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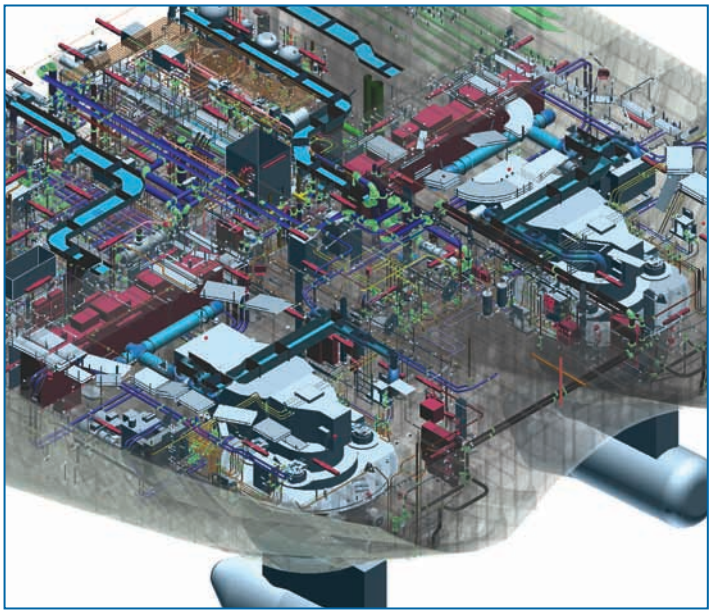

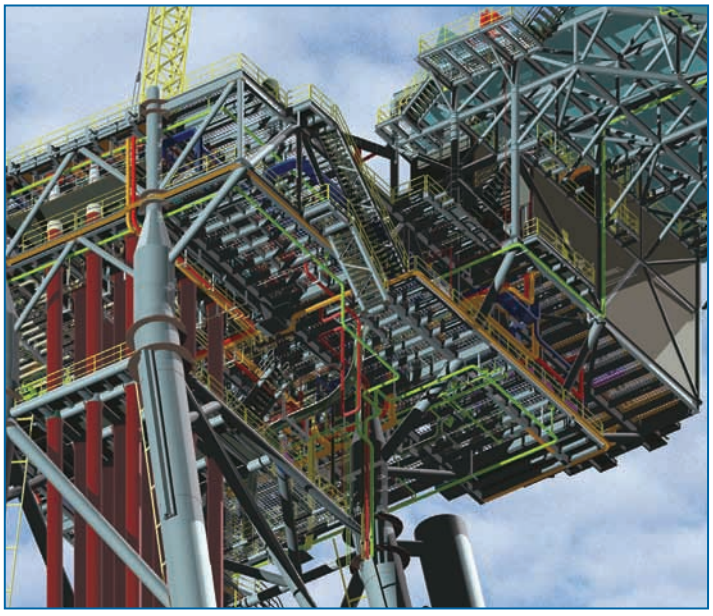

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KORMARINE 2011 will be open with great eclat at Busan Exhibition & Convention Center (BEXCO) , and Monthly KORSHIP will keep you updated with the latest news swiftly during the show as the official media of KORMARIE 2011 and we appreciate you cooperation in advance.

KORMARINE 2011 will run from October 26 to October 29 Busan Exhibition Convention Center (BEXCO) .
Our daily news will have a circulation of 10,000 every day during the show.

Contact Monthly KORSHIP or K. Fairs for inquiries or suggestions for the daily news article related to KORMARINE 2011 or advertisement in the print Edition. (Deadline Date: September 20th 2011)

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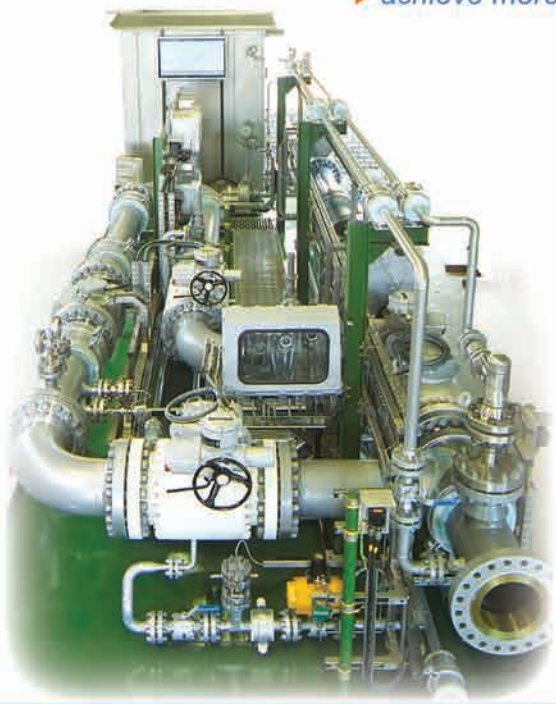

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HHI to deploy drillship for the continental shelf oil/gas exploitation project in the East Sea

Hyundai Heavy Industries (HHI) announced on June 30 that the drill ship which was commissioned from Deepsea Metro in February 2008 and completed recently would be deployed in September this year for the nation's resource exploitation project to drill oil and gas resources in the continental shelf of the East Sea.

This marks the first time that the drillship is used for the exploitation of local energy resources. In particular, it is meaningful very much that the drillship built by the Korean shipyard is directly deployed. Preliminary exploration showed that the continent shelf of the East Coast was presumed to have 0.7TCF of oil and gas in reserves (1 TCF equals approximately 21 million tons of natural gas and 170 million barrels of oil) at No. 8 mining area where the drillship would operate.

The offshore gas production facility, built and installed by HHI in 2004, is already producing approximately 20 billion ft^3 of liquefied natural gas, which is five times larger than the nation's daily gas consumption, and 380,000 barrels of condensate in the gas field off the Korean Peninsula's East Sea.

Drillship of HHI

The success in the drilling operation would be an important step towards energy security and self-sufficiency through national efforts and technology geared towards indigenous offshore energy resource that can be drilled, exploited, produced, and operated.

The drillship of HHI has the world's most advanced drilling capacity, capable of drillling up to 12.2km under water. It has the drillship specific design which optimizes the size of vessel to enhance fuel efficiency. Additionally, it dramatically reduces maintenance and repair cost as the thruster, the core facility, can be repaired on board.

The newbuilt drillship slated for deployment in the East Sea is currently installing the Remotely Operated Vehicle (ROV) necessary for the final drilling operation and drill pipes, etc. The drillship will carry out the drilling operations at the dept of 1,000m under water for 4 months, starting from September.

This year, HHI shifted its focus toward the vessels related to energy resource exploitation to spur growth in order intake from the shipbuilding and offshore industries. A majority of newbuilding orders won by HHI has been the vessels such as drillship, the most value-added vessel, FPSO (Floating, Production, Storage, and Offloading), LNG carriers, LNG-FSRU (Floating, Storage & Regasfication Unit), etc, which are directly used for the exploitation and utilization of energy resources such as oil and gas.

According to the Ministry of Knowledge Economy (MKE), the deepwater energy market is expected to skyrocket to USD 180 billion by 2010, USD 300 billion by 2025, and USD 440 billion by 2030. This will stimulate the growth of the shipbuilding and offshore market which is closely related to the deepwater oil and gas exploitation.

Meanwhile, HHI has injected fresh impetus into its development of ships used for energy resource exploitation, such as LNG-FPSO, next-generation CO_2 carriers, LNG-powered vessels, etc. In the first half of this year, HHI won orders for a total of 63 vessels worth USD 14.8 billion (including the order intake of Hyundai Samho Heavy Industries) in the shipbuilding and offshore sectors, which is approximately 75% of its annual order target of USD 19.8 billion.

KR was designated as domestic and international certification organization in the wind power sector

The Korean Register of Shipping (KR) was officially designated by the Korea Accreditation System (KAS) as the wind energy equipment certification organization on July 1. Thus, KR became the nation's first organization to acquire both domestic and international accreditation for granting product certification in the wind power sector.

KAS product certification system is a conformity evaluation system established in 2001 by the Korean Agency for Technology and Standards (KATS) under the Ministry of Commerce, Industry and Energy (currently, the MKE) based on the Article 21 and 22 of the Framework Act on

National Standards. It ensures high transparency in the certification process that allows companies to voluntarily apply for and adopt the certification. Now, KR can grant certification for major components of wind power system and wind power equipments in 4 certification fields (prototype certification, parts certification, type certification, and project certification).

KR has focused on supporting green growth sectors as the next-generation growth engine for companies and pushed forward with large-scale R&D while attracting and retaining a talented workforce since 2007. In 2008, KR established the technical standard for wind power system for the first time nationwide. In addition, KR completed the development of technical standard for offshore wind power generation recently.

Besides, KR entered into cooperation agreement with global wind power companies, research institutes, academic societies, such as KORWIND of Germany and ISC of Japan, as part of effort to gain competitive advantage in component technology related to wind power generation.

Kim Man-eung, President of the Green Industry Technology Institute of KR, said, "By acquiring this accreditation, we successfully laid the cornerstone for developing global competitiveness in the certification industry, one of pillars that have underpinned our effort to join the ranks of the world's top 3 offshore wind power countries as specified in the government's roadmap for offshore wind power development."

He added, "we will actively participate in the domestic projects to build track record necessary to evolve into the best certification organization in the Asia-Pacific Region and make inroads into the global market."

EXIM Bank won the Deal of the Year award from Marine Money

Export Import Bank of Korea (EXIM Bank) announced that its financial support for the U.S.-based Pacific Drilling's ultra-deepwater drillship project was selected as the winner of the coveted 'Deal of the Year Awards for 2010' by Marine Money.

Marine Money, published in the United States, is a leading trade publication specializing in the business of ship finance and has honored the best financial transactions annually.

EXIM Bank played a decisive role in creating an international financing package for the 4 ultra-deepwater drillship project commissioned by Pacific Drilling by injecting USD 450 million in the form of structured finance (customized finance) which is 25% of the total loan for the project.

The drillship ordered to Samsung Heavy Industries (SHI) is a state-of-art drillship which can operate at water depth of 3,600m which is 14 times larger than the height of 264m-high 63-building, a skyscraper on Yeouido island.

Marine Money commented, "This drillship project owes its success to the leading role taken up by the EXIM Bank in the financial negotiation despite the unfavorable circumstances in the aftermath of the global financial crisis that has eroded the ability of global commercial banks to offer ship financing. This sets an example of successful large-scale offshore plant export bolstered by public export credit organization."

An official from EXIM Bank said, "We will actively offer customized ship financing for both domestic and overseas ship owners to build up competitiveness of shipbuilding industry, a strategic export industry, in our attempt to stimulate the growth in the new-building orders for high value-added ships."

Internal suppliers of HSHI acquired KOSHA 18001 certification

Internal suppliers of Hyundai Samho Heavy Industries (HSHI) have established the Occupational Health and Safety Management System (OHSMS) in a bid to ensure safety at workplace.

HSHI held a ceremony to award the 18001 certificates in the presence of about 100 officials from the Korea Occupational Safety & Health Agency (KOSHA), Mokpo branch off of the Ministry of Labor & Employment, etc, to its 10 internal suppliers who successfully passed final review in the KOSHA 18001 certification process which began under the technical supervision of KOSHA in March.

KOSHA 18001 certification is an autonomous safety management system, by which the results upon implementation of OSH (occupational safety and health) management plan are internally evaluated on a regular basis to identify and attain necessary improvement in accordance with detailed guideline pursuant to the implementation and related stan-

HSHI held a ceremony for awarding KOSHA 18001 certificates to its internal suppliers on July 15.

dards.

HSHI and KOSHA supported the costs and technology necessary for the acquisition of the certification.

KOSHA put a high valuation on the systematic and autonomous OHS management activities - such as identification and improvement of hazards in respective production processes, TBM activities which promote safety culture in conjunction with the holding company - during the evaluation process for the KOSHA 18001 certification of HSHI's internal suppliers.

HSHI anticipates that its internal suppliers will actively introduce OHSMS to prevent workplace accidents and reduce loss in the rapidly changing business environment. In addition, HSHI plans to continuously support its internal suppliers which have yet to obtain the certification in a bid to ensure greater safety in workplace.

Meanwhile, Lee Yong-gil, President of Taihan Engineering Co. (TEC), said with determination during the certificate award ceremony on the same day, "We will use this KOSHA 18001 certification as a springboard to enhance our image both internally and externally as a business which takes the workplace safety as top priority and exert ourselves to ensure safety and health in workplace for all employees."

KATS accredited KR, etc, as international product certification organization

Korean Agency for Technology and Standards (KATS) under Ministry of Knowledge Economy (MKE) announced its accreditation of 3 organizations - Korean Register of Shipping (KR), Korea Conformity Laboratories, National IT Industry Promotion Agency - which met the international standards as the international product certification organizations on July 1. Thus, KR can act as international certification for wind power, Korea Conformity Laboratories for furniture/synthesized resin containers, etc, and National IT Industry Promotion Agency for Radio Frequency Identification Tag (RFID-Tag).

KATS is operating Korea Accreditation System to develop global certification organizations enforcing the standards of international certification requirements. Products certified by international certification organizations have the advantage in gaining foothold in 38 countries worldwide.

International product certification organization can use the logo of Korea Accreditation System (KAS) along with their certification marks. The certified companies can also use the certificates imprinted with the logo of Pacific Accreditation Cooperation (PAC) or International Accreditation Forum (IAF) when they export related products.

The number of international product certification organizations accredited domestically has risen to 14 (about 220 certified products). In addition, newly certified organizations will contribute to the stimulation of Radio Frequency Identification Tag sector and wind power industry which have emerged as new industries of Korea.

Particularly, domestic wind power industry relied totally on overseas certifications so far.

With the accreditation of KR as international certification for the first time nationwide, domestic industry can prevent leakage of design technology, avoid making overseas remittance of certification fees, save related costs incurred to wind power companies which will then be better positioned to make inroads into foreign markets.

So far, overseas certification organizations, such as Germanischer Lloyd (GL), Det Norske Veritas (DNV), etc, dominated the certifications for wind power. The cost per certification ranged somewhere between USD 400 million to USD 1.5 billion and the certification (for design/performance evaluation) took about 1 year. The certification by KR can reduce the certification cost by over 50%, compared to the certification by overseas organization, and the certification period is expected to be shortened by around 1/3.

SHI acquired Seentech, an industrial boiler manufacturer

Samsung Heavy Industries (SHI) entered into a contract on July 12 to acquire a 27% stake in Seentech, an industrial boiler equipment manufacturer, from its majority shareholder for KRW 41.5 billion.

SHI's acquisition of Seentech aims to leverage the great market potential and growth capability of boilers, pressure containers, etc, and the great synergic effect between this sector and the shipbuilding/offshore unit, the core business of SHI.

Seentech has competitiveness in chemical engineering equipments such as small/medium-sized industrial boilers, pressure containers, and heat exchangers.

Headquartered in Changwon, South Gyeongsang Province, it operates factories in Haman and Gwangyang and has 5 overseas offices in various countries including Japan. Particularly, Seentech has competitive advantage in the design and production technology for boilers used in combined heat and power generation.

With this acquisition of stakes, SHI will secure supply of the fittings such as various pressure containers used in boilers including marine boilers, Heat Recovery Steam Generator (HRSG), etc and offshore plants through vertical integration of production.

SHI plans to focus on developing capabilities of boilers with the output capacity between 100MW and 500MW, as well as HRSG, and increasing supply of pressure containers and container package equipments to the chemical engineering plant markets.

HHI held a sailing-out ceremony for the offshore platform for Thailand

Hyundai Heavy Industries (HHI) held a sailing-out ceremony for the Bongkot gas pressurization/refining offshore platform of Thailand's PTTEP (PTT Exploration and Production Public Company Limited) in the offshore quay wall at its Ulsan headquarter on July 7.

HHI was awarded this USD 1 billion order to construct this offshore platform in September 2008. This large offshore platform can produce 385 million ft^3 of natural gas and 18,000 barrels of condensate per day.

HHI carried out the entire processes on EPIC (Engineering, Procurement, Installation and Commission) turnkey contract, ranging from the design, through the transportation and installation, to the commissioning of the gas production platform, 1 jacket, 1 flare tower, 3 bridges, etc, of this facility.

An official from HHI said, "Having successfully completed the construction of this offshore platform, the largest in Thailand, we are better-positioned to make inroads into the offshore plant market of the South East Asia."

This offshore platform will be installed in Bongkot oil field, 600km southeast of Bangkok, Thailand, by the end of this year.

HHI has been highly recognized for its cutting-edge technology in the offshore plant market, successfully delivering around 80 fixed offshore platforms to Yadana of Myanmar, East Area of Nigeria, etc, including the Umm Shaif offshore platform which sailed away for United Arab Emirates (UAE) in June, 2009.

HHI's fixed offshore platform was selected as the World's Top Class Product in 2008

Gas pressurization/refining offshore platform built by HHI, which will be installed in Bongkot, Thailand

by the Ministry of Knowledge Economy and has been one of the nation's strategic export items that garners significant share in the global market.

Meanwhile, the sailing-out ceremony on the same day was attended by officials related to the construction of the offshore platform, including Kim Chang-joon, head of HHI's Offshore & Engineering Division, Chaiyong Satjipanon, Ambassador of Thailand to the Republic of Korea, Suraphong Iamchula, President of Thailand's PTTEP, etc.

STXOS launched the world's largest 400,000-ton VLOC

STX Offshore & Shipbuilding (STXOS) announced that it held a launching ceremony for a 400,000-ton Very Large Ore Carrier (VLOC) at its Jinhae shipyard on July 14, which was attended by Shin Sang-ho, President & CEO of STXOS, and officials from STX Pan Ocean, the ship owner.

This newly launched VLOC measures 361m in length, 65m in width, and 30.5m in height. This VLOC is the world's largest, which is about 3 and a half times larger than a soccer field and capable of carrying a total of 400,000 tons of iron ores, equivalent to the full loads of 15-ton 26,700 dump trucks, at a speed of 14.8 knots.

This VLOC, independently researched, designed, and built by STXOS, has a cargo hold capacity 20% larger compared to the vessels of the same class and carry around 400,000 tons of cargo. Particularly, the stern of this vessel was designed to form a straight line to ensure excellent sailing performances and reduction of fuel costs.

An official from STXOS said, "The results of our test showed that straight line stern is far more effective in reducing the resistance of the water against ultra large vessel of over 400,000 tons, although ordinary merchant ships are usually designed to have oval-shaped stern to reduce various resistance."

Moreover, this VLOC is fitted with high capacity ballast water treatment system which can enhance seawater discharge and cargo capacity, thus accomplishing the loading capacity of 16,000 tons per hour and significantly reducing delays during the loading operation.

Equipped with TIER-II engine that outperforms existing marine engines in terms of fuel consumption per hour, this VLOC slashes emissions of harmful gases such as NOx, SOx, CO_2, etc. Besides, this VLOC built, with high tensile steel, enhanced fuel efficiency and increased sailing speed.

An official from STXOS who attended the launching ceremony said, "This VLOC, the world's largest, fully occupied the dry dock (358m long, 74m wide, 11m deep) to an extent that I could not find any gap. As the dry dock is filled with water and this gigantic vessel is towed by small tugboats in front and rear, it looked like the giant in Gulliver's Travel being tied down."

Meanwhile, STXOS has won a wave of newbuiliding orders for ultra large vessels this year, including the orders for 3 units of 13,000TEU ultra large container ships and 1 unit of 320,000-ton ultra large crude oil tanker.

STXOS launched a 400,000-ton VLOC, the world's largest, at its Jinhae shipyard on July 14. The photo shows the VLCC waiting to be launched at the dry dock.

STX Group published the integrated sustainability management report for 2 consecutive years

STX Group announced on July 19 that it

published '2010 STX Sustainability Management Report' containing the sustainability management performances of its major affiliates during the previous year.

STX has been publishing the sustainability management report annually since its first publication last year, and this is the 2nd report. STX is also publishing the Group report separately to ensure sustainability in business management.

STX's Group report focused on 5 major issues - technological competitiveness, talented manpower management, co-growth, advancement of regional community, environmental protection - which are highlighted by customers, officers/employees, shareholders, vendors, stakeholders such as government, regional community, etc, on the basis of G3 GRI guideline (Third Generation of the GRI's Sustainability Reporting Guidelines).

Meanwhile, STX Group published the sustainability management report on its 7 affiliates such as STX Pan Ocean, STX Offshore & Shipbuilding, STX Engine, STX Heavy Industries, STX Energy, STX Metal, and STX Construction, along with STX Group report.

An official from STX Group said, "This sustainability management report, the second edition after its first release last year, embodies our commitment to sustainable business and society. We will continuously develop sustainable management system by expanding the participation of stakeholders and upgrading the structure and contents of the sustainability management report to the next level.

G3 GRI guideline (Third Generation of the GRI's Sustainability Reporting Guidelines) was launched by GRI (Global Reporting Initiative), a UN agency, and is the standard for sustainability reporting worldwide.

Bosch Power Tools debuts laser distance measurer

Recently, Bosch Power Tools released 'GLM 80', a professional laser distance measurer enabling accurate measurement of distances, heights, and angle more conveniently. Specifically, GLM 80 fitted with an integrated high precision tilt sensor can read angles and immediately measure the distance between 2 different points simply via calculation of angle.

GLM 80's distance measurement by laser is far more superior compared to other products. It has the measurement range of up to 80m and the measurement accuracy of ±1.5mm. The measured distance is accurately displayed on a large LCD screen. In addition, GLM 80 can calculate the area and volume of the work space and can be used for measuring the minimum and maximum distance.

Particularly, the high precision tilt sensor, a new feature, accurately covers the radius of 360°. The indirect measurement became more convenient due to the tilt sensor capable of accurate measurement of angle with the accuracy range of ±0.2°. The height of a building can be calculated, for example, simply by aiming at the top edge of a building wall and ground surface beneath the building if the distance between the 2 different points is measured. This convenient indirect measurement function can further enhance efficiency of work.

GLM 80 which comes along with the built-in lithium ion battery is lightweight and can be used for a long time. Moreover, it can be conveniently recharged simply by connecting the USB cable to the computer at office or home.

