

December 2002

**MARITIME
REPORTER**

**AND
ENGINEERING NEWS**

There are many Great Ships of 2002, but

DAT's Incredible



Meet the ULFPS

IZAR investigates Ultra Large Floating Production Systems

Maritime Transportation Security Act

Dennis Bryant discusses what it really means

Investment in Design • Government Update • TBT Phase Out • Electronics Update

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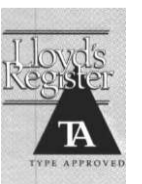
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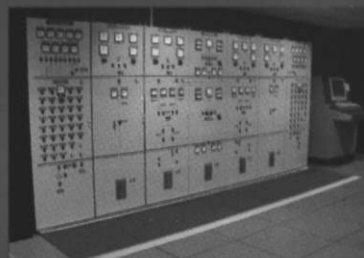
Seventeen ships, from the first Double Acting Tanker (DAT) to the first commercial dry cargo vessel to be built in the U.S. in 10 years are featured on these pages. Also, read about the "Malacca-max" tanker with the revolutionary Ax-bow; Contship Aurora, built by Daewoo and the first ship built to Germanischer Lloyd's new "Green Passport"; and the Chinese-built Rickmers Hamburg.



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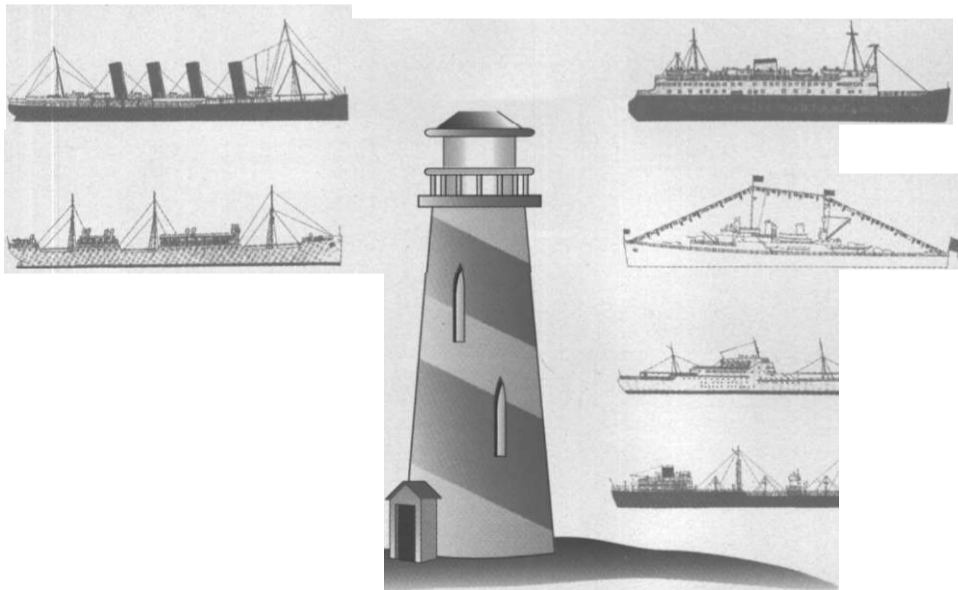
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Editor's Note

This is not the way that I prefer to launch into our year-end Great Ships edition, but unfortunately, *It* has happened again. On my early a.m. drive to work on Wednesday, November 20, the radio in my car was tuned to WBAB 102.3 FM, the "Roger & JP" show, which is a couple of stereotypical shock jocks better known for lockerroom humor than intelligent debate of world events. It was through this unlikely duo that I first learned that the 81,589-dwt tanker *Prestige* had finally sunk. The maritime industry had hit the mainstream again, and not in a positive light. The disaster really hit the big time with the publication of the November 25 edition of the *Wall Street Journal*. A page 1 article entitled "Clash of Politics, Economics Sealed a Tanker's Fate" examines the Port of Safe Harbor rules, or lack thereof, and the likely effects it had in the loss of *Prestige*.



For those *MR* readers outside of the U.S., it is important to realize that, despite nearly 95,000 miles of coastline and navigable waterways, and despite its status as the world's No. 1 trading nation, maritime industry awareness in the U.S. is generally confined to those living immediately on the coasts, rivers and lakes. Simply put, it is a subliminal part of the American psyche, until, of course, something goes wrong. But listening to the duo ramble on about the sight of seeing the huge ship break in half and sink, Roger or JP ... I have no idea which is which ... simply asked:

How does a ship break?

Despite the early hour and the absence of my first cup of coffee, my mind broke into "work mode" thinking of dozens of reasons as to why ship accidents and sinkings occur: Age; Cumulative effects of the sea; Poor maintenance practices/corrosion; Politics; Bad navigation/decision making; Engineering miscalculations ... the list goes on.

Despite my initial reaction of "these guys have no clue about the marine business" and my self assurance that I could lead a reasonably lively debate on the matter, I found myself coming back to the same, simple question that the radio disc jockey posed:

How does a ship break?

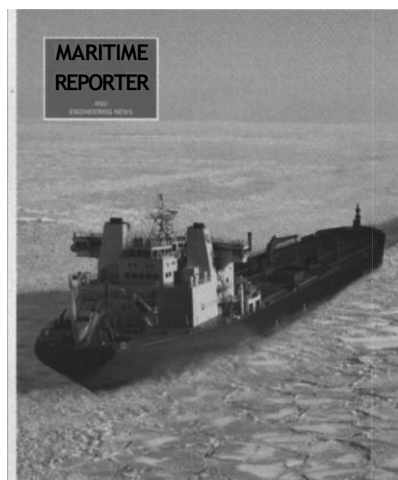
Frankly, it is confounding. I am the first to defend the marine business as safe and efficient carriers of all types of cargo around the world. In the coming weeks, I will be deluged with myriad data and statistics regarding the incredibly high percentage of cargo that goes through, year in, year out, without incident. But, as in every walk of life, there are good owners and bad owners; safe operators and unsafe operators; reputable builders and scurrilous builders. But with the vast resources, spanning from the International Maritime Organization to the U.S. Coast Guard to the individual offices of every vessel owner, builder and naval architect and marine engineer, loss due to structural failure is simply unacceptable. Delivering a cargo safely following a perilous 5,000 miles journey is deemed boring, un-newsworthy, by the general media. But, a ship breaking in half and sinking; spilled cargo; oiled critters of every genus pulled dead and alive from the sea is dramatic, heartwrenching and *very* newsworthy, the perfect cue for lawmakers — small and large — to stand on the nearest soapbox and demand change. Ironically, on November 19, a truck rolled off of a ferry and into Long Island Sound, resulting in loss of life and injury. Roger or JP (which one, I don't know) again asked "How does a truck roll off of a ferry?" I've taken that ferry, and I would also like to know.

How does a ship break?

If anyone knows, I invite you to write me.

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On the Cover



This month's cover features *Tempera*, the world's first Double Acting Tanker, and a Great Ship of the Year, featured on page 26. The vessel, built in Japan under license from Kvaerner Masa Yards, is unique in that it travels bow first in normal operating conditions, stern first in ice-breaking mode. The versatile Azipod solution makes the ship possible.

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As a Ship Sinks, So Does Some Credibility

The break up and sinking of the tanker Prestige last month off the coast of Spain is sure to create grass root changes in the maritime market that far exceed the economical and ecological damage caused. While it is impossible to determine, exactly, what new measures may be, there is an undeniable feeling that the powers in charge are determined to ensure that this sort of event is never repeated again. The fate of the tanker and the political and procedural situation that preceded it were fodder for the front page of the Wall Street Journal recently, not exactly the publicity the maritime sector seeks. There are many issues that jump to the forefront of the Prestige incident, including, and in no particular order: Procedures regarding ports of safe refuge; Phase-out of single hull tankers; Survey and Inspection; Design, Construction and Maintenance; and Marine Salvage and Recovery.

To the credit of all involved, the flow of information regarding the ship, its history, its status and its prospects was clear and free flowing from all corners, including SMIT, ABS, IMO and INTERTANKO. The availability and use of information could prove critical in assuring catastrophes such as Prestige are not repeated.

The following is excerpted from IMO's release on



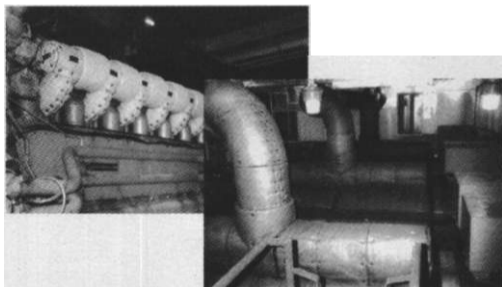
the matter on November 20:

"IMO's main concern now is to establish, as quickly and as thoroughly as possible, exactly what went wrong in this case so that the effectiveness of the regulatory framework that IMO has put in place can be

properly assessed and action taken, if need be, to rectify any weaknesses or deficiencies identified. Under the provisions of SOLAS and MARPOL, the Flag State Administration is required to conduct an investigation into serious casualties. The Flag State authorities of the Bahamas are therefore urged to expedite their investigation into the incident and provide IMO with their findings, conclusions and recommendations."

— Greg Trauthwein

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Prestige Facts

Name M/T Prestige
 IMO Number 725327
 Year Built 1976
 Shipbuilder Hitachi Shipbuilding & Engineering Co. Japan
 Owner Mare Shipping Inc., Registered in Liberia
 Manager Universe Maritime Ltd., Greece
 Flag Bahamas
 Class ABS - Built and maintained to ABS class
 Marpol 13G Phase out Date March 11, 2005
 Design Deadweight 81,589 tons
 Gross Tonnage 42,820
 Sister Vessels None in service
 ISM Documentation Reportedly issued by Bureau Veritas
 P&I Coverage London Steamship Owners Association
 Pollution Liability Coverage The operators state that Mare Shipping is full covered for shipowner's pollution liability within the International Oil Pol-

World Tanker Fleet

World Tanker Fleet (including chemical carriers) 8/2002

< 10,000 dwt	2,404
> 10,000 dwt	4,916
Total	7,320

World Single Hull Tanker Fleet (including chemical carriers) 8/2002

< 10,000 dwt	1,829
> 10,000 dwt	3,414
Total	5,243

World Double Hull Tanker Fleet (including chemical carriers) 8/2002

< 10,000 dwt	575
> 10,000 dwt	1,502
Total	2,077

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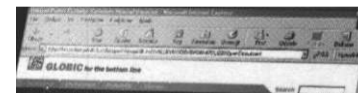
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News

KMM Designed PSV to be Built by Bender

Bender Shipbuilding and Repair Co., Inc. won a contract from Naviera Tamaulipas, S.A. of Tampico, Mexico, to build a 202-ft. (61.5-m) Platform Supply Vessel (PSV) designed by Kvaerner Masa Marine (KMM), part of

the Aker Kvaerner Group. The design is based on the K220, part of KMM's new K-series of Platform Supply Vessel designs.

The 202 x 54 x 19-ft. (61.5 x 16.4 x 5.7-m) vessel was designed to incorporate the specific needs of the owner for operation in the Mexican offshore mar-

ket. It includes new technologies and embodies market trends, with its oblong liquid mud tanks outboard of the center line bulk mud tanks, and 600-hp A/C electric motor driven CPP tunnel thrusters, two in the bow and one in the stern. The vessel will be certified to ABS DPS 1 and will be equipped with a



5,300 gpm fire monitor driven by an A/C electric motor. Propulsion consists of two Caterpillar 3516B DITA diesel engines driving fixed pitch open propellers. The vessel design is based on the KMM standard K200 series K220 that KMM developed specifically for the Gulf of Mexico market. The K200 series consists of PSV designs where the second two digits represent the design deadweight in hundreds of tons. The design has been tailored to the facilities and construction philosophy at the Bender shipyard. "We welcome this opportunity to team with KMM and with Capt. Sanchez and his team at Naviera Tamaulipas to construct a vessel which will be the best equipped and mission capable PSV in the Mexican Flag Fleet," said Tom Bender, president, Bender Shipbuilding.

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**Conrad Industries
Awarded Ferry Contract**

Conrad Industries, Inc. has awarded a \$9.5-million contract for the Alaska Marine Highway System. The contract award calls for the construction of a 181-ft. (55.1-m) ferry capable of transporting 149 passengers and 18 vehicles. When delivered, the vessel will provide service between Metlakatla and Ketchikan, two of the Inside Passage of Alaska's southernmost communities.

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Keppel Wins Barge Order

Keppel Corporation Limited, through its offshore unit in Keppel Offshore & Marine Ltd (Keppel O&M), has clinched a \$14.1-million contract to build a swamp barge from repeat customer, PT Apexindo. The Indonesian drilling contractor, who recently obtained a public listing on the Jakarta Stock Exchange, has earlier awarded Keppel with two other contracts, one for the new construction of a 226-ft. (68.8-m) swamp barge Raisa, which was launched on October 22, 2002, and another for the repair and refurbishment of swamp barge Maera — whose six-month refurbishment is halfway complete.

Wartsila, MHI to Develop New Diesel Engine by 2004

Wartsila Corporation and Mitsubishi Heavy Industries (MHI) will together develop a new 500-600 mm cylinder bore engine, with the ambitious goal of having the first unit ready for delivery in 4Q 2004. The development perhaps ushers in a new era of cooperation amongst major equipment suppliers, which continually search for innovative means to keep product lines up to date while simultaneously keeping a lid on soaring new product development costs. According to **Mikael Makinen**, Wartsila group vice president, Marine Division, the development costs for the engine will be shared equally, and the engine will be marketed and sold separately, branded with both the Mitsubishi and Sulzer name.

"We see in the market that we (Wartsila and MHI) are complementing each other rather than competing," Makinen said. A collaboration of this scale is not unprecedented, as Wartsila and Cummins formed and eventually dissolved a similar relationship in which the companies sought to develop and sell a smaller engine range.

"We learned a lot from that experience," Makinen said. "First, it has to be very clear on who is responsible for what... and it helps if the partner com-

panies have a similar philosophy."

Past disappointments notwithstanding, Makinen is confident of success with the much larger Japanese partner, which is nearly 10 times larger than the Finnish company with a nearly \$22.1 billion turnover versus Wartsila's \$2.4 billion turnover. In fact, Makinen admits that the intention of the new partnership is to develop more than just one engine, though nothing is confirmed past the initial engine.

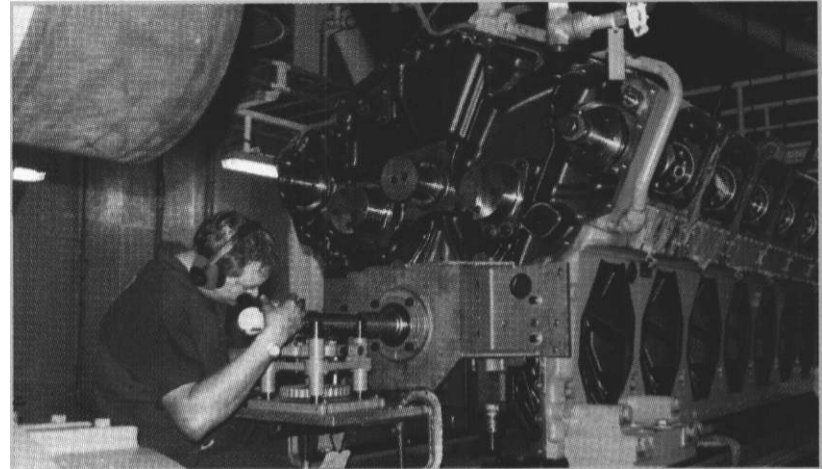
The low speed marine diesel engine will have a 500-600 mm cylinder bore, and will be targeting a wide variety of ships, including Handymax and Panamax bulk carriers, large product tankers, container feeder vessels and medium-sized reefer ships.

Both companies currently manufacture a range of low-speed marine diesel engines, with Wartsila's Sulzer range covering the 5,000 to 80,000 kW range, and Mitsubishi's UE engines covering the 1,120 to 46,800 kW range. While Makinen did not suggest the new unit will directly replace a Sulzer engine, he did say that the Sulzer 52 UB is one of the oldest engines in the brand's range, and he envisages it being around for another 10 years.

— Greg Trauthwein

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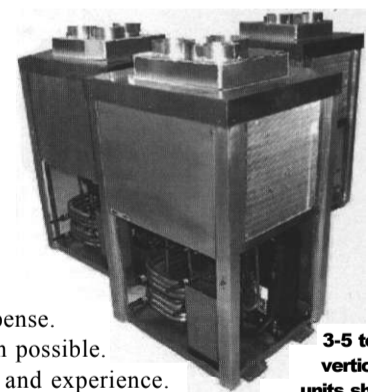
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News

Construction of World's Largest Dredger

SMIT has been awarded a contract from IHC of The Netherlands to provide heavy lift services next year, during the construction of the world's largest self-propelled cutter suction dredger. Commencing in January 2003, the contract

will involve at least 10 visits to IHC's Rotterdam yard. Over an eight-month period, the floating sheerlegs Taklift 1 and Taklift 4 will install modules equipment during the construction of the 45,000 cum jumbo dredger. The new-build, for Belgian dredging group Jan de Nul, will be delivered in 2003.

Tom Crowley Jr., Honored with AOTOS Award

Norman Mineta, U.S. Secretary of Transportation, presented one of two United Seamen's Service 2002 Admiral of the Ocean Sea (AOTOS) Awards to Tom Crowley Jr., chairman, president and CEO of Crowley Maritime, on the

evening of November 8. An AOTOS award was also presented to Capt. Timothy A. Brown, president of the International Organization of Masters, Mates & Pilots, ILA, AFL-CIO. The AOTOS award honors those within the shipping industry who have made significant contributions to American shipping and American Seafarers.

VT Halter Marine Secures OSV Contract

Vision Technologies Systems, Inc.'s (VTS) subsidiary, VT Halter Marine, Inc. won a contract to build an Offshore Supply Vessel (OSV) for an undisclosed interest. The contract includes options for six additional vessels. This contract announcement, which includes options for six additional vessels, comes within days of VTS concluding the purchase of Halter Marine's assets. This state-of-the-art OSV, scheduled for delivery in approximately 13 months, will be ABS-classed and U.S. flagged for international service. Pricing and vessel specifications were not disclosed.

SCA: Tanker Rates Justify Higher Prices

The vessel retirement schedule in the OPA '90 will force retirement over the next five years of at least 12 U.S.-flag product tankers totaling almost 500,000 dwt of capacity (approximately 25 percent of the total U.S.-flag product tanker fleet) and over 50 U.S.-flag tank barges greater than 5,000 gt totaling over 1,000,000 dwt of capacity (approximately 45 percent of the total U.S.-flag ocean-going tank barge fleet greater than 5,000 gt). The economy has been struggling and recently there have been warm winters, but with heating oil stocks in New England 27 percent below average for the last four years and the economy expected to recover, demand for petroleum product movement will increase causing charter rates to rise along with demand. According to the Shipbuilders Council of America (SCA), with long-term charter rates for U.S.-flag double-hull tankers now at a level of \$37,000/day, rates justify construction costs of approximately \$85 million per vessel. The breakeven time charter rate for a \$85 million handysize tanker utilizing 25 year Title XI financing at 7 percent per annum and daily operating costs of \$15,000 is approximately \$34,700/day, a rate well below today's market.

