

KORSHIP

Shipbuilding · Marine · Offshore · Offshore wind

2011. 12

Marine Tech
Korea Official
Magazine

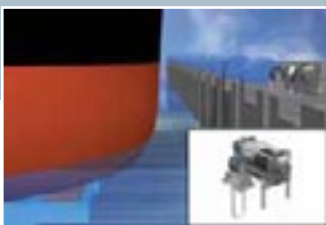
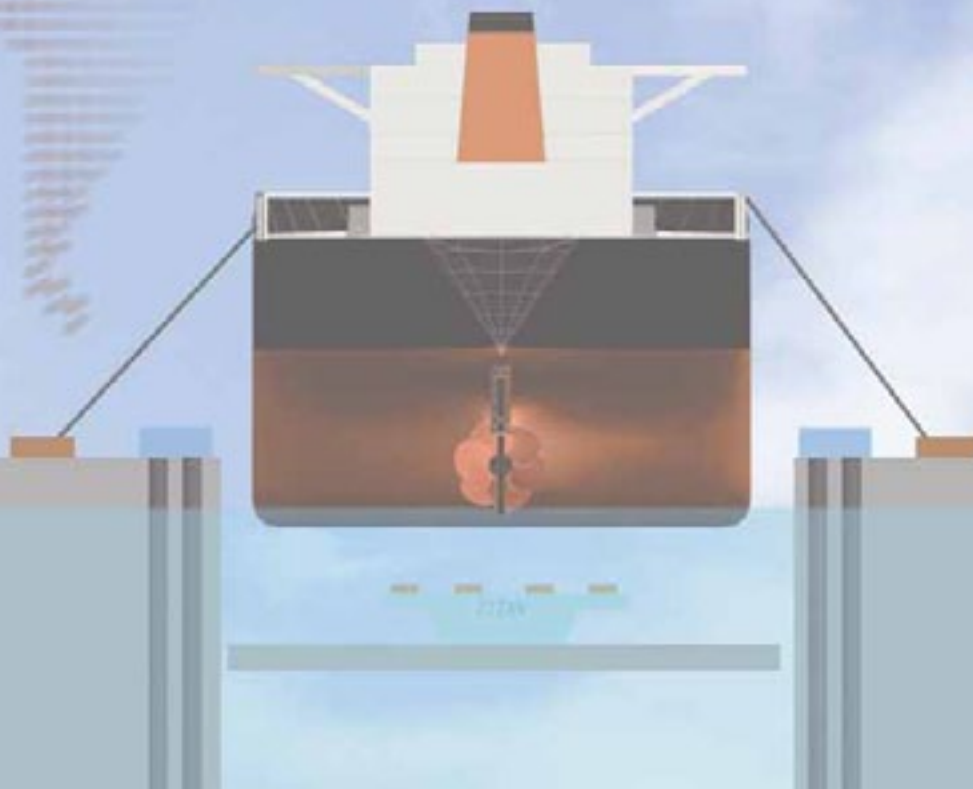
ACS 1000. Medium Voltage AC Drives for Marine Applications



The ACS 1000 family of drives is one of the most successful drives in its class, providing marine auxiliary applications with simple and reliable power control. ACS 1000 family provides speed and torque control of induction motors with various voltages. An output sine filter designed by ABB, eliminates voltage reflections and common mode voltages, making the drive suitable for standard motors and retrofit applications. ACS 1000, water-cooled and air-cooled, with integrated transformer (ACS 1000i) will meet the requirements of marine certifications, such as ABS, DNV, and CCS. www.abb.com/drives

INNOVATION AND CREATIVITY OF TRANSPORTER PRODUCTION - RA IN HO CO., LTD.

Create a better planet with our world best technology.
Create environment friendly transportation systems for the shipbuilding industry.



Shiplift System
CAPACITY: UP TO 35,000TON
MORE CAPACITY AVAILABLE



MTP (Module Transporter)
CAPACITY: 60TON ~ 1,000TON
FOR COMBINATIONS OF UP TO
OVER. 20,000TON



RTP (Transfer System)
CAPACITY: 100TON ~ 600TON
FOR COMBINATIONS OF UP TO
90,000TON

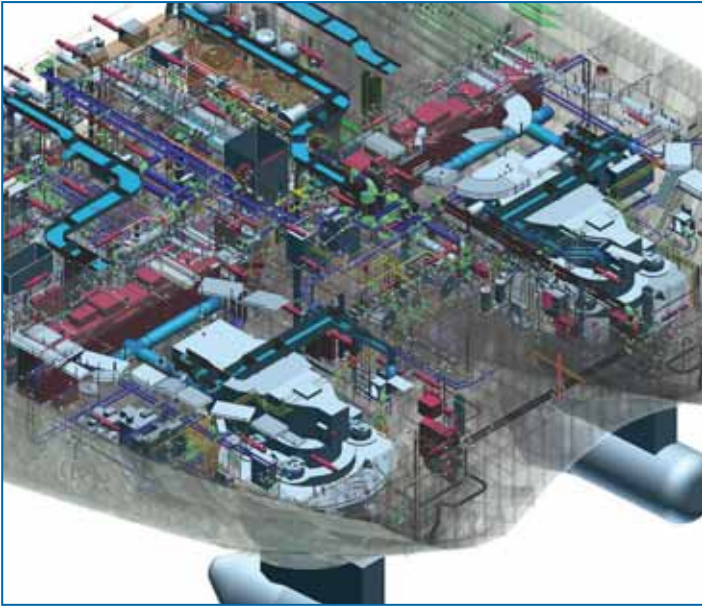


SSC (Ship Section Carrier)
CAPACITY: 50TON ~ OVER. 1,000TON
FOR COMBINATIONS OF UP TO
10,000TON

Ra In Ho Co., Ltd.

6Block, Yulchon 1 Industrial Complex, Hodu-ri, Haeryong-myeon, Suncheon-si, Jeollanam-do, South Korea

Tel.: (82)061-750-8800 / Fax.: (82)061-727-6690 / e-mail : titan@rainho.co.kr



SMARTMARINE[®] ENTERPRISE

The new wave in marine design, construction and operation

Gain project schedule and cost benefits through your complete life cycle

Choose a solution that supports concept design through operations.

Intergraph offers best-in-class, standalone applications for materials management and project controls; 3D modeling and visualisation; and information management.

Take advantage of integrating these applications to gain even greater benefits.

www.intergraph.co.kr

INTERGRAPH[®]

Heavy Industries Happy Industries

Technology helps create the world that we dream of.
Hyundai Heavy Industries pursues the happiness of the
global community with its advanced technology.

In the realm of heavy industries, our technology is everywhere,
improving the quality of life and happiness of everyone.
We are building a world of shared dreams.



Shipbuilding



Offshore &
Engineering



Engine &
Machinery

**Not everybody can protect
your business against CORROSION
in sea environments...**

Munters CAN!



Humidity is a key driver in corrosion processes.

Munters, the world leader in energy efficient air treatment, has years of experience in offering the best protection against corrosion, also in open sea environments.

By reducing the humidity in the air, corrosion and other threats are slowed down and even stopped. Our customers? Worldwide shipyards, key wind turbine manufacturers, energy companies, defence organizations, etc.



M/MG Series



BX Series



ML Series



MX Series



MB/MBX Series



Feel free to contact us and we will offer you the advice you need for your climate conditions.

With over 300,000 installations worldwide, Munters is your sustainable global partner!!



Munters

Munters Korea
Tel: +82-(0)2-761-8701 Fax: +82-(0)2-761-8777
E-mail: munters@munters.co.kr
www.munters.co.kr

since 1861...



*together
for excellence*

Marine

Certification

Industry



RINA

... day after day, in every single activity, through each one of its professionals, RINA knowingly operates to improve the quality and safety of human life and to protect the environment for future generations.

Busan Office (Tel)+82 51 465 5412, (Fax)+82 51 465 5535, Pusan.Office@rina.org, www.rina.org



SIEMENS

**What can we do to preserve
the seas for future generations?**

**Siemens Marine Solutions provides sophisticated technology
for the long-term eco-friendly operation of ships.**

Highest availability, as well as low operating, personnel and maintenance costs, is of particular importance throughout the entire life cycle of a civil vessel. And the need for better environment protection is yet another challenge for shipbuilders and shipowners.

Siemens Marine Solutions is the globally operating expert partner for the latest automation systems and diesel-electric drive systems that ensure efficient, reliable and environment-friendly vessel operation. This is good news not only for nature. www.siemens.com/marine



Bosch Rexroth Korea held a seminar covering the technologies with applications to the shipbuilding and maritime industries

Bosch Rexroth Korea held a seminar on the technologies applicable to the shipbuilding and maritime industries at the BEXCO convention hall on October 27 during the KOR-MARIN which ran for 4 days from October 26.

In the seminar, Bosch Rexroth Korea presented the cutting-edge drive/control technology related to the shipbuilding and maritime industries. Particularly, the world-renowned experts in the shipbuilding and maritime industries directly gave explanations, drawing positive response from the attendants.

The presentations by the experts in various fields related to the high performance drive solution for the winch system, high energy efficient new axial piston unit incorporating the leading technology, hydraulic system for deepwater application with the proven capability to operation at depths up to 6,000m, high-speed performance through continuous jack-up system, operation of safe and reliable offshore equipments through active heave compensation, elec-

tronic remote control system for the engine, gear, jet propulsion system and pitch propeller, energy efficient/eco-friendly diesel engine control technology, and others.

An official from Bosch Rexroth Korea explained, "This seminar focused on introducing the attendants to the capabilities of our new drive and control technology which allows the users in related fields to operate the shipbuilding or maritime equipments with greater productivity and efficiency, and was a successful event that brought great inspiration and captivated their hearts."

Bosch Rexroth Korea, a partner of shipbuilding and maritime industries, are offering various state-of-art parts, modules, systems, and projects. Particularly, Bosch Rexroth Korea is supporting customers

worldwide based on its extensive applications and expertise in the major technologies of maritime industry.

Bosch Rexroth Korea offers a wide range of products, including hydraulic valve, pump, motor, cylinder, HPU, control system, electric drive, ship control, etc, and has the sales network spanning 80 countries worldwide and manufacturing facilities in 67 countries.



The technical seminar related to the shipbuilding and maritime industries at the BEXCO convention hall on October 27

HHI signed a contract with SKT to set up LTE network

Hyundai Heavy Industries (HHI) is poised to be equipped with the next-generation super-fast LTE (Long Term Evolution) network and turn itself into a smart shipyard for the first time worldwide.

HHI entered into an agreement to set up the LTE network at its Ulsan headquarters on October 20 in a signing ceremony which was attended by SK Telecom President & CEO Ha Sung-min and HHI President &

CEO Lee Jai-seong.

Under the agreement, LTE network which is 5 times faster than the existing 3G network will be set up at the HHI's shipyard by December this year and enable ultra-speedy transmission of large amounts of data at any place in the shipyard occupying about 6.15 million m² (approximately 1.86 million pyong).

For that, SK Telecom, will install 39 optical

repeaters and LTE base stations at 9 places throughout its headquarters. Based on the network, HHI plans to introduce the mobile office, mobile intra phones, integrated video conference system, etc, as part of efforts to improve the working environment. The LTE network will allow the operators to transfer large amounts of data at an ultra-fast speed via mobile devices such as smartphones and table PCs between the



SK Telecom President & CEO Ha Sung-min (left) and HHI President & CEO Lee Jai-seong (right) signed a contract to set up the LTE network at its Ulsan headquarters on October 20.

production site and office. The operators in the office can check the current progress of work on the production site in real time through the video, and this Smart Work is expected to increase work efficiency.

Furthermore, the new technology which allows the employees and authorized users of the company to have access to the Smart Work system, depending on the type of mobile devices such as smartphone or tablet PC, will help strengthen the security. Hwang Si-young, Vice-President of HHI (chief information officer), said, "This IT system, which is optimized for the production site and fully reflects the rapidly changing needs of communication environment, will help HHI maintain its world's leading position in the shipbuilding industry.

HHI has been at the forefront of applying the communication technology to sharpen competitive edge. Specifically, HHI built the WiBro network in 2009 in order to control the logistics, etc, constructed the world's first smart ship in March which can be controlled remotely from land, and launched the 'm-PASS', the mobile after-sales service system for ships in August.

SSME consecutively held the hand-over and naming ceremonies for 4 vessels

Sungdong Shipbuilding & Marine Engineering (SSME) consecutively named and delivered ships of various models to the ship owners of different countries for 3 days from October 25 to 27. SSME held a hand-over and naming ceremony on October 26 for 'Smart Lady', a 115,000-ton crude oil tanker for the U.K.-based

Blenheim, following the hand-over and naming ceremony on October 25 for 'Marvellous', a 180,000-ton carrier ordered by Hong Kong-based Teh-Hu. In addition, SSME named the 2 units of 75,000-ton crude oil tankers for the Greece-based Navios as 'Nave Andromeda' and 'Nave Estella', respectively, on October 27. SSME, currently under negotiation with the creditors such as Export Import Bank of Korea, Woori Bank, etc, on a voluntary agreement, is building and delivering ships



The officials of SSME pose for a photo after naming the 75,000-ton crude oil tanker as 'Nave Andromeda' on October 27.

without disruption according to its business normalization plan owing to the concerted efforts of its employees and support of capital-abundant clients despite global economic depression.

An official from SSME said, "We will overcome current crisis by concentrating our capabilities on the high value-added ships and offshore plants while beating off the competition from the emerging shipbuilding countries such as China."

STXOS will participate in the Canadian government's shipbuilding project

STX Canada Marines, the subsidiary of STX Offshore & Shipbuilding (STXOS), announced on October 31 that it would sign an agreement with the Canada-based Seaspan Vancouver Shipyards on a project to build the warships and non-combat vessels for the Canadian government.

The Canadian government is currently proceeding with the national shipbuilding procurement strategy, which represent the

largest procurement in Canadian history, to build 15 frigates and destroyers, 6 to 8 large icebreakers, and coastal patrol boats, etc, over the next 25 years.

STX Canada Marines will participate in the construction of non-combat vessels such as the joint support ships, polar icebreakers, offshore oceanographic support vessels, offshore fisheries science vessels, etc. The project in the field of non-combat ves-



sels is projected to be worth about KRW 9 trillion (CAD 8 billion).

STX Canada Marines partakes in the project with Seaspan Vancouver Shipyards, the local shipyard, as the warship and non-combat vessel project requires the vessels to be built in Canada.

STX Canada Marines will provide the

design engineering of all ship models to be built by Seaspan Vancouver Shipyards along with the consulting services on the shipbuilding, and STXOS will bring its shipbuilding expertise.

An official from STX remarked, "The North American market which covers Canada stands out in the field of special purpose

vessels such as warships, icebreakers, and others. STXOS, which was awarded this contract in recognition of its excellence in the shipbuilding technology, will add momentum to its advancement into the markets of developed countries including the North America."

Siemens PLM Software received an appreciation plaque from HHI

Siemens PLM Software announced that it received an appreciation plaque from Hyundai Heavy Industries (HHI) for helping with HHI's drive for innovation in the shipbuilding technology, following its successful supply of PLM (product lifecycle management) software to the Shipbuilding Division of HHI on November 7.

The Shipbuilding Division of HHI built the PLM environment for optimizing the entire shipbuilding lifecycle process by introducing Teamcenter, a PLM platform of Siemens PLM Software, and Tecnomatix, a digital manufacturing (DM) solution. Particularly, this large-scale PLM project is differentiated from existing small-scale PLM projects carried out by the shipyards

in China, Japan, and Europe, and thus attracted wide attention from the industry.

The Shipbuilding Division of HHI accomplished the integrated management of information related to the shipbuilding, which is the backbone of innovation in the design and processes. Above all, the Shipbuilding Division of HHI set up a system for the integrated management of CAD drawings/technical data and logistics information processing through BOM and systemized the design process flow. To create an optimized production environment, the Shipbuilding Division of HHI aims to set up a simulation-based digital shipbuilding system in tandem with its quest for high efficiency in design based on the information sharing in design alterations, accumulation of expertise and proactive elimination of errors.

In fact, the Shipbuilding Division of HHI plans to expand the application of PLM system to its work processes and enhance the design productivity upon the completion of PLM project incorporating the Siemens PLM Software solution, and increase the productivity and efficiency vital in boosting customer satisfaction and cementing its leadership in the shipbuilding industry.

An official from HHI said, "Siemens PLM Software solution has allowed us to optimize the digital manufacturing environment and build efficient system for collaboration. HHI awarded the appreciation plaque to Siemens PLM Software for helping HHI successfully build PLM environment and drive forward with the innovation in technology."

He added, saying "The Shipbuilding Division of HHI has achieved various results of innovation enabled by PLM. Based on that, HHI will solidify its leading position in both domestic and overseas markets."

Gwon Gyeong-reul, President of Siemens PLM Software, said, "HHI's introduction of PLM system will provide a benchmark for the application of PLM to the shipbuilding industry as large shipyards are moving quickly to build the PLM system in order to build up competitiveness. By playing a key part in stimulating the shipbuilders' adoption of PLM, Siemens PLM Software will be able to leverage synergic effects created between both companies."

Meanwhile, Siemens PLM Software plans to move ahead with the development of technologies and solutions to drive the PLM innovations in shipbuilding industry.



The appreciation plaque which Siemens PLM Software received from HHI in recognition of its contribution to the HHI's innovation drive



DSME held a naming ceremony for 2 drillships for Odebrecht at the same time

Daewoo Shipbuilding & Marine Engineering (DSME) held a naming ceremony on November 4 for 2 drillships ordered by Odebrecht, the largest construction plant group of Brazil, at its Okpo shipyard in Geoje island, South Gyeongsang Province. On the same day, the two newbuilds were named 'ODN-1' and 'ODN-2', respectively, in the naming ceremony attended by about 220 officials including Nam Sang-tae, CEO & President of DSME, Roberto Ramos, President of Odebrecht, and José

Sergio Gabrielli, Chairman of Petrobras. These drillships, ordered in November 2009, measure 243m in length and 42m in width and adopt DSME-10000 design developed independently by DSME. In addition, these drillships are equipped with dynamic positioning system and cutting-edge drilling system and can operate at a maximum depth of 3,000m under water with a drilling capacity of up to 12km. After the naming ceremony, both are scheduled for delivery to the ship owner by March next year. They will be chartered to Petrobras, the largest oil exploration company of Brazil, after delivery.

Meanwhile, the naming ceremony on the same day was attended by major executives of Petrobras, including José Sergio Gabrielli, Chairman of Petrobras.

Nam Sang-tae, CEO & President of DSME, and José Sergio Gabrielli, Chairman of Petrobras, exchanged various ideas on the maritime development projects of Brazil in a face-to-face discussion immediately upon the naming ceremony.

Nam Sang-tae, CEO & President of DSME, said, "DSME has built a strong trust and relationship with Odebrecht by proving excellence in quality and safety, etc, like working 800 hours without single incident or accident in the drillship project for Odebrecht. This strong relationship of trust with the ship owner was vital in successfully completing the drillship construction."

Roberto Ramos, President of

Odebrecht, the ship owner, commented, "I am thankful to DSME for building the best quality drillships without single incident. We will keep building strong partnership with DSME based on mutual trust."

MAN Diesel & Turbo launched second generation of EGR system for prototype testing

MAN Diesel & Turbo has announced the first order for its second-generation Exhaust Gas Recirculation (EGR) system, to be applied aboard a Maersk Line container vessel - the 4,500TEU new building #2358. The system will be fully integrated with the vessel's main engine, a two-stroke MAN B&W 6S80ME-C9 type to be built by Hyundai Heavy Industries' engine & machinery division.

The EGR system enables the meeting of the imminent IMO NOx Tier III emission levels due to come into force by 1 January 2016.

Søren H. Jensen, Vice President and Head of Research & Development at MAN Diesel & Turbo said, "We have taken an important step forward in the development



Major officials of DSME and Odebrecht are posing for a photo, including Nam Sang-tae (third from the right), CEO & President of DSME, José Sergio Gabrielli (first from the left), Chairman of Petrobras, Roberto Ramos (second from the right), President of Odebrecht, and others during the naming ceremony held at the Okpo shipyard in Geoje island, South Gyeongsang Province, on November 4.



Graphic of the second-generation EGR system (orange) integrated with its host engine



of exhaust gas recirculation with the release of this second-generation system. This configuration will mirror the final design for our Tier-III NOx EGR engine programme.

The main focus has been on integration of the entire EGR system into one unit which is a part of the engine as a charge-air cooler. The EGR unit comprises a cooler, a scrubber, a water mist catcher and a blower unit, and is designed to be fitted on the engine in the same way as a charge-air cooler. Since the first-generation EGR was tested in service, we have achieved significant technical advances as well as improvement in performance. We have optimised the performance of the EGR so that the system recirculates 40% of the exhaust gas so as to meet the Tier-III reduction criterion."

The new EGR generation comprises a compact design that entails only minor changes to the engine outline, to the extent that the new engine type does not require any major design changes by shipyards.

The new building #2358 from Hyundai's shipbuilding division is in the C-class series of 22 container vessels ordered by the Maersk Line and will be delivered in early 2013.

Upon delivery, the vessel will serve the trade route between East Africa and the Far East. For a test period of three years, the engine will be operated partly with IMO Tier III NOx emission levels.

NAPA and STXOS began to cooperate in Green Ship

NAPA, a leading software house for ship design and operations, has signed an

agreement with STX Offshore and Shipbuilding (STXOS). The agreement specifies the co-operation between STX and NAPA regarding sales, model creation and delivery of the environment-efficient NAPA software for STXOS designed vessels.

NAPA software solution will be the solution for the Ship Energy Efficiency Management Plan (SEEMP) in STXOS newbuildings. NAPA is used for obtaining energy savings through the most optimal trim, route, speed, and engine rpm.

In addition, it includes a complete office platform which provides a quick overview of the fleet efficiency, including tools for detailed analysis of hull and propeller performance, and monitors achievement of the SEEMP.

STXOS and NAPA are both committed to energy efficiency and ecological sustainability. "We are very pleased to start this co-operation with STXOS. It verifies further that we have state of the art capabilities to provide our customers with superior software solution that will cover the upcoming SEEMP requirements for energy efficient planning of ship operations. We are very happy to work with STXOS toward greener shipping", says Matti Salo, President of NAPA for Operations.

"STXOS is devoted to satisfy its customers as a value-creating company, committed to building energy efficient ships, on time and with technological superiority. NAPA is a very important part of our Green Ship concept. It provides our customers a possibility to optimize the vessel's complete operation and provides a platform to fulfil the SEEMP requirements", says Head of Ship Technology Department, Director Choi Young-dal from STXOS.

KR signed a MOU with ECN for cooperation in renewable energies and energy efficiency technologies

Korean Register of Shipping (KR) entered into a MOU (Memorandum of Understanding) with ECN (Energy Research Centre of the Netherlands), the national research institute of the Netherlands, for technical collaboration in the field of renewable energies and energy efficiency at the Westin Chosun Hotel in Seoul on October 24.

Signing this MOU, both companies will work closely as strategic partners for developing technologies in the renewable energy field and other fields related to energy efficiency in order to reduce greenhouse gas emissions, and particularly, will cooperate for international certification in the wind power industry.

ECN, one of the world's 3 largest institutes dedicated to the wind power research, along with RISO (Denmark's national research center), NREL (National Renewable Energy Laboratory), has the world's best technology in the field of renewable energies, such as wind power, and energy efficiency vital for slashing the greenhouse gas emissions.



KR signed a MOU for technical collaboration with ECN in the renewable energy and energy efficiency sectors on October 24



Oh Gong-gyun, Chairman of KR, said, "The build-up of technological capacity related to the performance test and global network are essential for finalizing the domestic wind power certification system. This MOU that we signed with ECN will lay the groundwork for completing the global network that can be leveraged to secure the technology related to the performance test of wind power facilities. KR will put forth its best effort in technological collaboration to ensure that KR can establish itself as the world's leading certifier in the wind power industry."

KR became the internationally certified product certification body accredited by Korea Accreditation System (KAS) in July, for wind farms, wind power facilities and major components thereof, etc, in 4 certification fields (type approval, project certification, parts certification, prototype certification), and entered into a technological cooperation agreement with NREL and DEWI (German Wind Energy Institute) to build the global network related to the performance test of wind power facilities.

Kunsan National University to offer specialized job training program in the strategic industries of South Jeolla Province

The consortium, composed of 8 companies such as Hyundai Heavy Industries (HHI), JY Heavy Industries, Wing Ship Heavy Industries, Dae Ryun Heavy Industries, KB Heavy Industries, etc, including Kunsan National University, was selected to support the specialized job training program in the field of strategic

industries of South Jeolla Province.

The specialized job training program in the field of strategic industries aims to address the mismatch between supply of university graduates and demand in the labor market. For that, the specialized job training courses will be developed through the collaboration of companies and universities to foster professional manpower that will meet the standard of companies. Under the program, employment contract will be signed among the universities, 1 or more companies or research institutes, and university graduates upon their completion of the job training courses. Universities will open the specialized training courses depending on the details of training that the companies or research institutes require.

The specialized job training program will cover the shipbuilding, carbon, LED, printed electronics, the major industries being promoted by South Jeolla Provincial government. Shipbuilding Engineering Department (headed by Professor Yeom Deok-joon) of Kunsan National University will offer the practical job training courses tailored to the needs of companies for 2 years to those who become juniors in 2012 academic year.

The specialized job training program will be operated on contractual basis, unlike existing job training programs, and is divided into the definitive employment type and



Shipbuilding Engineering Dept. of Kunsan National University was selected to support the specialized job training program that aims to foster professional manpower for the strategic industries of South Jeolla Province

employment-oriented type.

10 out of 17 students majoring in the shipbuilding engineering, who participate in this training, will enter into the definitive employment agreement and the remaining 7 will be admitted to the courses offering skill development training oriented towards employment generation. Those who join the program under the definitive employment agreement will receive scholarship awards equal to 100% of tuition costs for 2 years, while those who take the employment-oriented courses will be provided with scholarship awards equal to 80% of tuition costs for the same period.

The Shipbuilding Engineering Department of Kunsan National University is the only department selected in South Jeolla Province to offer the specialized job training program in the field of shipbuilding and will become the single source of manpower for building various ships such as bulk carriers, oil tankers, wig crafts, yachts, etc, thus taking the lead in opening door to the future of the region's shipbuilding industry.

MARINE TECH KOREA 2012

International Exhibition for the Korea Shipbuilding,
Marine Technology Industries 2012

13(Tue) ▶ 16(Fri) November 2012
CECO, Changwon, Korea



Mecca of World Shipbuilding Industry, Gyeongsangnam-do

Gyeongsangnam-do is the core position of
manufacturing technique of LNG Carrier
and Offshore Plant.



Main Exhibits

- Shipbuilding & Marine Equipment
- LNG Carrier & Offshore Plant
- Harbors, Logistics, Marine Safety

Events

- International Conference and Seminar
- One on One Business Meeting
- Shipbuilding Company & Marine Equipment Company Tour

Invitation for Foreign Buyers

- If foreign buyers want to make a contract, sign MOU etc during the show, the organizer would support 50% of airfare and accommodation

Organized by :  GYEONGNAM PROVINCE  CHANGWON CITY  TONGYEONG CITY  GEOJECITY

Managed by :  K.K. FAIRS  GNA M.I.C.E. Consulting  International Co., Ltd  Korea Marine Equipment Association  Reed Exhibitions

MARINE TECH KOREA 2012 Secretariat Tel : +82-2-555-7153, +82-55-212-1334~6 E-mail : info@mtkorea.org

Since 1968, JS Cable has been the leader in cable technology for marine and offshore applications

Where energy traverses the ocean,
JS Cable is there.



A global company growing with its customers on the basis of trust and world-class technology. That is the future of JS Cable



Marine & Offshore Cables



Wind Turbines Cable



Nuclear Power Plant Cable



Crane Cable



Mining Cable



Electric Cable



Data Cable



Copper Rod

JSCable
www.jscable.co.kr



COST-EFFECTIVENESS GUARANTEED!

Photos iStockphoto.com/susaro & /Mr-Eckhart and Acergy

We have a passion - we make AC drives, and AC drives only. They serve your needs from 0.25 kW to 5000 kW all voltage ranges from 220 V to 690 V, both air-cooled and liquid-cooled. Vacon drives optimize your main propulsion to save more fuel, make your winch system more compact and silent, and make your seawater pumps follow the real cooling need. Moreover, not forgetting the comfort in ventilation, which is achieved with our drives. www.vacon.com

Vacon Korea Ltd.

2Fl, Hyundai-Ansung Tower, 737-28 Hannam-Dong,
Yongsan-Gu, Seoul 140-893, Korea
Tel. +82[0]2 790 3352/3 • Fax. +82[0]2 790 3363

Vacon Korea Busan Office

#2403 Centum Leaders Mark, 1514 Woo-Dong,
Haeundae-Gu, Busan 612-020, Korea
Tel. +82[0]51 784 6668 • Fax +82[0]51 745 8363



VACON
DRIVEN BY DRIVES



Contents

06 Business News

20 Feature Story

Domestic shipbuilding industry on a slower growth path in 2012

31 Company & Comment

GL, a world leader in green technology
- Germanischer Lloyd

36 People & Comment

ODC poised to dominate both ship repair and offshore plant sectors
- Eom In-soo, Leader of Marketing Dept., Oman Drydock Company

Issue & Seminar

- 40 Honeywell, a key player in high tech ship control sector
- 44 Pioneer of green technology
- 48 Pure Thinking makes the sea green
- 52 Development of LNG-fuelled ultra large containership
- 54 Dr. James Truchard, President & CEO of NI, had a presence at NIDays 2011
- 56 Development of stand-alone large-capacity LNG cargo tank
- 57 Innovation in process enabled by 3D PLM



Technology

- 59 An upstanding surf rider - Active heave compensation
- Bosch Rexroth Korea
- 60 Fast-track conversion transforms supertanker into an intelligent FPSO
- Emerson Process Management Korea
- 66 Future technology (5): The arctic ship - **DNV**
- 70 New Orders
- 75 The Shippbuilding Marketshare
- 76 Offshore Plant Orders
- 80 Major Performance Gallery
Ships christened and delivered throughout 2011

New Product

- 86 Energy chain for moving cables
- igus Korea
- 88 Desiccant dehumidifier
- Munters Korea

Member List

- 90 KOMEA (Korea Marine Equipment Association)
- 94 KOSHIPA (The Korea Shipbuilder's Association)



Advertisers Index

ABB.....cover1	Sungdong Shipbuilding & Marine Engineering.....14	Parker Hannifin Connectors47
Rainhocover2	Vacon Korea15	AlfaLaval Korea.....51
Honeywell Analyticscover3	Honeywell.....17	FLIR Sytems Korea.....58
SPX Flow Technology Korea.....cover4	HANIL-FUJI KOREA.....19	EMERSON65
Intergrah korea.....1	GMS27	EUNHA MACHINERY INDUSTRIAL68
Hyundai Heavy Industries2	Asia Pacific Maritme 201228	Nexans69
Munters Korea3	AUTOMA29	KR78
RINA4	Germanischer Lloyd30	ITW PP&F Korea Limited79
SIEMENS5	KROHNE KOREA39	PHOENIX CONTACT85
MARINE TECH KOREA 2012.....12	PEPPERL+FUCHS43	HIGEN Motor96
JS cable.....13		

new level of expertise



Honeywell Marine is a global partner providing a complete solution for any vessel type.