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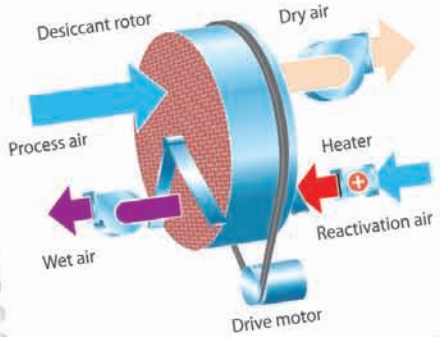

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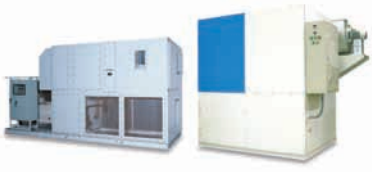
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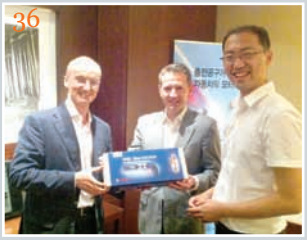

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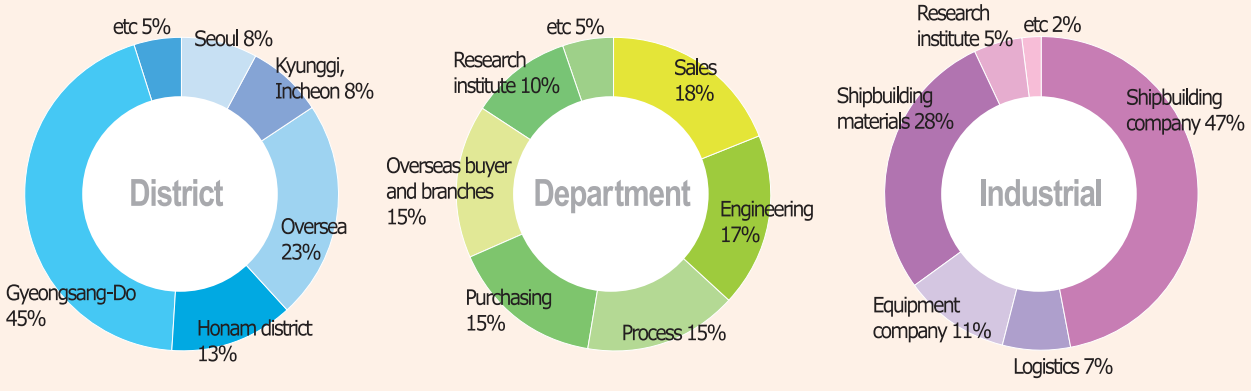

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Bright outlook for shipbuilding industry in the second

Recently, large domestic shipyards held the world's top spot with strong performance in high value-added vessel sector despite sluggishness in the newbuilding markets in the first quarter of 2011, according to the data published by the Ministry of Knowledge Economy (MKE) and Korea Shipbuilders' Association (KOSHIPA) based on the Clarkson data.

Meanwhile, The second half of 2011 will see continued newbuilding orders for containerships and LNG carriers which have recently showed strong performance, albeit difference depending on the type of ship, and steady flow of new orders for offshore plants used for the oil and gas filed exploitation.

In addition, industry experts speculate that the decline in order backlog and shipbuilding volume resulting from the order intake slump until the first half of last year will continue in the second half of this year.

In this issue, we look back on the overall performance of domestic shipyards in the first half of 2011 based on 'Performance of shipbuilding industry in the first half of 2011' published recently by the MKE and KOSHIPA and 'Outlook of shipbuilding industry in the second half of 2011' produced and released by Hong Seong-in, a researcher of the Korea Institute for Industrial Economics & Trade (KIET).

I. Performance of shipbuilding industry in the first half of 2011
II. Trend and outlook of shipbuilding industry in the first half of 2011
III. New orders for overseas plants in the first half of 2011

I. Performance of shipbuilding industry in the first half of 2011

1. New orders in the first half of 2011

According to the Korea Shipbuilders' Association (KOSHIPA) and the Ministry of Knowledge Economy, domestic shipyards maintained the world's top spot (in terms of new orders) as the large shipyards won massive orders for high value-added vessels although the global market for newbuilds declined by 10.2% in the first half of 2011.

In the first half of 2011, Korean shipyards' combined orderbook stood at 224 vessels of 8.92 million CGT worth USD 31.4 billion while the Chinese shipyards' combined orderbook stood at 258 vessels of 5.17 million CGT valued at USD 8.8 billion and (based on the data released by Clarkson).

Korean shipyards won lion's share of orders for high value-added ships such as drillship, FPSO, large containership, LNG carrier, LNG-FSRU, etc. 7 large domestic shipyards achieved over 75% of annual target for this year.

Large domestic shipyards clinched orders for 21 drillships, 2 FPSOs, and 2 LNG-FSRUs, the world's entire orders in these categories, except for the drillship orders that the Brazilian ship owners placed with Brazil's domestic shipyards (7 drillships worth approximately 4.6 billion). Besides, large domestic shipyards won orders for 19 LNG carriers commissioned worldwide in

the second quarter of this year. Hudong Zhonghua Shipbuilding received orders for 4 LNG carriers (from Japan's MOL) and Japan's Mitsubishi Heavy Industries secured an order for 1 LNG carrier (from Japan's NYK) in the first quarter of this year.

Large domestic shipyards obtained orders for 69 containerships with the capacity beyond 8,000TEU in the first half of this year, which accounts for around 75% of the world's entire orders for large containerships. In addition, newbuilding containership orders awarded to large domestic shipyards comprised about 65% of the world's entire orders for containerships in the first half of this year.

Meanwhile, small/medium-sized domestic shipyards continued to encounter difficulties in winning orders along with Chinese and Japanese rivals amid persistent sluggishness in the market for bulk carriers and tankers.

To tide over such difficulties, some medium-sized shipyards moved to diversify and expand their ship models. The combined orderbook of medi-

Table. 1 Trend of change in global shipbuilding market

	2007			2009			2010			Jan. to Jun., 2011		
Order placement (10,000CGT)	9,350			1,532			3,800			1,677		
Major receivers of new orders (share, %)	Korea 3,251 (34.8)	China 3,245 (34.7)	Japan 1,395 (14.9)	Korea 439 (28.6)	China 725 (47.3)	Japan 157 (10.3)	Korea 1,265 (33.3)	China 1,824 (48.0)	Japan 238 (6.3)	Korea 892 (53.2)	China 517 (30.8)	Japan 46 (2.7)

Date: Clarkson

Table. 2 Trend index of domestic shipbuilding industry

Year	New order			Shipbuilding volume			Order backlog		
	Number of ship	10,000CGT	Variation	Number of ship	10,000CGT	Variation	Number of ship	10,000CGT	Variation
2008	671	1,852	△43.0	510	1,550	28.8	2,359	6,902	6.3
2009	163	439	△76.3	516	1,539	△0.7	1,860	5,437	△21.2
2010	489	1,265	188.4	508	1,596	3.6	1,577	4,525	△16.8
Jan. to Jun., 2011	224	892	41.4	253	772	△6.1	1,416	4,319	△4.6

Data: Clarkson

um-sized shipyards stood at 30 vessels of 97,000 CGT in the first half of 2011, which includes 11 large containerships.

The shipbuilding volume shrank 6.1% year-on-year to 7.72 million CGT (253 vessels), the second largest worldwide after China (511 vessels of 8.36 million CGT). However, the gap between Korean shipyards and Chinese rivals in terms of the shipbuilding volume is decreasing.

The gap in the shipbuilding volume (based on the Korea's shipbuilding volume) between the two countries stood at 6.34 million CGT in 2008, 2.80 million CGT in 2009, 1.25 million CGT between January and June of 2010, 3.0 million CGT in 2010, and 640,000 CGT between January and June of 2011.

The export of equipments related to the shipbuilding and marine industries rose 30.1% year-on-year to register approximately USD 32 billion (provisional) in 2011, which is attributed to the seamless export of high value-added large vessels and offshore plants (according to Korea International Trade Association (KITA) MTI746, based on ship & offshore structures and parts).

Domestic order backlog diminished by 4.6% (43.19 million CGT, equivalent to about 2 years of work) compared to the end of 2010, but large domestic shipyards have seen their order backlog rising as a result of growing order intake. The combined order backlog of the 7 large domestic shipyards increased 5.5% as of June 2011 compared to the end of 2010, a year that saw the order backlog declining by 20.1% compared to the end of 2009.

2. Performance by type of ship

(1) LNG carriers

5 large domestic shipyards (Hyundai Heavy Industries, Daewoo Shipbuilding & Marine Engineering, Hyundai Samho Heavy Industries, STX Offshore & Shipbuilding) clinched orders for 19 LNG carriers (150,000 to 170,000cbm), sweeping the world's entire orders place in the second half of 2011.

The newbuilding orders for LNG carriers skyrocketed in the first half of 2011 on the back of increased demand for LNG amid improved price-competitiveness of LNG in comparison with high oil prices and growing demand for alternative energy sources. The global new order boookings for LNG carriers stood at 34 vessels in 2006, 30 vessels in 2007, 5 vessels in 2008, and 5 vessels in 2010 (based on Lloyd data). Particularly, LNG order placements which soared in the second quarter, all of which were awarded to large domestic shipyards. In the fourth quarter, Hudong Zhonghua Shipbuilding secured 4 orders for LNG carriers (from Japan's MOL, 170,000cbm) and Japan's Mitsubishi Heavy Industries won 1 order for LNG carriers (from Japan's NYK, 140,000cbm).

Major oil companies are expected to speed up

investment in LNG carriers also in the second quarter for reasons such as to place additional orders for LNG carriers to ensure timely deployment for LNG development projects currently underway, low level of order backlog in comparison to the demand, and high charterage fees, etc.

The global demand for LNG is expected to reach 5 trillion 100 billion m^3, up 62% from 2008, by 2035. The daily charterage fees for LNG carriers (based on IEA data) reached USD 20,000 in the first half of 2010, USD 30,000 in the second half of 2010, and USD 110,000 in the first half of 2011.

(2) Containerships

Medium-sized domestic shipyards has made significant inroads into the containership market, winning approximately 27% (about 15% of all orders for large containerships beyond 8,000TEU) of all containership orders awarded to domestic shipyards in the first half of 2011. Regarding the containership orders placed with medium-sized domestic shipyards, they bagged new orders for large containerships of 550,000 CGT (11 vessels) and small/medium-sized containerships of 420,000 CGT (19 vessels).

Domestic shipyards won about 65% (113 vessels of 4.94 million CGT) of all containership orders placed in the first half of 2011, dominating the containership sector. If the new order bookings of domestic shipbuilders' overseas shipyards are included, domestic shipyards secured 80% of all large containerships and over 70% of all containership orders. New orders for large containerships accounted for 50% of all containerships ordered worldwide based on the number of ships and exceeded 68% of all orders in this category based on CGT in the first half of 2011.

New orders for containerships worldwide reached 15.5 million DWT in the first half of 2011 amid growing freight traffic, spike in demand for eco-friendly high efficiency ships as a result of high oil prices, increasing quantity of containerships ordered in the wake of the slow-steaming, etc. New orders for containerships worldwide stood at 35.4 million DWT in 2007, 12.8 million DWT in 2008, 1.2 million DWT in 2009, 8.0 million DWT in 2010, and 15.5 million DWT between January and July of 2011. HR (Howe Robinson Container Index), which tracks the cost of shipping containers worldwide, was 1,243.8 in 2006, 1,263.8 in 2007, 1,133.1 in 2008, 366 in 2009, 553.7 in 2010, and 910.7 in May, 2011. Medium to large-sized containerships dominated the global newbuilding orders in the second quarter of this year as containerships comprised the largest portion of all orders placed worldwide.

Chinese shipyards received orders (17 vessels of 810,000 CGT) for large containers (8,000 vessels of 10,000TEU) from Chinese/Taiwanese ship owners as small/medium-sized containerships kept dominating newbuilding orders for containerships. Thus, Chinese shipyards has garnered around 28% (63 vessels of 1.94 million CGT) of global newbuilding orders for containerships.

Newbuilding orders for eco-friendly large containerships customized for slow-steaming operations are expected to rise in the period ahead amid the concern about the glut of ships in the market and high oil prices, although container traffic between Asia and Europe is forecast to increase.

(3) Bulker

Medium-size shipyards has secured over 60% of all bulker orders awarded to domestic shipyards (approximately 2.86 million DWT, 19% share in the domestic market). The orderbook of domestic shipyards for bulkers stands at around 4.26 DWT (28% share in the global market) including the order intake of domestic shipbuilders' overseas shipyards, among which medium-sized shipyards have won approximately 50%.

With the bulker newbuilding market being still sluggish in 2011, the order placement in the second quarter remained at a level similar to that of the first level. The global order for bulker beyond 10,000DWT stood at 173 million DWT in 2007, 106.3 million DWT in 2008, 34.1 million DWT in 2009, 8.1 million DWT in the first quarter of 2011, and 7.1 million DWT in the second quarter of 2011.

Chinese shipyards are dominating the bulker sector, winning over 70% of global orders. Newbuilding orders for bulkers are expected to keep dwindling despite low price of newbuilds in the period ahead, considering that charterage fees have fallen below cost since the second half of 2010 as a result of the glut of ship in the market and the operation costs have risen due to high oil prices. Baltic Dry Index (DBI) has continued to fall, reaching 6390 in 2008, 3005 in 2009, 1773 on December 24, 2010, and 1043 on June 30, 2011.

(4) Tanker

Unfortunately, no new order for Very Large Crude Carrier (VLCC) or medium-sized tanker was received by medium-sized domestic shipyards. Korean shipyards and Chinese shipyards swept over 96% of global tanker orders (based on CGT), winning 40.0% and 56.4%, respectively.

As the newbuilding tanker market is mired in doldrums, order placements slightly increased in the first quarter of 2011 compared to the second quarter of the same year with the small/medium-sized tankers below 100,000 DWT dominating the newbuilding orders. The global tanker orders stood at 48.5 million DWT in 2007, 56.7 million DWT in 2008, 15.8 million DWT in 2009, 35.9 million DWT in 2010, 0.7 million DWT in the first quarter of 2011, and 2.1 million DWT in the second quarter of 2011.

VLCC market has been stagnant amid the glut in the market, rising bunker oil prices, declining ship prices, etc. Daily VLCC freight charge amounted to USD 63.7 in 2007, USD 105.0 in 2008, USD 31.2 in 2009, 41.6 in 2010, and 15.2

Table 3. New orders by ship type between January and June 2011

Type	Global		China		Korea	
	Number of ship	10,000CGT	Number of ship	10,000CGT	Number of ship	10,000CGT
Bulker	200	369	150	280	39	70
Tanker	41	72	25	41	15	29
Containership	173	706	49	147	97	459
LNG carrier	26	213	4	34	21	170
Total	620	1,677	258	517	224	892

Data: Clarkson

on May 20, 2011.

Meanwhile, Chinese shipyards dominated the tanker sector, winning the world's entire orders for VLCCs (3 vessels), and obtained approximately 56% of the global tanker orders placed in the first half of this year. This strong performance may be attributed to the increased orders for containerships that sail away from the Chinese ports for the Middle East and carry crude oil back to China.

Newbuilding tanker market is not expected to turn around for the time being in the aftermath of the glut of ships in the market. As China's crude oil imports from the Middle East increase, shipbuilding contracts are expected to inked with Chinese shipyards for the construction of tankers. However, the slowdown in the transport of crude oil - which arose from the decision of IEA member countries to release oil from strategic petroleum reserve (SPR), recent fluctuation in the oil prices and foreign exchange rate - is expected to have some negative impact on the recovery of tanker market.

The international oil prices (based on Dubai oil) reached 61.92$/B in 2009, 78.13$/B in 2010, 108.53$/B in March 2011, 115.76$/B in April 2011, 112.04$/B on June 16, 101.07$/B on June, 2011, and 106.75$/B on June 30, 2011.

3. Outlook for the second half of 2011

The prevailing forecast is that LNG carriers and offshore plants will continue to dominate the newbuilding orders in the second half of 2011 amid sustained high oil prices and vigorous resources exploitations.

Large domestic shipyards, which have unrivalled technology for the construction of high value-added ships, are expected to show the strongest performance. However, they need to make multifaceted effort to ensure continued flow of new orders in the second half of this year, considering; first, vigorous efforts of shipyards in rival countries such as Japan to secure orders for ships incorporating high technology and eco-friendly features, second, Chinese government's policy to build up competitiveness of shipbuilding industry and provide ship financing, third, low localization rate of equipments used in high value-added ships.

Small/medium-sized shipyards need to sharpen technological competitiveness, enhance shipbuilding capabilities, and actively push forward with promotions to overcome disadvantages in winning new orders. A series of factors, such as continued sluggishness in the bulker and tanker markets, concern about the glut of containerships, financial instability in Europe, etc, are likely to have adverse effect on the order intake of small/medium-sized domestic shipyards.

4. Trend of global shipbuilding market

The global new order placements decreased 10.2% year-on-year to 16.77 million CGT in the first half of 2011.

New orders for containerships accounted for over 40% of the world's entire new orders based on the quantity of new orders (CGT), the largest proportion followed by the bulker orders (approximately 22%) and LNG carrier orders (about 12%). Small/medium-sized shipyards are facing continued difficulties as only 123 shipyards (20.5%) worldwide received new orders in the first half of 2011 (56 shipyards in China, 12 shipyards in Korea, and 6 shipyards in Japan),

The shipbuilding volume worldwide has shrunk this year compared to last year, and fell 15.7% year-on-year to register 22.97 million CGT (1,173 vessels) in the first half of this year. The variation in shipbuilding volume was 9.6% in 2007, 21.1% in 2008, 5.6% in 2009, 14.7% in 2010, and 15.7% in the first half of 2011.

The order backlog has continued to decline after reaching the peak in

around September 2008, and currently stands at 6,920 vessels of 1.34 million CGT as of June 2011, a 7.7% decrease compared to the end of 2010.

Ship prices has kept falling slightly without major variations compared to the end of 2010. Ship price index for Capesize (over 100,000DWT) bulkers registered the lowest point since March 2004 and ship price index for the containerships has risen slightly among the containerships of some sizes (3700, 8,800TEU).

II. Trend and outlook of shipbuilding industry in the first half of 2011

1. Trend of the first half of 2011

(1) Rising orderbook of large shipyards

Domestic shipyards are witnessing a surge in new orders in the first half of 2011, albeit variations depending on the ship model, on the back of the reviving demand for their major ship models. Particularly, LNG carriers and containerships continue to dominate newbuilding orders.

New orders for containerships have begun to increase amid the slow-steaming (reducing the speed at which ships sail to cut fuel consumption) and resultant decrease in the idling of ships since the second half of last year. This year, orderbook for containership has further risen as the combined cycle power generation is emerging as an alternative for nuclear power plants in the wake of devastating earthquake and nuclear crisis in Japan. As of late April this year, global orderbook for containerships stood at 8.9 million CGT, an increase by 61.8% compared to the same period of previous year (According to the data published by Clarkson).

Domestic shipbuilders have won a sizeable proportion of global orderbook for ultra large containerships amid the recent spurt of orders for ultra large containerships. Also, domestic shipyards have won a significant proportion of new orders for LNG carriers as the order placement for LNG carriers has been skyrocketing since the nuclear crisis in Japan began unfolding.

The new orders for containerships soared to 79 units and 3 million CGT as of April this year compared to the same period previous year (3 small units, below 100,000 CGT). Also, the orderbook for LNG carriers ballooned to 15 units and 1.2 million CGT compared to the corresponding period of previous year (1 unit, 100,000 CGT).

Domestic shipyards have received lion's share of new orders for LNG carriers as they are currently better-positioned than their neighboring rivals. Specifically, Japan's shipyards are facing the consequences of the catastrophic earthquake that has disrupted the supply of steel and electric power, while China's shipyards have yet to overcome the problem with quality because the country has only 1 shipyard with any experience in building LNG carriers. Meanwhile, the orders for most types of oil tankers and bulk carriers, the flagship products of domestic and Chinese small/medium-sized shipyards, have been on the decrease amid reduction in the freight charges due to the demand stagnation and overcapacity since the second half of last year.

Large domestic shipyards' combined orderbook increased over two-fold year-on-year to 4.9 million CGT, as of late April this year, on the back of the strong order intake for their flagship models and surpassed Chinese rival, which registered 2.8 million CGT, by wide margin in 2 years.

Table 4. Change in the trend of global shipbuilding market

	2007			2009			2010			Jan. to Jun., 2011		
Order placement (10,000CGT)	9,350			1,532			3,800			1,677		
Major receivers of new orders (share, %)	Korea 3,251 (34.8)	China 3,245 (34.7)	Japan 1,395 (14.9)	Korea 439 (28.6)	China 725 (47.3)	Japan 157 (10.3)	Korea 1,265 (33.3)	China 1,824 (48.0)	Japan 238 (6.3)	Korea 892 (53.2)	China 517 (30.8)	Japan 46 (2.7)

Data: Clarkson

Table 5. New orders received by Korea and China

Year	Korea			China		
	Number of ship	10,000CGT	Order amount (USD 1 million)	Number of ship	10,000CGT	Order amount (USD 1 million)
2007	1,181	3,251	974	2,075	3,245	818
2008	671	1,852	705	1,152	1,908	536
2009	163	439	143	520	725	144
2010	489	1,265	348	1,079	1,824	359
Jan. to Jun., 2011	224	892	314	258	517	88

Data: Clarkson

Table 6. Trend of ship price by ship type

(Unit: USD 1 million, point)

Type	2005	2006	2007	2008		2009		2010		2011
				Aug.	Dec.	Mar.	Dec.	Mar.	Dec.	May
VLCC (320,000 DWT)	120	120	146	160	150	141	101	97	105	102.0
Containership (6,700TEU)	89	101	107	108	100	95	67	66	79.5	70.5
Bulker (180k Capesize)	59	68	97	99	88	81	56	56	57	54.0
LNG carrier (160k)	205	220	220	250	245	245	212	212	202	200.0
Clarkson index	162	168	184	190	177	157	138	136	142	142.1

Large domestic shipyards are also seeing a massive growth in the orders for offshore plants with drillship, LNG-FPSO (Floating Production, Storage and Offloading), etc, dominating the newbuilding orders in this category in the wake of vigorous deepwater energy sources exploitations in the seas of Australia, Africa, Brazil, etc, which have gathered pace amid high oil prices.