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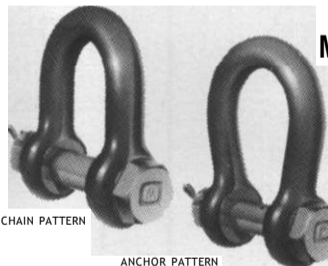


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Maritime Industry Gets A New Act

By Dennis L. Bryant,
Senior Maritime Counsel,
Haight Gardner Holland & Knight

After two years of machinations within Congress, involving various federal agencies and with some input from the private sector, the United States finally has a Maritime Transportation Security Act. This measure, when fully implemented, will impose broad security requirements on the maritime industry. It will also put the United States out of step with other nations with regard to various aspects of maritime security.

This bill is a combination or synthesis of measures adopted separately by the Senate and the House of Representatives. The Senate passed the Port and Maritime Security Act of 2001 on December 20, 2001. The Maritime Transportation Antiterrorism Act of 2002 passed the House of Representatives on June 4, 2002. The two measures took somewhat different approaches, but there were no major differences in the overall philosophy. Thus, it was relatively easy (at least by usual Capitol Hill standards) to fashion a compromise that all could live with. The success of the effort is reflected in the final vote. In the Senate, the bill passed 95-0. In the House, it passed by voice vote. Thus, there is a strong mandate, similar to that found with passage of the Oil Pollution Act of 1990 (OPA 90), in the United States to significantly enhance maritime security.

The Act includes numerous separate provisions. I will only attempt here to highlight some of the more important.

Vulnerability Assessments

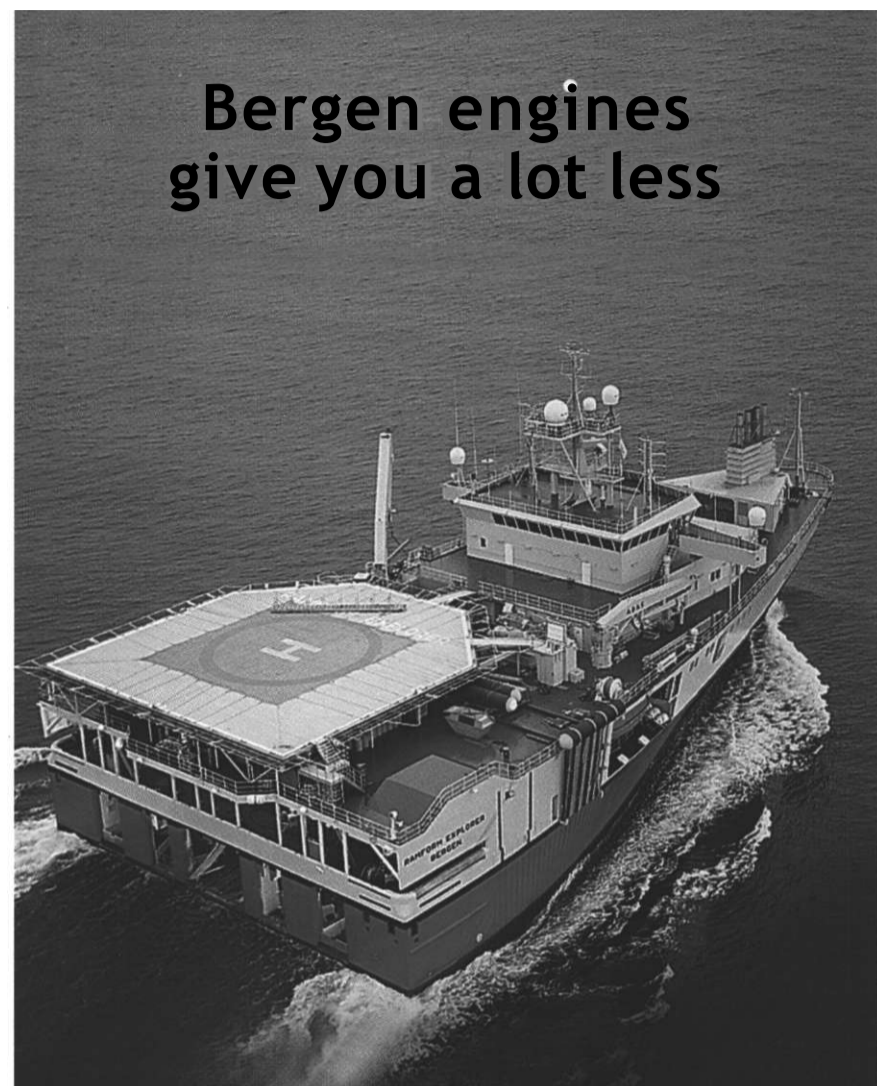
The Act requires facility and vessel vulnerability assessments to be done by the Coast Guard. The vessel vulnerability assessments will be limited, under this provision, to identification of vessel types that pose a high risk of being involved in a transportation security incident. The term 'transportation security incident' is defined in the Act as a security incident resulting in a significant loss of life, environmental damage, transportation system disruption, or economic disruption in a particular area. It is expected that tank vessels, passenger ships, liquefied natural gas (LNG) and liquefied petroleum gas (LPG) carriers, and container ships will be found vulnerable (at least to some extent) under this criteria.



Dennis L. Bryant, Senior Maritime Counsel at the law firm of Haight Gardner Holland & Knight, Washington, D.C., is a contributing editor of MR/EN.

Security Plans

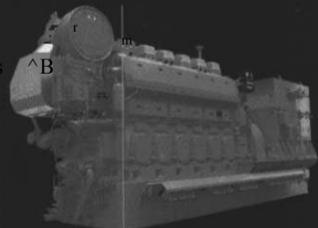
Similar to oil spill response plans under the Oil Pollution Plan of 1990 (OPA 90), the Secretary of the Department in which the Coast Guard is operating has been tasked with preparing a National Maritime Transportation Security Plan and Area plans for each Captain of the Port (COTP) Zone. Commercial vessels and facilities that the Coast Guard believes may be involved in a transportation security incident will be required to prepare and submit to the Coast Guard security plans for deterring a transportation security incident to the maximum extent feasible. The vessel and facility plans must be consistent with the National and Area plans; identify the qualified individual having full authority to implement security actions; identify and ensure by contract or other means approved by the Secretary the availability of security measures necessary to deter to the maximum extent practicable a transportation security incident; and describe the training, drills, and security actions of persons on the vessel or facility to be carried out under the plan. The plan must include provisions for establishing and maintaining physical security, passenger and cargo security, and personnel security; controlling access to secure areas of the vessel or facility; procedural security policies; communications systems; and other security systems. Unlike the OPA 90 situation, the vessel and facility plans are not limited to solely relying upon private resources, but the full extent of public resources in vessel and



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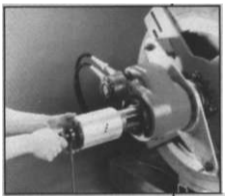
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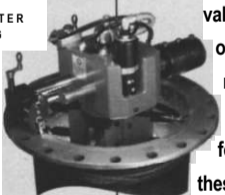
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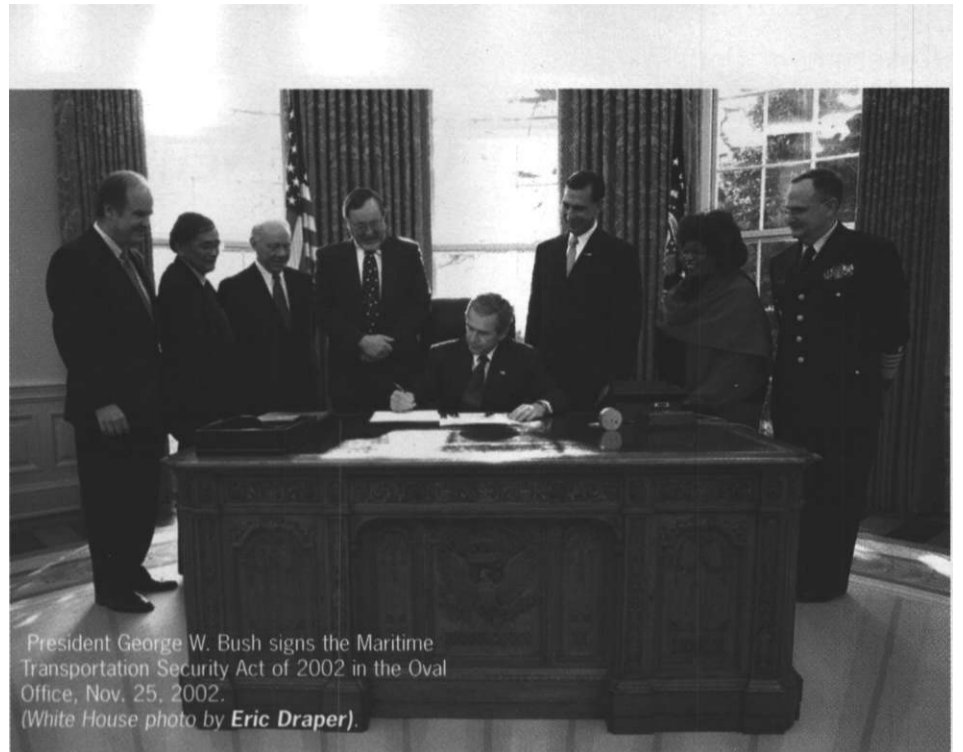
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President George W. Bush signs the Maritime Transportation Security Act of 2002 in the Oval Office, Nov. 25, 2002. (White House photo by Eric Draper).

facility security plans is not yet clear. The Coast Guard must promulgate its regulations for vessel and facility security plans by April 1, 2003. The vessel and facility security plans must be submitted to the Coast Guard within one year after the Coast Guard promulgates its regulations. Vessels and facilities will be allowed to operate under unapproved plans for up to one year, if they certify they have taken various measures. This will provide the Coast Guard with time to review and approve the plans.

At the same time, the International Maritime Organization (IMO), a specialized agency of the United Nations, is preparing to adopt international standards for ship security plans. The U.S. and IMO provisions will have numerous similarities, but also some striking differences. Both will require designation of company and ship security officers, in addition to development of the security plan. The IMO plan, though, will be prepared in accordance with IMO guidelines and will be approved by the flag state or its authorized agent (generally an IACS classification society). The U.S. plan will be prepared in accordance with USCG regulations and will be approved by the Coast Guard. The IMO plan will be required of all commercial vessels engaged in international trade of 500 gt and greater. The U.S. plan will be required of vessels designated by the Coast Guard. Tentatively, the IMO requirements will come into effect on July 1, 2004. The U.S. requirements will come into effect not later than April 1, 2004, and probably earlier.

Transportation Security Cards

No person will be allowed to enter secure areas of a vessel unless he or she possesses a Transportation Security Card issued by the U.S. Coast Guard or is accompanied by someone who has such a

card. Cards would be issued unless the individual is determined to pose a security risk. Transportation Security Cards would be required of the following:

- An individual allowed unescorted access to a secure area designated in a vessel or facility security plan;
- An individual issued a license, certificate of registry, or merchant mariners document by the U.S. Coast Guard;
- A vessel pilot;
- An individual engaged on a towing vessel that pushes, pulls, or hauls alongside a tank vessel;
- An individual with security sensitive information; and other individuals engaged in port security duties.

A Transportation Security Card may only be denied to one of the above individuals if the Secretary determines that the individual has been convicted within the previous seven years of a felony that either presents a terrorism security risk or causes a severe transportation security impact; has been released from incarceration within the preceding five years for such an offense; may be denied admission to the United States or removed from the United States under the Immigration and Nationality Act; or otherwise poses a terrorism security risk to the United States. A potential problem relates to foreign crewmembers. The Immigration and Naturalization Service (INS) is currently issuing 'detain on board' orders to large numbers of foreign crewmembers. It is unclear whether these crewmembers with thereby become ineligible for Transportation Security Cards. Since 'detain on board' orders have been issued for some senior shipboard personnel, such as chief engineers, this may present practical problems for ship operation. The Card issuance program would, though, include provisions for waiver and for appeal.

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Government Update

Enhanced Crewmember Identification

Crewmembers on vessels calling at U.S. ports will be required to carry and present on demand an identification credential acceptable to the U.S. Coast Guard. It is anticipated that a mariner's identification card issued under standards being developed by the International Labor Organization (ILO) would meet this requirement. If an international agreement providing for a uniform, comprehensive, international system of identification for seafarers is not negotiated within 24 months following passage of this measure, the Secretary is to present to Congress a draft bill that would establish a uniform, comprehensive system of identification for seafarers. The relationship between enhanced crewmember identification and Transportation Security Cards is not yet clear.

Grants

The maritime security grant program would be made permanent (subject, of course, to funding). Grants would be administered by the Maritime Administrator and available to port authorities, facility operators, and state and local agencies required to provide security services or funds to implement provisions of Area Maritime Security Plans or facility security plans. Costs that could be funded under these grants include conducting vulnerability assessments, acquiring and operating security equipment, and costs associated with correction of Coast Guard-identified security shortfalls. Funding levels for the grant program have not been resolved. While on-shore facility owners and operators have at least some hope that grant funds will offset the cost of mandated security upgrades, vessel owners and operators are again left holding the bag. The Act provides no grant monies for the costs of ship security upgrades. Container upgrades alone could cost hundreds of dollars per unit - and there are thousands and thousands of containers. Meanwhile, the failure of Congress to enact appropriations legislation has delayed funding of any new grants until at least April 2003.

Foreign Port Assessments

The Secretary has been tasked with assessing the effectiveness of antiterrorism measures maintained at foreign ports from which vessels depart on voyages to the United States or that otherwise present a security risk to international maritime commerce. Factors to be considered in the assessment include

screening and security measures in place at the port, licensing or certification of compliance with appropriate security standards (which would appear to mean standards developed by IMO), and the security management program of the port. If the Secretary finds that a foreign port does not maintain effective antiterrorism measures, the Secretary is to

notify the country of the finding and recommend steps to improve the antiterrorism measures at the port. The Secretary may also prescribe conditions of entry into the United States for any vessel arriving from that port or carrying any cargo or passengers originating from or transshipped through that port. The conditions of entry could be imposed 90

days after the foreign government has been notified of the finding that the port does not maintain effective antiterrorism measures (unless the Secretary finds that such measures have been adequately improved). The conditions of entry could be imposed immediately if the Secretary determines that the threat is severe. In extreme situations, the Secre-

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tary could prohibit U.S. port calls by ships arriving from foreign ports without effective antiterrorism measures.

Automatic Identification Systems (AIS)

The Coast Guard is authorized to require installation and operation of automatic identification systems (AIS) on self-propelled commercial vessels measuring 65 ft. (19.8 m) and longer, vessels carrying more than a specified number of passengers for hire, towing vessels of more than 26 ft. (7.9 m) and 600 hp, and any other vessel determined appropriate. Implementation dates are as follows:

- On and after January 1, 2003, for any vessel built after that date;
- On and after July 1, 2003, for any vessel built before 2003 that is a SOLAS passenger vessel, a tanker, or a towing vessel engaged in moving a tank vessel; and
- On and after December 31, 2004 for all other vessels.

The IMO requirement regarding AIS has not been finalized, but may well provide that the equipment is to be installed not later than the first ship's safety equipment survey after July 1, 2004 or December 31, 2004 — whichever occurs first. It is highly unlikely that the U.S. and international implementation dates for AIS will coincide.

Container Performance Standards

The Secretary, in consultation with the Transportation Security Oversight Board, is directed to establish a program to evaluate and certify secure systems of international intermodal transportation.

The program would include establishing standards and procedures for screening and evaluating cargo prior to loading in a foreign port for shipment to the United States either directly or via a foreign port; establish standards and procedures for securing cargo and monitoring security while in transit; develop performance standards to enhance the physical security of shipping containers, including locks and seals; establish standards and procedures for allowing the U.S. Government to ensure and validate compliance with the program; and any other measures the Secretary considers necessary.

The Secretary has also been tasked to develop an antiterrorism cargo identification, tracking, and screening system for containerized cargo shipped to and from the United States.

See the discussion above regarding the cost of upgrading shipping containers, in the 'Grants' section. The industry may well see itself pushed toward having two types of containers — those accepted in the United States and those accepted in the rest of the world. Initially at least, one should expect a shortage of U.S.-certified containers, particularly in smaller ports.

Civil Penalties

Civil penalties of up to \$25,000 could be imposed for violation of the maritime security statutes or regulations.

Expedited Rulemaking

The Secretary would be authorized to promulgate interim final regulations implementing the maritime security statutes without having to comply with the usual provisions of the Administrative Procedures Act, such as advance notice and comment. Final regulations, though, would have to meet the usual requirements.

What this means is that implementation will be greatly expedited, with minimal input from the regulated community. The result will be that any initial mistakes will not be caught

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Government Update

and corrected before carriers and others will have to spend time, money, and personnel resources to comply.

Extension of Seaward Jurisdiction

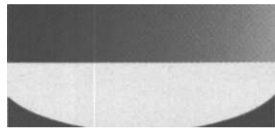
The Espionage Act of 1917 (which first established a port security program for the United States) has been amended

to extend jurisdiction out to 12 n.m. from the baseline from which the U.S. territorial sea is measured. A civil penalty of up to \$25,000 could be imposed for violation of the Espionage Act or regulations promulgated thereunder.

Transmittal of Information to Customs Service

The Customs Service is now authorized to require that information pertaining to cargo to be brought into the United States or to be sent from the United States be provided to the agency through

an electronic data interchange system prior to the arrival or departure of the cargo. Carriers must notify the U.S. Customs Service of any cargo tendered to the carrier for transportation that is not properly documented and that has remained in the marine terminal for more than 48 hours after delivery.



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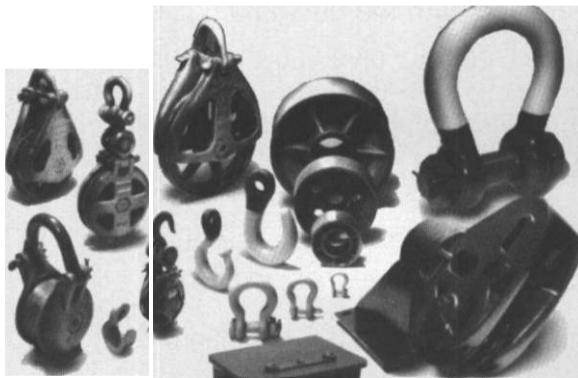
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Continuing Efforts to Enhance Maritime Security

The United States will continue its efforts to increase transparency in control and ownership of vessels. It will also work to enhance maritime transportation security, particularly intermodal transportation. In this respect, it will be joined by the majority of the community of nations, although there will be differences in specific measures to be relied upon to achieve the goal. One program that is causing discord is the Container Security Initiative (CSI) of the Customs Service. The European Commission contends that the program, under which U.S. Customs personnel are assigned to various foreign ports to assist in the pre-examination of containers bound for the United States, unfairly discriminates against smaller ports.

