of Atsalakis in the Perama Free Zone, Piraeus, for Goutos Lines.

The 262.5-ft. (80-m) long catamaran will be powered by two Mirreles Blackstone engines rated at 6,100 bhp, providing a service speed of 25 knots. The catamaran is capable of carrying up to 1,600 passengers and has deck space for 250 cars and 18 trucks. Launched on September 30, 1995, the vessel will begin operating in the Greek archipelago in spring 1996. Goutos Lines operates a fleet of three ferries and is reportedly the only

shipowner currently building in Greece.

For more information on Alfa Laval
Circle 7 on Reader Service Card

DOT Funds Ferry Projects

Secretary of Transportation **Federico Peña** announced that the U.S. Department of Transportation has awarded more than \$220 million in discretionary funds for

important infrastructure-related projects across the nation, with more than \$14 million allocated for ferry projects. "In the first two years of this Administration, we have invested more than \$40 billion in our nation's transportation infrastructure, a larger amount than in any other two-year period," Secretary **Peña** said. "These grants build on President **Clinton's** commitment to rebuild America. We have chosen them with common sense, strategically investing these funds so that we provide the greatest benefit to our highway users across the country."

The funds, made available for eligible projects at the discretion of the Secretary, are provided from various accounts through the department's Federal Highway Administration. Selection and distribution of the FY 1996 allocations were based on requests by the states and the eligibility of the projects submitted for additional federal funding. Ferry boats were one such recipient of these funds.

The following funds, totaling \$14,931,643 were allocated for ferries:

Alabama:	\$456,000
Alaska:	\$1,633,497
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Washington, D.C.:	\$1,000,000
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Kentucky:	\$95,000
Louisiana:	\$680,000
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New Jersey:	\$1,000,000
New York:	\$2,110,946
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Astilleros Españoles Orders Reach New Records

Orders won in 1995 by Astilleros Espanoles reportedly amounted to \$834 million, breaking the barrier of \$820,400,000 million in a single year for the first time in the history of the group and the Spanish shipbuilding industry. The figure refers to contracts for newbuildings, offshore units and large conversions, and does not include repairs.

It is also the first time Astilleros Espanoles has received orders totaling more than \$738,360,000 million in two consecutive years, as a result of the new products policy implemented at the end of 1993, aimed at entering higher added-value markets. This high level of contracts also provides a sound starting point for the implementation of the Strategic Competitiveness Plan, recently approved by the European Commission for the years 1996-1998.

For more information
on Astilleros Espanoles
Circle 8 on Reader Service Card

EUROPEAN UPDATE

by Carol Fullford and Andy Smith, contributing editors

Ailsa-Perth: from sunset to sunrise

Ailsa-Perth Marine Limited is a genuinely busy U.K. dockyard which is currently implementing an ambitious plan to expand the facility in an innovative way.

Business at the yard offers a unique perspective on maritime history. For instance, there are currently emergency repairs being carried out to a modern tractor tug in the same drydock from which Admiral Nelson's illustrious flagship, *Victory*, was launched some 230 years ago.

Ailsa-Perth Marine Limited was formed to take over two of the three existing drydocks at Chatham Historic Dockyard on the River Medway (which flows into the Thames Estuary) in the fall of 1994. In its first year it turned over close to \$3 million, a remarkable feat considering that there was no existing business on which to capitalize, and that the entire team consists of just 28 people. To discover how this has been achieved at a time when the trend is to close yards rather than open them up, it is necessary to look at the Ailsa-Perth Group as a whole.

A decade ago, the Ailsa Shipbuilders' yard at Troon in Scotland was doomed as one of the sacrificial lambs of the fast-shrinking conglomerate called British Shipbuilders. On the day that news of the closure was broken to a despondent workforce, an Australian businessman called at the yard. While on a family holiday, he simply had come to the yard hoping to uncover the original drawings of a 200-ft. (61-m) yacht that Ailsa had built in 1902, a vessel which he was considering purchasing. As it turns out, this unexpected visitor, **Gregory Copley**, ended up buying the yard and giving it a new identity.

Ailsa-Perth Shipbuilders; adding the name of his own home town in Western Australia. By investing in improved facilities and instituting the best modern management techniques, the Troon yard has gone from strength to strength with a busy program of newbuilds and repairs on a wide variety of vessels from tugs to ferries in its 400-ft. (122-m) drydock and building hall, a facility capable of holding two 374-ft. (114-m) vessels at a time.

Having proved that a well-run yard could prosper, Mr. Copley decided to look south of the border for another opportunity. Business associate and management consultant **Bill Carr** knew of the ideal site just 35 miles from London. As an independent consultant, he had been commissioned to look at the future prospects of The Chatham Royal Naval Dockyard when the Navy pulled out in 1986. This 350-acre site had served as a shipbuilding and ship repair base since the mid-16th century and was being

divided into three units: a commercial port, an area of prime housing and prestige office development; and the Chatham Historic Dockyard. This latter section, the

oldest part of the site, is now open to the public with numerous sights to see. This building, built by shipwrights in the only way they knew how, as an upside down hull, is

now appropriately used by Ailsa-Perth as a carpentry shop. In the middle of the area were three drydocks providing capacity for vessels up to 394 ft. x 49 ft. (120 m x 15 m).

Although these docks have been kept in use on an "ad hoc" basis

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30

since the navy pulled out, it was Mr. Carr, the former Royal Marine, who had the vision to see the overall prospects of the site. Not surprisingly, he was given the managing director position of the new enterprise by Mr. Copley. The primary tasks involved gutting and renovating several of the buildings to provide office accommodation, stores and workshops, initiating an intensive marketing effort and replacing a dock gate of one of the two dry-docks available. Mr. Carr hopes to get a third before too long.

The marketing initiative was immediately successful as the first docking, the cement carrier *Blue Circle Venture*, soon arrived for major refit. This was followed by a succession of vessels including more Blue Circle ships and others from owners such as Crescent, Dover Harbor Board, J.H. Whitaker Tankers, Port of London Authority, South Coast Shipping, Alexandra Towing, the Societe Loientaise d'Armement (a French freight line) and Union Transport. For a company in existence for just over a year, the list of owners reveals a remarkably large number of repeat bookings. Four Alexandra tugs have been docked, and both of Dover Harbor Board's tugs have undergone refit. One, the Ruston/Voith tractor *Dextrous*, was back in the "Victory" dock during *MR/EN's* visit, for damage repairs after it was pinned to a harbor wall by a bulbous bow. In the other dock, a coastal bulker, *Hoo Beech*, was having its Aquamaster thrusters replaced through a hole cut in the plating.

Meanwhile, maintaining day-to-day business, Mr. Carr plans for a promising future. The company is to manage a museum dedicated to the boats and activities of the Royal National Lifeboat Institution (RNLI) in a huge covered hall, formerly housing two of the navy's machine shops. The boats and displays are more or less in position, but elevated visitor walkways and cradles are to be constructed before its spring opening.

Adjoining the museum is a cavernous covered slip where frigates and O-Class submarines were once built, with adjacent construction bays capable of handling numerous craft up to 130-ft. (40-m) in length. Work is just about to start on renovating and cleaning up the building, to prepare for the construction of new vessels in the summer.

Mr. Carr has more ideas: "I'd very much like to attract some RNLI repair and construction work to the area between the museum and the slip. A viewing gallery would enable visitors to see the old and new side by side." Additional plans bring in other companies within the Ailsa-Perth Group much involved in the super yacht industry: naval architects G.L. Watson & Company and Vosper Yacht Services. Chatham is ideally located to build, service, repair and refit superyachts, being within easy reach of the English Channel. "Not only do we hope to attract business from Europe and the Mediterranean, but the nearby dockyard development includes 1,600 homes, many of which will have a yacht berth, and two of the large basins are to be converted into luxury marinas. This is bound to generate business."

FBM forges links with Far East

FBM Marine International (FBMI), a subsidiary of the Hong Kong Parkview Group, is teaming up with Aboitiz & Co. Inc., to build

Maritime Reporter/Engineering News

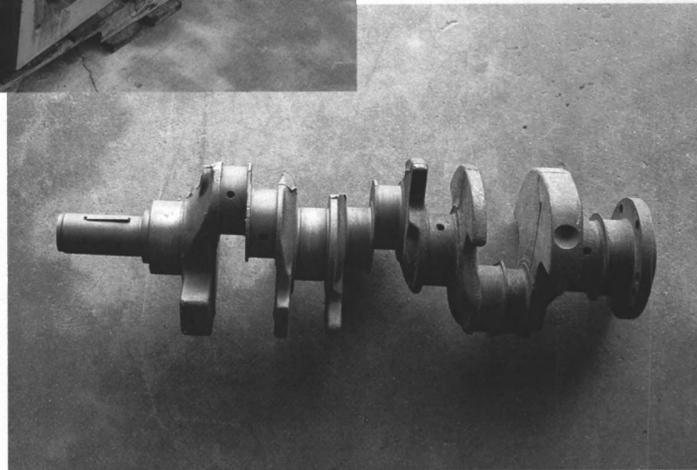
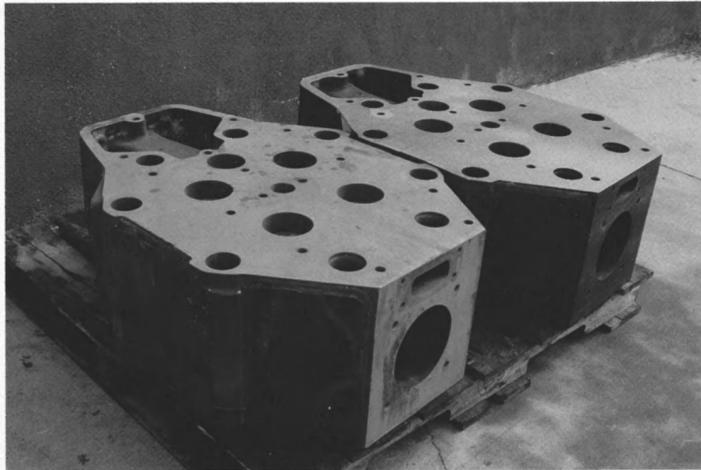


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EUROPEAN UPDATE

fast ferries and other high-speed craft in the Philippines. Parkview is already a co-partner of Aboitiz Transport Services, which last year began the operation of several fast catamaran ferry services on prime short distance routes in the area.

The \$30 million joint venture company is to be known as FBM-Aboitiz Shipbuilders; and will build shipyard, maintenance and repair facilities on a site in Balabnan. FBM Marine (U.K.), builder of successful vessels such as the TriCat and TransCat, is to

provide technical assistance for the shipbuilding venture as well as the plans and designs for fast craft.

Other good news for FBM (U.K.) is that two of the five TriCat catamarans ordered at the end of last year are now to be built at the new facility, a development which is

certain to ease congestion at the U.K. yard. More orders could, however, be created by Universal Aboitiz Inc., for vessels such as the 147.6-ft. (45-m) TriCat and the larger 229.6-ft. (70-m) fast ferry monohulls for operation on longer routes in the Philippines.

The new yard will also be able to build FBM's wide range of patrol boat designs, both for local use and for export. These include the 40-knot, 85.3-ft. (26-m) Guardian fast patrol boat, which has been specifically designed for coastal duties, including counter-smuggling and fishery protection. Like FBM (U.K.), the Balabnan facility will be designed to qualify for ISO 9001 certification.

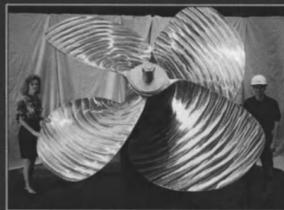
Other steps to expand in the Far East have also been taken by FBMI with a joint venture company established for the operation of fast passenger ferry services in Indonesia. FBMI's partner in the company, which is to be called PT Universal Infniti, is PT Infniti Indosaki, which, together with FBMI, has engaged in extensive research regarding Indonesian ferry operations in recent months.

PT Universal Infniti has already received licenses from the Minister of Communication to commence operation on a number of routes, and it is anticipated that service will begin on the Merak-Bakeheuni route early this year.

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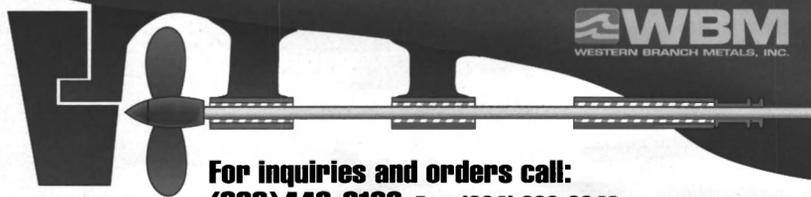
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London stage set for engine launches

The London Boat Show, the U.K.'s leading land-locked nautical event, attracts around 200,000 visitors every year to view the latest boats and gadgets on the leisure scene. This year proved no exception with plenty flocking to see new dinghies and inflatables.

While the major yacht and powerboat builders welcome their agents and the occasional Middle East royal, the serious equipment manufacturers also look to the event as a good showcase for their wares. Much that is new in London, particularly in the engine category, is of merit in commercial as well as leisure applications.

Just three months after the launch of the Perkins Sabre M265Ti at the Southampton Boat Show, the new higher-output, wastegated, turbocharged and air-cooled M265Ti was unveiled. It is the eighth new Perkins Sabre model to be launched in the past three years. The engine, which develops a maximum of 300 hp at 2,500 rpm, is suitable for both conventional shaft and V-drive installations.

Twin Disc launched the light-weight compact MG 5114RV marine gear, which it claims will prove of great benefit to space con-

(continued on following page)

Maritime Reporter/Engineering News

Leica Introduces DCA-TC

Leica introduced DCA-TC, the system for 3-D control and analysis (DCA) with submillimeter accuracy for large-scale assemblies. The system comprises Leica's high-precision industrial sensor TC2002, a hand-held control unit with on-board SW DCP10 for on-site control and the powerful dimensional analysis program DCP20 under Windows.

The overall concept behind the Leica-A.M.S. DCA-TC is bringing mobile CAD data to production site, fully linking and comparing design structures with as-built structures using their 3-D coordinates. Such analysis will reportedly improve manufacturing efficiency and minimize errors during assembly. One of the main fields of application is the shipbuilding industry.

For more information on Leica
Circle 9 on Reader Service Card

Senermar's FORAN To Be Implemented By PT PAL

Senermar's FORAN V30 software is Open VMS or UNIX-based and features a full-ship product model capability. Reportedly, a build strategy module (BUILDS) has been introduced to the FORAN system, allowing the user to define how each individual assembly will be built. To develop the build strategy, two tree structures are needed, one for hull structure and another for outfitting. The project is organized from the top through hull structure blocks or outfitting zones to the basic elements of the product model. The build strategy then relates to the product model and finally, both tree structures can be connected to generate information of complex products.

Indonesian Shipbuilder PT PAL has reportedly signed a license to use the FORAN CAD/CAM/CAE

London Stage Set (continued from previous page)

scious naval architects. Of remote V-drive configuration with a seven-degree down angle, its commercial rating is 420 hp at 1,800 rpm (continuous). Designed for use with high powered engines for fast planing-type hulls, it is available with reduction ratios of 1.03, 1.20, 1.48, 1.75, 1.92 and 2.5:1.

Volvo Penta revealed three engines for 1996, and commercial small boat operators could benefit from the 22/SX series of Aquamatic diesels designed to replace gasoline engines on RIBs and other planing craft.

The four-cylinder 22/SX is reportedly highly economical to run — saving as much as 75 percent in fuel costs over gas.

The engine sector was completed with the worldwide launch of Mermaid's Turbo-Four II, an engine also suited to the RIB/planing craft market.

system for ship design and ship production. Implementation of version 30 will be carried out at the Surabaya yard, and part of the general design modules will be implemented at the company's offices in Jakarta. The FORAN system is reportedly licensed for use worldwide in 121 shipyards in 21 countries.

For more information on Senermar
Circle 46 on Reader Service Card

Neuenhauser Kompressorenbau To Take On Air Receiver Production

Neuenhauser Kompressorenbau GmbH will reportedly take over the full production of air receivers, complete with valve head, from Messrs. Thyssen Umformtechnik GmbH, Werk Brackwede, Biele-

feld, as of this month. In carrying on the production line of air receivers and valve heads, Neuenhauser Kompressorenbau sees an efficient completion of its present activities. Neuenhauser Kompressorenbau will reportedly produce Thyssen-quality air receivers and valve heads.

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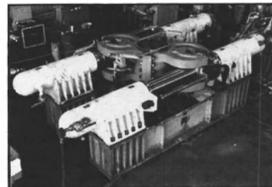
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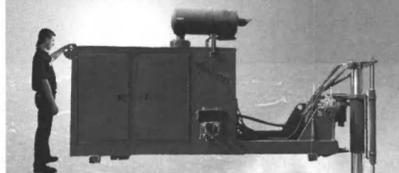
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Branton Offers New Line Of Joiner/Insulation Products

Branton Industries, provider of joiner and insulation products, has announced its line of Neptune products. This line provides navy cloth faced insulation, acoustical composites and custom joiner work. Branton Industries and Neptune products have been sup-

pliers to the marine industry for more than 30 years.

For more information
Circle 47 on Reader Service Card

Southwest Marine Wins Navy Contract

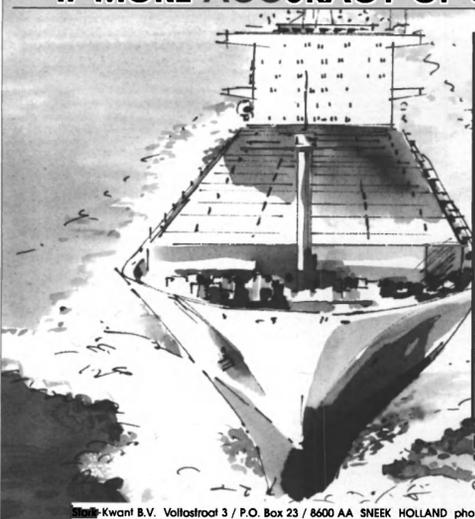
The Navy has reportedly awarded Southwest Marine Inc. (SWM) a

cost-plus-award-fee contract worth \$11.6 million for Post Shakedown Availabilities (PSAs) for Aegis destroyers USS *Fitzgerald* (DDG 62) and USS *Stethem* (DDG 63). The contract includes the option for work on USS *Benfold* (DDG 65), USS *Milius* (DDG 69) and USS *Hopper* (DDG 70), bringing the possible total of the contract to approximately \$30 million. The work package consists of post

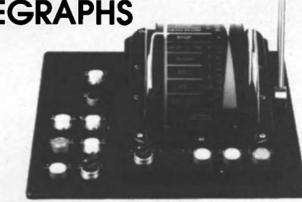
delivery repairs, preservation and upgrades to the hull as well as the mechanical and electrical systems. Work is scheduled for April-June 1996 on USS *Stethem*, and for May-August on USS *Fitzgerald*. The balance of the work on the remaining three vessels will be concluded by May 1988. All work is being performed in SWM's San Diego yard.

For more information on SWM
Circle 82 on Reader Service Card

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Dubai Wins FSO Conversion; Dalian Completes Graving Dock

Dubai Drydocks has won a contract for the conversion of a tanker into a Floating Storage Offloading Unit (FSO). The engineering was carried out by Single Buoy Moorings (SBM) and the FSO will be chartered by Elf-Congo for use on the Nkossa oilfield offshore the Congo. Its primary functions will be to receive, store and offload the stabilized crude oil produced on the field to export tankers. The FSO is expected to stay on-site for a minimum of 10 years.

The vessel is a 273,000-dwt tanker built in 1974, and the project consists of two major parts: the refurbishment of the vessel and the conversion to provide the required functions of the FSO. The major work includes: the installation of a purpose-built extension on the vessel's bow that will support the station keeping turret mooring system; the fabrication and installation of a helideck and a new boarding system; the installation of a new metering skid unit and a new cargo control room; major modifications to cargo systems; the conversion of the boiler to a new dual-fuel system; and the total refurbishment of the accommodations. The main design work for the FSO is being undertaken by SBM, but a significant amount of detailed engineering is being undertaken by Dubai Drydocks.

Dalian New Shipyard, a subsidiary of China State Shipbuilding Corporation (CSSC), announced the completion of a 1,181 x 262.5 x 42.7 ft. (360 x 80 x 13 m), 350,000-dwt capacity graving dock, complete with a 900-ton gantry for constructing harsh environment rigs and large offshore structures. CSSC operates 26 shipyards, 67 marine equipment manufacturing plants and 37 design and research institutes throughout China. Its subsidiary, China Offshore Industrial Corporation, is responsible for coordinating all commercial business related to newbuilding and repair of offshore rigs and structures on behalf of the group.

For more information on
Dubai Drydocks
Circle 49 on Reader Service Card

For more information on
Dalian New Shipyard
Circle 50 on Reader Service Card

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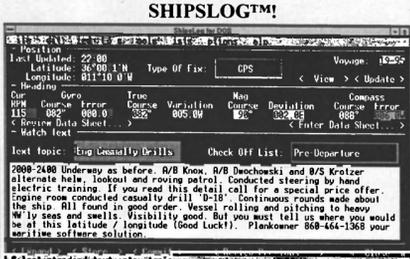
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Circle 2E on Reader Service Card

Recent Ship Sales

This report was compiled by Shipping Intelligence, Inc., a New York maritime consulting firm which tracks sale prices of secondhand bulk carriers and tankers. For further information, call (212) 997-0966.

Date	Vessel Name	Vessel Type	DWT	Year Built	Sale Price (M)	Date	Vessel Name	Vessel Type	DWT	Year Built	Sale Price (M)
12/4/95	Daishowa Voyageur	Bulker	15,192	82	\$7.3	12/4/95	OMI Missouri	Bulker	45,400	83	\$15
11/20/95	Empress	Bulker	17,309	90	\$19.3	12/4/95	New Glory	Bulker	46,056	85	\$15.6
12/4/95	San Jahn I	Bulker	19,464	70	\$2.2	12/11/95	OMI Sacramento	Bulker	49,675	83	\$15.2
11/20/95	Karlovy Vary	Bulker	22,623	74	\$3	11/20/95	Global Epica	Bulker	62,412	90	\$9
11/20/95	Golden Trader	Bulker	24,347	79	\$6.5	11/20/95	Mercury	Bulker	62,503	72	\$3.5
11/20/95	Blue Cosmo	Bulker	25,426	82	\$8.8	12/8/95	Tonci Topic	Bulker	65,000	76	\$7.9
12/11/95	Seminole Maiden	Bulker	26,536	73	\$3	11/27/95	K Fortune	Bulker	70,135	85	\$31
12/11/95	Bluebell Susannah	Bulker	26,900	73	\$7	12/4/95	Depa Giulia	Bulker	80,013	73	\$8.4
12/4/95	Jemima M	Bulker	26,904	74	\$3.5	12/11/95	Ron	Bulker	117,949	72	\$4.4
11/20/95	Arrowcane II	Bulker	27,259	71	\$1.3	11/20/95	Stainless Waqqa	Tanker	7,544	86	\$6.5
12/8/95	Great Uniarch	Bulker	28,000	77	\$5.5	11/27/95	Fuji Braves	Tanker	10,732	83	\$7.8
12/4/95	Federal Matane	Bulker	28,214	84	\$12.5	12/11/95	Vivaldi	Tanker	25,170	68	\$1.2
11/20/95	Dryso	Bulker	31,945	78	\$8.25	11/20/95	Elba	Tanker	29,892	75	\$4.5
11/20/95	Ocean Bright	Bulker	33,880	72	\$2.6	12/8/95	Capri Beta	Tanker	33,420	81	\$10
12/4/95	Sealady II	Bulker	34,607	84	\$13.5	11/27/95	Columbia Neptune	Tanker	60,068	81	\$13
12/8/95	Frotauruguay	Bulker	38,000	81	\$8.5	12/11/95	Abbeydale	Tanker	60,840	76	\$6.2
11/27/95	New Noble	Bulker	38,303	84	\$14.5	11/20/95	Skaujord	Tanker	84,656	83	\$15.7
11/20/95	World Themis	Bulker	39,000	77	\$8.3	11/27/95	Handy Sonata	Tanker	89,920	80	\$12.8
11/27/95	Armonia	Bulker	41,502	73	\$4.5						
11/27/95	Libre	Bulker	43,685	89	\$21.5						

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Stolt Parcel Purchases Four Chemical Parcel Tankers From Danish Interest

Stolt Parcel Tankers Inc. purchased four 4,700-dwt chemical parcel tankers from Finansieringsselskabet Gefion A/S, Denmark. Acquisition of the ships provides the company with one of the most modern and competitive coastal chemical tanker fleets in Europe. The ships will be traded

in the Stolt-Nielsen Inter Europe Service (SNIES).

The four vessels were built in 1991 and 1992 at Aarhus Flydedok in Denmark, and are IMO type 2/3 ships, with 14 stainless steel cargo tanks each. Delivery of the ships is expected to be completed by March, and the tankers will be

renamed *M/T Stolt Dipper*, *Stolt Tern*, *Stolt Kite* and *Stolt Petrel*. Stolt Parcel Tankers Inc. is part of the Stolt-Nielsen S.A. group, which provides transportation services for bulk liquid chemicals and other specialty liquids through its parcel tanker, tank container, terminal, rail and barge services.

Kvaerner Stolt Alliance Wins Offshore Structure Abandonment Contract

Elf Petroleum AS awarded Kvaerner Stolt Alliance a contract to handle abandonment and removal of the installation on the Norwegian North East Frigg field. The project calls for the abandonment and removal of the control unit and wellhead structure, including pipeline stoolpiece and control cables, and is reportedly the largest contract of its type ever awarded for the Norwegian continental shelf.

Work on the project was scheduled to start almost immediately following the contract announcement on January 22, and the vessels *DSV Seaway Osprey*, *ROSV Seaway Surveyor* and heavy lift ship *Stanislav Yudin* will be used in the marine operations.

For more information on Kvaerner Installasjon AS
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Lisnave Completes Two Chem Carrier Conversions

Portuguese yard Lisnave recently completed two conversion contracts for Latvian Shipping Co., preparing two former product tankers for service as chemical carriers. The first job entailed preparing the bare steel tanks of a 26,000-dwt Russian newbuilding, *Indra*, to receive chemical cargo. The vessel's narrow wing and double bottom ballast tanks were coated with a coal tar epoxy, and 10 cargo tanks were coated with siloxirane polymers, manufactured by U.S. company APS. Reportedly, *Indra* left the shipyard carrying cargoes of methilic alcohol and lube oil.

The second vessel, *Dzintari*, a 15-year-old phenolic resin-coated product tanker, underwent more extensive modifications. The vessel's cargo tanks were gritblasted internally and painted with siloxirane, and the cargo lines and pipes in way of the cargo section were gritblasted outside and inside and refitted. The smaller diameter pipes and more than 500 valves were replaced with stainless steel fittings. The 16 stainless steel deepwell pumps were also taken ashore and upgraded to a standard suitable for high grade chemicals.

Upon completion, *Dzintari* obtained an IMO class III notation, usually reserved for vessels with stainless steel tanks. The vessel did not lose its previous rating as a product tanker and in regards to the extent of the conversion performed, it is believed to be an industry first.

For more information on Lisnave
Circle 177 on Reader Service Card



Tanker Jupiter, Bay City, Michigan



Crane Barge BOS 400, Capetown, South Africa



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American Eagle Returns To Gulf Of Mexico

After 60 days on the east coast of Florida, American Eagle Marine, Inc. has returned to the Gulf of Mexico, having successfully salvaged the 4,500-hp tug *Marjorie B. McAllister* in 140 ft. (42.7 m) of water, and the 2,200-hp tug *M/V Sea Hawk* (ex-*Reno Grande*) in 80 ft. (24.4 m) of water. *Marjorie B. McAllister* was located 70 miles east of Jacksonville, Fla., and was delivered to Jacksonville for refurbishment. The *M/V Sea Hawk* was lifted and secured to an oceangoing deck barge and brought back to American Eagle Marine's Harvey Canal Yard to begin refurbishment of the vessel.

Since returning to the Gulf of Mexico, American Eagle has completed a 162-ft. (49.4-m), 115-ton cession installation at BP Oil for Kostmayer Construction, and is presently preparing for two platform removals in the South Pass area. American Eagle utilizes its chartered derrick barge *D/B Southern Hercules* for the above-mentioned work.

For more information on American Eagle
Circle 85 on Reader Service Card

RTK Supplies Island With Sea Truck For Oil Pollution Control



RTK STW Sea Truck.

U.K.-based boat builder RTK Marine has supplied a 39.4-ft. (12-m) Sea Truck to the island of Malta. The RTK STW 412 Sea Truck will reportedly be used to protect Malta from any oil spills or pollution that could affect the island's vital coastline.

The 412 Sea Truck features a non-slip, self-draining deck, useful in oil pollution control operations. Both oil boom and oil recovery equipment can be carried and deployed using the deck crane or built-in bow ramp. The ramp can be lowered at sea by the underdeck foam buoyancy. Beaching operations are also possible, and the Sea Truck is equipped with full length beaching skags for this purpose. The craft is powered by a single diesel engine, coupled to an out-drive.

This Sea Truck joins the other craft RTK Marine has constructed for oil pollution control operations worldwide.

For more information on RTK
Circle 19 on Reader Service Card

February, 1996

Gladding-Hearn Begins Construction On Pilot Boat

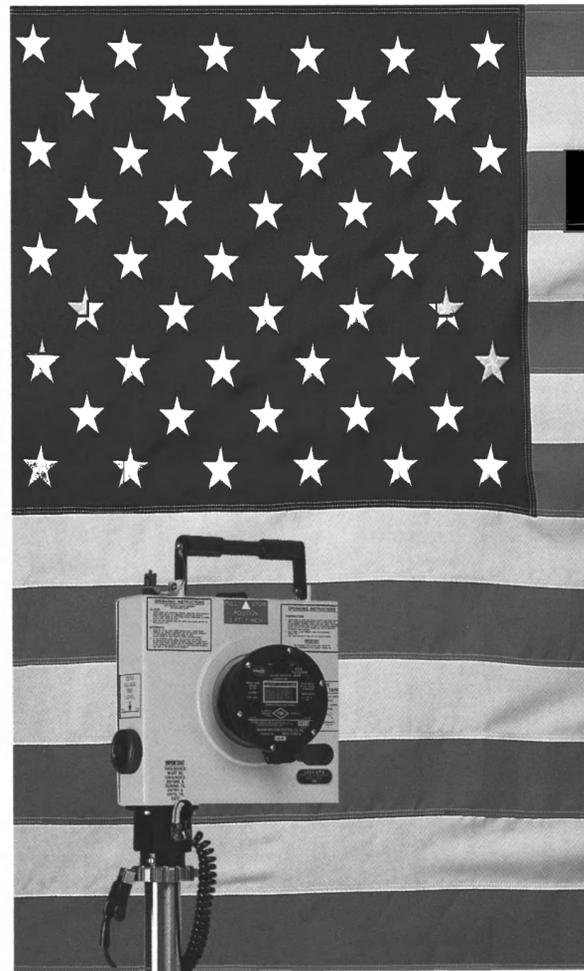
Gladding-Hearn Shipbuilding, The Duclos Corp., has begun construction of its fifth pilot boat for the Virginia Pilots Association, based in Virginia Beach, Va. Delivery is scheduled for August. According to a pilot association official, the all-aluminum vessel

will be used to board ships at Cape Henry and occasionally to relieve other boats operating in the Hampton Roads harbor. The boat measures 51 ft. (15.5 m) overall, with a 17-ft. (5.2-m) beam, and is powered by 6V-92TA Detroit Diesel DDEC engines. The vessel houses the yard's latest noise-deadening technology — metal sheathed, sound-absorbent insulation under the deck and against the engine

room bulkheads, combined with a sound-reducing, combustion-air intake system. Heavy duty, resilient engine mounts reportedly keep noise levels in the wheelhouse under 80 decibels at cruising speeds. Safety features include grabrails inside and out, wide side-decks and a boarding platform on the roof.

For more information
Circle 26 on Reader Service Card

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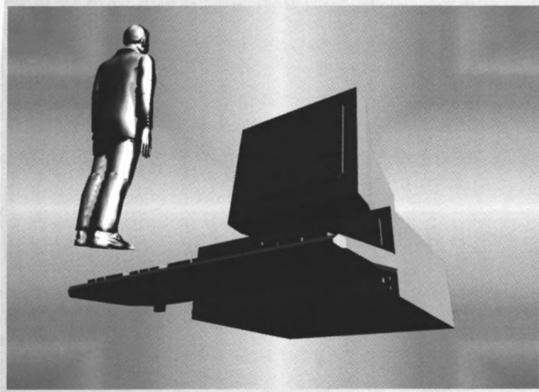


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Circle 276 on Reader Service Card



information technology

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MTC Offers Computerized Shop Steward

Treading the line between Information Technology (IT) and Computer-Aided Design/Manufacturing (CAD/CAM) is Micro-computer Technology Consultants, Ltd. (MTC), which has introduced the new Steward remote monitoring system.

The Windows-based software package monitors multiple machines via a multiplexed RS-232 connection and sends this information to a PC in another area of the shop or office — essentially providing necessary informa-

tion in a comprehensive form to a CAD/CAM environment. The Steward allows a production manager to supervise the status of a number of machines from a single PC. The system will display current machine information including machine status, activity, current job, current part, estimated job time, job percentage completed and percentage of up-time.

In addition to its monitoring capability, the Steward will be able to log information such as ignitions per station; on-time per station; consumption of cut fuel, oxygen, nitrogen and water; and tonnage plate loaded and tonnage parts cut. Steward can also print hard copy

reports of all collected information.

The Steward provides the shop manager with up-to-the-minute information on production jobs with the touch of a key. It also brings a unique capacity to the plate cutting industry by facilitating tracking of all process variables for enhanced quality control and documentation.

MTC is a company concentrating on the development and implementation of CNC cutting machine software for industries including general fabrication, rail and shipyard transportation, mining, sheet metal and more.

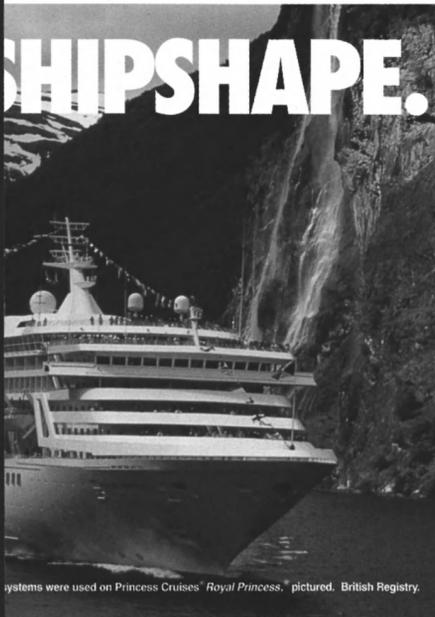
For more information on the Steward
Circle 54 on Reader Service Card

ShipsLog Automates Log-Keeping Functions

Plankowner Software, a recently-formed division of IEPS, Inc., offers ShipsLog — which, according to the company, is a software package originally developed for the Military Sealift Command (MSC) by Emprise Corporation of Ledyard, Conn. Reportedly, the original version the software — described by the company as a complete electronic log keeping solution for professional shiphandling personnel — is U.S. Coast Guard-approved, and has been in use in the MSC for more than a

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INFORMATION TECHNOLOGY

year.

According to the company, Ships Log has proven very effective at reducing the time required for recording log data. Plankowner redeveloped the software for commercial use, and the logs now provided include Remarks Sheet Position Log, Data Sheet, Night

Orders, Standing Orders, Departure, Arrival, Master's Daily and NOAA Weather Reports.

The software supports user-defined access levels, data replication and electronic data encryption to ensure data integrity. A shoreside installation supporting multiple databases allows for the electronic

transfer of log data. Ships Log for DOS is available immediately in both single-user and network versions; a Windows version is in the pipeline for release next month.

For more information on
Plankowner Software
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DXI-Net Networks Shippers With Fast Frame Relay

DXI Incorporated has launched series of broad-based networking services. Collectively called DXI Net, the new services will provide the infrastructure for the exchange of information between DXI and its customers. Customers will also have the ability to directly communicate with each other using DXI-Net.

DXI-Net establishes a high-speed, frame relay network to connect DXE-RateMaster systems worldwide to the DXI data repositories in Pittsburgh, Pa., and Livingston, N.J. Customers can use DXI-Net to connect to DXI RateMaster as well as all of their remote offices worldwide. Working with leading network service providers, DXI claims it is able to provide high-speed TCP/IP (Internet protocol) connections at a cost savings to the customer.

"Our customers will immediately see the advantages of DXI-Net through improved DXI-RateMaster Data Synchronization procedures. Tariff publishers will experience more efficient ATFI filing processes," said Kevin M. Foy, vice president of client services. The high speed of data transmission will allow better rating accuracy and the ability to transmit large filings to the Federal Maritime Commission with less monitoring.

Other reported benefits of the service include the elimination of low-speed dial-up procedures; improved system management and support; network access to DXI's OceanRate database; and e-mail communication capabilities with DXI personnel and other DXI customers.

DXI Incorporated, headquartered in Pittsburgh, is a software and services company whose clients reportedly include 42 of the top 50 liner carriers, including Crowley American Transport, A.P. Moller-Maersk Line, Orient Overseas Container Line (OOCL), Evergreen America Corporation, P&O Container Line, Nedlloyd Lines, Sealand Service, NYK Line (North America) and Hanjin Shipping Company.

For more information on
DXI Incorporated
Circle 56 on Reader Service Card

Rydex Upgrades Sat Software

Rydex Systems has released enhanced versions of its PC-based ship/shore satellite communications software.

The enhancements are described by Rydex as an integral part of a program designed to address the impact of new commercial and legislative challenges facing the marine industry on ship/shore communications. The company's

Maritime Reporter/Engineering News

INFORMATION TECHNOLOGY

development was accomplished in association with international marine clients such as Stolt Parcel Tankers (U.S.), Sea-Land Service (S.), Jo Tankers (Norway), Helmar (Greece) and Chemikalien transport (Germany). They are directed at three system areas: optimization, maximizing the efficiency and productivity of all infrastructure elements; connectivity, in terms of integrating vessel, shore and remote offices into a complete network; and management, providing for advanced supervision, administration and control of the network.

Rydex RMS-PC Ship/Shore for Windows

RMS-PC version 4.02 has been released following extensive feedback from shipboard users working in association with the Rydex Vancouver development team. RMS-PC is the heart of the day-to-day shipboard message, data and image communications operations, and its features now include extended e-mail archiving functions; comprehensive message search and retrieval options; a new look for its editor, with spellcheck and extended options; and improved on-line/hard copy documentation.

Mail Manager

The Rydex Mail Manager provides the shore-based hub of the messaging infrastructure, facilitating both message management and connectivity functions. The new release now runs under both OS/2 2.11 and OS/2 Warp. One of the key advantages of the Rydex mail manager technology is that the OS/2 operating environment allows true multi-tasking operation, scalability of hardware and system integrity.

Version 3.00.0 of the following Rydex gateways are also included in this release: IBM AS/400; AT&T; cc:Mail; Comtext; Fax; Mail Manager; MCI; MHS; MSMail; PC; Print Manager; Router; and DCE TelexBox.

Automated Message Exchange (AME)

AME is the unique Rydex Network Management System. Management of the ship/shore infrastructure is a key requirement in modern ship management where multiple applications will be required. AME Version 4.02.01 has enhanced Remote Systems Management, Automated Data Collection and Application-to-Application interface.

"The impending implementation of the IMO ISM Code and similar legislation, aside from the ever-increasing commercial pressures, is placing more and more significance on the ship/shore communications infrastructure," said **Bill Jubran**, chief operations officer for Rydex.

"It is a vital strategic decision for vessel owners and managers to implement an efficient and manageable ship/shore communications infrastructure. A managed infrastructure, integrated with shore-based systems and independent of specific applications, will provide

the essential foundations upon which to build the commercial applications and legislative compliance required in the near future."

For more information on Rydex
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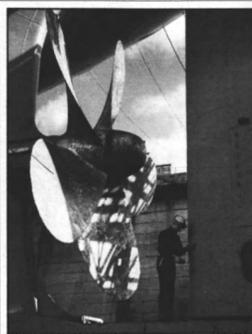
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Rydex To Manage Keystone Shipping Network

Rydex Systems is helping a Philadelphia shipper save time and money through network informatic exchange and communications.

Keystone Shipping Company of Philadelphia selected Rydex to implement and manage an advanced private ship/shore communications network (PSSN). The network will utilize the Rydex Advanced Ship/Shore Technology products and services to link Keystone's Philadelphia headquarters, California office and 22 vessels within the Keystone fleet, to a fully integrated communications infrastructure for messages, data and fax/image transmission. In addition to the supply and implementation of the network, Rydex will also manage the day-to-day operation of the network for Keystone.

Keystone, founded in 1919, specializes in the transportation of bulk cargo — specifically petroleum products, crude oil and chemicals — with clients that include leading world oil and chemical companies, many of whom have chartered Keystone vessels.

"Communications is an inherent and vital part of our ongoing commitment to improving quality in respect to crew and vessel safety, the environment and operational efficiency," said John Miller, Keystone's Rydex product manager. "We see the implementation of the Rydex communications infrastructure as the essential foundation to streamlining our internal communications and enabling a variety of strategic applications that will deliver service benefits to our customers."

"Keystone Shipping Company has selected a Rydex-managed private communications network, endorsing our decision to introduce this innovative and unique service for the maritime community," said Bill Jubran, Rydex chief operations officer. According to Mr. Jubran, the PSSN was launched following detailed consultation with major marine organizations. Of Rydex's continuing role in the network's operation, he said: "It is simply not enough to provide technology; it also has to be managed."

The Rydex PSSN will provide electronic mail communication between vessels and offices and will incorporate the latest Rydex Fax/Image option that optimizes the quality and cost of fax transmission of original forms and documents. Through Rydex advanced gateway technology, e-mail messages can be routed around the world via public networks or delivered as Telex.

Rydex, established in 1991, combines sophisticated communications technology with global network management for marine industry applications. Rydex has offices in Vancouver, New York, London, Greece, Singapore and Hong Kong.

For more information on Rydex
Circle 57 on Reader Service Card

Hitec To Acquire Marine Consulting Group

Hitec AS announced its intention to make an offer for all outstanding shares of Marine Consulting Group AS (MCG). The offer has been recommended by the board of MCG, and the four major shareholders have sold their 50.3 percent holdings.

The reason for the acquisition is the significant synergy effects perceived related to technology, market and products. With access to each other's technology, the two companies believe they will be able to develop new products, both jointly and separately. Hitec's multi-purpose remote control unit, for example, combined with MCG's technology, will result in simplified and more user-friendly systems. With access to Hitec's software and control systems, MCG will be able to increase the technological content in its products — a factor that will strengthen the company's competitive position.

Maritime Reporter/Engineering News

Hitec believes that — through its ownership of the Multi-Fluid companies — the letter of intent signed to acquire the subsea company JDS, and now also MCG, places the company in a strong position to carry out new field developments, such as systems for:

PROJECT	COMPANY
Drilling of production wells	Hitec
Metering oil, water and gas flows.....	Multi-Fluid
Transferring of crude oil offshore	MCG/APL
Installation and maintenance of subsea equipment.....	Hitec/UDS
Control and monitoring of production processes	Hitec
Loading/unloading of production vessels and offshore platforms	MCG

Marine Consulting Group is a supplier of systems for offshore transfer of crude oil. The company's systems for oil transfer consist of the Bow Loading System (BLS), the Stern Discharge Systems (SDS), and the combined loading and offloading Stern Loading and Discharge system (SLDS). The company's STL (Submerged Turret Loading) concept represents its most important area of business. The STL system was developed in the spring of 1992 in cooperation with Statoil and Marintek. The company has exclusive worldwide rights to the production and distribution of ship-related parts of the STL technology. MCG has delivered more than 20 systems for loading and offloading shuttle tankers and floating storage vessels.

Multi-Fluid specializes in instruments for multi-phase metering. The multi-phase meter makes it possible to accurately measure water, gas and oil flows from wells, without separating the different components.

UDS is a Norwegian company with special competence in the design of remotely controlled subsea operations. Hitec's remote control technology together with UDS' subsea experience, it is believed, will provide the necessary foundation for becoming a leading supplier of advanced subsea vessels and robots in the future.

For more information on Hitec AS
Circle 94 on Reader Service Card

Indian, Israeli Shippers In Cooperative Pact

The Shipping Corporation of India Ltd. (SCI) and the Israeli national carrier, Zim Israel Navigation Co. Ltd., have agreed to cooperate in providing a joint container service to the Indian foreign trade.

While the details, such as ports of call, frequency, and other factors have yet to be worked out and will be announced at a later time, the arrangement envisages the development of cooperation in stages.

February, 1996

Zim Israel will gradually introduce vessels with the aim of upgrading the present SCI container service between India and the U.K. to eventually reach a weekly frequency. The joint service will enable the companies, through hubs in Colombo and Barcelona, to transship containers through connecting services to the Far East, the U.S., and South America. The first stage of the service was

slated to begin at the beginning of this year, and the companies have also agreed to cooperate in other transport-related areas.