In particular, the offshore plant market is reviving after a period of sluggishness in the aftermath of oil spill in the Gulf of Mexico. The ban on new offshore drilling in the Gulf of Mexico was lifted late October last year. In addition, the oil prices kept soaring because of the pro-democracy movements in the Middle East, which in turn has increased newbuilding orders for drillships along with orders for FPSO, LNG-FPSO, LNG-FSRU (Floating Storage and Regasification Unit), Submersible Ship, Fisheries Research Vessel, etc.

New orders for the production and offloading facilities such as FPSO are expected to keep rising in tandem with those for offshore drilling facilities (drillships) if oil prices stay high in the period ahead.

(2) Decrease in the order backlog and shipbuilding volumes

The shipbuilding volumes of domestic shipyards in the first half of 2011 has shrunken year-on-year due to the order drought that persisted until the first half of last year.

The combined order backlog of domestic shipyards dwindled by 12.5%

year-on-year to 43.3 million CGT, as of April this year, which is attributed to the flat growth in new orders until the first half of last year, although the construction of ships on delivery delay was completed.

As a result, the shipbuilding volumes slided by 6% year-on-year to 4.7 million CGT, which is 400,000 CGT less compared to the shipbuilding volumes of Chinese rivals.

Based on the recent performance described above, recent strong growth in new orders has slowed down the reduction in order backlog, and shipbuilding volume is expected to reach 7.48 million CGT, down by approximately 0.3% compared to the same period of previous year, in 2011 as the construction of ships on delivery delay has been completed.

Meanwhile, the export which comprises about 95% of production jumped by around 28.5% year-on-year to USD 31.6 billion, driven by the construction of offshore plants and ships that were ordered when the ship prices were high, including the volumes of ships of which delivery has been delayed by the ship owners' request.

The import in the first half of this year reached USD 2.25 billion, a decrease by around 0.9%, as a result of the reduction in the influx of hull blocks from China and related equipments amid the diminishing volumes of ships built.

(3) Effect of Japan's devastating earthquake

The massive earthquake in Japan has not had a far-reaching impact on the domestic shipbuilding industry over the short-term, except for some disruption in the supply of steel plates used in the shipbuilding. Some shipyards have shifted to European suppliers for the offshore steels or overcome the shortage by using the steels sourced from their own stocks or securing existing volumes available.

Over the mid and long-term, domestic shipyards benefit the most. They have been winning massive new orders for LNG carriers since the combined cycle power generation was determined as an alternative for nuclear power generation. This sharp upswing in new orders is expected to be reflected in the performance of production and export over the next 2 years.

2. Change in domestic/oversea market in the second half

(1) Overcapacity

The bulk carrier market has remained sluggish since the second half of last year, and the oil tanker market has yet to recover. Under those circumstances, the growth in capacity keeps putting an increased strain on containership market despite the recovery enabled by the slow-steaming of shipping companies.

The overcapacity in merchant ships such as bulk carriers, oil tankers, containerships, a sector that witnessed consecutive placement of massive new orders, is expected to persist for the time being despite reduction in the number of mooring ships and steady increase in the decommissioning of old ships.

The freight charge of bulk carriers has been steadily decreasing since the second half of last year with the BDI (Baltic Dry Index) falling below 1,500 points, and the tanker freight index has continue to fall and remained flat.

(2) Appreciation of Korean currency

Appreciation of Korean currency erodes competitiveness of export in the shipbuilding industry which deliver most of the ships that they build to foreign countries, but most shipbuilders are hedging foreign currency exposures to mitigate foreign exchange risk upon entering into contracts. Moreover, sustained appreciation of Korean currency undermines competitiveness of domestic shipbuilders, specifically in the merchant ship sector, although they have cushioned the impact of foreign exchange rate by differentiating their products. Although strong Korean currency raises the concern about a rise in imports,

Table 7. Effect of strong Korean won on the shipbuilding industry

	Positive effect	Negative effect
Ship	-Reduces the costs of purchasing imported equipments.	-Erodes competitiveness in winning new orders. -Sustained appreciation weakens financial condition.
Equipments	-Reduces the costs of purchasing imported parts and elements.	-Increases the import of equipments.
Overall evaluation	-Product differentiation and concurrent appreciation of rival countries' currencies offset the erosion of domestic shipbuilders's competitiveness in terms of order intake. -Domestic marine equipment manufacturers may see declining sales due to the increasing influx of foreign equipments.	

it is not expected to have huge impact over the short-term because the currencies of Japan and China, the major trading partners of Korea, are experiencing strong upward pressure.

(3) Polarization of large shipyards and small/medium-sized shipyards

Major markets for small/medium-sized shipyards have remained flat, aggravated by retrenchment and restructuring, in sharp contrast to the strong recovery and soaring new orders in the markets for large shipyards. Consequently, polarization between large shipyards and small/medium-sized shipyards has deepened. Large shipyards are showing strong performance in new orders as the markets for offshore plants, ultra large containerships, and LNG carriers turn around, and resultantly has expanded capacity utilization. However, the markets for oil tankers and bulk carriers, the major products of small/medium-sized shipyards, are not showing signs of recovery. Furthermore, the ongoing retrenchment and restructuring in the wake of global financial crisis are deepening the polarization. 91.3% (21 out of 23 shipyards) of small/medium-sized shipyards which are exporters of newbuilds have been undergoing retrenchment and restructuring, preceded by overinvestment and tremendous losses caused by KIKO (Knock In Knock Out), since the outbreak of global financial crisis. These small/medium-sized shipyards encounter difficulties in providing refund guarantee (RG), as well as the sluggish markets for their major products, which significantly reduces their chances of winning new orders.

3. Outlook for the second half of 2011

(1) Offshore plant market is picking up

In the offshore plant sector, new orders for drillships and related products such as FPSO, LNG-FPSO, LNG-FSRU are expected to increase in case of sustained oil prices. Large domestic shipyards' orderbook for large containerships and LNG carriers is expected to rise until the second half

Table 8. Outlook on the change in conditions for shipbuilding industry

	Positive factor	Negative factor
Order intake	-Expansion of opportunity factors arising from Japan's nuclear crisis (growth in orders for LNG carriers) -Increase in orders for offshore plants amid high oil prices -Revived markets for flagship products of large shipyards (LNG carriers, containerships)	-Sustained overcapacity by type of ship -Inadequate normalization of ship financing -Deepening polarization due to the worsening market conditions for flagship products of small/medium-sized shipyards (oil tankers, bulk carriers)
Production	-Improvement of productivity -Continued construction of secured volumes	-Reduction in order backlog -Continued retrenchment of small/medium-sized shipyards (shutdown, receivership, etc)
Domestic consumption	-Expansion of ship fund	-Order placement of domestic shipping companies with overseas shipyards (China)
Export	-Consecutive export based on delivery schedule -Construction and export of ships ordered during the high-price period	-Inadequate recovery of shipping market
Investment	-Investment in R&D and business diversification (wind power, energy)	-Decrease in facility investment amid declining shipbuilding volume
Overall evaluation	-Deepening polarization due to different market conditions for flagship products of large and small/medium-sized shipyards (The shipping market for some types of ships is rebounding, but small/medium-sized shipyards are facing difficulties arising from sustained overcapacity, declining orders for small/medium-sized ships, difficulty in issuance of R/G. -Higher capacity utilization rate of large shipyards owing to the increasing order intake, surge in export based on amount due to the increased hand-over of ships on delivery delay and construction of high-priced ships, less import (blocks made overseas) along with the slight decrease in shipbuilding volume	

of this year. However, the growth is attributed to external factors (slow-steaming to cut CO_2 emissions and fuel consumption, nuclear crisis in Japan, etc), not the result of adjustment of demand/supply in the shipping industry, and therefore the growth will be limited to some degree.

Bulk carriers have severe overcapacity and BDI still stands below 1,500 points and will be difficult to exceed 2,000 points on annual average (the break-even point for bulk carrier operators is around BDI 3,000 points). The oil tanker market is expected to face similar stagnation.

Meanwhile, small/medium-shipyards which have nearly no prospect of winning orders in sectors other than product carriers, small/medium-sized bulk carriers, etc, may find their trouble aggravated by the ongoing retrenchment and restructuring.

(2) Rising prices of newbuilds

Prices of most newbuilds had recovered slightly from the trough before falling again, except for LNG carriers, but are expected to steadily increase along with the recent hike in the prices of steel plates.

Prices of containerships and LNG carriers, which recovered recently, have dropped by 20.6% and 18.4% from the peak, respectively. However, the prices of bulk carriers and oil tankers have declined by as much as 44.3% and 32.0%, respectively, from the peak. (Table 6)

The prices of newbuilds are expected to increase slightly in the second half of this year in tandem with the increase in the prices of steel plates, but will be affected by the supply/demand conditions.

The slight increase of newbuilds' prices which is anticipated in the second half of this year will be driven mainly by the increase in the prices of steel plates, but the newbuilds' prices will be affected by the demand/supply conditions.

(3) Reduction in the shipbuilding volume

The decline in order backlog has slowed down amid growth in new orders since the second half of last year. Shipbuilding volume, however, is expected to shrink in view of the impact of stagnation in order intake during the previous period and the dwindling order backlog. Considering the order drought in the period spanning the out-

break of global financial crisis until the first half of last year and current low volumes of ships built, the shrinkage in the shipbuilding volume will be unavoidable even if the construction of ships on delivery delay is completed.

Thus, shipbuilding volume in the second half of 2011 is expected to stand at 7.35 million CGT, about 0.8% less compared to this year, and total shipbuilding volume for 2011 is expected to stand at 14.82 million CGT, a decrease by 0.6%.

The export in the second half of this year is projected to increase by 5.6% year-on-year to USD 25.9 billion and reach USD 57.5 billion, an increase by 17.1% on annual basis, following the completion of the ships on delivery delay - which are ships ordered when the ship prices hit highs - and large-scale projects such as offshore plants.

Meanwhile, the import in the second half of this year is projected to decrease by 3.0% to USD 2.86 billion due to the declining influx of blocks manufactured in Chinese factories, and reach USD 5.1 billion, a decrease by 2.1% on annual basis.

(4) The impact of Japan's earthquake to be reflected in the 2nd half of 2012

The impact of March earthquake in Japan which has boosted new orders for LNG carriers and will be reflected only after the second half of next year. As the design and construction usually take more than 2 years, the performance in terms of production and export will not be reflected until the second half of next year. The supply of the Japanese-made steel plates which was disrupted over the short-term will be completely adjusted in the first half of the year and resume normally from the second half of the year.

5. Suggestion

Firstly, Hong Jeong-in, a researcher at Korea Institute for Industrial Economics and Trade (KIET) suggested based on the research data that the commissioned management would be an effective approach to helping small/medium-sized shipyards overcome a series of short-term problems and keep building ships.

Leveraging the marketing and technical support of large shipyards to increase facility utilization rate, small/medium-sized shipyards can boost profitability and resolve problems involved in issuance of refund guarantee (RG) and order intake at the same time. Particularly, This approach is expected to help overcome their competitive disadvantage against China in the construction of universal ships.

From the standpoint of balanced growth between large shipyards and small/medium-sized shipyards, the operation and maintenance of ship-

Table 9. Outlook on the supply/demand of shipbuilding industry

(Unit: 10,000 CGT, USD 1 million, %)

	2009	2010			2011		
		1st half	2nd half		1st half	2nd half	
Production	1,441 (-0.7)	750 (4.7)	740.7 (2.2)	1,491 (3.5)	748 (-0.3)	735 (-0.8)	1,482 (-0.6)
Import	4,872 (-8.5)	2,270 (-4.0)	2,943 (17.4)	5,213 (7.0)	2,250 (-0.9)	2,855 (-3.0)	5,105 (-2.1)
Domestic consumption	101 (-4.1)	50 (-2.5)	55 (9.8)	105 (4.0)	48 (-4.0)	50 (-9.1)	98 (-6.7)
Export	45,128 (4.6)	24,568 (1.8)	24,544 (16.9)	49,112 (98.80)	31,580 (28.5)	25,920 (5.6)	57,500 (17.1)

building facilities necessary for continued construction of ships are very essential and important process. Recently, Daewoo Shipbuilding & Marine Engineering (DSME) has decided to manage on a contractual basis Daehan Shipbuilding currently undergoing a restructuring process, which may be a good example of creating synergic effect between both companies.

Secondly, support needs to be provided to facilitate development of core technologies for green ships, extreme ocean plant, leisure vessels, and expansion of infrastructure in order to ensure differentiation of shipbuilding market for general population and enhance competitiveness.

Vigorous support for new growth engine sector will be pivotal in helping differentiate the markets of both large shipyards and small/medium-sized shipyards, build up their competitiveness and facilitate business conversion.

Thirdly, multifaceted support needs to be provided to marine equipment manufacturing sector in their quest for expanding export to major shipbuilding countries, so that the facility utilization rate can be maintained in the marine equipment manufacturing sector proportionally to the growth in the shipbuilding volume along with the expansion of market. Specifically, domestic marine equipment manufacturers have a bright prospect for exports in view of the fact that the localization rate of equipments at Chinese shipyards - which accomplished rapid growth in shipbuilding volume recently - stands at approximately 45%. However, domestic small/medium-sized shipyards are expected to face many problems in attempting to make inroads into foreign markets.

To help small/medium-sized equipment manufacturers expand export, it is necessary to offer market related information about the regions or countries targeted for export, support promotions of products in international trade fairs, and provide multifaceted support (support of local agency, etc) necessary for boosting the export of equipments to China where the transaction structure is complex.

III. New orders for overseas plants in the first half of 2011

According to the Ministry of Knowledge Economy (MKE) and the Korea Plant Industries Association (KPIA), domestic plant industry was awarded orders valued at a total of USD 28.3 billion (approximately KRW 31 trillion 130 billion) from overseas clients. That represents a decrease by 15.5% compared to the same period of last year, but is an increase by 90.2% if the nuclear power plant project awarded in January last year from United Arab Emirates (UAE) is excluded.

That shows strong growth in the orderbook for offshore plants. New orders received so far in the offshore plant sector are valued at USD 11.9 billion which exceeds USD 8.6 billion registered last year. Another factor behind the surge in new order bookings is that the offshore plant sector was not affected very much by the political instability in the Middle East countries such as Saudi Arabia (USD 8.3 billion), a traditional plant market.

7 new orders out of 9 projects valued at over USD 1 billion were awarded for the construction of offshore plants, including 1 LNG FPSO order from the Netherlands (Samsung Heavy Industries (SHI), USD 1.9 billion), 1 FPSO order from a European client (Hyundai Heavy Industries (HHI), USD 1.2 billion), etc.

By region, domestic companies saw sharp decline in the order intake (from USD 24.1 billion to USD 14.1 billion) from the Middle East, but actually showed strong performance despite political instability in Middle East if the nuclear power plant project mentioned above is not taken into account. In addition, the sharp upswing in new orders from the Americas (229%) and Europe (75%), a majority of which are offshore plant orders, has resulted in more balanced regional distribution of new orders which were received mostly from the Middle East. (Table 10)

Based on the field of facilities, a solid rise in new orders has been registered in the oil & gas (162%) and offshore plants (151%) which are related to the onshore and offshore oil/gas drilling and processing. Moreover, the industrial facility and equipment sectors showed significant growth with small/medium-sized plant and equipment manufacturers expanding business into foreign markets. (Table 11)

In the second half of this year, new orders for oil/gas and offshore/power generation plant sectors are expected to register steady growth amid

Table 10. Order intake by facility

Type		First half of 2010 (cumulative)		First half of 2011 (cumulative)		Variation (%)
		Performance (USD 1 million)	Share (%)	Performance (USD 1 million)	Share (%)	
Total		33,477	100.0	28,298	100.0	-15.5
Facilities	Power generation/ desalination	23,118	69.1	6,060	21.4	-73.8
	Offshore	4,720	14.1	11,882	42.0	151.7
	Oil&gas (onshore)	2,553	7.6	6,697	23.7	162.3
	Petrochemical	2,411	7.2	1,880	6.6	-22.0
	Industrial facilities	594	1.8	1,370	4.8	130.6
	Equipments	81	0.2%	409	1.4%	404.9

Table 11. Order intake by region

Type		First half of 2010 (cumulative)		First half of 2011 (cumulative)		Variation (%)
		Performance (USD 1 million)	Share (%)	Performance (USD 1 million)	Share (%)	
Total		33,477	100.0	28,298	100.0	-15.5
Region	Middle East	24,094	72.0	14,107	49.9	-41.5
	Asia	3,818	11.4	3,492	12.3	-8.5
	Africa	944	2.8	531	1.9	-43.8
	Europe	3,269	9.8	5,722	20.2	75.0
	Americas	1,352	4.0	4,446	15.7	228.8

high oil prices and spike in demand for energy and power generation as a result of the industrial power generation plans of emerging economies. However, uncertainties exist, including the possibility of cancellation or delay of projects, fiercer competition, etc, while the global financial crisis persists.

-Energy consumption forecast (EIA, 2010): Middle East 2.2%, Asia 2.8%, global average 1.4%

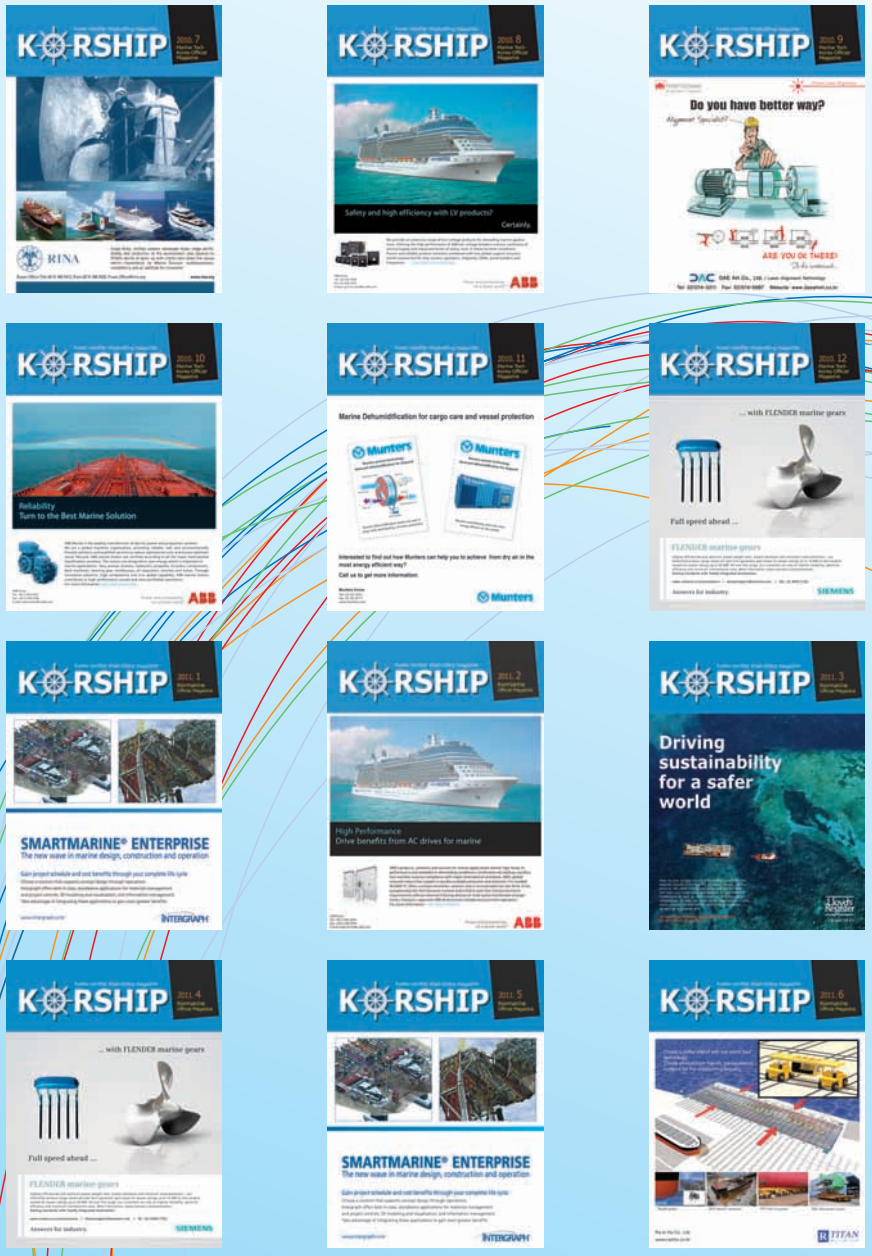
-Growth rate of plant market (2010-2015, ADL, 2009): oil & gas 8.4%, power generation 4.7%

In response to that, MKE announced that it would be active in playing supporting roles to help strengthen industrial cooperation by country and region to ensure steady growth in order intake. Specifically, MKE will arrange venues that can provide unique platform for discussing the measures to expand practical cooperations with the players from each of the emerging markets such as Central/Latin America, Africa which are currently mapping out plans for large-scale industrial development and infrastructures, and continuously provide support to help small/medium-sized plant companies and plant equipment manufactures expand their capabilities and make inroads into foreign markets. Besides, MKE plans to establish comprehensive and multi-phased strategies for developing offshore plant industry in the second half of this year (in December, 2011) in a bid to help the industry gain firm foothold in the global offshore plant market which has gradually came into limelight.

-Korea-Africa forum (scheduled for October), dispatch of new order mission (scheduled for September in India), events for the invited clients (Power Plant & Equipment Korea in September), etc

-Support for the evaluation of small/medium-sized plant projects, registration of equipment vendors, dispatch of trade mission

-A research titled 'Analysis on the competitiveness of offshore plant industry and strategies for short and long-term development' has been contracted out (from May to October, 2011).



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Bosch electric power tools at the fore-front of wireless revolution

Senior Vice President and Head of Asia Pacific Bosch Power Tools Division Dr. Werner Benade

In late June, Senior Vice President and Head of Asia Pacific Bosch Power Tools Division Dr. Werner Benade visited Korea, a country in which Bosch has registered a strong double-digit growth for 7 consecutive years, the highest rate worldwide. This interview with him provides insight into the topics of global electric power tool market, along with trends and outlook of the Korean market, from the perspective of Bosch which has captured the largest share in the global market.