Our comprehensive and local project and engineering capabilities help ship owners, operators, shipyards, OEMs, panel builders and integrators reduce capital investment risk. We are dedicated to providing the most reliable technology for marine operations, including compliance with international certifications and regulations.

Honeywell

To learn more about Honeywell Marine visit www.honeywellmarine.com
4F, Sangam IT Tower 1590, Sangam-Dong, Mapo-Gu, Seoul 121-835, Korea
Tel: +82-2-799-6114~5, Fax: +82-2-792-9015

© 2011 Honeywell International, Inc. All rights reserved.

Mission Statement

Korship helps not only to share informations and technologies of shipbuilding industry between users and potential suppliers but also introduce subscribers up-to-date shipbuilding related technologies and informations to become a shipbuilding industry technical journal.

Korship puts advertising domestic companies in touch with abroad buyers and tries to contribute development and growth of domestic shipbuilding industries by introducing world's new technologies, news, companies and products to superintendents, engineers, Korea branch of abroad companies, domestic shipbuilding companies and all related companies.

Technology

World's up-to-date indispensable informations of shipbuilding companies, products and system technology described to help people who engage in the industry.

Special Focus

Provide articles deeply focusing on latest shipbuilding industry technologies, logistics and port etc.

Company & Comments

Introduce latest tendency and related news of industry through company interview.

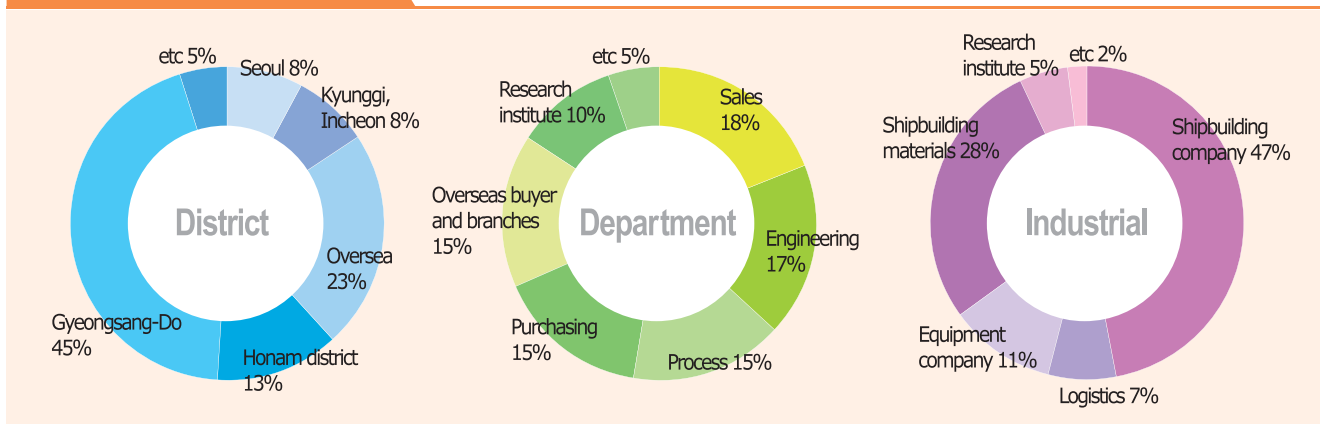
Product

New shipbuilding industry products overview

Business News

Issues and news articles from global shipbuilding companies and organizations

Detailed area breakdown



Keep Sailing

We provide all you need for non-stop sailing



TOTAL MARINE SERVICE



Stores/Provisions



Korean Spare
Parts



Repair/
Technical Service



Agent of Shell
Lubricant Oil

 **HANIL-FUJIKorea CO., LTD.**

Tel : +82-51-712-8300, Fax : +82-51-631-7735
Web : www.hanil-fuji.com
E-mail : shipstore@hanilss.com, spare@hanilss.com



Logistics Service



Domestic shipbuilding industry on a slower growth path in 2012

As the year-end comes closer, prominent domestic economic research institutes, such as Hyundai Research Institute (HRI), POSCO Research Institute (POSRI), Samsung Economic Research Institute (SERI), are publishing reports on the outlook of industries and economy for 2012.

They predict that the global economic growth will hover around 4.0% in 2012 amid the national debt problem, European financial crisis, etc, and that the domestic economic growth will slow down compared to 2011. As a result, the prospect for shipbuilding and shipping industries, etc, which are affected by the fluctuations in international trade volume, is not very bright.

This report summarizes analysts' forecasts with regard to the performance of domestic shipbuilding industry in 2012 based on the data released by HRI, POSRI, SERI, Kiwoom Securities.

The IMF (International Monetary Fund) revised down its growth forecasts for the global economy from 4.5% to 4.0% for 2012 as the global economic outlook is clouded by the downside risk amid the recent national debt problem and worsening instability in financial market. In 2012, economy may slow down further as the risk factors - such as the deep-

ening and spreading of the European financial crisis, sagging real estate market in the United States, political instability arising from the fiscal reconsolidation - are increasing volatility in the financial market and causing recession in the real economy. Although emerging economies are facing the risk of overheating, the spillover effect on them will be limited com-

pared to advanced countries.

Developed countries are expected to experience slowdown amid economic uncertainty in the United States and Europe, while developing countries are expected to achieve relatively high growth rates. The growth in the global trade volume will be adjusted down to 5.8%, a 0.9% decrease from 6.7%, due to the slow economic growth in developed countries which dominate international trade despite high growth rates of developing countries.

In 2012, domestic economy is expected to slow down to 3.8%, hovering below 3.9% recorded in 2011 due to the slump in exports amid the global recession, financial instability, and burden of household sector's debt. Overall growth in industries will be driven by export in manufacturing. Mechanical, steel, automotive industries, etc, will fall into contraction, and shipbuilding and shipping industries will rebound slowly. Construction and IT industries are expected to experience recession. Meanwhile, petrochemical industry is expected to be on a growth path, albeit slower.

POSRI: Downturn in shipbuilding volume due to the decline in new orders

POSCO Research Institute (POSRI) observed that the orderbook which had edged up in the 1st quarter of 2011 began to fall in the 2nd half of the year and predicted that the orderbook would shrink further in 2012.

According to the data released by POSRI, domestic shipbuilders' combined orderbook and volumes of ships built increased 53.2% and 19.0% year-on-year, respectively, in the 1st half of 2011, which is as robust as previous year. The year-on-year increase in both new order intake and shipbuilding volume in the 1st half of 2011 implies that the shipbuilding industry bottomed out, considering that the high growth registered in 2010 represents a recovery from a low base in 2009. The shipbuilding industry may rebound or fall into recession, depending on how the negative factors - such as recent downgrade of the USA's credit rating, eurozone financial crisis, etc - will affect the global economy.

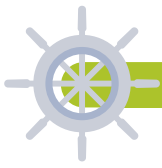
Domestic shipbuilders' orderbook for newbuilds rose 53.2% year-on-year to 17 million GT in 2011. This represents a dramatic slow down from 1,287.5% in the 1st half of 2010, but in terms of absolute volumes, is an increase compared to the 1st and 2nd half of 2010. However, the order intake is expected to decrease 27.4% year-on-year in the 2nd half amid global economic slowdown. Therefore, the combined order intake



of domestic shipyards is expected to reach 29.2 million GT in 2011, a 4.7% increase from 27.9 million GT registered in the previous year. The stagnation in the order intake is expected to persist into the 1st half of 2012 amid global economic recession, and consequently, new order intake is expected to reach 30.1 million GT in 2012, a 3.1% increase from the previous year. The sluggish growth in new order intake is primarily attributable to the remarkable increase in the capacity due to the construction of ships ordered in massive quantities during the period between 2007 and 2008 and the sluggish growth of production volumes in the midst of global economic slowdown in 2011.

As the order intake stalls, prices of all types of newbuild ships are falling. Prices of newbuild ships are expected to remain low for the time being in view of the overcapacity, although there may be some difference depending on the type of ships. In relation to the order intake based on countries, Korea and China are expected to keep taking the lion's share for some time. In the first half of 2011, the share of both countries in the global order intake further expanded. The combined order intake of Korean and Chinese shipbuilders in 2011 comprised 87.5% (27.3 million GT) of the global orderbook that stood at 31.2 million GT, which is a small increase from 86.1% in 2010.

Domestic shipyards' combined shipbuilding volume showed strong performance even during the financial crisis. As the order volume has sharply risen since mid 2000s, even block manufacturers which did not have any track record in shipbuilding branched out into the shipbuilding business, and



resultantly, domestic shipbuilding capability has expanded constantly. However, the order backlog gradually decreased as the order intake has plummeted since the outbreak of global financial crisis in 2008, and is very likely to diminish amid the sluggish growth in order intake. Domestic shipbuilding volume is expected to reach 31.8 million GT in 2011, a 0.9% decrease from 32.1 million GT from 2010. In particular, the shipbuilding volume is expected to shrink 17.8% year-on-year to 14.3 million GT in the 2nd half. The shipbuilding volume is not expected to slide significantly, considering that the delivery of ships is concentrated in 2011 after the delay in construction in the aftermath of global financial crisis. Domestic shipbuilding industry likely to experience sluggish growth rates for the time being, considering that the ever-increasing production volume will began to slide and fall further in 2012.

In this situation, the polarization of large companies and small and mid-sized shipyards will aggravate and may lead to the restructuring in the shipbuilding industry subsequently after the bankruptcy of small and mid-sized shipyards. The shipbuilding industry is considered to have bottomed out in the trough since the outbreak of global financial crisis, but is expected to experience sluggish growth for a while. To overcome the sluggishness, the shipbuilding industry needs to resolve the overcapacity arising from the increase in volumes and dismantling of existing ships, etc, as the global economy rebounds. Domestic small and mid-sized shipyards are expected to face difficulties for the next 2 to 3 years until the overcapacity is resolved.

HRI: Recovery from 2012

Hyundai Research Institute (HRI) predicted that the shipbuilding industry would not see a fast growth amid high prospects for the stagnation in demand for newbuilds in 2012 although the production volume of high value-added ships is expected to rise.

According to HRI, the shipbuilding industry started recovering from sluggishness in 2011.

The shipbuilding industry has experienced growth on technical rally in 2011, but the production index rose by only 7.1% in the 3rd quarter of 2011 compared to the same period of previous year, sliding from 21.7% in the 2nd quarter of 2011.

The order backlog increased, compared to the previous quarter, as the new order intake recovers.

The combined order intake of 9 member companies of the Korea Shipbuilders' Association (KOSHIPA) stood at 5.19 million CGT in the 2nd quarter of 2011, which is a two-fold increase from 2.77 million CGT registered in the 1st quarter of 2011. However, that number represents only about 67% of 7.70 million CGT registered in the 3rd quarter of 2007 before the global financial crisis.

The shipbuilding industry is expected to see a rise in exports of ships, specifically, high value-added ships in 2012, but the growth in order intake is not expected to exceed the one recorded in 2011.

As new orders for oil tankers and bulk carriers are not expected to sharply increase, the combined order intake of shipbuilding industry will not expand significantly in 2012 compared to 2011 in the midst of the stagnation in the demand for special purpose ships that enjoyed a boom in 2011. The demand for special purpose ships is not expected to rise remarkably on the assumption that the demand for ships used for offshore drilling, such as drillships, FPSO, etc, is closely linked to the fluctuations in oil prices, barring the prospect of any sharp increase in oil prices.

In 2012, the shipbuilding volume is expected to exceed the previous year's level in view of the massive quantities of ships to be built under existing contracts. The duration of time to build a ship is usually about 2 to 3 years, depending on the schedule as per contract. The total volumes of ships to be built in 2012 is expected to increase, compared to 2011, considering the quantity of ships ordered in 2010 and those ordered theretofore and still under construction.

The export of ships is expected to increase, compared to



2011, as a number of ships, specifically high value-added ships, which were ordered 2 to 3 years ago began to be delivered to the ship owners. In 2012, the surge in exports of high value-added ships is expected to offset overall growth in other sectors, thus pulling up the overall export volumes higher, albeit a small increase, than the level recorded in 2011.

Meanwhile, HRI predicted that the major issues faced by the shipbuilding industry would include the pressure on the shipyards for restructuring, Chinese shipbuilders' entry into special purpose ship market, growing demand for ships incorporating green technology, etc.

First, the worsening financial conditions of small and mid-sized shipyards amid the concentration of new orders in large shipyards and the build-up of competitiveness among large shipyards will become important issues that are affecting the shipbuilding industry. Large shipyards, such as Hyundai Heavy Industries (HHI), Daewoo Shipbuilding & Marine Engineering (DSME), Samsung Heavy Industries (SHI), etc, have reported their largest ever orderbook for high value-added ships such as offshore drilling facilities, LNG carriers, etc. By contrast, small and mid-sized shipyards are expected to suffer financial woes and be driven to the brink of shut-down as a consequence of the encroachment upon their market position by Chinese competitor, specifically in the low value-added market.

Second, domestic shipyards are expected to face competition from Chinese shipyards poised to enter the global market for special purpose ships. Chinese government designated large LNG carriers, semi-submersible drillships, luxury cruise ships, etc, as 10 key sectors and has promoted the

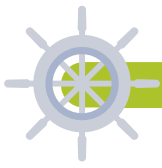
award of special purpose ship projects to the Chinese shipyards. As a result, China has 4 to 5 more shipyards capable of building LNG carriers and will compete directly against the Koreans in the market for special purpose ships by leveraging their low labor costs.

Third, there will be growing demand in the shipping industry for newbuild ships that adopt green technology in line with the new regulations enacted to control harmful emissions from ships. MARPOL requires the emissions of specific substances and byproducts of combustion of marine diesel fuels on board newbuild ships to be reduced by 90% and the emissions of NOx by 80% by January 1, 2016. EU decided to cut greenhouse gas emissions by 20% from all industries by 2020 and will demand the IMO to adopt the energy efficiency classification in an environmental conference scheduled for July. Shipping companies are more likely to demand shipyards to build ships incorporating the technologies that ensure compliance with international standards for emissions of harmful gases.

SERI: Robust growth driven by the high-priced special purpose ship sector

Samsung Economic Research Institute (SERI) predicted that domestic shipyards showing strength in the special purpose ship sector would achieve relatively positive results at a similar level to the previous year although the order for newbuilds would reduce amid the persistent uncertainty of global economy.

According to SERI, the global shipbuilding industry which showed signs of recovery in 2010 slowed down again in the



1st half of 2011 and is expected to show weak performance in the 2nd half. The global new orders for newbuild ships in the 1st half of 2011 stood at 16.77 million CGT, a decrease by 10.2% compared to the corresponding period of previous year. Containerships dominated the orderbook in the 1st half of 2011, the largest proportion (40%), followed by bulk carriers (22%), and LNG carriers (12%). The shipbuilding volumes sharply decreased, along with the new order volumes. In the 1st half of 2011, total volumes of ships built decreased 15.7% year-on-year to 22.79 million CGT (1,173 vessels). The downturn in the shipbuilding volume arose from the rapid fall in new orders after the advent of the global financial crisis in 2008 and is expected to continue for the next 2 to 3 years.

The overall newbuild market will slow down, but the newbuild market for special purpose ships, such as LNG carriers, drillship, FPSO, large containerships, etc, is expected to recover steadily. As oil prices hover around USD 80 per barrel, there will be a sustained demand for high-priced special purpose ships such as drillships and FPSO, etc. In the 1st half of 2011, 28 drillships and 2 FPSOs were ordered.

New orders for LNG carriers, LNG-FPSO, LNG-FSRU, etc, increased as the liquid natural gas (LNG) has emerged as an alternative energy source since the safety of nuclear power plants came under increased scrutiny in the wake of the earthquake and tsunami that devastated the northeast coast of Japan. Among a total of 24 LNG carrier orders

placed in the 1st half of 2011, 19 units were ordered after the earthquake in Japan.

** New orders for LNG carriers (units) : 34 (2006) → 30 (2007)
→ 5 (2008) → 1 (2009) → 5 (2010)*

New orders are expected to be placed one after another for large containerships with the capacity ranging from 8,000TEU to 18,000TEU amid the recent trend toward more energy-efficient and least polluting large containerships.

In 2012, the placement of orders for newbuild ships is expected to decrease as the global economic uncertainty persists. The market for newbuild ships is unlikely to recover unless the global economic uncertainty arising from the financial instability in Europe and U.S.A. is mitigated. The global economic instability has adverse impact on the international trade volumes and will result in decreased orders for newbuild ships.

Domestic shipbuilding industry, faced with the unavoidable prospect of weakness in the global newbuild market in 2012, has strength in the field of high-priced special purpose ships and is expected to accomplish relatively good results similar to last year's. Korean shipyards is expected to see a declining volumes of ships built in 2008 due to the rapid fall in new orders immediately after the start of global financial crisis in 2008. However, their combined orderbook will increase above the previous year's level as a result of the rising orderbook for high value-added ships, special purpose ships, etc. Meanwhile, Korea reclaimed the top spot in the global shipbuilding industry after it lost the leading position after being overtaken by China in 2009. Korean shipbuilders' combined order intakes surged, despite the weakness in the global newbuild market. Finally, Korean shipyards regained the top spot in the global shipbuilding market in the 1st half of 2011 after being dethroned by China in 2009. The combined order intake of Korean shipyards stood at 8.92 million CGT (MS 53.2%) in the 1st half of 2011, a 41.4% increase compared to 2010. In the same period, Chinese rivals' combined order intake stood at only 5.17 million CGT (MS 30.8%).

Korean shipyards which have strength in the sector of high value-added ships and offshore special vessels are expected to have a sustained competitive advantage over Chinese rivals in terms of both quantity and quality. Looking closely into the details of new orders awarded to Korean shipyards and Chinese rivals in the 1st half of 2011, it can be found that Korean shipyards outpaced Chinese rivals by wide margin in

terms of ship price and per unit cost of CGT.

* Korea: USD 140 million/unit, USD 3,520/CGT (USD 31.4 billion, 224 units)

* China: USD 34 million/unit, USD 1,702/CGT (USD 8.8 billion, 258 units)

Chinese shipyards which have inadequate capability to build high value-added special purpose ships are expected to experience sluggishness in 2012 amid weak demand for bulk carriers and small-sized containerships although new orders for LNG carriers and offshore special vessels are likely to increase.

Kiwoom Securities: Slump in new orders for commercial ships

Choi Won-gyeong, an analysis at Kiwoom Securities, predicted a fall in new orders for all types of commercial vessels and ship prices in the aftermath of European financial crisis and poor performance of shipping industry. She speculated that the offshore plant market, which had a bright outlook and saw a rising demand throughout 2011, would see further declines in new orders ahead until the 1st half of 2012 as a consequence of the financial crisis rocking Europe.

According to Kiwoom Securities, new orders for commercial ships are expected to shrink in 2012 compared to 2011. Large containerships dominated the orderbook for commercial ships during the period spanning from the 2nd half of 2010 to the 1st quarter of 2011. However, new orders for containerships is expected to slump amid the poor performance of shipping companies and decreased shipping finance as a result of eurozone's economic gloom. The markets for bulkers and tankers are expected to experience a sustained downturn, like in 2011. In other words, new orders for containerships, tankers and bulkers are likely to sink in 2012. However, massive cancellations and delays of ships are not expected to occur as experienced in the period between 2009 and 2010.

Here, we take a close look at the prospect of new orders for commercial ships in the 1st quarter of 2012.

The cumulative orderbook for containership stood at 8.28 million CGT as of September 2011. The cumulative orderbook reached 0.53 million CGT in 2009, 4.04 million CGT in 2010, and 8.28 million CGT in September 2011, maintaining an upward trend since 2009. However, the monthly new orders have fallen sharply since June 2011 due to the slump in the



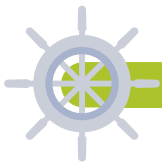
ship financing market since the outbreak of European financial crisis in August.

Clarkson speculated that the Container Trade/Fleet Balance would fall from 1% in 2011 to 0% in 2012. Most container shipping companies which suffered from deficit in the 3rd quarter of 2011 will have difficulty in placing new orders.

The upswing in new orders for containerships will depend on whether the European financial crisis will be contained and how fast the European economy will recover, considering that Nordic countries and European countries provide over 60% and 80% of total ship financing, respectively. Order intake may slump in 2012 after massive new orders in 2011. In a word, orders for containerships will decrease in 2012 compared to 2011.

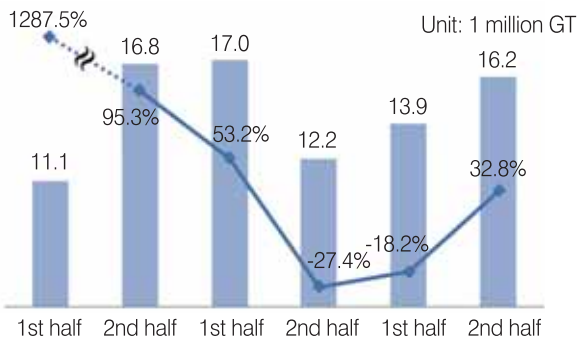
The cumulative orderbook for bulkers stood at 5.23 million CGT as of September 2011. Orders for bulkers plummeted in 2011 after reaching 20.89 million CGT in 2010. BDI (Baltic Dry Index) rose temporarily in 2010, providing a respite to the dwindling orderbook. However, bulker order intake remained low in 2011.

As major shipping companies and research institutes are predicting that BDI would reach 1,600 to 1,700pt in 2012, year 2012 has gloomy prospects. However, Chinese shipyards and some domestic shipyards expect the new orders for bulkers to increase slightly compared to 2011. New orders for bulkers are expected to be slightly higher than in 2011 in light of the order stagnation and increased dismantling of



ships in 2011 and recent increase in the price of pre-owned ships. However, new orders for bulkers are very likely to slump until the 1st half of 2012 amid European financial crisis. The resuming placement of new orders for bulkers will not have a significant impact on domestic shipbuilding industry in view of the fact that large domestic shipyards do not tend to target orders for bulkers.

The cumulative orderbook for tankers stood at 1.69 million CGT as of September 2011. The cumulative orderbook figure for tankers reached 7.15 million GT and 1.69 million CGT in 2011, the lowest among the 3 major vessels. The increase in new orders for tankers remained subdued in the midst of the global recession and declining consumption of fuel despite rising oil prices since the 2nd half of 2010.



Note: The variation is based on the same period of previous year. Source: Clarkson, POSCO Research Institute

Fig.1 Domestic shipyards's newbuilding order intake and outlook

In 2012, price of newbuild ships will continue to fall, as well as WS (World Scale). Furthermore, the oversupply which persisted in 2011 will hinder a significant upturn in new orders. However, prices of pre-owned ships are increasing, like bulkers, which raises some expectations of recovery.

Nonetheless, new orders are likely to slump until at least the 1st half of 2012 in the aftermath of European financial crisis. The orderbook for LNG carriers stood at 3.61 million CGT as of September 2011. The net growth in volumes based on long-term LNG contract and placement of LNG carrier order, which is spaced usually 2 years apart, have high correlation. The net decrease in volume between 2011 and 2012 is considered to have had a impact on the LNG carrier order stagnation between 2008 and 2010. However, as many as 45 LNG carriers of 3.61 million CGT were ordered until September 2011 as net growth in volumes is driven by long-term LNG contracts.

Based on the net growth in volumes based on LNG contract, about 20 to 30 LNG carriers are expected to be ordered yearly until 2014. The contracted volume is expected to expand further, considering the demand for the combined cycle power plants, which has been spurred since the explosion at a nuclear power plant in Japan, the surge in demand for LNG in India and China. However, new order placements are expected to decrease slightly in 2012 as a result of massive new orders in 2011 and speculative order placements. As LNG carriers are also impacted by the ship financing market conditions, new orders for LNG carriers may remain flat for the time being.

In 2012, offshore plant market has bright prospects for new orders over the long term amid sustained high oil prices. New orders for offshore plants, however, may edge down slightly in the 1st quarter of 2012 due to the massive new orders for drillships and LNG carriers which were placed in the 1st quarter of 2011. Another factor that may lead to the slump in new orders is that the drillships and LNG carrier order intake is also affected by the ship financing market conditions. The remaining options under the contracts to build drillships or LNG carriers are expected to be difficult to be exercised for some time.

The prices of ships are expected to keep falling in the 1st half of 2012. The steel plate price, the major indicator for determining ship prices, is expected to rise slightly in 2012 compared to 2011, and the slump in new orders is likely to lead the order backlog to keep shrinking.

Table 1. Trend of newbuild ship price

Unit: USD 1 million

	2011. 1	2011. 2	2011. 4	2011. 6	Variation
VLCC	104.0	103.5	102.0	102.0	-1.9%
Capesize	55.5	55.0	54.0	54.0	-2.7%
Container	78.5	76.0	70.5	71.0	-9.6%
LNG	203.0	202.0	200.0	200.0	-1.5%

Note: The variation is based on January 2011.
Source: Clarkson, POSCO Research Institute

Table 2. Outlook of supply in shipbuilding industry

(Unit: 1 million CGT)

Type	2010	2011	2012	Variation(%)	
				2011/2010	2012/2011
Order intake	1,265	1,700	1,650	34.4	△3.0
Shipbuilding volume	1,595	1,500	1,350	△6.0	△11.1
Order backlog	4,525	4,350	4,400	△3.9	1.1

Note: The forecast and outlook for 2011 are based on Samsung Economic Research Institute
Source: Ministry of Knowledge Economy (Jul. 18, 2011) for the performance of 2010, "Domestic shipyards hold onto top spot", Cars & Shipbuilding and press release

Chinese shipyards, which experienced a severe slump in new orders compared to large shipyards of Korea due to the concentration of new orders in commercial ship sector, may attempt to clinch orders by lowering ship prices in the early part of 2012. In addition, the order backlog, one of the major variables involved in the determination of ship price, is declining. Even the containership prices, which solely rose in 2011, may fall.

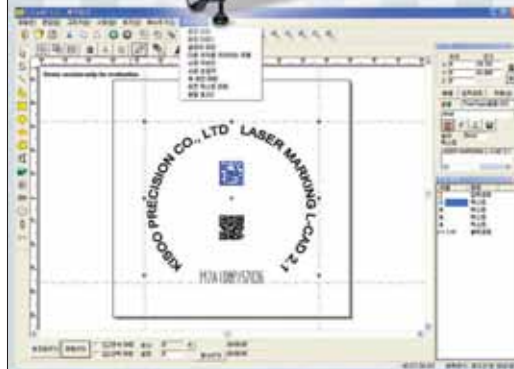
Shipyards are expected to show weaker performance in the 1st quarter of 2012. The quarterly operating profitability of major domestic shipyards such as HHI, DSME, SHI, etc, slid in the 2nd quarter of 2011 and the 3rd quarter of 2011. The operating profitability is expected to fall again in the 1st quarter of 2012 as the proportion of high-priced ships ordered before 2008 is diminishing fast while that of low-priced ships ordered between 2009 and 2010 is rising fast. The operating profitability is very likely to remain low until 2013 without particular improvement although it may bottom out in the 3rd quarter of 2012. ⚓

Nd.YAG LASER EL-DPG50

DIODE SIDE - PUMP LASER MARKER

EL - DPG50

High - Quality
Low - Price
Good Service



Soft Ware layout

www.g-ms.co.kr

G.M.S
GOOD MACHINERY SUPPLY

TEL:82-2-303-0816~7 FAX:82-2-303-0814

The 12th edition of



Shipbuilding & Marine • Workboat • Offshore

Asia Pacific Maritime 2012

Shipbuilding & Marine • Workboat • Offshore

14 - 16 March 2012

Sands Expo & Convention Centre, Marina Bay Sands, Singapore
Level 1 & Basement 2



THIS IS THE ONE

With over 900 leading international maritime exhibitors over 50 countries and more than 13,000 expected Asian visitors converging for the latest in marine equipment, technologies and services, there are now more reasons to participate in this Asia Pacific's premier exhibition.

Incorporating **Workboat & Offshore**, APM is the proven platform to buy, sell and network with Asia's rising maritime industry.

Expect More at APM 2012

- **18,000** sqm of exhibition space
- **13,000** visitors from more than **50** countries
- Participation from more than **12** National Pavilions
- More than **900** international participating companies from more than **50** countries

Join us at the region's premier maritime event. Contact us for more details.

T: 65 6780 4672 | F: 65 6588 3787 | E: apm@reedexpo.com.sg

Organised by  Reed Exhibitions*

A member of



Supported by



Endorsed by



Official Logistics Partner



Held in



HIGH QUALITY PNEUMATIC ACTUATOR & VALVE



AUTOMA Co., Ltd is one of professional manufacturing company in part of Automatic Valve industry. It means that we provide Total Solution related with Automatic valve in the process of equipment plants and various industries like Power plant, Water cleansing reservoir system, water treatment equipment process and etc.