Bisso Sets Production Deck In Alabama

Bisso Marine Company, Inc. has set a 280-ton production deck in six feet of water in Alabama State tract 59 Mississippi sound for

Legacy Resources Co. The 280-ton production deck was transported from Dolphin Services, Houma, La., on Bisso Marine Company's deck barge *Big Chief*, and towed by tug *Darlene Bisso* to the Alabama site. The 600-ton D/B *Lili Bisso*, stationed in Mobile, Ala., placed the deck on piles driven by Jordan Pile Driving of Mobile. The project was engineered and managed by MPC International of Houston.



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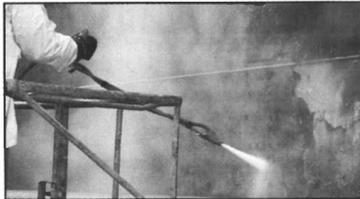
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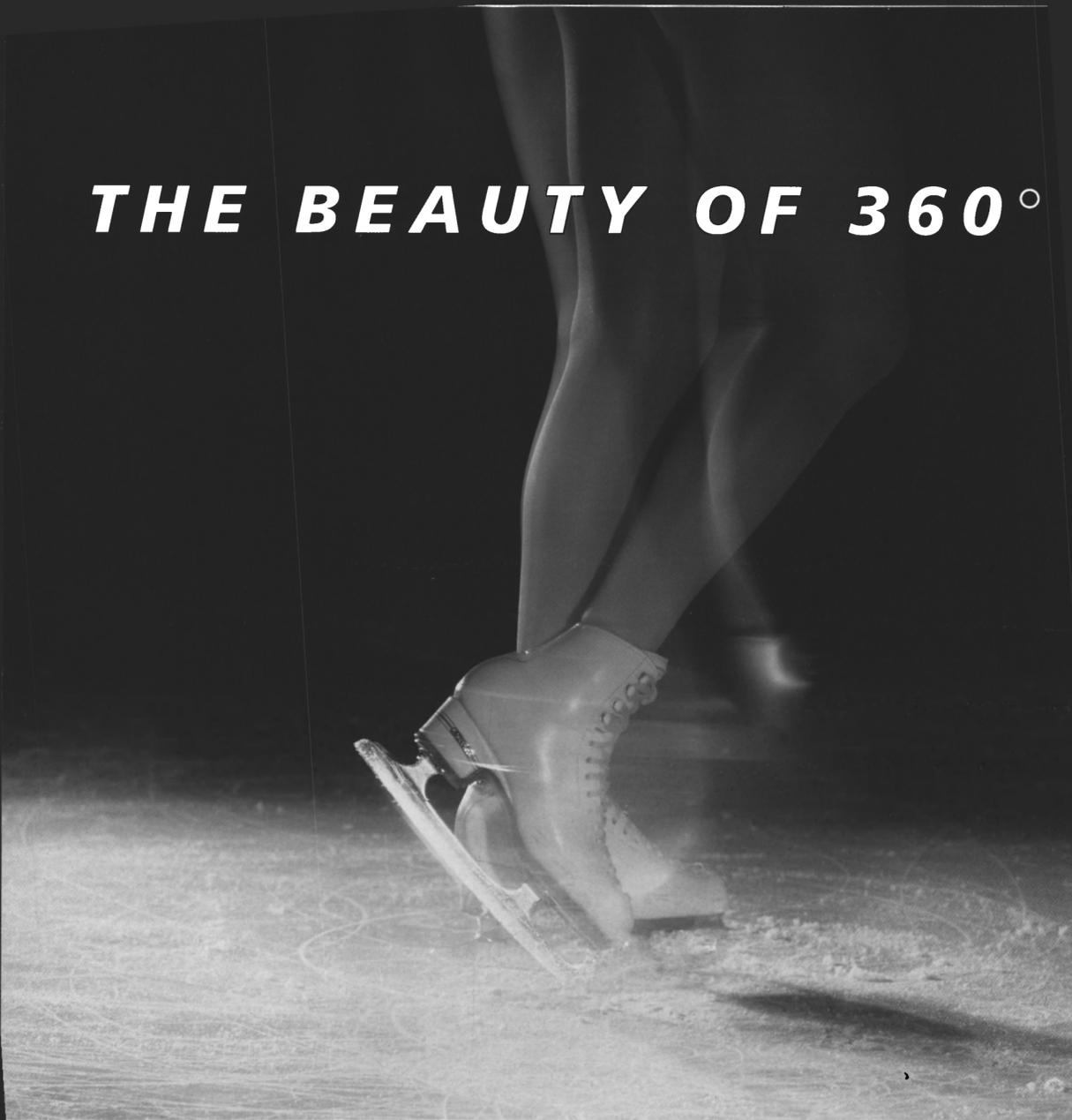
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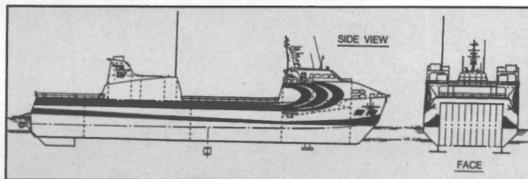
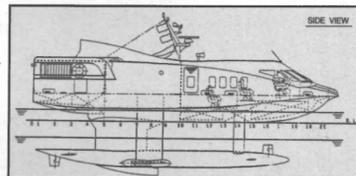
Contents

Page	Story
46	Far East Column: International editor Alan Thorpe offers an in-depth round-up of new order information as well as behind-the-scenes negotiation updates.
48	Singapore: Local yards fight fierce competition to retain position atop repair market.
50	Sea Japan '96 Preview
54	South Korea: Shipbuilding industry expansion continues as builders push for more market penetration.
117	Japanese Industry Statistics

50 JAPAN

Challenged by the appreciating yen and the expansion of the international shipbuilding industry, Japanese shipbuilders and equipment suppliers are focusing on ways to become yet more efficient and technologically advanced.

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Lindenau Taps Massive Market With New Design

Kiel, Germany-based Lindenau GmbH is a good example of how foreign companies are aligning themselves to tap the massive potential of the Chinese market. Last year, Lindenau delivered a pair of double hull oil tankers ordered by China National Machinery, Import & Export Corp., and delivered to Shanghai Shipping (Group) Co. The two tankers were part of a four-tanker contract, with the other two built at Wismar-based MTW Schiffswerft. The 13,144-ton vessels — suitable for transporting oil products in 10 cargo tanks and in two slop tanks — are the first double hull oil tankers built by Lindenau for the People's Republic of China, and belong to the highly developed Lindenau Double Hull Tanker Class 2000 design, which is a portfolio of vessel designs ranging in size from 3,000 to 40,000 dwt. The yard claims that the design offers many decisive advantages, including: minimum risk of environmental pollution; increased collision resistance; minimum effort for tank cleaning; and minimum loss of energy for heated cargo. The vessels are outfitted with a full complement of high-tech equipment, including a four-stroke M&K 6M552C main engine, which develops 4,200 kW at 500 rpm, a shaft generator for economic production of electric energy at sea, three centralized screw cargo pumps for efficient cargo handling and an efficient cargo stripping system for minimizing slop residuals. All cargo tanks, cargo pumps, valves in the cargo system and cargo pipes in the pump room are coated with Hempadur 1540.

For more information on Lindenau
Circle 138 on Reader Service Card

Dalian New Shipyard Completes New Dock

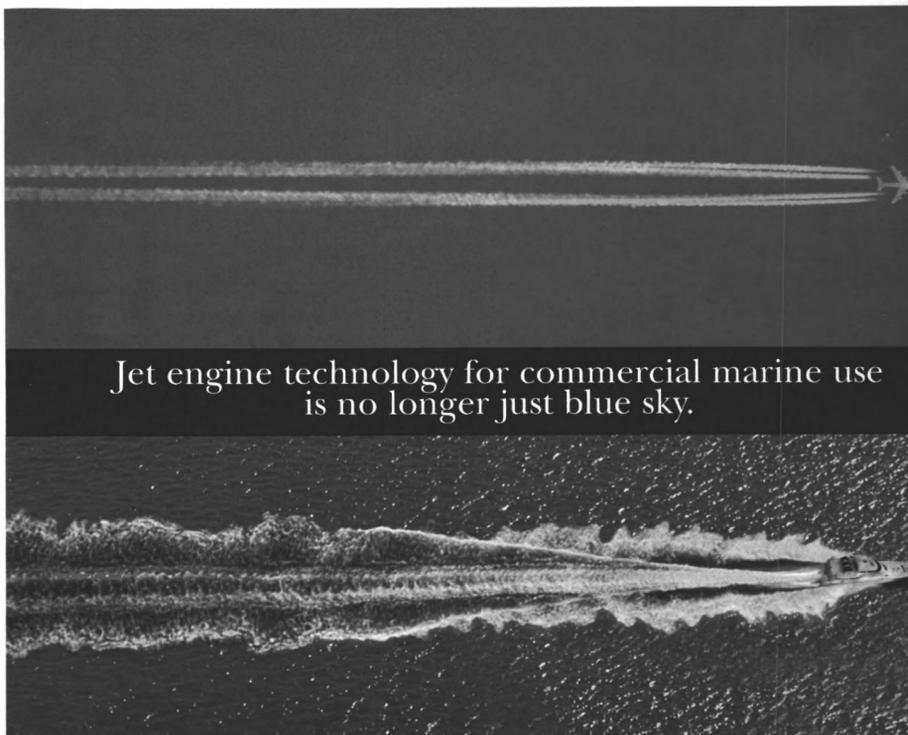
Dalian New Shipyard, a subsidiary of China State Shipbuilding Corp. (CSSC), has completed its new 1,181 x 262 x 43-ft. (360 x 80 x 13-m), 350,000-dwt capacity graving dock, complete with a 900-ton gantry crane, for constructing harsh environment rigs and large offshore structures. The facility is reportedly the largest and most modern in China, and meets ISO 9000 standards. The new yard can construct rigs under license from Friede & Goldman of the U.S., and Marine Structure Consultants of Holland.

For more information on the yard
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February, 1996



Double Hull Oil Tanker, 13,144 tdw / 13,900 m³
LINDENAU - Newbuildings S 237 / S 239



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BOXSHIP BUSINESS BOOMING

by Alan Thorpe, international editor

MRE/N Readers: This is the first installment of a bi-monthly column from international marine journalist Alan Thorpe. Every other month this column will be dedicated to current and projected business in one of the busiest commercial shipbuilding areas of the world, the Far East, making it a must read for anyone conducting, or hoping to conduct, business in this region of the world.

At press time, the latest news on the anticipated order for four 6,300-TEU containerships from P&O Containers — an order expected during the latter part of 1995 — is that Japan's IHI has emerged as the favorite. However, although South Korea's Samsung Heavy Industries (SHI), Hyundai Heavy Industries (HHI) and Daewoo Heavy Industries (DHI) are also heavily involved in negotiations.



Alan Thorpe

Also at the containership news forefront, Japan's Mitsubishi Heavy Industries (MHI) has been busy over the past few weeks with orders for a series of ten 4,173-TEU boxships from Taiwan's Evergreen Corp., two 4,369-TEU ships from Singapore's Neptune Orient Lines (NOL) and two 4,900-TEU vessels from Orient Overseas Lines (OOCL). NOL has also placed an order for four similar-size vessels with SHI. In addition, SHI has received an order for seven boxships (2,700-TEU capacity) from China's COSCO. Taiwan's China Ship Building Corp. (CSBC) has also been active in the domestic containership market with an order from Cheng Lie Navigation for a series of five 1,140-TEU vessels.

Following a number of orders placed with the Polish shipbuilding industry, France's Louis-Dreyfus has ordered two 42,000-dwt geared bulk carriers from IHI's Tokyo shipyard. The contract price is believed to be approximately \$48 million for the two ships, which will be the first of IHI's "Future-42" designs. Some Japanese owners are also reportedly interested in this type of ship.

Japan's Hitachi Zosen has won a contract from Norway's Tentic to build the hull of what will reportedly be the world's largest ever Floating Production Storage and Offloading Terminal (FPSO). The vessel will have a crude oil processing capacity of 200,000 bpd, a crude storage capacity of 900,000 bbls and a gas handling capacity of over 15 mcm/d. The unit will operate on Statoil's Asgard Field in the Norwegian sector of the North Sea. The consortium which won the contract from Statoil consists of ABB, Aker and Maritime Tentic. When the hull is completed in Japan, it will be towed to Aker's yard at Stord, Norway, for completion prior to hook-up. Hitachi Zosen won the order in close competition with Singapore's Far East Levingston Shipbuilding (FELS).



Korean shipbuilding giant Daewoo is said to still be in the running for an order for four 6,300-TEU containerships from P&O Containers.

FELS is also currently completing a floating production ship, which was originally ordered from the yard by Norway's Peder Smedvig during December (the ship was sold prior to delivery to Esso Norway). Peder Smedvig's order was purely speculative, and the price paid by Esso Norway is reported to be in the \$240 million region.

It is also reported that Daewoo has signed a letter of intent with U.S. oil major Chevron for a number of offshore platforms to be employed off the Angolan coast in West Africa. The deal is estimated to be worth \$180 million.

Another South Korean shipbuilding yard active in the market over recent weeks has been Halla Engineering & Heavy Industries (HEHI). A letter of intent has been signed with Paul Slater's First International for two 140,000-dwt suezmax tankers, vessels which will then be bareboat out to independent owners, believed to be Greek-based. HEHI recently announced the eventual closure of its Inchon shipyard, once the new Sambo Shipyard at Mokpo becomes fully operational in late 1996.

One Far East passenger ship operator, Singapore's Star Cruises, is expanding operations by placing a \$70 million, two-ship order with Germany's Meyer Werft. Star Cruises has previously built up its fleet using existing tonnage, this order being the first foray into the newbuilding market. The 75,000-grt vessels, due for delivery during 1998-99, will be utilized in cruising operations in South East Asia and North Asia. Each vessel will have a 2,000-passenger capacity in 1,000 cabins with approximately 800 crew. The main engine output will

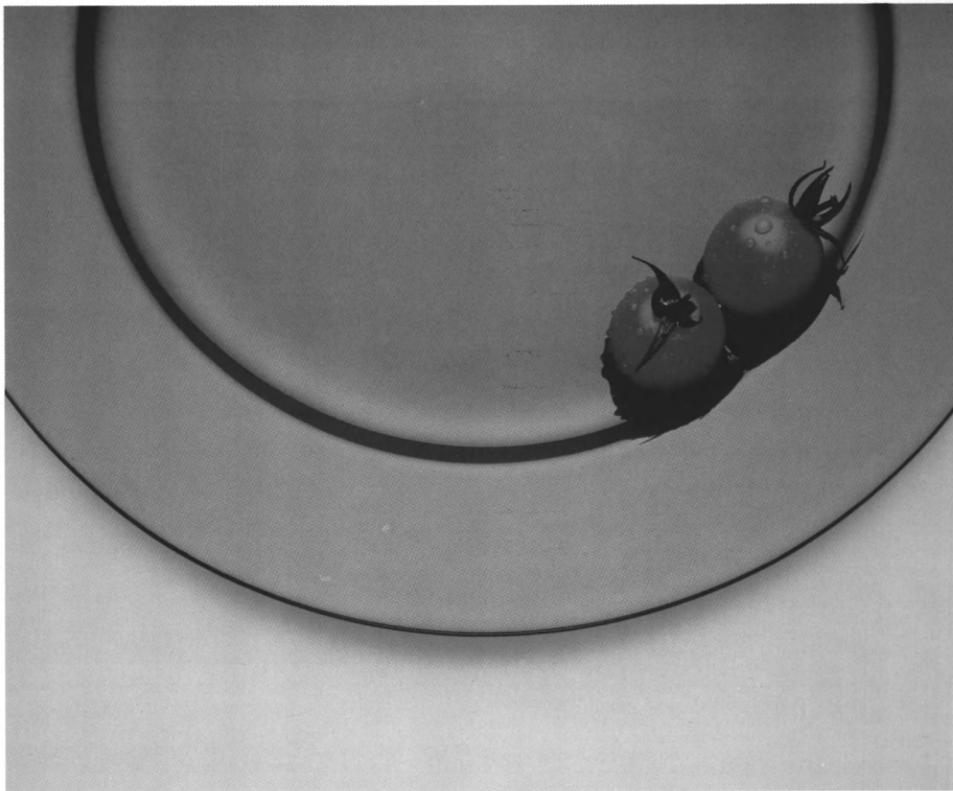
be 50,400 kW and will give the ships a service speed of 24 knots. The ships will be called *SuperStar Leo* and *SuperStar Virgo*.

Another owner of passenger-oriented tonnage is mainland China-based. During September 1993, an order was placed by the Chinese state export company, China National Machinery Import & Export Corporation (Machimpex), with Germany's MTW Schiffswerft GmbH, Wismar to build two combined passenger-container-vessels (PCV 400). The first of these vessels, *Zi Yu Lan*, has now been delivered, the vessel is to be operated by Shanghai Shipping (Group) Co.

The ships will be utilized between various mainland Chinese ports, specifically targeting ones with more than one million inhabitants, located on rivers with depths suitable for seagoing ships and in areas with brisk trade activities such as South East Asia, Hong Kong, Korea and Japan. The ships are designed to improve the transportation infrastructure in these regions, complementing the Chinese airways network and the country's continually improving road system.

Another candidate to add to the growing list of Singapore's FPSO projects is the four/five month life extension of the FSU *Erawan*, which is based on the Erawan Field off Thailand. The work is to begin this April. The design and contracting work for this project is being handled by U.K.-based Wavespec. Intec, Kuala Lumpur, is the main contractor, with Wavespec handling

(Continued on page 108)



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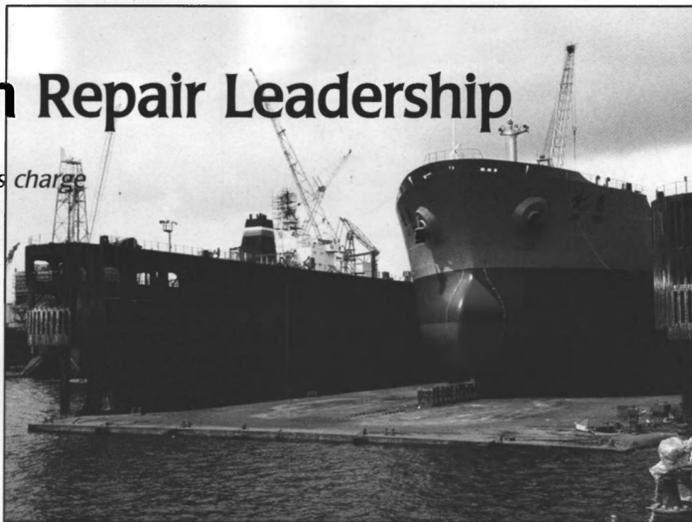
Circle 202 on Reader Service Card

Ship Repair and Shipbuilding in Singapore...

Fighting To Retain Repair Leadership

Tanker conversions to FPSO, FSU lead area's charge

By Alan Thorpe, international editor



Sembawang recently added new repair piers to help it retain its position among top international shiprepair yards.

The main marine activity in Singapore is ship repair. The Singapore area, which includes nearby Malaysia Shipbuilding & Engineering (MSE) at Pasir Gudang, comprises four large yards — Sembawang, Jurong Shipyard Ltd. (JSL), Keppel and Hitachi Zosen, along with a number of medium yards such as Singmarine, Pan United, Atlantis, and a large offshore yard — Far East Livingston Shipbuilding (FELS).

The ship repair industry is among the most competitive throughout the world, but Singapore is now facing threats to its leadership.

The current major threat comes from the two large yards in the Middle East, which have both been making inroads into Singapore's traditional markets including major oil company-owned tankers, Far East-owned tonnage, and more recently, the highly lucrative conversion market.

Singapore also faces a more long-term threat from mainland China, where ship repair prices (worker hours and steel) are currently much cheaper. Currently though, Chinese yards lack the necessary expertise to tackle the higher technical range of repair work as well as lack the type of infrastructure that has made Singapore such a success.

However, the Singapore yards maintain a steady battle to retain their leadership of the industry. Following expansions by Sembawang (new repair piers), MSE (new synchrolift system), and Singapore Technologies (new shipyard with two floating docks), the current expansion programs include a new 400,000-dwt capacity graving dock being built at the existing Tanjong Kling shipyard of JSL (the scheduled operational date being 1996) and a 300,000-dwt capacity graving dock, being constructed at Keppel's Tuas facility.

This new facility — which will complement two existing large docks at Tuas — will eventually take over for Keppel's City yard, which is due for redevelopment.

The Singapore area is also very active in the conversion market,

with particular emphasis upon offshore projects such as Floating Production and Storage and Off-loading Units (FPSOs) and Floating Storage Offshore Units (FSUs). However, it is a pipelayer which is currently making the news.

In December, Allseas Marine Contractors SA, the Swiss offshore and shipping group, terminated a \$211 million conversion contract with Singapore's Sembawang Shipyard.

A spokesman for Allseas said the company had taken that action because of delays in the final delivery date of the pipelayer *Solitaire*. The source added that Allseas was in joint discussions with Sembawang to try to amicably agree upon termination of the contract, which is understood to be around 75 percent complete.

The delivery of the vessel had already been delayed one year, due to mutual agreement between shipyard and shipowner, to the middle of 1996 because Allseas had no available work for the ship until then.

The cancellation of the contract was necessary to guarantee delivery of the ship within a timeframe consistent with the requirements for *Solitaire* to be operational. Completion was set for the end of the next year, but Sembawang could not meet the new deadline.

Other current offshore projects include the 137,684-dwt former NIS-registered conventional tanker *Ellida*, which arrived in Singapore's Keppel Shipyards during May 1995 for a nine month conversion contract to change her role to an FPSO for use by Shell on the Mauri Field off the coast of New Zealand.

The contract, believed to be worth approximately \$35 million, was placed with Keppel by Modec Inc. of Japan. Keppel has also recently completed work on a similar project involving the \$42.2 million contract dealing with the

149,494-dwt *Cossack Pioneer*, formerly *Chevron London*, for Woodside Petroleum's operations in the Cossack Field off the Australian coast.

Meanwhile, JSL also recently made inroads into this market with the \$20 million contract to convert the 134,000-dwt tanker *Mega Eagle* into an FPSO, the first such conversion contract won by JSL from this specialized offshore market. The contract to convert the 1975-built tanker, which is to be renamed *Nan Hai Sheng Li*, was also awarded to the yard by Modec.

One of the medium sized yards, Pan United, recently won a two-ship contract from Canada Maritime (CanMar) to carry out "winterization" modifications and general repair work.

The two ships are the 32,000-dwt, 1980-built containerships *Alligator Joy* and *Alligator Excellence*, both purchased from Mitsui OSK Lines. Both ships entered the yard in January for the work, which included the reinforcement of the steelwork around the vessels' ice bands, internal strengthening, insulation of deck pipes, etc., and container fittings modifications.

In September 1995, Singapore's rig-building and conversion specialist FELS, part of the Keppel Group, purchased the semi-submersible offshore rig *Polyportia* from Norway's Rasmussen Offshore for a price approximated at \$22.5 million. The rig will be converted for deepwater operations

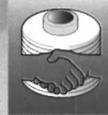
and then offered for sale to operators involved in such operations. The rig arrived in Singapore in October.

Shipbuilding

In addition to this conversion project, FELS is currently Singapore's largest shipbuilder with orders for two Floating Production Vessels from the Norwegian market. Statoil ordered one of the vessels in November 1994 for its Norne Field in the North Sea. The vessel is due for delivery in August.

Apart from the two large offshore vessels at FELS, small tankers appear to be the most popular size and type of ship currently under construction in the various shipbuilding facilities. Sembawang Bethlehem currently has an order for three tankers for Suisse Atlantique, JSL (Humpuss), Singmarine (Petroships and FT Everard), Pan United (Petroships), North Shipyard (PT Bumi), Hitachi Zosen (Daichi Shipping and Ocean Tankers) and Atlantis (Ocean Tankers). Singmarine is also building containerships for Keppel subsidiary, Steamers Containerships; Singapore Technology is building containerships for Regional Container Lines; and tugs are being built at Singmarine, Pan United and President Marine.

With Kvaerner Fjellstrand having a specialized aluminum building yard in the Tuas area, there is also a fast ferry capability in Singapore.



MEETING WORLDWIDE COMMITMENTS

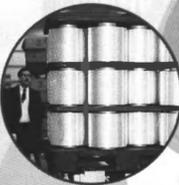


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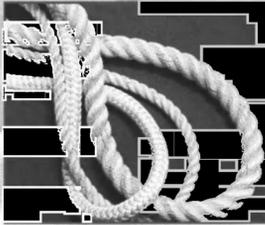


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Maritime Asia Maritime Asia Maritime Asia

JAPAN

Japanese shipbuilders and equipment suppliers espouse the values of technological innovation and international cooperations to maintain their position at the forefront of commercial shipbuilding. — by Greg Trauthwein, editor.

On the eve of Sea Japan '96, the status and challenges of the Japanese shipbuilding and equipment supply industry are not a guarded secret. An array of industry specific and international business situations — including but not limited to the expansion of shipbuilding capacity and the appreciation of the yen — has left already efficient Japanese companies looking for yet more ways to cut costs, increase efficiencies and expand markets.

But current political and business challenges aside, the contributions of Japanese builders and suppliers have been well-recorded and acknowledged. For example, *Maritime Reporter & Engineering News*' own "Great Ships of 1995" feature (page 29, December 1995) honors three Japanese-built vessels from Ishikawajima-Harima Heavy Industries (IHI), Kawasaki and Mitsui.

The following offers an intensive analysis of the Japanese shipbuild-

ing and maritime equipment supply market, spotlighting recent successes and current trends, and providing a glimpse of the near and long-term future for this perennial maritime power.

Shipbuilding Demand

Predictions for newbuilding demand were increased a few years ago (mainly for VLCCs), with activity peaking in the year 2000 and then starting a gradual decline, according to T.

Masaki, general manager, operations department, Japan Ship Exporters' Association (JSEA). However, he said that in the medium term the association projects a supply and demand imbalance due to several factors, including: the increase in newbuilding capacity worldwide due to the construction of new, large building facilities in Korea; the improved production

efficiency in all shipbuilding nations; and facility conversions from military to commercial use.

However, in regards to newbuilding orders in 1996, the association expects that the Japanese shipbuilding industry will secure as many export orders for ship constructions as necessary to fill its annual production capacity.

While noting that it is very difficult to anticipate which ship types

have the best market growth potential, Yoshihiro Midori-kawa of the Shipbuilders' Association of Japan (SAJ) said that the demand for VLCCs can be expected to rise due to replacement demands, and that the demands for both bulkers and container carriers presents other prospects, as seaborne cargoes are increasing in the Asian region.

The diversity of ships that are built well by Japanese builders can best be illustrated by examining recent successes of major yards.

Sumitomo Heavy Industries developed and built the double hull VLCC *Eagle* at its Oppama Shipyard for Mobil Shipping and Transportation Company. Delivered in August 1993, the vessel is powered by a Diesel United-Sulzer 7RTA84M marine diesel engine which generates 28,000 ps at 67 rpm. Classed by ABS, the ship's hull structure was designed using ABS DLA (Dynamic Load Approach) and advanced fatigue analysis to achieve a high degree of structural reliability. More recently the yard delivered the 307,000-dwt double hull VLCC *Berge Stadt* to Norway's Bergesen D.Y. AS. Delivered in March of 1994, the ship features an optimized hull form and high propulsive efficiency, and a computerized integrated cargo and machinery control system. Sumitomo delivered the smaller, but still significant, double hull Aframax tanker *Katja* in



Mitsubishi Heavy Industries

SEA JAPAN '96

Sea Japan '96, scheduled for March 5-9 in Yokohama, will feature representation of more than 350 companies, up from 282 exhibitors in 1994. Non-Japanese exhibitors account for more than half of that total, and there will be national pavilions from Germany, the U.K., Holland, Denmark, Finland and Norway. The European Union is participating in Sea Japan '96 as part of its "Gateway to Japan" export campaign. At the event, the EU will sponsor a one-day seminar, in order to introduce European marine technology and products to the Japanese market. In addition, the EU will host an evening reception party at the Yokohama Grand Intercontinental. A new feature at Sea Japan will be the new technology seminar, which will feature the latest developments in marine products and technology. In addition, one of the prototype vessels in the Japanese research and development project, Techno-SuperLiner, will be on display at a berth close to the exhibition hall.

SEA JAPAN '96 Calendar of Events

Tuesday, March 5	
Opening Ceremony	4:00 - 4:45 p.m., Pacifico Conference Center, Main Hall
Official Reception	5:00 - 7:00 p.m., Hah-Shoh Room, Yokohama Royal Park Hotel
Wednesday, March 6	
Japanese Marine Equipment Assoc. Reception	12:30 - 2:30 p.m., 2F Concourse, Exhibition Hall
Norwegian Trade Council Reception	3:00 - 5:00 p.m., Norwegian Pavilion, Exhibition Hall
Thursday, March 7	
Delegation of the Commission of the European Union Reception	6:00 p.m., East Ballroom, Yokohama Grand Inter-Continental Hotel

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Opportunities For Cooperation Between U.S. And Japanese Marine Equipment Manufacturers

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

More than 800 companies manufacture marine equipment in Japan. They range from large, vertically integrated firms that build ships and machinery, to small companies that specialize in niche areas. Their combined annual sales exceed \$800 million. Japanese companies have established a reputation for producing top-quality, state-of-the-art marine machinery and systems.

Interestingly, Japanese marine equipment manufacturers have derived almost 80 percent of sales from their local market over the past 10 years. They have been generally satisfied with the level of business generated by Japanese shipbuilders. And why not, given the enormous share that Japan has had in the worldwide shipbuilding market?

But things have changed. The yen has appreciated to a point where Japanese shipbuilders are trying to find dollar-based sources of supply to contain rising ship construction costs. This has placed Japanese suppliers in the role of competing with foreign sources for equipment orders from Japanese shipbuilders.

This situation produces some very interesting opportunities for U.S. companies willing to invest marketing and engineering resources to position themselves in the Japanese shipbuilding market. The most obvious possibility is to become a supplier to Japanese shipyards. Another possibility is to subcontract with established equipment suppliers in Japan to manufacture components, and in effect "dollarize" a portion of the final product. Is it realistic to try to enter the Japanese marine market? This is a question most will ask, and appropriately so, given the relative experience of U.S. and Japanese companies in the commercial marine market.

IMA thinks the answer is clearly yes. Our recent work with Japanese and U.S. companies indicates that it is possible to identify business opportunities where both parties can mutually benefit from collaboration. We have found situations where a Japanese shipbuilder or equipment supplier could lower its cost by subcontracting to a U.S. company, and the latter could gain access to new market opportunities. We have found opportunities where military-origin technology of a U.S. firm could be commercialized through association with a company active in the Japanese marine sector. We have also identified opportunities where the U.S. company would provide access to new markets for the Japanese partner. U.S. and Japanese marine equipment manufacturers should look carefully at the possibilities for cooperation. Timing is right, and both can benefit.

August 1995. The 97,220-dwt vessel was built for Finland's Lundquist Shipping Co. Ltd., and was designed and built to meet the latest worldwide requirements for double hulls, new MARPOL regulation adoption at IMO MEPC32 and the U.S.'s OPA 90 regulations.

While Sumitomo is a strong competitor in the tanker segment, it also builds world-class vessels of other types.

A 5,856-unit Pure Car and Truck Carrier, the *Nosac Tanabata*, was delivered to Taurs Carriers of the Wilh. Wilhelmsen Group in late 1994. Powered by a DU-Sulzer 6RTA62U diesel engine to 19.4 knots, the vessel features 12 car decks, including five liftable car decks and one upper-deck car space. Car deck No. 6 (one of the liftable decks) is operated by means of hydraulic jigger cylinders, and other liftable decks are operated by self-rolling table lifters.

Finally, the yard lays claim to building the world's largest (as recognized by the Guinness Book) 200-sq.-m. grab dredger, dubbed *Tosho*. The unit's hull measures

328 ft. (100 m) long, and features a counterweight-balanced and hydraulically operated dredging gear system (a system patented by Kojimagumi). *Tosho's* maximum hoisting capacity is 690 tons, and its maximum dredging capacity is 6,000 sq. m. per hour.

Mitsubishi Heavy Industries' (MHI's) diversity is exemplified by its work last year, as its three yards (Nagasaki, Kobe and Shimonoeseke) completed 29 ships totaling 1.65 million dwt in 1995. This impressive total included two tankers, nine cargo ships, eight bulk carriers, three car ferries, one car carrier, two LPG carriers, one LNG carrier and three miscellaneous ships. Mitsubishi started 1996 where it left off, receiving an order for a versatile crane ship from Fukada Salvage & Marine Works Co. of Japan. The crane ship will be one of the largest of its kind in Japan, and will be equipped with a 360-degree rotary crane with a hoisting capacity of 1,600 tons. The ship will be designed to handle other types of work, including piling and founding of caissons. When in service,

the ship will promptly and accurately take and maintain its position by utilizing a GPS/Electro Optical Automatic Tracking System Distance Meter.

This order is significant in another way, in the fact that the ratio of overseas procurement for the ship will be almost 50 percent. The ship will be designed by MHI's Hiroshima Machinery Works, and the crane will be supplied by U.S.-based AmClyde Engineering Products. The ship will also be equipped with a piling machine made by Continental Machine Co., Inc. of the U.S. Following the great Hanshin earthquake of January 1995, there has been an increase in Japan of maintenance and reinforcement work on ports and bridges. At the same time, the scale of construction work has become larger, and foreign companies have begun to participate in the construction works in Japan.

Another project of interest involving MHI is the recently announced cooperation agreement with Fluor Daniel Inc. (FD), of the U.S., to jointly pursue global contracts for projects in the LNG market. Under the agreement, both companies will cooperate in all activities from business development to construction. FD is a major engineering company with 40,000 employees worldwide. FD maintains strong relationships with petroleum majors, such as Shell, Exxon and Mobil.

Steps Toward A Larger Market

Ship scrapping rates could provide a keen insight into newbuild activity to come. The Japanese

Ministry of Transport reports that the scrapping of aged ships with potentially diminished safety levels is not only vital in terms of navigation safety and maritime environmental conservation, but also for the shipping and shipbuilding industry. Japan is actively promoting scrappings internationally in both the public and private sectors, and it estimates that a number of factors — including the revision of the International Convention for the Prevention of Pollution, and the implementation of regulations man-

dating double hull tankers — could accelerate moves to scrap substantially more tonnage in the latter half of the 1990s.

In April of 1992, the Japanese Shipowner's Association and the SAJ set up an ad hoc committee on ship scrapping to underscore its importance, and to make the improvements necessary to promote ship scrapping. The committee has sent study teams to China and India to investigate the state of the scrapping industries, to exchange ideas, and to make predictions of future volume and capacity.

Since 1978 the Ministry of Transport has provided subsidies to promote ship scrapping, a fund created by the Ship Scrapping and Removal Industry Promotion Association. From fiscal year 1995 onwards, subsidies have also been provided to the oceangoing shipping companies which sell the aged oil tankers for demolition.

While increasing scrapping rates is just a piece of the supply and demand puzzle, the cumulative Japanese industry has worked doggedly on the international front to help optimize the market.

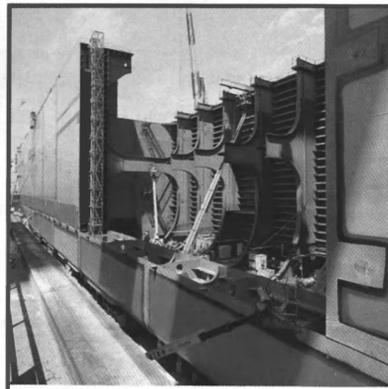
(Continued on page 109)

Japanese Shipbuilding Abstract

Shipbuilders	1,225
Shipbuilders capable of building, repairing ships 500 gt+	222
No. of docks able to accommodate ships >500 gt	209
No. of docks able to build ships of >100,000 gt	9
No. of repair docks capable of handling ships of >500 gt	193
No. of repair docks capable of handling ships of >100,000 gt	12
No. of workers employed by shipyards	55,000
No. of workers engaged in subcontracted work	33,000
Newbuilding orders in FY '94	11,186,000 gt

Source: Japanese Ministry of Transportation

(Complete Japanese industry data and statistics continue on page 111)



NKK's new MX series double hull tanker recently received approval from major classification societies.

Maritime Reporter & Engineering News

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Shipbuilding in South Korea...

Expansion Continues

By Alan Thorpe, international editor

The South Korean shipbuilding industry continues to expand despite the protests of OECD member states. While many feel that expansion in the shipbuilding industry is unproductive at a time when newbuilding orders are still hard to come by, South Korea continues to expand building facilities, with the intention of taking an even larger share of the world's shipbuilding orderbook.

The most ambitious plans involve the new shipyard being built at Mokpo by Halla Engineering and Heavy Industries (HEHI). The new Samho facility will comprise two 500,000-dwt building docks. Newbuilding work has already begun at the yard, which has an impressive orderbook of two VLCCs, cape-size bulk carriers, product carriers and suezmax tankers. The VLCC order comes from Halla Maritime Corp., the shipowning arm of the group.

Last year, Samsung Heavy Industries (SHI) on Kojé Island completed construction of a new 2,099 x 322-ft. (640 x 98-m) building dock, which is capable of building up to ULCC size. It also has ambitious plans to increase turnover during the 1995 financial year to \$1.34 billion from \$927 million in 1994.

The last of the large new construction plans is at Hyundai Heavy Industries (HHI). The Ulsan yard, already the largest single shipbuilding complex in the world, has two more building docks under construction, both 1,181 x 230-ft. (360 x 70-m) (VLCC size), the first one due for the first keel-laying in March. HHI denies that this is an expansion program, with the official line saying that the existing newbuilding facilities

in Ulsan are insufficient for the current orderbook in terms of space and working conditions. HHI said that the two new docks will merely constitute a spreading out of the current building facilities.

While Daewoo Heavy Industries (DHI) is not involved in physical expansion plans, the yard's productivity improvements over the past five years at the large Kojé Island shipyard have led to a 50 percent reduction in the time newbuildings spend in the building dock.

The majority of large South Korean yards concentrate newbuilding marketing efforts on the large tankers, bulk carrier and containership markets. Recent orders have included a series of four large containerships for Singapore's Neptune Orient Lines (NOL) to be built by Samsung; seven smaller containerships, also to be built by Samsung, for China's Cosco; three medium-size containerships to be built by HHI for Hyundai Merchant Marine; and two smaller containerships to be built by Daewoo for Germany's NSB Niederelbe. From the tanker market, orders have been won by HHI to extend the series of 110,000-dwt ships from Norway's K.G. Jebsens from four to six; and two 150,000-dwt oilers for Greece's Ceres Hellenic from Samsung.

On the bulk carrier side, orders include two panamax vessels from Brazil's Docenav for HHI; two new 135,000-dwt units from Hanjin, both for unnamed South Korean owners; two 73,000-dwt units from Hall for Halla Shipping Corp., and two 170,000-dwt units for Daewoo, one for Cosco and one for Japan's Mitsui OSK.

The charter deals preferred by many of the major oil companies have already been seen with the series of product carriers from Halla and the five VLCCs from Daewoo. Both contracts involve ownership and long-term bareboat charters to Shell.

The LNG market is also a major part of all of the yards' ambitions. State-owned Korea Gas Corp. originally ordered four large LNG carriers, three to be managed by Hyundai Merchant Marine, and built at HHI, and one to be managed by Hanjin Shipping, and built

Daewoo's Okpo shipyard.



Samsung has ambitious plans to increase its turnover to \$1.34 billion for the year.

by a joint venture between HHI (the ship and two tanks) and DHI (two tanks). Two of the HHI spherical design ships have already been delivered, as has the Hanjin ship which has a Gaz Transport containment system. According to sources in South Korea, the expected total fleet required for Korea Gas Corp. over the next few years is a fleet of 12 ships, the next batch of four shortly. Meanwhile, projects in Oman and Indonesia are being followed closely by the various South Korean yards.

But the two sectors that all yards are keen to penetrate on a long-term basis are the fast ferry and cruise markets. HHI, Hanjin, Daewoo and Samsung have been involved in fast ferry building programs, all for domestic operators, but international orders have yet to be won.

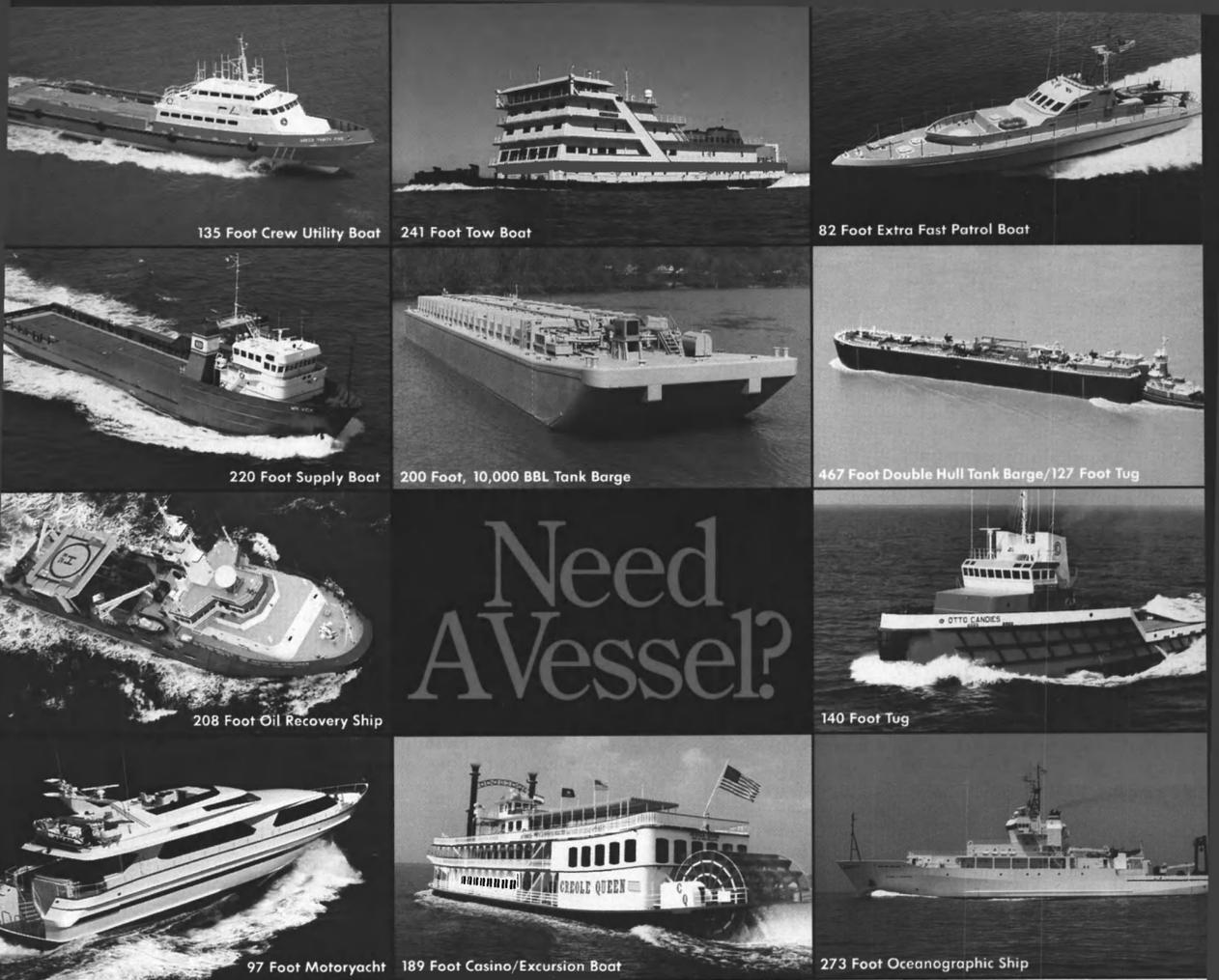
As for cruise vessels, it is unlikely that domestic owners would get involved so the penetration will have to come from the international market. This, the yards see as difficult with the European yards currently dominating the scene.

Ship Repairing

The ship repair industry in South Korea is dominated by Hyundai Mipo Dockyard (HMD), with four large graving docks, the world's largest single repair complex. HMD plays an important part in the world's shiprepair industry, concentrating on niche markets such as bulk carriers, containerships and the conversion industry. South Korea also has a vast domestic fleet, which tends to use South Korean ship repair yards for scheduled dockings. Most South Korean yards admit to a slightly (10 to 15 percent) higher price level basis than the Singapore area. However, South Korea is ideally located for ships trading into Japan, as long as no lengthy tank cleaning operations are required.

Expansion has again been the theme at

(Continued on page 107)



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CORROSION CONTROL

ABS Details How Ballast Tank Maintenance Is Crucial For Structural Integrity

Coatings are a vital part of an effective maintenance culture because, in protecting the ship, they number among the determining factors of the vessel's service life. Some shipowners say this is especially true for double hull tankers. The integrity of the ballast tank structure for these vessels is of paramount importance to their safety because the ballast tanks completely surround the cargo tanks, and thus present a massive critical area that must be protected. The slightest crack in a bulkhead separating these areas could, over time, allow ingress of sufficient hydrocarbons for an explosive situation to develop. Ballast tanks are quite important to the health of single hull tankers as well. The distinction here is that a single hull ship with segregated ballast tanks presents less bulkhead area in contact with cargo spaces.