Summary

The need to enhance maritime security was made painfully evident by the September 6, 2002 terrorist attack on the French supertanker LIMBURG in Yemen. Now, the goal is to enhance maritime security in a manner that maximizes the benefits while minimizing the costs. In the United States, the Coast Guard, Customs Service, and other agencies involved in the process should be looking to the maritime industry to assist in development of workable solutions. Many in the industry actively participated in the OPA 90 rulemaking process, and the system benefited greatly from that involvement. Similar participation is called for in this situation. The agencies will move ahead in their rulemaking programs with or without industry participation. The rules, though, will be more efficient and impose lower costs if all affected by the programs are involved in the process.

It is incumbent on government agencies to seek input from the regulated community. It is equally vital for the maritime industry to quickly provide its assistance. The parties must not forget that we are dealing with national and international security and that we face a nameless and daring enemy.

Meet the ULFPS

IZAR Investigates Ultra Large Floating Production Systems as Central to Seagas Project

While seeking to consolidate its existing LNG carrier workload by bidding for new tonnage to serve the Qatari export traffic and other projects, Spanish shipbuilder IZAR has intensified its research endeavors so as to create a broader business platform in the energy market.

The group has thrown its weight behind a new initiative aimed at developing floating plant incorporating gas-to-liquids (GTL) technology to extract and convert gas from remote offshore fields into premium grade liquid products. The joint industry research and development project, known as Seagas, draws in IZAR Fene Shipyard (the former Astano establishment), Bermuda-based engineering corporation Foster Wheeler, and other partners from various disciplines.

Against the backdrop of few examples globally of large-scale, land-based GTL facilities, the concept of a floating GTL plant is driven by considerations of the scale of 'stranded' offshore gas reserves, the strategic and market value of GTL products, and the environmental arguments against flaring and in favor of GTL liquid fuels.

The Fene yard's extensive know-how in the field of FPSO (floating production, storage and offloading) unit construction is especially apposite to the new effort to marinize onshore GTL technologies. One of IZAR's proposals, the Ultra Large Floating Production System (ULFPS), centers on a huge hull measuring 1,148 x 328 ft. (350 x 100 m), with a depth of 105 ft. (32-m), providing the requisite deck area for process equipment and tank storage capacity equivalent to 4.5-million barrels.

The ULFPS would provide for transfer of both stabilized oil and GTL products to shuttle tankers by way of a floating hose, offloading buoy or combination of both, and would incorporate an external bow turret to minimize load forces and motions in rigorous sea and weather conditions.

An alternative solution is the combined FPSO (CFPSO) concept, to overcome possible drawbacks associated with a single, huge floating plant. The CFPSO would consist of two FPSO units of more standard size, potentially with split GTL and crude oil functions, and connected by articulated arm.



by David Tinsley,
technical editor

Station-keeping would be ensured through an external turret installed in just one of the units, both of which would be thruster-fitted.

The application of know-how and resources to the investigation of opportunities for harnessing GTL technologies in the maritime sector is illustrative of IZAR's bid to strengthen its standing in higher added-value sectors of the market. It attests also to a dogged industrial will, at a time when Europe is giving up more and more of its production capabilities in the face of ever-broader competition from the Far East.

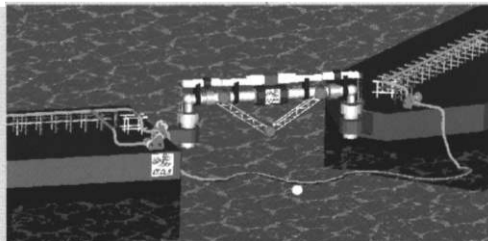
In the meantime, Spain has led European shipbuilding back into the LNG carrier sector. Construction of the Inigo Tapias, scheduled for delivery next August as the first of five membrane-type LNG tankers of 138,000-cu. m. capacity, has signaled the opening of a new chapter in IZAR production, in the face of Far Eastern dominance of that higher added-value sector.

The initial tranche of orders entailed three vessels, comprising Inigo Tapias for Naviera F Tapias, a second ship to the joint account of Knutsen OAS Shipping and Marpetrol, and a third vessel for Elcano - all of which will be run under long-term charter to Repsol. Follow-on business entailed an LNGC of the same type for Knutsen, to serve a charter to Spanish electricity generator Union Fenosa, and a fifth such vessel for Naviera F Tapias tied to a Repsol charter agreement.

IZAR added a new dimension to its orderbook during the past summer when it landed a deal with

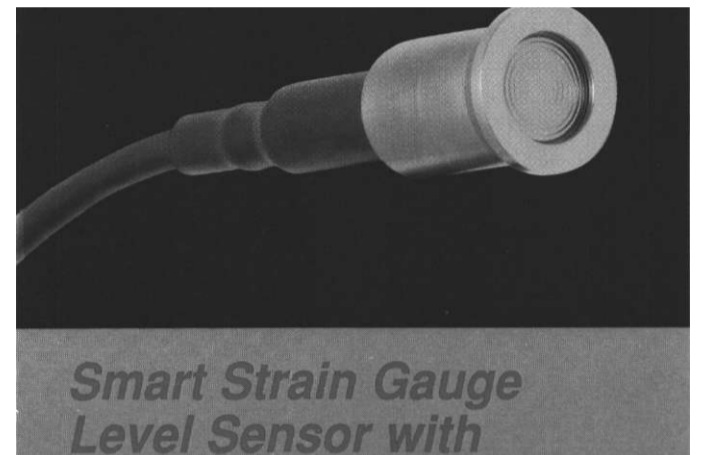


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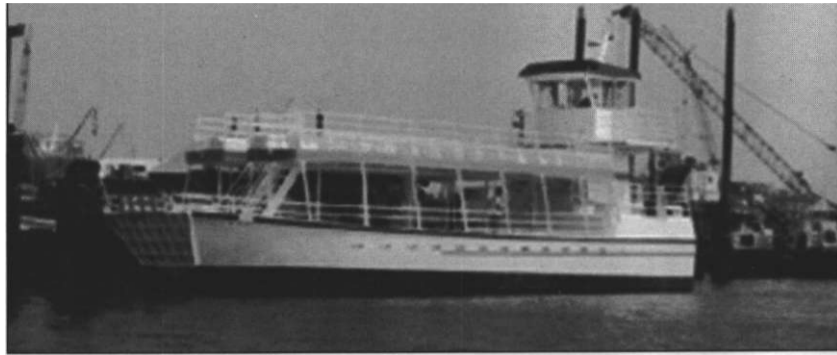
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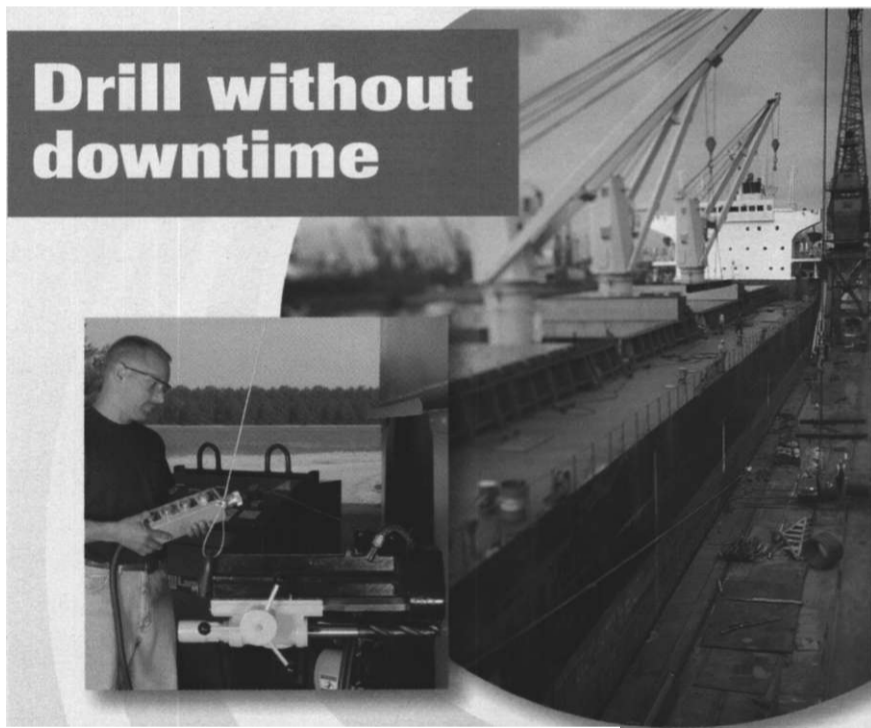
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Norwegian energy group Statoil to build a barge to accommodate processing equipment for gas liquefaction. To be delivered by the IZAR Fene Shipyard, the floating plant will convert natural gas derived from the Snohvit field into LNG and is expected to handle about 70 cargo shipments every year. The challenges associated with the project are intensified by the planned location of the unit in the harsh environs of the Barents Sea, near Melkoya Island off northern Norway.

Kyoto Tanker

As well as its contract for one of the new breed of deepsea LNG carriers from IZAR, progressive Norwegian operator Knutsen OAS Shipping has acted on the perceived potential for an exceptionally small LNG tanker intended to boost the coastal gas supply infrastructure. The vessel is distinguished not only by its modest cargo containment volume of 1,100-cu. m., but also by its planned installation of a bi-fuel powering plant to permit operation mainly on LNG in the form of cargo boil-off, with diesel oil as back-up.

Because of the environmental attributes of its propulsion arrangements, the newbuild is dubbed the 'Kyoto Tanker'. Four gensets will provide energy to the 900-kW frequency-controlled electric motors serving two azimuth propulsion thrusters. During normal service conditions, it is anticipated that cargo boil-off will be sufficient for propulsion needs, engaging the two 900 kW gensets driven by gas engines. Back-up and booster capacity will be available through a second pair of gensets of 640-kW output, using diesel prime movers.

The coastal LNG tanker newbuild contract has provided a filip to the ship

building industry in the Netherlands' northernmost provinces, the origin of many of the coaster and shortsea classes at work with the Dutch, German and other fleets, and a source of innovative design and production in the under-20,000-dwt vessel size category as a whole. Construction has been entrusted to Scheepswerf Bijlsma, a shareholder in the Groningen-based sales, marketing and design engineering firm Cono-ship International.

Knutsen's move to invest in a small ship able to work into a multitude of potential discharge points with limited space and limited storage capacity along Norway's fjord-indented, Atlantic fringe is an important step in the development of supply network for LNG marine bunker fuel. With a modern, gas-electric fjord shuttle ferry already running exclusively on Norwegian-derived LNG and unfolding projects for other ferries and also offshore support vessels running on 'clean' gas fuel, the industry has demonstrated its willingness to break new ground in usage of more environmentally-compatible fuel under the right economic and logistic circumstances.

The coming year will see the debut of a pair of 4,000-gt supply vessels equipped with dual-fuel engines driving the main generating sets in a diesel-electric system. Booked from Kleven Verft by Norwegian owners Eidesvik and Simon Mokster Shipping, the support ships will be operated from the Coast Center Base near Bergen under charter to Statoil, and will run on LNG with facility for switchover to diesel oil should occasion demand. Statoil reckons that the use of LNG will cut oxides of nitrogen (NOx) exhaust emissions by 85-percent compared with a conventional diesel-burning plant.

Maritime Reporter & Engineering News



By Dr. Michael A. Champ

The Diplomatic Conference held (October 1-5, 2001) by the International Maritime Organization (IMO) in London adopted the Draft Convention prepared by The Marine Environmental Protection Committee (MEPC) of IMO for the "Control of Harmful Anti-fouling Systems for Ships." The Convention has been developed to immediately ban the use of Tributyltin (TBT) globally in antifouling paints to "protect the marine environment". The ban on TBT has come about because TBT has detrimental effects on non-target marine organisms. In November 1999, IMO agreed that a Treaty be developed by the MEPC to ensure a ban on the application of TBT based antifouling paints by January 1, 2003, and a total ban on the use of TBT by January 1, 2008. The Convention will prohibit the use of harmful organotins in anti-fouling paints used on ships and establish a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems (www.imo.org).

Current Shipyard Practices

Current shipyard practices use freshwater and hydro blasting technologies (high pressure pumps) to washdown (to remove salt, slime, and biofouling) and paint from vessels. This produces washdown wastewater, which is discharged into waterways, contaminating port and harbor bottom sediments. If the TBT Treaty Enters into Force as proposed, the future cost of removal, treatment and disposal of spent antifouling TBT paint residues from ships in shipyards and drydocks and if not ther, then the subsequent cost for removal, treatment and disposal of TBT contaminated dredged material from harbors and waterways could increase significantly: an estimated 12 to 15 times. A key question is: who is liable for these additional costs? In the U.S., only the state of Virginia has discharge regulations (50 part-per-trillion) for TBT in washdown and hydroblast wasters from shipyards and drydocks. When a ship is first placed in a drydock, the vessel is washed down with freshwater to remove salt and prevent corrosion. This washwater is discharged directly to local rivers, estuaries or bays. The hydroblasting can break up

the removed paint into paint chips into 10-micron size particles, which can be widely distributed in waterways. Over the past few years, this hydroblasting has become the preferred method to remove antifouling marine coatings (paints) from a ship's hull because of the human health risks from breathing sand blasted materials. Without national regulations on discharge requirements, this practice will continue and significantly increase between 2003-2008 as a result of the Treaty. Contaminated washdown (salt and slime removal) wastewaters from a large ship can exceed 100,000 gallons Hydroblasting (for total paint removal) wastewater from the same ship can exceed an additional 400,000 gallons. Rainfall runoff alone in a drydock can reach 20,000 gallons. Monitoring studies in the U.S. and U.K. have demonstrated that shipyards and drydocks that remove spent TBT are the current major source of unregulated TBT in the marine environment.

Regulation of Shipyards and Drydocks

At MEPC 46 [a meeting of the IMO Marine Environmental Protection Committee held in London on April 23 through 27, 2001], a group of Delegations [Cyprus, Brazil, Denmark, Liberia, Marshall Islands and Vanuatu (formerly New Hebrides)] stressed the need for language in the treaty requiring safe removal, treatment and disposal of TBT from ships. Subsequently in Plenary, the delegates then instructed the drafting committee to include a new article to regulate the "application or removal of anti-fouling systems" that are banned, requiring that they be "collected, handled, treated and disposed of in a safe and environmentally sound manner to protect the environment and human health". For most of the world, TBT in washdown and shipyard wastewaters can legally be discharged directly into local waters. In some places the discharge from the shipyard is routed through (ineffectively) a municipal waste treatment plant (WWTP).

At MEPC meetings, serious concern was expressed by some experts for the need to identify in the Treaty the necessary regulatory language for:

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Coatings & Corrosion Control

(1) the "safe" removal, treatment, and disposal of "spent" marine antifouling paints (coatings) deemed "harmful" by the Treaty to also "protect the marine environment", and (2) who is liable for the future costs of dredging and disposal of TBT-contaminated port and harbor sediments dredged materials.

The requirement for "safe" removal and disposal was subsequently incorporated at MEPC 46 as Article 5 in the Treaty, without it shipyards complying with existing national and local discharge regulations (most have none for the discharge of TBT) could inadvertently release more TBT to ports and harbors in the five-year compliance period than has been leached from ships (hulls) in the past 40 years to the same waters. A future concern of ports and harbors may be the liability for costs associated with the treatment and disposal of dredged sediments that are contaminated with TBT, which has not been addressed.

Treatment of TBT Contaminated Waste

Over the past four years, the U.S. Environment Protection Agency (EPA) — has funded several projects to develop and test wastewater treatment tech-

nologies to the Center for Applied Ship Repair and Maintenance (CASRM) and Old Dominion University in Virginia. These studies have found that wash-down (salt removal) and hydroblast (paint removal) wastewaters in shipyards can contain up to six million parts per trillion TBT. In Virginia, this wastewater is treated to remove TBT from shipyard discharges. Researchers at Old Dominion University have demonstrated that off-the-shelf waste treatment technologies were not satisfactory for the treatment and removal of TBT in these wastewaters. In addition, U.S., Australian, U.K. and Swiss studies to remove TBT and other metals from wastewaters have found that advanced technologies not commonly utilized in normal sanitary treatment plants are required to remove TBT.

Studies conducted by EPA, U.S. Navy, UK DOE and the Consortium of Organotin Manufacturers Association (ORTEPA) have recorded declining levels of TBT worldwide, yet documented 'hot spots' of TBT in bottom sediments in the proximity of shipyards, drydocks, marina's, ports and harbors.

Costs

An example of how contamination can

increase the costs for disposal of dredged material is seen in the two alternatives available to the Port of NY/NJ. The Mud Dumpsite, located three miles offshore, has been operational for many decades and has been the traditional disposal area that can accept clean dredged materials. Contaminated "spoils" have to be disposed of at an upland hazardous waste disposal facility. From 1977 to 1991, 90 percent of all NY/NJ dredge spoils were tested and classified, as clean spoils and only one to two percent were contaminated spoils. However, in 1991 the U.S. EPA required bioassay testing. This increased the volume of contaminated spoils.

For contaminated dredged material, the currently available alternative is upland disposal at a hazardous materials storage facility and none are available in the near vicinity. Howland Hook Terminal in Staten Island shipped 150,000 cu. yd. of sediment via barge and rail to Utah at a cost of \$17 million or over \$110/cu. yd. Traditional fees for dumping dredge materials at the Mud Dumpsite at this time were in the area of \$10/cu. yd.

Therefore, concern was expressed over the need to identify regulatory language within the Treaty itself for the

"safe" removal, treatment and disposal of TBT from ships, and clarification on the issue of liability of future dredging and disposal of TBT-contaminated port and harbor sediments. Under current regulatory practices for most of the world, TBT in washdown wastewaters can be discharged directly into local waters.

It is quite possible that the "regulated" nations can quickly implement new requirements to correct this situation. This implementation will result in the transfer TBT contamination to the "unregulated" countries, which are least able to deal with it. However, at IMO, there is a concern that unregulated countries may unknowingly accept the environmental and human health risks to gain economic benefits from removing TBT from ship's hulls. Market forces are selective for low-cost labor and weak environmental regulation. Unfortunately, most of these developing countries do not have the funding or environmental expertise available for the monitoring, research and technology development essential to treat and dispose TBT washdown wastewaters safely. These

New Antifouling Tech Spurs Uncertainty

Registering a growing market uncertainty toward the ability of new TBT-free antifouling to offer the same range of benefits as TBT-based antifouling, Jotun Marine Coatings is now advising shipowners and operators to seek the recommendations of coating manufacturers prior to applying TBT-free antifouling treatment to ship hulls.

"Determining the correct antifouling and the appropriate pre-paint procedure is becoming a very complicated issue. Jotun Marine Coatings is being approached by an increasing number of shipowners and operators seeking advice on new products now flooding the market and how these new technologies will affect the treatment of underwater hulls," says Frank Mohn, Director of Jotun Marine Coatings.

"This requires a detailed understanding of the various types of antifouling technologies being supplied by all manufacturers of anti-fouling."

Jotun advises owners to expect following performance: Self-smoothing; Self-polishing; No build up of leached layers; Predictability; and Tailor-made solutions

Since 1999, when the IMO adopted the resolution to phase out organotins used in marine coatings, paint suppliers have been scrambling to develop and introduce alternative anti-fouling paints in time to meet the January 1, 2003 deadline, something that has proved far from easy. The result, according to Jotun Marine Coatings, has been a "divergence in technology offered for sale."