Dr. Werner Benade (middle), Senior Vice President and Head of Asia Pacific Bosch Power Tools Division

Bosch, a leading global supplier with over 50% share in the global market for electric power tools, achieved consolidated sales of EUR 3.5 billion in 2010, an increase by 19% from the previous year, and registered splendid growth in major markets such as Asia Pacific (30% share), Latin America (39% share), and Europe (19% share). Specifically, Bosch has put an added emphasis on Asia-Pacific region over the recent years and boosted its market share in the region by as much as 14% just in 4 years.

Dr. Werner Benade came aboard at the end of last year as Senior Vice President and Head of Asia Pacific Bosch Power Tools Division of Bosch which has come into limelight in the global market. In late June, he visited Korea, "one of the countries where Bosch has accomplished double-digit

growth for 7 consecutive years" and said, "Bosch will more actively target the Korean market using its global and independent cutting-edge green technologies."
He remarked, "Korea is one of the earliest adopters of innovative technologies and state-of-art products worldwide. Bosch has been mapping out strategies that suit Korean market by focusing on marketing wireless electric power tools with built-in lithium ion batteries, the proprietary technology of Bosch."
Bosch is the world's first company that applied lithium battery technology to rechargeable wireless electric power tools. In particular, the premium lithium ion battery technology of Bosch has unrivalled advantages in terms of power, weight, performance, lifespan, and speed, and enhanced energy efficiency contributing to the conservation of energy and environment.
The following is a series of questions and answers in an interview with the Senior Vice President and Head of Asia Pacific Bosch Power Tools Division Dr. Werner Benade.

Q : Is this your first visit to Korea? What is the purpose of your visit to Korea this time?

A : This is my first visit to Korea. I came aboard in October last year as Senior Vice President and Head of Asia Pacific Bosch Power Tools Division. I came to Korea, the priority market, to identify current market trends of Asia-Pacific region upon completing the transfer of duties from my predecessor over the past few months after the relocation of Asia-Pacific headquarters (from Hong Kong to Shanghai, China, on April 1, 2011).

Q : How do you compare the current trend of electric power tools with the trends in United States, Europe, and Korea? What is your prediction of future electric power tools?

A : Undoubtedly, powerful rechargeable tool is the global trend in the electric power tool market. I predict a gradual replacement by wireless tools, given the current long lifespan and unmatched power output of batteries.
In my personal view, multi-purpose tools which can cut not only woods but also aluminum, etc, have gained popularity in the Asian market, like 'GCM10M', Bosch's next-generation sliding angle cutter which enables precise cuts in various materials.
Users in Asia, specifically in Korea, prefer small, portable, convenient, and powerful tools that reduce the buildup of fatigue. In response to that, Bosch has made an effort to fully reflect these requirements of users in product development.

Q : What efforts have Bosch made to figure out the requirements of Korean consumers?

A : We have proceeded with market researches in many Asia-Pacific countries, and Korea tops the priority list of these countries for our market research. Recently, we have focused on consumer U&A (usage and attitude) research in a bid to have a firm grasp of users' work habits (e.g., types of works that they are performing, functions that they need to carry out works, problems and challenges involved in works). The results of these researches have bee vigorously incorporated into product development. That reflects the creed of Bosch, "Listen, research, grow!"

Q : Recently, wireless electric power tools applying lithium ion batteries have been rolling out one after another. What is your expectation regarding the spread of these wireless tools?

A : We are currently witnessing the transition from the wired to the wireless in the electric power tool market worldwide, and the lithium ion battery technology has been the main contributor to this new trend. Korea has an advanced market for rechargeable tools. Korean consumers are familiar with new lithium ion technology and highly praise compact and powerful features.
Thus, nearly a half of our sales in Korea are generated from the rechargeable tool sector, and most of these rechargeable tools incorporate the lithium ion battery technology.

Q : Have you visited the tool shops in Cheonggyecheon Stream area in Korea? What improvement do you think must be made there?

A : As mentioned before, this is my first visit to Korea. I would never say that this is my last visit to Korea. Korean market has come a long way and is incredibly vibrant and dynamic. Growth is taking place everywhere, and there are many new construction sites and new projects. I was amazed at many things during this visit.
I learned a lot from Korean users, and I can say for sure that I will keep learning many things from them.
To compare with the German market, Korean consumers also tend to put an emphasis on the value of innovation and

know the usage for enhancing the efficiency of work.

Q : Bosch has achieved double-digit growth for 7 consecutive years in Korea. What do you think is the main driver for Bosch's remarkable growth in the market share in Korea?

A : I think that such rapid growth was driven by our focus on the functions that consumers want, such as strong body, ease of use, capability to improve efficiency of work, etc, not merely focusing on innovation. Another key factor is our steady investment in brand, specifically in new communication channels, such as internet and mobile apparatus, which provide the capability for direction communication with consumers or clients.

Q : What do you think is the distinguishing features of Korean market compared to Chinese or Japanese market?

A : That is a little bit difficult question. The markets of 3 countries, China, Japan, and Korea, have clearly different characteristics. Korean consumers opt for innovative products to complete works fast, a trend similar to that of Japanese consumers. On the other hand, Korean market is very vibrant and dynamic in similar way to Chinese market. In short, Korea is a highly dynamic market that recognizes and highly praises the value of innovation in increasing the efficiency of work.

Q : Do you think that Korea is setting the trend in the global electric power tool market? If so, why is that?

A : Sure. Kore plays a very important role as the trend-setter in the market for electric power tools. Korean consumers are early adopters who accept and absorb new technologies very quickly. A good example is the broader spread of researchable tools and laser distance meter which apply lithium ion technology.

Q : Does Bosch have any electric power tool specialized for the Korean market?

A : Korean consumers need small, lightweight, strong, durable products that provide excellent performance.
One of the examples is 'GWS7', a 4-inch slim line angle grinder with slim hand grip. All product lines of rechargeable tools applying lithium ion batteries meet these requirements. 'GCM10M' the sliding angle cutter, was designed to cut not only wood or metal but also aluminium in line with the requirements of Korean consumers who want to work on various materials.

Q : What companies are the current competitors of Bosch, and what are the strength of Bosch products compared to competitors?

A : We are competing with both domestic and overseas tool manufacturing brands in the market. Our greatest strength lies in the power of innovation rooted in the tradition of Germany's engineering. This year marks a milestone as Bosch is celebrating its 125th anniversary. 8 decades have passed since we began to research into and produce electric power tools. Innovation is in the DNA of Bosch and the driving force of its growth.
Considering that 36% of sales in Asia-Pacific comes from new products rolled out less than 2 years ago, I can say with confidence that Bosch is leading the innovation.

Q : Bosch products are distinguished for beautiful design. What meaning does the design have in the electric power tools?

A : Design means external appearance and impression of tools, and has 2 basic functions. First, it ensures easy operation and ergonomic comfort. Third, it embodies the characteristics of tools. Bosch tools embody power, solidness, durability, trust, etc. Bosch Power Tools Division has very strict and meticulous guidelines on design considering both aspects of design.

Q : Bosch is the first foreign company that expressed willingness to pursue co-growth. What is the background and what specific effort has Bosch made for co-growth?

A : I think that the solid relationship between Bosch and customers is one of the key contributors to our rapid growth in sales and business in Korea. To help wholesalers, retailers, and all types of customers enjoy thriving business, we have developed and constantly offered marketing programs to boost their sales. 'Demonstrator' is one of good examples. We directly offer Demonstrator to customers' shops, creating opportunities for them to sell Bosch electric power tools directly to consumers. Consumers can have the hands-on experience with the Bosch products and understand their advantages.

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LIFE MATTERS

Strides towards co-growth

Domestic shipbuilding giants are making tangible progress in quest for co-growth with vendors. Hyundai Heavy Industries (HHI), Samsung Heavy Industries (SHI), Daewoo Shipbuilding & Marine Engineering (DSME), STX Offshore & Shipbuilding (STXOS) signed agreements to create co-growth funds one after another and have rolled up their sleeves to support vendors.

Large domestic shipbuilders' support for vendors are gathering pace. Daewoo Shipbuilding & Marine Engineering (DSME) and STX Offshore & Shipbuilding (STXOS) created co-growth funds with commercial banks in June, adding a fresh momentum to domestic shipbuilders' drive for establishing and promoting co-growth funds dedicated to supporting vendors.

Domestic shipbuilding giants such as Samsung Heavy Industries (SHI), DSME, STXOS have entered into cooperation agreements with vendors and have been expanding their support for vendors and striving to establish co-growth funds, to start with Hyundai Heavy Industries (HHI)'s conclusion of a cooperation agreement with vendors in 2009 for the first time in the domestic shipbuilding industry.

HHI, the first to drive for co-growth in the industry

HHI made clear that it would pursue co-growth with vendors when it announced a fair trade agreement in June, 2009, which was formulated to ensure fair trade between large businesses and small and medium-sized businesses (SMBs) and provide technical support and funding. This agreement covers the establishment of fair trade, financial support from the holding companies, administrative support, etc, with an objective of promoting co-existence and collaboration between large businesses and SMBs. In addition, HHI's supportive measures focus on ameliorating the financial difficulties of vendors. HHI specially established a KRW 70 billion special fund with Industrial Bank of Korea (IBK) to support vendors and boosted the fund by infusing KRW 35 billion additionally into it last month. Thus, HHI is currently operating a fund valued at a total of KRW 105 billion. Moreover, HHI has also created a fund worth KRW around 128 billion in conjunction with financial institutes for extending unsecured 'Network Loan', new financing vehicle, to vendors. The Network Loan is offered to vendors by the holding company to help them finance the purchase of facilities and business activities.

HHI concluded an agreement with IBK to establish a co-growth fund on December 14, 2010, and has expanded the eligibility of the funding to cover the secondary vendors although the funding was made available only to the primary vendors previously. Since the agreement went into effect, HHI has allowed about 2,700 vendors, both primary and secondary vendors, to be eligible to receive the funding - which used to be offered only to around 2,000 primary vendors previously - from the co-growth fund that HHI has been operating with IBK since February 2009. Furthermore, loans are

HHI held a ceremony to announce an agreement, 'HHI Group fair trade', in parallel with the HHIMBS' new year party on January 21, 2009 for the first time across the industry.

made available to the vendors with low interest rate which is approximately 3.5 to 5.7%, down by 2% from the previous level.

This agreement also includes the establishment of the Co-Growth Center where vendors can report inconveniences in the business dealings with HHI, apply for the co-growth loans, submit requests for consulting on tax affairs and business administration, and seek consultation from financial advisors and related services, etc.

In February 2011, HHI embarked on the effort to establish a fund worth KRW 30 billion in a bid to develop technologies in collaboration with the Small and Medium Business Administration (SMBA). On February 15 of the same year, HHI held a signing ceremony to formulate an agreement for establishing a fund dedicated to supporting the development of technologies through private and public sector collaboration. The event witnessed the convergence of many eminent officials, including the Chairman of WinWin Growth Committee, Administrator of SMBA, Secretary General of the Large, and Small Business Cooperation Federation, etc.

Under this agreement, HHI and SMBA will infuse KRW 15 billion each to create a fund worth a total of KRW30 billion, aiming to assist SMBs in technology development. The funding is targeted at the product development works and HHI will purchase the developed products.

With this agreement signed, HHI and SMBA will offer the funding equivalent to up to 75% of the ceiling which has been set at KRW 1 billion per project regarding the costs of SMBs' localization and new product developments.

Lee Jai-Seong, President & CEO of HHI, remarked on the same day, "This agreement is significant, considering that the government and a large company joined forces to help small and medium-sized businesses expand their technological capabilities in an endeavor to ensure financial support that can ease their path to developing technologies and facilitate their foray into new markets. HHI will be able to edge out competition more easily if small and medium-sized businesses successfully develop technologies."

Currently, HHI has around 200 internal vendors and about 2,300 external vendors.

HHI decided to create technology development fund for small and medium-sized companies, worth a total of KRW 30 billion in January. The photo shows Ahn Byeong-hwa, Secretary General of the Large and Small Business Cooperation Federation, Lee Jai-seong, President & CEO of HHI, Kim Dong-seon, Administrator of Small and Medium Business Administration, and Jeong woon-chan, Chairman of Co-Growth Commission.

SHI signed a co-growth agreement at the Group level

SHI entered into an agreement to promote fair trade and co-growth at the Group level on April 13.

In the signing ceremony, 9 affiliates of Samsung Group concluded agreement with 3,021 primary vendors. Subsequent to that, these primary vendors signed agreement with 2,187 secondary vendors. Thus, total of 5,208 vendors who supply to Samsung Group executed the agreement with quest for co-growth.

Particularly, Samsung Group will finalize the formal co-growth agreement with the secondary vendors to lay groundwork for expanding the co-growth boundary and ensuring sustainable co-growth, going beyond the formal agreement with the primary vendors. SHI will offer incentives to the primary vendors who perform the terms and conditions of the agreement in good faith and earnest.

To continue this endeavor to ensure sustainability in the co-growth, Samsung Group will actively adjust the per-unit cost depending on the price variations while operating the departments handling the matters

related to affiliates and reflecting the contribution of officers of departments which serve as liaison with vendors to the co-growth when their performance is evaluated.

Samsung Group will offer a total of KRW 610 billion to vendors, including KRW 186 billion in support of R&D, to enhance financial conditions of vendors and plans to make disbursement 3 times a month to vendors, instead of 2 times.

Meanwhile, SHI created a fund worth approximately KRW 120 billion with IBK in accordance with the said agreement and injected KRW 30 billion into it. The loan rate is set at 2.5%, lower than the market rate, and 1 company received the fund thus far.

An official from SHI said, "We will do our utmost to ensure real co-growth by leveraging tripartite collaboration involving Samsung, its vendors, and government to help vendors build up global competitiveness."

STXOS held a ceremony to conclude an agreement on June 28 on creating a co-growth fund worth a total of KRW 38 billion with the IBK, Kyongnam Bank, and KDB. The photo shows Yoo Sang-jeong, Vice-President of IBK, Shin Sang-ho, President & CEO of STXOS, and Jeong Ho-sang, General Manager of Kyongnam Bank (from the left).

DSME established special fund with KDB

DSME began a full-scale effort for co-growth when it formulated an agreement with Korea Development Bank (KDB) on June 30 to create a fund, 'DSME co-growth financial support special fund' worth KRW 41.1 billion.

The fund was established with the injection of KRW 25.8 billion from DSME and KRW 15.3 billion from KDB. The fund will be provided by KDB as loans to the vendors.

Loans will be made available with low interest rates, 2% lower than the benchmark rate, to the vendors of DSME, which will be practically helpful for cash-strapped vendors.

Vendors who opt for the loan can seek recommendation of DSME. The loan review process is completed within 1 year, depending on the track record of supply to DSME. The loans are available at all branches of KDB.

Along with that, DSME will settle the payment 100% in cash to vendors and make disbursement 3 times a month, instead of 2 times, to shore up financial health of vendors.

An official from DSME said, "We will make continued effort to

Table. 1 Co-growth funds of major domestic shipyards

	HHI	SHI	DSME	STXOS
Time of fund creation	January, 2009 (increased in June, 2010)	April, 2011	June, 2011	June, 2011
Fund size	KRW 105 billion in all (Independent infusion of KRW 20 billion)	KRW 120 billion in all (independent infusion of KRW 30 billion)	KRW 41.1 in all (independent infusion of KRW 25.8 billion)	KRW 68.1 in all (independent infusion of KRW 19 billion)
Interest rats (compared to the market rate)	2% ↓	2.5% ↓	2% ↓	1.9-2.5% ↓
Financial institutes	IBK	IBK	KDB	IBK, Kyongnam Bank, KDB
Performance	Executed KRW 90 billion	Provided loan to 1 company	Currently under way	Currently under way

** Note: Some data were sourced from the Economy Today.*

A ceremony to announce STX co-growth and fair trade agreement entered into between STX Group and about 500 vendors, held on October 15, 2010

ensure seamless provision of loans to vendors with excellent technology and high growth potentials, and will closely negotiate with vendors to make sure that the financial support system can further expand."

Currently, a total of 120 internal vendors are registered with the Co-Growth Promotion Committee, in addition to 695 external vendors. Among them, 99 vendors submitted application to DSME for funding and 62 vendors were determined eligible for the funding through internal review. Further details related to the provision of funding are unavailable so far because the fund was created recently.

STXOS created the co-growth fund with commercial bank

STXOS also embarked on establishing a fund in collaboration with a commercial bank to support vendors recently.

In a signing ceremony on June 28, STXOS formulated an agreement to set up a co-growth fund worth a total of 38 billion with Kyongnam Bank and IBK, which was followed by the execution of an agreement with KDB on July 4 to play a part in the creation of the co-growth fund.

The fund was created with the injection of KRW 19 billion from STXOS, KRW 12 billion from IBK, and KRW 7 billion from Kyongnam Bank. IBK and Kyongnam Bank will operate KRW 24 billion and KRW 14 billion of the funding, respectively, in the period ahead.

IBK which played a part in establishing this co-growth fund with STX in 2005 created the Network Loan, a new financing vehicle to provide vendors with low interest loans less than or equal to one sixth of the value of annual delivery based on the delivery performance.

In addition, Kyongnam Bank based in South Gyeongsang Province infused capital into the fund, which increases the access of companies in the South Gyeongsang Province - home to many marine equipment manufacturers - to the loans.

The co-growth fund of STXOS ballooned to KRW 68.1 billion after KDB injected capital into the fund last month. KDB additionally infused KRW 30.1 billion into the fund with STXOS after it entered into an agreement with STXOS on July 4 to create the co-growth fund.

The co-growth fund was snowballed with the capital injection of KDB, among which KRW 30.1 billion will be operated by KDB, KRW 24 billion by IBK, and KRW 14 billion by Kyongnam Bank.

The co-growth fund of STXOS will enable vendors to receive loans at low interest rate which is 1.9 to 2.5% point lower than the benchmark rate. Applicants for the loans can seek recommendation of STXOS.

An official from STXOS said, "We have paved the way for vendors to have easier access to low interest rate loans as part of our effort to help vendors conduct business activities with more ease. We will proceed with the co-growth effort based on trust with vendors by providing a suite of needed supports."

Meanwhile, STXOS held a ceremony to announce the agreement titled 'STX co-growth and fair trade' at a Group level on October 2010 and make clear that it would expand financial support and improve the terms of payment to subcontractors, play more supportive role in creating new business opportunities, provide more support for technology and education with an aim to help vendors achieve sustainable competitiveness, and expand collaborative projects for win-win/co-existence and fair trade.

STXOS's co-growth fund will begin to show tangible results soon although the fund was created recently and companies have yet to receive the funding. STXOS has approximately 500 internal vendors.

A venue to bring customers together

Edress+Hauser Korea held the 'Korea Sales Force Meeting 2011' in a complex called The Ocean Resort in Yeosu for 3 days from June 16. This year's event revolved around the theme of safety and efficiency of plant and drew around 150 customers from the Honam area, the southwest side of the Korea.

Edress+Hauser Korea hosted the 'Korea Sales Force Meeting 2011 (KSFM 2011)' in a complex called The Ocean Resort in Yeosu for 3 days from June 16 to 18. This annual event held by Edress+Hauser Korea provided a unique platform to introduce new technologies applicable to the automation market and new solutions created to maximize efficiency of process. Last year's event, themed around the shipbuilding and offshore solutions, took place on the Geoje island in South Gyeongsang Province and drew highly favorable reaction from the related industries.

Besides, this event is designed to bring together all agencies, employees, and major customers to evaluate and discuss aspects of business performance of the previous year and explore the directions for growth and enhance mutual understanding and harmony.

This year's event was a great success, drawing about 260 people including 150 major customers from the South Jeolla Province, all employees of Edress+Hauser Korea and agencies. An official from Edress+Hauser Korea said, "This event opened in Yeosu to add vitality to the local market in the Honam area, the southwest side of the Korea, and strengthen the market position and sales capabilities of Edress+Hauser Korea in this region."

Safety and efficiency of plant

On June 16, the first day of the event, a program was offered for the agencies and employees of Edress+Hauser Korea. They had opportunities to review the business performance of year 2010, envision future goals, and discuss targeted markets and realistic strategies in group.

On June 17, the second day of the event, the program consisted of 2 parts. The first part was dedicated to introducing the special features and practical applications of products to the invited customers, while the second part involved a technical seminar which revolved around the theme "safety and efficiency in plant, enhanceable with instrumentation".

Specifically, the first part covered the practical applications of flowmeter, level, pressure gauge by industry and the examples of cost-saving resulting from the use of spectrometer pH/Memosens.

The second part involved presentations on the energy management solution (EMS) in plants, importance of explosion-proofness and SIL (Safety Integrity Level) in plants, digital pH measurement and energy-saving, practical applications of inline ultrasonic flowmeter, latest technologies of guided wave radar, radiometic measurement system, and fieldbus technology.

Meanwhile, a banquet was held for the attendees in the outdoor square after the closure of seminar to solidify friendship and harmony, and Edress+Hauser Korea offered various events to add to the amusement.

Kim Iee-seop, President of Edress+Hauser Korea, said, "Edress+Hauser Korea has been on a stable and steady growth path with the support of customers in various fields of industry since it entered the Korean market in 1977. This event was prepared to reciprocate the trust and support that customers have shown to us, and I express my deepest gratitude to all customers here."

Firm on growth path

Endress+Hauser Group, which is Switzerland-based and founded in 1953, is a multinational corporation operating factories and branch offices in around 60 countries worldwide. It is a leading manufacturer and supplier of industrial measurement necessary for automated process, and has captured the world's second largest share in the related market and is further expanding its global market share.

Endress+Hauser Group, renowned for being in the vanguard of new technologies, has spent approximately 10% in R&D and is the only instrumentation supplier that offers a full range of process solutions for level, flow, pressure, temperature, analysis across a broad range of industries which optimize

'Korea Sales Force Meeting 2011 (KSFM 2011)' held by Edress+Hauser Korea for 3 days from June 16

processes enhancing the reliability and safety.

Edress+Hauser Korea opened branch offices in Ulsan, Yeosu, Busan, and Daesan and has risen above its growth path since it established local representative office in Seoul in 1997 with 100% capital investment of E+H Group. Specifically, Edress+Hauser Korea has registered double-digit growth every year since 2005, and aims to achieve KRW 100 billion in sales in 2015.

