

September 1999

MARITIME REPORTER AND ENGINEERING NEWS

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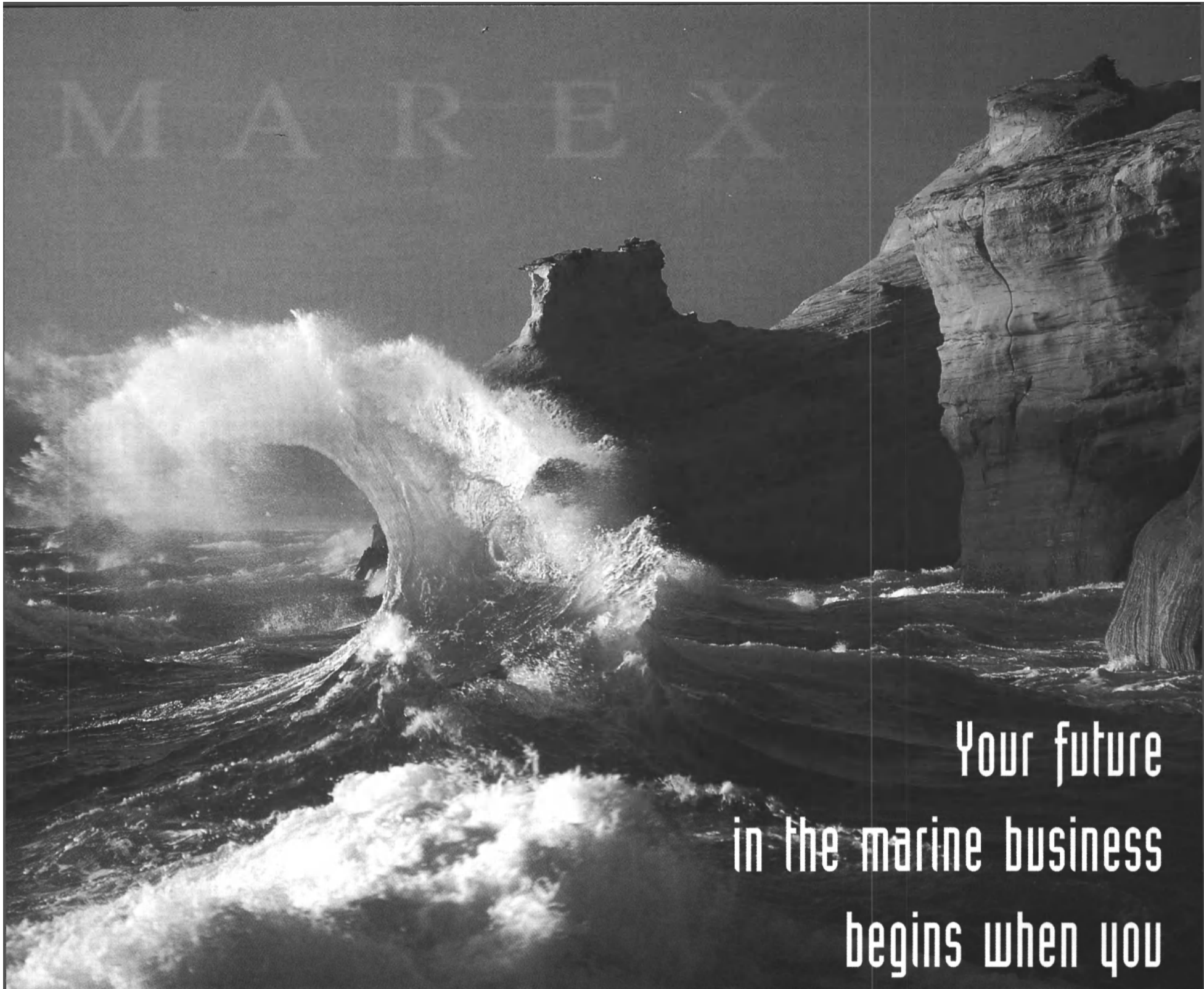
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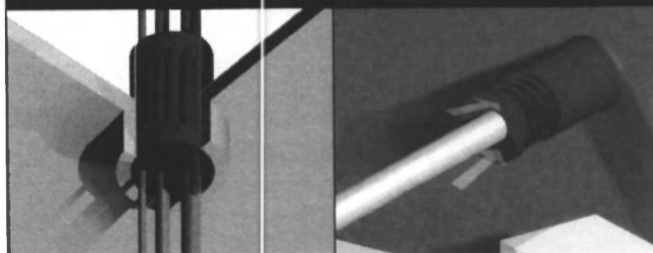


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On the Cover: BP Amoco's British Hunter was recently in Atlantic Marine-Mobile's facility for repair work, which entailed intermediate and tailshaft removal for inspection and machining, plus re-alignment of the vessel propulsion system. See this month's Marine Propulsion Annual, starting on page 17. (photo credit: Dale Moore, Alabama Shipyard Inc.)

13 Full House

Teekay Shipping took advantage of the tanker market swoon to load its arsenal with the ships and routes needed to dominate in the boom market to come.

24 Back to School

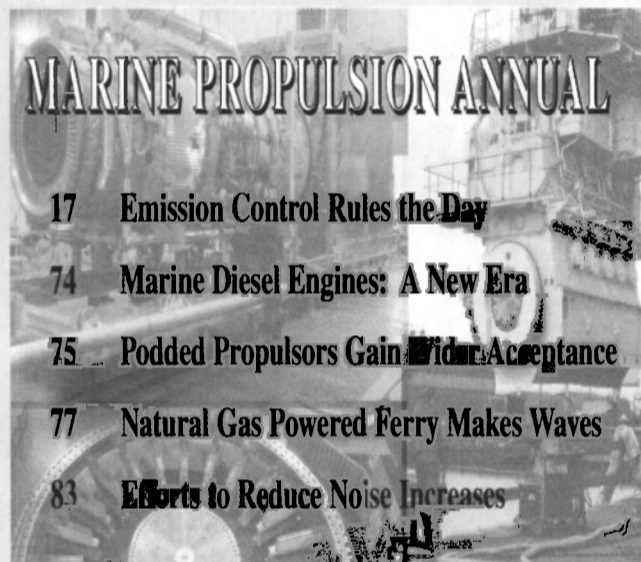
The United States Merchant Marine Academy's program to generate the next generation of ship yard leaders is bearing dividends, as recent grads of the program come prepared with the latest in classroom learning as well as real-world experience.

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Two naval architects in Japan have found an innovative, cost efficient method to handle the growing problem of ballast water exchange.



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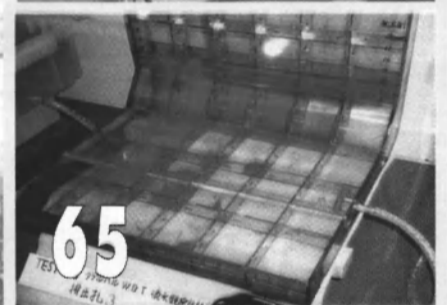
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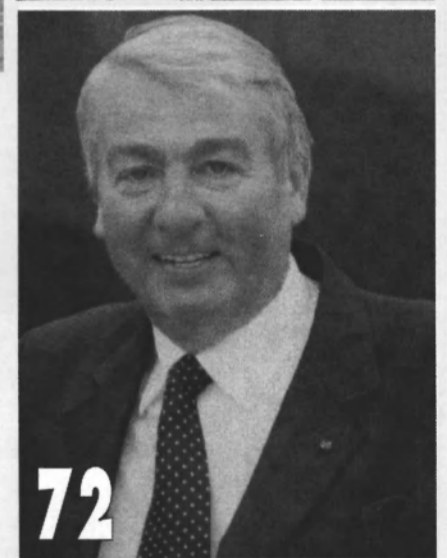
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EDITOR'S NOTE

While market consolidation can hardly be considered news, the level to which the maritime industry has contracted became glaringly apparent in preparing this year's Marine Propulsion Annual. The best and most recent example of merger-mania is embodied in activities by Vickers PLC, which has effectively constructed a marine propulsion powerhouse in a matter of months. The company now houses such big brand names as Ulstein, Kamewa, Rauma, Aquamaster, Brown Brothers, Michell Bearings and Bird Johnson. The efforts of the company and its leader, Baron Paul Buysse, can be found in two places this month, as a part of David Tinsley's Investment in Design column starting on page 8, and in a Q&A starting on page 72.



Becoming bigger, though, does not automatically mean better, but amassing vast technical and R&D budget resources under one roof offers some obvious advantages when companies are faced with updating marine products and systems to comply with the latest rules and regulations. Speaking of rules and regulations, vessel owners should have a large circle around January 1, 2000, and not only to check if the company's office and fleet computer systems are still running. It is on this date that portions of the International Maritime Organization's (IMO) rules regarding emissions from marine diesel engines enter force. While Annex VI of MARPOL 73/78 dealing with a wide range of air pollution control matters is still years from full ratification, some of the provisions are set to take effect — most notably NOx controls on new engines installed on ships built on or after January 1, 2000. A full report on the matter from Andrew Wright, who is the chairman of the CIMAC Exhaust Emissions Control (Piston Engines) Working Group, starts on page 74.

It is evident that pressures from environmental entities and through legislative arms — on all levels in all regions of the world — will continue to push maritime industry suppliers and operators to dizzying heights of compliance, performance and accountability. Royal Caribbean's recent infraction in Alaska, resulting in record fines and subsequent in-person apologies from the company's top executives, should serve as a wake-up call to any companies stretching the rules, intentionally or not. Owners and operators, more than ever, will rely on single solution system providers to constantly deliver the hardware and software solutions needed to compete in an intensely competitive and quick-changing environment.

Gregory R. Tinsley

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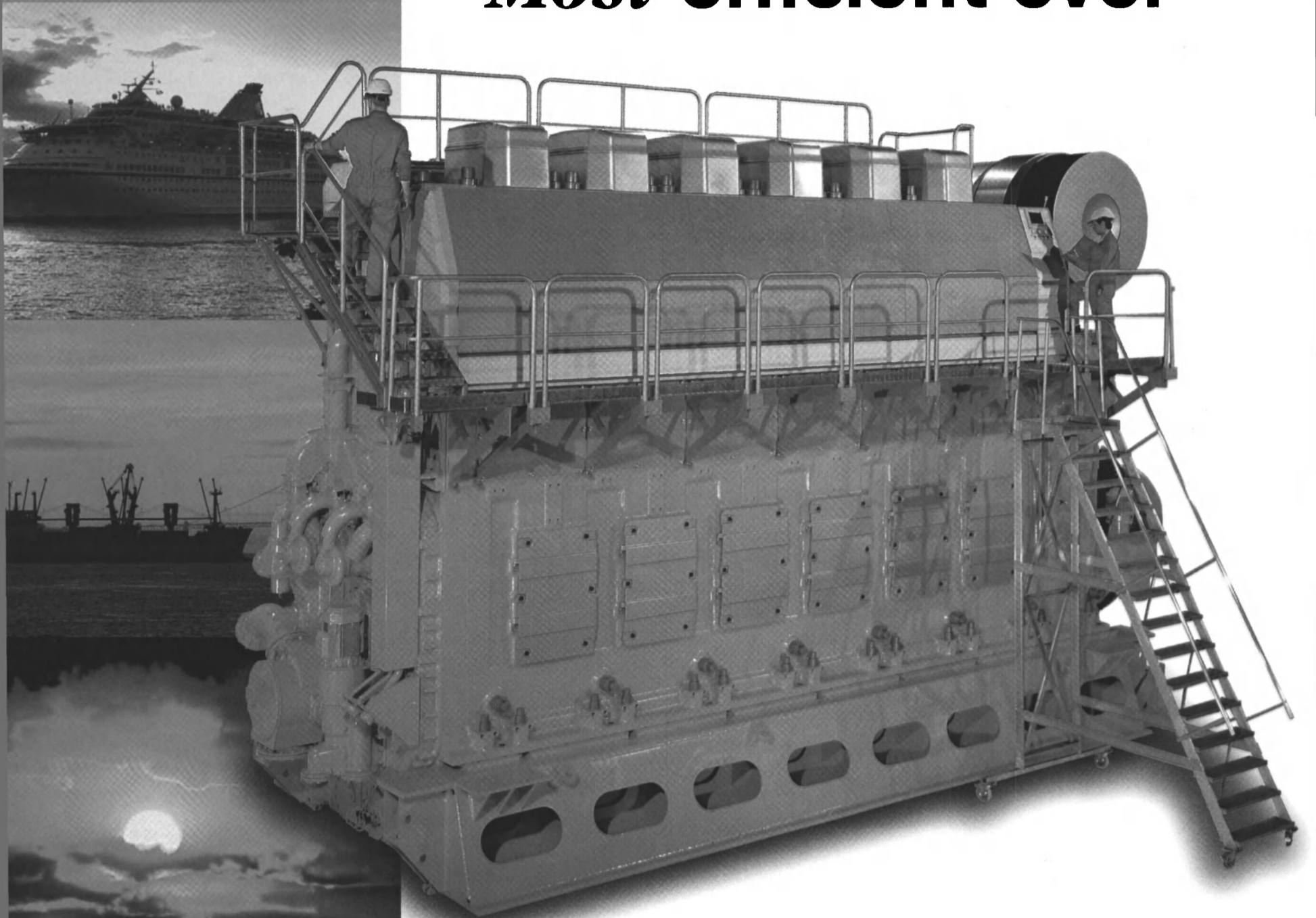
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by David Tinsley,
technical editor

A happy coupling

Largely complementary operations, a strong base in terms of volume and technologies, plus considerable synergy potential, provided a solid platform for the coupling of the marine equipment and design activities of Norway's Ulstein group and the British-owned, specialized engineering force Vickers. At a stroke, the combined strengths represented in Vickers Ulstein Marine Systems made the new entity the leader in specific market segments. However, its wide-ranging capabilities provide the requisite resources to increase penetration in existing areas of engagement and break into new markets.

Just as the organization has quickly acted on its considerably widened package supply potential, the sustained pace of product development throughout the Vickers Ulstein network demonstrates a determination to maintain the business momentum both parties had built up as separate undertakings. The acquisition of Ulstein, bar its shipbuilding opera-

tions, was wholly in line with Vickers' strategy of business development in niche engineering sectors offering growth potential. Ulstein Holdings' robust business performance, and accelerated growth following Oslo Stock Exchange listing in the fall of 1997, has been one of Scandinavia's major industrial success stories in recent years. Vickers marine division, meanwhile, has produced solid results through the 1990s, thanks in no small way to the prudent decision 13 years ago to purchase Swedish propulsion specialist Kamewa.

While there are many elements to the new union, the coupling of the Ulstein Propeller, Bird-Johnson, Kamewa and Aquamaster bloodlines, with retained brand identities, plus associated research resources, must rank as one of the most attractive aspects of the amalgamation. The expanded in-house capability through the whole power train, including main engines, transmissions,

shafting, waterjets and, now, compact gas turbines, bodes well for single-sourcing across a very substantial swath of the market. Vickers has a long and complex history, originating in Sheffield steelmaking in 1828. During both world wars, it was a major supplier of defense equipment, the most famous product being the Spitfire. Its role in airplane manufacture included its participation in the development of Concorde, which made its debut in 1969. Its withdrawal from shipbuilding came with U.K. nationalization of the industry towards the end of the 1970s. The 1986 purchase of Kamewa saw the revitalization of its marine activities, strengthened in 1995 with the takeover of Finland's Aquamaster-Rauma. Vickers' subsequent sale of Rolls-Royce Motor Cars to Volkswagen provided funds for the marine sector expansion strategy crystallizing in the marriage with Ulstein. By bringing the Norwegian-owned, international group into its fold, marine activities now constitute the largest of Vickers' three divisions, outstripping both defense systems and turbine components, the two other sectors, in terms both of turnover and employees. In technology areas such as research and development, and also in service-back-up, the

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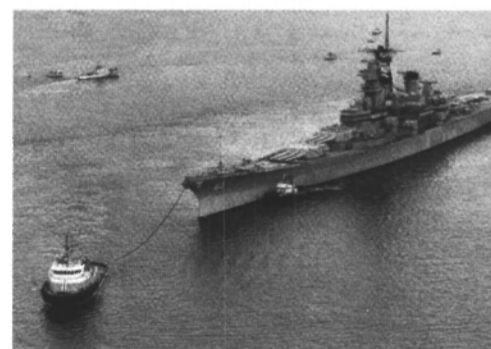


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Investment in Design

strength of Vickers Ulstein is more than the sum of its parts. A number of new products have been brought to market since the May 4 formal completion of the acquisition, more are planned in the short-term, and the new division is already benefiting from joint procurement initiatives.

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Bespoke fruit carriers

Italian business verve married with solid ship design skills has produced a new breed of refrigerated cargo vessel as the keypoint in a program of raising the efficiency of a Trans-Atlantic supply system linking plantations with retailers.

With her classical reefer ship fair lines and lean form, the 11,500-dwt Cala Pino is all the more striking for her pair of big sideport doors in the starboard shell, and two, high-stooled cranes on the weatherdeck. These are the main accou-

rements of the system of rapid cargo throughput central to the bespoke design developed for the Orsero Group shipping companies Armatori Partenopei and Cosiarma.

Delivered in August, Cala Pino leads a class of four 600,000-cu. ft. capacity newbuilds scheduled to be phased into service over the remainder of 1999 from Fincantieri's Ancona shipyard. The series will boost the carrier's scope and productivity in the trade with bananas and other fruit from Latin America and the Caribbean, to southern Europe. Although the vessel type can take a weatherdeck stow of 184 reefer boxes of 40-ft, the tonnage investment program is an endorsement of pallet-optimized sea transportation methods at a time of growing penetration of the global reefer trades by the pure containership. It is also significant from a point of view of timing, with new construction activity in

the conventional sector at a low ebb. Furthermore, the project is a testament to Fincantieri's broad-based design and build know-how during a period when so much attention has been focused on the group's trials and tribulations in the cruise ship domain.

The Italian hub for the Cala Pino and her 21.5-knot sisters will be Vado Ligure, near Savona, on the Italian Riviera, where the parent group controls a dedicated fresh fruit and vegetable handling facility, known as Reefer Terminal. With her three holds divided by three tweendecks, the new vessel provides for stowage of more than 4,900 pallets of perishable goods over a total refrigerated deck area of around 6,600 sq m. The home-grown side loading and discharge system, from engineering firm Goriziane, offers one of the most expeditious outturn rates throughout the industry, keyed to the owner's expecta-

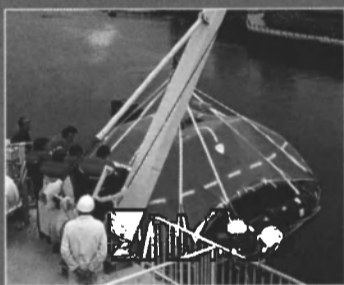
tions as to fast turnarounds at Vado Ligure.

The upperdeck reefer container capacity, while offering a supplementary eastbound shipment capability, has the merit of providing an eastbound payload from Europe. The Fincantieri-developed design thereby provides the requisite stability and safety for making Atlantic transits with the holds empty but with a full weatherdeck stow. The Cala Pino-headed quartet constitutes the second fertile collaboration between Fincantieri and the Orsero Group, following the completion at Ancona of the 365,000-cu ft Cala Pevero type during 1990-92. Although significantly smaller in enclosed volume, of more modest power and speed ratings, and vested with a single sideloader rather than two units, the 9,000-dwt Cala Pevero class has undoubtedly colored the Cala Pino project.

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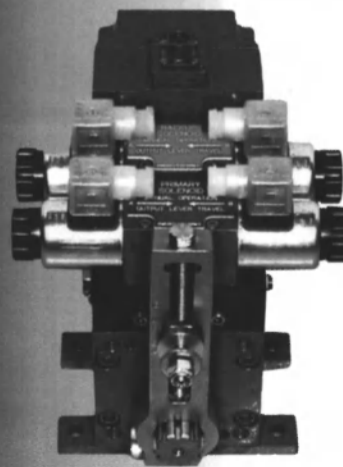
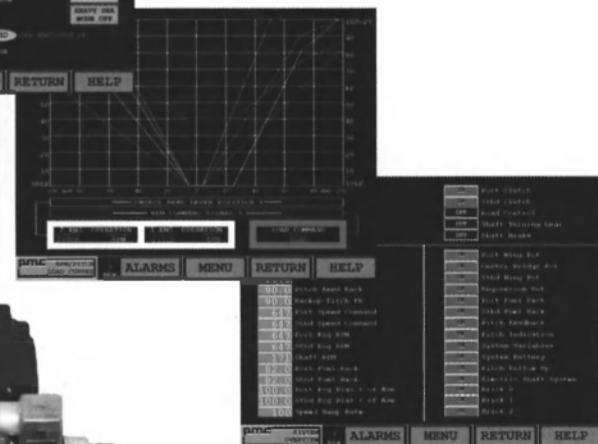
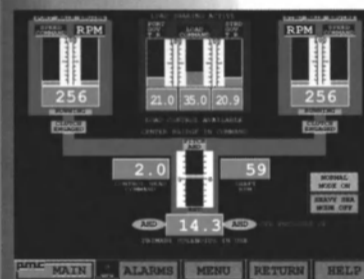
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Astilleros Españoles To Construct Innovative Ferries

Astilleros Espanoles was chosen as the builder of a new RoRo cargo and passenger fast ferry, by Transmediterranea, Spain's largest shipowner.

Intended for deployment by Transmediterranea on the routes running between mainland Spain and the Balearic and Canary Islands, the vessel will be the epitome of the latest safety conditions. Technical solutions applied onboard will enable the ferry to operate at high speeds with a large capacity, while instilling passenger comfort.

Top travel speeds of 23.5 knots on the engines' continuous service rating, allow the vessel to hold the title of the fastest and the most powerful in Transmediterranea's fleet. In order to maintain this high speed, propulsion power will be supplied by four 7,240 kW diesel engines rated at 500 rpm, with enhanced maneuverability by two 1,000 kW thrusters.

Measuring 564 ft. (172m) in overall length, with a breadth of 82 ft. (25 m) and depth measuring 20 ft. (6.2 m), the 5,000-dwt RoRo can accommodate 1,000 passengers with comfort and safety in mind.

Freight capacity consists of 1,800 lane meters, with a rolling cargo area comprised of three decks. Additionally, the vessel will house a special area for hazardous cargo and will include features such as restaurants, shops, swimming pools and fully air-conditioned accommodation areas.

The vessel will be constructed at Astilleros' Puerto Real facilities in Cadiz, southern Spain, which in the past 18 months has recorded the delivery of vessels such as the Skane, the world's largest multi-purpose RoRo and train ferry.

Circle 28 on Reader Service Card

Celebrity Selects James P. Colie

James P. Colie & Associates will take on the refurbishment of several public spaces on Celebrity Cruises' Zenith, during the vessel's drydock at Newport News Shipbuilding.

The company was chosen by Celebrity as turnkey contractor for the Zenith refit project managing all aspects including: structural, mechanical, electrical, plumbing, HVAC, fabrication and interior outfitting details.

Cory Towage Awarded Lithuanian Deal

Cory Towage has been granted a contract to provide a variety of marine services in the Baltic at the newly built import/export oil terminal at Butinge in Lithuania.

The agreement, which began in March, was awarded by Lithuania's state-owned oil company, Mazeikiu Nafta, and is centered around a single point mooring (SPM) facility for the export of Russian crude oil.

Cory's function in this venture is provision of tanker berthing and general marine support, including a berthing tug and a workboat, as well as

berthing/loading masters, operation of oil spill recovery equipment and maintenance services above and below the water for the SPM, located about five miles offshore, can accommodate tankers of up to 80,000-dwt.

VAF Instruments Set To Supply

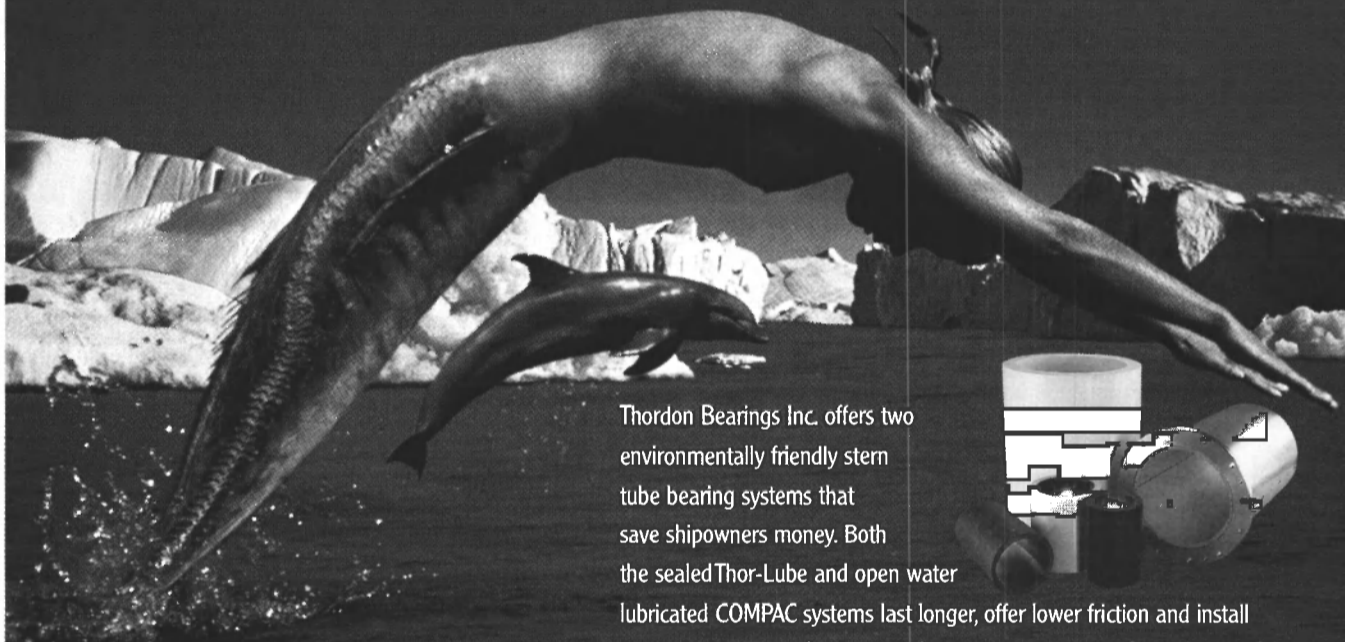
Brazilian state oil company, Petrobras has ordered five oil blending installa-

tions totaling \$1.2 million with VAF Instruments of the Netherlands.

In addition to being the designer of the systems, VAF will function as supplier and manufacturer of the measurement and control equipment. Upon the completion of its assembly, VAF's engineers in Brazil will then put the systems into operation.

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BIW And Energy Research Corp. Form Partnership

The Advanced Technology Division of Bath Iron Works (BIW) and the Energy Research Corporation (ERC) have partnered to develop an advanced carbonate-based fuel cell energy plant for defense marine applications.

The partnership is an effort to improve ship electric power generation (also

known as ship hotel power), with the development of the high efficiency Direct Fuel Cell (DFC) Ship Service Fuel Cell. "The establishment of this alliance marks the beginning of a process we believe will lead to the development of the first new power generation technology for surface ships since nuclear power was adopted for aircraft carriers," said **Jerry Leitman**, president and CEO of ERC.

Astromaritima Navegação To Upgrade OSV's

Astromaritima Navegação, known as the largest Brazilian offshore vessels' owner and operator, plans to upgrade three of its 180 ft. (54.8 m) OSV's for an approximate cost of \$4.5 million.

The first two of the vessel trio will receive a third engine and a second bowthruster to increase overall installed

potency to 4,300-bhp. The remaining OSV will house two new engines, with at least 2,200-bhp each, as well as a second bowthruster and midship section measuring 29.5 ft. (9 m). Financed by Brazilian development bank, BNDES, the modernization process will be partially executed by Astromaritima's drydock, while Promar Shipyards will provide related services from its Guanabara Bay facilities in Rio de Janeiro.

IMA

FLOATING PRODUCTION SYSTEMS

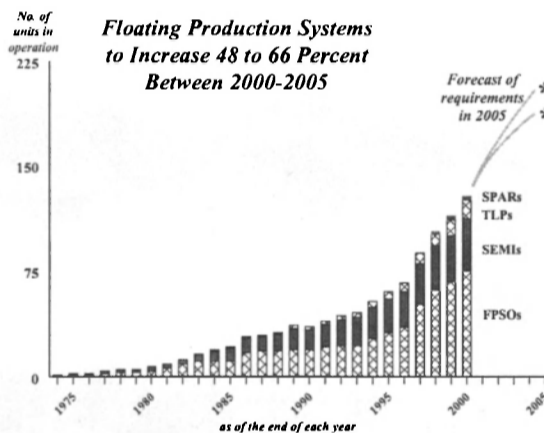
a series of business reports to be published in August 1999, December 1999 and April 2000

\$1,400 for the report series

Rapidly growing business sector — 107 floating production units are currently in operation, 21 are on order — and we see no slowdown of growth in this sector. Our forecast calls for the inventory of operating units to grow 48 to 66 percent between 2000 and 2005, requiring orders for 62 to 84 FPSOs, production semis, TLPs or spars over the next five years.

IMA's coverage — We closely follow this market sector and issue a series of business reports that

- ◆ summarize floating production systems in operation, on order and planned
- ◆ assess underlying business conditions driving future activity in floating production
- ◆ provide details for floating production systems planned, on order and recently delivered
- ◆ identify recent developments impacting floater technology and companies



Contents of the August 1999 Report

I. INVENTORY OF CURRENT AND PLANNED FLOATING PRODUCTION SYSTEMS

1. Floating Productions Systems Now in Operation
2. Systems Installed Since September 1996
3. Floating Systems Now on Order
4. Where Floaters are Currently Being Built or Converted
5. Floating Productions Systems Planned or Being Studied

II. ANALYSIS OF UNDERLYING MARKET DRIVERS FOR OFFSHORE ACTIVITY

1. World Economy Recovering as Asia Turmoil Recedes
2. Growth in Crude Demand Rebounding
3. Major Producers Adhering to Agreed Cutbacks
4. Excess Stocks to be Drawn Down in the 2nd Half
5. Spot Oil Prices Have Returned to Fall 1997 Levels
6. Recent Developments Are Beginning to Impact E&D
7. What Are the Threats to the Current Recovery?
8. Is The Rise in the Price of Crude Sustainable?

III. FORECAST OF ORDERS FOR FLOATING PRODUCTION SYSTEMS THROUGH 2005

1. FPSO Vessels
2. Production Semis
3. Tension Leg Platforms
4. Production Spars

IV. ASSESSMENT OF RECENT DEVELOPMENTS

1. Projects in the Planning or Design Stage
2. Floating Systems on Order
3. Systems Recently Installed
4. Equipment Acquisitions and Contract Changes

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Keppel Retools Tow Business

Keppel Hitachi Zosen Limited (KHZ) signed a letter of intent with Smit International to sell 49 percent of its wholly-owned subsidiary Maju Maritime to Smit for a consideration of \$5.39 million, resulting in a gain of \$1.76 million to KHZ. Concurrently, Keppel Corporation Limited and Keppel Marine Industries Limited (KMI) are selling their respective shares of 31 percent for \$8.68 million, and 20 percent for \$5.6 million, in Keppel Smit Towage to KHZ. The sale will consolidate all the Keppel Marine Group's towage businesses under KHZ and will have no material impact on KCL, resulting in a gain of \$2.2 million to KMI.

The restructuring should be completed by the end of September.

NautiCAN Nozzles To Go On Foss Towboats

Following the successful conversion of towboat Barbara Foss in 1994, Foss Maritime Company has upgraded towboats Phillips Foss and Jeffrey Foss equipping them with NautiCAN High Efficiency Nozzles, skewed propellers and Triple High Efficiency Differentially Linked NautiCAN Rudders. The NautiCAN HE Nozzle reportedly helps achieve an additional 10-12 percent of bollard pull. At the same time, coefficient of drag of NautiCAN airfoil section is 0.01 compared, allowing vessel to achieve greater free running speed.

Circle 192 on Reader Service Card

MSC, OSG Equip Their Fleets With Malin 3000

FCS' Inc. Malin 3000, a portable precision diesel engine analyzer continues to be the standard with OSG Ship Management and Military Sealift Command (MSC). The program is a speedy, accurate and reliable way to determine the status of the main and generator diesel engines. The information can then be downloaded onto a desktop P.C.; a software program produces the drawcard indicator, and derivative, and provides timing, engine balance, and trends over time. The unit also contains the new Windows software, which enhances the data's presentation and provides the use of color charts and graphics.

Circle 197 on Reader Service Card

designed to ensure the long-term health of Teekay.

Enhanced operating mode

A very basic restructuring of Teekay's marine operations was dubbed "Project Synergy." In short, the move entails the division of the fleet into smaller units, with all aspects managed by a cross-functional ship team, designed to optimize fleet operations and make the company more responsive to customer needs. The ship teams support and are supported by standards and policy teams, which fulfill several critical functions including acting as a center of expertise to the ship teams; ensuring high, uniform standard of operation and driving continuous improvement.

More recently, Teekay has entered into the launch of an innovative marine purchasing cooperative known as MARCAS. In partnership with two other major shipping entities, MARCAS seeks to leverage economies of scale in the purchase of products and services for ships, and in effect creates an entity that buys supplies for 250 ships. Vessel operating expenses totaled more than \$84 million, including salaries — for the company in FY'99, and Teekay anticipates that cost efficiencies through programs such as MARCAS — particularly with a gradual increase of membership

and a widening of the scope of services provided to the organization's members — will help enhance the bottom line for years to come.

According to Björn Moller, Teekay's director president & CEO, the company expects the tanker market to remain difficult in the near term, but is counting on

a medium-term recovery and long-term prospects to buoy the company's financial prospects. In his message to shareholders, Moller notes that global oil consumption is again on the rise, parallel with recovery among the Asian economies, and that oil production is continuing to shift to the Middle East countries. This, of course, is a favorable trend to tanker operators, as it requires longer voyages and greater tanker demand. Teekay also points to positive trends within the ship supply and demand side that could indicate a strong charge ahead is inevitable. Specifically, much press has been given in the past few years to the "aging fleet," and the replacement requirement of ships sent to the ship breakers. In 1999, the pace of new tanker ordering has slowed considerably in reaction to the poor tanker rates, and Teekay notes that the Aframax tanker orderbook has fallen from 10 million dwt on order in May 1998 (19.4 percent of the Aframax tanker fleet), to 6.3 million dwt, or 11.5 percent of the Aframax tanker fleet just one year later. Enhancing this trend (from the tanker owner's side) is the fact that the rate of tanker scrapping in 1999 is twice that of the rate in 1998, and scrapping is running at its highest annualized level since the mid-1980s. Factors involved in the decision to scrap are numerous indeed,

The Teekay Fleet

Name	Type	DWT	Year Built	Name	Type	DWT	Year Built
Hamane Spirit	DH	105,300	97	semaster	SH	101,000	90
Poul Spirit	DH	105,300	95	Hakuyou Maru	SH	93,000	87
Roben Spirit	DH	98,600	94	Cook Spirit	SH	91,500	87
Mayon Spirit	DH	98,600	92	Magellan Spirit	DS	95,000	85
Luzon Spirit	DH	98,600	92	Bornes	DS	88,900	90
Leyte Spirit	DH	98,600	92	Mendana Spirit	SH	81,700	80
Samar Spirit	DH	98,600	92	Shetland Spirit	DH	106,200	94
Palmstar Thistle	SH	100,200	91	Orkney Spirit	DH	106,200	93
Palmstar Lotus	SH	100,200	91	Kyushu Spirit	DS	95,600	91
Teekay Spirit	SH	100,200	91	Koyagi Spirit	SH	96,000	89
Palmstar Cherry	SH	100,200	90	Sabine Spirit	DS	84,800	89
Onozo Spirit	SH	100,200	90	Hudson Spirit	DS	84,800	88
Palmstar Poppy	SH	100,200	90	Columbia Spirit	DS	84,800	88
Palmstar Rose	SH	100,200	90	Shannon Spirit	SH	99,300	87
Palmstar Orchid	SH	100,200	89	Clare Spirit	SH	99,300	86
Gotland Spirit	DH	95,400	95	Kanata Spirit	DH	113,000	99
Falster Spirit	DH	95,400	95	Kareela Spirit	DH	113,000	99
Sotra Spirit	DH	95,400	95	Kiowa Spirit	DH	113,000	99
Ulsan Spirit	SH	106,700	90	Koa Spirit	DH	113,000	99
Shilla Spirit	SH	106,700	90	Kyeema Spirit	DH	113,000	99
Pioneer Spirit	SH	106,700	88				
Pacific Spirit	SH	106,700	88				
Dampier Spirit (FSO)	Sh	106,700	88				
Namsen Spirit	SH	106,700	88				
Mersey Spirit	DS	94,700	86				
Clyde Spirit	SD	94,700	85				
Nassau Spirit	DH	107,000	98				
Senang Spirit	DH	95,700	94				
Sebarok Spirit	DH	95,700	93				
Seraya Spirit	DS	97,300	92				
Seafalcon	DS	97,300	90				
Alliance Spirit	DS	97,300	89				
Sentosa Spirit	DS	97,300	89				
Semakau Spirit	DS	97,300	88				
Seletar Spirit	DS	97,300	87				
Sudong Spirit	DS	97,300	87				
Singapore Spirit	DS	97,300	87				
Silver Paradise	DH	105,200	98				
Seabridge	DH	105,200	96				
Torress Spirit	SH	96,000	90				

OBO CARRIERS			
Victoria Spirit	DH	103,200	93
Vancouver Spirit	DH	103,200	92
Teekay Forum	DB	78,500	83
Teekay Fulmar	DB	78,500	83
Teekay Fountain	DB	78,500	82
Teekay Fortuna	DB	78,500	82
Teekay Freighter	DB	75,400	82
Teekay Foam	DB	78,500	81
Teekay Favour	DB	82,500	81
Teekay Fair	DH	75,500	81

OTHER SIZE TANKERS			
Mushashi Spirit	SH	280,700	93
Inago	DS	159,800	93
Erati	DS	159,700	92
Palmerston	DB	36,700	89
Barrington	DH	33,300	89
Scotland	DS	40,800	82

Key to Vessel Type

SH = Single Hull DH = Double Hull
DS = Double Side DB = Double Bottom

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but in general, older ships cost more to keep up, and expenditures of this nature are the first to go in a depressed market. Teekay notes that most crude oil tankers, and virtually all Aframax size tankers, are scrapped previous to reaching 25 years of age. This is significant, as 83.2 million dwt, or 27.6 percent of the current world tanker fleet, will reach 25 years of age in the next four years.