Along with the divergence of technology has come questions about the mechanism and properties of new TBT-free products and now many end-users, rightfully so, are concerned about making wrong decisions and having to live with less than good results, says Mohn. From now until 2008, thousands of vessels with TBT-based antifouling will drydock. The way these are handled, prior to application of new antifouling, will remain uncomplicated and offer no more challenge than it does today.

The real challenge for end-users is the wading through the wide choice-range of new TBT-free coatings.

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Provisions, Specific Requirements and the Adopted Resolutions of the Adopted Resolutions

Treaty Specific Requirements:

- Under the terms of the new Convention, Parties to the Convention are required to prohibit and/or restrict the use of harmful anti fouling systems on ships flying their flag, as well as ships not entitled to fly their flag but which operate under their authority and all ships that enter a port, shipyard or offshore terminal of a Party.
- Ships of more than 400 gt and above engaged in international voyages (excluding fixed or floating platforms, FSUs and FPSOs) will be required to undergo an initial survey before the ship is put into service or before the International Anti-fouling System Certificate is issued for the first time; and a survey when the anti-fouling systems are changed or replaced.
- Ships of 79 ft. (24 m) or more in length but less than 400 gt engaged in international voyages (excluding fixed or floating platforms, FSUs and FPSOs) will have to carry a Declaration on Anti-fouling Systems signed by the owner or authorized agent. The Declaration will have to be accompanied by appropriate documentation such as a paint receipt or contractor invoice.
- Anti-fouling systems to be prohibited or controlled will be listed in an annex (Annex 1) to the Convention, which will be updated as and when necessary.
- As recommended by the 21 st session of the IMO Assembly, the Conference agreed to an effective implementation date of January 1, 2003 for a ban on the application of organotin-based systems,
- In November 1999, IMO adopted an Assembly resolution that called on the MEPC to develop an instrument, legally binding throughout the world, to address the harmful effects of anti-fouling systems used on ships. The resolution called for a global prohibition on the application of organotin compounds, which act as biocides in anti-fouling systems on ships by January 1, 2003, and a complete prohibition by January 1, 2008.
- The new convention will enter into force 12 months after 25 States representing 25 percent of the world's merchant shipping tonnage have ratified it. Annex I attached to the Convention and adopted by the Conference states that by an effective date of January 1, 2003, all ships shall not apply or re-apply organotins compounds which act as biocides in anti-fouling systems.

By January 1, 2008 (effective date), ships either:

- Shall not bear such compounds on their hulls or external parts or surfaces;
- or
- Shall bear a coating that forms a barrier to such compounds leaching from the underlying non-compliant anti-fouling systems.

This applies to all ships (including fixed and floating platforms, floating storage units (FSUs), and Floating Production Storage and Offtake units (FPSOs).

The Convention includes a clause in Article 12, which states that a ship shall be

entitled to compensation if it is unduly detained or delayed while undergoing inspection for possible violations of the Convention.

The Convention provides for the establishment of a "technical group," to include people with relevant expertise, to review proposals for other substances used in anti-fouling systems to be prohibited or restricted. Article 6 on Process for Proposing Amendments to controls on Anti-fouling systems sets out how the evaluation of an anti-fouling system should be carried out.

The Diplomatic Conference Adopted Four Resolutions:

Resolution 1: Early and Effective Application of the Convention — The resolution invites Member States of the Organization to do its utmost to prepare for implementing the Convention as a matter of urgency. It also urges the relevant industries to refrain from marketing, sale and application of the substances controlled by the Convention.

Resolution 2: Future work of the Organization pertaining to the Convention — The resolution invites IMO to develop guidelines for brief sampling of anti-fouling systems; guidelines for inspection of ships; and guidelines for surveys of ships. The guidelines are needed in order to ensure global and uniform application of the articles of the Convention, which require sampling, inspection and surveys.

Resolution 3: Approval and Test Methodologies for Anti-Fouling Systems on Ships — This resolution invites States to approve, register or license anti-fouling systems applied in their territories. It also urges States to continue the work, in appropriate international fora, for the harmonization of test methods and performance standards for anti-fouling systems containing biocides.

Resolution 4: Promotion of Technical Co-operation — The resolution requests IMO Member States, in co-operation with IMO, other interested States, competent international or regional organizations and industry programs, to promote and provide directly, or through IMO, support to States in particular developing States that request technical assistance for:

- the assessment of the implications of ratifying, accepting, approving, or acceding to, and complying with, the Convention;
- the development of national legislation to give effect to the Convention; and
- the introduction of other measures, including the training of personnel, for the effective implementation and enforcement of the Convention.

It also requests Member States, in co-operation with IMO, other interested States, competent international and regional organization and industry programs, to promote co-operation for scientific and technical research on the effects of anti-fouling systems as well as monitoring these effects.

activities would defeat the purpose of the Treaty, which is to provide standardized global regulation and ensure that shipowners do not face multiple, fragmented and counter productive national regulations.

It has been estimated that between 70 to 80 percent of the 28,038 ships in global commerce use TBT. Under current practices, the estimated annual increase in wastes in shipyards and drydocks from the Treaty will be: 2.3 million tons of contaminated grit, 18,000 tons of spent paint, 1.8 million paint cans, and 1.1 billion gallons of contaminated washwater (low pressure for salt removal), and if the trend increases of using high pressure hydroblasting to remove spent paint, the volume of wastewater could exceed 5 billion gallons of water needing treatment.

Before the language of the Treaty is ratified, member nations should be aware of the need for regulating the removal and treatment of the spent paint (with biocides) in shipyards by each Member State (Contracting Parties to the Convention) and the permitted discharge limits for treated liquid wastes. In addition, where port and harbor bottom sediments contain TBT's, either from past activities or from paint removal in compliance with the treaty, port authorities would benefit also from defining who is liable for the increased costs for special dredging and treating of the TBT contaminated dredged material.

A Conference was recently held at the Technical University of Denmark in Lyngby, Denmark to bring together researchers on "Environmental Aspects of Handling Heavy Metal and TBT-Polluted Harbor Sediment." International experts indicated that a cost-effective system for remediation of persistent TBT (mostly paint chips) in contaminated bottom sediments might not be available for several years. Without incorporation of Article 5 in the treaty, shipyards complying with national and local discharge regulations could inadvertently release more TBT to ports and harbors in the five-year compliance period than has been released from ships (hulls) in the past 40 years to the same waters. This would be devastating to the marine environment.

Liability

When the IMO "TBT Treaty" enters into force, it will be implemented to remove the TBT from ships to protect the marine environment. The regulatory

gap between removal and disposal may contaminate more port and harbor bottom sediments. Consequently, both shipyards and drydocks and ports and harbors (who had nothing to do with the Treaty) could be at risk for the liability of treatment and disposal of spent antifouling (TBT) paint residues and subsequent highly (TBT contaminated) bottom sediments in special landfills. The key question then becomes who is liable for the costs of removing and disposing these TBT contaminated spent antifouling paint residues and TBT contaminated dredged materials: shipowners, shipyards, or port and harbor authorities or the paint companies? Costs today for just dredging and disposal in a toxic and hazardous landfill have been estimated to be greater than \$150 per cu. yd. ... more than 10 times the current costs ... and could be significantly greater if contained dredging is required and depending on the availability and location of nearby toxic and hazardous waste landfills and location of sensitive environmental resources in adjacent bays and estuaries. Current waste treatment technology is NOT available for treating TBT contaminated dredged materials, however a few studies are underway to develop them.

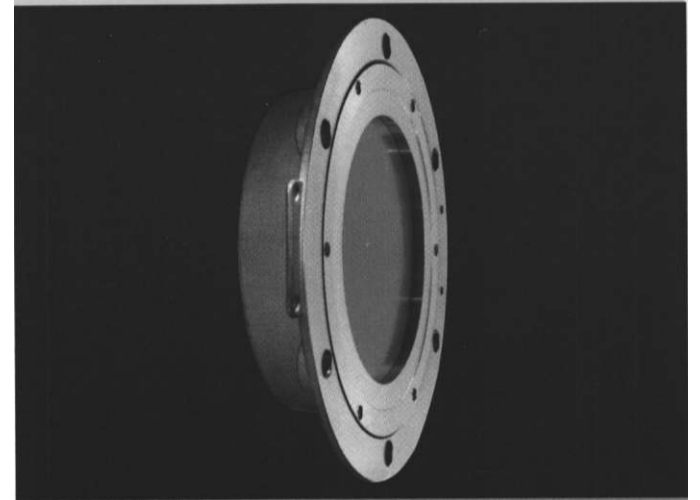
Regulation of "Contaminants" in Dredged Materials

Under Annex I of the London Dumping Convention, Contaminants in dredged materials can be ocean dumped if they are not greater than trace background levels, and not be Persistent, Toxic or Bioaccumulate.

Regarding TBT, it is a man made compound that does not occur in the marine environment, it is considered the most toxic material ever added to the marine environment, and filter feeding bivalves readily accumulate TBT. Bioaccumulation Factors (BAF) reported in the literature are as high as 50,000.

As the IMO TBT Treaty is ratified by Member Nations, Port and Harbor Authorities to determine their risks and liabilities from TBT contaminated dredged materials may wish to privately conduct risk assessments to determine the degree and extent of TBT contamination in their waterways and begin to give serious consideration to developing special toxic and hazardous material storage areas which could serve as immediate storage for TBT contaminated dredged materials until suitable technologies can be developed to treat them.

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About the Author

Dr. Michael Champ has been involved in pollution and waste management for over 30 years. He has held appointments at the American University, Texas A&M University and the University of Alaska, Fairbanks. He has edited or authored eight books and over 350 publications. He is the co-editor of the major reference work on "Organotins: Environmental Fate and Behavior" 664 pg. (published by Chapman and Hall, Oxford). The book is a summary of over 40 years of research on the use and fate and behavior of the biocide - tributyltin (TBT), which is used as an additive in antifouling paints. He has served as the resident scholar to the Army Corps of Engineers and to NOAA and a senior science advisor at EPA and a Queens Fellow (QE1) for marine science in Australia. Dr. Champ was asked by the U.S. Congress to help draft the Organotin Antifouling Paint Control Act of 1988, Public Law 100-333. (33 USC 2401). He has chaired four international symposia related to organotins and two for pollution prevention from ships and shipyards. In 2000 and 2001, he was the Technical Advisor to the Marshall Islands, Delegation for IMO MEPC 45, 46, for the New IMO Convention to "Control Harmful Antifouling Systems on Ships". The Treaty was adopted by IMO on October 5, 2001. He is the President of the Advanced Technology Research Project (ATRP) Corporation in Falls Church, Va., (www.atrp.com) and has been extensively involved in developing waste treatment technologies and systems for TBT. He was a special consultant to CASRM (Center for Applied Ship Repair and Management) for three years for the development of the Barge Mounted TBT Waste Treatment System.

Interior Design

Bringing Magic to the Cruise Experience — the Role of Technology

By Mark Hilferty,
Joint Managing Director, McNiece

"Any sufficiently advanced technology should be indistinguishable from magic"
— Arthur C. Clarke

"Any technology distinguishable from magic is not sufficiently advanced"
— Gregory Benford

As we are swept along in the surge of technology that pervades almost every aspect of our lives, we sometimes take for granted the innovations that intervene in our most complex interactions as well as our most mundane.

The passenger shipping industry is no exception: from mooring systems to active stabilizers, Internet access and TV broadcasting ability; technology has 'infiltrated' every area. And these days, with virtually none of the processes undertaken by humans being completed without a technological interface of one form or another, technology has asserted itself as a sort of animated inanimate 'man's best friend'. Though within this 'pseudo' relationship, which can be so harmonious, there can also be an element of distrust, as if somehow we were waiting for a momentary technological lapse of 'domestication' when the techno beast returns to the wild.

So perhaps it is best to follow the advice of my opening quotations, and integrate our technological requirements into to our lives, and host environments, to the point of near invisibility — like some hidden hand.

"The future is not what it used to be" — where the traditional role of the designer has been to create an environment in which the operator can perform, like some ballet of elegant and effortless service against a background of visually seductive interiors. Now, with the introduction of more and more technology, the designer has to consider the integration of this new 'guest' with care and delicacy and use it to weave the dreams for today's 'dream society'. Let us look at some of the areas where technology has made the biggest impact and speculate on the most likely innovations to be implemented in the near future.

Cabin Experience

The contemporary definition of a cabin is 'the destination within the destination', and it is true. Even modern American fashion, which minimizes bedrooms in favor of public rooms, still pays homage to this rule. But the



demand for independence, or some degree of control over your leisure experience, is an increasing modern phenomenon. All of this has to be catered for within the cabin scenario: no wonder hoteliers and cruise operators have turned to technology for solutions. In-cabin technology has escalated exponentially and will continue to do so as the contemporary traveller, who is at home with a wide range of technology in daily life and feels the need to be connected at all times, demands more autonomy

More interactive digital systems are being employed for the remote control of curtains, internet access, television, DVD, CD player, lighting — passive or active — message answering systems and more. Utilizing flat screen technology and infrared remote control you can e-mail, surf the net, shop, access games, movies or music from an almost limitless library of digitally encoded DVD's and CD's, allowing you to watch or listen whenever you want, not just when the schedule dictates.

Active light sensors at low level that switch on when you get up in the middle night are particularly simple and effective. As is mood set lighting control, traditionally utilized only in public spaces, now an integral feature of intimate places and relaxing spaces.

Even the bathroom, now considered an extension to the bedroom, should not be excluded from the application of technology. This might be in the form of a telephone extension; sound system, mini water resistant TV screen or even visual communication with the bedroom using hi-tech glass laminates which change from clear to opaque at the flick of a

switch or by voice command.

And there is more on its way...

Super thin hi-fi speakers, which can almost be applied like wallpaper, or disguised as pictures or mirrors. Active thermostatic atmospheric controls, which are capable of being pre-programmed to suit your tastes. Some of this pampering can be challenging when first confronted. On a recent trip to Japan I had my first meeting with the digital toilet seat. The array of buttons in green, yellow and red (I never tried that one) more commonly found on your TV remote control at first bemused me, but the automatic flush, wash and brush up that followed eased my initial concerns — perhaps I should have tried the red button. The bathroom 'to die for' moves forward another step.

Public Room Experience

"Designers of the new hotel tend to use the lobby as a kind of manifesto for their design intentions." And so it is with technology. The awareness of something special behind the scenes is as important as the 'wow' factor when you first enter a new destination space, whether a hotel, restaurant, nightclub or cruise ship. But beware, as all kinds of sassy, smart and sharp operators are getting potential cruise customers to spend their private leisure time and post-tax pleasure money in increasingly aspirational physical places and stimulating mental spaces. From the ice-cool designer bar, right up to the signature art gallery anchoring the regenerated waterfront, potential guests are spaced out on great spatial design, empowered by great content and caressed into loyalty by great brands, where the use of tech-

nology is as clever as it comes.

The cruise industry's response to this has been varied. But it is not just about the choice of bars or of lavish entertainment, it is not even about variety of dining options, nor the awe inspiring atria that give the cruise experience something which, after the first taste, is difficult to give up. Integrating new technology into the environment can be one of the biggest challenges confronted by designers.

Take M&E: given the creative willingness of the engineer and effective installation of control features, it is possible to achieve high levels of environmental comfort while minimizing the visual effect on the interior design. Link this with the designer's desire to vary lighting conditions according to usage and time of day, and we approach a balanced environment. However, we are informed that aesthetics and passenger comfort have to compete for available power with the fundamental operational functions of the vessel, and the compromise is usually borne by environmental aesthetics.

Benchmarks for areas of cruise ship design are invariably taken from the nearest equivalent land-based environments, but our aspirations have to be tempered by the added constraints imposed by an altogether more variable and potentially more aggressive environment. However, this should not stop designers pushing back the boundaries of accepted design criteria.

For instance, lighting is being revolutionized by the introduction of LED's (Light Emitting Diodes). LED lighting fixtures can qualify for energy efficient incentive schemes. The Enhanced Capital Allowance Scheme can provide large financial benefits to those investing in these products. Under this scheme up to 100 percent, of the expenditure on approved technology, can qualify for up-front tax relief. And there are other benefits. The long lamp life, which in some cases is guaranteed for 25 years, could last as much as 50 years. That, if nothing else, will kill all other forms of lighting source in due course.

LED fittings when first introduced, although technically advanced, were thought to be ineffective as contributory light sources. Now, with further development, LED usage is steadily increasing, and given their low power consumption, low heat output and long life (hence low maintenance), are making

steady inroads into all manner of environments.

Technology can also provide some spectacular and very visible contributions. For example innovations in projection systems, which utilize the possibilities of laser technology to overcome projector focusing problems because the images look perfect on any surface. In conjunction with image processing computers, it is possible to project via six screens on to a dome without any distortions and no junction lines where the different projected images meet. "The net result is the wonder of Virtual Reality. Passengers can be catapulted into the middle of Niagara Falls, the Grand Canyon, or a space shuttle bound for Mars". Incredibly realistic effects can be supplied by the 360 immersion.

Our own Destination Brisbane project is specifying extremely advanced technology and media providers. With public spaces required to change use from virtual retail mall and lounge to media venue and exhibition suite, this is quite a design and technological challenge. Satellite delivery, high speed connectivity and low cost usage of high quality media on a continuous 24/7 basis streaming to strategically located outlets will give passengers empowerment. Add to this the previously mentioned smart card capabilities and the end result will be service that works by anticipation of needs and individual requirements by accessing your personal profile and offering you on-board experiences tailored to suit your needs and desires, not just reacting to requests. It is these, and similar invisible technological tricks, which bring a smile and help deliver the brand values of 'a credible promise of a memorable experience'.

Delivery Systems

We have, at present, very sophisticated services management capabilities using the latest fiber optic information transfer and control technology. One of the main stumbling blocks is that any services management system comprises three elements, namely: emergency, security and economy. The difficulty comes in trying to assess which will be the primary mover. Although all of the tools are available, what is lacking is the co-ordination and

Security And Escape

Always a great area for debate and one of the first issues that confronts you when going onboard a cruise ship is safety and escape. Many have tried and suggested new methods and new rules and indeed shipbuilders now have evacuation simulators allowing them and ship owners access to 'reliable analysis of the evacuation process'. McNece has also entered the debate and suggested that new ways of thinking and approach are required: not that these concepts (as illustrated) should be taken as literal solutions. For us the key issues are maximizing safety, minimizing difficulty and maximizing comfort. Our involvement in the EDELL and DSM systems looked to review the current attitude to emergency embarkation, without reducing the effectiveness of the product, thus producing a more engaging, easy to use environment rather than the austere functionalism of existing facilities. Inseparable from this was the need to re-evaluate emergency embarkation procedures themselves; examining passenger flow, life jacket application, assembly point facilities and transfer into lifeboats. Our aim is a seamless integration of these processes, serving to minimize fear and uncertainty in the passenger and promote confidence on the part of the passenger in the crew.

integration of these technologies to transform these individually managed systems into an intuitive and predictive technology, capable of assessing both immediate and future requirements based on observation and interpretation so that eventualities can be properly managed.