In addition, Edress+Hauser Korea has an excellent track record in various industrial fields including chemistry, oil and gas, shipbuilding, water treatment, etc, and has added prominent large domestic companies to its list of customers, including EPC (Engineering, Procurement, and Construction) companies.

These successful results are the culmination of its effort to actively communicate with customers across a wide range of industries by holding various product briefing sessions and conducting on-site visits, etc, and sharpen its competitiveness by aggressively responding to the challenge of expanding its organizational capabilities and providing a variety of training programs in an endeavor to offer more specialized information and services.

In relation to that, Kim lee-seop, President of Edress+Hauser Korea, stressed, "The best thing that we can do to reciprocate the support and trust which customers have lavished on us is to provide them with various solutions incorporating the latest technologies and the optimized products which can help them build up competitiveness as we stand firm on our belief that the support and trust of customers are the driving force behind our growth."

Siemens Korea Industry Automation Division held 'Integrated Automation Innovation Tour 2011 Roadshow' spanning 7 cities nationwide from June 10 to 30.

TIA Innovation Tour

Siemens Korea Industry Automation Division launched a 3-week 'Integrated Automation Innovation Tour 2011 Roadshow' travel that covered 7 cities across the country from June 10 to 30. Particularly, this event offered the solutions suited to the flagship industries of the 7 regions, captivating the participants.

Siemens Korea Industry Automation Division successfully held 'Integrated Automation Innovation Tour 2011 Roadshow' spanning 7 cities across the country, starting from Yeosu, through Changwon, Busan, Ulsan, Pohang, Asan, to Seoul, for 20 days between June 10 and June 30.

This roadshow aimed to reach out even closer to customers by providing customized solutions to 7 regions that form the backbone of the Korean industry, and was prepared in such a way that suited specialized industries by region. In particular, automation and drive solutions were displayed to allow participants to have hands-on experience using the live demonstration equipment, and drew highly favorable reaction.

In addition, TIA Portal, the engineering framework, was demonstrated, along with the presentation on the examples related to practical application of energy management solution. This event featured drives, PROFINET and solutions of Siemens, living up to the reputation of Siemens that pursue intuitive and efficient solutions.

The Integrated Automation Innovation Tour launched by Siemens this time offered a quick glance at the latest solutions and examples of practical application which are useful for customers' work.

This event was hailed as great success for providing a platform to present innovative and intuitive solutions unique to Siemens, reflect the requirements of customers as much as possible, and actively communicate with customers face-to-face.

Eun Min-soo, Vice President of Siemens Korea Industry Automation Division, said "We will continue to support customers by means of more diverse roadshows and exhibitions, harnessing the solid technologies and various know-how of Siemens."

EMERSON. CONSIDER IT SOLVED.

Shipbuilding using the on-ground build method, which HHI successfully completed in 2005 for the first time worldwide

Highly sophisticated patented technology of Korean shipyards

Recently, Korea has seen a significant growth in the number of patent applications in the domestic shipbuilding industry at a faster pace compared to rival countries such as China, Japan, United States, and is considered to have the differentiated patented technologies in qualitative terms.

Domestic shipbuilding industry which maintained the world's top spot until 2007, but was temporarily overtaken by Chinese rival which registered rapid growth bolstered by the Chinese government's policy to stimulate domestic demand (China pushed forward with the policy to stimulate domestic demand through fiscal pump-priming efforts, including the shipbuilding/shipping financing). However, domestic shipbuilding shipyards dethroned the Chinese rival by edging out China in new orders in the first quarter of 2011.

Growing number of patent applications

According to the survey of the Korean Intellectual Property Office (KIPO) on the trend of patent application in 5 major shipbuilding countries (Korea, China, Japan, European countries), the number of patent applications filed by Korean shipyards has been rising at a relatively faster pace compared to rivals such as China. In 2009 (the statistics is based on the period between 2001 and 2009 because disclosure of patent application is made only after a lapse of certain period (18 months later), Korean shipyards have applied about twice as many applications (1,454 applications) as the Chinese and Japanese rivals have. (Table 1)

In particular, Samsung Heavy Industries (SHI) has filed over 1,099 patent applications, exceeding 1,000 patent applications for the first time in the domestic shipbuilding industry. In addition, Hyundai Heavy Industries (HHI), Daewoo Shipbuilding & Marine Engineering (DSME) will reach the milestone of 1,000 patent applications this year. (Table 2, 3)

This increase in the number of patent applications has been driven by the expansion of the scope and functions of departments dedicated to the protection of intellectual property rights in large domestic shipyards. HHI and SHI set up Intellectual Property Office and Technical Planning Team, respectively. Meanwhile, DSME is operating Technical Planning Division.

Besides, the chief executives of large domestic shipyards have shown a heightened interest in patent application recently. Min, Gye-sik, CEO and Chairman of HHI, directly developed the fundamental technology for marine propeller blade and filed patent application for that, a technology which can reduce fuel consumption of containerships (which use about 300 metric tons of fuel a day) by 5% and has drawn highly favorable reaction from German ship owners.

Patent applications for technologies associated with hulls, offshore facilities, outfitting (B63B) have comprised the largest proportions and soared to 681 cases, an increase by approximately 20% from 2001 (34 cases), regarding the trend of patent applications by large domestic shipyards in technical field classified under B63 of International Patent Classification (IPC) over the last decade.

Table 1. Patent applications by country

	Korea	China	Japan	U.S.A	Europe	Total
2001	345	153	1,362	220	479	2,559
2002	340	194	1,569	782	523	3,408
2003	360	256	1,593	993	438	3,640
2004	470	303	1,293	1,237	560	3,863
2005	619	524	1,312	1,434	564	4,453
2006	563	374	1,086	1,203	361	3,587
2007	892	461	929	1,090	495	3,867
2008	1,236	540	772	1,108	580	4,236
2009	1,454	758	764	1,061	529	4,566

Note: 1. The above numbers were extracted from the DB based on patent applications disclosed between 2001 and 2009 (including utility model right). Patient applications filed after 2010 were excluded for reason of statistical accuracy because patent applications are disclosed 1 year and 6 months after filing and therefore the period after 2010 contains many undisclosed patent applications.

2. B63B: hull, offshore facilities, outfitting/ B63C: launching and construction of ships/ B63G: submarines and submersibles/ B63H: marine propulsion system/ B63J: view of ships

Table 2. Statistics on the patent applications by major domestic shipyards based on year (patent application DB, all IPCs)

Year / Patent applier	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
HHI	177	192	188	215	295	311	383	435	502	844	3,542
SHI	52	61	80	88	196	209	351	451	546	1,099	3,133
DSME	116	80	70	96	127	135	260	319	430	665	2,298
STXOS	0	0	2	8	2	53	50	118	81	85	399
HHIC	0	0	0	0	2	8	12	29	71	11	133

Note: Number of patent applications between 2001 and 2010, extracted from the patent application DB (including the utility model right)

Table 3. Number of patent/utility model right applications by major domestic shipyards (application DB, from Jan. to Apr. in 2011, all IPCs)

	HHI	SHI	DSME	STXOS	HSHI
Total applications	346	318	83	24	4

Additionally, the number of patent applications for marine propulsion system (B63H) ballooned 16 times larger in 2010 (161 cases) compared to 2001 (10 cases) amid increasingly stringent environmental regulations implemented by International Maritime Organization (IMO) in accordance with the United Nations Framework Convention on Climate Change, Kyoto Protocol, etc, to reduce the emissions of greenhouse gas, NOx, and SOx and save energy. (Table 4)

Patented technologies of Korea

Large domestic shipyards have highly sophisticated patented technologies differentiated from those of rival countries such as China, Japan, etc, in addition to quantitative growth in patent applications.

Among the patented and world's first technologies of large domestic shipyards are included HHI's marine propeller blade, an energy-saving technology, DSME's multiple offshore crane synchronization system, a loading/launching/shipbuilding technology, HHI's on-ground build method, SHI's floating dock shipbuilding technology, STXOS's skid

Table 4. Statistics on patent applications by IPC technical field (B63)
(application DB, 5 major domestic shipyards)

Year / Classification	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
B63B	34	44	30	30	97	103	247	378	538	681	2,182
B63C	3	4	2	16	23	8	17	27	14	8	122
B63G	0	0	0	1	2	6	6	4	5	18	42
B63H	10	15	5	11	50	38	56	83	81	161	510
B63J	2	2	1	1	5	8	23	29	37	88	196
Total	49	65	38	59	177	163	349	521	675	956	3,052

Note: 5 major domestic shipyards - Hyundai Heavy Industries, Samsung Heavy Industries, Daewoo Shipbuilding & Marine Engineering, STX Offshore & Shipbuilding, Hanjin Heavy Industries & Construction

launching system, HHIC's dam engineering technique, etc.
Meanwhile, the welding technology, combined with information technology (IT), has helped ensure high efficiency and high quality in shipbuilding process, including HHI's digital welding technique, SHI's automatic bonding system for the second barrier of LNG carriers, STXOS's welding machine using the optical communication technology. (Table 5)
Domestic shipyards has built up competitive advantage by forging ahead with the development of differentiated and highly sophisticated patented technologies, talented manpower and new technologies, and these ceaseless efforts have led to a steady growth in the number of patent applications.
The Korean Intellectual Property Office (KIPO) plans to push ahead with a project called 'Intellectual Property (IP) in R&D alliance' in a bid to support domestic shipyards in their quest to acquire patents for core and fundamental technologies and help them maintain the world's top spot. KIPO will also proceed with cooperation (based on MOU) with the The Korea Shipbuilders' Association (KOSHIPA) to further strengthen support to domestic shipyards and marine equipment manufacturers with respect to patent applications.
The 'Intellectual Property (IP) in R&D alliance' project is KIPO's strategic project focusing on the acquisition of intellectual property rights to technologies. In 2008, KIPO undertook a project in the shipbuilding sector for energy-saving technology related to ship performance.
The following relates to the major patented technologies of large domestic shipyards.

Schematic diagram of the stand-alone type LNG storage cargo hold, developed by DSME, and a LNG-FPSO fitted with that cargo hold

1. Marine propeller blade: Fitted to the steering unit behind the propeller, It has a shape that maximizes propulsion. Based on the principle associated with the lift of aircraft wings, it uses the energy from the swirl flow generated by propeller rotation for the propulsion of ship.

2. On-ground build method: It is an engineering method to launch hull horizontally by using a barge after assembling and loading the hull block on land, unlike the conventional method of shipbuilding in the onshore dry dock. The world's first ship built on land is the 'Challenger' constructed by HHI in October, 2004.

3. Floating dock shipbuilding technology: It is an engineering method to assemble and outfit the hull block in the floating dock using 3,000-ton large crane based on the mega block engineering technique, instead of in the onshore dry dock.

4. Multiple offshore crane synchronization system: Offshore works can be performed safety by synchronizing more than 2 offshore cranes in 1 offshore crane when loading or moving large merchant vessel block or offshore structure,

Table 5. Major patented technologies of large domestic shipyards

	Shipyard	Description	Special feature
Energy-saving technology	HHI	1. Marine propeller blade (application no. : 10-2007-0029663)	World's first, saves fuel by 4-6%
	SHI	Saver Fin (registration no. : 10-0718934)	Saves fuel by 5%, reduces vibration by up to 70%
	DSME	Pre-swirl stator propulsion system of low speed large-sized ship (registration no. : 10-0640299)	Saves fuel by 5%, increase the speed by 0.24 knots
Loading/launching/shipbuilding technology	HHI	2. On-ground build method (registration no. : 10-0949891)	World's first, shipbuilding without a dock
		Tandem submerge method (registration no. : 10-0953487)	Shortens the number of dock-use day (70 days →13 days)
		Drillship canister loading method (patent pending)	The thruster can be repaired internally.
	SHI	3. Method for shipbuilding in the floating dock (registration no. : 10-0496137)	World's first, shipbuilding in the floating dock
		Automatic ballast system and ballast control method for building large ships in the floating dock (registration no. : 10-0496136)	
	DSME	4. Multiple offshore crane synchronization system (registration no. : 10-0987022)	World's first, shortens the duration of loading
		Method for the LNGC cargo hold assembly in the floating/dry dock, and method for shipbuilding using the system footing (registration no. : 10- 923404, 10-0923405)	Localization, integration with block, shortens the shipbuilding period
	STXOS	5. On-ground build and launching method using the skid launching system (registration no. : 10- 623201)	World's first, loading → delivery: 100 days
		Equipment for transporting ultra-heavy objects using the hydraulic synchronous cart that has the tilting function (registration no. : 20-0382118)	Uses the module transporter, can transport 7,000-ton block
		Method for loading large blocks in the floating dock and offshore shipbuilding method (registration no. : 10-0914385)	Uses the module transporter, and does not require offshore crane
		Launching method using the hose by stage (registration no. : 10-1027865)	Optimizes the ballast for trim adjustment, shortens the time for launching
	HHIC	6. Dam engineering technique (registration no. : 10-0511946)	World's first, enables construction of ship larger than the dry dock
		Skid loading method for pre-erection loading of ultra-large blocks (registration no. : 10-328309)	Enable the loading of ultra-large blocks, shortens the shipbuilding period
		Method for loading the stern in the water (registration no. : 10-0553664)	Enables the pre-erection loading of large objects at the stern area
		Lifting-off launching method using the crane (registration no. : 10-864144)	On-ground build method, and lifting-off launching method using the crane
Welding technology	HHI	7. Digital welding technique (patent pending)	World's first, enables the uniformity in quality
	SHI	Method for welding corrugated objects and the device (registration no.: 10-0568627)	Corrugation shape tracking welding and control

	Shipyard	Description	Special feature
Welding technology	SHI	8. Automatic bonding system (registration no.: 10-0928316)	World's first, technology for the construction of the second barrier of LNG
		Device for inspecting the welded area (registration no.: 10-0587228)	Improves the reliability of inspection
	STXOS	9. SCR welding machine using the optical communication technology (patent pending)	World's first, combines IT technology
	HHIC	Vertical automatic welding technique (registration no.: 10-0864144)	Shortens the welding time (based on 10m in length with 75mm in thickness, 300 hours → 30 hours)
Hull structure	SHI	Top bracing of marine engine (registration no.: 10-0421609)	Resolves the chronic problem of breakage, installation in 150 ships (1998-2011)
	DSME	Passageway arrangement structure of deck house on board (registration no.: 10-1021522)	World's first, intercepts the pirates
		Stand-alone storage tank (application no.: 10-2009-0102122)	Independent technology, reduces the royalty payment for LNG tanks
Eco-friendly system	DSME	Fuel gas supply system of LNG carrier and the method for fuel gas supply (registration no.: 10-0835090)	Uses LNG fuel, reduces the emissions of NOx, SOx, and CO_2
Production technology	SHI	Built-in robot control system (registration no.: 10-0945884)	Resolves the problem of cable, automated production technology
	DSME	Dual low block slit assembly method for hull (registration no.: 10-0151613)	Improves productivity, saves cost
	STXOS	Automatic steel pile-up system using the magnetic crane (registration no.: 10-0910925)	Applies IT, monitoring, establishment of smart shipyard
		Automatic steel pile-up and marking system (registration no.: 10-0910925V)	Received the excellence prize of the 100 patent products award from the Prime Minister
Other technologies	HHIC	Robot for the non-destruction inspection of industrial pipes (registration no.: 10-0553664)	Removes foreign matters from pipes for transporting LNG and checking of the crack
		Gap adjustment fixture (registration no.: 10-0693706)	Prevents damage to the ship block and reduces the work hours

etc, using more than 2 offshore cranes.

5. Skid launching system: The hull can be launched horizontally from the floating dock after the assembly and loading on land in the same way as the skid launching method of traditional wooden vessels, unlike the conventional method of ship launching using a dry dock.

6. Dam engineering technique: The dam engineering method, a new technique, enables the construction of ship longer than the dock. The section of ship that can be loaded in the dock is built in and launched off the dock, and the section that exceeds the length of dock is built on land. The 2 different sections are welded together at sea.

7. Digital welding technique: It integrates the welding machine, feeder, carriage, cable, etc, into the digital system by dramatically increasing the productivity and quality of welded product using the digital communication method and control circuit. It allows the worker to monitor the conditions of welding equipments, such as welding voltage, electric currents, etc, via LED screen. Thus, even the welding beginners can produce high quality welding work and figure out any failure in the system.

8. Automatic bonding system: It is related to the automatic bonding machine that automatically performs construction of the secondary barrier of LNG cargo hold, and is characterized by the automated construction of secondary barrier in LNG carriers.

Transportation of a 6,500-ton green block built in land by STXOS, using the semi-submersible heavy-load carrier

Dam engineering technique of HHIC

Table 6. Patent applications by the 3 major domestic shipyards in the wind power sector (F03D)

(Unit: case)

Patent applicant	2006	2007	2008	2009	2010	Grand total
A company		1	3	9	28	46
B company				1	21	22
C company	1	1	2	4	6	14
Total	1	2	5	14	55	82

9. SCR (Sillicon Controlled Rectifier) welding machine using optical communication technology: It applies the method that controls electric currents and voltage by transmitting and receiving optical signal through less than 1mm thick optical cable between the welding machine and wire feeder, and specifically, improved convenience of work and performance.

Growth in the number of patent applications in the wind power sector

Meanwhile, domestic shipyards have made noticeable inroads into wind power sector since 2007. As fast movers in low carbon emission and green technologies that can be utilized as new growth engines, domestic shipyards which have maintained the world's top position have diversified and strengthened their business portfolios and expanded their foothold in wind power sector.

Three major domestic shipyards have embarked upon full-fledged expansion into the wind power sector. SHI delivered wind power generators to Cielo in the United States and completed wind power plant on Geoje island. DSME acquired DeWind, a U.S. wind turbine maker, and HHI established Green Energy Division and became the first domestic company to export wind turbines to Europe, thus making full-scale advancement into the wind power sector.

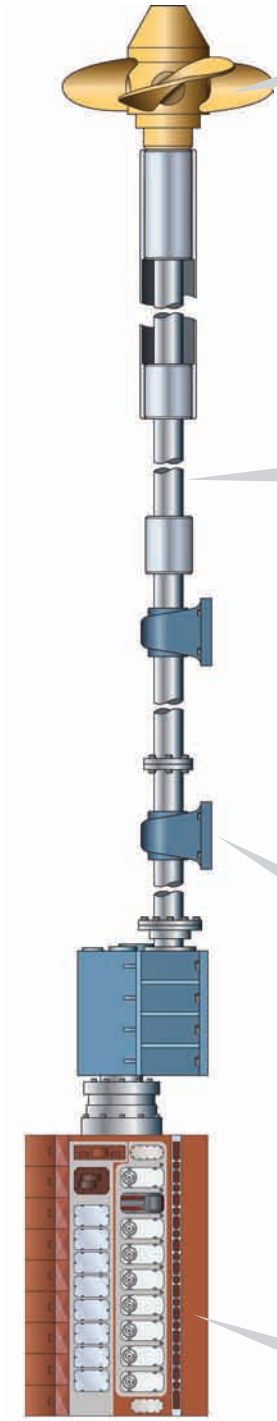
The patent applications filed by the aforesaid 3 major domestic shipyards soared over the recent 3 years to 55 cases in 2010 from 2 cases in 2007. In particular, domestic shipyards which have excellent technologies for shipbuilding and offshore structures are making significant headway into offshore wind power market rather than onshore wind power market dominated by European companies.

In 2010, the 3 major domestic shipyards filed 6 patent applications for the first time in the offshore wind power sector.

The installed wind power capacity is increasing by 25% annually as countries worldwide are striving to reduce greenhouse gas emissions in compliance with the United Nations Framework Convention on Climate Change and adding momentum to the green growth policy.

According to the KIPO, the number of patent applications filed by domestic residents in the wind power sector rose constantly over the recent periods to 669 cases in 2010 from 71 cases in 2002, an increase by 104% on the annual average, amid the growth in the global wind power generator market.

Marine industry moves forward thanks to laser precision alignment

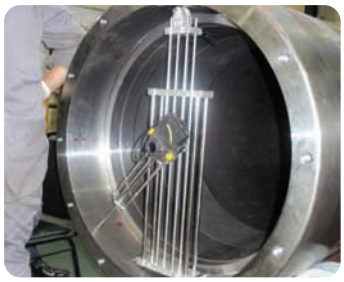


PROPELLER

LEVALIGN Ultra

STERN TUBE

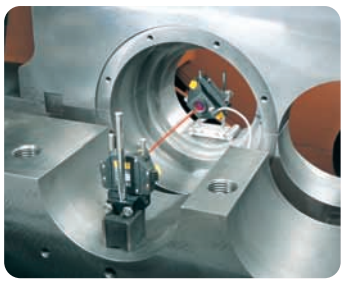
CENTALIGN Ultra
(unmounted shaft)



LONG SHAFT

ROTALIGN Ultra
(mounted shaft)

CENTRALIGN Ultra
(unmounted shaft)



MAIN ENGINE

ROTALIGN Ultra
(mounted crank shaft)

CENTRALIGN Ultra
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Cost-efficient switching of three-phase asynchronous motors

Contactron hybrid motor starter

Three-phase AC induction motors can be better depending on the requirements switch with mechanical or solid state contactors. A hybrid motor starter now combines the advantages of mechanical and solid state contactors in a single device without their drawbacks.

Phoenix Contact Electronics GmbH / Matthias Borotta

Three-phase asynchronous motors must be switched, reversed, and protected, especially in machine and plant construction. Moreover, they must be able to be switched off safely up to cat. 3 PL e, or SIL 3. Users also require a long life-span, a space-saving design, and an affordable price; and the devices should contribute to a high availability of the application. At this point, the question always arises as to whether such requirements are better fulfilled by the use of mechanical or solid-state contactors.

Both solutions bring advantages and disadvantages, which invariably result in compromises in the machine/plant design. In its Contactron hybrid motor starters, Phoenix Contact is now able to combine the advantages of both mechanical and solid-state contactors in a single device. The solid-state contactors switch the motor on and off via an integrated protective circuit in a wear-free fashion up to an output of 4kW. This enables a service life of up to 30 million operating cycles, which is approximately ten times that of a mechanical contactor. The additional circuitry means that the components adjacent to the hybrid motor starters in the control cabinet are not subjected to any further EMC interference.