Cumulatively, the above adds up to a rosy tanker rebound in the medium-term. However, it can be assured that when tanker rates start nudging skyward again, plans to scrap older tonnage will be delayed by some, in an effort to extract valuable dollars from older ships before they begin their new life as razor blades.

Heading To The Scrapheap: Low Rates, High Costs Squeeze Tanker Market

A report issued last month by noted shipbrokers Simpson, Spence and Young (SS&Y) claim that oil tankers are being squeezed by low freight rates and high fuel costs and some older ships may be heading for the scrapyard.

OPEC's cut in oil production combined with reduced demand and high bunker fuel prices have seemingly made it difficult for even older tankers with little financial commitment to break even. SS&Y's wrote in its Monthly Shipping Review. Rates this summer for VLCCs heading to Japan from the key Middle East loading theater have been attracting rates as low as Worldscale 36 (\$4 a ton) and have been paying bunker fuel prices of over \$100 a ton. SS&Y reported that the last time bunker prices were at comparative high levels was in late 1997 when charter rates for Middle East to Japan trips were around W80, more than double current levels.

Earnings for tanker owners are not expected to improve dramatically in the short-term. OPEC's output cuts are continuing to enjoy compliance of over 90 percent from member countries and while some owners may opt to scrap, the impact of their vessels leaving the market will not be felt in the near future.

Intertanko said in its August report that 67 tankers — 14 of them VLCCs — have been sold for scrap this year.

Kawasaki Heavy, China Ocean Shipping To Set Up Shipyard

In continuing rounds of consolidation in the shipbuilding industry, Japan's Kawasaki Heavy Industry Ltd. and state-run China Ocean Shipping Group have announced intentions to set up a \$96.8 million shipyard in east China. The shipyard, to be located in Nantong in Jiangsu province, is intended as a 50/50 joint venture and will design and

build vessels of at least 160,000 dwt.

There was also report that South Korea's Samsung Heavy Industries Ltd. is expected to set up a wholly-owned shipyard in Ningbo in Zhejiang province. It said the second phase of the project would require approval from the State Development Planning Commission but gave no further details.

China has been trying to boost exports to spur its sluggish economic growth.

Latvian Shipping Shares To Hit Auction Block

Latvia's government has apparently approved a plan to sell 44 percent of Latvian Shipping, which could take place by the end of the year. The plan reportedly call for 34 percent of the firm to be offered in a first-round cash auction, with the winner of that bid to get another 10 percent in a separate transac-

tion for the same tender price. Shipping has 200 million shares and first-round bidding is expected to put the size of the deal in the neighborhood of \$88 million. Following the sale of 44 percent, another 21 percent of Shipping will be sold for privatization vouchers in domestically-aimed offerings. Another 24.1 percent will be reserved for later cash offering. Latvian Shipping is the world's 19th largest shipping firm by tonnage.



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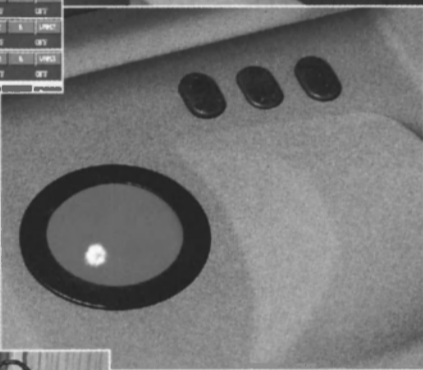
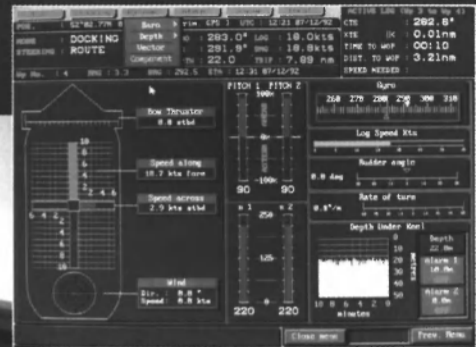
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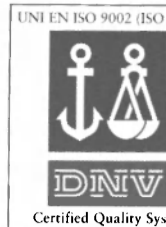
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Marine Propulsion Annual

Playing by the (new) Rules

The increased focused attention on emission of all types is hardly news to shipowners and marine propulsion suppliers. For decades, entities from individual groups to international policymakers continuously changed the manner in which ships and boats are operated. But today perhaps more than ever before, scrutiny of emissions from ships and boats has never been more intense, or as critical in the development, design and marketing of marine propulsion equipment. Diesel engine manufacturers, for example, are spending a good percentage of their R&D budgets dedicated to ensuring their engines are not only compliant with the new emissions rules and regulations, but to ensure that these same "new" engines operate as reliably and efficiently under the new operating realm. The concept of emission control is hardly a new one to these same manufacturers, which have had to contend with strict rules and regulations in the other industries — such as automotive and industrial — which they serve.

Airing Out

Much of the emission attention is, of course, squarely focused on the realm of minimizing pollutants, particularly NOx. With the new International Maritime Organization regulations regarding NOx emissions planned to take effect January 1, 2000 (see related story, page 74), most engine manufacturers' efforts are focused on ensuring that their entire line-up falls within the prescribed emission levels, thus ensuring their customers are in compliance. However, at press time, a new report from noted international researchers was sure to give pause to all involved in the process of propelling ships, as focus has now shifted to the potential effects on sulfur emissions from ships.

Scientists at Carnegie Mellon University and Duke University said (in a letter to the science journal Nature) that ships are emitting sulfur, previously suspected, causing ocean and coastal pollution and affecting scientific understanding of global climate change.

The concerns are varied, and include the thought that regional sulfur emissions contribute to acid rain, which can pollute bodies of water. Emissions from ships are also involved in the formation of clouds over the oceans. "Sulfur emissions have a large role in the formation of aerosols (tiny particles) on which water condenses to form clouds," said Spyros Pandis, who contributed to the study. "The interactions of aerosols and clouds have been identified as one of the most important uncertainties in understanding the rate of climate change, or global warming, because clouds reflect energy and thereby reduce the net warming effect of long-lived greenhouse gases."

The researchers also reportedly showed that the emissions from ships were most evident in oceans in the Northern Hemisphere where heavy shipping occurs. While comments on the study from the maritime community were not forthcoming at press time, it can be sure that the topic will be a headliner discussion for many industry and legislative conferences and meetings.

Quiet, Please

While the issues of noise and vibration are generally off of the radar scope in the legislative sense, particu-

larly in comparison to matters regarding, for example, exhaust emissions, efforts to reduce noise and vibration levels have been ongoing for many years. Germany was one of the first countries to introduce a standard for noise limits. In 1988 it issued a code regarding permissible noise levels on ships. Today,

(Continued on page 82)

IMO Noise Limits

(Sound Pressure Level)

	dB(A)
Work Spaces	
Machinery spaces (continuously manned)**	90
Machinery spaces (not continuously manned)**	110
Machinery control rooms	75
Workshops	85
Unspecific work areas	90
Navigation Spaces	
Navigating bridge and chartrooms	65
Listening posts, including nav. bridge wings and windows	70
Radio rooms	60
Radar rooms	65
Accommodation spaces	
Cabins and hospitals	60
Mess rooms	65
Recreation rooms	65
Open recreation areas	75
Offices	65

** Ear protectors should be worn when the noise level is above 85 dB(A), and no individual's daily exposure duration should exceed four hours continuously or eight hours in total.

Source: MAN B&W's "Diesel Engines and the Environment - Noise"

Propulsion Innovations

PSI Adds On New Feature

Propulsion System, Inc. has taken the Trimable Surface Drive into high-gear, while still holding on to its readiness for everyday application. The Pulse Drive, which differs from most other surface piercing drives because it is not articulated, holds a straight shaft supported by a strut and self-aligning water lubricated bearing enclosed housing. Supported by a weight bearing vinyl ester cowling, the shaft and cowling move vertically. The trimable surface drive gets the upper blades out of the water, and reduces drag with its advantages lying within its rudders, which are flanked by propellers on each end of the housing.

Circle 93 on Reader Service Card

Schottel Rudders Installed For Power

Reading & Bates Falcon Exploration Company, Houston, has ordered a semi-submersible drilling platform from Hyundai Heavy Industries for positioning both in deep water by Ruderpropellers and by means of anchors and winches in shallow depths.



Installed for deep-water purposes are Schottel Ruderpropellers type SRP 4500 kW with a special added feature that allows the units to retract into the hull, thereby reducing the vessel's draft in shallow water.

The order for specific units SRP 4500 with an input rating of 5,000 kW at 932 rpm was processed in conjunction with Schottel Werft Spay and Baylor Co. Texas through their joint subsidiary Schottel, Inc.

Circle 74 on Reader Service Card

ALSTOM Assembles Powerful Diesel Engine

ALSTOM Engines Mirrless Blackstone completed assembly of the most powerful 600 r/min diesel engine to be constructed and designed in the U.K. Known as the builder of the first British diesel engine in 1897, Mirrless has designated the MB430M as the newest addition to its product base. Built in 18 cylinder form, it puts out 15,627 BKw.

Circle 76 on Reader Service Card

Pinpoint Introduces Capture

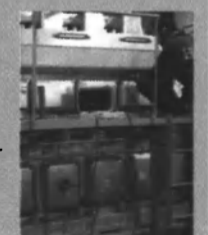
Pinpoint Laser Systems now offers Capture — a new measuring, recording and analysis package for use with precision measuring systems similar to the company's Microgage. The program, which swiftly loads in Windows, is simple to use on the production floor, machine shop and QC/QA lab. The product allows for measurements to 0.00001 and can be adapted to various applications.



Circle 85 on Reader Service Card

ICON Doctor To Monitor SeaLand Ship

Icon Research's Doctor diesel engine performance system has been selected to monitor the engines aboard SeaLand's Champion Class containerships. The company supplied nine systems for the new vessels, in addition to systems that SeaLand had previously purchased. All engines — one main and three auxiliaries — are monitored by a portable Doctor instrument. Each engine also holds a permanently installed inductive crank pickup and connector box for easy use and a highly accurate crank angle.



On the main engine, installation is simplistic with a small bracket fitted near the flywheel to take the twin inductive pickups, which monitor engine speed and correct for variations in speed during each revolution of the engine.

Circle 83 on Reader Service Card

Contracts

Tampa Bay Shipbuilding & Repair Enters Agreement

Tampa Bay Shipbuilding & Repair Company has been chosen by Maritrans Operating Partners, a subsidiary of Mar-

itrans, Inc. to retro-fit its second single-hull vessel, Ocean 244, in order to comply with the requirements of OPA 1990, via double-hull conversion.

Tampa Bay has decided to employ the same Maritrans innovative computer-

assisted design and manufacturing process that led to Tampa Bay's citation as one of Maritime Reporter and Engineering News Outstanding Shipbuilders of 1998 for their development of Maritrans 192.

OPA 1990 requires that all existing single-hull vessels engaged in the maritime transport of oil and petroleum products be retro-fitted with double hulls - or be retired by 2015.

AMCV Acquires

MS Nieuw Amsterdam

American Classic Voyages (AMCV) has come to an agreement with Holland America line to buy MS Nieuw Amsterdam for \$114.5 million, contingent upon various conditions expected to be resolved by this coming fall.

A unit of Carnival Corporation, Holland America Line is scheduled to transfer the 1,214-passenger cruise ship to AMCV during fall 2000. AMCV plans to re-document Nieuw Amsterdam as a U.S.-flag vessel, complete with American crew, to sail the Hawaiian Islands as part of the company's Project America - the result of the U.S.-Flag Cruise Ship Pilot Project Statute passed by Congress in 1997.

The project, which is expected to create more than 5,000 American jobs, is based on the goal of the revitalization of the U.S.-flag oceangoing cruise ship fleet.

"The acquisition of Nieuw Amsterdam will expand cruising options in Hawaii, offering consumers the highest level of service," said Philip C. Calian, president and CEO of AMCV. "The vessel will not only expand cruising opportunities in Hawaii, attracting more cruisers to the state, but also will create approximately 400 new U.S. jobs onboard this ship."

Measuring 704-ft. (214.5 m), 33,930-gt Nieuw Amsterdam provides the amenities of a posh resort hotel with the conveniences of cruising. Its Hawaiian Island itineraries will showcase the natural beauty of the Islands, allowing passengers to partake in the vessel's five lounges, two restaurants and 15-ft (4.5 m)-wide teak deck, encircling the Upper Promenade Level.

Kent Line Selects OSL

Kent Line International Ltd., St. John, N.B., has chosen Offshore Systems Ltd. for the supply of electronic navigation systems for four of its vessels. Awarded in May, the contract will result in the Irving Canada, Irving Eskimo, Irving Arctic and Kent Voyager being outfitted with the most recent version of OSL's Electronic Chart Precise Integrated Navigation System (ECPINS) PRO product. Crew training and the provision of electronic navigational charts via OSL's subsidiary Offshore Charts are also part of the agreement.

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Circle 246 on Reader Service Card

Contracts

Ulstein Nordvestconsult Garners Design Contract

Ulstein Nordvestconsult (UNVC), part of Vickers Ulstein Marine Systems, was awarded a contract comprised of the design of two 5,950-dwt RoPax ferries for a Greek shipowner.

Anek Lines is set to operate the vessels, which will carry trailers, cars and passengers, between Chania and Piraeus.

Scheduled for construction at Fosen Mekaniske Verksteder AS, Norway, the RoPax ships are slated for delivery in October 2000 and will measure 656-ft. (200 m) with a beam of 85-ft. (25.8 m).

Each vessel will travel at a service speed of 27.5 knots and hold a certificate for 1,500 passengers.

Circle 95 on Reader Service Card

Ulstein Brattvaag Awarded Supply Of Deck Machinery

Ulstein Brattvaag has landed contracts totaling \$2 million by two of Japan's largest shipbuilders for the supply of deck machinery for a pair of LNG carriers.

The agreement also allows for options for corresponding equipment for two more LNG tankers, thus allowing the contract to double in value.

Construction of the series of 135,000 cu. m. LNG carriers for the Malaysian State company Petronas tankers has been placed with two Japanese shipyards: Mitsubishi Heavy Industries and Mitsui Engineering.

The contract calls for Ulstein to supply a full set of low-pressure hydraulic deck winches for each LNG carrier, comprising two Brattvaag combined windlasses and mooring winches forward.

All components, such as the electrically driven low-pressure hydraulic power packs and remote controls for foredeck and aftdeck machinery are also included.

Circle 96 on Reader Service Card

Litton Marine Wins IBS Orders

Litton Marine Systems, subsidiary of Litton Industries has been granted orders to provide Integrated Bridge Systems (IBS) for Norwegian owners.

The orders include two new 55,000-dwt LPG carriers for Bergensen (Gdynia Shipyard, Poland) and a 37,500-dwt chemical carrier for Jo Tankers at the Kvaerner Kleven Florø yard.

Bergensen, which has opted for a complete DNV Watch One bridge system for ocean and coastal operations, will include Litton-supplied X-band and S-band BridgeMaster E radars, Voyage

Management System (VMS) and other components.

Circle 97 on Reader Service Card

Leica To Supply Beacon Reference Station

The Singapore Maritime Port Authori-

ty has awarded a contract to Leica Geosystems for the supply of a portable DGPS beacon reference station.

The agreement, which consists of a Leica MX 9400R DGPS beacon reference station with disk antenna, also includes a portable beacon transmitter with autotuning antenna coupler and

guyed monopole mast antenna, as well as Leica integrity monitoring software.

The system is designed to provide emergency backup to the fixed DGPS beacon system and is designed for a rapid deployment in case the main system should fail.

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Circle 264 on Reader Service Card

Bender And Otto Candies Agree On Tugs

Bender Shipbuilding and Repair Co., and Otto Candies have signed a contract for three 150 ft. (45.7 m) Anchor Handling Tugs to be constructed by the Mobile, Ala., shipbuilding company.

The contract, which requires the trio of vessels to be delivered in 2000, also grants Otto Candies an option to purchase five more identical tugs.

Measuring 150 x 50 x 21 ft. (45.7 x 15.2 x 6.4 m), with a 10,000-hp capacity, the vessels hold a Stewart & Stevenson triple screw propulsion system, with

two EMD diesel engines driving outboard Aquamaster Z-drives and one EMD diesel engine through a Reintjes reverse reduction gear.

Deck machinery aboard the tug group will consist of a SMATCO line pull Double Drum Reverse Waterfall Towing/Anchor Handling Winch; two

SMATCO tuggers rated at 20,000 lbs. line pull, and one set each of SMATCO's 14 x 24 Pop Up towing pins and Model 300T Shark Jaw.

Litton Sends Decca Bridgemaster Off To Shell

Litton Marine Systems has delivered Bridgemaster E radars to Shell International Trading and Shipping Company for retrofit on four S-Class tankers fitted with interswitched X-band and S-band Bridgemaster E 340 radars, with optional control keypads.

Introduced to the industry last year, Bridgemaster radars were designed to deliver a significant technological breakthrough in signal processing automatic clutter suppression.

Circle 29 on Reader Service Card

Transmarine Granted Repeat Equipment Order

Transmarine of Newcastle, a specialist in the design and supply of cargo access equipment (CAE) such as linkspans, ramps and hatch covers, has won a \$970,000 order from Ferguson Shipyard on the River Clyde in Glasgow. The contract calls for RoRo access equipment for a new car/passenger RoRo ferry being constructed for Caledonian MacBrayne.

The new ship, which will sail along the route between the Scottish mainland and Hebridean islands, will hold approximately 110 cars and 650 passengers. Equipment is comprised of a two-section bow ramp, bow visor, a stern ramp and two hoistable car decks.

The company has also just completed the design stage of a contract to design and supply a RoRo linkspan to accommodate ship ramps for the transfer of RoRo traffic at Matthews Quay, Aberdeen.

Awarded to Transmarine, the contract is part of the strategy created by the port to increase volume of ships, as well as introducing larger ships from the continent.

Circle 9 on Reader Service Card

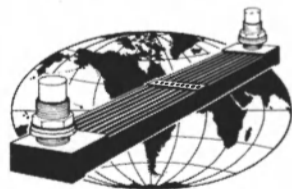
Lockheed Martin To Commence Towed Array Systems

Lockheed Martin Ocean, Radar & Sensor Systems (OR&SS) received the go-ahead in July from the U.S. Navy that it can begin to work on the towed array sensor systems contract it was awarded on December 18, 1998.

Delayed as a result of a bid protest, the contract was granted to Lockheed for engineering and manufacturing services in support of the new towed array.

Estimated value of the contract stands at \$31.7 million.

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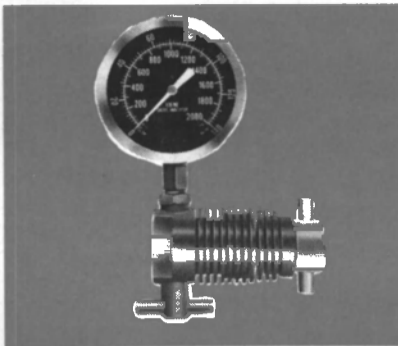
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Circle 27C on Reader Service Card

Inmarsat Appoints Storey

Inmarsat's Board of Directors has named **Michael Storey** as the company's new president and CEO. Storey, who has 18 years experience in telecommunications, will be responsible for the company's daily management as well as guiding the development of Inmarsat's growth strategies for eventual IPO.

ASRY Appoints New Agent For Italy And Monaco

ASRY has named Victoria Maritime Services (VMS), which provides Italian and Monaco-based owners with a premier shiprepair yard representation service certified to ISO 9002, as its agent for Italy and Monaco. Established in 1992 by **Luca**



Maurizio Taviani, Carole, Spinelli and Maurizio Luca Spinelli. VMS also provides damage, valuation and condition surveys for P&I Clubs, Salvage Association, financial institutions and owners, as well as holding representation for the Registro Italiano Navale.

Aker Marine Sets New Mooring Record

Aker Marine Contractors, while working under contract for Vastar Resources, has set a new world water depth record for conventionally-moored drilling rigs using onboard monitoring systems. Named Ocean Victory, the Diamond Offshore rig had its eight drag embedment, high holding power (HHP) anchors in water depths of 5,800 ft. (1,767.8 m) with the rig itself stationed in 5,423 ft. (1,652.9 m) of water.

Aker has also successfully re-installed FSO Harrier in a bow to bow tandem mooring with the FPSO Zafiro Producer, for Mobil Equatorial Guinea at its Zafiro field, offshore Equatorial Guinea.

New Appointments At Great Lakes Towing

Great Lakes Towing Company has appointed three people to new positions on its staff:

Jerome A. Popiel was elected assistant vice president, operations and will be responsible for the company's Operations Center and all dispatching functions. Prior to joining Great Lakes, Popiel served as operating officer, Buffalo, and as an Aide to the Commander of the Ninth District for the U.S. Coast Guard.

Brian T. Schellhase joins as director, marketing & business development and has a background that concentrates on new business products and customer service. Schellhase is a graduate of the Weatherhead School of Management's MBA program at Case Western Reserve University.

Gregg Thauvette was appointed operations manager for Great Lakes. Thauvette, who previously served as logistics assistant with the company, served for seven years in the U.S. Navy's nuclear power program before joining Great Lakes.

Crowley, Hamburg Sud Reach Agreement

Crowley Maritime Corp. and Hamburg Suedamerikanische Dampfschiffahrtsgesellschaft Eggert & Amsinck (Hamburg Sud) have come to an understanding in principle on the acquisition of Crowley American Transport's South America liner services by Hamburg Sud. The purchase, which is expected to be finalized by October 1, will include the business trade lanes between the U.S. Atlantic/Gulf and South America East Coast, West Coast and Venezuela.

eXperience

Logistics support has always been a basic need for any fighting force. For the U.S. Navy, the most demanding need has been the ability to deliver supplies to ships at sea.

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Circle 295 on Reader Service Card

Go to the Head of the Class

Academy aims to create future shipyard engineers with its comprehensive, hands-on Shipyard and Marine Management Program

The United States Merchant Marine Academy (USMMA), located in Kings Point, N.Y., strives to produce graduates who have the expertise, as well as the understanding of not only how a ship works, but what it takes to operate and build a ship. An ordinary preparatory program? Not so, as the Academy holds a unique spot in the maritime education and engineering world – they are known as the only learning institution to offer a fully consolidated undergraduate program geared specifically towards shipyard management. MR/EN recently spent the day with various professors involved, as well as members of the program's class of 2000, as they shared their thoughts and views on this premier curriculum.

— By Regina P. Ciardiello, assistant editor

Step back in time to 1995 for a moment. It may be an insignificant year for some people, but not for Professor Jose Femenia. As head of the United States Merchant Marine Academy's (USMMA), engineering department, Femenia noted that 1995 was the year in which the Academy's shipyard management program was loosely formatted. It was through his efforts that the program became a reality a year later in 1996.

Beginning with a focus on ship maintenance and repair, several elective courses had been developed, such as ship maintenance and repair, and ship-

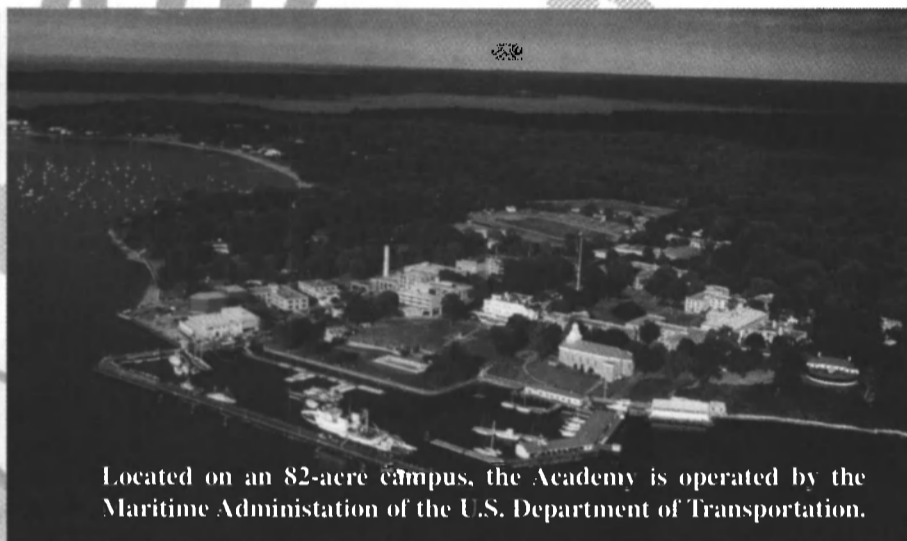
yard design and operations that students could enroll in – but were not yet part of a fully formalized agenda. In turn, these electives led to the birth of the Academy's shipyard management program.

This blend of marine engineering, industrial engineering and engineering management, which is comprised of two stems – ship repair and ship construction, "focuses on how to manage and run a shipyard," according to Femenia, who was hired as engineering department head in 1995 and also serves as president of the Society of Naval Architects and Marine Engineers (SNAME).

Although classroom instruction may be the core portion of an enrolled student's learning experience, the program is unusual because of its additional requirement – students must complete a six-week internship before entering their senior year, but not before fulfilling their sea year requirement.

An instrumental force with this aspect is Prof. Boris Butman – the program's founder and whose drive is to see his

Students at the United States Merchant Marine Academy are able to tap numerous resources, including the latest technology, an experienced teaching staff, and valuable industry internships to further their maritime careers.



Located on an 82-acre campus, the Academy is operated by the Maritime Administration of the U.S. Department of Transportation.

students succeed both in and out of the classroom. In addition to teaching various courses, he assists his students in garnering internships and often confers with noted shipyards such as National Steel and Shipbuilding Company (NASSCO) in San Diego, Calif. and Atlantic Marine in Mobile, Ala., both of which are avid supporters of the program.

"Our kids are getting tremendous experience by bringing the combination of spending time at sea with the knowledge related to a shipyard," Butman said.

Various shipyards throughout the U.S. typically accept two to five interns a year from the Academy, enabling students to gain experience of working at a real shipyard – as well as utilizing skills they have absorbed from their course-

work.

Upon completion of the internship, students are then required by the Academy to submit a comprehensive report outlining their daily activities and summarizing everything that they learned throughout their experiences. The two yards that have had the most exposure to this program, Atlantic Marine and NASSCO, take the program a step further with their structured formatting, where students receive mentors who guide them through their daily workday.

According to Katherine Chumley, human resources director for Atlantic Marine's Mobile, Ala. facility, the program offers "a well-balanced approach to the types of jobs that will be available to students upon graduation." In fact, according to Chumley, of the students who have been hired from the Academy from Atlantic in the past three years, 50 percent were those who held internships with the yard.

"Our program is one that is well-rounded and designed to correspond with the students' curriculum," Chumley said.

Atlantic's program also incorporates weekly lunch meetings giving students the opportunity to voice their concerns and thoughts to their supervisors.

"The weekly lunches give students the opportunity to provide their mentors with feedback so they can make sure that they are learning and getting the experience they need," Chumley added.

Take Jenny Darnell for instance. The





Since completing their respective six-week internships, these members of the USMMA Class of 2000 gained valuable experience that will aid them in their upcoming job searches. Pictured (Clockwise from left): **Antoinette D'Elia, Danny LoCasto, Jessica Montgomery** and **Kellie Redcay**

1997 USMMA graduate completed her internship at Atlantic and when it was time to apply her skills into the real world, Darnell was offered (and accepted) a position in the yard's planning department as a production planner.

Although the formalized shipyard management program had not yet been established for her class, Darnell was still able to take everything that she learned from the courses she took at the Academy and worked them into her position at Atlantic Marine.

"You need a basic understanding of how a shipyard works and what is involved to get a project done," said Darnell, who was recently promoted to project coordinator. "Whether it's a repair or building job, knowing how to deal with the work process and all the people involved on various levels is important."

Although **Jason Perusek**, USMMA Class of 1999, is pursuing a different path outside the shipyard world, the Chardon, Ohio resident found himself in the midst of a quite favorable experience during his internships at NASSCO and Solar Turbines.

For a 14-week period, sometimes putting in 16-hour days, Perusek worked at NASSCO during the day, Solar Turbines at night and on weekends, and still managed to develop a palm-top computer and bar code technique designed and created for NASSCO's inspection department. The futuristic device, which Perusek presented to the yard's various department heads, included the vice president of production and finance, was developed for the purpose of performing quicker and easier inspections – thus allowing the process to become completely electronic, rather than using the conventional paper method.

"This is one of the first times that

most of these students will get to work in a shipyard," said **Karin Hagen**, internship coordinator at NASSCO. "They are exposed to many of our departments, managers work with them and allow them to observe and participate in meetings and assign them meaningful projects."

Perusek credits his classroom experience as well as his motto of always

Seniors **Zachary Franczyk, Jeff Benton,** and **Elizabeth Nicoletti** shared with MR/EN their thoughts on the Academy's Shipyard Management Program.



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going above and beyond what is required of him to his successful run at NASSCO.

"It's amazing how much I already knew when I got there because of the projects I worked on in class," he said. "It was a real asset to have that valuable

experience."

In addition to the opportunity that students get to spend at the yards, they also gather a taste of the real world from the classroom through the program's final Capstone Project, which must be completed by the end of their senior year.

The project, which is designed to give students a view of the "big picture" of just what goes into the design, construction and repair of a ship, is a valuable learning tool. This year's construction class projects are a design of a shipyard overhaul of a ship and an oceanographic

research vessel. Upon being divided into their respective groups, students then subdivide the various tasks that must be put into the project such as market analysis, cost estimate and design work instructions. In fact, a project report schedule with due dates is distributed to each student from the very first day, so that each group can organize its tasks in an orderly fashion.

But perhaps the most desirable function of the Capstone Project is just who gets to see the finished project. Of course, the students present their finished wares to their classmates and professors, but the greatest audience are the various shipyard executives and port engineers who are invited by Butman to witness possible future engineers at their respective yards, first-hand.

The projects are usually presented to the executives during late-winter, and according to Butman, many of his students had not one, but two or three job offers by the end of March-early April.

"A big advantage of this program," Butman said, "is the positive feedback that students receive from companies."

According to the Academy, out of the 29 members of the Class of 1999, most did indeed have job offers by the predicted time, and moving back to 1998, approximately 50 percent of that group went on to work for various U.S. shipyards. As impressive as these figures may seem, they are not foreign to the Academy in terms of job availability/offers. According to a report of employment statistics dated July 15, 1999 by the Academy's Office of Professional Development, at press time 163 students out of this year's class of 180, were currently employed within some aspect of the maritime industry.

MR/EN observed two classes offered



Jeff Benton from Indianapolis, Ind., completed his internship at Baltimore Marine Industries.



Elizabeth Nicoletti interned at Northwest Marine Industries in Tacoma, Wash. where she had the opportunity to work on the new JAWS ride for Universal Studios Japan.



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Uniservice: Innovative Product Keeps Cruise Ships Running

The development of URICLEAN Concentrate was partly due to the shipowners' continual problem of line blockages in Vacuum sanitation systems where uric acid deposits crystallize. When crystallization occurs in these lines the acceleration of line blockages becomes increasingly difficult to control. The result is a snowball effect and 4" lines can become 80-90% blocked and in some cases completely blocked in as little as 90-120 days.

Although Vacuum systems are the best form of waste management on board a vessel, the problem of uric acid deposits continues to plague an industry that continues to expand ship size and passenger numbers. As this continues to grow the obvious result will be more line blockages and costly downtime in repairing these serious problems that ultimately reflect on the vessel and shipowner. The crystallized

deposits formed in Vacuum lines can be simply described as rock-like deposits, with pitted and scarred surfaces which then allow other types of deposits to attach themselves. Vessels are particularly subject to problems in areas where there are 45 – 90 degree turns and lines that run horizontally.

In years past, marine chemical companies presented to the shipowners the idea that if a vessel uses bacteria type products in its sanitation lines, the problem of uric acid deposits would be greatly reduced and/or eliminated. Through extensive studies and research, including those at leading Bio-

logical Institutes, it was determined that bacteria products have virtually no effect on uric acid deposits that exist within a vacuum system. Bacteria can only be effective in biodegradation when retention time is great and the environment is stable. The reality of a vacuum type system is that the vessel has neither! The introduction of bacteria to a sanitation system is of course excellent for a vessel's CHT (Collection Holding Tank), but it has nil effect in cleaning and maintaining a vessel's vacuum sanitation lines.

The first major step Uniservice was able to accomplish in combating uric acid deposits was the development of a unique product called URICLEAN concentrate. This product combines a very unique blend of concentrated cleaning agents that are chemically effective in removal of the crystallized hardened deposits caused by uric acid. As uric acid deposits crystallize within the internals of a sanitation piping system, URICLEAN concentrate effectively starts the softening process of these hard crystallized deposits, and, in a controlled time frame, begins the removal process. Each vessel has a unique system either by piping configuration and/or type of vacuum system used. Keeping this in mind, Uniservice utilizes a management approach in cleaning these systems on-line. It is extremely critical that the removal of the crystallized deposits be accomplished in a controlled time frame in order to avoid greater blockages at lower levels as the crystallized deposits begin to fall off. To clean an existing problem that could reflect 80-90% blockage, the vessel and ship owner should



Uniservice's reference list includes clean, hassle-free piping on many of the industry's top ships, including Horizon.



Uniservice's URICLEAN system was developed to help cruise ship owners avoid costly downtime due to problem build-up in a ship's sanitation piping system.

allow a 90 day clean-up period. If this were allowed to occur within a much shorter period of time, the blockages in lower cabins could increase dramatically as deposits begin to fall away from upper level lines. After the 90 day clean-up period the vessel then can reduce its dosage level greatly and only use a preventive maintenance dosage in order to preclude this serious problem from reoccurring.

Through much trial testing onboard various cruise vessels and with the assistance of shipboard engineers, Uniservice has been able to understand the proper dosage amounts required to effectively remove uric acid deposits, while also maintaining an efficient and effective waste management system.

Initially we recommended that the vessel introduce the product into the heads each time the cabin was cleaned by the hotel staff. This was of course an inexpensive approach to introducing this unique product into the system. However, Uniservice was determined to develop something more accountable and reliable, while trying to avoid adding more work to the ship staff.

With the help and advice of NCL's vessel the m/v Seaward, Uniservice was able to introduce a simple inexpensive dosing unit that is fitted in strategic locations throughout the vessel.

The units are simple, reliable, require easy installation, and can be retrofitted on all existing tonnage. Our Uriclean dosing unit utilizes the ship's vacuum as a way of introducing the product into strategic locations throughout the vessel.

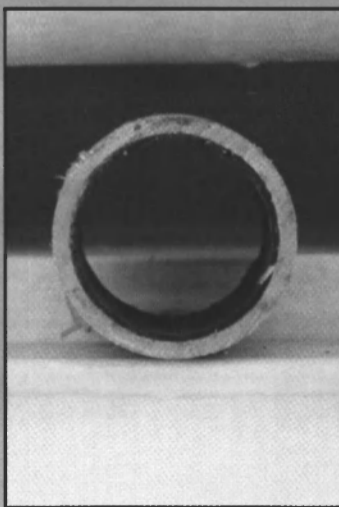
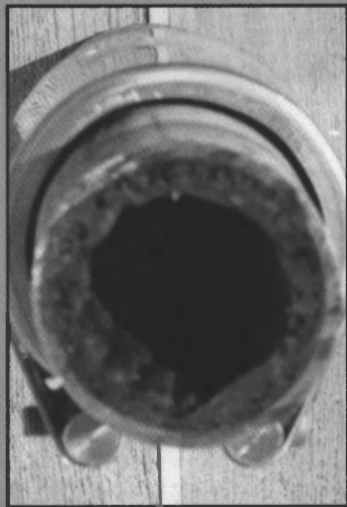
With new tonnage Uniservice can design a dosing system that can be fed throughout the vessel utilizing 2-3 dosing locations from the ship's engine room. This will allow for little requirement from the ship's staff and can be easily monitored and controlled.

For more information about URICLEAN concentrate and our dosing systems, please contact our U.S. headquarters in Slidell, La.

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Now you see it...
...Now you don't!

The development of URICLEAN Concentrate was partly due to the shipowners continual problem of line blockages in Vacuum sanitation systems where uric acid deposits crystallize. Pictured left is piping before treatment; to the right is piping after treatment.





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to graduating seniors of the program — Engineering Design Management taught by Prof. **John Tuttle**, and Engineering Economics led by Butman. Tuttle, whose class focuses on the preparation and presentation of students' final Capstone Project, discussed the focal points,

architecturally speaking, of what needs to be incorporated into the design of the ship. Butman, on the other hand, gave students a sampling of the economic side of the design project.

In speaking with several seniors present in class that day (all of which com-

pleted their internships), *MR/EN* found that the majority, were enthusiastic and well informed in regards to their thoughts of the program — as well as their plans for the future.