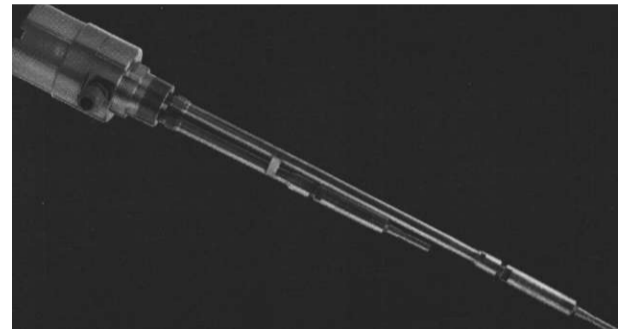
What's Next — Brave New Dreamworld

"The future isn't what it used to be" and of course it would be easy to think that we might be heading towards a technology park. But don't get confused. This is actually not about technology, it is about passenger experience. As the world moves from the information age into the age of experience economy, people are beginning to buy into dreams and not just tangible things. Why else is so much time and money spent creating themed and fantasy spaces, dream-like situations that transport you far from reality? Why the need to surround oneself with natural materials to restore 'balance and harmony' to our lives? These dreams need to be supplied by ever more clever delivery systems and active technology vehicles. For the designer, the response has to be based on simplifying what may be complex, integrating what could be intrusive, and employing the cleverest of the increasingly available leisure technologies. The next generation of cruise ships will have to offer the flexibility of the virtual office, the cachet of the London Club, the connectivity of the digital hub, the personal uplift of your favourite spa or the culinary variety of Soho - and more. It will be the wonders of technology that will deliver these dreams and bring magic to the passenger experience.

About the Author:

Mark Hilferty is Joint Managing Director of McNece, London-based designers for the travel and leisure industry. McNece is part of the Expert Alliance network and a founder member of Designation!, the strategic design consultancy and leisure think-tank. Currently advising on a range of projects for various government bodies globally including iconic cruise investment generators, Maglev transportation networks and next-generation passenger airships. For further information please contact: althomas@mcnece.com

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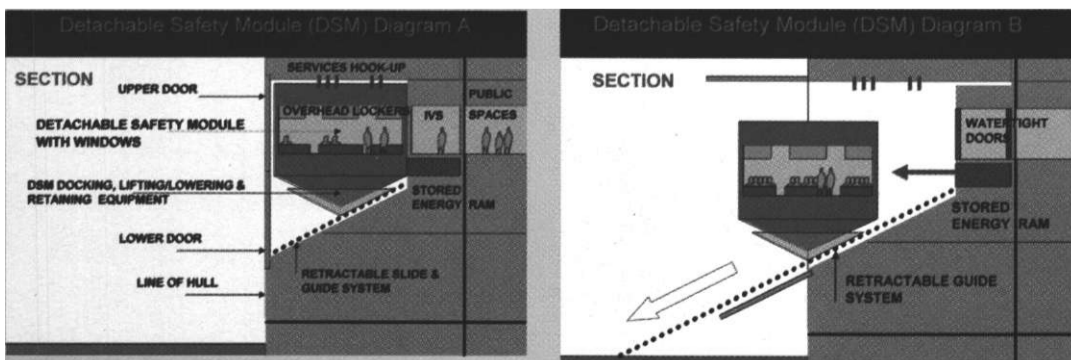
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Great Ships of the Year



Name Tempera
Type Double Acting Tanker (DAT)
Owner Fortum
Built Sumitomo Heavy Ind.

Kvaerner Masa-Yards is well renowned for its ship and ship's equipment ice breaking technology. Upon visiting Finland on a recent excursion and enjoying winter in November, it's easy to see why. Quite simply, Finland must keep its icy shipping channels open during the winter to ensure its commercial survival. In the beginning of the 1990s, the company, in partnership with the Finnish Maritime Administration and ABB Industry of Finland, developed a new electrical propulsion system for ice-breakers, the trade name of which is Azipod. The first vessels equipped with the new system, the 16,000 dwt tankers M/T Uikku and M/T Lunni owned by Fortum operated Nemarc Shipping, have now, combined, nearly 100,000 hours of operation experience, and the vessels have, for example, several times successfully navigated through the North-East Passage in extremely harsh conditions.

Through real world experience and continuous R&D, the shipyard has shown that vessels with a podded drive are capable of breaking ice with a considerably higher efficiency than before, when moving backwards with the propeller first. This concept — DAT — was developed by Kvaerner Masa-Yards, and now its first reference is in service. The 105,000 dwt M/T Tempera, built in Japan for Fortum Shipping, has arrived to its home waters for the first time, as well as M/T Mastera that will be completed later, are the first cargo ships of this double-acting type in the world. In open water, they can reach a speed of 17 knots, and thanks to their efficient icebreaking capacity that can be achieved while running with stern first, they are entitled to the highest IA Super Ice Class with their engine power of 16 MW, while even 25 MW would be required for this, using conventional technology. These vessels are able to navigate independently in the Baltic Sea area. M/T Tempera was built at the Yokosuka shipyard of Sumitomo Heavy Industries Ltd. in close co-operation with Kvaerner Masa-Yards under license by the latter company.

Name Midnight Sun
Type Commercial Dry Cargo Vessel
Owner Totem Ocean Trailer Express
Builder NASSCO

National Steel and Shipbuilding Company (NASSCO) and Totem Ocean Trailer Express, Inc. (TOTE) christened M.V. Midnight Sun, the first commercial dry cargo vessel to be built in the U.S. in 10 years. The Midnight Sun is the first of two new Orca-class trailerships being built by NASSCO for TOTE's service from Tacoma, Wash., to Anchorage, Alaska.

It and its sister ship, MV North Star, are 840 x 118-ft. (256 x 35.9-m), RoRo cargo ships offering the option to carry trailers as large as 53 ft. in length. The ships' cargo can be loaded and discharged in nine hours, with the speed and efficiency of this process being an important competitive advantage for TOTE. The vessel, which will



transport trucks, cars, trailers, trailer-borne products and equipment, military equipment, and project cargo, will have a hull arrangement consisting of a raised fo'c's'le deck with turtleback; transom stern; bulbous bow; deckhouse aft; six decks with fixed ramps fore and aft. Though not to be delivered until early 2003, M. V. Midnight Sun and M. V. North Star have already received several awards for their environmentally sensitive design. These include the States/British Columbia Oil Spill Task Force Legacy Award for 2000, the Alaska Department of Environmental Conservation Commissioner's 2000 Pollution Prevention Award, and the Biennial William M. Benkert Foundation 2002 Environmental Excellence Bronze Award.

Main Particulars

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Length, (o.a.) 839 ft. (255.7 m)
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Depth 90 ft. (27.4 m)
Draft, (max.) 30 ft. (9.1 m)
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Trailer capacity 600 FEU
Auto capacity 200 FEU
Cargo deck area 360,000 sq. ft.
Design displacement 45,843 LT
Lightship weight 23,975 LT
Main engines 4x MAN B&W 9L58/64, 2x MAN B&W 9L 27/38 medium speed diesels @ 400 and 720 rpm, respectively

Name Carnival Legend
Type Cruise Ship
Owner Carnival Cruise Lines
Builder Kvaerner Masa Yards

MS Carnival Legend, newbuilding no. 501, was delivered to Carnival Corporation at Kvaerner Masa-Yards' Helsinki shipyard this past August. Legend is the fourth cruise ship in a series of new Panamax-Max size cruise ships under construction for Carnival Corporation and operated by Carnival Cruise Lines and Costa Crociere. The first ship in the series, Costa Atlantica, was delivered in June 2000, and the sisterships Carnival Spirit and Carnival Pride in 2001.

Measuring 960 ft. (292.5 m) with a maximum breadth of 127 ft. (38.8 m), a breadth of 106 ft. (32.2 m) and a draft of 25 ft. (7.8 m), Carnival Legend entered service August 21 with a three-day cruise from Harwich, U.K. to Amsterdam. Touted as one of the most spacious ships in the contemporary cruise sector, Carnival Legend carries a total of 2,680 passengers (lower beds: 2,124 passengers) in a total of 1,062 staterooms. The maximum crew capacity is 961.

The vessel holds a diesel-electric power package,

Main particulars

Classification Society RINA
Flag Panama
Length, (o.a.) 960 ft. (292.5 m)
Breadth, max. 127 ft. (38.8 m)
Breadth, dwt 106 ft. (32.2 m)
Draft, dwt 25 ft. (7.8 m)
GT 85,900 (including balconies, approx. 88,500)
Passenger capacity, lower bed 2,124
Passenger capacity, max. 2,680
Passenger staterooms, total 1,062

Passenger staterooms, outside 849
- with balconies 750
Crew capacity 961
Speed, service 22 knots
Machinery output 62,370 kW
Propulsion 2x 17.6 MW Azimuthing rudder propellers
Machinery Diesel-electric, power station, Azipod@ propulsion
Machinery output 62,370 kW
Main engines 6 x Wartsil 9L46D, 6 x 10,395 kW/514 rpm

Main generators 6 x 14,405 kVA / 60 Hz/11,000 V, ABB
Propulsion 2x 17.6 MWAzipod@
Propulsion motors: The bnishless synchronous motor, mounted inside the pod of the Azipod@ propulsion units have double windings. Max. output power of each motor is 17.6 MW, with a speed range of 0-150 RPM.
Propellers Two fixed pitch Azipod@ propellers
Bow thrusters 3x 1.91 MW

Name Murillo
Type RoPax
Owner Trasmediterranea
Builder IZAR

This past March, IZAR's Seville yard delivered the largest RoPax ferry ever to sail under Spanish flag to owner Trasmediterranea — the 6,900 dwt RoPax Murillo. As the largest RoPax vessel ever owned by a Spanish company and sailing under Spanish flag, it exceeds the dimensions of any other vessel in Trasmediterranea's fleet, even the recently delivered 564-ft. (172-m) RoPax sisters Sorolla and Fortuny.

Seville has introduced substantial improvements in cargo and accommodation capacities on the Murillo, a project that followed the successful design carried out on the Merchant series of four vessels for Cenargo. Payload cargo has been

increased, as the accommodation, for instance, has been more than doubled. Murillo has 123 cabins of different sizes compared with the Cenargo vessels' 57 — an increase in the number of passengers up to 396 in cabins and 150 in seats.

Also, Murillo has 2,396 vehicle lane meters (1,900 lane m. for trucks and 400 lane meters) for cars on four decks where Cenargo vessels performed 2,000 lane m. on two decks. The lower cardeck is located on the tank top with the upper one mounted directly above it. Access is provided by a fixed ramp between the decks, which in turn can be accessed via a fixed ramp from the main deck. Two lifting ramps provide access to and from the upper deck.

Murillo is powered by four Wartsila 9L38 four-stroke engines developing 5,940 kW at 600 rpm



arranged in pairs in separate engine rooms with separate feed systems, and equips Flender gearboxes.

Lips propellers are used on Murillo, which incorporates two Brunvoll bowthrusters. Stabilizing is done via an Interling anti-roll system. This is enhanced further with the addition of Mitsubishi retractable hydraulic fin stabilizers. The quick construction time also is remarkable. The advanced delivery has given a 20-month construction time.

Main Particulars

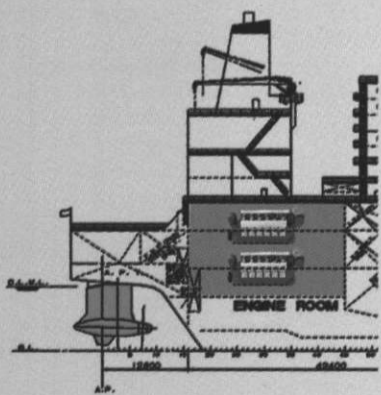
Length, (o.a.) 591 ft. (180 m)
Length, (bp) 553 ft. (168.7 m)
Breadth 79.7 ft. (24.3 m)
Depth to main deck 31.5 ft. (9.6 m)
DWT 6,900 tons
GT 24,813
Draft, design 21.3 ft. (6.5 m)
Speed, service at 85% MCR 22.8 knots
Maximum trial speed 23.25 knots at 85% MCR
Main engines, output 4 x 5,940 kW
Accommodation 123 cabins for passengers/51 cabins for crew
Maximum passenger capacity 600 persons on board
Vehicle capacities 1,070 lm on deck 5
830 lm on deck 3
180 lm on deck 2
216 lm on deck 1
Stern ramp 56 x 62 ft. (17 x 19m)
Ramps From deck 3 to deck 2, 7.6 ft. (2.3 m)
From deck 2 to deck 1, 6.6 ft. (2.0 m)
Lifesaving equipment 2 Semi-Enclosed Lifeboats
2 Rescue Boats

Digital Vessels, A-Voyage

Samsung creating a better maritime future

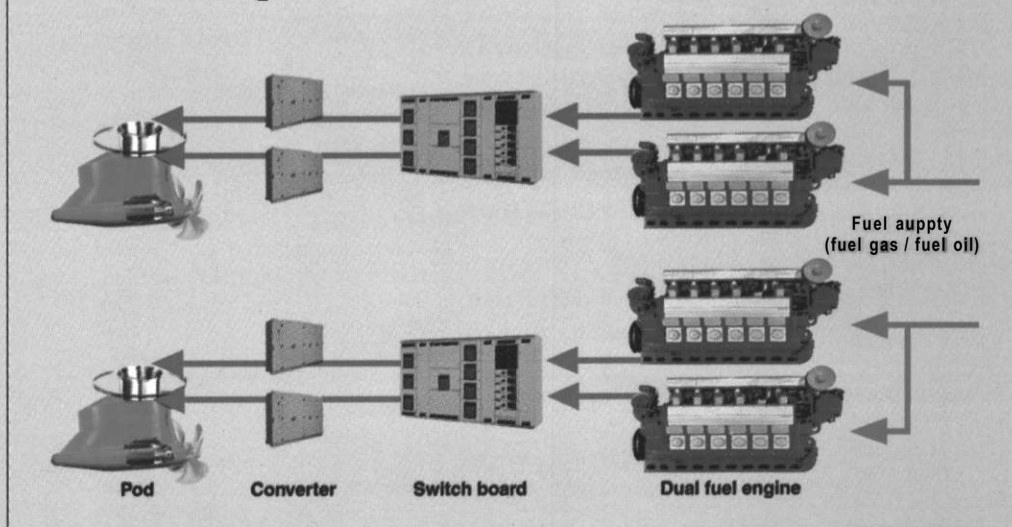


Samsung 149K LNG Carrier Alternative Propulsion System



Cargo Volume : 149,000 m³
Ship speed : 19.5 knots
Propulsion power : 12,050 kW x 2 sets
Green ship
Advanced maneuverability
Remarkably reduced engine room
Full redundancy propulsion system
BOG as primary fuel
Fuel oil as back-up fuel
Enhanced operability and lower fuel cost

System Configuration for Dual Fuel Diesel & Elec Motor Propulsion



Great Ships of the Year



Name Contship Aurora
Type 4,100 TEU Container
Owner Contship Containerlines Ltd.
Builder Daewoo Shipbuilding and Heavy Machinery Co. Ltd.

Constructed under U.K. flag, Contship Aurora was ordered by CP Ships and delivered by Daewoo Shipbuilding & Marine Engineering Co., Ltd. Okpo Shipyard in September 2002. The vessel has been designed and built under the survey of Germanischer Lloyd — the first ship to qualify for Germanischer Lloyd's new "Green Passport" class character. This vessel has fully welded flush deck with fore-castle, a raked stem with bulbous bow, a transom stern with open type stern frame, a semi-balanced rudder, a fixed pitch propeller and a bow thruster of controllable pitch propeller. Passage-way from engine room to No.2 cargo hold space is arranged below the upper deck at both sides.

The propulsion machinery and living quarters have eight tiers including navigation the bridge. The speed of the vessel at the designed draft of 39 ft. (12 m) through sea trial is 25.3 knots with the main engine running at 90 per-

Main Particulars

Classification Germanischer Lloyd
Port of Registry London, U.K.
Flag U.K.

Length, (o.a.) 922 ft. (281 m)
Length, (waterline) 862 ft. (262.9 m)
Length, (b.p.) 885 ft. (269.8 m)
Beam 106 ft. (32.2 m)
Draft 41 ft. (12.5 m)/summer

Depth 65 ft. (19.8 m)
Displacement 74,112 MT / summer
DWT 54,155 MT/summer
GT 46,009; Net 25,880
Main Engines Sulzer 9RTA 96C-B
Auxiliary Engines Wärtsilä: 2x 3,900 + 2* 3,400 kW

Propellers FP 8.5-m diameter, five-blade
Max. Speed At 102 rpm - 26.1 knots
Cruising Speed At 98.5 rpm - 25.4 knots
Side Thrusters Lips 1,600 kW
Accommodation 30
Watermakers 30mt/day
Radars 2 Kelvin Hughes
Depth Sounders Furuno FE200
Radios VHF Raytheon + Skanti
Satcom B SATURN "B" MK 2
Auto Pilot Yoko Gawa Denshikiki
GPS 4 k Simrad, Shipmatz
GMDSS Raytheon Standards
Weatherfax DEBEG 2952
Plotters Kelvin Hughes
Paint or Coatings Tin-free, Chugoku
Life Rafts Viking
Life Boats Fassmer Co., Ltd.

cent MCR (62,940 PS) with 20 percent sea margin. With respect to vibration and noise, the vessel has demonstrated excellent results through sea trials. Especially the maximum vibration levels in living quarters including the wheelhouse, which was clocked at 4.4 mm/sec, which is below the allowable limit of 7 mm/sec, peak.

The vessel is arranged with seven cargo holds, fore of the engine room, and consists of 16 bays with 14 hatches, with three panel hatch covers in way of each cargo hold (except two panel for No.1 hatch cover). The cargo hold is equipped with cell guides and support structure for the carriage of 40-ft. ISO containers, 11 rows and seven tiers, with depth of holds for containers of four tiers with 9 ft. and three tiers with 10 ft. high in general. Double loading of 20 ft. containers in hold is considered in the 40-ft. cell guide. Containers on deck can be generally carried with 13 rows and in five, six or seven tiers.

The vessel is designed to carry total 4,121 TEU containers, 1,698 in hold and 2,423 TEU on deck.

Name Tateyama
Type Malaccamax Oil Tanker
Owner Aquamarine Ship Holding Maritime
Builder NKK Corp.



NKK Corp. delivered a 300,000-dwt., Panamanian-flagged, Malaccamax oil tanker to Aquamarine Ship-holding Maritime S.A., a Panamanian subsidiary of NYK Line in September 2002. Built at NKK's Tsushima Works, the tanker, which is now in regular service for Nippon Oil Corp., is the first in the Malacca-max VLCC (very large crude carrier) class that NKK has developed in response to owners requirements for maximum operational efficiency.

Measuring 1,092 x 197 x 97 ft. (333 x 60 x 29.6 m) with a 68 ft. (20.8 m) draft, realizing the maximum permissible dimension to sail through the Strait of Malacca. The ship incorporates the latest energy-saving technologies and designs, including a sharp-edged Ax-Bow that greatly reduces wave resistance under rough sea conditions.