Optimal function via the micro controller

The contactors become worn because the motor requires 8 times the rated current from the mechanical contactor contacts upon being switched on. Moreover, during the power down process, the contacts are subjected to an inductive surge, which generates a spark when the contact is opened. This spark leads to premature mechanical wear and tear on the contactor and hence a significant reduction in its service life. As with the contactors, the relays installed in the hybrid motor starter electrically isolate the input and output on the power side. They are connected in series to the semi-conductors to perform the emergency stop function so as to bring the motor to a safe standstill.

As a result, no extra emergency stop contactors are required. Relays also reduce power losses during operation through a bypass. This means that they are connected to the semi-conductors in parallel, rendering any heatsink superfluous. The relay-contacts are referred to as switching “cold,” i.e. without current or power, and only carry the motor's continuous current, which is uncritical.

The combination of mechanical relays and semi-conductors is referred to as hybrid circuits. This circuiting principle would not be sufficient on its own to secure the substantial advantages in comparison to contactors. To ensure optimal functioning, Phoenix Contact has integrated a microcontroller in

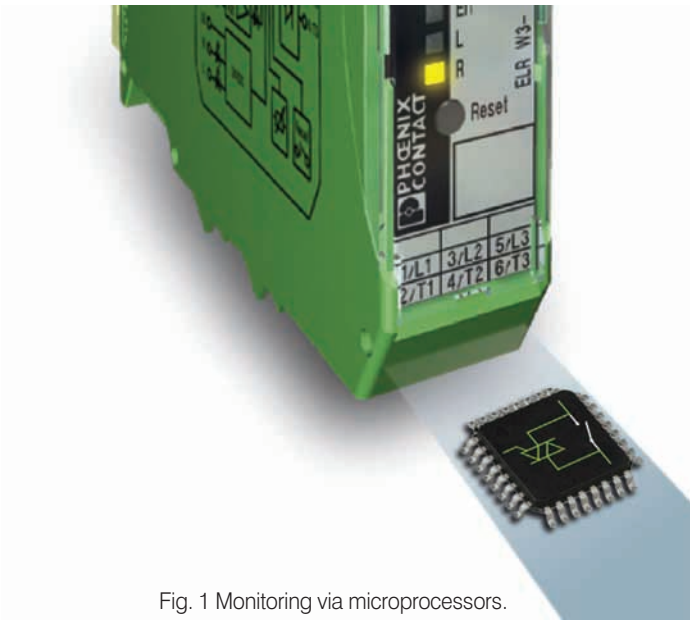


Fig. 1 Monitoring via microprocessors.

the hybrid motor starters. This monitors the switching behavior of the relays and power semi-conductors and ensures that the motor is switched off safely in the case of an internal or external fault (Fig. 1). Only in this way is operation possible in, for instance, Atex areas. This is confirmed by a certificate.

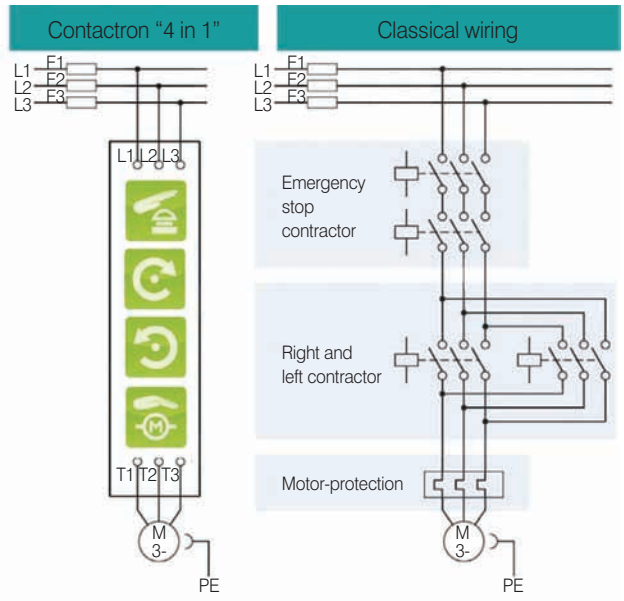


Fig. 2 How Contactron compares to the classical design of a reversing contactor circuit.

Little wiring required

Comparing the wiring of the load circuit of a mechanical reverse contactor combination with an emergency stop up to cat. 3, with the associated wiring of a "4 in 1" Contactron motor starter underlines the advantages of the new solution from Phoenix Contact (Fig. 2). While the hybrid motor starter only has six connection points, the conventional solution with mechanical contactors requires many more. Moreover, the control-side locking mechanism between the right and left controller as well as the load wiring are already integrated into the Contactron motor starters. This reduces the wiring required by up to 75%.

Simple monitoring

The in-built bimetal function provides reliable motor protection. To this end, the motor rated current is set and displayed via a potentiometer and LEDs located on the motor starter. The motor is switched off safely upon overload in accordance with the class 10 A bimetal curve (Fig. 3). Should a phase fail, the network monitoring device prevents the motor from starting. This information is also displayed visually via the LEDs on the motor starter. A floating changeover contact communicates the error - for example, to the control center.

Fig. 3 Reliable motor protection against overload.

Safe deactivation

Some applications require safe deactivation, and determining performance indicators within the framework of safety engineering has proven to be a highly difficult and thus time-consuming process. Insofar as the manufacturer has failed to provide the safety-relevant data regarding his components, it is the individual responsibility of the user to research or calculate this data. In view of this, the hybrid motor starters with their integrated safety function can be integrated into the safety circuit quickly and easily. This device fulfills all the

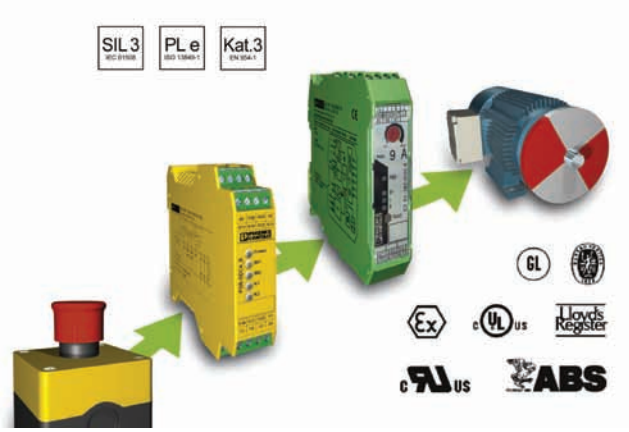


Fig. 4 Simple integration of a Contactron motor starter in the safety circuit.

requirements of IEC 61508 - SIL 3, following EN 954-1 - cat. 3 and the new standard ISO 13849-1 - PL e (Fig. 4).

Diverse applications

The hybrid motor starter combines up to four functions in a single device and can be operated in almost every area. Thus the planning and guarantee of reliable operation of the application number among the standard tasks of the employees of machinery and plant engineering. In addition to the selection of suitable components and solutions, the implementation of a secure motor control is a decisive factor. The hybrid motor starters take full advantage of their strengths, providing the user with the required reliability and thus contributing to a high level of plant availability.

The product family Contactron is available in various stages of expansion with between 1 and 4 functions. The most simple “1 in 1” device enables only the motor switching, while the maximum “4 in 1” version provides the functions clockwise contactor, counter-clockwise contactor, motor protection, and emergency stop. All modules measure only 22.5 mm, saving up to 75% of space in the control cabinet. The user is thus able to select from some 40 devices the motor starter which provides the functions required by the application at hand.

Conclusion

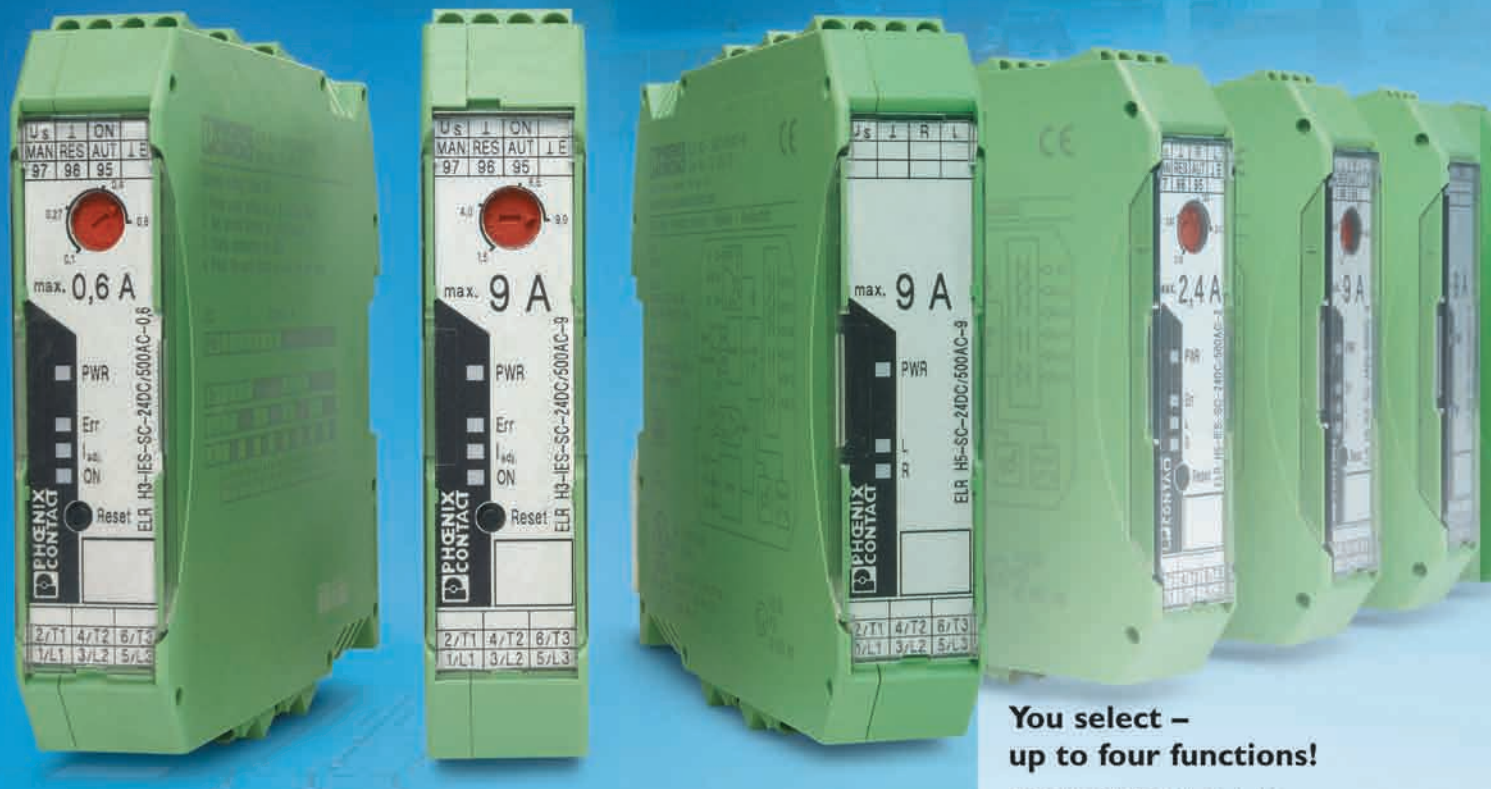
The individual combination of the functions clockwise contactor, counter-clockwise contactor, motor protection, and emergency stop provided by Contactron hybrid motor starters for motors up to 4kW (3x9 A) mean that they provide the appropriate solution for every task. With a life-span ten times that of comparable devices and low maintenance costs, the devices set themselves apart from the competition. Their integrated protective circuitry ensures reliable switching even in harsh environmental conditions. Depending on the function selected, the user receives a reliable and economical solution, especially as space requirements and the wiring requirements are reduced by up to 75%. Certifications such as Atex, GL, and UL allow hybrid motor starters to be used in almost any industrial application.

Wide and diverse product range

The Contactron product range from Phoenix Contact comprises a large number of hybrid motor starters with different functional ranges, all designed to start, reverse, monitor (for overloads), or deactivate three-phase asynchronous motors via emergency stop up to cat. 3, PL e, or SIL 3. The 22.5 mm wide devices reduce space requirements in the control cabinet by up to 75%. Their service life is up to ten times longer than that of mechanical contactors, which considerably increases plant reliability. Application of hybrid motor starters saves up to 75% of the previous wiring requirement. The Contactron devices are available in a number of varieties:

-24 VDC and 230 VAC control
-Adjustable current monitoring up to 0.6 A, 2.4 A, and 9 A
-Starting and reversing of three-phase asynchronous motors
-Safety level in accordance with SIL 3 (IEC 61508-1), PL 3 (ISO 13849-1), and cat. 3 (EN 954-1).

CONTACTRON
hybrid motor starter



Motor starter plus additional functions. Simply select:

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- ☐ 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.

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Telemonitoring with GPRS

The MD741-1 GPRS router from Siemens - “catching the wind”

There is a special need for telemonitoring in many applications today. Wireless communication via the GSM network makes it possible to realize economic benefits in the form of lower installation costs, higher data transfer rates, and a high level of data transfer security.

Siemens AG / Sara Kretschmer, Jorg Deckers

Packet-oriented transmission services such as GPRS are today no longer associated only with mobile Internet connection via radio telephone. This wireless service, based on the GSM network, plays an exceptional role particularly in the area of telecontrol. In many plants, there are no private lines or telephone connections available for process data communication. Retrospective installation would be too expensive or impossible due to prevailing geographical conditions, as in the case of older wind farms (Fig. 1) or mobile applications such as container monitoring. Wireless solutions requiring a license, such as the use of wireless telecontrol in the 448-MHz band, often fail on the basis of the distance involved, or they require increased investment in infrastructure (transmission masts, lightning protection measures, etc.) due to the topology profile, so that in most cases they do not offer an alternative either. The same applies to an even greater extent to license-free wireless solutions whose susceptibility to interference from, for example, other wireless nodes rules out their use for transmission over longer distances with increased availability requirements.

Fig. 1 Wind turbine

In all these cases, GPRS - a service that uses free GSM capacity for packet-oriented data transfer - is the suitable transmission medium for telecontrol tasks or the centralized monitoring of plants. The benefits are obvious: After all, with a market share of 85%, GSM networks cover 80% of the world’s population in 220 countries (Source: www.gsm-world.com), so investment in proprietary transmission networks is not only unnecessary, but also economically unjustifiable.

Cost benefits of GPRS

In contrast to data transmission via the CSD service (modem mode) within the GSM network, GPRS is charged by volume and is thus independent of the high charges arising from frequent connections or long transmission durations. Specific M2M (machine-to-machine) tariffs are usually selected in the case of GPRS. These enable low-cost and continuous online connection without troublesome connection buildup times. However, to avoid excessively high data volumes and the associated added costs, it is necessary to use efficient protocols and event-oriented data transmission procedures instead of cyclic data transmission procedures.

In Germany, many network providers offer a data volume of 50MB for around 10 euros per month, and this trend toward falling provider costs continues. GPRS is thus the most favorably priced 24-hour online connection.

VPN security without added cost

With a typical mobile phone Internet connection via GPRS, communication is unidirectional: Internet pages are sent to the mobile phone at the request of the mobile phone user.

Internet access to the mobile phone is blocked by the mobile phone provider's firewall. Telecontrol requires the option of unprompted access to the GPRS node from the control center, but this is not necessarily possible.
Nevertheless, in order to put forward the option of bidirectional data communication, some providers offer virtual private network (VPN) solutions. But these entail separate contracts that also include further services such as the coordination of IP addresses. And this leads to additional monthly costs that make this solution unattractive in many cases.
Use of the MD741-1 GPRS router from Siemens is a cost-effective solution. This device makes it possible to establish a permanently online VPN beyond the NAT gateway and the firewall of the mobile wireless provider, direct and easy to handle - that is, without additional provider services and using commercially available SIM cards. This allows bidirectional communication between two nodes.
Bidirectional communication is used, for example, in "condition monitoring": Not only is the control center supplied with data, but the measured values in the monitored process stations can also be recorded at shorter intervals, especially in the case of significant changes, enabling fast and selective response to those changes. Such status-oriented monitoring is important especially in those cases where plant standstills would result in greater economic damage and must therefore be avoided.

Increased data transfer rates

The data transfer rates that can be achieved with GPRS are a special benefit. While data rates of approximately 9.6kbit/s can be achieved with the CSD service within the GSM network, the theoretical rates with GPRS can go as high as 107 Kbit/s (8x13.4 kbit/s). However, the channel enable restrictions of the GSM providers mean that in most cases, data rates comparable with those of an analog modem are to be expected. Expansion of GPRS through the introduction of additional modulation procedures, known as EDGE or EGPRS, increases the data transfer rates of GPRS by a factor of four or five. Experience shows that the speed of EDGE is even higher than that of UMTS connections in insufficiently covered areas. In contrast to UMTS, EDGE is also available almost everywhere in the world. In a few countries, such as Germany, many mobile phone providers offer only the normal GPRS instead of EDGE (EGPRS) in conurbations supplied by UMTS. The MD 741-1 GPRS router from Siemens is already set up for the higher transfer rates and can handle both GPRS and EDGE (EGPRS).

Data security

Given the potential hazards of the Internet, data security naturally plays a crucial role. In particular, connections for exchanging process data in automation applications must be protected by VPN technology against manipulation from outside. Data security on the MD 741-1 GPRS router is guaranteed by the IPsec security protocol. This standardized procedure encrypts all the data traffic handled via a VPN tunnel by means of authentication procedures. This highest security level virtually rules out the danger of data manipulation.

Telecontrol at Siemens Mechanical Drives (previously A. Friedr. Flender AG)

As with many other companies, wireless telecontrol is becoming increasingly significant for the Mechanical Drives Business Unit of Siemens AG. This company is one of the leading manufacturers of components for mechanical and electrical drives. The Service International Division offers services for these components. This involves predominantly maintenance work and analysis of the problems of gear units, including gear units in wind turbines (Fig. 2). The range offered by the service provider includes mobile measuring elements, telediagnostics services for vibration-based status monitoring of the gear units, and temporary troubleshooting elements for problem analyses with mobile measuring systems.

Fig. 2 Installation in the pod of a wind turbine

The problem

Today, Internet access via telephone lines is guaranteed on larger wind farms to a great extent. However, many wind farms in the lower performance classes will not be retrofitted with "condition monitoring" until after the service contracts with the manufacturer have expired and the plant operator assumes responsibility for their maintenance. Thanks to the continuous measured data recording of the condition monitoring systems, machine failures are now becoming predictable. However, individual wind turbines or smaller wind farms often have insufficient communication connections. Telecommunications companies do not provide lines all the way up to the pod of the wind turbine, so the need for wireless data communication is especially great here.

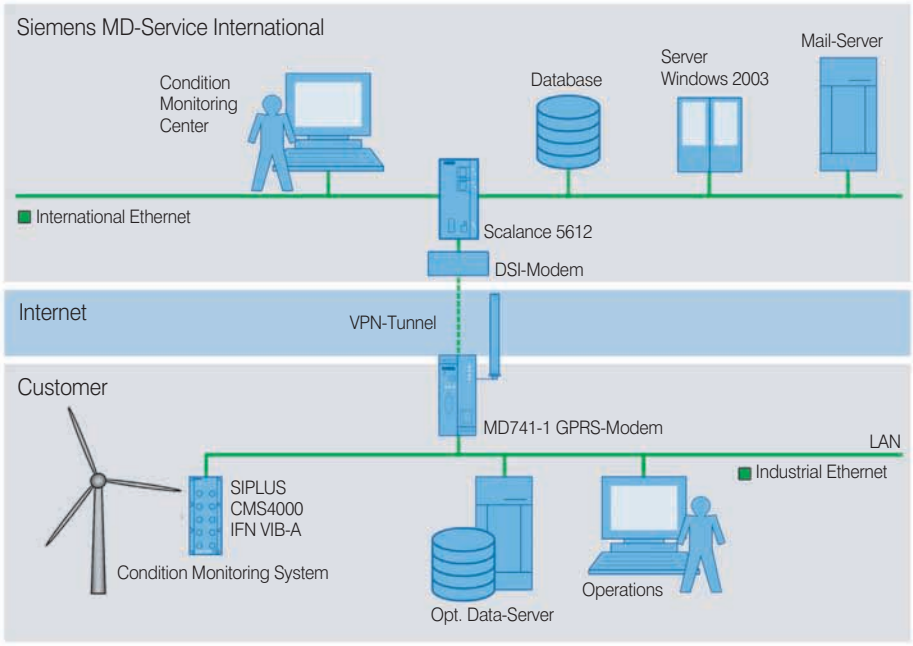

Fig. 4 Typical configuration

The solution: GPRS

With the MD 741-1 GPRS router, Service International offers a wireless Internet connection that is independent of the plant operator, together with clear cost allocation for this communication channel. Installation of the communication system and the VPN is extremely simple, so parameterization can be carried out using the Scalance S Security Appliance without the need for specialist IT personnel (www.siemens.com/simatic-net).

Continuous and low-cost, status-based maintenance by means of condition monitoring is made possible despite the poor accessibility of many sites. Thanks to the EDGE technology supported by the MD 741-1, the achievable data transfer rates are more than sufficient for the application. (Fig. 3) The high level of data security in the VPN is also decisive for Mechanical Drives. This is guaranteed on the MD 741-1 by IPsec.

Test run

The application was tested by Service International in the spring of 2008 over a period of three weeks on a wind farm near Hannover, Germany. The MD 741-1 GPRS router and the Scalance S612 Security Module were used as the main components. (Fig. 4) Thanks to the shared configuring tool, it was relatively easy to set up a VPN tunnel between the station and the control center. Online access was guaranteed over the entire period and no data losses were detected.

Fig. 3 MD741-1 EGPRS router from Siemens for remote connection via GPRS

The MD 741-1 is currently in use in a temporary condition monitoring system for a plastics extruder. In general, Service International sees potential use wherever Internet connection over the telephone line is not possible, or in troubleshooting applications. Troubleshooting applications require only the

temporary setup of a diagnostics system over a period of 4 to 12 weeks, for example, if mechanical problems are suspected in a system but permanent online monitoring is not necessary. In such cases, Service International will continue to back the GPRS application with the MD 741-1 in future.