Contrary to popular belief, women do in fact have a formidable place within

the shipyard industry, just ask **Kellie Redcay**, a 21-year-old senior who hopes one day to hold an upper-level management position at a shipyard.

Redcay, who hails from Reading, Pa., completed her internship this past June at Bay Shipbuilding in Sturgeon, Wis., where she worked on repairs and new construction.

"At first I didn't know what to expect when I got there, but I soon realized that things at Bay ran rather smoothly — it was a relaxing, family atmosphere," she said.

Spending eight to ten hours a day at the yard, the future shipyard executive was treated "more as a regular full-time employee rather than an intern" by her co-workers. Redcay recalls one specific project that she was asked to manage when unforeseen changes cropped up.

"We were working on a dredger contract and at the last minute the owner made some changes, I was then asked to figure out the cost-estimate based on his changes," she said.

Other students praised the numerous job offers that alumni have received in the past.

"The shipyard management program provides good connections because most everyone is guaranteed a job placement upon graduation," said senior, **Jeff Benton**.

Sometimes working on eight to ten jobs at one time, Benton, 20, from Indianapolis, Ind., recently finished his internship at Baltimore Marine Industries (BMI), where he worked in the yard's ship's management and machinery departments.

"At BMI, I was able to see the big picture through planning and estimation," Benton said. "I got the opportunity to act as a liaison between the shipyard and port engineer."

Another member of the senior class, **Elizabeth Nicoletti**, 21, had an experience that was similar to Benton's — she too, gained a "big picture" of the shipyard world. Nicoletti, who fulfilled her internship requirement at Tacoma, Wash.-based Northwest Marine Industries, worked on the design foundations for ships and even had the opportunity to work on the construction process for a major project — the new Jaws ride planned for Universal Studios Japan.

"I was involved with everything from managing and designing sketches, to scheduling and planning," Nicoletti said.

She added that the time she spent at sea had a major influence on her understandings of a shipyard.

"You need to know your way around a ship and how it works," she said. "I wouldn't have known if I hadn't been to sea."

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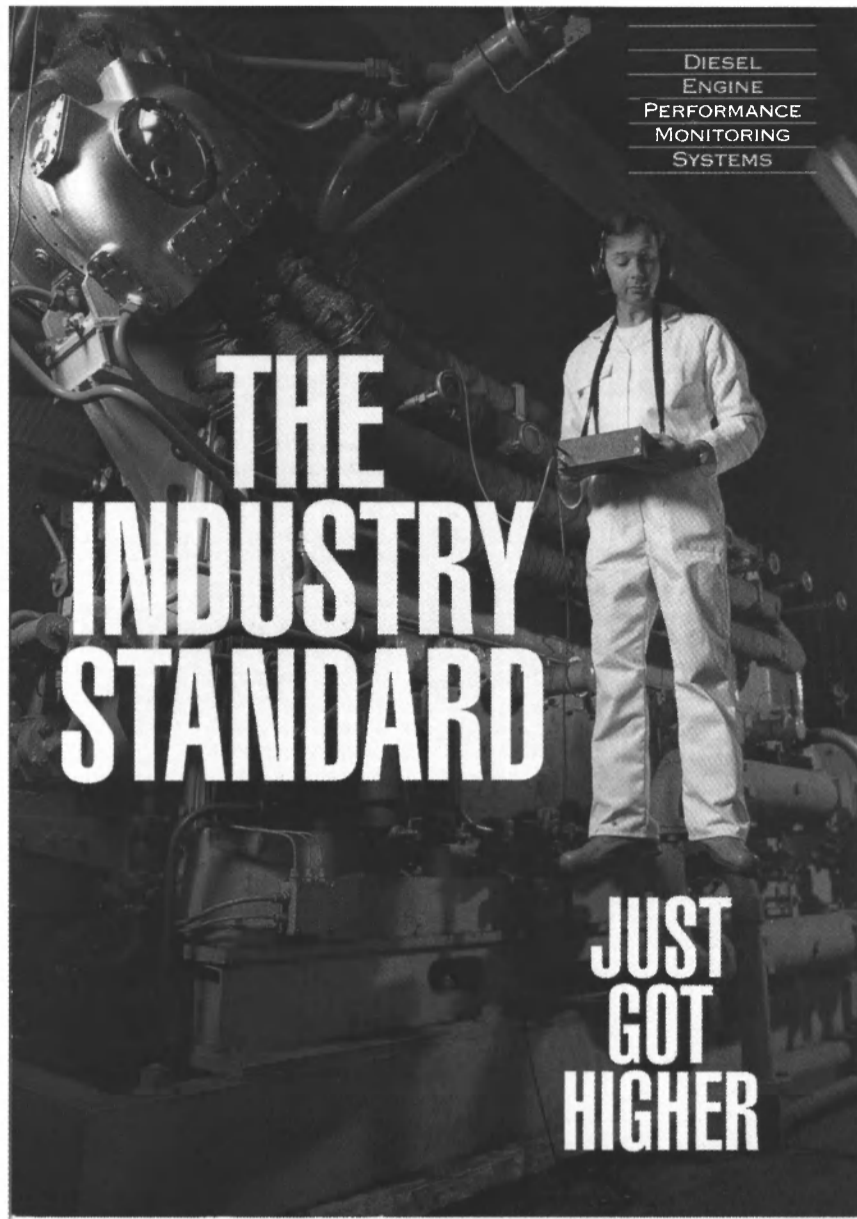
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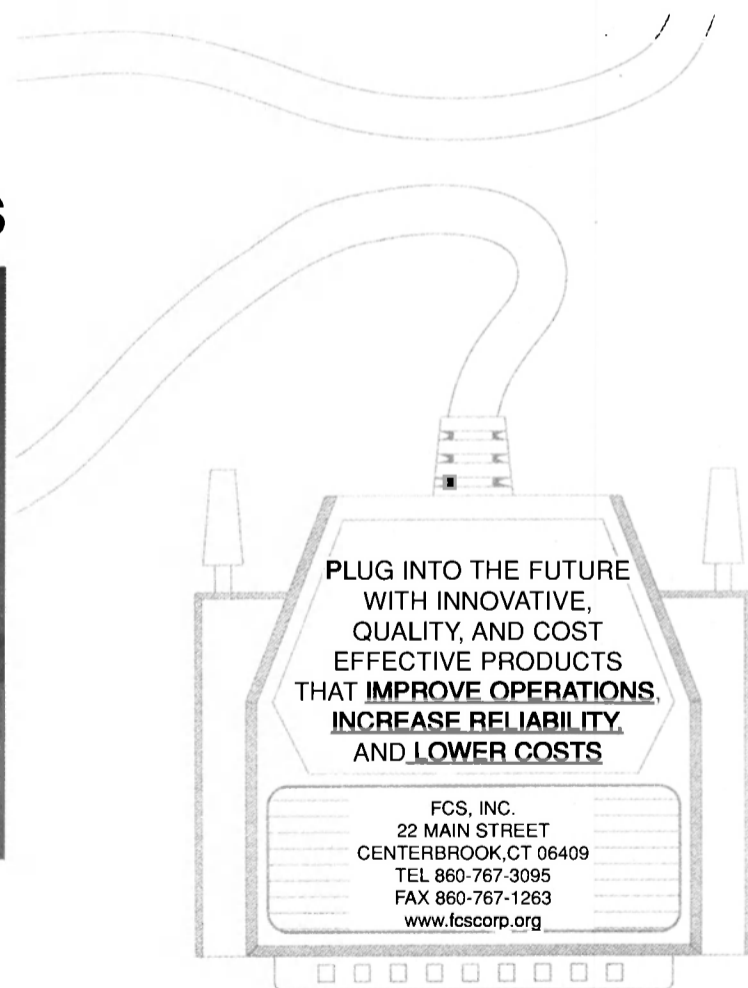
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SNAME Meeting Scheduled For Baltimore

Held annually, the Society of Naval Architects and Marine Engineers' (SNAME) International Maritime Exposition is a premiere event for professional networking, and also provides attendees with a chance to see the latest tech-

nical advances in the maritime industry. This year's annual meeting will be held at the Baltimore Convention Center, in Baltimore, from Wednesday, September 29 through Saturday, October 2. The exposition portion, featuring more

than 150 exhibitors, will be open to attendees on Thursday, September 30 and Friday, October 1, only.

The exposition, held in Hall F of the Convention Center will be open Thursday, September 30, from 7:30 a.m.-12:45 p.m., and again from 2:15 p.m.-5:00 p.m. Friday's hours will be 8:00 a.m.-4:00 p.m.

The newly expanded Baltimore Convention Center is the central site for the technical program and exposition.

Technical Program

Thursday, September 30, 1999

Room 345

9:00 a.m.: The Loss of USS Yorktown (CV 5), A Marine Forensics Analysis

10:00 a.m.: An Information Technology Blueprint for the Twenty-first Century Amphibious Warship

3:00 p.m.: Stern Wedges and Stern Flaps for Improved Powering U.S. Navy Experience

4:00 p.m.: Propeller Shaft Strut Design

Room 347

3:00 p.m.: T&R Report # 1: Proposed Full Scale Maneuvering Tests in Houston Ship Channel

T&R Report # 2: Proposed Guidelines for Hydrodynamic Load Tests

Presented by: Allen Engle

T&R Report # 3: Structural Design & Responses in Collisions & Groundings

Presented by: Alan Brown

T&R Report # 4: Safety of Double Hull Tankships

Friday, October 1, 1999

Room 345

9:00 a.m.: Ice-Class Propeller Performance in Extreme Conditions

10:00 a.m.: Power Prediction of Single-screw Ships Based on Comparable Trial and Model Test Results

2:30 p.m.: A New Challenge for the Ship Operator: The Mgmt System

3:30 p.m.: Solid and Liquid Waste Treatment Design for the UK Future Surface Combatant

4:30 p.m.: On the Legal Ramifications of Margins of Error

Room 347

9:00 a.m.: Ship Docking Module: Design, Construction, and Evaluation

10:00 a.m.: Comparative Studies for Future Cutters of the USCG

2:30 p.m.: Longitudinally Stiffened Panels A Comparative Analysis of the Compressive Strength of Three Common Construction Methods

3:30 p.m.: On the Rational Design of Double Hull Tanker Structures Against Collision

4:30 p.m.: A Wave-Induced Fatigue Strain Recorder for Surface Ships

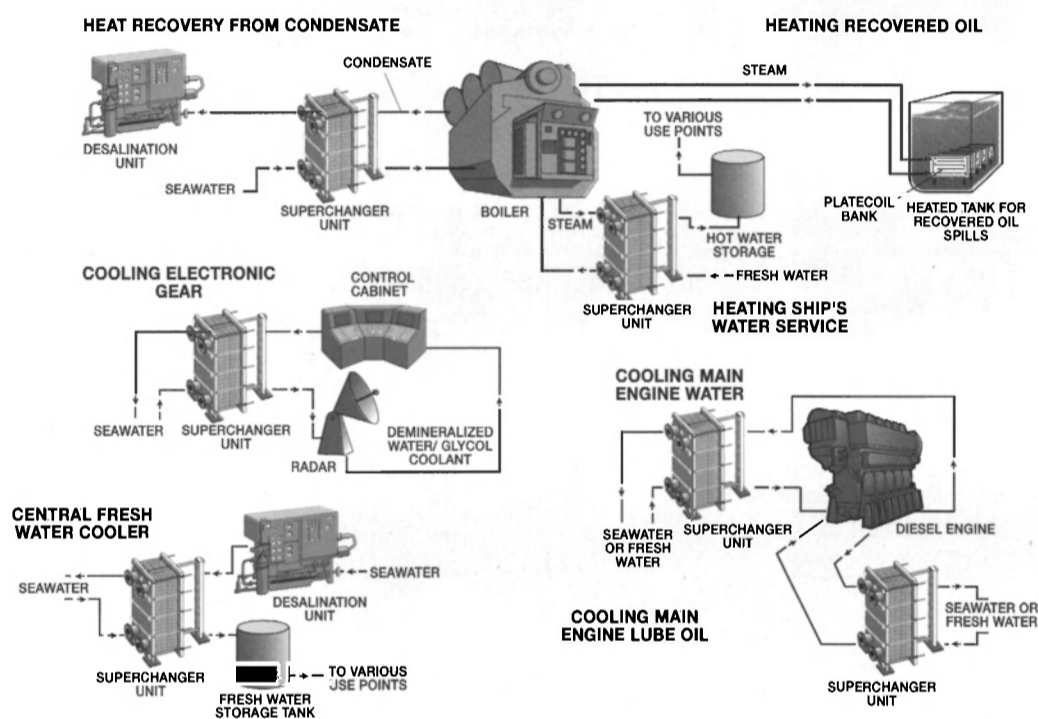
Room 349

9:00 a.m.: Measurement of Small Craft Kinematics for Stability Analysis

10:00 a.m.: Dynamic Capsize Vulnerability: Reducing the Hidden Operational Risk

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SNAME 1999: Exhibitor Profiles

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Airchime Manufacturing Co. Booth #519

Alabama Shipyard is located on Pinto Island on the Mobile River in Mobile, Ala. and has gained global attention with its contracts to build chemical tankers for an international owner.

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ALLWEILER Marine Booth # 431

ALLWEILER Marine designs and delivers complete cargo handling systems for Offshore AHTS vessels, firefighting systems and is a leading manufacturer of pumps and pumping systems to the worldwide marine and offshore industries. The scope of the supply includes two and three spindle

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ALSTOM Drives & Controls is a world leader in high-technology solutions for the diesel electric marine market, committed to the reduction of life-cycle costs. The company's project list includes many naval and commercial references.

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American Bureau of Shipping Booth # 127

The American Bureau of Shipping is one of the world's leading ship classification societies. ABS establishes and administers standards for the design, construction, and periodic survey of ships and other marine structures.

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American United Marine Corp. Booth # 727

American United Marine Corp. is a general agency for the supply of marketing, sales, engineering, technical service and products to the marine industry.

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Ameron Fiberglass Pipe Group Booth #321

Applied High Technology Booth 629

Cedervall & Söner AB Booth # 727

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Appleton Marine Inc. Booth # 427

Appleton Marine has continued to supply marine deck machinery including cranes, winches, windlasses and capstans for military and commercial shipbuilding for the last 25 years. Recent applications include offshore cranes and anchor pre-tensioning winches for various FPSO installations.

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Calhoon MEBA Eng. School Booth # 404

The Calhoon MEBA Engineering School was

founded 30 years ago to provide technical education for licensed sea-going deck, engineering, and radio officers. The school offers 26 different courses, taught in state-of-the-art lecture rooms and laboratories. Major programs include: electronics, propulsion, communication, computers, firefighting and STCW.

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California Maritime Academy Booth #531

Carderock Division, NSWC Booth # 220

The Carderock Division, Naval Surface Warfare Center's booth will highlight the work that was done on the Deep Water Surface Piercing Platform, a new model testing of the Mobil Offshore Base, the DD-21 Program, and progress on the Electric Drive Program.

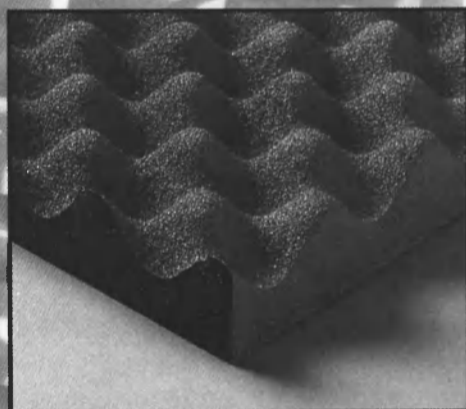
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Caterpillar Booth # 233

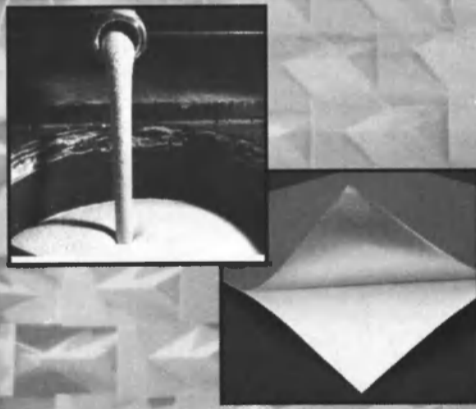
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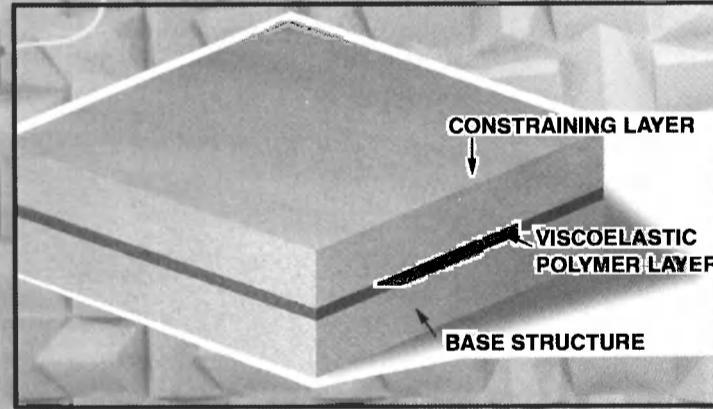
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Vibration Damping:
Apply spray on compounds or sheet products to eliminate ringing and resonances in thin panels



Use **Soundamp** or **Dyad** to reduce engine structure borne noise in thick metal plates (hulls, bulkheads, decks, etc.)

Contact Sales Engineering (ext. 153) for innovative ideas, improved assembly techniques, product information, samples and noise testing



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Maritime Reporter/Engineering News



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**NEWPORT NEWS
SHIPBUILDING**

www.nns.com
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SNAME ANNUAL

for larger engines, Caterpillar's sister company MaK is located in the adjoining booth.

Circle 110 on Reader Service Card

Cegelec
Booth #518

Cerberus Pyrotronics
Booth #527

**Chesapeake Specialty Products
Booth # 318**

Chesapeake Specialty Products is the only manufacturer of metallic abrasives that are specifically engineered for surface preparation, dry or wet. The company's goal is to supply the best abrasive for all surface preparation needs.

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CHLOR*RID International Inc.

CHLOR*RID is a unique organic bonding chemistry that removes chlorides and sulfates from contaminated surfaces in a simple dilution with any potable water source.

Circle 170 on Reader Service Card

Claremont Corporation
Booth # 621

Claremont has specialized in insulation for the

shipbuilding industry for nearly 30 years. The company currently manufactures polyimide and fiberglass hull insulation, a variety of fire stopping products, as well as custom insulation pads. In addition, Claremont proudly distributes cover guard, a complete line of protective materials.

Circle 155 on Reader Service Card

Colonnas Shipyard
Booth #114

Conor Pacific
Booth #540

**Crane Unidynamics/ St. Louis Inc.
Crane Defense Systems
Booth # 719**

Crane Defense Systems (CDS) manufactures and designs material handling equipment, doors, cranes, elevators, winches, conveyors, and customer specified products. The company specializes in engineering design, and manufacturing of quality products for the DoD and commercial markets.

Circle 112 on Reader Service Card

CTI Industries
Booth # 123

A service engineering company specializing in the restoration of condensers and heat exchangers. Shield/Sales™ (metallic tube inserts) restore tube end erosion/ corrosion and save 80-90 percent compared with cost to retube. Full Length Tube Liners™ restore plugged/condemned tubes to service.

Circle 113 on Reader Service Card

**Cummins Marine-Cummins Wärtsilä
Booth # 339**

High-speed marine diesel engines for propulsion and auxiliary applications from 76-5,000 hp (57-3,730 kW.) New construction and repower financing also available through a partnership with Cummins case credit.

Circle 114 on Reader Service Card

**Cunningham Marine Hydraulics
Booth # 728**

Cunningham Marine Hydraulics Co. specializes in hydraulic systems, engineering services and repairs worldwide, variable displacement hydraulic pump manufacture, sales and service, hydraulic equipment distributors, hydraulic steering systems, including rotary piston steering gear.

Circle 115 on Reader Service Card

Daros Piston Rings
Booth #326

**DBC Marine Safety Systems
Booth #533**

DBC, a division of Dunlop-Beaufort Canada, manufactures the only 100 person reversible inflatable platform built in North America. Designed for passenger carrying vessels, the product is also available in a variety of sizes.

Circle 172 on Reader Service Card

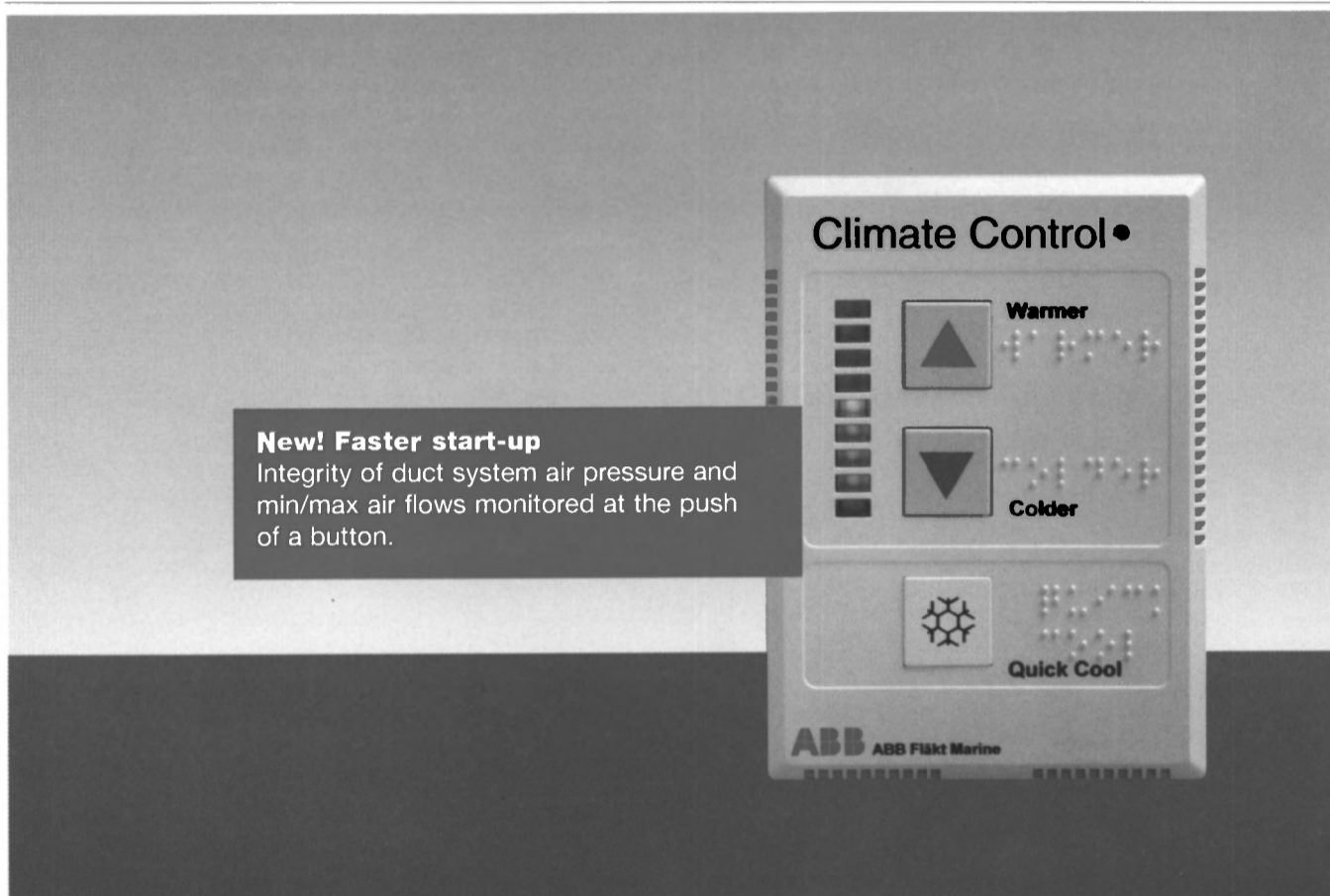
Det Norske Veritas
Booth #426

DNV is an autonomous independent foundation with the objective of safeguarding life, property and the environment, assisting clients all over the world in managing risks associated with business operations in the maritime, offshore and other industries.

Circle 173 on Reader Service Card

Detroit Diesel Corp.
Booth #627

Detyens Shipyards
Booth #643



Theory is one thing. But in real life, many ship air conditioning systems provide passengers and crew with a choice of two extremes, Icy Blast or Blast Furnace.

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**Duramax Marine
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Duramax® Marine manufactures bearings, sealing systems, rubber fendering and keel coolers. Johnson Cutlass® bearings are manufactured for shaft diameters up to one meter and used on pleasure, commercial, and government vessels in over 50 countries.

Circle 117 on Reader Service Card

**Dynalco Controls
Booth #536**

**ERL Marine Products
Booth #628**

**Electronic Marine Systems
Booth #826**

Electronic Marine Systems offers a breakthrough technology in console system design with its lightweight, modular console systems, which replace hand-wired embedded technology.

Circle 176 on Reader Service Card

**Excel/Craftmer Specialty Towing
Booth #530**

**Exceltec International Corp.
Booth #326**

**Exxon Co. International
Booth #331**

**FAST Systems, Smith & Loveless
Booth # 543**

FAST Systems manufactures sewage treatment systems and oil/water separators for marine, offshore and special applications.

Circle 118 on Reader Service Card

**FCS Inc.
Booth # 735**

FCS's Malin is an award winning series of precision diesel engine analyzers — the industry standard Malin 3000 and low cost Malin 2000 with advanced Windows-based MK-5 software.

Circle 119 on Reader Service Card

**Federal Resources Inc.
Booth # 636**

Federal Resources Inc. represents manufacturers of military and marine products. Its product line includes: Hellan fluid strainers, AeroControlex ball bearing control cables and remote valve actuators, EDDY "Tornado" pumps, GemSensors, Schroeder filtration and fluid diagnostic equipment, Kahlenberg electronic horns, Waterless urinals and MSA gas monitoring instrumentation.

Circle 120 on Reader Service Card

**Fire Protection Service Inc.
Booth # 644**

Fire Protection Service Inc. is a worldwide service company of fire suppression/detection systems, extinguishers, breathing air, liferafts, and safety items. The company specializes in fast turn around inspections and are insured with regulatory approvals, sales, service, troubleshooting, engineering, regulatory submittals, and consulting alternative retrofits.

Circle 121 on Reader Service Card

**First Wave / Newport
Shipbuilding
Booth # 116**

A full-service shipyard company with six yards and twenty haul-out facilities in the Houston/Galveston area offering repair and new construction of inland and ocean barges, boats, OSV's, offshore drilling and production rigs, drill ships, dry cargo ships and tankers.

Circle 122 on Reader Service Card

**Fleetway, Inc.
Booth #742**

**Frank Mohn Houston Inc.
Booth # 327**

Frank Mohn Houston is a manufacturer of environmentally safe submerged cargo pumps for oil products, chemical vessels, oil spill recovery equipment, and emergency offloading equipment.

Circle 123 on Reader Service Card

**Fuel Dynamics LLC
Booth # 726**

Fuel Dynamics will be displaying its Fuel Mag Magnetic Diesel Fuel Conditioner, which is Bureau Veritas-certified and its Fuel Mag decontamination units that reportedly increase filter life, extend diesel engine life, eliminate the use of hazardous toxic biocides, and reduce costly maintenance and downtime.

Fuel Mag is distributed exclusively to North and South America.

Circle 124 on Reader Service Card

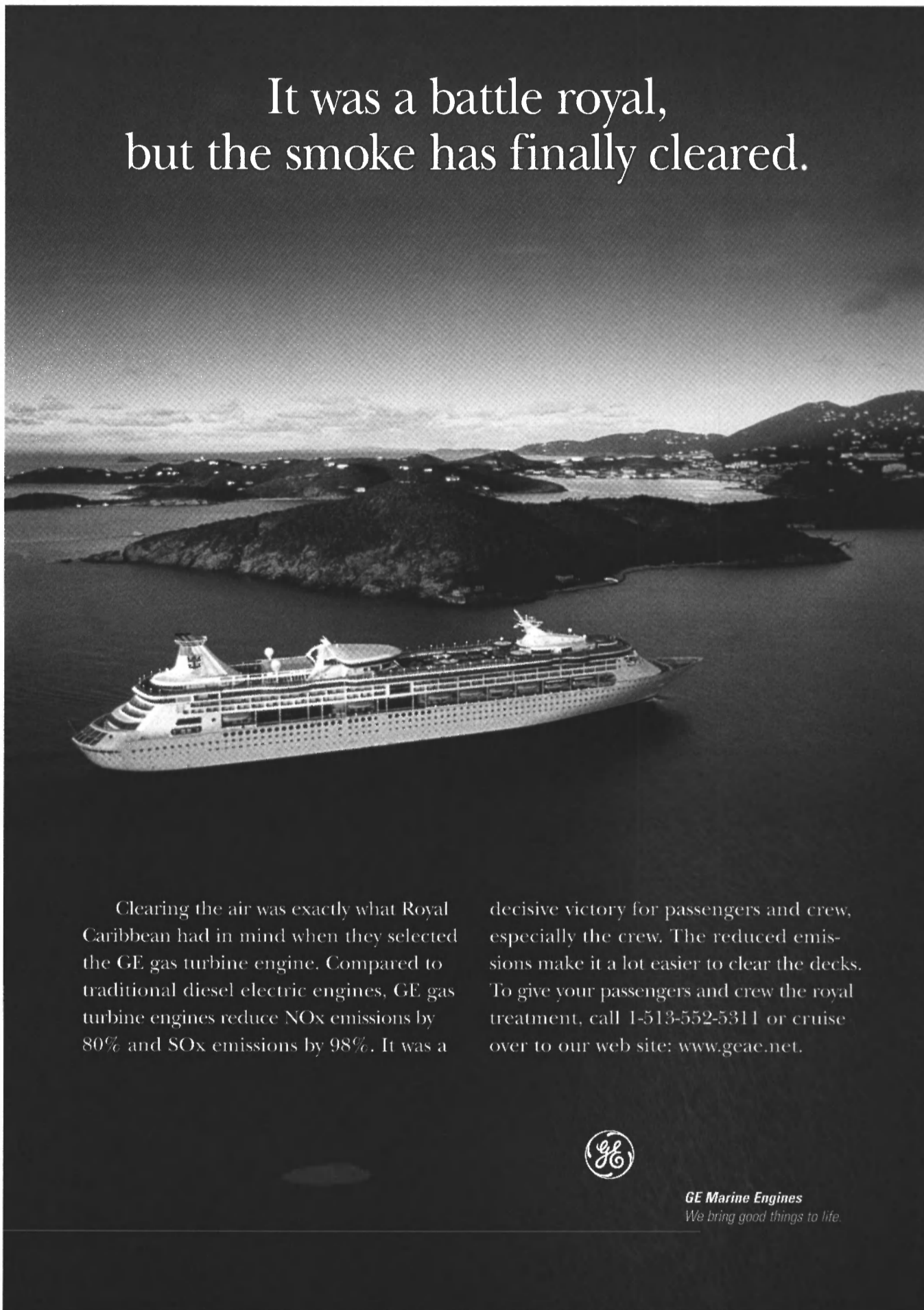
**Furuno U.S.A. Inc.
Booth # 332**

Furuno is a leading manufacturer of state-of-the-art marine electronics. Featured at SNAME will be its simply-installed, compact GMDSS consoles as well as its well-known FAR2805 and FR2105 of ARPA radars.

Circle 125 on Reader Service Card

**Gard Specialists
Booth #100**

It was a battle royal,
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Clearing the air was exactly what Royal Caribbean had in mind when they selected the GE gas turbine engine. Compared to traditional diesel electric engines, GE gas turbine engines reduce NOx emissions by 80% and SOx emissions by 98%. It was a

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SNAME ANNUAL

Gems Sensors Inc.
Booth # 626

Gems Services is a worldwide service and repair representative providing technical support, installation and assistance. Gems' products range from rugged flow and level switches to visual indicators.

Circle 126 on Reader Service Card

General Dynamics Marine
Booth # 421

General Dynamics Marine Systems, consisting of Bath Iron Works, Electric Boat, and National Steel and Shipbuilding (NASSCO), provides marine engineering, design, construction, conversion, and life-cycle support for the navy's nuclear submarine, surface combatant, and auxiliary ship programs and the commercial marine market.

Circle 127 on Reader Service Card

Gerard Technology Associates
Booth # 322

GTA is a manufacturer's representative, supplying the following quality marine equipment and service: TeamTec-Golar Marine Incinerators, Team Tec Golar A-60 Safety Windows.

Circle 128 on Reader Service Card

Gibbs & Cox, Inc.
Booth #534

Grinnell Fire Protection Systems
Booth # 845

Grinnell Fire Protection Systems provides fire protection, fire alarm and detection for marine applications. The company's Aquamist Marine Fire Protection System, is a low pressure, automatic, wet pipe system that responds to fire quicker and uses less water resulting in less fire and water damage.

Circle 129 on Reader Service Card

Goltens-New York, Corp.
Booth #513

Hanna Cylinders
Booth #615

Hiller Systems, Inc.
Booth #432

Hopeman Brothers
Booth #441

Hopeman Brothers Interiors provides engineering, program management, installation and turnkey accommodations all performed on time, within budget and customer focus.

Circle 177 on Reader Service Card

Howell Laboratories
Booth #743

Hubbell Electric Water Heater
Booth # 631

Hubbell manufactures water heaters specifically for shipboard installation, including electric, steam, and combination, electric/steam powered. The heaters are ABS, USCG, Mil-H-965 shock and vibration approved.

Circle 130 on Reader Service Card

Industrial Coatings Alliance
Booth # 309

The group's unique coatings products include SUPERTHERM; a 7 Mil coating that provides an R-19 insulation value; RUST GRIP, which provides corrosion protection over existing surfaces without sandblasting to white metal, and SP-2001 F-FIRE COAT, which offers fire/heat protection to 3,000 degrees F.

Circle 131 on Reader Service Card

Inflatable Survival Systems
Booth #745

Information Handling Services
Booth #740

Instruments Computers & Controls
Booth #733

Intergraph Corporation
Booth # 415

Intergraph Corporation, a computer industry pioneer for three decades, offers specialized software systems and services for ship design, construction, and management. Using its engineering functions and information management capabilities, the company has helped its customers streamline shipbuilding processes, deliver better ships and lower manpower and material costs.

Circle 132 on Reader Service Card

Intl. Marine Software Assoc.
Booth # 221

International Marine Software Associates (IMSA) is an association of marine computer software developers providing design and manufacturing solutions

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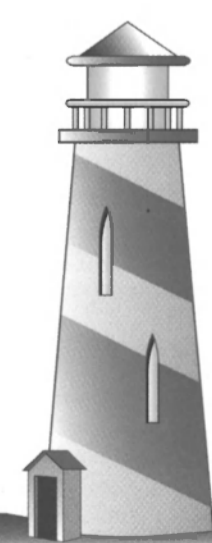
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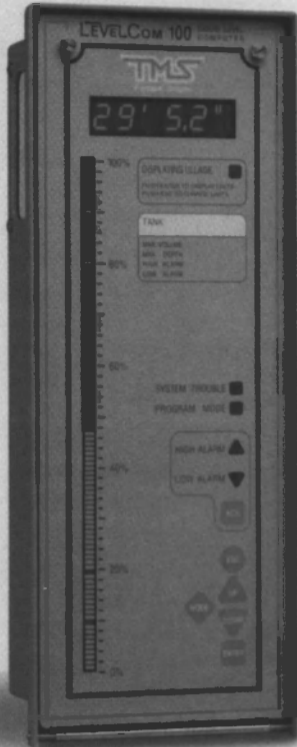
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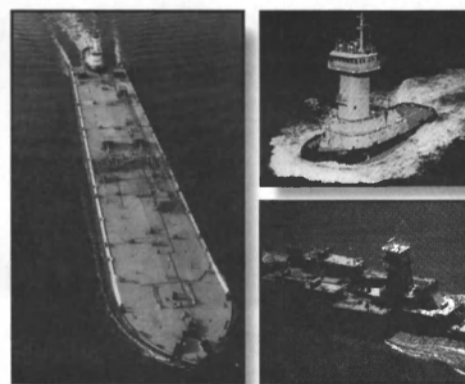
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to the ship design and ship building industries. From conceptual design to construction: the association provides software tools for hull design, hydrostatics, stability, longitudinal strength, resistance, powering, propulsion analysis, structural design and optimization, lofting, plate development, and N/C burning.

Member companies participating at SNAME include: Hydrocomp, Proteus Engineering, Albacore Research Ltd., Creative Systems, Inc. and SPAR Associates.

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**ITW Philadelphia Resins
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ITW Philadelphia Resins' structural polymers and application expertise have been employed in all major shipbuilding facilities for more than 40 years. Over 42,000 main propulsion systems (including 70,000 and 80,000 Hp engines) and auxiliaries installed with Chockfast Orange®. Other high-performance products include: heavy-duty marine coatings, hull and rudder fairing compounds, non-skid deck and ramp coatings, machine repair putties and erosion-resistant resurfacers.

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**Jered Industries Inc.
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**John Crane Lips Americas
Booth #541**

Jotun

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**Kamewa Group
Booth #440**

**Klattenberg Marine Agency
Booth # 737**

Klattenberg Marine Agency represent shipyards worldwide; supply spare parts and repair engine room equipment including diesel engines, heat exchangers, purifiers, turbochargers and gearsets.

Circle 137 on Reader Service Card

**Kockums Computer Systems
Booth #437**

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Circle 174 on Reader Service Card

**Kvaerner Masa Marine Inc.
Booth # 526**

Kvaerner Masa Marine offers innovative and high quality naval architecture and marine consulting services including feasibility studies; concept through detail ship design and marine engineering.