Name CMA CGM Neptune
Type Container Carrier
Builder Hanjin Heavy Industries
Owner Hansa Shipping

The 4,389 TEU container carrier known as CMA CGM Neptune for Hansa Shipping company is powered by a MAN B&W 9K90MC-C main engine, which produces 55,890 bhp at MCR with 104 rpm to give the vessel a service speed of 24.2 knots at 90 percent of MCR with 25 percent sea margin on a design draft of 39 ft. (12 m). Four sets of auxiliary engine consist of



two sets of 1,800 kW at 720 rpm and two sets of 2,100 kW at the same rpm diesel engine. Fully 4,389 TEU containers of 2,017 TEU in hold and 2,372 TEU on deck can be loaded on the vessel in addition to the 500 FEU reefer sockets provided (200 FEU in hold and 300 FEU on deck). Maximum 11 rows with eight tiers containers can be loaded in seven holds, and 13 rows with six tiers containers to be carried on hatch covers. Forty-ft. container based cell guides were equipped in every hold, generally two tiers height of lashing bridge structure was installed between hatch coamings and extraordinary cell guides of 5.5 tiers height help cargo securing on utmost end deck.

Main Particulars

Length, (o.a.) 926 ft. (282.1 m)
Length, (b.p.) 873 ft. (266 m)
Breadth, (molded) 106 ft. (32.2 m)
GT 50,242
DWT, (design) 50,709
DWT, (scantling) 58,399
Draft, (design) 39 ft. (12 m)
Draft, (scantling) 43 ft. (13 m)
Speed, (service) 24.2 knots at 90 percent MCR with 25 percent sea margin on design draft (12 m)
Complement 25 + 6 (Suez)
Cargo capacity 4,389 TEU (hold-2,017 / deck-2,372)
Water ballast 17,100cu. m.
Fuel consumption 156.5 ton/day
Main engine manufacturer Hyundai
Main engine type MAN B&W 9K90MC-C
Total hp 55,890 ps
Auxiliary engines NIL
Propellers Fixed pitch propeller * 1set (8.2 diameter, SMM manufactured)
Thruster Kamewa
Thruster engine Rolls-Royce controllable pitch type TT2400
Generators Hyundai
Generator engines B&W 6L 27/38 * 2sets (1,800ps/720 rpm)
B&W 7L 27/38 * 2sets (2,100 ps/720 rpm)

Name Bongo
Type FPSO
Owner Shell Nigeria Exploration and Production Co.
Builder Samsung Heavy Industries

Samsung's latest technological innovation is the successful completion and delivery of an 2,000,000 bbls FPSO, Bonga, built for the Shell Nigeria Exploration and Production Company, SNEPCO in June 2002.

The vessel, which is a double hull type floating oil production, storage, and offloading unit (FPSO), will be permanently spread moored in Bonga field located offshore Nigeria in water depth ranging from 1,000 to 1,125 m. The Machinery space will be located underneath the accommodation spaces. The double bottom in way of machinery spaces is used as sludge and oily water drain tanks. The topside process facilities shall be located on a Process Deck, elevated 5.5 m above the Main Deck of the hull at the centerline; a helideck has been built above the accommodation.

The hull structure has been designed and constructed to remain on station for the hull field life without recourse to drydocking, and the longitudinal strength of the vessel shall also be considered for tow condition. The vessel's mooring system consists of four groups of three mooring legs located on port and starboard sides at both fore and aft ends, two sets of 10 tonne air tugger winch, mooring fitting such as bollards and mooring chocks. The Crude oil has been exported from the storage tanks by both oil cargo offloading and tandem offloading system. The hydraulic power pack for the submersible crude oil offloading pumps has been provided to facilitate these offloading.

Name Stena Britannica
Type RoPax
Owner Stena RORO
Builder Hyundai Heavy Industries

Built at Hyundai Heavy Industries, the 3,500-lane m Stena Britannica was scheduled for delivery to Stena RORO in Sweden on November 30, 2002. Measuring 692 x 96 x 51 ft. (210.8 x 29.3 x 15.6 m), and a design draft of 21 ft. (6.3 m), the vessel is powered by four MAN B&W 9L40/54 engines, each developing 6,480 kW at 500 rpm driving a pair of Rolls-Royce CP propellers through two Renk twin-input/single-output gearboxes. These gearboxes reduce engine speed to 150 rpm enabling the vessel to move at a service speed of 22 knots. The vessel, which will operate between the U.K. and Holland and Ireland, was designed to comply with the new Stockholm Agreement Rules and IMO A 265 for the damage stability. Four fixed decks (1, 3, 5 and 7) with one hoistable car deck on starboard side of deck five are provided for vehicles offering 3,500 lane m. Vehicles will be loaded and unloaded through a wide stern and bow ramp/door installed on deck three. Two alternators, each developing 2,400 kW take power from the gearboxes and four Hyundai-built MAN B&W 8L23/30H diesel-driven sets, each developing 1,200 kW are provided to the electrical system. Twin flap rudder is adopted, and two 2,200 kW bowthrusters are fitted for powerful maneuverability.



Main Particulars

Length (o.a.) 1,000 ft. (305.1 m)
Length, (b.p.) 968 ft. (295 m)
Breadth, (molded) 190 ft. (58 m)
Depth, molded 105 ft. (32 m)
design draft 21 ft. (23.4 m)
Operating draft 78 ft. (23.9 m)
Displacement 355,320 MT at design draft
Accommodation 70 persons
Cargo Tanks 324,700 cu. m. (Excluding slope Tanks)
Slope Tanks 10,000 cu. m.
Methanol Tank 2,450 cu. m.
chemical Tank 320 cu. m. (For H2S Scavenger)
Chemical Tank 160 cu. m. (For Corrosion Inhibitor)
Methanol Tank 10,000 cu. m.
Diesel Oil tanks 7,500 cu. m.
Fresh Water Tanks 1,000 cu. m.
Seawater Ballast tanks 139,000 cu. m.



Main Particulars

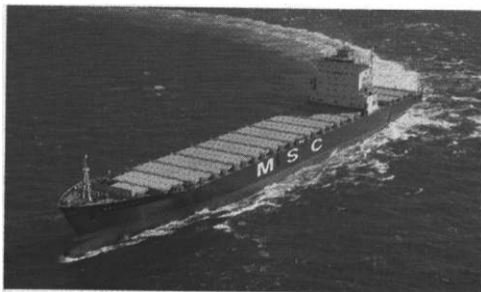
Main engines 4x MAN B&W 9L40/54
Auxiliary engines Hyundai MAN B&W
Propellers, Thrusters Rolls-Royce
Generators Hyundai
Fin stabilizers Brown Bros.
Couplings Flender
Reduction gears Renk-Tacke
Engine controls Valmarine
Deck machinery BLM
Bearings Blohm+Voss
Coatings KCC/IPK
Electronics Hyundai Kongsberg
Heat exchangers APV-KPH
A/C ABB Flakt Marine
Lifeboats Norsafe
Liferafts DSB
Davits Davit Intl.
Firefighting Semco
Waste management Usen
Destination equipment Alfa-Laval
IACMS Valmarine

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Great Ships of the Year



Name Blue Star Naxos
Type RoPax
Owner Blue Star Ferries Maritime
Builder Daewoo Shipbuilding & Heavy Machinery

Blue Star Naxos is the third RoPax, which was constructed under Greek flag and delivered by DSME (Daewoo Shipbuilding and Marine Engineering Co. Ltd.) in June 2002 in compliance with the requirements of BV.

This vessel is the one of twins and the sister (Blue Star Paros) had been delivered just one and half month ahead of the vessel in April 2002. Classed by BV, the vessel has two car decks and two accommodation decks, while the upper garage deck level is divided into the fore half car space and the aft half crew cabins. This layout allowed the complete separation of the above passenger decks from the lower decks machinery noise and vibration. The prototype vessel's bow ramp/door are not repeated to the sister vessels, however, there are still turn around arrangement even on the hoistable platform decks and half length upper garage.

The hoistable platform decks are COREX system from MacGREGOR which having only 100 mm (one third of conventional) depth and no external stiffeners.

The passenger's main entrance is through the separated stern ramp and two escalators which directly leading the passengers to the reception hall, without any interruptions by car traffic or crews. The vessel can carry 792 winter passengers (inboard) and 1,500 passengers during summer time. For the large number of summer-time passengers, most of weather decks are designed to the sun protected and wind shielded passenger sun decks. Passenger Public spaces are arranged throughout the deck

No. 6 and it includes first class lounge, café bar lounge, economic class lounge, a la carte restaurant, self service restaurant, air seat rooms and outdoor cafe.

The public space interior was designed by Apostolos Molindris, known for his architectural concept on the Superfast Ferries. Molindris' partner was Se-Jin for the workshop drawings and installation

The vessel, which is fitted with

one trailer deck and one car deck, allows vehicles to gain access over the stern at main deck level through an approx. 11 m wide stern ramp. Internal access of vehicles are composed of two tiltable ramps and hoistable car decks of five sections from main deck to upper deck.

Four Wartsila 6L38B main engines each developing 4,350 kW at 600 rpm drive CP propellers for a service speed of 24.4 knots and a maximum speed of 24.9 knots. The drive to a pair of Kamewa CP Propellers is through Flender gear boxes. Electrical power is derived via a trio of Wartsila 6L20 alternator sets each developing 1,080 kW.

One 950 kW Kamewa bow thruster together with two shafts/CPPs/rudders satisfies the vessel's high maneuverability requirements in the busy Mediterranean ports.

Main Particulars

Flag Greece
 Class Bureau Veritas
 Length, (o.a.) 407 ft. (124.2 m)
 Length, (b.p.) 384 ft. (117 m)
 Breadth, (molded) 62 ft. (18.9 m)
 GT 10,438 tons
 DWT, design 1,330 tons
 Draft, (design) 16 ft. (4.9 m)
 Speed, service 24.4 knots
 Daily fuel consumption 67 tons
 Main engines 4x Wartsila 6L38B,
 4,350 kW @ 600 rpm
 Gearboxes 2x Flender GVL 15 25,
 8,700 kW @ 190 rpm
 Propellers 2x Kamewa, CP @ 175 rpm
 Bowthrusters Kamewa, 950 kW @ 1,480 rpm
 Boilers Aalborg
 Mooring equipment Ulstein
 Passengers 1,500 (summer)
 Fire extinguishing systems Marioff
 Fire detection system Consilium
 Radars JRC

Name Maritea
Type Chemical Carrier
Owner Calisa S.p.A-Augusta, Italy
Builder 3.Maj

Constructed by 3.Maj for Calisa S.P.A. in Augusta, Italy, Maritea is designed for worldwide service, but its primary voyage profile comprises traffic between Mediterranean oil ports/terminals. The 35,000 dwt IMO Type II Chem Carrier boasts several innovations, such as a hull structural design based on direct calculation (FEM) including fatigue criteria, an Integrated Navigation system with ECDIS connection on both radars, controllable pitch propeller (CPP) installation, and high efficiency



flap type rudder and bow thruster for enhanced maneuvering. The vessel also holds an anchoring and mooring system designed according to OCIMF criteria, and its wheelhouse, which is designed for One Man Bridge Control, has all-round windows and CCTV surveillance. Maritea's onboard cargo system has midship manifold (eight cargo lines) and stern manifold (three lines). Thermal oil boilers with primary loop for Engine Room Tanks heating and a secondary loop for Cargo Tanks heating.

Name British Trader
Type LNG Carrier
Owner BP Shipping
Builder Samsung



British Trader has been noted as a technologically advanced double hull LNG carriers, designed to meet world wide trading on the ship/shore compatibility and fuel tank capacity, double hulled cargo area with four cargo tanks constructed to GazTransport & Technigaz Mark III cargo containment system — for the carriage of LNG cargoes at cryogenic temperature (-163°C) and atmospheric pressure. The hull structure, which has been designed in accordance with the requirements of LR's ShipRight, has a fatigue life designed for a period of no less than 40 years. This vessel, with GTT Mark-III containment system, has been built for British owner, BP Shipping, can carry 138,200 cu. m. LNG in its specialized cargo tanks encased with primary membrane of corrugated SUS 304L stainless steel plates, 1.2 mm thick, and secondary membrane of triplex glass wool. The insulation is of 270 mm thick reinforced polyurethane foam. This system makes it possible to restrict boil-off gas rate to 0.15 percent of the total cargo volume per day. Two cargo pumps of 1,700 cu. m./hr. capacity each can be used to completely discharge the cargo tanks within duration of 12 hours after the tanks have been pre-cooled by LNG spray. Two 8,000 cu. m./hr. low duty compressors and two 26,000 cu. m./hr high duty compressors are arranged in the compressor room on the trunk

deck and other equipment includes four 50 cu. m./hr. spray pump, 550 cu. m./hr. emergency cargo pump, two 23,400 kg/hr. warming-up heater, 23,100 kg/hr. LNG vaporizer, 7,000 kg/hr. forcing vaporizer, 14,000 N cu. m./hr. inert gas generator and two 90 N cu. m./hr. nitrogen generator. The propulsion system consists of cross-compound steam turbine that delivers MCR of 39,500 shp and NCR of 33,580 shp (85 percent of MCR) at 85.3 rpm, driving six-bladed fixed-pitch propellers to give service speed of 20.1 knots with 15 percent sea margin. The vessel is provided with one Kawasaki make bowthruster of 2,500 kW.

Main Particulars

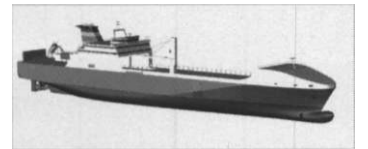
Flag Isle of Man
 Classification Lloyd's Register of Shipping
 Length, (o.a.) 915 ft. (278.8 m)
 Length, (b.p.) 873 ft. (266 m)
 Breadth, (molded) 140 ft. (42.6 m)
 Depth, (molded) 85 ft. (26 m)
 Draft, (scantling) 40 ft. (12.3 m)
 Draft, (design) 37 ft. (11.3m)
 Displacement 107,300 at 12.3 m
 Lightweight 29,800
 DWT, (scantling) 77,500
 DWT, (design) 68,100
 Speed, service 20.1 knot at 85 percent MCR
 Steam turbine Kawasaki UA-400, 29,500 kW
 Gearboxes Kawasaki
 Propellers Mitsubishi
 Bowthrusters Kawasaki, 2,500 kW
 Diesel-driven alternators, (engine) Wartsila ;
 (alternator), ABB
 Cargo cranes MacGregor
 Mooring equipment Friedrich Kocks
 Lifesaving equipment Schat-Harding
 Fire detection system Consilium Marine
 Radars KMSS
 Satellite navigation Leica
 Computers Kongsberg Simrad
 Cargo capacity
 Liquid volume 138,200 cu. m.
 Heavy oil 7,700 cu. m.
 Diesel oil 400 cu. m.
 Water ballast 54,800 cu. m.
 Daily fuel consumption 170.9 MT/day

Name Rickmers Hamburg
Type Multipurp. Container Carrier
Owner Rickmers Linie
Builder Xiamen Shipyard



Combining a specialization in project and heavy-lift freight with long experience in liner-type service, Hamburg-based Rickmers-Linie has opened a major new stage of fleet development entailing nine ships of the Superflex Heavy MPC (multipurpose container carrier) designation.

Name Hurst Point
Type RoRo Ferry
Owner DFDS
Builder Flensburger Schiffbau Gesellschaft (FSG)



Flensburger Schiffbau-Gesellschaft (FSG) has developed a future generation of RoRo ferries incorporating a capacity for 6,000 lane-m of freight.

FSG delivered the 722-ft. (220-m) Hurst Point, the first of four 23,300-gt RoRo sisters contracted by British consortium AWSR for strategic sealift duties under a transport service agreement with the U.K. Ministry of Defense. The 2,600 lane-m heavily-reinforced design incorporates three decks, with the addition of a 36-ton crane on the weatherdeck, and further demonstrates the German yard's propensity for meeting bespoke RoRo requirements within the bounds of efficient production practices. The vessel series, which has already attracted the interest of operators looking to achieve further scale economies on high-volume routes, combines an unprecedented arrangement of five trailer decks and flexible freight distribution with a rapid service speed of 23-knots. The design thereby promises high productivity as well as a major advance in unit capacity. Close attention to hull form, hydrodynamic performance and propulsive plant configuration has resulted in an attractive speed and power relationship, bearing on freight ton-mile efficiency and also capital outlay. The favored layout keeps faith with the diesel-mechanical concept, comprising four medium-speed engines driving twin controllable pitch propellers through reduction gearing. The engine written into the provisional specification is a seven-cylinder version of the MaK M43 series from Caterpillar Motoren, for a total plant output of 25,200-kW. The 6,052 lane-m design from Flensburg could be the next trendsetter. The as yet unique provision of five decks suited to trailer-borne freight comprises four enclosed decks plus the weather deck, served by an inter-deck ramp system configured to allow simultaneous working of four different cargo areas. RoRo access is concentrated over twin stern ramps.

Great Ships of the Year

First-of-class Rickmers Hamburg is every inch the modern maid-of-all-work, offering a 640-ton unit lift capacity along with a variable hold space configuration suited to the widest range of breakbulk and conventional cargoes as well as large, indivisible items of freight. The 30,000-dwt Superflex series is due to extend to nine ships before the end of next year, with construction having been distributed among three yards in China.

The Rickmers-Linie program entails five vessels from Xiamen Shipyard and two from Jinling Shipyard, plus the Rickmers Hamburg and a sistership from Shanghai Shipyard. The five-hold design is fitted with four, high-stooled deck cranes, two of which have a 320-ton maximum lift capacity, while one is rated at 100-tons and other at 45-tons. By using the two largest units in tandem, piece weights up to 640-tons can be handled.

The hatchway layout provides openings up to 105 ft. (32 m) in length and 34 ft. (10.3 m), accessing holds fitted with adjustable tweendecks. The below-deck arrangements mean that the hold spaces can be highly compartmentalized using three flexible tweendecks, or can be configured to give various hold heights up to 15.7-m in accordance with cargo needs, making for optimum space utilization.

Name Harad
Type VLCC
Owner Hellespont
Builder Samsung Heavy Industries



Harad is the first in a four-ship double-hulled series of VLCCs constructed for Hellespont of Greece by the South Korean builder Samsung Heavy Industries. During construction, the four vessels were re-sold to NSCSA of Saudi Arabia. The vessel, which incorporates a number of technical features to ensure high levels of environmental protection and high performance, holds a large main engine, improved strength by increased plate thickness, improved service lifetime for coatings by increased paint specification and advanced inert gas system.

The hull form of the vessel has been specifically remolded to meet Hellespont's requirements and differs from the conventional VLCCs, featuring a 'blunt' fore part and a breadth of 190 ft. (58 m) to reduce hull deflection. As a result Harad benefits from a reduction in hull deformation by around 10 percent. This has been achieved by strengthening the primary member, double structures and buttress. The hull structure has been designed in accordance with the requirements of ABS Safehull and LR' ShipRight, with a structural quality maintained with the usage of higher tensile steel to 45 percent of the total hull structural steel weight. In addition Z quality steel were used for outermost

strake in the inner bottom and 'E' grade steel in the lowest hopper strake.

The number of individual components within the hull structures and the size of the painting area in the water ballast area have been reduced by using a construction method based on one internal bottom plate for each block. According to the shipyard, this reduces the number of maintenance points onboard the vessel. Local strength require-

ment means that the bottom longitudinal stiffener of the cargo well has to be 18 mm thick compared with conventional VLCCs, which tend to be 12 mm. This approach virtually eliminates the possibility of welding defects and subsequent paint damage since there is no welding seam.