Products

- **Pneumatic Actuator**
AD Series, AS Series
- **Electric Actuator**
ATM Series
- **Limit Switch Box**
ALS10 Weatherproof Type
ALS30 Explosion Proof Type
- **Automatization**
Flanged Ball Valve, Screwed Ball Valve,
Butterfly Valve, Globe Control Valve
Plastic Butterfly Valve, Plastic Ball Valve
- **Other Valve Accessories**
Electro-Pneumatic Positioner, Solenoid Valve,
Air Filter Regulator, Declutch Manual

Features

1. We use SUS material for Brackets / Coupling / Bolts.
2. We can exchange from manual valve being used to automatic valve system.
3. We sell bracket sets for ball valves.

Maritime

Germanischer Lloyd



YOU CAN COUNT ON US!

The GL-registered tonnage has exceeded the 100 Million GT mark. Our formula for your success is based on technical expertise, client proximity and business understanding. Our clients count on their partnership with us. You can too.



WORLD-CLASS EVERYTHING.

GL, a world leader in green technology

Germanischer Lloyd (GL) with its foundation dating back to 1867, has about 140-year history. GL has its head office in Hamburg, Germany, maintains a global network of 208 offices in 77 countries and has about 5,000 experts including engineers. The number of ships classed by GL has reached over 6,700 and the tonnage of vessels that underwent the safety evaluation and inspection by GL stands at more than 100 million GT. GL specializes in the development of technology and services for ships and offshore plants in the shipbuilding and inspection sector. Meanwhile, Fred Ebers, Vice President, Area Manager for North East Asia, GL, whom we met at GL's booth during KORMARINE, said, "GL is focusing on fuel-saving and green technology development, the key issues of shipbuilding issues recently, and on that basis, GL will provide practical support to related industries."

Germanischer Lloyd

Due to its in-depth knowledge and role as independent partner, GL facilitates a great number of standards and joint industry and research projects each year. GL develop new tools, methodologies, standards and recommended practices to solve technical questions while reinforcing high safety and quality standards.

GL's business segments

GL Group consists of three major business fields: ship classification, oil & gas, and renewables.

• **Maritime services**

GL is dedicated to ensuring the safety of life and property at sea, and the prevention of pollution of the marine environment.



To the shipping and shipbuilding world, the name GL has been synonymous with reliability, diligence and engineering excellence since the company was established as a ship classification society by German ship-owners in 1867. Today, more than 7,200 vessels, equivalent to 100 million GT, are GL-classed. Every year GL performs about 24,000 inspections. Numerous international technical standards are based on GL know-how.

The ship classification GL belongs to the top five classification societies. As an independent third party, GL develops state of the art rules, procedures and guidance for ship owners, ship yards and the maritime supply industry in order to offer commercially sound answers in times of economic challenges and tight regulatory regimes.

•Oil & gas

GL Noble Denton is a world class technical service provider for the oil and gas industry.

As demand for energy takes exploration and production operations to ever more challenging extremes of geography and climate, the commercial and personal risks are amplified

and the rewards ever harder to realise. GL Noble Denton offers expert advice and practical assistance from an independent position to help ensure that regardless of scale or complexity, projects and ongoing operations are both safe and profitable.

GL provides assurance, inspection, consulting, project management and execution. It focuses on technical services and solutions along the entire life cycle of oil and gas (upstream, midstream, and downstream) and energy installations onshore and offshore. The scope of technical services includes safety, integrity, reliability and performance management.

•Renewables

GL Garrad Hassan is recognised worldwide as a provider of services at all stages of onshore and offshore wind projects.

It has developed industry standard software products for onshore and offshore wind turbine and wind farm design. Always at the forefront of research and development activities, GL Garrad Hassan has also had a dedicated marine energy team since 2003, which has worked on more than 65 wave and tidal projects across 15 countries, including prototype trials. It has delivered the world's first tidal turbine design software. GL Garrad Hassan's achievements in the field of mechanical renewables are being replicated in solar, its most rapidly growing sector, where it supports both photovoltaic and concentrated solar power projects.

Meanwhile, GL Renewables Certification, part of the GL Group, is a leading certification body primarily focussed on the certification of wind farms, wind turbines and their components.

At the forefront of understanding in renewables technology, it is abreast of all the necessary standards and requirements and takes a harmonised approach in ensuring that these are



met. Manufacturers, banks and insurers around the world rely on the state-of-the-art service provided by GL Renewables Certification.

GL's global network

The backbone of GL's safety and quality philosophy is its highly-skilled, well-trained, internationally-minded experts who understand the needs of clients and stakeholders.

GL staff works in a group wide culture of open-mindedness, service and result orientation, willingness to go the extra mile and delivering solutions for its clients - without ignoring the merits of thoroughness and strictness when it comes to promoting quality and safety.

GL delivers superior value and safe, efficient and innovative solutions, uncompromising quality and world-class service for its clients around the world. GL's qualification, know-how, and experience allow the company to be a trusted partner, a truly independent advisor and a third party organisation. GL is constantly anticipating future challenges and provide feasible, commercially sound solutions.

The global GL network consists of 208 locations in 80 countries. With the head office in Hamburg, Germany, GL maintains stations, country and site offices worldwide whenever and wherever its clients need direct contact to GL experts.

GL's vision, mission and values

GL will be the most respected international technical advisor and trusted partner for all of its clients. GL's vision will help all contribute to the journey and involves the aspirations of everyone who works as part of the GL group. GL will achieve its vision by being world class in everything that it does, in every aspect of every project.

The depth of GL's heritage, together with a unique combina-

tion of expertise, focus and understanding, will give GL the opportunity to build on its position as leaders in its industry. GL will deliver on its vision by using its diverse experience, its vast network and its comprehensive service offering. GL will retain the respect and trust of its partners, provide unrivalled expertise across the globe and realise success through the creativity, drive and ambition of its exceptional people.

At GL its mission gives a roadmap to achieve the vision. GL constantly strives to be safer, smarter and greener.

Safer, because GL will drive a safety culture that prevents loss or harm to people and assets. Smarter, because GL will use its expertise, its wealth of experience and its network, to deliver superb results. Greener, because GL will share its learning to inspire its clients and colleagues to reduce their environmental impact and help shape a greener future.

By using creative new approaches, delivering on a vast range of expertise and building on its global network, GL will improve on its trusted ways of working and increase its problem-solving ability to provide genuinely innovative solutions for its clients.

GL's values will bring life to its mission. GL values the trust it has earned and will demonstrate integrity, respect and the highest level of quality to enhance the trust shared by its clients and colleagues. GL will embrace change, and take every opportunity to improve its business. This will be achieved by its commitment to being open-minded and flexible to respond quickly and intelligently to changing markets. GL will deliver results that count for its clients and its colleagues.

GL is responsible for providing winning solutions based on both practical and innovative approaches, which means GL can ensure that the results GL achieves, support its vision to be world class in all that GL does.



Fred Eber, Vice President, Area Manager for the North East Asia

The following is a series of questions and answers with Fred Eber, Vice President, Area Manager for the North East Asia, GL, whom we met at the GL's booth during KORMARINE.

Q : What is the key issue of GL recently?

A : GL has a huge interest in energy-saving and green technology. We have developed optimal ship designs or developed and supplied the solutions that can dramatically raise fuel efficiency since long before, playing both supporting and leading role for the shipping and shipbuilding industries. We have emphasized that these technologies will not only enable compliance with the more stringent environmental regulations but also bring economic benefits to the industries. We tried to get this message across during KORMARINE.

Q : What are the achievements of GL in the development of energy-saving and green technologies?

What is the technology to be unveiled in the period ahead?

A : GL has already completed development of various technologies ensuring maximum energy efficiency based on optimal ship designs or zero emission of pollutants and is constantly proceeding with R&D.

Some of the examples related to newbuild ships include the slender hull shapes to decrease the wave making resistance of the vessel and ensure reduction in fuel consumption even at the same speed of navigation, and the installation of eco system on board of ship to maintain appropriate trim during the navigation and decrease the resistance to save fuel.

Recently, GL developed the concept of feeder containership which is powered by liquid hydrogen produced by wind turbine and therefore emits zero pollutants ('ZeroShip'). Furthermore, GL will inject momentum into its development of technology in order to bring practical alternative zero-emission fuel technology to the fleets of ships worldwide. Along with that, GL will make intensive investment in renewable energy sector including wind farms.

Additionally, GL's unique hull lines optimization design has been adopted by 10,000 ships, bringing operational cost savings in lower fuel consumption. Moreover, this hull lines optimization design also facilitates hull modification. Using the software such as CO-Assistant and GL SeaScout, we increase the forecastability for customers with regard to the profit from the fuel-savings.

Q : In relation to zero emission of pollutants, there is a growing interest in LNG as alternative energy source to power ships. GL is also proceeding with related researches. Please explain about it in detail.

A : Increasingly, high-efficiency dual fuel engines are being fitted to the newbuild LNG carriers. Additionally, there is a growing willingness to use LNG as fuel to power ordinary ships. We set forth the provisional guidelines on the safety with regard to the installation of natural gas-powered fuel engines on board ships in collaboration with IMO in 2009 and conducted researches on the feeder containerships powered by gas. Bunker C oil, which is used to power existing ships, emit large amounts of pollutants, and therefore, researches have been conducted vigorously in regard to the ship fuel which can dramatically reduce such emissions.

Recently, we participated in the development of ultra-large LNG-fuelled container with Daewoo Shipbuilding & Marine

Engineering (DSME) and finished the approval in principle during the KORMARINE trade fair.

As mentioned before, we will focus on unveiling advanced technologies enabling the application of LNG and hydrogen cell as alternative fuel for ships.

Q : What is the unique strength of GL compared to other classification societies?

A : As the serving GL fleet is made up of 50 % container ships, GL has the unrivalled leading position in the container-ship sector. As mentioned before, GL's optimized ship design and technologies that dramatically enhance fuel efficiency help shipbuilding and shipping industries increase profitability. The key factor in our leading position ahead of other classification societies is that we provide practical benefits in addition to the technologies enabling conformity with environmental regulations, and we take pride in that.

Q : What is the plan of GL for the period ahead?

A : Currently, GL retains the unmatched leading position in the containership sector and keep strengthening our competitiveness to cement our leading position.

Recently, GL's recent acquisition of 2 companies in the offshore and renewable energy (wind power, solar power) sector further broadened GL's business portfolio, on the basis of which, GL will fully leverage the synergic effect with the existing maritime business. Customers will be provided more enhanced services in the offshore plant or renewable energy sectors.

Korea, the most powerful shipbuilding country, is by far the most important market to GL. Therefore, GL will further increase support for many Korean shipyards. As the shipbuilding market changes recently, Korean shipyards are winning orders for different types of ships. One of typical example is the wind turbine installation vessel added to the orderbook of Samsung Heavy Industries and Daewoo Shipbuilding & Marine Engineering. In keeping abreast with this new trend, GL will play a supporting role to help Korean shipyards sharpen competitiveness.

Q : GL has strengthened services for Korean customers, like supporting the Korean language at its website.

A : Yes, it has. GL opened a Korean language website in May. This new website will be useful for Korean customers to gain

access to the information that they are looking for in relation to the maritime service of GL and use the latest information more easily, thus strengthening our connection to customers.

Recently, GL underwent restructuring in an attempt to reach out to customers more closely. GL is providing services to Korea with great efficiency based on 3 regions. Along with that, we are holding technical meetings to address issues of all classes, involving the shipyards, suppliers, etc, and operate communities on a two-tier structure consisting of the shipbuilding and other industries in our endeavor to ensure increased support for customers.

Q : What is your impression of your experience in working with Korean customers?


A : Currently, I am in charge of the area including Japan and Philippines, besides Korea, and worked in Italy, United States, Japan, etc, besides Korea.

Compared to customers in those countries, I have found that Koreans work with great, accuracy, and competency, which is a tendency that may fit in nicely with German customers who demand high tech and accuracy.

Q : Recently, many Korean shipyards are seeking to transform themselves, like searching for new growth engines such as offshore wind power. What is your personal view on the Korean shipyards, including such drive into a new direction?

A : Currently, Korean shipbuilding market is facing economic instability and oversupply in terms of new orders for newbuild ships. As the decline in new orders for newbuild ships is unavoidable in the period ahead, Korean shipyards will have no alternative but to find more business. I think that the Korean shipyards have good reason to seek new directions and make redoubled efforts, like advancing into renewable energy sectors, such as wind power, recently.

Additionally, gas fuels that can substitute existing bunker C oil to power ships are difficult to handle and related facilities are complex. In relation to that, Korean shipyards are making a very desirable move to invest heavily in R&D and they will be better prepared for the future.

Meanwhile, I think that the real worlds leading shipyard must have independent ship design technology and validate it in the market. Unfortunately, Korean shipyards have yet to secure advanced design technology. I hope that they make more investment and effort in that area. 



ODC poised to dominate both ship repair and offshore plant sectors

Oman Drydock Company (ODC), which is operated by Daewoo Shipbuilding & Marine Engineering (DSME) under the Contract for Operation and Management, participated in KORMARINE that opened with great eclat in October 26. Eom In-soo, Leader of Marketing Dept. at ODC, the first ship repair yard operated by a Korean shipyard in the Middle East, provided his comments and views in relation to how ODC has built its current fame as a giant ship repair yard.

Eom In-soo, Leader of Marketing Dept., Oman Drydock Company



Oman Drydock Company (ODC), which was established by the Government of Sultanate Oman (GOSO) with its 100% stake, specializes in the business of repair shipyard based on the Contract for Operation and Management (O&M) which was concluded with DSME. In particular, DSME was involved in the early stages of design and construction and is currently operate ODC. Currently, about 50 employees of DSME are working in ODC.

The contract expires in 2015, but DSME can operate ODC for another 2 decades until 2025 if the Oman government exercises the option.

Eom In-soo, Leader of Marketing Dept. at ODC, said, "The Oman government established ODC to stimulate development of oil refining industry and heavy industries, promote industrial diversification into new lines of business, create jobs, and develop the central region of the country. Importantly, ODC can utilize DSME's outstanding expertise accumulated over 3 decades of works in shipbuilding industry, as well as its brand value. Especially, the Oman government which wanted to avoid dependence on foreign shipyards for the repair of the state-owned fleets of vessels (specifically, LNG carriers) rated highly DSME's unmatched expertise in the construction of ships and offshore plants and ship repair and its leading position with 45% share in the global market for LNG carriers. Particularly, DSME announced that the Oman government's plan for the balanced national development would dovetail nicely with DSME's mid and long-term plan to build global network when it formulated the contract."

Optimal geographical condition and newest facilities

Eom In-soo, Leader of Marketing Dept., cited the optimal geographic location of ODC as its greatest advantage. He explained, "ODC is situated in Duqm, Al Wusta Region, Oman. Located outside the Straits of Hormuz, ODC adjoins the sea routes that run through the coastal area of Oman and is nestled at the entrance of the Arabian Gulf, which is an ideal geographical condition for any ship repair yard. Furthermore, the region has predictable weather patterns, low humidity and favorable climate conditions."

ODC adjoins Saudi Arabia and United Arab Emirates (UAE) to the west and is close to India and South East Asian countries to the east. Also, ODC is not affected by the economic and trade sanctions imposed against Iran and Iraq, the neighboring countries of Oman to the north.

Another advantage is ODC's one-stop services with its water treatment facilities. The eco-friendly ODC is equipped with slope, sludge, and wastewater treatment facilities to ensure undisturbed treatment of wastewater from large ships, in addition to incinerators and chemical treatment facilities.

Eom In-soo, Leader of Marketing Dept., stressed, "ODC offers one-stop services and utilizes state-of-art technologies of DSME, which are key factors leading the ship owners to place ODC in the top ship repair yard rankings and allows ODC to accomplish excellent results in a short period of time." He added, "In fact, this region is somewhat vulnerable to attacks by Somali pirates, and ODC is providing security facilities as part of countermeasures."

ODC, which aims to evolve into a large-scale ship repair yard complex, is equipped with the newest facilities and the largest of its kind in the Middle East. ODC occupies approximately 1,139,000m² of waterfront and 1,277,000m² of land, surrounded by the 2,800m-long wharf. Additionally, ODC has 2 dry docks with a capacity to handle commercial vessels of all sizes, including ultra large crude carriers (ULCCs), very large crude carriers (VLCCs), and 4th and 5th generation containerships. The docks measure 410m in length and 95m and 80m in width, respectively.

Eom In-soo, Leader of Marketing Dept., said, "Next year, ODC will complete the floating dock facility for the repair of Panamax class ships in order to expand its capability to repair medium and large-sized commercial ships and warships."

Currently, ODC employs about 5,000 skilled employees carrying out regular maintenance/repair and remodelling of ships below 600,000 deadweight tonnes, including the repair of all hull outfitting, pipeline works, electricity works, major structural steel works, blast, painting works, assembly and upgrade of machines.

First repair of LNG carrier in October

ODC has successfully repaired 26 ships of various size and purpose, including the landing craft of Oman-based NFC (National Ferris Company), 1,608TEU containership of Germany-based Hermann Buss, cement carrier of Greece-based Sekur Holdings, etc, since it repaired 2 units of 6,000-ton ships (Spill Hopper Vessels) of the Belgium-based Jande De Nul Dredging in April. Currently, 10 ships are on a waiting list for repair at ODC.

ODC was awarded a contract to repair 'Muscat', a LNG carri-



er of SAOC Shipping Company in Oman, on October 8, which is the first LNG carrier to be repaired at ODC. This contract would provide critical opportunities for ODC to upgrade the quality of its ship repair service. Particularly, this contract, which was awarded prior to ODC's commercial launch at the end of this year, is expected to have a positive effect on the revenue stream.

Eom In-soo, Leader of Marketing Dept., said, "Using this contract as a springboard, ODC will redouble efforts to build up experience and expertise related to the projects for remodelling LNG carriers and ships which require state-of-art technology."

This contract for the repair of Muscat LNG carrier includes the regular maintenance/repair and cleaning of main boiler, replacement of cable hanger and cable for permanent side-walks, installation of cable support, etc.

Meanwhile, ODC has launched marketing campaigns to raise its international profile. Specifically, ODC has been actively establishing a presence at the renowned shipbuilding and maritime trade shows worldwide - Sea Trade Middle East in Dubai, SMM in Germany, POSIDONIA in Greece, Sea Asia Singapore, Nor-Shipping in the Netherlands, KORMARINE in Korea, etc - and conferences related to the ship repair, since its participation in the Gulf Maritime Fair held in Sharjah, UAE in 2009. Along with that, ODC has made direct visits to shipyards as part of an overall marketing strategy.

Eom In-soo, Leader of Marketing Dept., added, "ODC purchased a large cruise ship and converted it into an accommodation vessel to increase the convenience of officials from ship owners and local employees. Moreover, ODC is currently building a 5-star hotel, apartment complex and villas in and around Duqm. An airport terminal is slated to be completed in 2 years from now, which will make ODC more accessible."

Hub of maritime business in the Western South Asia

The inadequate infrastructures and constraints such as the lack of manpower and supply of raw materials, has hindered the extension of ODC's business beyond the area of ship repair, although the Oman government had planed to make ODC, the only shipyard in Oman, a professional shipyard specializing in newbuild construction when it was being built. However, ODC is poised to diversify into newbuild construction business immediately upon the completion of infrastructure development and this plan is expected to be turned into



Booth of ODC in KORMARINE 2011

reality much sooner than expected as the Oman government has expanded investment to transform Duqm into industrial hub, like establishing new heavy industrial complexes.


Eom In-soo, Leader of Marketing Dept., expected that Duqm would turn itself into an industrial hub in the next 5 to 10 years.

He pointed to the vision of ODC, saying "ODC aims to move beyond the ship repair business into newbuild construction business over the long-term and evolve into the production hub of offshore plants which can effectively meet the demands for offshore plants in the Western South Asian region including the Middle East and India."

For that, ODC plans to embark on full-scale business in the maritime sector when it produces 3 topside modules of offshore plants under the contract, awarded from a client in Iran, from April next year. Also, ODC plans to produce steel structures, pipe spools, and onshore modules in relation to the onshore production.

ODC will produce only modules or jackets of offshore plants at the outset, but plans to go further and build rigs or even drillships by accumulating the experience and expertise.

Eom In-soo, Leader of Marketing Dept., explained, "ODC's advancement into maritime sector is consistent with DSME's strategy for establishing production base and dominating the offshore plant market in Western South Asian countries such as Kuwait, as well as the Middle East and India, which have high demand for offshore facilities."

He reiterated, "ODC will evolve into the undisputed No. 1 shipyard in the Middle East, offering both ship repair and offshore plant construction services." 

Original Global Process Instrumentation and Flow-Level Systems

1921
The Start

1952
The First Magnetic Flowmeter

1966
The First Largest and Most Accurate Calibration Center

1978
The First Multibeam Ultrasonic Flowmeter

1990
The First FMCW Radar Level Transmitter

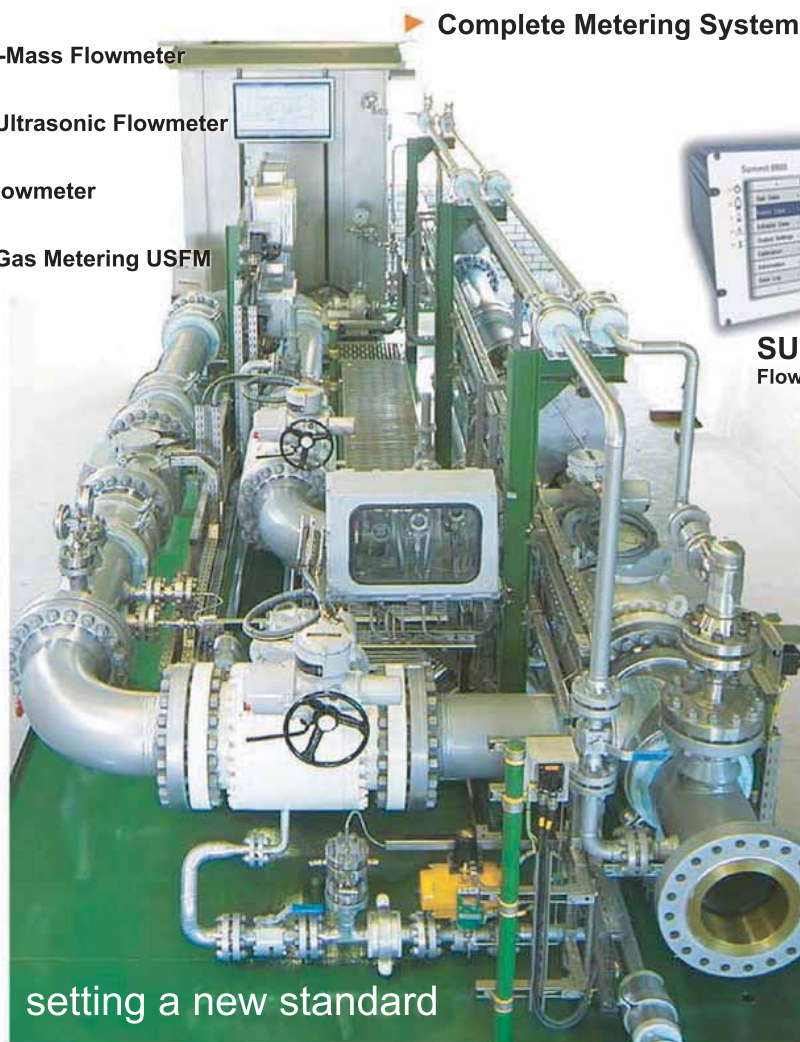
1994
The First Straight-Tube Cori-Mass Flowmeter

1996
The First Custody Transfer Ultrasonic Flowmeter

2001
The First 2-Wire Magnetic Flowmeter

2009
The First Custody Transfer Gas Metering USFM

▶ Complete Metering System



SUMMIT 8800
Flow computer

setting a new standard

The No.1 Service & Technology



S. Neuberger, CEO of KROHNE KOREA



KROHNE KOREA LTD.

100% KROHNE owned Office in Korea since 2003
508 Miwon Building, #43 Yoido Dong, Youngdeungpo-Ku
Seoul, Korea

www.krohne.co.kr
Email : mail@krohne.co.kr
Tel : 02-782-1900 , Fax : 02-780-1749

KROHNE MESSTECHNIK GMBH.

Headquarters of the International KROHNE GROUP in Germany
www.krohne.com

KROHNE OIL & GAS BV.

Headquarters of the System Business Group in The Netherlands

KOG UK (SKELTON HALL)

KOG Malaysia

www.krohne-oilandgas.com



Honeywell, a key player in high tech ship control sector

Honeywell held a press conference related to the marine business at its conference room in Sangam-dong, Seoul, on October 21. This conference was organized to coincide with the visit of David Higgins, Director of international marine project sales, and Shardul Sirsamkar, marine solution marketing manager of Asia Pacific, to Korea to attend a LNG and FLNG-related conference held in Marriott Seoul Hotel from October 24 to 27.

Honeywell began to supply integrated automation systems for LNG carriers since 1980s. At first, it provided automation systems for about 20 ships through a joint venture, called 'Yamazaki Honeywell', formed with a Japanese company. However, both companies split and has led the business independently.

Honeywell independently developed the ship control system through collaborative research with Daewoo Shipbuilding & Marine Engineering (DSME) and became the first company worldwide to supply automation system for LNG-RV (Regasification Vessel) in 2004. In 2008, Honeywell's automation system was installed on board Q-max FLNG which measure 300m in length, the largest worldwide. Particularly, Honeywell supplied its automation solution for the LNG carrier fitted with dual fuel engine operating on both steam and oil in 2010.

Honeywell has a solid foothold in the global automation systems market for state-of-art and high value-added ships, such as LNG carriers, FLNG (Floating Liquefied Natural Gas) facilities, etc, rather than universal vessels. Currently, Honeywell has been awarded contracts to supply solutions for a total



David Higgins, Director of International Marine Project Sales, is giving a briefing.

of 100 LNG carriers out of approximately 350 LNG carriers operating around the globe. Particularly, the orders to supply solutions for 60 LNG carriers out of the said 100 were directly obtained in Korea, thus solidifying the leading position in the global market and playing an integral role in the marine business of Honeywell.

Honeywell showed the strongest performance in 2008 when the international shipbuilding market reached its unprecedented peak. Honeywell, which registered somewhat less robust performance thereafter, is poised to launch

itself on a steep growth path, bolstered by the increase in new orders for LNG carriers or FLNG facilities amid the surge in the demand for LNG after Japan's nuclear crisis in 2011.

For that, Honeywell will expand its marine business portfolio with a focus on high value-added ships or offshore facilities by leveraging its extensive experience and expertise amassed through years of works in the fields of LNG carriers and FLNG facilities, etc, and furthermore, plans to vigorously target domestic shipyards dominating these sectors.

Honeywell has shown strength in the LNG carrier and FLNG sectors. Specifically, Honeywell signed a contract to provide its automation system for world's first floating LNG facility project awarded to Samsung Heavy Industries (SHI) in 2008.

The following is a summary of a series of questions and answers with Honeywell during the press conference.

The press conference was attended by David Higgins, Director of international marine project sales, Shardul Sirsamkar, marine solution marketing manager of Asia Pacific, Lee Dong-ryeul, Senior

Director of marine and EPC sales at Honeywell, and Lee Chang-dong, Director of marine business at Honeywell.

Honeywell announced that it would place primary focus on the high value-added vessel or offshore facility sector in the period ahead. Why is it? And what is your view on the prospect of this sector?

Our marine business is focused on high tech ships such as LNG carriers or FLNG facilities, etc, rather than ordinary commercial ships, as mentioned before. Honeywell will be better positioned than its competitors when the high tech ship market expands as we have strong competitiveness and extensive experience that we have built up while supplying automation solutions for more than 100 ships.

We have seen a slump in new orders for LNG carriers in the aftermath of the global financial crisis over the last 2 to 3 years. However, rigorous environmental regulations that we have today and a series of incidents at Japanese nuclear power plants have sparked heightened interest in alternative energy sources and triggered massive orders for LNG carriers. The newbuilt volumes are expected to surge as ship owners who postponed investments or took a wait-and-see attitude so far have recently shown an increased willingness to invest. According to a report, the market for FLNG facility will be worth USD 74 billion by 2016, and we also have high expectations. The upturn in new orders for LNG carriers or FLNG facilities and the swollen orderbook of domestic



The photo shows, from the left, Lee Chang-dong, Director of Process Control Division EPC/Marine Business, Shardul Sirsamka, Marine Solution Marketing Manager of Asia Pacific, David Higgins, Director of International Marine Project Sales, and Lee Dong-ryeul, Senior Director, Process Control Division, Overseas Sales Division.

shipyards with cutting-edge technology in this sector will bring increased opportunities for Honeywell.

Moreover, Honeywell has strengths and extensive track record in relation to FPSO and deepwater plants, such as FPSO, FRU, FSRU, a sector of which growth has been fuelled by the increased gas exploration or exploitations amid high prices of oil or natural gas.

What is the unique strength of Honeywell compared to competitors?

Ship control system is evolving to systematically link all parts of ships, instead of monitoring only from each part of vessel. Therefore, the ability to provide total solution related to ship control has taken on added importance. Honeywell offers total solutions for ship control, such as ESD, APC (Advanced Process Control), OTS (Operation Training Simulator), CCTV integration, Tang gauging system, Field instrument, etc, including the control system.

Honeywell is capable of completing the whole engineering process for entire system in Korea, unlike other compa-

nies, and is providing 24-hour call center services in Australia to swiftly meet the requirements of overseas ship owners or customers. Particularly, customers worldwide can be provided with accurate parts and services faster from 120 local branches and offices of Honeywell.

One of our competitors has a wide range of business portfolio and extensive track records in carrying out successful projects in the market for universal ships and has grown larger than ours in overall sense. However both

are playing in different markets because we focus on high value-added ships. Another strength of Honeywell lies in its abundant know-how related to high value-added ships.

How high do you think is the demand for the wireless and fieldbus, the latest technology of automation, in the shipbuilding and maritime industries? And how is this technology being applied?