In order to catch coating breakdown as it occurs, owners of double hull crude carriers are beginning to coat their ballast spaces in light colors. This should expose any leaks or problems instantly, especially if the first coat is of a darker color. Coating expenses run high for ships of all types. The builder of one new VLCC related that 60 acres of coating were needed in one application of the ballast space alone. While this may be an extreme example, industry estimates currently place the percentage of building costs consumed by coating at upwards of 10 percent for a crude oil carrier, 7 percent for a bulk carrier — and nearly 27 percent for a products carrier.

Coatings are primarily applied to maintain the strength of the ship by shielding ballast tanks and protecting the hull. They are also used to preserve the integrity of cargoes that would either react with steel or otherwise require extremely clean tanks (examples

being wine, jet fuels and aggressive chemicals). Coatings also serve a cosmetic function, covering decks and exteriors. In concept, the industry divides coatings into two broad categories: "soft" and "hard."

In one sense, coatings can be likened to the watercolor paints in which a dry tablet of pigment is dissolved in water. When the solvent — water — evaporates, the pigment is left behind. Until recently, all common paints and coatings were based on a similar principle to this, whether the solvent was linseed oil, paraffin oil, water or other much more complex chemicals.

Currently, the most common coatings are more sophisticated products: "hard" coatings, which are largely two-component epoxies that work on a principle similar to that applied in everyday household epoxy glues. The coating itself is dissolved in a solvent (the resin), which is mixed with another liquid (the hardener). While some of the solvent evaporates, the resin and hardener cure to form a new compound, a kind of plastic that remains behind as the coating. This plastic — a cross-linked polymer — is not necessarily "hard." Its properties can be carefully controlled by the chemical formulations of resin (or resins) and hardener.

Today there are literally thousands of epoxy formulations available with different chemical names, using different solvents, offering different properties and differences in the way they cure or react with cargoes. A "soft" coating is like the watercolor mentioned

above in that it is something that does not cure or react chemically on a steel surface once it is applied. The coating remains after the solvent has gone, but since it does not react, it is always resoluble in the original solvent. This might imply that it would be goeey or tacky, but again, it all depends on formulation.

In truth, hard and soft with respect to coatings are only terms of general understanding. Coatings are described as hard or soft, but no one has yet provided a hard and fast rule to separate them all into two families. For example, it would be convenient to say all soft coats fit the description above, but then there are "reversible" hard coatings, such as chlorinated rubber or acrylics, which can be thought of as hybrids, as they are also resoluble (though not reusable) in their original solvents.

Overwhelmingly, today's shipowners choose hard coatings, either a "pure epoxy," industry jargon for the cured epoxy-hardener combination, or a "modified epoxy," meaning a second resin has been added to obtain particular properties. An example of a modified epoxy is what was formerly the most common ballast tank coating around — coal tar epoxy. In this compound, the black tar "modified" or stretched the epoxy resin and brought to the coating some water-resistant properties. Now considered a hazardous substance, coal tar epoxy is falling fast out of favor among western shipbuilders. It has long been decried by surveyors because of the difficulty its black color presents those searching for coating breakdowns and leaks.

Maritime regulations did not always call for ballast tanks to be coated. Two notable items triggered the burst of awareness of their criticality. One was the series of bulk carrier tragedies in the early 1990s; the other the advent of double hull tankers. With these in mind, the marine industry began to realize that ballast structure was extremely critical to the safety of ships, double hulls in particular, and by extension, in other vessels as well. The International Maritime Organization also recognized this, and has mandated coatings for ballast tanks with a special recommendation that for crude carriers, light-colored coatings be used to ease inspection.

Regulations aside, the choice of coating requires careful consideration. In the simplest case, ballast tanks, pure or modified epoxies are generally applied — the added resin under some conditions improving anti-corrosive properties. For cargo tanks, the products to be carried generally determine the nature of the coating. A paint manufacturer will typically offer several formulations, each of which is resistant to several hundred chemicals.

Of course the owner could get around the need for coating cargo tanks by opting for stainless steel construction. Besides that, coatings are not always necessary. If the ship carries only petroleum products, for example, and if the owners do not put water in the cargo tanks and if the product is not sensitive to steel, there is really no reason to coat the cargo tanks. Crude oil tanks are seldom coated, though the owner may coat horizontal surfaces as preventive maintenance to account for acidic content of the crude. Some owners will coat selected parts of the bottom or deck overhead, if in the operator's experience the crude can cause pitting on horizontal sur-

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faces.

Further, it is important to have a minimum film thickness in order to achieve acceptable anti-corrosion performance, which is why most owners order two coats. A second coat would seal the first and work to eliminate both signifi-

cant film variation and the potential trouble posed by bubble bursting. Another item of considerable importance is hand striping, or having a painter with paintbrush give a coat to all corners and angles. Surface tension causes a drying coating to draw away from

sharp corners.

It can be said that an owner pours protection money into a piece of steel from the time it enters the builder's plate shop to the time the ship of which it is a part leaves for the scrapper's yard. While the coating itself in a ballast

tank may remain intact for 15 years, there are maintenance and inspection costs, such as the cost of touch-ups or of replacing sacrificial anodes used to back up the coating. The actual epoxy is only a very small part of the total cost of a coating job. When reckoning the cost of coatings, it is the cost of application — grit blasting and erection/removal of staging — that dominates.

Grit blasting is the heart of the coating process. The reasoning for this is that coatings literally hang on the ship. Virtually all marine coatings applied today adhere to their substrate through mechanical adhesion — in fact, it can be said that the way the coating stays in place is by grabbing onto the raw steel surface. This is why the coatings industry is so keen on surface preparation techniques. Because of the physical nature of the adhesion, one of the biggest threats to the longevity of even well-chosen coatings is not damage from a chemical reaction, but physical damage. Besides coating damage caused by the odd accident where a passing worker drops a hammer and exposes a bit of steel to pit over time, there is the ballast tank problem posed by wave action or sloshing. Wave action can eventually wear the coating off the steel, which is why a good operator will try to operate with ballast tanks totally empty or completely full. An owner who intends to keep the ship 18-20 years does not want to ever have to go back into those tanks and blast and recoat.

Steel will not start to corrode without a catalyst. In a polluted area, for example, there are plenty of catalysts in the air which promote reaction of the cleaned steel, forming an oxide layer and starting corrosion. If, on the other hand, the steel is blasted in a pure atmosphere, it will hold for years before it oxidizes. If a coal pier begins operating next door, the ship may start oxidizing almost immediately after blasting. Chlorides make perfect catalysts; in their presence there will be oxidation right away. The average large shipyard just has to contend with salt air, so it is only a matter of hours before appreciable oxidation begins. The normally accepted procedure in a yard, before starting to blast, is to hose down the substrate with fresh water in an attempt to rinse off as many chlorides as possible. The importance of good surface preparation methods is apparent in many new-building yards, which often go to great pains to this end. Many yards in fact will blast for an entire shift, eight hours straight, and end the shift by covering whatever they have blasted with primer.

These practices are less apparent in repair facilities, where tank recoating is covered by staging and piles of grit awaiting removal. Yet yards report that in a typical

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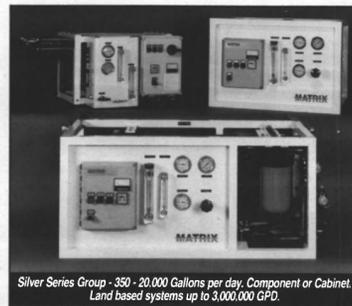
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Armex Selective Depainting: Arm & Hammer affiliate finds yet another use for baking soda

Time constraints, stringent regulations, environmental concerns and increasing drydock and labor costs are just a few examples of challenges which shipowners and ship repairers face.

Recently, a 500-ft. (152.4-m) long missile frigate owned by the German Navy had five coats of paint with a bond failure between the third and fourth coats. Since the ship was on active duty in the United Nations fleet, the Navy sought the aid of Muhlhan, a worldwide ship repair and painting contractor, to correct the problem and reactivate the ship within 10 days. This required a paint stripping method that could remove selective layers to expose only the third coat and provide a uniform surface for successful recoat adhesion.

A common process to correct this problem is sand-blasting; however, using sand would require an estimated 90-day timetable. And since sand cannot depaint selectively, the ship would have required a full recoat (including the primer), as well as the removal and reinstallation of sensitive equipment.

Muhlhan's project manager discovered that an effective alternative may be a baking soda-based depainting technology called Armex Cleaning & Coating Removal Systems, developed by Church & Dwight Co., the makers of Arm & Hammer brand products. Once stripping and adhesion tests confirmed Armex's effectiveness, the Navy directed the frigate to a drydock 70 miles up the Elbe River from the North Sea in Hamburg.

To meet the project timeline, Muhlhan employed two 13-person crews to work continuously with eight media blasting machines powered by three large (750 cfm) compressors using air coolers and receiver tanks. They paint-stripped the ship's estimated 65,000-sq.-ft. surface in five days. This used approximately 30 metric tons of patented Armex Maintenance XL Soluble Blast Media with SupraKleen Rinse Accelerator. The media was dry blasted at 90 psi, using patented nozzles designed to increase media velocity as compared to standard nozzles, resulting in a substantial productivity enhancement. The nozzles also utilize an atomized external water stream which optimizes dust control while reducing water usage (.25 to .5 gallons per minute). The recoating took four days and the Navy was able to reactivate its frigate one day ahead of schedule.

Muhlhan estimates that stripping with sand would have cost approximately \$500,000, when taking into account 90 days of drydock and labor; additional waste disposal and paint costs; and the need to remove and reassemble sensitive equipment. While the labor costs for the crew of 26 for nine days (2,808 hours) is unavailable, the Armex equipment and

media expenses totaled less than \$100,000.

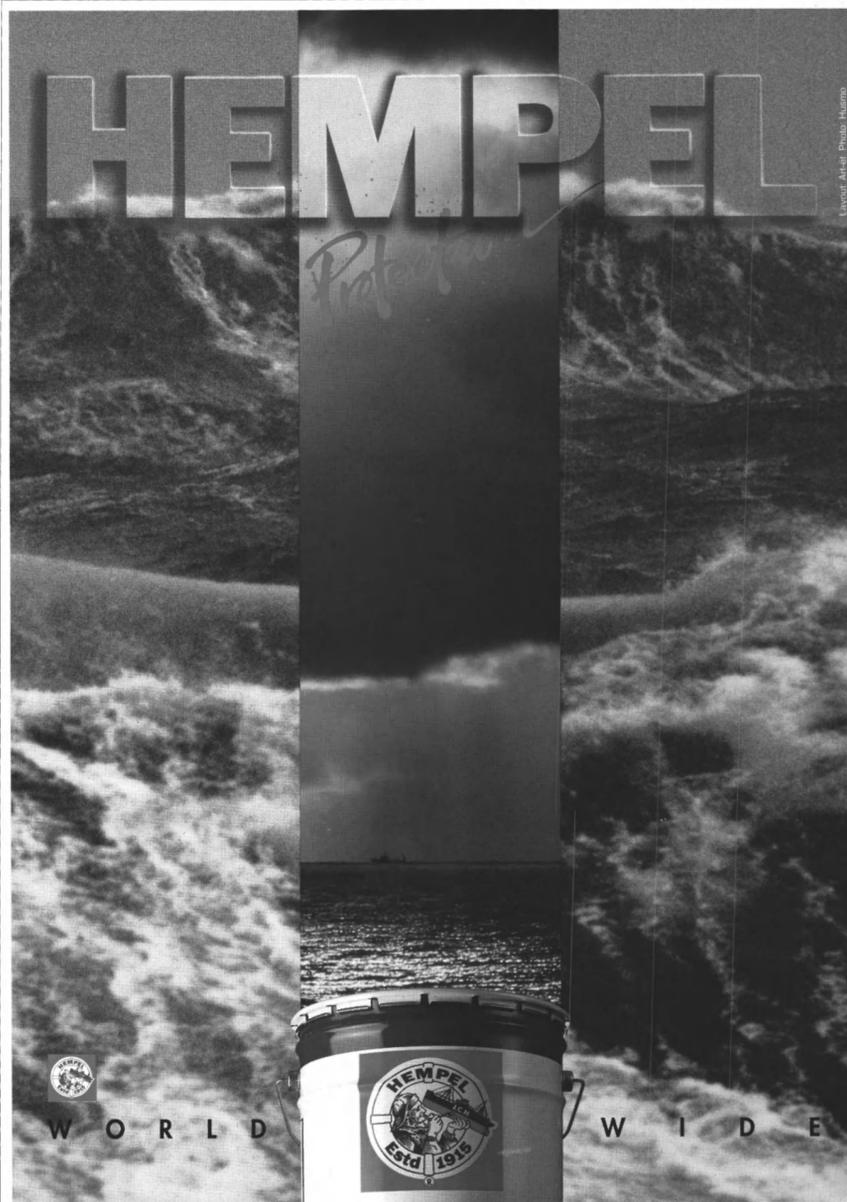
The "ABCs" of baking soda

Armex is a non-toxic, non-hazardous, soft abrasive which is designed to ensure the safety of both worker and environment.

Armex is water-soluble and reportedly generates only one-seventh the waste volume of sand-blasting, thus reducing disposal costs. Muhlhan reports it contained an estimated 99 percent of the spent media on the German frigate job.

Baking soda is a natural, inor-

ganic compound known as sodium bicarbonate. It has a soft and friable crystalline structure. The crystals break down on contact with the substrate, resulting in a more gentle cleaning process, and reportedly will not damage bearings, seals or other moving compo-



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Armex Selective Depainting

nents. Unlike plain baking soda, the Armex crystals are four times larger for greater productivity and include various proprietary formulations for specific cleaning applications and equipment compatibility. The equipment may be used to

blast wet or dry depending on containment needs. It has a patented flow control system which meters small amounts of media (.5 to 3.5 lbs./min.) required for optimal performance. The pressure gauge configuration and single regulator system help compensate for air pres-

sure fluctuations to control the media flow. This enabled Mühlhan to compensate for fluctuations in ongoing air supply/demand requirements. The eight units self-adjusted as they were being switched frequently on and off for moving nozzles and/or refilling

machines. The machines also are designed to be user-friendly with easy access parts for simple and rapid maintenance.

While the Armex process depaints approximately 20 percent slower per square meter than sand, the manufacturer claims that the reduced costs associated with preparation time and waste disposal significantly outweigh the somewhat slower stripping rate.

In cases when a total strip is required, such as for inspection of the metal skin, the Armex process requires an extra step. This is because sand will strip to white metal while the Armex Blast Media formulation for depainting only provides a near-white metal finish. The added step requires a different Armex formulation to remove the corrosion, which typically covers 10 to 15 percent of a ship's surface.

Clearing the way for jet fuel

In another case, a mid-size tanker owned by a Quebec company had transported Bunker C crude oil for more than 20 years, which had created a thick black residue on the entire surface of its four cargo holds.

The ship required thorough cleaning of the Bunker C residue in the holds without removing the existing (high-built epoxy) coating. The purpose was to switch from hauling Bunker C to high-grade, "Jet A" fuel, while ensuring that no residue remained that could contaminate the more sensitive cargo.

The ship's holds have two compartments each and are stacked three stories high. In all, the combined inner-hold surface area is more than 300,000 sq. ft. The two key concerns were to use a cleaning method that would not remove the existing coating and to avoid generating large volumes of hazardous waste.

The ship's owner contracted Montreal Tankers, also based in Quebec, to conduct a comprehensive evaluation. They found the Armex process to be the best method to effectively meet all the cleaning requirements. In addition, a materials analysis proved that spent media could be disposed of at a grade B disposal site in conformity with Quebec environmental authorities. Finally, they established sequences of blasting and quality control procedures using a specialized laboratory. Coincidentally, they used similar machines and the same media for removing the bunker residue as was used for the Navy frigate. However, some of the nozzles were different than those for depainting.

They cleaned the 300,000-sq.-ft. surface area in 1,500 continuous worker-hours over a three-week period. The ship sailed exactly 22 days after cleaning began, and did

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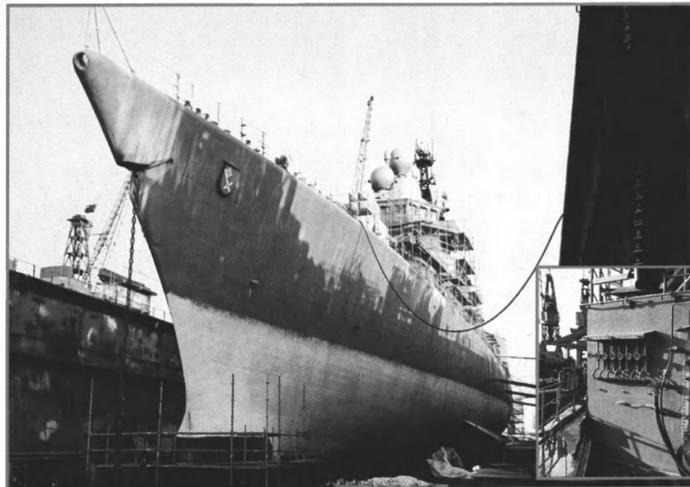
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LEFT: This German frigate used the Armex blasting method to save time, money and the environment.

INSET: The frigate had a coatings failure between the third and fourth coatings. By using an innovative system to just remove selective layers (including around intricate areas displayed in the inset picture), the ship was stripped, recoated and back in service in nine days.

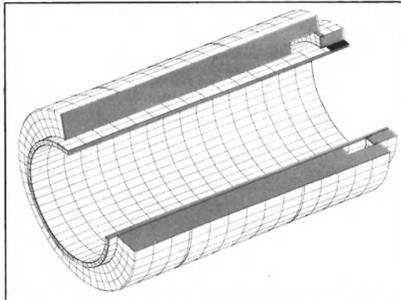
not require special containment. While most of the spent dry media settled to the bottom of the holds, access ports were covered with a dust sock to ensure total containment. After project completion, a sampling test conducted by an independent lab "conclusively" determined the holds were suitable to load the Jet A high-grade fuel.

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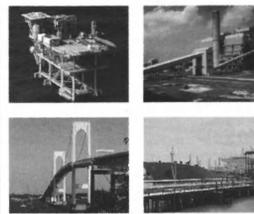
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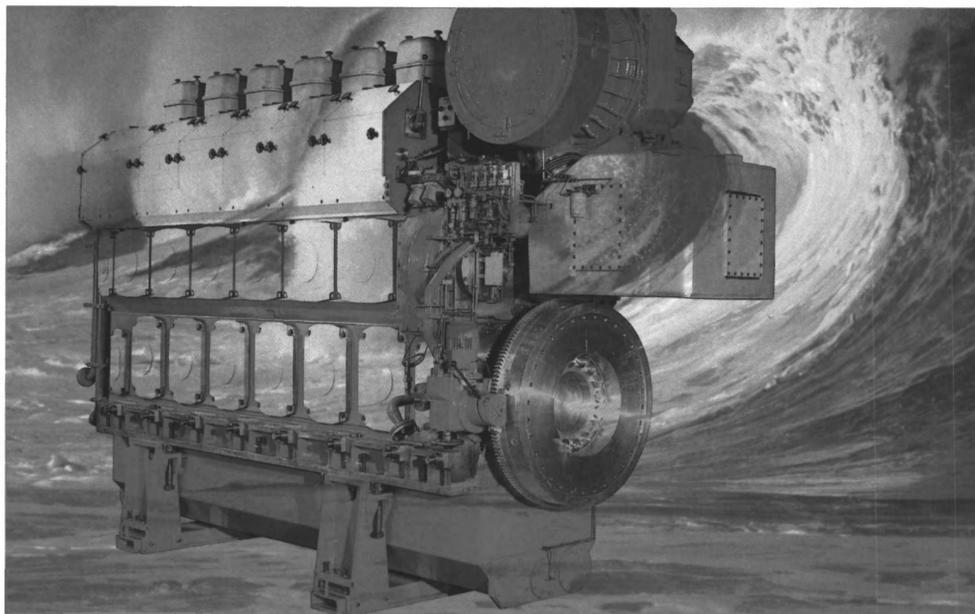
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ZF Marine Offers New Workboat Technologies

ZF Marine has announced new transmissions, variations and product improvements for pleasure boats and workboats. These include transmissions from Friedrichshafen (BW 161, 191 and 250/255 series), as well as from ZF

Hurth in Arco (HSW 150 and 450 series), and from ZF Padua (IRM 220, 280 and 311 series).

ZF Marine has also increased its market share of transmissions for installation in inland waterway vessels. Examples are the sister-ships *Anaconda* and *Cito*, ore carriers which trade between Rotterdam and Trier. Each ship, together with its matching barge, reportedly transports approximately

5,000 tons of ore.

The ship and barge have a combined breadth of 37.4 ft. (11.4 m) and total length of 564.3 ft. (172 m). Propulsion is supplied by two Caterpillar engines, each rated at 895 kW at a speed of 1,600 rpm. Optimum propeller speed is produced via a ZF type BW 461 transmission with a 5:037 ratio.

Ship speed when running upstream is 11 km/h, and 20 km/h



Pictured is the assembly of a BW 750 transmission.

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• German Hydrographic Institute



• Taiwanese Ministry of Fishing

• Canadian Coast Guard

• U.S. Environmental Protection Agency

• U.S. Military Sealift Command

• U.S. Naval Sea Systems Command

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• Japanese Maritime Self Defense Forces

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downstream. The ships are reportedly in service 24 hours a day, with loading and unloading times of two and three hours respectively, resulting in approximately 6,000 annual operating hours.

For more information on ZF
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New Sulzer Provides Philippines With Floating Power Station

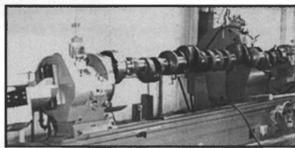
New Sulzer Diesel France SA has built a 67.5-MW power barge for the Philippines. The barge has six 11.2-MW generating sets, each powered by a Sulzer 16ZA40S medium-speed diesel engine. The barge was ordered under a turnkey contract by the Van der Horst Group of Singapore, and will be operated by Duracom Mobile Power Corporation of the Philippines when completed.

The purpose-designed, fully-integrated power barge measures 254.3 ft. (77.5 m) long overall, by 48.4 ft. (30 m) in breadth, with a loaded draft of 9.8 ft. (3 m). The barge reportedly contains all necessary equipment, including that used in the treatment of heavy fuel oil for the engines to the step-up transformers and 115-kV switchgear.

For more information on New Sulzer
Circle 48 on Reader Service Card

Goltens Expands Capacity With New Grinder

Diesel engine repairer, Goltens, has announced the expansion of its crankshaft grinding capability. Norman Goltens, president of Goltens, commented, "For more than 50 years we've been doing crankshaft grinding in-situ, in ship and in drydock. As our customers' needs expanded or changed, we have added to our services. Now



Maritime Reporter/Engineering News

we have purchased a new state-of-the-art crankshaft grinder that is capable of handling crankshafts as large as 14.1 ft. (3.48 m) long with a swing of 1,200 mm. We expect this grinder to greatly enhance our ability to service our customers."

Goltens' ship repair and spare parts services include crankshaft grinding, diesel engine overhaul, fuel equipment repair, rebabbiting, line boring and spare parts supply.

For more information on Goltens
Circle 93 on Reader Service Card

Avondale/Primorsk Tanker Deal Expires

Avondale Industries, Inc. announced that its previously announced contract for seven 42,000-dwt product carriers with the Primorsk Shipping Group expired due to the inability to obtain the required financing and equity for the project. Avondale indicated that it is continuing to assist Primorsk in similar shipbuilding opportunities.

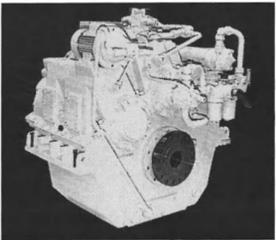
Bazan Offers High-Speed Ferries Featuring Reintjes Gears

Spanish shipyard Bazan now offers a comprehensive range of fast ships, particularly high-speed ferries. Bazan has sold two standard versions of the Mestral class at 315 ft. (96 m) long, and the larger version, the Alhambra class, at 410 ft. (125 m) long, is currently under construction.

This vessel is scheduled to be put into service between Argentina and Uruguay at the end of 1996.

The first Alhambra class, which will reportedly be capable of carrying 1,250 passengers and 246 cars, will incorporate six Caterpillar engines type 3616, with an overall output of 34,800 kW, driving five waterjets via four Reintjes gears type VLJ 5520 HL + HR and a compound transmission type DVLJ 5530, to provide a speed of 38 knots.

The vessels's range is 300 nauti-



Reintjes reduction gear WLS 930.

cal miles.

Reintjes gears will also be used in six fast patrol boats being built at Lung Teh Shipbuilding Co., Ltd., Taiwan.

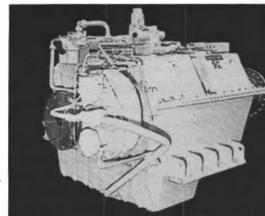
Each newbuilding will incorporate two Paxman 12VP185 type engines, each developing 2,443 kW at 1,950 rpm, and two Reintjes WLS 930 U-type gears.

The 91.7-ft. (28-m) long patrol boats have been ordered for the

Taiwan Seventh Peace Prevention Police Corps.

The patrol boats, with a crew of 12, are to be deployed to combat smuggling and piracy in Taiwanese coastal waters.

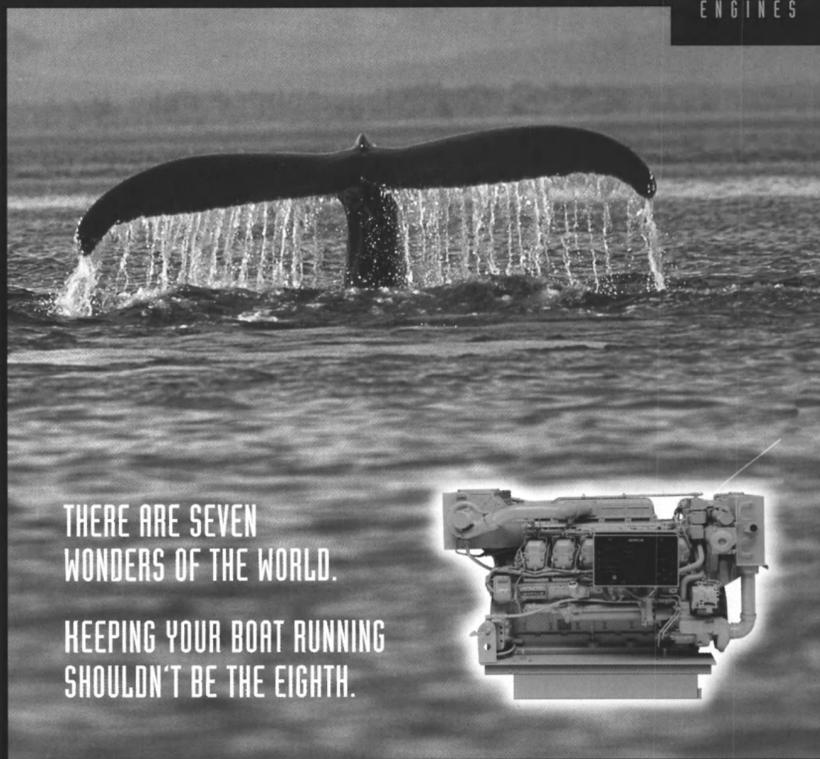
For more information on Reintjes
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Reintjes reduction gear VLJ 5520.

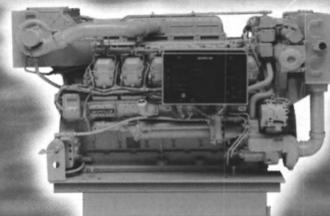
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PROPULSION UPDATE

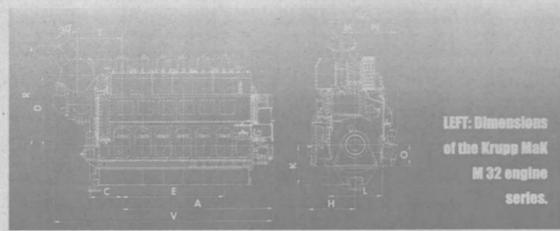
M 32 Sales Drive Krupp MaK

With propulsion engines from Kiel, the Danish shipyard Aarhus Flydedok A/S has equipped seven new 3,700-dwt reefer vessels. Krupp MaK Maschinenbau GmbH received a \$14,465,499 million order for seven heavy fuel diesel engines of the new type 8 M 32, each with an output of 3,500 kW per vessel. The engines are scheduled to be delivered in mid-1996. Under the Russian flag, the vessels will be used predominantly for transporting fishing products between Russia, the Far East and the U.S.

The M 32 high-value integral engine frame reportedly directs the firing and mass forces from the cylinder head to the main bearings, allowing the bearings to match the flux of the lines of force. A feature of the M 32 is the pulse charging system which reportedly creates a pressure difference even at part-load.

The M 32 can reportedly be used for drive tasks such as ship propulsion and generator or pump drives. The V-engines of the M 32 series have been specially designed for use in stationary power plants.

For more information on Krupp MaK
Circle 3 on Reader Service Card



LEFT: Dimensions of the Krupp MaK M 32 engine series.

Lovejoy Offers Power Transmission Catalog



Lovejoy's full-line Power Transmission Products catalog.

Lovejoy Inc.'s new 304-page, full-line catalog presents detailed technical data and selection criteria for the company's 11 expanded lines of mechanical power-transmission components. Application information, dimensional drawings and reference charts reportedly guide accurate specification of flexible couplings, all-metal couplings, universal joints, variable speed drives and elastomeric suspension products.

The majority of pages are devoted to eight major coupling lines: jaw; curved jaw; S-Flex rubber-in-shear; miniature; gear; high-performance gear; torsional; and specialty couplings. Among them,

users are reportedly offered the industry's largest selection of standard bore/keyway combinations in both imperial and metric measurements. The Lovejoy Rosta section contains self-adjusting chain/belt tensioners, motorbases, belt scrapers and other equipment based on pre-tensioned Rosta suspension modules. Lovejoy offers a full range of elastomeric, metal and specialty couplings, and is a supplier of universal joints, chain/belt tensioners, motor bases and variable-speed pulleys. The company's line of products is available through a worldwide network of PT distributors, supported by 20 sales offices and nine regional warehouses across North America and Europe.

For more information on Lovejoy
Circle 15 on Reader Service Card

Thrusters Available From Holland Roerpropeller

Holland Roerpropeller (HRP), a leader in the heavy duty Marine propulsion and maneuvering equipment field, offers a product line which includes 360-degree steerable propulsion products, retractable azimuth thrusters and transverse bowthrusters. HRP thrusters are available in the power range starting at 35 kW and exceeding 1,000 kW. They are available with certification from classification societies such as the American Bureau of Shipping, Bureau Veritas and Lloyd's Register of Shipping.

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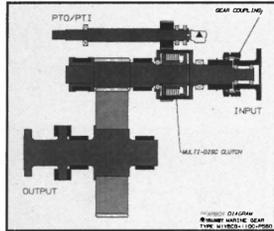
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Valmet Introduces New Coupling To Improve Safety

Valmet Power Transmission Inc. has introduced a new coupling solution which it said will increase machinery related safety and operation economy, allowing for a possible boost to the total propulsive power. The new concept features a combination of multi-disc clutch and a gear coupling which have been built together with a Valmet gearbox (see diagram). It forms a versatile system that functions



Valmet has introduced a new coupling solution which it touts as increasing safety and operational economy on ships.

reliably in the following operation modes: normal drive; shaft generation; emergency operation; and booster drive.

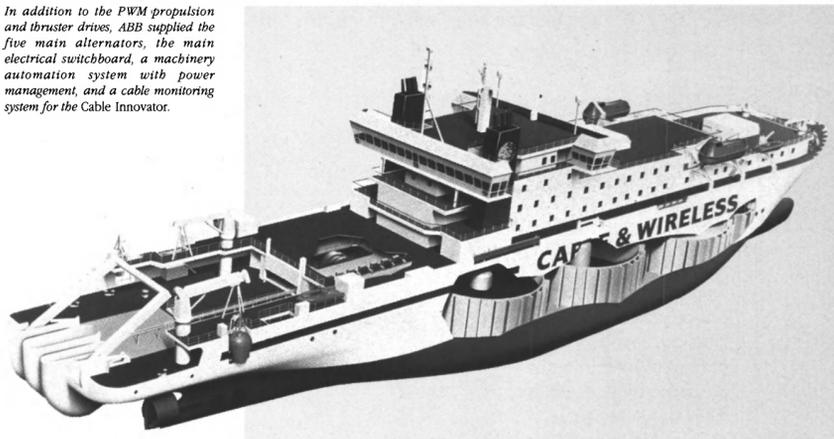
In normal drive at sea, when the entire propulsion system is operative, both of the couplings are

engaged. The CP propeller is driven by the main diesel engine and part of the engine power can be supplied to the shaft generator to produce electricity. When the ship calls at a port and additional electrical power is needed for loading

or unloading of cargo, shipboard power can be engaging the gear coupling. With the multi-disc clutch disengaged the propeller does not run.

For more information on Valmet
Circle 152 on Reader Service Card

In addition to the PWM propulsion and thruster drives, ABB supplied the five main alternators, the main electrical switchboard, a machinery automation system with power management, and a cable monitoring system for the Cable Innovator.



APL Completes Sale Of Six Containerships To Matson

American President Lines, Ltd., (APL) completed the previously announced sale of six containerships to Matson Navigation Company, Inc. This sale is the first step in the formation of a 10-year strategic alliance between APL and Matson which is expected to commence in February, subject to certain conditions, including approval of all final documents by the U.S. Maritime Administration.

As part of the alliance, the two companies will share cargo carrying capacity on five Matson vessels, including four of the ships acquired from APL, on a route serving the U.S. Pacific Coast, Hawaii, Guam, Korea and Japan. Matson will operate the vessels in the alliance and utilize their space on westbound voyages from the U.S. Pacific Coast to Hawaii and Guam, and the vessels' space will be made available to APL for the return eastbound voyages from the Far East.

The ships sold to Matson include three 2,900-FEU C9-class vessels, the *M/V President Lincoln*, *M/V President Monroe* and *M/V President Washington*, and three 2,000-FEU C8-class vessels, the *SS President Grant*, *SS President Hoover* and *SS President Tyler*. APL will bareboat charter five of the vessels from Matson for continued operation in its trans-Pacific services until the alliance commences. APL intends to sell certain of its assets in Guam to Matson upon commencement of the alliance.

PWM Propulsion Power

Our warmest congratulations to Cable and Wireless (Marine) Ltd. and Kvaerner Masa-Yards on the completion of the world's largest purpose built cable ship, the *Cable Innovator*.

Cable and Wireless (Marine) Ltd. is one of the more recent DP vessel operators to have selected AC variable-speed drives to power the two, 2,700 kW main propulsion drives, the 2,200 kW Gill Jet thruster and three side thrusters on board the *Cable Innovator*.

They opted for speed-controlled AC cage induction motors and fixed-pitch thrusters, because of their inherent simplicity, reliability and minimum maintenance requirements, plus superior fuel economy, especially while operating at dynamic positioning.

And they selected ABB's Sami Megastar PWM (Pulse Width Modulated) propulsion and thruster drives because of their excellent dynamic performance, providing maximum torque when needed, in either direction. Soft starts, smooth control and an exceptionally high power factor put a minimum of strain on thrusters, gears, and prime mover diesel gensets.

Another major safety benefit, resulting from the high power factor of PWM drives, is that all the thrusters can stay connected to the main power station and be immediately available, even if only one single main generator powers the vessel.

ABB's Sami Megastar drives are the only high-power PWM drives (available in power ratings up to 8MW) with a proven 10-year track record of more than 220 demanding land-based and offshore installations.

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ABB

Emerson Adds Marine Jet Drives To Product Line

Emerson Power Products has been named a qualified engine distributor for marine jet propulsion systems manufactured by North

American Marine Jet Inc. (NAMJ) of Benton, Ark. Already an authorized distributor of John Deere marine diesel engines, Emerson will sell, service and stock parts for NAMJ's products in the five-state Pacific Northwest region of Washington, Oregon, Alaska, Ida-

ho and Montana. The new partnership between NAMJ and Emerson will reportedly give customers in the Pacific Northwest closer access to marine jet products, as well as to parts and service. NAMJ designs and manufactures

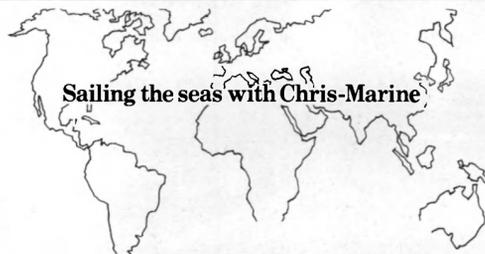
state-of-the-art marine jet propulsion systems. Emerson Power Products is a distributor of both Deere Power Systems Group and Yanmar diesel engines in the five-state Pacific Northwest region. Emerson also custom designs and builds diesel power generator plants and sets, power units and diesel power pumps for a wide variety of applications.

For more information on Emerson
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For more information on NAMJ
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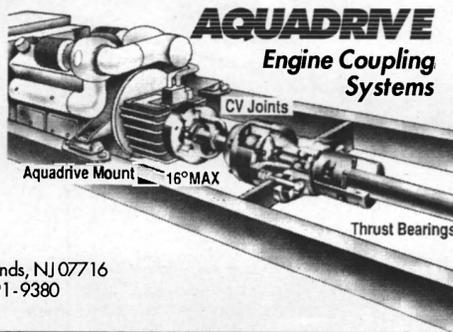
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Kvaerner Energy/GE Fast Ferries Enters Service On Hong Kong-Macao Run



Far East Hydrofoil Foilcat Barca.

With the successful entry into service in the Far East of the first of Kvaerner Fjellstrand's Foilcat fast ferry design, high-speed gas turbine specialist Kvaerner Energy has seen a major breakthrough. *Penha* and her sistership *Barca* were ordered from Norway's Kvaerner Fjellstrand by Hong Kong-based Far East Hydrofoil for the company's service between the British Crown Colony and the Portuguese protectorate, Macao. Both 114.8-ft. (35-m) long vessels have a capacity for 403 passengers, and are powered by twin GE LM 500 gas turbines driving waterjets. Each gas turbine has an output of 4,485 kW, providing a service speed of 45 knots.

Kvaerner Energy has been a General Electric licensee since 1957, initially supplying steam turbines for ship propulsion, and more recently gas turbine power packs for the offshore industry.

For more information on
Kvaerner Energy
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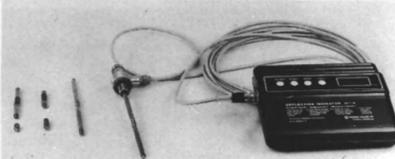
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Cegielski-Built Man B&W Holeby Gensets Target Polish Market

MAN B&W Holeby gensets will reportedly serve the expanding Polish shipbuilding sector through a new domestic licensee, H. Cegielski-Poznan. A license agreement, signed on December 14, 1995, with MAN B&W Diesel AS in Holeby, Denmark, by Cegielski's president and vice president,

Maritime Reporter/Engineering News

reportedly covers production of the Danish designer's 23 and 28 series engines at Poznan.

H. Cegielski-Poznan is an established MAN B&W low-speed engine licensee. The new license agreement reportedly allows the company to widen its production program with packaged solutions adopting MAN B&W main auxiliary engines. The Polish licensee expects to deliver its first orders for Holeby Gensets at the end of 1996.

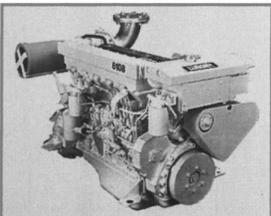
For more information on MAN B&W
Circle 12 on Reader Service Card

Atmospheric Detector Offered By QMI

QMI has introduced an atmospheric detector designed to sense the presence of oil mist in the atmosphere of machine and engine room spaces. This detector is dispersed around the vessel to give a warning before smoke detectors become active at the start of a fire. Placed in the air flow of a room within a distance of up to 229.6 ft. (70 m) from the monitor, the detectors will reportedly survey the space continuously. The connection between detector and monitor is via a screened four-core cable. Each detector has a built-in fan to draw in oil mist for measurement.

For more information on QMI
Circle 13 on Reader Service Card

Alaska Diesel Upgrades Lugger Engine



Lugger L6108A.

Alaska Diesel Electric, maker of Lugger marine diesels, has made significant improvements to its L6108A model, bringing the high output rating to 410 hp. The 436-cu.-in. engine has several improvements including a new cylinder block and new alloy pistons, and completely new oil spray piston cooling which now incorporates an internal oil gallery and spray nozzles. A high output turbocharger and new fuel injectors bring hp up to 410 at 2,700 rpm.

"After many years of success with the engine, we felt that with a few key modifications its performance could be greatly enhanced," said **Harold Johnson**, president of Alaska Diesel. "We're very excited

February, 1996

with the result, and we expect that the L6108 will set the standard in its new hp class."

For more information on Alaska Diesel
Circle 14 on Reader Service Card

Cummins Marine Introduces Enhanced KTA50-M2 Engine

Cummins Marine has introduced

the KTA50-M2 engine for use in a variety of commercial marine applications worldwide. The engine is now available at ratings of 1,700 bhp (1,268 kW) and 1,800 bhp (1,343 kW) for medium continuous duty applications, and at 1,400 bhp (1,045 kW) and 1,600 bhp (1,194 kW) for continuous duty.

A new Holset turbocharger, low-temperature aftercooling, active

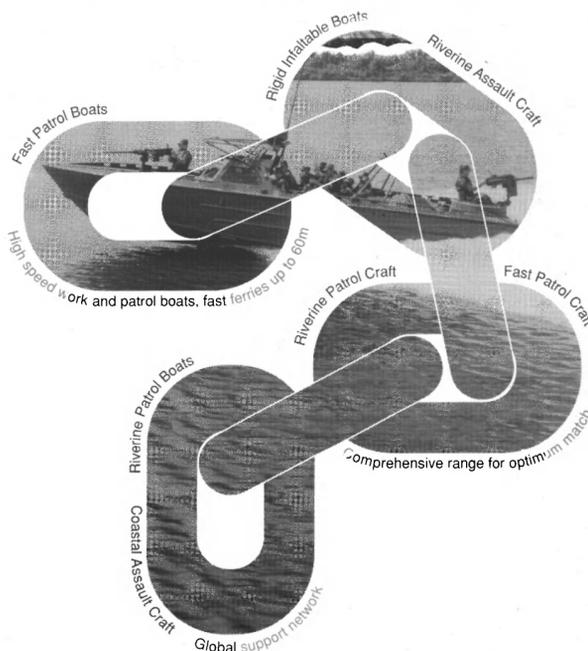


Cummins Marine's KTA50-M2 engine.

PFC; RAC; CAC; RIB; PCR; FPB; PBR...

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Circle 351 on Reader Service Card

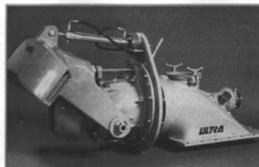
CWF 0943

coolant pressurization and a new gallery-cooled piston are among the improvements made to the engine. Typical applications for the KTA50-M2 include fishing vessels, tugs and barges, crewboats and ferries. This engine is equipped with Cummins' Centry electronics, and will be available early this year.

For more information on Cummins
Circle 16 on Reader Service Card

UltraJet Waterjets Available For Diverse Applications

UltraJet waterjets are now available in North America for military, commercial and pleasure boat applications. UltraJet offers military quality waterjets in 10 different pod and in-line models from 250 - 450 mm. UltraJets are reportedly capable of absorbing



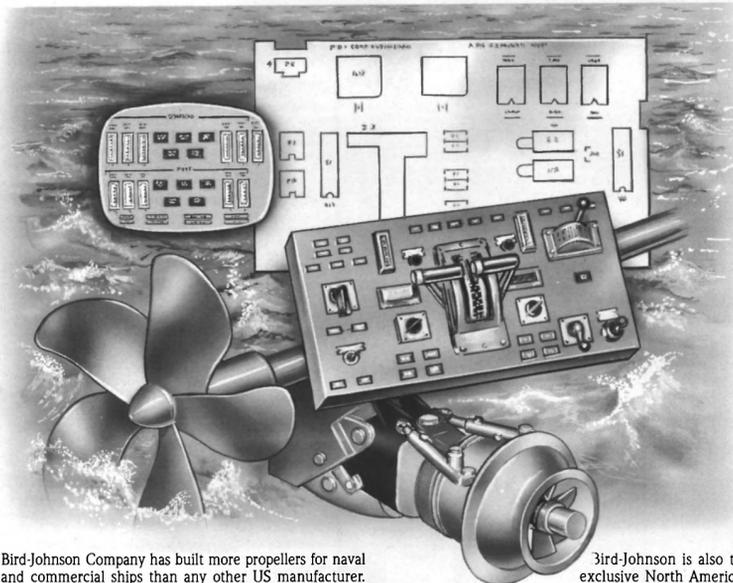
UltraJet waterjet.

from 150 to more than 1,350 hp, and are suitable for gas, diesel, electric or hydraulic input power.

Each UltraJet is built application-specific to assure that the optimum relationship between hull design, engine hp and vessel operating requirements is achieved. Features include: triple hard anodizing; multiple two-part epoxy coating; bearings designed to Maximum Time Before Failure (MTBF) of more than 5,000 hours; easily accessible internal and external zinc anodic protection; complete electrical isolation of dissimilar metals; stainless steel impellers and components; sleeved main shaft and the use of British Navy-approved sand and particulate rejective bearing materials.