HARAD is powered by an Samsung Wart-sila NSD 8RTA84T-D engine developing (MCR) 33,300 kW (44,640 bhp) at 76 rpm.

The service speed is 16.1 knots at main engine output of 26,780 kW (35,900 bhp) including 15 percent power margin. The main engine operates on heavy fuel oil with a maximum viscosity of 700cSt at 50°C. The large power main engine enables considerably higher speed when utilizing the NCR of the engine.

Great Ships continued on page 37

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Navigator of the Seas Delivered by KMY



The 1,020-ft., 140,000-gt, 3,800-passenger MS Navigator of the Seas was delivered November 18 at Kvaerner Masa-Yards' Turku shipyard. Navigator of the Seas, newbuilding 1347, is fourth in the Voyager-class series of cruise ships for Royal Caribbean Cruises Ltd. The first three ships in the series, Voyager of the Seas, Explorer of the Seas and Adventure of the Seas were delivered in October 1999, September 2000 and October 2001, respectively. A detailed technical report on Navigator will be published in the February 2003 edition of *MR*.

Main Particulars	
Length, (o.a.)	...1,020 ft. (311.1 m)
Breadth, (max.)	161 ft. (49.1 m)
Draft, (dwl)	28 ft. (8.6 m)
Speed, service	22 knots
Main Engines.	.6 x Wärtsilä 12V46C
Propulsion machinery	.3 x 14 MW AZIPOD

Spellings to Succeed Healey at EMMF

ExxonMobil Marine Fuels (EMMF) has appointed **Jaime Spellings** as director, Global Marine Fuels in succession to **Peter Healey**, who will assume a new role as global customer service manager.

Austal USA Adds To Sales Team

Austal USA has appointed **Carl F. Wegener** to its sales team in Mobile, Ala. A graduate of Old Dominion University with a degree in Mechanical Engineering, Wegener has more than 15

years of experience in the marine industry having worked with companies such as Newport News Shipbuilding and United Shipbuilders of America.

Woods New President of Rickmers-Linie America

Rickmers-Linie, Hamburg, Germany, has appointed **Bill Woods** as president/CEO of Houston-based Rickmers-Linie America, effective November 1, 2002. Woods, who has more than 28 years of experience working in the transportation industry, most recently served as vice president Commercial for Great Western Steamship Company (GWS), and senior vice president of Great Western Transportation Consulting, a wholly owned subsidiary of GWS.

ICS Welcomes New President

The Institute of Chartered Shipbrokers (ICS) has appointed **Anthony Cooke** and **Richard Sayer** as its new president and vice-president, respectively — for two years. From 1991 to 1999, Cooke was chief executive of Andrew Weir & Co and president of the Chamber of Shipping from 1996-97. He is currently a director of The Baltic Exchange, James Fisher & Sons pic, Bidcorp pic and the West of England Shipowners Mutual Insurance Association.

Northrop Grumman Names Kaufman as VP

Northrop Grumman Corporation's Newport News sector has appointed **Alene (Leni) Kaufman** as vice president and sector chief information officer. Kaufman, who has responsibility for establishing the IT strategic



Oil spill response efforts for the Prestige sinking are being coordinated by Sasemar (Sociedad de Salvamento y Seguridad), which is a department of the DGMM (Dirección General de la Marina Mercante). Ro-Clean Desmi — a Danish manufacturer that has been making offshore booms and skimmers for over 25 years — has been on scene assisting, sending emergency teams with more than 16,700 ft. (5,100 m) of offshore oil containment boom during the first week.

direction and the day-to-day leadership of all information systems at Newport News, began her career with Northrop Grumman in 1979 and has held several leadership positions of increasing responsibility that include project manager of integrated solutions, manager of software engineering and technical specialist of manufacturing systems.

Univan's Container Fleet Increases

Effective November 2002, Univan is taking over full technical management of six container ships. Ranging from 546 to 1,232 TEUs, these ships will bring the total Univan fleet to approximately 73 ships, including 41 container vessels.

These six containers ships — will be taken over between now and the end of the year, with existing crews being replaced with Indian masters and ratings from Univan's container crew pool, on a

gradual basis. Interest from other container ship owners is also due to Univan's growing pool of dedicated container ship crews and the self-perpetuating pool of technical expertise gathered by them.

Ship Concept Studies Contract Awarded

Six companies are each being awarded a firm-fixed-price contract worth \$500,000 for the performance of focused-mission ship concept studies intended to explore a range of approaches in an overall effort to define future ship requirements. These studies will further refine the Navy's requirements and knowledge of technology options for the proposed Littoral Combat Ship and other future ship classes.

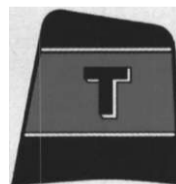
This is a part of the Naval services transformation into the 21st Century and lays the foundation for future warships.

San Francisco, California - May 2nd

The SS "Jacob Luckenbach", a C-3 ocean freight vessel built in 1944 sank in the environmentally sensitive California waters on July 14, 1953 as a result of a collision with the SS "Hawaiian Pilot". The "Luckenbach" now rests in 176 feet of water broken into 3 pieces.

Response & Results:

The USCG hired Titan to provide an assessment, removal, and disposal of oil from the vessel. Titan recovered 85,000 gallons of heavy bunker C oil from the wreck.



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The focused-mission ship to be studied is envisioned to be a networked, agile, stealthy surface combatant capable of defeating anti-access and asymmetric threats in the littorals.

Its primary missions would be prosecution of small boats, mine-countermeasures, and littoral anti-submarine warfare.

Loy Nominated for Post

President **George W. Bush** has nominated **James Loy** to be the Under Secretary of Transportation for Security. Loy, who was formerly the Commandant, U.S. Coast Guard, has been the Acting Under Secretary since **John Magaw** resigned.

Martime Modernization to be Held in D.C.

IDGA's Maritime Modernization conference, which will be held in Washington D.C. on January 28 - 29, 2003 will address the transformation of the U.S. maritime domain. Topics to be discussed at this year's conference include: modernizing the Coast Guard through its Deepwater Program, transforming the U.S. Navy through a new family of surface combatant ships and redefining the mission for other various maritime agencies. Attending this informative event and hear key leaders and experts like Vice Admiral **Thad Allen**, U.S. Coast Guard Chief of Staff and Rear Admiral **Patrick Stillman**, PEO for the Deepwater Program and Congressman **Frank LoBiondo** discuss strategies, requirements and capabilities of the maritime community.

Schat-Harding Takes Over Mulder & Rijke

Lifeboat and davit specialist Schat-Harding has taken over Dutch lifeboat builder Mulder & Rijke. Schat-Harding will continue to manufacture Mulder & Rijke lifeboats for the cruise and ferry market and will provide a global after sales service for all Mulder & Rijke SOLAS products.

The Mulder & Rijke order book for the cruise and ferry market consists mainly of large orders for the Italian Fincantieri group, which is building a series of cruise vessels for the Holland America Line. The HAL order is the single largest order for lifeboats currently in the market, for four ultra-large cruise ships plus two options.

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Wynn to Supply Wipers For RoRos

Wynn Marine is set to supply the window wiper systems for three technologically advanced high-speed RoRo vessels currently in production at the Dalian Shipyard in China, and owned by the Swedish shipping company, Stena. The first of the vessels, Stena Foreteller is

due for delivery to the owner during November 2002, while the remaining two vessels should be delivered soon afterwards. A combination of wiper systems will be used with each vessel being fitted with 25 Type 1762 systems and eight Type C systems. Both come from Wynn's Ocean Range of wipers systems, which are aimed at the commercial mar-

ket. Wynn Marine has designed a new one motor, dual window wiper system for a new ferry being built for the Shetland Islands Council. 'Filla' is the second of a pair of vessels out of the Northern Shipyards, Gdansk, Poland and is due for delivery in April 2003.

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C-MAP Plots Its Course On Both Sides

Beginning in the mid-1980's via a brainstorm session for an innovative electronic charting system, by partners, Fosco Bianchetti and Giuseppe Carnevali, C-MAP has become a force in electronic charting. MR/EN recently traveled to the company's U.S. division, in the heart of historic Cape Cod in Mashpee, Mass. for a firsthand account of how C-MAP compiles its real-time, up-to-the minute charting information.

By Regina P. Ciardiello,
managing editor

While the advent of electronic charts is a historic shift in marine navigation — C-MAP has grown since those first years in the mid-80s as a leading provider of vector-based electronic charts and charting systems to recreational boaters. In fact, the company prides itself on its ability to hold a library of more than 18,000 electronic charts in its database — covering virtually every port and harbor in the world. Not limiting itself to one area of expertise, C-MAP operates three divisions: C-MAP Commercial, C-MAP USA and C-MAP Aviation — the latter two operating out of the Mashpee locale.

C-MAP's CM93 edition 3's strategy is based on the business model of being able to implement its electronic charts and electronic charting technology into some of the world's largest original equipment manufacturers (OEM's) navigation systems — mainly Sperry Marine, Japan Radio Company, Kelvin Hughes and Raytheon — to name a few.

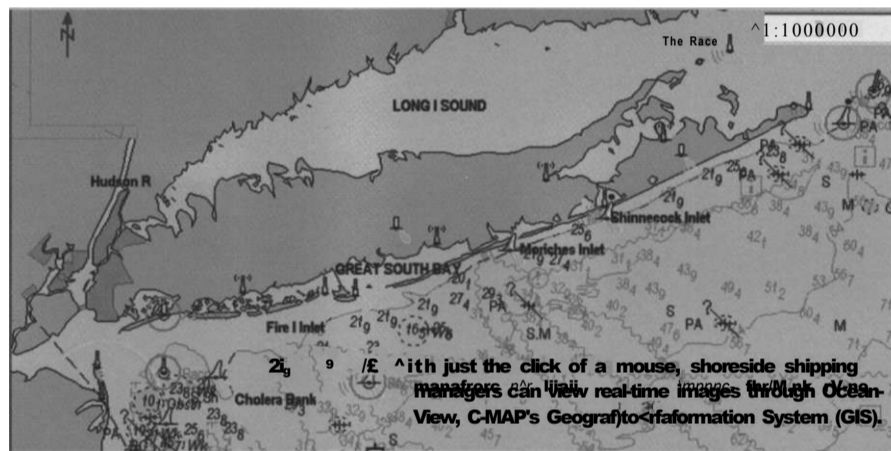
Since expanding into the commercial side more than 10 years ago, C-MAP holds some of the largest vessel owners as clients, and its reference list includes the tanker series currently being constructed for Polar Tankers, the fleets of the top cruise lines and several West Coast Tanker owners. The company has also established itself on government vessels. In fact, according to **Eric James**, C-MAP's Commercial Operations Manager, seven out of 10 U.S. Navy aircraft carriers currently afloat, are sailing with C-MAP's electronic charts.

The software also carries over to other branches of the U.S. Armed Forces, specifically the U.S. Army, who implemented C-Map's CM-93 Edition 3 earlier this year on USAV Lt. William B.

Bunker - a 273-ft. (83.2-m) logistic supply vessel equipped with Integrated Navigation and Situational Awareness Systems (INSA) developed by Conley and Associates of Newport News, Va.

An Italian Foundation

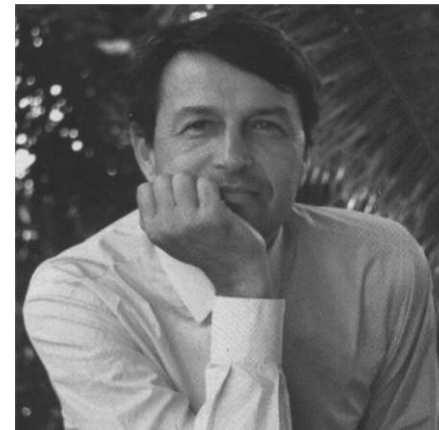
C-Map's database was not developed the same way that its information is processed — overnight. Rather it was a daunting, technologically driven task formulated by **Fosco Bianchetti** and **Giuseppe Carnevali** in 1984. The two men, who co-founded Navionics that same year, built this company to introduce a new type of charting that was poised to be a historic change to marine navigation. The systems, which would be an enhanced version of the already established raster systems, would provide better display, speed and have



greater space for data. Based on official government paper charts, this software would be universal — allowing mariners from the "light" marine world — to plot their courses. Therefore, in 1985, Bianchetti and Carnevali introduced the world premiere electronic charting system, Geonav. Following the success of this project, Bianchetti moved ahead, leaving Navionics to establish C-MAP later that year. Building upon the database that was designed in Italy, Bianchetti literally plotted out additional offices throughout Europe, in maritime strongholds such as Norway and Russia, in 1991, when C-MAP extended its product to ocean-going vessels. But not before it formed a presence on the other side of the Atlantic in 1988 - under the parent company of C-MAP/Italy. Beginning with just a handful of employees, the U.S. outfit, which has since moved from Pocasset, Mass. to Mashpee, has evolved into a group of more than 50 employees — within the

three divisions.

Based upon its recreational product, which by 1991 had already enjoyed several years of success, C-MAP chose Norway as the basis for its commercial outlet — an outlet that would provide electronic charts for oceangoing vessels worldwide. Previously commercial vessels had only had the option of raster charts, which while they were true-to-life of the paper charts, didn't do much in terms of real-time data; users basically had a photographic image of a conventional paper chart. With vector-based charting, although not replicas of paper/raster charts, they do provide higher functionality as opposed to a raster based system. Some examples include: layering of chart data allowing operators to customize the chart display according to their operational needs,



Fosco Bianchetti, (pictured above), developed an innovative electronic charting system in the mid-1980s with partner Giuseppe Carnevali.

While the company has offices located throughout the world boasting teams of people who update the electronic charts on a real-time basis, updates for the Americas, are handled out of the Mashpee location. A team of people who work out of this location, take in information on a daily basis, such as Notices to Mariners and bulletins from the U.S. Coast Guard, and implement them into C-MAP's database, which is updated daily. Dubbed by the company as a "very large, moving, dynamic database," these updates can then be downloaded via the Internet and integrated directly into the electronic charting system onboard the vessel so that vessel operators are kept abreast of the latest changes in the world's shipping lanes and ports — all with the push of a button. It is important to point out that these update files are quite small in size, a week's worth of updates for the U.S. East Coast is only 50kb, which via a typical Inmarsat connection, can be downloaded in just minutes.

While some may perceive that C-MAP supplies the actual equipment for the bridge system, they, according to the company's V.P. and General Manager, **Ken Cirillo**, function strictly as provider of pertinent data. "We don't sell these systems, rather we give our OEM's the ability to use our data," Cirillo said. In essence, C-MAP has mastered the first part of the puzzle for its OEM's, the next piece to concentrate on, according to Cirillo, is the challenge of ensuring that OEM's are integrating the data in a proper, timely manner, as well as promoting the functionality of the actual software. Cirillo cites that one of his main priorities regarding the development of the new CM-93 version is simply "getting the word out." According to

anti-grounding alarms — preset vessel safe contour and the system "looks ahead" for chart features/depths that can pose navigational hazards, course up or relative motion displays.

CM-93 — Information Via the Touch of A Button

CM-93 was developed to satisfy the needs of commercial/professional customers as well as to meet the demands of IMO's requirements for a S57 compatible database for use in ECDIS. Suitable for use in ECS (Electronic Charting Systems),

C-MAP's CM-93 or SENC (System Electronic Navigational Chart), is DNV (Det Norske Veritas) certified effectively allowing the shore based compiling of official ENC's, when available, and is distributed within the CM-93 database. A major advantage of CM-93 users that want to sail with official ENC's but do not want to deal with the at sea conversion of S57 data.

Cirillo, end-users need to be aware that this service is available and is relatively easy to maintain and update. In turn, if used effectively, the database can be a useful powerful tool enabling ships' officers at the bridge to operate a safer, more efficient fleet, as well as more effectively manage their integrated bridge systems (IBS).

A Shore-side View From the Bridge

Another way that C-MAP has furthered its product base is through its shore-side Geographic Information System (GIS) software product called Ocean View. Designed for use mainly by ship owners, operators and brokers, the company's exclusive program, which is based on the CM-93 database, provides a user-friendly exchange of geo-referenced information among a variety of users.

While visiting C-MAP's Mashpee location, *MR/EN* was given a demonstration of the program, and even had the ability of viewing such familiar sights and New York Harbor and the Long Island Sound — all in real time — via the true-to-life graphics and latest vector charts included in OceanView. With just the click of a mouse, shore-side vessel managers, can literally "micro-manage" their fleets via these graphics and charts. Visually, OceanView displays information on a chart background, and via its Database Wizard, allows the user to link up their own databases to the cartographic system. Other types of information such as bit map images, vessel position and links to industry-related web sites are also achieved via Ocean View.

Designed with C-MAP's latest Edition 3 version of CM 93/3, the program holds vector charts of virtually every navigable waterway worldwide. In addition to providing Internet access for electronic chart updates, the program can also export screenshots via bitmap and/or jpeg format — an added function for use in publications (such as this one) and journals.

In addition to the many OEM's that have employed this data, the main compliance unit of the maritime world, the International Maritime Organization (IMO) in London has implemented OceanView into its daily operations base, mainly to raise the level of its efficiency and service capabilities.

While C-Map has enjoyed the success of its CM-93 database and the launching of OceanView, the company has not taken to getting comfortable. At last year's Europort Exhibition in Amster-

dam, which traditionally serves as a platform for the introduction of new products, the company launched its new C-Star Weather Routing System. Developed in conjunction with DNMI (The Norwegian Meteorological Institute, Marine Forecasting Center), C-Star is a weather overlay tool that can be integrated into OEM's that already employ

the CM-93 database. This feature is especially beneficial to the shipping industry due to its ability to calculate the most cost and time efficient route to take in case a storm is brewing — offering precious time and fuel savings. With forecasts provided by worldwide meteorological agencies around the world, (up to ten days in advance, in six hour incre-

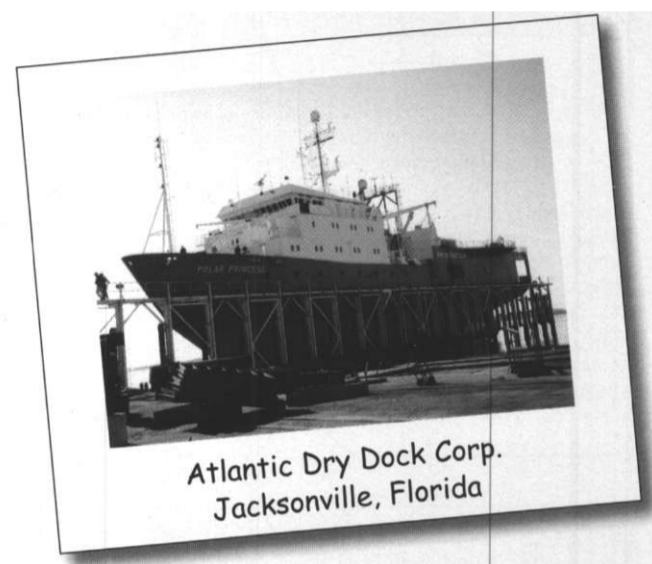
ments) the user has the ability to plot out a smooth course — not having to worry about possible route diversions and loss of time and/or fuel — thus furthering C-MAP's commitment of "tyelping OEM's to build better systems."