Currently, wireless or fieldbus is being applied partially in the shipbuilding and maritime industries, but still remains at an incipient stage. That is because there is reluctance to use a technology which has yet to be validated and ship owners tend to take very cautious approach compared to other markets. There are some instances of these new technologies being used for the offshore field. However, it may safe to say that there has not been a single case of this technology being applied to ships so far. Even if these technologies had actually found applications on board ships, it might have been applied par-



A press conference at the conference room of Honeywell, held on October 21

tially. At present, wireless technology is used to measure the vibration of ship and transfer the data over a wireless network or used for the maintenance via wireless access point or mobile computer. Its application is still in the testing stage. Similarly, fieldbus technology has not found much application so far despite its high demand in EPC market.

However, we will see an unavoidable surge in demand for wireless and fieldbus, the latest automation technologies. Honeywell, which has more than 100 years of experience and know-how in the automation field, is fully ready to fulfill the needs of customers in the market.

For your reference, FPSO utilizes fieldbus or wireless technologies for the integrated management of security and access control or the seamless integration with CCTV cameras and video surveillance systems.

What is the trend of latest technologies related to the ship control system?

Currently, the primary focus of shipbuilding market is placed on develop-

ing eco-friendly ships, reducing pollutant emissions from maritime transport, increasing fuel efficiency and minimizing the size of equipments. One of examples is the dual fuel engine developed recently by domestic shipyards.

There has been a growing trend towards the integration of all vessel control systems and equipments. In other words, the integration for ship control system is being achieved using less equipment, which allows the operator to control from one system with greater efficiency.

As for FPSO, the functional subsystems, such as control and ESD, etc, are increasingly built into the integrated automation system which makes the data collection easier and allows the same vendor to manage the facility.

Therefore, companies capable of more efficient integration of subsystem are very likely to dominate the market and the companies that offer total solutions will be better positioned. Honeywell has also expanded its business portfolio and is making efforts to develop integration technology.

As wireless or fieldbus technology is the

technical components that facilitate the integration, shipbuilding and maritime industries are expected to speed up introduction of both technologies.

What is the plan that Honeywell mapped out to increase sales?

Honeywell plans to give impetus to its promotional campaign. We will participate more actively in conferences and seminars related to the marine sector and vigorously target European ship owners with efficient sales and promotional efforts. Honeywell, based in Korea, has not been effectively targeting European ship owners in some way. So, we will do more to reach out closely to the targeted audience in the European market.

What is your goal for the upcoming period?

Honeywell accomplished the best results in the marine sector during the period between 2007 and 2008 on the back of robust performance of shipbuilding industry in 2007. With the new orders bottoming out in 2009 due to the impact of global economic slowdown, Honeywell has not shown strong performance recently. However, new orders for LNG carriers and offshore plants increased this year and the market has rebounded. In 2012, Honeywell will take another leap forward in the marine business.

For that, we will actively proceed with the marketing strategies to win orders from major domestic shipyards this year. We have worked closely with research centers of domestic shipyards to develop technologies based on the results of joint R&D and achieved much progress. Honeywell will surely make strides in the upcoming period. ⚓

POSITIVE PRESSURE SHOULD NEVER BE OVERLOOKED OR UNDERRATED



The Leaders in Purging Technology®

Pepperl+Fuchs' purge & pressurization systems have long been recognized as the industry standard.

Our expertise is with the process industry and our BebcO EPS line of products are used for Type X, Y, Z, Ex px, Ex nP and corrosive area applications. Our highly trained team of worldwide professionals is ready to help you design the cabinet, manufacture the system and support the solution.

Purge & pressurization systems are used to declassify a hazardous or corrosive environment within a cabinet and our solutions come fully tested and certified for the most rigorous applications. In fact, you won't find a better system with more features than those offered by Pepperl+Fuchs.

Pepperl-Fuchs Korea
5th Floor, Yangji Bldg II, 895-2,
Bangbae-dong, Seocho-gu
Seoul, Korea 137-060
Tel: +82 2 3481 9494
Fax: +82 2 3481 9495
E mail: pa-info@kr.pepperl-fuchs.com
www.pepperl-fuchs.co.kr

 **PEPPERL+FUCHS**
PROTECTING YOUR PROCESS



Pioneer of green technology

Rolls-Royce Marine Korea held a press conference in Rolls-Royce Marine Korea located in Noksan State Industrial Complex in Busan on October 25. On the same day, Rolls-Royce announced that it would focus on developing gas engine and propulsion system and enhancing ship design to bring green ships, the key issue in shipbuilding and maritime industries, into reality.



Jun Wan-ki, Managing Director, gave an overview of Rolls-Royce Marine's latest technologies, market strategies, etc, during the press conference.



A press conference of Rolls-Royce Marine Korea, held at Noksan State Industrial Complex in Busan on October 25

Rolls-Royce Marine Korea hosted a press conference at the seminar room of its company building located in Noksan State Industrial Complex in Busan on October 25.

The press conference was attended by Jun Wan-ki, Managing Director of Rolls-Royce Marine Korea, and officials of Rolls-Royce Marine Korea. Jun Wan-ki, Managing Director of Rolls-Royce Marine Korea, said, "Rolls-Royce will develop various green technologies for increasing the fuel efficiency as it plays a supporting role to help maritime industry make green shipping a reality."

Rolls-Royce

Rolls-Royce is a global business providing integrated power systems for use

in private aviation sector, defence aerospace, marine and energy sectors. Rolls-Royce now has a total of 54,000 gas turbines in service worldwide, and its customer base consists of over 500 private airlines, 4,000 utility aircraft and helicopter operators, 4,000 marine customers, including armed forces and navies in 16 countries.

Jun Wan-ki, Managing Director of Rolls-Royce Marine Korea, explained, "Rolls-Royce has established unrivalled leading position in the field of private aviation sector to an extent that airplanes fitted with Rolls-Royce are taking off or landing every 2.5 seconds. Private aviation sector rose to represent 50% of the Group's revenues."

Rolls-Royce has grown at an average annual rate of more than 15% over the last decade and has registered strong

performance with its revenue from the service sector - which includes the long-term support and parts service - climbing over 40% for 3 consecutive years. Rolls-Royce achieved KRW 2 trillion in total sales and has an order backlog worth KRW 110 trillion in 2011. Jun Wan-ki, Managing Director of Rolls-Royce Marine Korea, indicated that the key driver behind this fast growth is R&D. He said, "Rolls-Royce is making investments in R&D more than any other companies. Approximately 8 to 9% of total sales are allocated to R&D every year. Rolls-Royce has spent a total of KRW14 trillion on R&D over the last decade."

In particular, Rolls-Royce is supporting the global network of 28 University Technology Centers (UTC) worldwide, and currently, about 40 projects are

underway. UTC was established in Busan National University, the first of its kind in Asia.

Owing to such effort, Rolls-Royce is applying more than 450 patents and has solidified its footing as a leader in the market based on innovative technologies and products.

Rolls-Royce Marine

Rolls-Royce Marine Korea is located in Noksan State Industrial Complex in Busan.

Jun Wan-ki, Managing Director of Rolls-Royce Marine Korea, said, "Rolls-Royce, well-known for building aircraft engines, earns as high as 20% of its total revenue from maritime sector. Last year, Rolls-Royce achieved KRW 4 trillion from the maritime sector out of its total revenue of KRW 20 trillion.

Its customer base consists of over 4,000 marine customers, including 70 navies in 35 countries, and is supplying equipment to about 30,000 vessels worldwide.

Rolls-Royce is supplying Diesel & gas engines, gas turbines, automation and control (DP), propulsion systems, steering system, electric podded, azimuth thrusters, tunnel thrusters, waterjet, stabilizing system, winch system, etc, including ship design and integrated ship system related to the maritime sector.

Jun Wan-ki, Managing Director of Rolls-Royce Marine Korea, stressed, "The strength of Rolls-Royce lies in its supply of integrated solutions related to ships, ranging from the ship design and engine to the propellers, controllers, etc, based on the wide range of its product portfolio, which are vital for ensuring efficient ship-building process and operations."

Meanwhile, Rolls-Royce Marine Korea is offering all types of marine products

for ships, deck machinery manufactured in Korea, and carries out the marketing, sales operations, and services related to the marine equipments. Specifically, Rolls-Royce Marine Korea exports the deck machinery that it manufactures directly in Korea and offers after-sales services.

Major clients of Rolls-Royce Marine Korea include prominent domestic shipyards, such as Hyundai Heavy Industries (HHI), Samsung Heavy Industries (SHI), etc, shipping companies, such as SK Shipping, Hyundai Merchant Marine, STX Pan Ocean, etc, navy, Korean Coastal Guard and others. Rolls-Royce Marine Korea has maintained its robust performance, carving out 30% of share in the market for deck machinery. Particularly, the vane type steering gear of Rolls-Royce has captured 50% of market share.

A leader in green technology

IMO adopted more stringent environmental regulations requiring the emissions of NOx by 80% by 2016 and CO₂ by 30% by 2025.

Jun Wan-ki, Managing Director of Rolls-Royce Marine Korea, stressed, "Newbuild ships are required to be fitted with engines that do not emit SOx, etc, and existing ships are required to be equipped with the system reducing the emission of harmful gases in compliance with the IMO environmental regulations. Rolls-Royce is also developing green technologies that can ensure conformity with such mandatory requirements."

Currently, Rolls-Royce is focusing on developing gas engines and hybrid engines and propulsion systems, such as Promass and Rim-driven thruster, etc, and optimizing the ship design.



Manufacturing plant of Rolls-Royce Marine Korea located at Noksan State Industrial Complex in Busan. Deck machinery produced here are distributed in the Korean market and exported to Japan.

Among them, the most noticeable one is the propulsion system called 'Promass' which integrates the propeller and rudder into one unit.

Jun Wan-ki, Managing Director of Rolls-Royce Marine Korea, explained, "With the upper side of steering wheel and downstream crossing each other, vortex generated behind the rotating propeller is reduced, increasing the fuel efficiency by 3 to 8%."

In addition, Rolls-Royce developed 'Promas Lite' for the remodelling of existing ships other than newbuild ships. Promas Lite can be fitted to ships already in service to enhance their fuel efficiency, while using the propeller and rudder of existing ships.

Rolls-Royce plans to actively proceed with marketing activities, like strengthening promotional campaigns in trade fairs related to Promass and Promas Lite and launching promotions targeting



Rolls-Royce's booth in KORMARINE, showcasing the green technology which has come into limelight recently



Promas, which helps reduce fuel consumption

shipbuilding and shipping industries.

Aggressive targeting of off-shore plant sector

Rolls-Royce has built a strong business in this field with 50% share in the market for platform supply vessels. Rolls-Royce plans to strengthen cooperative relationship with Korean shipyards which maintain leading position in the offshore plant market. For that, Rolls-Royce mapped out plans to develop equipments optimized for FLNG, PLV, and special purpose vessels, and launch promotions for UT/NVC design packages, etc, targeting small and mid-sized shipyards.

Jun Wan-ki, Managing Director of Rolls-Royce Marine Korea, said, "Rolls-Royce was awarded orders for a total of 2 vessels worth USD 50 million until the 3rd quarter of this year as Korean shipyards won multitudes of orders for drillships, FPSOs, etc, in 2011. Korean market, which represents 20% of Rolls-Royce's revenue in the maritime sector, is a very important market."

He predicted, "As new orders are expected to pour into Korean shipyards in the offshore plant sector, Korean shipyards will show a performance as strong as this year. However, the decreasing volumes due to the European financial crisis, etc, make the prospects for sustained strong performance in 2013 and onwards unclear."

Meanwhile, Rolls-Royce recorded approximately KRW 600 billion in sales from the offshore plant sector last year. Jun Wan-ki, Managing Director of Rolls-Royce Marine Korea, said, "We will increase the revenue from maine sector based on our supply of integrated system solutions, ranging from ship design and engine to the propeller, controller, etc, and green technologies by strengthening relationship with major shipyards."

Rolls-Royce showcased its latest maritime products and green technologies during the KORMARINE trade fair in BEXCO, which opened on October 26, at its booth, attracting the attention of visitors.

Rolls-Royce expects that the market will expand fast with the original marine equipment sector being projected to be worth KRW 224 trillion and service sector worth KRW 182 trillion over the next 2 decades. In addition, Rolls-Royce plans to strengthen its service business which is showing fast growth recently.

Rolls-Royce to supply Azimuth thrusters to the Navy

Rolls-Royce announced on October 27 that it was awarded a contract to supply 15 Azimuth thrusters for new tugboats to the Korean Coastal Guard. This contract is valued at approximately KRW 2.1 billion. Under the contract, Rolls-Royce will supply the Azimuth thrusters to be operated as the major propulsion and steering system in new vessels and carry out the tugging operations and removal of oil from the marine environment.

Azimuth thrusters can rotate 360 degrees round, enabling the maneuvering of ship in all directions without rudder. ⚓

Parker Fluid Connectors Group Marine Products Offering

Why not take advantage of the strengths of
Parker's complete product program?

Tube Fitting



Parflange F37



Tube & Bending



Senso Control



Hydraulic Hose



Industrial Hose



High Pressure Hose



Multitube



Marine Hose



Mooring Line



Umbilical & Cable



Quick Coupling



The **Parker Fluid Connectors Group** manufactures and markets the widest range of hydraulic tube and hose fittings as well as related accessories. There are also high-quality instruments for measuring pressure, temperature and flow. Make the most of this broad product offering of millions of proven components. Furthermore, for product reliability and safety, Parker offers you many advantages when it comes to assembly, purchasing and logistics.

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Parker Korea Marine Service Center
1737-12, Songjung-dong, Gangseo-gu,
Busan, Korea 618-820
Tel : +82 51 831 1395
FAX : +82 51 831 1410



ENGINEERING YOUR SUCCESS.



Pure Thinking makes the sea green

Alfa Laval showcased its innovative technologies and solutions vital for environmental protection and energy efficiency, a key focus area in the maritime industry, during the KORMARINE 2011. Particularly, Alfa Laval captivated the invited major customers and representatives from related industries with its up-to-date solutions and applications - which became even more robust by combining the expertise of its newly acquired Aalborg Industries - for shipbuilding and maritime industries during the seminar held on October 27 in parallel with the trade show.

Alfa Laval showcased innovative technology and solutions related to the environmental protection and energy efficiency, one of the key focus areas in the maritime industry recently, during KORMARINE 2011, the world's largest marine trade exhibition, which ran from October 26 to 29.

Particularly, Marine & Diesel Division, one of the major divisions of Alfa Laval, organized a seminar introducing its new technologies applicable to the shipbuilding and maritime solutions to the invited major customers, representatives from related industries and media on October 27 during the show.

The seminar which revolved under the theme 'Pure Thinking: from green to blue' was instrumental in unveiling the robust integrated solutions and products built with cutting-edge technology

which has become even sharper and more finely honed than ever as Alfa Laval completed acquisition of Aalborg Industries recently, further expanding its business and solidifying its leading position both in Korean and global market.

An official from Alfa Laval mentioned before the seminar began, "This seminar will provide a unique platform for the participants to share the growth strategy and vision of Alfa Laval which has broadened its product offerings and sharpened its competitiveness in the shipbuilding and maritime markets in the wake of acquisition of Aalborg Industries."

Broader product offerings after acquiring Aalborg Industries

With the acquisition of Aalborg Industries, the world's leading manufacturer of marine boilers, in May, Alfa Laval has broadened its product portfolio to include the inert gas systems, thermal fluid systems, shell-and-tube type heat exchanger, etc. In addition, the acquisition has strengthened Alfa Laval's leading position in the global market for energy efficiency and eco-friendly solutions combining the expertise of Aalborg Industries such as the



Joakim Tholin, General Manager of Segment Marine & Diesel at Alfa Laval

waste heat recovery and exhaust gas purification technologies.

Joakim Tholin, General Manager of Segment Marine & Diesel at Alfa Laval, said, "By acquiring Aalborg Industries, we increased our global competitiveness and capabilities with the shipbuilding and maritime sectors comprising 25% of the Group's total revenue. As part of our continued dedication to promoting the advancement of industry, we will provide even more advanced technologies and solutions to the customers in Korea, the global leader in the shipbuilding and maritime industries."



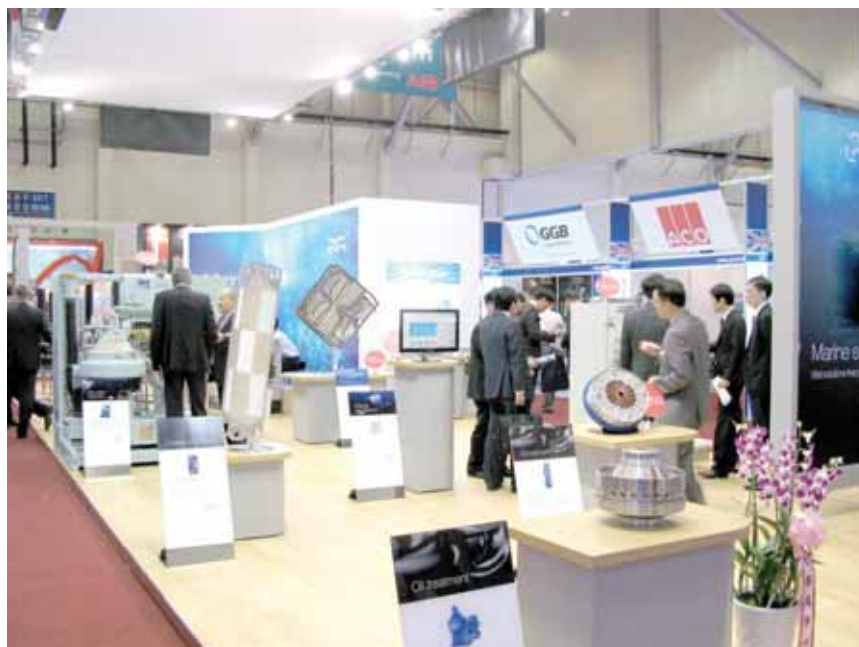
Technical seminar on October 27, organized by the Marine & Diesel Division of Alfa Laval

According to the data published in Fearnley's Review, the marine trade has increased four-fold over the last 4 decades and nearly 90% of world trade is carried by the international shipping industry today. Currently, the shipbuilding and maritime industries must comply with rigorous environmental regulations. Specifically, IMO regulations require the reduction of SOx to 0.1% by 2015, and MARPOL requires 80% reductions in NOx by 2016. Thus, the top priority for the industries will be to seek a way to ensure clean and safe maritime transportation.

In this situation, Alfa Laval's acquisition of Aalborg Industries will better enable Alfa Laval to cement its leading position in the market with quick response to market changes and requirements of industries.

Alfa Laval Korea on a high growth path

Alfa Laval has established itself as the world's leading company that offers a wide range of products including the oil treatment, cooling, heating solutions built with core technologies, such as heat exchange and fluid transfer, and environmental protection solutions, tank cleaning and desalination solutions, etc, since it supplied the centrifugal separator in 1917 for the first application in the shipbuilding and maritime industries. Particularly, the shipbuilding and maritime business of Alfa Laval has achieved steady growth and continues to lead the world in technology to the extent that 75% of all ships worldwide are fitted with Alfa Laval's equipments. Alfa Laval's presence in Korea dates back about half a century. Alfa Laval made an entry to the Korean market in 1962, starting the business through a



Alfa Laval's booth presenting the innovative solutions related to eco-friendly technology and energy efficiency during KORMARINE 2011

trading house, and since then, has offered a broad range of technologies and solutions in the Korean market as a leader in the market for heat exchange, centrifugal separation, and fluid transfer.

The Korean representative office of Alfa Laval, which was founded in 1979, marked the 30th anniversary in 2009 and has seen its sales increasing over three-fold between 2004 and 2009.

In addition, Alfa Laval established local adaptation center in Masan to reach out to customers more closely, thus adding fuel to its growth.

Alfa Laval Korea indicated that the key factor for its fast growth was its localization strategy that aimed to make Alfa Laval's entire product lines suited to Korean market by maintaining the excellence in product quality and constant communication with Korean customers.

Another key driver for its success was

its non-stop support of customers from 75 service centers worldwide in tandem with professional services such as the repair and consulting services.

An official from Alfa Laval explained, "We have supplied more than 200 units of ballast water treatment system since it was launched by the Marine & Diesel Division in 2006. Prominent domestic shipyards, such as Hyundai Heavy Industries, Samsung Heavy Industries, Daewoo Shipbuilding & Marine Engineering, have already installed or are considering to install Alfa Laval's ballast water treatment systems in their ships and offshore plants."

Eco-friendly products of Alfa Laval

On the same day, Alfa Laval unveiled the upgraded and innovative 'pure-thinking' marine solutions capable of reducing energy consumption and waste generation, which also captivated



▲ PureBallst 2.0 ▶ PureBilge BlueBox



the visitors at the company's booth. Among the most outstanding solutions are included 'PureBallast 2.0', the ballast water treatment system for controlling both SO_x and NO_x emissions, 'PureBilge BlueBox', a solution for the control in the treatment of bilge water, and Pure SO_x exhaust gas cleaning solution, etc.

Clearly, PureBallst 2.0 is a revolutionary system for ballast water treatment and has now entered its second generation. Slashing the energy consumption by as much as about 40%, it is cost-effective and reduces the maintenance costs. Furthermore, there are many other improvements that contribute to easier operation and installation. In particular, a new EX version for vessels with potentially explosive environments was launched.

Pure SO_x exhaust gas cleaning solution combines the expertise of Alfa Laval and Aalborg Industries. It removes sulfur compounds and particles from

exhaust gas by means of water injection of the scrubber from Aalborg Industries and performs the water cleaning with the high-speed separator from Alfa Laval, thus ensuring that the IMO requirements are fully met.

PureBilge BlueBox is a system for the treatment of bilge water from ships. Using the high speed centrifugal separation technology, it purifies the bilge water with great efficiency. Specifically, it provides a cleaning performance of 0 to 5ppm oil content in the bilge water and is not affected by sea waves, oil impact or high solid loading, etc, and obviates the need for backflushing.

Particularly, it has the integrated BlueBox which can record oil ppm level, GPS position, centrifugal separator operation, overall alarm log, overboard valve position, and overboard flow data. An official from Alfa Laval stressed, "The pure-thinking equipments of Alfa Laval help businesses find a sustainable balance, combined with the recov-

ery of fuel and the reduction of waste for incineration. These equipments reflect our interest in the protection of marine environment and help customers meet the stringent environmental requirements. The complete line of equipments from Alfa Laval conform to the requirements of IMO, MARPOL and related countries, and are suited for operation on board and easy to operate."

Meanwhile, the new series of Alfa Laval's landmark S-separator combines proven advantages with a wide range of technical developments. Smart adjustments in the disc stack, including an increase in separation area, create even greater efficiency and allow the use of a smaller separator for a given capacity. Additional changes, such as a new drive system, make the separator more robust and easy to use. ⚓

Ships are not still



So why are bilge water treatment systems static?

Traditional bilge water treatment systems rely on gravity, filters or flocculation chemicals to achieve 15 ppm. But while they may pass type approval tests in stable conditions on shore, these static technologies seldom perform at sea.

Because in real life, the ocean is anything but stable.

In a pitching and rolling environment, only a dynamic system like Alfa Laval's PureBilge offers continuous bilge water treatment. PureBilge uses centrifugal separation – the same technology trusted to protect your engine – to handle varying bilge water feed and the toughest emulsions.

The result is less filter waste and reject. Not to mention less time in the engine room.



PureBilge – a dynamic force
in bilge water treatment



www.alfalaval.com



Development of LNG-fuelled ultra large containership

Daewoo Shipbuilding & Marine Engineering (DSME) and Germanischer Lloyd (GL) held a conference on LNG-fuelled ultra large containerships at BEXCO, Busan, on October 28 and finished the approval in principle from GL. Large ships powered by natural gas is expected to bring about a sea change in the shipbuilding industry in the period ahead.



A conference on LNG-fuelled ultra large containerships, held by DSME and GL, during the KORMARINIE Trade Fair on October 28

LNG, as a promising fuel alternative, has not been used for container vessels. Daewoo Shipbuilding & Marine Engineering (DSME) and Germanischer Lloyd (GL) have proved the feasibility of running large container vessels on LNG in a recently completed joint project.

DSME and GL had a conference on LNG-fuelled large containerships during the KORMARINIE Trade Fair on October 28 and finished the approval in principle (AIP).

On the same day, Frederick Ebers, Vice-President and Area Manager for North East Asia, GL, said when he kicked off the press conference, "New technology is needed as cleaner transport is increasingly demanded and maritime environmental regulations are

becoming ever stricter. DSME and GL have acknowledged this challenge and agreed in 2010 to jointly start exploring technology options and safety concepts for large LNG-fuelled container vessels."

Seo Hyeong-gyun, Director in charge of the Comprehensive Design Operation Team at DSME, said, "We have already completed the technological development. The remaining challenge is strengthening the safety features to ensure that this system can be applied to many types of ships."

New era of ship propulsion technologies

The LNG-fuelled vessel, for which DSME obtained the approval this time,

applies its high pressure gas fuel supply system, developed independently by DSME, to MAN Diesel Denmark's ME-GI (ME-Gas Injection) engine and was presented in Copenhagen, Denmark, in May. This fuel supply system is a cost-effective and efficient means to supply high pressure natural gas to the engine.

BTU/cu ft of natural gas for the natural gas (USD/mmBTU, mmBTU = 1 million British Thermal Unit) is remarkably lower than that of existing bunker C oil or MGO (Marine Gas Oil). Additionally, natural gas-powered engines fitted with this system can reduce the emissions of CO₂ by about 23%, NO_x by 13%, and SO_x by up to 92% compared to diesel engines of same output. The natural gas-powered engines, more cost-effective and environment-friendly compared to existing diesel engines, are expected to open the door to new era of ship propulsion technologies.

Furthermore, large ships fuelled by natural gas is expected to bring a revolutionary change in the shipbuilding industry as global environmental regulations under the United Nations Framework Convention on Climate Change require all industries shift towards clean energy.



A ceremony for exchanging the certificate of official approval in principal and R&D report between GL and DSME

Containership, the first vessel powered by LNG

Dr. Gred-Michael Wuersig, Deputy Head of Environmental Research Department of GL and also a member of IMO Correspondence Group for the development of the Code for Gas as Ship Fuel (IGF-Code), added, "The major challenge lies in how to apply this technology to ensure safe bunkering procedures. This technology can guarantee that there is no gas spill and sufficient protection measures against inci-

dents and collisions. Related solutions have been under evaluation and will be available sooner or later."

In addition, Dr. Wuersig mentioned there is no restriction for people to hesitate to build these vessels on the basis of the interim guideline because LNG-fuelled vessels built according to the interim guidelines MSC. 285(86) will certainly be allowed to operate even IGF-Code is enforced.

The IMO has agreed to reduce SOx emissions by controlling the Sulphur content in marine fuels 2015 onwards, and for new vessels operating in ECAs (emission control areas), 80% reduction of NOx emission versus 2010 level is required starting from 2016. "This will make conventional fuel unattractive. But LNG can be environmentally and economically sound option due to its high efficiency and lower impact on environment," said Dr. Wuersig.

Dr. Wuersig is convinced that a new era

of LNG vessels is set to come. "LNG-fuelled cargo ships will be emerging on a large scale in the latter half of this decade," he predicted. "And there is a great potential for container ships to become one of the first cargo vessels using LNG as ship fuel."

GL has been seeking a step ahead in developing relevant rules and pushing forward the use of LNG as ship fuel. Under the assistance of GL, IMO Committee on Maritime Safety developed and adopted "Interim Guidelines on Safety for Natural Gas-Fuelled Engine Installations in Ships". GL has also published guidelines for gas used as ship fuel. Currently, GL is involved in converting a 25,000 DWT product tanker 'Bit Viking' into the first GL-classed gas-fuelled ship.

Meanwhile, a ceremony was held during the conference for exchanging the certificate of GL's official approval in principal and R&D report of DSME. ⚓

Waiting For Reader's Article

Korship wait for newest articles to introduce globalized shipbuilding industry to domestic or overseas market. To enhance shipbuilding & marine related industries competitiveness and development, please send technical article, new products article, application cases, company introduction and seminar, exhibition informations, etc by e-mail or fax. The valuable articles from readers will be checked compatibility by editor and will be printed monthly Korship on free of charge. Many readers interest and participate will be appreciated.

Articles about – Shipbuilding Equipments, Shipbuilding Engineering, Shipbuilding & Marine Plants, Vessel & Marine Automation, Related articles of Shipbuilding and Marine Industry

Address - 708 Acetchno Tower, 55-7 Moonrae dong 3-Ga, Yeongdeungpo-Gu, Seoul, Korea
 TEL : 82-2-2168-8898 / FAX : 82-2-2168-8895
 E-mail : korshipeditor@gmail.com

Until : Send to head office by 15nd every month.



Dr. James Truchard, President & CEO of NI, had a presence at NIDays 2011

'NIDays 2011', a graphical system design conference held at the Renaissance Seoul Hotel on November 15, ended in great success. Particularly, Dr. James Truchard, the Co-inventor of LabVIEW and President & CEO of National Instruments, attended the conference, attracting the attention from the industry.



Dr. James Truchard, President & CEO of NI

Dr. James Truchard, the pioneer of graphical system design technology and leader of the global instrumentation and control industry, made his first visit to Korea, drawing the attention from the industry.

Dr. James Truchard, President & CEO of National Instruments (NI), delivered a keynote speech under the theme of 'Innovation in the era of Graphical System Design' during 'NIDays 2011', a graphical system design conference, held at the Renaissance Seoul Hotel on November 15 and attended the press conference in the afternoon of the same day.

Dr. James Truchard, the co-founder of LabVIEW, has invented the graphical programming language easy to master for people of all generations, including non-programmers and children, as well as physicist, and brought a sea change in the approach of all scientists and engineers worldwide to the instrumentation.

Dr. James Truchard was named America's Sixth favorite CEO by Forbes Magazine and NI was named one of the 25 world's best places to work by Fortune Magazine on October 28.

Active support for the Korean market

In the press conference, Dr. James Truchard, President & CEO of NI, pledged continued support for and investment in the Korean market.

He said, "NI will expand support and investment to help scientists and engineers create successful applications for the market in Korea which has the state-of-art industrial sectors such as electric automobiles, smartphones, renewable energies, LED and others. Along with that, NI will keep developing the products and services that can meet their requirements. Furthermore, NI will cope with the challenges from the ever-diversifying breed of applica-

tions based on the unique strengths of its solutions adaptable to a variety of application requirements with a simple change of the software while using the same equipment and main board."