For more information on UltraJet
Circle 17 on Reader Service Card

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Bird-Johnson Company has built more propellers for naval and commercial ships than any other US manufacturer. Our people are experts in ship propulsion and machinery applications.

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410-224-2130
Fax: 410-266-6721

Circle 214 on Reader Service Card

Vicmar Offers Fuel Saving/Engine Performance Technology For Diesels

Fuel saving/engine performance improvement technology developed three years ago by British Columbian company Vicmar Engineering has reportedly been proven effective. The technology, first tested by Seaspan International, consists of an on-line turbocharger and scavenging air cooler washing system and turbocharger nozzle ring modification.

In Vicmar's system, the size of water tanks and the water quantity are designed according to the size of turbocharger, air coolers and engine power; hot water is used for washing, and pre-set temperature is maintained throughout the operation; compressed air of optimum pressure is used to inject water into the turbocharger; and water is injected — through special injectors which are installed on the turbine and air sides of the turbocharger — and completely covers the air side of the air coolers.

Vicmar's on-line washing system has also reportedly been tested by Cargill International, and has been implemented on new engines used for Cargill's six newbuildings.

For more information on Vicmar
Circle 18 on Reader Service Card

Western Branch Metals One Of Largest Shaft Distributors

Western Branch Metals of Portsmouth, Va. has targeted customer needs by maintaining a healthy inventory of quality AquaMet boat shafting. From .75-in. to seven-in. diameters, WBM can in most cases expedite delivery the same day an order is placed.

For more information on AquaMet
Circle 198 on Reader Service Card

Diesel Engine Directory

(Continued from page 64)

Model	Cycle	Cylinders	Bore (mm)	Stroke (mm)	Mean Piston Speed (m/s)	Speed (rpm)	Output (kW/cyl)	Output range (kW)	Bmp (bar)
Detroit Diesel (cont'd)									
24V-71TA DDEC	24 V	104.3	127.5	—	—	—	—	—	—
DD 500	8 V	104.3	110.3	—	—	—	—	—	—
6V-92 TA	6 V	121.3	125	—	—	—	—	—	—
6V-92 TA DDEC	6 V	121.3	125	—	—	—	—	—	—
6V-92 TIA DDEC	6 V	121.3	125	—	—	—	—	—	—
8V-92 TA	8 V	121.3	125	—	—	—	—	—	—
8V-92 TA DDEC	8 V	121.3	125	—	—	—	—	—	—
12V-92 TA	12 V	121.3	125	—	—	—	—	—	—
12V-92 TA DDEC	12 V	121.3	125	—	—	—	—	—	—
16V-92 TA	16 V	121.3	125	—	—	—	—	—	—
16V-92TA DDEC	16 V	121.3	125	—	—	—	—	—	—
8V-149TI DDEC	8 V	143.8	143.8	—	—	—	—	—	—
12V-149	12 V	143.8	143.8	—	—	—	—	—	—
12V-149TI	12 V	143.8	143.8	—	—	—	—	—	—
12V-149TI DDEC	12 V	143.8	143.8	—	—	—	—	—	—
16V-149	16 V	143.8	143.8	—	—	—	—	—	—
16V-149 TI	16 V	143.8	143.8	—	—	—	—	—	—
16V-149 TI DDEC	16 V	143.8	143.8	—	—	—	—	—	—
TAMD3L	6 L	96.8	117.5	—	—	—	—	—	—
TAMD3P	6 L	96.8	117.5	—	—	—	—	—	—
TAMD718	6 L	103	128	—	—	—	—	—	—
TAMD72P	6 L	103	128	—	—	—	—	—	—
TAMD72W	6 L	103	128	—	—	—	—	—	—
TAMD102A	6 L	118.8	137.5	—	—	—	—	—	—
TAMD102A	6 L	118.8	137.5	—	—	—	—	—	—
TAMD102D	6 L	118.8	137.5	—	—	—	—	—	—
TMD122A	6 L	127.5	147.5	—	—	—	—	—	—
TMD122A	6 L	127.5	147.5	—	—	—	—	—	—
TMD122P	6 L	127.5	147.5	—	—	—	—	—	—
TAMD162C	6 L	141.8	162.5	—	—	—	—	—	—
TAMD163A	6 L	141.8	162.5	—	—	—	—	—	—
TAMD163P	6 L	141.8	162.5	—	—	—	—	—	—
MTU engines (marketed by Detroit Diesel)									
MTU 6R 099 AZ.1	6 L	96	131	—	—	—	—	—	—
MTU 6R 099 TA.1	6 L	96	131	—	—	—	—	—	—
MTU 6R 099 TE.1	6 L	96	131	—	—	—	—	—	—
MTU 6R 183 TE.2	6 L	126	152.5	—	—	—	—	—	—
MTU 8V 183 TE.2	8 V	126	139.8	—	—	—	—	—	—
MTU 12V 183 TE.2	12 V	126	139.8	—	—	—	—	—	—
MTU 6R 183 TE.2	6 L	126	152.5	—	—	—	—	—	—
MTU 8V 183 TE.2	8 V	126	139.8	—	—	—	—	—	—
MTU 12V 183 TE.2	12 V	126	139.8	—	—	—	—	—	—
MTU 8V 396 TE.4	8 V	162.5	182	—	—	—	—	—	—
MTU 12V 396 TE.4	12 V	162.5	182	—	—	—	—	—	—
MTU 16V 396 TE.4	16 V	162.5	182	—	—	—	—	—	—
MTU 8V 396 TE.4L	8 V	162.5	182	—	—	—	—	—	—
MTU 12V 396 TE.4L	12 V	—	—	—	—	—	—	—	—
MTU 16V 396 TE.4L	16 V	—	—	—	—	—	—	—	—
Deutz MWM — Circle 65 on Reader Service Card									
226/8	4	4.4	105	120	10	2,500-3,000	14-25.3	55-155	6.3-11.7
416	4	8.12,16	132	160	11.2	1,500-2,200	48-85	384-1,360	15.7
620	4	6,8,12,16	170	195	11.7	1,500-1,800	94-140	544-2,240	16.19.2
626	4	6,8,9	170	255	10.2	1,000-1,200	100-115	600-1,035	19.9
440K	4	6,8	230	270	16	900-1,000	150	900-1,200	16
628	4	6,8,9,12,16	240	280	9.3	1,000-1,200	265-410	1,590-7,400	21.3
632	4	6,8,9,12,16	250	320	10.7	1,000-1,200	265-410	1,590-7,400	21.8
640	4	12,16	370	400	8.7	600-650	410-453	4,960-7,250	18.9
645	4	6,8,9	330	450	9	600-650	425-460	2,550-4,140	22.1
Dieselmotorenwerk Vulcan, Rostock-Bremen, Germany — Circle 66 on Reader Service Card									
LS9MC	2	4.8	300	1,620	7.99	111-148	640-1,330	2,560-10,640	10.9-17
SS9MC	2	4.8	300	1,910	8.09	95-127	690-1,430	2,740-11,440	11.5-18
LG9MC	2	4.8	800	1,944	7.97	92-123	920-1,920	3,680-15,360	10.9-17
SG9MC	2	4.8	600	2,92	8.02	79-106	980-2,040	3,920-16,320	11.5-18
L70MC	2	4.8	700	2,268	8.01	80-106	1,260-2,820	5,040-20,960	10.9-17
S70MC	2	4.8	700	2,674	8.11	58-91	1,350-2,810	5,400-22,480	11.5-18
KB9MC-C	2	6-12	800	2,300	7.97	89-104	2,470-3,610	14,820-43,320	14.4-18
LB9MC	2	4-12	800	2,592	8.04	70-93	1,650-3,430	6,600-41,160	10.9-17
SB9MC	2	4-12	800	3,058	8.05	59-79	1,750-3,640	7,000-43,680	11.5-18
K90MC-C	2	6-12	900	2,300	7.97	89-104	3,100-4,560	18,600-54,720	14.4-18
K90MC	2	4-12	900	2,550	7.99	71-94	2,200-4,570	8,800-54,840	11.5-18
LS9MC	2	4-12	900	2,916	7.97	62-82	2,070-4,310	8,280-51,720	10.9-17
S90MC-T	2	5-7	900	3,188	7.97	56-75	2,740-4,560	13,700-3,1920	14.4-18
KS9MC-C	2	9-12	980	2,400	8.32	94-104	4,130-5,710	37,170-68,520	14.6-18.2
RTA38	2	4.9	380	1,100	7.19	141-196	370-680	1,480-6,120	12.6-16.8
RTA48	2	4.9	480	1,400	7.19	111-154	600-1,090	2,400-9,810	12.8-16.8
RTA48T	2	5-8	480	2,000	8.27	99-124	820-1,360	4,100-10,880	13.7-18.2
RTA52	2	4.8	520	1,800	7.80	94-130	760-1,420	3,120-11,360	13.7-17.1
RTA52U									
RTA58	2	4.8	589	1,700	7.59	97-134	920-1,670	3,680-15,030	12.7-16.7
RTA58T	2	5-8	580	2,416	8.29	82-103	1,200-2,000	6,000-16,000	13.8-18.3
RTA62	2	4.8	620	2,150	7.81	79-109	1,120-2,030	4,480-16,240	13.1-17.2
RTA62U	2	4.8	620	2,150	8.1	82-113	1,220-2,220	4,880-17,760	13.7-18.2
RTA72	2	4.8	720	2,500	7.83	68-94	1,510-2,740	8,040-21,920	13.1-17.2
RTA72U	2	4.8	720	2,500	8.08	70-97	1,640-2,990	6,560-23,920	13.8-18.2
RTA76	2	4-10-12	760	2,200	7.63	75-104	1,580-2,870	6,320-34,440	12.7-16.6
RTA84	2	4-10-12	840	2,400	7.6	68-95	1,930-3,500	7,720-42,000	12.8-16.6
RTA84M	2	4-10-12	840	2,900	7.83	58-81	2,050-3,700	8,200-44,760	13.2-17.2
RTA84T	2	5-9	840	3,150	7.77	54-74	2,130-3,880	10,450-34,920	13.6-18
RTA84C	2	4-12	840	2,400	8.16	73-102	2,230-4,050	8,920-48,600	13.8-17.9
RTA96C	2	6-12	950	2,500	8.33	90-100	3,840-5,490	2,300-45,880	14.1-18.2
UEC37LA	2	4-8	370	880	8.16	158-210	280-515	1,120-4,120	11.2-15.6
UEC45LA	2	4-8	450	1,350	7.11	119-158	478-883	1,910-7,060	11.2-15.6
UEC52LA	2	4-8	520	1,600	7.09	100-133	638-1,178	2,550-9,410	11.2-15.6
UEC60LA	2	4-8	600	1,900	6.97	83-110	838-1,545	3,350-12,600	11.2-15.6
UEC52LS	2	4-8	520	1,850	7.4	90-120	718-1,374	2,870-10,590	12.2-16.8
UEC60LS	2	4-8	600	2,200	7.33	75-100	956-1,765	3,830-14,120	12.3-17
UEC50LSM	2	4-9	500	1,950	8.06	93-124	745-1,375	2,980-12,280	12.4-17.4
UEC60SM	2	4-8	600	2,300	8.05	79-105	1,076-1,986	4,300-15,890	12.6-17.5
UEC75SM	2	4-10-12	750	2,800	7.84	63-84	1,594-2,942	6,380-35,300	12.3-17
UEC85SM	2	5-10-12	850	3,150	7.98	54-76	1,981-3,862	9,900-46,340	12.3-17
UEC85SC	2	5-10-2	850	2,360	8.02	76-102	2,113-3,989	10,560-46,780	12.5-17.5
GEC Alsthom Paxman Diesels, Colchester, Essex, England — Circle 67 on Reader Service Card									
Propulsion Ratings									
Vega 12	4	12 V	160	190	9.5 @ 1,500 r/m	1,800	109	1,060-1,310	18.76
Vega 16	4	16 V	160	190	9.5 @ 1,500 r/m	1,800	109	1,410-1,745	18.71
Valentia 6	4	6 L	197	216	10.8 @ 1,500 r/m	1,600	170	845-1,020	19.20
Valentia 8	4	8 V	197	216	10.8 @ 1,500 r/m	1,600	189	1,125-1,515	21.33
Valentia 12	4	12 V	197	216	10.8 @ 1,500 r/m	1,640	207	2,000-2,480	22.68
Valentia 16	4	16 V	197	216	10.8 @ 1,500 r/m	1,640	206	2,465-3,300	22.68
Valentia 18	4	18 V	197	216	10.8 @ 1,500 r/m	1,640	206	3,000-3,710	22.66
12VP185	4	12 V	185	196	9.8 @ 1,500 r/m	1,950	218	2,000-2,611	25.4
Marine Power Generation Ratings									
Vega 12	4	12 V	160	190	9.5 @ 1,500 r/m	1,800	109	790-980	18.76
Vega 16	4	16 V	160	190	9.5 @ 1,500 r/m	1,800	109	980-1,305	18.71
Valentia 6	4	6 L	197	216	10.8 @ 1,500 r/m	1,200	127.5	618-745	19.2
Valentia 8	4	8 V	197	216	10.8 @ 1,500 r/m	1,200	127.5	815-1,020	21.33
Valentia 12	4	12 V</							

Diesel Engine Directory

Model	Cycle	Cylinders	Bore (mm)	Stroke (mm)	Mean Piston Speed (m/s)	Speed (rpm)	Output (kW/cyl)	Output range (kW)	Bmp (bar)
Makita Corporation — Circle 72 on Reader Service Card									
S26MC	2	4-12	260	980	8.17	250	400	1,600-4,800	18.5
L35MC	2	4-12	350	1,050	7.35	210	650	2,600-7,800	18.4
S35MC	2	4-12	350	1,400	7.93	170	700	2,800-8,400	18.3
L42MC	2	4-12	420	1,380	7.98	176	995	3,980-11,940	18
S42MC	2	4-12	420	1,764	8	136	1,025	4,100-12,300	18.5
L30M	4	6	300	600	6.6	320	245	1,471	21
L31M	4	6	310	600	6.4	320	245	1,471	20.3
M28M	4	6	280	480	6.32	395	172	1,030	17.6
M30M	4	6	300	480	6	375	184	1,103	17.3
M31M	4	6	310	550	6.51	355	245	1,471	20
M32M	4	6	320	550	6.42	350	245	1,471	19
M33M	4	6	330	600	6.6	330	282	1,692	20
L53L	4	6	330	640	6.19	290	245	1,471	18.5
L53L	4	6	350	680	6.23	275	282	1,692	18.8
L53L	4	6	380	740	6.29	255	343	2,059	19.2
L54L	4	6	420	840	6.36	227	417	2,501	18.9
MAN B&W Alpha Diesel — Circle 73 on Reader Service Card									
L23/30A E	4	6	225	300	8	800	133	800	16.8
L23/30A	4	6,8	225	300	9	900	160	940-1,280	17.9
Y23/30	4	12	225	300	9	900	160	1,920	17.9
L28/32A	4	6-9	280	320	8	775	245	1,470-2,205	19.3
Y28/32A	4	12,16	280	320	8	775	245	2,940-3,920	19.3
S26MC	2	4-12	260	980	8.2	250	400	1,600-4,800	18.6
L35MC	2	4-12	350	1,050	7.4	210	650	2,600-7,800	18.4
S35MC	2	4-12	350	1,400	7.9	170	700	2,800-8,400	18.4
L42MC	2	4-12	420	1,380	8	176	995	3,980-11,940	18
S42MC	2	4-12	420	1,764	8.0	136	1,025	4,100-12,300	18.5
MAN B&W Diesel — Circle 74 on Reader Service Card									
K90MC-C	2	9,10,11,12	980	2,400	8.3	104	5,710	51,390-48,520	18.2
S90MC-T	2	5,6,7	900	3,188	8	75	4,560	22,800	18
L90MC	2	4-12	900	2,916	8	82	4,310	17,240-51,720-31,920	17
K90MC	2	4-12	900	2,550	8	94	4,570	18,280-54,840	18
K90MC-C	2	6-12	900	2,300	8	104	4,560	27,360-54,720	18
S80MC	2	4-12	800	3,056	8	79	3,640	14,560-43,680	18
L80MC	2	4-12	800	2,592	8	93	3,430	12,720-41,160	17
K80MC-C	2	6-12	800	2,300	8	104	3,610	21,660-43,320	18
S70MC	2	4-8	700	2,674	8.1	91	2,810	11,240-22,480	18
L70MC	2	4-8	700	2,268	8	106	2,620	10,480-20,960	17
S60MC	2	4-8	600	2,292	8	105	2,040	8,160-16,320	18
L60MC	2	4-8	600	1,944	8	123	1,920	7,680-15,360	17
S50MC	2	4-8	500	1,910	8.1	127	1,430	5,720-11,440	18
L50MC	2	4-8	500	1,620	8	148	1,330	5,320-10,640	17
S42MC	2	4-12	420	1,764	8	136	1,025	4,100-12,300	18.5
L42MC	2	4-12	420	1,380	8	176	995	3,980-11,940	18
S35MC	2	4-12	350	1,400	7.9	170	700	2,800-8,400	18.4
L35MC	2	4-12	350	1,050	7.35	210	650	2,600-7,800	18.4
S26MC	2	4-12	260	980	8.2	250	400	1,600-4,800	18.5
Mitsubishi Heavy Industries Ltd., Tokyo, Japan — Circle 75 on Reader Service Card									
UEC371A	2	4-8 L	370	880	6.16	158-210	280-515	1,120-4,120	15.56
UEC451A	2	4-8 L	450	1,350	7.11	119-158	477-882	1,910-7,060	15.61
UEC521A	2	4-8 L	620	1,600	7.09	100-133	637-1,117	2,550-9,410	15.62
UEC601A	2	4-8 L	600	1,900	6.97	83-110	827-1,545	3,350-12,360	15.58
UEC521S	2	4-8 L	520	1,850	7.4	90-120	717-1,325	2,870-10,590	16.84
UEC501S	2	4-8 L	600	2,200	7.33	75-100	957-1,745	3,830-14,120	17.03
UEC371S II	2	4-8 L	370	1,050	7.35	158-210	307-467	1,230-4,530	17.15
UEC371S II	2	4-8 L	370	1,150	8.05	158-210	418-772	1,670-4,180	17.85
UEC431S II	2	4-8 L	430	1,500	8	120-160	570-1,051	2,280-8,410	18.1
UEC501S II	2	4-8 L	500	1,950	8.06	93-124	745-1,375	2,980-11,000	17.38
UEC751S II	2	4-10,12 L	750	2,800	7.84	63-84	1,595-2,942	6,380-35,300	16.99
UEC875S II	2	5-10,12 L	850	3,150	7.98	54-76	1,980-3,862	9,900-46,340	17.39
UEC875S-C	2	5-10,12 L	850	2,360	8.02	76-102	2,112-3,895	10,560-46,780	17.46
Mitsui Engineering & Shipbuilding Co., Ltd., Tokyo, Japan — Circle 76 on Reader Service Card									
K98MC-C	2	9-12	980	2,400	8.32	104	5,710	51,390-48,520	18.2
K90MC-C	2	6-12	900	2,300	7.97	104	4,560	27,360-54,720	18
K90MC	2	4-12	900	2,550	7.99	94	4,570	18,280-54,840	18
S90MC-T	2	5-7	900	3,188	7.97	75	4,560	22,800-31,920	18
L90MC	2	4-12	900	2,916	7.97	82	4,310	17,240-51,720	17
K80MC-C	2	6-12	800	2,300	7.97	104	3,410	20,460-40,920	17
S80MC	2	4-12	800	2,056	8.05	79	3,640	14,560-43,680	18
L80MC	2	4-12	800	2,592	8.04	93	3,430	12,720-41,160	17
S70MC	2	4-8	700	2,674	8.11	91	2,810	11,240-22,480	18
L70MC	2	4-8	700	2,268	8.01	106	2,620	10,480-20,960	17
S60MC	2	4-8	600	2,292	8.02	105	2,040	8,160-16,320	18
L60MC	2	4-8	600	1,944	7.97	123	1,920	7,680-15,360	17
S50MC	2	4-8	500	1,910	8.09	127	1,430	5,720-11,440	18
L50MC	2	4-8	500	1,620	7.99	148	1,330	5,320-10,640	17
S42MC	2	4-12	420	1,764	8	136	1,025	4,100-12,300	18.5
L42MC	2	4-12	420	1,380	7.98	176	995	3,980-11,940	18
S35MC	2	4-12	350	1,400	7.93	170	700	2,800-8,400	18.4
L35MC	2	4-12	350	1,050	7.35	210	650	2,600-7,800	18.4
S26MC	2	4-12	260	980	8.17	250	400	1,600-4,800	18.5
L42MA	4	6-18	420	450	9	600	625	3,750-11,250	20
L42MB	4	6,8	420	500	10	600	800	4,780-6,380	23
ADD30V	4	6-18	300	480	12	750	570	3,440-10,330	27
MTU, Friedrichshafen, Germany — Circle 135 on Reader Service Card									
099	4	6 L	97.5	133	11.5	2,600	29	80-175	13.55
183	4	6 L, 6, 8, 12 V	128	142	11.4	2,400	70	171-846	17.5
331	4	12 V	165	155	12.1	2,340	98	1,180	15.2
396	4	8, 12, 16 V	165	185	12.9	2,100	160	680-2,560	23.1
538	4	16, 20 V	185	200	12.7	1,900	206	3,300-1,120	24.2
595	4	12, 16 V	190	210	12	1,800	270	1,980-4,320	30.25
956	4	12, 16, 20 V	230	230	11.5	1,500	245	2,940-4,900	20.5
1163	4	12, 16, 20 V	230	280	12.1	1,300	370	3,600-7,400	29.4
New Sulzer Diesel, Winterthur, Switzerland — Circle 92 on Reader Service Card									
RTA96C	2	6-12 L	960	2,500	8.33	90-100	3,840-5,490	32,940-65,880	18.2
RTA84C	2	4-12 L	840	2,400	8.16	73-102	2,230-4,050	8,400-45,840	17.9
RTA84	2	4-10, 12 L	840	2,400	7.6	68-95	1,930-3,500	7,720-42,000	16.6
RTA84T	2	5-9 L	840	3,150	7.8	54-74	2,230-3,880	10,650-34,920	18
RTA84M	2	4-10, 12 L	840	2,900	7.83	58-81	2,050-3,730	8,200-44,760	17.2
RTA76	2	4-10, 12 L	760	2,200	7.63	75-104	1,580-2,870	6,320-34,440	16.6
RTA70	2	4-8 L	720	2,500	8.08	70-97	1,640-2,990	6,560-23,920	18.2
RTA620	2	4-8 L	620	2,150	8.1	82-113	1,220-2,220	4,880-17,760	18.2
RTA58T	2	5-8 L	580	2,416	8.29	82-103	1,200-2,000	6,000-16,000	18.3
RTA58	2	4-9 L	580	1,700	7.59	97-134	920-1,670	3,680-15,030	16.7
RTA52U	2	4-8 L	520	1,800	8.1	98-135	860-1,560	3,440-12,480	18.1
RTA48T	2	5-8 L	480	2,000	8.27	99-124	520-1,360	4,100-10,880	18.2
RTA48	2	4-9 L	480	1,400	7.19	111-154	600-1,090	2,400-9,810	16.8
RTA38	2	4-9 L	380	1,100	7.19	141-196	370-680	1,480-4,120	16.7
ZAS05	4	6-9 L, 12, 14, 16, 18 V	500	660	9.9	450	1,080-1,200	6,480-21,600	24.7
ZA405	4	6, 8, 9 L	400	560	9.52	510	600-720	3,600-12,960	24.1
AT25	4	5, 6, 8 L, 12, 16 V	250	300	10	720-1,000	140-220	700-3,520	17.9
S20	4	4, 6, 8, 9 L	200	300	10	720-1,000	115-160	460-1,440	20.4
Niigata Engineering Co., Ltd., Tokyo, Japan — Circle 77 on Reader Service Card									
<i>Medium-em high-speed marine use</i>									
6NSF-M/G	6 L	132.9	160	367	2,200	—	—	—	—
12MSAK-M/G	12 V	132.9	160	529	2,000				

OUTSTANDING CRUISE SHIPS

ORIANA



On April 2, 1995, the 69,153-gt cruise liner *Oriana* was delivered by Meyer Werft shipyard of Papenburg, Germany, to P&O Cruises, London. The vessel was christened by Queen Elizabeth II in Southampton on April 6th. The cruise liner's maiden cruise commenced April 9, sailing from homeport Southampton to the Canary Islands, Morocco, Gibraltar and Portugal. *Oriana*, reportedly the fastest cruise liner built for a quarter of a century, is capable of speeds up to 25 knots, and was built under the survey of Lloyd's Register of Shipping. The vessel complies with SOLAS requirements for number of lifeboats and fire protection standards.

Oriana's integrated bridge system, NACOS 45-2 by STN Atlas Elektronik, was selected to cope with difficult navigational conditions and to meet with the highest safety standards. The cruise liner has two controllable pitch propellers, three bowthrusters, one stern thruster and two rudders, all operated by a joystick. The installed stabilizers are capable of reducing the rolling motion by 90 percent at a speed of 19 knots.

The ship is propelled by four non-reversible, four-stroke MAN B&W L5B/64 engines, each with an output of 2 x 11,925 kW and 2 x 7,950 kW at 428 rpm. Each pair of engines transmits its power via a gearbox to a propeller shaft. The heavy fuel oil operated diesel engines are resiliently mounted and arranged according to the "father and son" principle, whereby one big and one small engine each work via a double reduction gear on a propeller shaft. Each gearbox is additionally provided with a power take-off for a 4,200-kW shaft generator for electric power supply during the voyage.

The vessel's waste handling system — with sorting, shredding, compression, incineration and storage capabilities — was designed to conform to U.S. Department of Public Health standards. John McTeer Ltd. designed the majority of public rooms aboard the vessel, and created *Oriana's* complete shipboard graphics package. *Oriana* combines advanced technology with the comfort and style of traditional ocean liners.

Oriana Particulars

Owner.....	P&O Cruises	.....	2 x 7,950 kW = 2 x 10,800
Builder.....	Meyer Werft	.....	2 x 4,000 kW (PTI) = 2 x 5,434 hp
Delivery date.....	April 1995	.....	Auxiliary diesel engines.....
Length.....	853 ft. (260 m)	.....	4 x 4,420 kW
Width.....	105.6 ft. (32.2 m)	.....	.....
Draft.....	26.9 ft. (8.2 m)	.....	.....
DWT.....	7,270 t	.....	.....
Tonnage.....	69,153 gt	.....	.....
Speed at 90% MCR.....	24 knots	.....	.....
Passenger capacity.....	1,975	.....	.....
Flag.....	British	.....	.....
Classification.....	Lloyd's Register	.....	.....
Propulsive power.....	2 x 11,925 kW = 2 x 16,200 hp	.....	.....

Oriana Equipment

Main engines.....	(4) MAN B&W L5B/64
Auxiliary diesel engines.....	(4) MAN B&W type 6L40/54
Integrated bridge.....	STN Atlas Elektronik NACOS 45-2
Gearboxes.....	(2) Renk-lacke
Couplings.....	Vulkan-Roto, flexible
Propellers.....	Lips 4-bladed, variable pitch
Filters.....	Boll + Kirch
Separator.....	Westfalia

SUN PRINCESS



According to reports from Princess Cruises, a subsidiary of The Peninsular and Oriental Steam Navigation Company (P&O), its 77,000-ton newbuilding *Sun Princess* is the largest cruise ship afloat. On November 11, 1995, she was delivered from Fincantieri's Monfalcone yard — two weeks ahead of schedule — to be readied for her inaugural sailing, which departed for the Caribbean on December 2. According to Fincantieri, one of the biggest challenges in the construction of *Sun Princess* was combining the vessel's large dimensions with the yard's classic "yacht look."

Sun Princess is a twin screw, diesel electric, first-class passenger vessel suitable for Panama and Suez canal transit, measuring 856 ft. (260.9 m) long and 106 ft. (32.3 m) wide, with a draft of 26 ft. (7.9 m), and capable of accommodating more than 2,300 passengers and 800 crew. The cost of building the vessel, according to Princess Cruises' figures, was more than \$300 million. The vessel is registered in the Italian registry, and is classed by both Lloyd's and RINA. Design of the *Sun Princess* was provided by Njal Eide, Oslo, Norway, and Giacomo Martola, Genoa, Italy.

The vessel is equipped with STN Atlas Elektronik's NACOS 45-2 Navigation Command System — the very system installed on P&O's *Oriana*, but with minor advances — which has the capacity to generate planned route data while also providing input and digital correction of electronic chart data for the Multipilot. The navigation system provides real-time comparisons between paper charts and ECDIS, and is compatible with the DX90-S57 data format of national hydrographic authorities, as well as other formats such as those offered by C-Map and the British Royal Navy's ARCS raster scan data system.

The launch of *Sun Princess* marked the 30th anniversary of Princess Cruises, in a celebration of the three decades that have passed and the nine ships constructed since the company's first cruise ship set sail. The new vessel is the first of the new Grand class of ships that will be launched by Princess in the next three years. *Dawn Princess*, sistership to the vessel about to be launched, will debut in the spring of 1997, and another vessel, the 104,000-ton *Grand Princess*, is also scheduled for launch in 1997.

Sun Princess Particulars

Owner.....	Princess Cruises	.....	.....
Builder.....	Fincantieri	.....	.....
Delivery date.....	November 1995	.....	.....
Length.....	856 ft. (261 m)	.....	.....
Width.....	106 ft. (32 m)	.....	.....
Draft.....	26 ft. (7.9 m)	.....	.....
DWT.....	5,710 t	.....	.....
Tonnage.....	77,000 gt	.....	.....
Speed at 90% MCR.....	21.4	.....	.....
Passenger capacity.....	2,400	.....	.....

Sun Princess Equipment

Main engines.....	(6) Sulzer-GMT diesel electric
.....	total output 46 MW
Integrated bridge.....	STN Atlas Elektronik
.....	NACOS 45-2
Thrusters.....	(4) side units
Propellers.....	(4) CP two forward,
.....	two aft
Stabilizing plant.....	two foldable fins for
.....	rolling reduction
Electric plant.....	(4) synchronous generators

IMAGINATION



M/S Imagination, the fifth superliner from Finland's Kvaerner Masa-Yards for U.S.-based Carnival Cruise Lines, Inc., was delivered on June 5, 1995. After the naming ceremony on July 2, followed by two cruises to nowhere, the vessel continued with seven-day cruises in the western Caribbean. The Panamanian-registered *Imagination* was built at Kvaerner's Helsinki yard for a cost of \$330 million. The vessel has a diesel-electric AC-AC power plant consisting of six diesel generators and two cycloconverter-controlled electrical propulsion motors, producing a total onboard power of 42,240 kW (57,400 hp).

The vessel's interior employs ancient mythological images, handmade mosaics and design elements such as subtle neon lighting effects and fiber optic illumination, blending classical architectural elements with new-age technology in order to

create a palatable vacation environment.

Imagination continues the series of Fantasy class cruise liners; a total of eight have been ordered. *M/S Fantasy*, the first in the series, was delivered in 1990, shortly thereafter followed by the deliveries of *M/S Ecstasy* (1991), *M/S Sensation* (1993), and *M/S Fascination* (1994). *M/S Inspiration* has been scheduled for delivery this month, and the last two Fantasy ships will emerge in 1998.

Imagination Particulars

Owner.....	Carnival Cruise Lines	.....	(2) 8ZAL40S
Builder.....	Kvaerner Masa	.....	Generators.....
Helsinki New Shipyard.....	.....	.....	(4) 10.3 MVA
Delivery date.....	June 1995	.....	(2) 6.8 MVA
Length.....	854.9 ft. (260.6 m)	.....	Propulsion motors.....
Width.....	118.1 ft. (36 m)	.....	(2) ABB Marine 14-MW
Draft.....	25.4 ft. (7.75 m)	.....	.....
Tonnage.....	70,367 gt	.....	.....
Speed.....	22 knots	.....	.....
Passenger capacity.....	2,634	.....	.....
Classification.....	Lloyd's Register	.....	.....

Imagination Equipment

Machinery.....	Diesel-electric, total output 42,240 kW
Main engines.....	(4) Wartsila-Sulzer 12ZAV40S
.....	(2) AC motors, 38,000 hp
.....	(2) KaMeWa 5.2 m-diameter CP
.....	(2) semi-balanced
.....	(3) 1,500 kW
.....	(3) 1,500 kW
.....	(2) Brown Brothers 14.5-sq.-m.
.....	(2) oil-fired steam boilers
.....	(6) exhaust gas boilers
.....	(2) Sperry, (1) STN Atlas
.....	(2) Sperry MK37
.....	Magnavox MS-200
.....	Racal Decca MNS-2000

OF 1995

Cruise liner *M/V Crystal Symphony* — a 780-ft. (238-m) luxury newbuild — was delivered by Kvaerner Masa-Yards' Turku New Shipyard in April 1995. The 50,200-gt vessel — owned by Nippon Yusen Kaisha (NYK Line), Japan, and operated by NYK-owned Los Angeles, Calif.-based Crystal Cruises, Inc. — is the largest and one of the most spacious new-buildings to enter the ultra-luxury segment in this decade. The vessel is propelled by two diesel-electric motors, which are powered by six Wärtsilä-Sulzer diesel generator engines, producing a total output of 33,880 kW (52,860 hp).

The vessel, a sistership to the *Crystal Harmony*, was constructed at a cost of \$250 million, and christened by sponsor **Angela Lansbury** in New York Harbor on May 3rd. Robert Tillberg AB, Viken, Sweden, and Studio Garroni Associati, Genova, Italy, were commissioned as *Crystal Symphony's* lead designers. The vessel has been designed for worldwide excursions, and has diverse itineraries, including cruises to Alaska, the Caribbean, the South Pacific islands, Australia and the Far East.

Crystal Symphony Particulars		Crystal Symphony Equipment	
Owner.....	Nippon Yusen Kaisha Line	Tonnage.....	50,200 gt
Operator.....	Crystal Cruises	Speed.....	22 knots
Builder.....	Kvaerner Masa Turku New Shipyard	Passenger capacity.....	960
Delivery date.....	April 1995	Classification.....	Lloyd's Register
Length.....	780.8 ft. (238 m)	Flag.....	Bahamas
Width.....	99 ft. (30.2 m)	Machinery.....	Diesel-electric power station
Draft.....	24.9 ft. (7.6 m)		



CRYSTAL SYMPHONY

Main engines.....	(6) Wärtsilä-Sulzer 9ZAL405, total output 33,880 kW (52,860 hp)	Bowthrusters.....	(2) KaMeWa, 1,000 kW each
Propulsion motors.....	(2) ABB AC motors, 11,500 kW each	Sternthruster.....	(1) KaMeWa, 1,000 kW
Propellers.....	(2) KaMeWa controllable pitch	Radar.....	(3) STN Atlas Elektronik 9600 ARPA
Rudders.....	(2) Becker, flap	GPS.....	Magnavox MX-200
Fin stabilizers.....	Brown Brothers	Navigation system.....	Racal Marine
		Fin Stabilizers.....	Electronics MNS-2000

On November 30, 1995, the 70,606-gt, 815-ft. (248-m) cruise vessel *Century* was delivered by Meyer Werft Shipyard, Papenburg, Germany, to Celebrity Cruises, Inc., Miami, Fla. The ship was christened in late October by **Tina Chandris**, spouse of Celebrity Cruises' Chairman **John Chandris**. The vessel will operate out of Fort Lauderdale, Fla., on year-round, seven-night journeys to the eastern and western Caribbean.

The ship's propulsion plant employs four MAN B&W diesel engines, the two larger, nine-cylinder "father" engines producing 8,775 kW at 450 rpm, and the two smaller, six-cylinder "son" engines producing 5,850 kW at 450 rpm. According to Celebrity Cruises, this father-son engine configuration was used to preserve the integrity of the ship's sailing schedule by ensuring consistency of speed regardless of tide or weather variables. *Century* is also equipped with three bowthrusters and two sternthrusters for ultimate maneuverability when docking sideways without the assistance of tugboats.

The technology infrastructure onboard the vessel includes a two-way, user-friendly communications link between the staff and guests — **Celebrity Network** — that allows passengers to "test drive" one of the world's first operating interactive television systems. *Century* is the first of three cruise vessels that Meyer Werft will build for Celebrity. The 73,000-gt *Galaxy* is presently being completed in the yard's covered building dock and will be delivered at year's end.

Century Particulars		Century Equipment	
Owner.....	Celebrity Cruises	Classification.....	Lloyd's Register
Builder.....	Meyer Werft Papenburg	Flag.....	Liberia
Delivery date.....	November 1995	Auxiliary generators.....	(4) MAN B&W diesel 6L40/54
Length.....	815 ft. (248.52 m)	Gearboxes.....	Renk Tacke
		Couplings.....	Vulcan-Roto
		Propellers.....	(2) Lips 5.8-m diameter
		Rudders.....	Becker
		Fin Stabilizers.....	Blohm & Voss



CENTURY

Main engines.....	(4) MAN B&W diesel L48/60
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The April 1995 debut of Royal Caribbean's 69,130-gt *Legend Of The Seas* marked the first of six new ships the company will introduce by 1998, and is also the first vessel the company will operate in a market outside the Caribbean or Bahamas. *Legend* sails summertime Alaska cruises, wintertime Panama Canal cruises and spring and fall Hawaii cruises.

Capable of cruising at speeds exceeding 24 knots, the vessel is notable for its speed, large size, and the amount of glass incorporated into its structure, which led to its nickname — "Ship of Light." The vessel has easily identifiable features, such as a seven-deck atrium, to provide passengers with points of reference onboard. In addition, *Legend* also features the world's first at-sea 18-hole miniature golf course, and facilities geared towards family entertainment. Built at Chantiers de l'Atlantique in St. Nazaire, France, the 867-ft. (264.2-m) vessel is registered in the Liberian registry.

Legend of the Seas Particulars		Legend of the Seas Equipment	
Owner.....	Royal Caribbean Cruise Line	Main engines.....	(2) Cegelec-Synchro
Builder.....	Chantiers de l'Atlantique	Engine controls.....	201 MW (27,310 hp)
Delivery date.....	April 1995	Generator engines.....	(5) Wärtsilä 46 V12, 11.7 MW (15,890 hp)
Length.....	867 ft. (264.2 m)	Generators.....	(5) GEC Alsthom
Width.....	105 ft. (32 m)	Emergency generators.....	(2) GM-Detroit, 14,187 KVA/ 6.6 KV
Draft.....	24 ft. (7.3 m)	Bowthruster.....	(2) Brunvoll CP, 1,500 kW
Tonnage.....	69,130 gt		
Speed.....	24 knots	Steering controls.....	Sperry Marine/ EMRI
Passenger capacity.....	2,076	Fin stabilizers.....	Snach
Registry.....	Liberian	Couplings.....	Vulcan
		Radar.....	(3) Rascar 3400 M
		Compass.....	(2) Sperry Marine MK 37
		GPS.....	Trimble
		Waste management.....	(2) Deerberg incinerators, Hobart pulpers



LEGEND OF THE SEAS

Steering controls.....	Sperry Marine/ EMRI	Compass.....	(2) Sperry Marine MK 37
Fin stabilizers.....	Snach	GPS.....	Trimble
Couplings.....	Vulcan	Waste management.....	(2) Deerberg incinerators, Hobart pulpers
Radar.....	(3) Rascar 3400 M		

For more information on the following yards and cruise companies, circle the corresponding number on the Reader Service Card:

Chantiers de l'Atlantique.....	125	Celebrity Cruises.....	130
Fincantieri.....	126	Crystal Cruises.....	131
Kvaerner Masa-Yards.....	127	Princess Cruises.....	132
Meyer Werft.....	128	P&O.....	133
Carnival Cruise Lines.....	129	Royal Caribbean Cruise Line.....	134

CRUISE NEWS

Costa Victoria Construction Proceeds On Schedule

The building of the cruise ship *Costa Victoria*, for Italian shipping company Costa Crociere S.p.A., is proceeding on schedule for the vessel's June delivery date. The 823.4-ft. (251-m), 74,000-ton ship is building at Bremer Vulkan shipyard, and was towed to the Lloyd shipyard in Bremerhaven for interior outfitting. Joint responsibility for the construction project is being assumed by four Vulkan Group companies: Bremen Vulkan; Schichau Seebeck; Lloyd shipyards; and STN Atlas Elektronik. The newbuild's first technical trip is scheduled to take place this month. The Bremer Vulkan companies have announced that they have received a follow-up order to the *Costa Victoria* — a 78,000-ton cruise ship to be delivered to Costa Crociere in July 1997.

Carnival, Airtours In Talks

At press time, Carnival Corp. announced that it and Airtours Plc of London were in discussions regarding a future cooperation, which could lead to Carnival acquiring a stake of less than 30 percent in equity of Airtours.

ACCL Expands Destinations

American Canadian Caribbean Lines (ACCL) has added Honduras to its shoulder season "Exploratory Cruise." The new itinerary will reportedly include the best of ACCL's Belize barrier reef and Guatemala cruise, and will also explore the bay islands of Utila and Roatan and the

coast of Honduras.

CLIA Welcomes Regal Cruises

Regal Cruises is the newest member of the Cruise Lines International Association (CLIA). Peter Arevalo heads up Regal at the company's headquarters in St. Petersburg, Fla. The cruise line offers four, five- and six-night cruises from Tampa Bay to Mexico, Key West, Grand Cayman and Jamaica in the winter.

CruisePhone Offers MSAT Equipment And Service

CruisePhone, Inc. and its subsidiary CP Communications International (CPCI) have begun offering MSAT satellite service to maritime users. The MSAT equipment offered by the company is manufactured by Westinghouse Mobile Satellite Communications exclusively for CruisePhone. The fully digital MSAT network, developed by American Mobile Satellite Corporation (AMSC) and TMI Communications, covers North and Central America, extending hundreds of miles offshore.

For more information on CruisePhone
Circle 164 on Reader Service Card

Port Everglades To Spend \$15.5 M. On Terminal Upgrade

In late 1995, Port Everglades, Florida, announced that a major upgrade and expansion project at its Northport

Cruise Terminal #2 was completed in preparation for the arrival of Princess Cruises' 77,000-ton *Sun Princess*. The \$4 million terminal project was reportedly completed ahead of schedule and within budget. A second project, valued at \$11.5 million, for the conversion of an older cargo transit shed into another cruise ship terminal — dubbed Terminal #18 — is currently underway. When completed, the terminal will be the port's tenth cruise terminal, and will provide a new home for Celebrity Cruises' 70,000-ton *Century*. The terminal project designs were drafted by Frederic R. Harris, Inc., and also contracted to AFCO Constructors.

Carnival Newbuilds To Be Equipped With ABB Stal Water Chillers

According to reports issued by interests of ABB Stal Marine, of Sweden, Carnival Cruise Line has decided to equip two of its Fantasy newbuilds — which will be built by Kvaerner Masa in Finland — with the company's water chillers, which operate with environmentally-conscious refrigerant R410b. The decision by Carnival to install these chillers is in line with the company's goal to operate ships that will not cause harm to the environment. Four water chillers, of a new design that resulted from the development of VSM units, will be supplied by ABB Stal. Screw compressors from the successful Stal S80 series are used in this equipment, as well as the latest control and supervisory system, Stalelectronic 700.

For more information on ABB Stal Marine
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HAL Names McHugh Executive VP

A. Kirk Lanterman, president and CEO of Holland America Line-Westours Inc., announced that Peter T. McHugh has been appointed to the position of executive vice president. In the past, Mr. McHugh has served as president of TWA Marketing Services, and as CEO of Pan American World Airways. For the past four years, he has been responsible for the orderly liquidation of Pan American's business. Holland America recently announced that its newest ship, *Veendam*, is expected to be completely paid for from operating cash flow in mid-1996.

Technomad Loudspeakers Adaptable For Cruise Vessel Applications

Technomad, Inc., Petaluma, Calif., manufactures loudspeakers for permanent, semi-permanent and mobile maritime audio applications, including cruise ships. The loudspeakers are fully weather and water resistant, and are built into container technology developed for the U.S. Armed Forces — a Military Specification 810E, ATA III approved polymer road case. All internal wiring is done with 12-gauge, multi-braided copper cable, and internal tubing is done with precision-density, weather-resistant polyurethane foam.