Customer benefits

Use of the MD 741-1 makes Service International independent of the availability of telephone lines. Simple installation and the combination with Scalance S mean the application is ready for operation at extremely short notice. Data security is also provided by the IPsec security protocol already integrated into the MD741-1 EGPRS router. Since the integrated function of IPsec means users are not restricted to just a few mobile wireless providers, the flexible choice of GPRS providers and tariffs in the national and international market offers an additional economic advantage. The international approvals of the MD 741-1 are a further decisive factor in the global use of this monitoring system.

Other potential uses of the MD 741-1

Telemonitoring via GPRS is also in use, or could conceivably be used in future, in many other sectors, such as wastewater treatment plants, traffic control systems, machine tools, solar power systems, or biogas systems. In large drinking water and wastewater treatment systems, the installation of additional GPRS links is common practice as a backup in the event of the failure of data transmission lines. Telemonitoring with GPRS is also used increasingly in mobile applications such as the monitoring of containers or complex construction machinery.

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Future technology (2): The green-fuelled ship

With sea-transport facing increasingly strict environmental regulations, and with rising bunker oil prices, natural gas, and renewables are being considered as alternative energy sources. LNG, biofuel blends, or more radical energy sources like wind or nuclear, all have the potential to be exploited. Adoption of LNG fuelling by a considerable share of ships in short-sea shipping is expected over the next decade, especially in Emissions Control Areas (ECAs).

DNV

Introduction

Impending stricter environmental regulations that require that the emission levels of SOx, NOx, particulates are reduced, and probably CO_2 also, are pushing the maritime industry towards using cleaner energy sources. Increases in bunker oil prices will probably accelerate this transition.

Abatement technologies, such as exhaust gas recirculation, scrubbers, or catalytic reduction, can meet some of these regulations, but typically CO_2 emissions are increased. Alternatively, LNG, biofuel blends, or more radical energy sources, like wind or nuclear, could be exploited. The implementation of these new technologies could face significant technical and economic challenges, and the time frame ranges from a few years for LNG, to decades for nuclear.

Large-scale demonstration projects, as well as model studies, are needed to evaluate performance, and to ease implementation into the fleet.

Natural gas

A switch to natural gas could virtually eliminate emissions of SOx and particulate matter, and NOx emissions could be reduced by 90% in gas-fuelled, lean-burn, 4-stroke engines. Such engines are suitable for cruise ships, smaller cargo and service ships, and also for auxiliary power. However, for slow speed, 2-stroke engines that are typical of larger commercial ships, NOx reductions are more modest.

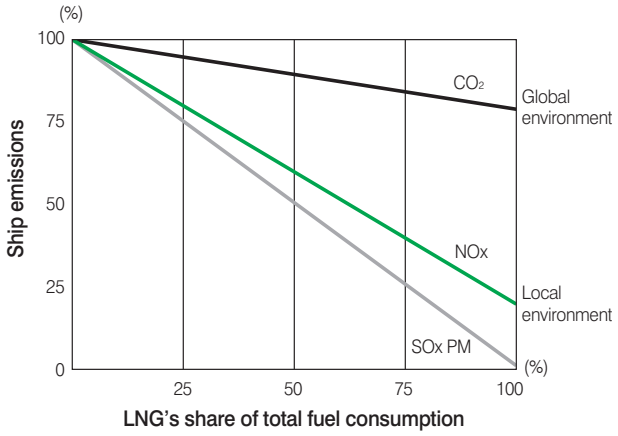
Although natural gas combustion can reduce CO_2 emissions by up to 25 % compared with bunker oil, emissions of unburned methane represent a problem. Methane is 21 times more potent greenhouse gas (GHG) than CO_2. Depending on engine type, the change in CO_2-equivalent emissions range from a reduction of 20% up to a net increase.

Engines fuelled by natural gas are widely used for power generation and transport on land. One challenge for shipping is that LNG tanks typically require 2 to 3 times more space than a diesel tank. Since natural gas must be stored either liquefied or compressed, these storage tanks are also more expensive. Based on recent experience, the new-build cost of LNG-fuelled ships is about 10-20% higher than for equivalent diesel-fuelled ships.

Although LNG bunkering infrastructure is currently very limited, a significant increase in the number of bunkering terminals is expected by 2020, especially within ECAs. Strict regulations on NOx and SOx emissions, combined with a more competitive gas price, will drive the uptake of gas as a marine fuel. It is anticipated that within 10 years a considerable share of new ships will have natural gas fuelling, particularly in short-sea shipping. It might also be expected that, in the coming years, some ships are retrofitted to run on LNG.

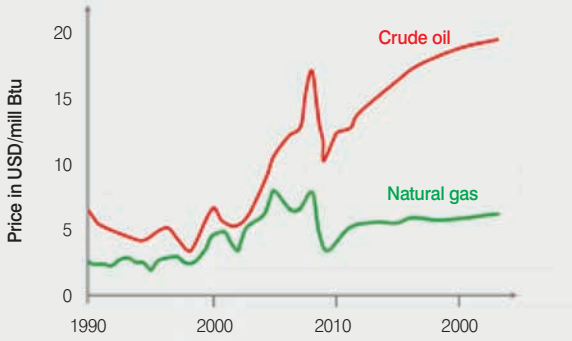
SkySails installation on a cargo ship.

Fig. 1 Ship emissions



Indicative emission reduction potential from the use of natural gas in the fleet (Baltic). (Source: IEA)

Fig. 2 Fuel prices



Projected natural gas and crude oil prices in USD (2008) per million Btu. (Source: EIA)

Kites

Kites are smaller installations and provide a thrust force directly from the wind. The system consists of the kite, control lines with a control node, a Hawser connection to the forecastle, a winch, and the bridge control system.

Commercial kites currently range from 160 to more than 300m^2 and can substitute a propulsion power of up to 2,000kW depending on the wind conditions and ship's speed. They fly at between 100 and 420m high, at wind speeds of 3 to 8 Beaufort scale. The automatic control system actively steers and stabilizes the kite, optimising its performance. The relative ease of kite installation for wind propulsion may result in ship retrofits within the next 10 years.

Kite operation entails few additional tasks for the crew. Conflicts with cargo handling equipment could arise.

Biofuel

Biofuel is a renewable energy source with the potential of considerable decrease in lifecycle CO_2 emissions. In operation, SOx and particulate matter emissions are also reduced, while NOx emissions slightly increase. In principle, existing diesel engines can run on biofuel blends.

The most promising biofuels for ships are biodiesel and crude plant oil. Biodiesel is most suitable for replacing marine distillate, and plant oil is suitable for replacing residual fuels. There are, however, various unresolved problems. These include fuel instability, corrosion, susceptibility to microbial growth, adverse effects on piping and instrumentation, and poor cold flow properties. Although these technical challenges could be resolved by 2020, widespread use of biofuel in shipping will depend on price, other incentives, and availability in sufficient volumes. Breakthroughs in production methods and new regulations could have a significant impact.

Nuclear

Nuclear power plants have no GHG emissions during operation and are especially well suited for ships with slowly varying power demands. Although several hundred nuclear-powered navy vessels exist, few nuclear-powered merchant ships have been built. Commercial nuclear ships would have to run on low enriched uranium. Land-based prototypes offer a compact reactor (comparable to large marine diesel engines), with power output in the range of 25mW. Fuel lifetime of around 10+ years at a price of USD 2mil/mW is indicated.

The extensive requirements for testing and qualifying this technology suggest that it will not be commercially available for civilian shipping by 2020. Government involvement could however accelerate the uptake process.

The main barriers to nuclear shipping relate to uncontrolled proliferation of nuclear material, decommissioning and storage of radioactive waste, the significant investment costs and societal acceptance.

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Emerson's Micro Motion Coriolis used for the world's first bunker fuel delivery service

Emerson's Micro Motion Coriolis technology used by VT Group provides the world's first certified bunker fuel delivery service. MTS Vlaardingen uses the this technology for custody transfer.

Emerson Process Management Co.

VT Group has successfully installed Emerson's Micro Motion Certified Marine Bunker Measurement Solution on the bunker fuel barge MTS Vlaardingen.

The maritime company VT Group (Verenigde Tankrederij) has successfully installed Emerson's Micro Motion Certified Marine Bunker Measurement Solution on the bunker fuel barge MTS Vlaardingen.

The solution provides the crew and the company's head office with real-time, accurate tracking of the heavy fuel oil (HFO) bunker deliveries, removing the need for manual soundings or calculations and enabling them to prove the quality and consistency of deliveries to VT's customers. An accurate HFO bunker transfer minimizes discrepancies and provides better transparency for HFO bunker transactions.

The implementation of the Certified Bunker Measurement Solution in December 2010 on MTS Vlaardingen is a natural extension of VT's in-house developed software system, which is based on tank radar measurement, corrected for trim and list. The VT radar system eliminates manual processes and already gives industry-leading, high accuracy results.

Emerson's Micro Motion Coriolis mass flowmeter technology brings an extra level of certified accuracy, ensuring that the deliveries made and paid for by the end user are proven.

"Certified Coriolis flowmeters support the existing VT business model of accurate quantity measurements," said Yuri Ouweneel of VT Group. "These flowmeters allow us to differentiate ourselves as a top-tier bunker service company, further improving our reputation while illustrating this value clearly to our customers."

The Certified Marine Bunker Measurement Solution includes a Micro Motion ELITE Coriolis meter, Series 3000 transmitter with Marine Bunker Transfer Package, and bunker delivery ticket printer. The system is capable of handling the density and viscosity inconsistencies inherent in HFO and was certified by Nederlands Meetinstituut (NMi), the notified body for testing to the guidelines of the European Instruments Directive (MID) and Issuing Authority for OIML (International Organization for Legal Metrology). The solution meets the OIML standard R117-1 and the MID standard 2004/22/EC Annex MI-005.

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LS Cable & System became the nation's first to win a contract for submarine cable project in the U.S.

LS Cable & System won a turn-key contract for a submarine cable project in the U.S. as the first in the cable industry of Korea. LS Cable & System announced on June 28 that the company had won a contract for a 35kV level submarine cable project from National Grid (a power grid operator in the eastern part of the U.S.).

This project aims at successful power supply to Long Island and Captree Island in the eastern part of New York. According to LS Cable & System, the significance of this contract is that it is a turn-key contract covering from cable delivery to installation and completion test. The installation is scheduled for completion by the end of 2011.

Since having developed submarine cable as the first in Korea, LS Cable & System has been briskly performing activities to win contracts. Following a contract for submarine cable installation between Jeju-do and Jindo in 2009, LS Cable & System successively won contracts for a submarine cable network project between Hwawon and Anjwa, a wind power plant pilot complex in Woljeong-ri, Jeju-do and a submarine cable project for tidal power generation complex covering from Jangjuk to Sudo of Jeollanam-do in 2010.

In addition, LS Cable & System won a contract for a 20kV submarine cable installation project for 10km from Tidore Island to Ternate Island to the north of Indonesia in 2010 and a contract for a 33kV submarine cable delivery and power grid project in the island areas of Sarawak, Malaysia in 2011. As such, LS Cable & System has been successively winning contracts for major domestic and international submarine cable projects.

Executive Director Jae-In Yoon of LS Cable & System's Power Business Division said, "This contract is a proof that LS Cable & System is advancing as a new power player in the global submarine cable market." He added, "We will strengthen marketing activities further as we forecast a continued increase of new demands in the global market from international power grid connection projects and offshore wind power complexes."

DSME inked a contract for 10 units of 18,000TEU containerships

Daewoo Shipbuilding & Marine Engineering (DSME) won a firm order for additional 18,000TEU ultra-large containership, the world's first and largest, writing a new chapter in the history of global shipbuilding industry.

Nam Sang-tae, CEO & President of DSME, signed a contract on June 27 with Eivind Kolding, President of AP Møller-Maersk, the world's largest containership operator, to build additional 10 units of 18,000TEU ultra-large containerships.

The contract is valued at approximately KRW 2 trillion. All these vessels will be built at the Okpo shipyard of DSME in Geoje, South Gyeongsang Province and delivered to the ship owner by 2015. DSME clinched orders for 10 vessels of the same class from the same ship owner in February for the first time worldwide. These 10 vessels have turned into firm orders out of the 20 optional vessels contracted between both companies in February.

Nam Sang-tae (left), CEO & President of DSME, are shaking hands with Eivind Kolding (right), President of AP Møller-Maersk, after signing a contract to build 18,000TEU ultra-large containerships on June 27.

Including the order placed in February and another one awarded this time, DSME has won orders worth approximately 4 trillion so far this year.

Major factors in the award of this contract were DSME's strong sales capabilities, differentiated technology, solid trust with the ship owner, and the active support of Export Import Bank of Korea (EXIM Bank).

The 18,000TEU container ships, the world's largest and first, measure 400m in length, 59m in width, and the deck takes up an area 4 times larger than a soccer field. These vessels will each carry up to 18,000 shipping containers which are 6m long and 2.5m high.

Thus, these vessels has higher container carrying capacity without increasing fuel consumption compared to existing containerships. Also, these vessels are based on economy of scale, significantly reducing transportation cost per container.

Additionally, these vessels has an optimized shape to reduce water friction beneath the surface and increase the load factor to ensure efficient loading of many containers. Incorporating the energy-saving technologies such as the Waste Heat Recovery System, these vessels have high fuel efficiency.

Meanwhile, DSME inked an order for 2 units of 9,200TEU containerships, priced at KRW 110 billion per unit, from Singapore's Neptune Orient Lines (NOL) on May 24. Besides, both companies formulated their agreement on the size alteration for 10 units of 8,400TEU commissioned last year.

Nam Sang-tae, CEO & President of DSME, said, "This additional order is meaningful very much in that we have carved out significant share of the market for ultra-large containerships with the capacity of 18,000TEU or higher."

DSME received an order for 2 LNG carriers

Daewoo Shipbuilding & Marine Engineering (DSME) was awarded a contract from the Greece-based Angelicoussis Group to build 2 units of 159,800m^3 LNG carriers on June 29.

On the same day, Nam Sang-tae, CEO & President of DSME, signed a contract in Greece with John Angelicoussis, Chairman of Angelicoussis Group, to construct 2 LNG carriers.

The contract is worth slightly above approximately KRW 400 million. These vessels will be built at Okpo shipyard of DSME in Geoje and delivered to the ship owner by the first half of 2014. The contract includes 2 additional options on top of the 2 firm orders.

These LNG carriers can transport up to 160,000m^3 of liquefied natural gas (LNG). The dual fuel diesel electric (DFDE) propulsion system fitted to these vessels enhances energy efficiency and ensures cost-effective operations.

Angelicoussis Group, the largest shipping company of Greece, currently owns around 100 ships.

The solid relationship between Angelicoussis Group and DSME dates back to 1994 when both companies signed the first newbuilding contract. Since then, Angelicoussis Group has placed over 50 ships with DSME to date.

Maran Gas Maritime Inc., the LNG shipping unit of the Angelicoussis Group which will operate these vessels after delivery, plans to use this contract as a springboard to expand its LNG fleet in an attempt to fully leverage the vibrant LNG carrier construction market.

Nam Sang-tae, CEO & President of DSME, stressed, "Angelicoussis Group has placed orders with DSME almost every year and has become a solid partner of DSME." He remarked, "We will cement our undisputed No. 1 status in the LNG carrier construction sector based on our close relationship with ship owners."

This order brings the total orders placed with DSME to 30 vessels worth USD 7.13 billion in the first half of this year. DSME is making smooth progress toward its target of USD 1.1 billion for 2011.

Nam Sang-tae (right), CEO & President of DSME, and John Angelicoussis (left), Chairman of Angelicoussis Group, are offering each other a toast after signing a contract to build LNG carriers in Greece on June 29.

HSHI clinched an order for 10 ultra-large containerships

Hyundai Samho Heavy Industries (HSHI) obtained a KRW 1trillion 400 billion order from Neptune Orient Lines (NOL), a Singapore's state-run shipping company, for the construction of 10 units of 13,900TEU containerships.

HSHI announced that the contract was formalized during a signing ceremony held in Mokpo Hyundai Hotel on June 24, which was attended by Oh Byung-wook, President & CEO of HSHI, etc.

These containerships measure 368m in length, 51m in width, 30m in height - about 4 times larger than a soccer field - and are ultra-large containerships capable of carrying 13,900 20ft containers.

HSHI plans to deliver these newbuilds over the period of 1 year from June 2013 to the ship owner on a staggered basis.

HSHI has accumulated extensive experience and technology while building a total of 114 ships so far in the containership sector. HSHI's order backlog of containership currently stands at 61 units which exceeds half of its total order backlog of 109 units.

HSHI has consecutively won orders for 5 units of 13,100TEU ultra-large containerships since January 2001, and has successfully delivered them upon completion.

An official of HSHI said, "Ship owners are showing favorable reaction to our state-of-art specifications that enhance fuel efficiency and reduce environmental impact, such as the optimized shape of ship, electronically controlled engine, etc, in line with the recent trend in the shipbuilding and maritime market. We will keep striving to attain competitive advantage and win new orders for containerships in the period ahead."

This order brings the HSHI's total orders to 30 ships worth USD 3.2 billion, achieving over 90% of its annual target of 32 ships and USD 3.5 billion.

HSHI's set a target of building 56 ships this year and achieving KRW 4 trillion 650 billion in sales.

A 13,100TEU ultra-large containership delivered by HSHI to the U.K.-based Zodiac in 2011

STX OSV won orders for 2 Multifunctional Deep Water Anchor Handling/Offshore Service Vessels

STX OSV (Offshore & Specialized Vessels), a subsidiary of STX Europe, announced that it received order worth approximately KRW 240 billion from Farstard Shipping for the construction of 2 Multifunctional Deep Water Anchor Handling/Offshore Service Vessels on June 22 (local time).

The Multifunctional Deep Water Anchor Handling/Offshore Service Vessels, which were ordered to STX OSV this time, measure 87.4m in length and 21m in width. The hull of these vessels will be built at Tulcea shipyard of STX OSV in Romania, and outfitted at Langsten shipyard of STX OSV in Norway. These newbuilds are scheduled for delivery starting from the second half of 2013.

These vessels will adopt 'UT 731 CD' model developed by Rolls Royce.

Farstard Shipping, headquartered in Norway, is a major international shipping company specializing in the offshore service vessels and currently owns a total of 57 ships. STX OSV secured an order for 2 offshore service vessels from Farstard Shipping in May.

Image of offshore service vessel to be built by STX OSV

HHIC secured orders for containerships, etc, in 3 years

Youngdo shipyard of Hanjin Heavy Industries & Construction (HHIC) successfully won an order, breaking a 9-year order drought.

HHIC announced that it received an order for 2 Landing Craft Utilities (LCUs) from Defense Acquisition Program Administration (DAPA) on July 6 and entered into a Letter of Intent (LOI) with an Asian ship owner for the construction of 4 units of 4,700TEU containerships worth approximately USD 250 million.

As a result, HHIC will secure new works in both fields of merchant ships and specialized ships, breaking the order impasse that has persisted for nearly 3 years since 2008. Furthermore, this order came after dramatic compromise was reached between the labor union and management on June 27, putting an end to 6-month-long strike, and laid the groundwork for the normalization of Youngdo shipyard.

The ship owner remarked, "HHIC's excellent technology and the quickest delivery led us to award this contract upon confirmation that the labor dispute was settled amicably between the union and management, although we were previously reluctant to place an order because of high shipbuilding costs and labor unrest at HHIC."

Moreover, HHIC commented, "We have been actively leveraging our global sales network in our vigorous attempt to win orders, and anticipate additional orders."

Industry experts are painting an upbeat picture of HHIC's performance underpinned by strong order intake in the period ahead, considering the settlement of strike, full-scale efforts of HHIC to normalize operations at Youngdo shipyard, quicker delivery compared to other companies, and its unmatched technology in the small and medium-sized containerships and specialized vessels.

Besides, HHIC added that they were considering a revenue-making business from a multifaceted perspective, which might help minimize the idle period of Youngdo shipyard.

Meanwhile, these containerships to be built by HHIC this time will measure 251m in length, 37m in width, and 20m in height, can sail at a maximum speed of 20 knots, and are eco-design latest ship models. The Landing Craft Utilities (LCUs) will be used for the support of naval operations and logistic supply.

A ship which is same model as 4,700TEU containership ordered to HHIC

Rolls-Royce secured offshore orders worth over EUR 100 million

Recently, Rolls-Royce announced orders worth over EUR 100 million to supply propulsion systems for offshore construction and drilling vessels.

The ships will be built at shipyards in Asia for a range of ship owners including Sea Drill, Pacific Drilling, Noble, Ocean Rig and Pride.

Anders Almestad, Rolls-Royce, President - Offshore said, "These orders demonstrate the success of our innovative and highly efficient marine technology. Our in-depth understanding of the demanding offshore industry and our proven technology ensures that our integrated propulsion systems are industry leading and meet the extraordinary demands placed on them."

These vessels will carry out drilling operations in deep water oil and gas fields. Each ship will feature multiple thrusters, which will be used to propel the vessels to and from drill sites and to maintain their position during drilling operations.

Rolls-Royce is a leader in the provision of integrated power and propulsion systems for vessels operating in offshore exploration and production. These include drilling ships, mobile rigs, construction vessels and shuttle tankers.

The orders announced also include options to supply additional thrusters.

SHI consecutively clinched USD 3.1 billion orders for drillships, etc

Samsung Heavy Industries (SHI) announced that it was awarded a contract worth USD 1 billion and 122.5 million (KRW 1 trillion and 194 billion) from the Denmark-based Maersk Drilling on July 6 for the construction of 2 drillships.

In addition, SHI received orders for 6 LNG carriers and 5 shuttle tankers from ship owners in Europe, Americas, etc. Thus far, SHI has won orders worth USD 3.1 billion in all, including the aforesaid 2 drillship orders.

SHI's order intake so far this year is valued at USD 14.2 billion which exceeds its annual target of USD 11.5 billion and represents an about 50% year-on-year increase from USD 9.7 billion recorded last year.

The key factor for this strong performance is the USD 3 billion firm order for the world's first and largest LNG-FPSO from Royal Dutch Shell late May. Additional order is expected as Royal Dutch Shell recently announced its gas field exploitation plan in Timor, following the announcement of the order for 1 LNG-FPSO - which will be deployed at the Prelude gas field off Australia's north west coast - to SHI Consortium.