Dr. James Truchard, President & CEO of NI, who visited Korea for the first time after the establishment of the Korean representative office in 1994, said, "As Korean scientists and engineers have made great strides in technology using NI platform, I think that Korean market is an important market. I visited Korea to help bring together and strengthen the specialist teams in Korea."

NI Korea Specialists (system engineers) have a supportive role in ensuring the customers effectively use the applications that they purchased from NI.

NI plans to expand the specialists teams. In relation to that, Kim chu-yeop, President of NI Korea, said, "NI Korea is making unsparing efforts to provide the best services to customers, unlike a majority of vendors who tend to invest only in products. We will strengthen the capabilities of specialists essential for meeting the growing demand for customer support."

Kim chu-yeop, President of NI Korea said in support of the plan envisioned by Dr. James Truchard, President & CEO of NI, "The focus has shifted from



A press conference coincided with the opening of NI Days and the visit of Dr. James Truchard, President & CEO of NI, to Korea on November 15.

the United States and Europe to Asia which has shown strong performance recently, and as a result, more investment will be made in Asia than any other regions around the globe.”

NI Korea has achieved double-digit growth every year based on its strategies tailored to the needs of Korean market and customers since its entry into the Korean market in 1994, and plays a pivotal role for NI that has 40 branches offices worldwide.

NI Korea riding on a double-digit growth path

“NI Korea achieved excellent results this year despite the unprecedented level of skills drain. The key driver for such strong performance is our focus on tapping into new markets for RF, semi-conductors, renewable energies and others and our thorough the year-long preparation through the organization of specialist teams or localization of LabVIEW.” said Kim chu-yeop, President of NI Korea.

Korea NI has vigorously targeted the markets for renewable energies, secondary cells, fuel cells, etc, moving beyond the existing markets, and launched various products such as Multi-Core CompactRIO-908X capable of high speed imaging processing and



‘NI Days 2011’, a graphical system design conference, attracted about 700 people.

Single-Board RIO 2.0, a board-shaped small and cost-optimized device.

Recently, NI Korea is focusing on carving out a bigger slice of market for radio frequency measurement by actively marketing the PXI, the state-of-art open platform for modular measurement.


For that, NI Korea recently acquired AWR, the high frequency EDA vendor, and Phase Matrix which designs and manufactures RF and microwave component/software, thus broadening its product line up applicable from the stage of product development to final production.

A unique platform for introducing new technologies of NI

NI Days 2011, a graphical system design conference, attracted about 700 scientists, engineers, etc, unveiling new technologies of NI.

Following the keynote speech by Dr. James Truchard, President & CEO of NI, under the theme of ‘The latest technology trends and new product intro-

ductions’, Hwang Gio, head of the marketing team, presented a comprehensive overview of NI’s new products related to the measurement, control, and automation and solutions deployed in various industrial sites. Specifically, he introduced the attendants of the conference to the examples of the latest applications in the medical, industrial, semi-conductor sectors which large companies are currently targeting with vigor.

In the afternoon of the same day, 35 presentations were made in relation to 7 tracks covering the measurement, control, automation, RF, software, and data collection. Experts in various fields and engineers of NI Korea presented a number of measurement and instrumentation solutions for domestic key industries such as automotive, heavy industry, shipbuilding, wind power, electronic, semi-conductor, medical, RF, LTE industries, etc, and suggested practical ways of meeting ever more complex test requirements with the automation solutions of NI. 



Development of stand-alone large-capacity LNG cargo tank

STXOS completed the development of stand-alone large-capacity LNG cargo tank using its own technology recently. This indigenous cargo tank technology is expected to help cut the cost and time required to build ships, reduce royalty payments, and lay the groundwork for STXOS to make inroads into green energy ship market.

STX Offshore & Shipping (STXOS) is expanding the application of its proprietary technologies to high value-added ships such as LNG carriers.

STXOS recently completed the development of stand-alone LNG cargo tank using its own technology and acquired AIP (Approval In Principle) from Norway-based classification society Det Norske Veritas (DNV).

This stand-alone LNG cargo tank technology developed by STXOS can be applied to the fuel tanks of large LNG carriers, offshore plants such as LNG FPSO (Floating, Production, Storage, and Offloading), and LNG-powered vessels.

LNG cargo tank is one of the essential parts for ships and facilities that store or transport LNG or are powered by LNG. So far, dependent type cargo tank structure was used for conventional large LNG carriers.

The stand-alone cargo tank is manufactured externally and fitted to the hull which results in the reduction of time and cost, unlike the dependent type cargo tank built separately after layers of insulations are attached to the inside of the hull's structure upon the completion of ship.

Noticeably, the stand-alone cargo tank

has the advantage of resolving the problem of internal damage arising from the sloshing of the gas liquefied at very low temperatures and external impact during the navigation. Importantly, this stand-alone cargo tank developed with the pure technology of STXOS can be installed on board 213,000CBM class LNG carrier, which is unprecedented. The stand-alone cargo tank was mainly installed on 80,000CBM class LNG carriers due to the technological constraints thus far.


The Norway-based classification society DNV which granted the AIP to the stand-alone cargo tank of STXOS is one of the world's 3 major classification societies along with U.K.-based Lloyd's Register (LR) and the U.S.-based American Bureau of Shipping (ABS) and its inspection and evaluation cover all aspects of shipbuilding and shipping industries such as the performance, structure, and navigation of ships.

STXOS has filed 6 domestic patent applications for its cargo tank structure, assembly, and support structure, etc, along with its stand-alone cargo tank which already acquired the AIP from the world's leading classification society.

STXOS named this stand-alone cargo tank, developed by using its proprietary

technology, as ITS (Independent Tank of STX) and plans to press ahead with R&D in the related fields with an objective of reducing royalty payments.

Heo Joo-ho, Director of STXOS' Technology Research Institute, said, "We developed the technology that can be incorporated into LNG-powered ships, as well the environment-friendly high value-added LNG carriers and LNG offshore plants for which the safety is the highest priority. This technology will be vital in our advancement into the market for energy efficient and environmentally friendly ships and vessels capable of navigating effectively in the ice-covered waters of the polar regions."

STXOS expects that this indigenous stand-alone cargo tank technology will reduce shipbuilding costs and royalty payments and dramatically increase efficiency in production process, and furthermore, will help lay the groundwork for making deep inroads into the green energy ship market in the period ahead. 

Innovation in process enabled by 3D PLM

DSME and Dassault System recently signed a MOU, joining hands to maximize business value by undertaking the evaluation and validation of innovation in the manufacturing and design processes achieved through the deployment of the 3D PLM technology to the sectors such as shipbuilding, green energy, plants, etc.



The signing ceremony of the MOU between Dassault System and DSME. The photo shows Monica Menghini, Vice President of Dassault System, Bernard Charles, Chairman of Dassault System, Jo Young-bin, President of Dassault System Korea, Lee Seong-geun, Managing Director of DSME, Hwang In-hwan, Executive Director of DSME, and Seo Heung-won, a committee member (from the left)

Daewoo Shipbuilding & Marine Engineering (DSME) and Dassault System announced that they entered into a strategic MOU (Memorandum of Understanding) to promote innovation in the PLM-based manufacturing and design processes through technical collaboration on October 31.

Using this strategic partnership as springboard, both companies will join forces to maximize the business value by evaluating and validating the innovation in the manufacturing and design processes achieved through Dassault System's PLM (Product Lifecycle Management) in the green energy sector such as wind power and plant sector which have emerged as new growth

engine, as well as the shipbuilding sector. DSME plans to apply Dassault System's V6 solution to the shipbuilding and new business fields in an endeavor to spur innovation in whole processes that include the design, development, and manufacturing which can be achieved through the use of the 3D-based state-of-art PLM solution. In addition, PLM solution is expected to help DSME carry out scientific evaluation and validation in new business sectors, including the green energy such as wind power and plant sector, etc, and ultimately reduce investment risk. Dassault System has strived to strengthen its global leadership in the shipbuilding sector, like setting up a

Global R&D Center in Daegu last year which specializes in the shipbuilding industry. Particularly, this partnership will lay the stepping stone for Dassault System to secure best practices in shipbuilding, plant, and wind energy sectors and incorporate them into product development, thus strengthening its competitiveness in the PLM market.

Jo Young-bin, President of Dassault System Korea, said, "It is encouraging that we have achieved tangible results in collaboration with a global company this year, following the establishment of the Global R&D Center in Korea which is dedicated to the shipbuilding industry. Under this MOU, Dassault System will provide V6 technology, the next-generation PLM, to DSME, and both companies will be able to verify the feasibility of 3D PLM solution in various industrial fields." Lee Seong-geun, Managing Director of the Central Research Institute of DSME, said, "DSME aims to establish itself as the world's leader in the field of heavy industry by 2020 and will further strengthen the cooperation with Dassault System as part of effort to achieve that goal." He added, "This MOU will facilitate our ongoing effort to achieve innovation in process in the field of shipbuilding and drive new business while avoiding the risks by following through upon the validation and putting clear-cut processes in place based on 3D PLM technology." 

See At Night... like never before

**Introducing the
FLIR First Mate™
Thermal Camera**

Starting at
\$3,600



- Navigate with confidence in total darkness; see channel markers, floating debris, rocks, logs, and other boats clearly.
- Helps find people in the water quickly to recover them safely.
- Compact, portable, and lightweight, the First Mate is fully submersible and built to survive the most demanding environments.

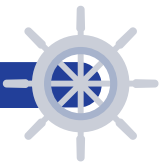
 **FLIR**®

FLIR Systems Korea Co., Ltd.

6th Floor, GuGu Building, 566
Samsung-Ro, Kangnam-Gu, Seoul, Korea
(Tel) 02-565-2714~7 (Fax) 02-565-2718
Email: flir@flirkorea.com



Learn more about FLIR's complete line of thermal night vision cameras at www.flir.com/cvs



An upstanding surf rider - Active heave compensation

Barge Master BV, a Dutch company, has installed Rexroth heave compensation to enhance the usefulness and deployability of offshore cranes.

Bosch Rexroth Korea



Heave compensation uses a moving platform to neutralize the roll, yaw and heave caused by the waves.

Wind farms at sea, drilling platforms far from the coast. Offshore installations are experiencing a real boom, all around the world. Construction costs play a major role here. One reason is that there was really no convincing crane technology available in the past. "Right now, standard floating cranes encounter difficulty with waves cresting at thirty centimeters. Safe crane operation can no longer be guaranteed," is how Jan-Paul van den Bos explained the challenge. Even at minor swaying of just two to three degrees, the tip of the crane, carrying the load, moves by four to five meters and endangers the crew," Martijn Koppert adds.

These are the two men who founded the Dutch firm, Barge Master BV. The company's mission was to solve this problem. Working together with Rexroth, Barge Master developed a comprehensive solution including all the necessary drive and control components. The system is suitable for all kinds of standard marine vessels and cranes, and drastically reduces the manufacturing costs and operating expenses for offshore projects.

Mastering five times the swells

This development also does the exceptional in terms of technology. "With Rexroth heave compensation we have expanded the application window for the floating cranes - handling waves of up to 150 centimeters," van den Bos points out proudly.



The heave compensation system engineered by Rexroth uses a moving platform to neutralize roll, yaw and heave. Here three hydraulic cylinders, affixed vertically, attach the crane to the hull of the ship by way of joints incorporating ball bearings. Connection rods with limited mobility freeze the remaining three degrees of freedom so that the cylinders' movements can compensate for wave action.

The controls are the heart of the solution. Special sensors deliver motion data, which are used to calculate target values for the compensatory movements that keep the platform stable. Barge Master thus considerably expands the use range for standard floating cranes. "Even at irregular swells, with crests of 1.5 meters and frequencies of six to twelve seconds, we can neutralize 95 percent of the motion," Koppert calculates.

At mid-2012 the C400 Barge Master will be ready for use with cranes weighing about 400 tons and payloads of up to 160 tons. Jan-Paul van den Bos is confident that with this step the company will be significantly expanding the utility of standard cranes.



Fast-track conversion transforms super-tanker into an intelligent FPSO

Integrated engineering, modular construction, and advanced automation technologies make the world's largest "smart" FPSO possible

Emerson Process Management Korea

The world's largest Floating Production, Storage, and Offloading (FPSO) vessel was put into operation in the Gulf of Mexico KMZ field by BW Offshore for Pemex, in late June, 2007. The 360,700-ton, single-hull supertanker Berge Enterprise was converted in less than two years into a mobile facility capable of processing 600,000 bopd and 120 MMcfd of gas. (Table 1)

An integrated engineering and construction team for the vessel's process automation systems led by BW Offshore and Emerson Process Management maintained a super fast-track schedule and achieved other significant goals. The "intelligent" FPSO uses a high degree of digital instrumentation, making maximum use of field diagnostics for operational and maintenance. Fabrication and installation costs were limited through tight management and modular construction of topside process units.

While modularization is not new, having the automation system built into each functional process unit during pre-fabrication was revolutionary. Each unit could then be tested on the fabricating site before transport to the shipyard in Singapore. System integration was then simply plugging modules into the established power and control networks - an important time-management factor.

In the beginning, BW Offshore's engineers expressed strong interest in integrating and using microprocessor-based field devices as a key part of the process control system. Advanced technologies were seen as the best means of implementing control and speeding the conversion process at the same time. For example, Emerson's PlantWeb digital plant architecture and DeltaV digital automation system with DeltaV digital safety system were implemented for the first time on a major FPSO to accommodate digital Foundation Fieldbus and Profibus-DP communication systems throughout the vessel. Of the more than 10,000 input/output (I/O) signals employed in controlling and safeguarding the process units, only 2,500 remained on conventional I/O. This contributed to cost savings through reduced wiring.

The project was executed by international design and production teams in Norway, the Netherlands, India, Dubai, Singapore, and Mexico. When an integrated team is brought

Table 1. Specifications for Yuum K'a'k Náab

Client:	Pemex
Water depth:	80m
Mooring:	Turret moored (STP)
Oil stabilization:	200,000 bopd
Gas compression:	120 MMcfd
Import of stabilized oil:	300,000 bopd of 21° API
	250bopd of 13° API
Total oil capacity:	600,000 bopd
Oil offloading to tanker:	1,200,000 bopd
Oil export via pipeline:	200,000 bopd
Gas export:	120 MMcfd
Cargo storage capacity:	2,200,000 bbl
Vessel s data	
Type:	Oil tank (single hull)
Built by:	Mitsui (Japan)
Year:	1980
Class:	DNV
Propulsion:	Slow speed diesel engine
Cargo capacity:	407,000m ³
Main dimension	
Length:	340.5m
Width:	65m
Depth:	31.5m
Draft:	23.2m
DWT:	360,700 metric tons



Fig. 1 The new FPSO, Yùm K´a´k Náab or Lord of the Seas in Mayan, was commissioned in late 2006 with first oil in late June 2007 and first offloads in early July 2007.



Fig. 2 The control package was integrated in the HPU package and under went factory acceptance testing before being shipped.

together very early in project planning greater efficiencies accrue.

Many activities were done in parallel to maximize efficiency and deliver the ship to Pemex in less than two years. New standards for FPSO control were developed and applied in a hardware concept that provided maximum flexibility for timely delivery and integration of the automation system on the ship's deck. The new FPSO was named Yùm K´a´k Náab, which is Mayan for Lord of the Seas, Fig. 1.

The organization

The fast-track timeline could not have been accomplished without several teams, key suppliers and sub-contractors working cooperatively. Two design and engineering teams were based in Norway; project management, detail design, testing, and HW assembly and staging teams were in Rijswijk, the Netherlands; and implementation teams were located in Pune, India. Topside module construction and commissioning took place in Dubai; installation and commissioning in Singapore; and startup support in Mexico.

The engineering and design team for automation systems created functional, integrated automation systems. The same team managed manufacturing, assembly, testing and instal-

lation. After selecting Kanfa Grenland Group of Sandefjord, Norway, as topside supplier, a second team was organized at Porsgrunn, Norway, to design the crude oil processing modules. Because these teams were integrated, and aware of what the other was doing, their efforts were complementary.

By taking responsibility for the design and implementation of the essential process units, these integrated teams guided the project through to commissioning. In this way, concepts worked out by the designers and approved by BW Offshore officials were implemented without alteration or dilution by subcontractors.

Automation system

The requirement for the extensive use of intelligent process instrumentation was well defined early in the planning phase and written as the Functional Design Specification for Automation during the FEED. Conventions for building the automation system were also defined. These became guidelines for the subcontractors, enabling them to deliver their automation design input in a consistent and correct form.

Emerson's digital plant architecture was written into the automation specs to bring intelligence from the field devices



up to the highest level, where it could improve operations and contribute to the predictive maintenance of critical process equipment. This concept was ideal for the FPSO application and the designers used it wherever possible. Separate stand-alone systems using programmable logic controllers (PLC) were largely avoided.

The digital architecture provides an elegant solution to communicating large amounts of data - both process measurements and diagnostics - between field devices and the control host. Because this architecture accommodates the "bus" methods of communication, it offers substantial benefits in reduced wiring along with fast and reliable control I/O transmission. As a result, operational costs are lower and product throughput is greater.

The DeltaV system was considered the ideal host to integrate automation, resulting in smooth-running continuous production processes. The system accepts digital signals from the fieldbus devices, 4-20mA communications from HART instruments, as well as inputs from the Profibus and Modbus systems. It also integrates data from Safety Instrumented Systems (SIS).

In addition, Emerson's AMS suite of software obtains real-time diagnostic data from the control communications network and delivers never-before-available, field-generated information about instruments condition, control valves and other devices. This information is processed, stored, and made available in a useful format on an easy-to-navigate dashboard for operating and maintenance personnel to use. Improved diagnostics result in less downtime and lower maintenance costs.

In general, the integrated engineering and design teams drove procurement activities, so that as much equipment as possible could be compatible with the plant architecture and automation systems. Procurement decisions were generally not left to the discretion of sub-contractors, enabling the project to move forward efficiently.

Still, procurement of field instruments for some packages had progressed beyond the point-of-no-return, which prevented the bus systems from being implemented throughout the vessel. In such cases, diagnostics were accessed from hard-wired HART instruments via multiplexers connected to the automation host. It was very important that this system be used rather than conventional PLCs, which would block the flow of intelligent information and limit the level of automation achievable with the specified systems.

The solution

A automation system's most significant aspect included the development of Control Typical for the various specific application and package units on board the FPSO. Each unit could then be pre-tested. This was an essential part of the fast-track plan.

Modules for the separation, gas compression, fuel gas/amine generation, inlet heating, mixing, metering and offloading, power management, etc. were designed and constructed as stand-alone units capable of carrying out their specific missions without being part of a larger process. Each contained a built-in system connected to the module's internal instrumentation.

A typical automation cabinet prepared for installation in a package unit is shown in Fig. 2. In this case, the control package was integrated in the HPU package and subjected to complete factory acceptance testing in Nordfjord, Norway, before it could be shipped to the Singapore yard. The cabinets for the Kanfa process modules were certified in the Netherlands for placement in Zone-2 applications. In addition, the whole project, including the control system architecture, power and grounding was certified by DNV (Det Norsk Veritas).

To maintain the fast-track concept, certain design preferences had to be abandoned. A case in point was the desire to include SIS in the Zone-2 modules containing a DeltaV controller, because at that time DNV was not ready to accept this design concept and technology. As a result, the DeltaV SIS was placed in safe area on the vessel. The safety instruments and final elements on these modules had to be wired and tested during the yard installation and commissioning period. This was a disappointment, causing some inefficiency and delay to the original master plan, which had the objective to fully pre-fab and test the module. This SIS concept will be accepted by DNV for future projects under specific design requirements allowing improved efficiency and project run-time.

Global execution

As the design phase evolved into the engineering and construction phases, the project took on global proportions with different activities occurring in the most appropriate locations. Much of the automation engineering was done at Emerson's Engineering Center in Pune, India. Some engineering leaders from India participated in detail design activities in Europe

and then returned to India, where they led for implemented agreed-upon concepts. That process shortened the overall project completion time.

The power management system was built by Wärtsilä Corp., a provider of complete lifecycle power systems headquartered in Finland and alliance partner of Emerson for marine and offshore applications. Engineers from the two companies worked together in the power management module design. Factory acceptance testing was done in the Netherlands. Wärtsilä engineers served on the commissioning team in Singapore and, more recently, in the GOM commissioning work.

The Daniel measuring skid was built by Emerson in Houston, using the design conventions and considerations prescribed by the automation design team in Norway. This was the first time an automation module was built into a Daniel metering skid. Acceptance testing was done on-site in Houston by the integrated engineering team before the skid was shipped to Singapore for installation.

After the topside hardware, manufactured in The Netherlands, had been tested and accepted by BW Offshore engineers, all units were shipped to Dubai for topside modules assembly and testing. The separate packages were brought together at the Sembawang yard in Singapore for installation. The automation panels on each module were integrated, tested and commissioned before the ship was moved to the GOM in March 2007.

Effective communications are crucial in the global execution of any major project and any major project and Emerson provided high-speed networks for engineering purpose and rapid messages and data transmission. A project database in the Netherlands served as the design and engineering repository, accessible from the other locations. Web-ex and conference calls were commonly used for voice communications, and remote desktop sessions were made possible via Windows Remote Desktop.

High speed communications were even used to complete acceptance testing remotely. In this case, a topside supplier was busy completing mechanical construction in Dubai, before doing acceptance testing. So, a test-system was set up in the Netherlands, executed remotely by the lead engineer in Porsgrunn, Norway, and observed via Web-ex by the customer in Dubai. This is typical use of communications technology to save travel time and money and keep the project on its fast track.

Implementation

During the implementation phase, the modules were positioned on the ship's top side with appropriate connections to shipboard tanks and other modules. The internal control systems were plugged into the vessel's bus networks leading to the process control room. In addition, the proper electrical power connections were made as a part of the "plug and play" concept.

Every FPSO project tends to be a race against time because once an operator like Pemex places an order for such a vessel, they want that ship delivered as soon as possible. On the other hand, the ship owner does not want to commit conversion funds until the contract is in hand and the actual processing requirements are known and understood. It's then a race against time to get the ship operational.

A head start was gained by obtaining a preliminary engineering contract without specific information on which to base the engineering. This allowed selection of the Main Automation Contractor and formation of the initial engineering and design team. That led to automation system selection and initiation of early-stage automation hardware construction. Even though the planners weren't quite sure where that hardware would be employed, they knew it would be needed. Rough estimates of control component's I/O requirements and locations enabled system designers to develop a cabinet that would allow I/Os to be assigned later. Many of the control system cabinets were constructed in this way and shipped to the yard for installation, providing the flexibility to move forward before all control requirements were fully defined. As a result, the time needed to develop and produce an automation system for a project of this magnitude was greatly reduced.

This technique, called MarineFlex and MarineSuperflex, was applied, making use of the DeltaV I/O termination properties and flexibilities. The upper rows of the cabinets were reserved for bus interface cards, and the next two rows were reserved for conventional I/O, i.e. analog I/O and discrete I/O. This cabinet design allows the backplanes and termination blocks to be used for whatever conventional I/O cards are needed. Once the I/O have been defined, which depends on the instrumentation installed with each module, the assignment of I/O cards could then be designed and provided quickly from the factory in Singapore. In fact, they were delivered within days and installed in a very short time. In the meantime, shipyard technicians were installing the cross-wiring to

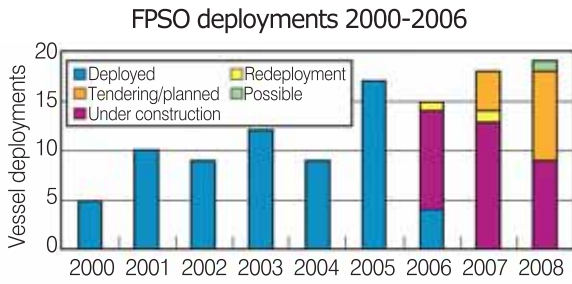


Fig. 3 Future projects will convert other oil supertankers to intelligent FPSOs.

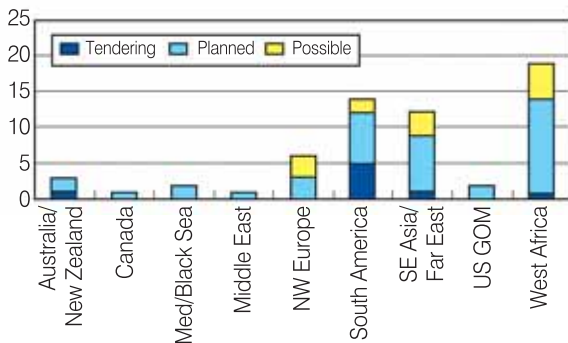


Fig. 4 Newbuild FPSOs will be placed around the world.

integrate the automation island into a total system. This approach allowed for application engineering to move forward without actually knowing the real I/Os.

Integrating SIS was accomplished in the yard, so that both process control and system safety could be operated from one database. This also allows field instrumentation intelligence to be used for safety purposes. The C&E logic can incorporate diagnostics from instruments and valves in a voting configuration to determine if safety action is needed or not, depending on the device integrity. This can prevent unnecessary shutdowns and save the operator money, once the vessel is on station. The transparent system also allowed gas detectors commissioning by one engineer at the AMS monitor, using the detector's diagnostics functionality instead of having multiple engineers climbing over vessel to check detectors. This represented another big time saver.

Emerson's predictive maintenance software provides an effective means of identifying potential equipment problems in time to avoid failure-related shutdowns. This is a separate application built into the automation system that accesses diagnostic information from the smart field instruments and digital valve controllers by monitoring them full-time and generating Status Alerts, calling attention to instruments or equip-

ment that may be in distress. Technicians can further evaluate by interrogating the instruments online for more in-depth information. In this way, they can determine if an immediate repair or replacement is necessary, or whether the device can be allowed to operate until a more convenient time. This is the essence of predictive maintenance, which results in greater throughput, higher reliability, and lower maintenance costs.

Delivery

Commissioning of the Yuum K'a'k Náab took place in Singapore in late 2006. By that time, the Norwegian, Indian, and Pilipino crew had received basic training on the ship's operation, processes and the automation system. The ship sailed from Singapore on February 2, 2007 and reached the KMZ Field in the GOM on March 16, 2007 and reached the KMZ Field in the GOM on March 16, where it is being operated by BW Offshore for Pemex. Emerson provided further training and support from its Mexican offices to assure a smooth transition from construction project to operational vessel. First oil was received in late June and the first off-loads were performed in early July.

Future Projects

BW Offshore and Emerson expect to apply lessons learned in the fast-track conversion of this ship from oil supertanker to intelligent FPSO on future projects. Fig. 3 and 4. The two companies are discussing a partnership that will enable them to form integrated teams at the very earliest stages of future conversions to make the process as efficient and painless as the Yuum K'a'k Náab project proved to be. ⚓

The authors:

Wim van Loon, Emerson Process Management
Hans-Jacob Fromreide, BW Offshore

Korea's only shipbuilding magazine
in English, Monthly KORSHIP

Contact for advertisement or subscription

TEL: +82-2-2168-8894/8899
International: +82-10-9402-7978 (Mr. Park)
E-mail: victory@procon.co.kr



My people are wasting their time on complex non-value added tasks. I need them focused on safety and reliability instead.

YOU CAN DO THAT



DELTA V™

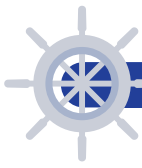
Emerson integrates and simplifies your automation solution to accelerate and optimize your marine project. Emerson's DeltaV automates your routine tasks resulting in productivity and asset efficiency. You can seamlessly integrate your automation requirements into a single system architecture assuring consistent production using best practices. The modular, scalable and smart nature of DeltaV allows to accelerate your projects and reduce project time. It's time to put the focus back where it belongs—on your business performance—scan the code below or go to EmersonProcess.com/LNG



The Emerson logo is a trademark and a service mark of Emerson Electric Co. © 2011 Emerson Electric Co.



EMERSON. CONSIDER IT SOLVED.™



Future technology (5): The arctic ship

Over the next decade, shrinking amounts of summer sea ice, along with higher prices of hydrocarbons and greater exploitation of raw materials, will result in an increase in Arctic ship traffic. This will lead to faster development of Arctic-related technologies, such as ice route optimisation software, hull load monitoring systems, and introduction of new icebreaking concepts. Inexperienced crews will be prepared for ice navigation by using ice training simulators. As conventional lifeboats or liferafts are not designed for safe evacuation in Arctic ice conditions, new amphibious types of evacuation vessels will be brought into service.

DNV

Introduction

Climate models predict a significant decrease in Arctic summer ice cover over the next ten years. Less ice provides new opportunities for shipping, leading to more intense and rapid development of Arctic-related technologies. Increased demand for seaborne trade in the Arctic will lead to the introduction of larger vessels that require novel icebreaking services.

Many technologies that are commonly used in more temperate areas, such as conventional lifeboats may not work in the Arctic environment.

Crews with little experience in Arctic navigation need support systems for decision making, and require training to be able to navigate safely and effectively in Arctic waters. Increased demand for seaborne trade in the Arctic will lead to the introduction of larger vessels that require novel icebreaking services.

Novel icebreakers

The bow shoulder areas of an escorted vessel that is wider

than the icebreaker, are exposed to unbroken ice, leading to increased ice resistance.

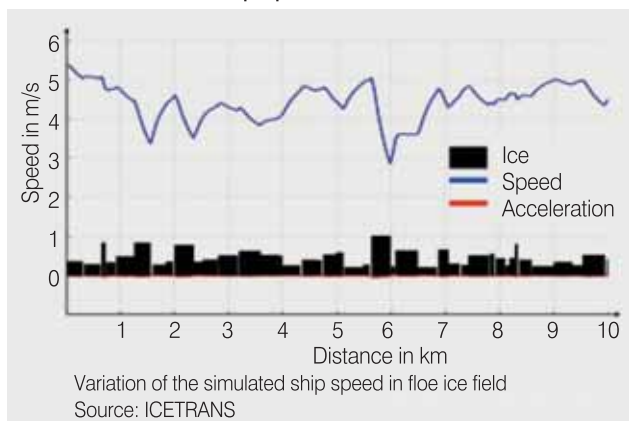
Wider channels can be broken by icebreakers with an oblique hull form that is especially designed for sideways icebreaking. Sideways operation is achieved by using several 360° rotating azimuthing propulsors. Such an icebreaker would operate bow first when escorting smaller vessels, and sideways for wider vessels. This design would allow an icebreaker with a 20m beam to open a channel up to 40m wide. This would enable a single icebreaker to escort wider vessels, which to date require two traditional icebreakers.