For more information on Technomad
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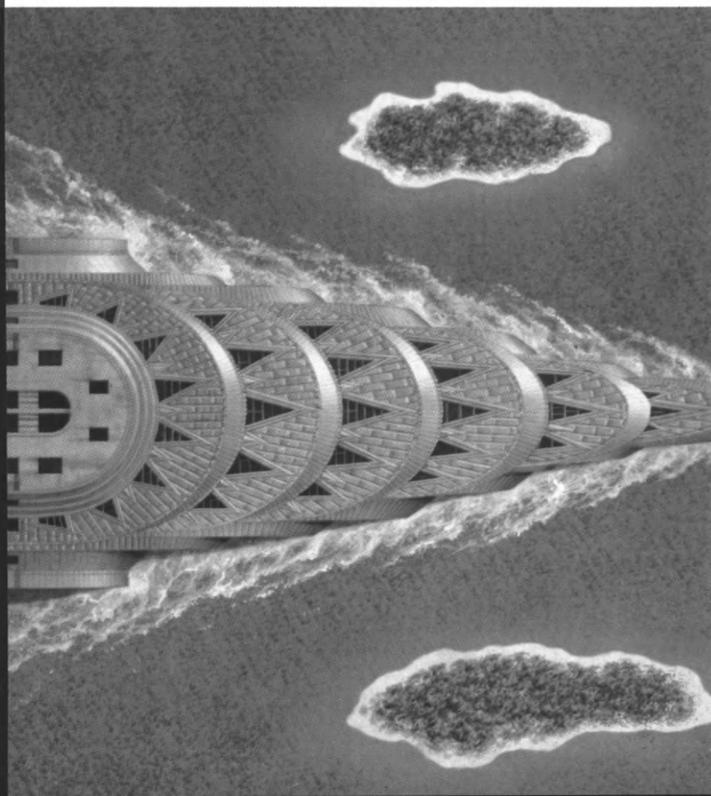
Star Cruises Expands Fleet With Meyer Werft Sistership Newbuilds

Genting International plc (GIPLC) has entered into an agreement with Meyer Werft to construct two new cruise ships to be operated by Star Cruises. The total cost of construction for the ships, to be named *SuperStar Leo* and *SuperStar Virgo*, has been approximated at \$700 million. Delivery of the vessels is scheduled for 1998.

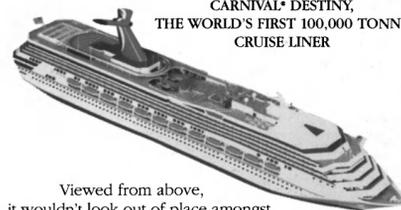
The two 75,000-ton newbuilds will measure 879 ft. (268 m) by 105.6 ft. (32.2 m), and will have a maximum speed of 24 knots. With the use of additional berths, each vessel will have a maximum passenger capacity of 2,800. Forty percent of the cabins will have private balconies spread over three decks, and an additional 20 percent of the cabins will have windows.

Features of the sisterships will include: a six-deck glass topped atrium with three glass elevators; a state-of-the-art double-deck showroom; and a 450-seat observation lounge/discotheque. There will also be two indoor boulevards, a 1,640.4-ft. (500-m) covered outdoor promenade, four levels of sundecks and a shopping plaza.

For more information on Meyer Werft
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Uniglory Opens Container Terminal On Taiwanese West Coast

In December 1995, Uniglory Marine Corporation opened a new container terminal in Taichung on the west coast of Taiwan. The terminal offers two berths with a combined length of 1,050 ft. (320 m),

and the backup area for container handling and storage extends 1,640 ft. (500 m) inland from the quay face. Initially, two ship-to-shore cranes, capable of handling Panamax container vessels, and built by China Shipbuilding Corporation (CSBC) under license to IHI, were provided. The container stacking area is served by four rail-mounted gantry cranes manufactured by Airstar Enter-

prise Co. Ltd., and two rubber-tire cranes built by Italy's CMR.

The official opening date of the terminal coincided with the arrival of Uni-Concord in Taichung, signaling a complete transfer of Uniglory's operations to its dedicated terminal. According to Uniglory Executive Vice President **Johnny Kuo**, reasons for construction of the new terminal include: a reduction in the costs

associated with trucking containers to and from Keelung and Kaohsiung; alleviating some of the pressure at the company's Kaohsiung terminal; and preparation for Taichung's upcoming role as a cross-strait trade outlet to China once direct sailings are permitted.

Evergreen Expands Northern China Services

Following the expansion of its services to central China in November 1995, shipping company Evergreen, Jersey City, N.J., has revised its northern China service to provide a faster and more convenient service to its customers.

Northern China is now served by two separate services from Osaka, Japan, and the Chinese port of Dalian has been added to the operating service that also includes Tianjin and Qingdao. Previously, Evergreen served northern China with one vessel, the 440-TEU *Ever Trust*. Currently, the 380-TEU chartered vessel *Pal Vassilis* also operates a weekly shuttle from Osaka/Qindao, which connects with the shipping company's worldwide services. As Chinese import and export cargoes increase tremendously, Evergreen has been adding one extension after another to its network of services to China.

Successful Commercial Fisheries Exhibition Held In South Africa

The first "Fish Africa" exhibition, opened by South African Deputy Environment Minister General **Bantu Holomisa**, had a successful three-day run at Cape Town's Culemborg Centre in December 1995. The show was the first international commercial fisheries exhibition held in the region, and reportedly attracted a total of 3,048 visitors from more than 32 countries. Numerous orders were reported by exhibitors for a wide range of equipment, ranging from fish boxes to big processing lines, with many companies appointing overseas dealers.

In his presentation, Minister **Holomisa** stressed the need for fair and equitable access to South Africa's major fish resources, reflecting the current surge of license applications by new entrants to the industry. "Stand of the show" awards were presented to Germany's Baader, whose stand featured working demonstrations of automated fish processing, and Cape Town fishing hydraulics specialist Petrel Engineering, whose giant crane and power block framed the exhibition entrance. Organizers have begun planning for a second exhibition to be held in October 1997. For more information, contact **Clare Northcott**, Emap Heighway, Meed House, 21 John St., London WC1N 2BP, U.K., tel: +44 (0) 171 470 6301; fax: +44 171 831 9362.



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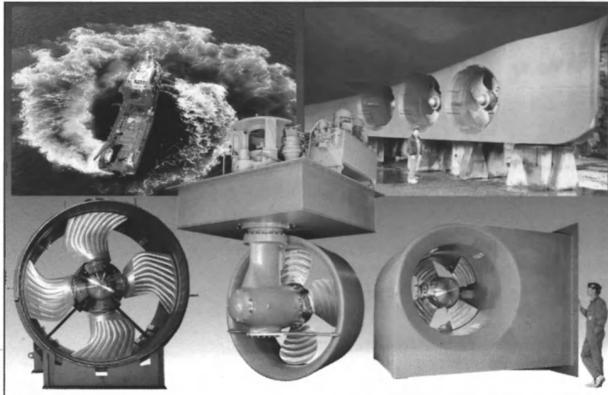


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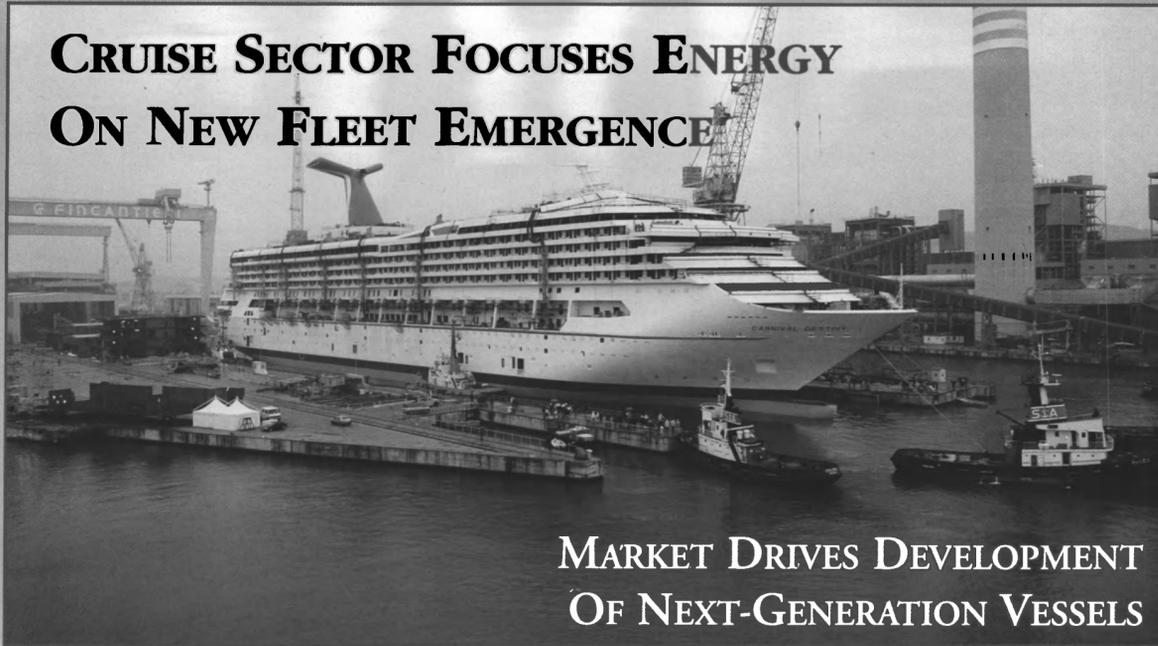
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CRUISE SECTOR FOCUSES ENERGY ON NEW FLEET EMERGENCE



MARKET DRIVES DEVELOPMENT OF NEXT-GENERATION VESSELS

A combination of the aging world cruise fleet, increased government safety and environmental requirements under SOLAS and MARPOL, and consumer demands for bigger and better products created a triple stimulus for the cruise market expansion that occurred a few years ago. Today, some market analysts are forecasting warnings against further expansion in the cruise sector — citing failures of long-established cruise interests Regency Cruises and Royal Cruise Line, perceived declines in passenger bookings, and increased competition for outfit and repair contracts as signs of a shaky marketplace. However, selective cruise lines are continuing to maintain a high level of new-build ordering activity. This ordering activity, along with the Disney corporation's decision to enter the market, suggests that the sector is not only poised to absorb further growth, but is in the process of consolidating its strengths in preparation for the new fleet of ships that will debut before the turn of the century.

Through the implementation of targeted business strategies and R&D projects, emerging market players have designed the new fleet of cruise ships to attract specific passenger segments — a strategy which could eventually lead to a diversification of the sector, with each major player appealing to a different clientele. With seven ships scheduled for delivery in 1996, seven more in 1997, and

five orders in place for 1998, cruise lines have demonstrated confidence in the future of the market by investing billions of dollars in newbuilding projects, which could translate into positive earnings for contract-hungry builders and suppliers.

Industry Gurus Address Market

Royal Caribbean Cruise Line (RCCL), Carnival Cruise Lines and Princess Cruises are three cruise companies currently maneuvering for market presence, as illustrated by their high volume of new tonnage and newbuild ordering activity. Executives from these companies recently offered views of the current state of the cruise ship market.

Rod McLeod, RCCL's vice president of sales, marketing and passenger services, offered: "What is going on today which has been characterized by some as a serious problem is a mid-course correction related to the re-tooling of the industry. Those who say the market for cruising has matured, I think, are misinformed." He reported that while 1994 "was the best year in our history," the company has maintained yields since that time.

Vicki Freed, vice president of sales and marketing for Carnival Cruise Lines, expressed similar sentiments. "I would say overall that there is better health for some cruise lines than others. About eight cruise companies are very healthy, very strong." However, she predicted "major fallout" of both major players and smaller companies in coming years, and added that

ABOVE: The 100,000-gt *Carnival Destiny*, due for delivery in the fall, is under construction at Fincantieri's Monfalcone yard.

by Bridget A. Murphy, assistant editor

CRUISE SHIPS ON ORDER

Year	Cruise Line	Ship	Delivery Date	Number of Berths	
1996	Carnival Cruise Lines	Inspiration	3/96	2,040	
	Carnival Cruise Lines	Destiny	Fall 96	2,600	
	Celebrity Cruises	Galaxy	10/96	1,750	
	Costa Cruises	Costa Victoria	6/96	1,950	
	Holland America Line	Veendam	Spring 96	1,266	
	Royal Caribbean Cruise Line	Splendour of the Seas	3/96	1,804	
1997	Royal Caribbean Cruise Line	Grandeur of the Seas	11/96	1,950	
	Celebrity Cruises	Unnamed	11/97	1,750	
	Costa Cruises	Unnamed	6/97	2,100	
	Holland America Line	Unnamed	Fall 97	1,320	
	Princess Cruises	Dawn Princess	5/97	1,950	
	Princess Cruises	Grand Princess	10/97	2,600	
	Royal Caribbean Cruise Line	Enchantment of the Seas	9/97	1,950	
	Royal Caribbean Cruise Line	Rhapsody of the Seas	4/97	2,000	
	1998	Carnival Cruise Lines	Unnamed	2/98	2,040
		Carnival Cruise Lines	Unnamed	11/98	2,040
Disney Cruise Lines		Disney Magic	1/98	2,400	
Disney Cruise Lines		Unnamed	11/98	2,400	
Royal Caribbean Cruise Line		Vision of the Sea	4/98	2,000	
1999	Carnival Cruise Lines	Unnamed	1999	2,600	

Source: Cruise Line International Association

Maritime Reporter/Engineering News

SOLAS regulations will force ships out of service, since a lot of companies will not be able to afford the costs associated with outfitting ships for compliance.

Rick James, senior vice president of sales and corporate relations for Princess Cruises, said the market is currently in the midst of "an evolutionary period." The force behind that evolution is the market polarization Ms. **Freed** described. "Those lines with strong financial backing are continuing to invest in newer ships. This evolution is separating the bigger lines from the smaller lines," he continued.

Notably, all three cruise executives volunteered the names of the two other cruises companies as emerging industry players, which suggests that intensified competition for business will be a driving force in the future of the market. As stated by **Jim McCaul**, president of IMA Associates, Inc., a Washington, D.C.-based consultancy firm which publishes reports on market outlooks for different maritime sectors, "There will continue to be orders simply because the industry is so competitive. In order to stay ahead of the pack, companies will have to invest in new equipment ... It's an industry driven by 'he who has the latest fad, the latest gimmick' — that's who will be attracting customers ... The market has brought about a separation of companies into those that are survivors and those that are going to get kicked off the ship."

Formulating Strategies For Capturing Market Control

While some cruise lines continue to produce large ships aimed at capturing all parts of the market, another strategy for locking into a profitable consumer base is to direct efforts towards attracting a particular segment of passengers.

To maintain influence in the increasingly competitive market, RCCL plans to utilize such a strategy, specifically by focusing on attracting a greater segment of European vacationers. "We have seen international business grow (by) 35 percent. The result of our efforts has led us to understand the ability of U.S. cruise lines to develop cruise markets," said Mr. **McLeod**. For RCCL in specific, that growth has been impressive. "We know we have five ships coming. Our company is growing — it will grow more than 60 percent in the coming three years. We don't have a tradition of ordering two ships every year." RCCL currently staffs international sales offices in Miami, London, Frankfurt and Oslo, and maintains 35 international representative offices worldwide.

Carnival's overall approach for capturing a controlling market position will be to concentrate on encouraging new passenger segments to take to the water. "We're continuing to go after the customer that doesn't think about cruising ... We cater to 95 percent of the total vacation market, (including) those looking for land-based vacations in

Orlando and Las Vegas," said Ms. **Freed**. According to the Carnival executive, the state of market will not affect Carnival's ordering activity. "We're going to order because of the success of our products," she said, adding: "I think families will continue to be a strong emphasis for us."

Mr. **James** explained that Princess will concentrate on providing customers with a variety of choices, in areas such as accommodations,

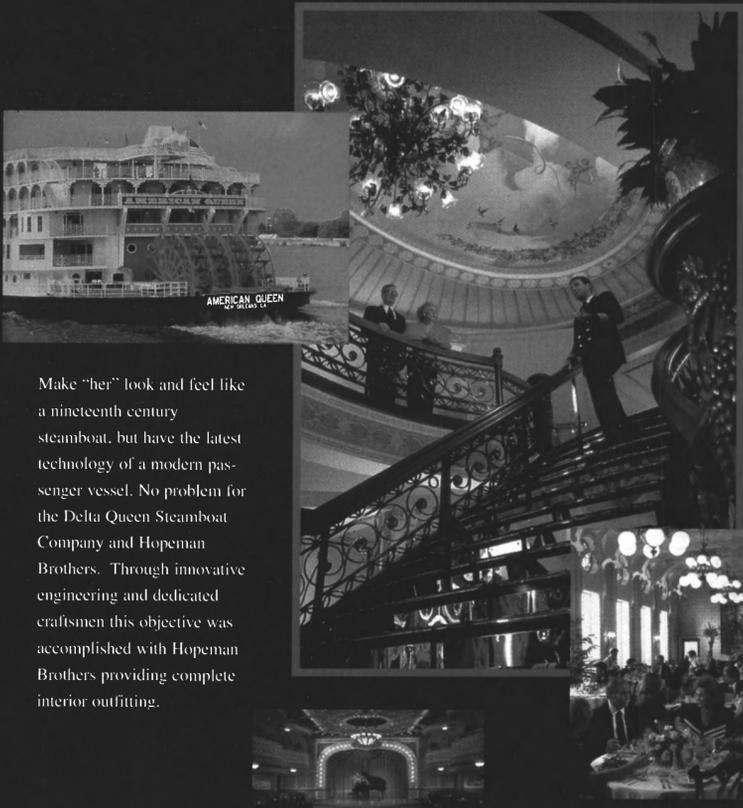
leisure activities, and dining facilities. He said that the company's goal is to "provide more choice to decrease regementation and expand (the) market." Accomplishing this goal provided part of the inspiration for the cruise line's new-build program. "We already committed over a billion dollars to newbuilding. We're not interested in being the largest, we're interested in positioning ourselves as being in control of our sector."

Market Influences Direction Of Newbuild Design

With an eye towards creating clear business plans for ordering and marketing the next-generation fleet, cruise lines have begun implementing R&D and design projects focused on producing ships that will succeed in the current cruise ship market.

Princess Cruises' overall goal of increasing passenger choice will

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translate into the design of its newbuilds. According to Mr. James, the line's new vessels will feature an increased concentration on interior design, in an effort to create more intimate settings and "decrease the effect of mass market." In dining facilities, for example, creative use of wall partitions and decorative structures will be employed in order to create the illusion of dining with 20 people as opposed to 300. In order to further

intensify consumer appeal, multiple dining facilities as well as entertainment complexes will be incorporated into the design of the new fleet.

Royal Caribbean is currently involved in coordinating the efforts of its in-house newbuilding department of naval architects and engineers with a major yard interest in order to define its next generation of newbuilds. The project, known as Project Eagle, is aimed at emu-

lating the success of the line's 1990 newbuild design project — Project Vision — whose ships are now entering the consumer market. As stated by Mr. McLeod, "We have an agreement with Mitsubishi to work with them in the development of this concept. This work is ongoing."

Carnival Cruise Line, a company which prides itself on serving passengers "aged two through 92 years old — the young at heart," is

designing its new fleet with a wide audience in mind, as evidenced by the variety of facilities that will be found onboard each ship, including children's playrooms, casinos and sports bars. Ms. Freed also stressed that the emergence of the large-sized ships would not eliminate the company's newbuild design efforts in the 70,000-ton range. "I think the 70,000-ton Fantasy ships will continue to be ordered because of the flexibility of being able to move in and out of port. It's not just the big ships that will be ordered," said the Carnival executive. She added that Carnival will continue to design ships capable of traversing the Panama Canal, and fulfilling a variety of worldwide itineraries.

According to Mr. McCaul, new-build orders "will be mostly in the middle range," consisting of "sleek, yacht-like ships," with smaller cabins and large table settings. It is his belief that owners will design newbuilds based on 90 percent of what a customer would get from a luxury ship, without spending the extra 10 percent in cash. He pointed to the failure of Kloster's Royal Cruise Line as an example of the trouble that can result from building ships solely suited to serving a smaller, high-end market.

"100,000-gt ships will probably generate more demand. People seem to like the idea of being on bigger ships," said Mr. McCaul.

Consolidating Sector Marked By Arrival Of New Market Player

To some extent, the competitive market is expected to force the consolidation of owning lines. "We've reached the point where older vessels, particularly (those) in the hands of smaller companies, are going to begin to struggle in the consolidating industry," said Mr. McLeod. But as pointed out by Mr. James, a synergistic merger can produce positive results, including significant cost savings and increased commercial strength, both of which often follow the consolidation of two interests, with the need to merchandize two brand names reduced to marketing efforts for a single company.

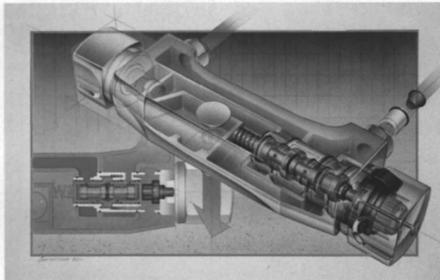
To some, the arrival of a new industry market player may seem untimely, with a number of failed business ventures and forced consolidations spreading across the market. However, the emergence of Disney Cruise Lines in 1998 will highlight the fact that the future of the cruise industry lies in the hands of high-profile players. As pointed out by Ms. Freed, the January 1998 arrival of the 85,000-ton, 2,400-passenger, Fincantieri-built *Disney Magic* is a much-anticipated event for the emerging cruise market players. "I think Disney is going to do a tremendous amount of good for the industry. We will benefit from the marketing and advertising the company will do. I think Disney will pull first-time cruisers into the market," said the Carnival executive.

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Midland Devices Designed For Overfill And Oil Spill Prevention

Magnolia Marine has reportedly chosen Midland Manufacturing Corp.'s B-610 high liquid level visual indicators and B-596 portable level alarms in an effort to replace problem-plagued overfill devices on its barges. According to **Gaston Barmore**, director of technical service for Midland, the B-610/596 system consists of Midland's Model B-610 high liquid level visual indicator and its intrinsically safe, Factory Mutual-approved Model B-596 portable level alarm.

The B-610 visual indicator reportedly provides a "trigger" magnet that is embedded in the upper section of the gauge rod at a level specified by the customer. The magnet then activates the B-596 portable level alarm that fill level is reached, alerting personnel to stop loading to prevent an overfill or spill. Magnolia Marine has reportedly installed 150 B-610 systems with 16 portable alarms on 18 of its barges, and plans to purchase additional visual indicator/alarm systems to outfit its 50 remaining barges.

In addition, Midland Manufacturing has announced the sale of 27 B-610 visual indicators to petroleum transport operator Maritrans, Inc. The indicators will reportedly be installed on two of Maritrans' ocean barges to meet OPA 90 requirements for overfill devices.

Midland's B-610 is specifically designed and manufactured for tank barges and tankers. It complies with 46 CFR 39.20-3 (b) (1) U.S. Coast Guard (USCG) regulations and OPA 90, and is approved for use on USCG-certificated vessels.

For more information on Midland
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Britannia Contracts For Bardex Rig Leveling Equipment Package

Britannia Operator Ltd. of London has contracted with Bardex Corporation of Goleta, Calif., for use of the latter's rig leveling equipment package on the fixed steel drilling/production/accommodations platform for the Britannia gas-condensate field development.

The Bardex rig leveling equipment will be used to level the substructure and derrick relative to the weather deck for each of the 32 well slots. The rig leveling package will consist of: four hydraulic extend-retract leveling jacks; a pneumatic-powered hydraulic power unit with overpressure protection; and a level monitoring sensor/display system. The rig leveling monitoring system, to be located

in the substructure switchroom, will comprise a stainless steel sensor unit with two electrolevels at right angles for measuring movement in both planes, a stainless steel display unit with computer and LCD screen and associated software.

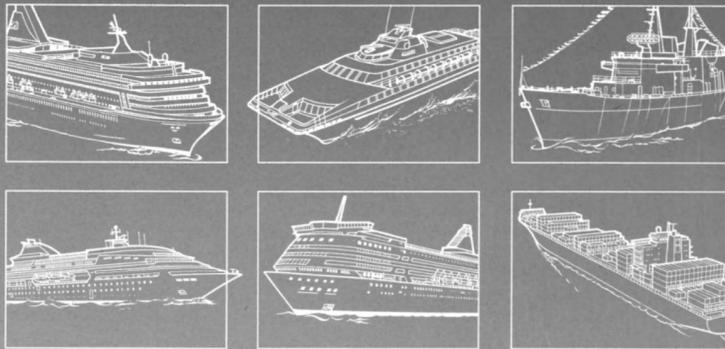
Shipment of the Bardex equipment package is scheduled for March. The Britannia field is located in the central North Sea,

130.5 miles (210 km) northeast of Aberdeen, Scotland, and contains approximately 2.6 trillion standard cu. ft. of recoverable natural gas, and up to 140 million barrels of recoverable condensate and natural gas liquids. Production is scheduled to begin in late 1998.

For more information on Bardex
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Pictured is Frank Ditte, barge inspection supervisor for Magnolia Marine Transport, checking asphalt loading levels with Midland's B-610 high liquid level visual indicators.



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Ship Production Symposium To Highlight Commercial Competitiveness

Presentations and discussions at the forthcoming Ship Production Symposium scheduled to take place on February 13-16 in La Jolla, Calif., will be focused on two themes, namely "International

Commercial Competitiveness in the Year 2000," and "Fleet Support and Maintenance." The event will feature seminars concerning state-of-the-art ship production, conversion and maintenance in the international marketplace. In addition to a CAD/CAM/CIM workshop, papers will be presented from North American, European and Far Eastern interests. For further details, contact **Peter E. Jaquith** at (619) 544-3500.

Stolt-Nielsen Orders Six Chemical Parcel Tankers

In December 1995, Stolt-Nielsen SA finalized an agreement with Italian shipyard Industrie Navali Meccaniche Affini (INMA) for the construction of a series of six 5,200-dwt chemical parcel tankers. The first ship is scheduled for delivery in December 1997, and subsequent deliveries will follow in

1998. Upon delivery, the vessels will join Stolt-Nielsen's Inter-European Service (SNIES), which also recently took delivery of four ships built in Japan.

The order was won by INMA against considerable worldwide shipyard competition. According to Stolt Nielsen, the La Spezia, Italy-based yard's successful bid was the result of the high technology and quality it offers and considerable previous experience in chemical tanker construction, combined with favorable commercial terms.

According to **Samuel Cooperman**, president of Stolt Parcel Tankers Inc., "Medium-speed diesel electric power plants are the heart of the new ships. This power plant will improve ship operating economy, maneuverability and safety, and give greater cargo-carrying capacity ... Amongst the many other advanced features are the 100 percent duplex stainless steel cargo tanks and innovative double hull design, which provides an effective safety barrier between the cargo, the fuel and the environment."

INMA is controlled by the Italian government through the wholly-owned subsidiary Società Gestioni e Partecipazioni Industriali (GEP Group), and has consolidated its presence in the international market through the construction of technically innovative merchant and naval ships, including gas tankers, chemical carriers, containerships, fast ferries and patrol boats.

For more information on Stolt-Nielsen SA

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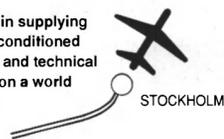


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Simrad Secures \$4.8 M Contract For Seabed Surveying Systems

Norwegian maritime electronics group Simrad has reportedly secured a contract worth \$4.8 million for the delivery of seabed surveying systems for a major maritime mapping project in Indonesia. The project is being undertaken by Norwegian survey company Blom AS, which has recently been appointed to conduct extensive maritime mapping of the Indonesian economical zone and shipping lanes.

Simrad will deliver hydroacoustic instrumentation and software packages for five survey vessels; one for mapping in deep water, two for medium depths and two for shallow waters. Delivery of the main equipment for the project is expected to be completed in the first half of this year. The company has recognized this contract as an important step in advancing into the markets of southeast Asia, and has recently secured contracts for the delivery of similar systems to Korean and Russian interests.

For more information on Simrad
Circle 115 on Reader Service Card

Smit Tak Completes Salvage; Wins Refloat Contract



Gas tanker *Happy Fellow*.

Working with French and Greek salvors, Smit Tak salvage teams recently brought two salvage operations to a successful conclusion. The 4,437-dwt LPG carrier *Happy Fellow* and the general cargo vessel *Darfur* reportedly collided at Honfleur. The gas tanker, in ballast, was making for the open sea at the time of the incident. *Happy Fellow* suffered major damage to its port and engine room.

French company Les Abeilles obtained a Lloyd's Open Forum (LOF) salvage contract. Smit Tak, responding under an International Salvors' Union (ISU) subcontract, immediately sent a senior salvage master and a naval architect to Honfleur.

In association with Les Abeilles, Smit Tak mobilized the sheerlegs crane *Rotterdam*. However, the casualty's trim was eventually corrected by ballasting the forward cargo tank. This reportedly enabled the crippled vessel to

enter Le Havre. Pollution control measures were taken during the salvage operation, including oil skimming in the flooded engine room. Cargo tanks were reportedly gas-freed and inerted with nitrogen, while machinery received preservation treatment.

As *Happy Fellow* entered port, *Kapetan Elias* went aground. Another Smit Tak team — working with Greek salvor Loucas Matsas — refloated the 43,442-dwt bulk carrier.

Kapetan Elias was bound for South Korea when she went aground on Gedser Reef, near the Danish coast.

After the refloating was accomplished, the casualty was anchored and a diving inspection was performed. Reportedly, due to prompt salvage intervention, very little damage resulted, and *Kapetan Elias* was able to resume her voyage.

In addition, Smit Americas has been awarded a contract to refloat the large derrick barge *DLB269* in the Gulf of Mexico. The barge sank during a recent hurricane, and is now resting on the bottom in 65.5 ft. (20 m) of water. This is reportedly a major wreck removal operation, requiring the mobilization of the heaviest units in the Smit fleet which include the *Takheave 32* pull barge and the *Taklift 8* crane barge.

For more information on Smit Tak
Circle 21 on Reader Service Card

Dredging International Nears Completion Of Environmental Dredging Trials

Dredging International (DI) is nearing completion of the second of two pilot projects in

Belgium and the Netherlands that have demonstrated advanced environmental dredging techniques.

In the Netherlands, DI has finished a pilot project, which was part of an environmental dredging techniques trials program organized by the Dutch government's Rijkswaterstaat. Reportedly, over a five-month period, a DI project team cleaned up a section of the Nieuwe Merwede river near Dordrecht.

In Belgium, DI is trying out a new version of

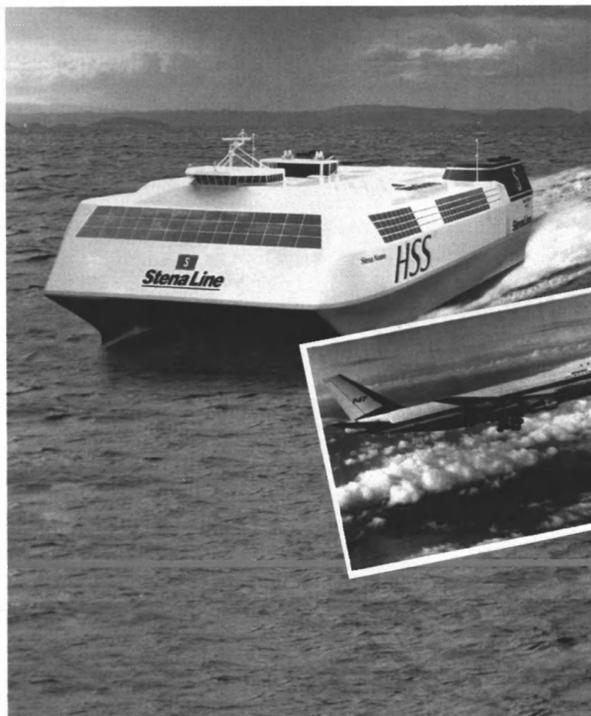


the environmental dredging scoophead it introduced three years ago.

Reportedly, the new head, known as the "sweephead" and mounted on the stationary dredger *Vlaanderen XV*, now offers enhanced environmental advantages in its maintenance dredging role.

This modified head can reportedly dredge layers as shallow as 20 cm, while maintaining the required density of material.

For more information on Dredging Int'l.
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Circle 249 on Reader Service Card

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SHIP & BOAT BUILDING TECHNOLOGY

Plasma Facility Open For Computer Guided Cutting

Northwest Plasma Cutting (NWPC) of Seattle has reportedly become a major resource for builders of aluminum boats. **Bruce Reagan**, president of the firm, said, "We handle each job as if the firm involved were our only customer, using our own experience as a builder to work with the customer yard to meet rigorous quality and schedule requirements." The operations are managed by **Rick LiaBraaten**, an electronics engineer, as well as a trained NC (Numerical Control) plasma cutting operator.

Although the company specializes in marine construction, projects that have passed through NWPC's 12,600-sq.-ft. production facility include metal shapes and plates for aerospace, automotive, chemical, oil refinery, fish processing, medical equipment, tank and boiler plate sections, and other structural and ornamental metal fabrications.

The M.G. cutting machine, with its 10 x 40-ft. (3.1 x 12.2-m) water table, is situated in a high-bay building with overhead cranes and wide doors to receive trucks for delivery of plates and loading of finished work under cover. The system reportedly consists of a CNC controller, electric eye tracer for customer templates and a

zinc powder marker for production layouts.

For more information from NWPC
Circle 22 on Reader Service Card



The thin plate and complicated structure of the *Navatek II* superstructure illustrates the type of plates and shapes prepared by Northwest Plasma Cutting. Northwest Plasma Cutting's M.G. cutting machine is located in a high bay building with overhead cranes and truck-wide doors to facilitate handling of raw and finished plates and shapes.



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Type "P" Cable From BIW Meets Upgraded Shipboard Cable Standards

BIW Cable Systems, Inc. has achieved compliance with the latest IEEE-45 1993 draft specification in recently completed product approval tests for Type "P" marine shipboard cable products. BIW is reportedly the first wire and cable manufacturer to meet all the requirements of the IEEE-45 1993 draft, IEC 92-3, and its associated bunched cable fire testing under IEC - 332 - 3 (Category "A"), for cable used in commercial shipboard or offshore applications.

New products available under this certification are BIW's Bostrig 125 type "P" cables which employ a type "P" insulation system and type "N" jacketing/sheathing system.

The full line of cables includes single (1/C) conductor power cables in both 600V and 2,000V ratings, as well as multi-conductor power and control cables with a 600V rating.

Also available is a complete range of twisted and shielded pairs (TPS) and triplets (TTS) instrumentation/communication cables.

For more information on BIW Cable
Circle 29 on Reader Service Card

and the Ritchie Triple Cup Sapphire and Hardened Steel pivot design.

A new CombiDamp dial system, developed primarily for small craft and commercial fishing boats, is also shown.

A new electronic compass section provides technical data on six models, ranging from the MAG/One self-contained unit to the MagTronic digital and analog display packages.

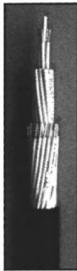
play packages.

Also included are descriptions of the Ritchie digital-direct (not fluxgate) heading sensor and the MagTronic Interface Modules which reportedly can be combined with displays to provide a single-source heading system for Loran, GPS, radar and automatic pilots.

For more information on Ritchie
Circle 27 on Reader Service Card

Large Capacity Mounting Offered By Rubber Design

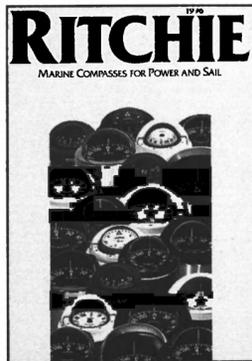
Rubber Design BV has designed a large capacity mounting of 200 kN, specially designed for the marine main and auxiliary medium-speed engines. The 200 kN Megamount reportedly matches load capacity in combination with high deflection up to 29 mm. The



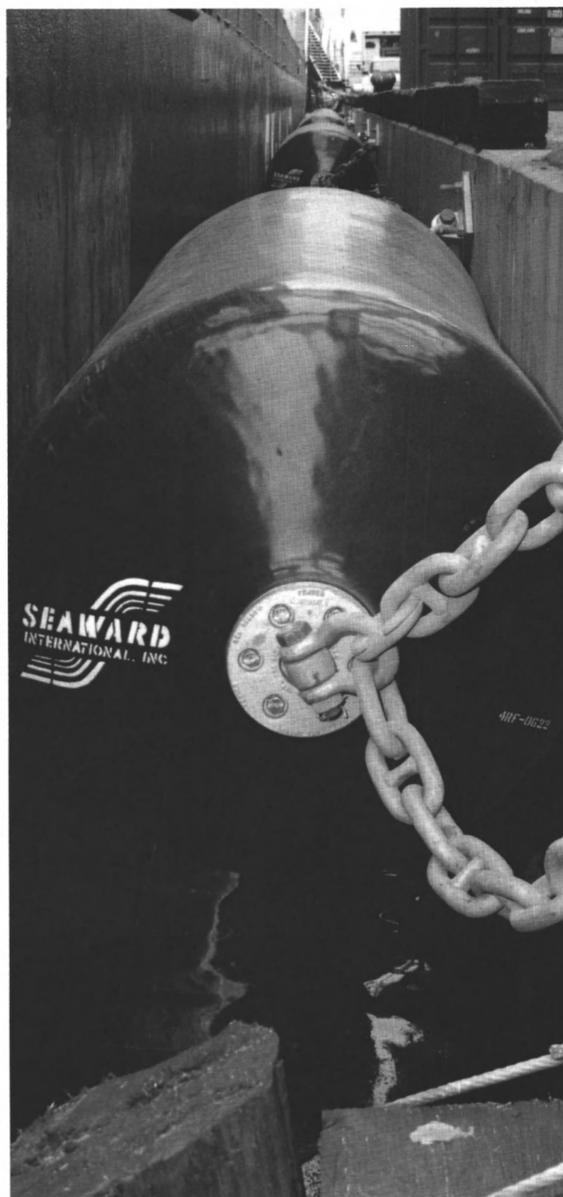
BIW Type "P" marine shipboard cable.

Ritchie Offers 1996 Catalog On Compass Technology

In its expanded 1996 catalog, Ritchie provides technical information on magnetic and electronic compasses, including mounting options, dial sizes and balancing for southern hemisphere zones. Details and descriptions cover the PowerDamp stabilized dial system



February, 1996



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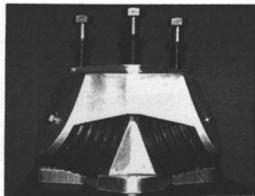
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mounting features Z to X and Y stiffness ratios which reportedly enable a wide application scope. For more information on Rubber Design Circle 31 on Reader Service Card

Mud Conditioner Cited In USCG Shipping Study

Included in a report of a shipping study published by the U.S. Coast

Guard (USCG) is a discussion of Mud Conditioner ballast tank water treatment, a product of Ashland Chemical's Drew Ameroid Marine Division. The study was authorized under the U.S. "National Ballast Water Control Program" and investigated the role of shipping in the introduction of non-indigenous species into U.S. waters, and potential options for controlling such introduction.



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Drew Marine's Mud Conditioner treatment is cited in a discussion of the importance of "sediment management" procedures for minimizing the heavy mud and silt deposits that can harbor organisms. Developed specifically to condition ballast water that carries mud and silt, Mud Conditioner treatment is a concentrated liquid that is dosed to the ballast water. High-molecular weight polymers contained in the treatment attach to the mud/silt particles to form a non-adhering, non-compacting sludge. The conditioned particles are loosely dispersed and discharged with the ballast water. Mud Conditioner ballast tank water treatment is available in 25 and 200-liter containers.

For more information on Drew Marine Circle 32 on Reader Service Card

USCG Seeks New Members For Chemical Transportation Advisory Committee

The Chemical Transportation Advisory Committee (CTAC) is a U.S. Coast Guard (USCG) sponsored industry advisory committee that provides advice and consultation to the Coast Guard on matters relating to the safe transportation and handling of hazardous materials in bulk on ships in U.S. ports and waterways.

The CTAC also functions in assisting the USCG in formulating U.S. positions at meetings of the International Maritime Organization (IMO). The USCG is currently seeking applications for appointment to membership on the CTAC.

Applicants should have experience in chemical manufacturing, marine transportation of chemicals, occupational safety and health, or environmental protection issues associated with chemical transportation.

Applications are being considered for seven positions that expire or become vacant in June. Each member serves for a term of three years, receives no salary from the federal government, and is responsible for all personal expenses associated with travel.

Persons interested in applying for membership on the committee may obtain the proper forms by writing to: Commandant (G-MOS-3), U.S. Coast Guard, 2100 Second St., SW, Washington, D.C. 20593-0001.

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**Ashland Chemical
Announces Executive
Appointments**

Ashland Chemical Company has appointed **Richard D. Rhinesmith** as vice president and general manager of its Drew Ameroid Division, and has named **Robert K. Fleming** to the position of vice president and general manager for its Electronic Chemicals Division. Mr. **Rhinesmith** joined Ashland's Drew Industrial Division in July 1980, and has served as vice president of the Asia-Pacific region and also as vice president of International Operations. Mr. **Fleming** most recently served as vice president and general manager of the Drew Marine Division, and has also held executive positions in the Industrial Chemicals and Solvents Division.

For more information on Ashland
Circle 167 on Reader Service Card

**Zodiac Fills Order For
Houston Fire Dept.**

Zodiac is providing five 472 Hurricane rigid-hulled inflatables to the Houston Fire Department for use in swift water rescue missions. The vessels, equipped with 50-hp OMC engines, were modified in order to suit the needs of the fire department. A key feature of the rescue boats is a fold-away stretcher rack which saves needed floor space. Chief **William Barry** of the Houston Fire Department reported that the rescue boats will be used on the bayous and surrounding rivers and lakes when swell conditions endanger community safety.

For more information on Zodiac
Circle 168 on Reader Service Card

**NRC and Edison Chouest
Announce Marine Alliance**

National Response Corporation (NRC) and Edison Chouest Offshore Inc. announced an agreement in principle to integrate the Edison Chouest vessel fleet and personnel into the NRC network for responding to oil spills.

Chouest Offshore owns a fleet of 57 vessels. These vessels, along with Chouest personnel, will support NRC's dedicated response vessels in these locations, and will be available during spills. As part of the deal, many Chouest personnel will receive Hazardous Waste Operations and Emergency Response (HAZWOPER) training.

NRC's Marine Resource Network tracks availability of equipment and personnel and fits them into an organized structure for responding to oil spills. The network includes more than 800 vessels in the U.S., and includes crew, utility, supply vessels, barges and tugboats. NRC, based in Calverton, N.Y., specializes in the planning for and response to spill incidents.

**RINA Spearheads
Watertight Safety Debate**

The Royal Institute of Naval Architects (RINA) has announced the formation of an international conference for the purpose of exploring and promoting improvements in watertight integrity in the maritime industry. The aim of the conference is to stimulate joint

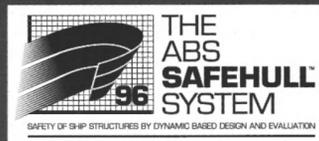
cooperation of designers, manufacturers, regulatory authorities, classification societies, insurance companies, materials experts and ship owners and operators in order to improve the watertightness of complete ship structures.

The conference will cover several areas, including equipment design loads and features, materials and manufacture, operation and inspection maintenance. RINA

invites participation from those interested in joint action, in order to improve ship survivability and prevent possible losses of life. *Watertight Integrity and Ship Survivability* will be held on November 21-22, 1996, in London.

For more information, contact **Mike Porter** at RINA, 10 Upper Belgrave St., London, SW1X 8BQ, U.K., tel: +44 0 171 235 4622; fax: +44 0 171 245 6959.

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Zentech Contracted For Rig Conversion

Texas Drydock Co. (TDI) has contracted Zentech Inc. of Houston, Texas, to perform all the construction support engineering for the conversion of Diamond Offshore semi-submersible rigs *Ocean Quest* and *Ocean Countess* to rigs capable of operating in ocean depths of 3,500 ft. (1,066.8 m) and 4,500 ft. (1,371.6 m), respectively.

Both of the rigs will be docked on TDI's drydock for the addition of blisters to sponsons and columns. The lifting capacity of the drydock is 64,000 tons, and it has been used for semi-submersible, jackup and ship shape conversions.

For more information on Zentech Inc.
Circle 171 on Reader Service Card

ADI To Provide Refit And Logistic Support For Royal Australian Navy

Australian company ADI Limited has been awarded a contract by the Royal Australian Navy to provide refit forward planning and logistics support services for its FFG Class ships. A dedicated FFG technical support unit will provide innovative assistance to processes such as ship documentation, engineering and material support. The unit, in conjunction with the Royal Australian Navy, will develop a series of improvement plans for FFG maintenance covering planned maintenance, defect items, configuration changes, refit analysis and refit forward planning. ADI has provided logistics support services and major refits for FFG ships since the company was established in 1989.

For more information on ADI
Circle 170 on Reader Service Card

Dutra Christens Hydraulic Excavator

The East Coast division of Dutra Construction Company, Inc., based in Miami, Fla., held a christening ceremony for its new hydraulic marine excavator *Hercules* in late January at the Port of Miami. The excavator reportedly incorporates the most efficient dredging technology, and is uniquely equipped to accurately dredge hard rock without underwater drilling and blasting. *Hercules* can work in depths up to 70 ft. (21.3 m), has increased digging ability and breakout force, and uses a synthetic oil in order to lessen the impact on the environment. Miami will reportedly be home to the excavator for the next several years while it completes a long-term channel and harbor deepening project. The Dutra Group, based in San Francisco, recently opened a Miami office in order to better serve the harbor and navigation route dredging and marine construction clients in the region. The company will also reportedly introduce *Antone*, a 198-ft. (60.3-m) marine excavator, in the coming months.

Kuo New Evergreen American Chairman

Evergreen Group Chairman Dr. **Yung-fa Chang** announced that effective January 1, Captain **S. Y. Kuo** would assume the position of chairman for Evergreen America Corporation. Capt. **Kuo** has served as vice chairman of Evergreen America since 1989, and has been involved with the company in the U.S. since the carrier commenced its full container services in 1975. He has been credited with helping to establish Evergreen's liner service between Europe and the Far East, and has served as a

director of the New York Shipping Association and the Carriers' Container Council.