Circle 138 on Reader Service Card

**Leitritz Corporation
Booth # 329**

Leitritz manufactures vertical and horizontal screw pumps for various shipboard services including: cargo pumping and stripping, lube, fuel oil, and hydraulic services for CP propellers, steering gears and deck machinery.

Circle 139 on Reader Service Card

**Lloyd's Register
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Lloyd's Register (LR) is the world's premier clas-

sification society with over 280 exclusively staffed offices worldwide representing over 135 national administrations. LR provides classification, statutory and technical advisory services.

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Mercy Ships
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Circle 144 on Reader Service Card

Metal Products Specialists Inc.
Booth # 635

Metal Products Specialists manufacture the Button-Lor staging system, which dramatically reduces staging man-hours of large steel structures. Some of the company's industrial applications include the construction and repair of ships, tanks, and offshore drilling structures. Other products include: specialized tools for rigging and shipfitting trades.

Circle 145 on Reader Service Card

MGI International
Booth #508

MIL Systems
Booth # 633

MIL Systems provides naval architecture and marine engineering services to commercial and government clients for ships and offshore projects. Services include: ship design, lofting, shipyard work package preparation and maintenance software.

Circle 169 on Reader Service Card

MMC International
Booth # 335

MMC International specializes in portable gauging, sampling, and sounding equipment for petroleum products and chemicals. Vapor control valves, fixed liquid level alarm systems (various application lube oil clarifier/coalescers, C-L couplings and line blinds, tank access covers (butterworthy plates.)

Circle 168 on Reader Service Card

M. Rosenblatt & Son Inc.
Booth # 229

M. Rosenblatt & Son is one of the nation's leading privately owned naval architecture and marine engineering firms with ten offices and over 600 engineering, design, and logistics personnel nationwide. The company also specializes in naval ship design and life cycle support.

Circle 146 on Reader Service Card

Moss Marine USA
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Oceanic Consulting Corporation
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Oceanic Consulting Corporation is a marine performance evaluation company specializing in physical and numerical modeling of ships, offshore structures, and other marine systems.

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Ocean Power & Equipment
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80,000 TLC

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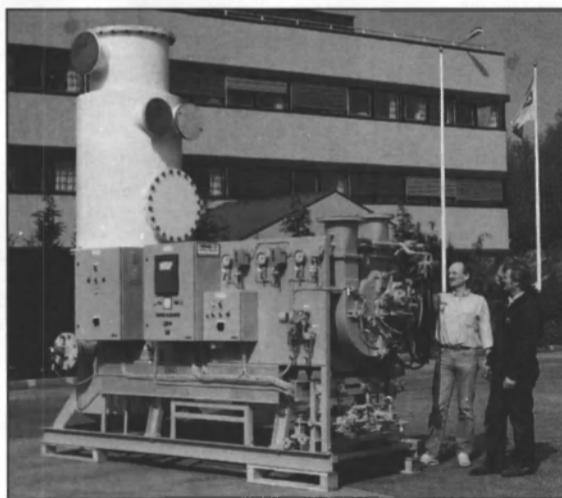
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turbocharger's complete history to aid in speedy diagnosis. They can then utilize our locally maintained stocks of genuine ABB parts or go on-line to rapidly locate necessary parts in our worldwide inventory.

You asked for the best in service, and we delivered. But you would expect nothing less. After all, we design and build the industry's most efficient turbochargers. It's only natural that we also offer the finest in repair and maintenance service, worldwide.

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Circle 202 on Reader Service Card

NAVIGATIONAL PILE

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Cut Life-Cycle Costs

Plastic Pilings, Inc. (PPI) is a world pioneer in the design, development, and manufacture of navigational marker pilings, fender pilings and load bearing pilings, camels and marine lumber derived from "waste stream" recycled plastics. PPI's patented process includes encapsulating a structural steel core or a Vinylester composite fiberglass structural tubing in plastic. Pilings are not affected by sea water, will not corrode, not subject to dry rot, and are immune to marine borers.

Plastic Pilings, Inc.
Corporate Office
Rialto, CA USA
Phone: (909) 874-4080
Fax: (909) 874-4860
www.plasticpilings.com

Circle 301 on Reader Service Card

**Pall Corporation
Booth # 844**

Pall's Rochem Disc Tube Module System designed to minimize concentration polarization and physical flow impediments; is a cost-efficient way to treat landfill leachate. The system removes organic and inorganic pollutants and heavy metals.

Circle 148 on Reader Service Card

**Peck & Hale
Booth #311**

**Polarmarine Scandinavia AB
Booth # 727**

Polarmarine is a tank cleaning company operating since 1967. The company was one of the developers of the first fixed installed tank cleaning system. Since 1978, POLARMARINE has produced and delivered its POLAR JET cleaning machines

Circle 105 on Reader Service Card

**Proteus Engineering
Booth #221**

**Qualisys
Booth #722**

**Roxcorp
Booth #414**

**RTM STAR Center
Booth # 538**

Star Center's capabilities are effectively utilized to evaluate proposed channel improvements, pier configurations, breakwater design, port access and accident analysis.

Proposed designs can be tested in a controlled environment in order to optimize any plan in terms of navigational safety and cost efficiency.

Circle 149 on Reader Service Card

**Rubatex
Booth #407**

**Scardana Americas Brokerage
Booth # 320**

Scardana, operating since 1974, provides procurement contracting and spare parts brokerage services since 1974, specializing in equipment and parts for foreign built ocean going ships. The company maintains a database of major parts for slow speed diesel engines worldwide, for prompt and effective service.

Circle 150 on Reader Service Card

**Schottel Inc.
Booth # 315**

Schottel Inc. is a manufacturer of thrusters and steerable propulsion systems including innovators of the new Schottel/Siemens Propulsor, a permanent-magnet electric motor-podded drive and developers of the Schottel Twin Propeller; 'Z'-Drives incorporating twin propeller technology.

Circle 151 on Reader Service Card

**Scientific Marine Services/Designers &
Planners
Booth # 121**

Scientific Marine Services is a naval architecture/marine engineering firm offering a wide range of services. Specialists in hull structural monitoring, vibration, sea trials, marine instrumentation and monitoring systems also, providing turn key services for physical model testing.

Designers & Planners is also a naval architecture/marine engineering firm specializing in marine environmental and safety, information systems.

Circle 152 on Reader Service Card

**Seaworthy Systems Inc.
Booth # 638**

Seaworthy Systems Inc. is a marine engineering/naval architecture consulting firm offering a full

spectrum of engineering design, operational support, and program management services. Recent projects and projects include the Convertible Carrier, Hudson River side wheeler passenger vessel and a series of 50 knot passenger ferries for PRS Inc.

Circle 153 on Reader Service Card

**SIMSMART Inc.
Booth # 629**

SIMSMART Inc. created a unique and highly advanced process and control design tool through dynamic virtual operation and modeling.

The tool enables users to design, visualize, simulate and optimize processes for fluids, gas heating/ventilation air-conditioning, associated AC/DC electrical systems and related process controls.

Circle 154 on Reader Service Card

**Thordon Bearings Inc.
Booth # 219**

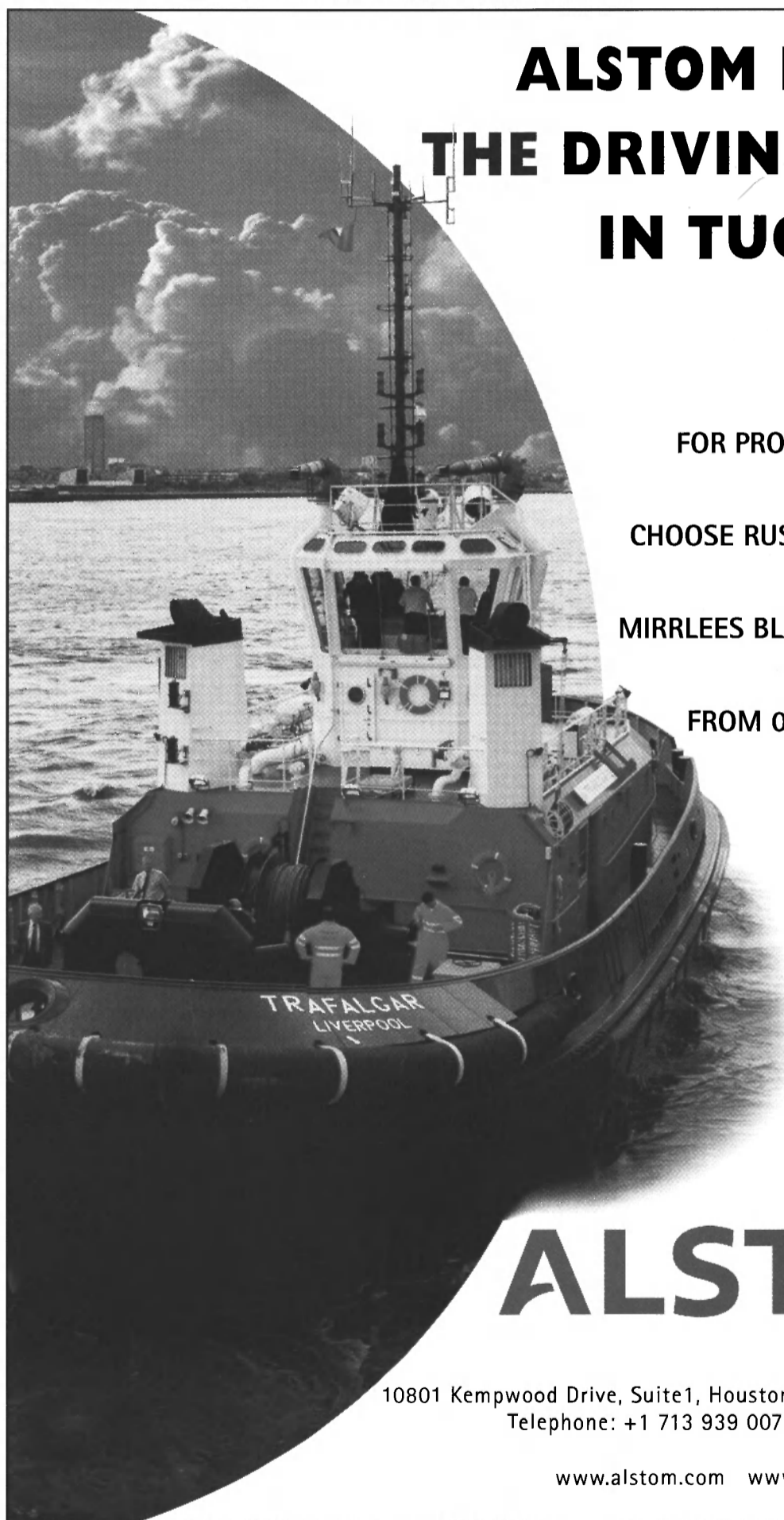
A pioneer in the development of pollution-free bearing designs, Thordon Bearings will present both sealed (Thor-Lube) and open (COMPAC), water

lubrication propeller shaft bearing system options with the SeaLion mechanical seal. Thordon will also present the 10-year wear life guaranteed SXL rudder bearing solutions for repair, conversion or new-builds.

Circle 156 on Reader Service Card

**Thrustmaster of Texas Inc.
Booth # 528**

Thrustmaster of Texas is a manufacturer of marine propulsion equipment, including deck mounted thrusters, thru hull thrusters; either 'Z'-Drive or 'L'-



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Tranter Inc.
Booth # 523

Tranter will display its Navy Standard plate heat exchangers, along with special marine heating and cooling applications of its SUPERCHANGER®

plate and frame, PLATECOIL® prime surface, MAXCHANGER® all-welded plate and MINEX® compact gasketed plate, and SWEP CBE Compact brazed heat exchangers.

Circle 158 on Reader Service Card

Tribco Inc.
Booth # 2828

Tribco Inc. will exhibit brake and clutch plates for transmissions, cranes, winches, and other maritime

applications that last three to five times longer than other plates-yet never scratch or wear down the opposing metal surface.

Circle 159 on Reader Service Card

UE Systems
Booth # 222

UE Systems has a production line of ultrasonic instruments for leak detection, electrical and

mechanical inspection. Its typical applications include leak detection in pressure or vacuum systems, valves and steam traps; electrical inspection for corona, arcing, and tracking, and mechanical inspection of bearings, pumps and compressors.

Circle 160 on Reader Service Card

United States Merchant Marine
Academy-Continuing Education
Booth # 807A

The continuing education program at USMMA includes over 100 short courses in the fields of nautical science, marine engineering, management, intermodal transportation, maritime security, admiralty, environmental, and transportation law. In addition, specialized training programs are regularly developed to meet the specific needs of companies and organizations. The program allows students to take full advantage of the Academy's campus, laboratories and simulators.

Circle 161 on Reader Service Card

Viking Life-Saving Equipment
Booth # 328

Viking manufactures inflatable life rafts, throw overboard type from four-100 persons; David Launchable type life rafts from 12-25 persons and IBA's 6-50 persons.

Circle 162 on Reader Service Card

Wärtsilä NSD Corporation
Booth # 341

Wartsila NSD Corporation, represented in the U.S. by Wartsila NSD North America, supplies the widest range of engines and power systems in the marine industry. The company has a complete diesel and gas engine portfolio that covers high-medium and low-speed engines and propulsion systems under the Wartsila and Sulzer brands from 500 to 66,000 kW (700-90,000-bhp).

Circle 163 on Reader Service Card

Water Weights Inc.
Booth # 632

Water Weights' highly certified system allows safe, practical, and economical use of water as weights for load testing lifting equipment; principally cranes, davits, lifeboats and elevators. The company also offers a line of intelligent digital load measuring equipment and systems for use in a variety of applications, as well as safety awareness training packages.

Circle 165 on Reader Service Card

W.B. Arnold Co. Inc.
Booth # 319

W.B. Arnold is dedicated to quality marine equipment and spares including: boilers, bollards and quick release hooks, compressors, desalination units, diesel engine spares, fiberglass pipes, life boats, pumps, vapor recovery and tank gauging systems.

Circle 166 on Reader Service Card

Willard Marine Inc.
Booth # 641

Willard Marine Inc. builds small craft in fiberglass and aluminum for tour boats, water taxis, small fast ferries, government patrol and ship's boats, SOLAS and other R.I.B.'s as well as trawler yachts.

Circle 167 on Reader Service Card

W&O Supply

Serving the marine and oilfield industry since 1975, W&O Supply provides valves, metals, metrics, fittings and flanges, and piping and tubing throughout its 20 stocking branches.

Circle 178 on Reader Service Card

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No matter where in the world you transport petrochemical products, MMC is never far away. In addition to the headquarters facility in the U.S.A., we have major manufacturing and marketing operations in the United Kingdom and Japan. Plus reliable agents almost everywhere else you need them.

This is the sales and service network that stands behind all MMC products – including C-L couplings, high-level alarm systems, and the closed gauging and sampling system shown below. When installed in an MMC vapor-control valve, it forms a gas-tight system that keeps fumes from escaping and meets all environmental and safety regulations.

As with all MMC products, it is built to high standards of accuracy and durability. And remember if you ever need help, we're never far away.

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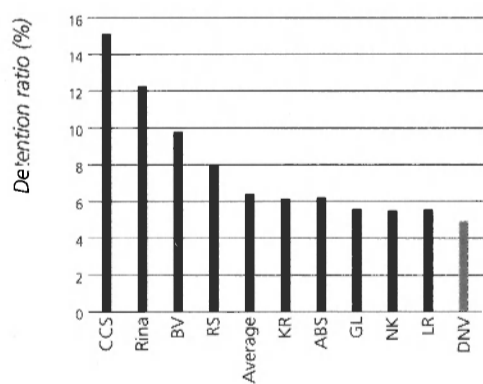
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Don't risk detention

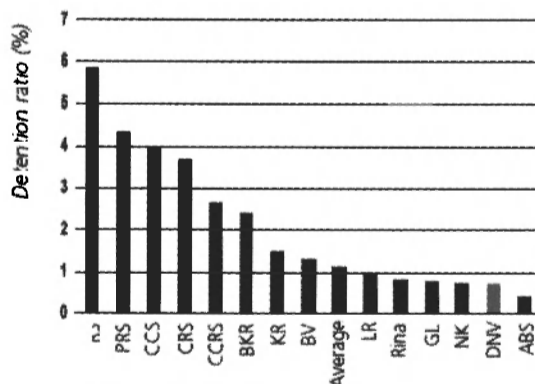
DNV class is your best bet if your aim is to keep your ship in continuous operation and your business running at optimum speed. The value of DNV class is demonstrated if a vessel is boarded for Port State Control. Currently available statistics from PSC detentions on a 3 year rolling period show that DNV classified ships have the lowest detention rate on a worldwide basis, helping shipowners all over the world to minimise their port state detention costs. Therefore, it is a sound business proposition to team up with a classification society renowned for the quality of its class.

DNV is an autonomous independent foundation with the objective of safeguarding life, property and the environment, assisting clients all over the world managing the risks associated with business operations within maritime, offshore, process and other industries.



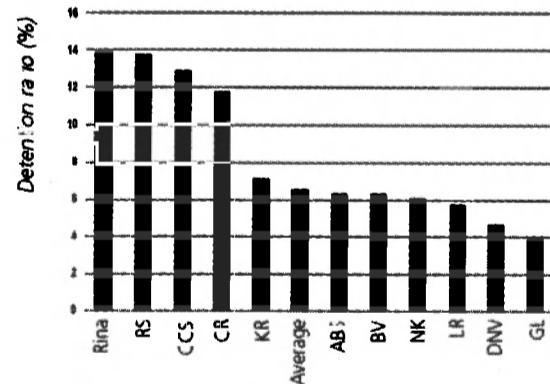
IACS Classification Society

Detention ratio in Tokyo MOU by class, rolling period 1995-97. Detention ratio = detention percentage of inspections. Source: Tokyo MOU Annual Reports 1995-97.



IACS Classification Society

Detention ratio in USA by class, rolling period 1996-98. Detention ratio = class filtered detention percentage of arrivals. Source: USCG Internet Homepage



IACS Classification Society

Detention ratio in Australia by class, rolling period 1996-98. Detention ratio = detention percentage of inspections. Source: AMSA Annual Reports 1996-98

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News Release

TURBOUSA, INC.

TURBOCHARGER SERVICE / REPAIR AND PARTS SUPPLY
Member of the Turboned International Network
NOW IN PORT EVERGLADES, FLORIDA

TurboUsa, Inc. has opened its turbocharger repair facilities in Port Everglades, Florida on June 1st, 1999. Willem Franken, formally Business Manager of TurboNed BV, Holland with which the US Company will be closely affiliated, will manage the company. Mr. Franken is the third generation of his family in the turbocharger repair business.

The full service shop will contain the latest model of balancing machine, and up-to-date equipment for the cleaning and repair of all models of turbochargers for marine and industrial use. The company will have access to \$7 million spares inventory at TurboNed BV, part of which will be stocked at TurboUsa, including the exclusive new type of high precision VTR 4-series bearings.

TurboNed's class approved repair procedures for blade tip welding and hot metal spraying for shaft repairs will also be available to TurboUsa.

Inquiries can be made to the company at:

Toll Free: 1-877-2687
Tel: 1-954-767-8631
Fax: 1-954-767-8632

Or To:
Klattenberg Marine Agency
Marketing Representative at:
Tel: 1-973-731-4018
Fax: 1-973-325-3681

Circle 373 on Reader Service Card

Chelton Avionics Acquires ACR

Chelton Avionics, Inc. has bought designer and manufacturer of search and rescue equipment, ACR Electronics, located in Fort Lauderdale, Fla.

Located in Prescott, Ariz., Chelton Avionics is a subsidiary of U.K.-based Chelton, Ltd., which joins five companies in becoming part of the Chelton Avionics Group.

ACR's product range or radio beacons consists of the EPIRB (Emergency Position Indicating Radio Beacon) and the ELT (Emergency Locator Transmitter), which, when activated, transmit an emergency signal via satellite link to the search and rescue authorities.

Circle 23 on Reader Service Card

Ro-Clean Offers New Skimmer



Ro-Clean Desmi has introduced a new disc skimmer for the recovery of floating oils – Ro-Disc, a high efficiency skimmer for inland waters and industrial process applications such as separators and tanks. Ro-Disc has a single bank of rotating oleophilic (oil attracting) discs driven by a hydraulic motor. Oil is recovered from the water's surface as it sticks to the disc surface.

Circle 25 on Reader Service Card

Hornblower Marine Services To Offer New Services

Hornblower Marine Services will be responsible for the complete start-up and operating infrastructure, in addition to the daily operations of Bahamas Fast Ferry Service Limited. This new ferry service will provide high-speed transportation between Nassau, Harbor Island, Eleuthera and other destinations.

The 114 ft. (35 m) Solent Class, high-speed catamaran, designed by FBM Marine and built by Pequot River Shipworks, will be used to transport visitors, as well as Bahamian residents (177 total) at speeds of 35-40 knots.

Hornblower has entered into yet another venture, this time with Virginia-based MetroMarine Holdings for a passenger ferry service between downtown Hampton and downtown Norfolk. Known as HarborLink, the service will be fully operated and privately financed by Hornblower, with additional funding provided by CMAQ federal funds.

In order to commence the service in time for the high season, MetroMarine attained the M/V Flyer, a 90 ft. (27.4 m) Wesport monohull through a bareboat charter agreement for operation on the ferry route.

Circle 47 on Reader Service Card

Autoship Systems Provides Timely Delivery

Autoship Systems Corporation has completed the delivery of the preliminary version of WL Load Planning System (WL LPS) to Wallenius Wilhelmsen Line of Stockholm, Sweden.

Autoships' contract with the Line focuses on the development of an LPS for 28 RoRo vessels and includes an easy-to-use "drag-and-drop method" of

stowing containers and RoRo cargo into the ships, as well as a type approved hydrostatic engine.

Circle 48 on Reader Service Card

BIMCO Offers One-Day Course

BIMCO will hold its one-day Towards Better Decisions course on September 30 in New York, focusing on tanker voyage charter parties. Entitled Seminar and Workshops on Laytime and Demur-

rage Under Tanker Voyage Charter Parties, the course will feature industry experts who are ready to guide participants in their search for upgraded knowledge of these parties. Topics include specific details of common problems in tanker chartering and operations – as well as their solutions.

For more information contact BIMCO: 161 Bagsvaerdvej, 2880 Bagsvaerd, Denmark, tel: 45 4444 4500; fax: 45 4444 4450, e-mail mailbox@bimco.dk, web: www.bimco.dk



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Software Solutions

PC Operator Workstation Uniquely Suited For Maritime Use

For the maritime industry, the advent of the personal computer and related control systems have been a boon. Bridge, propulsion and a host of other

onboard controls, formerly a hodge-podge of nonstandard analog and digital systems, now are beginning to benefit from the compactness and standardiza-

tion of the PC and related control architectures.

"Open" systems (PC industry terminology for a variety of compatibility



"Bridge Control Interface" - Built to operate reliably in "rollover" conditions, Bridge Control Interfaces are fully sealed and feature "hibrite" displays for daylight viewing.



All products, including the new Super-Hub Select for Mini-M users, come with a host of features designed to optimise the satellite connection, ensuring that every connection is fast, reliable and error free.

For nearly 15 years IMC (Information Management Consultants Ltd.) has been providing wireless data communication, information content and processing services to the mobile community.



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E-mail: IMCSales@super-hub.com Website: <http://www.super-hub.com>

Circle 260 on Reader Service Card



standards) and the familiar Windows user interface make PC-based systems relatively easy to integrate, install, maintain and use. From bridge and deck stations to the engine room and the hold, the PC is here to stay.

But between the familiar "pizza box" or "tower" design of commercial PCs and the rugged models that can stand up to the rigors of onboard operation lies a wide gulf. Maritime applications are among the most challenging in the world, far exceeding the rigors of industrial environments. Extremes of temperature, humidity, corrosive salt water, shock and vibration can quickly ruin what otherwise is a highly ruggedized operator interface of sophisticated design.

In maritime applications, the same conditions which make onboard control systems susceptible to failure often come accompanied by difficult opera-



In successful Naval certification trials, systems similar to civilian models were subjected to extremes of shock and vibration.

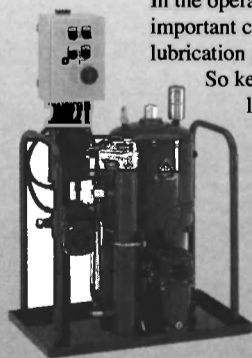
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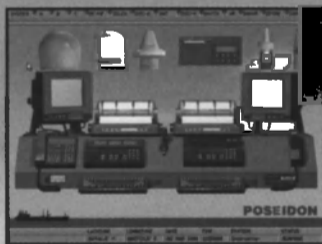
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The Engine Room Simulator complies with IMO's STCW'95 and the ISM code. Available as CBT or network version.

The Poseidon Radar Simulator (PRS) meets all IMO requirements for simulators used for approved navigation / radar / ARPA courses in accordance with the STCW '95 Code. The PRS is modular and offers up to 15 student ships independently in real time. Full visual option.



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Circle 302 on Reader Service Card

tor/user conditions. Specialized key-boards and data entry aids, self-adjusting displays and other human factor-related design considerations are critical when operators must contend with extremes of temperature, vibration and ocean conditions while carrying out complex operating tasks.

On the bridge, where accurate assessment of data and split-second decision making are imperative, the need for display "readability" and system reliability are most apparent. In the tight, "data intensive" environment at the nerve center of any ship, space comes at a premium. In such circumstances, size does count, and the less of it, the better. When "heads up" space is all that's available, tight integration of display (self adjusting hi-brite flat panels work best for a variety of reasons) and computer make real sense.

Further complicating design requirements, radio frequency interference (RFI) generated by communications systems ranging from radar to cell phones can impact or even disable sensitive bridge computers. Design know-how vital to excluding RFI penetration (and its corollary, not creating it) is important, yet is often minimized or overlooked altogether as a specification.

Below decks, the endless pounding created by propulsion systems and waves, when combined with moisture, fumes and airborne contaminants, create more reliability issues for operator interface designers. Electromagnetic interference (EMI) emitted by genera-

tors, compressors and pumps, introduces even more reliability problems.

On-deck operator workstations present their own special considerations; PC-based operator interface design solutions are often overlooked altogether because of the enormously punishing environment to which they are subjected. But cargo handling and monitoring, heavy equipment control and other applications can benefit from the graph-

ical display and operator I/O options offered by PC-based systems.

For those who design or use onboard control systems, ruggedness, reliability and ease of use are critical considerations. Azonix Corporation, based in Billerica, Massachusetts, successfully deals with such complexities, designing and building PC-based navigation, bridge control and below decks operator interfaces for a variety of military and civil-

ian clients.


Azonix's market position is supported by two key factors: 1) the company's dedication to designing and manufacturing operator workstations and displays for extreme industrial environments and; 2) modular product design and adaptive engineering services. For clients requiring uniquely adapted systems in quantities of 10s or 100s, the combination of modular design (reli-

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from Proteus Engineering




FlagShip is a complete ship design system, including hull-form design (*FastShip*), structural design and optimization (*MAESTRO*), stability, powering, maneuvering, seakeeping, shipyard cost estimating and interfaces to CAD and ship production programs. *FlagShip* is based on time-tested, best-in-class applications, which are in use by more than 1,000 designers in over 30 countries around the world.

NavCad
from HydroComp, Inc.



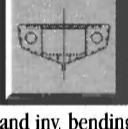
NavCad offers an integrated platform to predict resistance and power, and to determine optimum propeller parameters. With *NavCad* each aspect of a ship's performance can be evaluated for virtually every type of displacement hull, semi-displacement and planing craft, river barge train, catamaran and auxiliary-powered sailboat.

General HydroStatics (GHS)
from Creative Systems, Inc.



Widely recognized as the most advanced and productive trim/stability/strength software. Specialized versions are available for ship operators, for salvage engineers and for small craft designers. Includes efficient modeling for all types of complex vessels, and the ability to analyze them both afloat and aground.

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from Albacore Research Ltd.



Integrated ship production for Win95/NT. **ShipCAM:** Fairing and lofting including frames with cutouts, plate expansion, shell expansion and inv. bending. **CAD-Link:** AutoCAD13 based 3D structural modeling as easy as 2D drafting plus weight & CG. **NC-Pyros:** NC-code generation from CAD drawings.

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We welcome our newest member, SPAR Associates

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To gain a sense of the utility of these unique control devices, four application examples follow:

Bridge Propulsion System Display

- Operates on open decks and bridges
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- Totally sealed against spray, rain, deck "washover"
- Continuing operation, including "rollover" submerged conditions
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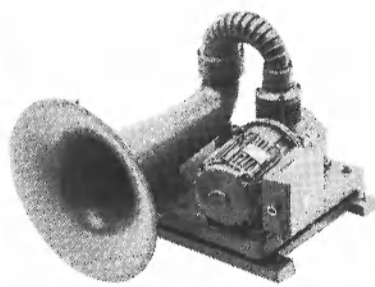
- Operates on offshore oil platforms (any climate/season)
- Certified for use in hazardous areas
- Isolated against liquids, shock/vibration, EMI/RFI, etc.
- Self-adjusting display brightness for 24-hour operation
- Networkable, Web ready, easy upgrade

Aircraft Carrier Flight Deck Control Ops

- Large display/small footprint (Flat-panel LCD) for "heads up" bulkhead mounting in limited bridge space
- Low electronic emissions (EMI/RFI - Mil Spec 461D) - Prevents interference with communications equipment/ detection by enemy
- Barge tested (depth charge detonation) for shock resistance

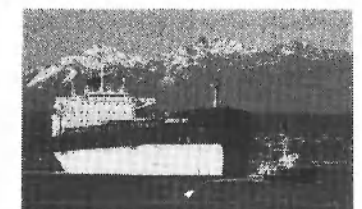
Below Decks Communication System Display

- Resistance to extreme shock and vibration from heavy equipment and propulsion systems
- Imperviousness to high concentrations of EMI
- Sealed system for total resistance to system degradation from washdowns, fumes and airborne contaminants



Model S-120 Piston Horn

Chosen for use on aircraft carriers as well as commercial vessels over 200 meters in length, the S-120 utilizes an oscillating piston driven by 7-1/2 horsepower 3 phase 220/440 volt electric motor producing 143 dB and a fundamental frequency of 94 Hz in 1/3 octave band at one meter.



Kahlenberg Signals were developed to withstand the punishing use of commercial and military service. Their durability has been demonstrated over decades of service on ocean-going vessels ranging from naval warships to commercial vessels. Military specifications have required extensive testing for many of these whistles and the accessories supplied with them, which have proven the exceptional qualities of Kahlenberg design and manufacturing.



Model S-203C S-203 CHT

For vessels over 75 meters in length this design allows both whistles to exceed 143 dB (1/3 octave band). The S-2036 and S-203 CHT are virtually maintenance free. Durability is ensured by the use of bronze and marine aluminum construction materials through out. For the most extreme cold weather operation, Model S-203 CHT (shown) includes a thermostatically controlled heated enclosure for both the combination manual/electric valve and the horn sounding body.

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able, upgradeable, long product life) and adaptive engineering (knowledgeable, innovative, application specific) represents real value.

In 1991, after a decade of building high-precision measurement and control systems, Azonix began to develop PC-based computers for extreme environment computing, first making operator workstations for the offshore oil explo-

ration and development marketplace. Happily, oil exploration and maritime application requirements are similar in almost all respects.

ProPanel, Azonix's flagship workstation product, was built from the first as an integrated unit combining all the components of a PC in a brazed metal, fully sealed enclosure. At the same time, sealing creates an apparent contradic-

tion to reliable operation: heat build up is the Number 1 cause of electrical system failure.

Azonix deals with the heat factor by marshaling a variety of innovative design conventions to the task. Flat-panel, LCD computer displays, for instance, allow for large format, high resolution and exceptional brightness (critical for daylight operation), with

very low power consumption. Integral radiating fins built into the exterior of ProPanel cases dissipate otherwise destructive heat. Total power requirements one-third or less wattage of the current required by traditional PC s.

Noting the variety of hostile influences and number of engineered features that Azonix has built into its maritime operator workstations, it is reasonable to conclude system standards must exceed even the most challenging of those associated with land-based industrial applications.

Recognizing this, Azonix has chosen to place its offshore oil exploration, military and maritime experience at the disposal of naval architects, engineers and fleet owners. The ProPanel operator workstation/display, "bred to the ocean" is uniquely suited to a wide variety of maritime applications. Perhaps one of them is yours.

by Ed Conroy - Azonix Corporation

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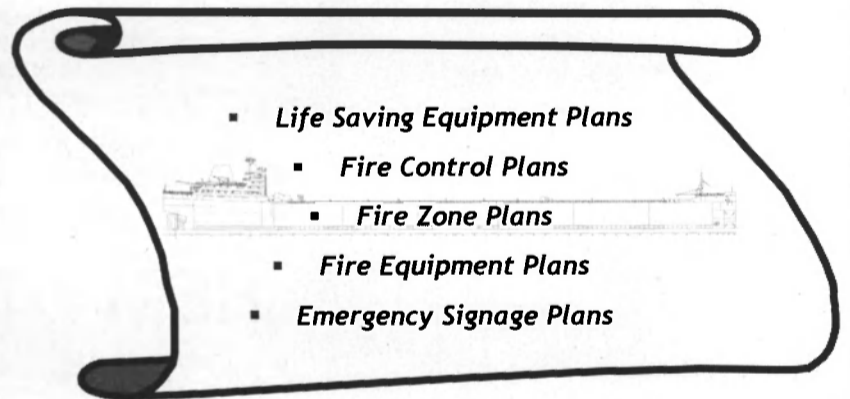
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Entomology for the millennium: Options for the bugs

Every company in the marine and offshore industries has at some stage been involved in a millennium bug compliance study. It is now time to admit that industry is bored with the subject. Since the problem was

first mooted, its possible outcome has remained a mystery, which is the only definite aspect of the millennium bug problem. No one actually knows what will happen.

One thing is certain, though, in the modern marine and offshore industry, information has become the most important business tool. How companies handle and store it for use depends on their internal structure, but it is safe to say that it will be on a computer at some stage. Lose the information, and the company will lose money rapidly while trying to recoup that information and operate effectively at the same time. So information-sensitive companies such as shipbrokers, agents, offshore oil companies, and ship operators, have been forced to take measures to ensure compliance. Until recently, there was only one course of action open to them, weed out the problems now by replacing equipment, at huge cost, that does not meet millennium bug requirements.

There are now two courses of action possible.

Companies can now rent the software. Renting software is a service that has never been offered to the shipping industry before, but small and medium-sized companies have welcomed the idea. In order to meet the millennium compliance guarantees of larger companies, those using older systems have been forced to replace them with new, up-to-date equipment. Added to this are the associated costs of hardware, software, and the technical backup required to ensure that it all works smoothly. Replacement programs also mean massive capital outlay, a financial millstone that can be avoided by renting.

Companies can rent software to customers on short-term rental agreements, offering full technical backup and assistance 24 hours a day as part of the rental agreement. For the marine industry, the advantages of rental are mainly financial. Software can be upgraded as newer versions become available, while the company renting the software doesn't have to find cash for the newer versions. Reputable suppliers will also offer a 24-

hour support service for any problem users may experience, and provide a guarantee that their systems are millennium-compliant. Renting has become

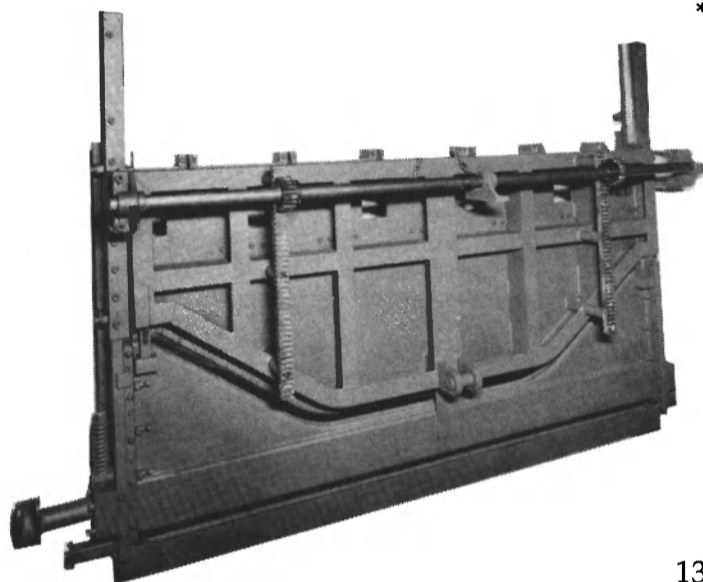
the buzzword of the financial sector, where it has proven to be a cost-effective alternative to replacing entire computing networks avoiding the rapid deprecia-

tion computing systems undergo. Currently, a system, or piece of software, can be bought one day, and declared obsolete the following month. By rent-



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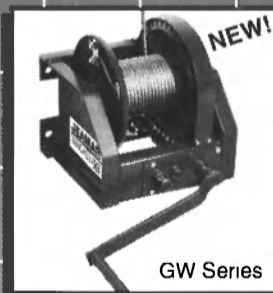
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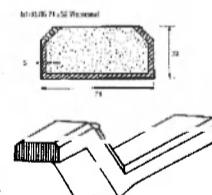
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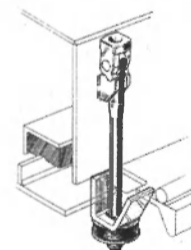
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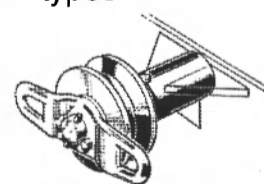


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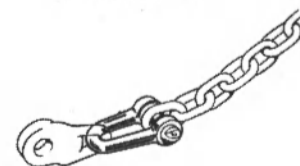
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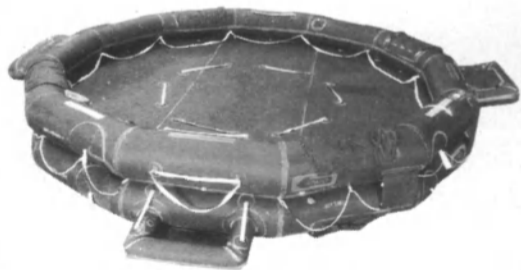
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ing the software, companies do not get caught out. Renting also has the potential to provide further cost savings for the user. Software providers install the application for you, provide the relevant licenses and offer the appropriate warranties. Companies who prefer the initial capital outlay of buying in completely new systems, will be hit with maintenance and repair bills at regular intervals. For those renting, it will usually be included in the rental agreement. Software providers will also offer

short-term agreements. This makes renting particularly attractive for small and medium-sized companies, giving them the option to continue with the service at regular intervals, or choose to leave when they are more financially sound and can afford to install and maintain their own systems.