Tests indicate that when in oblique operation mode, the speed is less than half the normal speed. Over the next decade, this novel icebreaking concept is expected to be widely adopted for Arctic operations.

Ice load monitoring

When navigating in ice-covered waters, the captain must be

Ship speed simulation



Oblique ice breaker



Sideways advancing breaks a wider channel than a traditional ice breaker of same size. Source: Arctic Technology Inc.

Novel evacuation vessels in ice



Evacuation vessels advances in water and on ice using Archimedes' screw for propulsion. Photo: Sveinung Løset

able to judge when the ice load has reached a level that exceeds the local strength of the ship's hull.

The ice load monitoring system on the bridge should indicate when extreme loading occurs. Ice loading is continuously measured by a couple of 100s of strain gauges that are affixed to selected frames in the bow region of the vessel. The signals measured will then be benchmarked against the known safety limits of the frames. The safety limits have been calculated, based on the vessel-specific, finite-element model. This system relies on correct sensor positioning, calibration and detection of malfunctioning sensors, and the quality of the benchmarking.

It is expected that over the next decade, such systems will be deployed on many Arctic vessels providing advice on when to slow down or when to select another route in order to avoid ship damage.

Arctic evacuation vessels

Conventional lifeboats or liferafts are not designed for safe evacuation under Arctic ice conditions.

Ice strengthened and winterized lifeboats are needed to travel over ice formations, like ice ridges, and to transit in open water. By 2020, such vessels will use the Archimedes' screw concept for movement. Two large, screw-like, floating pontoons will be located along either side of the vessel. Design challenges include the material of the pontoons and their connections, as they will have to tolerate high impact loads at extreme temperatures.

Evacuation vessels on board Arctic ships will have to be included in the general winterization of the ship, e.g. protected from icing and with preheating of their engines.

Ice manoeuvring simulator



Manoeuvring simulator can provide realistic training experience for ice navigators. Source: Ship Manoeuver Simulator in Trondheim

Ice routing software

Ships without icebreaker escort will have to find their own routes through the ice that will keep their fuel consumption and travel time to a minimum.

By 2020, ice routing software will take into account information on prevailing ice conditions, based on satellite images, weather observations, ice charts, and weather and ice model forecasts. Ice conditions, such as level ice, brash ice channel, floe ice field, and ice ridge field, will be simulated stochastically for the area of the route selected initially. The model will then compute the resulting ice resistance, speed, and transit time, also taking into account the ship characteristics. The navigator will set the preferred optimization criteria, such as speed, transit time, fuel economy, or emissions, for best route selection. Ice routing may also suggest the safer routes through ice.

Ice navigation training simulator

A growing number of ships in Arctic areas will have navigators with little or no ice experience. Effective training methods for mastering navigation in ice are needed.

Training simulators offer an environment in which the navigator can train for ship operations in varying conditions of simulated ice, darkness, snow, fog, and icing. The ship response to navigator's actions is computed in real-time, based on the ship-ice interaction and propulsion models, together with the effects from chosen weather conditions.

The navigators will learn to recognize different ice types and to avoid heavy ice features, such as ice ridges and multi-year ice. Training for specific ship operations, such as station keeping in ice or ice management, can be performed in the simulator. The challenge will be to model ship behaviour realistically for all different types of ice conditions. ⚓

Hammelmann High pressure systems in the plant industry

Process pumps - High pressure pumps – Cleaning systems

Founded in 1949 Hammelmann has decades of experience in the development and manufacture of high pressure systems for all branches of chemical industry.

Process pumps

Hammelmann Triplex and Quintuplex pumps provide the highest standards of safety and reliability.

Power ratings up to 650 kW
Flow rates up to 2000 l/min
Pressures up to 3000 bar

Typical applications

Methanol injection
Fatty alcohol process
LDPE
Wet oxidation
CO₂ extraction
Mill scale removal
Non woven fabrics
Boiler feed pumps
Re-injecting reservoir water

Typical fluids

- Acrylic acid
- Adipoladipinat
- Butane
- Carbon dioxide
- Diesel oil
- Ester
- Ethanol
- Fatty acids
- Glucose
- Glycol
- Inhibitors
- LDHI
- Methanol
- Methylester
- Pentane
- Process water
- Salt water
- Scale Squeeze
- Vinyl acetate
- Waste water



High pressure pumps

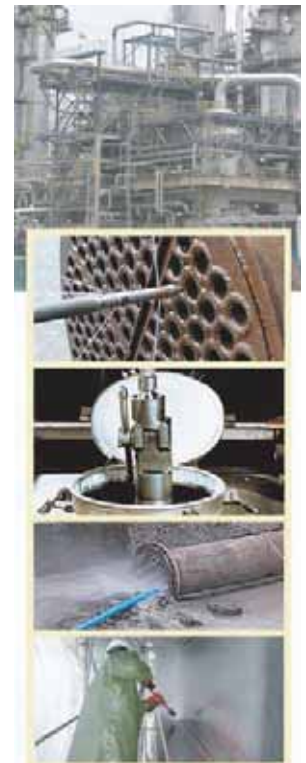
Hammelmann pumps produce maximum performance from a minimal footprint which is the result of combining a compact integral speed reduction gear end with the concept of a vertical configuration.

Power ratings up to 750 kW
Flow rates up to 1700 l/min
Pressures up to 4000 bar



Industrial cleaning with high pressure pumps and applications systems up to 3500 bar

- Heat exchanger cleaning: rigid and flexible flushing lances, tube cleaning nozzles, internal and external heat exchanger cleaning systems
- Tank cleaning: tank cleaning heads, internal cleaning systems for autoclaves
- Pipe and sewer cleaning: standard and reversible sewer cleaning nozzles, powered hose reels
- Surface prep./cleaning: with and without vacuum, remote controlled
- Abrasive cutting: abrasive entrainment and cutting nozzles, abrasive container, precision cutting components



Kukdong
a Nexans company

At the core of performance

ICEFLEX®

Photo credit: ©Getty Images - SAATCHI & SAATCHI

ICEFLEX®: THE FIRST MARINE ENERGY CABLE TO RESIST ULTRA-COLD ARCTIC TEMPERATURES.

For safe and secure arctic development, you need high performance cables. Nexans developed ICEFLEX®, the first marine energy cable qualified for extremely low temperatures. Even at -50°C , it remains highly flexible, resistant, while ensuring advanced fire performance.

It was designed for all shipboard and offshore/onshore applications, making it easier to safely develop new oil and gas fields, shipping routes and refineries in the High Arctic. ICEFLEX®, the ultra cold cable which meets the arctic challenge... to help you achieve your goals.

 nexans

www.nexanskorea.com

www.cablekukdong.co.kr



STX OSV received orders worth KRW 200 billion for 4 units of PSVs

STX OSV, the subsidiary of STX Europe, announced on October 31 (local time) that it won an order worth approximately KRW 200 billion for 4 units of Platform Supply Vessels (PSVs) from the Ireland-based Island Offshore.

These PSVs will measure 84.3m in length and 17.0m in width with a deadweight of 3,800 tons. The hull will be built at the Braila shipyard in Romania and the rest of the works will be completed at the Brevik shipyard in Norway. They will be delivered from the 3rd quarter of 2013 to the 1st quarter of 2014 on a staggered basis.

These PSVs will feature 'UT 717 CD' design developed by Rolls Royce.

PSV supports the construction and installation of offshore plants and is capable of deepwater drilling, subsea construction, installation of subsea pipes, etc, and equipped with the cutting edge capabilities such as unmanned subsea operation system, etc, depending on the ship model.

Major vessels include the PSV, Anchor Handling Tug Supply Vessel (AHTS), Off-Shore Construction Vessel (OSCV), Seismic vessel, etc, the high value-added vessels, along with offshore plants, which have come into the limelight amid increasing exploitation of deepwater resources recently.

STX OSV has captured the largest share of the global orderbook for large Offshore Platform Vessels beyond 4,500DWT and the AHTS greater than 20,000BHP.

Meanwhile, Ireland Offshore, the ship owner, is a shipping company which have come to a prominence in drilling projects in the Americas and the North Sea and acquired more than 25 ships from STX OSV over the last decade and has maintained strong cooperative relationships with STX OSV.



Image of PSV to be built by STX OSV

Nexans signed a contract to supply power cables, umbilical, and accessories for the Asgard oil and gas field

Nexans signed a contract worth EUR 75 million with Statoil on November 2 (local time) to supply a total of 165km of static & dynamic umbilical, power cables, and accessories. These cables will be installed in the Asgard oil and gas field located in the Norwegian Sea.

The products from Nexans' specialized manufacturing plants in Norway, Halden, Rognan and Namsos, and Charleroi in Belgium will be used in this complex subsea project. Nexans will supply 4 power cables and power umbilical cables, each 40km in length, 2 dynamic power umbilical and 2.3km-long standard umbilical cables.

Ragnvald Graff, the Sales and Marketing Director in Nexans Norway said, "This contract that we signed with Statoil to supply umbilical cables for this expansion project attests to the excellence of our technology and products. In this project, Nexans will maintain close cooperative relationship with Statoil with regard to the development of all necessary technologies and innovation vital in ensuring the successful completion of the project."

The power umbilical, developed for the first time by Nexans, integrates the

capabilities of power cables and umbilicals in a cable and enables the supply of high voltage power for deepwater subsea projects. The power umbilical consists of many steel tubes, including the fiber optic elements, control/monitoring and insulated power cores, etc, and can be transported at the same time without need for separate transport and installation of the power/controlling cables, thus helping save both transport and installation costs.

Meanwhile, Asgard oil and gas field is situated in the Norwegian Sea about 200km off the coast of mid Norway and has a reserve of 14 million barrels of condensate equivalent to 28 trillion m³ of gas and 220 million barrels of oil.

STX OSV won an order for 1 Arctic Trawler

STX OSV announced on November 12 (local time) that it was awarded a contract from Remøy Fiskeriselskap AS to build 1 Arctic Trawler.

The vessel to be built by STX OSV under this contract will measure 74m in length and 16m in width. The hull will be built at the shipyard in Romania and the remaining work will be completed at the Brattvaag shipyard in Norway. The vessel is scheduled for delivery in the 3rd quarter of 2013.

The vessel will adopt the 'ST-117' developed by Skipsteknisk, a company which specializes in the design.

Rem Group, which Remøy Fiskeriselskap AS - the ship owner - belongs to, has placed orders with STX OSV for many fishing and offshore vessels and has maintained long-standing strong cooperative relationship with the ship-builder.

STX OSV has 9 shipyards in 4 countries such as Norway, Romania, Vietnam and Brazil with approximately 9,000 employees worldwide.

STX OSV has the largest orderbook worldwide with 43% share in the market for Anchor Handling Tug Supply (AHTS, beyond 20,000BHP) vessels and

second largest orderbook for Platform Supply Vessels (PSV, beyond 4,500DWT) based on the order backlog as of late September.



Image of Arctic Trawler ordered to STX OSV

DSME inked a contract in Brazil for 2 pipe-laying support vessels

Daewoo Shipbuilding & Marine Engineering (DSME) secured an order for pipe-laying support vessel, showing strong performance in the field of offshore facilities.

DSME entered into a contract with Odebrecht, Brazil's largest plant construction company, in Rio de Janeiro, Brazil, on November 16 for the construction of 2 pipe-laying support vessels in a signing ceremony. The signing ceremony was attended by Nam Sang-tae, CEO & President of DSME, Roberto Ramos, President of Odebrecht, and Frederic Delormel, Chief Operating Officer of France-based Technip, and other officials.

The contract is valued at approximately USD 500 million. These vessels will be built at DSME's Okpo shipyard and delivered to the ship owner by August 2014. After delivery, these vessels will be chartered to Petrobras, the largest company in Latin America, for carrying out the installation of subsea pipelines and cables in the sea off the coast of Brazil.

These vessels will measure 146m in length and 30m width with the deadweight of 17,300 tons. Equipped with cranes and large pipe reelers, etc, they can install subsea pipes in water depths up to 2,500m.

Odebrecht, the ship owner, has placed 5 drillships and 1 semi-submersible drilling rig with DSME and is one of major partners of DSME. Odebrecht established a joint venture with Technip and placed an order for pipe-laying

support vessels that will be chartered to Petrobras in a strategic move to advance into the market for pipe-laying support vessels.



Nam Sang-tae (right), CEO & President of DSME, shakes hands with Roberto Ramos (middle), President of Odebrecht, and Frederic Delormel (left), Chief Operating Officer of Technip, after signing a contract to build two pipe-laying support vessels in Rio de Janeiro, Brazil, on November 16 (local time).



Importantly, this contract represents the first award for the construction of the pipe-laying support vessels from Odebrecht and attests to the ship owner's recognition of DSME's excellent shipbuilding technology and the long-standing relationship between both companies.

Particularly, this signing ceremony was attended by many officials representing Petrobras, the charterer of these pipe-laying support vessels and the largest company in Latin America. In April, José Sergio Gabrielli, Chairman of Petrobras, visited DSME's Okpo shipyard and had an exclusive face-to-face meeting with Nam Sang-tae, CEO & President of DSME.

Nam Sang-tae, CEO & President of DSME, said, "Currently, many offshore

development projects are under way in Brazil and additional orders for offshore facilities, including the pipe-laying support vessels, are anticipated. We will keep winning new orders for offshore facilities in Brazil, one of the emerging markets, based on the strong cooperative relationship with ship owners."

Including this order, DSME has won orders for 48 units of vessels and offshore facilities worth approximately USD 13 billion so far.

STX signed an additional contract to build a steel plant in Middle East

STX Group signed an additional contract for a construction project in Saudi Arabia which is an extension project for the steel plant awarded to STX Group in 2009.

STX Heavy Industries announced on November 16 (local time) that it entered into a contract with South Steel Company in Riyadh, Saudi Arabia, to build a rolling mill plant in a signing ceremony attended by Lee Hee-beom, Chairman of STX Heavy Industries and STX Construction, Lee Chan-woo, President of STX Heavy Industries, Sulaiman Al Harbi, Chairman of South Steel Company, and officials representing the local banks in Saudi Arabia.

This contract is an extension of the steel plant project awarded from the same client in 2009 and attests to the widespread recognition for the excellence of STX Heavy Industries in the plant projects.

The rolling mill plant to be built by STX Heavy Industries will include the rolling and auxiliary facilities with an annual production capacity of 500,000 tons of reinforced steel bars and wire rods and are scheduled for completion by 2014 in Jazan, one of the important commercial hubs in Saudi Arabia, where the steel plant is under construction.

STX will undertake the project as a turnkey-based EPC which integrates the engineering design, procurement and construction, including the installation of essential facilities. The total project costs, including the current project cost, will increase to approximately USD 250 million.

Meanwhile, STX Heavy Industries has established a leading position in the plant markets of the Middle East, winning a series of plant projects in Saudi Arabia, UAE, and Iraq, since its first project in Jordan in 2008.

STX Heavy Industries plans to place primary focus on winning plant construction projects based on its full array of engineering, procurement and construction (EPC) services and business portfolio that encompass a wide range of business such as the steel, power, chemical plants because a large number of contracts are expected to be awarded from countries, such as



STX Heavy Industries signed a contract with South Steel Company in Riyadh, Saudi Arabia, on November 16 (local time) to build a rolling mill plant. The photo shows Sulaiman Al Harbi, Chairman of South Steel Company, Lee Hee-beom, Chairman of STX Heavy Industries and STX Construction, Lee Chan-woo, President of STX Heavy Industries (from the third on the left side).

Saudi Arabia, Iraq, etc, amid the politically stabilized situation in the Middle East which remains a lucrative market for industrial plant projects.

Lee Chan-woo, President of STX Heavy Industries, said, "STX will continuously proceed with R&D activity and vigorously target the market to maintain strong position in the plant sector of the Middle East."

Nexans signed a contract to supply power umbilical for Jack and St. Malo oil fields

Nexans signed a contract with Chevron U.S.A. on November 4 to design, manufacture, and supply the a total of 42km (138,000 feet) power umbilicals and subsea termination head. The cables to be supplied by Nexans under this contract will be used for the Jack and St. Malo oil fields located in the deepwater Gulf of Mexico. The umbilical cable will be unloaded at the new long-term logistics center built in Mobile, Alabama to ensure optimized logistics support for customers in the Gulf of Mexico region.

The Jack and St. Malo oil fields are situated about 450km from the south of New Orleans, Louisiana, which is at the water depths of 2,100m (7,000 feet), and both oil fields are spaced about 40km apart. This project includes the process of fixing the 3 subsea centers to the major production facilities capable of producing 42.5 million CF (cubic feet) of natural gas and 170,000 barrels of oil per day.

2 separate lengths of umbilical power cables will be designed and manufactured at the Nexans specialized subsea cable manufacturing plant in Halden, Norway, along with the subsea termination heads (UTH) that will be used in the Jack and St. Malo oil fields.

Upon the completion of production, the umbilical power cables will be delivered to carousel, the new logistics center built at the Theodore industrial port in Mobile, Alabama in 2013. At this place, the cables will be kept in storage until Chevron comes to pick them up for installation.

The umbilical power cable is the innovative product of Nexans that integrates the capabilities of both umbilical and power cable in one single cable which

is capable of ultra-high voltage power supply for deepwater projects.

Umbilical power cable consists of the fiber optic elements for the control and monitoring purpose and several steel tubes. The power umbilical obviates the need for separate transport and installation of power and umbilical and thus dramatically saves the cost of transport and installation.

“Signing this contract to supply umbilical power cables for the Jack and St. Malo oil fields is a development of crucial importance for Nexans, considering that Chevron is one of the leading operators in the deepwater Gulf of Mexico where we can build a significant reputation as major supplier of subsea technology. Furthermore, this contract will provide a springboard for Nexans to take a strategic step forward in this region by introducing the carousel, the new and long-term logistics center that will help improve regional logistics support.” said Ragnvald Graff, Sales & Marketing Director, Energy Division, Nexans.

STXOS won an order for 6 ultra large containerships

STX Offshore & Shipbuilding (STXOS) announced on November 16 that it was awarded a contract from an European ship owner for the construction of 6 units of 16,000TEU ultra large containerships (2 newbuilds and 4 optional vessels).

In parallel with this contract, STXOS signed a deal to alter the size of 4 large containerships ordered from an European ship owner in October last year to 16,000TEU ones.

This contract is valued at USD 1.6 billion, including the value of the alteration contract.

These vessels will measure 399m in length, 54m in width, and 30m in height with the deck area equal in size to 4 soccer fields and can carry 16,000 20-foot containers. They will be built at Jinhae shipyard of STXOS and delivered

from the 3rd quarter of 2014.

An official from STXOS said, “This contract attests to the unmatched competitiveness of STXOS in the market for ultra large containerships. The strong and long-standing cooperative relationship with the ship owner played a key part in this contract award.”

STXOS won the orders for 9 units of 13,000TEU containerships from the Europe-based MSC in 2007, which was the single biggest deal it had ever signed. Since then, STXOS has successfully delivered 4 units out



of the 9 units and built up the expertise in the construction of ultra large containerhips and strengthened the competitiveness of its production.

These 16,000TEU containerhips ordered to STXOS this time are the second largest ones to be ever built after 18,000TEU containerhips in the global market.

Particularly, these containerhips dramatically reduce costs per container and sharply slash CO₂ and harmful gas emissions, and incorporate innovative fuel-saving technology for reducing the production of sludge from vessels.

Furthermore, these vessels adopt various eco-friendly technologies that can reduce the financial burden on the global ship owners amid sustained high

oil prices, and conform to the trends toward high efficiency and large-scale vessels in the global container transport market.

An official from STXOS commented "The award of this contract heralds a new change in the market for large containerhips. Global containerhip operators are expected to proactively acquire large ships for a considerable period of time ahead."

STX signed a USD 2 billion contract to build a large-scale plant complex in Saudi Arabia

STX was awarded a USD 2 billion contract for the construction of large-scale plants in Saudi Arabia.

STX Heavy Industries announced that it signed PEPCOM contract worth USD 2 billion (KRW 2 trillion 250 billion) on November 19 (local time) in Riyadh, the capital of Saudi Arabia, for the development of iron ore mine and construction of large-scale plants. The signing ceremony was attended by Gang Deok-soo, Chairman of STX Group, Lee Hee-beom, Chairman of STX Heavy Industries and STX Construction, Jang Do-soo, President of Korea South East Power, Waleed, CEO of National Mining Company, and other related officials.

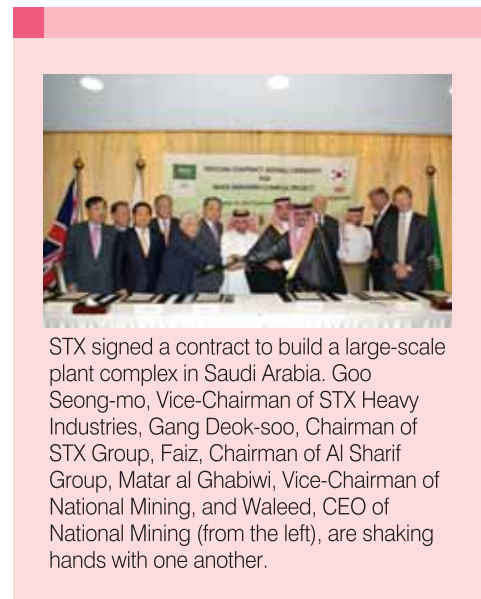
The PEPCOM contract covers the operation and management (O&M) of the plant, in addition to the planning, engineering design, procurement and construction (EPC), and is considered to be more advanced project method in the plant industry.

STX Heavy Industries will produce 5 million tons of iron ore annually in Wadi Sawawin, Tabuk in the northwestern corner of Saudi Arabia and construct a plant complex that includes the pelletizing plant, power plant, and desalination plant.

The pelletizing plant to be built in Wadi Sawawin is an industrial infrastructure that processes the mined iron ore, the raw material, and removes the impurities contained therein to make pellets suitable for the steel production.

STX Heavy Industries already has an experience in building a plant manufacturing semi-finished and finished steel products in Saudi Arabia and gained recognition for its excellence in technology.

Under the contract, STX Heavy Industries with a proven track record in the construction of various power plants will also build a power plant to supply electricity essential for the large-scale industrial complex and a desalination plant to supply water for industrial use.



STX signed a contract to build a large-scale plant complex in Saudi Arabia. Goo Seong-mo, Vice-Chairman of STX Heavy Industries, Gang Deok-soo, Chairman of STX Group, Faiz, Chairman of Al Sharif Group, Matar al Ghabiwi, Vice-Chairman of National Mining, and Waleed, CEO of National Mining (from the left), are shaking hands with one another.

Wadi Sawawin has at least over 125 million tons of commercially viable iron-ore deposits. National Mining, which awarded this contract to STX, holds the right to operate the iron ore mines in this region.

Meanwhile, this project is consistent with the Saudi Arabian government's policy of moving away from an oil economy and promoting balanced national development, thus drawing huge attention from the Saudi Arabian government.




Korean shipyards reclaimed the top spot in the global shipbuilding orders/order amount in 2011 after being overtaken by China in 2010 by a slight margin in terms of new orders, shipbuilding volumes and order backlog, thus cementing the status of the country as the world's largest shipbuilder.

The prediction at the beginning of the year was right on target. The orderbook for high value-added ships, such as containership and LNG carriers, has grown and the newbuilding orders for offshore facilities have increased amid resumption of delayed projects in tandem with rising oil prices. Particularly, domestic shipyards which have high competitive edge in those 2

sectors have continued to win a wave of new orders since the beginning of the year.

According to UK-based shipping researcher Clarkson, domestic shipyards have maintained strong orderbook and been placed in the top cluster of world's leading shipyards.

Here, we take a close look at the performance of South Korean major shipyards, the world's leading players with strong growth in new orders as shown currently in the Clarkson data, such as Hyundai Heavy Industries (HHI), Daewoo Shipbuilding & Marine Engineering (DSME), Samsung Heavy Industries (SHI), STX Offshore & Shipbuilding (STXOS), and others based on the order backlog data. 

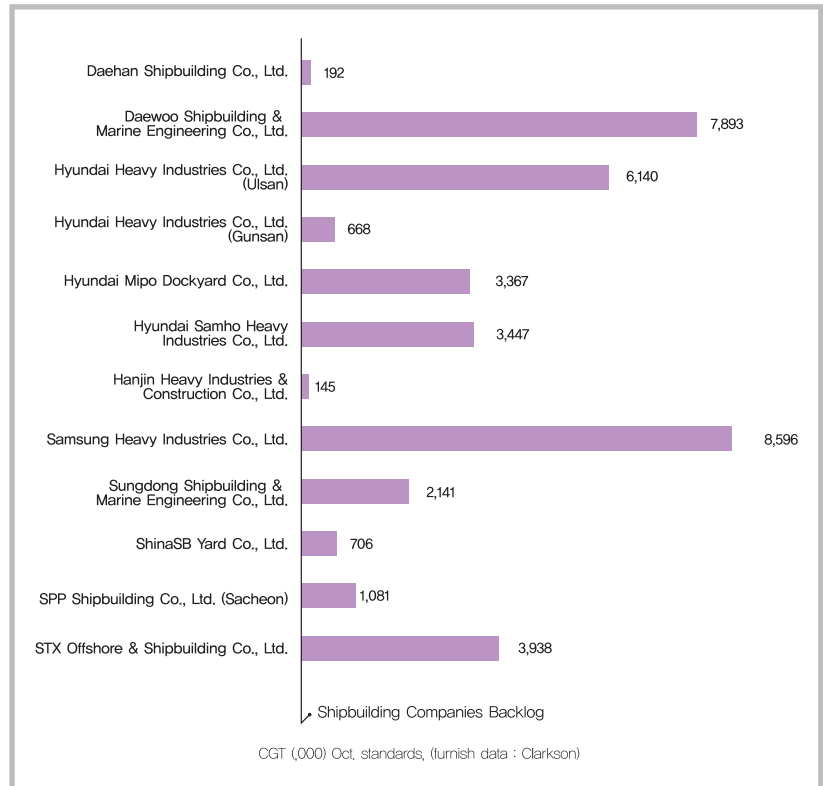


Photo: SPP Shipbuilding Co., Ltd.