Incat Modifies Wave Piercing Catamaran Specs

Incat Australia Pty. Ltd. of Tasmania, Australia, announced that its proposed 84-m (275-ft.) vessel has been lengthened to 86 m (282 ft.). The decision resulted from continuous development of the company's wave piercing catamaran design. The lengthened model will increase the size of the waterjet compartment and effect a .75 knot enhancement. The major components for the first three vessels were ordered in late 1995, and construction of the first vessel has begun.

For more information on Incat
Circle 173 on Reader Service Card

MacGregor Wins Orders For 24 Flood Control Doors

In the wake of a unilateral decision by the Norwegian Maritime Directorate to enforce the fitting of flood control doors to all ferries operating out of Norwegian ports, MacGregor's RoRo division has secured orders for the fitting of 24 of its jalouise-type flood control door designs. According to the manufacturer, this total is a majority of the the total 31 doors needed to be fitted on vessels operated by 10 international RoRo ferries operating out of Norwegian ports.

For more information from MacGregor
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How To Reduce Human Error!

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The National Transportation Safety Board, American Pilots Association, and the U.S. Coast Guard have all given it

their approval. This course also includes all the elements of the proposed ruling for Bridge Resource Management Training for Single Hull Tank Vessels.

What sets STAR Center's Bridge Team/Resource Management course ahead of others are the bridge simulation exercises. Everything that is taught in the classroom is reinforced in real-life scenarios played out on our full-mission simulation bridges. It quickly becomes evident how well a mariner knows his bridge teamwork skills!

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Circle 316 on Reader Service Card

Miami To Host Cruise Shipping '96

The 12th annual Cruise Shipping Convention is scheduled to be held on March 12-16 in Miami — a city at the very heart of the cruise industry. The event will take place at the Miami Beach Convention Center, a facility whose floor plan provides 175,000 sq. ft. of exhibitor space, which will be filled with companies offering the latest in products, services and technologies.

Seminar presentations and discussions are scheduled to be held on a variety of topics, including: commercial strategy; operations and technology; ship design and construction; pricing strategies; regulatory matters; onboard revenue; safety; security; and itinerary planning. The event's famous "State of the Industry" debate,

which involves a discussion among top cruise line executives concerning the past, present and future of business in this sector, will headline the seminar schedule.

Organizers expect that 600 executives from 48 different cruise lines will be in attendance in order to stay informed on the industry's

latest developments as they prepare to submit business planning schedules for the next calendar year. According to **Michael Kazakoff**, vice president of Miller Freeman, the company in charge of coordinating Cruise Shipping '96, booths at the exhibition will be grouped by category on the floor, in

order to foster an environment most conducive to cutting business deals.

For more information on the show, contact Mr. **Kazakoff** by phone at (609) 452-9414, by fax at (609) 452-9374, or write to 125 Village Blvd., Suite 202, Princeton, N.J. 08540.

Naval Engineers Descend On D.C. To "Build Freedom's Future"

The American Society of Naval Engineers (ASNE) will gather at the Sheraton Washington Hotel in Washington, D.C., from March 13-15, in order for its members and guests to participate in technical demonstrations, educational seminars and product exhibits. The event, ASNE DAY '96, has been themed "Building Freedom's Future," and will feature more than 20 papers on a variety of naval engineering topics, including combat systems, structural loading, ship design, ship systems and HM&E, life cycle acquisition and modeling, testing and simulation. The society's "Best of '95" papers from regional symposia, which include papers on fleet maintenance and environmental issues, will also be presented.

John Kamensky, director of the National Performance Review, will be the keynote speaker at the event, and will discuss managing resources in a balanced budget environment. The plenary session will discuss current initiatives, replacements for government standards and ISO lessons learned. The expected panel members are: **Frank Doherty**, OUSC (A&T); **Glenn Ashe**, ABS America; Capt. **Ronald Marafioti**, U.S. Coast Guard Yard; and Capt. **James Baskerville**, NSWC Carderock. Other industry figures scheduled to speak at ASNE Day include Admiral **Jeremy M. Boorda**, USN, chief of naval operations, and Admiral **Robert E. Kramek**, Commandant, U.S. Coast Guard.

For more information on the event, contact **Sally Cook** at ASNE, 1452 Duke St., Alexandria, Va. 22314-3458, tel: (703) 836-6727; fax: (703) 836-7491.

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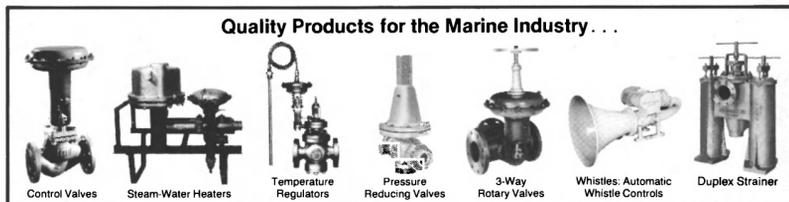
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COMPANY & PEOPLE NEWS

Tramp Oil & Marine Appoints New Managers

Jack Rudd has retired as manager of the Bunker Department of international trader and supplier Tramp Oil & Marine Ltd., after 13 years of service. He has been closely associated with the development of new markets for Tramp Oil, and the company will retain his services on a consultation basis. As a result of Mr. Rudd's retirement, the directors of the company have made a number of changes in the structure of the department he formerly headed. **Bob Layton** has been appointed general manager and **Jon Harvey, Stuart Straker** and **Peter Turner** will serve as managers.

For more information on Tramp Oil & Marine Ltd. Circle 83 on Reader Service Card

Cybo Robots Names Rowe Materials Manager

According to an announcement made by Cybo Robots, Inc., President **Ronald C. Reeve, Jr.**, **Kenneth Rowe** has been appointed materials manager for the company, which designs, builds and integrates robots, controllers, vision sensors and robotic welding systems. In his new position, Mr. Rowe is in charge of developing and managing purchasing, shipping/receiving and inventory control. Prior to joining Cybo Robots, which is headquartered in Indianapolis, Ind., he was the materials manager for an automotive company and a purchasing agent and materials control supervisor for Philips Industries.

For more information on Cybo Robots Circle 84 on Reader Service Card

Walters Joins Rhodes Communications

Rhodes Communications, Inc., a 12-year old advertising, public relations and specialty publishing company whose clients include Magnavox, Leica, Comsat, Harris, Crusair and Navionics, has named **Patricia Walters** its vice



Jack Rudd



Kenneth Rowe



Patricia Walters

president. Ms. Walters will assume a major role in account management for the Norfolk, Va., based agency's growing list of international clients. Formerly, she held the position of manager of corporate services for Rhodes, and has also been employed by Seaward Marine Services of Norfolk.

Hughes Aircraft Purchases Magnavox Electronics Systems For \$370 M

In mid-December, the Hughes Electronic Corp. and The Carlyle Group, L.P., concluded the transfer of Magnavox Electronic Systems Co. to Hughes. The purchase price was \$370 million and the acquisition was non-dilutive to shareholders. Magnavox now reports to the Hughes Aircraft unit of Hughes Electronics.

Magnavox, headquartered in Fort Wayne, Ind., is involved in military tactical communications, electronic warfare, command and control systems, electro-optics and air anti-submarine warfare, and reported 1994 revenues of approximately \$400 million. Hughes Aircraft, based in the Washington, D.C., area, is a leading defense manufacturer of missiles, airborne and ground-based radars, electro-optical systems and shipboard displays.

For more information Circle 89 on Reader Service Card

Dimico Appointed Western Manager For Ampco Pumps

Ampco Pumps Company, Inc. of Milwaukee, Wis., has named **Brian Dimico** its western regional manager, responsible for the company's sales and engineering applications in the western U.S., British Columbia and Alberta. For the past six years, Mr. Dimico has served as a sales engineer for Beckwith & Kuffel, Seattle, Wash.

Siemens Marine Engineering Subdivision Under New Management

According to reports released by Siemens AG, Hamburg, Germany, the company's marine engineering subdivision came under new management at the beginning of 1996. The former head, **Wolfgang Zwillich**, has moved to a new post in the Industrial and Building Systems Group in Erlangen, and **Werner Walker** has filled his position in Hamburg.

Mr. Walker has served Siemens in several positions, including as a commissioning engineer in the field services department, manager of naval sales projects, manager of system sales, and head of sales. As head of sales, Mr. Walker was responsible for merchant marine engineering and surface ship business in Hamburg and Bremen. As of April, **Stefan Richter**, current manager of the Anzac project in

Australia, will assume Mr. Walker's post and management of the subdivision.

For more information on Siemens Circle 103 on Reader Service Card

Unitor Insulation Business Sold To Rheinhold & Mahla

Rheinhold & Mahla and Unitor signed an agreement under which the industrial and offshore division of Unitor's insulation business — previously the I & O Division in Ticon Isolering AS — was to be taken over by Rheinhold & Mahla Isolering AS, effective January 2, 1996. Unitor's fitting out and insulation services directed towards Norwegian shipyards were included in this agreement.

The sale did not include activities directed towards the international marine market or the cooling/refrigeration market. Unitor AS reported that the reasoning for the sale was part of a strategy aimed at concentrating group activities on the international merchant fleet and on international concepts — which provide a greater measure of synergy in relation to Unitor's established network. As of January 2, all activities, equipment and employees in the involved departments were scheduled to be transferred to Rheinhold & Mahla. As a compensation, Unitor was awarded a 50 percent holding in the company, to be taken over by Rheinhold over a maximum period of five years, dur-

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COMPANY & PEOPLE NEWS

ing which time Unitor will have a representative on the board.

For more information on Unitor
Circle 140 on Reader Service Card

Wilcox Named VP, GM Of Chevron Shipping

Ray Wilcox, formerly managing director of Chevron Asiatic Ltd., will succeed **Jack Leutwyler** as vice president and general manager of operations of Chevron Shipping Company, upon Mr. Leutwyler's retirement in April.

As managing director of Chevron Asiatic, Mr. Wilcox is responsible for overseeing the company's oil and gas business in Australia, including the Northwest Shelf Project. In his new position, he will manage Chevron's worldwide vessel operations and commercial activities.

Jack Leutwyler joined Chevron Research Company in 1960 as a research engineer, later transferring to the corporation's computer service department in 1971. After receiving several promotions, he was named manager of strategic planning for Chevron's U.S. oil and natural gas subsidiary. Mr. Leutwyler continued to advance through company ranks, serving as manager of the tanker planning and economics group and vice president of traffic and chartering, prior to assuming his current position in July 1995. He has served on the Partnership Council of Tengizchevroil since the joint venture was formed in 1993.

Renk Executes Organizational Measures To Merge Operations

As of November 1995, Renk Tacke GmbH as a unit was merged with Renk Aktiengesellschaft (Renk AG), Augsburg, Germany. Extensive

organizational measures have been undertaken in order to merge the production and administrative operations of the two companies. Renk's major product ranges — automatic vehicle transmissions, marine gear units, industrial gear units, couplings and clutches, slide bearings and test systems — are now grouped under a single corporate entity. Renk AG will reportedly continue to focus its efforts on optimizing contacts with customers and suppliers.

Manfred Hirt, speaker of the executive board, has succeeded **Heinz-Ludwig Schmitz**, who has resigned from his tasks as chairman of the executive board. Professor Hirt will continue to be responsible for the technical and marketing sectors. **Ulrich Sauter**, previously a director of MAN B&W Diesel in Augsburg, has been appointed as a new member of the executive board, responsible for the administrative and production sectors.

For more information on Renk AG
Circle 113 on Reader Service Card

Executive Appointments At CIT Group

In December 1995, The CIT Group/Capital Equipment Financing announced the implementation of a new organizational structure, which resulted in several executive appointments. **Thomas Lowndes** joined the company as assistant vice president, responsible for asset valuation and forecasting future valuation of assets for the marine industry. Prior to joining CIT, Mr. Lowndes was vice president of Marine Transport Lines, Weehawken, N.J., and worked as a chartering broker for Unisphere Chartering Corp. in New York City. **Steve McClure** has assumed supervisory responsibilities for specialty groups which include marine/intermodal financing and project financing.

For more information on The CIT Group
Circle 114 on Reader Service Card

Overlaet Retires From Multiport



Frank Overlaet (right), retiring president of the Multiport Ship Agencies Network; **Tawfiq Kavar** (center), current chairman, and **Peter Titchner**, secretary general.

Frank Overlaet, president of the Multiport Ship Agencies Network, has retired from his position at the organization which he helped to found in 1978. The Multiport Ship Agencies Network consists of 92 companies covering 1,100 ports worldwide, and strives to bring professionalism and quality into ship agency practice by conducting annual financial and operational external audits of its membership. As president of Multiport, Mr. Overlaet spoke at major industry conferences and contributed several articles on ship agency practice to the world's press. Secretary General **Peter Titchner** will fill the senior management void by assuming most of Mr. Overlaet's current responsibilities from the new base in London's Docklands. Mr. Overlaet has accepted the post of Lifetime Advisor to the Board.

Texaco Marine Announces Retirement Of General Managers

Richard J. Quegan, general manager of Texaco's Marine Department, has retired from the company, effective January 1, 1996, after more than 35 years of service. **John McHale**, president of Texaco International Trader Inc., has assumed responsibility for the Marine Department's activities.

Mr. Quegan joined Texaco as a fleet officer on the S.S. *Texaco Montana* in 1960, and two years later was transferred to a shore training assignment in the Marine Department in New York. Since then he has served in numerous other capacities, including as: assistant fleet superintendent of the U.S. fleet; assistant general manager of fleet operations; and assistant general manager of fleet planning. In 1985, he was appointed general manager of the Marine Department.

James J. Bartell, general manager of Texaco Fuel and Marine Marketing Department (TFAMM) has also announced plans to retire, effective March 1, and will be succeeded by **C. Michael Bandy**, current deputy general manager of TFAMM.

Mr. Bartell joined Texaco's Comptroller Department in 1960, where he held various accounting, programming, systems and supervisory positions, including: supervisor, Development Programming in the Computer and Information Systems Department; project director for the

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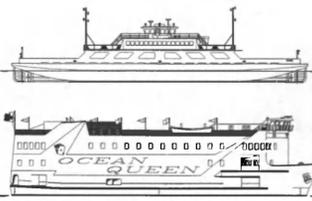
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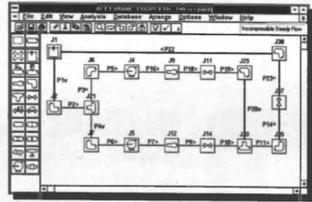
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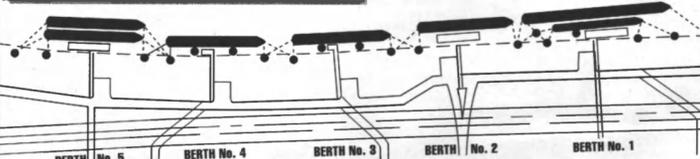
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development of marketing computer applications in the U.S.; manager, Economics and Planning in the Marine Department; senior vice president, Strategic Planning and Marketing; and general manager, International Marine Sales.

For more information on Texaco
Circle 90 on Reader Service Card

SPD Technologies Awarded ISO 9002 Certification

On January 2, **Larry Colangelo**, president of Philadelphia, Pa.-based SPD Technologies, Inc. — which designs and manufactures electronic, case-hardened circuit breakers and switchgear — announced that the company had been awarded ISO 9002 certification by Underwriters Laboratories, Inc. The certification applies specifically to the manufacture, testing and factory servicing of air and molded-case circuit breakers and accessories for use in commercial, military and nuclear applications.

"ISO certification signals SPD's continued diversification into commercial markets... A demonstration of our ability to meet the needs of all our customers, commercial and military, no matter how high their standards may be," said Mr. Colangelo.

For more information on SPD Technologies
Circle 91 on Reader Service Card

McDonald Sworn In As New St. Lawrence Seaway Administrator

On January 2, Secretary of Transportation **Federico Pena** swore in **Gail C. McDonald**, former chairwoman and commissioner of the Interstate Commerce Commission (ICC), as administrator of the St. Lawrence Seaway Development Corporation. Secretary Pena lauded Ms. McDonald for her "outstanding transportation leadership at the ICC, for her success in the private sector, and for her many achievements in state government in Oklahoma." He continued, adding: "This distinguished record makes her eminently qualified to assume the duties of the U.S. Seaway Administrator."

Accepting her appointment as the Seaway Corporation's seventh administrator, Seaway Administrator McDonald said, "I welcome the opportunity to work with the Department of Transportation and the Great Lakes maritime community in enhancing the competitive position of the Great Lakes Seaway system."

In 1990, Ms. McDonald was appointed as an ICC commissioner by U.S. President **George Bush**. In 1992, she advanced to the commission's vice presidency, and was named chairwoman by President **Bill Clinton** in 1993. Before joining the ICC, she served eight years as the associate director of Regulatory Affairs at the Gas Research Institute in Washington, D.C. She has also served as director of the Energy Conservation Services Division and as executive assistant to Commissioner **Norma H. Eagleton** at the Oklahoma Corporation Commission. In 1979, Ms. McDonald was a legislative aide for Oklahoma Senator **David L. Boren**, and was named assistant for Education and Cultural Affairs when he was elected governor.

Maritime Reporter/Engineering News

COMPANY & PEOPLE NEWS

Evergreen President Joins TT Club Board Of Directors

George Hsu, president of Evergreen Marine Corp. (Taiwan) Ltd., has been appointed a director of the Through Transport Club (The TT Club), which provides liability insurance coverage to the intermodal industry worldwide. Mr. Hsu joined Evergreen in 1973, and has served as president since 1993. Welcoming him to the board, **Sam Ignarski**, the Club's regional manager for Asia Pacific, commented: "George Hsu's appointment reflects the growing strength of the Club in Asia. His extensive experience of liner shipping on three continents will bring a new perspective to our meetings."

For more information on The TT Club
Circle 112 on Reader Service Card

International Shipholding Corp. Announces Executive Appointments

International Shipholding Corporation has announced new executive appointments at company subsidiaries in New Orleans, La., and Memphis, Tenn. At Forest Lines in New Orleans, the appointments include: **Joseph E. Zehner**, general sales manager; **Scott J. Richert**, regional sales manager; and **Greg J. LaCaze**, intermodal coordinator. In Memphis, **Reinder G. Schlinsky** has been

named regional sales manager for the LITCO (LASH Intermodal Terminal Company) Terminal.

Forest Lines operates a transatlantic LASH liner service between U.S. Gulf, interior river and south Atlantic ports, and ports in the U.S. and northern Europe. The LITCO Terminal provides 287,000 sq. ft. of fully enclosed warehouse and loading/discharging stations for LASH barge, rail, truck and heavy-lift operations.

Noble Named GM Of CruisePhone Subsidiary

CruisePhone, Inc. — a provider of cellular and satellite communications for the maritime industry — announced that **Gene Noble** has been named general manager of the mobile division for CP Communications International (CPCI), a wholly-owned subsidiary. In this position, Mr. Noble will oversee all non-cruise ship satellite communications products and services. Prior to joining CruisePhone, he held senior management positions at Westinghouse Electric Corporation, including serving as president of the company's Wireless Communications Products division, during which time he was responsible for establishing Westinghouse in the mobile satellite products business. Mr. Noble is also credited as one of the founders of Westinghouse Security Systems.

CruisePhone offers maritime

users the equipment and service for MSAT satellite service. The MSAT equipment offered by CruisePhone and CPCI is manufactured by Westinghouse's Mobile Satellite Communications division.

For more information on CruisePhone
Circle 104 on Reader Service Card

Kobelt Relocates To Larger Facility

Kobelt Manufacturing Co., Ltd. recently relocated to a new facility in British Columbia. The company manufactures a complete line of electronic, hydraulic and pneumatic controls for commercial and recreational vessels. The new location houses both manufacturing and office space, and is located at 8238 129th St., Surrey, B.C., V3W 0A6, Canada, tel: (604) 572-3935; fax: (604) 590-8313.

Middle East Navigation Aids Service Appoints New GM

The Middle East Navigation Aids Service (MENAS), a British-registered charity responsible for providing and maintaining aids to navigation in the Arabian Gulf, has appointed Captain **Andrew Ritchie** as its general manager in Bahrain. Capt. Ritchie recently retired from the Royal Navy where his final appointment was at the

Captain School of Maritime Operations and HMS *Dryad*.

MENAS maintains approximately 500 navigation aids, including light buoys, light floats, light beacons and radar beacons, as well as a Decca chain of four stations in the southern Arabian Gulf and a manned lighthouse on Quoin Island. Current member companies include British Petroleum, Shell, Esso, Caltex, Kuwait Oil Company, United Arab Shipping Company, P&O and P&O Containers.

For more information on MENAS
Circle 105 on Reader Service Card

Marine Project Management Co. Names Harkins VP

John B. Harkins has been named senior vice president of TerraMar Managers, Inc., a Metairie, La.-based company that provides complete project management of marine logistics for pipeline and platform transportation, as well for newbuild, conversion and repair contracts for supply boats, tugs and barges. Mr. Harkins was most recently employed as the West African Area manager for Western Atlas.

TerraMar also provides marine surveying and consulting, computerized maintenance management systems and nautical charts and supplies through its affiliates.

For more information on TerraMar Managers, Inc.
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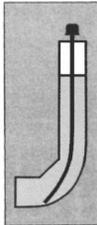
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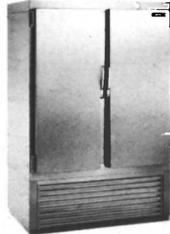


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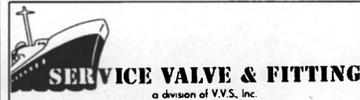


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SeaArk Marine Expands Sales Team

SeaArk Marine, located in Monticello, Ark. and a builder of aluminum workboats, has announced additions to its sales team and the opening of two new departments as a result of increasing sales in regional markets and an expanding product line.

Bob Neelon, formerly vice president of Wininghoff Boats Inc., was named southeast regional sales manager. **Fred Rode**, previously the manager of special services at Outboard Marine Corp., has joined SeaArk as the sales manager for the central and Great Lakes region, and will participate in special state and municipal government sales around the U.S.

Martin L. Petersen, newly appointed western regional sales manager, and former general sales manager at American Eagle Manufacturing, will coordinate sales efforts in the West, including Alaska and Hawaii. **Rixby Trahan**, Gulf Coast oil market sales veteran, will manage sales and service for SeaArk in Texas, Louisiana, Mississippi and Alabama, and will consult with the company regarding special spill response vessel projects.

William S. Brown, former Navy officer and employee of Bender Shipbuilding, Lantanna Boatyard and Swiftships, will assist SeaArk with international sales. **Rob McMahon**, former vice president of SkipperLiner Industries, will serve as product development manager for the company's new Excursion/Dinner Boat division. To provide direct assistance to its customer base, SeaArk has opened a Parts department, which will be managed by **Karen Caldwell**, who will oversee the after-market sales and delivery of replacement parts and spares. A seven-year veteran of the company, Ms. **Caldwell** will also develop a parts catalog and spare parts packages for specific SeaArk models. SeaArk Marine began as MonArk Boat Company in 1959, and continues to produce 17- to 90-ft. aluminum vessels for patrol, fire, spill response, military, excursion and other special applications.

For more information on SeaArk
 Circle 87 on Reader Service Card



Bob Neelon



Fred Rode



Martin L. Petersen



Rixby Trahan



William S. Brown



Rob McMahon



Karen Caldwell

Maritime Reporter/Engineering News

COMPANY & PEOPLE NEWS

Vitulli Named Maritime Marketing Rep For Safeco



Kevin J. Vitulli

Safeco Credit Company, Inc., Seattle, Wash., announced that **Kevin J. Vitulli** has been appointed its national maritime marketing representative. According to **Steve Isaacson**, Northwest division vice president, the company has never before engaged the services of an industry specialist to increase its marine portfolio. Mr. Vitulli is experienced in providing commercial term loans to the inland/offshore workboat and passenger vessel industries, and Safeco will utilize his expertise to help better serve the financing needs of the maritime industry. Safeco Credit, a subsidiary of Safeco Corporation, was started in 1969, and is a member of the American Waterways Operators (AWO) and the Passenger Vessel Association (PVA).

For more information on Safeco
Circle 111 on Reader Service Card

MMC Launches Web Site

MMC International Corporation, Inwood, N.Y. — manufacturer of tank gauging and sampling instruments, vapor control valves, cam-lock couplings and other maritime and chemical industry products — has launched a site on the Internet's World Wide Web to enable customers to view its product line from their private computer terminals.

MMC elected to take this step after recognizing electronic promotion as an increasingly important source of business. "It will soon become routine," said MMC President **William Henry**, "and we want to make sure that we're right there when it happens." The Web address is as follows: <http://tigerjvnc.net/~levins/mmc.html>.

Mason Named Commercial Manager For Sonsub

Ian Mason, formerly operations manager for Sonsub Services, Pty., Ltd., has been promoted to commercial manager, in which capacity he will be responsible for preparing bids, quotations and tenders, and responding to client inquiries from throughout the Asian Pacific region. Mr. Mason joined Sonsub in 1985, and has a broad base of experience in offshore project management and operations.

For more information on Sonsub
Circle 109 on Reader Service Card

Pennella Appointed Executive VP Of Crowley Maritime

On January 3, **Tom Crowley, Jr.**, chairman and CEO of Crowley Maritime Corporation (CMC), announced the board of directors' approval of **William A. Pennella's** appointment to the position of executive vice president of the corporation.

Mr. Pennella joined Crowley in 1987, and soon after was promoted to senior vice presi-

dent of human resources and labor relations. In his new position, he will continue to oversee the human resources and labor relations departments, and in addition, the corporate purchasing, public relations and advertising departments will also report to him. Prior to joining Crowley, Mr. Pennella reportedly held management positions with Sea-Land, Global Terminals and United States Lines.

CMC, headquartered in Oakland, Calif., is a holding company with operating subsidiaries that conduct liner and common carrier operations and provide worldwide contract and specialized marine transportation services.

For more information on Crowley Maritime
Circle 110 on Reader Service Card

Micrologic Appoints Marketing Communications Manager

Micrologic, Chatsworth, Calif. — manufacturer of GPS and Loran consumer products — announced that **Cindi Leonard** has been named marketing communications manager, in which capacity she will oversee all advertising and public relations-related functions under **Michael Deveso**, vice president of marketing. Ms. Leonard was previously employed by Northrop Grumman's Military Aircraft System division, where she was involved in the T-38 Avionics Upgrade program.

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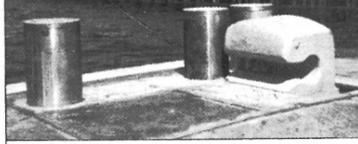


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CALENDAR OF EVENTS

AAPA's Navigation and Environment Seminar. February 7-9, Corpus Christi Marriott, Corpus Christi, Texas.
Contact: **Caren Coffenberry**, American Association of Port Authorities (AAPA), 1010 Duke St., Alexandria, Va. 22314; tel: (703) 684-5700; fax: (703) 684-6321.

5th Annual International Boatbuilders' Exhibition & Conference (IBEX). February 8-10, Ft. Lauderdale/Broward County Convention Center, Ft. Lauderdale, Fla.
Contact: CMC, 200 Connecticut Ave., Norwalk, Conn. 06856-4900, tel: (203) 852-0500; fax: (203) 838-3710.

1996 Ship Production Symposium. February 13-16, Hyatt Regency, La Jolla, Calif.
Contact: **Peter E. Jacquith**, tel: (619) 544-3500.

ASNE Channel Islands Section Meeting, Combat Systems Symposium. February 14-15, Port Hueneme, Calif.
Contact: **Margaret New**, American Society of Naval Engineers, 1452 Duke St., Alexandria, Va. 22314-3458, tel: (703) 836-6727; fax: (703) 836-7491.

1996 Customs/Trade/Finance Symposium of the Americas. February 25-27, Intercontinental Hotel, Miami, Fla.
Contact: **Buck Banks** or **Cristy Clavijo**, Stewart Newman Associates, 3191 Coral Way, Ste. 204, Miami, Fla., tel: (305) 461-3300.

MARCH

Oceanology International '96. March 5-8, Brighton, U.K.

Contact: **Bob Munton**, Spearhead Exhibitions Ltd., Ocean House, 50 Kingston Rd., New Malden, Surrey KT3 3LZ, U.K., tel: +44 181 949 9222; fax: +44 181 949 8186; e-mail: oi96@spearhead.co.uk.

Sea Japan '96. March 5-9, 1996, Pacifico, Yokohama.
Contact: **Anthony Nash**, Seatrade House, 42 North Station Rd., Colchester CO1 1RB, U.K., tel: +44 1206 45121; fax: +44 1206 45190, or contact: **Christopher Eve**, Shuwa Kioicho TVR Bldg., 9th floor, 5-7 Kaji-machi, Chiyoda-ku, Tokyo 102, Japan, tel: +81 3 3222 6901; fax: +81 3 3222 4320.

AAPA's Special Seminar for Members of Port Authority Governing Boards and Commissions. March 6-8, Westin Oaks Hotel, Houston, Texas.

Contact: **Caren Coffenberry**, American Association of Port Authorities (AAPA), 1010 Duke St., Alexandria, Va. 22314; tel: (703) 684-5700; fax: (703) 684-6321.

Microbes in Ships: Effect On Operations and Safety. March 12, London, U.K.

Contact: **Fleur Heapy**, The Institute of Marine Engineers, The Memorial Building, 76 Mark Lane, London EC3R 7JN, U.K., tel: +44 171 481 8493; fax: +44 171 488 1854.

Cruise Shippina '96. March 12-15, Miami Beach, Fla.

Contact: **Margaret New**, American Society of Naval Engineers, 1452 Duke St., Alexandria, Va. 22314-3458, tel: (703) 836-6727; fax: (703) 836-7491.

United States Merchant Marine Academy STCW Panel Discussion. March 13, Kings Point, N.Y.
Contact: The Nautical Institute, Box 581, Center Moriches, N.Y. 11934, tel: (516) 773-5447; fax: (516) 773-5529.

Shipping '96. March 18-20, Stamford Sheraton, Stamford, Conn.

Contact: **Carleen Kluss**, International Marketing Strategies, 66 Field Point Rd., Greenwich, Conn. 06830, tel: (203) 406-0106; fax: (203) 406-0110.

Advanced Hydrographic Surveying Workshop. March 18-22, Mobile Convention Center, Mobile, Ala.
Contact: **Barbara Sanders**, Coastal Oceanographics, Inc., 40 Salted Lane, Durham, Conn. 06422-1111, tel: (203) 349-3800; fax: (203) 349-1982.

19th Annual Marine Safety Seminar. March 21-22, The San Luis Resort and Conference Center, Galveston, Texas.
Contact: **Dewayne Hollin**, seminar coordinator, Sea Grant College Program, Texas A&M University, 1716 Briarcrest Dr., Ste. 702, Bryan, Texas 77702, tel: (409) 845-3857; fax: (409) 845-7525.

ASNE Mechanicsburg Section, 10th Annual Logistics Symposium. 3rd week of month, Harrisburg Hilton,

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481 8493; fax: +44 171 488 1854. 2779.

Sasmex International '96. April 30-May 2, Brighton Metropole Hotel, Brighton, U.K.
Contact: **Gillian Jones**, Sasmex '96, Queensway House, 2 Queensway, Redhill, Surrey, RH1 1QS, U.K., tel: +44 1737 768611; fax: +44 1737 760564.

MAY

Offshore Technology Conference and Exhibition. May 6-9, 1996, Astrodome, Houston, Texas. Contact: Society of Naval Architects and Marine Engineers (SNAME), 601 Pavonia Ave., Jersey City, N.J. 07306, fax: (201) 798-4975.

ASNE Mechanicsburg Section Tenth Annual Logistics Symposium. May 7-9, Harrisburg Hilton, Harrisburg, Pa.
Contact: **Annette C. Verna**, American Society of Naval Engineers (ASNE), 1452 Duke St., Alexandria, Va. 22314-3458, tel: (703) 836-6727; fax: (703) 836-7491.

Mareforum '96: Market Mechanisms For Safer Shipping and Cleaner Oceans. May 8-10, Erasmus University, Rotterdam, the Netherlands.

Contact: **Erasmus Forum, I. Kostoulas**, managing director, P.O. Box 1738, 3000 DR Rotterdam, the Netherlands, tel: +31 10 408 1098; fax: +31 10 453 0784.

The Ship As Link In The Transport Chain. May 9-11, Mercator University, Duisburg, Germany.

Contact: **I. Schuler** or **A. Wittfeld**, Institute of Ship Technology Duisburg (ISD), Mercator University, Duisburg, Germany.

Radio Technical Commission For Maritime Services Conference (RTCM). May 12-17, San Diego, Calif.
Contact: RTCM, 655 Fifteenth St. N.W., Washington, D.C. 20005, tel: 202-639-4006.

SHIPUKRAINA '96: Shipping, Shipbuilding, Harbor and Offshore Industries. May 13-17, Kiev, Ukraine.

Contact: **Hans Jürgen Stöling**, Messe- und Ausstellingsgesellschaft Ost-Handel Consulting mbH, Friedrich-Bergius-Straße 7, D-41516 Grevenbroich, Germany, tel: +49 2181 720 11 13; fax: +49 2181 722 77.

Third International Summit On Safety At Sea. May 14-15, Holmenkollen Park Hotel Rica, Oslo, Norway.
Contact: Conference Secretariat, Norwegian Petroleum Society, Oslo, Norway, tel: +47 22 43 00 50; fax: +47 22 55 46 30.

New Regulations Affecting Ship Operations: Drug Testing, Benzene Testing & Other Regulations. May 15, SUNY Maritime College, Fort Schuyler, N.Y.

Contact: The Nautical Institute, Box 581, Center Moriches, N.Y. 11934, tel: (516) 773-5447; fax: (516) 773-5529.

Small Craft Marine Engineering, Resistance and Propulsion Symposium. May 15-17, Radisson Golf and Conference Center, Ypsilanti, Mich.
Contact: Professor **Michael M. Bernitsas**, chair, Department of Naval Architecture and Marine Engineering, University of Michigan, 2028 E. State St., Ann Arbor, Mich. 48106, tel: (313) 763-2300; fax: (313) 763-2300.

COMPANY & PEOPLE NEWS

Vitulli Named Maritime Marketing Rep For Safeco



Kevin J. Vitulli

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Circle 111 on Reader Service Card

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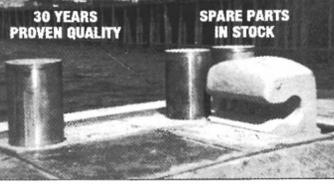
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CALENDAR OF EVENTS

AAPA's Navigation and Environment Seminar: February 7-9, Corpus Christi Marriott, Corpus Christi, Texas.
Contact: **Caren Coffenberry**, American Association of Port Authorities (AAPA), 1010 Duke St., Alexandria, Va. 22314; tel: (703) 684-5700; fax: (703) 684-6321.

5th Annual International Boatbuilders' Exhibition & Conference (IBEX): February 8-10, Ft. Lauderdale/Broward County Convention Center, Ft. Lauderdale, Fla.
Contact: CMC, 200 Connecticut Ave., Norwalk, Conn. 06856-4900, tel: (203) 852-0500; fax: (203) 838-3710.

1996 Ship Production Symposium: February 13-16, Hyatt Regency, La Jolla, Calif.
Contact: **Peter E. Jacquith**, tel: (619) 544-3500.

ASNE Channel Islands Section Meeting, Combat Systems Symposium: February 14-15, Port Hueneme, Calif.
Contact: **Margaret New**, American Society of Naval Engineers, 1452 Duke St., Alexandria, Va. 22314-3458, tel: (703) 836-6727; fax: (703) 836-7491.

1996 Customs/Trade/Finance Symposium of the Americas: February 25-27, Intercontinental Hotel, Miami, Fla.
Contact: **Buck Banks** or **Cristy Clavijo**, Stewart Newman Associates, 3191 Coral Way, Ste. 204, Miami, Fla., tel: (305) 461-3300.

Offshore '96: Operation and Decommissioning of Offshore Facilities: February 28-29, Aberdeen, Scotland.
Contact: **Fleur Heapy**, The Institute of Marine Engineers, The Memorial Building, 76 Mark Lane, London EC3R 7JN, U.K., tel: +44 171 481 8493; fax: +44 171 488 1854.

MARCH

Oceanology International '96: March 5-8, Brighton, U.K.
Contact: **Bob Munton**, Spearhead Exhibitions Ltd., Ocean House, 50 Kingston Rd., New Malden, Surrey KT3 3LZ, U.K., tel: +44 181 949 9222; fax: +44 181 949 8186; e-mail: oi96@spearhead.co.uk.

Sea Japan '96: March 5-9, 1996, Pacifico, Yokohama.
Contact: **Anthony Nash**, Seatrade House, 42 North Station Rd., Colchester CO1 1RB, U.K., tel: +44 1206 45121; fax: +44 1206 45190, or contact: **Christopher Eve**, Shuwa Kioicho TVR Bldg., 9th floor, 5-7 Koji-machi, Chiyoda-ku, Tokyo 102, Japan, tel: +81 3 3222 6901; fax: +81 3 3222 4320.

AAPA's Special Seminar for Members of Port Authority Governing Boards and Commissions: March 6-8, Westin Oaks Hotel, Houston, Texas.
Contact: **Caren Coffenberry**, American Association of Port Authorities (AAPA), 1010 Duke St., Alexandria, Va. 22314; tel: (703) 684-5700; fax: (703) 684-6321.

Microbes In Ships: Effect On Operations and Safety: March 12, London, U.K.
Contact: **Fleur Heapy**, The Institute of Marine Engineers, The Memorial Building, 76 Mark Lane, London EC3R 7JN, U.K., tel: +44 171 481 8493; fax: +44 171 488 1854.

Cruise Shipping '96: March 12-15, Miami Beach, Fla.
Contact: **Michael Kazakoff**, Seatrade, Princeton Forrestal Village, 125 Village Blvd., Ste. 220, Princeton, N.J. 08540-5703, tel: (609) 452-9414; fax: (609) 452-9374.

ASNE Day 1996, Annual Meeting and Exhibition: March 13-15, Sheraton Washington Hotel, Washington, D.C.

Contact: **Margaret New**, American Society of Naval Engineers, 1452 Duke St., Alexandria, Va. 22314-3458, tel: (703) 836-6727; fax: (703) 836-7491.

United States Merchant Marine Academy STCW Panel Discussion: March 13, Kings Point, N.Y.
Contact: The Nautical Institute, Box 581, Center Moriches, N.Y. 11934, tel: (516) 773-5447; fax: (516) 773-5529.

Shipping '96: March 18-20, Stamford Sheraton, Stamford, Conn.
Contact: **Carleen Kluss**, International Marketing Strategies, 66 Field Point Rd., Greenwich, Conn. 06830, tel: (203) 406-0106; fax: (203) 406-0110.

Advanced Hydrographic Surveying Workshop: March 18-22, Mobile Convention Center, Mobile, Ala.
Contact: **Barbara Sanders**, Coastal Oceanographics, Inc., 40 Salted Lane, Durham, Conn. 06422-1111, tel: (203) 349-3800; fax: (203) 349-1982.

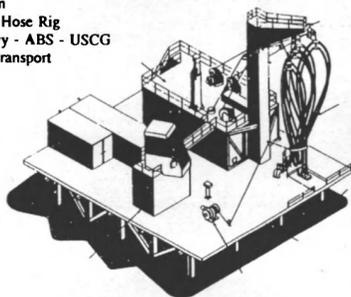
19th Annual Marine Safety Seminar: March 21-22, The San Luis Resort and Conference Center, Galveston, Texas.
Contact: **Dewayne Hollin**, seminar coordinator, Sea Grant College Program, Texas A&M University, 1716 Briarcrest Dr., Ste. 702, Bryan, Texas 77802, tel: (409) 845-3857; fax: (407) 845-7525.

ASNE Mechanicsburg Section, 10th Annual Logistics Symposium: 3rd week of month, Harrisburg Hilton, Harrisburg, Pa.
Contact: **Margaret New**, American Society of Naval Engineers, 1452 Duke St., Alexandria, Va. 22314-3458, tel: (703) 836-6727; fax: (703) 836-7491.

Corrosion '96: March 24-29, Colorado Convention Center, Denver, Colo.
Contact: NACE International, P.O. Box 218340, Houston, Texas 77218-8340, tel: (713) 492-0535; fax:

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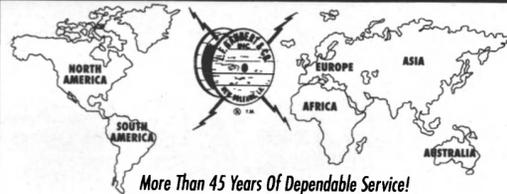
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Maritime Reporter/Engineering News

CALENDAR OF EVENTS

(713) 492-8254.

International Gaming & Business Expo (IGBE) '96: March 25-27, Sands Expo & Convention Center, Las Vegas, Nev. Contact: **Christopher McCabe**, group show director, CMC, 200 Connecticut Ave., Norwalk, Conn. 06856-4990, tel: (203) 852-0500; fax: (203) 838-3710.

Singapore '96 International Maritime Exhibition & Conference: March 26-29, 1996, World Trade Center, Singapore. Contact: **Singapore '96, Times Conferences & Exhibitions Pte. Ltd.**, Times Center, One New Industrial Road, Singapore 1953, tel: +65 284 8844; fax: +65 286 5754.

International Boatbuilders' Exhibition & Conference West (IBEX West): March 30-April 1, Washington State Convention & Trade Center, Seattle, Wash. Contact: **Gina Amatruda**, group show director, CMC, 200 Connecticut Ave., Norwalk, Conn., tel: (203) 852-0500; fax: (203) 838-3710.

APRIL

AAPA's Spring Conference and Annual Washington People's Lunch: April 1-3, Park Hyatt, Washington, D.C. Contact: **Caren Coffenberry**, American Association of Port Authorities (AAPA), 1010 Duke St., Alexandria, Va. 22314, tel: (703) 684-5700; fax: (703) 684-6321.

China International Boat Show: April 8-11, Shanghai. Contact: **Proshow**, 16a Chelsea Wharf, Lots Rd., London, SW10 0QJ, U.K., tel: +44 171 376 7777; fax: +44 171 352 0818.

INEC '96: The Institute of Marine Engineers' Third International Naval Engineering Conference: April 10-12, The Royal Netherlands Naval College, the Netherlands. Contact: **Kathleen Ford**, Conference Organizer, The Institute of Marine Engineers, The Memorial Building, 76 Mark Lane, London EC3R 7JN, U.K., tel: +44 (0) 171 481 8493; fax: +44 (0) 171 488 1854.

AWO Annual Meeting: April 11, Ritz Carlton, Washington, D.C. Contact: **American Waterways Operators**, 1600 Wilson Blvd., Ste. 1000, Arlington, Va. 22209, tel: (703) 841-9300; fax: (703) 841-0389.

American International Shipbuilding Exposition: April 11-13, New Orleans, La. Contact: **Bruce J. Cole**, president and sales manager, American International Shipbuilding Exposition, P.O. Box 418, 34 Spruce St., Rockport, Maine 04856, tel: (207) 236-6196; fax: (207) 236-0369.

Maritime Vietnam '96: April 17-19, Ho Chi Minh International Exhibition & Convention Centre, Ho Chi Minh City, Vietnam. Contact: **RAI Exhibitions London Ltd.**, Glen House, 200/208 Tottenham Court Rd., London W1P 9LA, U.K., tel: +44 171 436 9774; fax: +44 272 436 5694.

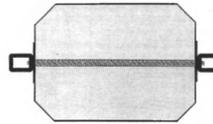
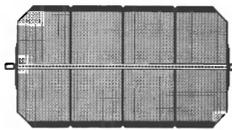
ASNE Professional Development And Systems Engineering Workshop: April 24, Crystal City, Va. Contact: **Annette C. Verna**, American Society of Naval Engineers (ASNE), 1452 Duke St., Alexandria, Va. 22314-3458; tel: (703) 836-6727; fax: (703) 836-7491.

Economics and Operations of Bunkers and Marine Lubricants: April 29-May 3, London, U.K. Contact: **Fleur Heapy**, The Institute of Marine Engineers, The Memorial Building, 76 Mark Lane, London EC3R 7JN, U.K., tel: +44 171

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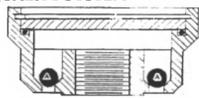
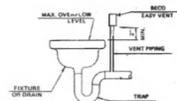
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Sasmex International '96: April 30-May 2, Brighton Metropole Hotel, Brighton, U.K.

Contact: Gillian Jones, Sasmex '96, Queensway House, 2 Queensway, Redhill, Surrey, RH1 1QS, U.K., tel: +44 1737 768611; fax: +44 1737 760564.

Radio Technical Commission For Maritime Services Conference (RTCM): May 12-17, San Diego, Calif.

Contact: RTCM, 655 Fifteenth St. N.W., Washington, D.C. 20005, tel: 202-639-4006.

MAY

Offshore Technology Conference and Exhibition: May 6-9, 1996, Astrodome, Houston, Texas. Contact: Society of Naval Architects and Marine Engineers (SNAME), 601 Pavonia Ave., Jersey City, N.J. 07306, fax: (201) 798-4975.