Of course, software rental is likely to have far-reaching consequences for the shipping and office environments. Shipowning companies could install loading and structural software on their vessels under license, while offshore companies could install rented software for electronic mail and ship-to-shore communications with their platforms out at sea. New software facilities for use with satellite communications could be marketed under fixed-term rental arrangements.

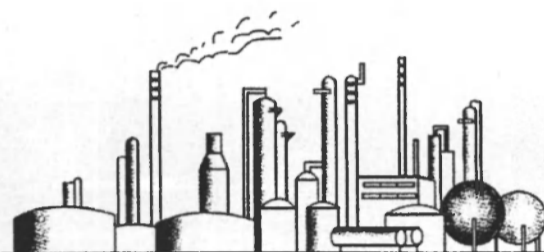
Renting software could help a company ensure it is millennium-compliant, as well as provide a guarantee for a company's customers that it is capable of ensuring continuity of service over the suspect dates, in addition to exhibiting preparedness to make internal investments to continue providing them with a quality service. More companies can be expected to offer it as standard.

by Lawrence Royston, marketing director of U.K.-based Dataworks (U.K.) Ltd.



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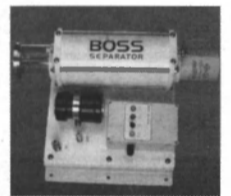
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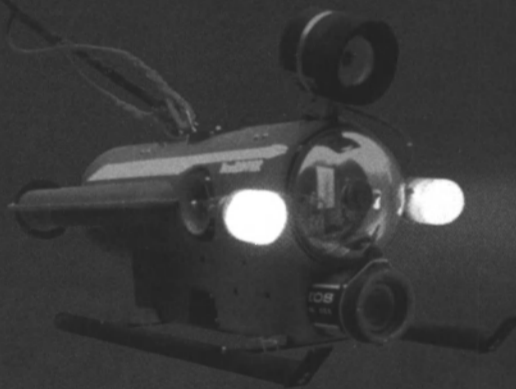
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Hale Hamilton Creates Flexible Valve System

A new, flexible valve system developed by specialists Hale Hamilton is setting the standard for major changes in the way high pressure pneumatic and hydraulic operations are controlled on naval submarines and surface ships. The high performance Series 30 comprises a cartridge valve system based on five different valve body sizes, as well as a stand-alone range of valve inserts to suit the individual application. The completely interchangeable inserts ensure are easier to maintain and repair, and a replacement cartridge can be easily fitted or the inserts can be removed and repaired in-situ, resulting in minimum downtime for boat systems.

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Coatings Put To Test To Keep Ships Cool

Every Sailor who has made a deployment to the Persian Gulf can agree on one thing: it's blistering hot. At least two out of every three Navy ship

deployments are made to high-temperature areas. Sustained operations in searing weather increase stress on both equipment and crew.

To help lessen the load on shipboard cooling systems, NAVSEA's Corrosion Control Division (SEA 03M) is testing a new derivative of the anti-stain paints

already being tested by the Navy—an anti-stain paint that also absorbs fewer of the sun's rays. This special characteristic is known as Low Solar Absorption (LSA).

This coating incorporates LSA and anti-stain properties into the standard topside paint formulation, and is applied in the same manner as the old paint system. The LSA coating is expected to result in interior temperature reductions of at least 10 degrees Fahrenheit. The LSA coating will also help reduce ambient exterior temperatures by reducing solar absorption.

USS Fletcher (DD 992), undergoing a maintenance availability at the Pearl Harbor Naval Shipyard, is the first ship to receive the entire LSA paint package—stem to stern, freeboard to superstructure, and decks. The package consists of two different LSA coatings: an anti-stain coating for freeboard and superstructure and a non-skid coating for decks. USS Fletcher leaves the shipyard in a late summer/early fall timeframe.

To quantify any temperature reduction achieved as a result of the LSA coating, temperature sensors were placed throughout USS Fletcher before painting began. Initial readings from the sensors were recorded and sent to the Naval Research Lab (NRL). Readings will be taken again after LSA coating application is completed, and will be taken regularly thereafter to provide NRL meaningful data with which to perform an analysis.

The LSA coating also has anti-stain properties. Anti-stain coatings use chelating technology to avoid staining. A chelating additive chemically transforms rust into a transparent film—in effect removing the reddish stain.

The LSA coating will lessen the load on shipboard cooling systems while improving working and living conditions aboard ship.

In addition, fewer hours will be required for topside paint preservation, easing the "chipping and painting" burden on the ship's crew. At the same time, the ship's operating systems will be able to function more efficiently, even in high-temperature zones.

Once the temperature reduction data from USS Fletcher is validated, NAVSEA's Corrosion Control Division will begin immediate delivery of the LSA paint package to the rest of the Fleet. LSA technology is part of the Capital Investment for Labor (SEA LABOR) program, which is a series of initiatives to reduce maintenance workload through superior products and technology.

*by Richard Parks, Director,
NAVSEA's Corrosion Control Division*

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Schat-Harding Achieves Strong Order Book

Schat-Harding, a supplier of life saving and evacuation systems for the cruise, shipping, and offshore industries, reported that its orderbook for lifeboat and davit systems is strong. The company says, the cruise sector saw high

profile orders for the third and fourth Royal Caribbean Cruise Line/Celebrity "Millennium Class" vessels. The ships will have four CTL 38 cruise tenders and VIP davits, as will the seventh and eighth vessels for Renaissance cruises, in addition to lifeboats and davits equipped to handle 150 people.

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Sofeworks Forms Rigging Specialists Group

Safeworks LLC, owners of Spider and PowerClimber, has formed Safeworks Rigging Specialists Inc., specializing in providing customers with safe access onto any structure through standard rigging, engineered rigging and repelling

techniques. The group's members have done past rigging for bridge inspections, interior ship inspections (for cargo and ballast tanks,) repelling for dam inspections, power plants, towers, and worldwide rescue retrieval.

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Glasis Recore Classified As Fireproof Material

Glasis AB, Sweden, a supplier to the shipbuilding industry, announced its product Recore S was classified as completely fireproof by Det Norske Veritas. The advantages of its product lie primarily in increased fire prevention which, combined with its light weight, offers an improved general economy for the user. The material is also simple to use, and it can be easily transported and molded in complete pieces into interior details, panels, or ventilation ducts.

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Exceltec Introduces Compact Sewage Treatment System

Exceltec International Corporation presents a new, ultra-compact OMNIPURE 15MX Process Module for Marine Sewage Treatment. The newly designed process module, which utilizes existing shipboard tanks, effectively treats black water effluent of 500 people from a skid that measures only 30 in. (762 mm) wide x 64 in. (1,626 mm) long.

Features of this new process module include an innovative, high efficiency electrolytic cell, which replaces the dual cell arrangement of the existing OMNIPURE process module. All the while, the cell still continues to meet all U.S. Coast Guard and IMO Requirements for the discharge of wastewater.

The addition of a microprocessor-based control panel makes the unit especially simple to use and includes an operator interface terminal with sealed keypad for control.

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device is reportedly the world's most advanced smoke hood that provides up to 20 minutes of breathable air in a toxic environment. The cruise line's primary purpose for providing the smoke hoods is to protect against smoke inhalation in the event of a shipboard fire. Princess is deploying between 350 and 700 units per vessel. Currently, Brookdale Inter-

national Systems Inc., the manufacturer of EVAC-U8, has received an order for 4,000 units; deliveries began in May 1999.

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Fast Ferry Crews Train At MSI
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Newport Simulator Center is offering captains and first mates five-day courses in High-Speed Craft (HSC) Maneuvering and HSC Safety.

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and the safety course also covers aviation-type Cockpit Resource Management (CRM) and incorporates the use of Electronic Chart Display Information System (ECDIS.) Both courses include case studies, simulator exercises, and response models based on fast-ferry experiences.

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People & Company News

Atlantic Marine Gets British Hunter Job

BP Amoco Shipping recently dry-docks its motor tanker, British Hunter at Atlantic Marine for work consisting of intermediate and tailshaft removal for inspection and machining, realignment

of the vessel's propulsion system, seal overhaul, and hull cleaning, blasting and coating.

The 151,401-dwt vessel, which was built in Korea in 1987, measures 900 x 151 x 75 ft. (274 x 46 x 23 m) and is the largest ever to be docked on Atlantic's floating drydock, Alabama.

Global Acquires Marine Construction Business

Global Industries, Ltd. has attained the offshore marine construction business of its Mexican joint venture CCC Fabricaciones y Construcciones, S.A. de C.V. and sold its interest in CCC to the other

principal shareholder of CCC, Grupo Consorcio de Fabricaciones y Construcciones. Under these terms, Global is acquiring four marine vessels and the marine support base at Ciudad de Carmen, Mexico, in addition to the existing offshore marine construction contracts totaling more than \$72 million.

Another transaction in the works is a definitive purchase agreement that was signed for the attainment of ETPM, SA, an international offshore construction company. The combined company will be the largest offshore construction company in market capitalization with combined 1998 revenues of about \$1.3 billion. Joining forces with Global's current international operations, ETPM will work to create a new International Division, with Pierre Laborie, ETPM's current president and CEO as head of the venture.

From a construction standpoint, Global used its deepwater pipelay/heavy-lift barge Hercules to install 17.6 miles of 16-in. pipe for Dauphin Island Gathering Partners (DIGP) in the Gulf of Mexico this summer. Implemented between Main Pass Block 225 in water depths of 240 ft. (73.1 m) and Viosca Knoll Block 823 stationed in 1,130 ft. (344.4 m), Global's vessel Pioneer assisted Hercules during pipelay as well as throughout installation of a pipeline skid at Viosca Knoll 823.

Global Industries has added a new member to the company with the election of Russell J. Robicheaux as vice president and general counsel. Robicheaux, who previously served as assistant general counsel at J. Ray McDermott, holds a B.S. in Electrical Engineering from LSU and a J.D. from Loyola University.

Adams Named President At Dixie Machine

Dixie Machine Welding and Metal Works, a subsidiary of Diversified Group, New Orleans, La., has elected John C. Adams as president. With more than 30 years experience in shipbuilding and repair management, Adams has served in various capacities in the marine repair management field.

New Hull Insurance Syndicate Announces Appointment

The new hull insurance syndicate formed by Thomas Miller & Co., Chartwell Managing Agents and Swiss Reinsurance Company has named Ann Waite as director of claims.

Waite, who joins the syndicate with vast experience in the marine insurance industry, will coordinate teams of claims executives in the daily handling

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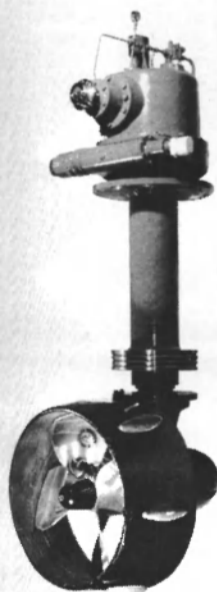


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Maritime Reporter/Engineering News

of claims throughout Europe, Asia and the Americas.

KCI Konecranes To Supply To Ingalls

KCI Konecranes VLC Corporation was granted the contract to provide one of the world's largest cranes to Ingalls Shipbuilding, a division of Litton Ship Systems. Known as Goliath, because of

its unusually large size, the crane is one of fewer than 100 worldwide.

The 660-ton capacity crane will allow Ingalls to assemble sections of ships that are triple the size than previous, thus utilizing dock space more efficiently.

Resembling a giant sawhorse at 329 ft. (100 m) tall, the crane spans 411 ft. (125.2 m) and employs 96 wheels to travel down a delineated runway. Goliath also holds two trollies, dual self-

controlled diesel power plants, and boasts AC variable frequency controls with built-in programmable logic.

Circle 49 on Reader Service Card

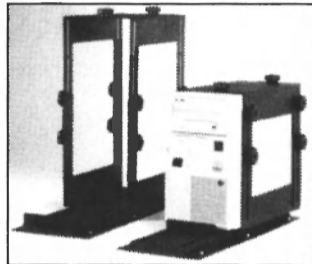
Phillips & Temro Acquires Product Line

Phillips & Temro Industries has consolidated with EM Products for its product line of engine and blower silencers.

Manufacturers of a complete line of Cowl engine exhaust silencers and EM Products silencers, Phillips & Temro's acquisition of EM's line will provide the company with an opportunity to enhance Cowl's existing product line, as well as expanding into products with exhaust connection requirements of 14-in. or more.

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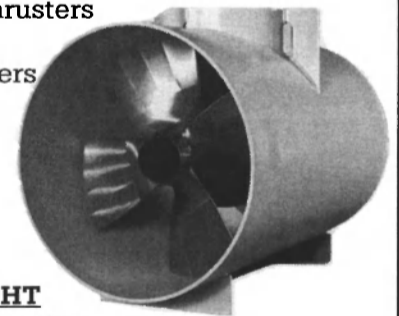
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People & Company News

New Vessels To Be Classed By Lloyd's Register

Lloyd's Register announced that a variety of new vessels on order will be elected to Lloyd's Register class, namely two RoPax vessels for Anek Lines in Crete.

The 669 ft. (204 m) RoRo cargo/passenger ferries, sailing under the Greek flag at 31,000-gt will carry up to 1,500 passengers between Greece and Italy at a service speed of 27.5 knots.

Built at Bruce Mekaniske Verstad in Sweden, the hulls will then be subsequently towed to Fosen Mekaniske

Verksteder, Norway for outfitting. With the first expected to be delivered in October 2000, four main engines will power each ferry, each with a rating of 12,600 kW, geared two controllable pitch propellers on two shafts.

Circle 51 on Reader Service Card

J/Boats Upgrades Its Autoship Systems Program Suite

Autoship Systems played a significant part in J/Boats' recent expansion of its suite of programs for hull design and hydrostatics.

The leading designer of racer/cruise boats since 1977, J/Boats has utilized Autoship as its supplier of hull design and hydrostatic software since 1988. With the introduction of multiple copies of Autoship 7, Autoyacht 7 and Autohydro 5 into its design offices, J/Boats now holds a powerful software design suite.

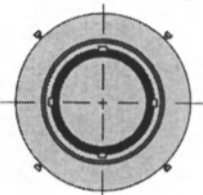
Circle 54 on Reader Service Card

Chevron Names FPSO Vessel

Chevron's Floating Production Storage and Offloading Vessel (FPSO) Kuito was officially named at a ceremony in Singapore recently.

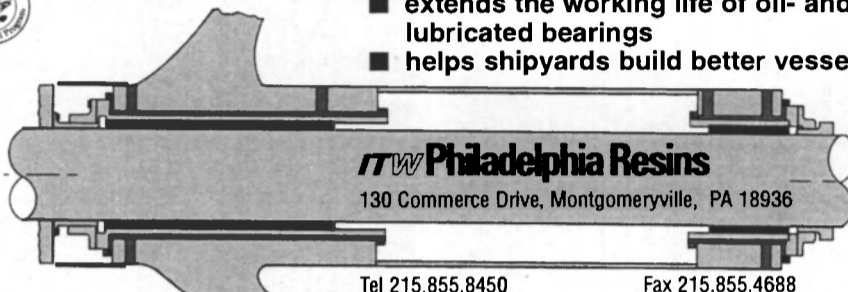
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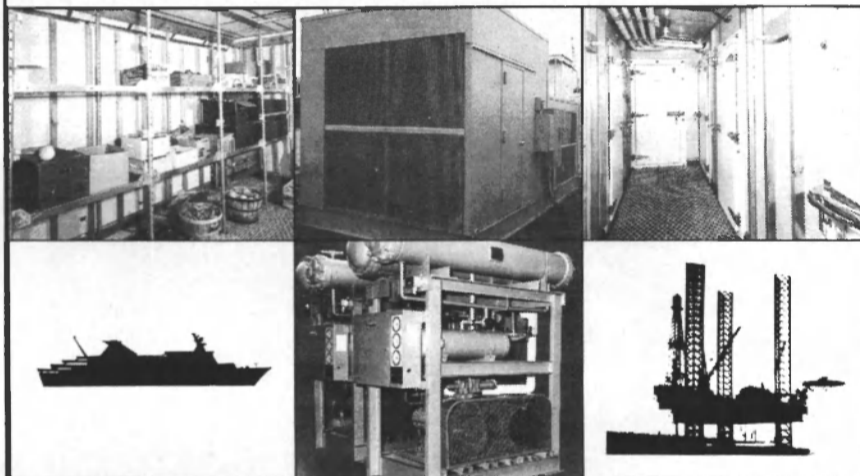
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Maritime Reporter/Engineering News

Named after the field discovered by Chevron in 1997, Kuito is an intricate portion of plans for the first development of Block 14, a 1,560 sq. mile area located next to another Chevron operated concession, Block 0.

After commissioning, Kuito will depart for the western coast of Africa where it will be spread moored in water depths of approximately 1,260 ft. above the Kuito oil field – 50 miles offshore Angola.

In compliance with the highest environmental and safety standards, Kuito has a production capacity of 100,000 barrels of oil per day and can store in excess of 1.4 million barrels.

Adriatic Shipyard Offers Complete Repair Services

Known as the largest shiprepairyard in the Southern Adriatic, Shipyard Bijela houses key facilities and precise workmanship for quick repair of all types of vessels, no matter what type or size – according to regulations of all world Classification Societies.

Complete with sophisticated docking facilities, the yard is able to accommodate and repair of vessels up to 120,000-dwt, not to mention facilities for smaller crafts as well, specifically barges, pontoons and working platforms. The yard also involves itself as a producer of maritime construction steel piles, all types of piping ranging from 400 mm on, and tanks and steel structures.

Employing a considerable amount of technicians and engineers, Adriatic provides a variety of services, such as dry-docking, anticorrosive protection and carpentry.

Circle 52 on Reader Service Card

New President Appointed At Webb Institute

Webb Institute, based in Glen Cove, L.I., named **Ronald K. Kiss** as president on July 1, 1999. Kiss, the first alumnus to hold such a post, will serve as the Institute's 13th president.

Kiss, who graduated in 1963 with a B.S. in Naval Architecture and Marine Engineering, then joined the Maritime Administration where he earned a Master of Science in Naval Architecture from the University of California, Berkeley. Kiss began his career in federal service, eventually moving up through the ranks at the Maritime Administration to the position of director of the office of ship construction.

Before joining Webb as executive vice president in 1998, Kiss was vice president for systems development at SYNTEK in an Arlington, Va.

Crowley Marine Promotes Operations Directors

Crowley Marine Services appointed two new directors for its Atlantic and International Services, **Ed McCain** and **Matt Yacavone**.

McCain, a graduate of the United

States Merchant Marine Academy, has been with the company for 15 years. He assumes the position of director, domestic and liner operations.

Yacavone, who joined Crowley in 1993 as port captain, takes on the position of director, contract and international operations.

Crowley Receives Last Of Tractor Tug Series

Crowley Marine Services has accepted the final vessel in a series of six new Harbor-Class tractor tugs from the company's subsidiary, Vessel Management Services, Inc. (VMS). The vessel,



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People & Company News

known as Chief, will be deployed in Puget Sound for ship assist and escort work. Designed by Seattle-based, Guido Perla and Associates and constructed by Nichols Brother Boat Builders, for VMS, each of the six Harbor Class tugs features Voith Schneider twin cycloidal propulsion.

AMS To Hold Meeting And Award Ceremony

The American Maritime Safety annual membership meeting and award ceremony will be held on Thursday, September, 30, 1999 at Manhattan's Yale Club. Although only AMS members

may attend the membership meeting, the luncheon and award ceremony is open to all industry executives, as well as representatives from the P&I Clubs and Classification Societies.

For further information, log on to the AMS Web site at: <http://members.aol.com/amsadmins>

Maritime Services Corp. Establishes European Division

With U.S. corporate headquarters in Hood River, Ore., Maritime Service Group has formed a presence on the other side of the Atlantic with the opening of its new European Headquarters in Southampton. Offering a complete turnkey service covering all trades for land and marine refurbishment works, such as casinos and cabins, the new establishment will also be able to undertake individual parts of a project.

Bisso Marine Updates On Salvage Of Mr. Bice

Bisso Marine Co., Inc. has completed salvage of 60 percent of the hull section of the Broughton Drilling Company jackup, Mr. Bice, located at Grand Isle Block 49. Sections of the 5,000 ton rig are being loaded onto barges and transported to the Ocean Marine Corporation facility in Amelia, La. for scrapping.

Cruise Lines Cite Zero Tolerance For Onboard Crimes

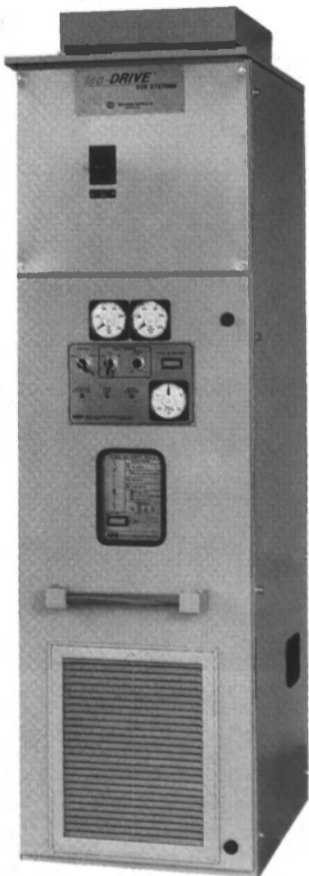
The senior executive officers of four of the largest international cruise companies released an open letter outlining an industrywide standard for dealing with the investigation and reporting of crimes committed onboard cruise ships.

Senator **John McCain** (R-Ariz.), chairman of the committee on commerce, science and transportation, stated the following regarding this announcement:

"I am pleased that leaders in the cruise ship industry have come together to implement an industry-wide standard for dealing with the investigation and reporting of crimes committed onboard cruise ships. "Cruise ships have the ultimate responsibility to protect their passengers and workers, especially from attacks by their own employees. The industry's announcement that allegations of onboard crime will be reported swiftly to the appropriate law enforcement authorities is encouraging."

McElroy Marine Develops Combination Anchor Windlass

McElroy Marine, a subsidiary of Halter Marine's Engineered Products Group, has developed a combination anchor windlass/winch for offshore supply boat applications. The compact design incorporates dual wildcats sized for 1.5 in. stud link chain and a mooring drum that holds 2,000 ft. of 1.5 in. wire rope and produces 18,000 lbs. of pull at 45 ft. per minute, and fitted with integral chain stoppers and 16 ft. steel catheads.



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Ballast Water Exchange: Is There A Better Way?

There are few other topics gathering more attention than ballast water exchange, as the chorus of environmental damage from the scientific community and howls of reform from the legislative community grow louder each day. Two naval architects working with Teekay Shipping in Japan were recently involved in a study and have issued a paper on a more efficient, effective way to handle the ballast water conundrum. — by **H. Numata**, site manager for construction of Teekay Crude Carriers, Teekay Shipping (Japan) Ltd., and **M. Tamashima**, naval architect, senior researcher, West Japan Fluid Engineering Laboratory.

Ballast Water and Sediment Discharge is prohibited into coastal waters to minimize the risks of introduction of harmful marine organisms. Since management of ballast water discharge becomes mandatory, a ship is obliged to exchange ballast water in open ocean and as far as

possible from coast. Two methods are introduced in IMO Resolution A.868 (20) adopted November 27, 1997. One is to empty a tank until suction is lost and pump in clean ballast water. The other is "Overflow Through Method" by pumping ballast water into the tank and allowing the water overflow through the openings on the tank top. In both cases, a ship is required to run an electric/steam driven ballast pump and to monitor deballasting and ballasting operations, followed by running a diesel generator or firing a boiler which in turn creates an extra work load for the duty engineer.

A New Idea

To achieve ballast water exchange, clean water is guided from ship's bow front utilizing pressure difference of the stream along the hull surface of a running ship. The idea does not require any kind of ship's power except those for topping up operation to initial water level at final stage. A ship is free from an extra duty for operation and monitoring of auxiliary machinery. The system is applicable to all kinds of ship at any size, but the investigation was conducted on a model Aframax oil carrier.

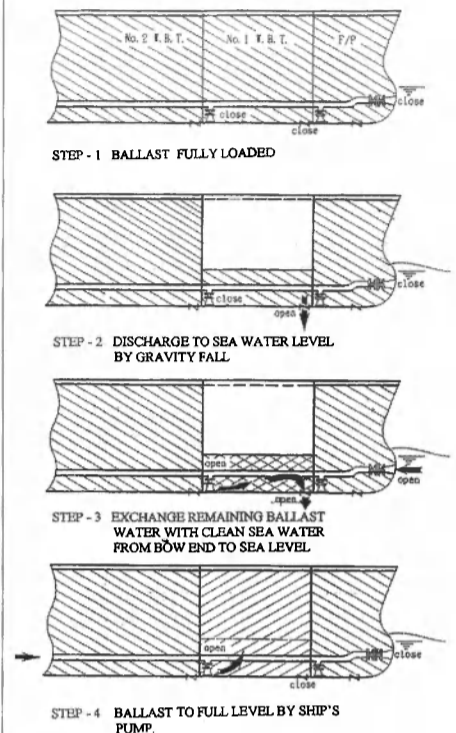
The system consists of:

- 1] To provide a water inlet at Ship's Bow End, introduce and lead clean water in water ballast tank through existing Water Ballast Tank Main Line.
- 2] The water flowing in the tank with a certain positive pressure push away the biologically dirty water through the opening (Sea Chest), which is provided at forward bottom end of the tank.

However, each of the ships has its own bottom structure formed by girders and floors. Model Tank tests were conducted to confirm the influence of bottom structure in relation to the location of water inlet points in the tank (bell mouth). Tests conducted confirmed the speed at which the Ballast Water is exchanged through the use of red-colored water in the model Aframax ballast tank, which was constructed using transparent plastic (see photos).

Preliminary testing showed that approximately seven hours was sufficient to exchange 90 percent of the volume of the water in a 3,500 cu. m. tank, with a 400 mm diameter Ballast Water Main Line with the ship traveling 15 knots.

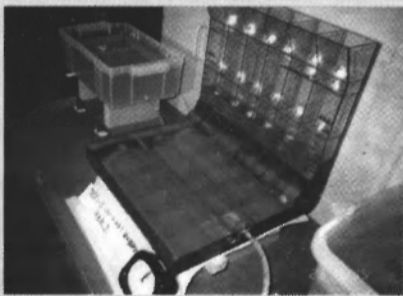
The model test was conducted for both single and double hulled Aframax tanker types, and it was confirmed that the most suitable location of the Water Outlet is at the forward end of the tank to have the longest water path to achieve the water exchange most effectively.



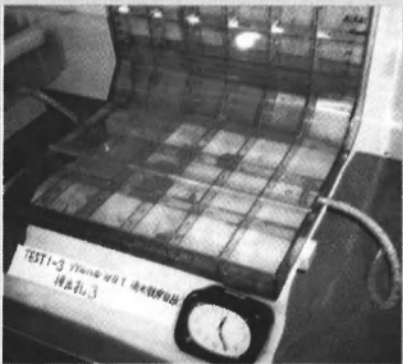
Actual operation of the new ballast water exchange system in four steps. Step 1: Tank ballasted until 98 percent volume level with biologically "dirty" water; Step 2: Discharging Ballast Water by gravity fall to ship's draft level; Step 3: Exchange dirty ballast water with clean water led from bow front; Step 4: Fill up tank to 98 percent intact level with clean water by the ship's ballast pump.

Put to the Test

Finding a superior manner to exchange ballast water at sea was the point of recent tests in Japan.



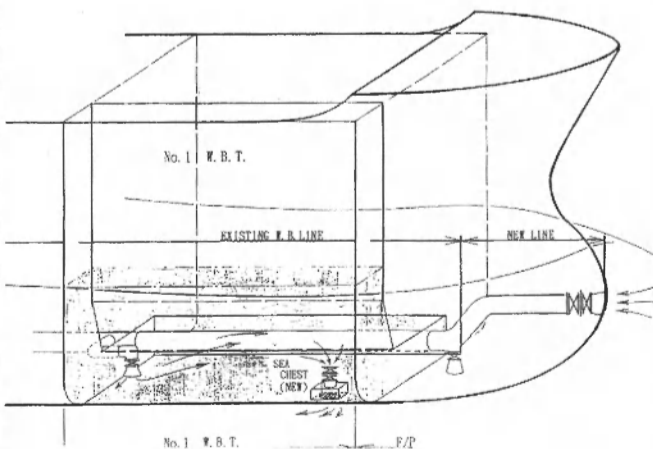
1 minute into test.



25 minutes into test.



70 minutes later, the end of the test



The practical arrangement of the new ballast water exchange system includes: Water Inlet, at bow front, with two stop valves, one of which at outboard is of steel casting as specified in regulations; Water Outlet, at forward of the tank, with two stop valves. Outboard valve is of steel casting. Sea chest structure and grid are to be provided.

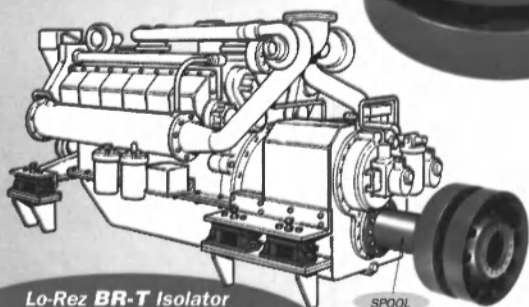
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itarian organization deploys ocean-going vessels as hospitals and relief and development vehicles with a goal it hopes to reach by 2005 of serving one million people. Believed to be one of



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Quality in Command

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the largest individual gifts given to a Christian charity in the U.K. – a donation of \$6.4 million was recently granted to the organization for the purchase of another vessel for its good Samaritan fleet. This good-will gesture offered by Ann Gloag, executive director of Stagecoach Holdings plc, will go toward Mercy Ships' purchase of Dronning Ingrid – a 16,071-grt Scandlines train and car ferry. Constructed in 1980, the vessel will travel from Denmark with a small Mercy Ships' crew, followed by a two-year alteration project, transforming Ingrid into a Hospital/Relief & Development mercy ship. Upon its readiness to float-out, the vessel will provide care for those less fortunate through free medical care, community development projects and relief aid to developing African nations who are struggling. The group, which currently owns and operates three other vessels, Anastasis, Caribbean Mercy and Island Mercy, holds a volunteer staff of more than 700 long term.

Circle 43 on Reader Service Card

JSC Purchases Revised Handling Equipment

JSC, an affiliated enterprise of the Sea Port of St. Petersburg, has purchased various equipment such as lift trucks and gantry cranes for optimizing of handling conditions of ferrous and non-ferrous metal and paper, all of which are traditional items of Russian export.

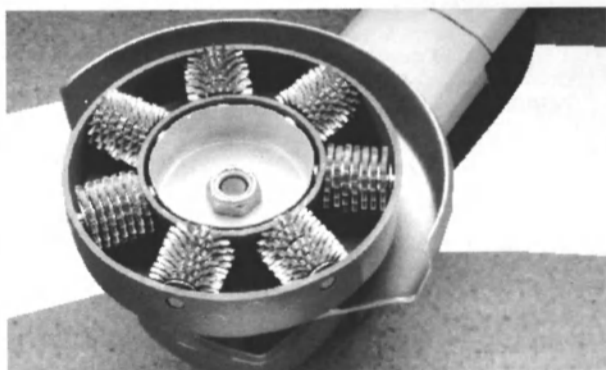
Ameron Introduces Pre-Construction Primer

Ameron Coatings introduced a revolutionary waterborne inorganic pre-construction primer – DSP2. Pioneering the development of the original inorganic zinc silicate coatings presented under the Dimetcote® name more than 50 years ago, DSP2 combines a unique blend of metal silicates and zirconium compounds – both of which improve the water resistance and lower weld porosity in comparison with other pre-construction primers.

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Company Profile

C-MAP Sets The Standard In Electronic Charts

Its an innovative tool that is IMO compliant, optimized and structured — all from the convenience of a CD-ROM and is designed for use on advanced electronic charting and navigation systems such as ECDIS — the CM-93.

Marketed and sold by C-MAP Commercial, this professional electronic charting database for the Americas is licensed under companies such as Advanced Maritime Technology, Sperry, Raytheon, Leica, Q-Mar and a variety of other special application companies.

With various locations worldwide, some of C-Map's recent additions to its product line lies in the charting sector, namely "Block Charts" for the Gulf of Mexico; and Bathymetric Charts developed for the Mid-Atlantic, West Coast, Gulf of Alaska and Bering Sea.

The company has also presented an updating system that allows customers to download chart corrections via the Internet.

With its primary marketing base concentrating on commercial shipping and military vessels, C-Map also plans on targeting tug vessels, oil support ships and mega yachts.

The company is also expanding worldwide since the past 10 years have brought about an upgrade in GPS Technology, allowing ECS and ECDIS to be utilized internationally. These advances in electronic charting systems through processing power and the increased quality of vector dates have formed GPS into an advancement eventually used by all vessels.

Currently in the works for C-Map is the CM-93/3, a data structure for the SENC database, which fully supports all features of S-57/3, including the application for updates.

The product's approach to ECDIS, according to C-MAP, will be used as an exchange and processing format for all electronic charts slated for use by the ECDIS — regardless of their origin.

Focusing on issues that drive its product/service development, namely marine/navigation safety; demand for high quality, timely electronic charts; and the ability to maintain and distribute up-to-date chart databases and new editions, C-Map stresses the fact that CM-93 is a vector-based electronic chart format.

The company utilizes official government charts and then transforms the already-digitized charts into its own proprietary format, which they sell and market as CM-93.

Updating its database with the weekly

Notice to Marine Corrections, C-Map's database currently includes more than 13,500 completed charts.

Aiming to focus its sights on Naval

vessels, cargo and oil carriers and cruise ships all throughout the world that use CM-93, the company feels that in the long run, the market segment with the

most promising business potential is within smaller systems that cost less and are to be implemented on a new category of vessels such as mega yachts, oceangoing tugs and coastal vessels — all of which, to date, have not been active within GPS technology.

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Global Shiprepair Market Faces Further Consolidation, Competition

For those convinced that the latest round of corporate consolidations is the last, think again. According to a new report from Drewry, the announcement by Keppel and Hitachi to further amalgamate the shiprepair industry in Singapore is the latest indication of a changing market structure through increased consolidation, diversification and an increased competitiveness from low cost emerging nations.

The intense competition prevalent within the industry is exemplified by the announcement of the two giant Singapore based conglomerates Keppel Corp. and Hitachi Zosen to merge their shiprepair and building

activities in a \$165-million deal, Drewry noted in "Shiprepair And Conversion: The Global Outlook." The merger gives Hitachi and Keppel interests of around 31 percent and 56 percent, respectively and heightens consolidation in the region as Sembawang and Jurong followed a similar path in 1997 effectively reducing the big four into two without reducing capacity.

The global shiprepair market experienced concentrated restructuring during the 1980s as yards responded to changing market conditions and trading patterns in line with ship owners. The 1990s have continued to follow

this pattern. In the 1990s, it is estimated that shiprepair capacity based on dry-docks and floating facilities for vessels in excess of 10,000-dwt has changed its structure dramatically. In North Europe, capacity in dead-weight terms has increased by 20 percent since 1990, while that in the Far East has risen by 70 percent (albeit that this includes an effective reclassing of existing facilities in Taiwan). SE Asia has witnessed 30 percent growth in repair facilities doubtless inspired by the aging tanker fleet. On the other hand there has also been a dramatic fall in capacity in North America — the 20 percent decline mainly on the eastern seaboard.

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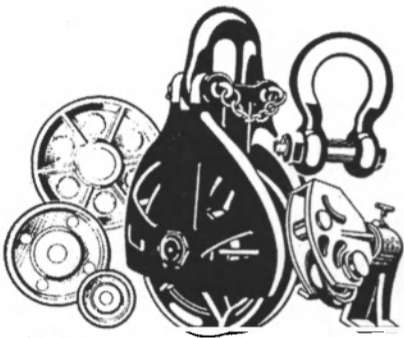
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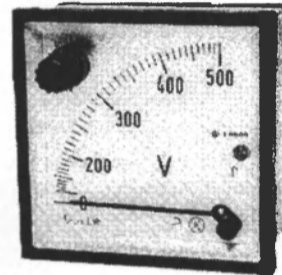
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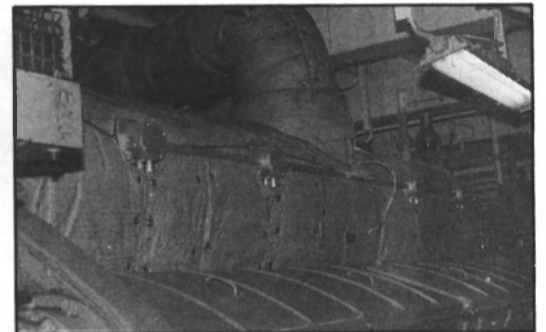
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Circle 326 on Reader Service Card
Maritime Reporter/Engineering News

Global dry-dock capacity has increased by around 12 percent — and although this is not out of context with the growth of the world fleet, it must be borne in mind that considerable fleet renewal has taken place and the age profile of the fleet has declined, (and therefore by implication the demands for repair work).