Offshore plant orders awarded to domestic shipyards in 2011

Date	Type	Number of vessel	Amount	Ship owner
January	Drillship	1 vessel (including 1 optional vessel)	KRW 590 billion	Diamond Offshore Drilling Limited, U.S.A
	Offshore Plant	-	USD 900 million	RasGas, Qatar
	Drillship	2 vessels (including 2 optional vessels)	KRW 1 trillion 140 billion	Noble Drilling, U.S.A
	Deepwater drillship	1 vessel	-	Atwood Oceanics, U.S.A
February	Offshore facility carrier FPSO for the North Sea	1 vessel	KRW 265 billion	Dockwise, Netherlands
	Platform Supply Vessel	-	USD 1.2 billion	BP (British Petroleum), U.K
	Fisheries Research Vessel	1 vessel	-	-
March	Fisheries Research Vessel	1 vessel	EUR 35 million	Ministry of Fisheries and Marine Resources, Republic of Namibia
	Offshore Platform (North Sea Drilling & Production platform, Quarters & Utilities platform)	1 unit each	USD 600 million	BP (British Petroleum), U.K
	Deepwater drillship	2 vessel (including 2 optional vessels)	KRW 1 trillion 200 billion	Aker Drilling, Norway
	Drillship	2 vessels	USD 1.1 billion	Ship owner, U.S.A
	Platform Supply Vessel	1 vessel	-	Norsea Group AS, Norway
April	Platform Supply Vessel	1 vessel	-	-
	Drillship	1 (including 1 optional vessel)	-	Fred Olsen Energy, Norway
	Drillship	2 vessels	USD 1.12 billion	Maersk, Denmark
	Drillship	1 vessel	USD 680 million	Ocean Rig, Greece
May	Shuttle Tanker	2 (including 2 optional vessels)	USD 200 million	European Navigation, Greece
	Drillship	2 (including 1 optional vessel)	USD 1.12 billion	Rowan, U.S.A
	Deepwater drillship	1 (including 1 optional vessel)	-	Vantage Drilling, U.S.A
	Offshore Platform (Top side of offshore platform)	-	USD 414 million	Statoil, Norway
	FPSO	1 vessel	USD 636 million	Teekay Petrojarl, Norway
	Platform Supply Vessel	2 vessels	Around KRW 120 billion	Farstad Shipping, Norway
	FSO	1 unit	-	PTSC, Vietnam
June	LNG-FPSO	1 unit	USD 3.026 billion	Royal Dutch Shell, U.S.A
	Platform Supply Vessel	2 vessels	Around KRW 150 billion	Island Offshore, Norway
	LNG-FSRU	2 units (including 2 optional vessels)	USD 500 million	Høegh LNG, Norway
	Multifunctional Deep Water Anchor Handling, Offshore Service Vessels	2 vessels	KRW 240 billion	Farstad Shipping, Norway
July	Drillship	1 vessel	USD 680 million	Ocean Rig, Greece
	Drillship	2 vessels	USD 1.1225 billion	Maersk, Denmark
August	LNG-FSRU (Floating Storage and Regasification Unit)	1 vessel	USD 280 million	Excelerate Energy, U.S.A
September	Semi-submersible Rig	2 units	USD 1.1 billion	Songa Offshore, Norway
	Well Intervention Vessel	2 vessels	USD 420 million	Eide Marine Services AS, Norway
	Drillship	1 unit (optional vessel awarded on January 19)	Approximately KRW 600 billion	Noble Drilling, U.S.A
October	Fixed Offshore Platform	-	USD 1.4 billion	Chevron, U.S.A
	Drillship	1 unit	Approximately USD 550 million	Offshore drilling company, Americas
	Platform Supply Vessel	1 unit	-	Troms Offshore Supply AS, Norway
	Offshore Plant Module	2 units	-	-
	Platform Supply Vessel	4 units	KRW 2 trillion	Island Offshore, Norway

*Note : Based on the press release and public announcements of each shipyards, internal estimation of Monthly KORSHIP (estimation until November 15, 2011)

Delivery	Shipyard
Mid 2013	Hyundai Heavy Industries
Late 2013	Hyundai Heavy Industries
On a staggered basis until late September 2013	Hyundai Heavy Industries
Second half of 2013	Daewoo Shipbuilding & Marine Engineering
October, 2012	Hyundai Heavy Industries
Early 2015	Hyundai Heavy Industries
2012	STX OSV
Early 2012	STX Finland
Late 2014	Hyundai Heavy Industries
Second half of 2013	Daewoo Shipbuilding & Marine Engineering
-	Samsung Heavy Industries
Jun-12	STX OSV
2012	STX OSV
Aug-13	Hyundai Heavy Industries
-	Samsung Heavy Industries
Oct-13	Samsung Heavy Industries
2013	STX Offshore & Shipbuilding
Second half of 2013	Hyundai Heavy Industries
Late May, 2013	Daewoo Shipbuilding & Marine Engineering
-	Samsung Heavy Industries
Mid 2013	Samsung Heavy Industries
First half of 2013	STX OSV
Early 2013	Sungdong Shipbuilding & Marine Engineering
2016	Samsung Heavy Industries
First quarter, third quarter of 2013	STX OSV
Second half of 2013, first half of 2014	Hyundai Heavy Industries
From the second quarter of 2013	STX OSV
Nov-13	Samsung Heavy Industries
Jul-14	Samsung Heavy Industries
First quarter of 2014	Daewoo Shipbuilding & Marine Engineering
Second half of 2014	Daewoo Shipbuilding & Marine Engineering
2013	STX Finland
Second half of 2014	Hyundai Heavy Industries
Second half of 2014	Daewoo Shipbuilding & Marine Engineering
	Daewoo Shipbuilding & Marine Engineering
First half of 2013	STX OSV
First half of 2012	STX Finland
Consecutively from the 3rd quarter of 2013 to the 1st quarter of 2014	STX OSV

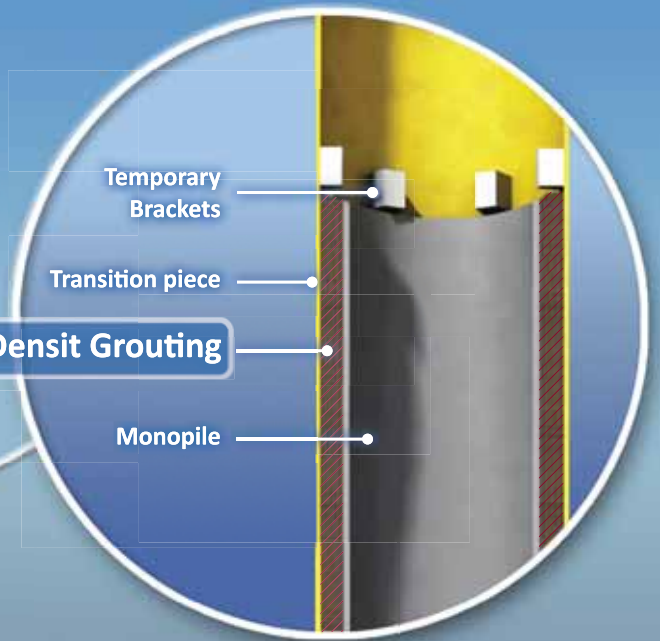




Your Dependable Class Partner Anytime, Anywhere

As a member of International Association of Classification Societies (IACS), KOREAN REGISTER (KR) has been providing top quality classification services for ships and offshore installations. With exclusive survey offices at major ports around the world, KR endeavors to safeguard life, property and the environment.





APPLICATION STRENGTH IN NUMBERS

Densit is the leading provider of Engineered UHPC (Ultra High Performance Concrete) solutions as chosen by the worldwide Offshore Wind and Upstream Oil & Gas Industries



DURABLE APPROVED PERFORMANCE

Polyspec is a leading brand of polymer coatings, linings, flooring and sealants for construction and corrosion protection in industrial, institutional, commercial and marine markets.



IMO-SOLAS Certifications mean safety is a top priority

Certified, safe, and easy to maintain

Multi-functional products to meet all your flooring needs

Durable, long lasting, tough protection indoors or out



ITW PP & F Korea Limited
Tel. +82-2-513-3560 www.itwppfkorea.com



Ships christened and delivered throughout 2011

Major domestic shipyards, such as Hyundai Heavy Industries (HHI), Daewoo Shipbuilding & Marine Engineering (DSME), and Samsung Heavy Industries (SHI), etc, successfully built and delivered containerships, oil tankers, bulk carriers, etc, and offshore plants in 2011. The following is a summary of the ships christened and delivered by major domestic shipyards to ship owners throughout 2011. ⚓

■ Hyundai Heavy Industries (HHI)



HHI reached the milestone of 1,700 vessels for the first time around the globe with the delivery of 'Morning Lily', an 8,100 unit Pure Car Truck Carrier (PCTC), to Eukor Car Carriers on January 30.



Very large crude carrier (VLCC) fitted with the ballast water treatment system for the first time worldwide, which was delivered to Oman-based OSC on January 10



'Incheon', the next-generation 2,300-ton Guided-Missile Frigate (FFG), and the launching ceremony held on April 29



The launching ceremony on July 7 for a 30,000-ton offshore gas pressurization and refining platform for the Thailand-based PTTEP's Bongkot gas project



Naming ceremonies held simultaneously by Hyundai Heavy Industries and Hyundai Samho Heavy Industries on August 11, which were telecasted live via satellite for the first time worldwide

■ Daewoo Shipbuilding & Marine Engineering (DSME)



'Pazflor', the world's largest FPSO delivered to French Total on January 12



Naming ceremony on November 4 for 2 drillships ordered from Brazil's Odebrecht. The vessels were named 'ODN-1' and 'ODN-2', respectively.



■ Samsung Heavy Industries (SHI)



'Ocean Rig Corcovado', a drillship delivered to Greece-based Cardiff Marine on January 3



Naming ceremony on April 8 for 'MSC Fillippa', a 12,600TEU containership. Interestingly, a female employee in charge of quality inspection was the sponsor for this vessel. The ship owner is German-based Peter Doehle.

■ Sungdong Shipbuilding & Marine Engineering (SSME)



1 2

Naming ceremony on September 30 for 3 carriers delivered by SSME in a row,

1. 'Bergen Trader', an 82,000-ton cargo carrier delivered to Japan-based Nisshin Shipping
2. 'Taurus', a Cape-size bulk carrier delivered to Greece-based Enterprises



SSME held naming ceremonies for 3 days from October 25 for 'Marvellous', a 180,000-ton cargo carrier for Hong Kong-based Teh-Hu, 'Smart Lady', a 115,000-ton crude carrier for U.K.-based Blenheim, and 2 units of 75,000-ton product carriers for Greece-based Navios, which were christened 'Nave Andromeda' and 'Nave Estella', respectively. Related officials are posing for photo during the naming ceremony.

■ Hanjin Heavy Industries & Construction (HHIC)



Naming ceremony on January 4 for 'Christina Bulker', an 180,000-ton bulk carrier ordered by Denmark-based Lauritzen





■ Hyundai Mipo Dockyard (HMD)



Hand-over ceremony for 'Caletta', a 52,000-ton Product Carrier (PC) delivered to Italy-based Dalmare

'Iver Balance', a 6,500-ton asphalt carrier built for the first time by HMD, which was delivered to Netherlands-based Vroon on February 21



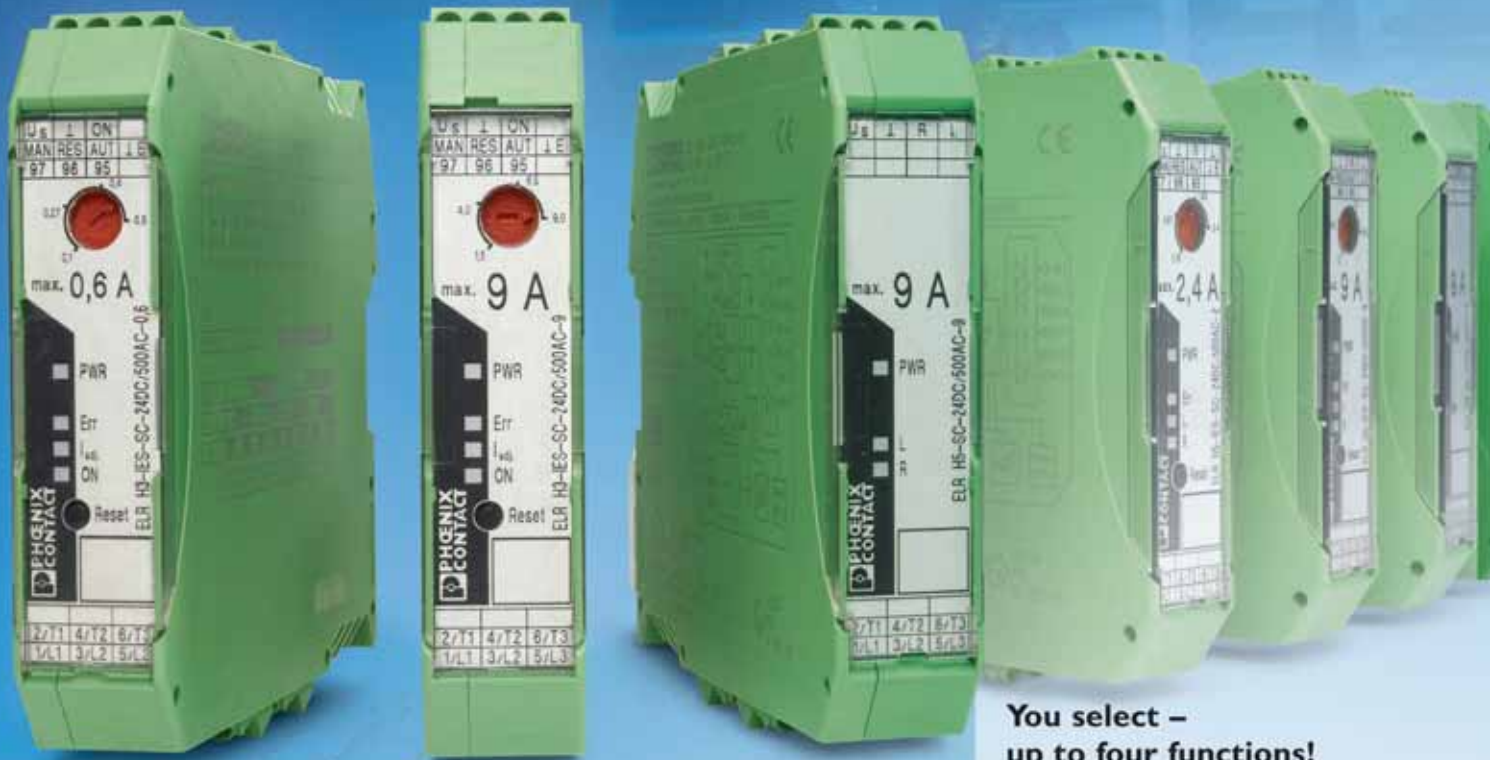
■ STX Offshore & Shipbuilding (STXOS)



STXOS held a hand-over ceremony for its first drillship at STX Dalian Shipbuilding Complex in China on May 18. The vessel, christened 'Noble Globe Trotter', was delivered to Noble Drilling Holdings.

CONTACTRON

hybrid motor starter



**Motor starter plus additional functions.
Simply select:**



Forward running



Reverse running



Motor protection



Emergency stop



**You select –
up to four functions!**

CONTACTRON Hybrid motor starters are durable, compact and can be quickly wired – thanks to hybrid technology. They offer up to four functions for your motor in only one device: Forward running, reverse running, motor protection and emergency stop. You can simply select any of four functions from the simple "1 in 1" direct starter up to "4 in 1" reversing starters with motor protection and emergency stop – CONTACTRON switches motors of up to 4 kW quickly and reliably.

For additional information call
TEL. 031-740-9900
www.phoenixcontact.co.kr

Energy chain for moving cables

igus Korea

igus is specialist for e-chain (energy chain) which products and guides dynamic moving cables. igus that is located in Cologne, Germany is one of global companies in components industry, which has more than 28 branches in the world. igus Korea is one of them as sales main office for Korean customers. Now igus introduces 2 kinds of most representative successful e-chain by innovative own design.

Breakthrough in “green” automation

Energy chain expert igus, Cologne, has developed a fast, quiet solution to supply power, data and media for energy-efficient handling and bearing processes. With travel distances from 40 to 50m, the costs for power and operation are significantly reduced when automated processes are interlinked.

Processing lines, such as in the woodworking industry are a good example: if heavy manufacturing parts are loaded and unloaded over long distances, this must be done quickly, quietly and with minimal use of power. The same applies to bearing technology, for example with storage and retrieval systems, and for

gantry robots. This is what is known as “green automation”.

What does this have to do with energy chain systems, cables and hoses? Are there any machine modules whose energy-efficient design promises more significant power savings? First of all the answer is yes says igus. And secondly, as highly dynamic moving machine parts, energy chains are among those engineering items which “must be taken into account, because they can make a very substantial contribution to reducing the power consumption of the drives”. After all, the drives have increased loadson them in order to move the energy chains, and so are therefore essential for operational safety. This transport energy cost could be reduced significantly, since there is still “a lot of untapped savings potential”, says igus Managing Director Frank Blase.

That is exactly what igus has been doing recently with its P4 profile roller energy chain system for green automation. The first innovation will be seen at the EMO and probably also at Motek.

The P4 system, originally developed for high-speed container cranes (and already in operation

with these worldwide for three years), basically makes 800m of travel possible at a speed of 10m/s and more, with high load weights up to 10kg/m. The P4 energy chain kit now also comes in smaller sizes - notably the P4.32 and P4.42 - for green han-



The abrasion-resistant and quiet P4 profile roller energy chain from igus, Cologne, requires 57% less drive power for handling and bearing processes at 3m/s and faster.



The almost one hundred per cent airtight energy tube RX from igus, which can be opened quickly in the outer radius.

dling processes. These rolling solutions are superior to purely gliding energy chains for this purpose, says Andreas Hermey, development director at igus, "At 3m/s, especially at 3.5m/s and more, users have big advantages". Because if they switch to automated processes for roller chains, the rolling friction will be 75% less compared to gliding friction, and this means up to 57% less driving power is required (taking into account not only friction, but also inertia and chain weight). Secondly many handling processes can now be much faster in velocity and acceleration, without increasing the noise level. The P4 profile roller energy chain is particularly abrasion-resistant and quiet. The upper run rolls pass through the rollers of the lower run - they are offset from one another - which will

increase the life of the plastic chain even more. The pitch length of the chain links with and without rollers is the same, so that the energy chain achieves quiet and low vibration operation. The tribologically optimised plastic profile rollers are securely integrated into the side panels.

Airtight and hinged

The innovative plastic energy tube RX from igus, Cologne, is almost one hundred per cent airtight (2.7 g chips after 251,900 cycles). The manufacturer has also carried out extreme tests under water to comply with the absolute airtight requirement (IP40, TÜV Saarland). The rounded design without undercut or edges and the smoothly curved outer contour allows chips - from coarse to tiny particles - to simply slide off. In addition, the connection elements and fittings are concealed, so that chips cannot be caught on these either. The energy tube is easy to open and can quickly be swung open in the outer radius.

Alongside the three design sizes with an inner height of 52, 62 or 73mm, there is now a - new - design size available with a maximum inner height of only 42mm. The new size is available with the option of a high-temperature variant, resistant to hot chips up to 850°C, and as a variant with reverse bending radius (RBR). Dust, dirt, oil, aggressive environment conditions, humidity and heat have no affect whatsoever on the sturdy energy chains.

-TEL: +82-32-821-2911
-http://www.igus.kr

HSHI entered into an agreement with local universities to support research projects

HSHI signed a contract at Hotel Hyundai on October 24 with 3 local companies to support research projects.

The signing ceremony was attended by Kim Seong-mo, Vice-President of HSHI, and other related officials of HSHI, professors of Mokpo National University, Chonnam National University, and Chosun University who will lead the researches, head of the University-Industry Collaboration Group.

HSHI plans to provide support for 4 research projects selected from those submitted from each local universities. The universities will carry out the researches for 6 to 12 months, which include the development and analysis of various contents and equipments, forecast projects, etc.

An official from HSHI said, "This agreement is vital for the local universities to expand their research capabilities, Hopefully, this collaboration between the industry and universities will play a key part in promoting regional development."

Desiccant dehumidifier

Munters Korea



MX7600

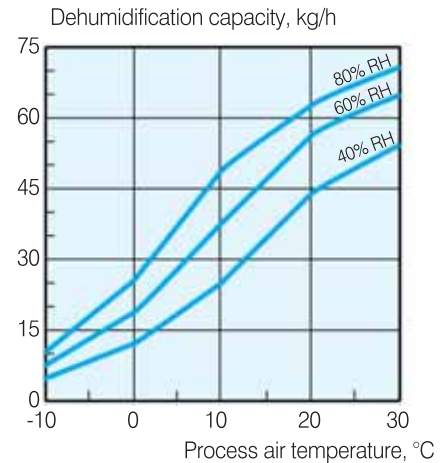
The MX7600 desiccant dehumidifier is designed to efficiently dehumidify in low moisture applications. Its airtight construction delivers accurate conditions and optional features provide versatility to adapt the system for specific applications. Its rugged formed metal frame and access panels are produced from corrosion resistant Aluzink. Standard equipment includes either a base control package or an optional microprocessor-based controller.

The electrical control system conforms to EN 60204 (IEC204) standards. The electrical components are mounted on busbars and are constructed of halogen-free plastic. The electrical system is designed for up to 690V and 60°C.

MX Series dehumidifiers conform to both harmonised European Standards and to CE marking specifications.

MX7600 has the following features:

- Dehumidifies efficient down to -20°C
- High capacity with very low dewpoints
- Reactivation heater choice - electrical, steam or gas
- Microprocessor based control or base control choice
- Compact design - requires minimal floor area



Dehumidification capacity: Approximate capacity in kg/h at different inlet process air relative humidity, % RH.

Munters rotor technology

The desiccant rotor is manufactured from a corrugated composite material that is highly effective at attracting and holding water vapour. Every Munters dehumidifier applies a unique rotor technology. Airflows, air conditions, rotor sections, and rotor rotation speeds are optimised for specific applications. An innovative control system maximises the units energy efficiency.

A characteristic of the MX Series rotor technology is the precision seals which divide the air distribution chamber. These provide a precise airflow balance for dehumidification and reactivation while allowing for alternative fan placement and rotor sectioning.

Additional sectors for low dewpoints and heat recovery are optional.

-TEL: +82-2-761-8701
-<http://munters.co.kr>



Kormarine
Official Magazine

Marine Tech Korea
Official Magazine

CIMPS
Media Partner

*Korea Monthly International
Shipbuilding Magazine*

KORSHIP

Tel: +82-2-2168-8898 Fax: +82-2-2168-8895

www.korship.co.kr

KOMEA (Korea Marine Equipment Association)

Member List

AMS CO., LTD.

head office : SAHA-GU, BUSAN
 homepage add : www.albatros.co.kr
 main products : universal machine
 TEL : +82 51-293-8641

BUMHAN INDUSTRIES CO., LTD.

head office : Changwon Gyeongnam
 homepage add : www.bumhan.com
 main products : air compressor, high pressure air compressor,
 high pressure air dryer & reducing stations
 TEL : +82 55-251-6070

BOYANG HARDWARE CO., LTD.

head office : Gimhae Gyeongnam
 homepage add : www.byhd.co.kr
 main products : stairway body, ladder, handrail & stormrail, other
 outfittings, sanitary & furniture hardware
 TEL : +82 55-345-1951/3

BY CONTROLS INC.

head office : Gimhae Gyeongnam
 homepage add : www.bycontrols.com
 main products : control valves, hydraulic & pneumatic actuator,
 valve remote control sys
 TEL : +82 55-345-6110

BC TAECHANG IND. CORP.

head office :
 homepage add : www.bcinternational.co.kr
 main products : water jet power pump, marine tape, petro tape,
 corrosshield bt
 TEL : +82 55-333-1985

CHK CO., LTD.

head office : Gangseo Busan
 homepage add : www.chkj.co.kr
 main products : fire damper, junction box, steel furniture, pilot
 chair, cable box
 TEL : +82 51-831-9500

CMR KOREA CO., LTD.

head office : Geumjeong Busan
 homepage add : www.cmrkorea.com
 main products : Marine Telephone, Marine CCTV, Anemometer,
 TEL : +82 51-521-2883

CAPE INDUSTRIES LTD.

head office : Yangsan Gyeongnam
 homepage add : www.capeind.com
 main products : cylinder liner-man b&w, sulzer(wartsila)
 TEL : +82 55-370-1234

Emerson Process Management Marine Solutions Korea Co., Ltd.

head office : Saha-Gu, Busan
 homepage add : www.emersonprocess.com/marine
 main products : Valve Remote Control Systems, Tank Level
 Gauge Systems, Marine Tank Management Systems
 TEL : +82 51-602-5555

DAEYANG INSTRUMENT CO., LTD.

head office : Saha-Gu, Busan
 homepage add : www.daeayang.co.kr
 main products : precision instrument-anemometer rudder angle
 indicator, engine monitoring system, temperature sensor
 TEL : +82 51-200-5303

DAE JIN IND. CO., LTD.

head office : Gangseo Busan
 homepage add : www.daejinqc.co.kr
 main products : aluminium/steel/wooden furniture, catering
 furniture, fire & gas damper a60
 TEL : +82 51-831-4551

DAE JIN DAMPHA CO., LTD.

head office : Ulju Ulsan.
 homepage add :

main products : ceiling panel, wall panel
 TEL : +82 52-225-2361

DAECHUN INDUSTRIAL CO., LTD.

head office : Gimhae Gyeongnam
 homepage add : www.daechun.co.kr
 main products : multi core tube, stainless steel tube
 TEL : +82 55-345-2288

DAIHAN ANCHOR CHAIN MFG. CO., LTD.

head office : Nam-Gu Incheon
 homepage add : www.dhac.co.kr
 main products : anchor chain grade 2, anchor chain grade 3,
 mooring chain r3, (stud & studless)
 TEL : +82 32-862-0091/4

DONG KANG M-TECH CO., LTD.

head office : Kangnam-Gu, Seoul
 homepage add : www.dkmtech.com
 main products : water jet,(hj212, hj292, hj322, hm461, hm817),
 night navigator(nn-9000, nn-3000)
 TEL : +82 2-553-0181

DONG WOO MACHINERY & ENGINEERING CO., LTD.

head office : Changwon Gyeongnam
 homepage add : www.hanyang-p.co.kr
 main products : provision crane, hose handling crane, cargo m/r
 room, center frame
 TEL : +82 55-295-3261

DONG-I INDUSTRIAL CO., LTD.

head office : Chin-ju Gyeongnam
 homepage add : www.e-dongi.com
 main products : marine gear box, hyd. steering system, power
 take off
 TEL : +82 55-755-9928

DONGHWA ENTEC

head office : Gangseo Busan
 homepage add : www.dh.co.kr
 main products : e/r heater & cooler, plate cooler, frash water
 generator, charged air cooler, lng cargo handling system,
 TEL : +82 51-970-1000

DOOSAN ENGINE CO., LTD.

head office : Changwon Gyeongnam
 homepage add : www.doosanengine.com
 main products : marine diesel engine, diesel power plant
 TEL : +82 55-260-6000

DONGNAM MARINE CRANE CO., LTD.

head office : Gimhae Gyeongnam
 homepage add : www.dmcrcrane.co.kr
 main products : hose handling crane, hose handling crane,
 provision crane, engine room crane, offshore crane
 TEL : +82 55-720-3001

DAEMMSTOFF INDUSTRIE KOREA LTD.

head office : Saha-Gu, Busan
 homepage add : www.daemmstoff.com
 main products : KVM Sealing Compound, Mangana Retaining
 Compound, Durasin Chocking Compound, Panda-90
 TEL : +82 51-261-7073

DAEYANG ELECTRIC CO., LTD.

head office :
 homepage add : www.daeayang.co.kr
 main products : lighting fixture, main switch board, fan, precision
 instrument,
 TEL : +82 51-200-5303

DAE HEUNG COOLER CO., LTD.

head office : Pocheon Giyeonggi
 homepage add : www.cooler.co.kr
 main products : heat exchanger, gas cooler, oil cooler, air cooler,
 water chiller
 TEL : +82 31-532-9667/9

DONG-A VALVE IND. CO.

head office :
 homepage add :
 main products : gate valves, globe valves, check valves(swing,
 dual, single), strainer(basket, y-type)
 TEL : +82 51-831-1500

DK TECH CORPORATION

head office :
 homepage add : www.dklok.com
 main products : Instrumentation Fitting & Valve-Compression
 Tubing Fitting, Pipe & Weld Fitting, Needle, Check, Ball, Plug
 TEL : +82 55-338-0032

DAE HEUNG MARINE CORP. LTD.

head office :
 homepage add :
 main products : rudder, block, bolster
 TEL : +82 55-346-3663

DONGJIN M.P. TECH CO., LTD.

head office :
 homepage add : www.epmp.net
 main products : parts for marine engine, shaft systems for ship,
 power generation facility, industrial machines
 TEL : +82 55-346-0303

DAECHANG METAL CO., LTD.

head office : Saha-Gu, Busan
 homepage add : www.dcm.co.kr
 main products : chain wheel, main bearing support, uec center
 piece, piston crown
 TEL : +82 51-264-0831/5

FINETEC CENTURY CORPORATION

head office : Kangnam-Gu, Seoul
 homepage add : www.century.co.kr
 main products : Air Conditioner, Chilling Unit, Air Conditioning
 Equipment
 TEL : +82 2-2185-7000

GENERAL MARINE BUSINESS INC.

head office :
 homepage add : www.gmbmarine.com
 main products : ship shore communication sys. emergency
 shutdown sys. trim/list indicator
 TEL : +82 52-254-5215

G.S HIGH TECHER CO., LTD.

head office : Gangseo-Gu, Busan
 homepage add : gshightecher.koreasme.com
 main products : Air vent heads, Auto air vent heads, Pipe
 coupling, Expansion joint
 TEL : +82 51-832-0456

GS-HYDRO KOREA LTD.

head office : Gangseo-Gu, Busan
 homepage add : www.gshydro.com
 main products : Hydraulic Pipe, High Pressure Pipe, Steering
 Gear Hydr. Pipe
 TEL : +82 51-266-8221/5

HY-LOK CORPORATION

head office :
 homepage add : www.hy-lok.com
 main products : HY-Lok Tube Fittings, Bite Type (DIN 2353, JIS
 b2351) Fittings, 37/Flared Type(SAE J514) Fittings
 TEL : +82 51-9700-800

HANKUK MIBOO CO., LTD.

head office :
 homepage add : www.hankookmiboo.co.kr
 main products : Spiral Duct, Cold Chamber, Deck Covering
 TEL : +82 51-263-3621

HI AIR KOREA Co., Ltd.

head office :
 homepage add : www.hiarkorea.co.kr

main products : Air Conditioning System, Refrigeration Plant, Package A/C, Ventilation Fan
TEL : +82 55-340-5000

HAN KOOK FLEXIBLE CO.

head office :
homepage add : www.hkflex.com
main products : Flexible, Expansion Joint, Rubber Compensator
TEL : +82 51-508-6291/3

HANLA LEVEL CO., LTD.

head office :
homepage add : www.hanlalevel.co.kr
main products : Cargo Tank Monitoring Sys. Tank Remote Sounding Sys. High Level Alarm Sys.
TEL : +82 51-605-3000

HALLA INDUSTRIAL CO., LTD.

head office :
homepage add : www.hallaiq.co.kr
main products : Refrigeration Pumps (NH₃ , R22, NHO₂ , CO₂), Volute Pumps, Turbine Pumps
TEL : +82 51-264-2201/5

HANSHIN ELECTRONICS CO., LTD.

head office :
homepage add : www.ehanshin.com
main products : Public Address System (hpa-9600, hpa-9200, hpa-7300), Marine Telephone
TEL : +82 51-412-5551

HAN JO CO., LTD.

head office : Yeongdo Busan
homepage add : www.hanjom.com.kr
main products : expansion joint. Fuel Injection Pipe. Air Filter
TEL : +82 51-414-7201

HAEAN MACHINERY IND. CO., LTD.

head office :
homepage add : www.haeon21.com
main products : Marine Crane, Deck Machinery(Outfitting). Special Equipment
TEL : +82 55-345-2024

HYUNDAI LIFEBOATS CO., LTD.

head office :
homepage add : www.hdboat.com
main products : Life Boat & Rescue Boat
TEL : +82 52-237-4850/4

HYUNDAI MARINE MACHINERY CO., LTD.

head office :
homepage add : www.hmmco.co.kr
main products : Hyundai-Atlas Incinerator. Hyundai-Jowa 15ppm Bilge Separator, Auxiliary Blower, Ventilation Fan
TEL : +82 32-583-0671

HYUNDAI ELEVATOR CO., LTD.

head office :
homepage add : www.hyundaielevator.co.kr
main products : Elevator, Escalator, Auto. Parking System
TEL : +82 31-644-5114

HYUNDAI WELDING CO., LTD.

head office :
homepage add : www.hdweld.co.kr
main products : Covered Electrode ARC Welding Consumables, Sub-Merged ARC Welding Flux & Wire
TEL : +82 2-6230-6010/2

HYUN DAE FITTING CO., LTD.

head office :
homepage add : www.hdfco.co.kr
main products : Flange, Stainless Steel, Duplex Stainless Steel, Forged Carbon Steel
TEL : +82 51-831-0891

HYUN JIN CO., LTD.