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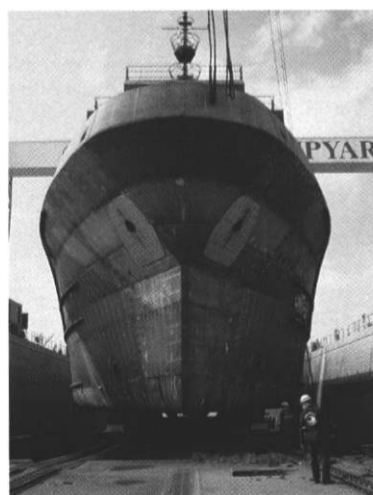
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Circle No. 101



Kongsberg

Kongsberg Maritime Ship Systems (KMSS) combines develops marine electronic systems with over 100 years of experience in design, engineering and commissioning ship systems and simulators. KMSS delivers the industry's first integrated ship control, on board training systems and satellite enabled fleet management software tools.

Circle No. 102

MDS

Marine Data Systems provides specialized and integrated AIS Solutions. In the brochure, The Total AIS Solution, MDS overviews the following products: AIMS Mill, KDU (Key Display Unit), ECDIS (Electronic Chart Display and Information System), ECS, AIMS Utility Software and VTMS.

Circle No. 103

Max Sea

MaxSea navigation software products are designed for all boaters, from the recreational sailor or motor boater, to the professional racer and the commercial fisherman. MaxSea provides TrueView seamless chart technology for optimum viewing and brings point and click simplicity.

Circle No. 104

Raytheon

Raytheon's Marine Integrated Bridge System is a modern, flexible design and can be used for all ship's bridges commercial and military and meets all conceivable ship's operating requirements. The user-friendly technology is designed for One Man Bridge Operation and to reduce workload and stress.

Circle No. 105

Skanti

Skanti has introduced the Skanti Scansat F77. Skanti Scansat F77 uses Inmarsat's recently launched Fleet 77 services and enables online access via MPDS (Mobile Packet Data Service). MPDS allows the vessels, to be online at no charge, and only the transfer of data will be charged per megabyte. This allows the vessels to be online with shore systems.

Circle No. 106

Consilium

Consilium Selesmar recently launched the new SeLux TFT Display. The flexible modular radar display follows a new design that can work with both integrated in an IBS and as a stand-alone radar. It has full ARPA configuration exceeding IMO recommendations and can track up to 100 targets simultaneously.

Circle No. 107

NDI

NDI offers the electronic data products and services required by the shipping industry. Official ENC and EC data with updating services will help ensure safe and efficient navigation in Canadian and international waterways. Digital Ocean Professional electronic charts are the only officially released CHS vector charts on the market.

Circle No. 108

Sailor

Sailor Fleet 77, the new maritime high-speed satellite communications terminal was recently launched. It enables ship owners to optimize business opportunities and minimize costs by integration of the entire fleet into a corporate network. Each vessel can stay online constantly at no charge from Inmarsat. Sailor Fleet77 offers high speed and cost effective data communication.

Circle No. 109

STN

STN ATLAS Marine Electronics has launched its new UAIS DEBEG 3400, which has accorded the European Type Approval last October by the German Maritime and Hydrographic Agency. The DEBEG 3400 is designed to fit into STN ATLAS Marine Electronics' navigation equipment as well as stand alone system.

Circle No. 110

Nauticast

NautiCast AG is an AIS-Systems specialist, catering for the maritime and inland waterway industries. They are launching their AIS-Transponder, the X-Pack DS, and will enhance their AIS offering with base, and repeater stations by spring 2003. NautiCast production is ISO 9001 certified and outsourced to Siemens AG Austria.

Circle No. 111

Northstar

Northstar Technologies has introduced the 958 Integrated Navigation System. The all new 958 integrates a Chart Plotter, Radar, and Fish Finder on a single display. The system was unveiled at the NMEA Annual Convention. It combines radar and fish finder operation with Northstar's GPS and Chart Plotting, resulting in a user-friendly combo.

Circle No. 112

Uni-Safe

Uni-Safe electronics introduces a new, modified version of its the Salinometer SL6000, called SL6005. The new model SL6005 features a new type of built-in display with separate readings on both alarm set and ppm. Both versions have the DNV approval, indicating that the salinometer has been tested according to the requirements from e.g. Lloyds, Germanischer Lloyd, ABS and Bureau Veritas.

Circle No. 113

Norcontrol IT

As a supplier of Vessel Traffic Management & Information Systems (VTMIS), Norcontrol IT has more than 120 systems operating in some of the world's largest ports, major offshore oil and gas fields, and coastal areas. Norcontrol IT Vessel Traffic Management & Information Systems (VTMIS) provide the operator with a concise picture of vessels' movements and interactions in the surveillance area.

Circle No. 114

Thuraya

SatCom Distribution has launched a maritime external antenna and docking station for the Thuraya GSM/satellite phone. It will enable users to send and receive calls, faxes and data without requiring direct line of sight to the Thuraya satellite. The system provides users with voice, fax, data, SMS and GPS services to 99 countries.

Circle No. 115

Raymarine

Raymarine provides the complete marine electronics package, including instrumentation, autopilots, radar, chartplotters, fishfinders, communications and PC charting software available through a global network of dealers and distributors. Raymarine's headquarters are in Portsmouth, U.K. with key offices in Nashua, New Hampshire, and Ft. Lauderdale, Fla.

Circle No. 116

L-3

L-3 Communications is a merchant supplier of defense electronics and a growing provider of commercial communications and transportation products. They supply high technology, proprietary products to the Department of Defense, prime contractors, international customers, OEMs and to the space and telecommunications markets.

Circle No. 117

Diamond

Diamond Electronics designs, manufactures, and installs closed-circuit television systems for virtually any high-temperature application. Diamond's extensive line of high-temperature camera equipment and accessories is custom configured to your requirements.

Circle No. 118

Inmarsat

Fleet F77 combines the quality and speed of a 64kbit/s Mobile ISDN service with the world's first global, high-speed, maritime Mobile Packet Data service via satellite, to deliver e-mail, secure Internet and intranet access and voice, plus a choice of two fax services, making it possible to have a truly mobile office at sea.

Circle No. 119

Rutter

The Rutter VDR-100 is designed to meet recording requirements of the marine industry. A modularized approach allows the unit to be configured to meet the needs of individual ship owners, while the playback system makes data easily accessible for investigation or training purposes. It is fully type approved and IMO compliant.

Circle No. 120

Alstom

Alstom is a global specialist in energy and transport infrastructure. They serve the energy market through its activities in power generation and power transmission and distribution, and transport through its activities in rail and marine.

Circle No. 121

Ballast Technologies, Inc.

Ballast Technologies, Inc. (BTI) has been a provider and installer of fixed ballast materials since 1983. The company's product and service known as Perma Ballast, is widely acknowledged to be the quickest and most cost-effective method of ballast installation today.

Circle No. 122

Chartco

The ChartCo system, which is widely fitted onboard SOLAS vessels to ensure the prompt receipt of critical navigation and weather data, can also be used to receive daily and weekly news. Using the Inmarsat Point to Multipoint Service, satellite broadcast provides an efficient method of providing ships crews with up to date news while at sea.

Circle No. 123

Cross

Cross Equipment Incorporated has an inventory that includes a wide variety of makes and models of winches and deck equipment. The Cross Equipment Inventory includes: Winches, Levelwinds, Diesel HPU, Spooling Units, Deck Equipment, Hose /Umbilical Reels, Fairleads, Sheaves and Blocks.

Circle No. 124

Thales

Thales Underwater Systems is a member of the Thales Group. With over 50 years experience in under-sea warfare, they are a leader in supplying sonar and associated systems for navies and air forces as well as civil seismic applications. Thales Underwater Systems has operating units in the U.K., France, and Australia.

Circle No. 125

The ship has a total of 15 cargo oil tanks with a combined capacity of 342,510 cu. m. at 98 percent loading. In addition, there are two slop tanks fully coated in tar epoxy with a capacity of 7,030 cu. m.. The cargo pumping system allows for a maximum discharge rate of 15,000 cu. m./hr. at a head of 160 mlc via three main pumps. The maximum loading rate is 20,000 cu. m./hr. Three grades of oil can be handled simultaneously through a two-valve segregation arrangement.

The ship is outfitted with an inert gas system with double scrubbers, which reduces the S02 content to less than 2 ppm.

Main Particulars

Flag	Bahamas
Class	ABS
Length, (o.a.)	1,093 ft. (333.3 m)
Length, (b.p.)	1,043 ft. (318 m)
Breadth, (molded)	190 ft. (58 m)
Depth, (molded)	102 ft. (31.2 m)
Draft, (scantling)	74 ft. (22.5 m)
Draft, (design)	70 ft. (21.4 m)
Displacement	350,900 tons
DWT, (scantling)	303,100
DWT, (design)	284,000
Speed, (service)	16.4 knots
Cargo capacity, liquid volume	350,100 cu. m.
Water ballast	98,200 cu. m.
Daily fuel consumption	124.7 tons/day
Main engines	HSD Engine Co., 32,825 kW
Propellers	MMG, Germany
Diesel-driven alternators	3x W rtsil (engine); Hyundai (alternator)
Boilers	Mitsubishi
Hose handling crane	Samsung
Provision crane	Tae Kwang
Mooring equipment	Samsung & Rolls Royce Marine
Lifesaving equipment	CSSC, China
Cargo pumps	Shinko, Japan
Cargo control system	Nakakita, Japan
Ballast control system	Nakakita, Japan
Bridge control	JRC
Fire detection	Consilium
Satellite	Inmarsat
Sewage plant	Hamworthy
Complement	Officers, 17; Crew 25

Name	World Crest
Type	Crude Oil Tanker
Owner	Niarchos Ltd./Anole Shipping Co.
Builder	Daewoo Shipbuilding & Heavy Machinery

Built by Daewoo Shipbuilding & Heavy Machinery for Niarchos Ltd./Anole Shipping Co., World Crest is a 306,000-dwt double hull crude oil tanker under Greece flag, which was delivered in December 2002. Designed and built to meet the standard of ABS rule and classed +A1(E), "Oil Carrier, ESP", SH, +ACCU, +AMS, RES, SHCM, NIBS, with the descriptive notes of VEC, SPM and UWILD. To enhance environmental protection up-to-date International Rule & Reg. including MARPOL Annex IV and VI have been applied and H.F.O tanks



December, 2002

arranged as double hull. Other requirements and Industrial standards also have been considered such as OCIMF recommendations and USCG Requirement, etc.

The vessel, which is intended for the trade of crude oil having a flash point below 60 degrees in cargo tanks, has been constructed as double side and bottom in way of cargo tanks and arranged with five center/side tanks (p&s) and two slop tanks.

Cargo handling system consists of three cargo pump with capacity of 5,000 cu. m./hr. each driven by steam turbine and three cargo manifolds on deck for three segregation of cargo loading and discharging.

Water ballast tanks of five pairs in cargo area and two E/R w.b.tanks and two peak tanks are arranged and two ballast pumps with capacity of 3,000 cu. m/hr. each driven by electronic motor are provided.

The design fatigue life at critical connections of hull structure is 30 years and longitudinal end connection in cargo area is 40 years in compliance with ABS SafeHull Phase A requirement.

The speed of the vessel is 15.8 knots with the main engine running at 85 percent MCR with 10 percent sea margin, and the main engine is B&W 7S80MC-C with MCR output of 36,960 PS at 76 rpm driving a fixed pitch propeller.

In addition, a seven-tier deckhouse located aft provides accommodation for 35 persons.

Wheelhouse is arranged for the concept of the One Man Bridge Operation (NIBS) equipped with integrated navigation system including electronic chart display and information system and also interfaced with other equipment and also provided with remote/automation control system.

Main Particulars

Flag	Greece
Class	ABS
Length, (o.a.)	1,089 ft. (332 m)
Length, (b.p.)	1,050 ft. (320 m)
Breadth, (molded)	190 ft. (58 m)
Draft, (design)	68 ft. (20.8 m)
Draft, (scantling)	73 ft. (22.4 m)
DWT, design	277,500
DWT, scantling	306,050
Speed	15.8 knots at scantling draft
Cargo capacity	
Liquid volume	346,351 cu. m.
Bunkers	
Heavy oil	7,532 cu. m.
Water ballast	103,279 cu. m.
Diesel oil	442 cu. m.
Main engines	MAN B&W 7S80MC-C
Propeller	Hyundai Heavy Industries
Diesel-driven alternators	3x STX Corp., 1,710 bhp @ 720 rpm
Boilers	Mitsubishi Heavy Industries
Mooring equipment	Fukushima
Cargo pumps	3x Shinko Industries
Bridge control systems	Lorcontrol
Fire detection systems	NK Co. Ltd.
Radars	Japan Radio
Waste disposal	Teamtec Marine Products

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YIORTELBOER

Name	M/V Tarantella
Type	Chem/oil tanker
Owner	Whitefin Shipping
Builder	Trogir

The vessel Tarantella features a variety of outstanding and unique characteristics representing an advanced concept of chemical tanker. Compared to earlier Trogir built tankers (Trogir and Azov Sea), the hull of Tarantella embodies a number of upgrading features such as: Execution of bulkheads, bottom and lower stools to facilitate drainage of the cargo /washing water to the practical minimum as described with "str 0.05" class notation; Introduction of trapezoidal corrugation (instead of rectangular) to enable 96 percent of tank surfaces to be exposed to direct jet from washing machines and therefore qualify for ETC notation; Strengthening of structure to suit for wider range of IMO 2 chemicals, which effected bulkheads and boundary of alternate tanks being strength-

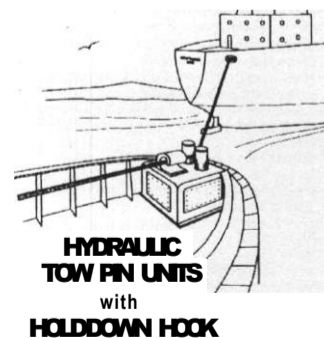


ened for unlimited filling level of 1,600 t/cu. m. cargo density and deck structure reinforced to withstand 0.7 bar overpressure, which prevents some cargoes (pentane, pentene) from vaporization at environmental temperatures; Review of cargo tanks/double hull structure by 3-D FEM fatigue life analyze (DNV — Nauticus — new-building) followed with introduction of extra thickness, brackets or execution of cut-outs and similar as needed for assignment of DNV Plus — 2 notation: Structure fatigue life is 40 years. Extension of double hull further aft — to protect fuel storage tanks from leakage in case of minor shell plating damages; 2 m clear-

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ance is main tain e d throughout; In order to keep steel hull mass as low as possible some 31.5 percent of HTS (NV36) is introduced, mainly in cargo tanks envelope and bulkheads and partly in bottom plating. Cargo tanks' drying system is composed of one 30,000 cu. m./hr. air heater with fan, steel ducting on cargo tanks' deck with branches for flexible connections to desired tank; Nitrogen production plant of 4,500 N cu. m./hr. capacity with supply connections to each cargo tank — used for inerting of sensitive chemicals. Instead of conventional submerged hydraulically driven cargo pumps electrically driven deep well pumps are provided. Speed control by frequency converters. Redundancy, flexibility, maneuverability ease of maintenance, high electricity demand during frequent cargo discharge operation and low initial cost were decisive factors for selection of suitable propulsion/ electricity generation configuration: consisting of two medium speed engines.

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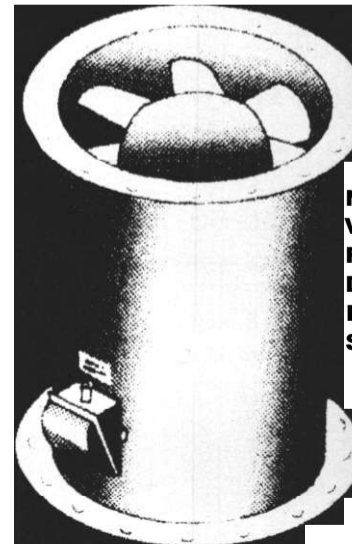
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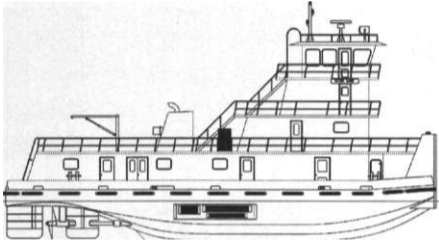
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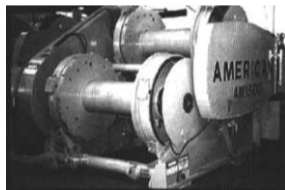
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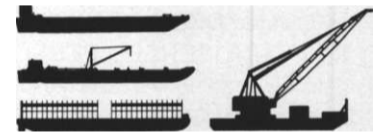
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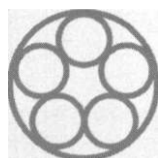
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Mate (USCG Lie 500+ tons)	\$145/day	\$ 52,925
Compressor Mechanic (2000+ psi)	\$132/day	\$ 48,140
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Previous Seismic (OBC) experience is a plus.

Qualified applicants are encouraged to contact recruiter for more information on open positions. You can forward a resume & salary history (include schedule) to jhodge@fairfield.com or fax it to Jeff Hodge - Human Resources/Field Recruiter @ 337.232.2313. Screening includes completion of Drug test, background check, physical & agility test.

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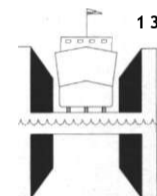
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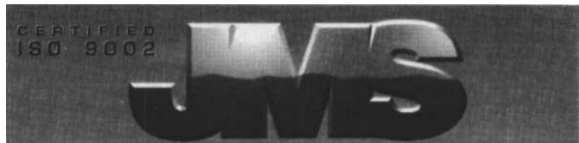
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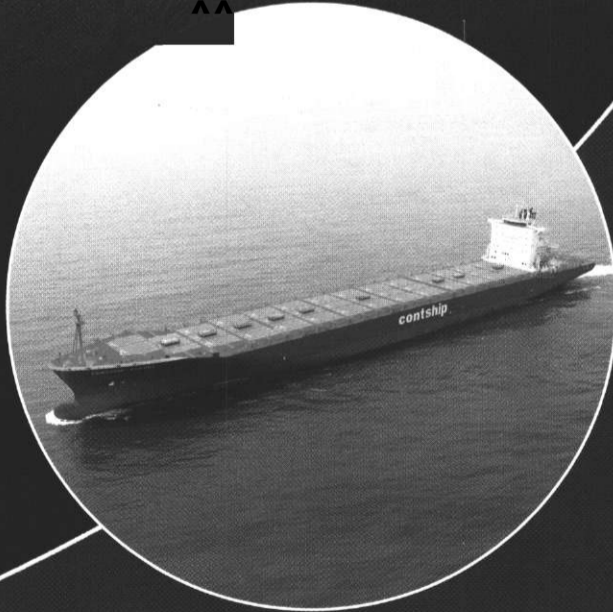
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