Drewry's survey analyzes the markets and forecasts that geographic split in market share is set to alter again compounding the intense competition currently in the shiprepair business. The Far East is expected to attain 11 percent of the global market share of revenue by 2003 with SE Asia growing by 1.7 percent by the same period.

As shiprepair revenue is unlikely to generate extraordinary gains on a per ship type basis, it would be natural to assume that geographical differences are also unlikely to see any radical movements. However, this is not necessarily the case as the high incidence of wide ranging capacity and competition within the market plus the elasticity of shipyard costs given such factors as exchange rates and outsourcing of labor has meant

that certain regions have found themselves more competitive and achieved greater revenues.

Far Eastern yards are forecast to make significant strides in terms of market share as China's intention to expand facilities and utilize cheap resources will see them gain further market share from Japan and Singapore. It is anticipated that S. Korea may make gains over the forecast period as a result of the economic crisis suffered by many of the shipbuilding yards. The Japanese share of market revenue is forecast to decline further overall as even its strong reliance on domestic work will be reduced following a lowering of R&M budgets from domestic operators.

The Middle East is forecast to increase its market share through tough competition with the development of specialized projects such as gas and conversion work. The Middle East has been engaged in a fierce battle with its rivals in Singapore to become the prestigious number one center for large tanker repairs. By the end of 1997 many observers felt that this had been achieved through the large volume of stemmings for

high profile tonnage. Given that they had a cost advantage of approximately three to five percent, however, the impact of relative currency advantages secured by the Singapore yards in recent months has brought them back in line. SE Asia is also forecast to increase its percentage share of revenue with its ability to undertake steel replacement work or tank cleaning and coating at lower cost. The financial crisis suffered by the majority of Asian countries is likely to have an inverse effect on the shiprepair markets and actually prove a boon to shiprepairers as they take advantage of consistent exchange rate gains against the U.S. dollar, according to Drewry. Much of the work from domestic ship owners in the short to medium term will be lost as these owners will seek to reduce overheads at the expense of R&M budgets. However, Drewry predicts that growth will nevertheless remain positive and thus attract international owners in the wake of cheaper exports and thus increase the captive market share for shiprepairers in Southeast Asia.

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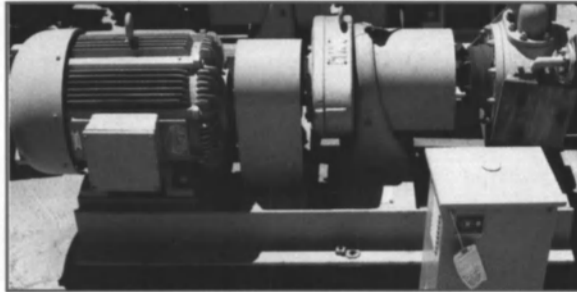
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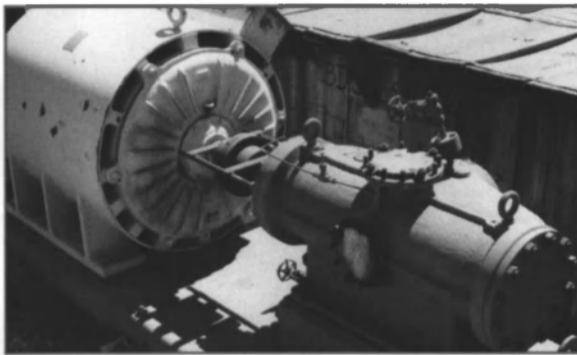
17 Bilge Stripping Pumps Mfg: Blackmer
100GPM@60/70psig Horizontal Model BXL2.5NFA-NHRB
Motor: Tech Systems 1800RPM 400/3/60 TEFC With
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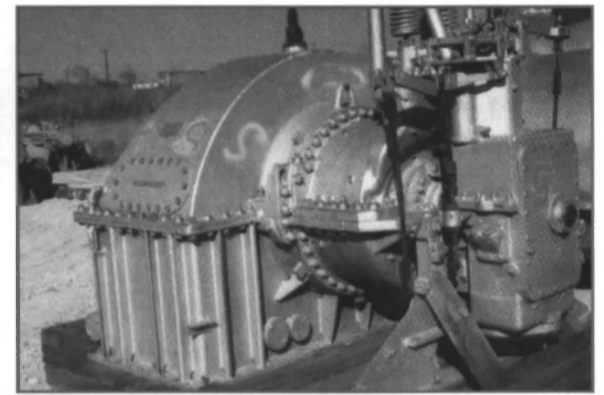
15 Foam Fire-Fighting Pumps Mfg: Blackmer
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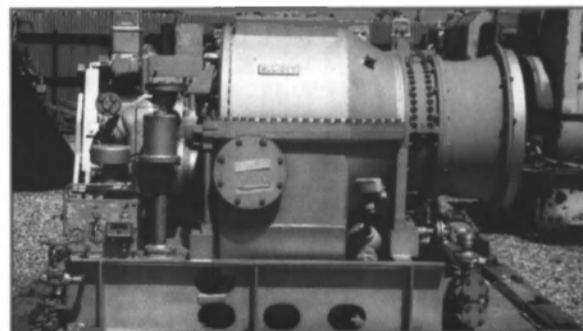
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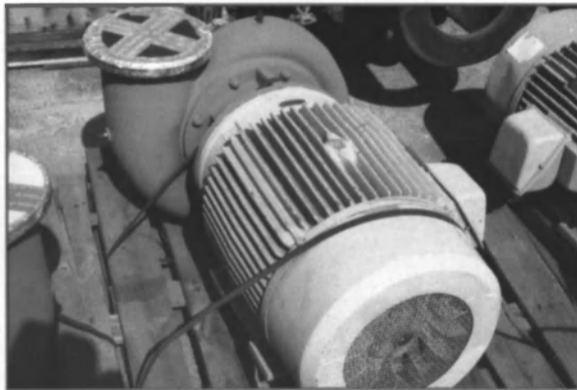
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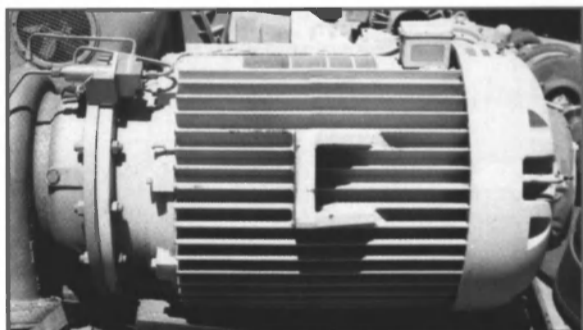
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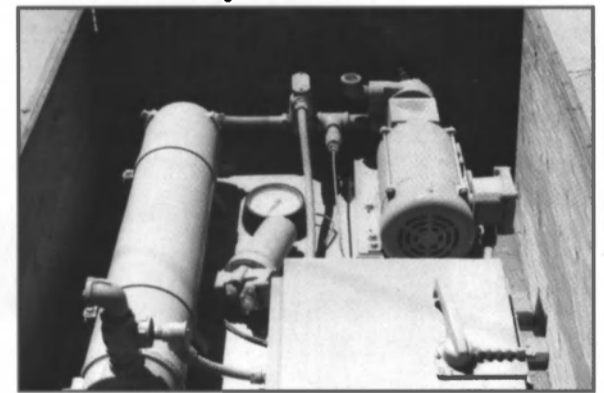
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3000GPM @ 150psi Horizontal Bronze Casing Model 8SHW
Missing 500HP 1800RPM Motor



1 Fire Pump Size 5x6 Mfg: Worthington
1000GPM@125psi Vertical Titanium Casings Model 5DTVS-10
Motor: Hansome 150HP 440/3/60 TEFC



1 Turbogenerator 2000kW Mfg: Westinghouse
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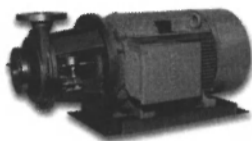
solution that deals with specific needs including cable laying and anchor handling, in addition to offshore support and ROV support vessels. The cost-effective system is easy to upgrade and

will be interfaced to the thrusters, sensors and position measurement equipment – providing manual or automatic control of the vessel's position.

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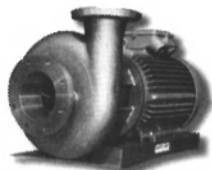
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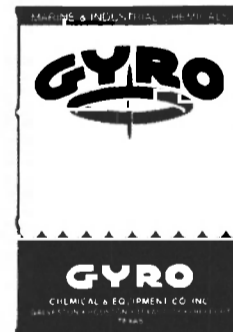
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Building A Marine Propulsion Empire

Vickers Plc has made a major investment in becoming a dominating player in the marine propulsion realm. With a stable of brand names — Ulstein, Kamewa, Rauma, Aquamaster, Brown Brothers and Michell Bearings — the group is positioned to capitalize on markets

around the globe. *Maritime Reporter* caught up with Vickers Plc CEO, Baron Paul Buysse for his take on this venture, as well as his inside strategies and goals for the future of the new company.

MR: Why the heavy investment in

marine at this point in time?

PB: After the divestment of Rolls Royce and Cosworth, Vickers plc was left with three strong engineering divisions: Defense, Turbine Components and Marine. In the Marine division we have very strong brand names such as

Kamewa, Rauma, Aquamaster, Brown Brothers and Michell Bearings. These businesses are mainly specialists in propulsion and positioning. Propellers, thrusters and water jets are the main products, which are distributed on a global basis. When we reviewed the Vickers strategy in early 1998 we came to the conclusion that the specialist vessel sectors of the marine industry such as offshore, fast cargo and passenger vessels, and cruise will have a substantial growth pattern in the coming decade. We then scanned the leaders in these markets to identify who would make an ideal fit with Vickers Marine. It was the Ulstein Group, which came out of this survey as outperforming all the criteria we had set ourselves.



Vickers PLC CEO
Baron Paul Buysse

Given our combined position in, for instance, deep water offshore exploration and production, (undoubtedly one of the growth sectors of the industry), as well as in fast vessels, naval and cruise segments, (where our new Mermaid POD system is being particularly well accepted) we are convinced that long-term the marine industry will be successful for us.

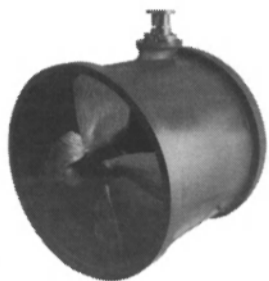
MR: How are you preparing Vickers to compete in good and bad markets?
PB: With the new combined Group, we are in an ideal position to offer our customers a technological partnership including the services of our unique hydro dynamic research center in Sweden. We will provide ship systems design, technological research, and a strong global service and repair network supported by a high quality manufacturing platform, which has benefited recently from important capital investments.

MR: How does the Ulstein purchase strengthen Vickers?

PB: Ulstein was roughly 75 percent complimentary to Kamewa and the other Vickers Marine businesses. Where the Vickers Marine companies focus more on research and advanced technological solutions for our customers, Ulstein was very active in expanding their global presence including the updating of the most modern standards in the manufacturing and development of their ship systems and design departments. Their recent acquisition of Bird-Johnson in the U.S. gives them a very strong presence there.

MR: Discuss the melding of corporate cultures among the companies you have acquired.

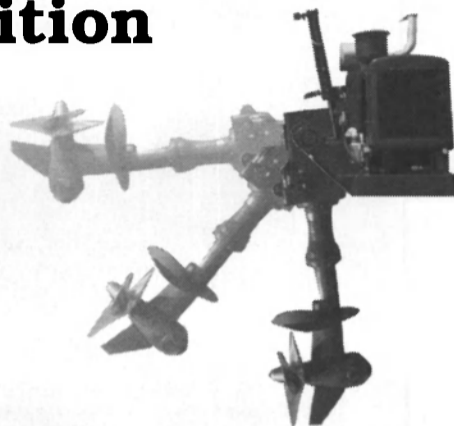
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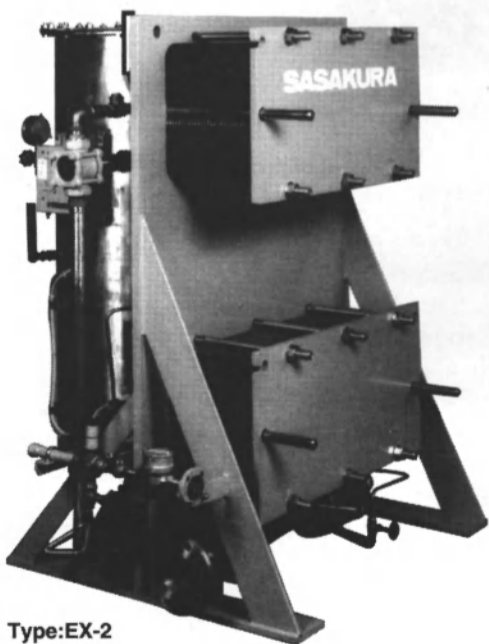
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PB: Obviously, there is not a surprisingly different way in which the two groups do business. Under Vickers, Kamewa and the other marine businesses focus very much on profitable growth and technology, where Ulstein was more active on commercial and service expansion. It relates a little to the strengths of both the Swedish and Norwegian culture. Bringing the two together makes, of course, a very powerful business culture.

So far, the 11 integration teams, composed of executives from all over the world, are mainly British, Swedish and Norwegian, and are performing remarkably efficiently and smoothly.

MR: What are the strengths of your product and service line?

PB: The strengths of our product line are obviously that we can claim to be leaders in propulsion, positioning and active stabilization and have the highest technology in ship systems and design. Our new Mermaid POD propulsion system has had a remarkable and successful acceptance by the market who acknowledge these systems as the future in specific sectors of the market.

MR: What does the future look like for Vickers?

PB: The future strategy for Vickers concentrates around opportunities for the three divisions. We see in Defense a movement for consolidation of companies who are active in land systems in Europe and expansion into a trend to look at lighter armed vehicles. As a dominant player in that sector of the industry, we will actively pursue opportunities to stimulate a sound consolidation process in the interest of our shareholders. Turbine Components is an industry that is also going through a phase of consolidation. We invested adequately in our manufacturing infrastructure and will continue to do so in 1999 to finally develop the optimum 'state of the art' supply base that our customers in aerospace, industrial, gas turbine and the automotive industries are rightly expecting from us.

And the Vickers Ulstein Marine Systems division, which now accounts for 50 percent of our turnover, will undoubtedly continue its strategy for sound and profitable expansion.

MR: What attracted you to the lead position with Vickers?

PB: I have always run or been involved with international engineering businesses. Vickers, of course, is one of the strongest corporate names in the world. It also has a very strong historic connotation, which, for a European such as myself, is very interesting.

Furthermore, it looked challenging for me to work with a strong management team to expand the business into a world leading engineering group again and to

demonstrate to our shareholders that their faith, trust and investment is very well placed with Vickers.

The enthusiastic support from Sir Colin Chandler, chairman, and the members of the Board was also an important element in the decision-making process.

I must say that, so far, we are very much enjoying this interesting phase in our history.

MR: What are your guiding business philosophies?

PB: Being very pragmatic and trying with a 'passion for excellence' to bring across to my people that profitable growth is the main objective for the group. Profit is, indeed, of critical importance in order to continuously invest in the business, to return to our shareholders the financial share that they are entitled to receive, and that

would continue to attract the involvement of an expanding group of investors and last, but not least, to keep and attract outstanding partners in all our businesses.

I have a very strong belief in personal commitment, in a no-nonsense management style with direct communication with all parties involved, including our customers, who I particularly regard as our most important relationship.

New Simulator Training for Pilots and Tug Captains

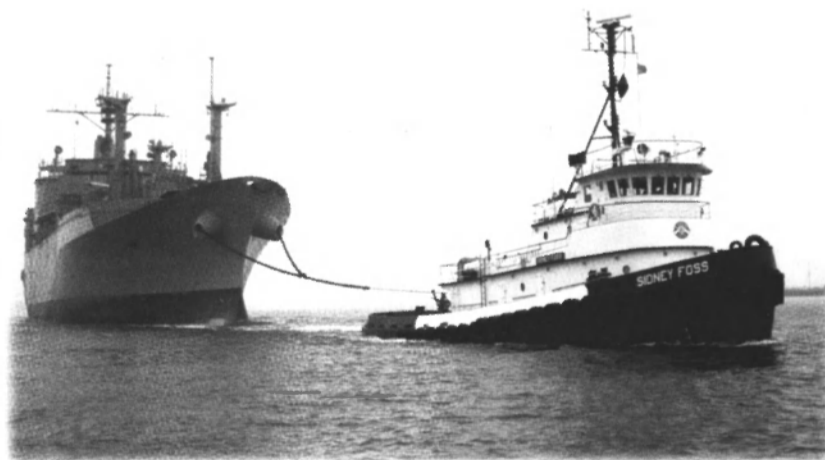


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Marine Diesel Engines: Entering A New Certification Era

Marine diesel engines have long been subject to classification society rules. However, from the start of next year, a whole new – and quite separate control regime will begin to take effect with major implications for both new and existing engines.

Annex VI of MARPOL 73/78, dealing with a wide range of air pollution control matters (including ozone depleting

substances, acid deposition materials, volatile organic compounds, incineration and oil fuel quality), is still some way from reaching the required level of ratification to enter into force. Nevertheless, the time is fast approaching when some of the provisions of that Annex will start to take effect. This is particularly true in terms of the oxides of nitrogen (NOx) controls, Regulation 13. As

shown in Figure 1, engines installed on ships constructed on or after January 1, 2000 will, following the entry into force of the Annex, need to meet the relevant certification requirements contained in the Annex. So too will those engines which, on or after January 1, 2000, have been subjected to a 'major conversion', as defined within the regulations, irrespective of the date of construction of the ship on which they are installed.

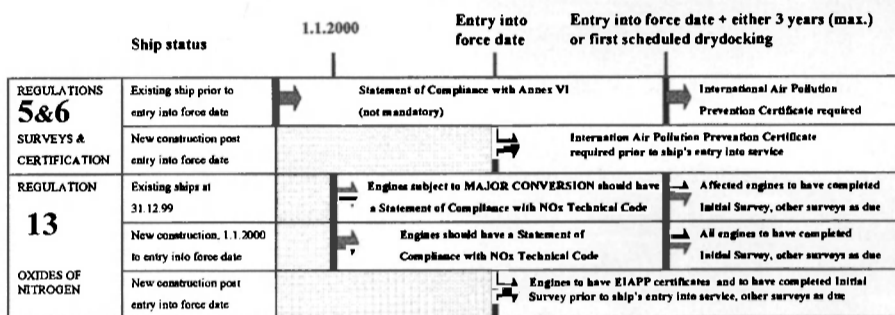
While the date of January 1, 2000 is written into Regulation 13, compliance between then and the entry into force date, which may be a few years off, should be seen as voluntary early compliance. However, this should be seen as a very qualified voluntary. Following the entry into force of the Annex, a year after achieving the required level of ratification, an International Air Pollution Prevention (IAPP) Certificate, of which the NOx controls are but one aspect, will become essential for a ship to trade on

an international basis. As shown in Figure 1 for existing ships at that time there will be a maximum period of up to three years in which to obtain this certificate. Where those engines to which Regulation 13 applies are not already voluntarily compliant, shipowners will face a monumental, if not near impossible in some cases, task at that time in obtaining that essential certification.

The first stage of achieving this compliance with the NOx control requirements is through either pre-certification or testing onboard, after installation in a few instances or more usually on completion of any major conversion, in accordance with the procedures as set out in the IMO NOx Technical Code. This Code is a mandatory document that underpins the Regulation 13 requirements. Consequently, despite the voluntary nature of this compliance over the next few years, the pressure will be on engine builders and those responsible for undertaking major engine conversions to provide the necessary approved documentation at the time of installation or following conversion. By so doing this will reduce the NOx aspects of the IAPP Initial Survey to a relatively sim-

(Continued on page 91)

Figure 1



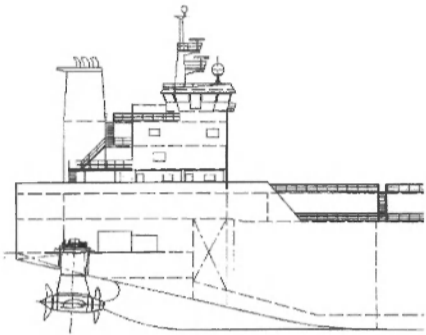
Note: NOx controls only applicable to engines over 130 kW and not used solely for emergency purposes



Podded Propulsors Gain Wider Acceptance

By David Tinsley, technical editor

The growing uptake of integral electric-driven, podded propulsors in the most capital-intensive sector of the cruise shipping industry, has forever altered the established position of conventional propulsion systems in an



The Siemens-Schottel Propulsor (SSP) (also pictured far right) is due to make its operational debut next year, having been selected for Rederi Donsotank's 19,500-dwt chemical product tanker booked with Shanghai Edward Shipyard in China. The contract for the newly-developed pod was actually awarded by the shipbuilder, which is partly German-owned.

important segment of the market.

Having established a foothold in the offshore sector, the concept will no doubt find increasing application with the next upswing in investment by the offshore oil and gas industry. Once conservatism has been overcome in various quarters of the shipping business, and once the net acquisition costs of such systems reach more acceptable levels for a broader band of the shipowning community, usage of the technology will no doubt spread to other spheres.

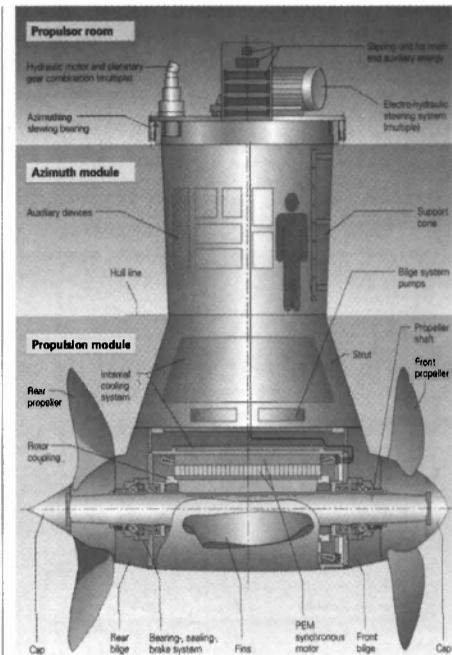
The relative paucity of orders for podded drives in areas where precision handling is paramount, as with icebreakers, cableships, ferries and specialized tankers, belies the extent to which such systems are being written into draft proposals or discussed at the project planning stage. The concept is especially apposite to vessels with varying service profiles, particularly where high maneuverability is required.

The long-term sales impact of the industrial commitment from the design engineering and manufacturing side

cannot be understated. In each case, podded propulsors are the products of pairings entailing major players in propulsion and electrical engineering, entailing direct or indirect links with leading shipbuilders, in certain instances.

As a progression on thruster technology, the basic principle is that the conventional shafting, propeller and rudder system is replaced with a 360-degree rotatable thruster unit also encapsulating the electric motor. Space savings are thereby achieved within the hull, while the efficiency losses from reduction gearing, long shaftlines, rudders, stern thrusters and also brackets and bossings are eliminated.

The market is opening up not only because of the improved propulsion efficiency, design flexibility and also reduced noise and vibration conferred by the generic type, but also because of its virtues in generating high steering forces, and achieving extremely high levels of maneuverability, invariably at lower power cost than with conventional



arrangements.

The first cruise ship application of podded electric drive was Carnival's 70,400-gt Elation, commissioned in

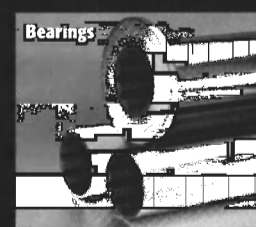
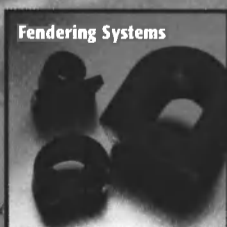
(Continued on next page)

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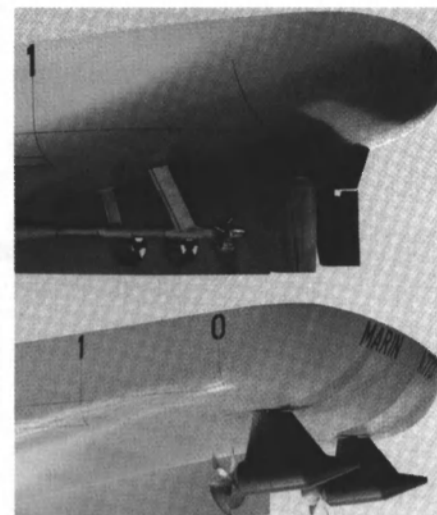
Marine Propulsion Annual

early 1998 and fitted with two 14-MW, Finnish-developed Azipod propulsion units. The most widely employed system to date, Azipod was originated by ABB Industry and Kvaerner Masa-Yards (KMY), but Italian shipbuilder Fincantieri is also a shareholder today in the system's proprietary company.

Current newbuild references include the entire Carnival group program, Royal Caribbean's prestigious Project Eagle series, as well as Hapag-Lloyd's Europa, all at KMY yards, and Holland America Line's sister to the Rotterdam from Fincantieri.

The Finns, with a long track record in

thruster technology, were the leaders in the podded drive concept, first applied in the form of a 1.5-MW Azipod unit to a Finnish waterway service vessel in 1991. Although the competing Mermaid system is building market share, the Azipod name is wholly synonymous with what must rank as one of the marine



The coges concept is similarly being used for the Millennium cruise ship program at Chantiers de l'Atlantique, but with propulsive effect to be conveyed by 19.5-MW Mermaids.

industry's most innovative, pragmatic developments over the past decade.

As a measure of its influence, the Azipod system figures in each of the substantial number of cruise ship newbuilds currently in hand and on order at KMY. By April this year, confirmed orders for the device had totaled 40 units of an aggregate 487,000-kW, including a total of 29 in 13 cruise ship applications.

The adaptability of the Azipod technique is implicit in a design range which extends from just 500-kW to approximately 25-MW. The commissioning towards the end of last year of two Azipod-equipped ice-strengthened platform supply vessels, for operation in the Caspian Sea, underlined its versatility.

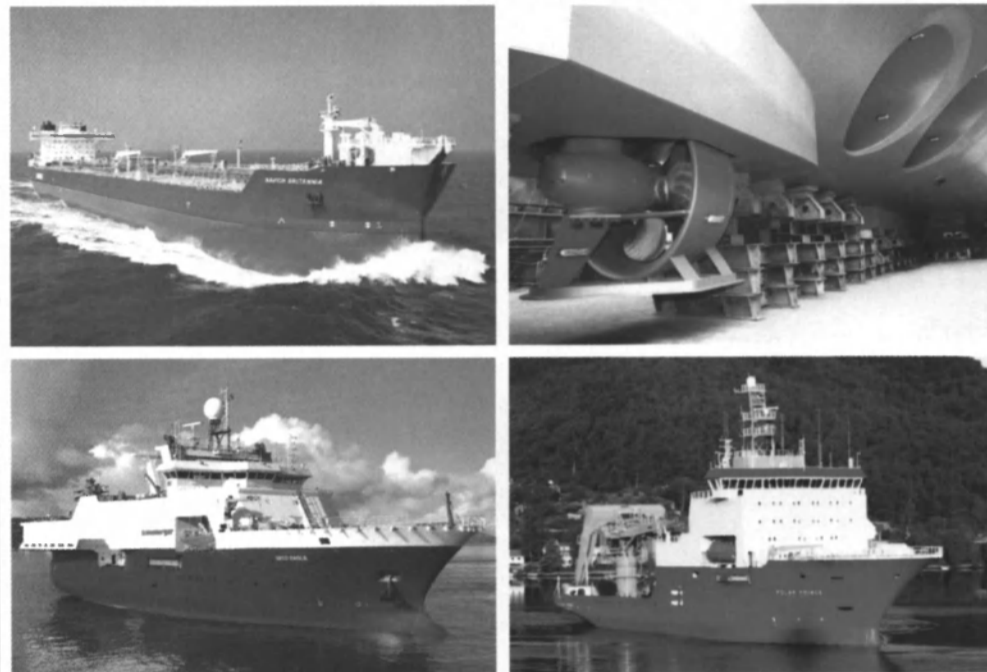
While each of Royal Caribbean's Voyager of the Seas-led Eagle class is being equipped with three 14-MW pods, the biggest unit power concentrations specified to date are the 19.5-MW motors in each of the twin Azipod installations for the shipowning group's Vantage-class from Meyer Werft.

The newbuilds in Germany will have added distinction as showcases for the U.S.-engineered combined gas and steam turbine, integrated electric drive system (coges). The coges concept is similarly being used for the Millennium cruise ship program at Chantiers de l'Atlantique, but with propulsive effect to be conveyed by 19.5-MW Mermaids.

No longer just a fabled creature of the sea, the Mermaid is now an embodiment of advanced marine technology, which has caught the eye of the cruise ship and offshore sectors. Following its milestone selection for Royal Caribbean's Millennium cruise ship newbuild project in France, the Mermaid pod propulsion system has been specified for Radisson Seven Seas' luxury cruise vessel from the same yard, Chantiers de l'Atlantique.

(Continued from page 93)

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A First Time for Everything

Transit Company Meets Challenge with Natural Gas Powered Ferry

Tidewater Regional Transit (TRT), Norfolk, Va., operates mass transit in the Hampton Roads area. It includes three passenger ferries that transport nearly 100,000 people per year across the Elizabeth River between downtown Norfolk and Portsmouth, Va. Like other mass transit providers, TRT receives federal, state and local funds and is encouraged to use alternative fuels to reduce dependence on foreign oil and help improve the environment. But unlike any other transit authority, TRT is successfully operating the world's first passenger ferry powered exclusively by natural gas.

Sparking interest

The idea to convert one of TRT's diesel-powered ferries to natural gas resulted from a 1989 meeting with representatives of Virginia Natural Gas to discuss bus fuel conversion. A feasibility study identified potential investors and possible funding sources. As part of the study, TRT's local Cat dealer, Carter Machinery Co., conducted Performance Analysis Review tests and additional analyses on the vessel's two six-cylinder, two-cycle, 180 bhp (135 kW) diesels. Information collected on fuel consumption and other operating parameters helped establish the attainable benefits of switching to natural gas power. Carter also collected data on Caterpillar's experience with other marine natural gas applications, including a dual-fuel (diesel and natural gas) Canadian car ferry. One benefit of natural gas engines is that they typically have longer life-to-overhaul intervals compared to similarly sized diesels.

TRT determined that converting a ferry to natural gas fuel would lessen its dependence on imported fuel and contribute to a cleaner environment. Recognized as a first for the marine industry, TRT's compressed natural gas (CNG)-fueled ferry required new Coast Guard regulations for CNG fuel. "Safety comes first," says **Mark Haushalter**, TRT equipment maintenance supervisor, "everything else is secondary."

The Coast Guard agreed with that philosophy and developed installation, monitoring and training requirements for the vessel. Working with TRT and a naval architect from JJH Inc., Portsmouth, Va., installation specifications were established for the storage,

transfer and safe use of CNG fuel in the marine environment. New system designs and regulations were also needed for the shore-side CNG fueling facility as well as for the vessel.

James C. Echols, operated by Tidewater Regional Transit, Norfolk, Va., is the world's first passenger ferry powered exclusively by natural gas.



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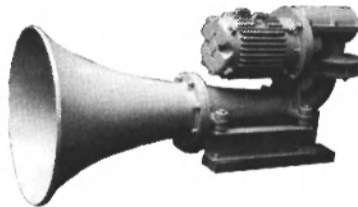


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Marine Propulsion Annual

Installation innovations

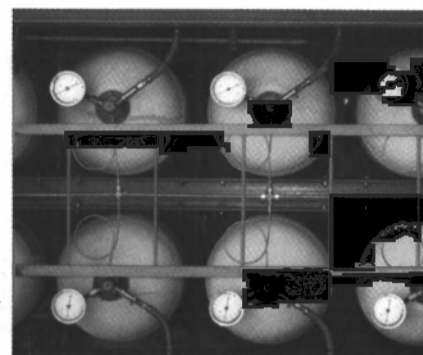
Following a bid process, two Cat 3406 SINA (spark-ignited naturally aspirated) engines were selected for the repower. Significant additions included explosion-proof 32-volt alternators with custom mounting brackets, and air-starting motors with non-sparking pinions. The

3406 SINA engines are each rated 215 bhp (161 kW) at 1,800 rpm. They drive 30 in. x 26 in. (76 x 66 cm) wheels through Twin Disc MG-509 2:1 ratio gears. The repower was completed at Lyon Shipyard Inc. in Norfolk, and the ferry was renamed the James C. Echols in honor of TRT's long-time executive

director. The replica sternwheeler, built at Freeport Shipbuilding, Freeport, Fla., in 1982, is 60 ft. (18 m) long, with 22.5 ft. (7 m) of beam, and 3.5 ft. (1 m) draft with a full load of 138 passengers.

New fuel considerations

Because CNG had never before been



New fuel storage, supply, monitoring and alarm systems were developed in order to meet U.S. Coast Guard fuel safety requirements. The tank hold 42,000 cu. ft. (1,260 cu. m) of CNG at 3,000 psi (20,700 kPa).

approved by the U.S. Coast Guard for use on a passenger vessel, the majority of new work on this project focused on fuel safety. New fuel storage, supply, monitoring and alarm systems were developed. Additionally, 20 gas storage cylinders were skid-mounted on the back of the vessel to carry enough fuel for three days' work. The tanks hold 42,000 cu. ft. (1,260 cu. m) of CNG at 3,000 psi (20,700 kPa). Fuel line pressure is stepped down to 125 psi (862 kPa) before entering the engine room, and supplied to the carburetors at a rate of 6 psi (41 kPa).

Haushalter, who worked on the project from its inception, is proud of the success of the James C. Echols. "It isn't easy doing a world's first," he says. "There were plenty of challenges, but we worked through them and we now have a very reliable boat."

Reliable use of alternate fuel proved especially beneficial when the diesel fuel supply ran low for a short period of time last winter: At that time, TRT's first-ever natural gas powered ferry was the only ferry moving passengers across the Elizabeth River.

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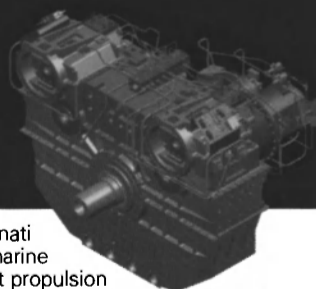
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Circle 222 on Reader Service Card

Caterpillar Tunes Up International Marketing Team

Caterpillar's Engine Products Division re-engineered its sales and marketing efforts with the formation of a new marine business unit within this division. The new marketing team, headed by 21-year veteran sales and marketing manager, **Jan Arnold**, includes more than 370 years of combined experience in the marine engine business. MR/EN recently spoke with Arnold to get her views on the market for engines in the marine industry, as well as her goals for the future of this new consolidated group. — by **Regina P. Ciardiello**, assistant editor



Jan Arnold

It was a group that had a wide-variety of coverage, yet lacked a consolidated or home base — the biggest factor in Caterpillar's (CAT) decision to form a new marine business unit within its engine products division. Although the company had a group dealing with petroleum and LPG's, when it came to a focused, centralized team dealing strictly with engines in the marine industry — Caterpillar felt it was at a loss.

Enter **Jan Arnold**, seasoned sales and marketing manager who had spent 21 years not only with Caterpillar but also as sales manager for the marine division of CAT Financial Services and for CAT dealer Thompson Machinery Corp. in Tennessee. Arnold, who holds a B.S. degree in Industrial Administration from Iowa State University, claims the top spot in this new unit, and with a wealth of experience, will undoubtedly lead the way for the group's smooth transition into its place within the company.

"This group (marine business unit) focuses on worldwide opportunities within the marine industry," Arnold said. "Now that we are centralized, we can look at the industry from a total perspective." Regarding her strategies for the group, both long and short term, Arnold stresses that effective communications among her team is key.

"Timely and accurate communications worldwide is something that needs to be worked on," she said. "I want to ensure that everyone is receiving pertinent information all at the same time and that no one is being left out of the loop."

Potentials for the future

Arnold hopes to expand the group's scope by becoming more of a system supplier rather than just an engine supplier, as well as broadening the product line into propulsion and auxiliary

engines.

"Shipyards are looking more to the engine supplier to offer the whole system, not just the engine," Arnold said. "They (shipyards) used to go to a different person for each aspect of the engine, but now they are looking for the supplier to accomplish all of this."

to accomplish all of this."

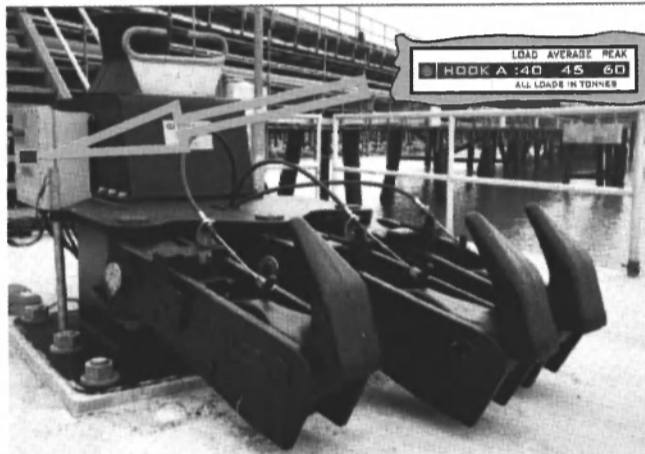
She also wants to offer marine certification packaging for all engines where part of the processing will involve the engine already having been certified by classification societies such as Lloyd's Register and Det Norske Veritas before

they are ready for operation.