SHIPUKRAINA '96: Shipping, Shipbuilding, Harbor and Offshore Industries: May 13-17, Kiev, Ukraine.

Contact: Hans Jürgen Stöling, Messe- und Ausstellingsgesellschaft Ost-Handel Consulting mbH, Friedrich-Bergius-Straße 7, D-41516 Grevenbroich, Germany, tel: +49 2181 720 11 13; fax: +49 2181 722 77.

ASNE Mechanicsburg Section Tenth Annual Logistics Symposium: May 7-9, Harrisburg Hilton, Harrisburg, Pa. Contact: Annette C. Verno, American Society of Naval Engineers (ASNE), 1452 Duke St., Alexandria, Va. 22314-3458, tel: (703) 836-6727; fax: (703) 836-7491.

Third International Summit On Safety At Sea: May 14-15, Holmenkollen Park Hotel Rica, Oslo, Norway. Contact: Conference Secretariat, Norwegian Petroleum Society, Oslo, Norway, tel: +47 22 43 00 50; fax: +47 22 55 46 30.

Mareforum '96: Market Mechanisms For Safer Shipping and Cleaner Oceans: May 8-10, Erasmus University, Rotterdam, the Netherlands.

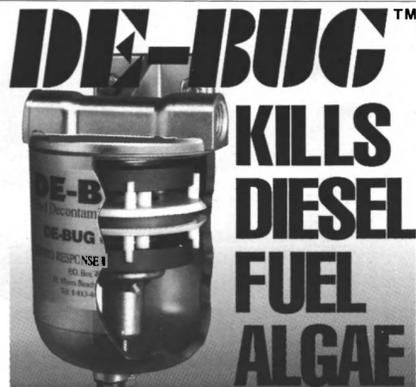
Contact: Erasmus Forum, I. Kostoulas, managing director, P.O. Box 1738, 3000 DR Rotterdam, the Netherlands, tel: +31 10 408 1098; fax: +31 10 453 0784.

The Ship As Link In The Transport Chain: May 9-11, Mercator University, Duisburg, Germany.

Contact: I. Schuler or A. Wittfeld, Institute of Ship Technology Duisburg (ISD), Mercator University Duisburg Bismarckstr. 69, D-47057 Duisburg, Germany, tel: +49 203 379 2779; fax: +49 203 379

New Regulations Affecting Ship Operations: Drug Testing, Benzene Testing & Other Regulations: May 15, SUNY Maritime College, Fort Schuyler, N.Y. Contact: The Nautical Institute, Box 581, Center Moriches, N.Y. 11934, tel: (516) 773-5447; fax: (516) 773-5529.

Small Craft Marine Engineering, Resistance and Propulsion Symposium: May 15-17, Radisson Golf and Conference Center, Ypsilanti, Mich. Contact: Professor Michael M. Bernitsas, chair, Department of Naval Architecture and Marine Engineering, University of Michigan, 2600 Draper Rd., Ann Arbor, Mich. 48109-2145, tel: (313) 936-0566; fax: (313) 936-8820.



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Maritime Reporter/Engineering News

• Ship & Boatbuilding Technology •

Total Project Management

A project management company's view on how design efficiency can conflict with engineering liability

Conceptual design, detailed construction engineering, and owner representation during contract negotiation and construction are three very different functions and phases of vessel construction. They are, however, intimately related and may be consolidated within a single design/project management team. This methodology has many design advantages, but can result in a potential conflict of interest and problems with engineering liability. While recently applied effectively by a Pacific Northwest naval architecture and marine engineering firm, project success is heavily dependent on the development of a partnership between owner, builder and designer.

Owner: Get Involved Early

General arrangements, performance requirements and specifications must be developed in as much detail as possible, and it is at this initial period that input from the owner is most needed and beneficial. Many times the personnel who will operate the vessel are not involved in the design until construction is well underway, resulting in extensive and costly modifications. The design firm can and will offer detailed advice based on previous experience with similar vessels, but significant involvement by the owner (and any consultants such as lighting, interior design, etc.) should occur early in the design phase.

Early consultation with various regulatory agencies must also be a high priority. Many owners — both new and experienced — are surprised with the additional U.S. Coast Guard (USCG) requirements sometimes imposed by the Officer-in-Charge of Marine Inspections (OCMI) in the local area of operation. What is needed is a design/project management firm which is knowledgeable of local USCG, Corps of Engineers, state and municipal regulations and concerns — to develop a rapport with the local inspectors, avoid delays with permits, and in the long term, negate any bad press associated with a poorly managed project. This can be particularly crucial with the introduction of a large casino or excursion vessel into a new area.

Construction Contract Review And Negotiation

The design/project management firm must conduct a detailed review of the bids received for the construction contract. A matrix comparing key design and construction elements should be prepared to allow for a useful comparison. Negotiations with those builders evaluated as meeting the majority of the owner's requirements should concentrate on eliminating any misunderstandings or misinterpretations of the bid documents.

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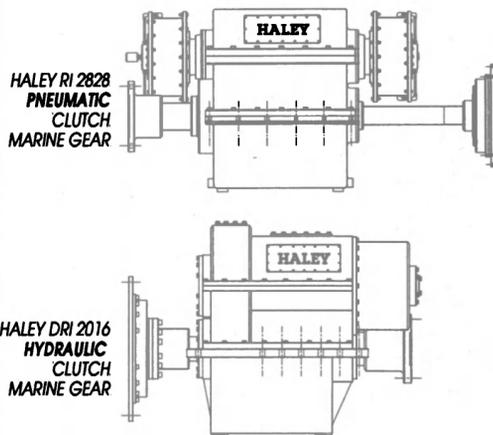
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101

ClassNK Attains ISO Certification

Japanese classification society Nippon Kaiji Kyokai (ClassNK) has attained ISO certifications for its classification and statutory services for ship and offshore installations. The 96-year-old society reportedly classes one-fifth of the

world's merchant fleet, and its ISO accreditation applies to its head office, research institute and worldwide branches.

The ISO assessment was carried out by SGS International Certification Services and registered with Raad voor Accreditatie, based in the Netherlands.

For more information on ClassNK Circle 107 on Reader Service Card

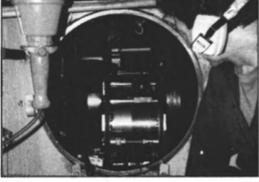
MIB Services Appoints Houston Rep

MIB Services, Inc., a company that supplies employers with background information concerning job applicants, has appointed **Kathlene Reeves** as its new regional representative, based in Houston, Texas. The company services

employers in a variety of industries, including the marine, transportation, oil and gas exploration and production, drilling, ship repair, construction, trucking and manufacturing industries. Previously, Ms. Reeves was employed by Coastal Towing.

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Aker Omega Participates In Gulf Of Mexico Subsea Choke Retrieval

Aker Omega, Inc. recently assisted Phillips Petroleum with a remote subsea choke retrieval in the Gulf of Mexico, reportedly the first such operation in this area. The Dynamically Positioned (DP) vessel *Witch Queen* was mobilized for the Phillips Seastar Garden Banks 70/71 project on November 15, 1995. The retrieval operation utilized diverless tools with ROV assistance, and was completed in 37 hours.

Witch Queen, equipped with dedicated retrieval equipment, utilized a special purpose choke retrieval/installation tool designed by Hydril, with utility umbilical and reel supplied by Ocean-eering/Multiflex and Koomey. Hydril service technicians assisted in the retrieval operations, which were organized and directed by Phillips' Lafayette operations managers and Aker Omega, Inc. The choke was retrieved, repaired and reinstalled without incident.

For more information on Aker Omega Circle 165 on Reader Service Card

Navy Awards Towboat Contract

Marine Inland Fabricators was awarded a contract by the Naval Facilities Engineering Service Center, Port Hueneme, Calif., for the construction of a steel towboat. The 35-ft. (10.6-m) vessel will be built to ABS Rules for Service on Rivers and Intracoastal Waterways, and will be used to tow and maneuver a unique experiment support platform at a Navy research facility on Lake Pend Oreille in northern Utah. The towboat will be equipped with two John Deere 6076AFM diesel engines driving two 42-in. Michigan Workhorse series propellers through Twin Disc MG-509 marine transmissions. A 20-kW generator will provide 120/208 VAC electrical power for the boat and service power for the experiment support platform. The yard will install government furnished electronics. Design of the vessel will be provided by John Bond and Associates, Inc., and Quantic Engineering and Logistics Corp. will provide logistics and tests and trials documentation.

For more information Circle 169 on Reader Service Card

• Ship & Boatbuilding Technology •

Every builder will also recommend changes to the design, usually to save money for the builder and maybe the owner. These will fall into several categories, including: use of different equipment; structural modifications to meet a particular builder's construction techniques; or system modifications based on the builder's preference and installation experience.

At this point in the project, modifications to the vessel design can be accomplished with minimal effort or cost, but it's imperative that every proposed change is evaluated. The owner and builder may have different expectations for equipment reliability, maintenance costs, compatibility and ease of operation. It is during this evaluation that the design firm — acting as owner's representative — has a tremendous advantage. Apparently minor modifications may have a major impact on other aspects of the vessel design. An owner's representative not intimately involved in the vessel design can make critical mistakes which may not be discovered until well into construction.

Detailed construction schedules should also be provided by the builders for evaluation. The design/project management firm needs a thorough understanding of shipyard construction methods and constraints to ensure the schedule is realistic and incorporates a timetable for receipt of owner furnished equipment, interior design drawings, detailed engineering drawings, etc. Builder manpower schedules should also include other projects at the facility which could impact the construction schedule.

Owner Furnished Equipment: Do's And Don'ts

Owners may, for various reasons, choose to supply a wide range of equipment for their vessel. Major shipboard equipment, such as main engines, generators and propulsion systems, may be purchased and supplied by the owner to avoid the material mark-up charged by the builder. Short-fused projects coupled with long lead time equipment may require an owner to specify and order this equipment prior to the awarding of a construction contract. Many specialty vessels, such as casino and excursion boats, require specialized data management systems, exotic sound systems, gaming equipment, surveillance systems, etc.

The specification, contracting, and delivery schedule of all this equipment must be coordinated to avoid construction delays and extensive penalties levied by the builder. This liability should be a primary consideration for any owner contemplating purchasing equipment which is traditionally provided by the builder. The design/project management firm must also be proactive in obtaining detailed technical data for this equipment, as any drawing delays

will also result in hefty penalties for the owner.

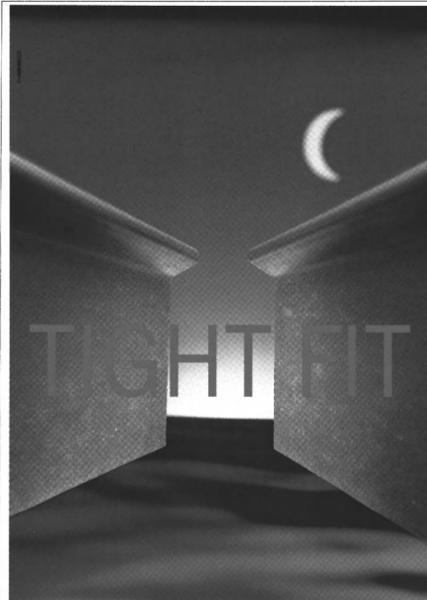
Detailed Engineering

Development of the detailed engineering package is greatly simplified with the original design team simply expanding the scope of the project. No delays are encountered while new personnel familiarize themselves with the vessel design. On many projects, numerically

controlled lofting tapes for the hull and components can be prepared while the contract bids are being evaluated. At contract award, the tapes can be delivered to the builder and cutting of steel can begin immediately.

Conversely, potential problems and conflicts of interest will quickly appear at the start of a detailed engineering package. Feedback from the builder during contract

negotiations must be incorporated into the detailed design drawings. This will also include the extent of detail required by the builder in different areas. A complete technical specification will have detailed performance specifications, but will normally not specify the system design methodology. The builder may prefer a totally different method for meeting the design intent than was envisioned by the

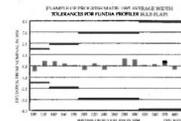


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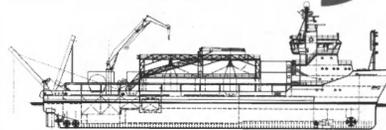


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design firm. In some instances, this difference of opinion could have a profound effect on other drawings (designer's concern) and/or significantly affect the estimated installation time (builder's concern).

While working for the owner, the design/project management firm must have a thorough understanding of shipyard construction methods and constraints, as well as the design flexibility to incorporate builder specific construction techniques and preferred systems. Two key questions must be resolved between the designer and builder during contract negotiations: To what extent will the builder check the drawings prior to construction? Who is liable for mistakes discovered during construction?

Constant communication between the design engineers and builder's production personnel is required during drawing development. Current computer aided design (CAD) technology allows detailed composite drawings to be developed which identify potential interference problems early in the design stage. While this effort increases the design costs, significant rework is eliminated in the field, reducing construction costs and avoiding expensive delays. This and other quality control measures must be employed to provide added builder confidence in construction drawings and reducing the

owner's liability.

On-Site Liaison Engineering And Construction Management

Designers and engineers from the naval architect's office can provide extensive on-site support for the builder, while ensuring the quality and conformance to specifications expected by the owner. Ongoing inspections of all systems can identify errors or misinterpretations of drawing and/or specifications early, significantly reducing rework. Drawing omissions and/or mistakes are also identified early and changes or revisions to a drawing can be issued quickly.

Many relatively minor, and some major engineering decisions cannot be made at the corporate office and are better left to the engineer in the field. Equipment received on-site is quite often different from that specified. Engineers and technicians involved with the original concept and detailed engineering packages are well-equipped to make these decisions, as well as evaluate and resolve design and construction problems.

Construction management is owner representation at the builder's facility for the construction and delivery of the vessel. The design/project management firm is given owner's authority to negotiate changes and settle contractor

disputes. Construction management coordinates engineering design, owner equipment and material procurement, owner subcontractor work on the vessel, site interface coordination, and regulatory issues. This results in a single point of contact for the builder, located at the construction site, significantly reducing delays involved in the daily decisions required to keep a project moving.

Conclusions

While the concept of a single design/project management team appears to be an ideal answer to efficient project management for vessel construction, conflicting priorities between the owner, builder, and designer will invariably result in less than ideal "team building" situations. A relationship of trust, professional respect, realistic expectations and, most importantly, open communications must be developed early in the project, as well as a commitment to work at and maintain this relationship.

The preceding was authored by Joseph Payne, P.E., Guido Perla. Based in Seattle, Guido Perla and Associates, Inc. has completed several recent projects across the country. Most recently, Harveys Kanesville Queen, a 272-ft. (82.9-m) casino riverboat with three decks, opened in Council Bluffs, Iowa on schedule and under budget.

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Principal Contracts Recorded, December 1995

Listed alphabetically, by vessel type. Publisher is not responsible for errors or omissions. For additional information on this, or other ship market information, contact: FERLISHIP, Paseo De San Francisco De Sales, 8, 28003 Madrid, Spain, tel: +341 441 4138; fax: +341 441 4138.

OWNER OPERATOR	COUNTRY	SHIPYARD	COUNTRY	TYPE	No	DWT	GT	DELIV	PRICE M \$
DAMPSKIBS	DENMARK	HUDONG	CHINA	BULK CARRIER	2	27,000	--	1998	--
UNILINE	PERU	XINGANG	CHINA	BULK CARRIER	2	29,000	--	1997	22
ROYAL MAR CORP	--	KANDA	JAPAN	BULK CARRIER	1	23,500	--	6/97	--
UNKNOWN	--	KANDA	JAPAN	BULK CARRIER	2	23,500	--	1997	--
UNKNOWN	--	TSUNESHISHI	JAPAN	BULK CARRIER	2	73,000	--	1997	--
MISR	EGYPT	HITACHI	JAPAN	BULK CARRIER	2	73,000	--	1997	60
WAH KWONG SHIPPING	HONG KONG	HASHIHAMA	JAPAN	BULK CARRIER	1	45,000	--	9/97	--
COSCO	HONG KONG	SASEBO	JAPAN	BULK CARRIER	2	72,000	--	1996	--
MITSUBISHI CORP.	JAPAN	HAKODATE DOCK	JAPAN	BULK CARRIER	1	28,000	--	6/97	--
NAVIX LINE	JAPAN	IMABARI	JAPAN	BULK CARRIER	1	24,000	15,200	3/96	--
NIPPON YUSEN KAISA (NYK)	JAPAN	HINAMI	JAPAN	BULK CARRIER	1	28,000	19,000	3/96	--
DIAMOND CAMELLIA SA	JAPAN	SAKI	JAPAN	BULK CARRIER	1	23,400	14,700	4/97	--
JAPANESE INTERESTS	JAPAN	SUMITOMO	JAPAN	BULK CARRIER	4	73,000	--	1997	--
UGLAND GROUP	NORWAY	TSUNESHISHI	JAPAN	BULK CARRIER	1	45,000	--	1997	24.3
UNKNOWN	--	SAMSUNG	KOREA	BULK CARRIER	1	73,000	41,000	11/96	--
DAEWOO	JAPAN	DAEWOO	KOREA	BULK CARRIER	1	170,000	--	10/97	45
NIPPON YUSEN KAISA (NYK)	JAPAN	SAMSUNG	KOREA	BULK CARRIER	1	149,000	--	1997	--
HALLA MARITIME CORP.	KOREA	HALLA	KOREA	BULK CARRIER	2	73,000	--	1997	57
SEACREST SHIPPING	U.K.	HALLA	KOREA	BULK CARRIER	2	45,000	--	1997	49
QATAR SHIPPING CO	QATAR	MANGALIA	ROMANIA	BULK CARRIER	1	42,000	--	--	20.9
DREYFUS	FRANCE	I.H.I.	JAPAN	BULK CARRIER	2	42,000	--	97/98	24
GOLDEN OCEAN	UK	OSHIMA	JAPAN	BULK CARRIER	2	47,300	--	1998	23.6
SHINWA	JAPAN	I.H.I.	JAPAN	BULK CARRIER	1	170,000	--	1997	45
HANJIN GROUP	CHINA	HANJIN	KOREA	BULK CARRIER	2	135,000	--	1997	80
SEAMAR SHIPPING CORP.	BRAZIL	HYUNDAI	KOREA	BULK CARRIER	2	72,000	--	1997	57
GERMAN INTERESTS	GERMANY	SCHLOMER	GERMANY	CARGO	2	1,500	--	1996	--
MARITIME CREDIT CORP.	--	KANDA	JAPAN	CARGO	1	13,400	--	4/96	--
DUTCH INTERESTS	NETHERLANDS	BULSMA	NETHERLANDS	CARGO	1	2,500	--	1996	--
UNKNOWN	--	BODEWES	NETHERLANDS	CARGO	1	8,200	5,875	--	--
IJDA	NETHERLANDS	NAVOL SA	ROMANIA	CARGO	1	3,000	2,000	1996	--
SCOTT LINE	U.K.	YORKSHIRE	U.K.	CARGO	1	3,000	2,100	12/96	--
SINGA SHIP MGMT.	SINGAPORE	ZHONGHUA	CHINA	CEMENT CARRIER	4	9,000	--	97/98	80
TRANSROLL	BRAZIL	CCN/MAUIA	BRAZIL	CONTAINERSHIP	2	--	--	--	83
HARTMANN SCHIF	GERMANY	HAWEI	CHINA	CONTAINERSHIP	1	--	--	1996	--
STAMERS/MARITIMEHLDs	SINGAPORE	WUHU SHIPYARD	CHINA	CONTAINERSHIP	2	5,000	--	1997	--
AP MOLLER	DENMARK	ODENSE	DENMARK	CONTAINERSHIP	3	--	--	1998	240
B RICKMERS	GERMANY	FLENSBURGER	GERMANY	CONTAINERSHIP	1	--	--	1997	--
GERMAN INTERESTS	GERMANY	FLENSBURGER	GERMANY	CONTAINERSHIP	1	--	--	1997	--
GERMAN INTERESTS	GERMANY	FLENSBURGER	GERMANY	CONTAINERSHIP	2	36,000	--	1997	--
GERMAN INTERESTS	GERMANY	KROGER WERFT	GERMANY	CONTAINERSHIP	1	4,870	2,986	10/96	--
GEORG SABMANNSHAUSEN	GERMANY	KROGER WERFT	GERMANY	CONTAINERSHIP	3	4,870	2,986	97/98	--
GERMAN INTERESTS	GERMANY	IWAGI	JAPAN	CONTAINERSHIP	1	16,500	13,300	6/96	--
UNKNOWN	--	MITSUBISHI	JAPAN	CONTAINERSHIP	2	--	--	1997	--
ORIENT OVERSEAS INT. LTD	HONG KONG	IMABARI	JAPAN	CONTAINERSHIP	2	15,000	--	1997	--
NIPPON YUSEN KAISA (NYK)	JAPAN	SHIN KURUSHIMA	JAPAN	CONTAINERSHIP	4	15,000	--	1997	--
KIEN HUNG SHIPPING	TAIWAN	I.H.I.	JAPAN	CONTAINERSHIP	2	--	--	1997	30
SEA-LAND	U.S.	SAMSUNG	KOREA	CONTAINERSHIP	4	--	--	97/98	270
HAPAG-LLOYD	GERMANY	I.H.I.	JAPAN	CONTAINERSHIP	3	--	--	97/98	--
WAGENBORG	NETHERLANDS	BIJLSMA	NETHERLANDS	CONTAINERSHIP	1	9,100	--	1997	--
DUTCH INTERESTS	NETHERLANDS	DAMEN-BIJHOLT	NETHERLANDS	CONTAINERSHIP	2	5,400	--	--	--
REDERIJ MASTER LEMMER	NETHERLANDS	YSSEL-VLIET	NETHERLANDS	CONTAINERSHIP	2	14,000	9,100	96/97	--
INTERORIENT NAVIGATION	CYPRUS	KVAERNER	NORWAY	CONTAINERSHIP	2	--	--	1997	97
GERMAN INTERESTS	GERMANY	WARNOV WERFT	NORWAY	CONTAINERSHIP	2	30,000	--	97/98	--
KLAUS OLDENDORFF	GERMANY	GDYNIA	POLAND	CONTAINERSHIP	2	22,260	--	8/97	--
SCHOELLER HOLDINGS	GERMANY	SZCZECIN	POLAND	CONTAINERSHIP	1	13,700	10,500	1997	--
DANAOS SHIPPING	GREECE	SZCZECIN	POLAND	CONTAINERSHIP	2	42,000	42,800	7/98	--
ELITE SHIPPING	DENMARK	GDANSK STOCZNIA	POLAND	CONTAINERSHIP	1	9,000	--	1998	46.4
STAR CRUISES	MALAYSIA	AARHUS	DENMARK	CONTAINERSHIP	2	--	75,000	1998	700
OCEAN BRIDGE INVESTMENTS	ITALY	MEYER WERFT	GERMANY	CRUISE	1	5,700	--	9/96	--
STOLT NIELSEN	NORWAY	FINCANTIERI	ITALY	CHEMICAL	6	5,200	--	97/99	120
STORLI	NORWAY	KVAERNER FLORO	NORWAY	CHEMICAL	2	37,000	--	1998	150
C F AHRENKIEL	GERMANY	VIANA DO CASTELO	PORTUGAL	CHEMICAL	2	5,700	--	96/97	--
BIBBY LINE	U.K.	NAVAL GLION	SPAIN	CHEMICAL	1	19,000	--	1998	38
UNKNOWN	--	NARASAKI	JAPAN	DRY CARGO	1	5,600	--	1996	--
GHNTC	LIBYA	DAEWOO	KOREA	DRY CARGO	1	7,500	--	3/97	15
UNKNOWN	--	YORKSHIRE	U.K.	DRY CARGO	1	3,000	--	1996	--
VALFAJRE SHIPPING	IRAN	WAVEMASTER	AUSTRALIA	FERRY	2	--	--	1996	15

(Ferliship's New Contracts Recorded continued on next page)

OWNER OPERATOR	COUNTRY	SHIPYARD	COUNTRY	TYPE	No	DWT	GT	DELIV	PRICE M \$
MOBY LINES	ITALY	RODRIQUEZ	ITALY	FERRY	1	--	--	1997	--
PARKVIEW FERRY SERVICES	U.K.	FBM MARINE	U.K.	FERRY	5	--	--	--	--
ULSTICA LINES	ITALY	RODRIQUEZ	ITALY	FERRY	1	--	--	--	--
STATOIL	NORWAY	SINGMARINE DOCKYARD	SINGAPORE	FPSO	1	--	--	--	--
UNKNOWN		NKK	JAPAN	LNG	1	10,580	16,500	--	--
KOREA SPECIAL SHIPPING	KOREA	DAEWOO	JAPAN	LPG	1	--	--	1997	--
FOKA GAS		SEYERNAV	ROMANIA	LPG	2	3,369	--	1996	--
GRAIG SHIPPING+CLIPPER	U.K.+DENMARK	ZHONGHUA SHIPYARD	CHINA	MULTI-PURPOSE	4	9,000	--	97/98	58
MAMMOET SHIPPING	NETHERLANDS	MERWEDE SHIPYARD	NETHERLANDS	MULTI-PURPOSE	3	16,000	--	--	--
PHOENIX REEFEREI	JAPAN	MARAMARA TRANSPORT	TURKEY	MULTI-PURPOSE	2	--	--	1996	--
INDONESIAN GOVT.	INDONESIA	MERWEDE SHIPYARD	GERMANY	PASSENGER	2	--	--	1998	--
ANTILLES EXPRESS	ANTILLES	MARINTEKNIK SINGAPORE	SINGAPORE	PASSENGER	1	--	--	1996	--
JINOO TRANSPORTATION	KOREA	KVAERNER FJELLSTRAND	SINGAPORE	PASSENGER	1	--	500	1996	--
LAESOE		NORDSOVAERFET	DENMARK	PASSENGER	1	--	--	2/97	15
UNKNOWN		SHIN KIRUSHIMA	JAPAN	REEFER	1	4,100	3,750	3/96	--
LASKARIDES	GREECE	61 KOMAMUNAR	UKRAINE	REEFER	2	7,172	--	1998	--
ALPHA MARINE	U.S.	NORTH AMERICAN SB	U.S.	RESEARCH	1	1,400	1,525	12/96	--
COTUNAV	TUNISIA	SCHICHAU SEEBECKWERFT	GERMANY	RORO	2	6,000	--	1997	--
LITHUANIAN SHIPPING CO.	LITHUANIA	BALTIJA	LITHUANIA	RORO	1	5,600	--	6/96	--
LANMALCO	U.A.E.	SINGMARINE DOCKYARD	SINGAPORE	SUPPLY	1	1,450	--	--	--
THEHARMARIS	GREECE	DALLAN	CHINA	TANKER	2	110,000	--	97/98	89
TORM	DENMARK	HYUNDAI	KOREA	TANKER	2	95,000	--	1997	92
GENERAL NATIONAL MARINE	LIBYA	DAE DONG	KOREA	TANKER	1	8,500	--	3/97	--
HOWARD SMITH TOWAGE	U.K.	MCTAY MARINE	U.K.	TRACTOR TUG	1	--	--	--	--
MAMMOET SHIPPING	NETHERLANDS	MERWEDE SHIPYARD	NETHERLANDS	TWEEN DECKERS	2	15,400	--	1997	--

New Foss System Speeds Tanker Recovery

The Foss Transom Link, for which a patent is pending, was developed by Foss to speed tractor tug retrieval of a tanker's emergency towline in the event of a tanker losing power or steering while being escorted to refinery terminals. Designed by Foss with assistance from Glosten Associates, Seattle, Wash., the unit is a large hook made of an extra-strong, lightweight titanium alloy. The link has a spring-loaded latch for quickly connecting the tug's winch-mounted towline to a pennant or tag line hanging from the stern of tankers being escorted. Running either ahead or astern, a Foss tractor tug safely maneuvers through a tanker's wake at escort speed and approaches at the stern, enabling a deckhand to retrieve the tanker's tag line with a pike pole.



Without assistance from tanker personnel, the tug deckhand pulls the tag line and its Spectra pennant aboard and quickly inserts the pennant eye through the latch of the unit, mounted in a cradle on the tug's transom. The deckhand then evacuates the tug's aft deck, and the tug captain, with full visibility, maneuvers the tug away from the tanker. The link connecting the ship's pennant and the tug's towline is pulled from the transom-mounted cradle, as the tug pays out 400 ft. (121.9 m) of 10-in. Spectra line from the aft winch.

"You can have a state-of-the-art tug, but unless you can apply that tug's forces quickly and efficiently, you will not be effective," said Pete Campbell, Foss general manager of marine operations.

He added that the Transom Link facilitates effective emergency response during non-tethered escorts "because it doesn't require a tanker crew to be standing by on the after deck. We are in control of making the connection."

Larry Johnson, Foss Pacific Northwest marine

superintendent, said that the linking unit "enables us to make up to a tanker unaided by tanker crew consistently in two minutes or less at escort speeds. Only one deckhand on the tractor tug is needed to do the hookup between the two vessels."

The Foss Transom Link has been fitted aboard the Voith Schneider cycloidal propulsion tractor tugs *Lindsey Foss* and *Garth Foss*, each measuring 155 ft. (47.2 m), with 8,000 hp. In recent trials involving a 120,000-dwt tanker, *Lindsey* reportedly brought the fully laden tanker to a halt in three-quarters of a mile, from an escort speed of 11 knots.

Seattle-headquartered Foss Maritime owns nine tractor tugs, which operate on Puget Sound, the Columbia River, San Francisco Bay and San Pedro Bay. The company also provides a complete range of harbor barge services, and is involved in ocean transportation, oil tanker escort, petroleum distribution, vessel repair and environmental services for Pacific Basin customers.

For more information on Foss Circle 139 on Reader Service Card



A unique emergency towline connection device that enhances marine environmental protection is reportedly in use aboard Foss Maritime tractor tugs that escort and assist oil tankers on Puget Sound.

ONE STEP AT A TIME: The following sequence depicts the steps of tanker retrieval as accomplished by use of Foss' tractor tug emergency towline connection device.



Korea

(Continued from page 54)

HMD's Ulsan shipyard. Recent plans completed include the widening of its No. 4 graving dock by 36 ft. (11 m), which now has dimensions of 984 x 246 ft. (300 x 75 m) — to allow more simultaneous dockings, and the extension of the deep draft quayside space on the yard's western side by another 1.25 miles (2 km), as it recently lost quayside space on the eastern side of the yard to Hyundai Offshore. The extension of the No. 4 graving dock has resulted in the yard now having a total of four drydocks, each with the capability of accommodating VLCCs, although due to geographical location, the main market for HMD is bulk carriers and containerships.

Another part of HMD's expansion programs is the construction of a new hatch cover repair and manufacturing shop within the yard's confines. It is the intention for HMD to become a major manufacturer of hatch covers within the next few years. With a workforce of 3,000, which has been steady over the past few years and not involved to a great extent in the political disruption experienced at Hyundai's newbuilding yard, the delivery time for large scale repair, refit and conversion contracts often leads to HMD becoming very competitive.

Conversion work has always been a niche of the market in which HMD has been successful.

South Africa's Safmarine recently awarded a conversion contract to HMD involving the alteration of the bulk carrier *Recife* to a specialized liquid pitch aluminum carrier. The vessel arrived in the yard last October, and was due for completion in January.

HMD has also won a two-ship contract from Spain's Elcano for the re-engining of the two bulk carriers *Castillo de la Luz* and *Castillo de Lopera*, both of which were originally built as coal-fired steam turbine ships.

Last year, the yard completed the \$24 million Sunrise 2000 project, which involved the conversion of the 8,675-dwt heavy lift vessel *Sunrise* to a specialized pipe-laying vessel for Coflex of France. The vessel, which now has the capability of laying flexible pipe in depths up to 6,561 ft. (2,000 m), is the first contract being a charter with Brazil's Petrobras for work off the Brazilian coast.

Hanjin Heavy Industries Co. (HHIC) operates the Youngdo Shipyard in the Port of Pusan, the country's largest and busiest port.

Although the main activity in this shipyard is newbuildings, two graving docks are given over to the repair market. The largest of these is a 150,000-dwt capacity drydock, which is dedicated solely to the repair market. Of course, a number of repair contracts come from Hanjin's shipowning division, Hanjin Shipping Co., which oper-

ates a fleet of more than 45 containerships and bulk carriers. Later this year, the company is to take delivery of its first LNG carrier, currently being built at the same yard. HEHI is currently building a new shipyard, Samho Shipyard in Mokpo. The smaller of the two building docks, which has a 500,000-dwt capacity, is being designated as a newbuilding/ship conversion dock. HEHI also cur-

rently operates a ship building/repairing yard in Incheon, South Korea's second largest port, although the emphasis is mainly on newbuilding. It is expected that the Incheon facility will close when Samho becomes fully operational. The Incheon yard has a 40,000-dwt capacity floating dock, which is used foremost as a launching platform for newbuilding operations, and is only available for repair

operations during a few days each month. The newbuilding section is currently busy, and repair operations take a backseat.

Another of South Korea's expanding ship repair facilities is DHI, Koje Island, which recently doubled its repair capacity following the purchase of a Panamax-sized floating dock from the Ukraine. DHI already operates a 120,000-dwt capacity floating dock.

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Far East Column

(Continued from page 46)

the design and contracting. The offshore field is operated by Unocal (Thailand), part of California-based Unocal. No yard has yet been designated for the work, but the various Singapore yards are reportedly leading the bidding.

Wavespec has also won the contract to handle the contract negotiation, plan approval, newbuilding superintendency and commissioning of the two 300,000-dwt crude carriers on order at Japan's MHI, Nagasaki, for Canada's Irving Oil.

Singapore's Sembawang Shipyard has reportedly broken records in January for its performance in the cruise refit market. During January, a total of four cruise ships will be repaired — Star Cruises' 40,053-grt *Star Pisces* and her sistership *Star Aquarius*, V Ship's 16,927-grt Bahamas-registered *Silver Cloud* and the 9,520-grt Panamanian-registered *Coral Princess*, which is managed in

Singapore by Sembawang Johnson.

Following Keppel's success in developing overseas joint ventures and purchases, another of Singapore's large ship repair companies, Sembawang, has made an overseas move. During mid-December, Sembawang Shipyard Ltd., a division of Sembawang Corporation, and China Offshore Oil Bohai Corporation of China have signed a joint venture agreement to operate a ship repair yard in northern China. The new shipyard, which is to be named Bohai Sembawang Shipyard (Tianjin) Co. Ltd. (BSSC), will be 50 percent owned by both companies. The yard currently operates one graving dock for vessels up to 20,000-dwt and repair quays, totaling 2,624.6 ft. (800 m).

Occupying a total area of 73,000-sq.-m of land, plans are underway for additional upgrading and modernization, including a 10,000-dwt floating dock, the lengthening and upgrading of the existing graving dock to accommodate vessels up to 70,000-dwt, the extension of existing berths and the installation of additional cranes, equipment and other repair services.

Meanwhile, a memorandum of understanding has been signed between Aluminum Craft Ltd., a subsidiary of Singapore's Singmarine Industries Ltd., part of the Keppel Group, and Mofaz Marine to set up a shipyard in Malaysia. Across the Johore Causeway, Malaysia's PSC Industries is to buy the naval dockyard at Lummut on the Malacca Strait for \$118 million. PSC, whose subsidiary Penang Shipbuilding Corp. has a 40 percent stake in a five-member consortium buying the dockyard, will invest \$47.2 million, a senior official said. Persima Industries, a subsidiary of Merusahan Timah, holds a 30 percent share in the venture and will pay \$35.1 million. Malaysia's National Armed Forces Fund Board owns 15 percent of the yard with Syarikat Permodalan Perak, a state development firm, holding seven percent. The remaining eight percent is held by the private company Suria Barisan.

In Thailand, Bangkok's Unithai Shipyard, part of the IMC Group, is to expand its facilities to enable repairs to ships up to 40,000-dwt to be repaired in the facility. The first stage of the yard's development was ideal to cater for IMC's fleet of ships, but the second stage, worth some \$12 million, will move the yard into the international market.

Babtie Oakvee Ltd. and Peter Fraenkel BMT (Asia) Ltd., both based in Hong Kong, have merged to form Babtie BMT (Hong Kong) Ltd. to cover the Hong Kong and mainland China areas. The new company will be headed by Peter French, currently chairman of Peter Fraenkel BMT (Asia), and managing directors will be Ross Bar and Henry Leung, currently managing director of Oakvee and Peter Fraenkel BMT (Asia), respectively.

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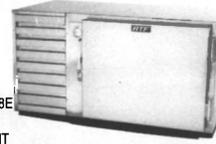
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Japan

(Continued from page 52)

JSEA, for one, has endeavored to establish an orderly international shipbuilding market under reasonable cost conditions, and has been taking action to expand favorable conditions in the international shipbuilding market and to increase international cooperation, said Mr. Masaki. "Our most urgent task at present is strengthening of the international competitiveness of the industry in the single international market — which will require tougher competition in the industry to receive orders for newbuilding."

The Methods & The Means

International politics and financing aside, the Japanese shipbuilding industry is now focusing on strengthening its cost competitiveness. According to Mr. Midorikawa of the SAJ, builders are specifically focusing on: integration of production; promotion of automation for labor saving (e.g. increased production using computer integrated manufacturing); rationalization of indirect departments; specialization of products; and promotion of ship machinery standardization in cooperation with ship machinery manufacturers. Research and development is also proceeding for the future development of the industry, as seen in such projects as Mitsui's Techno-SuperLiner and Megafloat structures.

"The Japanese shipbuilding industry will continue to invest in equipment for increased productivity and cost competitiveness, and at the same time will endeavor to maintain an adequate shipbuilding supply and demand, considering conditions in the worldwide shipbuilding market," Mr. Midorikawa said.

NKK development of a higher standard double hull VLCC design (pictured on page 52) is an example of how Japanese builders continue to innovate to compete. Development work on the design began in July 1994, and the resulting design has been dubbed the MX series. The new design uses the advantages of the modernized Tsu Works, and was developed to stress improved structural reliability and maintenance. Already, NKK has received design approval from major classification societies, and the yard has begun marketing the MX series VLCCs. Soon it will market the MX series capsize bulk carriers, for which new design development is nearly completed.

Recent deliveries from Mitsui mirror industry trends, including the building of the 4,700-TEU containership *Tyne*, built at Mitsui's Chiba Works for MOL Euro-Orient Shipping S.A. of Panama. The vessel has an over-Panamax hull form and is extensively equipped with rationalized container handling devices. The ship is powered by one of the world's largest fuel-efficient main diesel engines with a shaft generator system (a Mitsui MAN B&W 10K90MC), driving a highly-skewed propeller.

Ship Machinery Supply

The Japanese ship machinery supplier market is perhaps best likened to the manufacture and supply relationship of the U.S. auto industry: enormous domestic consumption has led to a vertically integrated industry, allowing builders to draw most resources from local vendors, and leaving suppliers with little incentive to fully develop outside markets and alliances.

However, recent market downturns and long-term newbuilding trends may prompt these suppliers to seek other profitable markets, and alternative manufacturing relationships.

According to James R. McCaul, president, IMA Associates Inc. (Washington, D.C.), Japanese marine equipment suppliers as a group offer state-of-the-art products and potentially lucra-

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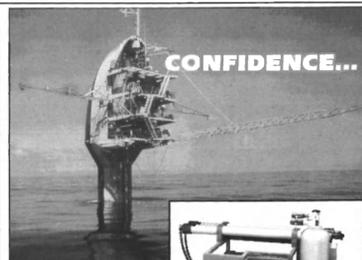
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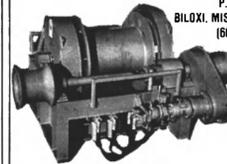


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Japan

(Continued from page 109)

tive opportunities for potential foreign partners. He believes technology transfer and licensing arrangements, much like the ones which have been so common on the shipbuilding side in recent years, will start to form on the equipment side. (See related story, page 52.)

General equipment sales trends released by the Japanese Marine Equipment Association (JSMEA) tend to support a need for diversification. Using yen as a comparative only, the ship machinery and equipment manufactured in Japan in 1994 totaled 811.9 billion yen, down 20 billion yen from the year before, according to JSMEA. Broken down by percentage, the following categories constitute the largest sectors of marine equipment manufactured:

Type	Percentage
Marine diesel engines	31.7
Parts and accessories	22.1
Outfitting	14.4
Marine auxiliary machinery	9.7
Nautical equipment	7.9

Looking a bit deeper, it is seen that the sale of large diesel engines (more than 10,000 ps) declined 7.6 percent, while the sale of medium- and small-size diesel engines increased 7.4 and 2.8 percent, respectively. The production of marine turbines and marine boilers declined 61.1 and 24.4 percent respectively.

Ship machinery export, overall, was down 6.1 percent in 1994 as compared to the previous year. The annual total of exports, which held a 17.6 percent share in overall output, registered a decline for the fourth straight year. By geographic region, three areas accounted for 88 percent of the total value of ship machinery and equipment exports. They were: Asia (39.3 percent); North America (27.2 percent); and Europe (21.8 percent).

On the other hand, ship machinery and equipment imported by Japanese shipyards totaled 16.5 billion yen, up 16.5 percent.

While data and statistics often give an accurate picture of a given matter, they can never deliver the full picture. While trends indicate that the ship machinery sector is faced with many challenges, it must be remembered that a cornerstone of the industry's success has been its consistent development and production of quality innovative products. To strengthen business, ship machinery manufacturers are working together with shipowners and shipbuilders for standardization of ship machinery and equipment. The aim is to improve the reliability and reduce the costs of these products by promoting the use of common parts, for example. Some manufacturers have also reportedly started to import some components from overseas, and the trend is predicted to continue.

Also, research and development, and delivery to market of next generation products, continues. Current efforts focus on improving the operation and reliability of engines and navigational equipment; reducing of NOx and other pollutants; and development and use of new paints.

Examples of this innovation can be seen in many products, real and under development. For example, the Seavans integrated bridge system from Tokimec is an integrated bridge package to meet safety in navigation while allowing for reduction in crew. Furuno has also developed an integrated bridge system, the Voyager, which totally conforms to DNV W1-Class notation, allowing for one-man bridge W1 approval.

IHI offers a slim deck crane for feeder containerships, and the first unit of the new space-saving product series is installed onboard a 1,500-TEU containership built by Imabari Shipbuilding Co.

Maritime Reporter & Engineering News

for Nantai Line of Taiwan. Kashiwa Co. has introduced an emergency towing arrangement which was jointly developed with Tateno Manufacturing for installation on vessels of more than 50,000 dwt. The product has reportedly passed a strength test based on IMO guidelines, reportedly the first such device in the world that has passed this test.