Noticeably, SHI has won a growing number of orders for drillships and LNG carriers, the sectors in which SHI traditionally hold competitive advantage.

Including these 2 drillship orders above, SHI has secured a total of 10 drillship orders this year. SHI has clinched orders for a total of 42 drillships out of the 75 ordered worldwide since 2000, capturing the lion's share of the global market for drillships with 56% share.

Furthermore, SHI has won 14 LNG carriers, half of 29 LNG carriers ordered worldwide this year, proving its dominance in the global LNG carrier market.

According to Clarkson and the industry experts, a total of 177 LNG carriers are expected to be ordered by 2015 and a steady growth is expected in the market for floating offshore facilities such as FSRU, LNG-FPSO, etc, which have emerged as blue ocean.

Roh In-sik, CEO & President of SHI, said, "The proportion of offshore facilities in SHI's orderbook is over 50% higher than in the last 5 years. We exceeded this year's target as a result of our accurate forecast of demand for offshore facilities and ceaseless R&D."

HSHI signed a USD 200.4 billion contract for LNG carriers

Hyunda Samho Heavy Industries (HSHI) successfully won a contract worth a total of USD 400 million from the Greece-based Maran Gas for the construction of 2 LNG carriers.

These 164,000m^3 LNG carriers will measure 289m in length, 45.6m in width, 26m in depth, and will be delivered to the ship owner in December 2013 and in April 2014, respectively. Particularly, this contract includes an option for 2 more vessels, raising the prospect for additional orders.

These LNG carriers to be built by HSHI are membrane types that have the cargo tank inside, and will adopt Dual Fuel Diesel Electric (DFDE) system that can operate on both marine heavy fuel oil and natural gas, depending on the need.

HSHI was awarded this LNG carrier contract in 6 years since 2005, and this contract signals that the NLG carrier market has finally begun to rebound from the doldrums that persisted over the last years.

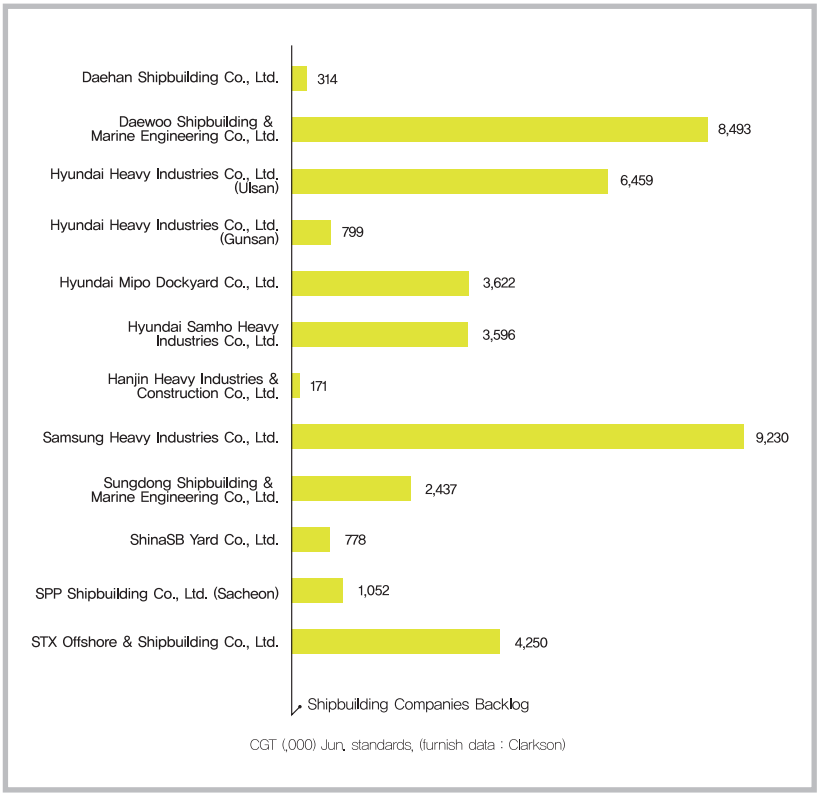
HSHI has built a total of 3 LNG carriers so far since it received the first order for LNG carrier in 2004, and has delivered 1 LNG carrier a year to ship owners since 2008.

Clarkson, the U.K.-based shipbuilding and shipping market researcher, forecast that a total of 177 LNG carriers would be ordered between 2011 and 2015, and Arctic Securities, an investment bank of Norway, forecast that the import of LNG carriers worldwide would increase by 30% annually to 286 million tons by 2015.

Test-run of 'Ben Badis', an 177,000m^3 LNG carrier, delivered by HSHI to Japan's MOL in November 2010

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: Hyundai Heavy Industries 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	1 vessel	KRW 265 billion	Dockwise, Netherlands
	FPSO for the North Sea	-	USD 1.2 billion	BP (British Petroleum), U.K
	Platform Supply Vessel	1 vessel	-	-
	Fisheries Research Vessel	1 vessel	EUR 35 million	Ministry of Fisheries and Marine Resources, Republic of Namibia
March	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
	Platform Supply Vessel	1 vessel	-	-
April	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
	Shuttle Tanker	2 (including 2 optional vessels)	USD 200 million	European Navigation, Greece
May	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
	LNG-FPSO	1 unit	USD 3.026 billion	Royal Dutch Shell, U.S.A
June	Platform Supply Vessel	2 vessels	Around KRW 150 billion	Island Offshore, Norway
	LNG-FSRU	2 units (including 2 optional vessels)	USD 500 million	Höegh LNG, Norway
	Multifunctional Deep Water Anchor Handling, Offshore Service Vessels	2 vessels	KRW 240 billion	Farstad Shipping, Norway
	Drillship	1 vessel	USD 680 million	Ocean Rig, Greece
July	Drillship	2 vessels	USD 1.1225 billion	Maersk, Denmark

**Note : 1. Based on the press release and public announcements of each shipyards, internal estimation of Monthly KORSHIP (estimation until July 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

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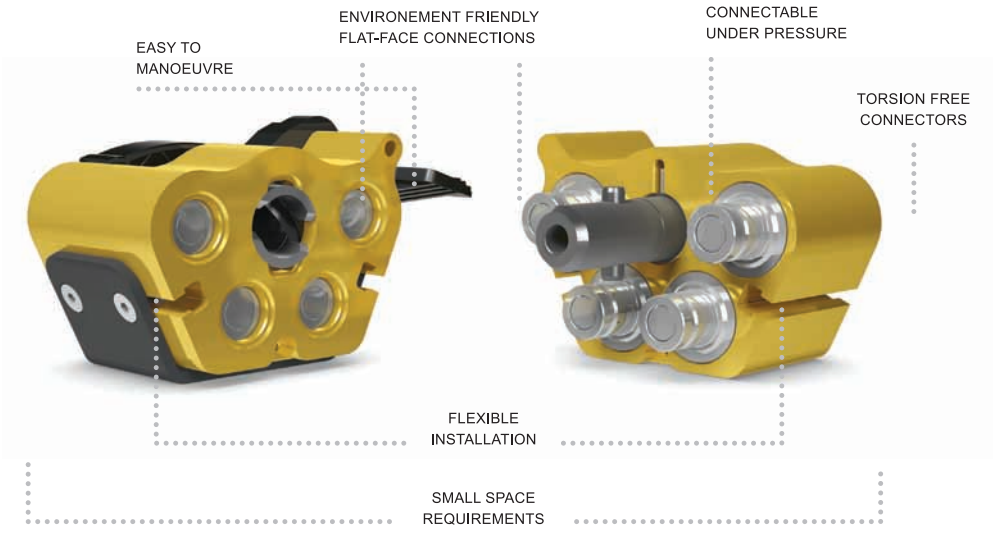

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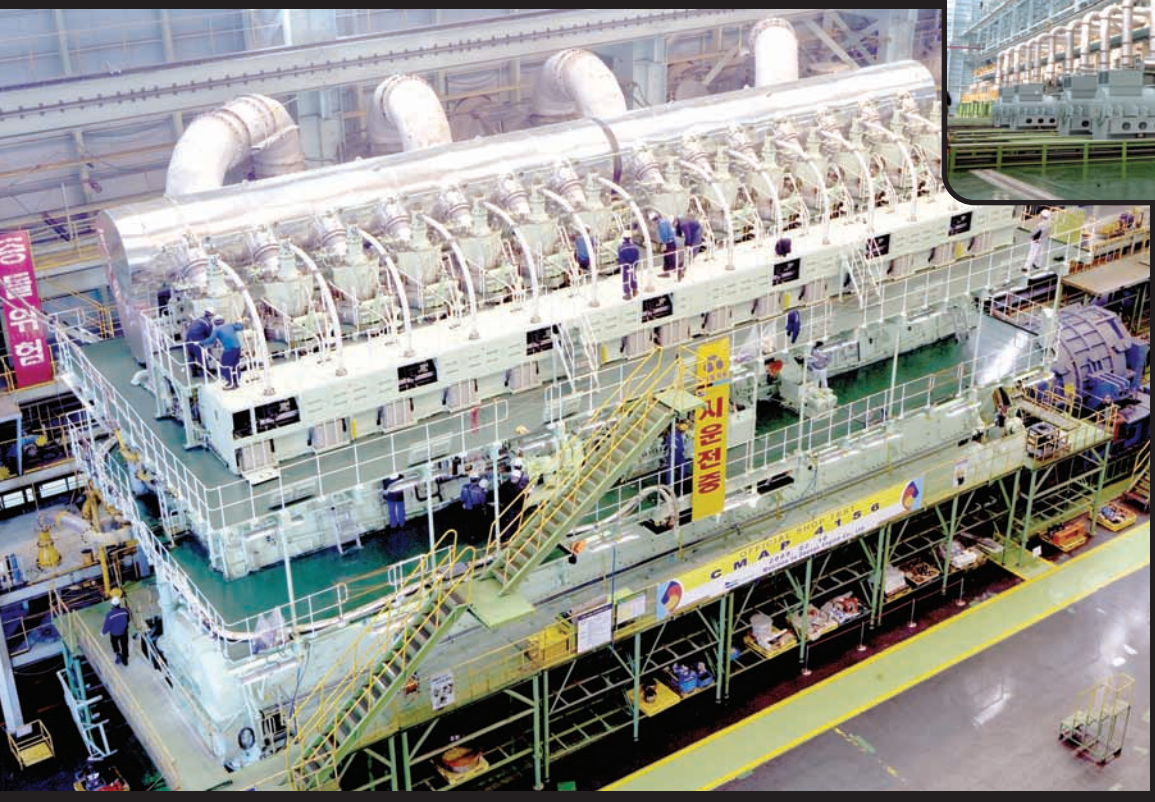
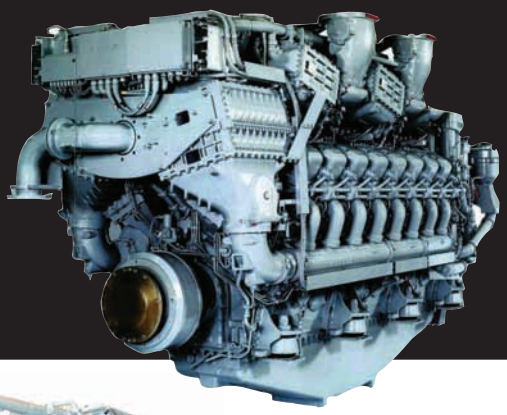
The first commercial internal combustion engine was the steam engine. These days, diesel engine which is a type of internal combustion engine and provides excellent propulsive force is widely used in ship. Currently, marine engines are manufactured by MAN Diesel, Wartsilia-SULZER, Mitsubishi, Catapillar, etc, including domestic manufacturers such as Hyundai Heavy Industries (HHI), Doosan Engine, STX Engine, etc.

- Doosan Engine

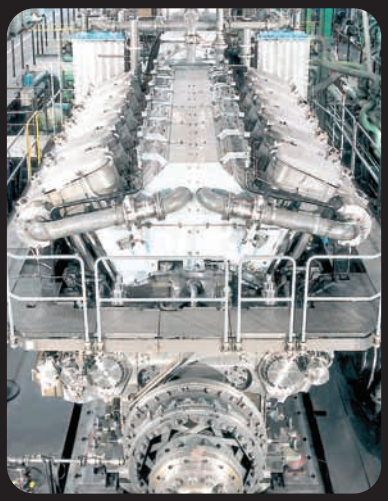


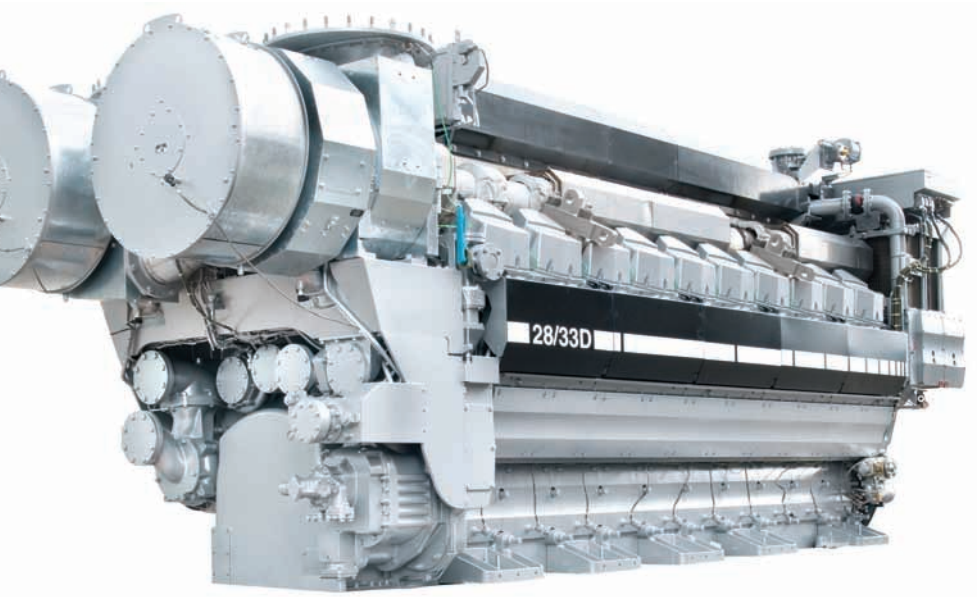
• Hyundai Heavy Industries (HHI)

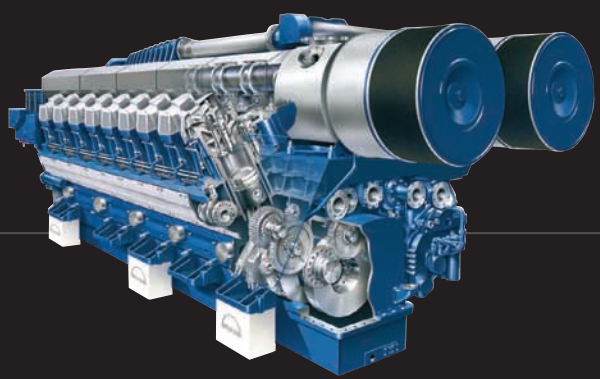
• STX Engine / STX Heavy Industries



- MAN Diesel & Turbo SE







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New Product

PXI frame grabber

National Instruments Korea

NI PXIe-1435

Recently National Instruments (NI) announced the NI PXIe-1435 high-performance Camera Link frame grabber. Engineers can use the new module to integrate high-speed and high-resolution imaging into their PXI systems, the industry standard for automated test with more than 1,500 measurement modules available from more than 70 vendors. By combining high-throughput imaging with the benefits of off-the-shelf PXI measurement hardware, NI now offers full software-defined solutions for demanding automated test applications in industries such as consumer electronics, automotive and semiconductor.

The NI PXIe-1435 is the industry's highest throughput PXI frame grabber and acquires from all Camera Link camera configurations, including 10-tap extended-full, with up to 850 MB/s of throughput. Engineers can power cameras through Power over Camera Link (PoCL)-enabled cables, eliminating the need for additional wires in deployment environments. The frame grabber also offers 512 MB of DDR2 onboard acquisition memory for added reliability in transferring large images without fear of data overflow. Onboard digital I/O includes four bidirectional transistor-transistor logic (TTL), two opto-isolated inputs and one quadrature encoder for triggering and communicating inspection results with automation devices.

The frame grabber incorporates the synchronization, timing, data streaming and processing capabilities of the PXI Express specification, and supports image processing on complementary field-programmable gate array (FPGA) boards to further boost system performance.

"The NI PXIe-1435 frame grabber further complements our capabilities in the PXI platform," said Matt Friedman, NI senior product manager for the PXI platform and PXISA board member. "The addition of high-performance imaging to our PXI offerings enhances our mixed-signal capabilities for

high-end test systems."

The high throughput and low latency of the Camera Link standard make the frame grabber ideal for line-scan image sensors, which engineers can use for surface inspection of large areas, including finding esthetic and functional defects in solar panels and dead pixels in flat panel displays. The NI PXIe-1435 frame grabber also works well in many industrial applications, such as fault analysis using a stop trigger to record images before and after an event on the factory floor, and medical device applications such as analyzing intricacies in movement and recording stimulus response in objects from heart valves to eye corneas.

Engineers can program the new module using NI LabVIEW graphical development software and the NI Vision Development Module, a comprehensive library of imaging functions. They also can configure it using NI Vision Builder for Automated Inspection software, an easy-to-use, stand-alone package for fast development and simple maintenance. NI vision software helps engineers take advantage of hundreds of imaging processing algorithms, make decisions based on multiple inspection results, customize user interfaces and communicate results using I/O and industrial communication protocols.

Readers can visit to learn more about the new module and NI vision products.

NI is transforming the way engineers and scientists design, prototype and deploy systems for measurement, automation and embedded applications. NI empowers customers with off-the-shelf software such as NI LabVIEW and modular cost-effective hardware, and sells to a broad base of more than 30,000 different companies worldwide, with its largest customer representing approximately 4 percent of revenue in 2010 and no one industry representing more than 15 percent of revenue. Headquartered in Austin, Texas, NI has approximately 5,500 employees and direct operations in more than 40 countries. For the past 12 years, FORTUNE magazine has named NI one of the 100 best companies to work for in America.

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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.dmcrane.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.daeyang.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 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 : Saha-Gu, Busan
homepage add : www.gshydro.co.kr
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.hiairkorea.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 Romote 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 (NH_3 , R22, NHO_3 , CO_2), 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.hanjoms.co.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.haean21.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.kr
main products : Hyundai-Atias 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 : Ordinery 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.jscable.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. & $n_2$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 vlaves, 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 unt, reciprocating compressor unit condensing unit, brine chiling unit
TEL : +82 55-294-8678

MYCOM KOREA CO., LTD.
head office :
homepage add : www.mycomkorea.com
main products : screw compressor unt, reciprocating compressor unit, condensing unit, brine chiling 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 & overfill 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 : sungsin.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-ind.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, lng/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

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head office :
homepage add : www.stxenpaco.co.kr
main products : turbocharger, diesel engine parts, marine equip.
TEL : +82 55-282-1131

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head office : Eum-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

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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 Accessaries, Floodlight, Deck Light, Reflected Lamps
TEL : +82 2-2272-1960

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homepage add : www.tanktech.co.kr
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TEL : +82 51-979-1600

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homepage add : www.techmarine.net
main products : Loading Computer System
TEL : +82 51-467-7003

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head office : Gangseo Busan
homepage add : www.tsdream.co.kr
main products : cable tray, heating coil, strainer
TEL : +82 51-974-7900

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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

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head office :
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main products : steel door, ventilator, mooring fitting, h/c fitting, hand rail
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homepage add : www.whayoung.co.kr
main products : Supply Unit Assy, Collector Block Assy, Fuel & Exh. Movement, Fuel Pump Assy
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WILSON WALTON CORRPRO KOREA
head office :
homepage add : www.wwckorea.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

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homepage add : www.youjeon steel.co.kr
main products : Marine Engine Parts-Engine Bed
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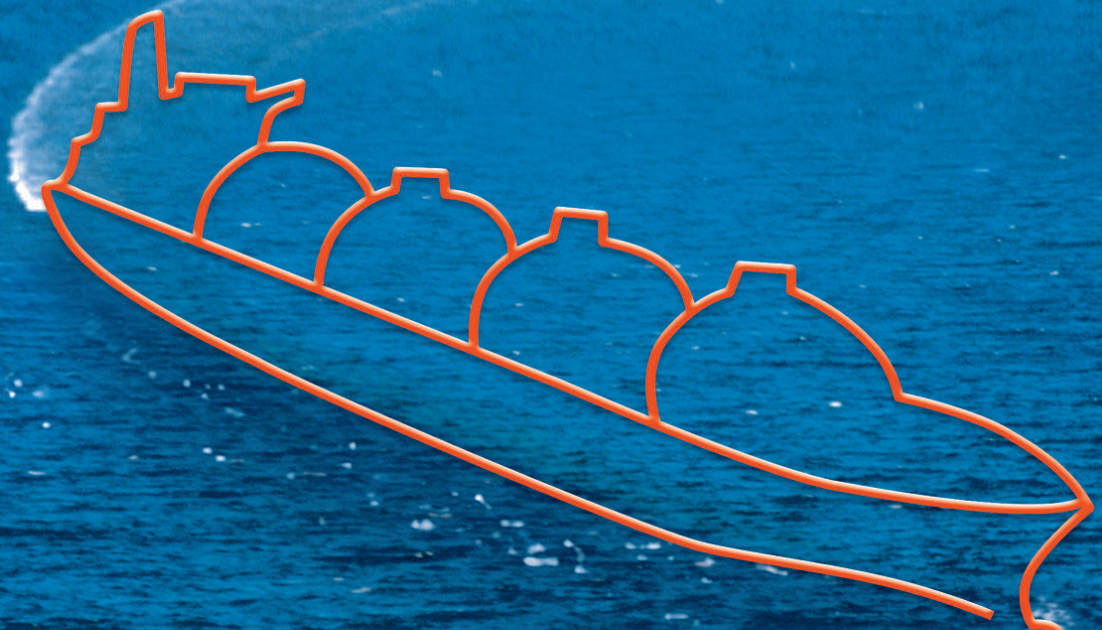

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