Geographically, Arnold has mapped out her targeted areas of which she would like to further expand into — adding on to North America, Europe and Australia, all of which, according to Arnold "are already significant contributors to our marine business today."

"There is major growth in the Asia-

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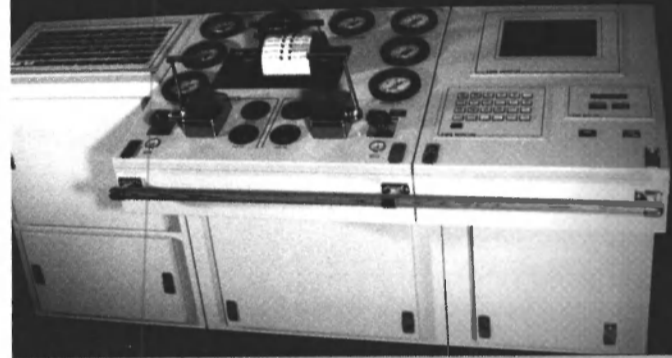
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Marine Propulsion Annual

Pacific region now that Asia is recovering from an economic downturn," she said. "In fact, 40 percent of all marine industry sales lie within that region."

She added, "While I would like to continue our efforts in North America and Europe, I want to also explore options in Brazil and the military/naval business."

In terms of the unit's muscle, which lies in CAT dealer organizations, Arnold was not at all hesitant to express her upbeat attitude toward these groups.

"Bar none, the largest strengths are the CAT dealer organizations," she said. "We sell through our dealers because they are internationally known as the

best in the business in terms of worldwide coverage."

Just how will this new marine business unit enhance CAT's already broad customer base? Arnold cites that the expansion is a positive one because customers will now look to the company as one that is committed to the industry.

In essence, the expansion is one that also based on two facets that will not go out of style – growth and revenue.

"We see growth in the marine industry for us is largely due to the focus we've placed on it," Arnold said. "And a measure of that growth is in the revenue and profits."

PULSE-DRIVE

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June 15, 1999

Frankie Pragg & Harry School
Propulsion Systems Inc.
550 Parkway Drive Suite 102A
Dunedin Beach, FL 32641

Dear Frankie & Harry,

It has been nearly six months since the new PSI surface drives were installed and I felt it was time to let you know exactly how things are going and how pleased we are with our investment.

Just to be clear, prior to the installation of the new PSI drives the previous outdrives were lasting 2-3 weeks. Each time we had a drive failure the rebuild cost was \$1600 and the round trip shipping for the repair of the drives was another \$500. If you add to it the maintenance time to install a drive, the opportunity costs of what the maintenance department could be accomplishing, the loss of customer revenue, and the customer dissatisfaction, the cost of each failure could easily be placed at \$3500.

The ongoing drive failures also placed the Resort in a position of high potential liability for passengers, crew, and vessel should the outdrive failure occur during a key maneuver or during inclement weather.

To sum it up the ongoing outdrive failures were costing the Resort dearly in both direct and indirect costs.

Now for the positive news. Since we have installed your PSI outdrives the boat has only been down for six hours which could be attributed directly to the drives. This is during nearly six months of operation. So for a conservative estimate I feel we have saved nearly \$20,000 in direct costs in the first six months.

Also, the installation of the PSI drives has benefited us in two very unexpected ways. First, during the first few months of 1999 the water levels for Lake Havasu were the lowest seen in nearly a decade. It would have been virtually impossible to operate the boat in the marina or channel during this time had the new drives not been installed, the 12" - 12" lower draft made it possible. If the old drives were in operation the failure rate would have doubled because of the inevitable hits taken from the lake bottom. Secondly, we are absolutely amazed at the

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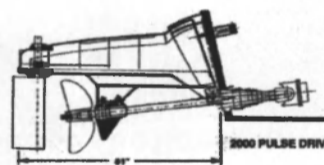
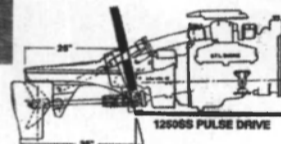
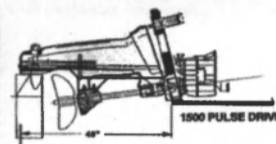
HAVASU LANDING RESORT & CASINO FERRY BOAT

improvement in fuel economy since the installation. We are currently running two Star Power 7.3 Ford Diesels and the fuel consumption has dropped by nearly 18% over last year during the same months. An unexpected savings of over \$600 a month!

The direct savings we have experienced since the installation of the PSI drives such as drive rebuilds, shipping, and fuel costs are easily calculated. However, the many other benefits such as improved customer satisfaction, captain and crew confidence, and overall Resort morale may be even more important to consider as part of the equation. I truly believe that when everything is considered the new PSI drives have fully paid for themselves in the short six months we have had them in use.

Thanks again for working with us in our remote geographic location. The confidence your drives have restored to our operations is fantastic. I would be happy to speak to any prospective purchasers to relay our story.

Sincerely,
David V. Anderson
David V. Anderson
General Manager



SPECIFICATIONS

PULSE DRIVE MODELS:	1000	1000 DUAL	1250SS	1500SX	1250 LONG	1250 DUAL	1500	1500 DUAL	1500 SS	2000	2500	3000
TYPICAL VESSEL SIZE	UP TO 20'	UP TO 26'	UP TO 26'	UP TO 26'	UP TO 36'	UP TO 42'	UP TO 42'	UP TO 50'	UP TO 36'	26'-50'	40'-65'	50'-85'
HORSE POWER RANGE (Approx)												
PLEASURE CRAFT RATING	120	TWIN 120	300	500	300	TWIN 300	650	TWIN 650	650	1000	1250	1600
TORQUE LIMITS IN FT.LBS. @Propeller	220	TWIN 220	500	650	500	TWIN 500	800	TWIN 800	800	1800	3600	6100
MAXIMUM PROPELLER DIAMETER	12"	12"	15"	15"	18"	18"	20"	20"	20"	24"	28"	34"
SHAFT SIZE DIAMETER IN INCHES	1"	1"	1.25"	1.5"	1.25"	1.25"	1.5"	1.5"	1.5"	2"	2.5"	3"
WEIGHT IN LBS.	42	90	110	140	170	190	205	285	225	350	650	990
EXTERNAL LENGTH FROM TRANSOM	32"	32"	32"	32"	48"	42"	48"	48"	43"	60.25"	67.5"	81"
RUDDER ANGLE	80°	80°	80°	80°	80°	80°	80°	80°	80°	80°	80°	80°
PROPELLER TRIM	6°	6°	6°	6°	6°	6°	6°	6°	6°	6°	6°	6°
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Sause Brothers Adds Second ASD Tug



Sause Bros. has added its second Azimuth stern drive (ASD) tug, Tira Lani to its Hawaiian operation for assistance to ships both departing and arriving Honolulu Harbor, as well as their own barge movements.

Joining ASD tugs Kamehu and Pono, Tira Lani was designed and constructed by Southern Oregon Marine Shipyard, Coos Bay, Ore.

Powered by twin CAT electronic propulsion engines rated at 2,100-hp @ 1,600 rpm, Tira Lani is also equipped with Ulstein Azimuth stern drive with 86 in. diameter propellers in nozzles. The system provides the vessel with a service speed of 13 knots, a bollard pull astern of more than 100,000 lbs. and a bollard pull ahead of 120,000 lbs.

Two Northern Lights Model M80C.2s, 80 kW and 480 volt generators provide electric power for the bow winch.

Main Particulars

Length (o.a.)	84 ft. (25.6 m)
Length (reg.)	75 ft. (22.8 m)
Breadth	35 ft. (10.6 m)
Draft light	12 ft. (3.6 m)
Draft loaded	13 ft. (3.9 m)
GT	188
Speed	13 knots
Displacement full load	350
Bollard pull	109,000 lbs.
Total HP	4,100 @ 1,600 rpm
Azimuth z-drive	Ulstein

STN Atlas Offers New Propulsion Innovations

New developments from Hamburg-based STN Atlas Marine Electronics consist of Dolphin, an advanced modular podded propulsion system created in association with LIPS BV of the Netherlands and manufacturers of the unit's electric motor, LDW of Bremen.

Featured advantages include power gains of between six and 10 percent

resulting from upgraded hydro-dynamic and electrical efficiencies, low noise and vibration levels, as well as enhanced maneuvering characteristics.

The system, which provides up to 360 degrees of freedom around the vertical axis of rotation, is designed for vessels of all types where high speed and maneuverability are a main concern. Available for power applications from 3 mW to more than 19 mW, the Dolphin system provides more space savings due to the absence of shaft systems, gears and stern thrusters.

Circle 40 on Reader Service Card

Thrustmaster Manufactures Comprehensive Line

Thrustmaster of Texas, Inc., manufacturers of a full range of mechanical drive azimuthing thrustmasters from 500 to 3,000-hp, aims to ensure that all mechanical drives are designed to complement Thrustmaster's existing group of hydraulic thrusters.



Circle 41 on Reader Service Card

Deutz Powered Freighter Enters Operation

The new coastal freighter RMS Mülheim, built by Romania's Santierul Naval Tulcea, was put into operation by Mssrs. Rhein-, Maas- and Seeschiffahrtskontor (RMS). The 294.3-ft. (89.7-m), 2,500-ton vessel is powered by a Deutz AG series 628 engine, an eight cylinder version with a capacity of 1,500 kW at 900 rpm. Power is transferred to the fixed pitch propeller via a Reintjes 3.654:1 reversing reduction gear. Mülheim, with a width of 38-ft. (11.7 m) and a draft of 14.5 ft. (4.5 m) is designed for the European inland canals and rivers, as well as for sea traffic.

Circle 62 on Reader Service Card

MaK Motoren Makes Change At The Top

Dr. Jens Hollunder, chairman of the board of MaK Motoren GmbH has retired, thus handing over the responsibility for the operative business in mid July. Jan E. Grundtman has been appointed chairman of the board and general manager of MaK Motoren. Dr. Hollunder entered service with MaK in 1984, and was appointed chairman of the board on July 1, 1993.

Circle 69 on Reader Service Card

VTC Secures Diesel Electric Propulsion Contract

Vosper Thornycroft Controls (VTC) won a contract from Ferguson Shipbuilders to provide a diesel electric propulsion system for a new lighthouse and buoy tender vessel. The 164 ft. (50 m), 1,100-gt vessel is scheduled for

delivery by the end of 2000, and VTC is currently carrying out design work on the electrical system which comprises three 876 kW diesel generators delivering power to two 1,000 kW azimuthing stern thrusters and two 210 kW bowthrusters.

Circle 64 on Reader Service Card

Overhaul Intervals Extended

Caterpillar Engine Products Div. Announced that the recommended overhaul schedules for most 3500 family marine engines have been extended 50 percent, helping to significantly reduce lifetime costs.

Circle 67 on Reader Service Card



DUTCH CRAFTSMANSHIP IN THRUSTER SYSTEMS



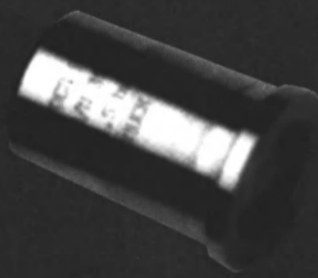
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Marine Propulsion Annual

(Continued from page 17)

there is a plethora of international and national codes that both recommend and demand maximum permissible noise levels aboard ships.

Additionally, scientific evidence regarding the effects of noise on every-

thing from shipboard personnel to whales is sure to raise the bar in regards to noise control in years to come. Simple in statement, yet complex in real-world delivery, continuing efforts to reduce emissions, noise and vibration signatures aboard vessels of all types and sizes is a technological challenge,

particularly given the acoustical properties of water and of the primary materials utilized in shipbuilding.

MAN B&W has continued to lead the charge on many diesel engine R&D fronts, and has published a report entitled "Diesel Engines and the Environment - Noise." The company's efforts in

the field of environmental issues are numerous, and it has earned it the Danish Environmental Prize for developing a plant for removing nitric oxides from exhaust gases.

The company notes that whereas noise was traditionally considered a "necessary evil," today excessive noise is considered a form of pollution with far-reaching ramifications. In general, the brochure notes that noise emitted by the engine's exhaust gas, and the structure borne noise excited by the engine, are so low that it is possible to keep within the noise requirements for the bridge wing and accommodation. On the other hand, airborne noise emitted from the engine in the engine room is so high that in some cases there is a risk that the noise limits for the engine room cannot be met, unless additional noise measures are introduced. Hence, the company sees future efforts pointed toward developing an engine with reduced airborne sound levels.

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Making Noise

The study of shipping generated noise's effect on the environment is a relatively new phenomena, but it is sure to become increasingly important in the new decade.

While shipboard noise is an obvious concern to personnel operating or luxuriating onboard, increasing attention is being paid to the effects of ship-generated noise on the ocean environment. Consequently, this should catch the attention of ship designers, builders, owners and outfitters as the topic inevitably starts making the conference and legislative rounds. Headlining efforts in the U.S. is the National Resources Defense Council (NRDC), whose researchers are studying the effects of man-made undersea noise and its relationship to a healthy ocean, and its effects on certain types of marine

Buquebus: Sound Reduction Advances

The effort to eliminate sound and vibration signatures is particularly critical in the passenger/cruise vessels markets for many reasons. A noisy, shaky ride is sure to alienate passengers and hurt business prospects, but adding layer upon layer of sound-deadening materials adds critical weight factors and effectively reduces a vessel's profitability as well. In creating the 52-knot Buquebus, builder and designer took extra steps to ensure that noise control was judiciously yet adequately placed. Sound measurement trials were completed with noise measurements taken by noise consultants, J & A Enterprises Inc., at various locations throughout the vessel with the microphone held at approximately five ft. above sole. At an early stage in the design, NGA and Derektor decided to pursue a philosophy of not fitting any sound insulation, other than the inherent sound deadening provided by fire insulation, until noise measurements could be completed during trials. This simple approach allows for noise reduction to be applied exactly where it is required, with a potential saving in the weight of additional noise insulation that may not have been effective. Average noise levels within the lower and upper passenger saloons during initial trials were 82 db(a) and 76 db(a) respectively. This trial also showed noise generated from the hull bottom with the vessel at high speed (15 db(a) in forward voids) was contributing significantly to the interior noise levels. Therefore, following this trial, two forms of noise reduction were installed. Polymer panels were applied to areas of the bottom structure to provide mass damping of these panels and secondly, a layer of sandwich construction insulation with a high-density middle layer was applied across the underside of the deck in way of the passenger saloon. The combined effect of these treatments was to reduce the average noise level in the lower deck passenger saloon to 75 db(a) and to 72 db(a) in the upper deck saloon.

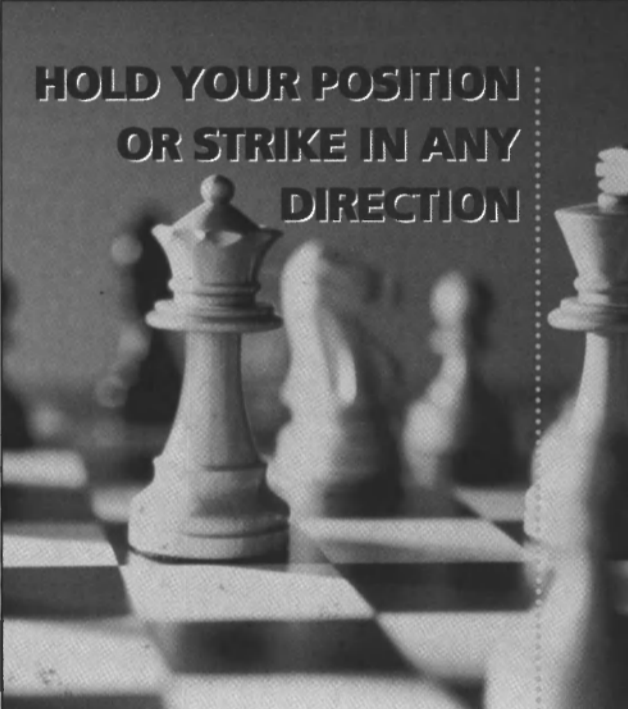
species. Undersea noise has reportedly been shown as affecting the habitual behavior of marine mammals; leading them to swim off course, abandon traditional breeding grounds, and cease from singing, clicking, and performing the patterned sequences of sound, experts believe, they use for communication in the depths of the ocean.

"The amount of noise in our oceans nearly doubles every 10 years," says

Roger Jentry the coordinator for the National Marine Fisheries Service (NMFS) Acoustics Team. According to a recent report put out the NRDC, the largest producer of undersea noise is shipping. NRDC statistics reveal that since the on-set of the global economy, the size of the merchant fleet has doubled and gross tonnage quadrupled engrossing shipping lanes and the ocean's lower frequencies with constant

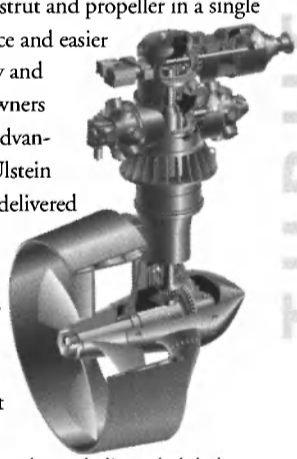
noise. The same lower frequencies existing research has shown marine species use to interact in. In 1996, two sperm whales swimming nearby Spain's Canary Islands were struck from behind and killed by a cargo ship. Investigations believe that neither one made any attempt to escape the ship's path. Reports say, both whales were suffering from low-frequency acoustic trauma in the inner ear and apparently did not hear

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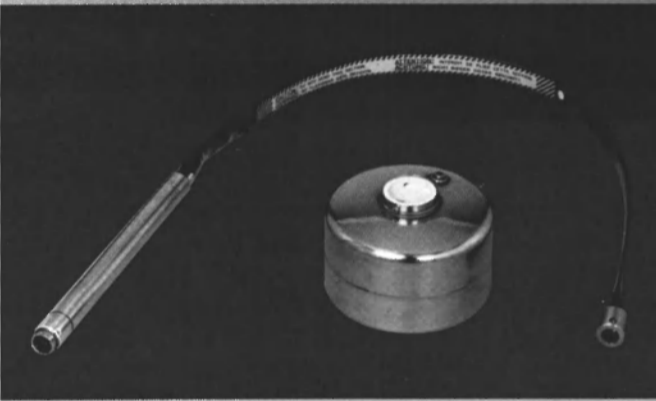
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Marine Propulsion Annual

the ship approaching.

Researchers have shown that a supertanker cruising at 17 knots fills the frequency band below 500Hz, with a steady sonic sound, says the NRDC report, of 190 decibels or more, and mid-sized vessels such as tugs and ferries can produce sounds of 160-170 decibels.

One of the most infamous examples of the dangers high decibels of sound in the lower frequencies of the ocean can have on marine life occurred in 1996, and notably does not involve commercial shipping at all. During 1996, 12 Cuvier beaked whales beached themselves off the West Coast of Greece. Investigators said each whale was spaced about two

miles apart from each other on shore and all were said to have fled the waters in a sudden panic at about the same time. This came just days after NATO had been experimenting with a low-frequency active sonar (LFAS) in the area.

LFAS is an experiment deployed by the U.S. Navy as early as the mid-1980's to detect diesel and nuclear submarines.

Joel Reynolds, NRDC's Project Director, says the main concern with LFAS is the extraordinarily loud ranges of sound that are sent out into the lower frequencies of the ocean in areas of rich biological resources. Sometimes these sounds have been known to be as high as 235 decibels or greater, much stronger than the level of 120 decibels in which gray whales have shown to be disturbed.

"I'm realistic enough to know things don't change overnight," says Reynolds, calling for workshops to begin to discuss the types of regulations that can be feasible. To date there are apparently no regulations on the matter, so NRDC has been using the Marine Mammal Protection Act (MMPA) on an ad-hoc basis to legally battle the Navy and other sources who they believe are putting species at risk with little justification for their needs.

Reynolds says undersea noise can be regulated in much the same way other forms of pollution have been in the past, taking its cue from the Clean Air and Clean Water Acts. "It will take some time, but it must be done," he says.

Momentarily the deployment of LFAS has been stopped pending further research, but other forms of noise continue. The offshore industry, for one, is sure to come under closer scrutiny for noise production, with its seismic surveys, airguns, the positioning of drills, the construction of platforms and pipes. According to the NRDC report, marine mammals encountering these production sites either avoid the airguns, swerve off course, as bowhead whales do, or completely evacuate the area, as sperm whales exhibited during a seismic survey.

Within the last decade there has also been another contributing source: thermal acoustic thermometry. In the hopes of providing evidence of the greenhouse effect and global warming, scientists began experimenting with acoustic then-thermometry. The goal: to calculate the average ocean temperatures by the amount of time sound takes to travel undersea, using the knowledge that speed of sound increases as water warms. What organizations like the NRDC are most concerned with however, is the amount of time the experiment would take to conclude, estimating that as many as 12 transoceanic loudspeakers would be emitting 195-decibels of low-frequency tones throughout the ocean for as long as a decade.

"Undersea noise is really an unknown form of pollution," says Jentry. One of the first things that must be done, he says, is to begin discussing and writing clearer guidelines. To date, there isn't enough research on the hearing ranges of the numerous species of our oceans," said Jentry. — by Maria Medina

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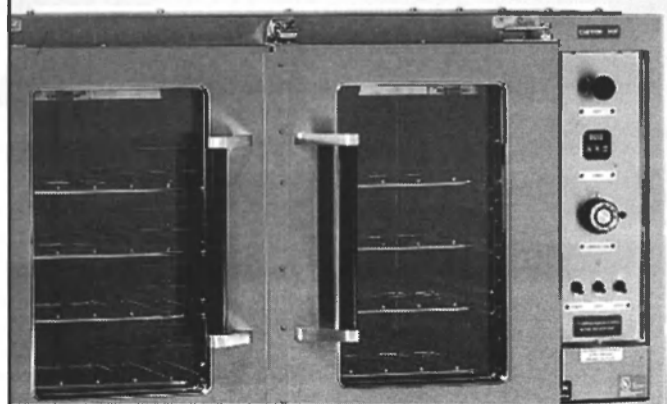
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Circle 277 on Reader Service Card

Cummins: Fine Tuning the Engine Line

Doug Cartwright, Chief Engineer and Geoff Conrad, Commercial Marine Sales & Marketing Manager with Cummins recently spent some time with Maritime Reporter & Engineering News to discuss changing rules and regulations in regard to diesel engine emissions, and the company's activities to continually advance the engine line.

Complying with emission rules and regulations is hardly a new topic to the engineers at Cummins Engine Co. The company has a long and successful history serving the more stringent automotive and industrial markets, boasting more than 25 years experience designing engines that meet demanding emission parameters and provide efficient, reliable performance.

According to Conrad, with the January 1, 2000 deadline looming for compliance with new IMO standards regarding NOx emissions (see related story, page 74), Cummins is prepared to support its customers by having a full range of IMO compliant engines available in countries covered by the IMO treaty. While Conrad admits that this has presented some challenges, he said the task was made simpler since the U.S. Environmental Protection Agency (EPA) has regulated emissions in other diesel markets since 1992. Product upgrades are already underway at Cummins to meet these more stringent restrictions through an increased use of electronics, advance air handling techniques and other modifications. The manufacturer's commitment is substantiated by the fact that, according to Cartwright, 75 percent of test cell time (currently) is spent on the legislative side of emissions, a measure taken to ensure that the entire product line-up will be compliant with IMO regs by the end of 1999.

While the responsibility is on the vessel owner operator to prove a propulsion package's compliance, Conrad believes it is smart planning to arm customers with the necessary technical documentation. "It is our position at Cummins that we should protect our customers in regard to the MARPOL 73/78 regulations, including proper engine documentation in addition to the Lloyds Registry certification. At the same time we will continue to offer the same wide range of horsepower with the quality products that have earned us a growing stake in the worldwide marine market."

And while marine players have been hit with a seeming barrage of rules and regulations regarding operational para-

meters in recent year, Cartwright notes that the marine industry is a good 25 years behind the automotive world. But it will soon change. "The interesting thing in the marine world, is that we will very quickly catch up to the automotive

side in terms of emission level, by 2010 we may be only a few years behind, versus 25 years now.

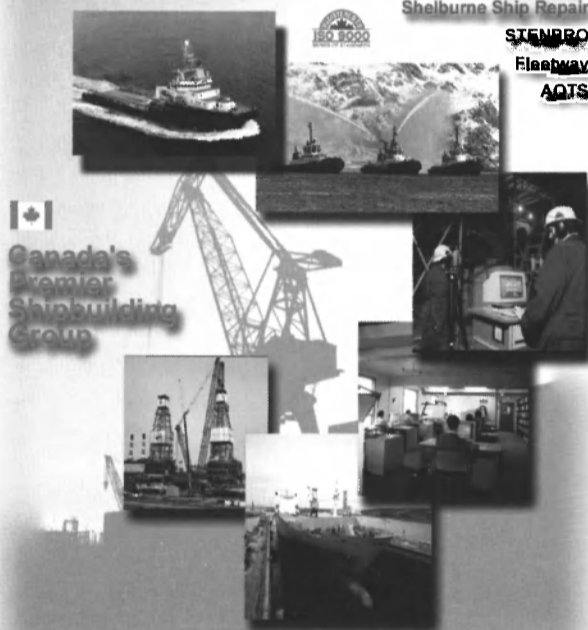
In fact, engine line production and enhancement will be significantly stepped-up in the new century, as

Cartwright and company plan for compliance with future regulations. He said that advances in low temperature after-cooling and electronic control, in particular will be important to comply with next generation, EPA-driven requirements, that will potentially incorporate NOx, particulates and CO, as well as potential noise.

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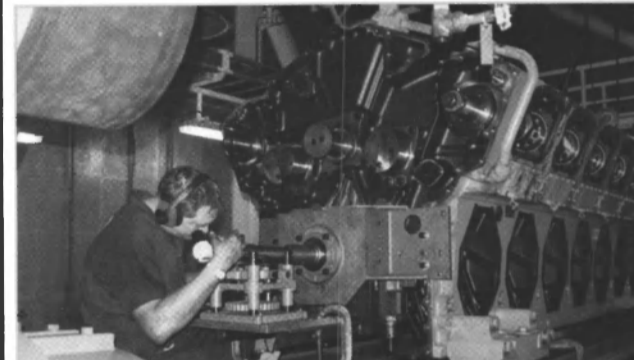
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Circle 337 on Reader Service Card

Gas Turbine Advances

The proliferation of gas turbine use as prime propulsion in the maritime market has taken off, as a new generation of vessel feel the need to run fast and clean.

Not too long ago, the gas turbine for commercial maritime use was relegated as an exotic luxury by many, as the use was centered mainly on high performance naval vessel applications. But a metamorphosis of sorts has occurred in recent years, and the market potential for gas turbine usage on commercial boats and ships is rapidly expanding. Specifically, the evolution of very large, very fast cargo, automotive and passenger ferries has resulted in the increased specification of gas turbine propulsion packages.

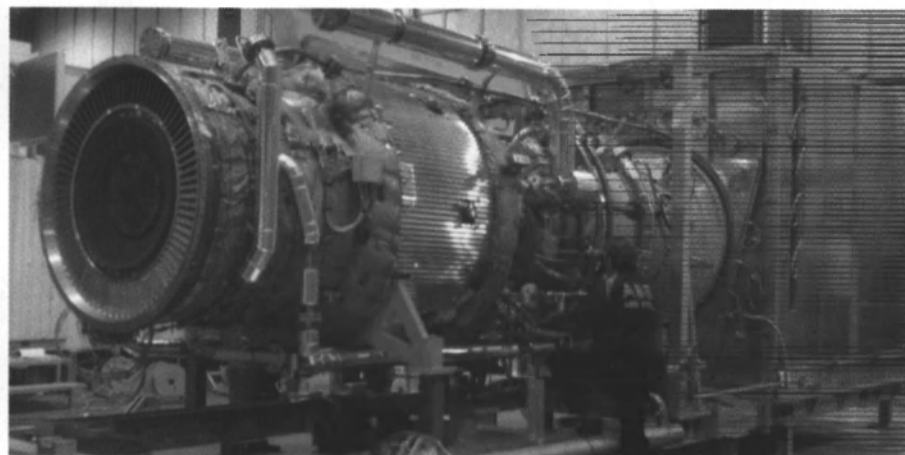
Also, the increased focus on the environment and tighter scrutiny on exhaust emissions has led to new orders for gas turbines for new users, such as the cruise ship market.

Late last month one of the higher-profile gas turbine projects — FastShip — selected Rolls Royce gas turbines to power its revolutionary high speed Trans-Atlantic fleet. The deal, worth \$1 billion, represents the largest-ever single order for Rolls Royce for marine engines. The agreement requires Rolls Royce to construct 25 marine Trent gas turbines — five in each of FastShip's ini-

tial four vessels, and five spares. Additionally, Rolls Royce will provide a 20-year support package throughout the life of each engine, as well as establish a maintenance facility in the Philadelphia region for the contract's management purposes.

The Rolls Royce Trent engines, which are derived from the company's Trent aero-engine, will drive one Kamewa water jet, delivering 335,000-hp. The propulsion package will allow the 860 ft. (262 m) vessels, carrying a payload of 10,000-tons to complete the journey from Philadelphia to Cherbourg in less than four days, while attaining speeds of up to 40 knots.

Another watershed-type contract was the specification of GE gas turbine engines for Royal Caribbean's new cruise ships. Royal Caribbean, which has battled public relations problems of late with some non-propulsion related pollution issues, loudly touted the gas turbine choice of propulsion as evidence of its commitment to improving the environment in which it operates. GE has derived much of its business in the marine market from the naval side, but



increasingly it has found its LM aeroderivative gas turbine products specified on commercial craft, from fast ferries to cruise ships. In fact, the company recently passed a major milestone as GE's worldwide LM aeroderivative gas turbine fleet reached the 40 million operating hour mark.

GE has also seen its market expand in its traditional naval markets, as its LM2500 aeroderivative gas turbine was recently used as the prime mover for the Integrated Power Systems (IPS) test program, marking the first time that the Navy had used the LM2500 in an electric drive configuration. The IPS program, under direction of the U.S. Navy's DD21 and Associated Technologies Program Executive Office, is designed to enhance ship performance and increase arrangement flexibility.

Solar Turbines is another traditional gas turbine company, and a pair of its

Taurus 60M gas turbines were recently specified to power a 174-ft. (53-m), 450-passenger 43-knot catamaran being built by FBM Marine in the U.K. for operation in Greece. The ferry follows another Solar Turbine powered ferry — Athina — into the Greek market. To date, Athina has logged more than 2,000 operating hours with no lost trips due to engine related problems. In total, the Taurus 60M has accumulated over 186,000 operating hours in 13 fast ferries, including eight ferries in Hong Kong, three ferries in the U.S. and two ferries in Greece.

For more information on the companies in this story, circle the appropriate number on the Reader Service Card in this edition:

Rolls Royce	195
General Electric	194
Solar Turbines	193

Sulzers Power New Astilleros-built Ships For Finnlines

Finnish operator, Finnlines, has taken delivery of a pair of innovative combined fast ferry and RoPax vessels, which include advanced safety and access features — setting them apart from any of their kind.

Constructed at Astilleros Españoles' Puerto Real yard, the vessels, named Finneagle and Finnclipper, are the first couple of a series of four RoPax vessels designed and built according to the new Seapacer-class concept developed by Swedish owner Stena. Both vessels are equipped with a substantial access system leading onto the main deck, comprising a stern ramp/door with a 64 ft.

(19.5-m) driveway at the ship threshold. Able to manage two lanes of traffic simultaneously, the 64 ft. (15-m) ramp leads into a hull opening measuring 66 ft. (20 m) wide — reducing to 49 ft. (15 m) at the shore end.

Built for the purpose of providing a speedy service with comfortable overnight accommodations, the compactness of the vessels' public areas proves to be advantageous. Extending over four levels, the forward accommodation super-structure is designed for up to

440 passengers in 187 cabins — more than the minimum requirement on a pure driver RoRo vessel.

The sister vessels move at speeds of 20.5 knots with propulsion supplied by four Sulzer main engines, each outputting 5,760 kW at 510 rpm.

Circle 190 on Reader Service Card

Cats Power First ASRY Newbuild



Marking a milestone in the yard's history this past May, ASRY launched its first newbuilding, a 41 ft. (12.5 m) LOA service and mooring boat for its internal use following its planned diversification into the small craft newbuilding sector. ASRY can now construct vessels such as harbor tugs, workboats, pilot launches and other small service craft for operation in the area.

Circle 33 on Reader Service Card

Main Particulars

Length, (o.a.)41 ft. (12.5 m)	WindlassSimpson Lawrence
Breadth13 ft. (4 m)	Towing hook . . .Oelkers + Eichler
Depth6.5 ft. (2 m)	CompassW.Ludolph
Draft4 ft. (1.2 m)	Electrical system 24 V DC system
Main enginesCaterpillar	charged by engine driven alternator
Gear boxesTwin Disc	Speed8.5 knots
Stern gearTeignbridge Prop	Bollard pull3.5 tons
Rudder assembly . . .Teignbridge	
Steering gear . . .Groveready Ltd.	

Cummins Drives Chicago's Little Lady

Mercury Skyline Sightseeing Boats has christened and placed into service its newest vessel, Chicago's 68-ft. (20.7-m) Little



Lady. Built by Freeport Shipbuilding of Freeport, Fla., the 149-passenger craft is classically styled. With a 17-ft. (5.57 m) draft, the vessel can slip under the downtown bridges on the Chicago River. Little Lady will be used extensively for narrated architectural cruises; beginning at Mercury Skyline's landing at Wacker Drive and Michigan Avenue on the Chicago River. The two Cummins 6CTA8.3-M1 engines are fitted with Twin Disc MG-507 gearboxes. The engines are resiliently mounted and the engine room is acoustically insulated.

Circle 17 on Reader Service Card

EMD Powers World-Class Tugboat

Washburn & Doughty launched Marci Moran, a 92-ft. (28-m) Z-drive tractor tug for Moran Towing. Marci Moran is the first of six tugs being built by Washburn & Doughty for Moran over the next year. Upon delivery, the vessel will report to its homeport in Norfolk, Va. A state-of-the-art Ulstein Z-drive propulsion system, powered by two EMD 16-645-E2 main engines, will provide extraordinary maneuverability and power.

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Reintjes Perform In Demand Applications

Reintjes is an acknowledged leader for gears for unusual applications on special-purpose ships, such as vessels for public authorities, workboats, lifeboats and fast ferries, for transmission of engine outputs from 25010,000 kW.

Based in Hamelin, Reintjes gears are found aboard many of the most advanced types of vessels being built today, notably Australian-built fast ferries such as the Austal-built Auto Express 86 for Turkish shipping line IDO, and the InCat-built InCat 96 super freight ferries of the type, dubbed Devil Cat and Bonanza Express. Reintjes units were also selected for the impressive InCat 91-type vessel, an 800 ton fast catamaran ferry series, which measure 295 x 85 ft. (90 x 26 m), and incorporate four compact high-performance diesel engines developing 7,000 kW each, generating speeds up to 40 knots. Each engine acts on a gear to propel a water jet. Speeds of 1,000 min-1 have to be reduced with minimal weight to 450 min-1 suitable for waterjets. Use of Reintjes gears can be found much closer to home, as the company's products were specified for 40 new U.S.C.G. heavy weather rescue cruisers of type 47' MLB (motor life boats) from Textron Marine & Land Systems. About half of these boats were delivered by the end of 1998, and the remainder is to be put into service this year. These rescue vessels are an entirely new development calling for the

highest performance from installed systems, particularly the propulsion plant.

The rescue cruisers incorporate two Detroit 6V92 TA DDEC diesels, each developing approx. 310 kW/rpm 2,100 min-1. This output is transmitted via Reintjes gears of type WVS 234 UP with 1:2 reduction driving two fixed-pitch propellers (28 x 36 x 4"), providing a max. speed of 25 knots. The vessels have an action radius of 200 nm at a cruising speed of 22 kn.

The order presented a formidable challenge, as in the event of capsizing the rescue cruisers have to right themselves within six seconds. This involves first of all guaranteeing full gear functions even upside down without oil leakage. When the boat capsizes, the engines automatically run idle and initially the gears remain engaged. If air is sucked in during this time, the drive shaft is disengaged for a short time, and after the boat has righted itself the gears automatically reengage. Series production of 47' rescue cruiser MLB at Textron Marine & Land Systems in New Orleans

The orders were handled via Reintjes U.S. contracting partner, Karl Senner Inc., based in New Orleans. This company, which was founded in 1972 and has branches in Everett and New York, has been highly successful distributing and servicing Reintjes products in the USA.

Circle 63 on Reader Service Card

CIMAC Day At Europort

On November 17, CIMAC will hold its annual CIMAC Day at Europort. The day is dedicated to Turbocharging, and the conference will feature the current view of manufacturers and users. A number of topics will be addressed by the expert panel, including: Performance, efficiency and reliability: A compatible triad for turbochargers?; Degradation of turbocharger performance and service; Transient response requirements for turbochargers; Single stage and multi-stage turbocharging; Limits and opportunities; and Outlook: New developments, systems and arrangements. The panelists will be: G. Wachtmeister, MAN B&W; P. Spengler, ABB Turbo Systems; Ch. Lutzen, A.P. Moeller; D. Tsalpatis, MAN B&W; K. Imakiire, Mitsubishi; and S.N. Yoo, Hyundai.