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Japanese Shipbuilding Data & Statistics

Japanese Newbuild Orderbook (Million GT)

1983	13.6
1984	11.4
1985	9.1
1986	5.1
1987	4.8
1988	5.3
1989	8.0
1990	12.2
1991	13.2
1992	10.5
1993	9.9
1994	12.8

Source: Japanese Ministry of Transportation

Japanese Shiprepair Contract Trends

	Domestic	Foreign Flag	Total
1985	122	80	202
1986	128	35	163
1987	116	31	147
1988	102	37	139
1989	119	29	148
1990	131	40	171
1991	150	37	187
1992	127	29	156
1993	116	29	145
1994	122	20	142

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MAN B&W Diesel AG, Tegelhögsgade 41, DK-2450 Copenhagen SV, DENMARK
MAN B&W Diesel, 17 State St., New York, NY 10004
Motor-Service AB, Box 2115, S-144 04 Ronninge, SWEDEN
Motor Service-Hugg Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
Nor-Tech, Inc., 100 Wall St., New York, NY 10005
Paxman Diesels, P.O. Box 8, Paxman Works, Colchester, Essex, CO1 2HW, ENGLAND
Ulsan Bergen AS, PO Box 924, NS022 Bergen, NORWAY
Warska Diesel, 201 Defense Highway, Annapolis, MD 21401

DIVING & SALVAGE

Baso Marine Co., P.O. Box 4113, New Orleans, LA 70178
H.J. Menzies, P.O. Box 23123, New Orleans LA 70183
Midcon Marine Services, Inc., P.O. Box 221, Terminal Island, CA 90781

DOCK - MARINE & INDUSTRIAL

Branton Ind., 1101 Edwards Ave., Jefferson, LA 70181
Installations, Inc., 1101 Edwards Ave., Harahan, LA 70123
Mapco Wall & Krenzer, Inc., 90 Forest Ave., Locust Valley, NY 11560
Marine Accommodations, 8535-S Baymeadows Rd., Jacksonville, FL 32256

DRIVE SHAFTS

Aquatic Systems, 17 Ave. D, Atlantic Highlands, NJ 07716

DRY DOCKS-Design

Conrad Industries, 1501 Front Street, Suite 790, Morgan City, LA 70381
Vita Motivator, 566 Parker St., Newark, NJ 07104

ELECTRICAL ENCLOSURES

Special Applications International Corp., 3990 Old Town Ave., Ste. 300C, San Diego, CA 92121

ELECTRICAL EQUIPMENT

MMC International, 90 Inp Dr, Inwood NY 11698

ELECTRICAL WIRE DEVICES

Metric Corp., 1935 Ace World Wide Lane, Cudahy, WI 53110

ELECTRONIC DISPLAY

Kookum 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

EMISSION CONTROLS

ABB Fiat Marine, Box 1043, S-436 21 ASKIM SWEDEN
Haldor Topsoe Nymblevev, 55, DK-2600, Lyngby, DENMARK

EMPLOYMENT

Box Crews, 1 Seine Court, Suite 309, New Orleans, LA 70114
Marine Jobs, Inc., 800 Downtown Blvd. Ste. 111, Mobile, AL 36609

ENGINEERING SERVICES / MARINE ENGINEERS

Kvaerner Masa Marine Inc., 201 Defense Highway, Suite 202, Annapolis, MD 21401
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

ENGINE ROOM LIGHTING

Pauluhn Electric Mfg. Co., Inc., 1616 N. Main, P.O. Box 53, Pearland, TX 77581

ENGINE TEST EQUIPMENTS

General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Rd., Plymouth, MA 02360

ENVIRONMENTAL SYSTEMS

Foss Environmental Services, 7440 West Marginal Way So., Seattle, WA 98108-4141

EPHIBUS

ACR Electronics, Inc., 5757 Ravenswood Rd., P.O. Box 5247, Ft. Lauderdale, FL 33310-5247
Alden Electronics, 40 Washington St., Westborough, MA 01581

EVAPORATORS

Ala-Laval Separation, Inc., 955 Meares Rd., Warrinerstar, PA 18974
Beard Industries Inc., P.O. Box 31115, Shreveport, LA 71130

FAHNS - VENTILATORS - BLOWERS

ABB Fiat Marine, Box 1043, S-436 21 ASKIM SWEDEN
Jon M. Lisa Associates, Inc., 411 Borel Ave., San Mateo, CA 94402

FAHNSERS

Jameson Distributors, 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02835
Osaka Co., Inc., 645 Forest Edge Drive, Vernon Hills, IL 60061-3106

FENDERING SYSTEMS/BOOYS - Dock & Vessel

B.F. Goodrich, 150 Division Drive, Wilmington, NC 28401
Kahnberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Schuyler Mfg. Co., Inc., 16901 Woodville-Redmond Rd., Woodville, WA 98072
Seward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook, VA 22624

FIBERS

Allied Signal, Meyer I Box, 101 Columbia Rd., Morristown, NJ 07962

FILTER SYSTEMS

Eppure Inc., 680 N. Blackhawk Dr., Westmont IL 60559
Luber-Finor, Inc., 5650 Quorum Drive, Dallas, TX 75240

FIRE STABILIZERS

Blom & Voss AG, P.O. Box 10 07 20, D-2000 Hamburg 1, GERMANY
U.S.A. Regs. Simplex-Turner Inc., P.O. Box 168, Little Neck, NY 11363-0168

FIRE DETECTION SYSTEMS

Autonics Marine AS, Drammensveien 128, N-0277 Oslo 2, NORWAY

FIRE FIGHTING EQUIPMENT

Sea Systems Inc., 187 Ward Hill Ave., Ward Hill, MA 01855-0679
Shocharnidge Masts, P.O. Box 280, Hubbard, RI 07032

FIRE RESISTANT PANELS

Thermax N.A., 13115 Dulany Valley Rd., Glen Am, Baltimore, MD 21057

FIRE SUPPRESSION AGENT

American Pacific Corp., 3770 Howard Hughes Pkwy, Las Vegas, NV 89109

FLAME CUTTING MACHINE

Sup-O-Systems, 3003 West Carson St., Pittsburg, PA 15204

FLEXIBLE COUPLINGS

American Vulcan, P.O. Drawer 673, Water Haven, FL 33882

GALE EQUIPMENT

Cospolich Refrigerator Co., 949 Industry Rd., Kenner, LA 70062
Jameson Metal Marine Sales, 4710 Northwest Second Ave., Boca Raton, FL 33431
Noy Manufacturing

Kookum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Pauluhn Electric Mfg. Co., Inc., 1616 N. Main, P.O. Box 53, Pearland, TX 77581
Francis Searchlight Supply Co., 4415 6th N.W., Seattle, WA 98107

LIQUID LEVEL GAUGES
King Engineering Corp., P.O. Box 1228, Ann Arbor, MI 48106

LIQUID OVERFILL PROTECTION SYSTEMS
E.R.L. Marine Products, P.O. Box 1026, New Albany, IN 47151-1026
Meritape, Inc., 59 Porter Rd., Littleton, MA 01460
Midland Mfg. Corp., 7733 Gross Point Rd., Skokie IL 60076-0226

LOGISTICS
Newport News Shipbuilding, Logistics & Technical Services, 12129 Jefferson Ave., Newport News, VA 23601
OEO, 4646 N. Wilshire Road, Virginia Beach, VA 23455
V.L. Logistics Consultants, Inc., 3420 Blenheim Blvd., Ocean Springs, MS 39564

LUBRICANTS
Royal Lubricants, P.O. Box 518, East Hanover, NJ 07936
Texaco International, 2000 Westchester Avenue, White Plains NY 10650

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
Del Gavo, 619 Industrial Rd., Carlstadt, NJ 07072
Golden Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231
Hopeman Brothers, P.O. Box 821, 426 Essex Ave., Weymouth, VA 22969
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Jameson Metal Marine Sales, Inc., 4710 Northwest Second Ave, Boca Raton, FL 33431
Maritime Services Corp., 3457 Guignard Dr., Hood River, OR 97031

MARINE ACCOMMODATIONS
Directions in Design Inc., 11457 Old Cabin Rd., Ste. 100, St. Louis, MO 63141
Hopeman Brothers, P.O. Box 821, 426 Essex Ave., Weymouth, VA 22969
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Jameson Metal Marine Sales, Inc., 4710 Northwest Second Ave, Boca Raton, FL 33431
Maritime Services Corp., 3457 Guignard Dr., Hood River, OR 97031

MARINE CEILING
Hydro-Aluminum, Via Verk, N-5860 Vik I SOGN, Norway
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807

MARINE DECKING
Hopeman Brothers, P.O. Box 821, Weymouth, VA 22969
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Selyo, P.O. Box 1600, Sapulpa, OK 74067

MARINE ELECTRONICS
Frank L. Beier Radio, 2001 Ridgeway Drive, Metairie, LA 70001
Kookum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Sao Marine Electronics, 49, Box 15045, 402 St. Gabriel, SWEDEN
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

MARINE ELEVATORS
Alimak Elevator Co., 1100 Boston Ave., Bridgeport, CT 06601
McEloy Machine, 1101 Lorraine Rd., Bixoi, MI 39535-4454

MARINE EQUIPMENT
Borini & Associates, 150 Rule Rochelle, Sidel, VA 70458
McEloy Machine, P.O. Box 4454, Bixoi, MS 39535-4454

MARINE FINANCING
Safeco Credit Co., Inc., 4909 156th Ave. NE, Redmond, WA 98052

MARINE FIRE PROTECTION
Halter Systems, 3710 Lakeside Court, Mobile, AL 36683
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Unitor Ship Service Inc., 2375 West Esther Street, Long Beach, CA 90813

MARINE FUEL MANAGEMENT
Det Norske Veritas, Haashtachtstraat 7, 3279 DC Rotterdam, The Netherlands

MARINE FURNITURE
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Jameson Metal Marine Sales, Inc., 4710 NW Second Ave Boca Raton, FL 33431
Maritime Services Corp., 3457 Guignard Dr., Hood River, OR 97031

MARINE GEARS
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
The Falk Corp., PO Box 492, Milwaukee, WI 53201-0492
Henry Marine Gears, Inc., P.O. Box 689, Greenville, MS 38702
Marine Gears, P.O. Box 689, Greenville, MS 38701
Western Gear Corp., 2002 East Imperial Hwy., Lynwood, CA 90262
ZF Industries, Inc., 777 Hickory Hill Drive, Vernon Hills, IL 60061

MARINE HYDRAULICS
Det Norske Veritas, Haashtachtstraat 7, 3279 DC Rotterdam, The Netherlands

MARINE INTERIORS
John G. Alden, 1300 SE 17th St., Fort Lauderdale, FL 33316

MARINE INTERIORS
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Jameson Metal Marine Sales, 4710 Northwest Second Ave, Boca Raton, FL 33431
Johnson Construction Specialties, Inc., 3402 River Road, Houston, Texas 77251

MARINE LADDERS
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031

MARINE LADDERS
Sea Systems, Inc., 75 Avco Rd., Ward Hill, MA 01835

MARINE PLUMBING
Bill Brown Enterprises, Inc., 4995 Osoan Pines, Berlin, MD 21011

MARINE PUMPS
Gibbs & Cox, Inc., P.O. Box 628, Seabrook, TX 77586

MARINE SURPLUS SALES
Defense Realization & Marketing Service, 2163 Airways Blvd., Memphis, TN 38114

MULTI-CABLE DEHIMATION DEVICE
NMP, 12437 E. 60th St., Tulsa, OK 74133

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
Donald L. Blount, 2550 Ellersmere Ave., Ste. K, Norfolk, VA 23513
C. Baxter & Associates, P.O. Box 9006, Mobile, AL 36609
C.J. Marine Co., 4400 Woodstock Rd., Ste 220, Arlington, VA 22204
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Ln., Dedham, MA 02006
Crone Consultants, 15301 First Ave. S., Seattle, WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
C.T. Marine, 56 Crooked Trail, Rowayton, CT 06853
Arthur D. Darden, 3000 Rappahock Dr., Suite 403, Metairie, LA 70002
DeLong & Lebet, Inc., 1734 Emerson Street, Jacksonville, FL 32207
Design Associates Inc., 14360 Chief Merritt Highway, New Orleans, LA 70129
Designers & Planners, 2150 Washington Blvd., Ste 220, Arlington, VA 22204
Elliot Bay Design Group 5301 Shiloh Ave. N.W. Ste. 200, Seattle, WA 98107
Ercon Marine Engineering Consult Services, P.O. Box 7780, Beaumont, TX 77706
GHM Inc. (Ind. Measurement Consultants), P.O. Box 1836, Newport News, VA 23601
Gibbs & Cox, Inc., 50 West 23rd St., New York, NY 10010
John W. Gaber & Assoc., Inc., 96 Long Wharf, Boston, MA 02110
The Glosten Assoc., Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
Guido Peria & Assoc., 720 3rd Ave., Ste. 1200, Seattle, WA 98104
Morris Gurulnick Associates, Inc., 130 Sutter St., Ste. 400, San Francisco, CA 94104
C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110
Hydrocoast, Inc., 202 C Packets Court, Williamsburg, VA 23185
J.H. Inc., 3412 Progress Dr., Bensalem PA 19009
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
Kraemer Masa Marine Inc., 201 Defense Highway, Suite 202, Annapolis, MD 21401
James S. Kroger, 750 Brockwell Plaza Ste. 701, Miami, FL 33131
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
MCA Engineers, Inc., 2290 Airway Ave., #4-103, Costa Mesa, CA 92626
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
McEloy Machine & Mfg Co., Inc., P.O. Box 4454, Bixoi, MS 39535-4454
John J. McKelven Associates, Inc., 1 World Trade Ctr, Ste 3000, N.Y.N.Y. 10048
Fennell Marbury, P.O. Box 2321, Annapolis, MD 21401
Marine Design & Operations, Inc., 226 Chestnut St., Roselle Park, NJ 07068
Marine Management Systems Inc., 102 Hamilton Ave., Stamford CT 06902
Marine Power Associates, 1010 Turquoise St., Ste 217, San Diego, CA 92109
Marinech, Seaside, Bay Road, Newmarket, NH 03857
Maritime Design, Inc., 3203 Hatterly Rd., Jacksonville, FL 32257
R.J. Mellusi & Co., 71 Hudson St., New York, NY 10013
Nautical Designs, Inc., 2101 S. Andrews Ave/Suite 202, Ft. Lauderdale, FL 33316
Ocean Motors Co., P.O. Box 130, 49 Shore Drive, Barrington, RI 02806-0130
Olsen Marine Surveyors Co., P.O. Box 283, Port Jefferson, NY 11777
OED Systems Inc., 4645 Wilshire Rd., Virginia Beach, VA 23465
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 620 Fulton St., Ste. 301, San Francisco, CA 94107
Sargent & Heikes, 225 Baronne St., Suite 1405, New Orleans LA 70112
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
Sea School, 10812 Dandy Boulevard, St. Petersburg, FL 33702
Seavorty Systems Inc., P.O. Box 965, Essex, CT 06425, 17 Battery Pl., New York, NY 10004, P.O. Box 975, Barnegat Light, NJ 08006; 2 Skyline Pl., 3203 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 54225
A.K. Suda & Ass., 3004 19th St., Melrose, LA 70002-4969
TIMSCO, P.O. Box 91560, Mobile AL 36691

NAVIGATION & COMMUNICATIONS EQUIPMENT
Aurionca Marine A/S, Dammenveien 126, N-2277 Oslo 2, NORWAY
Comsat Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024
Crusaphone, 2100 Park Central N., Pompano Beach, FL 33064
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Hose-McCann, 1241 W. Newport Center Dr., Deerfield Beach, FL 33442
ICS Electronics Ltd., Lind V., Rufford Industrial Estate, Ford, Ayrshire, West Essex, UK
Mackay Communications, 300 Columbus Circle, Edison, NJ 08837
Nelson Marine Consultants, 840 Bond Street, Elizabeth, NJ 07201
Olinone Systems Ltd., 107-650 West 1st St., North Vancouver, B.C. V7P 3N4 CANADA
Raytheon Marine Co., 676 Island Point Rd., Manchester, NH 03109-5420
Scandinavian Micro Systems P.O. Box 155, N-1411, Kolbotn, NORWAY
Scientific Atlanta, Inc., 1650 International Court, Norcross, GA 30093
Sea, Inc., 7030 220th S.W., Mountlake Terrace, WA 98043
Sinnad, 19210 3rd Avenue West, Lynnwood, WA 98026
Sinnad Robertson, 10801 Hammett, Suite 100, Houston, TX 77043-1923
Sperny Marine Inc., 1070 Semmore Trail, Charlottesville VA 22901
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Starlink, Inc., 6400 Highway 290 East Suite 202, Austin TX 78752
Trimble Navigation, 585 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94086
Wireway Communications System, Inc., 453 E. Park Pl., Jeffersonville, IN 47130

NOZZLE SYSTEM
Rice Propellers, Av. Rio Esquina #88, Mazatlan, MEXICO 81280

Oil-Heating-Adapters
Mobil Oil Corporation, 3225 Gallows Road, Fairfax, VA 22037-0001

OIL SPILL CONTAINMENT
Foss Environmental, 7440 W. Marginal Way S., Seattle, WA 98108-4141

OILWATER SEPARATORS
Alfa-Laval Separation, Inc., 955 Meares Rd., Westminster, PA 18774-0556
Blom & Voss AG, P.O. Box 10 07 20, D-20457 Hamburg, 1 GERMANY
U.S.A. Repe Simplex-Turner Inc., P.O. Box 168, Little Neck, NY 11363-0168
Fast Systems, 3240 North Broadway, St. Louis, MO 63147
MMC International, 60 Insp Dr., Inwood NY 11696
National Fluid Separators, 927 Hester Industrial Ct., St. Louis, MO 63144
Nelson Industries, Highway 51 West, Sloughon, WI 53589

PAINT-COATING-CORROSION CONTROL
Ashland Chemical Co., One Drew Plaza, Broomton, NJ 07005
Corrosal, Inc., 1045 12th Ave. NW-PSA, Issaquah, WA 98027
Devco Coatings, 4000 Dupont Circle, Louisville, KY 40207
E. Fiant Co., 5 Colcord Dr., Burns, MA 02836
Egard, Inc., P.O. Drawer 2698, Lafayette, LA 70522
Finn Corp., 1501 North Flora St., Plymouth, IN 46363
Jamestown Distrib., 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02835
Hempel Coatings, 6901 Cavacade St., Houston, TX 77028
Halter Systems, 3710 Lakeside Court, Mobile, AL 36683
Permaspco Flut, 264 South Main St., Wallingford, CT 06492
Product Research Service, Inc., 229 Hwy 23, PO Box 159, Belle Chasse, LA 70037
Royal Chemical, 2705 Concord Road, Belle Chasse, LA 70037
Sigma Coatings, 8979 Market St., Houston, TX 77029, 330 Rover Rd., Haney, LA 70059, 1100 Adams St., Hoboken, NJ 07030
Unitor Ship Services Inc., 2375 West Esther Street, Long Beach, CA 90813

PIPE FITTING/CUTTING/CONNECTING SYSTEMS
George Fischer Pipe Tools, 407 Hadley St., Box 40, Holly, MI 48442
Loring Equipment, 1001 E. 1st St., Houston, TX 77002
Loring Equipment, 1001 E. 1st St., Houston, TX 77002

POLLUTION CONTROL/PRODUCTS/MARINE SERVICES
Foss Environmental, 7440 W. Marginal Way S., Seattle, WA 98108-4141
Marco Pollution, 2300 West Commodore Way, Seattle, WA 98199
Oil Imp. Corp., 221 Rue De Jean, Lafayette, LA 70508

PORTLIGHTS
Clegg Cat. P.O. Box 253, Monroe, CT 06468

PREDICTIVE MAINTENANCE
Predictive Maintenance Way West, Barbridge Island, WA 98110

PROPELLERS
Rice Propellers, Av. Rio Esquina #88, Mazatlan, MEXICO 81280
Rolla Propeller SA, Via Siva, S.P.O. Box 251, 6628 Balerna SWITZERLAND
Rolla SP Propellers USA, Inc., 4033 Mustang Road, Melbourne, FL 32934 USA
Sourd Propeller, 12001 Springview Avenue, Seattle, WA 98102

PROPULSION EQUIPMENT
-Bowltrunners, Diesel Engines, Gears, Propellers, Shafts, Turbines
Anavada Industries, Henry Glick Repair, P.O. Box 115, Harvey, LA 70058
American Air Filter, P.O. Box 56590, Louisville, KY 40426
ABB Diesel, P.O. Box 372, Milwaukee, WI 53201-0372, USA
ABB Industry Oy, P.O. Box 186, 00281 Helsinki, FINLAND
ABB TURBOCHARGER, Inc., 1460 Livingston Avenue, N. Brunswick, NJ 08902
Aquamaster-Rauma Ltd., Box 220, SF-26101, Rauma, FINLAND
Aquamaster-Rauma, Inc., 186 West 89 Ave., Vancouver, BC CANADA V5Y 1N2
Bird Johnson Company, P.O. Box 1528, Pascagoula, MS 39567
Brunell AIS, P.O. Box 370, N-6401, Molde, Norway
Caterpillar, 100 N. Kent Avenue, Peoria, IL 61629-2300
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
The Falk Corp., PO Box 492, Milwaukee, WI 53201-0492
Fincantieri, Diesel Engines-GMT, Bagnoli della Rosandra 334, Trieste, ITALY
GE Naval & Drive Turbine Systems, 168 Boulder Dr., Fitchburg MA 01420
Guthrie Marine Company, 161 Van Brunt St., Brooklyn, NY 11231
Holset Engineering, Inc., 1320 Kemper Meadow, Ste. 500, Cincinnati, OH 45240
In-Pace Machinery Co., Inc., 1929 North Buftum Street, Milwaukee, WI 53212-3793
Kaltenberg Bros. Co., P.O. Box 359, Two Rivers, WI 54241
Krupp, MAK, 7555 Danbro Crescent, Mississauga, Ontario, CANADA L5N 6P9
Kobe Manufacturing, 8208 129th Street, Sunny, B.C. CANADA V3W 0A6
LIPS B.V., P.O. Box 6, 5151 RP Druinen, The Netherlands
LIPS U.S.A. Inc., 3617 Koppans Way, Chesapeake, VA 23323
Lohmann & Stoltefort, P.O. Box 1860, D-58406 Witten, Germany
Lo-Rez Vibration Control, 186 West 89 Ave., Vancouver, BC CANADA V5Y 1N2
Mapco Products Inc., 90 Forest Ave., Locust Valley, N.Y. 11560
Manches Wierk, P.O. Box 1442, D-5684 Halver GERMANY
MAN B&W Diesel, 17 State St., New York, NY 10004
MAN B&W Diesel AS, Ostervej 2, DK-4960 Høiby, DENMARK
MAN B&W Diesel AS, Aahs Diesel, Hals Jæls Vej 15, DK-9000
Frederikshavn, DENMARK
MAN B&W Diesel GmbH, Stachbacherstrasse 1, D-86153 Augsburg 1 GERMANY
Omnitruster, Inc., 9515 Sorenson Ave., Santa Fe Springs, CA 90670
Oron corp., 1111 Cedar Creek Rd., Grafton, WI 53024
Rolla SP Propellers SA, Via Siva 2, P.O. Box 251, 6628 Balerna SWITZERLAND
Rolla SP Propellers USA, 4033 Mustang Road, Melbourne, FL 32934, USA
Karl Sermer, Inc., 25 W Third, Kenner LA 70002
Schottel-Werk, Manzer Strasse 99, D-56222 Spenhoff, GERMANY
Schottel North America, Inc., 1956 Cotton Ave., Hammond, LA 70403
Ship Machinery International, Inc., 8375 N.W. 58 Street, Miami, FL 33166
Siemens Electric Ltd., 1180 Courtyepark Rd., Mississauga, ONTARIO
Stewart & Stevenson, 1400 Dedman, P.O. Box 8, Haney, LA 70059-0008
Thrusmaster of Texas, P.O. Box 840189-12227, FM 529, Houston, TX 77284-0189
Unitor Bengel Diesel A/S, P.O. Box 924, A-5002, Bergen, NORWAY
J. M. Voth GmbH, Marine Division, Postfach 1940, D-7920, Heidenheim/Brenz, GERMANY U.S. Rep. Voth Schneider America, Inc., 121 Susquehanna Ave., Great Neck, NY 11021
Oy Warfella Ab, Vasa and Abo Divisions, P.O. Box 244, SF65100 Vasa, FINLAND

PUMP-Repairs-Drives
Del Gavo, 619 Industrial Rd., Carlstadt, NJ 07072
Gikas, Inc., PO Box 628, Seabrook, TX 77586
Jery B. Leach Co., Box 71, 647 State Rd., Cheraw, SC 29520
Leitz Corporation, 165 Chestnut Street, Alhambra, NJ 07401
Vita Motorator, 568 Parker St., Newark, NJ 07104

REFRIGERATION EQUIPMENT/SERVICES
Ashtek Marine, 1410, Central Ave., Farmingdale, NY 11735
Ashland Chemical Co., One Drew Plaza, Broomton, NJ 07005
RTF Mfg., PO #1 Route 66, Hudson, NY 12521
Unitor Ship Service Inc., 2375 West Esther Street, Long Beach, CA 90813

REMOTE VALVE OPERATORS
Americo, 1001 E. Main Street, Rt. 1, Saugus, MA 01906
Elliott Manufacturing, P.O. Box 773, Birmingham, NY 13902

RIGID INFLATABLE BOATS
American Eagle, 780 E. Francis Johnson Way, LaComer, WA 98257
Willard Marine, Inc., 1250 N. Grove St., Anahim, CA 92806
Zodiac of N. America Thompson Creek, P.O. Box 400, Seveville, MD 21666

ROPE-Manila-Nylon-Hawesers-Fibers
Allied Signal Inc., Fibers Division, 101 Columbia Rd. Morristown, NJ 07962
American Mfg. Co., 200 Southpark Rd., Lafayette, LA 70508-3609

RUDDER BUSHES
Vesco Plastics, P.O. Box 40647, Cleveland 2022, South Africa

SAFETY LIGHTING
Datex, Inc., P.O. Box 1150, Kinder, LA 70648-1150

SALVAGE/PILL RESPONSE
Echon International Corp., 1110 Industrial Blvd, Spartanburg, TX 77479

SANITATION DEVICE-Pollution Control
Byrne, Rice & Turner, Inc., 1172 Camp Street, New Orleans, LA 70130
Comsat Mobile Communications, 22300 Comsat Dr., Chantebourg, MD 20871-8475
Envirovac, Inc., 1260 Tunnel Dr., Rockford, IL 61111
Fast Systems, 3240 North Broadway, St. Louis, MO 63147
Microhor, Inc., 452 E. Hill Rd., P.O. Box 1460, Willis, CA 95490
Research Products Blankenship, 2839 Ardon Dallas, TX 75220

SATELLITE COMMUNICATIONS
American Mobile Satellite Corp., 10802 Parkridge Blvd., Reston, VA 22091
British Telecom, Room 203, 43 Bartholomew Close, London EC1A 7HP
Comsat Mobile Communications, 22300 Comsat Dr., Chantebourg, MD 20871-8475
CP Comm. Intl., 2100 Park Central North, Ste. 900, Pompano Beach, FL 33064
DB Mobile Comm., 6903 Rockledge Dr., Ste. 500, West Bethesda, MD 20817
Maritime Cellular Network, 560 Village Blvd., W. Palm Beach, FL 33409
Norwegian Telecom, Postboks 6701 St. Olav Plass, N-0130, Oslo, Norway
PTT Telecom, Station 12, P.O. Box 30150-2500, JD The Hague, NETHERLANDS
Scientific Atlanta, Inc., 1650 International Court, Norcross, GA 30093
Singapore Telecom, 15 Hill Street, Telephone House, 2nd Storey, Singapore 0617
Telexis Mobile Satellite & Radio Services, 79 St. Hillers Rd., Auburn NSW 2144, AUSTRALIA

SCALE MODELS
Marketed, PO Box 225, Oconomowoc, WI 53086
Scale Reproductions, 16346 County Road 13, Fairhope, AL 36532
Sturgeon Bay Model Shop, 187 N Ninth Ave., Sturgeon Bay WI 54235

SEALS
Blom & Voss AG, P.O. Box 10 07 20, D-20457 Hamburg, GERMANY
U.S.A. Repe Simplex-Turner Inc., P.O. Box 168, Little Neck, NY 11363-0168
Kobelco Marine Engineering Co., 6F Tatsunuma Bldg., 3-19, Yaesu 1-chome, Chuo-ku, Tokyo 103, JAPAN
U.S.A. Rep. Roland Marine Inc., 90 Broad Street, New York, NY 10004
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Marine Service AS, Box 2115, 144 04 Rominge, SWEDEN
Munson Manufacturing, 150 West Dayton, Edmonds, WA 98020
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ABB INDUSTRY OY	PROPULSION SYSTEM	201
ABB TURBO SYSTEM AS	TURBOCHARGER	202
ALLIEDSIGNAL	ROPES/FIBERS	203
AMERCABLE	SHIPBOARD CABLES	204
AMERICAN BUREAU OF SHIPPING	SHIP CERTIFICATION	205
AMERICAN INT'L SHIP EXPORT	TRADE SHOW	206
AMERICAN MOBILE SATELLITE	SATELLITE PHONE	207
APPLIED FLOW TECH.	COMPUTER SOFTWARE	208
AQUADRIVE SYSTEMS	ENGINE COUPLING	338
AQUAMASTER RAUMA	PROPELLERS	339
A/S DAN-BUNKERING	BUNKERING	209
ASNE	ASSOC	210
ASTILLEROS ESPANOL	SHIPYARD	348
AUTOSHIP SYSTEMS	SOFTWARE	211
BAINBRIDGE AQUABATTEN INC.	FLAME RETARDENT TEMP.	212
BBN ACOUSTIC	ACOUSTICS	213
BECO VALVES	VALVES AIR EMITTING	365
BIRD JOHNSON	PROPULSION	214
BLOHM & VOSS SIMPLEX TURMAR	SIMPLEX COMPOUND 2000	215
BOATLIFE - LIFE INDUSTRIES	LIFE CALK	216
BOLLINGER	SHIPYARD	217
BP MARINE	LUBRICANTS	218
BRANTON INDUSTRIES	JOINERS	219
BILL BROWN	AIR CONDITIONING	220
BRUNVOLL A/S	THRUSTERS	221
CAMBRIDGE APPLIED SYSTEM	VISCOSITY MANAGEMENT	222
CAPITOL DIESEL	ENGINES & GENERATORS	223
CARRIER TRANSCOLD	REFRIGERATION	347
CATERPILLAR INC.	MARINE ENGINES	224
CEBU SHIPYARD	SHIPYARD	225
CHARLEBOR (USA)	STEEL	342
CHESAPEAKE SPECIALTY PROD.	ABRASIVES	359
CHRIS-MARINE AB	DIESEL ENGINE MAINTENANCE	226
CINCINNATI GEAR	MARINE GEARS	227
COLTEC	DIESEL ENGINES	350
COMNAV MARINE	AUTOPILOTS	229
CORROSEAL INC.	MARINE INDUSTRIAL COATINGS	230
CREATIVE SYSTEMS	HYDROSTATIC SOFTWARE	231
CURACO DRYDOCK	SHIP REPAIR	232
CUSTOM NOZZLE FABRICATORS	CUSTOM NOZZLES	233
CUSTOM SHIP INTERIORS	JOINER CONTRACTOR	234
CYGNUS INSTRUMENTS	ULTRA SONIC THICKNESS TESTING	235
DATREX, INC.	LOW LOCATION LIGHTING SYSTEM	236
DEBUG U.S.A.	FUEL DECONTAMINATION	244
JOHN DEERE	MARINE ENGINEERING	237
DEL GAVIO	MARINE HYDRAULICS	238
DERBYSHIRE MACH & TOOL	VALVES & FITTINGS	340
DE VOE	MARINE SEALER	239
E PAINT	MARINE PAINTS	356
ELECTROCATALYTIC	CATHODIC PROTECTION SYSTEM	240
ELECTRONIC MARINE SYSTEM	NAVIGATOR	241
ELLIOTT MFG	VALVE CONTROL SYSTEM	242
ELTECH INTL	SANITATION DEVICES	243
EMERALD CREEK GARNET	ABRASIVES	341
ENVIROVAC, INC.	VACUUM TOILET	245
FALK CORP.	MARINE GEARS	246
R.W. FERNSTRUM	GRID COOLERS	247
FERRI CORP.	LIQUID COATINGS	248
FINNYARDS LTD.	SHIPYARD	249
J.W. FISHERS	UNDERWATER METAL DETECTORS	250
FLAGG BRASS	FITTINGS	349
FUNDIA BYGG AS	STEEL MFG.	251
GALATZ SHIPYARD	SHIPBUILDING/SHIP REPAIR	344
L.F. GAUBERT	ELECTRICAL CABLE	252
G.E. MARINE	PROPULSION	253
GENERAL THERMODYNAMICS	BMEP	254
GIBBS & COX	NAVAL ARCHITECTS	255
GISLAVED FOLIE AB	MARINE INTERIOR DESIGN	256
GOLTEMS	SHIP REPAIR	257
HAMILTON JET	WATER JETS	351
HARBOR MASTER	MARINE PROPULSION PRODUCTS	258
HEMPEL COATINGS	MARINE COATINGS	259
HILLER SYSTEMS	MARINE FIRE PROTECTION	260
HOLLAND ROER PROPELLER	PROPELLERS	261
HOLSET ENGINEERING	TORSIONAL VIBRATION DAMPERS	262
HOPEMAN BROS.	INTERIORS	263
HOUMA FABRICATORS	SHIPYARD	264
HYDROCOMP, INC.	CAD CAM DESIGN	265
IDB MOBILE	COMMUNICATIONS	266
IMO GEMS	SENSORS	267
IN-PLACE MACHINING	CRANKSHAFT REPAIR	360
INTERMARINE U.S.A.	SHIPBUILDING & REPAIR	268
ITW PHILADELPHIA RESINS	CHOCKFAST	269
JAMESTOWN METAL MARINE	INTERIORS	270
JEAMAR WINCHES	WINCHES	271

ADVERTISER	EQUIPMENT /SERVICE	CIRCLE NO.
JERED BROWN BROS.	SHIP EQUIPMENT	272
JETS VACUUM A/S	MARINE SANITATION	345
KAHLENBERG BROS.	HORNS/WHISTLES	273
KLATTENBERG MARINE	SHIP REPAIR/ENGINE SPARE PARTS	274
KONGSBERG NORCONTROL AUTO.	INTEGRATED SHIP CONTROL	275
KRUPP MAK	DIESEL ENGINES	276
KVAERNER MASA YARDS OY	SHIPBUILDER	277
LAKESHORE, INC.	MODULAR FUEL DELIVERY STATION	352
LANG MFG.	GALLEY EQUIPMENT	278
LEEVAC SHIPYARD	SHIPYARDS	279
LESUE CONTROLS	VALVES	280
LOVEJOY CENTRA	COUPLING	281
MAN B & W HOLERY	DIESEL ENGINES	282
MAPECO PROD.	COUPLINGS	283
MARINE GEARS	MARINE GEARS	284
MARINE MANAGEMENT SYS.	COMPUTER SOFTWARE	287
MATRIX DESALINATION	DESALINATION EQUIPMENT	366
MCLEROY MACHINE	MARINE EQUIPMENT	286
JOHN J. MCMULLEN	NAVAL ARCHITECT	353
METRIPE INC.	TANK LEVEL GAUGING	287
MMC INTL.	PORTABLE GEAR TAPE	288
MOTOR SERVICE AB	SPARE PARTS	289
MOTOR SERVICE HUGO STAMP	DIESEL ENGINES/SPARE PARTS	290
NEI SYNCHROLIFT	SHIFTLIFT TECH.	291
NEW ENGLAND TRAWLER	DECK MACHINERY	292
NEW SULZER DIESEL	DIESEL	367
NORTECH (USA)	ENGINE SPARE PARTS	346
OFFSHORE MARINE	REVERSE OSMOSIS	293
OMNITHRUSTER, INC.	THRUSTERS	294
ORION CORP.	BEARINGS	295
PERMASTOP RUST	ANTI CORROSION SYSTEM	296
SG PINNEY & ASSOC.	CORROSION CONTROL	297
PLANKOWNER SOFTWARE	SHIP LOGGING SOFTWARE	298
POL TAK PROT SYS.	PROTECTION SYSTEMS	299
PRISMA TEKNIK AB	DEFLECTION INDICATOR	300
PROPULSION SYSTEMS	PROPULSION SYSTEM	301
RASMUSSEN WIRE & ROPE	ROPE	302
RESEARCH PRODUCTS	ELECTRIC TOILET	303
RICE PROPELLERS	NOZZLE SYSTEMS	304
ROCHEM SEPARATION	WATER PURIFICATION SYSTEMS	361
ROLLA SP	PROPELLERS	368
ROYAL CHEMICAL CORP.	BALLAST & VOID COATINGS	305
RTF MFG	REFRIGERATION	306
SARBA ART STUDIO	MARITIME ARTWORKS	307
SCALE REPRODUCTION	MODELS	308
SCANDINAVIAN MICRO SYSTEMS	DIGITAL CYRO REPEATERS	371
SCANIXX CORP.	SHOWER FAUCETS	309
SEAWARD INTL.	FENDERS	310
KARL SENNER	SHIPBUILDING	311
SERVICE VALVE & FITTINGS	VALVES & FITTINGS	312
SHIP TECH A/S	MARINE CONSULTANTS	313
SIGMA COATINGS	EPOXY PRIMER	314
SOUND PROPELLERS	PROPELLERS	354
STAR CENTER	COATINGS	315
STAN BLAST ABRASIVES	SIMULATION TRAINING	316
STORK KWANT	CONTROLS	317
TECHNOMAD	LOUD SPEAKERS	318
TEKNOTHERM A/S	MARINE REFRIGERATION	319
TEXAS INSTRUMENTS	NIGHTSIGHT	320
THRUSTMASTER OF TEXAS	JET BOW THRUSTERS	321
TMT SERVICE	RUST CORROSION CONTROL	370
TODCO, INC.	INTERIOR SYSTEMS	362
TRIMBLE NAVIGATION	NAVIGATION/COMMUNICATION	322
TRINITY MARINE	SHIPBUILDING	355
TYLOK INTL.	TUBE COUPLINGS	372
ULSTEIN PROPELLERS	PROPELLERS	364
UNIVERSAL SHELTERS	TEMP. PERMANENT SHELTERS	324
VANCOUVER SHIPYARD	SHIPYARD	328
VIA NOVA ENGINEERING	SHIPBUILDING EQUIPMENT	325
VIKING FENDER	FOAM FENDERING	326
VIKING LIFESAIVING	LIFE RAFTS	327
VIOLET DOCK PORT	BERTHING FACILITIES	329
WARTSILA DIESEL OY	DIESEL ENGINES	330
WASHINGTON CHAIN	CHAINS	331
WATERMAN SUPPLY	MARINE EQUIPMENT	332
WESMAR	BOW THRUSTER	333
WESTERN BRANCH METALS	BOAT SHAPING	353
WESTERN MACHINE WORKS	HYDRAULIC TOW PINS	334
WESTINGHOUSE	PROPULSION SYSTEM	358
WILLARD MARINE	RIGID INFLATABLE BOATS	335
WORKSKIFF	BOAT BUILDERS WORKSKIFFS	336

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Sanoyas Hisino Meisho Corp.
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 For more information
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Actual and Forecast of Required Tanker Tonnage (Mid-Year Basis)
 (Millions Tons)

	1995	1996	1998
10-40,000 dwt	27.3	26.5	24.6
40-80,000 dwt	28.4	29.0	29.6
80-150,000 dwt	75.9	78.0	81.9
Total	258.5	263.2	276.5
(Increase %)	(1.9)	(1.8)	(2.3)

Source: ASIS

Ship Machinery Export Contract Trends
 (Billions Yen)

	Domestic Use	Export	Total
1986	604	166	770
1987	475	173	648
1988	546	186	732
1989	578	178	756
1990	624	188	812
1991	684	175	859
1992	698	165	863
1993	679	152	831
1994	669	143	812

Source: Japanese Ministry of Transportation

Japanese Marine Diesel Engine Production

	Large +10,000 ps	Medium Under 10,000 ps	Small Under 1,000 ps	Total
1986	2,906	2,024	2,959	7,889
1987	2,114	1,720	3,203	7,037
1988	1,799	2,021	3,740	7,560
1989	2,073	2,154	3,496	7,723
1990	2,955	2,065	4,074	9,094
1991	3,060	2,121	3,656	8,837
1992	3,154	1,939	3,769	8,862
1993	3,606	1,834	3,421	8,861
1994	3,782	2,226	3,477	9,485

Note: Turbines and ignition type engines are excluded
 Source: Japanese Ministry of Transportation

Ship Machinery Exports

Outboard engines	29.7%
Diesel engines	18.2%
Navigational equipment	16.7%
Parts & components	16.2%
Auxiliary machinery	8.2%
Other	11%

WORLDWIDE SHIPBUILDING STATISTICS
 World Fleet Size (Ships Larger Than 100 GT)

	No. of Ships	1,000 gt
1980	10,568	21,862
1985	10,288	39,940
1990	10,000	27,078
1994	9,706	22,102

(Statistics are as of end of year, 1995)

Actual and Forecast of Seaborne Bulk Cargo Trade, Worldwide
 (Million Tons)

	1995	1996	1997
Iron ore	392	396	397
Coal	393	409	429
Grain	181	185	188
Alumina	52	53	54
Fluxite/aluminum	27	26	26
Phosphate rock	1,045	1,069	1,094
Sub total	(4.3)	(2.3)	(2.3)
Minor bulk	444	456	466
Grand total	1,489	1,525	1,560
	(3.8)	(2.4)	(2.3)

Note: Figures in parentheses are the increase (%) for the previous year
 Source: Association for Structural Improvement of the Shipbuilding Industry (ASIS), "Forecast on World Shipbuilding Demand."

February, 1996



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Astronac Marine AS, Drammensveien 126, N-0277 Oslo 2, NORWAY
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E.R.L. Marine Products, P.O. Box 1026, New Albany, IN 47151-1026
Ian-Conrad Bergen, 3409 Gulf Breeze Parkway, Gulf Breeze, FL 32561
IMO Industries, Gems Simons Division, One Cowles Rd., Plainville CT 06062
Kockum Sonics, Inc. 819 Veterans Blvd., Suite 201, Kenner, LA 70068
MMC International, 60 Inp Dr., Inwood NY 11696
Saba Marine Electronics AB, P.O. Box 13065, S-402 51 Göteborg SWEDEN

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Kockum Sonics, Inc. 819 Veterans Blvd., Suite 201, Kenner, LA 70068
Mettrape, Inc. 59 Porter Rd., Littleton, MA 01460
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THICKNESS TESTING
Cygnus Instruments, P.O. Box 3127, Annapolis, MD 21403
M.A.C.E., 5910 N.E. 15th Ave., Fort Lauderdale, FL 33331

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T.W. Spatzings, 186 W. 8th Ave., Vancouver, BC CANADA V5Y 1N2
Vibranalysis Engineering Corp., 9300 Gamebird, Houston, TX 77034

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Leslie Controls, 12501 Telecom Dr., Tampa, FL 33637
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Vibranalysis Engineering Corp., 9300 Gamebird, Houston, TX 77034

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Estepure, Inc., 680 N. Blackhawk Dr., Westport, IL 60559
Lifesaver Water Purification Equip., 16611 Gemini Lane, Huntington Beach, CA 92647
Offshore Marine Labs, 22994 El Toro Rd., Ste. 105, Lake Forest, CA 92630
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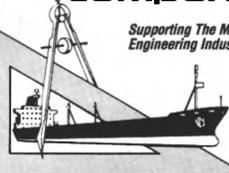
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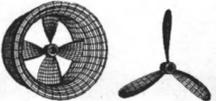
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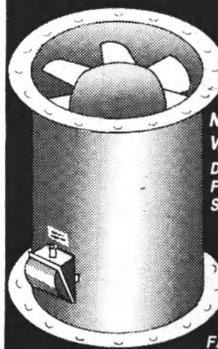


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DEMO	23' Cabin Workboat, Volvo Duo-Prop
NEW	18' Munson Skiff, Double Wall, Partial
DEMO	23' Cabin Workboat, 175HP Yamaha
NEW	19' 19' Yacht Tender
DEMO	17' 17' 115HP Merc.
T/I/N	36' Dive Boats. (in Hawaii)
DEMO	26' Cabin Workboat, Volvo Duo-Prop
DEMO	21' 21' T/140HP Tohatsu
NEW	23' Workboat, No Power or Options
DEMO	21' 21' , 200 HP
NEW	17' 17' , No Power
NEW	30' Oil Skimmer, Lori, 175HP

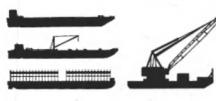
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- Extensive knowledge of all international classification society rules and MIL-STD quality requirements;
- Extensive knowledge of welding procedures for steel, stainless steel, aluminum, etc. in accordance with ABS, AWS, and MIL-STD requirements. Will develop and maintain required welding procedures and welders qualifications.
- Establish and maintain quality standards commensurate with company and regulatory body standards;
- Knowledgeable in meeting and supportive of company policies, OSHA regulations and industry standards safety and environmental requirements;
- Ability to develop and maintain qualified work force up to 150 men;
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P.O. Box 3255
Jacksonville, FL 32206
Fax 904-356-1668



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Re: Job order number
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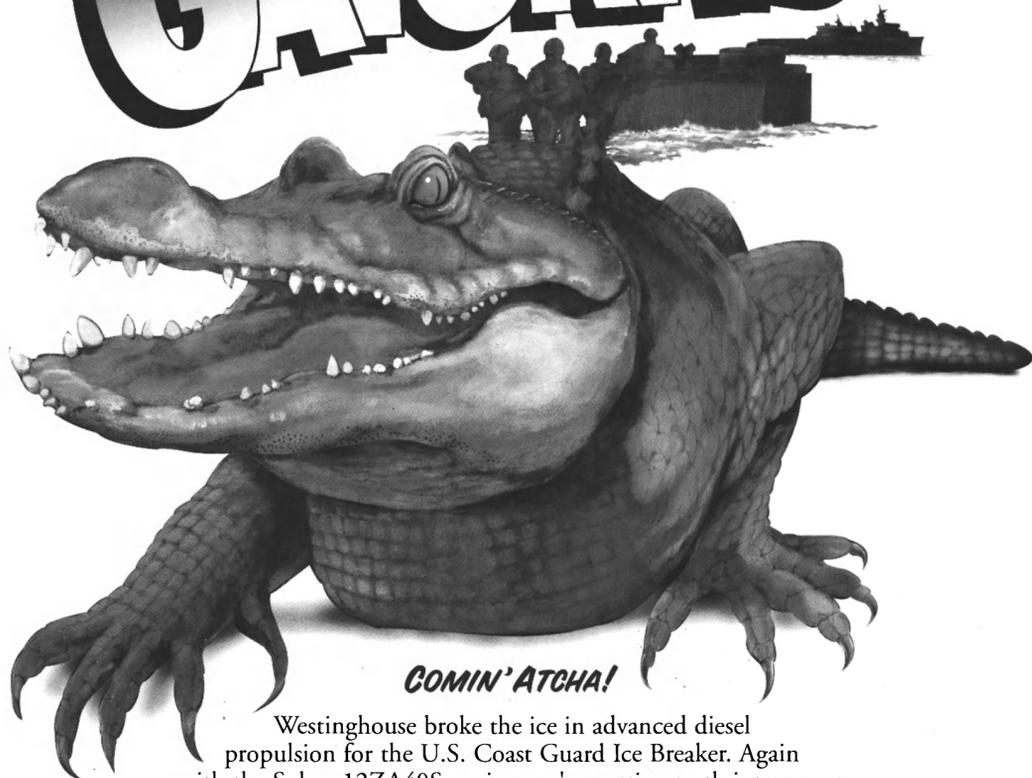
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