head office :
homepage add : www.hyunjinn.co.kr
main products : Control Colsole, Light Signal, Column, Control Panel
TEL : +82 51-263-9841

HYUNJIN MATERIALS CO., LTD.

head office : Gangseo Busan
homepage add : www.hjmco.co.kr
main products : Marine Engine Uses-Camshaft & C/Flange, Connecting Rod, Cross Head
TEL : +82 51-602-7700

HOSEUNG ENTERPRISE CO., LTD.

head office : Gangseo Busan
homepage add : hoseung.koreasme.com
main products : Package Unit for Engine Room, Portable Tank, Ventilator, Cable Box
TEL : +82 51-831-2233/4

HOCHANG MACHINERY INDUSTRIES CO., LTD.

head office :
homepage add : www.hoc21.com
main products : Deck Machinery, Hose Handling Crane, Provision Crane, Cell Guide
TEL : +82 52-255-2000

HAE WON INDUSTRY CO.

head office :
homepage add : haiwon1.koreasme.com
main products : marine diesel engine parts(water seal, inflatable ring, mating ring, compact seal, cr-liner)
TEL : +82 51-831-4600

HODU INDUSTRIAL CO.

head office :
homepage add :
main products : ups & rectifier sys. hull stress monitoring sys. waste compactor
TEL : +82 51-291-9512

I.M.E. CORPORATION

head office :
homepage add : www.promarine21.com
main products : engine valve & seat, all type engine
TEL : +82 55-346-1127

IL SEUNG CO., LTD.

head office : Gimhae Gyeongnam
homepage add : www.ilseung.co.kr
main products : Sewage treatment plant. Biological type, Frash water generator. Plate. tubular type,
TEL : +82 55-345-4114

IL-SUNG IND. CO.

head office :
homepage add :
main products : Hot water calorifier, Silencer(for m/e, g/e, fan), Mist eliminator, Washable air filter
TEL : +82 51-312-4056

JUNG GONG IND. CO., LTD.

head office :
homepage add : www.jung-gong.com
main products : Ordinary window & side scuttle, Heated window, Fire resistant window & side scuttle, Window for passenger ship, Window box, Roller blind
TEL : +82 51-261-2911

JUNG-A MARINE CO., LTD.

head office :
homepage add : www.jung-a.co.kr
main products : Accommodation ladder, Wharf ladder, Window wiper
TEL : +82 51-831-4147

DONGHWA PNEUMATIC TECHNOLOGY CO., LTD.

head office :
homepage add : www.jptec.co.kr
main products : marine reciprocating air compressor, industrial air compressor, screw type air compressor
TEL : +82 51-831-3227

JUNGSAN ENTERPRISE CO., LTD.

head office :
homepage add : www.jungsan.com
main products : Bolt & Nut (Exhaust valve, Cylinder cover, Connecting-rod, Main bearing & etc.)
TEL : +82 52-254-3290

JHK INC.

head office : Gimhae Gyeongnam
homepage add :
main products : Container Fixed Fitting, Car Lashing Equipment
TEL : +82 55-346-2225

JONGHAP MACHINERY CO., LTD.

head office : Yangsan Gyeongnam
homepage add : www.jonghap.biz
main products : sewage treatment plant, welding positioning equipment sys. parts former
TEL : +82 55-383-2300

JS CABLE LTD.

head office : Cheonan Chungnam
homepage add : www.js-cable.co.kr
main products : offshore & marine cable, power cable, speciality cable, nuclear cable
TEL : +82 41-559-4800

KANGRIM HEAVY INDUSTRIES CO., LTD.

head office : Changwon Gyeongnam
homepage add : www.kangrim.com
main products : boilers, marine & industrial, inert gas system(i.g.s.), i.g.g. & n:generator
TEL : +82 55-269-7701

KANGRIM INSULATION CO., LTD.

head office : Saha-Gu, Busan
homepage add : www.kangrim.com
main products : lng & lpg carriers tank & pipe cryogenic insulation, lng receiving terminal tank & pipe cryogenic insulation
TEL : +82 51-220-6001

KUNSUL CHEMICAL IND. CO., LTD.

head office : Jin-Gu Busan
homepage add : www.jebi.co.kr
main products : marine & heavy duty, protective coatings
TEL : +82 51-892-4221/7

KYUNG EUN CERAMICS CO., LTD.

head office : Gimhae Gyeongnam
homepage add : www.ke-ceramics.com
main products : ceramic back-up tape
TEL : +82 55-345-7761

KUKDONG ELECTRIC WIRE CO., LTD.

head office : Jincheon Chungbuk
homepage add : www.cablekukdong.co.kr
main products : shipboard cable, lan utp cable, power cable, rubber cable, pvc cable
TEL : +82 43-530-2000/1, +82 2-2140-3061

KUMKANG PRECISION CO., LTD.

head office : Saha-Gu, Busan
homepage add : www.kkmarine.co.kr
main products : marine valve, valve for engine, air reservoir tank
TEL : +82 51-262-4890

KUMOH MACH. & ELEC. CO., LTD.

head office : Gijang Busan
homepage add : www.komeco.net
main products : eng. & t/c tacho system, vibration measuring system, d/g engine control panel
TEL : +82 51-724-5070

KEYSUNG METAL CO., LTD.

head office :
homepage add : www.keysungmetal.com
main products : valves for marine & offshore plant, cryogenic valves, strainer
TEL : +82 51-831-3391

K. C. LTD.

head office :
homepage add : www.iccp-mgps.com
main products : I.C.C.P. System, Anti-fouling System(M.G.P.S.), Shaft Earthing Device
TEL : +82 51-831-7720

KSP CO., LTD.

head office :
homepage add : www.kspvalve.com
main products : Engine Valve, Flange
TEL : +82 51-831-6270/7

KTE CO., LTD.

head office :
 homepage add : www.kte.co.kr
 main products : Marine Switchboard(high, low), Marine Control Console, Alarm Monitoring System, Thruster
 TEL : +82 51-265-0255

KOKACO CO., LTD.

head office :
 homepage add :
 main products : Exhaust Valve & Valve Seat Grinding Machine, Nozzle Lapping Machine
 TEL : +82 51-403-4114/6

KONGSBERG MARITIME KOREA LTD.

head office :
 homepage add : www.km.kongsberg.com
 main products : IAS, DP, K-Chief 500, Auto Chief c20, K-Gauge, K-Bridge, MIP, MBB
 TEL : +82 51-749-8600

KEYSTONE VALVE(KOREA) LTD.

head office : Anseong Gyeonggi
 homepage add : www.tycovalves.com
 main products : Butterfly Valve, Ball Valve, Safe Valve
 TEL : +82 31-670-2500

KEON CHANG IND. CO., LTD.

head office :
 homepage add : www.keonchang.co.kr
 main products : marine equipment, ladle turret, roll stand assy, side trimmer & chopper, bloom c c, screw conveyor, etc.
 TEL : +82 51-203-0161

KWANG SAN CO., LTD.

head office :
 homepage add : www.kwangsan.com
 main products : heating coil, sus spool, air vent head, expansion joint
 TEL : +82 51-974-6301

KEUMYONG MACHINERY CO., LTD.

head office : Buk-gu, Daegu
 homepage add : www.keumyong.com
 main products : exhaust valve complete with valve spindle, axial vibration damper
 TEL : +82 53-608-8110/6

KWANG SUNG CO., LTD.

head office :
 homepage add : ikwangsung.com
 main products : t-girder, panel, stair, handrail, inclined ladder,
 TEL : +82 55-338-9973

KUK DONG ELECOM CO., LTD.

head office : Saha-Gu, Busan
 homepage add : www.kukdongelecom.com
 main products : marine & offshore light fixtures, explosion-proof lights, flood & search lights, mgf packing system
 TEL : +82 51-266-0050

KYUNGSUNG INDUSTRY CO., LTD.

head office : Gangseo Busan
 homepage add : www.e-clamp.com
 main products : clamp, sus corner, anchor strip
 TEL : +82 51-831-4960

LS CABLE LTD.

head office :
 homepage add : www.lscable.co.kr
 main products : marine shipboard & offshore cable, bare conductor wire, (pvc/pe/xlpe/rubber) power & control cable
 TEL : +82 2-2189-9114

LEE YOUNG INDUSTRIAL MACHINERY CO., LTD.

head office : Ulju Ulsan
 homepage add : www.leeyoung.co.kr
 main products : engine casing, corr. bhd, upper deck, built-up longitudinal, chain locker, lashing bridge
 TEL : +82 52-231-5800

MIN SUNG CO., LTD.

head office : Sasang Busan

homepage add : www.minth.co.kr
 main products : cable tray, hatch, electric cable box
 TEL : +82 51-305-8862

Mt.H CONTROL VALVES CO., LTD.

head office :
 homepage add : www.mth.co.kr
 main products : crankcase relief valve, main starting valve, pneumatic control valve, safety relief valve
 TEL : +82 51-974-8800

MSL COMPRESSOR CO., LTD.

head office : Pocheon Giyeonggi
 homepage add : www.mslcomp.com
 main products : breathing air compressor, h.p air compressor, n2 gas booster
 TEL : +82 31-853-7000

MYCOM KOREA CO., LTD.

head office :
 homepage add : www.mycomkorea.com
 main products : screw compressor unit, reciprocating compressor unit, condensing unit, brine chilling unit
 TEL : +82 55-294-8678

MYCOM KOREA CO., LTD.

head office :
 homepage add : www.mycomkorea.com
 main products : screw compressor unit, reciprocating compressor unit, condensing unit, brine chilling unit
 TEL : +82 55-294-8678

Myung Sung Engineering Co., Ltd.

head office : Mokpo Jeonnam
 homepage add :
 main products : rudder & rudder stock, rudder horn, stern roller
 TEL : +82 61-276-7650

Marine Radio Co., Ltd.

head office :
 homepage add : www.mrckorea.com
 main products : public address system, auto tel. exchanger sys. communal aerial sys. marine clock system
 TEL : +82 51-414-7891

NK CO., LTD.

head office :
 homepage add : www.nkcf.com
 main products : ballast water system, co2system, deck foam system, dry power system
 TEL : +82 51-204-2211/3

ORIENTAL PRECISION & ENGINEERING CO., LTD.

head office :
 homepage add : www.opco.co.kr
 main products : deck house, funnel & engine room casing, life boat davit, engine room crane
 TEL : +82 51-202-0101

OSCG CO., LTD.

head office : Sasang Busan
 homepage add : www.oscg.net
 main products : cable gland(eexd & e), adapter / reducer, flexible connectors
 TEL : +82 51-305-3910

PANASIA CO., LTD.

head office : Gangseo Busan
 homepage add : www.pan-asia.co.kr
 main products : cargo monitoring sys. tank level gauge sys. high & overflow alarm sys.
 TEL : +82 51-831-1010

SARACOM CO., LTD.

head office : Yeongdo Busan
 homepage add : www.saracom.net
 main products : gmdss, ship sound signal appliances, navigation equipment, fire detection system
 TEL : +82 51-600-9000

SAMGONG Co., Ltd

head office :
 homepage add : www.sam-gong.co.kr
 main products : oil purifiers, ships accommodation ladders, ships

windows
 TEL : +82 51-200-3040/1

SAMYOUNG MACHINERY CO., LTD.

head office : Daedeok Daegeon
 homepage add : www.sym.co.kr
 main products : cylinder head, cylinder liner, piston
 TEL : +82 42-625-4064

SAMYUNG ENC CO., LTD.

head office :
 homepage add : www.samyungenc.com
 main products : ais(si-30)-auto. identification sys. dsc vhf radio telephone(str 6000a)-gmdss equipment
 TEL : +82 51-601-6601

SUH HAN INDUSTRY CO., LTD.

head office :
 homepage add : www.suhhani.co.kr
 main products : cable tray others-steel, galvanized steel, stainless steel, aluminium
 TEL : +82 51-204-1920

SEOHAE MARINE SYSTEM CO., LTD.

head office :
 homepage add : www.seohae-ms.com
 main products : hatch-pontoon type, folding type, side rolling type, etc. lashing equipment-2/3tier
 TEL : +82 51-204-8408

SUNBO INDUSTRIES CO., LTD.

head office :
 homepage add : www.sunboind.co.kr
 main products : tank top unit, engine room unit, package unit
 TEL : +82 51-261-3454

SUNG KWANG BEND CO., LTD.

head office :
 homepage add : www.skbend.com
 main products : pipe fittings-butt. welding / socket welding / thread type/ flange
 TEL : +82 51-3300-200

SUNG MI CO., LTD.

head office :
 homepage add : www.sung-mi.co.kr
 main products : fire retarding doors, fire retarding wall, ceiling panel
 TEL : +82 55-329-1117

SUNGSIN INDUSTRIES CO., LTD.

head office :
 homepage add : sunsin.koreasme.com
 main products : hatch coaming, t-bhk block, fore mast & port, water separator
 TEL : +82 54-776-6441

SUNG IL CO., LTD. (SIM)

head office :
 homepage add : www.sungilsim.com
 main products : pipe spool fabrication, induction pipe bending, marine engine pipe
 TEL : +82 51-831-8800

ESAB SeAH CORP

head office :
 homepage add : www.esab.co.kr
 main products : welding consumable, welding equipments
 TEL : +82 55-289-8111

SEUN ELECTRIC CO., LTD.

head office :
 homepage add : www.seunelectric.co.kr
 main products : battery charger and dist. board. full auto. charging sys. .lcd display monitor
 TEL : +82 51-208-4641

SE-WON INDUSTRIES CO., LTD.

head office :
 homepage add : www.sewon-ind.com
 main products : high velocity p/v valve, gas free vent cover, flame screen
 TEL : +82 51-728-4191

SAEJIN INTECH CO., LTD.

head office :

homepage add : www.sjhind.com
main products : emergency towing system, telescopic radar post,
deck fittings(mooring fitting), industrial m/c & etc.
TEL : +82 55-328-1770

SE JIN IND. CO., LTD.

head office : 61-68 Ungnam-dong, Changwon-si,
Gyeongsangnam-do.
homepage add : www.sejin89.co.kr
main products : piping, h.f.o supply unit, purifier module each kind
TEL : +82 55-239-4700

SPECS CORPORATION

head office :
homepage add : www.specs.co.kr
main products : system division-oil mist detector, portable level
temp/oil
TEL : +82 31-706-5211

SHIN DONG DIGITECH CO., LTD.

head office :
homepage add : www.shindong.com
main products : satellite tv sets-satellite communication
equipments, draft buoy(1m, 1.6m, 2.4m discus buoy)-ocean
information technology division
TEL : +82 51-467-5001

SIL LA METAL CO., LTD.

head office :
homepage add :
main products : propeller(f.p.p.), c.p. propeller blade & hub,
propeller shaft, inter shaft
TEL : +82 51-831-5991/8

SHINMYUNG TECH CO., LTD.

head office :
homepage add :
main products : air & electric winch-0.2ton ~ 10ton, air motor-1p ~
25p, davit (all)-0.2ton ~ 5ton
TEL : +82 55-363-7091

SHINSUNG DIESEL KIKI CO.

head office :
homepage add : nozzle.koreasme.org
main products : for marine engine-nozzle, plunger assy, delivery
valve assy
TEL : +82 51-264-8829, 262-8869

SHIN SHIN MACHINERY CO., LTD.

head office :
homepage add : www.sspump.com
main products : centrifugal pumps, gear pumps, screw pumps,
submersible pumps
TEL : +82 51-727-5300

SHINA METALTECH CO., LTD.

head office :
homepage add : www.shinametal.com
main products : white metal bearings-marine metal bearing,
automotive metals
TEL : +82 52-298-2100/4

SHIN YOUNG HEAVY INDUSTRIES CO.,LTD

head office :
homepage add : www.syhico.com
main products : oil & gas system, hydraulic system
TEL : +82 61-800-3700

S & W CORPORATION

head office :
homepage add :
main products : cam & camshaft, valve spindle & seat ring, piston
pin
TEL : +82 51-205-7411

S.A. MART CO., LTD.

head office :
homepage add : www.samartkr.com
main products : control lever, control cable, hydraulic steering
system, auto pilot system, stern drive system
TEL : +82 32-815-6314

STX ENGINE CO., LTD.

head office :
homepage add : www.stxengine.co.kr

main products : marine diesel engine, military diesel engine, gas
engine, gas turbine
TEL : +82 55-280-0114

SIMULATION TECH INC.

head office : Geumcheon Seoul
homepage add : www.simulationtech.co.kr
main products : Emergency Shutdown System, Grease
Extractor/de-Oiler, Operator Training Simulator
TEL : +82 2-3281-0960

SHINHAN MACHINERY CO., LTD.

head office :
homepage add : www.shinerpia.com
main products : deck house, engine casing & funnel, fore/after-
end block & others
rudder, living quarters
TEL : +82 52-231-3525

SAMGONG INDUSTRIAL CO., LTD.

head office : Pyonghaek Gyeonggi
homepage add : www.samgong.com
main products : inflatable rubber products
TEL : +82 31-654-4805/6

SIN YOUNG ENTERPRISE CO., LTD.

head office : Gimhae Gyeongnam
homepage add : www.sy-nd.com
main products : main hole, access hatch, bollad
TEL : +82 55-346-0034

SUNG JIN GEOTEC CO., LTD.

head office : Namgu Ulsan
homepage add : sgtkor.co.kr
main products : bulbous bow, stern block, hull block, module,
Ing/lpg tank
TEL : +82 52-228-5801

STACO CO., LTD.

head office : Gangseo Busan
homepage add : www.staco.co.kr
main products : Wall Panel, Ceiling Panel, Unit Toilet, Cabin Door,
Furniture,
TEL : +82 51-831-7000

STX ENPACO CO., LTD.

head office :
homepage add : www.stxenpaco.co.kr
main products : turbocharger, diesel engine parts, marine equip.
TEL : +82 55-282-1131

SEOUL ELECTRIC CABLE CO., LTD.

head office : Eun-seong Chungbuk
homepage add : www.seoulcable.com
main products : offshore & shipboard cables, travelling cables,
high voltage power cables
TEL : +82 43-879-7200

SMECO

head office :
homepage add :
main products : piston, piston liner, piston skirt
TEL : +82 41-864-3030

SURO PROPELLER & MACHINERY CO

head office : Yeongdo Busan
homepage add : www.suropump.co.kr
main products : Propeller(d : 2500mm), Shaft (l : 6m), Pump
TEL : +82 51-415-0444

SHIN-A ENTERPRISE CO., LTD.

head office : Saha Busan
homepage add : www.shina-ent.com
main products : navigation equipment, communication equipment,
monitoring system equipment
TEL : +82 51-204-6221/5

TK CORPORATION

head office :
homepage add : www.tkbend.co.kr
main products : Elbow, Reducer, Tee, Cap
TEL : +82 51-831-6550

TAE YOUNG TRADING LTD.

head office : Junggu Seoul

homepage add : www.marine-material.com
main products : Receptacles & Wire Accessories, Floodlight,
Deck Light, Reflected Lamps
TEL : +82 2-2272-1960

TANKTECH Co., Ltd.

head office :
homepage add : www.tanktech.co.kr
main products : High Velocity P/V Valve, Local Fire Fighting Sys.
Tank Cleaning Machine
TEL : +82 51-979-1600

TECHMARINE S/W CO., LTD.

head office :
homepage add : www.techmarine.net
main products : Loading Computer System
TEL : +82 51-467-7003

FRIEND CO., LTD.

head office : Gangseo Busan
homepage add : www.tsdream.co.kr
main products : cable tray, heating coil, strainer
TEL : +82 51-974-7900

TMC CO., LTD.

head office : Cheonan Chungnam
homepage add : www.tmc-cable.com
main products : marine cable, optical fiber cable
TEL : +82 2-771-3434

WARTSILA ACCOMMODATION SYSTEMS KOREA, INC.

head office : Goseong Gyeongnam
homepage add : www.waskorea.co.kr
main products : unit toilet, unit cabin, wall panel, ceiling panel,
door
TEL : +82 55-673-7315

WOOSUNG IND. CO., LTD.

head office :
homepage add :
main products : steel door, ventilator, mooring fitting, h/c fitting,
hand rail
TEL : +82 55-331-1651

WHA YOUNG CO., LTD.

head office : Miryang Gyeongnam
homepage add : www.whayoung.co.kr
main products : Supply Unit Assy, Collector Block Assy, Fuel &
Exh. Movement, Fuel Pump Assy
TEL : +82 55-359-1100

WILSON WALTON CORRPRO KOREA

head office :
homepage add : www.wvckorea.com
main products : i.c.c.p system, m.g.p.s, s.g.d
TEL : +82 51-831-0131

YOUNG KWANG MACHINE CO., LTD.

head office :
homepage add : www.ykme.co.kr
main products : package unit, group unit, module unit for industrial
plant
TEL : +82 54-776-5456/9

YOOWON INDUSTRIES LTD.

head office :
homepage add : www.yoowonind.com
main products : steering gear, auto filter, deck machinery
TEL : +82 51-205-8541

YOUJEON STEEL CO., LTD.

head office : Changwon Gyeongnam
homepage add : www.youjeonsteel.co.kr
main products : Marine Engine Parts-Engine Bed
TEL : +82 55-297-2121

DAEWOO SHIPBUILDING & MARINE ENGINEERING CO., LTD. (DSME)

- Address : 85, Da-dong, Jung-gu, Seoul, Korea • Tel : +82-2-2129-0114 • Fax : +82-2-2129-0077~8 • <http://www.dsme.co.kr>
- Products : LNG Carriers, LNG-RVs, LNG-FPSOs/FSRUs, LPG Carriers, LPG-FPSOs, ULCCs, VLCCs, Suezmax/Aframax/Panamax Tankers, Shuttle/Chemical Tankers, Product Carriers, Containerships, Capesize/ Kamsarmax/ Supramax Bulk Carriers, Ore Carriers, VLCCs, Ro-Ro Ships, PCTCs, Passenger Car Ferries, FPSOs, FSOs, FPU, Drill Ships, Semi-Submersible Drilling Rigs, Fixed Platforms, Submarines, Submarine Rescue Vessels AUVs, Destroyers, Battle Ships

SAMSUNG HEAVY INDUSTRIES CO., LTD. (SHI)

- Address : 1321-15, Seocho-Dong, Seocho-Gu, Seoul, Korea • Tel : +82-2-3458-7312 • Fax : +82-2-3458-7319
- <http://www.shi.samsung.co.kr>
- Products : Arctic Shuttle Tankers, VCLLs, Crude Oil Tankers, Container Vessels, LNG/LPG Carriers, FPSO, FSO, Drillships, etc., LNG FPSO, Offshore Platforms, TLP, SEMI, Cruise Ships & Ferries, Steel Structures, Bridges & Building, Cargo & Material Handling Equipment

SLS SHIPBUILDING CO., LTD.

- Address : 227, Danam-dong, Tongyeong, Gyeongnam, Korea • Tel : +82-55-640-3301/3340 • Fax : +82-55-649-2114 • <http://www.slsship.co.kr>
- Products : 43,000DWT Stainless Steel Chemical Tanker, 44,000DWT Chemical Tanker, 45,000DWT Chemical Tanker, 51,000DWT Product/Chemical Tanker, 49,700DWT Product Oil Tanker, 41,000DWT Product/Chemical Tanker, 40,000DWT Product/Chemical Tanker, 58,000DWT Supramax Bulk Carrier

HYUNDAI MIPO DOCKYARD CO., LTD. (HMD)

- Address : 1381, Bangeo-dong, Dong-gu, Ulsan, 682-712 Korea • Tel : +82-52-250-3031~3040 • Fax : +82-52-250-3056 • <http://www.hmd.co.kr>
- Products : Product/Chemical Tankers, Containerships, Self-Unloading Bulk Carriers, Multipurpose Cargo Carriers, Drillships, Cable Layers, Pipe Layers, FPSOs, Car Ferry & Passenger Ships, LPG Carriers, Pure Car / Truck Carriers, General Cargo Carriers, Ro-Ro Vessels

HYUNDAI SAMHO HEAVY INDUSTRIES CO., LTD. (HSHI)

- Address : 1700, Yongdong-ri, Samho-eup, Yeongam-gun, Jeollanam-do, Korea • Tel : +82-61-460-2114 • Fax : +82-61-460-3701
- <http://www.hshi.co.kr>
- Products : Tankers, VLCCs, Product Carriers, Chemical Tankers, Containerships, LNG Carriers, LPG Carriers, Pure Car Carriers, Bulk Carriers, Other Vessels

HYUNDAI HEAVY INDUSTRIES CO., LTD. (HHI)

- Address : 1, Jeonha-dong, Dong-gu, Ulsan, Korea • Tel : +82-52-202-2114 • Fax : +82-52-202-3470 • <http://www.hhi.co.kr>
- Products : Bulk Carriers, Containerships, Tankers, VLCCs, Product Carriers, Multi-purpose Cargo Ships, OBO Carriers, Pure Car Carriers, LPG Carriers, Ro-Ro Ships, Chemical Tankers, Offshore Rigs/Barges, LNG Carriers, Passenger Ships, Drill Ships, Special & Naval Ships, FPSO, FSO, Semi-submersible Drilling Rig, Other Vessels

HANJIN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.

- Address : 29, 5-ga, Bongnae-dong, Yeongdo-gu, Busan, Korea • Tel : +82-51-410-3240 • Fax : +82-51-410-8477 • <http://www.hanjinsc.com>
- Products : Container Carriers, Product/Chemical/Crude Oil Tankers, LNG/LPG Carriers, Cable Ships, Supply Boats, Semi-Submersible Drilling Rigs, Dredgers, Naval Ships, Special Purpose Ships, Bulk Carriers

STX OFFSHORE & SHIPBUILDING CO., LTD.

- Address : 100 Wonpo-dong, Jinhae, Gyeongnam, Korea • Tel : +82-55-548-1122 • Fax : +82-55-546-7928 • <http://www.stxship.co.kr>
- Products : Crude Oil Tankers, Product Oil Tankers, Chemical Tankers, Bulk Carriers, Container Ships, LNG/LPG Carriers, Pure Car & Truck Carriers, Ferries & Passenger Ships, Naval Ships, Special Purpose Ships, Offshore and offshore support vessel, Etc

DAESUN SHIPBUILDING & ENGINEERING CO., LTD.

- Address : 12, 4-ga, Bongrae-dong, Yeongdo-gu, Busan, Korea • Tel : +82-51-419-5090~1 • Fax : +82-51-416-7965 • <http://www.daesunship.co.kr>
- Products : Container Ships, Bulk Carriers, Tankers, MPC & General Cargo Ships, Gas Carriers, Ro/Ro ships, Tug Boats, Fishing Boats/Vessels, Special Purpose Vessels



Registration No. : **Youngdungpo Ra 00220**

www.korship.co.kr www.procon.co.kr

Published on **Dec. 5. 2011**

E-mail : korshippeditor@gmail.com

Publisher **Yoseob Choi**

Price per Copy : **₩10,000**

Editorial Director **Wooseung Cha**

Annual Subscription Fee : **₩100,000**

Editor-in-Chief **Chunghoon Lee**

Senior Editor **Myungeui Jo**

Designer **Jaeyong Park**

Marketing Manager **Kijong Seo
Jongki Hong**

Printed by **Dae Han Mi Sul**

Printed (CTP) by **Myungjin**

Published by **PROCON**

Adress : **Rm 708 ACE Techno Tower #55-7,
Mullae-dong 3 ga, Youngdungpo-ku,
Seoul, Korea**

Tel : **+82-2-2168-8899**

Fax : **+82-2-2168-8895**

International : **+82-10-9402-7978 (Mr. Park)**

Bank of receipt	
Kiup Bank	083-038571-04-013
Kook Min Bank	757-21-0285-181
Shin Han Bank	284-05-012954
Woo Ri Bank	182-07-168838
* Deposit person : PROCON (Choi Yo Seob)	

This Publication Keeps publication ethics charter of "Korea Publication Ethics commission" and any unauthorized replication or modification without Procon's permission is strictly prohibited.

Application of Subscription

Company's Name : _____

Applicant : _____

Address : _____

Term of Subscription : From M/Y _____

~ To M/Y _____

Tel : _____

Fax : _____

Rate of Subscription : **1 Month / 10,000(Korean Won)**
1 Year / 100,000(Korean won)

(Air postage will be charged for foreign countries.)

Inquiry : Tel / **+82-2-2168-8898**

Fax / **+82-2-2168-8895**

E-mail : victory@procon.co.kr



“
Motor Business Since 1963

*LG started it.
OTIS joined it.
HIGEN inspired it.*

”

**HIGEN MOTORS means
HIGH ENERGY efficiency
and reliability
For Shipbuilding Industry.**



Ready, Steady, Go!



Introducing Sensepoint XCD

XCD's unique tri-colour visual display allows the device's status to be seen at a glance - even from a distance! Using an instantly recognizable 'traffic light' system, the unit features three visual settings; steady green for normal operation, flashing yellow for a fault or warning and flashing red for an alarm.



Optimised for the detection of flammable, toxic and Oxygen hazards in potentially hazardous areas, XCD offers ease of



operation and a low cost of ownership. Simple one man operation permits non intrusive configuration of the device, helping to reduce ongoing maintenance requirements.

Honeywell Analytics - Experts in Gas Detection

Made in Korea!



MED approval
(MED-B-6360)

Fixed Gas Detection

Our fixed range of gas detection products is suited to all types of applications and industries; from high functionality devices to low-cost systems ideal for the compliance market.

Toxic Gas Detection

Our toxic gas detection systems offer unrivalled sensitivity combined with flexible functionality to support a comprehensive array of gases including exotics.

Technical Services

From calibration work and maintenance to full end-to-end support, our technical services and additional support options provide expert assistance to ensure maximum up-time of your equipment.

Honeywell

SPX®

WHERE IDEAS MEET INDUSTRY

We don't follow the pack, we lead it.

At SPX, we believe you deserve the latest process technologies and equipment, not mere imitations. Combining an aggressive product development program with state-of-the-art manufacturing practices, SPX sets the standard year after year.

You know the brands. You know the quality. You know the importance of improving your process.

Choose the industry leader — the brands you know and trust — for all your processing needs.

BRAN+LUEBBE
AN SPX BRAND

APV



JEMACO

Plenty
Plenty