Circle 70 on Reader Service Card

New Training Resource For Engine Room Staff

A new guide dubbed Fuel and Lube Oil Training Manual has been published by Kittiwake, specifically aimed at the protection of extremely expensive and vital generating plants. The publication, produced in conjunction with

Wartsila NSD and Mobil Oil Co., takes the reader through a simple, thorough understanding of both fuels and lubricating oils used in modern engine plants. The manual is \$40.

Circle 68 on Reader Service Card

Commercial Breakthrough For MAN B&W

Following its traditional policy of a safe, step-wise development of new technology, MAN B&W has taken the initiative towards a commercial product by demonstrating the concept in full scale in actual service namely, on the 37,500 dwt chemical carrier M/T Bow Cecil.

Upon its delivery to the Norwegian owner Odfjell ASA from Kvaerner Florø yard in Norway, the vessel's main engine was equipped with the IE systems in parallel with the usual camshaft. This conventional system allows for a quick change-over to the IE system – or vice versa within three hours.

During a recent sea trial, the ordinary camshaft system was used during the first operating period of the vessel. Auxiliary systems onboard were tested and the electronic hardware systems and comprehensive relevant software will be fit to the engine this fall.

Circle 77 on Reader Service Card

September, 1999

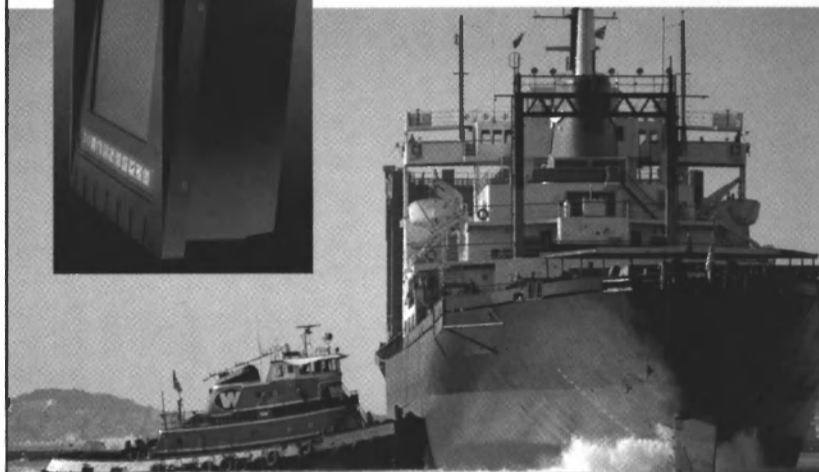
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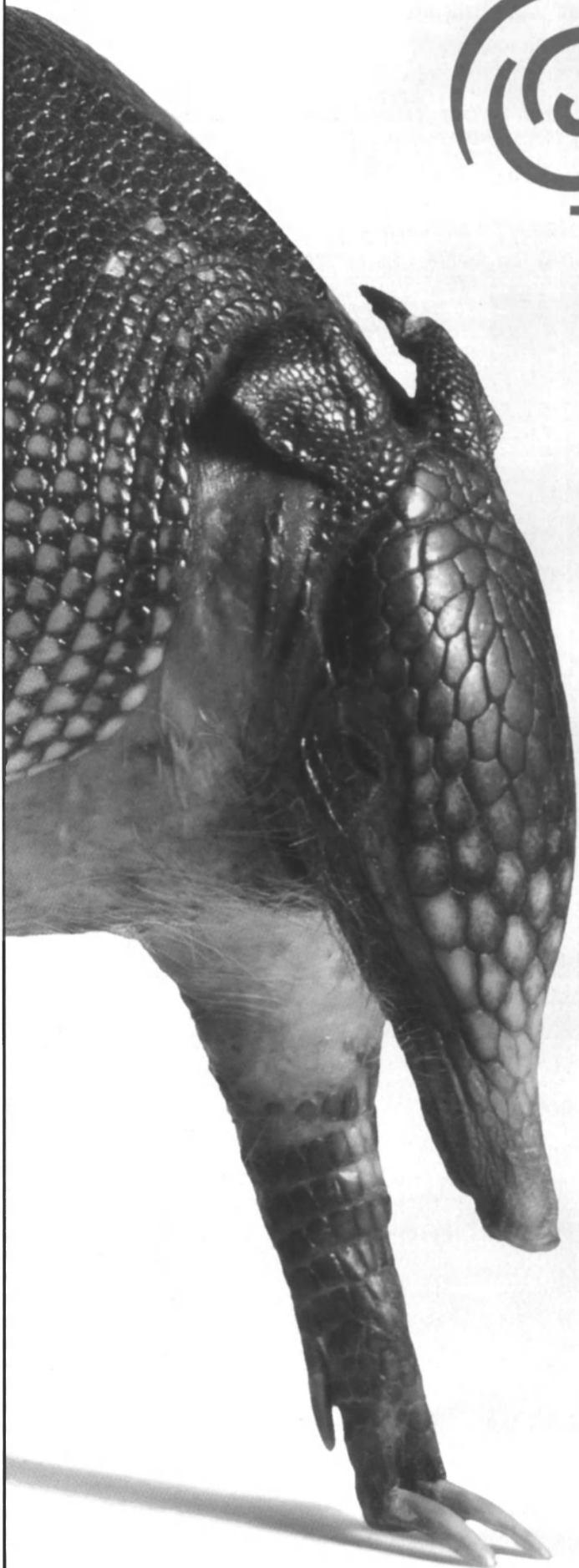
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The first IMO exhaust emissions certificate for a Sulzer diesel engine has been received by Sulzer for its 7RTA52U engine outputting 10,920 kW at 135 rev/min. Issued by the classification society Nippon Kaiji Kyokai, the engine was tested at the Aioi works of the Wärtsilä NSD licensee Diesel United Japan.



Wärtsilä NSD is working to install direct water injection on seven RoRo vessels.

Wärtsilä is fully supporting the engine builders to garner certification of the first engines of each Sulzer engine type, which also involved cooperation with the classification societies to which many flag states have given out the issuing of IMO emissions certificates. The company is also working to install direct water injection on seven RoRo vessels chartered by Transfennica, a transporter of Finnish forest products. This technology, which can lower NOx emissions up to 60 percent, offers a unique combination of low investment and operational costs, reliability with virtually no additional space requirements. All seven forest product carriers are being built by the German shipyard J.J. Sietas for a delivery sometime this year.

Wärtsilä has a positive record of developing its products and systems to comply with current and future environmental standards via its application of NOx reduction techniques – low NOx Combustion, Compact SCR and Direct Water Injection.

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Soundcoat Supplies Noise Insulation Package

The Soundcoat Company, a supplier of noise and vibration control materials, provided a package for the new Kvichak Marine patrol craft to be used by the City of Seattle Police Department. Measuring 44 ft. (13.4 m), the vessel is powered by Caterpillar engines rated at 660-bhp each, with a cruising speed of 28 knots.

Circle 78 on Reader Service Card

SSP Picked For Chem Tanker

The Chinese Shanghai Edwards Shipyard granted the Siemens-Schottel Propulsor (SSP) consortium the contract for an SSP 7 with a power rating of 5.1 Mw. Newly developed, the pod drive will be fit into a 19,500-dwt chemical product tanker ordered by Donsotank Reederi AB of Sweden. The tanker, which will be built in accordance with DNV Ice Class 1A.

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AMSTERDAM

Marine Diesel Engines: Entering A New Certification Era

(Continued from page 74)

the matter of verification rather than turning the ship into a seagoing emissions measurement laboratory.

New Engines

All engine builders who supply engines that will fall within the scope of the Annex VI requirements for installation on ships built on or after January 1, 2000 will therefore generally be expected to supply engines that are either pre-certified or, in those few cases where engines cannot be accommodated on test beds, tested to the required extent onboard following installation. When the Annex enters into force, pre-certification will result in the issue of an Engine International Air Pollution Prevention (EIAPP) Certificate; however, in the interim period it will be a Statement of Compliance with the NOx Technical Code which will be issued instead.

The actual engine certification process depends on the principles that NOx emissions do not increase over the service life of an engine and that, under standardized conditions, do not differ between engines of the same design, adjustment and usage. Consequently, the basis of the whole NOx certification program is to measure once but rigorously, as per the NOx Technical Code, for the Parent Engine and thereafter to ensure by means of the conformity of production that all subsequent engines, to be covered by that test, will have NOx emission rates no higher than that of the Parent Engine.

The approval process for a Parent Engine divides into a number of stages:

- Categorization into either Engine Family or Engine Group depending on the potential range of adjustment and the possibility of modifications
- Selection of the Parent Engine – The Parent Engine is to have the highest NOx emission rate of all those engines within the Engine Family or Engine Group which are to be represented by that Parent Engine.
- Adjustment and fit of the Parent Engine as tested. Again these are to such as to give the highest NOx emission rate for the selected Parent Engine.
- Parent Engine test in accordance with the NOx Technical Code.
- Preparation of the Technical File – this is to give the engine's rated performance, any designation and restrictions and identify the components, settings, operating values and adjustment ranges of those items which can affect the NOx emissions. The specification of spare parts is also to be included. In the case of Engine Group members, the Onboard NOx Verification procedures must also be given.

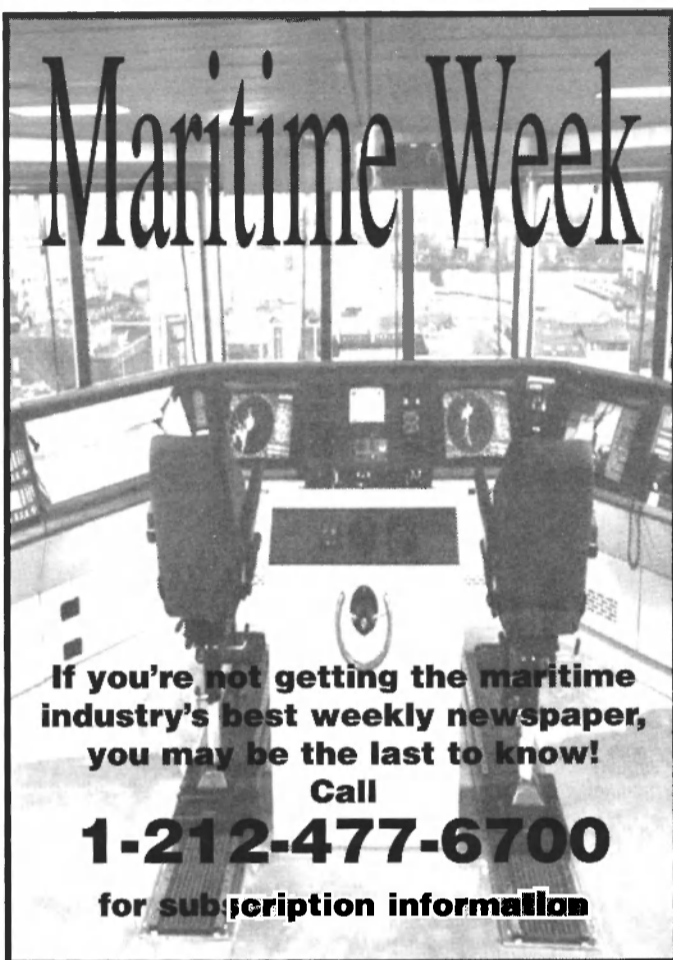
Since these aspects tend to be very specific to the engines under considera-

tion, it is for the engine builders to prepare their proposals in respect of each of these five stages and to submit these for approval to the relevant administration or delegated organization. In order to support the proposed Parent Engine selection, adjustment and fit, it may be necessary for the engine builder to have undertaken a number of emission trials to determine the actual effects of the

various factors that influence NOx formation during the combustion process with the Parent Engine test therefore being the final verification of performance. In addition, for series produced engines, the engine manufacturer would need to show that adequate arrangements will be in place to ensure effective control of the conformity of production.

Major Conversions


For those engines within the scope of the Annex VI requirements, a major conversion is defined in the NOx Technical Code as where the engine is replaced by a new engine built on or after January 1, 2000, where the maximum continuous rating of an engine is increased by more than 10 percent or where it is subject to a 'substantial mod-



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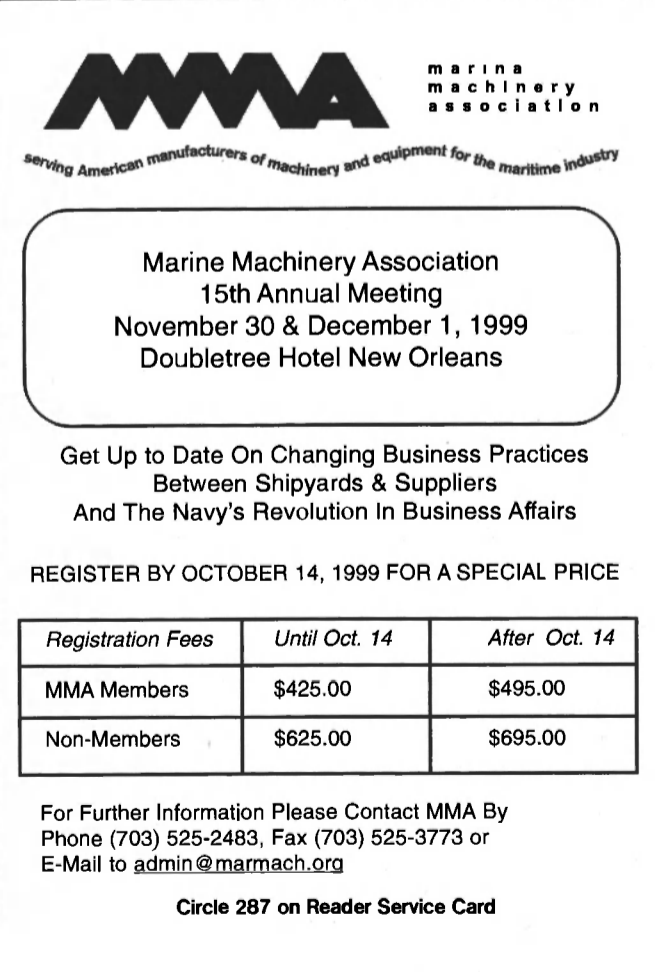
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ification.' The definition of substantial modification depends on when the ship was built. For those built on or after January 1, 2000 substantial modifications are those that could potentially cause the engine to exceed the NOx limits as set out by Regulation 13 of Annex VI. For ships built prior to that date, the engines would not normally have been subject to any emission control measures and hence may have NOx emission rates well above those permitted by Regula-

tion 13. In the latter case, the NOx Technical Code requires that the NOx emissions be quantified in accordance with the Simplified Measurement Method, as given in the Code, prior to and on completion of those modifications. If the NOx emission value increases by more than the set allowance, 10 percent or 15 percent depending on test conditions, then that engine as modified thereafter falls within the scope of the Annex VI requirements and will therefore need to

meet the relevant NOx limit as set out in Regulation 13, be provided with an approved Technical File and be subject to subsequent surveys.

Consequently, from January 1, 2000 shipowners contemplating modifications to those engine components or settings (i.e. combustion chamber geometry, oil fuel injection arrangements or charge air system) which could affect the NOx emission value will need to take particular care as to the effect of

those modifications as to an engine's status as regards Annex VI. In the case of engines on ships built before January 1, 2000, it should be recognized that the possible need to perform two sets of emission measurements onboard and go through the attendant approvals process is one that should not be undertaken lightly.

Uniformity of Approach

The certification aspects resulting from these NOx controls will be the responsibility of the Flag State of the ship on which an engine is, or will be installed. But, as with other MARPOL work, the administrations may delegate that work to other organizations, which are able to act on their behalf. It is of great importance to both engine builders and shipowners to have a unified procedure for this certification on a worldwide basis. Not only will this reduce the difficulty in reaching common interpretations of aspects within the regulations but also simplifies matters where change of Flag is undertaken. Currently, the bulk of the work associated with the NOx controls is being undertaken by the classification societies, which, through IACS, have a ready means of achieving common agreement between themselves. This matter of agreement is crucial since if there were to be irreconcilable differences in approach between the various organizations issuing the certification then the smooth operation of the whole system would be impossible. Consequently, it may be seen that the widespread delegation of this NOx certification work to the classification societies would be an effective way of providing the essential uniformity of approach. With all this work associated with the introduction of NOx emission controls, particularly since it addresses matters, which historically have not been of concern to the marine industry, it is to be expected that any number of questions will arise from and between Administrations, classification societies, engine builders, shipowners and others. The CIMAC Exhaust Emission Controls Working Group, as a cross industry forum involved in these matters consequently anticipates a busy and productive future.

Mr. Andrew Wright from the American Bureau of Shipping is currently Chairman of the CIMAC Exhaust Emission Control (Piston Engines) Working Group. Working within ABS' London based Engineering Services Department he has a central role in the development and provision of the Bureau's engine certification services to meet the MARPOL Annex VI requirements.



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Circle 271 on Reader Service Card

Podded Propulsors Gain Wider Acceptance

(Continued from page 76)

Parented by Kamewa, as the Swedish arm of the Vickers group, and electric drive specialist Cegelec, the system now has a rather broader ownership spread, as a result of the creation of the new Vickers-Ulstein Marine organization and Alstom's takeover of Cegelec. In-house connections play a vital role in business development, as demonstrated by the current level of recourse to Mermaid for newbuild orders at Chantiers de l'Atlantique, the primary shipbuilding entity within Alstom.

The latest contractual reference in France calls for the delivery of two 8.5-MW podded electric drive, azimuthing units for the \$280 million, 46,000-gt Seven Seas Mariner. It underscores the growing popularity of podded systems, which eliminate the need for long shaft-lines, rudders, rudder machinery, and stern thrusters, freeing large amounts of space onboard, and which provide much greater maneuverability and steering capability than the conventional alternatives.

Due to be ready for delivery at the beginning of 2001, Seven Seas Mariner will become the largest vessel operated by Radisson Seven Seas, in a project involving the participation of the Monaco-based ship management company V. Ships. The 360-cabin newbuild will become the industry's first all-balcony, all-suite cruise vessel. She testifies to the positive view of the cruise ship market held by the Minneapolis-based Carlson Group, which plans to expand the Seven Seas fleet by one vessel per annum over the next five years from 2000.

The first two Millennium-class 85,000-gt cruise ships booked with Chantiers de l'Atlantique by Royal Caribbean are intended for operation with its subsidiary Celebrity Cruises. The project signals the introduction of gas turbine propulsion and the coges concept to the cruise market, and will employ two 19.5-MW Mermaid podded units.

The build program at St. Nazaire has been extended as a consequence of options on third and fourth Millennium being exercised recently by the Royal Caribbean group. While the initial ships are expected in June 2000 and January 2001, deliveries of the second pair into Celebrity's employ are slated for August 2001 and March 2002.

It is understood that the technical design of the latest additions to the workload will be identical to that of the first two vessels, which points to the likelihood of a further tranche of contracts for the Mermaid system before too long.

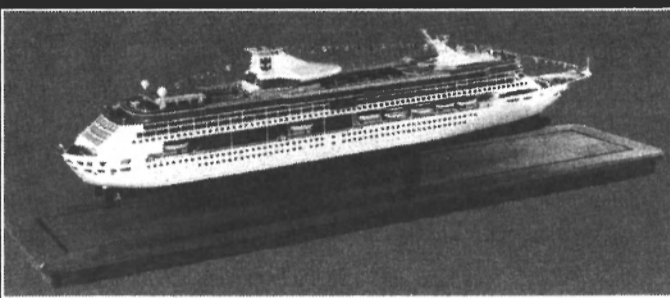
With the Radisson cruise ship deal, the

sales tally for Mermaid reached 18 units in a comparatively short period of time, while Royal Caribbean's new additions to its Millennium program hold out the prospect of orders for another four 19.5-MW drives. Podded propulsion is also to be adopted for the two 48,000-gt cruise ships just ordered from Chantiers de l'Atlantique for operation with Festi-

val Cruises of Greece. It is understood that consideration is being given both to Mermaid and to a rival system.

Mermaid achieved its market breakthrough last year with a four-unit installation on the Sedco Forex semi-submersible drilling exploration platform Sedco Express. Each of the rig's azimuthing pods is rated at 7-MW.

The Sedco Forex deal involved two such platforms, and the company went on to order a similar package of four pods for a third rig. The Mermaid propulsion arrangements form part of a package from Kamewa and Cegelec encompassing main distribution switchboards, automation and dynamic positioning systems.




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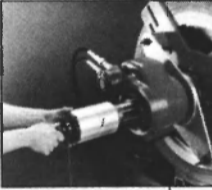


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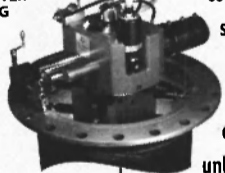
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Development work on Mermaid constituted one of the most extensive projects in the history of Kamewa's Hydrodynamic Research Center in Kristinehamn, Sweden, where model testing of azimuthing thrusters has been conducted for decades.

"The testing has ensured that Mermaid offers the lowest possible noise and vibration levels," said Mermaid Propulsion project manager, Jan Pettersson.

"This, in turn, means an unusually high level of passenger comfort. Safety is increased by excellent maneuverability, and superior crabbing and crash-stop capabilities," he added.

While Germany's premier shipping group, Hapag-Lloyd, selected Azipod drive for its prestigious Europa cruise ship project, the German contender in the field of podded propulsion systems has achieved its market breakthrough

courtesy of a Swedish shipowner's new-build project. The endorsement of the German-engineered alternative is all the greater in its significance for the prominence of Scandinavian technology in the field.

The solution devised by steerable propulsion specialist Schottel in conjunction with electrical engineering group Siemens differs substantially from the other options available through

the adoption of tractor and pusher propellers at each end of the podded drive.

The Siemens-Schottel Propulsor (SSP) is due to make its operational debut next year, having been selected for Rederi Donsotank's 19,500-dwt chemical product tanker booked with Shanghai Edward Shipyard in China. The contract for the newly-developed pod was actually awarded by the shipbuilder, which is partly German-owned.

Since the main contestants in the market have been successful in attracting serial contracts, repeat, batch and potentially volume production will impact on manufacturing economics and enhance the competitiveness of the relevant products.

Significantly, therefore, Schottel has made dedicated provision for the output of SSP units from the facilities of Wismar Propeller und Maschinenbau, acquired from Dieselmotoren-Werke Rostock. Renamed Schottel-Antriebstechnik, the plant will be the subject of a five-year DM 30 million investment program, and will be the point of manufacture, assembly and testing of SSP propulsors.

The Swedish tanker recipient of the entirely German-conceived system, in its SSP7 configuration with an output of 5.1-MW, will be constructed to the highest ice class notation of Det Norske Veritas for year-round duties in the Baltic trade.

One of the characteristics which favored SSP's selection for the Donsotank vessel, designed by the Uddevalla firm FKAB, was its ease of fitting, a factor salient to its use in a project in China. Modular design and the avoidance of complex air cooling arrangements, makes for a relatively straightforward installation.

Perceived strong points of the concept, from the contractual owner's standpoint, are improved efficiency compared with conventional propulsion systems, outstanding maneuverability and ice-going capabilities, low maintenance requirements, and space-saving attributes, enabling more of the hull envelope to be used for cargo carrying.

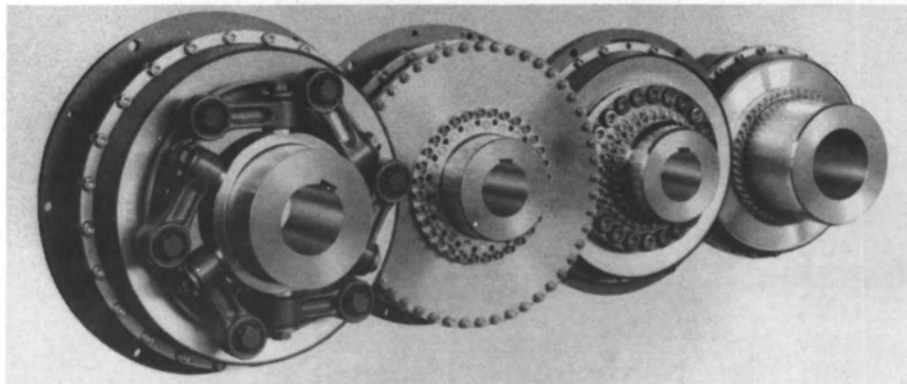
Schottel and Siemens have jointly developed the 360-degree rotating SSP using the SVA institute in Potsdam for tank and cavitation tests. It is claimed to offer 10 percent higher propulsion efficiency than conventional systems, and is targeted at applications in the 5-30 MW range embracing the cruise ship, large ferry, reefer, products and chemical tanker, icebreaker, and offshore and sectors as well as the naval market.

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AVERAGE	986.5	337	12.9	.04	.20	2.50	120	21	26	.03	AVERAGE	987.7	312	13.6	.07	.45	2.80	251	19	33	.04	
MAX	991.8	378	14.5	.12	.55	3.22	206	61	41	.05	MAX	991.3	371	18.9	.09	.90	3.47	352	36	79	.09	
BUENOS AIRES, ARGENTINA											PIRAEUS, GREECE											
AVERAGE	943.5	183	8.6	.01	.10	.49	12	7	27	.01	AVERAGE	972.5	333	12.9	.03	.07	2.99	133	28	25	.02	
MAX	961.4	217	9.6	.02	.20	.54	15	9	47	.01	MAX	990.9	389	18.1	.07	.15	3.93	176	80	65	.04	
FUJAIRAH, UAE											PUERTO LA CRUZ, VENEZUELA											
AVERAGE	973.7	376	15.4	.02	.17	3.07	93	23	6	.52	AVERAGE	964.7	286	10.8	.04	.09	2.04	149	9	27	.01	
MAX	981.6	464	19.9	.05	.25	3.80	152	30	10	6.00	MAX	971.0	405	11.9	.05	.15	2.24	183	16	39	.02	
GIBRALTAR, SPAIN											SANTOS, BRAZIL											
AVERAGE	978.3	301	10.7	.03	.21	2.89	112	15	17	.02	AVERAGE	974.6	344	9.2	.02	.08	.60	19	2	33	.01	
MAX	987.9	370	13.0	.05	.65	3.55	136	33	28	.03	MAX	978.5	375	9.7	.04	.10	.63	22	3	53	.01	
HOUSTON, TX											SINGAPORE											
AVERAGE	984.9	260	14.2	.03	.09	3.15	93	12	21	.02	AVERAGE	982.9	342	14.8	.03	.52	3.56	75	8	31	.03	
MAX	991.0	356	17.7	.06	.20	4.13	166	22	51	.04	MAX	991.0	405	17.8	.05	5.80	4.16	97	13	77	.06	
INCHON, KOREA											WILHELMSHAVEN, GERMANY											
AVERAGE	953.6	168	6.4	.02	.05	2.12	94	8	4	2.01	AVERAGE	978.0	301	11.9	.03	.17	2.08	131	14	37	.03	
MAX	956.2	177	7.0	.04	.05	2.85	200	26	8	8.00	MAX	989.9	344	14.3	.06	.40	2.63	296	20	66	.07	
LOS ANGELES, CA											YOSU, SOUTH KOREA											
AVERAGE	971.8	228	6.2	.05	.13	1.20	44	12	14	.01	AVERAGE	964.4	338	10.5	.02	.08	3.22	76	6	24	.03	
MAX	985.0	354	6.6	.07	.15	1.20	55	15	15	.01	MAX	966.6	394	11.4	.03	.10	3.37	93	6	27	.04	
NEW ORLEANS, LA											ZEEBRUGGE, BELGIUM											
AVERAGE	989.5	229	15.6	.04	.07	3.90	112	14	9	.03	AVERAGE	988.9	317	13.8	.04	.06	2.76	146	42	18	.03	
MAX	990.1	242	16.7	.05	.10	4.02	116	19	19	.05	MAX	990.9	365	15.5	.07	.07	2.86	172	72	28	.05	



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United States Marine Repair Promotes Dickinson

B. Edward Ewing, CEO of Norfolk-based United States Marine Repair (USMR), the largest non-nuclear ship repair, modernization and conversion company in the U.S. announced that **Monty Dickinson** will head USMR's West and Gulf Coast Shipyards.

Dickinson joined USMR last January as president and general manager of the

company's San Diego-based shipyard, Southwest Marine. In addition to managing that yard, Dickinson will spearhead leadership and operations of SWM's San Pedro, Calif. and Ingleside, Texas shipyards and San Francisco Drydock in the Bay area. Previously COO **Alexander J. Krekich** managed all shipyard operations. Under the new structure, Krekich will expand upon his responsibilities as COO of USMR, and will continue to lead East Coast opera-

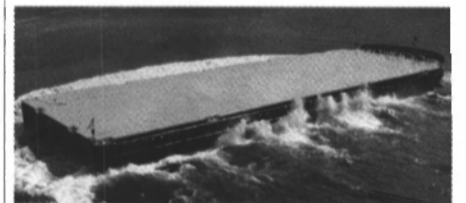
tions as president and general manager of Norfolk Shipbuilding and Drydock Company (NORSHIPCO).

FirstWave/Newpark Lands Diamond Offshore Job

FirstWave/Newpark Shipbuilding has been awarded a contract by Diamond Offshore Drilling of Houston, Texas for completion of upgrades to the drillship Ocean Clipper, which returned to Galve-

ston for the additional upgrades on August 16. "We're pleased that Diamond brought Ocean Clipper back to our yard for this project," said **Francis Fair**, FirstWave's executive vice president Galveston Operations. "FirstWave performed work on Clipper earlier this year, and we appreciate Diamond's confidence in us to provide additional services for the vessel."

Gunderson To Deliver Deck Cargo Barge



Gunderson, Inc., a subsidiary of the Greenbrier Companies, launched a high-capacity deck cargo barge, Signet Ulysses from its side-launch ways along the Willamette River. Measuring 300 x 200 x 20 ft. (91 x 61 x 6 m), with a high load capacity of 4,100 lbs. per sq. ft., the oceangoing barge will be sent to Signet Maritime of Houston, Texas. The vessel's smooth deck features recessed bits and kevels so that oversized loads can be easily moved, as well as a parabolic bow and specified corrugated bulkheads for strength and easy cleaning. The barge will carry heavy loads of machinery and other supplies to drilling platforms in the Gulf of Mexico and for special cargoes to Central and S. America.

Circle 46 on Reader Service Card

Flender Werft Launches Spaarneborg

The first of three RoRo vessels to be used for the Stora Transport System Europe was launched in August at Flender Werft's yard in Lubeck, Germany.

Sponsored by Mrs. **Eva Widigsson**, wife of Mr. **Olle Widigsson**, who is vice president of Stora's Purchasing and Logistics, the vessel will operate between Gothenburg and Zeebrugge, carrying graphic and packing paper.

The newbuilding is constructed for the transportation of items such as Stora boxes, trailers, trucks, and loading and unloading will be formatted through a stern ramp leading to main and lower hold. Propulsion is supplied by a long-stroke cross-head Wartsila diesel engine with an output of 10,920 kW @ 135 rpm, giving the vessel a service speed of 18 knots.

Main Particulars

Classification	BV
Flag	Netherlands
Length	601 ft. (183.4 m)
Breadth	83 ft. (25.2 m)
Depth	50 ft. (15.3 m)
Draft	25 ft. (7.5 m)
Deadweight	13,000 tdw

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99	AT&T Undersea Cable	undrsea cable	nrsn	91	Marine Machinery Association	association	287
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40	C & G Boatworks, Inc.	shipbuilding	366	71	Nautical Safety Products	gangways	386
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93	Climax Portable Machine Tools, Inc.	machine tools	223	52	PCS Marine Technologies	consultants	299
39	Comsat Mobile Communications	satellite communications	224	42	Permea Maritime Protection AS	gas generation systems	300
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NOTICE INVITING SEALED BIDS

NOTICE IS HEREBY GIVEN that sealed bids will be received by the Office of the Secretary of the District, Golden Gate Bridge, Highway and Transportation District (District) at its mailing address, P.O. Box 9000, Presidio Station, San Francisco, CA 94129, or by delivery to its office at the Administration Building, Toll Plaza, Golden Gate Bridge, San Francisco, CA until 2:00 p.m., Tuesday, November 23, 1999, at which time bids will be publicly opened and read for **CONTRACT NO. 99-FT-8, PROCUREMENT OF A FAST ALUMINUM PASSENGER FERRY**. The vessel is to be a twin-hulled catamaran configuration, excluding Air Cushion, SWATH and Hydrofoil vessels, designed for maximum utilization in fast passenger ferry service on San Francisco Bay and adjacent inland waters. Propulsion shall be provided by waterjet propulsion units driven by four diesel engines through reduction gears.

The District hereby notifies all bidders that it is the policy of the District to ensure nondiscrimination on the basis of race, color, sex or national origin in the awarding and in the administration of District contracts. The successful bidder shall cooperate with the District and shall use its best efforts to ensure that barriers to the participation of Disadvantaged Business Enterprises (DBE) do not exist. For DBE assistance, call Candice A. Gonzalez, Diversity Programs Director, at 415-257-4536.

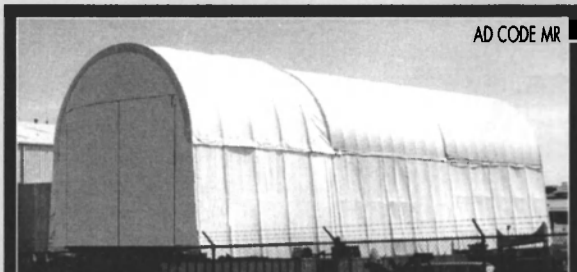
It is anticipated that this contract will be funded in part with federal financial assistance. Any name appearing on the Comptroller General's list of ineligible contractors for federally financed and assisted construction is not an eligible bidder, and any contract that may be entered into with such a contractor may be cancelled, terminated or suspended by the District.

Bids must be accompanied by a bidder's security as described in the contract documents. Bids will be reported to the District Board of Directors, which reserves the right to waive any irregularities or informalities in any bid or in the bidding procedure or to reject any and all bids.

A pre-bid conference will be held at 2:00 p.m., Tuesday, October 5, 1999, at the Administration Building, Toll Plaza, Golden Gate Bridge, San Francisco, CA.

Specifications, proposal forms, bonds and contract documents may be inspected and purchased at the non-refundable price of \$40 at said Office of the Secretary of the District, telephone 415-923-2223, facsimile 415-923-2013. Questions should be directed to Carl Harrington, Ferry Transit Manager at 415-925-5570. /s/Janet S. Tarantino, Secretary of the District. Dated: Tuesday, August 24, 1999.

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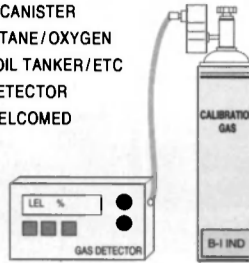
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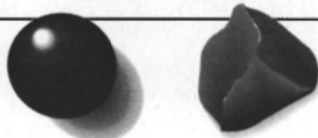
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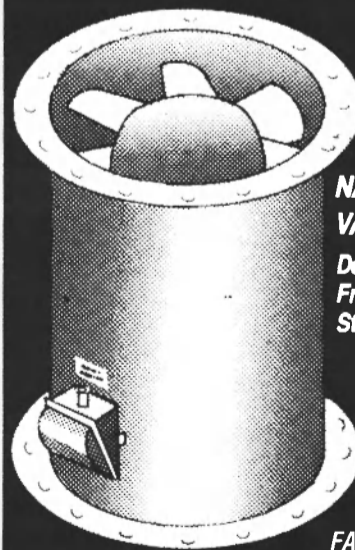
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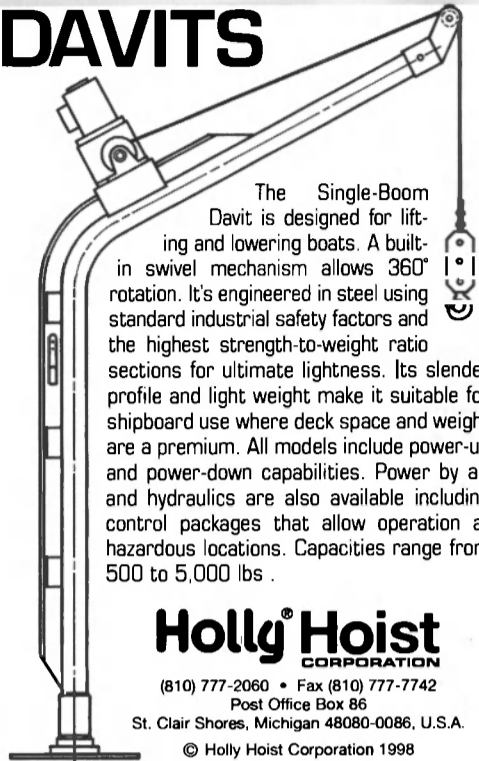
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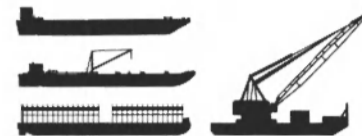
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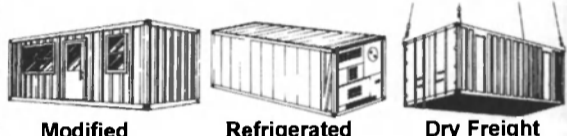


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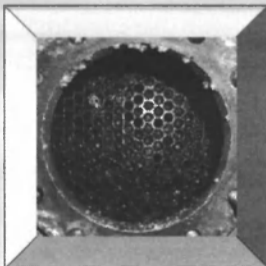
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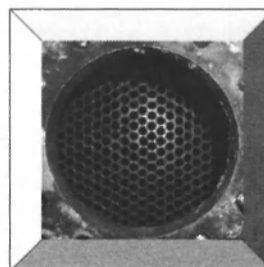


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